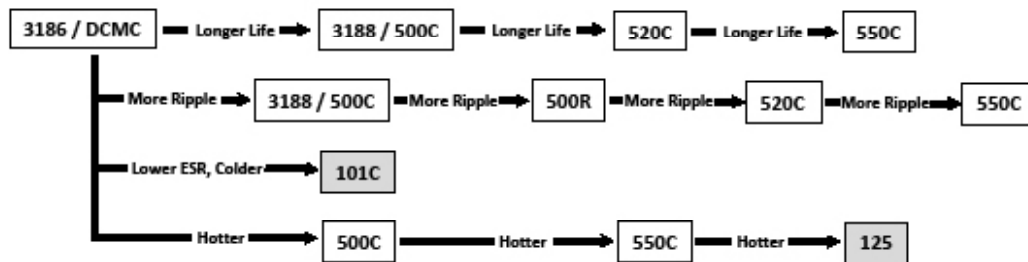


Aluminum Electrolytic Capacitors

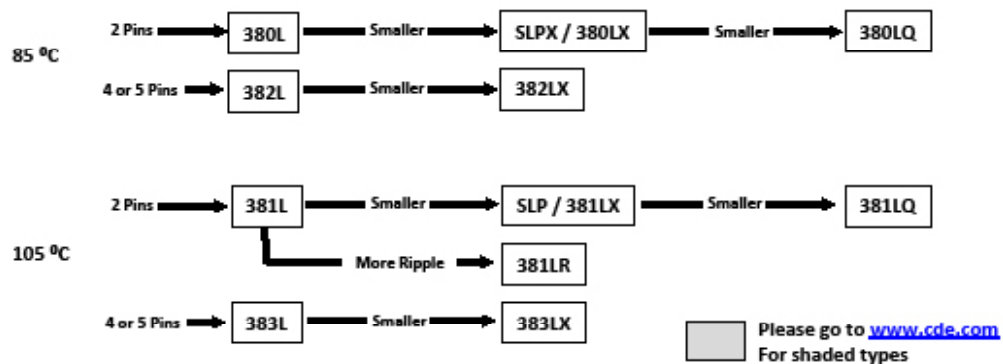


Aluminum Electrolytic Capacitor Selector Chart

Large Screw Terminal Capacitors



Snap-in Capacitors

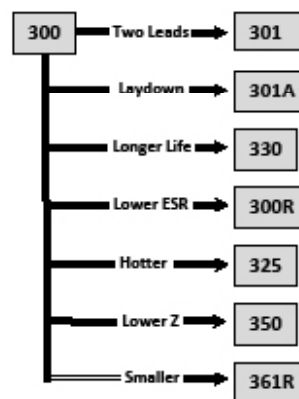


Radial Leaded Capacitors

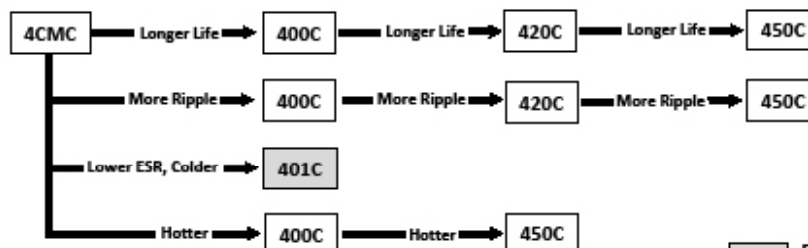
Flatpack Capacitors



Switching Power Output Capacitors



Plug-in Type Capacitors



Please go to www.cde.com For shaded types

Aluminum Electrolytic Selector Guide

Type	Max Cap (μF)	Volts (Vdc)	Max Temp (°C)	Load Life (h)	Case Size (Inches)	Case Size (mm)	Application	Hi Value	Best Bus Caps	Highlights	Page
Snap-In Types 											
SLPX	82,000	10 to 450	85 °C	3000	0.87x0.98 to 1.38x1.97	22x25 to 35x50	DC Filtering, Power Supply General Purpose	•		High Value Package	26
380LX/382LX	100,000	16 to 500	85 °C	3000	0.87x0.98 to 1.98x4.14	22x25 to 50x105	DC Filtering, Power Supply General Purpose			Widest Selection, 45 case sizes	34
380LQ	3,900	160 to 450	85 °C	2000	0.87x0.98 to 1.38x1.97	22x25 to 35x50	DC Filtering, Power Supply General Purpose			Compact, 27% Smaller than 380LX	41
SLP	56,000	10 to 450	105 °C	3000	0.87x0.98 to 1.38x1.97	22x25 to 35x50	DC Filtering, Power Supply Inverter	•		High Value with High Ripple, Long Life	47
381LX/383LX	120,000	10 to 450	105 °C	3000	0.87x0.98 to 1.98x4.14	22x25 to 50x105	DC Filtering, Power Supply Inverter		•	4 x Life of 380L/LX	55
381LQ	46,000	160 to 450	105 °C	2000	0.87x0.98 to 1.38x1.97	22x25 to 35x50	DC Filtering, Power Supply Inverter		•	24% Smaller than 381LX	61
381LR	2,200	200 to 450	105 °C	3000	0.87x0.98 to 1.38x1.97	22x25 to 35x50	DC Filtering, Power Supply Inverter Power Supply		•	25% Higher Ripple than 382L/LX	67
Large Radial Leaded Board-Mount Types 											
4CMC	560,000	16 to 500	85 °C	2000	1.375x1.75 to 2x5.75	35x44 to 51x146	UPS, Power Supply input/output			High Capacitance 3 Leads	71
400C	530,000	100 to 500	95 °C	3000	1.375x1.75 to 2x5.75	35x44 to 51x146	UPS, Power Supply Long Life			Highest Capacitance 3 Leads	76
420C	27,000	100 to 500	85 °C	4000	1.375x1.75 to 2x5.75	35x44 to 51x146	Inverters, High Ripple, Long Life			High Ripple 3 Leads	81
450C	24,000	100 to 500	105 °C	5000	1.375x1.75 to 2x5.75	35x44 to 51x146	Inverters			High Ripple Long Life	86
Flatpack Types 											
MLP	47,000	6.3 to 450	85 °C	2000	1.5x1.75x0.5 to 3x1.75x.5	38x44x13 to 51x44x13	Voltage Holdup, Filtering, Military			50 year life, Flatpack, Heatsinkable	92
MLS	47,000	5.0 to 250	125 °C	2000	1.5x1.75x0.5 to 3x1.75x.5	38x44x13 to 51x44x13	Voltage Holdup, Filtering, Military			100 year Life, Flatpack, Heatsinkable	97
Screw Terminal Types 											
3186	1,000,000	16 to 500	85 °C	2000	1.375x2.125 to 3.00x8.625	35x54 to 76x220	Shock Resistant Military or Transportation	•	•	High Cap Rilled Construction	101
DCMC	2,700,000	6.3 to 550	85 °C	2000	1.38x1.63 to 3.5x8.63	35x41 to 89x220	UPS, Power Supply input/output		•	Highest Cap, ThermalPak™	107
3188	1,000,000	16 to 450	85 °C	4000	1.375x2.125 to 3.00x8.625	35x54 to 76x220	Long Life Military or Transportation			Rilled Construction High Ripple Current	115
500C	2,600,000	6.3 to 550	95 °C	5000	1.38x1.63 to 3.5x8.63	35x41 to 89x220	UPS, Power Supply Long Life, input/output		•	Long Life, ThermalPak™	121
520C	39,000	200 to 500	85 °C	8000	1.38x1.63 to 3.5x8.63	35x41 to 89x220	Inverters, High Ripple, Long Life		•	Inverter-Grade ThermalPak™	127
550C	35,000	200 to 450	105 °C	10,000	1.38x1.63 to 3.5x8.63	35x41 to 89x220	Inverters, Higher Ripple, Longer Life		•	Inverter-Grade ThermalPak™	133
500R	18,000	350 to 500	85 °C	5000	1.38x1.63 to 3.5x8.63	35x41 to 89x220	High Endurance Inverter	•	•	Very High Ripple, Long Life	139

Aluminum Electrolytic Capacitor Application Guide

This guide is a full handbook on aluminum electrolytic capacitors, of course with emphasis on Cornell Dubilier's types. It covers construction in depth and discloses the latest information on performance and application for the major aluminum electrolytic types made worldwide. We encourage you to tell us what more you'd like to know, so we can improve this guide.

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ALUMINUM ELECTROLYTIC CAPACITOR OVERVIEW

Except for a few surface-mount technology (SMT) aluminum electrolytic capacitor types with solid electrolyte systems, an aluminum electrolytic capacitor consists of a wound capacitor element, impregnated with liquid electrolyte, connected to terminals and sealed in a can. The element is comprised of an anode foil, paper separators saturated with electrolyte and a cathode foil. The foils are high-purity aluminum and are etched with billions of microscopic tunnels to increase the surface area in contact with the electrolyte.

While it may appear that the capacitance is between the two foils, actually the capacitance is between the anode foil and the

electrolyte. The positive plate is the anode foil; the dielectric is the insulating aluminum oxide on the anode foil; the true negative plate is the conductive, liquid electrolyte, and the cathode foil connects to the electrolyte. However, just as the anodic-oxide dielectric insulates the anode foil from the electrolyte, so too the cathode is insulated from the electrolyte by the low voltage air oxide on the cathode foil and the double-layer ionic barrier. This makes the cathode a capacitor in series with the anode. In high voltage capacitors the cathode capacitance is hundreds of times the anode capacitance and does not measurably affect the overall capacitance, but in capacitors of less than about 50 V the anode capacitance begins to approach the value of the cathode capacitance and requires use of higher capacitance cathode to avoid needing to increase the anode length to achieve the rated

capacitance. Aluminum electrolytic capacitor construction delivers colossal capacitance because etching the foils can increase surface area more than 100 times and the aluminum-oxide dielectric is less than a micrometer thick. Thus the resulting capacitor has very large plate area and the plates are intensely close together.

These capacitors routinely offer capacitance values from 0.1 μF to 3 F and voltage ratings from 5 V to 550 V. Up to 700 V are commercially available. They are polar devices, having distinct positive and negative terminals, and are offered in an enormous variety of styles which include molded and can-style SMT devices, axial- and radial-leaded can styles, snap-in terminals styles and large-can, screw-terminal styles. Representative capacitance-voltage combinations include:

330 μF at 100 V and 6,800 μF at 10 V for SMT devices,

100 μF at 450 V, 6,800 μF at 50 V and 10,000 μF at 10 V

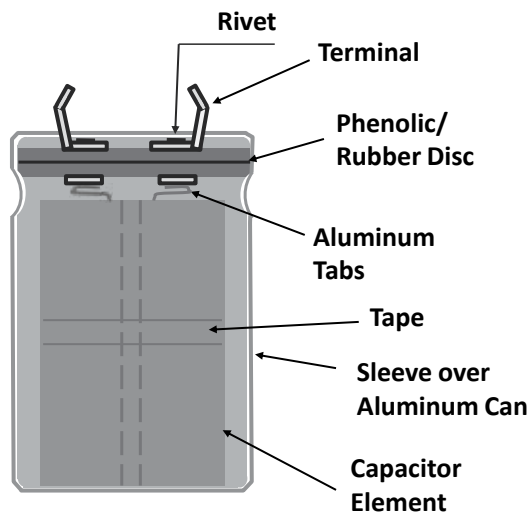
for miniature-can styles,

1200 μF at 450 V and 39,000 μF at 50 V for snap-in can styles and

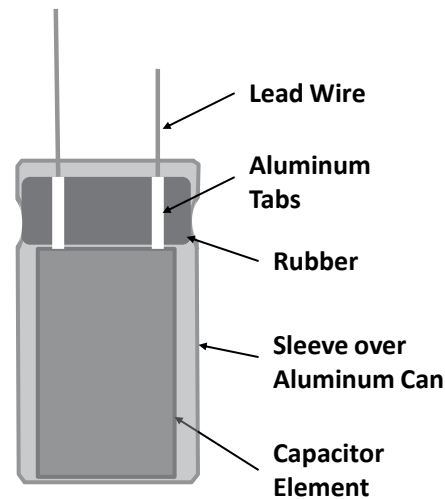
9000 μF at 450 V and 390,000 μF at 50 V for large-can, screw-terminal styles.

If two, same-value, aluminum electrolytic capacitors are connected in series with the positive terminals or the negative terminals connected together, the resulting single capacitor is a non-polar capacitor with half the capacitance. The two capacitors rectify the applied voltage and act as if they had been bypassed by diodes. When voltage is applied, the correct-polarity capacitor gets the full voltage. In non-polar aluminum electrolytic capacitors and motor-start aluminum electrolyte capacitors a second anode foil substitutes for the cathode foil to achieve a non-polar capacitor in a single case.

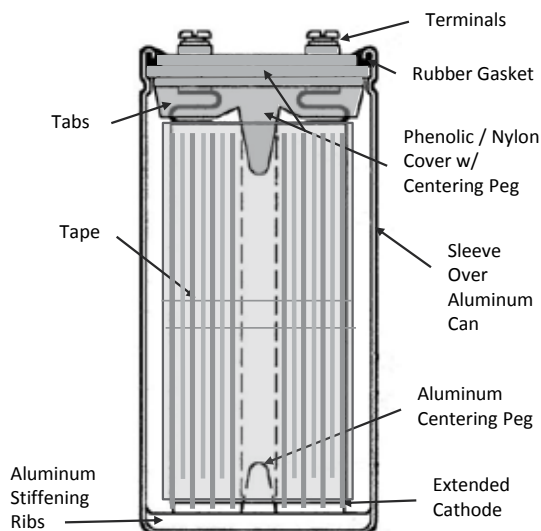
CAPACITOR CONSTRUCTION



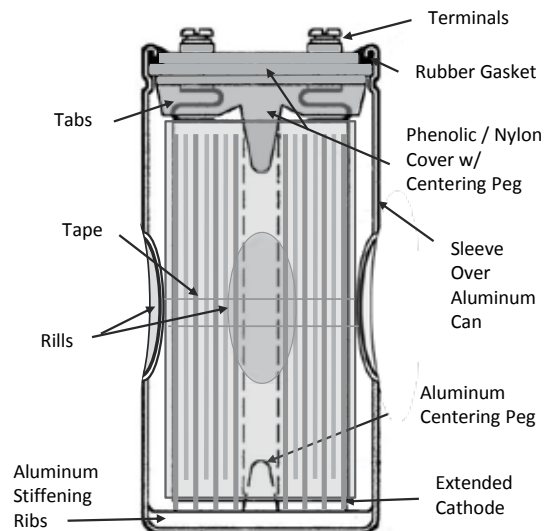
Snap-in Type



Miniature, Radial-Leaded Type



Thermal Pak Construction



Rilled Construction

These figures show typical constructions of the non-surface-mount aluminum electrolytic capacitors. All Cornell Dubilier capacitors use compression-fit construction so there is no thermoplastic potting compound to interfere with safety-vent operation. Thermal Pak™ and Rilled are Cornell Dubilier's exceptional constructions for screw terminal capacitors. Compared to conventional, potted construction, Thermal Pak operates cooler, provides longer life, withstands higher shock and vibration, delivers more reliable safety vent operation and is lighter weight. Rilled offers superior shock and vibration withstanding, typically withstanding more than 15 g acceleration forces.

ETCHING

The anode and cathode foils are made of high purity, thin aluminum foil, 0.02 to 0.1 mm thick. To increase the plate area and the capacitance, the surface area in contact with the electrolyte is increased by etching the foils to dissolve aluminum and create a dense network of billions of microscopic tunnels penetrating through the foil. For maximum increase in surface area in higher voltage capacitors the anode foil is 99.99% high purity, high cubicity aluminum that allows the billions of microscopic etch tunnels to be parallel and mostly perpendicular to the foil surface.

Etching involves pulling the aluminum foil on rollers through a chloride solution while applying an AC, DC or AC-and-DC voltage between the etch solution and the aluminum foil. Surface area can increase as much as 200 times for foil in low-voltage capacitors and up to 60 times for high-voltage capacitors.

FORMING

The anode foil carries the capacitor's dielectric. The dielectric is a thin layer of aluminum oxide, Al_2O_3 , which is chemically grown on the anode foil during a process called "formation." Formation is accomplished by pulling the anode foil on rollers through an electrolyte bath and continuously applying a DC voltage between the bath and the foil. The voltage is 135% to 200% of the final capacitor's rated voltage. The thickness of the aluminum oxide is about 1.4 to 1.5 nm for each volt of the formation voltage, e.g., the anode foil in a 450 V capacitor may get a formation voltage in excess of 600 V and have an oxide thickness of about 900 nm. That's about a hundredth of the thickness of a human hair.

Formation reduces the effective foil surface area because the microscopic tunnels are partially occluded by the oxide. The tunnel etch pattern is adjusted by choice of foil and etching process so that low-voltage anodes have dense tunnel patterns compatible with thin oxide and high-voltage anodes have coarse tunnel patterns compatible with thick oxide. The cathode foil is not formed and it retains its high surface area and dense etch pattern.

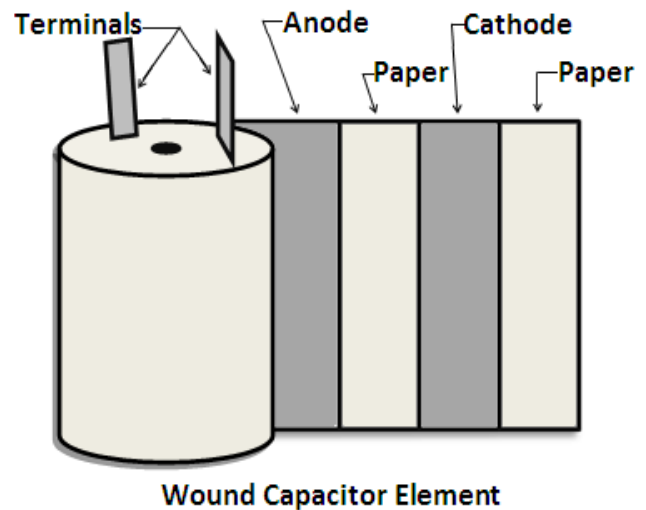
SLITTING

Foil is etched and formed in jumbo rolls of 40 to 50 cm wide and then slit into various widths according to the lengths of the final capacitors.

WINDING

The capacitor element is wound on a winding machine with spindles for one-to-four separator papers, the anode foil, another set of one-to-four separator papers and the cathode foil. These are wound into a cylinder and wrapped with a strip of pressure-sensitive tape to prevent unwinding. The separators prevent the foils from touching and shorting, and the separators later hold the reservoir of electrolyte.

Before or during winding aluminum tabs are attached to the foils for later connection to the capacitor terminals. The best method is by cold-welding of the tabs to the foils with tab locations microprocessor controlled during winding so that the capacitor element's inductance can be less than 2 nH. The older method of attachment is by staking, a process of punching the tab through the foil and folding down the punched metal. Cold welding reduces short-circuit failures and performs better in high-ripple current and discharge applications in which the individual stakes may fail from high current like buttons popping off one at a time from a fat-man's vest.



CONNECTING TERMINALS

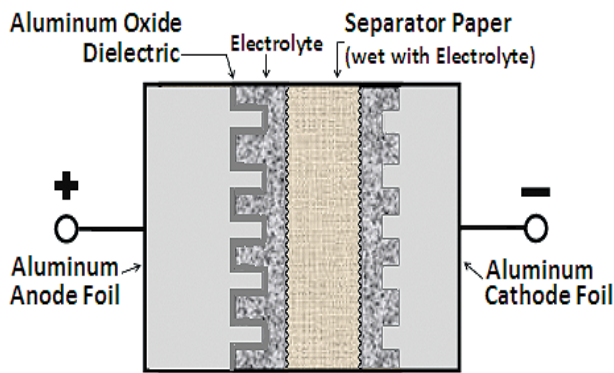
In SMT capacitors and miniature capacitors with rubber-bungs, extensions of the tabs are the capacitor terminals. But in large-can capacitors like snap-ins and screw-terminal styles, the tabs are riveted or welded on the underside of the capacitor tops to terminal inserts. Welding produces the lowest contact resistance and highest current handling. Both resistive welding and ultrasonic welding are used. The up to 12 tab pairs that may be used in large screw-terminal capacitors often require more mechanical support during assembly so the tabs in such capacitors may be both riveted to post extensions on the terminals and then welded. In an axial-leaded capacitor the cathode tab is welded to the can before sealing.

IMPREGNATION

The capacitor element is impregnated with electrolyte to saturate the paper separators and penetrate the etch tunnels.

The method of impregnation may involve immersion of the elements and application of vacuum-pressure cycles with or without heat or, in the case of small units, just simple absorption. The electrolyte is a complex blend of ingredients with different formulations according to voltage and operating temperature range. The principal ingredients are a solvent and a conductive salt – a solute – to produce electrical conduction. The common solvent is ethylene glycol (EG) and is typically used for capacitors rated -20°C or -40°C . Dimethylformamide (DMF) and gammabutyrolactone (GBL) are often used for capacitors rated -55°C . Common solutes are ammonium borate and other ammonium salts.

Water in the electrolyte plays a big role. It increases conductivity thereby reducing the capacitor's resistance, but it reduces the boiling point so it interferes with high temperature performance, and it reduces shelf life. A few percent of water is necessary because the electrolyte maintains the integrity of the aluminum oxide dielectric. When leakage current flows, water is broken into hydrogen and oxygen by hydrolysis, and the oxygen is bonded to the anode foil to heal leakage sites by growing more oxide. The hydrogen escapes by passing through the capacitor's rubber seal.



Capacitor–Element Materials

SEALING

The capacitor element is sealed into a can. While most cans are aluminum, phenolic cans are often used for motor-start capacitors. In order to release the hydrogen the seal is not hermetic and it is usually a pressure closure made by rolling the can edge into a rubber gasket, a rubber end-plug or into rubber laminated to a phenolic board. In small capacitors molded phenolic resin or polyphenylene sulfide may replace the rubber. Too tight a seal causes pressure build up, and too loose a seal shortens the life by permitting drying out, loss of electrolyte.

AGING

Here the capacitor assembly comes full circle. The last manufacturing step is “aging” during which a DC voltage greater than the rated voltage but less than the formation voltage is applied to the capacitor. Usually the voltage is applied at the capacitor's rated temperature, but other temperatures and even room temperature may be used. This step reforms the cut edges and any damaged spots on the anode foil and covers any bare aluminum with aluminum oxide dielectric. Aging acts as burn-in and reduces or eliminates early life failures (infant mortals). Low, initial DC leakage current is a sign of effective aging.

COMPARISON TO OTHER TYPES OF CAPACITORS

CERAMIC CAPACITORS

Ceramic capacitors have become the preeminent, general-purpose capacitor, especially in SMT chip devices where their low cost makes them especially attractive. With the emergence of thinner-dielectric, multilayer units with rated voltages of less than 10 V capacitance values in the hundreds of microfarads have become available. This intrudes on the traditional, high-capacitance province of aluminum electrolytic capacitors.

Ceramic capacitors are available in three classes according to dielectric constant and temperature performance. Class 1 (NPO, COG) is suitable for low capacitance, tight tolerance applications in the range of 1 pF to a few mF. Class 2 (X7R, X5R, Y5V) has 20 to 70 times as much capacitance per case size, but capacitance typically varies about $\pm 10\%$ over its -55 to 125°C temperature range. The maximum change is $+15\%$ to -25% . Class 3 (Z5U) with about 5 times the capacitance of Class 3 has wild swings of capacitance with voltage and temperature. The temperature range is -25°C to 85°C , and capacitance varies about $+20\%$ -65% over the range. All classes of ceramic capacitors are available in a variety of physical forms, ranging from round disc or rectangular single layer to multilayer types as well as tubular and feed-through types. Ceramic chip capacitors are brittle and sensitive to thermal shock, so precautions need to be taken to avoid cracking during mounting, especially for high-capacitance large sizes.

The typical temperature range for aluminum electrolytic capacitors is -40°C to 85°C or 105°C . Capacitance varies about $+5\%$ -40% over the range with the capacitance loss all at cold temperatures. Capacitors rated -55°C generally only have -10% to -20% capacitance loss at -40°C . Cold temperature performance for rated voltages of 300 V and higher is often worse, and temperature performance varies by manufacturer. Thus Class 1 and 2 ceramic capacitors perform better than aluminum electrolytic capacitors at cold temperatures, and Class 3 ceramic capacitors perform worse at all temperatures.

Aluminum electrolytic capacitors readily deliver much more capacitance. Aluminum electrolytic capacitors give more capacitance and energy storage per unit volume than ceramic capacitors for all types except for low-voltage, Class 3 ceramic SMT chip capacitors. While tolerances of $\pm 5\%$ and $\pm 10\%$ are routine for ceramic capacitors, $\pm 20\%$ and -10% $+50\%$ are the norms for aluminum electrolytic. This makes aluminum electrolytics the choice for high-capacitance applications like rectification filters and power hold up where more capacitance is a bonus.

Ceramic capacitors are not polarized and therefore can be used in AC applications. The low DF and high capacitance stability of Class 1 and 2 are especially suited to AC and RF applications. By comparison, aluminum electrolytic capacitors are polarized and cannot withstand voltage reversal in excess of 1.5 V. While non-polar aluminum electrolytics are available for momentary-duty

AC applications like motor starting and voltage-reversing applications, the high DF of aluminum electrolytic capacitors – from 2% to 150% – causes excess heating and short life in most AC applications.

Ceramic capacitors are generally no more reliable than aluminum electrolytic capacitors because aluminum electrolytics self heal. Since high-capacitance ceramic capacitors may develop micro-cracks, aluminum electrolytic capacitors are preferred for high capacitance values. However, small sizes of aluminum electrolytic capacitors may have limited life due to dry out, and so consider reliability in your choice for applications operating at high temperatures, over 65 °C.

FILM CAPACITORS

Film capacitors offer tight capacitance tolerances, very low leakage currents and small capacitance change with temperature. They are especially suited to AC applications through their combination of high capacitance and low DF that permits high AC currents. However, they have relatively large sizes and weights.

The popular polymers used for plastic-film dielectric capacitors are polyester and polypropylene. The popular polymer for SMT devices is polyphenylene sulfide (PPS). While film/foil construction is often used for small capacitance values – less than 0.01 μF – and for high-current applications, metallized-film is usually preferred because it gives smaller size, lower cost and is self healing. Film capacitors are general-purpose capacitors for through-hole applications and have special uses for tight-tolerance, AC voltage, high voltage and snubbing.

Polyester film capacitors operate from –55 °C to 85 °C at rated voltage; 85 °C to 125 °C with linear voltage derating to 50% rated voltage. The typical capacitance change over the entire range is less than –5% +15% with $\pm 1\%$ from 0 °C to 50 °C. Capacitance values are readily available up to 10 μF with special large sections to 100 μF . Generally available voltages are 50 to 1000 Vdc and 35 to 600 Vac. AC current handling is limited by polyester's high-temperature DF of about 1%.

Polypropylene film capacitors operate from is –55 °C to 85 °C at rated voltage; 85 °C to 105 °C with linear voltage derating to 50% rated voltage. The typical capacitance change over the entire range is less than +2% –4% with $\pm 1\%$ from –20 °C to 60 °C. Capacitance values are readily available up to 65 μF with special large sections to 1000 μF . Generally available voltages are 100 to 3000 Vdc and 70 to 500 Vac. AC current handling permits use in motor-run and other continuous duty AC applications.

Compared to aluminum electrolytic capacitors, film capacitors take the lead in high voltage, AC voltage and tight tolerance applications. Aluminum electrolytics excel in capacitance and energy storage. However, there is growing use of power film capacitors as replacements for aluminum electrolytic capacitors as dc-link, bus capacitors in high-voltage inverter power systems. While generally power film capacitors are more than four times the price for capacitance as aluminum electrolytic capacitors, film capacitors are perceived as more reliable because failures are relatively benign and without the incidence of explosion and

ignition that can accompany aluminum electrolytic capacitor failures in large high-voltage banks of 10 or more capacitors. Cornell Dubilier now provides special aluminum electrolytic capacitors with improved self-healing to deliver the needed reliability for these applications.

SOLID TANTALUM CAPACITORS

Like aluminum electrolytic capacitors solid tantalum capacitors are polar devices (1 V maximum reverse voltage), having distinct positive and negative terminals and are offered in a variety of styles. Case styles include both molded and conformal-coated versions of radial, axial and surface mount configurations. Typical capacitance values are from 0.1 μF to 1000 μF in voltage ratings from 2 V to 50 V. Typical maximum capacitance-voltage combinations are approximately 22 μF at 50 V for leaded styles and 22 μF at 35 V for surface mount. Strengths are temperature stability, volumetric efficiency and compatibility with all automated assembly systems. Weaknesses are the limited voltage and capacitance ranges and a short-circuit failure mode accompanied by catching fire.

The operating temperature range is –55 °C to 85 °C at rated voltage; +85°C to 125 °C with linear voltage derating to 2/3 rated voltage. The typical capacitance change over the entire range is less than $\pm 5\%$. Thus aluminum electrolytic capacitors have a much broader voltage and capacitance ranges than solid tantalum capacitors but perform worse at cold temperature.

Solid tantalum capacitors are generally considered more reliable than aluminum electrolytic capacitors because solid tantalum capacitors do not wear out. Their failure rate decreases with time, while aluminum electrolytic capacitors wear out by drying out. As a practical matter, dry-out only affects the smallest capacitors operating in high-temperature environments. Larger aluminum electrolytics do not dry out in the 10 to 20 years expected of most applications, and the open-circuit, dry-out failure is benign compared to solid-tantalum's short circuit failure mode.

PARAMETRIC CHARACTERIZATION

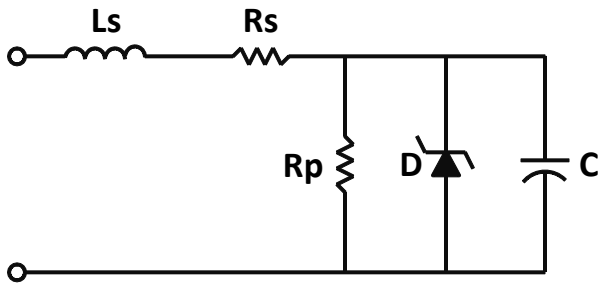
CIRCUIT MODEL

Capacitance occurs when two electrical conductors are separated by an insulator, the dielectric. A capacitor is an electronic component optimized to deliver capacitance. The capacitance in μF is:

$$C = 8.855(10^{-8})(n-1)\epsilon A/d$$

Where n is the number of plates or electrodes, ϵ is the dielectric constant, A is the plate surface area in cm^2 and d is the thickness of the dielectric between the plates in cm. Dielectric constant is the multiplier increase in capacitance that the dielectric delivers compared to a vacuum. The dielectric constant for aluminum oxide is about 8.

The equivalent circuit on the next page models the aluminum electrolytic capacitor's normal operation as well as overvoltage and reverse-voltage behavior.



Equivalent Circuit

Capacitance C is the equivalent capacitance and it decreases with increasing frequency. Common values range from $1\ \mu\text{F}$ to $1\ \text{F}$, a six-decade range.

Resistance R_s is the equivalent series resistance, and it decreases with increasing frequency and temperature. It increases with rated voltage. Typical values range from $10\ \text{m}\Omega$ to $1\ \Omega$, and R_s is inversely proportional to capacitance for a given rated voltage.

Inductance L_s is the equivalent series inductance, and it is relatively independent of both frequency and temperature. Typical values range from $10\ \text{nH}$ to $30\ \text{nH}$ for radial-leaded types,

20 to $50\ \text{nH}$ for screw-terminal types, and up to $200\ \text{nH}$ for axial-leaded types. It increases with terminal spacing.

Resistance R_p is the equivalent parallel resistance and accounts for leakage current in the capacitor. It decreases with increasing capacitance, temperature and voltage, and it increases while voltage is applied. Typical values are on the order of $100/C\ \text{M}\Omega$ with C in μF , e.g. a $100\ \mu\text{F}$ capacitor would have an R_p of about $1\ \text{M}\Omega$.

Zener diode D models overvoltage and reverse voltage behavior. Application of overvoltage on the order of $50\ \text{V}$ beyond the capacitor's surge voltage rating causes high leakage current and a constant-voltage operating mode quite like the reverse conduction of a zener diode. Application of reverse voltage much beyond $1.5\ \text{V}$ causes high leakage current quite like the forward conduction of a diode. Neither of these operating modes can be maintained for long because hydrogen gas is produced by the capacitor, and the pressure build up will cause failure.

The table below expresses capacitor parameters for the series equivalent-circuit model shown schematically on the left. From this table Capacitance C , Dissipation Factor DF , Equivalent Series Resistance R_s , Impedance Z , Inductance L_s , Self-Resonant Frequency f_o and Voltage are explored more fully in the next section.

Parameter	Unit	Symbol	Formula	Approximately
Capacitance	farads (F)	C		
Capacitive Reactance	ohms (Ω)	X_c	$1/(2\pi fC)$	Z
Current	amperes (A)	I	$C(dV/dt)$, V_z/Z	
Dissipation Factor	none	DF	R_s/X_c , $2\pi fCR_s$, $\tan(\delta)$, $\cot(\Theta)$	PF
Energy	Joules (J)	E	$\frac{1}{2}CV^2$	
Equivalent Series Resistance	ohms (Ω)	R_s	$DF/(2\pi fC)$	
Frequency	hertz (Hz)	f		
Impedance	ohms (Ω)	Z	$[R_s^2 + (X_c - X_L)^2]^{1/2}$	X_c
Inductance	henries (H)	L_s		
Inductive Reactance	ohms (Ω)	X_L	$2\pi fL_s$	
Loss Angle	degrees ($^\circ$)	δ	$\tan^{-1}(DF)$	
Phase Angle	degrees ($^\circ$)	Θ	$\cot^{-1}(DF)$	
Power	watts (W)	P	I^2R_s	
Power Factor	none	PF	R_s/Z , $\sin(\delta)$, $\cos(\Theta)$	DF
Quality Factor	none	Q	X_c/R_s , $1/DF$, $\cot(\delta)$, $\tan(\Theta)$	$1/PF$
Self-Resonant Frequency	hertz (Hz)	f_o	$1/[2\pi(LC)^{1/2}]$	
Voltage	volts (V)	V	$V_c = IX_c$, $V_z = IZ$	
Volt-Amperes	V-A	VA	IV_z , I^2Z	

PARAMETERS

TEMPERATURE RANGE

Operating temperature range

The Operating Temperature Range is the temperature range over which the part will function, when electrified, within the

limits given in the specification. It is the range of ambient temperatures for which the capacitor has been designed to operate continuously. Largely the formation voltage sets the high-temperature limit. Higher formation voltages permit higher operating temperatures but reduce the capacitance. The low-temperature limit is set largely by the cold resistivity of the electrolyte. The higher cold resistivity increases the capacitor's ESR 10 to 100 fold and reduces the available capacitance.

Typical temperature ranges are –20 °C to 55 °C, –25 °C to 85 °C, –40 °C to 85 °C, –55 °C to 85 °C, –40 °C to 105 °C, –55 °C to 105 °C and –55 °C to 125 °C.

Storage Temperature Range

The Storage Temperature Range is the temperature range to which the part can be subjected unbiased, and retain conformance to specified electrical limits. It is the range of ambient temperatures over which the capacitor may be stored without damage for short periods. For long periods of storage keep capacitors at cool room temperatures and in an atmosphere free of halogen gases like chlorine and fluorine that can corrode aluminum. Storage temperature ranges are from –55 °C to the upper limit of the operating-temperature ranges.

CAPACITANCE

Rated Capacitance

The rated capacitance is the nominal capacitance and it is specified at 120 Hz and a temperature of 25 °C. The rated capacitance is also the capacitance marked on the unit.

Capacitance Tolerances

Capacitance tolerance is the permitted minimum and maximum capacitance values expressed as the percentage decrease and increase from the rated capacitance, $\Delta C/C$. Typical capacitance tolerances are $\pm 20\%$, -10% $+50\%$, and -10% $+75\%$. Tighter tolerances are more readily available in high voltage capacitors, e.g., above 150 V, but tolerances tighter than $\pm 10\%$ are generally not available. Note that tighter tolerance parts may meet other tolerance requirements and are readily substitutable.

The capacitance varies with temperature and frequency. This variation itself is also dependent on the rated voltage and capacitor size.

Capacitance Measurement

For aluminum electrolytic capacitors, capacitance is measured as the capacitance of the equivalent series circuit at 25 °C in a measuring bridge supplied by a 120 Hz source free of harmonics with maximum AC signal voltage of 1 Vac and no bias voltage.

Capacitance Temperature Characteristics

The capacitance varies with temperature. This variation itself is dependent to a small extent on the rated voltage and capacitor size. Capacitance increases less than 5% from 25 °C to the high-temperature limit. For devices rated –40 °C capacitance declines up to 20% at –40 °C for low-voltage units and up to 40% for high-voltage units. Most of the decline is between –20 °C and –40 °C. For devices rated –55 °C capacitance typically declines less than 10% at –40 °C and less than 20% at –55 °C.

Capacitance Frequency Characteristics

The effective capacitance decreases as frequency increases. Self-resonance is reached typically below 100 kHz depending on capacitance. At self-resonance the device is resistive and beyond it is inductive. The termination style (i.e., axial, radial, screw-terminal) will influence the inductive characteristics.

Small radial-lead capacitors have inductance of less than 20 nH. Larger capacitors have more inductance according to terminal spacing. See INDUCTANCE.

DISSIPATION FACTOR (DF)

Dissipation factor is the measurement of the tangent of the loss angle ($\tan \delta$) expressed as a percentage. It is also the ratio of the ESR to the capacitive reactance and is thus related to ESR by this equation:

$$DF = 2\pi fC(ESR)/10,000$$

Where DF is a unit-less number expressed in percent, test frequency f is in Hz, capacitance C is in μF and ESR is in Ω .

DF Measurement

The measurement of DF is carried out at +25 °C, 120 Hz, and no voltage bias, with a maximum 1 Vac signal voltage free of harmonics. The value of DF is temperature and frequency dependent.

DF Temperature Characteristics

The dissipation factor decreases with increasing temperature. DF declines about 50% from 25 °C to the high-temperature limit, but increases more than 10 fold at the low-temperature limit. The DF of the better devices rated –55 °C increases less than 5 times at –40 °C.

DF_{lf} , defined in the next paragraph, varies little with temperature and ESR_{hf} , also in the next paragraph, increases 10 to 100 times from 25 °C to the low-temperature limit. The increase in DF at cold temperatures is set by the ESR_{hf} .

DF Frequency Characteristics

The dissipation factor varies with frequency at high frequencies. DF can be modeled as below:

$$DF = DF_{lf} + 2\pi fC(ESR_{hf})/10,000$$

Where DF is the total dissipation factor in percent, DF_{lf} is the low-frequency dissipation factor in percent, ESR_{hf} is the high-frequency ESR in Ω , f is the test frequency in Hz and C is the capacitance in μF at the test frequency. DF_{lf} results from the power lost by the applied electric field in orienting the molecules of the aluminum oxide dielectric. ESR_{hf} results from the resistive losses in the foils, connections and the electrolyte/separator pad. The electrolyte/separator pad resistance usually dominates and its resistance varies little with frequency. DF_{lf} ranges from about 1.5% to 3%. ESR_{hf} ranges from 0.002 to 10 Ω and decreases with increasing temperature.

The DF equation above shows that DF is constant for low frequencies and crosses over to increasing-DF, constant-ESR, at a crossover frequency inversely proportional to capacitance. Since high-capacitance capacitors have low crossover frequencies, DF increases more with increasing frequency than for lower-capacitance capacitors.

EQUIVALENT SERIES RESISTANCE (ESR)

The equivalent series resistance (ESR) is a single resistance representing all of the ohmic losses of the capacitor and connected in series with the capacitance.

ESR Measurement

For aluminum electrolytic capacitors, ESR is measured as the resistance of the equivalent series circuit at 25 °C in a measuring bridge supplied by a 120 Hz source free of harmonics with maximum AC signal voltage of 1 Vac and no bias voltage.

ESR Temperature Characteristics

The high-frequency ESR declines with increasing temperature. It declines about 35% to 70% from 25 °C to the high-temperature limit, but increases more than 10 fold at the low-temperature limit. The ESR of devices rated –20 °C or –40 °C can increase more than 100 times at –40 °C.

DF_{lf} has a positive temperature coefficient of 0.4 %/°C; so, it varies little with temperature, but ESR_{hf} increases 10 to 100 times from 25 °C to the low-temperature limit. The increase in ESR at cold temperatures is set by the ESR_{hf} .

ESR Frequency Characteristics

Like DF , the ESR varies with frequency. Rewriting the DF equation above, ESR can be modeled as below:

$$ESR = 10,000(DF_{lf})/(2\pi fC) + ESR_{hf}$$

Expressing the ideas in ESR terms, at low frequencies the ESR declines steadily with increasing frequency and crosses over to constant ESR at a frequency inversely proportional to capacitance. This crossover is typically below 10 kHz. The ESR of high-capacitance capacitors changes little with increasing frequency because high-capacitance causes them to have low crossover frequencies. The ESR_{hf} ranges from 0.002 Ω for large, screw-terminal capacitors to 10 Ω for miniature devices.

IMPEDANCE (Z)

For aluminum electrolytic capacitors impedance is actually impedance magnitude. It is the ratio of voltage to current at a given frequency and is related to the capacitor's capacitance, ESR and series inductance as follows:

$$Z = [(ESR)^2 + (1/(2\pi fC) - 2\pi fL_s)^2]^{1/2}$$

Where Z is impedance in Ω , ESR is equivalent series resistance in Ω , f is frequency in Hz, C is capacitance in F and L_s is equivalent series inductance in H.

Z Measurement

For aluminum electrolytic capacitors, Z is measured as the impedance magnitude of the equivalent series circuit at 25 °C in a measuring bridge supplied by a variable frequency source capable of delivering an AC signal voltage of 1 Vac free of harmonics from 10 Hz to 100 kHz. Impedance measurements are mostly for typical performance curves and for low-temperature limit measurements.

Low-Temperature Impedance

Low-temperature impedance is the capacitor's 120 Hz impedance measured at the low-temperature limit. It is usually expressed as a multiple of the device's 25 °C impedance.

Z Low-Temperature Measurement

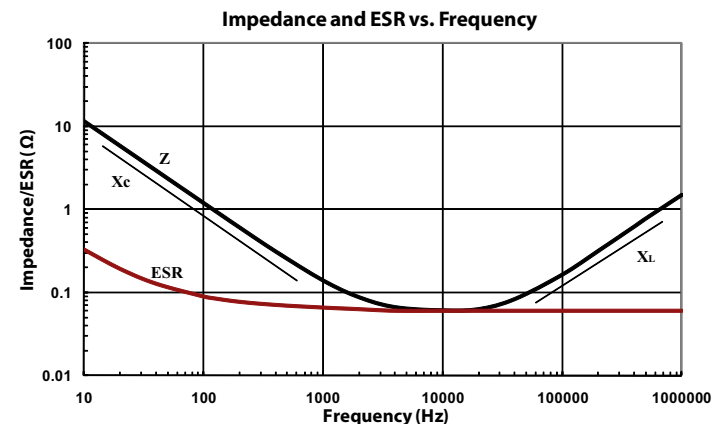
For low-temperature impedance measurement, place the capacitors in a chamber set to the low-temperature limit ± 2 °C. Measure impedance at 120 ± 5 Hz using any suitable method providing an accuracy of $\pm 2\frac{1}{2}$ %. After temperature stabilization, make the measurements quickly using as small as practical an AC measuring voltage in order that it will not cause heating of the capacitors. Assure that the capacitors have reached thermal stability by demonstrating that two successive measurements taken at 15 minute intervals show no change.

Z Temperature Characteristics

Impedance typically decreases less than 5% from 25 °C to the high-temperature limit but increases up to 10 times to the low-temperature limit.

Z Frequency Characteristics

The frequency characteristics of impedance are dictated by the contributions from capacitive reactance ($1/(2\pi fC)$), inductive reactance ($2\pi fL$) and from resistive losses in the electrolyte. A typical impedance-versus-frequency curve is below. The low point is at the self-resonant frequency, and the impedance is equal to the ESR at that frequency.



DC LEAKAGE CURRENT (DCL)

DC Leakage Current is the DC current flowing through the capacitor with the rated voltage applied. The value of leakage current depends on the voltage applied, the charging period and capacitor temperature.

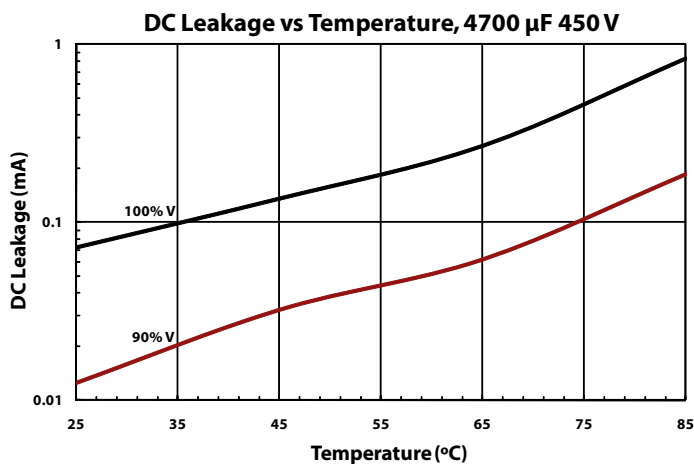
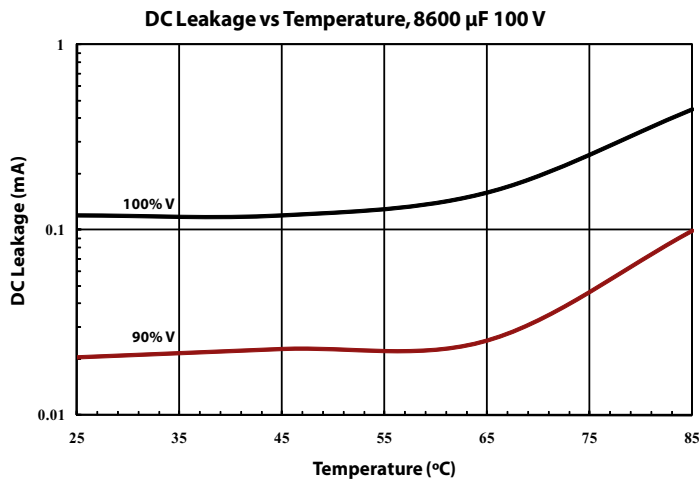
DCL Method of Measurement

Measure leakage current at 25 °C with the rated voltage applied through a protective resistance of 1000 Ω in series with the capacitor in the measuring circuit. Five minutes after the

application of voltage, the leakage current is not to exceed the maximum value indicated in the specification.

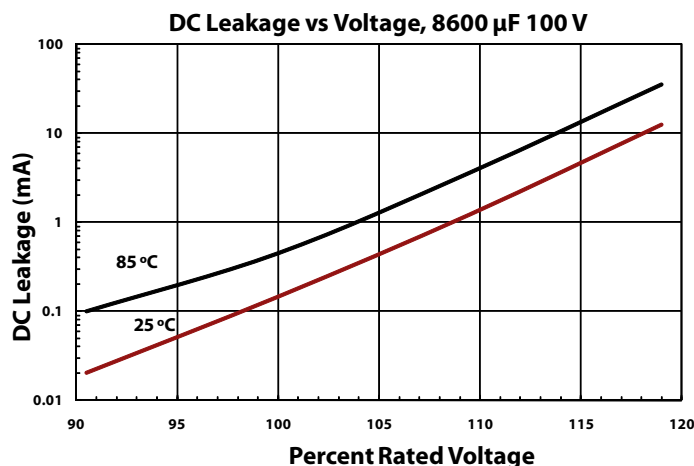
DCL Temperature Characteristics

Typical temperature characteristics are shown below:

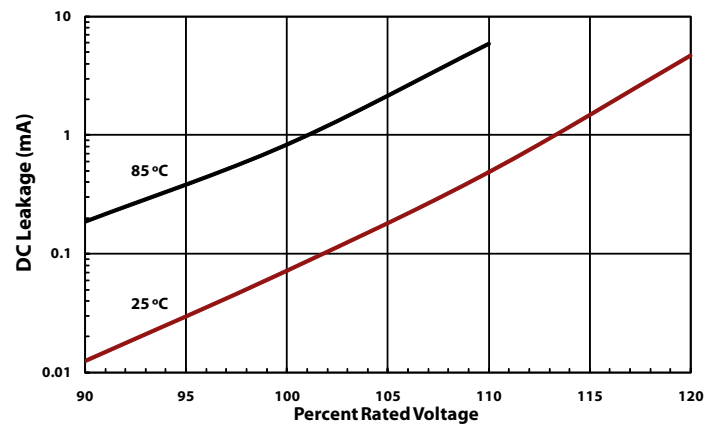


DCL Voltage Characteristics

The leakage current value drops rapidly as the applied voltage decreases below the capacitor's rated voltage. The effect of voltage derating on the leakage current is shown next.



DC Leakage vs Voltage, 4700 μ F 450 V



VOLTAGE WITHSTANDING

Rated DC Voltage

Rated DC voltage is the nominal voltage marked on the capacitor, and it is the maximum peak voltage including ripple voltage that may be applied continuously between the terminals and over the rated temperature range. Higher rated voltage capacitors may be substituted for lower rated voltage capacitors as long as case size, DF, and ESR ratings are also compatible.

Rated Surge Voltage

Rated surge voltage is the maximum DC overvoltage to which the capacitor may be subjected at 25 °C for short periods not exceeding approximately 30 s at infrequent intervals of not less than 5 min.

Surge voltage Measurement

Subject the capacitors to their rated surge voltage at normal room temperature and through a $1000 \Omega \pm 10\%$ resistor (except for capacitances of 2500 μ F and up, use a higher value resistor calculated as $2,500,000/C \pm 10\%$ where C is the capacitance in μ F). Cycle the voltage $\frac{1}{2}$ minute on followed by $4\frac{1}{2}$ minutes off during which each capacitor is discharged through the charging resistor or equal resistor. Repeat the cycles for 120 h. Post test requirements are for DCL, ESR and DF to meet initial requirements and for there to be no evidence of mechanical damage or electrolyte leakage. Electrolyte residue with no droplets or visible flow is permitted.

Reverse Voltage

Aluminum electrolytic capacitors are polarized and must be connected in the correct polarity. They can withstand reverse voltages up to 1.5 V. Higher reverse voltage can cause failure by pressure build up and rupture of the capacitor's safety vent structure. Non-polar and semi-polar devices are available that can withstand reverse voltage.

Transient Overvoltage

Aluminum electrolytic capacitors can generally withstand extreme overvoltage transients of limited energy. Application of overvoltage more than about 50 V beyond the capacitor's surge voltage rating causes high leakage current and a constant-voltage operating mode quite like the reverse conduction of

a zener diode. The capacitor may fail short if the electrolyte cannot take the voltage stress, but even if it can, this operating mode cannot be maintained for long because hydrogen gas is produced by the capacitor, and the pressure build up will cause failure. However, special designs are available that use the overvoltage, zener-clamping effect to successfully protect equipment from overvoltage transients such as lightning strikes.

Capacitors used as bus capacitors in large, high-voltage capacitor banks are less capable of withstanding overvoltage transients because the high energy and low source impedance of the capacitor bank can prevent a momentary partial discharge from self healing and cause it to become a runaway short-circuit failure. For high-voltage capacitor-bank applications use capacitors proven for that use.

RIPPLE CURRENT

Ripple current is the AC current flowing in the capacitor. It's called ripple current because the associated AC voltage rides like ripple on water on the capacitor's DC bias voltage. The ripple current heats the capacitor and the maximum permitted ripple current is set by how much can be permitted and still meet the capacitor's load life specification. Too much temperature rise will cause the capacitor to exceed its maximum permitted core temperature and fail quickly, but operation close to the maximum permitted core temperature dramatically shortens expected life. The load life specifications for aluminum electrolytic capacitors operating at maximum permitted core temperature are typically 1000 to 10000 hours. That's a load life of six weeks to a year and a seventh and not long enough time for most applications.

Ripple current ratings usually assume that the capacitor is convection cooled and that the entire can is in contact with air. A convection coefficient of $0.006 \text{ W/}^\circ\text{C/in}^2$ predicts the temperature rise from air to the case, and the core temperature is assumed to be the same as the case temperature. The power dissipated is the ripple current squared times the ESR. Often the 25°C , 120 Hz maximum ESR is used, but since ESR decreases at elevated temperatures, less than maximum ESR may be used to calculate power dissipated.

Here's an example. Suppose you wanted the ripple-current rating for a $4700 \mu\text{F}$, 450 V capacitor in a 3 inch (76 mm) diameter and $5 \frac{5}{8}$ inches (143 mm) long can and the maximum ESR at 25°C and 120 Hz is $30 \text{ m}\Omega$. The can area – not including the terminal end – is 60.1 in^2 (388 cm^2). The thermal conductance is $(0.006)(60.1) = 0.36 \text{ W/}^\circ\text{C}$. For a 10°C temperature rise the case may dissipate 3.6 W. So the permitted ripple current with an ESR of $30 \text{ m}\Omega$ is 11 A. If you assume that the ESR would decrease 35% by 85°C , then the maximum ripple current can be 13.6 A.

With large-can capacitors, like the one in this example, neglecting the temperature rise from the case to the core can seriously overstate the ripple current capability. With some constructions the core is 3 to 5°C per watt of ripple power hotter than the case. So the total temperature rise would be more than double the intended 10°C with rated ripple current and maximum ESR. It is generally safe to assume that the core temperature is the same as the case temperature for capacitors smaller than 25 mm

diameter. For larger cases with high ripple current, verify the temperature rise by requesting samples with thermocouples imbedded in the cores.

Cornell Dubilier Thermal Pak, screw-terminal capacitors have controlled, low thermal resistance from core to case. You can predict temperature rise using the **Thermal Resistance Chart** later in this section or by using the thermal-resistance/expected-life model available on the website, <http://www.cde.com>.

Ripple Current Temperature Characteristics

Rated ripple current can be increased for operating temperatures less than rated temperature. Multipliers are shown in the specifications. Generally the multipliers are derived based on maximum core temperature (T_c), rated temperature (T_r) and ambient temperature (T_a) as

$$\text{Ripple Temperature Multiplier} = [(T_c - T_a)/(T_c - T_r)]^{1/2}$$

Counting on multipliers for temperatures below 60°C and for more than $1\frac{1}{2}$ times rated ripple current is risky. High ripple currents can cause shorter operating lives than expected because as the capacitor ages its ESR increases and causes more heating for the same ripple current. This accelerates wearout.

Ripple Current Frequency Characteristics

Rated ripple current can be adjusted for operation at frequencies other than 120 Hz. Multipliers are shown in the specifications. Generally the multipliers are derived based on expected ESR change with frequency; however, as discussed above, ESR is a complex function of temperature, capacitance and rated voltage as well as frequency. So it is difficult to create ripple-frequency multiplier tables that accurately model the frequency dependence. For high-ripple current applications verify ESR at frequencies of interest and calculate total power dissipated.

INDUCTANCE

Inductance is the equivalent series inductance, and it is relatively independent of both frequency and temperature. Typical values range from 2 to 8 nH for SMT types, 10 nH to 30 nH for radial-leaded types, 20 to 50 nH for screw-terminal types, and up to 200 nH for axial-leaded types. These low values are achieved by tab location and the intrinsic, low inductance of the dielectric contact geometry. The capacitor element has typical inductance of less than 2 nH.

SELF RESONANT FREQUENCY

The self-resonant frequency is the frequency at which the capacitive reactance ($1/(2\pi fC)$) equals the inductive reactance ($2\pi fL$). Because the capacitive reactance is 180 degrees out of phase with the inductive reactance, the two reactances subtract out, and the remaining impedance is purely resistive and is equal to the ESR at that frequency. Above self resonance the device is inductive. In aluminum electrolytic capacitors the self-resonant frequency typically occurs at less than 100 kHz. The self-resonant frequency is equal to $1/[2\pi(LC)^{1/2}]$. It occurs at a frequency higher than expected based on 120 Hz capacitance because capacitance decreases with increasing frequency.

The self resonant frequency can decrease with increasing temperature from capacitance increase.

DIELECTRIC ABSORPTION

Dielectric absorption may be observed as the reappearance of a voltage across a capacitor after the terminals have been shorted for a brief period and the short removed. This characteristic is important in RC timing circuits, triggering systems and phase shift networks. For aluminum electrolytic capacitors dielectric absorption will allow up to 10% recovery of the charging voltage between 100 s and 1000 s at 25 °C, and is more pronounced at higher temperatures. Maximum dielectric absorption can be obtained by charging capacitors for 1 hour at rated voltage and discharging through a dead short for 1 minute. Subsequent measurements over time can be made with a high impedance micrometer.

With high-voltage aluminum electrolytic capacitors rebound voltages of 40 to 50 V are possible. While such voltages are not a safety hazard, they can certainly cause sparking and create a frightening distraction if the terminals are shorted by a tool during installation. Conductive tape and wire shorting straps can be supplied for the faint of heart. The tradeoff is extra cost and the labor to remove them.

INSULATION AND GROUNDING

With non-solid electrolyte aluminum electrolytic capacitors the aluminum cases connect to the negative terminals by contact with electrolyte. The resulting isolation resistance may vary from a few ohms to a few thousand ohms. For axial leaded capacitors and flatpacks the case is connected to the negative lead. If objects contacting the cases are to be at a potential other than the negative terminal's potential, use capacitors with insulating sleeves.

The plastic insulation can withstand 3000 Vdc or 2500 Vac, 60 Hz for 1 minute applied between the case and a ¼ inch wide metal foil placed around the sleeve. For stud-mounting, apply the voltage between the mounting plate and the case, and mount the capacitor with an approved nylon nut and clearance hole.

Insulation resistance is no less than 100 MΩ after 2 minutes electrification with 100 volts applied between the foil and the capacitor case.

ELEVATION AND EXTERNAL PRESSURE

Not relevant for capacitors with solid electrolyte. Aluminum electrolytic capacitors can operate to 80,000 feet and pressures as low as 3 kPa. Maximum air pressure depends on the size and style of the capacitor. Exceeding the maximum value can damage the capacitor by crushing the case, opening the pressure-relief vent or causing a short circuit.

VIBRATION WITHSTANDING CAPABILITY

Aluminum electrolytic capacitors can generally withstand 10 g vibration forces. Limits are shown in the specifications. Adjust the procedure below as required by the individual type specifications.

To test vibration resistance, clamp the capacitors to a vibrating platform and subject them to a simple harmonic motion having maximum peak-to-peak amplitude of 0.06 inches and maximum acceleration of 10 g or 15 g as specified. Vary the frequency of vibration linearly between 10 and 55 Hz. Traverse the entire frequency range in 1 minute. Unless specified otherwise, vibrate the capacitors for 1½ hours with the direction of motion being parallel to the axis of the capacitor, then place the capacitors so that the direction of motion is perpendicular to the axis and continue vibration for 1½ hours. During the last ½ hour of test connect the capacitor to a capacitance meter and observe for a 3-minute period.

There will be no evidence of loosening of the capacitor element within the container when shaken by hand following the test. Also there will be no indication of intermittent contact, open or shorting during the 3-minute observation period.

SAFETY CONSIDERATIONS

Pressure-Relief Vent

During operation of an aluminum electrolytic capacitor with non-solid electrolyte, gas pressure normally increases. This gas is mostly hydrogen and excess pressure is avoided by permeation of the gas through the capacitor's seal. But in cases like application of overvoltage, reverse voltage, AC voltage or capacitor failure, excess pressure can cause the capacitor to explode. To reduce the risk of explosion aluminum electrolytic capacitors are usually equipped with pressure-relief vent structures. These safety vents are intended to rupture and release the gas pressure. After rupture the capacitor has limited life because it loses electrolyte and dries out.

Be careful not to interfere with the operation of the vent, for instance by mounting measures such as clamps, glue or potting compounds. In the case of large capacitors with the capacitor elements secured by thermoplastic potting, don't mount them with the safety vents down as the potting may flow when the capacitors overheat and block the vents.

In rare cases for capacitors mounted alone and more often for capacitors in multiple-unit parallel capacitor banks a fully functioning pressure relief device may not react in time. This could be from extreme overload or ignition of gas inside the capacitor through sparking caused by breakdown. Protect personnel from possible rupture of high-energy capacitors with shielding, and be sure to use substantial shielding when testing the pressure-relief vent. Examples of appropriate shielding for testing are ¼-inch thick steel or ½-inch polycarbonate enclosures with one end open to redirect the explosion rather than contain it.

Test the capacitor’s pressure-relief capability by applying voltage or current using one of the following three methods:

A. Subject the capacitor to AC current according to the rated capacitance as below:

Rated Capacitance μF	Test Current Aac, 60 Hz
up to 3000	1 to 100
3,000 to 20,000	85 to 150
above 20,000	100 to 175

B. For a capacitor rated 150 Vdc and above, apply 110 to 125 Vac, 60 Hz through a 5 Ω ±10% series, current-limiting resistor.

C. Subject the capacitor to reverse polarity, DC voltage sufficient to allow a current from 1 to 10 A to flow.

The excess internal pressure will be relieved without violent expulsion of the capacitor element or cover or ignition of surrounding material. To demonstrate non-ignition, wrap the case loosely with two layers of cheese cloth which must not ignite during test. A short or open circuit is not a failure of the test.

Contact with Electrolyte

The electrolyte in non-solid electrolytic capacitors is a biodegradable liquid based on a stable solvent with a high boiling point as the main ingredient. The most common solvent is ethylene glycol (EG). Dimethylformamide (DMF) and gammabutyrolactone (GBL) may be used in capacitors rated –55 °C. The electrolyte includes an acid base system and other chemicals. The electrolyte is chemically neutral and contains no PCBs or halogenated compounds. It has low toxicity but you should avoid contact with the skin or eyes and avoid prolonged inhalation. A Material Safety Data Sheet is available for the electrolyte solvent base material.

Immediately treat contact with electrolyte by rinsing exposed area with water. If electrolyte contacts eyes, flush for 10 minutes with running water. Seek medical attention if any symptoms persist. Avoid inhalation of electrolyte vapors or dust particles. If vapors are present, ventilate the room. Smoke from burning electrolyte is irritating but does not contain dioxins or similar toxic substances. If electrolyte gets on clothing, wash it off with water.

Charge-Discharge

Frequent, rapid charge and discharge of aluminum electrolytic capacitors not designed for such service can damage the capacitors by overheating and overpressure or breakdown with consequent failure by open or short circuit. For charge-discharge applications use capacitors designed for that use.

Polarity – Reverse Voltage

Check the polarity of each capacitor both in circuit design and in mounting. Polarity is marked on the capacitor. While the capacitors can withstand continuous application of 1.5 V reverse voltage, exceeding that can damage the capacitor by

overheating, overpressure, and dielectric breakdown. This can result in associated open-circuit or short-circuit failures and rupture of the capacitor’s pressure-relief vent.

Flammability

Aluminum electrolytic capacitors contain materials which can catch fire and support combustion when contacted by flames. Flammable parts include plastic parts, insulating sleeves, paper, and the electrolytes. Most capacitors will pass the needle-flame test requirements of UL 94V-O and not support combustion to the requirements of Category B or C.

In rare cases the capacitor may self-ignite from heavy overload or capacitor defect. Hydrogen in the capacitor can ignite if sparking occurs during capacitor failure. In critical applications such as mining applications consider providing fire-resistant shields.

CAPACITOR BANK CONFIGURATIONS

PARALLEL

Capacitors may be connected in parallel for increased capacitance and ripple-current capability.

Bus Structure

When connecting capacitors in parallel, design the connecting bus with these features in mind. For minimum series inductance use a laminated-bus or strip-line structure. For example, have one plane of the circuit board as the plus connection and another plane as the minus connection to all capacitors. Path resistance to each capacitor should be equal to assure equal current sharing. While ripple current divides among the capacitors in proportion to capacitance values for low-frequency ripple, high-frequency ripple current divides in inverse proportion to ESR values and path resistance.

Fusing

In order to fuse the individual capacitors, include a slow-start circuit at equipment turn-on, and fuse each capacitor at twice its expected, maximum ripple current. The slow-start circuit can be a resistor in series with the capacitors that is shorted after initial charging.

SERIES

Capacitors may be connected in series for increased voltage withstanding.

Voltage Sharing

During charging the voltage on each capacitor connected in series is proportional to the inverse of the actual capacitance, but upon reaching final voltage, the voltage on each capacitor is proportional to the inverse of the capacitor’s leakage current. Of course in a series string there is only one leakage current and the capacitors with a propensity for higher leakage current will get less voltage. Since leakage current increases with applied voltage, less voltage results in higher leakage resistance, and the voltages tend to equalize. However, voltage distribution will not be uniform, and to assure that no capacitor is subjected to more

than its rated voltage, use higher rated voltage capacitors or a balancing scheme such as balancing resistors, discussed next. Assist voltage sharing stability by using capacitors from the same manufacturing lot and mounting them to operate at the same temperature.

Balancing Resistors

The difference in leakage currents in μA for two capacitors in series at rated temperature can be estimated as $0.0015CV_b$ where C in μF is rated capacitance of each capacitor and V_b in V_{dc} is the bus voltage across the two series capacitors. Using this estimation enables selecting a value of balancing resistance for each capacitor as follows:

$$R = (2V_m - V_b) / (0.0015CV_b)$$

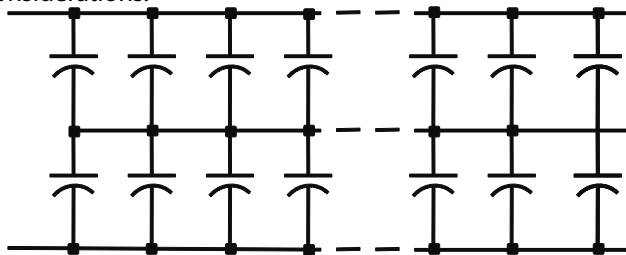
Where R in $M\Omega$ is the balancing resistance, V_m is the maximum voltage you'll permit on either capacitor, and V_b is the maximum bus voltage across the two capacitors.

For three or more capacitors in series use the following where n is the number of capacitors in series:

$$R = (nV_m - V_b) / (0.0015CV_b)$$

PARALLEL/SERIES

Capacitors connected as shown below with a common connection between multiple series combinations have these considerations.



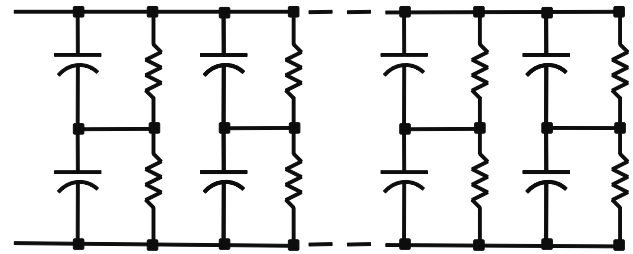
Parallel-series array with common center connection

Advantages: As the number of capacitors in parallel increases the capacitance at the top tends to equal the capacitance at the bottom. This improves voltage balance during transients. Also the leakage current at the top tends to equal the leakage current at the bottom, so voltage balance improves during steady-state conditions. Finally, only two balancing resistors need be considered, and the top and bottom may be so well matched as to eliminate the need for balancing resistors.

Disadvantage: If one capacitor fails short, the other half of the bank gets the entire bus voltage, so other capacitors will fail too unless the shorted capacitor blows open. Thus one capacitor failure can cause failure of the entire bank.

SERIES/PARALLEL

Capacitors connected as shown below with multiple series combinations in parallel have these considerations. This configuration is the clear choice when balancing resistors are not used.



Series - parallel array, no center connection

Advantages: If one capacitor fails short then the capacitor in series with it also fails, but other capacitors in the bank are unaffected. If balancing resistors are not used, high leakage current of one capacitor affects only a single pair of capacitors. The independent, series pairs permit fusing.

Disadvantages: With balancing resistors the construction is more complex; many resistors need to be fitted, and the additional resistors cost more.

NON-POLAR AND MOTOR START CAPACITORS

If two, same-value, aluminum electrolytic capacitors are connected in series with the positive terminals or the negative terminals connected together, the resulting single capacitor is a non-polar capacitor equal in capacitance to half of the rated capacitance of either of the original pair. The two capacitors rectify the applied voltage and act as if they had been partially bypassed by diodes. However, at all levels of AC voltage the apparent capacitance is half of the rated capacitance as you would expect for capacitors connected in series. The nonlinear performance produces distortion where non-polar aluminum electrolytic capacitors are used in audio AC applications.

In non-polar aluminum electrolytic capacitors and motor-start aluminum electrolytic capacitors a second anode foil substitutes for the cathode foil to achieve a non-polar capacitor in a single case. These are available for momentary-duty AC applications like motor starting and voltage-reversing applications, but the high DF of aluminum electrolytic capacitors – from 2% to 150% – causes excess heating and short life in most AC applications.

Aluminum electrolytic, motor-start capacitors are non-polar and designed for intermittent operation in starting single-phase induction motors or for other brief AC applications such as motor-run capacitors in electric door openers.

RELIABILITY AND LIFETIME

Aluminum electrolytic capacitors are quite reliable largely because of their effective, self-healing mechanism. While wear-out is the most common failure mode, most such failures are gradual conversions to open circuits as the units become more and more resistive.

Failure Modes

Early-Life Failures

Early-life failures, infant mortals are mostly short-circuit failures from weaknesses in the aluminum oxide dielectric. Incidence can be reduced with extended aging or burn-in.

Wear-Out

Wear-out failures are mostly open-circuit failures from loss of electrolyte or ESR increase from other causes. In the case of large capacitors enduring high levels of ripple current, the increasing ESR can cause overheating and short-circuit failures as wear-out failures.

Operating Life

Onset of wear-out is determined mainly by the capacitor's size and average operating temperature. Operating voltage has some effect. For capacitors operating at moderate temperatures the operating life doubles for each 10 °C that operating temperature is reduced. Operating life can be expressed as

$$Lop = MvLb2^{[(Tm - Ta)/10]}$$

Where

Lop is the expected operating life in h,

Mv is a unitless voltage multiplier for voltage derating,
Lb is the expected operating life in h for full rated voltage and temperature,

Tm is the maximum permitted internal operating temperature in °C, and

Ta is the actual capacitor internal operating temperature in °C.

Most manufacturers use this model to predict operating life; however, values for Mv, Lb and Tm vary both by capacitor type and by manufacturer. For case diameters larger than 25 mm with significant ripple current, take into account the temperature rise of the capacitor element over its case.

Some makers appear to calculate operating life saying that expected lifetime doubles with less than a 10 °C drop in temperature. The expectation that life doubles for each 10 °C reduction is well demonstrated by life tests and is consistent with the Arrhenius equation of chemical activation and the activation energy for aluminum electrolytic capacitors. However, there is another school of thought that says the reaction rate at cooler temperatures slows more than predicted by the Arrhenius equation because only a growingly smaller portion of the molecules have the activation energy needed to break existing chemical bonds and form new ones. This collision theory puts a prefactor in the Arrhenius equation that enables much longer calculated service-life capability at temperatures near room temperature. Use these predictions with caution because it is not validated by life test results.

Often Mv is neglected, and values for the other variables change by case size. Typical values for Lb are 1000 to 2000 h for miniature types, 2000 to 10,000 h for snap-in types and 2000 to 20,000 h for large-can screw terminal types. Lb can be greater than the rated load life because no ripple is applied and because it's typical life rather than minimum. Often Tm is 95 °C when rated temperature is 85 °C and is 108 to 110 °C when it's 105 °C.

Mv based on life tests for Cornell Dubilier capacitor types is:

$$Mv = 4.3 - 3.3Va/Vr$$

where Va is applied voltage and Vr is rated voltage. Values for Lb and Tm are:

Type	Lb	Tm
330	12000 h	108 °C
401C/101C	8000 h	108 °C
300/301	6000 h	108 °C
380L/LX	5000 h	90 °C
381L/LX	5000 h	110 °C
400C/500C/500R	7500 h	98 °C
420C/520C	12000 h	103 °C
450C/550C	15000 h	108 °C
DCMC	5000 h	95 °C
MLP up to 250V	12000 h	88 °C
MLP 300V & up	5000 h	88 °C
MLS	4000 h	125 °C
SLP	4500 h	110 °C
SLPX	4500 h	90 °C

Determining Operating Life

Determine expected operating life by calculating the capacitor's expected operating temperature, Ta, and then use the operating-life formula. The operating temperature is the expected average ambient temperature plus temperature rise from ripple current and leakage current. Leakage-current power is small compared to ripple-current power and can be neglected. Measure temperature rise from ripple current using sample capacitors with thermocouples installed at the core hotspot, or calculate temperature rise from dissipated power. If you calculate the power, do so at each significant ripple frequency and add the powers together for total power. Use the **Thermal Resistance Chart** to determine temperature rise. It's equal to power multiplied by thermal resistance.

Calculating power at a frequency other than 120 Hz requires knowing the ESR at the new frequency. You may infer the ESR value from the ripple-current frequency multipliers for each type.

$$ESR_f = ESR_{120} / Mf^2$$

Where ESR_f = ESR at a frequency f, ESR_{120} = ESR at 120 Hz and Mf = Frequency multiplier for frequency f.

Or you may calculate the new ESR using the equation in **ESR Frequency Characteristics**. Using that equation to solve for ESR_{hf} and including 3% for DF_{if} ,

$$ESR_f = ESR_{120} - 39800(f - 120)/fC$$

Where ESR is in mΩ, f is in Hz and C is in μF. Although 3% is at the high end for DF_{if} it fits with ESR_{120} which is a maximum limit for the ESR at 120 Hz.

Besides knowing ESR at the new frequency you also need to know the ESR at a new temperature, the expected operating

temperature. For Cornell Dubilier capacitors with electrolytes rated to -40 °C this table shows representative ratios of ESR at elevated temperatures to ESR at 25 °C.

Rated	Capacitor Temperature		
Voltage	45 °C	65 °C	85 °C
Vdc	Ratio to ESR at 25 °C		
Up to 150	82%	77%	77%
200 to 300	75%	70%	70%
350 & 450	70%	60%	60%
500	61%	49%	45%

Here's an illustration to unify this information: Consider the earlier example, a 4700 µF, 450 V capacitor in a 3 inch (76 mm) diameter and 5 5/8 inches (143 mm) long can with a maximum ESR at 25 °C and 120 Hz of 30 mΩ. Suppose that the capacitor is used as a bus capacitor in a motor-drive inverter, and the ripple current consists of 11 A at 360 Hz and 6.5 A at 8000 Hz. And the average applied voltage, the bus voltage, is 390 Vdc.

First calculate the ESRs at the two frequencies. While you would use one or the other of the methods above to calculate ESR, here we'll use both to illustrate. If the capacitor is a Type DCMC, the frequency multiplier for 360 Hz is 1.13. Thus the 360 Hz ESR is $30/1.13^2$ or 23.5 mΩ. Or using the **ESR Frequency Characteristics** equation, the 360 Hz ESR is $[30 - 39800(360-120)/360/4700]$ or 24.4 mΩ. Similarly at 8000 Hz the ESRs calculate to be 19.5 and 21.6 mΩ.

Next calculate the total power. At 360 Hz it's $(11^2)(0.0244)$ or 2.9 W. At 8000 Hz it's $(6.5^2)(0.0216)$ or 0.9 W. That's a total power of 3.8 W.

Then calculate the core hot-spot temperature. From the **Thermal Resistance Chart** the thermal resistance for free convection cooling is 3.07 °C/W. So the temperature rise is $(3.8)(3.07)$ or 14 °C. If the ambient temperature were 50 °C, the core temperature would be 64 °C.

Now predict operating life capability using the **Operating Life** equation. The voltage multiplier, Mv is $[4.3 - 3.3(390/450)]$ or 1.44. Operating life is

$$\begin{aligned} \text{Lop} &= (1.44)(5000)2^{[(95 - 64)/10]} \\ &= 61,700 \text{ h} \end{aligned}$$

But if the core temperature is 64 °C, the ESR would have decreased about 40%. The new total power would be $0.6(3.8)$ or 2.3 W. The new temperature rise would be $(3.07)(2.3)$ or 7 °C, and the core temperature would be 57 °C. Recalculating operating life with the lower core temperature gives.

$$\begin{aligned} \text{Lop} &= (1.44)(5000)2^{[(95 - 57)/10]} \\ &= 100,300 \text{ h} \end{aligned}$$

And actual ESRs are typically 70% of limit so you could argue that the total power is 1.6 W. Thus the temperature rise would be 5 °C, the core temperature, 55 °C, and the operating life, 115,000 h. However, it is more accurate to use the maximum limit because

that takes into account the ESR increase over life.

The example lower left shows the iterative approach. If a higher core temperature gives the operating life you require, you are done.

If the math needed to calculate operating life seems burdensome, take cheer. You can shortcut the calculations and consider more mounting and cooling options by using our Java applet on our website, <http://www.cde.com>.

Transient Over-Temperature

As said, life of aluminum electrolytic capacitors generally doubles for each 10 °C that the core temperature is reduced. The core is the hottest spot at about the center of the capacitor. However, as a capacitor heats up toward its maximum permitted core temperature, the rules change. At temperatures above the maximum core temperature and by 125 °C for most types the electrolyte can be driven from capacitor element and the ESR can increase as much as 10 times. By this mechanism, transient over-temperature or over-current can permanently increase the ESR and make the capacitor unusable. Be alert to this possibility in high-temperature and high-ripple applications, and pay extra attention to system cooling.

Load Life Test

Place the capacitors in a circulating air oven set to the upper temperature limit, 85 °C, 105°C or 125 °C, ± 3 °C. Apply a DC voltage and an AC ripple voltage. Adjust the AC voltage to cause current equal to the rated ripple current to flow and adjust the DC voltage such that the peak voltage equals the capacitors' rated voltage. Apply the voltage for the rated load-life period -0 +6 h. Upon completion allow the capacitors to stabilize at 25 °C for 24 h or more. The capacitors will meet the specified post-test limits for capacitance, ESR and DCL.

EIA Ripple Life Test, EIA IS-479

Conduct the wear-out lifetime test per EIA Interim Standard 479. The highlights of that test are as follows:

Apply ripple current at 120 Hz or adjust to maintain the same power dissipation if performed at another frequency. Set DC bias voltage equal to rated voltage minus peak applied AC voltage. Set ambient temperature to 85 ± 2 °C with airflow less than 0.5 m/s. Periodic test interval ≤ 1000 h. Sample size is 10 or more. Mount capacitors horizontally and spaced 25 mm or more. Choose any temperature ≤ 85 °C for measurements, and make all measurements at that temperature. End of Lifetime is $\leq$ the time when 10% or more of the sample have

capacitance < 80% initial value or
ESR > 200% initial requirement or
DCL > initial value or
there is evidence of mechanical damage or
leakage of electrolyte.

10% of sample may fail short or open and not be counted.

Voltage Derating

Voltage derating is expressed as the percentage that the applied voltage is less than rated voltage, e.g., a 450 V capacitor operating at 400 V would have 11% voltage derating.

Aluminum electrolytic capacitors made with formation voltages at least 35% higher than rated voltage and with rated temperatures of 85 °C or higher, don't require much voltage derating. In applications operating at less than 45 °C no derating is needed, and with up to 75 °C, 10% is sufficient. For higher temperatures and with high ripple current, 15% or 20% is appropriate. Since operating life continues to increase for further derating, military and space applications use 50% voltage derating.

Photoflash capacitors may be used at full rated voltage at normal room temperatures because they are designed for such duty. Strobe capacitors benefit from at least 10% voltage derating because their continuous operation makes them run hot.

SHELF LIFE

Aluminum electrolytic capacitors stored for more than 5 to 10 years may have increased levels of DC leakage current. Check if DCL meets application requirements before placing in service. Recondition high DCL units by applying rated voltage through 1,000 Ω resistor for 30 minutes.

Shelf life is a measure of how the capacitors will withstand storage for long times especially at high temperature. To test shelf life place the capacitors in an oven set to the shelf-life test temperature -0 ± 3 °C for the shelf-life test period. Upon completion of the test stabilize the capacitors at 25 °C for 24 h or more. Apply the rated voltage for 30 minutes, then verify the post test limits. Unless otherwise specified the capacitance, DCL and ESR will meet initial requirements.

COOLING AND THERMAL RESISTANCE

Cooling Strategies

Cornell Dubilier screw-terminal capacitors conduct heat from

the core to the bottom much more effectively than out the sides. You can take advantage of this heat path by mounting the capacitors directly to a metal chassis. In many case sizes this can double the permitted ripple current for the same temperature rise.

Mounting can be by using capacitors with mounting studs and screwing the capacitors directly to the plate or it can be by pressing the capacitors against a plate using the interconnecting bus structure. Cornell Dubilier furnishes silpad inserts at the bottom of the capacitors for this application. The silpads create smooth bottoms by eliminating the steps at the sleeve rollovers. The thermal resistance between the can and the underlying plate for capacitors merely sitting on the plate is about 2.5 °C/W. This decreases to less than 1 °C/W if the capacitors are pressed in place. Recommended vertical mounting force is 100 pounds. A Java applet is available on the Cornell Dubilier website which permits you to explore cooling options and directly see the affect on operating life. Go to <http://www.cde.com>.

Thermal Resistance

In large-can capacitors there can be significant temperature rise from the case to the core, the hottest spot at the center of the capacitor. For Cornell Dubilier Thermal Pak screw-terminal capacitors use the following thermal resistance data to determine temperature rise from power dissipated. As an illustration, consider 20 amps of ripple current at 120 Hz in a 3 x 5 5/8 case with a maximum ESR of 20 m Ω . The hot, typical ESR would be about half that or 10 m Ω , and the power dissipated would be I^2R s, $20^2 \times 0.01$ or 4 W. For the DF case code the table shows that the thermal resistance from core to bottom of the can is about 0.41 °C/W. That varies a little depending on how the capacitor is cooled, but 0.41 °C/W predicts a temperature rise of 1.6 °C for 4 W. The free-convection cooling column shows a total thermal resistance of 3.07 °C/W for air on all sides and 1.02 °C/W for the capacitor pressed against a large metal plate or chassis. The 3.07 °C/W predicts a temperature rise of 12.3 °C, and 1.02 °C/W predicts 4.1 °C.

Thermal Resistance °C/W Thermal Pak Screw Terminal Aluminum Electrolytic Capacitors

		Free Convection						200 lfm Airflow					
Case Code	Case Size D x L (in)	Air on Side & End			Air & Metal Chassis			Air on Side & End			Air & Metal Chassis		
		Core to bottom	Case to air	Total	Core to bottom	Case to air	Total	Core to bottom	Case to air	Total	Core to bottom	Case to air	Total
AK	1 3/8 X 1 5/8	1.67	17.12	18.78	1.68	3.29	4.97	1.66	12.19	13.86	1.68	3.08	4.76
AA	1 3/8 X 2 1/8	1.70	13.72	15.42	1.74	3.13	4.87	1.70	9.80	11.50	1.74	2.90	4.64
AH	1 3/8 X 2 5/8	1.72	11.49	13.21	1.78	2.99	4.77	1.72	8.23	9.94	1.77	2.73	4.51
AB	1 3/8 X 3 1/8	1.72	9.91	11.63	1.80	2.86	4.66	1.71	7.12	8.83	1.79	2.59	4.38
AJ	1 3/8 X 3 5/8	1.69	8.73	10.43	1.81	2.74	4.55	1.69	6.29	7.99	1.80	2.46	4.25
AC	1 3/8 X 4 1/8	1.66	7.82	9.48	1.81	2.63	4.44	1.66	5.65	7.32	1.79	2.33	4.13
AD	1 3/8 X 4 5/8	1.62	7.09	8.71	1.80	2.52	4.32	1.62	5.14	6.76	1.78	2.22	4.00
AE	1 3/8 X 5 1/8	1.58	6.49	8.07	1.79	2.42	4.21	1.58	4.72	6.30	1.76	2.12	3.88
AF	1 3/8 X 5 5/8	1.53	5.99	7.52	1.77	2.33	4.10	1.53	4.37	5.90	1.74	2.02	3.76
EA	1 3/4 X 2 1/8	1.03	10.40	11.43	1.05	1.90	2.96	1.03	7.43	8.46	1.05	1.79	2.84
EH	1 3/4 X 2 5/8	1.06	8.77	9.83	1.09	1.84	2.93	1.06	6.28	7.34	1.09	1.71	2.80
EB	1 3/4 X 3 1/8	1.08	7.61	8.68	1.13	1.77	2.90	1.08	5.47	6.55	1.12	1.64	2.76
EJ	1 3/4 X 3 5/8	1.08	6.73	7.82	1.15	1.72	2.87	1.08	4.86	5.94	1.15	1.57	2.72
EC	1 3/4 X 4 1/8	1.08	6.06	7.13	1.17	1.66	2.83	1.08	4.39	5.47	1.16	1.51	2.67
ED	1 3/4 X 4 5/8	1.07	5.51	6.58	1.19	1.61	2.79	1.07	4.01	5.08	1.17	1.45	2.62
EE	1 3/4 X 5 1/8	1.05	5.07	6.12	1.19	1.55	2.75	1.05	3.70	4.75	1.18	1.39	2.57
EF	1 3/4 X 5 5/8	1.03	4.69	5.72	1.20	1.50	2.70	1.03	3.43	4.47	1.18	1.34	2.52
BA	2 X 2 1/8	0.78	8.89	9.67	0.80	1.45	2.24	0.78	6.35	7.14	0.80	1.37	2.17
BH	2 X 2 5/8	0.81	7.53	8.34	0.84	1.40	2.24	0.81	5.40	6.21	0.83	1.32	2.15
BB	2 X 3 1/8	0.83	6.55	7.38	0.87	1.36	2.23	0.83	4.71	5.54	0.87	1.27	2.13
BJ	2 X 3 5/8	0.84	5.82	6.66	0.90	1.32	2.22	0.84	4.20	5.04	0.89	1.22	2.11
BC	2 X 4 1/8	0.85	5.24	6.09	0.92	1.28	2.20	0.85	3.80	4.65	0.91	1.18	2.09
BD	2 X 4 5/8	0.84	4.78	5.63	0.93	1.25	2.18	0.84	3.48	4.33	0.93	1.14	2.07
BE	2 X 5 1/8	0.84	4.40	5.24	0.95	1.21	2.16	0.84	3.22	4.06	0.94	1.10	2.04
BF	2 X 5 5/8	0.83	4.09	4.92	0.96	1.18	2.14	0.83	3.00	3.83	0.94	1.06	2.01
CH	2 1/2 X 2 5/8	0.52	5.80	6.32	0.53	0.89	1.42	0.52	4.16	4.68	0.53	0.85	1.38
CB	2 1/2 X 3 1/8	0.54	5.07	5.61	0.56	0.87	1.43	0.54	3.65	4.19	0.56	0.82	1.38
CJ	2 1/2 X 3 5/8	0.55	4.53	5.08	0.58	0.85	1.43	0.55	3.27	3.82	0.58	0.80	1.38
CC	2 1/2 X 4 1/8	0.56	4.10	4.66	0.60	0.83	1.43	0.56	2.98	3.54	0.60	0.78	1.38
CD	2 1/2 X 4 5/8	0.57	3.47	4.04	0.64	0.79	1.43	0.57	2.55	3.11	0.63	0.74	1.37
CD	2 1/2 X 5 1/8	0.57	3.47	4.04	0.64	0.79	1.43	0.57	2.55	3.11	0.63	0.74	1.37
CF	2 1/2 X 5 5/8	0.57	3.23	3.80	0.65	0.78	1.43	0.57	2.38	2.95	0.64	0.72	1.36
DB	3 X 3 1/8	0.37	4.10	4.47	0.39	0.61	0.99	0.37	2.95	3.33	0.39	0.58	0.97
DJ	3 X 3 5/8	0.39	3.67	4.06	0.41	0.59	1.00	0.39	2.66	3.04	0.41	0.56	0.97
DC	3 X 4 1/8	0.40	3.34	3.73	0.43	0.58	1.01	0.40	2.43	2.82	0.42	0.55	0.97
DC	3 X 4 5/8	0.40	3.34	3.73	0.43	0.58	1.01	0.40	2.43	2.82	0.42	0.55	0.97
DE	3 X 5 1/8	0.41	2.85	3.26	0.46	0.56	1.02	0.41	2.09	2.50	0.45	0.53	0.98
DF	3 X 5 5/8	0.41	2.66	3.07	0.47	0.55	1.02	0.41	1.96	2.37	0.46	0.51	0.98
DP	3 X 5 7/8	0.41	2.58	2.99	0.47	0.55	1.02	0.41	1.91	2.32	0.47	0.51	0.98
DG	3 X 8 5/8	0.40	1.95	2.35	0.52	0.49	1.01	0.40	1.47	1.87	0.51	0.45	0.96
FC	3 1/2 X 4 1/8	0.30	2.79	3.09	0.32	0.43	0.75	0.30	2.03	2.33	0.31	0.41	0.72
FD	3 1/2 X 4 5/8	0.30	2.58	2.88	0.33	0.42	0.75	0.30	1.88	2.19	0.33	0.40	0.73
FE	3 1/2 X 5 1/8	0.31	2.40	2.71	0.34	0.42	0.76	0.31	1.76	2.07	0.34	0.39	0.73
FF	3 1/2 X 5 5/8	0.31	2.24	2.56	0.35	0.41	0.76	0.31	1.66	1.97	0.35	0.39	0.74
FP	3 1/2 X 5 7/8	0.31	2.18	2.49	0.36	0.41	0.77	0.32	1.61	1.93	0.36	0.38	0.74
FG	3 1/2 X 8 5/8	0.31	1.67	1.98	0.40	0.37	0.78	0.31	1.26	1.58	0.40	0.34	0.74

Thermal Resistance °C/W Thermal Pak Screw Terminal Aluminum Electrolytic Capacitors

Case Code	Case Size D x L (in)	500 lfm Airflow						1000 lfm Airflow					
		Air on Side & End			Air & Metal Chassis			Air on Side & End			Air & Metal Chassis		
		Core to bottom	Case to air	Total	Core to bottom	Case to air	Total	Core to bottom	Case to air	Total	Core to bottom	Case to air	Total
AK	1 3/8 X 1 5/8	1.66	7.83	9.49	1.68	2.75	4.43	1.66	5.62	7.29	1.68	2.46	4.14
AA	1 3/8 X 2 1/8	1.70	6.31	8.02	1.73	2.53	4.26	1.70	4.56	6.26	1.73	2.22	3.95
AH	1 3/8 X 2 5/8	1.72	5.33	7.05	1.76	2.35	4.11	1.72	3.87	5.59	1.76	2.04	3.79
AB	1 3/8 X 3 1/8	1.71	4.64	6.35	1.78	2.19	3.97	1.71	3.39	5.11	1.77	1.88	3.65
AJ	1 3/8 X 3 5/8	1.69	4.13	5.82	1.78	2.05	3.83	1.69	3.04	4.73	1.76	1.75	3.52
AC	1 3/8 X 4 1/8	1.66	3.73	5.39	1.77	1.93	3.70	1.66	2.76	4.42	1.75	1.64	3.39
AD	1 3/8 X 4 5/8	1.62	3.41	5.03	1.75	1.82	3.57	1.62	2.54	4.16	1.72	1.54	3.27
AE	1 3/8 X 5 1/8	1.58	3.15	4.73	1.72	1.73	3.45	1.58	2.36	3.93	1.70	1.46	3.15
AF	1 3/8 X 5 5/8	1.53	2.93	4.46	1.69	1.64	3.33	1.53	2.20	3.73	1.66	1.38	3.04
EA	1 3/4 X 2 1/8	1.03	4.79	5.83	1.05	1.61	2.66	1.03	3.46	4.50	1.05	1.45	2.49
EH	1 3/4 X 2 5/8	1.06	4.08	5.14	1.09	1.51	2.60	1.06	2.97	4.03	1.08	1.35	2.43
EB	1 3/4 X 3 1/8	1.08	3.57	4.65	1.12	1.43	2.55	1.08	2.62	3.69	1.11	1.26	2.37
EJ	1 3/4 X 3 5/8	1.08	3.20	4.28	1.14	1.36	2.50	1.08	2.36	3.44	1.13	1.19	2.32
EC	1 3/4 X 4 1/8	1.08	2.91	3.99	1.15	1.29	2.44	1.08	2.16	3.24	1.14	1.13	2.27
ED	1 3/4 X 4 5/8	1.07	2.67	3.74	1.16	1.23	2.39	1.07	2.00	3.07	1.14	1.07	2.21
EE	1 3/4 X 5 1/8	1.05	2.48	3.54	1.16	1.18	2.33	1.05	1.87	2.92	1.14	1.02	2.16
EF	1 3/4 X 5 5/8	1.03	2.32	3.35	1.15	1.13	2.28	1.03	1.76	2.79	1.13	0.97	2.11
BA	2 X 2 1/8	0.78	4.10	4.88	0.79	1.25	2.04	0.78	2.97	3.75	0.79	1.14	1.93
BH	2 X 2 5/8	0.81	3.50	4.32	0.83	1.18	2.01	0.81	2.55	3.36	0.83	1.07	1.89
BB	2 X 3 1/8	0.83	3.08	3.91	0.86	1.13	1.99	0.83	2.26	3.09	0.86	1.01	1.86
BJ	2 X 3 5/8	0.84	2.77	3.61	0.88	1.07	1.96	0.84	2.05	2.89	0.88	0.95	1.83
BC	2 X 4 1/8	0.85	2.52	3.37	0.90	1.03	1.93	0.85	1.88	2.73	0.89	0.91	1.80
BD	2 X 4 5/8	0.84	2.33	3.17	0.91	0.99	1.90	0.84	1.75	2.59	0.90	0.87	1.77
BE	2 X 5 1/8	0.84	2.17	3.01	0.92	0.95	1.87	0.84	1.64	2.48	0.91	0.83	1.74
BF	2 X 5 5/8	0.83	2.03	2.86	0.93	0.91	1.84	0.83	1.55	2.38	0.91	0.80	1.71
CH	2 1/2 X 2 5/8	0.52	2.70	3.22	0.53	0.78	1.31	0.52	1.97	2.49	0.53	0.71	1.24
CB	2 1/2 X 3 1/8	0.54	2.39	2.93	0.55	0.75	1.30	0.54	1.76	2.29	0.55	0.68	1.23
CJ	2 1/2 X 3 5/8	0.55	2.16	2.71	0.58	0.72	1.30	0.55	1.60	2.15	0.57	0.65	1.23
CC	2 1/2 X 4 1/8	0.56	1.98	2.54	0.59	0.70	1.29	0.56	1.48	2.04	0.59	0.63	1.22
CD	2 1/2 X 4 5/8	0.57	1.72	2.29	0.62	0.65	1.27	0.57	1.31	1.88	0.62	0.58	1.20
CD	2 1/2 X 5 1/8	0.57	1.72	2.29	0.62	0.65	1.27	0.57	1.31	1.88	0.62	0.58	1.20
CF	2 1/2 X 5 5/8	0.57	1.62	2.19	0.63	0.63	1.26	0.57	1.24	1.81	0.62	0.56	1.19
DB	3 X 3 1/8	0.37	1.94	2.31	0.39	0.53	0.92	0.37	1.42	1.80	0.38	0.49	0.88
DJ	3 X 3 5/8	0.39	1.76	2.14	0.40	0.52	0.92	0.39	1.30	1.69	0.40	0.47	0.88
DC	3 X 4 1/8	0.40	1.62	2.02	0.42	0.50	0.92	0.40	1.21	1.61	0.42	0.46	0.88
DC	3 X 4 5/8	0.40	1.62	2.02	0.42	0.50	0.92	0.40	1.21	1.61	0.42	0.46	0.88
DE	3 X 5 1/8	0.41	1.42	1.83	0.45	0.47	0.92	0.41	1.08	1.49	0.44	0.43	0.88
DF	3 X 5 5/8	0.41	1.34	1.76	0.46	0.46	0.92	0.41	1.03	1.44	0.45	0.42	0.87
DP	3 X 5 7/8	0.41	1.31	1.72	0.46	0.46	0.92	0.41	1.01	1.42	0.46	0.41	0.87
DG	3 X 8 5/8	0.40	1.05	1.45	0.50	0.39	0.89	0.40	0.83	1.23	0.48	0.36	0.84
FC	3 1/2 X 4 1/8	0.30	1.36	1.65	0.31	0.38	0.69	0.30	1.02	1.31	0.31	0.35	0.66
FD	3 1/2 X 4 5/8	0.30	1.27	1.57	0.32	0.37	0.69	0.30	0.96	1.26	0.32	0.34	0.66
FE	3 1/2 X 5 1/8	0.31	1.20	1.51	0.34	0.36	0.70	0.31	0.91	1.22	0.33	0.33	0.67
FF	3 1/2 X 5 5/8	0.31	1.14	1.45	0.35	0.35	0.70	0.31	0.87	1.19	0.34	0.33	0.67
FP	3 1/2 X 5 7/8	0.32	1.11	1.43	0.35	0.35	0.70	0.32	0.86	1.17	0.35	0.32	0.67
FG	3 1/2 X 8 5/8	0.32	0.91	1.22	0.39	0.31	0.70	0.32	0.72	1.04	0.38	0.28	0.66

Thermal Resistance Chart °C/W Snap-in Aluminum Electrolytic Capacitors

		Free Convection			200 lfm Airflow			500 lfm Airflow			1000 lfm Airflow		
Case Code	Case Size DxL(mm)	core to case	case to air	total	core to case	case to air	total	core to case	case to air	total	core to case	case to air	total
H01	22 x 25	7.92	22.46	30.38	7.90	13.05	20.96	7.89	8.31	16.20	7.87	5.78	13.64
H02	22 x 30	8.13	20.02	28.15	8.11	11.75	19.87	8.09	7.58	15.67	8.06	5.34	13.41
H03	22 x 35	8.33	18.15	26.48	8.31	10.78	19.08	8.28	7.05	15.32	8.24	5.04	13.28
H04	22 x 40	8.51	16.69	25.20	8.48	10.03	18.51	8.44	6.65	15.09	8.39	4.83	13.22
H05	22 x 50	8.83	14.56	23.39	8.79	8.97	17.75	8.73	6.12	14.85	8.66	4.56	13.22
J01	25 x 25	6.11	18.99	25.10	6.10	11.04	17.14	6.08	7.03	13.11	6.06	4.89	10.95
J02	25 x 30	6.32	17.01	23.33	6.30	9.99	16.29	6.28	6.44	12.72	6.25	4.54	10.79
J03	25 x 35	6.52	15.49	22.00	6.49	9.20	15.69	6.46	6.01	12.47	6.42	4.30	10.72
J04	25 x 40	6.70	14.29	20.99	6.67	8.59	15.26	6.63	5.70	12.32	6.58	4.13	10.71
J45	25 x 45	6.87	13.32	20.19	6.83	8.11	14.94	6.78	5.46	12.24	6.72	4.02	10.73
J05	25 x 50	7.03	12.54	19.57	6.98	7.73	14.71	6.92	5.27	12.20	6.85	3.93	10.78
K01	30 x 25	4.28	14.84	19.12	4.26	8.63	12.89	4.25	5.50	9.74	4.22	3.82	8.04
K02	30 x 30	4.46	13.40	17.86	4.44	7.87	12.31	4.41	5.08	9.49	4.38	3.58	7.96
K03	30 x 35	4.63	12.27	16.91	4.61	7.29	11.90	4.57	4.77	9.34	4.53	3.41	7.94
K04	30 x 40	4.80	11.38	16.18	4.77	6.84	11.61	4.73	4.54	9.26	4.67	3.29	7.96
K45	30 x 45	4.96	10.66	15.62	4.92	6.49	11.41	4.87	4.37	9.23	4.80	3.21	8.01
K05	30 x 50	5.12	10.07	15.19	5.07	6.21	11.28	5.00	4.23	9.24	4.92	3.15	8.07
A01	35 x 25	3.19	11.98	15.18	3.18	6.97	10.15	3.16	4.44	7.60	3.14	3.09	6.22
A02	35 x 30	3.35	10.89	14.24	3.33	6.40	9.73	3.31	4.13	7.43	3.28	2.91	6.18
A03	35 x 35	3.51	10.03	13.53	3.48	5.96	9.44	3.45	3.89	7.34	3.40	2.78	6.18
A04	35 x 40	3.66	9.34	13.00	3.62	5.62	9.24	3.58	3.72	7.30	3.52	2.69	6.22
A45	35 x 45	3.80	8.78	12.58	3.76	5.35	9.10	3.70	3.59	7.29	3.64	2.63	6.27
A05	35 x 50	3.94	8.32	12.26	3.89	5.13	9.02	3.82	3.49	7.31	3.74	2.59	6.33
A06	35 x 63	4.26	7.46	11.72	4.19	4.75	8.94	4.09	3.34	7.43	3.98	2.54	6.53
A08	35 x 80	4.63	6.76	11.39	4.52	4.48	9.00	4.38	3.26	7.64	4.23	2.54	6.78
A10	35 x 105	5.03	6.19	11.21	4.87	4.30	9.17	4.69	3.24	7.93	4.49	2.59	7.08
N04	40 x 40	2.90	7.84	10.74	2.87	4.71	7.58	2.82	3.12	5.94	2.77	2.25	5.02
N05	40 x 50	3.15	7.03	10.18	3.10	4.33	7.43	3.04	2.94	5.98	2.96	2.18	5.14
N06	40 x 63	3.45	6.34	9.79	3.37	4.03	7.41	3.28	2.83	6.11	3.17	2.14	5.31
N08	40 x 80	3.79	5.78	9.57	3.68	3.83	7.50	3.54	2.77	6.31	3.39	2.15	5.54
N10	40 x 105	4.18	5.33	9.51	4.02	3.70	7.71	3.83	2.77	6.60	3.63	2.19	5.83
B05	50 x 50	2.20	5.25	7.45	2.15	3.23	5.38	2.09	2.19	4.27	2.01	1.61	3.62
B06	50 x 63	2.44	4.79	7.23	2.37	3.04	5.40	2.27	2.11	4.39	2.17	1.59	3.76
B08	50 x 80	2.72	4.41	7.14	2.61	2.90	5.52	2.48	2.08	4.56	2.34	1.60	3.94
B09	50 x 92	2.90	4.24	7.14	2.76	2.86	5.62	2.60	2.09	4.69	2.44	1.61	4.06
B10	50 x 105	3.07	4.12	7.18	2.90	2.83	5.74	2.72	2.10	4.81	2.53	1.63	4.17

PROCESS CONSIDERATIONS

SOLDERING

Preheat

Don't exceed the maximum storage temperature while preheating the capacitors. If this cannot be avoided, contact the supplier first.

Temperature and Duration

Strictly adhere to soldering conditions for temperature, duration and minimum distance of solder from body. Don't contact insulating sleeve or other plastic parts with a soldering iron or molten solder. Reflow solder only SMT types, and then only one reflow cycle. Contact the supplier if more than one reflow is necessary.

Care after Soldering

Do not exert any mechanical force like bending, straightening, twisting or tilting of capacitors after soldering into a printed circuit board.

Handling Assembled Devices

During transport and handling of assembled devices do not misuse capacitors as a handle. Ensure that capacitors are protected from physical damage during mounting of printed circuit boards into assemblies or during stacking.

Halogenated-Solvent Cleaning

Halogenated hydrocarbon solvents (CFC) are ozone depleting chemicals harmful to the environment. Such solvents can penetrate the capacitors' seals and cause corrosion and failure when voltage is applied, and so use them to clean aluminum electrolytic capacitors only to the limited conditions given by the component supplier and then only as a last resort. Solvent-proof miniature capacitors and capacitors with epoxy endseals are available for limited use with halogenated solvents.

Aqueous Cleaning

Water with a mild detergent may be used to clean aluminum electrolytic capacitors. However, immediately dry the capacitors in hot air at about 85 °C for 5 or more minutes but not hotter than the capacitors' maximum storage temperature. Water can become trapped beneath the sleeve which may not be dispelled by evaporation at room temperature. Water can be trapped under the sleeve and cause hydration and discoloration of the aluminum cases; although this does not affect capacitor operation.

Alcohol Cleaning

Alcohol solvents like isopropanol, methanol, ethanol and propanol have no harmful effects on aluminum electrolytic capacitors. While they are fine for cleaning, they are not very effective in removal of commercial soldering fluxes.

Cleaning Precautions

The capacitor's insulating sleeve may re-shrink or crack if rapidly heated to above 100 °C just after cleaning. If the solder flux contains chlorine as many active flux types do, frequently regenerate or replace the cleaning solvent to avoid damaging the capacitors. Cleaning solvents may swell the insulating sleeves and affect the legibility of marking if applied too long or with too high mechanical forces or temperatures.

Potting and Gluing

Be certain that varnishing, coating, lacquering, embedding and gluing near the capacitors' seals are halogen free. And be sure all constituent parts including base material, thinners, binders, reacting agents, propellants and additives are halogen free. If the printed circuit board has been cleaned with halogenated solvent, be sure it's fully dry before installation of capacitors. When gluing, don't apply glue to the full capacitor circumference, and don't cover the capacitors' pressure-relief vent with potting or glue.

Fumigation Warning

International shipments of electronic equipment are often in wooden crates, and these crates may be fumigated with methyl bromide gas during shipment to control insect infestation. Also, some factories such as flourmills are routinely fumigated with this gas. Methyl bromide can penetrate cardboard boxes, vinyl bags and other packaging materials used to protect the equipment. Methyl bromide can also penetrate the seals of aluminum electrolytic capacitors; cause corrosion and cause open-circuit capacitor failure after the equipment is put into service.

Beginning in 2005 methyl bromide use has been limited to applications with EPA Critical Use Exemptions for specific agricultural and food-processing use.

To protect aluminum electrolytic capacitors against such failures use capacitors proven to be able to withstand fumigation or individually sealed to prevent penetration of the methyl bromide gas. Screw terminal capacitors with rubber vent plugs are the most susceptible type.

MOUNTING

Mounting Position

Aluminum electrolytic capacitors have longer operating lives at lower ambient temperatures; so, put the capacitors at the coolest place on the board. Ensure that aluminum electrolytic capacitors are away from hot components like power resistors, power transistors or diodes and transformers. Adequately space components apart for cooling air to circulate. Ensure that aluminum electrolytic capacitors are away from hot components like power resistors, power transistors or diodes and transformers. Adequately space components apart for cooling air to circulate. This is especially important when high ripple current or charge/discharge loads are applied.

Mount screw-terminal capacitors upright with terminals up or horizontally with pressure-relief vent plug at the 12-O'clock position; so, the least amount of electrolyte will be expelled if the vent operates. Do not mount upside down with terminals down as this may reduce the operating life and could impair the operation of the pressure-relief vent.

Place the capacitors so that a person working on the equipment would be protected from the hot vapor in the event that a vent was to operate.

Horizontal Mounting

One maker of high voltage screw terminal aluminum electrolytic capacitors reports that if mounted horizontally, the positive terminal should be above the negative terminal to avoid corrosion. This is not needed with Cornell Dubilier capacitors, but if you advocate better safe than sorry, you can mount the capacitor with the vent plug at the 11-O'clock position, so the positive terminal would be higher.

For high-ripple-current applications of screw terminal aluminum electrolytic capacitors with extended paper, horizontal moun-

ting shortens the lifetime. With heating from ripple current the electrolyte in such capacitors may bleed from the winding, and puddle along the side of the can where there is no paper to wick it back into the winding. If the ripple current is low (less than half of rated 85 °C current), this is not an issue. But if the ripple current is high, the effect is accelerated due both to the increasing temperature driving the electrolyte out faster and to the drying of the wet paper where it is crushed into the can bottom. The drying of the paper can thermally insulate the element causing it to get hotter and the can bottom to get cooler. This can actually turn into a thermal runaway condition that can greatly reduce the capacitor lifetime, sometimes by as much as 90%.

The possible solutions are 1) to mount such capacitors upright, 2) use Thermal Pak construction with extended cathode foil, 3) use rilled construction with the element secured by dimples in the can wall, or use potted construction where the element is anchored with pitch. If the capacitor is upright, the electrolyte is able to readily wick back into the winding, and the thermal contact and ESR do not degrade significantly. Thermal runaway does not occur, and the expected lifetime is achieved.

If a Thermal Pak extended-cathode capacitor is mounted horizontally, the thermal insulation does not occur because the thermal contact never degrades. However, the lifetime may still be somewhat shortened because of electrolyte loss. Life reduction may be more than 10% with rated 85 °C ripple. Because the thermal contact does not degrade, there is no thermal runaway.

If a potted construction capacitor is mounted horizontally, increased heating does not occur because the electrolyte does not readily escape the winding, and the thermal contact never degrades. Potted construction has limited availability because of environmental issues and is currently not available in Cornell Dubilier capacitors.

Position of the Pressure-Relief Vent

Aluminum electrolytic capacitors with liquid electrolyte have pressure-relief vents. The vents are scored lines or patterns on the end or side of the cans or rubber plugs in the molded tops. Vents are designed to rupture, release gas and electrolyte vapor, and prevent possible explosion from pressure build up during capacitor abuse, e.g. overvoltage, reverse voltage or application of AC voltage.

Provide adequate clearance for proper operation of the pressure-relief vent. The following distances are a guide.

Nominal Case Diameter	Space around pressure relief device
< 16 mm	> 2 mm
> 16 mm to < 40 mm	> 3 mm
> 40 mm	> 5 mm

Mount the capacitors with the vents up to reduce the amount of electrolyte expelled if a vent operates.

Polarity indication

Aluminum electrolytic capacitors are normally polarized and

require correct-polarity installation in the circuitry. To ensure correct mounting and identification of the polarity, put a clear + and/or – on the board layout marking. If the circuit voltage can reverse polarity or is unknown, consider using non-polar capacitors. Disadvantages are that non-polar capacitors are larger and more expensive.

Printed-Circuit Board Precautions

Avoid positioning holes in places where parts of a capacitor could be on the other side and be touched by molten solder. Because the can and sometimes extra terminals of an aluminum electrolytic capacitor have resistive connections to the negative terminal through the electrolyte, don't locate tracks or lands under upright capacitors, don't permit metal capacitor parts other than active terminals to contact conductive tracks or other components, and leave dummy pins voltage free.

Handling Terminals

Before handling a capacitor be sure it is sufficiently discharged. To avoid damaging the capacitor, don't bend rigid terminals, and be sure to clamp the terminals during cutting or bending to avoid excess stress on terminations, welds and capacitor seals. Don't use extra force to insert capacitors. If they cannot be inserted easily, correct the problem. Discard capacitors showing signs of mechanical damage.

Screw-Terminal Torque

Excess torque during tightening screws into terminals may affect the performance of the capacitor or damage the terminal. The following torque settings are recommended. Be certain that at least six screw threads are engaged.

Terminal	Recommended Torque
10–32, Low Post	25 in-lb, 2.8 N-m
10–32, High Post	25 in-lb, 2.8 N-m
¼–28, Low Post	50 in-lb, 5.6 N-m
¼–28, High Post	60 in-lb, 6.8 N-m
Small M5 Post	25 in-lb, 2.8 N-m
M5 Post	30 in-lb, 3.4 N-m
M6 Low Post	50 in-lb, 6.8 N-m
M6 High Post	60 in-lb, 6.8 N-m

Screw-Terminal Current Rating

For normal operation the maximum recommended continuous AC currents for screw terminals are as tabulated below.

Terminal	Maximum Current
10–32, Low Post	30 Aac
10–32, High Post	30 Aac
¼–28, Low Post	50 Aac
¼–28, High Post	50 Aac
Small M5 Post	30 Aac
M5 Post	35 Aac
M6 Low Post	50 Aac
M6 High Post	60 Aac

The ripple current ratings may exceed the currents listed here. Terminals can withstand continuous currents of more than double the maximum currents listed if you assure gas-tight connections to avoid formation of aluminum oxide. Use Belleville washers and a commercial electrical joint compound, e.g. Penetrox A, and tighten the terminals to the recommended torque for the washers.

Mounting-Stud Torque

Screw-terminal, capacitors are available with threaded mounting studs on the can bottoms, and nylon nuts are available for insulated mounting. The following torque settings are recommended.

Nylon Nut Thread	Recommended Torque
M8	25 in-lb, 2.8 N-m
M12	75 in-lb, 8.5 N-m

DISPOSAL OF CAPACITORS

Aluminum electrolytic capacitors with non-solid electrolyte principally include high-purity aluminum foils, capacitor paper, electrolyte, aluminum case, cover and sealing parts (phenolic, thermoplastic, rubber and phenolic board), insulating sleeve (polypropylene, polyester or polyvinylchloride) and, perhaps, safety-vent plugs made of synthetic rubber. If incinerated, be certain that the temperature is more than 1200 °C. Disposal is permitted in appropriate landfills.

Type SLPX 85 °C Snap-In Aluminum Electrolytic

Best Value 85 °C Snap-In Type



Type SLPX is the best value package snap-in series for 85 °C, 3000 h operation. This series is the most cost-effective choice for DC filtering and power supply applications where long life and high ripple capability are needed.

Highlights

- 3000 h ripple load life at rated voltage
- 85 °C rated
- Small case size with high capacitance
- Best for switching power supplies
- 22 mm to 35 mm diameter, 10 mm lead spacing
- Great value snap-in type
- High ripple current

Specifications

Temperature Range	-40 °C to +85 °C ≤ 250 Vdc -25 °C to +85 °C ≥ 315 Vdc				
Rated Voltage Range	10 Vdc to 450 Vdc				
Capacitance Range	68 µF to 82,000 µF				
Capacitance Tolerance	±20%				
Leakage Current	≤ 3 √CV µA at 5 minutes				
Ripple Current Multipliers	Ambient Temperature				
	20 °C - 45 °C	55 °C	65 °C - 75 °C	85 °C	
	1.58	1.41	1.22	1.00	
	Frequency				
	Voltage	60 Hz	120 Hz	1 kHz	10 kHz & Up
	10 - 100 Vdc	0.90	1.00	1.15	1.25
	160 - 450 Vdc	0.80	1.00	1.15	1.47
To apply multipliers, see ratings tables for ripple current values					
Low Temperature Characteristics	Impedance ratio: Z _{-20°C} /Z _{+25°C} ≤ 10 (10 Vdc) ≤ 8 (16–50 Vdc) ≤ 4 (63–100 Vdc) ≤ 3 (150–450 Vdc)				
Endurance Life	3,000 h @ full load @ 85 °C Δ Capacitance ±20% ESR ≤200% of limit DCL 100 % of limit				
Shelf Life	1,000 h @ 85 °C Δ Capacitance ±15% ESR ≤150% of limit DCL 100 % of limit				
Vibration	10 Hz to 55 Hz 0.06” and 10g max 2 h in each plane				
RoHS Compliant					

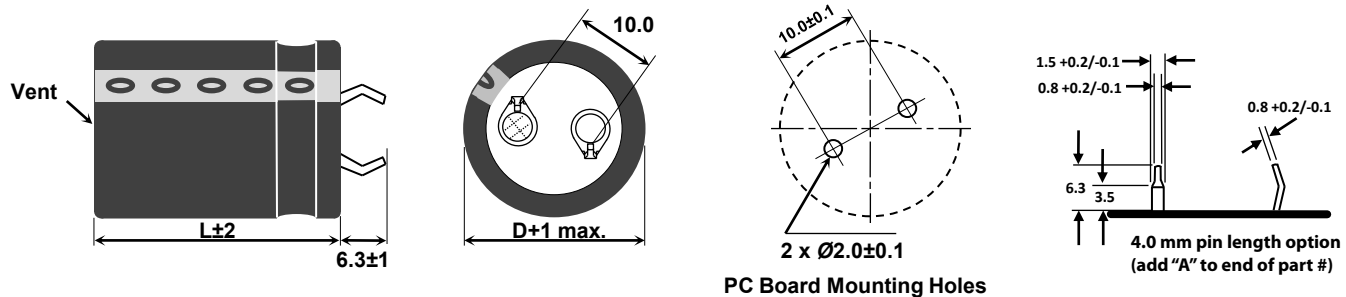
Type SLPX 85 °C Snap-In Aluminum Electrolytic

Best Value 85 °C Snap-In Type Part Numbering System

SLPX	562	M	025	A1	P	3	A
Type	Cap	Tolerance	Voltage	Case Code	Polarity	Insulating Sleeve	Pin Style
SLPX	821 = 820 μ F 332 = 3300 μ F 103 = 10,000 μ F	M = $\pm$ 20%	025 = 25 Vdc 250 = 250 Vdc		P = Polarized	3 = PVC	Blank = 2 pins snap-in 6.3 mm L A = 2 pins snap-in 4.0 mm L

Diameter	Length					
	25	30	35	40	45	50
mm (in)	(1.00)	(1.18)	(1.38)	(1.57)	(1.77)	(2.00)
22 (0.87)	A1	A3	A5	A7	A4	A9
25 (1.00)	C1	C3	C5	C7	C4	C9
30 (1.18)	E1	E3	E5	E7	E4	E9
35 (1.38)	H1	H3	H5	H7	H4	H9

Outline Drawing



Ratings

Cap (μ F)	3000 h @ 85 °C Catalog Part Number	Max 25 °C ESR (Ω) 120 Hz 20kHz	Max 85 °C Ripple (A_{rms}) 120 Hz 20kHz	Nominal Size (DxL) (mm)
10 Vdc (13 Vdc Surge)				
12000	SLPX123M010A1P3	0.061	0.046	2.41 3.01 22 x 25
15000	SLPX153M010A3P3	0.049	0.037	2.88 3.60 22 x 30
15000	SLPX153M010C1P3	0.049	0.037	2.88 3.60 25 x 25
18000	SLPX183M010A5P3	0.041	0.031	3.22 4.03 22 x 35
18000	SLPX183M010C3P3	0.041	0.031	3.08 3.85 25 x 30
22000	SLPX223M010A7P3	0.033	0.025	3.79 4.74 22 x 40
22000	SLPX223M010C3P3	0.033	0.025	3.66 4.58 25 x 30
22000	SLPX223M010E1P3	0.033	0.025	3.53 4.41 30 x 25
27000	SLPX273M010A4P3	0.027	0.020	4.04 5.05 22 x 45
27000	SLPX273M010C5P3	0.027	0.020	4.04 5.05 25 x 35
27000	SLPX273M010E3P3	0.027	0.020	3.99 4.99 30 x 30
33000	SLPX333M010A9P3	0.022	0.017	4.58 5.73 22 x 50
33000	SLPX333M010C7P3	0.022	0.017	4.56 5.70 25 x 40
33000	SLPX333M010E3P3	0.022	0.017	4.58 5.73 30 x 30
39000	SLPX393M010C4P3	0.019	0.014	5.29 6.61 25 x 45
39000	SLPX393M010E5P3	0.019	0.014	5.21 6.51 30 x 35
39000	SLPX393M010H3P3	0.019	0.014	5.50 6.88 35 x 30
47000	SLPX473M010C9P3	0.016	0.012	5.78 7.23 25 x 50
47000	SLPX473M010E7P3	0.016	0.012	5.78 7.23 30 x 40
47000	SLPX473M010H5P3	0.016	0.012	5.55 6.94 35 x 35
56000	SLPX563M010E4P3	0.013	0.010	6.59 8.24 30 x 45
56000	SLPX563M010H5P3	0.013	0.010	6.40 8.00 35 x 35

Additional Voltages and Sizes available at www.cde.com/catalogs/SLPX.pdf

Cap (μ F)	3000 h @ 85 °C Catalog Part Number	Max 25 °C ESR (Ω) 120 Hz 20kHz	Max 85 °C Ripple (A_{rms}) 120 Hz 20kHz	Nominal Size (DxL) (mm)
10 Vdc (13 Vdc Surge)				
68000	SLPX683M010E9P3	0.011	0.008	7.50 9.38 30 x 50
68000	SLPX683M010H7P3	0.011	0.008	7.48 9.35 35 x 40
82000	SLPX823M010H9P3	0.009	0.007	8.50 10.63 35 x 50
16 Vdc (20 Vdc Surge)				
8200	SLPX822M016A1P3	0.081	0.061	2.56 3.20 22 x 25
10000	SLPX103M016A3P3	0.066	0.050	2.89 3.61 22 x 30
12000	SLPX123M016A3P3	0.055	0.041	3.13 3.91 22 x 30
12000	SLPX123M016C1P3	0.055	0.041	3.01 3.76 25 x 25
15000	SLPX153M016A5P3	0.044	0.033	3.69 4.61 22 x 35
15000	SLPX153M016C3P3	0.044	0.033	3.64 4.55 25 x 30
15000	SLPX153M016E1P3	0.044	0.033	3.73 4.66 30 x 25
18000	SLPX183M016A7P3	0.037	0.028	3.98 4.98 22 x 40
18000	SLPX183M016C5P3	0.037	0.028	3.98 4.98 25 x 35
18000	SLPX183M016E3P3	0.037	0.028	3.88 4.85 30 x 30
22000	SLPX223M016A9P3	0.030	0.023	4.52 5.65 22 x 50
22000	SLPX223M016C7P3	0.030	0.023	4.44 5.55 25 x 40
22000	SLPX223M016E3P3	0.030	0.023	4.38 5.48 30 x 30
27000	SLPX273M016C4P3	0.025	0.019	4.98 6.23 25 x 45
27000	SLPX273M016E5P3	0.025	0.019	4.95 6.19 30 x 35
27000	SLPX273M016H3P3	0.025	0.019	4.82 6.03 35 x 30
33000	SLPX333M016C9P3	0.020	0.015	5.49 6.86 25 x 50
33000	SLPX333M016E7P3	0.020	0.015	5.60 7.00 30 x 40

Type SLPX 85 °C Snap-In Aluminum Electrolytic

Best Value 85 °C Snap-In Type

Additional Voltages and Sizes available at www.cde.com/catalogs/SLPX.pdf

Cap	3000 h @ 85 °C	Max 25 °C ESR		Max 85 °C Ripple		Nominal	Cap	3000 h @ 85 °C	Max 25 °C ESR		Max 85 °C Ripple		Nominal
Cap (µF)	Catalog Part Number	(Ω) 120 Hz	(Ω) 20kHz	(A _{rms}) 120 Hz	(A _{rms}) 20kHz	Size (DxL) (mm)	Cap (µF)	Catalog Part Number	(Ω) 120 Hz	(Ω) 20kHz	(A _{rms}) 120 Hz	(A _{rms}) 20kHz	Size (DxL) (mm)
16 Vdc (20 Vdc Surge)							35 Vdc (44 Vdc Surge)						
33000	SLPX333M016H3P3	0.020	0.015	5.46	6.83	35 x 30	10000	SLPX103M035C7P3	0.053	0.040	3.65	4.56	25 x 40
39000	SLPX393M016E4P3	0.017	0.013	6.21	7.76	30 x 45	10000	SLPX103M035E3P3	0.053	0.040	3.61	4.51	30 x 30
39000	SLPX393M016H5P3	0.017	0.013	6.12	7.65	35 x 35	12000	SLPX123M035C4P3	0.044	0.033	4.15	5.19	25 x 45
47000	SLPX473M016E9P3	0.014	0.011	6.93	8.66	30 x 50	12000	SLPX123M035E5P3	0.044	0.033	4.14	5.18	30 x 35
47000	SLPX473M016H7P3	0.014	0.011	6.89	8.61	35 x 40	12000	SLPX123M035H3P3	0.044	0.033	4.27	5.34	35 x 30
56000	SLPX563M016H4P3	0.012	0.009	7.69	9.61	35 x 45	15000	SLPX153M035C9P3	0.035	0.026	4.77	5.96	25 x 50
25 Vdc (32 Vdc Surge)							15000	SLPX153M035E7P3	0.035	0.026	4.80	6.00	30 x 40
5600	SLPX562M025A1P3	0.107	0.080	2.31	2.89	22 x 25	15000	SLPX153M035H5P3	0.035	0.026	4.95	6.19	35 x 35
6800	SLPX682M025A3P3	0.088	0.066	2.56	3.20	22 x 30	18000	SLPX183M035E4P3	0.029	0.022	5.30	6.63	30 x 45
8200	SLPX822M025A5P3	0.073	0.055	2.86	3.58	22 x 35	18000	SLPX183M035H7P3	0.029	0.022	5.71	7.14	35 x 40
8200	SLPX822M025C1P3	0.073	0.055	2.78	3.48	25 x 25	22000	SLPX223M035H4P3	0.024	0.018	6.38	7.98	35 x 45
10000	SLPX103M025A5P3	0.060	0.045	3.31	4.14	22 x 35	27000	SLPX273M035H9P3	0.020	0.015	6.90	8.63	35 x 50
10000	SLPX103M025C3P3	0.060	0.045	3.16	3.95	25 x 30	50 Vdc (63 Vdc Surge)						
10000	SLPX103M025E1P3	0.060	0.045	3.28	4.10	30 x 25	2200	SLPX222M050A1P3	0.211	0.158	1.93	2.41	22 x 25
12000	SLPX123M025A7P3	0.050	0.038	3.77	4.71	22 x 40	2700	SLPX272M050A3P3	0.172	0.129	2.21	2.76	22 x 30
12000	SLPX123M025C5P3	0.050	0.038	3.63	4.54	25 x 35	3300	SLPX332M050A3P3	0.141	0.106	2.41	3.01	22 x 30
12000	SLPX123M025E1P3	0.050	0.038	3.80	4.75	30 x 25	3300	SLPX332M050C1P3	0.141	0.106	2.38	2.98	25 x 25
15000	SLPX153M025A9P3	0.040	0.030	4.21	5.26	22 x 50	3900	SLPX392M050A5P3	0.119	0.089	2.72	3.40	22 x 35
15000	SLPX153M025C7P3	0.040	0.030	4.10	5.13	25 x 40	3900	SLPX392M050C3P3	0.119	0.089	2.68	3.35	25 x 30
15000	SLPX153M025E3P3	0.040	0.030	4.00	5.00	30 x 30	4700	SLPX472M050A7P3	0.099	0.074	3.02	3.78	22 x 40
18000	SLPX183M025C4P3	0.033	0.025	4.68	5.85	25 x 45	4700	SLPX472M050C3P3	0.099	0.074	3.07	3.84	25 x 30
18000	SLPX183M025E5P3	0.033	0.025	4.66	5.83	30 x 35	4700	SLPX472M050E1P3	0.099	0.074	3.01	3.76	30 x 25
18000	SLPX183M025H3P3	0.033	0.025	4.68	5.85	35 x 30	5600	SLPX562M050A7P3	0.083	0.062	3.26	4.08	22 x 40
22000	SLPX223M025C9P3	0.027	0.020	5.29	6.61	25 x 50	5600	SLPX562M050A4P3	0.083	0.062	3.43	4.29	22 x 45
22000	SLPX223M025E7P3	0.027	0.020	5.33	6.66	30 x 40	5600	SLPX562M050C5P3	0.083	0.062	3.47	4.34	25 x 35
22000	SLPX223M025H5P3	0.027	0.020	5.26	6.58	35 x 35	5600	SLPX562M050E3P3	0.083	0.062	3.43	4.29	30 x 30
27000	SLPX273M025E4P3	0.022	0.017	6.02	7.53	30 x 45	6800	SLPX682M050A9P3	0.068	0.051	3.94	4.93	22 x 50
27000	SLPX273M025H7P3	0.022	0.017	6.02	7.53	35 x 40	6800	SLPX682M050C7P3	0.068	0.051	3.87	4.84	25 x 40
33000	SLPX333M025E9P3	0.018	0.014	5.29	6.61	30 x 50	6800	SLPX682M050E5P3	0.068	0.051	3.93	4.91	30 x 35
33000	SLPX333M025H4P3	0.018	0.014	6.75	8.44	35 x 45	8200	SLPX822M050C4P3	0.057	0.043	4.44	5.55	25 x 45
39000	SLPX393M025H9P3	0.015	0.011	7.56	9.45	35 x 50	8200	SLPX822M050E5P3	0.057	0.043	4.47	5.59	30 x 35
35 Vdc (44 Vdc Surge)							8200	SLPX822M050H3P3	0.057	0.043	4.41	5.51	35 x 30
3900	SLPX392M035A1P3	0.136	0.102	2.22	2.78	22 x 25	10000	SLPX103M050E7P3	0.046	0.035	5.08	6.35	30 x 40
4700	SLPX472M035A3P3	0.113	0.085	2.46	3.08	22 x 30	10000	SLPX103M050H5P3	0.046	0.035	4.92	6.15	35 x 35
4700	SLPX472M035C1P3	0.113	0.085	2.43	3.04	25 x 25	12000	SLPX123M050E9P3	0.039	0.029	5.72	7.15	30 x 50
5600	SLPX562M035A3P3	0.095	0.071	2.61	3.26	22 x 30	12000	SLPX123M050H7P3	0.039	0.029	5.69	7.11	35 x 40
5600	SLPX562M035A5P3	0.095	0.071	2.79	3.49	22 x 35	15000	SLPX153M050H4P3	0.031	0.023	6.56	8.20	35 x 45
5600	SLPX562M035C3P3	0.095	0.071	2.75	3.44	25 x 30	18000	SLPX183M050H9P3	0.026	0.020	7.14	8.93	35 x 50
6800	SLPX682M035A7P3	0.078	0.059	2.97	3.71	22 x 40	22000	SLPX223M050H9P3	0.021	0.016	7.89	9.86	35 x 50
6800	SLPX682M035C3P3	0.078	0.059	2.89	3.61	25 x 30	63 Vdc (79 Vdc Surge)						
6800	SLPX682M035E1P3	0.078	0.059	3.09	3.86	30 x 25	1800	SLPX182M063A1P3	0.221	0.166	1.90	2.38	22 x 25
8200	SLPX822M035A4P3	0.065	0.049	3.47	4.34	22 x 45	2200	SLPX222M063A3P3	0.181	0.136	2.35	2.94	22 x 30
8200	SLPX822M035C5P3	0.065	0.049	3.33	4.16	25 x 35	2200	SLPX222M063C1P3	0.181	0.136	2.30	2.88	25 x 25
8200	SLPX822M035E3P3	0.065	0.049	3.29	4.11	30 x 30	2700	SLPX272M063A5P3	0.147	0.110	2.50	3.13	22 x 35
10000	SLPX103M035A9P3	0.053	0.040	3.75	4.69	22 x 50	2700	SLPX272M063C3P3	0.147	0.110	2.52	3.15	25 x 30

Type SLPX 85 °C Snap-In Aluminum Electrolytic

Best Value 85 °C Snap-In Type

Additional Voltages and Sizes available at www.cde.com/catalogs/SLPX.pdf

Cap	3000 h @ 85 °C	Max 25 °C ESR		Max 85 °C Ripple		Nominal	Cap	3000 h @ 85 °C	Max 25 °C ESR		Max 85 °C Ripple		Nominal	
Cap (µF)	Catalog Part Number	(Ω)		(A _{rms})		Size (DxL)	Cap (µF)	Catalog Part Number	(Ω)		(A _{rms})		Size (DxL)	
		120 Hz	20kHz	120 Hz	20kHz	(mm)			120 Hz	20kHz	120 Hz	20kHz	(mm)	
63 Vdc (79 Vdc Surge)							80 Vdc (100 Vdc Surge)							
3300	SLPX332M063A7P3	0.121	0.091	2.72	3.40	22 x 40	8200	SLPX822M080H4P3	0.040	0.030	5.89	7.36	35 x 45	
3300	SLPX332M063C3P3	0.121	0.091	2.74	3.43	25 x 30	10000	SLPX103M080E9P3	0.033	0.025	6.63	8.29	35 x 50	
3300	SLPX332M063E1P3	0.121	0.091	2.78	3.48	30 x 25	100 Vdc (125 Vdc Surge)							
3900	SLPX392M063A4P3	0.102	0.077	3.09	3.86	22 x 45	820	SLPX821M100A1P3	0.324	0.243	1.86	2.33	22 x 25	
3900	SLPX392M063C5P3	0.102	0.077	3.13	3.91	25 x 35	1000	SLPX102M100A3P3	0.265	0.199	2.02	2.53	22 x 30	
3900	SLPX392M063E3P3	0.102	0.077	3.09	3.86	30 x 30	1200	SLPX122M100A3P3	0.221	0.166	2.12	2.65	22 x 30	
4700	SLPX472M063A9P3	0.085	0.064	3.69	4.61	22 x 50	1200	SLPX122M100C1P3	0.221	0.166	2.11	2.64	25 x 25	
4700	SLPX472M063C7P3	0.085	0.064	3.59	4.49	25 x 40	1500	SLPX152M100A5P3	0.177	0.133	2.45	3.06	22 x 35	
4700	SLPX472M063E3P3	0.085	0.064	3.54	4.43	30 x 30	1500	SLPX152M100C3P3	0.177	0.133	2.47	3.09	25 x 30	
5600	SLPX562M063C4P3	0.071	0.053	4.01	5.01	25 x 45	1800	SLPX182M100A7P3	0.147	0.110	2.77	3.46	22 x 40	
5600	SLPX562M063E5P3	0.071	0.053	4.00	5.00	30 x 35	1800	SLPX182M100C5P3	0.147	0.110	2.81	3.51	25 x 35	
5600	SLPX562M063H3P3	0.071	0.053	3.75	4.69	35 x 30	1800	SLPX182M100E1P3	0.147	0.110	2.65	3.31	30 x 25	
6800	SLPX682M063C9P3	0.059	0.044	4.52	5.65	25 x 50	2200	SLPX222M100A4P3	0.121	0.091	3.15	3.94	22 x 45	
6800	SLPX682M063E7P3	0.059	0.044	4.55	5.69	30 x 40	2200	SLPX222M100C7P3	0.121	0.091	3.21	4.01	25 x 40	
6800	SLPX682M063H3P3	0.059	0.044	4.44	5.55	35 x 30	2200	SLPX222M100E3P3	0.121	0.091	3.17	3.96	30 x 30	
8200	SLPX822M063E4P3	0.049	0.037	5.12	6.40	30 x 45	2700	SLPX272M100C4P3	0.098	0.074	3.66	4.58	25 x 45	
8200	SLPX822M063H5P3	0.049	0.037	5.05	6.31	35 x 35	2700	SLPX272M100E5P3	0.098	0.074	3.65	4.56	30 x 35	
10000	SLPX103M063E9P3	0.040	0.030	5.78	7.23	30 x 50	2700	SLPX272M100H3P3	0.098	0.074	3.77	4.71	35 x 30	
10000	SLPX103M063H7P3	0.040	0.030	5.75	7.19	35 x 40	3300	SLPX332M100C9P3	0.080	0.060	4.15	5.19	25 x 50	
12000	SLPX123M063E9P3	0.033	0.025	6.20	7.75	30 x 50	3300	SLPX332M100E7P3	0.080	0.060	4.18	5.23	30 x 40	
12000	SLPX123M063H4P3	0.033	0.025	6.47	8.09	35 x 45	3300	SLPX332M100H5P3	0.080	0.060	4.07	5.09	35 x 35	
12000	SLPX123M063H9P3	0.033	0.025	6.76	8.45	35 x 50	3900	SLPX392M100E4P3	0.068	0.051	4.67	5.84	30 x 45	
80 Vdc (100 Vdc Surge)							3900	SLPX392M100H5P3	0.068	0.051	4.61	5.76	35 x 35	
1200	SLPX122M080A1P3	0.276	0.207	1.77	2.21	22 x 25	4700	SLPX472M100H7P3	0.056	0.042	5.23	6.54	35 x 40	
1500	SLPX152M080A3P3	0.221	0.166	2.01	2.51	22 x 30	4700	SLPX472M100E9P3	0.056	0.042	5.26	6.58	30 x 50	
1800	SLPX182M080A3P3	0.184	0.138	2.11	2.64	22 x 30	5600	SLPX562M100H4P3	0.047	0.035	5.88	7.35	35 x 45	
1800	SLPX182M080C1P3	0.184	0.138	2.26	2.83	25 x 25	6800	SLPX682M100H9P3	0.039	0.029	6.01	7.51	35 x 50	
2200	SLPX222M080A7P3	0.151	0.113	2.53	3.16	22 x 40	160 Vdc (200 Vdc Surge)							
2200	SLPX222M080C3P3	0.151	0.113	2.53	3.16	25 x 30	390	SLPX391M160A1P3	0.510	0.383	1.63	2.40	22 x 25	
2200	SLPX222M080E1P3	0.151	0.113	2.56	3.20	30 x 25	470	SLPX471M160A3P3	0.423	0.317	1.86	2.73	22 x 30	
2700	SLPX272M080A4P3	0.123	0.092	2.93	3.66	22 x 45	470	SLPX471M160C1P3	0.423	0.317	1.86	2.73	25 x 25	
2700	SLPX272M080C5P3	0.123	0.092	2.93	3.66	25 x 35	560	SLPX561M160A3P3	0.355	0.266	2.15	3.16	22 x 30	
2700	SLPX272M080E3P3	0.123	0.092	2.91	3.64	30 x 30	560	SLPX561M160C3P3	0.355	0.266	2.15	3.16	25 x 30	
3300	SLPX332M080A9P3	0.101	0.076	3.23	4.04	22 x 50	680	SLPX681M160A7P3	0.293	0.220	2.35	3.45	22 x 40	
3300	SLPX332M080C7P3	0.101	0.076	3.29	4.11	25 x 40	680	SLPX681M160C3P3	0.293	0.220	2.33	3.43	25 x 30	
3300	SLPX332M080E3P3	0.101	0.076	3.25	4.06	30 x 30	680	SLPX681M160E1P3	0.293	0.220	2.33	3.43	30 x 25	
3900	SLPX392M080C4P3	0.085	0.064	3.62	4.53	25 x 45	820	SLPX821M160A4P3	0.243	0.182	2.68	3.94	22 x 45	
3900	SLPX392M080E5P3	0.085	0.064	3.70	4.63	30 x 35	820	SLPX821M160C5P3	0.243	0.182	2.65	3.90	25 x 35	
4700	SLPX472M080C9P3	0.071	0.053	4.28	5.35	25 x 50	820	SLPX821M160E3P3	0.243	0.182	2.64	3.88	30 x 30	
4700	SLPX472M080E7P3	0.071	0.053	4.23	5.29	30 x 40	1000	SLPX102M160A9P3	0.199	0.149	3.02	4.44	22 x 50	
4700	SLPX472M080H3P3	0.071	0.053	4.12	5.15	35 x 30	1000	SLPX102M160C7P3	0.199	0.149	3.00	4.41	25 x 40	
5600	SLPX562M080E4P3	0.059	0.044	4.70	5.88	30 x 45	1000	SLPX102M160E3P3	0.199	0.149	2.96	4.35	30 x 30	
5600	SLPX562M080H5P3	0.059	0.044	4.64	5.80	35 x 35	1200	SLPX122M160C4P3	0.166	0.125	3.43	5.04	25 x 45	
6800	SLPX682M080E9P3	0.049	0.037	5.27	6.59	30 x 50	1200	SLPX122M160E5P3	0.166	0.125	3.41	5.01	30 x 35	
6800	SLPX682M080H7P3	0.049	0.037	5.24	6.55	35 x 40	1200	SLPX122M160H3P3	0.166	0.125	3.40	5.00	35 x 30	

Type SLPX 85 °C Snap-In Aluminum Electrolytic

Best Value 85 °C Snap-In Type

Additional Voltages and Sizes available at www.cde.com/catalogs/SLPX.pdf

Cap	3000 h @ 85 °C	Max 25 °C ESR		Max 85 °C Ripple		Nominal
(µF)	Catalog	(Ω)		(A _{rms})		Size (DxL)
	Part Number	120 Hz	20kHz	120 Hz	20kHz	(mm)
160 Vdc (200 Vdc Surge)						
1500	SLPX152M160E7P3	0.133	0.100	3.96	5.82	30 x 40
1500	SLPX152M160H5P3	0.133	0.100	3.94	5.79	35 x 35
1800	SLPX182M160E4P3	0.111	0.083	4.31	6.34	30 x 45
1800	SLPX182M160H5P3	0.111	0.083	4.28	6.29	35 x 35
2200	SLPX222M160H7P3	0.090	0.068	4.96	7.29	35 x 40
2700	SLPX272M160H9P3	0.074	0.056	5.57	8.19	35 x 50
180 Vdc (225 Vdc Surge)						
330	SLPX331M180A1P3	0.603	0.452	1.49	2.19	22 x 25
390	SLPX391M180A1P3	0.510	0.383	1.84	2.70	22 x 25
470	SLPX471M180A3P3	0.423	0.317	1.91	2.81	22 x 30
470	SLPX471M180C1P3	0.423	0.317	2.08	3.06	25 x 25
560	SLPX561M180A5P3	0.355	0.266	2.25	3.31	22 x 35
560	SLPX561M180C1P3	0.355	0.266	2.25	3.31	25 x 25
680	SLPX681M180A5P3	0.293	0.220	2.48	3.65	22 x 35
680	SLPX681M180C3P3	0.293	0.220	2.50	3.68	25 x 30
680	SLPX681M180E1P3	0.293	0.220	2.46	3.62	30 x 25
820	SLPX821M180A7P3	0.243	0.182	2.86	4.20	22 x 40
820	SLPX821M180C5P3	0.243	0.182	2.75	4.04	25 x 35
820	SLPX821M180E1P3	0.243	0.182	2.69	3.95	30 x 25
1000	SLPX102M180C7P3	0.199	0.149	3.06	4.50	25 x 40
1000	SLPX102M180E3P3	0.199	0.149	3.10	4.56	30 x 30
1200	SLPX122M180C4P3	0.166	0.125	3.63	5.34	25 x 45
1200	SLPX122M180E5P3	0.166	0.125	3.55	5.22	30 x 35
1200	SLPX122M180H3P3	0.166	0.125	3.49	5.13	35 x 30
1500	SLPX152M180E7P3	0.133	0.100	4.10	6.03	30 x 40
1500	SLPX152M180H5P3	0.133	0.100	4.02	5.91	35 x 35
1800	SLPX182M180E4P3	0.111	0.083	4.55	6.69	30 x 45
1800	SLPX182M180H5P3	0.111	0.083	4.54	6.67	35 x 35
2200	SLPX222M180H7P3	0.090	0.068	4.83	6.04	35 x 40
2700	SLPX272M180H9P3	0.074	0.056	5.30	6.63	35 x 50
200 Vdc (250 Vdc Surge)						
270	SLPX271M200A1P3	0.737	0.553	1.37	2.01	22 x 25
330	SLPX331M200A3P3	0.603	0.452	1.63	2.40	22 x 30
330	SLPX331M200A1P3	0.603	0.452	1.51	2.22	22 x 25
390	SLPX391M200A3P3	0.510	0.383	1.73	2.54	22 x 30
390	SLPX391M200C1P3	0.510	0.383	1.71	2.51	25 x 25
470	SLPX471M200A3P3	0.423	0.317	1.97	2.90	22 x 30
470	SLPX471M200C3P3	0.423	0.317	1.95	2.87	25 x 30
560	SLPX561M200A7P3	0.355	0.266	2.18	3.20	22 x 40
560	SLPX561M200C3P3	0.355	0.266	2.15	3.16	25 x 30
560	SLPX561M200E1P3	0.355	0.266	2.15	3.16	30 x 25
680	SLPX681M200A4P3	0.293	0.220	2.48	3.65	22 x 45
680	SLPX681M200C5P3	0.293	0.220	2.48	3.65	25 x 35
680	SLPX681M200E3P3	0.293	0.220	2.48	3.65	30 x 30
820	SLPX821M200A9P3	0.243	0.182	2.81	4.13	22 x 50
200 Vdc (250 Vdc Surge)						
820	SLPX821M200C7P3	0.243	0.182	2.79	4.10	25 x 40
820	SLPX821M200E3P3	0.243	0.182	2.75	4.04	30 x 30
1000	SLPX102M200C4P3	0.199	0.149	3.28	4.82	25 x 45
1000	SLPX102M200E5P3	0.199	0.149	3.15	4.63	30 x 35
1000	SLPX102M200H3P3	0.199	0.149	3.25	4.78	35 x 30
1200	SLPX122M200C9P3	0.166	0.125	3.61	5.31	25 x 50
1200	SLPX122M200E7P3	0.166	0.125	3.61	5.31	30 x 40
1200	SLPX122M200E4P3	0.166	0.125	3.80	5.59	30 x 45
1200	SLPX122M200H5P3	0.166	0.125	3.57	5.25	35 x 35
1500	SLPX152M200E4P3	0.133	0.100	4.13	6.07	30 x 45
1500	SLPX152M200H5P3	0.133	0.100	3.85	5.66	35 x 35
1500	SLPX152M200H7P3	0.133	0.100	4.06	5.97	35 x 40
1500	SLPX152M200H4P3	0.133	0.100	4.26	6.26	35 x 45
1800	SLPX182M200H4P3	0.111	0.083	4.59	6.75	35 x 45
2200	SLPX222M200H9P3	0.090	0.068	5.25	7.72	35 x 50
220 Vdc (270 Vdc Surge)						
220	SLPX221M220A1P3	0.905	0.679	1.30	1.91	22 x 25
270	SLPX271M220A1P3	0.737	0.553	1.42	2.09	22 x 25
330	SLPX331M220A3P3	0.603	0.452	1.59	2.34	22 x 30
330	SLPX331M220C1P3	0.603	0.452	1.59	2.34	25 x 25
390	SLPX391M220A5P3	0.510	0.383	1.80	2.65	22 x 35
390	SLPX391M220C1P3	0.510	0.383	1.75	2.57	25 x 25
470	SLPX471M220A5P3	0.423	0.317	2.06	3.03	22 x 35
470	SLPX471M220C3P3	0.423	0.317	2.08	3.06	25 x 30
470	SLPX471M220E1P3	0.423	0.317	2.16	3.18	30 x 25
560	SLPX561M220A7P3	0.355	0.266	2.22	3.26	22 x 40
560	SLPX561M220C5P3	0.355	0.266	2.38	3.50	25 x 35
560	SLPX561M220E1P3	0.355	0.266	2.18	3.20	30 x 25
680	SLPX681M220A4P3	0.293	0.220	2.62	3.85	22 x 45
680	SLPX681M220C7P3	0.293	0.220	2.56	3.76	25 x 40
680	SLPX681M220E3P3	0.293	0.220	2.52	3.70	30 x 30
820	SLPX821M220C4P3	0.243	0.182	2.91	4.28	25 x 45
820	SLPX821M220E5P3	0.243	0.182	2.84	4.17	30 x 35
820	SLPX821M220H3P3	0.243	0.182	2.79	4.10	35 x 35
1000	SLPX102M220C9P3	0.199	0.149	3.53	5.19	25 x 50
1000	SLPX102M220E7P3	0.199	0.149	3.36	4.94	30 x 40
1000	SLPX102M220H3P3	0.199	0.149	3.29	4.84	35 x 30
1200	SLPX122M220E7P3	0.166	0.125	3.54	5.20	30 x 40
1200	SLPX122M220E4P3	0.166	0.125	3.72	5.47	30 x 45
1200	SLPX122M220H5P3	0.166	0.125	3.68	5.41	35 x 35
1500	SLPX152M220H7P3	0.133	0.100	4.10	5.13	35 x 40
1800	SLPX182M220H4P3	0.111	0.083	4.52	5.65	35 x 45
250 Vdc (300 Vdc Surge)						
220	SLPX221M250A1P3	0.905	0.679	1.24	1.82	22 x 25
270	SLPX271M250A3P3	0.737	0.553	1.50	2.21	22 x 30

Type SLPX 85 °C Snap-In Aluminum Electrolytic

Best Value 85 °C Snap-In Type

Additional Voltages and Sizes available at www.cde.com/catalogs/SLPX.pdf

Additional voltages and sizes available at www.cde.com/catalogs/SLPX.pdf													
Cap (µF)	3000 h @ 85 °C Catalog Part Number	Max 25 °C ESR (Ω) 120 Hz 20kHz		Max 85 °C Ripple (A _{rms}) 120 Hz 20kHz		Nominal Size (DxL) (mm)	Cap (µF)	3000 h @ 85 °C Catalog Part Number	Max 25 °C ESR (Ω) 120 Hz 20kHz		Max 85 °C Ripple (A _{rms}) 120 Hz 20kHz		Nominal Size (DxL) (mm)
250 Vdc (300 Vdc Surge)							315 Vdc (365 Vdc Surge)						
330	SLPX331M250A3P3	0.603	0.452	1.66	2.44	22 x 30	1000	SLPX102M315H9P3	0.199	0.149	3.57	4.46	35 x 50
330	SLPX331M250C1P3	0.603	0.452	1.61	2.37	25 x 25	350 Vdc (400 Vdc Surge)						
390	SLPX391M250A5P3	0.510	0.383	1.88	2.76	22 x 35	120	SLPX121M350A1P3	1.659	1.244	1.04	1.53	22 x 25
390	SLPX391M250C3P3	0.510	0.383	1.88	2.76	25 x 30	150	SLPX151M350A3P3	1.327	0.995	1.20	1.76	22 x 30
470	SLPX471M250A7P3	0.423	0.317	2.15	3.16	22 x 40	150	SLPX151M350C1P3	1.327	0.995	1.22	1.79	25 x 25
470	SLPX471M250C5P3	0.423	0.317	2.15	3.16	25 x 35	180	SLPX181M350A3P3	1.106	0.830	1.34	1.97	22 x 30
470	SLPX471M250E1P3	0.423	0.317	2.04	3.00	30 x 25	180	SLPX181M350C1P3	1.106	0.830	1.37	2.01	25 x 25
560	SLPX561M250A4P3	0.355	0.266	2.48	3.65	22 x 45	220	SLPX221M350A5P3	0.905	0.679	1.47	2.16	22 x 35
560	SLPX561M250C5P3	0.355	0.266	2.35	3.45	25 x 35	220	SLPX221M350C3P3	0.905	0.679	1.53	2.25	25 x 30
560	SLPX561M250E3P3	0.355	0.266	2.35	3.45	30 x 30	220	SLPX221M350E1P3	0.905	0.679	1.54	2.26	30 x 25
680	SLPX681M250C7P3	0.293	0.220	2.67	3.92	25 x 40	270	SLPX271M350A7P3	0.737	0.553	1.70	2.50	22 x 40
680	SLPX681M250E5P3	0.293	0.220	2.71	3.98	30 x 35	270	SLPX271M350C5P3	0.737	0.553	1.73	2.54	25 x 35
820	SLPX821M250C9P3	0.243	0.182	3.01	4.42	25 x 50	270	SLPX271M350E1P3	0.737	0.553	1.80	2.65	30 x 25
820	SLPX681M250E5P3	0.243	0.182	2.98	4.38	30 x 35	330	SLPX331M350A4P3	0.603	0.452	1.87	2.75	22 x 45
820	SLPX821M250H3P3	0.243	0.182	2.96	4.35	35 x 30	330	SLPX331M350C7P3	0.603	0.452	1.97	2.90	25 x 40
1000	SLPX102M250E5P3	0.199	0.149	3.20	4.70	30 x 35	330	SLPX331M350E3P3	0.603	0.452	2.03	2.98	30 x 30
1000	SLPX102M250E4P3	0.199	0.149	3.56	5.23	30 x 45	390	SLPX391M350C7P3	0.510	0.383	2.14	3.15	25 x 40
1000	SLPX102M250E9P3	0.199	0.149	3.73	5.48	30 x 50	390	SLPX391M350E5P3	0.510	0.383	2.23	3.28	30 x 35
1000	SLPX102M250H5P3	0.199	0.149	3.48	5.12	35 x 35	390	SLPX391M350H3P3	0.510	0.383	2.30	3.38	35 x 30
1200	SLPX122M250E9P3	0.166	0.125	3.99	5.87	30 x 50	470	SLPX471M350E5P3	0.423	0.317	2.53	3.72	30 x 35
1200	SLPX122M250H7P3	0.166	0.125	3.84	5.64	35 x 40	470	SLPX471M350H3P3	0.423	0.317	2.55	3.75	35 x 30
1500	SLPX152M250H4P3	0.133	0.100	4.33	6.37	35 x 45	560	SLPX561M350E7P3	0.355	0.266	2.73	4.01	30 x 40
1800	SLPX182M250H9P3	0.111	0.083	4.54	6.67	35 x 50	560	SLPX561M350H5P3	0.355	0.266	2.75	4.04	35 x 35
315 Vdc (365 Vdc Surge)							680	SLPX681M350H7P3	0.293	0.220	3.15	4.63	35 x 40
180	SLPX181M315A3P3	1.106	0.830	1.29	1.90	22 x 30	820	SLPX821M350H4P3	0.243	0.182	3.47	5.10	35 x 45
180	SLPX181M315C1P3	1.106	0.830	1.38	2.03	25 x 25	1000	SLPX102M350H9P3	0.199	0.149	3.60	5.29	35 x 50
220	SLPX221M315A5P3	0.905	0.679	1.41	2.07	22 x 35	385 Vdc (435 Vdc Surge)						
220	SLPX221M315C3P3	0.905	0.679	1.47	2.16	25 x 30	82	SLPX820M385A1P3	2.427	1.820	0.76	1.12	22 x 25
270	SLPX271M315A7P3	0.737	0.553	1.70	2.50	22 x 40	100	SLPX101M385A3P3	1.990	1.493	0.89	1.31	22 x 30
270	SLPX271M315C3P3	0.737	0.553	1.70	2.50	25 x 30	120	SLPX121M385A3P3	1.659	1.244	0.98	1.44	22 x 30
330	SLPX331M315A4P3	0.603	0.452	1.91	2.81	22 x 45	120	SLPX121M385C1P3	1.659	1.244	1.02	1.50	25 x 25
330	SLPX331M315C5P3	0.603	0.452	1.94	2.85	25 x 35	150	SLPX151M385A5P3	1.327	0.995	1.12	1.65	22 x 35
330	SLPX331M315E3P3	0.603	0.452	1.98	2.91	30 x 30	150	SLPX151M385C3P3	1.327	0.995	1.14	1.68	25 x 30
390	SLPX391M315A9P3	0.510	0.383	2.07	3.04	22 x 50	180	SLPX181M385A7P3	1.106	0.830	1.27	1.87	22 x 40
390	SLPX391M315C7P3	0.510	0.383	2.11	3.10	25 x 40	180	SLPX181M385C5P3	1.106	0.830	1.30	1.91	25 x 35
390	SLPX391M315E3P3	0.510	0.383	2.15	3.16	30 x 30	180	SLPX181M385E1P3	1.106	0.830	1.37	2.01	30 x 25
470	SLPX471M315C4P3	0.423	0.317	2.39	3.51	25 x 45	220	SLPX221M385A4P3	0.905	0.679	1.42	2.09	22 x 45
470	SLPX471M315E5P3	0.423	0.317	2.38	3.50	30 x 35	220	SLPX221M385C5P3	0.905	0.679	1.48	2.18	25 x 35
470	SLPX471M315H3P3	0.423	0.317	2.36	3.47	35 x 30	220	SLPX221M385E3P3	0.905	0.679	1.49	2.19	30 x 30
560	SLPX561M315E7P3	0.355	0.266	2.63	3.87	30 x 40	270	SLPX271M385C7P3	0.737	0.553	1.61	2.37	25 x 40
560	SLPX561M315H5P3	0.355	0.266	2.69	3.95	35 x 35	270	SLPX271M385E5P3	0.737	0.553	1.64	2.41	30 x 35
680	SLPX681M315E4P3	0.293	0.220	2.80	4.12	30 x 45	330	SLPX331M385C9P3	0.603	0.452	1.80	2.65	25 x 50
680	SLPX681M315H7P3	0.293	0.220	3.05	4.48	35 x 40	330	SLPX331M385E7P3	0.603	0.452	1.85	2.72	30 x 40
820	SLPX821M315E9P3	0.243	0.182	3.28	4.82	30 x 50	330	SLPX331M385H3P3	0.603	0.452	1.87	2.75	35 x 30
820	SLPX821M315H4P3	0.243	0.182	3.45	5.07	35 x 45	390	SLPX391M385E7P3	0.510	0.383	2.05	3.01	30 x 40

Type SLPX 85 °C Snap-In Aluminum Electrolytic

Best Value 85 °C Snap-In Type

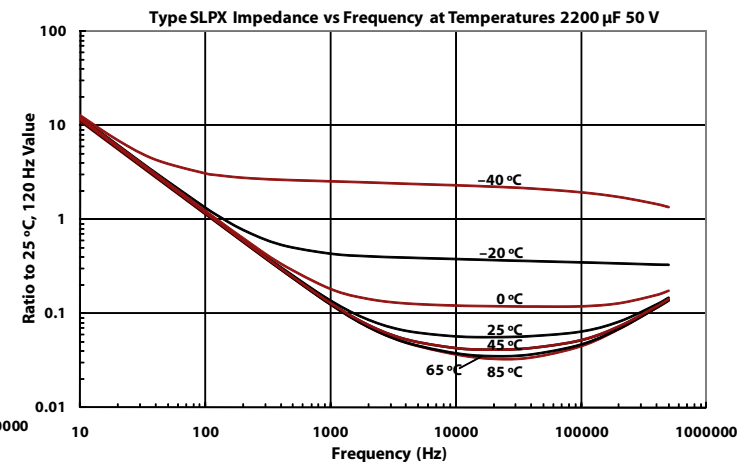
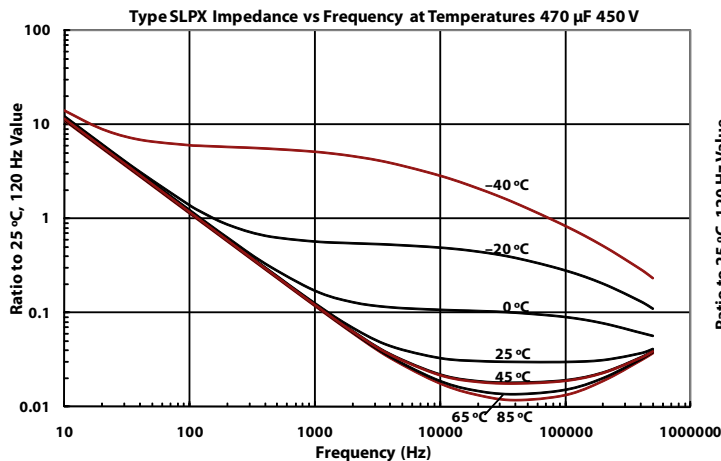
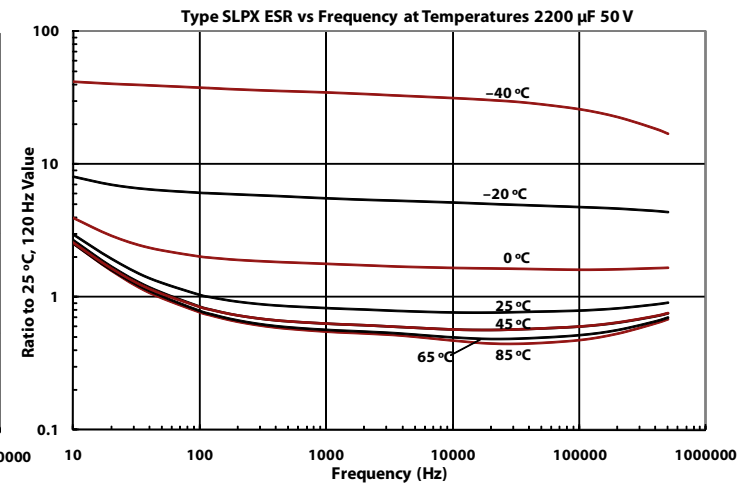
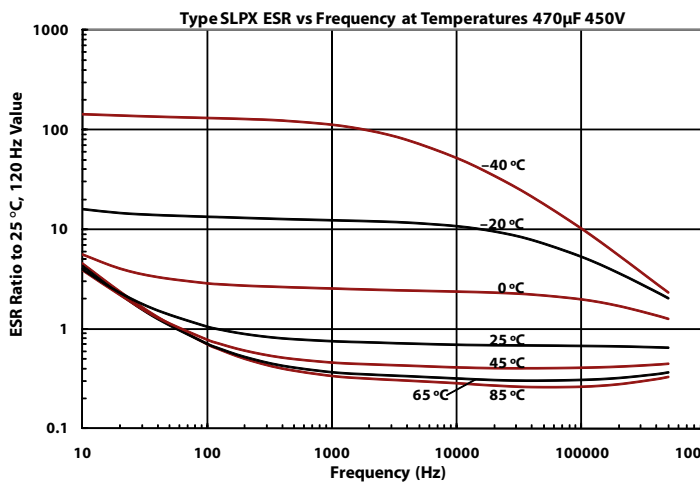
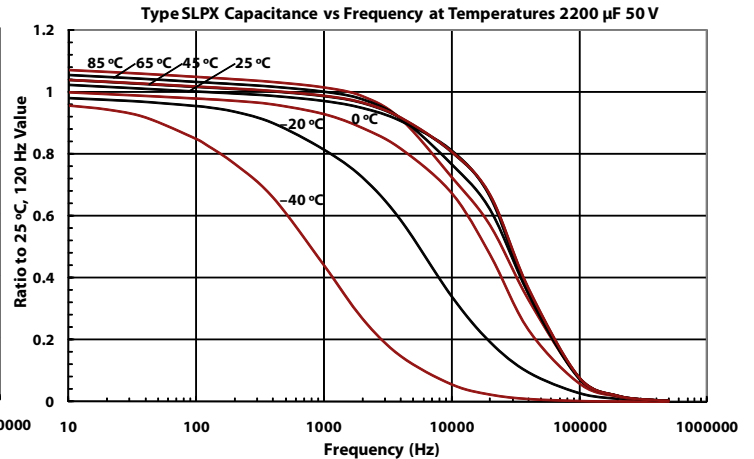
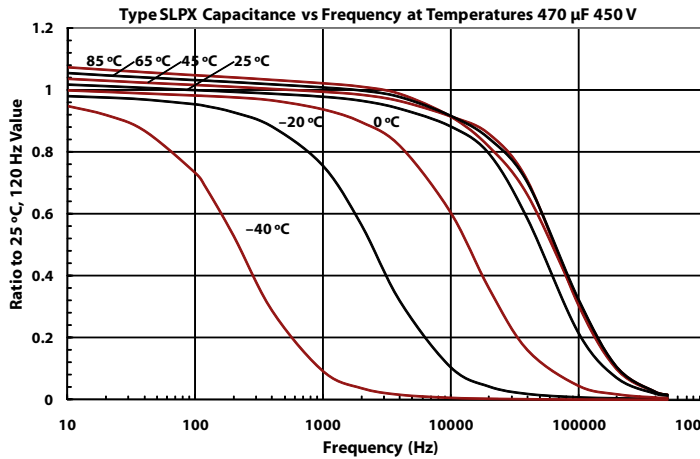
Additional Voltages and Sizes available at www.cde.com/catalogs/SLPX.pdf

Additional Voltages and Sizes available at www.cde.com/catalogs/SLP_X.pdf													
Cap	3000 h @ 85 °C	Max 25 °C ESR		Max 85 °C Ripple		Nominal	Cap	3000 h @ 85 °C	Max 25 °C ESR		Max 85 °C Ripple		Nominal
Catalog	(Ω)	(A _{rms})	Size (DxL)	Catalog	(Ω)	(A _{rms})	Size (DxL)	Catalog	(Ω)	(A _{rms})	Size (DxL)		
Part Number	120 Hz 20kHz	120 Hz 20kHz	(mm)	Part Number	120 Hz 20kHz	120 Hz 20kHz	(mm)	Part Number	120 Hz 20kHz	120 Hz 20kHz	(mm)		
385 Vdc (435 Vdc Surge)							420 Vdc (470 Vdc Surge)						
390	SLPX391M385H5P3	0.510	0.383	2.07	3.04	35 x 35	180	SLPX181M420C5P3	1.106	0.830	1.42	2.09	25 x 35
470	SLPX471M385E9P3	0.423	0.317	2.26	3.32	30 x 50	180	SLPX181M420E1P3	1.106	0.830	1.48	2.18	30 x 25
470	SLPX471M385H7P3	0.423	0.317	2.26	3.32	35 x 40	220	SLPX221M420A4P3	0.905	0.679	1.55	2.28	22 x 45
560	SLPX561M385H4P3	0.355	0.266	2.59	3.81	35 x 45	220	SLPX221M420C5P3	0.905	0.679	1.58	2.32	25 x 35
680	SLPX681M385H9P3	0.293	0.220	2.80	4.12	35 x 50	220	SLPX221M420E3P3	0.905	0.679	1.65	2.43	30 x 30
400 Vdc (450 Vdc Surge)							270	SLPX271M420C7P3	0.737	0.553	1.74	2.56	25 x 40
82	SLPX820M400A1P3	2.427	1.820	0.84	1.23	22 x 25	270	SLPX271M420E5P3	0.737	0.553	1.90	2.79	30 x 35
100	SLPX101M400A3P3	1.990	1.493	0.99	1.46	22 x 30	270	SLPX271M420H3P3	0.737	0.553	1.94	2.85	35 x 30
120	SLPX121M400C1P3	1.659	1.244	1.13	1.66	25 x 25	330	SLPX331M420C9P3	0.603	0.452	2.20	3.23	25 x 50
120	SLPX121M400A3P3	1.659	1.244	1.09	1.60	22 x 30	330	SLPX331M420E5P3	0.603	0.452	1.98	2.91	30 x 35
150	SLPX151M400A5P3	1.327	0.995	1.24	1.82	22 x 35	330	SLPX331M420H5P3	0.603	0.452	2.17	3.19	35 x 35
150	SLPX151M400C3P3	1.327	0.995	1.27	1.87	25 x 30	390	SLPX391M420E7P3	0.510	0.383	2.22	3.26	30 x 40
180	SLPX181M400A7P3	1.106	0.830	1.41	2.07	22 x 40	390	SLPX391M420H5P3	0.510	0.383	2.27	3.34	35 x 35
180	SLPX181M400C3P3	1.106	0.830	1.44	2.12	25 x 30	470	SLPX471M420E4P3	0.423	0.317	2.50	3.68	30 x 45
180	SLPX181M400E1P3	1.106	0.830	1.52	2.23	30 x 25	470	SLPX471M420H7P3	0.423	0.317	2.61	3.84	35 x 40
220	SLPX221M400A4P3	0.905	0.679	1.58	2.32	22 x 45	560	SLPX561M420H4P3	0.355	0.266	2.95	4.34	35 x 45
220	SLPX221M400C3P3	0.900	0.675	1.54	2.26	25 x 30	450 Vdc (500 Vdc Surge)						
220	SLPX221M400C5P3	0.905	0.679	1.64	2.41	25 x 35	68	SLPX680M450A1P3	3.903	2.927	0.71	1.04	22 x 25
220	SLPX221M400E3P3	0.905	0.679	1.66	2.44	30 x 30	82	SLPX820M450A1P3	3.236	2.427	0.86	1.26	22 x 25
270	SLPX271M400C7P3	0.737	0.553	1.79	2.63	25 x 40	100	SLPX101M450A3P3	2.654	1.991	0.95	1.40	22 x 30
330	SLPX331M400C4P3	0.603	0.452	2.00	2.94	25 x 45	120	SLPX121M450A5P3	2.212	1.659	1.07	1.57	22 x 35
330	SLPX331M400E5P3	0.603	0.452	2.05	3.01	30 x 35	120	SLPX121M450C3P3	2.212	1.659	1.09	1.60	25 x 30
330	SLPX331M400H3P3	0.603	0.452	2.05	3.01	35 x 30	120	SLPX121M450C3P3	2.212	1.659	1.09	1.60	25 x 30
330	SLPX331M400C4P3	0.603	0.452	2.00	2.94	25 x 45	120	SLPX121M450E1P3	2.212	1.659	1.12	1.65	30 x 25
390	SLPX391M400E7P3	0.510	0.383	2.26	3.32	30 x 40	150	SLPX151M450A7P3	1.769	1.327	1.18	1.73	22 x 40
390	SLPX391M400H5P3	0.510	0.383	2.28	3.35	35 x 35	150	SLPX151M450C3P3	1.769	1.327	1.25	1.84	25 x 30
470	SLPX471M400E4P3	0.423	0.317	2.51	3.69	30 x 45	150	SLPX151M450E1P3	1.769	1.327	1.29	1.90	30 x 25
470	SLPX471M400H7P3	0.423	0.317	2.54	3.73	35 x 40	180	SLPX181M450A4P3	1.474	1.106	1.32	1.94	22 x 45
560	SLPX561M400H9P3	0.355	0.266	3.13	4.60	35 x 50	180	SLPX181M450C5P3	1.474	1.106	1.40	2.06	25 x 35
560	SLPX561M400H7P3	0.355	0.266	2.85	4.19	35 x 40	180	SLPX181M450E3P3	1.474	1.106	1.45	2.13	30 x 30
680	SLPX681M400H9P3	0.293	0.220	3.10	3.88	35 x 50	220	SLPX221M450C7P3	1.206	0.905	1.59	2.34	25 x 40
820	SLPX821M400H9P3	0.240	0.180	3.40	4.25	35 x 50	220	SLPX221M450E3P3	1.206	0.905	1.64	2.41	30 x 30
420 Vdc (470 Vdc Surge)							220	SLPX221M450H3P3	1.206	0.905	1.66	2.44	35 x 30
82	SLPX820M420A1P3	2.427	1.820	0.85	1.25	22 x 25	270	SLPX271M450C4P3	0.983	0.737	1.73	2.54	25 x 45
100	SLPX101M420A3P3	1.990	1.493	0.97	1.43	22 x 30	270	SLPX271M450E3P3	0.983	0.737	1.78	2.62	30 x 30
100	SLPX101M420C1P3	1.990	1.493	0.98	1.44	25 x 25	270	SLPX271M450E5P3	0.983	0.737	1.89	2.78	30 x 35
100	SLPX101M450C3P3	1.990	1.493	0.90	1.32	25 x 30	270	SLPX271M450H3P3	0.983	0.737	1.90	2.79	35 x 30
120	SLPX121M420A3P3	1.659	1.244	1.07	1.57	22 x 30	330	SLPX331M450H5P3	0.804	0.603	2.15	3.16	35 x 35
120	SLPX121M420C1P3	1.659	1.244	1.08	1.59	25 x 25	330	SLPX331M450E7P3	0.804	0.603	2.12	3.12	30 x 40
150	SLPX151M420A5P3	1.327	0.995	1.21	1.78	22 x 35	390	SLPX391M450E4P3	0.680	0.510	2.35	3.45	30 x 45
150	SLPX151M420C3P3	1.327	0.995	1.26	1.85	25 x 30	390	SLPX391M450H7P3	0.680	0.510	2.38	3.50	35 x 40
150	SLPX151M420E1P3	1.327	0.995	1.30	1.91	30 x 25	470	SLPX471M450H9P3	0.565	0.424	2.80	4.12	35 x 50
180	SLPX181M420A7P3	1.106	0.830	1.33	1.96	22 x 40	470	SLPX471M450H4P3	0.565	0.424	2.68	3.94	35 x 45

Type SLPX 85 °C Snap-In Aluminum Electrolytic

Best Value 85 °C Snap-In Type

Typical Performance Curves



Type 380LX / 382LX 85 °C High Capacitance, Snap-In Aluminum

2, 4 and 5 pin styles available



The excellent value of Type 380L/LX capacitors finds application in switching power supply input and output circuits and even motor drives where the high surface area of multiple units in parallel approaches the ripple capability of our Type 520C computer-grade capacitor. Type 380LX delivers more capacitance per can size while Type 380L available in the largest case sizes gives lower ESR for the same capacitance. Types 382L and 382LX give the choice of 4 or 5 leads for stable, reverse proof mounting.

Highlights

- Latest available ratings, worldwide
- Top performance in power supplies and motor drives
- Big selection of 46 case sizes
- 2, 4 and 5 leads available

Specifications

Temperature Range	-40 °C to +85 °C ≤ 250 Vdc -25 °C to +85 °C ≥ 315 Vdc						
Rated Voltage Range	16 Vdc to 500 Vdc						
Capacitance Range	33 µF to 270,000 µF						
Capacitance Tolerance	± 20%						
Leakage Current	≤3√CV µA at 5 min						
Ripple Current Multipliers	Ambient Temperature						
	45 °C		60 °C		70 °C		85 °C
	1.5		1.4		1.3		1.0
	Frequency						
		50 Hz	60 Hz	120 Hz	500 kHz	1 kHz	10 kHz & Up
	16 - 100 WV	0.93	0.95	1.00	1.05	1.08	1.15
160 - 450 WV	0.75	0.80	1.00	1.20	1.25	1.40	
Low Temperature Characteristics	Impedance ratio: Z _{-20°C} /Z _{+25°C} ≤ 8 (16–50 Vdc) ≤ 4 (63–100 Vdc) ≤ 3 (150–500 Vdc)						
Endurance Life Test	3,000 h @ full load at +85 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit						
Shelf Life Test	1,000 h @ 85 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit						
Vibration	10 to 55 Hz, 0.06" and 10 g max, 2 h in each plane						
RoHS Compliant							

Type 380LX / 382LX 85 °C High Capacitance, Snap-In Aluminum

2, 4 and 5 pin styles available

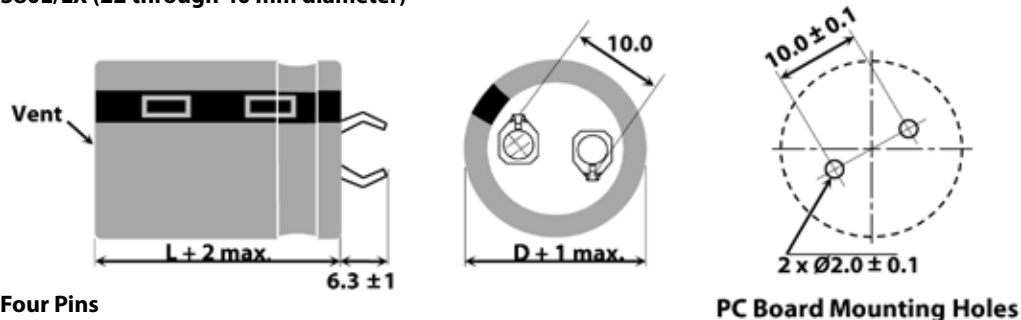
Part Numbering System

382LX	272	M	200	N05	2	V
Type	Cap	Tolerance	Voltage	Case Code	Insulation	# of pins
380L / LX (2 pins)	272 = 2700 μ F	M = $\pm 20\%$	200 = 200 Vdc		2 = PVC	
382L / LX (4 or 5 pins)	333 = 33000 μ F					
						Blank = 2 pins / 4 pins snap-in 6.3mm L
						A = 2 pins / 4 pins snap-in 4.0mm L
						VS = 5 pins snap-in 6.3mm L
						V = 5 pins standoff

Outline Drawings

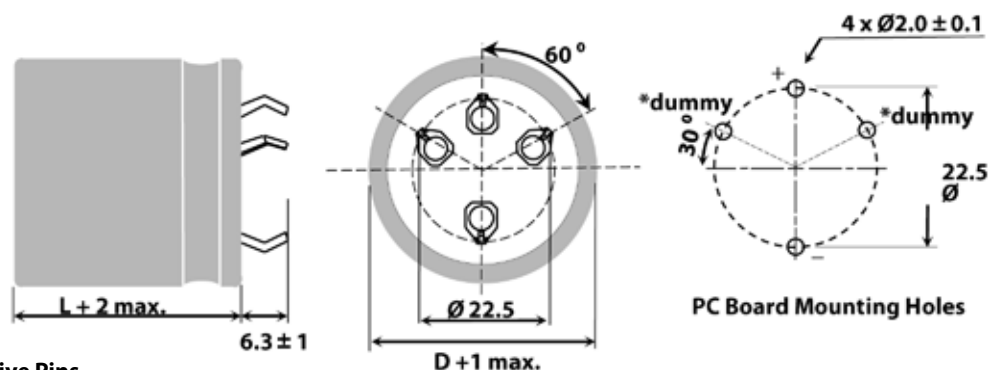
Two Pins

380L/LX (22 through 40 mm diameter)



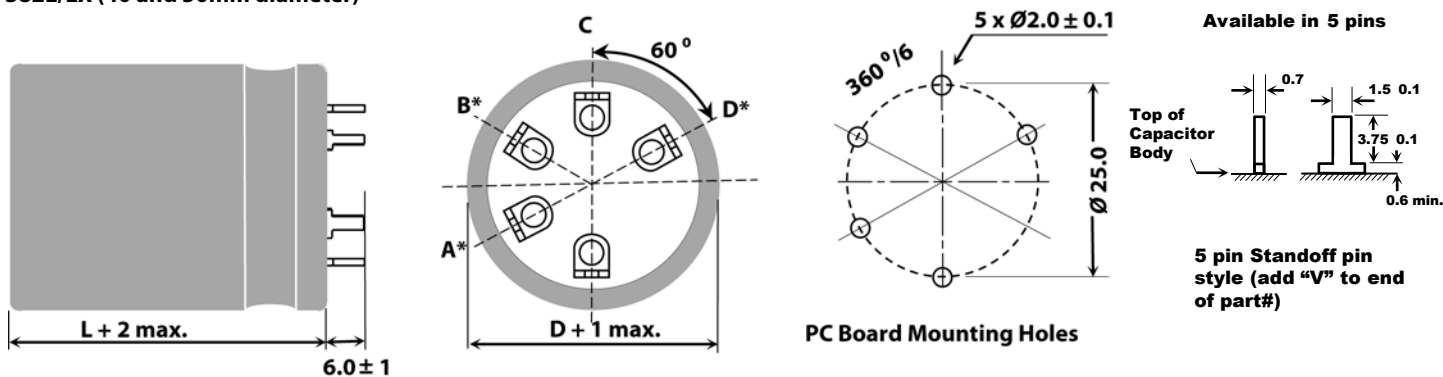
Four Pins

382L/LX (35 and 40mm diameter)



Five Pins

382L/LX (40 and 50mm diameter)



Terminal	Connection	
	40 mm Dia.	50 mm Dia.
A	dummy	negative (-)
B	dummy	dummy
C	positive (+)	positive (+)
D	dummy	positive (+)
-	negative (-)	negative (-)

Notes:

* Use dummy terminals for mechanical support only. Make no electrical connection because they resistively connect through the electrolyte to the negative terminal.

** Safety Vent may be on the bottom or on the side of the can.

Type 380LX / 382LX 85 °C High Capacitance, Snap-In Aluminum

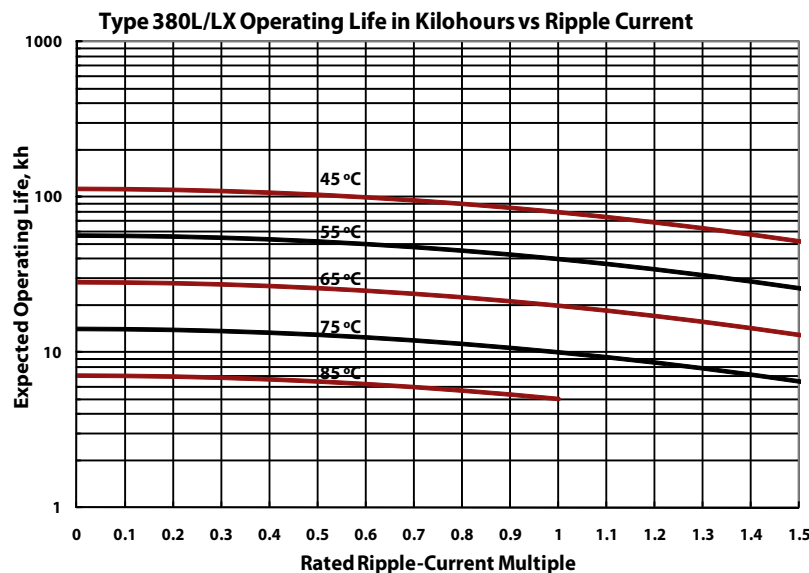
2, 4 and 5 pin styles available

Insulated Case Dimensions

Case Code	DIAMETER "D"		LENGTH "L"		Typical Weight (grams)
	mm	inches	mm	inches	
H20	22	0.87	20	0.79	14
H01	22	0.87	25	0.98	16
H02	22	0.87	30	1.18	19
H03	22	0.87	35	1.38	22
H04	22	0.87	40	1.57	24
H45	22	0.87	45	1.77	28
H05	22	0.87	50	1.97	31
J20	25	0.98	20	0.79	16
J01	25	0.98	25	0.98	20
J02	25	0.98	30	1.18	24
J03	25	0.98	35	1.38	27
J04	25	0.98	40	1.57	31
J45	25	0.98	45	1.77	35
J05	25	0.98	50	1.97	38
K20	30	1.18	20	0.79	25
K01	30	1.18	25	0.98	30
K02	30	1.18	30	1.18	35
K03	30	1.18	35	1.38	40
K04	30	1.18	40	1.57	44
K45	30	1.18	45	1.77	48
K05	30	1.18	50	1.97	53

Case Code	DIAMETER "D"		LENGTH "L"		Typical Weight (grams)
	mm	inches	mm	inches	
A20	35	1.38	20	0.79	35
A01	35	1.38	25	0.98	42
A02	35	1.38	30	1.18	48
A03	35	1.38	35	1.38	54
A04	35	1.38	40	1.57	62
A45	35	1.38	45	1.77	67
A05	35	1.38	50	1.97	74
A06	35	1.38	63	2.48	88
A07	35	1.38	70	2.76	98
A08	35	1.38	80	3.15	112
A10	35	1.38	105	4.13	144
N04	40	1.57	40	1.57	82
N05	40	1.57	50	1.97	105
N06	40	1.57	63	2.48	130
N08	40	1.57	80	3.15	185
N10	40	1.57	105	4.13	265
B05	50	1.97	50	1.97	136
B06	50	1.97	63	2.48	168
B08	50	1.97	80	3.15	239
B09	50	1.97	92	3.62	241
B10	50	1.97	105	4.13	325

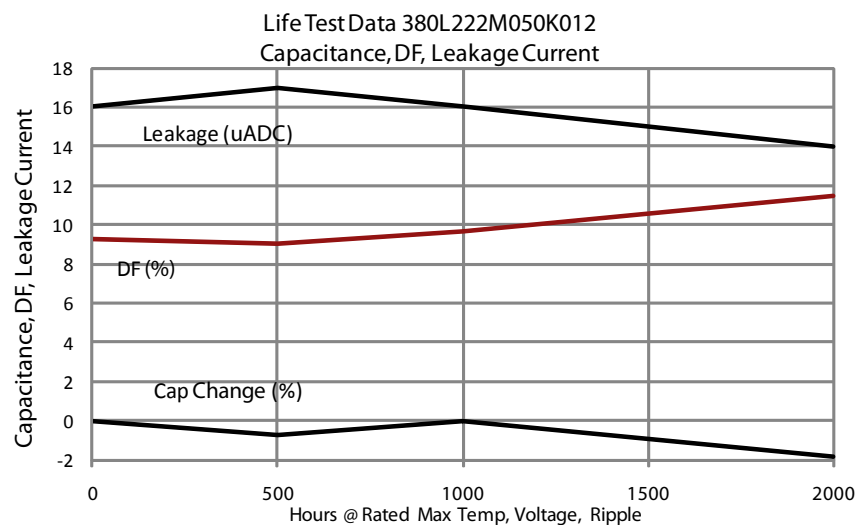
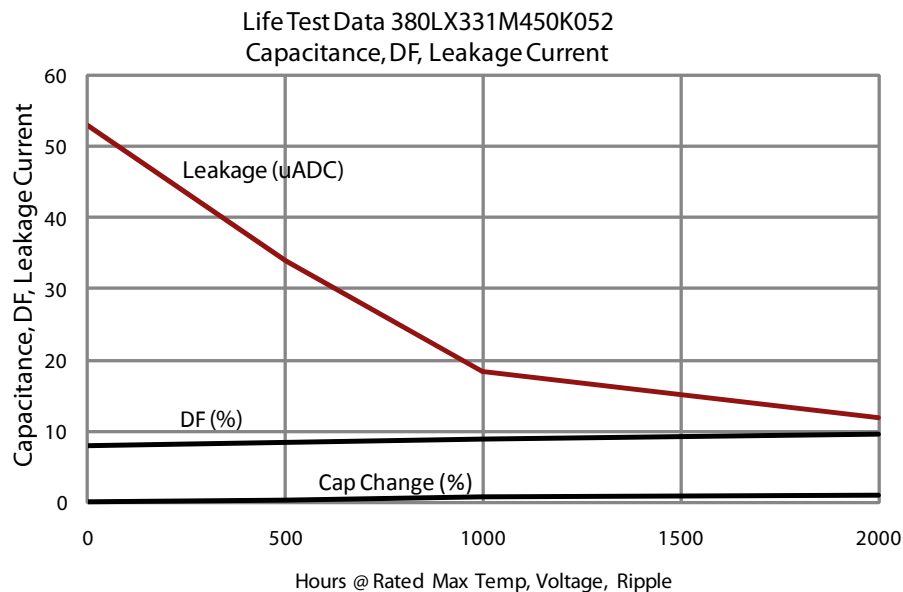
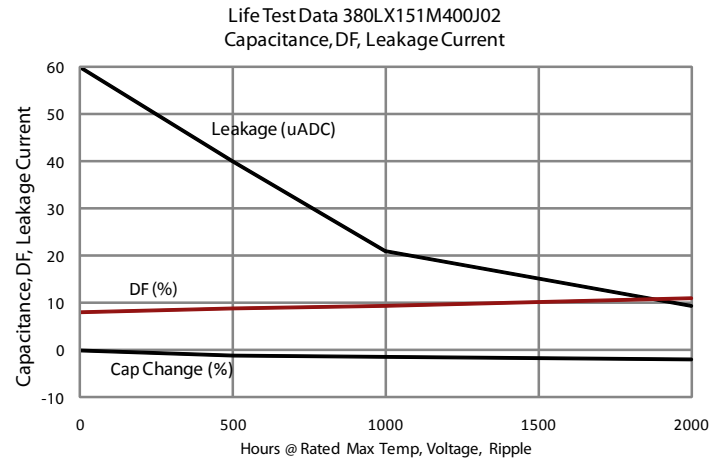
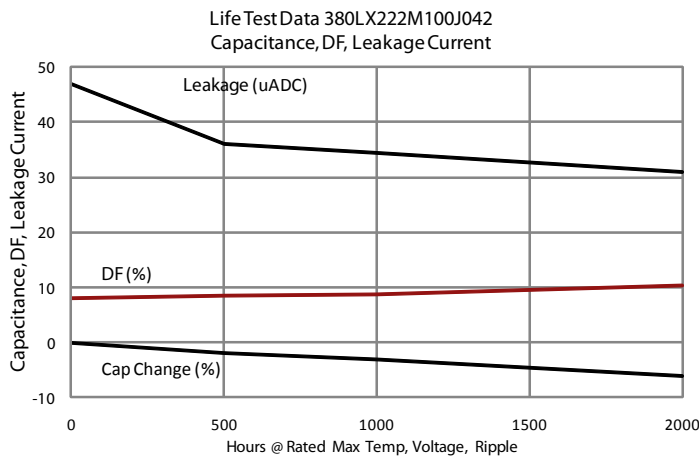
Typical Performance Curves



Type 380LX / 382LX 85 °C High Capacitance, Snap-In Aluminum

2, 4 and 5 pin styles available

Typical Performance Curves



Type 380LX / 382LX 85 °C High Capacitance, Snap-In Aluminum

2, 4 and 5 pin styles available

Ratings

Additional Voltages and Smaller Sizes available at <http://www.cde.com/catalogs/380-382.pdf>

Cap.		Max. ESR		Ripple Amps		Nominal
		Ω @ 25 °C		Max. @ 85 °C		Size D x L
(μ F)	Catalog Part Number	120 Hz	20 kHz	120 Hz	20 kHz	(mm)
16 Vdc (20 Vdc Surge)						
33000	380LX333M016A022	0.025	0.021	6.80	7.90	35 x 30
39000	380LX393M016A032	0.022	0.018	6.95	8.00	35 x 35
47000	380LX473M016A042	0.022	0.020	7.50	8.60	35 x 40
56000	380LX563M016A452	0.020	0.018	8.70	10.00	35 x 45
56000	382LX563M016N042	0.022	0.021	9.00	10.40	40 x 40
68000	380LX683M016A052	0.018	0.017	9.00	10.40	35 x 50
82000	380LX823M016A062	0.016	0.015	10.00	11.50	35 x 63
82000	382LX823M016N052	0.016	0.015	10.30	11.80	40 x 50
100000	380LX104M016A082	0.015	0.014	11.00	12.70	35 x 80
100000	382LX104M016N062	0.018	0.017	11.40	13.00	40 x 63
120000	380LX124M016A102	0.014	0.013	12.81	14.73	35 x 105
120000	382LX124M016N082	0.017	0.016	12.40	14.30	40 x 80
120000	382LX124M016B052V	0.014	0.013	13.17	15.15	50 x 50
150000	382LX154M016B062V	0.012	0.011	14.40	16.56	50 x 63
180000	382LX184M016N102	0.013	0.012	14.85	17.08	40 x 105
180000	382LX184M016B082V	0.011	0.010	15.69	18.04	50 x 80
220000	382LX224M016B092V	0.010	0.009	16.73	19.24	50 x 92
270000	382LX274M016B102V	0.009	0.008	17.79	20.46	50 x 105
35 Vdc (44 Vdc Surge)						
10000	380LX103M035A012	0.050	0.037	4.40	5.10	35 x 25
12000	380LX123M035A022	0.044	0.033	5.10	5.80	35 x 30
15000	380LX153M035A022	0.036	0.027	5.60	6.40	35 x 30
18000	380LX183M035A032	0.030	0.023	5.70	6.50	35 x 35
22000	380LX223M035A042	0.026	0.020	6.10	7.00	35 x 40
27000	380LX273M035A452	0.021	0.017	6.80	7.90	35 x 45
27000	382LX273M035N042	0.021	0.017	6.80	7.90	40 x 40
33000	380LX333M035A052	0.018	0.014	7.15	8.22	35 x 50
33000	380L333M035A062	0.018	0.009	7.80	8.70	35 x 63
39000	380LX393M035A062	0.015	0.012	7.90	9.10	35 x 63
39000	380L393M035A072	0.015	0.008	8.60	9.50	35 x 70
39000	382LX393M035N052	0.017	0.014	8.00	9.20	40 x 50
47000	380LX473M035A082	0.015	0.011	9.50	10.90	35 x 80
47000	382LX473M035N062	0.016	0.013	9.60	11.00	40 x 63
56000	382LX563M035N082	0.015	0.012	10.30	11.90	40 x 80
56000	382LX563M035B052V	0.015	0.012	10.94	12.58	50 x 50
68000	380LX683M035A102	0.010	0.008	10.62	12.21	35 x 105
68000	382LX683M035B062V	0.013	0.011	11.93	13.72	50 x 63
82000	382LX823M035N102	0.012	0.009	12.02	13.82	40 x 105
82000	382LX823M035B082V	0.012	0.010	13.06	15.02	50 x 80
100000	382LX104M035B092V	0.011	0.009	13.97	16.07	50 x 92
120000	382LX124M035B102V	0.010	0.008	14.86	17.09	50 x 105
63 Vdc (79 Vdc Surge)						
4700	380LX472M063A012	0.080	0.060	4.90	5.60	35 x 25
5600	380LX562M063A022	0.070	0.050	5.40	6.20	35 x 30
6800	380LX682M063A022	0.060	0.045	5.80	6.70	35 x 30
8200	380LX822M063A032	0.050	0.040	6.00	6.90	35 x 35
10000	380LX103M063A042	0.033	0.025	6.50	7.50	35 x 40
10000	382L103M063N042	0.028	0.017	6.60	7.20	40 x 40
12000	380LX123M063A052	0.028	0.021	7.20	8.30	35 x 50
12000	380L123M063A062	0.019	0.010	7.70	8.60	35 x 63
12000	382LX123M063N042	0.035	0.028	7.15	8.22	40 x 40
15000	380LX153M063A062	0.028	0.021	7.70	8.90	35 x 63
15000	380L153M063A072	0.016	0.009	8.50	9.40	35 x 70
18000	380LX183M063A082	0.023	0.012	9.40	10.80	35 x 80
18000	382LX183M063N062	0.028	0.022	9.25	10.60	40 x 63
27000	380LX273M063A102	0.015	0.012	10.38	11.94	35 x 105
27000	382LX273M063N082	0.018	0.015	10.00	11.50	40 x 80
27000	382LX273M063B052V	0.018	0.015	10.86	12.49	50 x 50
33000	382LX333M063N102	0.015	0.012	11.76	13.52	40 x 105
33000	382LX333M063B062V	0.017	0.013	11.57	13.42	50 x 63
47000	382LX473M063B082V	0.013	0.010	12.78	14.70	50 x 80
51000	382LX513M063B092V	0.012	0.010	13.34	15.34	50 x 92
56000	382LX563M063B102V	0.012	0.009	13.93	16.02	50 x 105
80 Vdc (100 Vdc Surge)						
5600	380LX562M080A032	0.055	0.040	4.60	5.20	35 x 35
6800	380LX682M080A042	0.045	0.035	5.20	5.90	35 x 40
8200	380LX822M080A052	0.040	0.030	5.80	6.70	35 x 50
8200	382LX822M080N042	0.040	0.030	5.83	6.70	40 x 40
10000	380LX103M080A062	0.033	0.025	6.40	7.34	35 x 63
12000	380L123M080A072	0.020	0.012	8.10	9.00	35 x 70
12000	382L123M080N052	0.025	0.016	7.50	8.00	40 x 50
15000	380L153M080A082	0.017	0.010	8.80	9.60	35 x 80
15000	382L153M080N062	0.020	0.013	8.50	9.20	40 x 63
18000	382L183M080N082	0.014	0.009	10.30	10.80	40 x 80
18000	382LX183M080B052V	0.023	0.017	10.00	11.50	50 x 50
22000	380LX223M080A102	0.015	0.011	9.86	11.34	35 x 105
22000	382LX223M080B062V	0.019	0.014	11.08	12.74	50 x 63
27000	382LX273M080N102	0.015	0.012	11.35	13.05	40 x 105
27000	382LX273M080B082V	0.015	0.012	12.33	14.18	50 x 80
33000	382LX333M080B092V	0.014	0.010	13.37	15.38	50 x 92
39000	382LX393M080B102V	0.013	0.010	14.34	16.49	50 x 105
100 Vdc (125 Vdc Surge)						
2200	380LX222M100A012	0.121	0.078	3.14	3.61	35 x 25

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Type 380LX / 382LX 85 °C High Capacitance, Snap-In Aluminum

2, 4 and 5 pin styles available

Additional Voltages and Smaller Sizes available at <http://www.cde.com/catalogs/380-382.pdf>

		Max. ESR		Ripple Amps		Nominal
Cap.		Ω@ 25 °C		Max. @ 85 °C		Size D x L
(µF)	Catalog Part Number	120 Hz	20 kHz	120 Hz	20 kHz	(mm)
100 Vdc (125 Vdc Surge)						
2700	380LX272M100A022	0.104	0.068	3.70	4.30	35 x 30
3900	380LX392M100A032	0.080	0.050	4.50	5.20	35 x 35
4700	380LX472M100A042	0.070	0.050	5.10	5.90	35 x 40
5600	380LX562M100A452	0.060	0.040	5.80	6.60	35 x 45
5600	382LX562M100N042	0.060	0.045	5.80	6.60	40 x 40
6800	380LX682M100A052	0.050	0.040	6.60	7.60	35 x 50
6800	380L682M100A062	0.024	0.014	7.20	8.10	35 x 63
6800	382L682M100N052	0.026	0.017	7.40	7.90	40 x 50
8200	380LX822M100A062	0.040	0.030	7.00	8.10	35 x 63
8200	380L822M100A072	0.021	0.012	8.00	8.90	35 x 70
8200	382LX822M100N052	0.040	0.030	7.30	8.40	40 x 50
8200	382L822M100N062	0.021	0.013	8.40	9.10	40 x 63
10000	380LX103M100A082	0.033	0.025	8.70	9.60	35 x 80
10000	382LX103M100N062	0.033	0.025	8.00	9.20	40 x 63
10000	382LX103M100B052V	0.033	0.025	8.82	10.14	50 x 50
12000	380LX123M100A102	0.028	0.021	8.57	9.86	35 x 105
12000	382LX123M100N082	0.028	0.021	8.65	10.00	40 x 80
15000	382LX153M100N102	0.022	0.017	10.12	11.64	40 x 105
15000	382LX153M100B062V	0.022	0.017	10.07	11.58	50 x 63
18000	382LX183M100B082V	0.018	0.014	11.00	12.65	50 x 80
22000	382LX223M100B092V	0.015	0.011	11.76	13.52	50 x 92
27000	382LX273M100B102V	0.014	0.010	12.53	14.41	50 x 105
200 Vdc (250 Vdc Surge)						
820	380LX821M200A012	0.243	0.124	2.90	4.10	35 x 25
1000	380LX102M200A022	0.199	0.102	3.30	4.60	35 x 30
1200	380LX122M200A022	0.166	0.075	3.50	4.90	35 x 30
1500	380LX152M200A032	0.144	0.072	3.87	5.42	35 x 35
1800	380LX182M200A042	0.120	0.060	4.32	6.05	35 x 40
2200	380LX222M200A452	0.098	0.054	4.92	6.89	35 x 45
2200	382LX222M200N042	0.098	0.054	4.92	6.89	40 x 40
2700	380LX272M200A062	0.080	0.045	5.50	7.70	35 x 63
2700	382LX272M200N052	0.080	0.045	5.40	7.60	40 x 50
3300	382LX332M200N062	0.065	0.037	6.30	8.90	40 x 63
3300	380LX332M200A082	0.065	0.037	6.40	9.00	35 x 80
3900	380LX392M200A082	0.055	0.030	6.60	9.25	35 x 80
3900	382LX392M200N062	0.055	0.030	6.80	9.50	40 x63
3900	382LX392M200B052V	0.055	0.030	8.22	9.45	50 x 50
4700	382LX472M200N082	0.046	0.025	8.38	11.73	40 x 80
4700	382LX472M200B062V	0.046	0.025	9.32	13.05	50 x 63
5600	380LX562M200A102	0.038	0.021	8.90	12.46	35 x 105
6800	382LX682M200N102	0.032	0.017	8.65	12.11	40 x 105
6800	382LX682M200B082V	0.032	0.017	11.41	15.97	50 x 80
7500	382LX752M200B092V	0.029	0.016	12.28	17.19	50 x 92

		Max. ESR		Ripple Amps		Nominal
Cap.		Ω@ 25 °C		Max. @ 85 °C		Size D x L
(µF)	Catalog Part Number	120 Hz	20 kHz	120 Hz	20 kHz	(mm)
200 Vdc (250 Vdc Surge)						
8200	382LX822M200B102V	0.026	0.014	13.16	18.42	50 x 105
250 Vdc (300 Vdc Surge)						
560	380LX561M250A012	0.326	0.130	2.30	3.20	35 x 25
680	380LX681M250A022	0.293	0.149	2.50	3.50	35 x 30
820	380LX821M250A022	0.222	0.089	2.80	3.90	35 x 30
1000	380LX102M250A032	0.182	0.073	3.32	4.65	35 x 35
1200	380LX122M250A042	0.166	0.083	3.53	4.94	35 x 40
1500	380LX152M250A052	0.133	0.068	4.00	5.70	35 x 50
1500	382LX152M250N042	0.133	0.066	4.04	5.66	40 x 40
1800	380LX182M250A062	0.110	0.055	4.50	6.30	35 x 63
1800	382LX182M250N052	0.110	0.055	4.50	6.30	40 x 50
1800	382L182M250N062	0.062	0.030	4.80	6.40	40 x 63
2200	380LX222M250A062	0.090	0.045	4.70	6.60	35 x 63
2200	380LX222M250A082	0.090	0.045	4.90	6.90	35 x 80
2200	382LX222M250N062	0.090	0.045	4.90	6.90	40 x 63
2700	380LX272M250A082	0.074	0.037	5.60	7.90	35 x 80
2700	382LX272M250N062	0.074	0.037	5.80	8.10	40 x 63
2700	382L272M250N082	0.043	0.021	6.30	8.40	40 x 80
2700	382LX272M250B052V	0.074	0.037	6.77	7.79	50 x 50
3300	382LX332M250N082	0.060	0.030	7.00	9.80	40 x 80
3300	382LX332M250B062V	0.060	0.030	7.79	10.91	50 x 63
3900	380LX392M250A102	0.051	0.026	7.47	10.46	35 x 105
3900	382LX392M250N082	0.051	0.026	7.35	10.30	40 x 80
4700	382LX472M250N102	0.042	0.021	8.88	12.43	40 x 105
4700	382LX472M250B082V	0.042	0.021	9.65	13.51	50 x 80
5600	382LX562M250B092V	0.036	0.018	10.80	15.12	50 x 92
6800	382LX682M250B102V	0.029	0.015	12.16	17.02	50 x 105
400 Vdc (450 Vdc Surge)						
270	380LX271M400A022	0.680	0.240	1.70	2.30	35 x 30
330	380LX331M400A022	0.550	0.200	1.90	2.70	35 x 30
390	380LX391M400A032	0.470	0.160	2.10	3.00	35 x 35
470	380LX471M400A042	0.388	0.136	2.39	3.35	35 x 40
560	380LX561M400A452	0.326	0.114	2.69	3.77	35 x 45
560	382LX561M400N042	0.326	0.114	2.70	3.80	40 x 40
680	380LX681M400A052	0.270	0.095	3.00	4.20	35 x 50
680	382LX681M400N052	0.270	0.095	3.40	4.70	40 x 50
820	380LX821M400A062	0.222	0.078	3.55	4.97	35 x 63
820	382LX821M400N052	0.222	0.078	3.40	4.70	40 x 50
1000	380L102M400A082	0.179	0.099	3.60	4.80	35 x 80
1000	382LX102M400N062	0.199	0.127	4.20	5.80	40 x 63
1000	382LX102M400B052V	0.199	0.080	4.76	5.47	50 x 50
1200	380LX122M400A082	0.152	0.053	4.52	6.33	35 x 80
1200	382LX122M400N062	0.152	0.053	4.52	6.33	40 x 63

Type 380LX / 382LX 85 °C High Capacitance, Snap-In Aluminum

2, 4 and 5 pin styles available

Additional Voltages and Smaller Sizes available at <http://www.cde.com/catalogs/380-382.pdf>

Cap.		Max. ESR		Ripple Amps		Nominal
Ω@ 25 °C		Max. @ 85 °C				Size D x L
(μF)	Catalog Part Number	120 Hz	20 kHz	120 Hz	20 kHz	(mm)
400 Vdc (450 Vdc Surge)						
1200	382LX122M400B062V	0.166	0.066	5.47	7.66	50 x 63
1500	380LX152M400A102	0.122	0.043	5.44	7.62	35 x 105
1500	382LX152M400N082	0.122	0.043	5.50	7.70	40 x 80
1500	382LX152M400B082V	0.133	0.053	6.47	9.06	50 x 80
1800	382LX182M400N102	0.101	0.035	6.53	9.14	40 x 105
1800	382LX182M400B092V	0.111	0.044	7.35	10.29	50 x 92
2200	382LX222M400B102V	0.090	0.036	8.43	11.80	50 x 105
420 Vdc (470 Vdc Surge)						
220	380LX221M420A012	0.900	0.320	1.50	2.10	35 x 25
270	380LX271M420A022	0.740	0.260	1.70	1.93	35 x 30
330	380LX331M420A032	0.600	0.210	1.90	2.68	35 x 35
390	380LX391M420A042	0.500	0.180	2.10	3.00	35 x 40
470	380LX471M420A452	0.420	0.150	2.40	3.35	35 x 45
560	380LX561M420A052	0.355	0.125	2.70	3.80	35 x 50
450 Vdc (500 Vdc Surge)						
180	380LX181M450A012	0.921	0.368	1.40	1.90	35 x 25
220	380LX221M450A022	0.904	0.461	1.60	2.20	35 x 30
270	380LX271M450A022	0.680	0.270	1.80	2.50	35 x 30
330	380LX331M450A032	0.553	0.221	2.01	2.81	35 x 35
390	380LX391M450A452	0.510	0.260	2.20	3.10	35 x 45
470	380LX471M450A452	0.423	0.233	2.53	3.54	35 x 45
470	382LX471M450N042	0.423	0.233	2.53	3.54	40 x 40
560	380LX561M450A052	0.355	0.171	2.50	3.50	35 x 50
560	380LX561M450A062	0.355	0.195	2.90	4.10	35 x 63
680	380L681M450A072	0.226	0.120	3.20	4.20	35 x 70
680	382LX681M450N052	0.290	0.160	3.15	4.40	40 x 50
680	382L681M450N062	0.201	0.109	3.40	4.50	40 x 63
820	382LX821M450N062	0.243	0.133	3.70	5.20	40 x 63
820	382LX821M450B052V	0.263	0.145	4.31	4.96	50 x 50
820	380LX821M450A082	0.243	0.133	3.80	5.30	35 x 80
1000	382LX102M450N082	0.216	0.119	4.20	5.90	40 x 80
1000	382LX102M450B062V	0.216	0.119	4.96	6.94	50 x 63
1200	380LX122M450A102	0.166	0.091	4.80	6.72	35 x 105
1200	382LX122M450N082	0.166	0.091	4.85	6.80	40 x 80
1200	382LX122M450B082V	0.180	0.099	5.71	7.99	50 x 80

Cap.		Max. ESR		Ripple Amps		Nominal
Ω@ 25 °C		Max. @ 85 °C				Size D x L
(μF)	Catalog Part Number	120 Hz	20 kHz	120 Hz	20 kHz	(mm)
450 Vdc (500 Vdc Surge)						
1500	382LX152M450N102	0.133	0.073	5.81	8.13	40 x 105
1500	382LX152M450B092V	0.144	0.079	6.55	9.17	50 x 92
1800	382LX182M450B102V	0.120	0.066	7.38	10.30	50 x 105
500 Vdc (550 Vdc Surge)						
100	380LX101M500A012	1.580	0.962	1.10	1.50	35 x 25
120	380LX121M500A022	1.160	0.707	1.40	1.90	35 x 30
150	380LX151M500A012	1.105	0.442	1.29	1.80	35 x 25
180	380LX181M500A022	0.921	0.388	1.38	1.93	35 x 30
180	380LX181M500A032	0.920	0.555	1.60	2.20	35 x 35
220	380LX221M500A032	0.754	0.339	1.50	2.10	35 x 35
220	380LX221M500A042	0.749	0.456	1.90	2.50	35 x 40
270	380LX271M500A042	0.614	0.278	1.76	2.46	35 x 40
270	380LX271M500A052	0.529	0.322	2.30	3.10	35 x 50
270	382L271M500N042	0.549	0.342	2.40	3.20	40 x 40
330	380LX331M500A452	0.502	0.251	1.99	2.79	35 x 45
330	382LX331M500N042	0.502	0.276	2.16	3.00	40 x 40
390	380LX391M500A052	0.425	0.234	2.22	3.11	35 x 50
390	380LX391M500A062	0.423	0.257	2.70	3.60	35 x 63
390	382L391M500N052	0.388	0.242	2.90	3.90	40 x 50
470	380LX471M500A062	0.353	0.194	2.58	3.61	35 x 63
470	380LX471M500A072	0.353	0.215	3.20	4.20	35 x 70
470	382LX471M500N052	0.353	0.194	2.70	3.78	40 x 50
470	382L471M500N062	0.311	0.194	3.40	4.50	40 x 63
560	380LX561M500A082	0.295	0.179	3.60	4.80	35 x 80
560	382LX561M500N062	0.326	0.179	3.11	4.35	40 x 63
560	382LX561M500B052V	0.355	0.195	3.52	4.05	50 x 50
680	380LX681M500A082	0.244	0.134	3.21	4.49	35 x 80
680	382L681M500N082	0.218	0.135	4.50	6.00	40 x 80
680	382LX681M500B062V	0.293	0.161	4.07	5.70	50 x 63
820	380LX821M500A102	0.202	0.111	3.97	5.56	35 x 105
820	382LX821M500N082	0.222	0.122	3.88	5.43	40 x 80
1000	382LX102M500B082V	0.199	0.109	5.05	7.07	50 x 80
1200	382LX122M500N102	0.152	0.084	5.90	8.26	40 x 105
1200	382LX122M500B092V	0.166	0.091	5.74	8.04	50 x 92
1500	382LX152M500B102V	0.144	0.079	6.65	9.31	50 x 105

Type 380LQ 85 °C Compact, High Capacitance, Snap-In Aluminum

Higher Capacitance per Case Size



Type 380LQ is on average 27% smaller and more than 10 mm shorter than Type 380LX. This is achieved with a new can-closure method that permits installing capacitor elements into smaller cans. Approaching the capability of the 380LX, the new 380LQ enables you to shrink equipment size and retain the original performance.

Highlights

- New, more capacitance per case
- Compare to Type 380LX
- New, lower voltages down to 16 V

Specifications

Temperature Range	-40 °C to + 85 °C ≤ 315 Vdc -25 °C to + 85 °C ≥ 350 Vdc																				
Rated Voltage Range	16 Vdc to 450 Vdc																				
Capacitance Range	82 μF to 100,000 μF																				
Capacitance Tolerance	±20%																				
Leakage Current	≤ 3 √CV μA, 4 mA max, 5 minutes																				
Ripple Current Multipliers	Ambient Temperature																				
	<table><tr><td>45 °C</td><td>60 °C</td><td>70 °C</td><td colspan="4">85 °C</td></tr><tr><td>1.50</td><td>1.40</td><td>1.30</td><td colspan="4">1.00</td></tr></table>							45 °C	60 °C	70 °C	85 °C				1.50	1.40	1.30	1.00			
	45 °C	60 °C	70 °C	85 °C																	
	1.50	1.40	1.30	1.00																	
Frequency																					
<table><tr><td>Voltage</td><td>50 Hz</td><td>60 Hz</td><td>120 Hz</td><td>500 kHz</td><td>1 kHz</td><td>10 kHz & Up</td></tr><tr><td>16–100 WV</td><td>0.93</td><td>0.95</td><td>1.00</td><td>1.05</td><td>1.08</td><td>1.15</td></tr></table>							Voltage	50 Hz	60 Hz	120 Hz	500 kHz	1 kHz	10 kHz & Up	16–100 WV	0.93	0.95	1.00	1.05	1.08	1.15	
Voltage	50 Hz	60 Hz	120 Hz	500 kHz	1 kHz	10 kHz & Up															
16–100 WV	0.93	0.95	1.00	1.05	1.08	1.15															
Low Temperature Characteristics	Impedance ratio: Z _{-20°C} /Z _{+25°C} ≤ 8 (16–50 Vdc) ≤ 4 (63–100 Vdc) ≤ 3 (150–450 Vdc)																				
Endurance Life Test	2000 h at full load at 85 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit																				
Shelf Life Test	1000 h at 85 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit																				
Vibration	10 to 55 Hz, 0.06" and 10 g max, 2 h each plane																				
RoHS Compliant																					

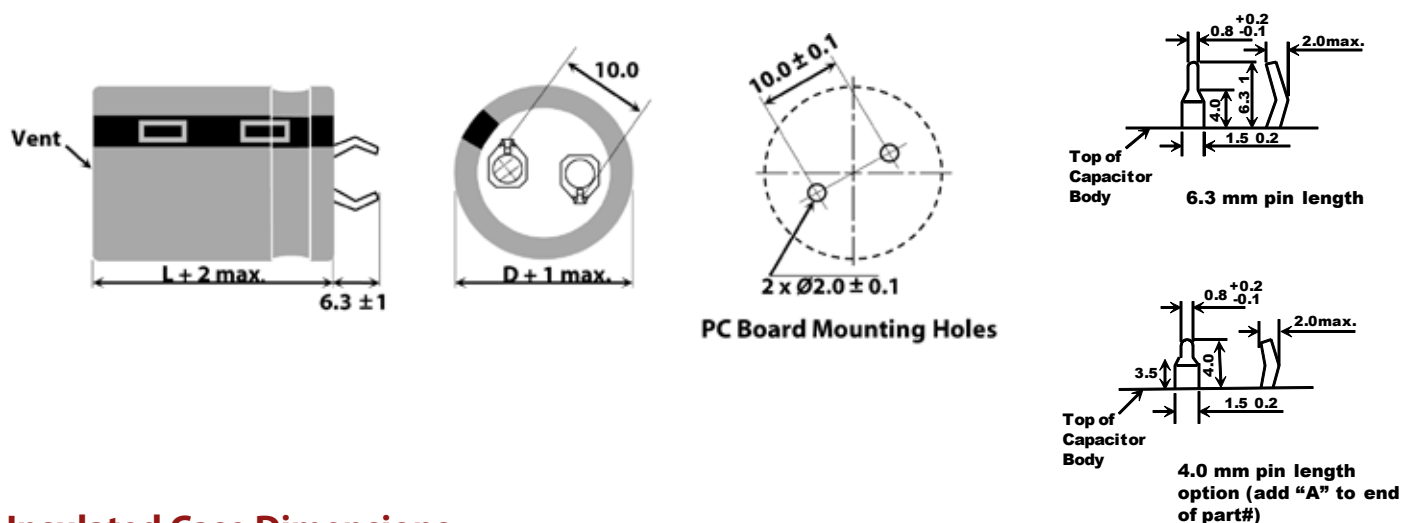
Type 380LQ 85 °C Compact, High Capacitance Snap-in Capacitors

Higher Capacitance per Case Size

Part Numbering System

380LQ	272	M	200	A05	2	A
Type	Cap	Tolerance	Voltage	Case Code	Insulation	Pin Styles
380LQ	561 = 560 μ F 272 = 2700 μ F 392 = 3900 μ F	M = $\pm$ 20%	016 = 16 Vdc 200 = 2000 Vdc 450 = 450 Vdc		2 = PVC	Blank = 2 pins snap-in 6.3 mm L A = 2 pins snap-in 4.0 mm L

Outline Drawing



Insulated Case Dimensions

Case Code	DIAMETER D		LENGTH L		Typical Weight (grams)	Case Code	DIAMETER D		LENGTH L		Typical Weight (grams)
	mm	inches	mm	inches			mm	inches	mm	inches	
H01	22	0.87	25	0.98	16	K01	30	1.18	25	0.98	30
H02	22	0.87	30	1.18	19	K02	30	1.18	30	1.18	35
H03	22	0.87	35	1.38	22	K03	30	1.18	35	1.38	40
H04	22	0.87	40	1.57	24	K04	30	1.18	40	1.57	44
H45	22	0.87	45	1.77	28	K45	30	1.18	45	1.77	49
H05	22	0.87	50	1.97	31	K05	30	1.18	50	1.97	53
J01	25	0.98	25	0.98	20	A01	35	1.38	25	0.98	42
J02	25	0.98	30	1.18	24	A02	35	1.38	30	1.18	48
J03	25	0.98	35	1.38	27	A03	35	1.38	35	1.38	54
J04	25	0.98	40	1.57	31	A04	35	1.38	40	1.57	60
J45	25	0.98	45	1.77	35	A45	35	1.38	45	1.77	67
J05	25	0.98	50	1.97	38	A05	35	1.38	50	1.97	74

Type 380LQ 85 °C Compact, High Capacitance Snap-in Capacitors

Higher Capacitance per Case Size

Ratings

Additional Voltages available at www.cde.com/catalogs/380LQ.pdf

Cap. (µF)	Catalog Part Number	ESR Max @ 25° C		Ripple Amps @ 85 °C		Nominal Size
		120 Hz	20 kHz	120 Hz	20 kHz	D x L
		(Ω)	(Ω)	(A)	(A)	(mm)
16 Vdc (20 Vdc Surge)						
12000	380LQ123M016H012	0.069	0.059	4.52	5.20	22 x 25
15000	380LQ153M016H022	0.055	0.047	5.26	6.05	22 x 30
18000	380LQ183M016H032	0.046	0.039	5.57	6.41	22 x 35
18000	380LQ183M016J012	0.046	0.039	5.57	6.41	25 x 25
22000	380LQ223M016H042	0.038	0.032	6.10	7.02	22 x 40
22000	380LQ223M016J022	0.038	0.032	6.10	7.02	25 x 30
27000	380LQ273M016H452	0.031	0.026	6.31	7.26	22 x 45
27000	380LQ273M016J032	0.031	0.026	6.31	7.26	25 x 25
27000	380LQ273M016K012	0.031	0.026	6.31	7.26	30 x 25
33000	380LQ333M016H052	0.025	0.021	6.84	7.87	22 x 50
33000	380LQ333M016J042	0.025	0.021	6.84	7.87	25 x 40
33000	380LQ333M016K022	0.025	0.021	6.84	7.87	30 x 30
33000	380LQ333M016A012	0.025	0.021	6.84	7.87	35 x 25
39000	380LQ393M016J452	0.024	0.020	6.94	7.98	25 x 45
39000	380LQ393M016K032	0.024	0.020	6.94	7.98	30 x 35
47000	380LQ473M016J052	0.023	0.019	7.47	8.59	25 x 50
47000	380LQ473M016K042	0.023	0.019	7.47	8.59	30 x 40
47000	380LQ473M016A022	0.023	0.019	7.47	8.59	35 x 30
56000	380LQ563M016K452	0.022	0.019	8.73	10.04	30 x 45
56000	380LQ563M016A032	0.022	0.018	8.73	10.04	35 x 35
68000	380LQ683M016K052	0.021	0.018	9.05	10.41	30 x 50
68000	380LQ683M016A042	0.021	0.018	9.05	10.41	35 x 40
82000	380LQ823M016A452	0.020	0.018	9.49	10.91	35 x 45
100000	380LQ104M016A052	0.019	0.018	10.18	11.71	35 x 50
35 Vdc (44 Vdc Surge)						
5600	380LQ562M035H012	0.104	0.078	3.36	3.86	22 x 25
8200	380LQ822M035H022	0.071	0.053	4.00	4.60	22 x 30
8200	380LQ822M035J012	0.071	0.053	4.00	4.60	25 x 25
10000	380LQ103M035H032	0.058	0.044	4.42	5.08	22 x 35
10000	380LQ103M035J022	0.058	0.044	4.42	5.08	25 x 30
12000	380LQ123M035H042	0.048	0.036	5.05	5.81	22 x 40
12000	380LQ123M035J032	0.048	0.036	5.05	5.81	25 x 35
12000	380LQ123M035K012	0.048	0.036	5.05	5.81	30 x 25
15000	380LQ153M035H452	0.039	0.029	5.57	6.41	22 x 45
15000	380LQ153M035J042	0.039	0.029	5.57	6.41	25 x 40
18000	380LQ183M035J452	0.032	0.024	5.68	6.53	25 x 45
18000	380LQ183M035K022	0.032	0.024	5.68	6.53	30 x 30
18000	380LQ183M035A012	0.032	0.024	5.68	6.53	35 x 25
22000	380LQ223M035J052	0.026	0.02	6.10	7.02	25 x 50
22000	380LQ223M035K032	0.026	0.02	6.10	7.02	30 x 35
22000	380LQ223M035A022	0.026	0.02	6.10	7.02	35 x 30
27000	380LQ273M035K452	0.021	0.016	6.84	7.87	30 x 45

Cap. (μF)	Catalog Part Number	ESR Max		Ripple Amps		Nominal
		@ 25° C		@ 85 °C		Size
		120 Hz (Ω)	20 kHz (Ω)	120 Hz (A)	20 kHz (A)	D x L (mm)
35 Vdc (44 Vdc Surge)						
27000	380LQ273M035A032	0.021	0.016	6.84	7.87	35 x 35
33000	380LQ333M035K052	0.018	0.013	7.15	8.22	30 x 50
33000	380LQ333M035A042	0.018	0.014	7.15	8.22	35 x 40
39000	380LQ393M035A452	0.017	0.014	7.91	9.10	35 x 45
47000	380LQ473M035A052	0.017	0.014	8.56	9.84	35 x 50
63 Vdc (79 Vdc Surge)						
2200	380LQ222M063H012	0.188	0.141	2.52	2.90	22 x 25
3300	380LQ332M063H022	0.126	0.094	4.10	4.72	22 x 30
3300	380LQ332M063J012	0.126	0.094	4.10	4.72	25 x 25
3900	380LQ392M063H032	0.106	0.080	4.44	5.11	22 x 35
3900	380LQ392M063J022	0.106	0.080	4.44	5.11	25 x 30
4700	380LQ472M063H042	0.088	0.066	4.86	5.59	22 x 40
5600	380LQ562M063H452	0.074	0.056	5.36	6.16	22 x 45
5600	380LQ562M063J042	0.074	0.056	5.36	6.16	25 x 40
6800	380LQ682M063J452	0.061	0.046	5.84	6.72	25 x 45
6800	380LQ682M063K022	0.061	0.046	5.84	6.72	30 x 30
6800	380LQ682M063A012	0.061	0.046	5.84	6.72	35 x 25
8200	380LQ822M063J052	0.051	0.038	6.00	6.90	25 x 50
8200	380LQ822M063K032	0.051	0.038	6.00	6.90	30 x 35
8200	380LQ822M063A022	0.051	0.038	6.00	6.90	35 x 30
10000	380LQ103M063K042	0.041	0.031	6.52	7.50	30 x 40
10000	380LQ103M063A032	0.041	0.031	6.52	7.50	35 x 35
12000	380LQ123M063K452	0.035	0.026	7.15	8.22	30 x 45
12000	380LQ123M063A042	0.035	0.026	7.15	8.22	35 x 40
15000	380LQ153M063A452	0.028	0.021	7.91	9.10	35 x 45
18000	380LQ183M063A052	0.023	0.018	8.55	9.83	35 x 50
18000	380LQ183M063A052	0.023	0.018	8.55	9.83	35 x 50
80 Vdc (100 Vdc Surge)						
1500	380LQ152M080H012	0.221	0.166	2.26	2.60	22 x 25
1800	380LQ182M080H022	0.184	0.138	2.52	2.90	22 x 30
2200	380LQ222M080H032	0.151	0.113	2.73	3.14	22 x 35
2200	380LQ222M080J012	0.151	0.113	2.73	3.14	25 x 25
2700	380LQ272M080H042	0.123	0.092	2.78	3.20	22 x 40
2700	380LQ272M080J022	0.123	0.092	2.78	3.20	25 x 30
3300	380LQ332M080H452	0.100	0.075	3.21	3.69	22 x 45
3300	380LQ332M080J032	0.100	0.075	3.21	3.69	25 x 35
3300	380LQ332M080K012	0.100	0.075	3.21	3.69	30 x 25
3900	380LQ392M080H052	0.085	0.064	3.59	4.13	22 x 50
3900	380LQ392M080J042	0.085	0.064	3.59	4.13	25 x 40
3900	380LQ392M080A012	0.085	0.064	3.59	4.13	35 x 25
4700	380LQ472M080H452	0.071	0.053	4.09	4.70	25 x 45
4700	380LQ472M080K022	0.071	0.053	4.09	4.70	30 x 30

Type 380LQ 85 °C Compact, High Capacitance Snap-in Capacitors

Higher Capacitance per Case Size

Additional Voltages available at www.cde.com/catalogs/380LQ.pdf

Cap. (μF)	Catalog Part Number	ESR Max		Ripple Amps		Nominal
		@ 25° C		@ 85 °C		Size
		120 Hz (Ω)	20 kHz (Ω)	120 Hz (A)	20 kHz (A)	D x L (mm)
80 Vdc (100 Vdc Surge)						
5600	380LQ562M080J052	0.059	0.044	4.55	5.23	25 x 50
5600	380LQ562M080K032	0.059	0.044	4.55	5.23	30 x 35
5600	380LQ562M080A022	0.059	0.044	4.55	5.23	35 x 30
6800	380LQ682M080K452	0.049	0.037	5.16	5.93	30 x 45
6800	380LQ682M080A032	0.049	0.037	5.16	5.93	35 x 35
8200	380LQ822M080K052	0.040	0.030	5.83	6.70	30 x 50
8200	380LQ822M080A042	0.040	0.030	5.83	6.70	35 x 40
10000	380LQ103M080A452	0.033	0.025	6.51	7.49	35 x 45
12000	380LQ122M080A052	0.028	0.021	7.28	8.37	35 x 50
100 Vdc (125 Vdc Surge)						
1000	380LQ102M100H012	0.332	0.216	1.96	2.25	22 x 25
1200	380LQ122M100J012	0.276	0.180	2.31	2.66	25 x 25
1500	380LQ152M100H022	0.221	0.144	2.57	2.96	22 x 30
1800	380LQ182M100H032	0.184	0.120	2.84	3.27	22 x 35
1800	380LQ182M100J022	0.184	0.120	2.84	3.27	25 x 30
2200	380LQ222M100H452	0.151	0.098	3.14	3.61	22 x 45
2200	380LQ222M100J032	0.151	0.098	3.14	3.61	25 x 35
2200	380LQ222M100K012	0.151	0.098	3.14	3.61	30 x 25
2700	380LQ272M100H052	0.123	0.080	3.71	4.27	22 x 50
2700	380LQ272M100J042	0.123	0.080	3.71	4.27	25 x 40
2700	380LQ272M100K022	0.123	0.080	3.71	4.27	30 x 30
2700	380LQ272M100A012	0.123	0.080	3.71	4.27	35 x 25
3300	380LQ332M100J452	0.100	0.065	4.06	4.67	25 x 45
3300	380LQ332M100K032	0.100	0.065	4.06	4.67	30 x 35
3900	380LQ392M100J052	0.085	0.055	4.54	5.22	25 x 50
3900	380LQ392M100K042	0.085	0.055	4.54	5.22	30 x 40
3900	380LQ392M100A022	0.085	0.055	4.54	5.22	35 x 30
4700	380LQ472M100K452	0.071	0.046	5.13	5.90	30 x 45
4700	380LQ472M100A032	0.071	0.046	5.13	5.90	35 x 35
5600	380LQ562M100K052	0.059	0.041	5.75	6.61	30 x 50
5600	380LQ562M100A042	0.059	0.038	5.75	6.61	35 x 40
6800	380LQ682M100A452	0.049	0.034	6.60	7.59	35 x 45
8200	380LQ822M100A052	0.040	0.030	7.29	8.38	35 x 50
200 Vdc (250 Vdc Surge)						
390	380LQ391M200H012	0.510	0.230	1.68	2.35	22 x 25
470	380LQ471M200H022	0.423	0.190	1.85	2.59	22 x 30
560	380LQ561M200H022	0.355	0.160	2.43	3.40	22 x 30
560	380LQ561M200J012	0.355	0.160	2.43	3.40	25 x 25
680	380LQ681M200H032	0.293	0.132	2.68	3.75	22 x 35
680	380LQ681M200J022	0.293	0.132	2.68	3.75	25 x 30
820	380LQ821M200H042	0.243	0.109	2.93	4.10	22 x 40
820	380LQ821M200J022	0.243	0.109	2.93	4.10	25 x 30

Additional Voltages available at www.fdc.com/catalogs/380LQ.asp						
Cap. (µF)	Catalog Part Number	ESR Max @ 25° C		Ripple Amps @ 85 °C		Nominal Size
		120 Hz	20 kHz	120 Hz	20 kHz	D x L
		(Ω)	(Ω)	(A)	(A)	(mm)
200 Vdc (250 Vdc Surge)						
820	380LQ821M200K012	0.243	0.109	2.93	4.10	30 x 25
1000	380LQ102M200H452	0.199	0.090	3.25	4.55	22 x 45
1000	380LQ102M200J032	0.199	0.090	3.25	4.55	25 x 35
1000	380LQ102M200K022	0.199	0.090	3.25	4.55	30 x 30
1000	380LQ102M200A012	0.232	0.116	3.25	4.55	35 x 25
1200	380LQ122M200H052	0.166	0.075	3.50	4.90	22 x 50
1200	380LQ122M200J042	0.166	0.075	3.50	4.90	25 x 40
1200	380LQ122M200K022	0.166	0.075	3.50	4.90	30 x 30
1500	380LQ152M200J052	0.133	0.060	3.87	5.42	25 x 50
1500	380LQ152M200K032	0.144	0.065	3.87	5.42	30 x 35
1500	380LQ152M200A022	0.144	0.065	3.87	5.42	35 x 30
1800	380LQ182M200K452	0.160	0.080	4.32	6.05	30 x 45
1800	380LQ182M200A032	0.120	0.060	4.32	6.05	35 x 35
2200	380LQ222M200K052	0.098	0.049	4.92	6.89	30 x 50
2200	380LQ222M200A042	0.105	0.053	4.92	6.89	35 x 40
2700	380LQ272M200A052	0.086	0.043	5.45	7.63	35 x 50
250 Vdc (300 Vdc Surge)						
270	380LQ271M250H012	0.737	0.332	1.31	1.83	22 x 25
330	380LQ331M250H022	0.603	0.271	1.75	2.45	22 x 30
390	380LQ391M250H022	0.510	0.230	1.91	2.67	22 x 30
390	380LQ391M250J012	0.510	0.230	1.91	2.67	25 x 25
470	380LQ471M250H032	0.423	0.190	2.11	2.95	22 x 35
470	380LQ471M250J022	0.423	0.190	2.11	2.95	25 x 30
560	380LQ561M250H042	0.355	0.160	2.25	3.15	22 x 40
560	380LQ561M250J022	0.355	0.160	2.25	3.15	25 x 30
560	380LQ561M250K012	0.355	0.160	2.25	3.15	30 x 25
680	380LQ681M250H452	0.293	0.132	2.50	3.50	22 x 45
680	380LQ681M250J032	0.293	0.132	2.50	3.50	25 x 35
680	380LQ681M250K012	0.293	0.132	2.30	3.20	30 x 25
680	380LQ681M250K022	0.293	0.132	2.50	3.50	30 x 30
820	380LQ821M250H052	0.243	0.109	2.77	3.88	22 x 50
820	380LQ821M250J042	0.243	0.109	2.77	3.88	25 x 40
820	380LQ821M250K022	0.243	0.109	2.77	3.88	30 x 30
820	380LQ821M250A012	0.243	0.121	2.77	3.88	35 x 25
1000	380LQ102M250J452	0.199	0.090	3.32	4.65	25 x 45
1000	380LQ102M250K032	0.199	0.090	3.32	4.65	30 x 35
1000	380LQ102M250A022	0.199	0.090	3.32	4.65	35 x 30
1200	380LQ122M250K042	0.166	0.075	3.53	4.94	30 x 40
1200	380LQ122M250A032	0.166	0.083	3.53	4.94	35 x 35
1500	380LQ152M250K052	0.133	0.066	4.04	5.66	30 x 50
1500	380LQ152M250A042	0.133	0.066	4.04	5.66	35 x 40
1800	380LQ182M250A452	0.111	0.055	4.55	6.37	35 x 45

Type 380LQ 85 °C Compact, High Capacitance Snap-in Capacitors

Higher Capacitance per Case Size

Additional Voltages available at www.cde.com/catalogs/380LQ.pdf

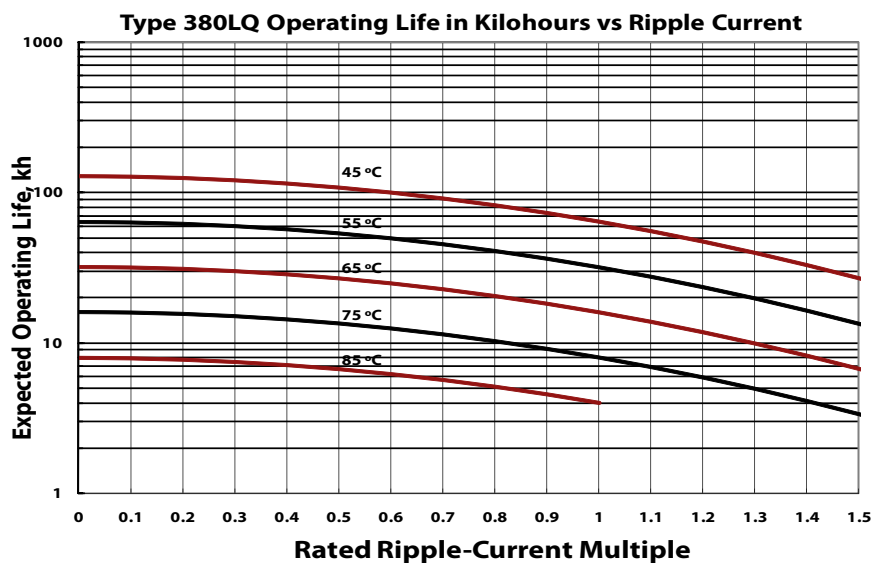
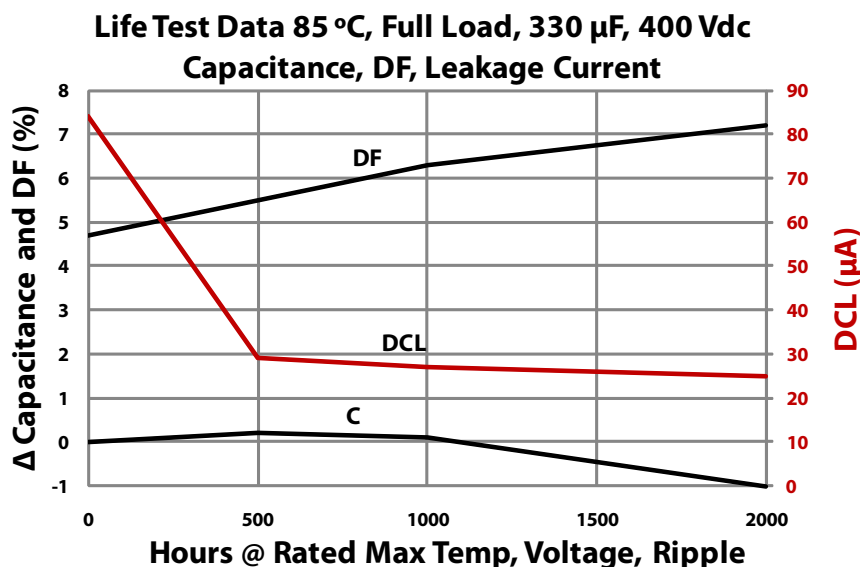
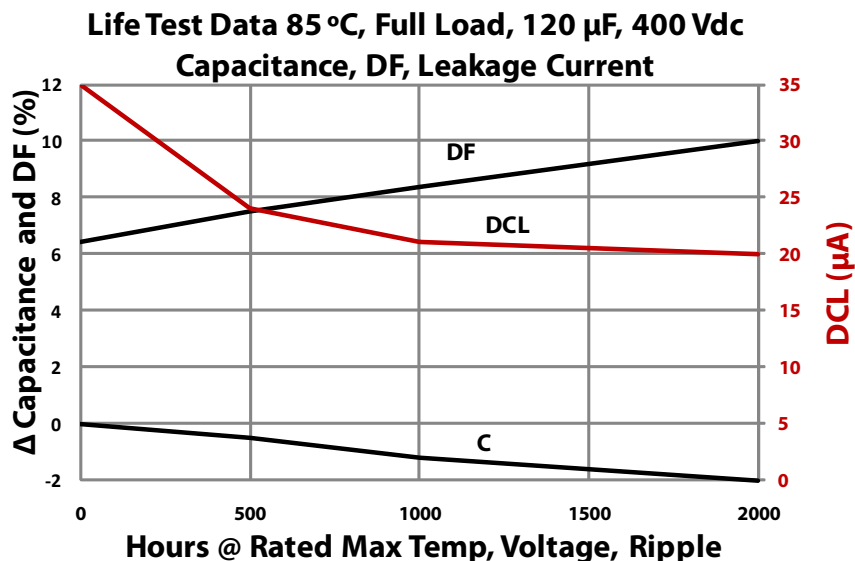
Cap.	Catalog	ESR Max		Ripple Amps		Nominal
		@ 25° C		@ 85 °C		Size
		120 Hz	20 kHz	120 Hz	20 kHz	D x L
(µF)	Part Number	(Ω)	(Ω)	(A)	(A)	(mm)
250 Vdc (300 Vdc Surge)						
2200	380LQ222M250A052	0.105	0.052	5.00	7.00	35 x 50
400 Vdc (450 Vdc Surge)						
120	380LQ121M400H012	1.658	0.830	1.02	1.43	22 x 25
150	380LQ151M400H022	1.326	0.660	1.16	1.62	22 x 30
180	380LQ181M400H022	1.105	0.552	1.30	1.80	22 x 30
180	380LQ181M400H032	1.105	0.552	1.44	2.02	22 x 35
220	380LQ221M400H032	0.904	0.452	1.40	1.90	22 x 35
220	380LQ221M400H042	0.904	0.452	1.49	2.09	22 x 40
220	380LQ221M400J022	0.904	0.452	1.49	2.09	25 x 30
270	380LQ271M400H452	0.737	0.368	1.67	2.34	22 x 45
270	380LQ271M400J032	0.737	0.368	1.67	2.34	25 x 35
270	380LQ271M400K022	0.737	0.368	1.67	2.34	30 x 30
330	380LQ331M400H052	0.603	0.301	1.90	2.66	22 x 50
330	380LQ331M400J042	0.603	0.301	1.90	2.66	25 x 40
330	380LQ331M400K022	0.603	0.301	1.90	2.66	30 x 30
330	380LQ331M400A012	0.603	0.301	1.90	2.66	35 x 25
390	380LQ391M400J452	0.510	0.255	2.13	2.98	25 x 45
390	380LQ391M400K032	0.510	0.255	2.13	2.98	30 x 35
390	380LQ391M400A022	0.510	0.255	2.13	2.98	35 x 30
470	380LQ471M400J052	0.423	0.212	2.39	3.35	25 x 50
470	380LQ471M400K042	0.423	0.212	2.39	3.35	30 x 40
470	380LQ471M400A022	0.423	0.212	2.39	3.35	35 x 30
560	380LQ561M400K452	0.355	0.178	2.69	3.77	30 x 45
560	380LQ561M400A032	0.355	0.178	2.69	3.77	35 x 35
680	380LQ681M400K052	0.293	0.148	2.96	4.14	30 x 50
680	380LQ681M400A042	0.293	0.148	2.70	3.80	35 x 40
680	380LQ681M400A452	0.293	0.148	2.96	4.14	35 x 45
820	380LQ821M400A452	0.243	0.122	2.95	4.15	35 x 45
820	380LQ821M400A052	0.243	0.122	3.25	4.55	35 x 50
420 Vdc (470 Vdc Surge)						
150	380LQ151M420H022	1.330	0.660	1.20	1.65	22 x 30
150	380LQ151M420J012	1.330	0.660	1.20	1.65	25 x 25
180	380LQ181M420H032	1.100	0.550	1.40	1.95	22 x 35
220	380LQ221M420H042	0.904	0.452	1.50	2.10	22 x 40
220	380LQ221M420J032	0.904	0.452	1.50	2.10	25 x 35
220	380LQ221M420K012	0.904	0.452	1.50	2.10	30 x 25
270	380LQ271M420H452	0.737	0.368	1.75	2.40	22 x 45
270	380LQ271M420J042	0.737	0.368	1.75	2.40	25 x 40

Additional Portages available at www.ecc.com/catalog/380LQ.php						
Cap.	Catalog	ESR Max		Ripple Amps		Nominal
		@ 25° C		@ 85 °C		Size
		120 Hz	20 kHz	120 Hz	20 kHz	D x L
(µF)	Part Number	(Ω)	(Ω)	(A)	(A)	(mm)
420 Vdc (470 Vdc Surge)						
330	380LQ331M420J452	0.603	0.302	1.95	2.75	25 x 45
330	380LQ331M420K022	0.603	0.302	1.95	2.75	30 x 30
390	380LQ391M420J052	0.510	0.255	2.15	3.05	25 x 50
390	380LQ391M420K032	0.510	0.255	2.15	3.05	30 x 35
390	380LQ391M420A022	0.510	0.255	2.15	3.05	35 x 30
470	380LQ471M420K042	0.423	0.212	2.45	3.40	30 x 40
470	380LQ471M420A032	0.423	0.212	2.45	3.40	35 x 35
560	380LQ561M420K452	0.355	0.178	2.75	3.85	30 x 45
560	380LQ561M420A042	0.355	0.178	2.75	3.85	35 x 40
680	380LQ681M420A452	0.293	0.146	3.10	4.35	35 x 45
450 Vdc (500 Vdc Surge)						
82	380LQ820M450H012	2.426	1.213	0.83	1.16	22 x 25
100	380LQ101M450H012	1.990	0.995	0.93	1.30	22 x 25
120	380LQ121M450H022	1.656	0.829	1.04	1.46	22 x 30
150	380LQ151M450H032	1.326	0.663	1.19	1.67	22 x 35
150	380LQ151M450J022	1.326	0.663	1.19	1.67	25 x 30
180	380LQ181M450H042	1.105	0.553	1.35	1.89	22 x 40
180	380LQ181M450J022	1.105	0.553	1.35	1.89	25 x 30
220	380LQ221M450H452	0.904	0.452	1.55	2.17	22 x 45
220	380LQ221M450J032	0.904	0.452	1.45	2.00	25 x 35
220	380LQ221M450J042	0.904	0.452	1.55	2.17	25 x 40
220	380LQ221M450K022	0.904	0.452	1.55	2.17	30 x 30
220	380LQ221M450A012	0.904	0.452	1.55	2.17	35 x 25
270	380LQ271M450H052	0.737	0.368	1.78	2.49	22 x 50
270	380LQ271M450J042	0.737	0.368	1.78	2.49	25 x 40
270	380LQ271M450K022	0.737	0.368	1.78	2.49	30 x 30
330	380LQ331M450J052	0.603	0.302	2.01	2.81	25 x 50
330	380LQ331M450K032	0.603	0.302	1.90	2.60	30 x 35
330	380LQ331M450K042	0.603	0.302	2.01	2.81	30 x 40
330	380LQ331M450A022	0.603	0.302	2.01	2.81	35 x 30
390	380LQ391M450K042	0.510	0.255	2.24	3.14	30 x 40
390	380LQ391M450A032	0.510	0.255	2.24	3.14	35 x 35
470	380LQ471M450K452	0.423	0.212	2.53	3.54	30 x 45
470	380LQ471M450A042	0.423	0.212	2.53	3.54	35 x 40
560	380LQ561M450K052	0.355	0.178	2.82	3.95	30 x 50
560	380LQ561M450A452	0.355	0.178	2.82	3.95	35 x 45
680	380LQ681M450A052	0.293	0.146	3.00	4.25	35 x 50

Type 380LQ 85 °C Compact, High Capacitance Snap-in Capacitors

Higher Capacitance per Case Size

Typical Performance Curves



Type SLP 105 °C Snap-In Aluminum Electrolytic

Best Value 105 °C Snap-In Type



Type SLP is the best value package snap-in series for 105 °C, 3000 h operation. This series is the most cost-effective choice for DC filtering and power supply applications where high temperature, long life and high ripple capability are needed.

Highlights

- 3000 h ripple load life at rated voltage
- 105 °C rated
- Small case size with high capacitance
- Best for switching power supplies
- 22 mm to 35 mm diameter, 10 mm lead spacing
- Best value snap-in type
- High ripple current

Specifications

Temperature Range	-40 °C to +105 °C ≤ 100 Vdc -25 °C to +105 °C ≥ 160 Vdc				
Rated Voltage Range	10 Vdc to 450 Vdc				
Capacitance Range	47 μF to 56,000 μF				
Capacitance Tolerance	±20%				
Leakage Current	≤ 3 √CV μA at 5 minutes				
Ripple Current Multipliers	Ambient Temperature				
	20 °C - 45 °C	65 °C	85 °C	105 °C	
	2.00	1.89	1.52	1.00	
	Frequency				
	Voltage	60 Hz	120 Hz	1 kHz	10 kHz & Up
	10 - 100 Vdc	0.90	1.00	1.15	1.25
160 - 450 Vdc	0.80	1.00	1.25	1.47	
To apply multipliers, see ratings tables for ripple current values					
Low Temperature Characteristics	Impedance ratio: Z _{-20°C} /Z _{+25°C} ≤ 10 (10 Vdc) ≤ 8 (16-50 Vdc) ≤ 4 (63-100 Vdc) ≤ 3 (150-450 Vdc)				
Endurance Life	3,000 h @ full load @105 °C Δ Capacitance ±20% ESR ≤200% of limit DCL 100 % of limit				
Shelf Life	1,000 h @ 105 °C Δ Capacitance ±20% ESR ≤150% of limit DCL 100 % of limit				
Vibration	10 Hz to 55 Hz , 0.06" and 10g max 2 h for each plane				
RoHS Compliant					

Type SLP 105 °C Snap-In Aluminum Electrolytic

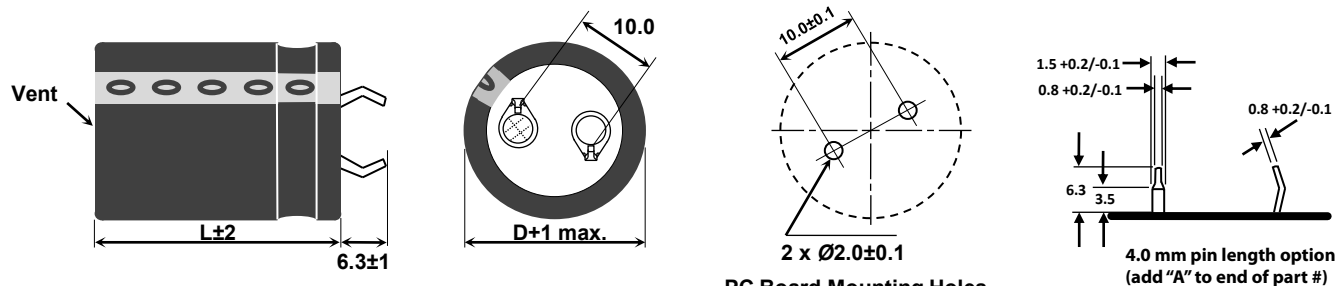
Best Value 105 °C Snap-In Type

Part Numbering System

SLP	562	M	025	A3	P	3	A
Type	Cap	Tolerance	Voltage	Case Code	Polarity	Insulating Sleeve	Pin Style
SLP	821 = 820 μ F 332 = 3300 μ F 103 = 10,000 μ F	M = $\pm$ 20%	025 = 25 Vdc 250 = 250 Vdc		P = Polarized	3 = PVC	Blank = 2 pins snap-in 6.3 mm L A = 2 pins snap-in 4.0 mm L

Diameter		Length					
		25	30	35	40	45	50
		(1.00)	(1.18)	(1.38)	(1.57)	(1.77)	(2.00)
mm	(in)						
22	(0.87)	A1	A3	A5	A7	A4	A9
25	(1.00)	C1	C3	C5	C7	C4	C9
30	(1.18)	E1	E3	E5	E7	E4	E9
35	(1.38)	H1	H3	H5	H7	H4	H9

Outline Drawing



PC Board Mounting Holes

Ratings

Cap (μ F)	3000 h @ 105 °C Catalog Part Number	Max 25 °C ESR (Ω) 120 Hz 20kHz	Max 105 °C Ripple (A _{rms}) 120 Hz 20kHz	Nominal Size (DxL) (mm)
10 Vdc (13 Vdc Surge)				
10000	SLP103M010A1P3	0.073	0.055	1.80 2.25 22 x 25
12000	SLP123M010A3P3	0.061	0.046	2.20 2.75 22 x 30
12000	SLP123M010C1P3	0.061	0.046	2.20 2.75 25 x 25
15000	SLP153M010A5P3	0.049	0.037	2.30 2.88 22 x 35
15000	SLP153M010C1P3	0.049	0.037	2.30 2.88 25 x 25
18000	SLP183M010A7P3	0.041	0.031	2.52 3.15 22 x 40
18000	SLP183M010C3P3	0.041	0.031	2.40 3.00 25 x 30
22000	SLP223M010A4P3	0.033	0.025	2.60 3.25 22 x 45
22000	SLP223M010C5P3	0.033	0.025	2.60 3.25 25 x 35
27000	SLP273M010A9P3	0.027	0.020	3.19 3.99 22 x 50
27000	SLP273M010C7P3	0.027	0.020	3.10 3.88 25 x 40
33000	SLP333M010C4P3	0.022	0.017	3.40 4.25 25 x 45
33000	SLP333M010H3P3	0.022	0.017	3.40 4.25 35 x 30
39000	SLP393M010E7P3	0.019	0.014	3.79 4.74 30 x 40
39000	SLP393M010H3P3	0.019	0.014	3.70 4.63 35 x 30
47000	SLP473M010E4P3	0.016	0.012	4.26 5.33 30 x 45
47000	SLP473M010H5P3	0.016	0.012	4.20 5.25 35 x 35
56000	SLP563M010H7P3	0.013	0.010	5.00 6.25 35 x 40
16 Vdc (20 Vdc Surge)				
6800	SLP682M016A1P3	0.098	0.074	2.20 2.75 22 x 25
8200	SLP822M016A3P3	0.081	0.061	2.40 3.00 22 x 30
10000	SLP103M016A3P3	0.066	0.050	2.60 3.25 22 x 30

Additional Voltages and Sizes available at www.cde.com/catalogs/SLP.pdf

Cap (μ F)	3000 h @ 105 °C Catalog Part Number	Max 25 °C ESR (Ω) 120 Hz 20kHz	Max 105 °C Ripple (A _{rms}) 120 Hz 20kHz	Nominal Size (DxL) (mm)
16 Vdc (20 Vdc Surge)				
10000	SLP103M016C1P3	0.066	0.050	2.60 3.25 25 x 25
12000	SLP123M016A5P3	0.055	0.041	2.90 3.63 22 x 35
12000	SLP123M016C3P3	0.055	0.041	2.90 3.63 25 x 30
15000	SLP153M016A7P3	0.044	0.033	3.20 4.00 22 x 40
15000	SLP153M016C5P3	0.044	0.033	3.25 4.06 25 x 35
15000	SLP153M016E1P3	0.044	0.033	3.11 3.89 30 x 25
18000	SLP183M016A4P3	0.037	0.028	3.50 4.38 22 x 45
18000	SLP183M016C7P3	0.037	0.028	3.50 4.38 25 x 40
18000	SLP183M016E3P3	0.037	0.028	3.50 4.38 30 x 30
22000	SLP223M016C4P3	0.030	0.023	3.80 4.75 25 x 45
22000	SLP223M016E3P3	0.030	0.023	3.80 4.75 30 x 30
22000	SLP223M016H3P3	0.030	0.023	3.80 4.75 35 x 30
27000	SLP273M016C9P3	0.025	0.019	4.20 5.25 25 x 50
27000	SLP273M016E5P3	0.025	0.019	4.20 5.25 30 x 35
27000	SLP273M016H3P3	0.025	0.019	4.20 5.25 35 x 30
33000	SLP333M016E7P3	0.020	0.015	4.70 5.88 30 x 40
33000	SLP333M016H5P3	0.020	0.015	4.70 5.88 35 x 35
39000	SLP393M016E4P3	0.017	0.013	4.90 6.13 30 x 45
39000	SLP393M016H7P3	0.017	0.013	5.10 6.38 35 x 40
47000	SLP473M016E9P3	0.014	0.011	5.27 6.59 30 x 50
47000	SLP473M016H4P3	0.014	0.011	5.50 6.88 35 x 45

Type SLP 105 °C Snap-In Aluminum Electrolytic

Best Value 105 °C Snap-In Type

Additional Voltages and Sizes available at www.cde.com/catalogs/SLP.pdf

Cap	3000 h @ 105 °C	Max 25 °C ESR		Max 105 °C Ripple		Nominal
Catalog		(Ω)		(A _{rms})		Size (DxL)
Part Number		120 Hz	20kHz	120 Hz	20kHz	(mm)
25 Vdc (32 Vdc Surge)						
3300	SLP332M025A1P3	0.181	0.136	1.70	2.13	22 x 25
4700	SLP472M025A1P3	0.127	0.095	2.00	2.50	22 x 25
5600	SLP562M025A3P3	0.107	0.080	2.20	2.75	22 x 30
6800	SLP682M025A3P3	0.088	0.066	2.40	3.00	22 x 30
6800	SLP682M025C1P3	0.088	0.066	2.40	3.00	25 x 25
8200	SLP822M025A5P3	0.073	0.055	2.70	3.38	22 x 35
8200	SLP822M025C3P3	0.073	0.055	2.70	3.38	25 x 30
8200	SLP822M025E1P3	0.073	0.055	2.70	3.38	30 x 25
10000	SLP103M025A7P3	0.060	0.045	3.00	3.75	22 x 40
10000	SLP103M025C5P3	0.060	0.045	3.00	3.75	25 x 35
10000	SLP103M025E3P3	0.060	0.045	3.00	3.75	30 x 30
12000	SLP123M025A9P3	0.050	0.038	3.20	4.00	22 x 50
12000	SLP123M025C7P3	0.050	0.038	3.20	4.00	25 x 40
15000	SLP153M025C4P3	0.040	0.030	3.60	4.50	25 x 45
15000	SLP153M025E5P3	0.040	0.030	3.60	4.50	30 x 35
15000	SLP153M025H3P3	0.040	0.030	3.60	4.50	35 x 30
18000	SLP183M025E7P3	0.033	0.025	3.90	4.88	30 x 40
18000	SLP183M025H5P3	0.033	0.025	3.90	4.88	35 x 35
22000	SLP223M025E4P3	0.027	0.020	4.30	5.38	30 x 45
22000	SLP223M025H5P3	0.027	0.020	4.30	5.38	35 x 35
27000	SLP273M025H4P3	0.022	0.017	4.80	6.00	35 x 45
33000	SLP333M025H9P3	0.018	0.014	5.55	6.94	35 x 50
35 Vdc (44 Vdc Surge)						
3900	SLP392M035A3P3	0.136	0.102	2.00	2.50	22 x 30
4700	SLP472M035A5P3	0.113	0.085	2.20	2.75	22 x 35
4700	SLP472M035C1P3	0.113	0.085	2.20	2.75	25 x 25
4700	SLP472M035C5P3	0.113	0.085	2.53	3.16	25 x 35
5600	SLP562M035A5P3	0.095	0.071	2.40	3.00	22 x 35
5600	SLP562M035C3P3	0.095	0.071	2.40	3.00	25 x 30
6800	SLP682M035A7P3	0.078	0.059	2.60	3.25	22 x 40
6800	SLP682M035C5P3	0.078	0.059	2.60	3.25	25 x 35
6800	SLP682M035E1P3	0.078	0.059	2.78	3.48	30 x 25
8200	SLP822M035A9P3	0.065	0.049	2.90	3.63	22 x 50
8200	SLP822M035C7P3	0.065	0.049	2.90	3.63	25 x 40
8200	SLP822M035E3P3	0.065	0.049	2.90	3.63	30 x 30
10000	SLP103M035C4P3	0.053	0.040	3.20	4.00	25 x 45
10000	SLP103M035E5P3	0.053	0.040	3.20	4.00	30 x 35
10000	SLP103M035C7P3	0.053	0.040	3.04	3.80	25 x 40
12000	SLP123M035C9P3	0.044	0.033	3.50	4.38	25 x 50
12000	SLP123M035E7P3	0.044	0.033	3.50	4.38	30 x 40
12000	SLP123M035H3P3	0.044	0.033	3.50	4.38	35 x 30
15000	SLP153M035E4P3	0.035	0.026	3.90	4.88	30 x 45
15000	SLP153M035H5P3	0.035	0.026	3.90	4.88	35 x 35

Additional Voltages and Sizes available at www.cde.com/catalogs/SLP.pdf						
Cap (µF)	3000 h @ 105 °C Catalog Part Number	Max 25 °C ESR (Ω) 120 Hz 20kHz		Max 105 °C Ripple (A _{rms}) 120 Hz 20kHz		Nominal Size (DxL) (mm)
35 Vdc (44 Vdc Surge)						
18000	SLP183M035H7P3	0.029	0.022	4.51	5.64	35 x 40
22000	SLP223M035H4P3	0.024	0.018	5.24	6.55	35 x 45
22000	SLP223M035H9P3	0.024	0.018	5.48	6.85	35 x 50
50 Vdc (63 Vdc Surge)						
1800	SLP182M050A1P3	0.258	0.194	1.50	1.88	22 x 25
2200	SLP222M050A3P3	0.211	0.158	1.70	2.13	22 x 30
2700	SLP272M050A3P3	0.172	0.129	1.80	2.25	22 x 30
2700	SLP272M050C1P3	0.172	0.129	1.80	2.25	25 x 25
3300	SLP332M050A5P3	0.141	0.106	2.00	2.50	22 x 35
3300	SLP332M050C3P3	0.141	0.106	2.00	2.50	25 x 30
3900	SLP392M050A7P3	0.119	0.089	2.23	2.79	22 x 40
3900	SLP392M050C3P3	0.119	0.089	2.20	2.75	25 x 30
3900	SLP392M050E1P3	0.119	0.089	2.20	2.75	30 x 25
4700	SLP472M050A4P3	0.099	0.074	2.50	3.13	22 x 45
4700	SLP472M050C5P3	0.099	0.074	2.43	3.04	25 x 35
4700	SLP472M050E3P3	0.099	0.074	2.50	3.13	30 x 30
5600	SLP562M050A9P3	0.083	0.062	2.80	3.50	22 x 50
5600	SLP562M050C7P3	0.083	0.062	2.80	3.50	25 x 40
5600	SLP562M050E3P3	0.083	0.062	2.76	3.45	30 x 30
6800	SLP682M050C4P3	0.068	0.051	3.30	4.13	25 x 45
6800	SLP682M050E5P3	0.068	0.051	3.30	4.13	30 x 35
6800	SLP682M050H3P3	0.068	0.051	3.30	4.13	35 x 30
8200	SLP822M050E7P3	0.057	0.043	3.71	4.64	30 x 40
8200	SLP822M050H5P3	0.057	0.043	3.85	4.81	35 x 35
10000	SLP103M050E9P3	0.046	0.035	4.51	5.64	30 x 50
10000	SLP103M050H7P3	0.046	0.035	4.49	5.61	35 x 40
12000	SLP123M050H4P3	0.039	0.029	4.56	5.70	35 x 45
15000	SLP153M050H9P3	0.031	0.023	4.80	6.00	35 x 50
63 Vdc (79 Vdc Surge)						
1200	SLP122M063A1P3	0.332	0.249	1.40	1.75	22 x 25
1500	SLP152M063A3P3	0.265	0.199	1.50	1.88	22 x 30
1800	SLP182M063A3P3	0.221	0.166	1.70	2.13	22 x 30
1800	SLP182M063C1P3	0.221	0.166	1.70	2.13	25 x 25
2200	SLP222M063A5P3	0.181	0.136	2.00	2.50	22 x 35
2200	SLP222M063C3P3	0.181	0.136	2.00	2.50	25 x 30
2700	SLP272M063A7P3	0.147	0.110	2.20	2.75	22 x 40
2700	SLP272M063C5P3	0.147	0.110	2.20	2.75	25 x 35
2700	SLP272M063E1P3	0.147	0.110	2.20	2.75	30 x 25
3300	SLP332M063A4P3	0.121	0.091	2.60	3.25	22 x 45
3300	SLP332M063C5P3	0.121	0.091	2.39	2.99	25 x 35
3300	SLP332M063E3P3	0.121	0.091	2.50	3.13	30 x 30
3900	SLP392M063C7P3	0.102	0.077	2.57	3.21	25 x 40
3900	SLP392M063E5P3	0.102	0.077	2.70	3.38	30 x 35

Type SLP 105 °C Snap-In Aluminum Electrolytic

Best Value 105 °C Snap-In Type

Additional Voltages and Sizes available at www.cde.com/catalogs/SLP.pdf

Cap (µF)	3000 h @ 105 °C Catalog Part Number	Max 25 °C ESR (Ω) 120 Hz 20kHz	Max 105 °C Ripple (A _{rms}) 120 Hz 20kHz	Nominal Size (DxL) (mm)
63 Vdc (79 Vdc Surge)				
4700	SLP472M063C9P3	0.085	0.064	3.00 3.75 25 x 50
4700	SLP472M063E7P3	0.085	0.064	3.00 3.75 30 x 40
4700	SLP472M063H3P3	0.085	0.064	3.00 3.75 35 x 30
5600	SLP562M063E7P3	0.071	0.053	3.22 4.03 30 x 40
5600	SLP562M063H5P3	0.071	0.053	3.30 4.13 35 x 35
6800	SLP682M063E9P3	0.059	0.044	3.86 4.83 30 x 50
6800	SLP682M063H7P3	0.059	0.044	3.84 4.80 35 x 40
8200	SLP822M063H4P3	0.049	0.037	4.43 5.54 35 x 45
10000	SLP103M063H9P3	0.040	0.030	5.11 6.39 35 x 50
10000	SLP103M063H4P3	0.040	0.030	4.89 6.11 35 x 45
80 Vdc (100 Vdc Surge)				
1000	SLP102M080A1P3	0.332	0.249	1.19 1.49 22 x 25
1200	SLP122M080A3P3	0.276	0.207	1.50 1.88 22 x 30
1500	SLP152M080A3P3	0.221	0.166	1.59 1.99 22 x 30
1500	SLP152M080C1P3	0.221	0.166	1.59 1.99 25 x 25
1800	SLP182M080A5P3	0.184	0.138	1.79 2.24 22 x 35
1800	SLP182M080C3P3	0.184	0.138	1.71 2.14 25 x 30
2200	SLP222M080A7P3	0.151	0.113	2.03 2.54 22 x 40
2200	SLP222M080C5P3	0.151	0.113	2.10 2.63 25 x 35
2200	SLP222M080E1P3	0.151	0.113	1.98 2.48 30 x 25
2700	SLP272M080A4P3	0.123	0.092	2.39 2.99 22 x 45
2700	SLP272M080C7P3	0.123	0.092	2.35 2.94 25 x 40
2700	SLP272M080E3P3	0.123	0.092	2.35 2.94 30 x 30
3300	SLP332M080C4P3	0.101	0.076	2.64 3.30 25 x 45
3300	SLP332M080E5P3	0.101	0.076	2.61 3.26 30 x 35
3300	SLP332M080H3P3	0.101	0.076	2.60 3.25 35 x 30
3900	SLP392M080C9P3	0.085	0.064	2.92 3.65 25 x 50
3900	SLP392M080E7P3	0.085	0.064	2.82 3.53 30 x 40
3900	SLP392M080H3P3	0.085	0.064	2.97 3.71 35 x 30
4700	SLP472M080E4P3	0.071	0.053	3.34 4.18 30 x 45
4700	SLP472M080H5P3	0.071	0.053	3.38 4.23 35 x 35
5600	SLP562M080E9P3	0.059	0.044	3.80 4.75 30 x 50
5600	SLP562M080H7P3	0.059	0.044	3.80 4.75 35 x 40
6800	SLP682M080H4P3	0.049	0.037	3.90 4.88 35 x 45
8200	SLP822M080H9P3	0.040	0.030	4.20 5.25 35 x 50
100 Vdc (125 Vdc Surge)				
680	SLP681M100A1P3	0.390	0.293	1.09 1.36 22 x 25
820	SLP821M100A3P3	0.324	0.243	1.40 1.75 22 x 30
1000	SLP102M100A3P3	0.265	0.199	1.47 1.84 22 x 30
1000	SLP102M100C1P3	0.265	0.199	1.45 1.81 25 x 25
1200	SLP122M100A5P3	0.221	0.166	1.69 2.11 22 x 35
1200	SLP122M100C3P3	0.221	0.166	1.68 2.10 25 x 30
1500	SLP152M100A7P3	0.177	0.133	1.97 2.46 22 x 40

Cap (µF)	3000 h @ 105 °C Catalog Part Number	Max 25 °C ESR (Ω) 120 Hz 20kHz	Max 105 °C Ripple (A _{rms}) 120 Hz 20kHz	Nominal Size (DxL) (mm)
100 Vdc (125 Vdc Surge)				
1500	SLP152M100C5P3	0.177	0.133	1.98 2.48 25 x 35
1500	SLP152M100E1P3	0.177	0.133	1.95 2.44 30 x 25
1500	SLP152M100E3P3	0.177	0.133	2.09 2.61 30 x 30
1800	SLP182M100A4P3	0.147	0.110	2.23 2.79 22 x 45
1800	SLP182M100C7P3	0.147	0.110	2.20 2.75 25 x 40
1800	SLP182M100E3P3	0.147	0.110	2.20 2.75 30 x 30
2200	SLP222M100C4P3	0.121	0.091	2.53 3.16 25 x 45
2200	SLP222M100E5P3	0.121	0.091	2.55 3.19 30 x 35
2200	SLP222M100H3P3	0.121	0.091	2.60 3.25 35 x 30
2700	SLP272M100C9P3	0.098	0.074	2.82 3.53 25 x 50
2700	SLP272M100E7P3	0.098	0.074	2.86 3.58 30 x 40
2700	SLP272M100H5P3	0.098	0.074	2.90 3.63 35 x 35
3300	SLP332M100E4P3	0.080	0.060	3.30 4.13 30 x 45
3300	SLP332M100H5P3	0.080	0.060	3.25 4.06 35 x 35
3900	SLP392M100E9P3	0.068	0.051	3.60 4.50 30 x 50
3900	SLP392M100H7P3	0.068	0.051	3.67 4.59 35 x 40
4700	SLP472M100H4P3	0.056	0.042	3.80 4.75 35 x 45
5600	SLP562M100H9P3	0.047	0.035	4.05 5.06 35 x 50
160 Vdc (200Vdc Surge)				
330	SLP331M160A1P3	0.603	0.452	1.20 1.76 22 x 25
390	SLP391M160A3P3	0.510	0.383	1.30 1.91 22 x 30
470	SLP471M160A3P3	0.423	0.317	1.55 2.28 22 x 30
470	SLP471M160C1P3	0.423	0.317	1.55 2.28 25 x 25
560	SLP561M160A5P3	0.355	0.266	1.67 2.45 22 x 35
560	SLP561M160C3P3	0.355	0.266	1.67 2.45 25 x 30
680	SLP681M160A7P3	0.293	0.220	1.82 2.68 22 x 40
680	SLP681M160C5P3	0.293	0.220	1.85 2.72 25 x 35
680	SLP681M160E1P3	0.293	0.220	1.82 2.68 30 x 25
820	SLP821M160A4P3	0.243	0.182	2.04 3.00 22 x 45
820	SLP821M160C7P3	0.243	0.182	2.04 3.00 25 x 40
820	SLP821M160E3P3	0.243	0.182	2.04 3.00 30 x 30
1000	SLP102M160C4P3	0.199	0.149	2.40 3.53 25 x 45
1000	SLP102M160E5P3	0.199	0.149	2.25 3.31 30 x 35
1200	SLP122M160C9P3	0.166	0.125	2.62 3.85 25 x 50
1200	SLP122M160E7P3	0.166	0.125	2.49 3.66 30 x 40
1200	SLP122M160H3P3	0.166	0.125	2.49 3.66 35 x 30
1500	SLP152M160E4P3	0.133	0.100	2.84 4.17 30 x 45
1500	SLP152M160H5P3	0.133	0.100	2.84 4.17 35 x 35
1800	SLP182M160E9P3	0.111	0.083	3.32 4.88 30 x 50
1800	SLP182M160H7P3	0.111	0.083	3.00 4.41 35 x 40
2200	SLP222M160H4P3	0.090	0.068	3.50 5.15 35 x 45
180 Vdc (225Vdc Surge)				
270	SLP271M180A1P3	0.737	0.553	1.00 1.47 22 x 25

Type SLP 105 °C Snap-In Aluminum Electrolytic

Best Value 105 °C Snap-In Type

Additional Voltages and Sizes available at www.cde.com/catalogs/SLP.pdf

Cap (µF)	3000 h @ 105 °C Catalog Part Number	Max 25 °C ESR (Ω) 120 Hz 20kHz	Max 105 °C Ripple (A _{rms}) 120 Hz 20kHz	Nominal Size (DxL) (mm)
180 Vdc (225Vdc Surge)				
330	SLP331M180A3P3	0.603	0.452	1.20 1.76 22 x 30
390	SLP391M180A3P3	0.510	0.383	1.35 1.98 22 x 30
390	SLP391M180C1P3	0.510	0.383	1.35 1.98 25 x 25
470	SLP471M180A5P3	0.423	0.317	1.50 2.21 22 x 35
470	SLP471M180C3P3	0.423	0.317	1.50 2.21 25 x 30
560	SLP561M180A7P3	0.355	0.266	1.67 2.45 22 x 40
560	SLP561M180C3P3	0.355	0.266	1.67 2.45 25 x 30
560	SLP561M180E1P3	0.355	0.266	1.67 2.45 30 x 25
680	SLP681M180A4P3	0.293	0.220	1.78 2.62 22 x 45
680	SLP681M180C5P3	0.293	0.220	1.78 2.62 25 x 35
680	SLP681M180E3P3	0.293	0.220	1.78 2.62 30 x 30
820	SLP821M180A9P3	0.243	0.182	2.04 3.00 22 x 50
820	SLP821M180C7P3	0.243	0.182	2.04 3.00 25 x 40
820	SLP821M180E3P3	0.243	0.182	2.04 3.00 30 x 30
1000	SLP102M180C4P3	0.199	0.149	2.30 3.38 25 x 45
1000	SLP102M180E5P3	0.199	0.149	2.30 3.38 30 x 35
1000	SLP102M180H3P3	0.199	0.149	2.30 3.38 35 x 30
1200	SLP122M180E7P3	0.166	0.125	2.55 3.75 30 x 40
1200	SLP122M180H5P3	0.166	0.125	2.55 3.75 35 x 35
1500	SLP152M180E4P3	0.133	0.100	2.90 4.26 30 x 45
1500	SLP152M180H7P3	0.133	0.100	2.90 4.26 35 x 40
1800	SLP182M180H4P3	0.111	0.083	3.30 4.85 35 x 45
2200	SLP222M180H9P3	0.090	0.068	3.65 5.37 35 x 50
200 Vdc (250 Vdc Surge)				
220	SLP221M200A1P3	0.905	0.679	0.99 1.46 22 x 25
220	SLP221M200A3P3	0.905	0.679	1.07 1.57 22 x 30
270	SLP271M200A1P3	0.737	0.553	1.10 1.62 22 x 25
330	SLP331M200A3P3	0.603	0.452	1.25 1.84 22 x 30
330	SLP331M200C1P3	0.603	0.452	1.25 1.84 25 x 25
330	SLP331M200C3P3	0.603	0.452	1.35 1.98 25 x 30
390	SLP391M200A5P3	0.510	0.383	1.35 1.98 22 x 35
390	SLP391M200C3P3	0.510	0.383	1.35 1.98 25 x 30
470	SLP471M200A7P3	0.423	0.317	1.50 2.21 22 x 40
470	SLP471M200C3P3	0.423	0.317	1.50 2.21 25 x 30
470	SLP471M200C5P3	0.423	0.317	1.60 2.35 25 x 35
470	SLP471M200E1P3	0.423	0.317	1.50 2.21 30 x 25
560	SLP561M200A4P3	0.355	0.266	1.67 2.45 22 x 45
560	SLP561M200C5P3	0.355	0.266	1.70 2.50 25 x 35
560	SLP561M200E1P3	0.355	0.266	1.67 2.45 30 x 25
680	SLP681M200A9P3	0.293	0.220	1.78 2.62 22 x 50
680	SLP681M200C5P3	0.293	0.220	1.72 2.53 25 x 35
680	SLP681M200C7P3	0.293	0.220	1.82 2.68 25 x 40
680	SLP681M200E3P3	0.293	0.220	1.78 2.62 30 x 30

Cap (µF)	3000 h @ 105 °C Catalog Part Number	Max 25 °C ESR (Ω) 120 Hz 20kHz	Max 105 °C Ripple (A _{rms}) 120 Hz 20kHz	Nominal Size (DxL) (mm)
200 Vdc (250 Vdc Surge)				
820	SLP821M200C4P3	0.243	0.182	2.10 3.09 25 x 45
820	SLP821M200E5P3	0.243	0.182	2.04 3.00 30 x 35
820	SLP821M200H3P3	0.243	0.182	2.04 3.00 35 x 30
1000	SLP102M200C9P3	0.199	0.149	2.42 3.56 25 x 50
1000	SLP102M200E7P3	0.199	0.149	2.30 3.38 30 x 40
1000	SLP102M200H5P3	0.199	0.149	2.30 3.38 35 x 35
1200	SLP122M200E4P3	0.166	0.125	2.65 3.90 30 x 45
1200	SLP122M200H5P3	0.166	0.125	2.65 3.90 35 x 35
1200	SLP122M200H3P3	0.166	0.125	2.49 3.66 35 x 30
1500	SLP152M200H7P3	0.133	0.100	3.08 4.53 35 x 40
1800	SLP182M200H4P3	0.111	0.083	3.48 5.12 35 x 45
1800	SLP182M200H7P3	0.111	0.083	3.31 4.87 35 x 40
220 Vdc (270 Vdc Surge)				
220	SLP221M220A1P3	0.905	0.679	1.00 1.47 22 x 25
270	SLP271M220A3P3	0.737	0.553	1.15 1.69 22 x 30
330	SLP331M220A5P3	0.603	0.452	1.25 1.84 22 x 35
330	SLP331M220C1P3	0.603	0.452	1.25 1.84 25 x 25
390	SLP391M220A5P3	0.510	0.383	1.40 2.06 22 x 35
390	SLP391M220C3P3	0.510	0.383	1.40 2.06 25 x 30
470	SLP471M220A7P3	0.423	0.317	1.51 2.22 22 x 40
470	SLP471M220C3P3	0.423	0.317	1.44 2.12 25 x 30
470	SLP471M220E1P3	0.423	0.317	1.50 2.21 30 x 25
560	SLP561M220A4P3	0.355	0.266	1.70 2.50 22 x 45
560	SLP561M220C5P3	0.355	0.266	1.64 2.41 25 x 35
560	SLP561M220E3P3	0.355	0.266	1.70 2.50 30 x 30
560	SLP561M220H1P3	0.355	0.266	1.71 2.51 35 x 25
680	SLP681M220C7P3	0.293	0.220	1.84 2.70 25 x 40
680	SLP681M220E5P3	0.293	0.220	1.93 2.84 30 x 35
680	SLP681M220H3P3	0.293	0.220	1.89 2.78 35 x 30
820	SLP821M220C4P3	0.243	0.182	2.08 3.06 25 x 45
820	SLP821M220E7P3	0.243	0.182	2.19 3.22 30 x 40
820	SLP821M220H3P3	0.243	0.182	2.16 3.18 35 x 30
1000	SLP102M220E4P3	0.199	0.149	2.50 3.68 30 x 45
1000	SLP102M220H5P3	0.199	0.149	2.44 3.59 35 x 35
1200	SLP122M220H7P3	0.166	0.125	2.79 4.10 35 x 40
1500	SLP152M220H4P3	0.133	0.100	3.22 4.73 35 x 45
250 Vdc (300 Vdc Surge)				
180	SLP181M250A1P3	1.106	0.830	0.88 1.29 22 x 25
180	SLP181M250C1P3	1.106	0.830	0.95 1.40 25 x 25
220	SLP221M250A3P3	0.905	0.679	1.00 1.47 22 x 30
220	SLP221M250C1P3	0.905	0.679	1.08 1.59 25 x 25
270	SLP271M250A5P3	0.737	0.553	1.18 1.73 22 x 35
270	SLP271M250C3P3	0.737	0.553	1.27 1.87 25 x 30

Type SLP 105 °C Snap-In Aluminum Electrolytic

Best Value 105 °C Snap-In Type

Additional Voltages and Sizes available at www.cde.com/catalogs/SLP.pdf

Cap (µF)	3000 h @ 105 °C Catalog Part Number	Max 25 °C ESR (Ω) 120 Hz 20kHz	Max 105 °C Ripple (A _{rms}) 120 Hz 20kHz	Nominal Size (DxL) (mm)
250 Vdc (300 Vdc Surge)				
330	SLP331M250A7P3	0.603	0.452	1.30 1.91 22 x 40
330	SLP331M250C3P3	0.603	0.452	1.30 1.91 25 x 30
330	SLP331M250E1P3	0.603	0.452	1.35 1.98 30 x 25
330	SLP331M250A3P3	0.603	0.452	1.15 1.69 22 x 30
390	SLP391M250A4P3	0.510	0.383	1.49 2.19 22 x 45
390	SLP391M250C5P3	0.510	0.383	1.49 2.19 25 x 35
390	SLP391M250E3P3	0.510	0.383	1.49 2.19 30 x 30
470	SLP471M250A9P3	0.423	0.317	1.65 2.43 22 x 50
470	SLP471M250C7P3	0.423	0.317	1.65 2.43 25 x 40
470	SLP471M250E3P3	0.423	0.317	1.65 2.43 30 x 30
560	SLP561M250C4P3	0.355	0.266	1.80 2.65 25 x 45
560	SLP561M250E5P3	0.355	0.266	1.80 2.65 30 x 35
680	SLP681M250C9P3	0.293	0.220	2.03 2.98 25 x 50
680	SLP681M250E7P3	0.293	0.220	2.00 2.94 30 x 40
680	SLP681M250H3P3	0.293	0.220	2.00 2.94 35 x 30
820	SLP821M250E4P3	0.243	0.182	2.30 3.38 30 x 45
820	SLP821M250H5P3	0.243	0.182	2.30 3.38 35 x 35
1000	SLP102M250E9P3	0.199	0.149	2.70 3.97 30 x 50
1000	SLP102M250H7P3	0.199	0.149	2.69 3.95 35 x 40
1200	SLP122M250H4P3	0.166	0.125	3.09 4.54 35 x 45
1500	SLP152M250H9P3	0.133	0.100	3.61 5.31 35 x 50
315 Vdc (365 Vdc Surge)				
120	SLP121M315A1P3	2.765	2.074	0.75 1.10 22 x 25
150	SLP151M315A3P3	2.212	1.659	0.82 1.21 22 x 30
150	SLP151M315C1P3	2.212	1.659	0.82 1.21 25 x 25
180	SLP181M315A5P3	1.843	1.382	0.92 1.35 22 x 35
180	SLP181M315C3P3	1.843	1.382	0.93 1.37 25 x 30
220	SLP221M315A7P3	1.508	1.131	1.04 1.53 22 x 40
220	SLP221M315C3P3	1.508	1.131	1.04 1.53 25 x 30
220	SLP221M315E1P3	1.508	1.131	1.04 1.53 30 x 25
270	SLP271M315A4P3	1.229	0.922	1.16 1.71 22 x 45
270	SLP271M315C5P3	1.229	0.922	1.16 1.71 25 x 35
270	SLP271M315E1P3	1.229	0.922	1.16 1.71 30 x 25
330	SLP331M315A9P3	1.005	0.754	1.33 1.96 22 x 50
330	SLP331M315C7P3	1.005	0.754	1.33 1.96 25 x 40
330	SLP331M315E3P3	1.005	0.754	1.33 1.96 30 x 30
390	SLP391M315C4P3	0.851	0.638	1.47 2.16 25 x 45
390	SLP391M315E5P3	0.851	0.638	1.47 2.16 30 x 35
390	SLP391M315H3P3	0.851	0.638	1.47 2.16 35 x 30
470	SLP471M315E7P3	0.706	0.530	1.70 2.50 30 x 40
470	SLP471M315H3P3	0.706	0.530	1.70 2.50 35 x 30
560	SLP561M315E4P3	0.592	0.444	2.05 3.01 30 x 45
560	SLP561M315H5P3	0.592	0.444	2.05 3.01 35 x 35
680	SLP681M315H7P3	0.488	0.366	2.17 3.19 35 x 40

Cap (µF)	3000 h @ 105 °C Catalog Part Number	Max 25 °C ESR (Ω) 120 Hz 20kHz	Max 105 °C Ripple (A _{rms}) 120 Hz 20kHz	Nominal Size (DxL) (mm)
820	SLP821M315H4P3	0.405	0.304	2.20 3.23 35 x 45
350 Vdc (400 Vdc Surge)				
100	SLP101M350A1P3	3.317	2.488	0.69 1.01 22 x 25
120	SLP121M350A3P3	2.765	2.074	0.75 1.10 22 x 30
120	SLP121M350C1P3	2.765	2.074	0.75 1.10 25 x 25
150	SLP151M350A5P3	2.212	1.659	0.82 1.21 22 x 35
150	SLP151M350C3P3	2.212	1.659	0.83 1.22 25 x 30
180	SLP181M350A7P3	1.843	1.382	0.92 1.35 22 x 40
180	SLP181M350C3P3	1.843	1.382	0.92 1.35 25 x 30
180	SLP181M350E1P3	1.843	1.382	0.90 1.32 30 x 25
220	SLP221M350A4P3	1.508	1.131	1.05 1.54 22 x 45
220	SLP221M350C5P3	1.508	1.131	1.04 1.53 25 x 35
220	SLP221M350E3P3	1.508	1.131	1.02 1.50 30 x 30
270	SLP271M350A9P3	1.229	0.922	1.16 1.71 22 x 50
270	SLP271M350C7P3	1.229	0.922	1.18 1.73 25 x 40
270	SLP271M350E3P3	1.229	0.922	1.17 1.72 30 x 30
330	SLP331M350C4P3	1.005	0.754	1.29 1.90 25 x 45
330	SLP331M350E5P3	1.005	0.754	1.34 1.97 30 x 35
330	SLP331M350H3P3	1.005	0.754	1.22 1.79 35 x 30
390	SLP391M350C9P3	0.851	0.638	1.51 2.22 25 x 50
390	SLP391M350E7P3	0.851	0.638	1.51 2.22 30 x 40
390	SLP391M350H5P3	0.851	0.638	1.47 2.16 35 x 35
470	SLP471M350E4P3	0.706	0.530	1.65 2.43 30 x 45
470	SLP471M350H5P3	0.706	0.530	1.69 2.48 35 x 35
560	SLP561M350E9P3	0.592	0.444	1.85 2.72 30 x 50
560	SLP561M350H7P3	0.592	0.444	1.90 2.79 35 x 40
680	SLP681M350H4P3	0.488	0.366	2.20 3.23 35 x 45
385 Vdc (435 Vdc Surge)				
68	SLP680M385A1P3	4.879	3.659	0.45 0.66 22 x 25
82	SLP820M385A3P3	4.046	3.035	0.52 0.76 22 x 30
100	SLP101M385A3P3	3.317	2.488	0.58 0.85 22 x 30
120	SLP121M385A5P3	2.765	2.074	0.68 1.00 22 x 35
150	SLP151M385A7P3	2.212	1.659	0.79 1.16 22 x 40
150	SLP151M385E1P3	2.212	1.659	0.75 1.10 30 x 25
180	SLP181M385A4P3	1.843	1.382	0.94 1.38 25 x 45
180	SLP181M385E3P3	1.843	1.382	0.88 1.29 30 x 30
220	SLP221M385E3P3	1.508	1.131	1.00 1.47 30 x 30
270	SLP271M385E7P3	1.229	0.922	1.14 1.68 30 x 40
270	SLP271M385H3P3	1.229	0.922	1.10 1.62 35 x 30
330	SLP331M385E4P3	1.005	0.754	1.31 1.93 30 x 45
330	SLP331M385H5P3	1.005	0.754	1.32 1.94 35 x 35
390	SLP391M385E9P3	0.851	0.638	1.48 2.18 30 x 50
390	SLP391M385H7P3	0.851	0.638	1.48 2.18 35 x 40
470	SLP471M385H4P3	0.706	0.530	1.76 2.59 35 x 45
560	SLP561M385H9P3	0.592	0.444	1.95 2.87 35 x 50

Type SLP 105 °C Snap-In Aluminum Electrolytic

Best Value 105 °C Snap-In Type

Additional Voltages and Sizes available at www.cde.com/catalogs/SLP.pdf

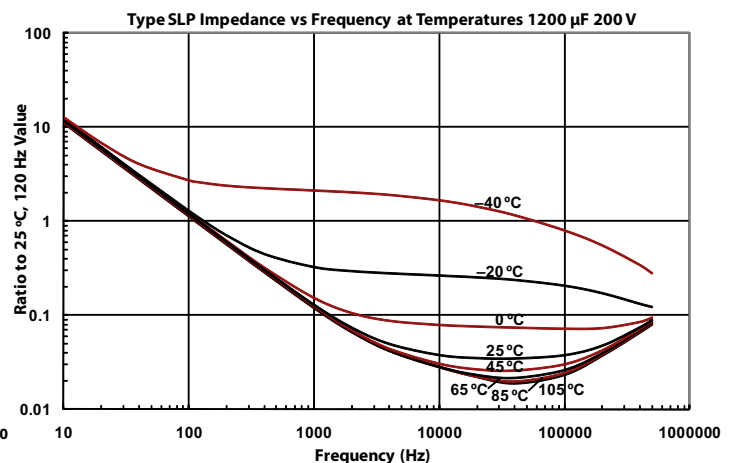
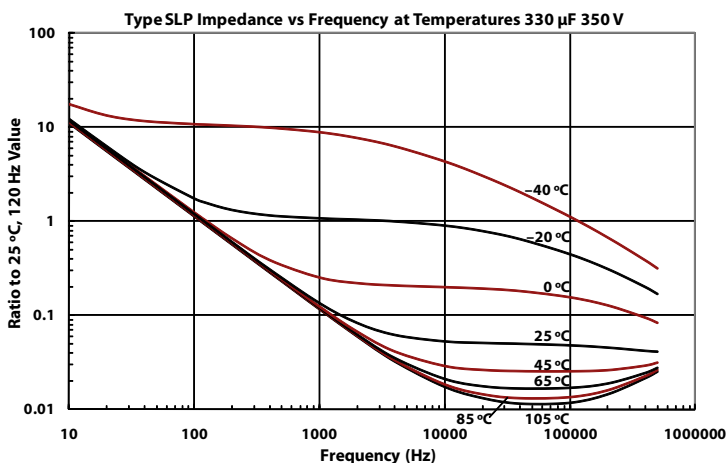
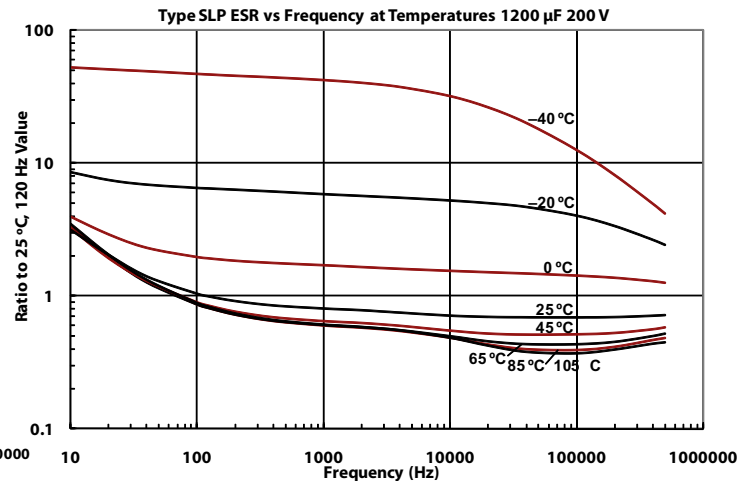
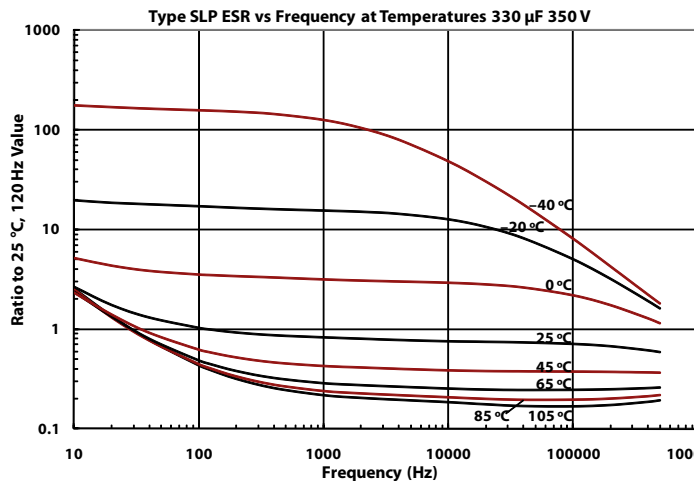
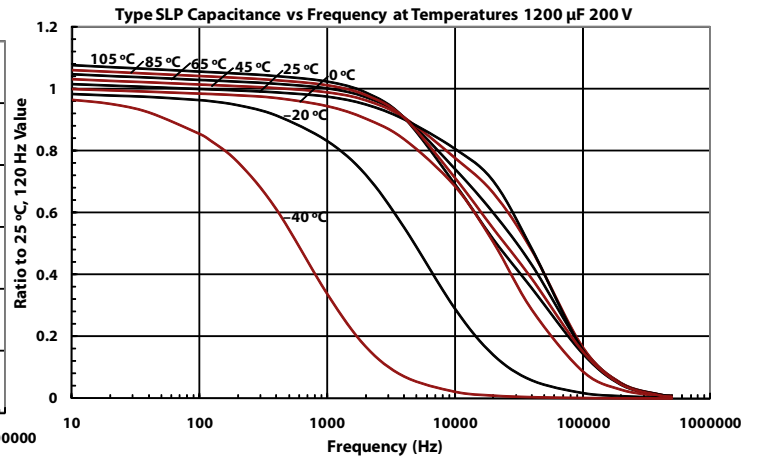
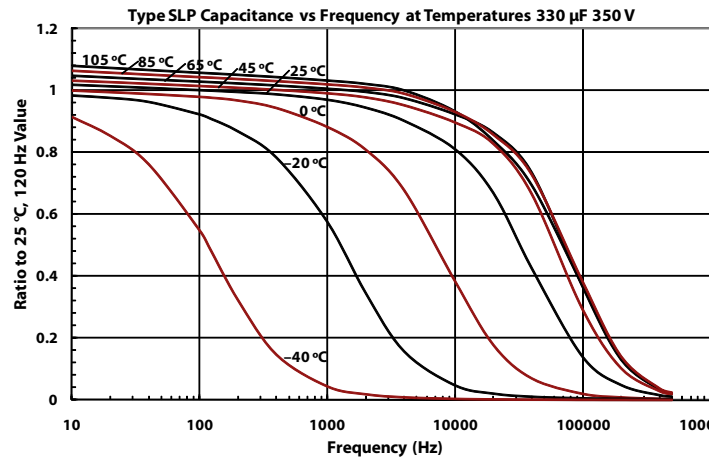
Cap (µF)	3000 h @ 105 °C Catalog Part Number	Max 25 °C ESR (Ω) 120 Hz 20kHz	Max 105 °C Ripple (A _{rms}) 120 Hz 20kHz	Nominal Size (DxL) (mm)
400 Vdc (450 Vdc Surge)				
47	SLP470M400A1P3	7.058	5.294	0.42 0.62 22 x 25
68	SLP680M400A1P3	4.879	3.659	0.50 0.74 22 x 25
82	SLP820M400A1P3	4.046	3.035	0.64 0.94 22 x 25
100	SLP101M400A3P3	3.317	2.488	0.70 1.03 22 x 30
100	SLP101M400C1P3	3.317	2.488	0.70 1.03 25 x 25
120	SLP121M400A5P3	2.765	2.074	0.75 1.10 22 x 35
120	SLP121M400C3P3	2.765	2.074	0.75 1.10 25 x 30
150	SLP151M400A7P3	2.212	1.659	0.88 1.29 22 x 40
150	SLP151M400C5P3	2.212	1.659	0.89 1.31 25 x 35
150	SLP151M400E1P3	2.212	1.659	0.88 1.29 30 x 25
150	SLP151M400C3P3	2.212	1.659	0.83 1.22 25 x 30
180	SLP181M400A4P3	1.843	1.382	0.98 1.44 22 x 45
180	SLP181M400E3P3	1.843	1.382	0.98 1.44 30 x 30
220	SLP221M400A9P3	1.508	1.131	1.10 1.62 22 x 50
220	SLP221M400C5P3	1.508	1.131	1.04 1.53 25 x 35
220	SLP221M400C7P3	1.508	1.131	1.10 1.62 25 x 40
220	SLP221M400E3P3	1.508	1.131	1.10 1.62 30 x 30
220	SLP221M400E5P3	1.508	1.131	1.28 1.88 35 x 35
270	SLP271M400C9P3	1.229	0.922	1.29 1.90 25 x 50
270	SLP271M400E5P3	1.229	0.922	1.22 1.79 30 x 35
270	SLP271M400H3P3	1.229	0.922	1.22 1.79 35 x 30
330	SLP331M400E4P3	1.005	0.754	1.55 2.28 30 x 45
330	SLP331M400H3P3	1.005	0.754	1.44 2.12 35 x 30
330	SLP331M400E5P3	1.005	0.754	1.39 2.04 30 x 35
390	SLP391M400E4P3	0.851	0.638	1.60 2.35 30 x 45
390	SLP391M400H5P3	0.851	0.638	1.60 2.35 35 x 35
470	SLP471M400H7P3	0.706	0.530	1.90 2.79 35 x 40
560	SLP561M400H4P3	0.592	0.444	2.12 3.12 35 x 45
680	SLP681M400H4P3	0.488	0.366	2.34 3.44 35 x 45
420 Vdc (470 Vdc Surge)				
68	SLP680M420A1P3	4.879	3.659	0.55 0.81 22 x 25
82	SLP820M420A1P3	4.046	3.035	0.64 0.94 22 x 25
82	SLP820M420C1P3	4.046	3.035	0.58 0.85 25 x 25
100	SLP101M420A3P3	3.317	2.488	0.70 1.03 22 x 30
100	SLP101M420C1P3	3.317	2.488	0.70 1.03 25 x 25
120	SLP121M420A5P3	2.765	2.074	0.75 1.10 22 x 35
120	SLP121M420C3P3	2.765	2.074	0.75 1.10 25 x 30
120	SLP121M420E1P3	2.765	2.074	0.78 1.15 30 x 25
150	SLP151M420A7P3	2.212	1.659	0.88 1.29 22 x 40
150	SLP151M420C5P3	2.212	1.659	0.88 1.29 25 x 35
150	SLP151M420E1P3	2.212	1.659	0.88 1.29 30 x 25
180	SLP181M420A4P3	1.843	1.382	0.95 1.40 22 x 45
180	SLP181M420C7P3	1.843	1.382	0.97 1.43 25 x 40
180	SLP181M420E3P3	1.843	1.382	0.96 1.41 30 x 30
180	SLP181M420H1P3	1.843	1.382	0.94 1.38 35 x 25

Cap (µF)	3000 h @ 105 °C Catalog Part Number	Max 25 °C ESR (Ω) 120 Hz 20kHz	Max 105 °C Ripple (A _{rms}) 120 Hz 20kHz	Nominal Size (DxL) (mm)
420 Vdc (470 Vdc Surge)				
220	SLP221M420C4P3	1.508	1.131	1.13 1.66 25 x 45
220	SLP221M420E5P3	1.508	1.131	1.10 1.62 30 x 35
220	SLP221M420H1P3	1.508	1.131	1.10 1.62 35 x 25
270	SLP271M420C9P3	1.229	0.922	1.37 2.01 25 x 50
270	SLP271M420E7P3	1.229	0.922	1.25 1.84 30 x 40
270	SLP271M420H3P3	1.229	0.922	1.22 1.79 35 x 30
330	SLP331M420E4P3	1.005	0.754	1.49 2.19 30 x 45
330	SLP331M420H5P3	1.005	0.754	1.45 2.13 35 x 35
390	SLP391M420E9P3	0.851	0.638	1.67 2.45 30 x 50
390	SLP391M420H7P3	0.851	0.638	1.66 2.44 35 x 40
470	SLP471M420H4P3	0.706	0.530	1.90 2.79 35 x 45
450 Vdc (500 Vdc Surge)				
47	SLP470M450A1P3	7.060	5.295	0.40 0.59 22 x 25
56	SLP560M450A1P3	5.924	4.443	0.50 0.74 22 x 25
68	SLP680M450A3P3	4.879	3.659	0.53 0.78 22 x 30
68	SLP680M450C1P3	4.879	3.659	0.53 0.78 25 x 25
82	SLP820M450A3P3	4.046	3.035	0.64 0.94 22 x 30
82	SLP820M450C1P3	4.046	3.035	0.64 0.94 25 x 25
100	SLP101M450A5P3	3.317	2.488	0.69 1.01 22 x 35
100	SLP101M450C3P3	3.317	2.488	0.69 1.01 25 x 30
100	SLP101M450E1P3	3.317	2.488	0.72 1.06 30 x 25
100	SLP101M450C7P3	3.317	2.488	0.78 1.15 25 x 40
100	SLP101M450A3P3	3.317	2.488	0.65 0.96 22 x 30
120	SLP121M450A7P3	2.765	2.074	0.80 1.18 22 x 40
120	SLP121M450C3P3	2.765	2.074	0.80 1.18 25 x 30
120	SLP121M450E1P3	2.765	2.074	0.80 1.18 30 x 25
150	SLP151M450A4P3	2.212	1.659	0.88 1.29 22 x 45
150	SLP151M450C5P3	2.212	1.659	0.88 1.29 25 x 35
150	SLP151M450E3P3	2.212	1.659	0.88 1.29 30 x 30
150	SLP151M450C3P3	2.121	1.591	0.82 1.21 25 x 30
180	SLP181M450C7P3	1.843	1.382	1.00 1.47 25 x 40
180	SLP181M450E3P3	1.843	1.382	1.00 1.47 30 x 30
220	SLP221M450C4P3	1.508	1.131	1.12 1.65 25 x 45
220	SLP221M450E5P3	1.508	1.131	1.12 1.65 30 x 35
220	SLP221M450H3P3	1.508	1.131	1.12 1.65 35 x 30
220	SLP221M450E3P3	1.508	1.131	1.05 1.54 30 x 30
270	SLP271M450E7P3	1.229	0.922	1.28 1.88 30 x 40
270	SLP271M450H5P3	1.229	0.922	1.28 1.88 35 x 35
330	SLP331M450E9P3	1.005	0.754	1.45 2.13 30 x 50
330	SLP331M450H5P3	1.005	0.754	1.37 2.01 35 x 35
330	SLP331M450H7P3	1.005	0.754	1.45 2.13 35 x 40
390	SLP391M450H7P3	0.851	0.638	1.55 2.28 35 x 40
470	SLP471M450H4P3	0.706	0.530	1.77 2.60 35 x 45
470	SLP471M450H9P3	0.706	0.530	1.85 2.72 35 x 50
560	SLP561M450H9P3	0.590	0.443	2.00 2.94 35 x 50

Type SLP 105 °C Snap-In Aluminum Electrolytic

Best Value 105 °C Snap-In Type

Typical Performance Curves



Type 381LX / 383LX 105 °C High Ripple, Snap-In Aluminum

High Ripple, Long Life, 2, 4 and 5 pin styles available



Adding longer-life and more ripple capability to the excellent value of Type 380L/LX capacitors, the 381L/LX readily handles tough switching power supply input and output circuits and motor-drive bus capacitor applications where the high surface area of multiple units in parallel equals the ripple capability of our Type 520C inverter-grade capacitor. Type 381LX delivers more capacitance per can size while Type 381L gives lower ESR for the same capacitance rating. Type 383L/LX has 4 or 5 leads for stable, reverse-proof mounting.

Highlights

- Top performance in power supplies and motor drives
- 4 times the life of Type 380L/LX
- 2, 4 and 5 leads available
- Big selection of 42 case sizes

Specifications

Temperature Range	-40 °C to + 105 °C ≤ 315 Vdc -25 °C to + 105 °C ≥ 350 Vdc					
Rated Voltage Range	10 Vdc to 450 Vdc					
Capacitance Range	33 μF to 150,000 μF					
Capacitance Tolerance	± 20%					
Leakage Current	≤3 √CV μA, 4 mA max, 5 minutes					
Ripple Current Multipliers	Ambient Temperature					
		45 °C	60 °C	70 °C	85 °C	105 °C
	381L 383L	2.70	2.60	2.50	2.10	1.00
	381LX, 383 LX	2.35	2.20	2.00	1.70	1.00
	Frequency					
		50 Hz	60 Hz	120 Hz	500 Hz	1 kHz 5 kHz & up
	10-100 Vdc	0.93	0.95	1.00	1.05	1.08
160-450 Vdc	0.75	0.80	1.00	1.20	1.25	1.40
Low Temperature Characteristics	Impedance ratio: Z _{-20°C} /Z _{+25°C} ≤ 10 (10 Vdc) ≤ 8 (16–50 Vdc) ≤ 4 (63–100 Vdc) ≤ 3 (150–450 Vdc)					
Endurance Life Test	3000 h at full load at 105 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit					
Shelf Life Test	1000 h at 105 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit					
Vibration	10 to 55 Hz, 0.06” and 10 g max, 2 h each plane					
RoHS Compliant						

Type 381LX / 383LX 105 °C High Ripple, Snap-In Aluminum

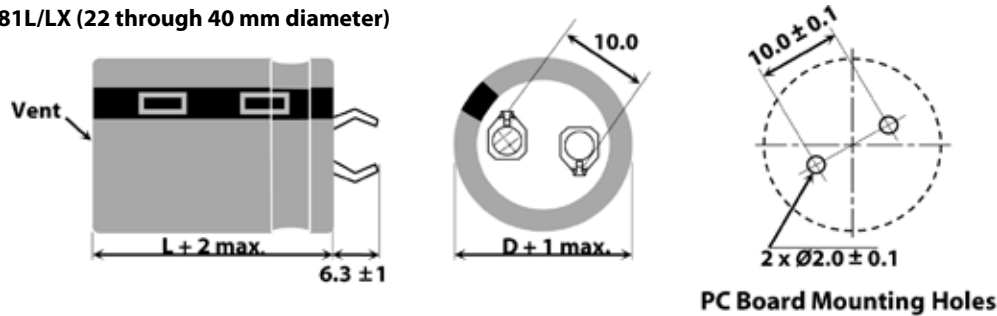
High Ripple, Long Life, 2,4 and 5 pin styles available

383LX	272	M	200	N08	2	V
Type	Cap	Tolerance	Voltage	Case Code	Insulation	# of pins
381L / LX (2 pins)	100 = 10 μ F	M = $\pm 20\%$	200 = 200 Vdc		2 = PVC	Blank = 2 pins / 4 pins snap-in 6.3mm L
383L / LX (4 or 5 pins)	101 = 100 μ F					A = 2 pins / 4 pins snap-in 4.0mm L
	272 = 2700 μ F					VS = 5 pins snap-in 6.3mm L
						V = 5 pins standoff

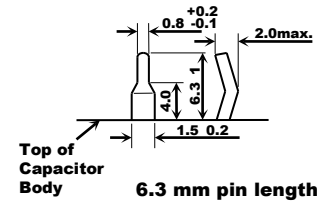
Outline Drawings

Two Pins

381L/LX (22 through 40 mm diameter)

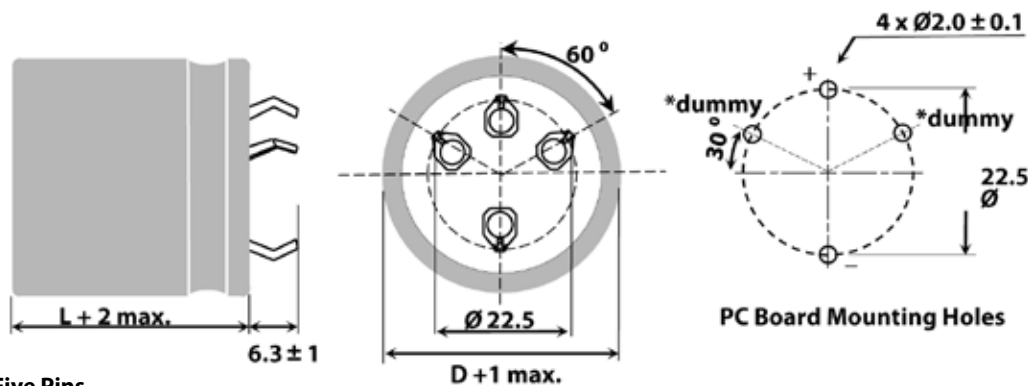


Available in 2, 4 and 5 pins

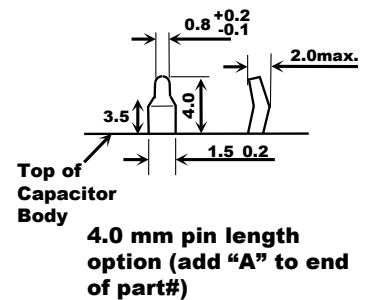


Four Pins

383L/LX (35 and 40 mm diameter)

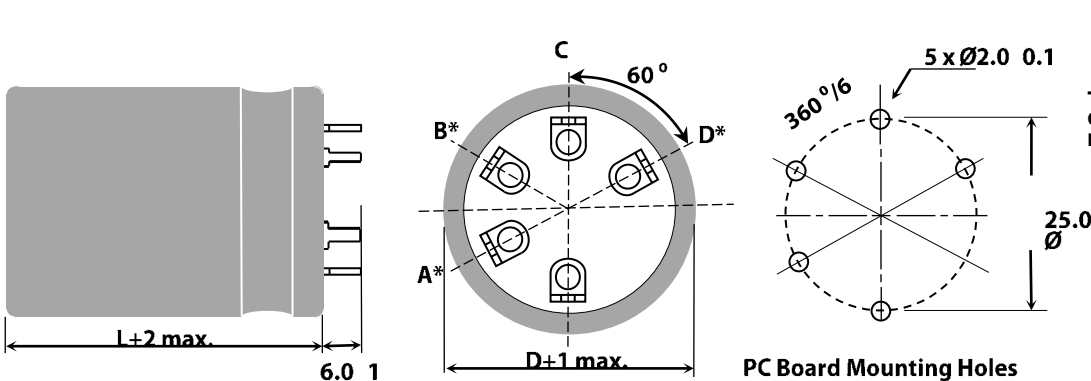


Available in 2 and 4 pins

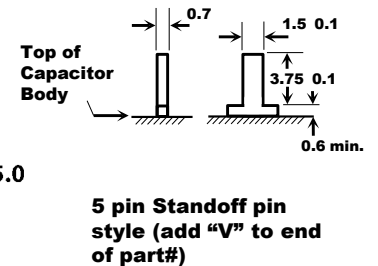


Five Pins

383L/LX (40 and 50 mm diameter)



Available in 5 pins



Terminal	Connection	
	40 mm Dia.	50 mm Dia.
A	dummy	negative (-)
B	dummy	dummy
C	positive (+)	positive (+)
D	dummy	positive (+)
-	negative (-)	negative (-)

Notes:

* Use dummy terminals for mechanical support only. Make no electrical connection because they resistively connect through the electrolyte to the negative terminal.

** Safety Vent may be on the bottom or on the side of the can.

Type 381LX / 383LX 105 °C High Ripple, Snap-In Aluminum

High Ripple, Long Life, 2,4 and 5 pin styles available

Case Code	DIAMETER "D"		LENGTH "L"		Typical Weight (grams)
	mm	inches	mm	inches	
H20	22	0.87	20	0.79	14
H01	22	0.87	25	0.98	16
H02	22	0.87	30	1.18	19
H03	22	0.87	35	1.38	22
H04	22	0.87	40	1.57	24
H45	22	0.87	45	1.77	28
H05	22	0.87	50	1.97	31
J20	25	0.98	20	0.79	16
J01	25	0.98	25	0.98	20
J02	25	0.98	30	1.18	24
J03	25	0.98	35	1.38	27
J04	25	0.98	40	1.57	31
J045	25	0.98	45	1.77	35
J05	25	0.98	50	1.97	38
K20	30	1.18	20	0.79	25
K01	30	1.18	25	0.98	30
K02	30	1.18	30	1.18	35
K03	30	1.18	35	1.38	40
K04	30	1.18	40	1.57	44
K45	30	1.18	45	1.77	48
K05	30	1.18	50	1.97	53

Case Code	DIAMETER "D"		LENGTH "L"		Typical Weight (grams)
	mm	inches	mm	inches	
A20	35	1.38	20	0.79	35
A01	35	1.38	25	0.98	42
A02	35	1.38	30	1.18	48
A03	35	1.38	35	1.38	54
A04	35	1.38	40	1.57	62
A45	35	1.38	45	1.77	67
A05	35	1.38	50	1.97	74
A06	35	1.38	63	2.48	88
A07	35	1.38	70	2.76	98
A08	35	1.38	80	3.15	112
A10	35	1.38	105	4.13	144
N04	40	1.57	40	1.57	82
N05	40	1.57	50	1.97	105
N06	40	1.57	63	2.48	130
N08	40	1.57	80	3.15	185
N10	40	1.57	105	4.13	265
B05	50	1.97	50	1.97	136
B06	50	1.97	63	2.48	168
B08	50	1.97	80	3.15	239
B09	50	1.97	92	3.62	241
B10	50	1.97	105	4.13	325

Ratings

Additional Voltages and Smaller Sizes available at <http://www.cde.com/catalogs/381-383.pdf>

Cap (μF)	Catalog Part Number	Max ESR Ω @ 25 °C		Ripple Amps Max @ 105 °C		Nominal Size
		120 Hz	20 kHz	120 Hz	20 kHz	D x L (mm)
10 Vdc (13 Vdc Surge)						
27000	381LX273M010A012	0.033	0.028	3.10	3.60	35 x 25
33000	381LX333M010A022	0.030	0.023	3.40	3.90	35 x 30
39000	381LX393M010A022	0.025	0.020	3.70	4.30	35 x 30
47000	381LX473M010A032	0.023	0.020	4.20	4.80	35 x 35
56000	381LX563M010A042	0.022	0.019	5.00	5.80	35 x 40
68000	381LX683M010A052	0.021	0.020	5.50	6.30	35 x 50
68000	383LX683M010N042	0.023	0.022	5.40	6.20	40 x 40
82000	381L823M010A062	0.013	0.008	6.30	7.90	35 x 63
82000	383LX823M010N052	0.018	0.017	7.40	8.50	40 x 50
100000	381L104M010A072	0.011	0.007	7.30	9.00	35 x 70
120000	381L124M010A082	0.010	0.006	8.20	10.00	35 x 80
120000	383L124M010N062	0.012	0.008	7.10	8.60	40 x 63
150000	383L154M010N082	0.009	0.006	8.90	10.60	40 x 80
16 Vdc (20 Vdc Surge)						
18000	381LX183M016A012	0.040	0.034	3.50	4.00	35 x 25
22000	381LX223M016A022	0.033	0.028	3.80	4.40	35 x 30
27000	381LX273M016A022	0.030	0.025	4.20	4.80	35 x 30
33000	381LX333M016A032	0.023	0.020	4.70	5.40	35 x 35
39000	381LX393M016A042	0.022	0.020	5.10	5.90	35 x 40
47000	381LX473M016A452	0.020	0.018	5.50	6.30	35 x 45

Cap (μF)	Catalog Part Number	Max ESR Ω @ 25 °C		Ripple Amps Max @ 105 °C		Nominal Size
		120 Hz	20 kHz	120 Hz	20 kHz	D x L (mm)
16 Vdc (20 Vdc Surge)						
47000	383LX473M016N042	0.020	0.018	5.50	6.33	40 x 40
56000	381LX563M016A052	0.019	0.017	6.00	6.90	35 x 50
68000	381LX683M016A062	0.017	0.015	6.60	7.60	35 x 63
68000	381L683M016A072	0.012	0.007	7.10	9.00	35 x 70
68000	383LX683M016N052	0.015	0.014	7.30	8.40	40 x 50
82000	381L823M016A082	0.010	0.007	8.00	10.00	35 x 80
82000	383LX823M016N062	0.017	0.013	7.70	8.80	40 x 63
100000	381LX104M016A082	0.015	0.013	8.00	9.20	35 x 80
120000	381LX124M016A102	0.014	0.012	8.71	10.02	35 x 105
120000	383LX124M016N082	0.014	0.012	8.80	10.10	40 x 80
120000	383LX124M016B052V	0.015	0.014	9.02	10.37	50 x 50
150000	383LX154M016N102	0.013	0.012	9.88	11.36	40 x 105
150000	383LX154M016B062V	0.014	0.013	10.15	11.67	50 x 63
180000	383LX184M016B082V	0.013	0.012	11.02	12.67	50 x 80
220000	383LX224M016B092V	0.012	0.011	11.71	13.47	50 x 92
250000	383LX254M016B102V	0.011	0.010	12.31	14.16	50 x 105
35 Vdc (44 Vdc Surge)						
8200	381LX822M035A012	0.049	0.037	2.90	3.30	35 x 25
10000	381LX103M035A022	0.040	0.030	3.20	3.70	35 x 30
12000	381LX123M035A022	0.033	0.025	3.50	4.00	35 x 30

Type 381LX / 383LX 105 °C High Ripple, Snap-In Aluminum

High Ripple, Long Life, 2,4 and 5 pin styles available

Additional Voltages and Smaller Sizes available at <http://www.cde.com/catalogs/381-383.pdf>

Cap (µF)	Catalog Part Number	Max ESR Ω @ 25 °C	Ripple Amps Max @ 105 °C	Nominal Size	120 Hz 20 kHz	120 Hz 20 kHz	D x L (mm)
35 Vdc (44 Vdc Surge)							
15000	381LX153M035A032	0.030	0.020	3.90	4.50	35 x 35	
18000	381LX183M035A042	0.030	0.021	4.30	4.90	35 x 40	
22000	381LX223M035A052	0.023	0.017	5.00	5.80	35 x 50	
22000	383LX223M035N042	0.023	0.017	5.00	5.75	40 x 40	
27000	381LX273M035A062	0.025	0.018	5.50	6.40	35 x 63	
27000	383LX273M035N052	0.020	0.015	5.45	6.25	40 x 50	
33000	381L333M035A072	0.014	0.009	6.40	8.10	35 x 70	
33000	383L333M035N062	0.019	0.014	6.60	7.60	40 x 63	
39000	381LX393M035A082	0.019	0.014	6.50	7.50	35 x 80	
47000	381LX473M035A102	0.017	0.013	8.07	9.28	35 x 105	
47000	383L473M035N082	0.018	0.013	7.80	9.00	40 x 80	
47000	383LX473M035B052V	0.021	0.016	8.25	9.49	50 x 50	
56000	383LX563M035B062V	0.019	0.014	9.07	10.43	50 x 63	
68000	383LX683M035N102	0.016	0.012	9.27	10.66	40 x 105	
68000	383LX683M035B082V	0.017	0.013	10.07	11.58	50 x 80	
82000	383LX823M035B092V	0.015	0.011	10.89	12.52	50 x 92	
100000	383LX104M035B102V	0.013	0.010	11.75	13.51	50 x 105	
63 Vdc (79 Vdc Surge)							
3300	381LX332M063A012	0.090	0.070	2.50	2.90	35 x 25	
3900	381LX392M063A022	0.080	0.060	2.70	3.10	35 x 30	
4700	381LX472M063A022	0.063	0.048	3.00	3.50	35 x 30	
5600	381LX562M063A032	0.055	0.040	3.30	3.80	35 x 35	
6800	381LX682M063A042	0.050	0.040	3.60	4.10	35 x 40	
8200	381LX822M063A452	0.040	0.030	3.90	4.50	35 x 45	
8200	383L822M063N042	0.031	0.018	3.70	4.80	40 x 40	
10000	381LX103M063A052	0.033	0.028	4.40	5.10	35 x 50	
12000	381LX123M063A052	0.030	0.025	4.40	5.10	35 x 50	
12000	381L123M063A062	0.029	0.012	4.20	6.50	35 x 63	
12000	383LX123M063N042	0.030	0.028	4.52	5.20	40 x 40	
12000	383L123M063N052	0.022	0.013	4.70	6.10	40 x 50	
15000	381LX153M063A062	0.024	0.021	4.90	5.70	35 x 63	
15000	383LX153M063N052	0.027	0.023	4.80	5.50	40 x 50	
15000	383L153M063N062	0.018	0.011	5.70	7.20	40 x 63	
18000	381LX183M063A082	0.022	0.019	5.80	6.70	35 x 80	
18000	383LX153M063N062	0.023	0.020	5.40	6.20	40 x 63	
22000	383L223M063N082	0.013	0.009	7.20	9.00	40 x 80	
22000	383LX223M063B052V	0.019	0.016	6.76	7.77	50 x 50	
27000	381LX273M063A102	0.017	0.014	6.53	7.51	35 x 105	
27000	383LX273M063N082	0.017	0.014	6.60	7.60	40 x 80	
27000	383LX273M063B062V	0.017	0.014	7.34	8.44	50 x 63	
33000	383LX333M063B082V	0.015	0.013	8.00	9.20	50 x 80	
39000	383LX393M063N102	0.014	0.012	7.53	8.66	40 x 105	
39000	383LX393M063B092V	0.014	0.012	8.48	9.75	50 x 92	
47000	383LX473M063B102V	0.012	0.010	8.99	10.34	50 x 105	
80 Vdc (100 Vdc Surge)							
2200	381LX222M080A012	0.090	0.063	2.10	2.40	35 x 25	
2700	381LX272M080A022	0.074	0.055	2.40	2.80	35 x 30	
3300	381LX332M080A022	0.065	0.049	2.60	3.00	35 x 30	
3900	381LX392M080A032	0.060	0.044	3.00	3.50	35 x 35	
4700	381LX472M080A042	0.048	0.036	3.30	3.80	35 x 40	
5600	381LX562M080A452	0.050	0.038	3.70	4.30	35 x 45	
5600	383L562M080N042	0.035	0.022	3.50	4.40	40 x 40	
6800	381LX682M080A052	0.041	0.031	3.90	4.50	35 x 50	
6800	383LX682M080N042	0.041	0.031	3.90	4.49	40 x 40	
8200	381L822M080A062	0.024	0.014	4.60	5.90	35 x 63	
8200	383L822M080N052	0.025	0.016	4.40	5.60	40 x 50	
10000	381L103M080A072	0.020	0.012	5.40	6.90	35 x 70	
10000	383L103M080N062	0.021	0.013	5.30	6.70	40 x 63	
12000	381L123M080A082	0.017	0.011	6.10	7.70	35 x 80	
12000	383LX123M080B052V	0.035	0.026	6.03	6.93	50 x 50	
15000	381LX153M080A102	0.024	0.018	6.13	7.05	35 x 105	
15000	383L153M080N082	0.015	0.010	6.80	8.40	40 x 80	
15000	383LX153M080B062V	0.028	0.021	6.65	7.65	50 x 63	
18000	383LX183M080B082V	0.026	0.019	7.29	8.38	50 x 80	
22000	383LX223M080N102	0.019	0.014	6.95	7.99	40 x 105	
22000	383LX223M080B092V	0.022	0.016	7.83	9.00	50 x 92	
27000	383LX273M080B102V	0.018	0.014	8.38	9.64	50 x 105	
100 Vdc (125 Vdc Surge)							
1500	381LX152M100A012	0.122	0.073	2.10	3.15	35 x 25	
1800	381LX182M100A022	0.111	0.072	2.30	3.45	35 x 30	
2200	381LX222M100A022	0.090	0.060	2.60	3.90	35 x 30	
2700	381LX272M100A032	0.080	0.052	2.90	4.35	35 x 35	
3300	381LX332M100A042	0.075	0.053	3.20	4.80	35 x 40	
3900	381LX392M100A452	0.064	0.045	3.60	5.40	35 x 45	
4700	381LX472M100A052	0.053	0.040	3.80	5.70	35 x 50	
4700	381L472M100A062	0.032	0.013	4.00	5.80	35 x 63	
4700	383LX472M100N042	0.053	0.040	3.80	5.70	40 x 40	
5600	381LX562M100A062	0.044	0.033	4.10	4.70	35 x 63	
5600	381L562M100A072	0.027	0.011	4.70	6.70	35 x 70	
5600	383L562M100N062	0.027	0.012	4.60	6.50	40 x 63	
6800	381L682M100A082	0.023	0.010	5.30	7.50	35 x 80	
6800	383LX682M100N052	0.037	0.027	4.60	5.30	40 x 50	
8200	381LX822M100A082	0.030	0.023	5.15	5.90	35 x 80	
8200	383LX822M100N062	0.030	0.023	5.00	5.77	40 x 63	
8200	383L822M100N082	0.020	0.009	6.00	8.20	40 x 80	
8200	383LX822M100B052V	0.030	0.023	6.14	7.06	50 x 50	
10000	381LX103M100A102	0.025	0.019	6.38	7.34	35 x 105	
12000	383LX123M100N082	0.021	0.016	6.44	7.40	40 x 80	
12000	383LX123M100B062V	0.022	0.017	7.17	8.25	50 x 63	

Type 381LX / 383LX 105 °C High Ripple, Snap-In Aluminum

High Ripple, Long Life, 2,4 and 5 pin styles available

Additional Voltages and Smaller Sizes available at <http://www.cde.com/catalogs/381-383.pdf>

Cap (µF)	Catalog Part Number	120 Hz	20 kHz	Max ESR Ω @ 25 °C	Ripple Amps Max @ 105 °C	Nominal Size
100 Vdc (125 Vdc Surge)						
15000	383LX153M100N102	0.017	0.012	7.37	8.48	40 x 105
15000	383LX153M100B082V	0.019	0.014	8.01	9.21	50 x 80
18000	383LX183M100B092V	0.017	0.012	8.64	9.94	50 x 92
22000	383LX223M100B102V	0.015	0.011	9.32	10.72	50 x 105
200 Vdc (250 Vdc Surge)						
820	381LX821M200A012	0.263	0.118	2.00	2.80	35 x 25
1000	381LX102M200A022	0.216	0.108	2.20	3.10	35 x 30
1200	381LX122M200A032	0.193	0.097	2.30	3.20	35 x 35
1500	381LX152M200A042	0.155	0.077	2.50	3.50	35 x 40
1800	381LX182M200A452	0.129	0.077	2.70	3.80	35 x 45
1800	381L182M200A062	0.055	0.028	3.20	4.50	35 x 63
1800	383LX182M200N042	0.129	0.077	2.70	3.78	40 x 40
1800	383L182M200N052	0.063	0.033	3.00	4.10	40 x 50
2200	381LX222M200A052	0.105	0.063	2.90	4.00	35 x 50
2200	381L222M200A082	0.042	0.021	4.10	5.80	35 x 80
2200	383L222M200N062	0.051	0.027	3.60	4.90	40 x 63
2700	381LX272M200A062	0.080	0.047	3.65	5.11	35 x 63
2700	383LX272M200N052	0.086	0.052	3.55	4.97	40 x 50
2700	383L272M200N082	0.032	0.018	4.60	6.20	40 x 80
3300	381LX332M200A082	0.065	0.039	4.50	6.33	35 x 80
3300	383LX332M200N062	0.700	0.040	4.40	6.20	40 x 63
3300	383LX332M200B052V	0.075	0.045	5.20	7.28	50 x 50
3900	383LX392M200B062V	0.064	0.038	5.90	8.26	50 x 63
4700	381LX472M200A102	0.046	0.028	5.70	7.98	35 x 105
4700	383LX472M200N082	0.050	0.030	5.75	8.10	40 x 80
4700	383LX472M200B082V	0.053	0.032	6.82	9.55	50 x 80
5600	383LX562M200N102	0.041	0.025	6.76	9.46	40 x 105
5600	383LX562M200B092V	0.044	0.027	7.68	10.75	50 x 92
6800	383LX682M200B102V	0.034	0.020	8.71	12.19	50 x 105
250 Vdc (300 Vdc Surge)						
560	381LX561M250A012	0.296	0.148	1.50	2.10	35 x 25
680	381LX681M250A022	0.244	0.134	1.70	2.38	35 x 30
680	381L681M250A052	0.293	0.149	1.80	2.50	35 x 50
820	381LX821M250A032	0.202	0.111	2.00	2.80	35 x 35
1000	381LX102M250A042	0.199	0.109	2.20	3.10	35 x 40
1200	381LX122M250A452	0.166	0.099	2.30	3.20	35 x 45
1200	383LX122M250N042	0.180	0.117	2.66	3.72	40 x 40
1200	383L122M250N052	0.081	0.031	2.60	4.30	40 x 50
1500	381LX152M250A052	0.144	0.093	2.50	3.50	35 x 50
1500	381L152M250A072	0.066	0.021	3.10	5.50	35 x 70
1800	381L182M250A082	0.057	0.018	3.60	6.30	35 x 80
1800	383LX182M250N052	0.120	0.078	3.25	4.55	40 x 50

Cap (µF)	Catalog Part Number	120 Hz	20 kHz	Max ESR Ω @ 25 °C	Ripple Amps Max @ 105 °C	Nominal Size
250 Vdc (300 Vdc Surge)						
1800	383L182M250N062	0.066	0.025	3.10	5.10	40 x 63
2200	381LX222M250A082	0.096	0.064	3.75	5.25	35 x 80
2200	383LX222M250N062	0.098	0.064	3.70	5.15	40 x 63
2200	383L222M250N082	0.043	0.017	4.00	6.40	40 x 80
2200	383LX222M250B052V	0.098	0.064	4.35	6.09	50 x 50
2700	381LX272M250A102	0.080	0.052	4.80	6.72	35 x 105
2700	383LX272M250N082	0.092	0.047	3.10	4.30	40 x 80
2700	383LX272M250B062V	0.080	0.052	4.98	6.97	50 x 63
3300	383LX332M250N082	0.065	0.042	4.86	6.80	40 x 80
3900	383LX392M250N102	0.055	0.036	5.61	7.85	40 x 105
3900	383LX392M250B082V	0.055	0.036	6.10	8.54	50 x 80
4300	383LX432M250B092V	0.050	0.033	6.67	9.34	50 x 92
4700	383LX472M250B102V	0.046	0.030	7.03	9.84	50 x 105
400 Vdc (450 Vdc Surge)						
180	381LX181M400A012	0.737	0.258	0.90	1.30	35 x 25
220	381LX221M400A012	0.754	0.264	1.10	1.50	35 x 25
270	381LX271M400A022	0.614	0.215	1.20	1.70	35 x 30
330	381LX331M400A032	0.502	0.201	1.40	1.90	35 x 35
390	381LX391M400A042	0.425	0.170	1.55	2.20	35 x 40
470	381LX471M400A452	0.353	0.141	1.80	2.50	35 x 45
470	383LX471M400N042	0.353	0.141	1.80	2.50	40 x 40
560	381LX561M400A052	0.296	0.118	1.80	2.50	35 x 50
680	383LX681M400N052	0.244	0.098	2.20	3.00	40 x 50
820	381LX821M400A062	0.202	0.081	2.44	3.42	35 x 63
820	383LX821M400N052	0.202	0.081	2.58	3.61	40 x 50
820	383LX821M400B052V	0.202	0.081	3.20	4.40	50 x 50
1000	381LX102M400A082	0.202	0.081	3.00	4.20	35 x 80
1000	383LX102M400N062	0.202	0.081	3.00	4.20	40 x 63
1200	381LX122M400A102	0.138	0.055	3.80	5.30	35 x 105
1200	383LX122M400N082	0.138	0.055	3.80	5.30	40 x 80
1200	383LX122M400B062V	0.152	0.061	4.20	5.90	50 x 63
1500	383LX152M400N102	0.111	0.044	4.80	6.70	40 x 105
1500	383LX152M400B082V	0.122	0.049	5.20	7.30	50 x 80
1600	383LX162M400B092V	0.114	0.046	5.60	8.00	50 x 92
1800	383LX182M400N102	0.101	0.041	5.10	7.10	40 x 105
1800	383LX182M400B102V	0.101	0.041	6.48	9.10	50 x 105
180	381LX181M400A012	0.737	0.258	0.90	1.30	35 x 25
220	381LX221M400A012	0.754	0.264	1.10	1.50	35 x 25
270	381LX271M400A022	0.614	0.215	1.20	1.70	35 x 30
330	381LX331M400A032	0.502	0.201	1.40	1.90	35 x 35
390	381LX391M400A042	0.425	0.170	1.55	2.20	35 x 40
470	381LX471M400A452	0.353	0.141	1.80	2.50	35 x 45

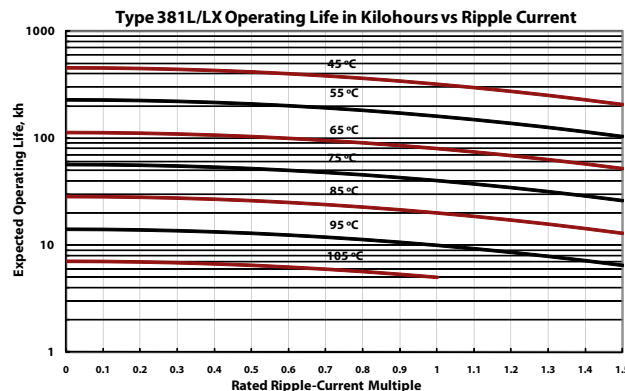
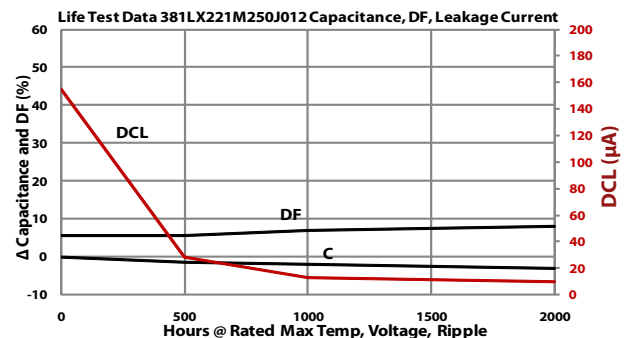
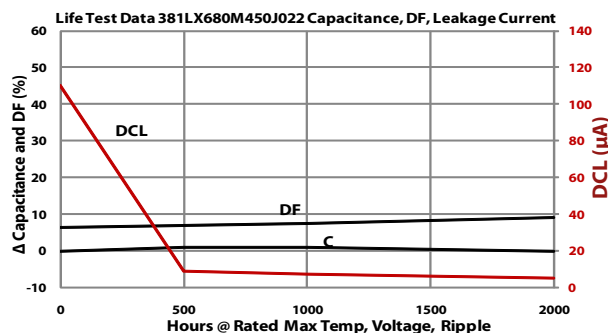
Type 381LX / 383LX 105 °C High Ripple, Snap-In Aluminum

High Ripple, Long Life, 2,4 and 5 pin styles available

Additional Voltages and Smaller Sizes available at <http://www.cde.com/catalogs/381-383.pdf>

Cap (μF)	Catalog Part Number	Max ESR Ω @ 25 °C	Ripple Amps Max @ 105 °C	Nominal Size
400 Vdc (450 Vdc Surge)				
470	383LX471M400N042	0.353	0.141	1.80 2.50 40 x 40
560	381LX561M400A052	0.296	0.118	1.80 2.50 35 x 50
680	383LX681M400N052	0.244	0.098	2.20 3.00 40 x 50
820	381LX821M400A062	0.202	0.081	2.44 3.42 35 x 63
820	383LX821M400N052	0.202	0.081	2.58 3.61 40 x 50
820	383LX821M400B052V	0.202	0.081	3.20 4.40 50 x 50
1000	381LX102M400A082	0.202	0.081	3.00 4.20 35 x 80
1000	383LX102M400N062	0.202	0.081	3.00 4.20 40 x 63
1200	381LX122M400A102	0.138	0.055	3.80 5.30 35 x 105
1200	383LX122M400N082	0.138	0.055	3.80 5.30 40 x 80
1200	383LX122M400B062V	0.152	0.061	4.20 5.90 50 x 63
1500	383LX152M400N102	0.111	0.044	4.80 6.70 40 x 105
1500	383LX152M400B082V	0.122	0.049	5.20 7.30 50 x 80
1600	383LX162M400B092V	0.114	0.046	5.60 8.00 50 x 92
1800	383LX182M400N102	0.101	0.041	5.10 7.10 40 x 105
1800	383LX182M400B102V	0.101	0.041	6.48 9.10 50 x 105
420 Vdc (470 Vdc Surge)				
220	381LX221M420A012	0.750	0.260	1.10 1.50 35 x 25
270	381LX271M420A022	0.610	0.210	1.20 1.70 35 x 30
330	381LX331M420A032	0.502	0.200	1.35 1.90 35 x 35
390	381LX391M420A042	0.420	0.170	1.55 2.18 35 x 40
470	381LX471M420A452	0.350	0.141	1.75 2.45 35 x 45
470	383LX471M420N042	0.350	0.141	1.78 2.45 40 x 40
450 Vdc (500 Vdc Surge)				
150	381LX151M450A012	1.100	0.390	0.80 1.10 35 x 25
220	381LX221M450A022	0.750	0.260	1.00 1.40 35 x 30
270	381LX271M450A032	0.614	0.246	1.20 1.70 35 x 35
330	381LX331M450A042	0.502	0.176	1.40 1.90 35 x 40
390	381LX391M450A452	0.425	0.150	1.60 2.20 35 x 45
390	383LX391M450N042	0.425	0.170	1.68 2.35 40 x 40
470	381LX471M450A052	0.353	0.123	1.70 2.40 35 x 50
470	383LX471M450N042	0.350	0.140	1.75 2.45 40 x 40
560	381LX561M450A062	0.296	0.104	2.20 3.00 35 x 70
560	383LX561M450N052	0.296	0.104	2.20 3.00 40 x 50
680	383L681M450A082	0.188	0.124	2.00 2.50 35 x 80
680	383LX681M450N062	0.244	0.085	2.50 3.50 40 x 63
680	383LX681M450B052V	0.244	0.085	2.90 4.06 50 x 50
820	383LX821M450A082	0.202	0.071	2.70 3.80 35 x 80
820	383LX821M450B062V	0.222	0.078	3.42 4.79 50 x 63
1000	381LX102M450A102	0.166	0.058	3.47 4.86 35 x 105
1000	383LX102M450N082	0.166	0.058	3.50 4.90 40 x 80
1200	383LX122M450N102	0.138	0.048	4.33 6.06 40 x 105
1200	383LX122M450B082V	0.152	0.053	4.70 6.58 50 x 80
1300	383LX132M450B092V	0.140	0.049	5.16 7.25 50 x 92
1500	383LX152M450B102V	0.122	0.043	6.03 8.44 50 x 105

Typical Performance Curves



Type 381LQ 105 °C Compact, High Ripple, Snap-In Aluminum

Higher Capacitance per Case Size



Type 381LQ is on average 23% smaller and more than 5 mm shorter than Type 381LX. This is achieved with a new can closure method that permits installing capacitor elements into smaller cans. Approaching the robust capability of the 381L the new 381LQ enables you to shrink equipment size and retain the original performance.

Highlights

- More capacitance per case
- Compares to the 381L

Specifications

Temperature Range	-40 °C to + 105 °C ≤ 315 Vdc -25 °C to + 105 °C ≥ 350 Vdc						
Rated Voltage Range	10 Vdc to 450 Vdc						
Capacitance Range	100 µF to 100,000 µF						
Capacitance Tolerance	± 20%						
Leakage Current	≤3 √CV µA, 4 mA max, 5 minutes						
Ripple Current Multipliers	Ambient Temperature						
	45 °C	60 °C	70 °C	85 °C	105 °C		
	2.35	2.20	2.00	1.70	1.00		
	Frequency						
	Voltage	50 Hz	60 Hz	120 Hz	500 kHz	1 kHz	10 kHz & Up
	10 - 100 WV	0.93	0.95	1.00	1.05	1.08	1.15
	160 - 450 WV	0.75	0.80	1.00	1.20	1.25	1.40
Low Temperature Characteristics	Impedance ratio: Z _{-20°C} /Z _{+25°C} ≤ 10 (10 Vdc) ≤ 8 (16–50 Vdc) ≤ 4 (63–100 Vdc) ≤ 3 (150–450 Vdc)						
Endurance Life Test	2000 h at full load at 105 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit						
Shelf Life Test	1000 h at 105 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit						
Vibration	10 to 55 Hz, 0.06” and 10 g max, 2 h each plane						
RoHS Compliant							

Type 381LQ 105 °C Compact, High Ripple, Snap-In Aluminum

Higher Capacitance per Case Size

Part Numbering System

381LQ

Type

381LQ

821

Cap

471 = 470 μ F

332 = 3300 μ F

103 = 10,000 μ F

M

Tolerance

M = $\pm 20\%$

400

Voltage

160 = 160 Vdc

450 = 450 Vdc

A05

Case

Code

2

Insulating

Sleeve

2 = PVC

A

Pin Style

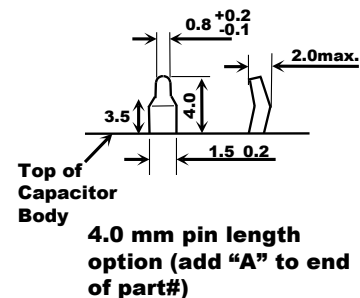
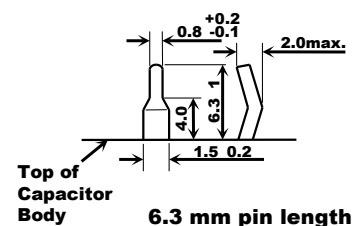
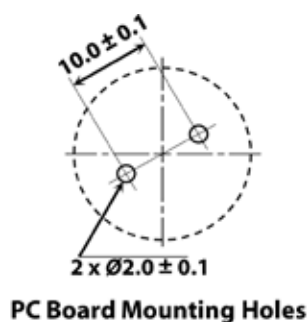
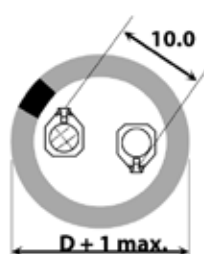
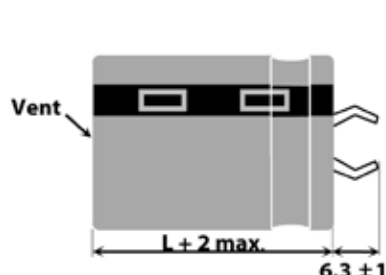
Blank = 2 pins

snap-in 6.3 mm L

A = 2 pins snap-in

4.0 mm L

Outline Drawing



Insulated Case Dimensions

	DIAMETER		LENGTH		Typical
Case	D		L		Weight
Code	mm	inches	mm	inches	(grams)
H01	22	0.87	25	0.98	16
H02	22	0.87	30	1.18	19
H03	22	0.87	35	1.38	22
H04	22	0.87	40	1.57	24
H45	22	0.87	45	1.77	28
H05	22	0.87	50	1.97	31
J01	25	0.98	25	0.98	20
J02	25	0.98	30	1.18	24
J03	25	0.98	35	1.38	27
J04	25	0.98	40	1.57	31
J45	25	0.98	45	1.77	35
J05	25	0.98	50	1.97	38

	DIAMETER		LENGTH		Typical
Case	D		L		Weight
Code	mm	inches	mm	inches	(grams)
K01	30	1.18	25	0.98	30
K02	30	1.18	30	1.18	35
K03	30	1.18	35	1.38	40
K04	30	1.18	40	1.57	44
K45	30	1.18	45	1.77	49
K05	30	1.18	50	1.97	53
A01	35	1.38	25	0.98	42
A02	35	1.38	30	1.18	48
A03	35	1.38	35	1.38	54
A04	35	1.38	40	1.57	60
A45	35	1.38	45	1.77	67
A05	35	1.38	50	1.97	74

Type 381LQ 105 °C Compact, High Ripple, Snap-In Aluminum

Higher Capacitance per Case Size

Ratings

Additional Voltages available at <http://www.cde.com/catalogs/381LQ.pdf>

		ESR Max		Ripple Amps		Nominal			ESR Max		Ripple Amps		Nominal		
		@ 25 °C		@ 105 °C		Size			@ 25 °C		@ 105 °C		Size		
Cap.	Catalog	120 Hz 20 kHz		120 Hz 20 kHz		D x L			Cap.	Catalog	120 Hz 20 kHz		D x L		
(µF)	Part Number	(Ω)	(Ω)	(A)	(A)	(mm)			(µF)	Part Number	(Ω)	(Ω)	(A)	(A)	(mm)
10 Vdc (13 Vdc Surge)									16 Vdc (20 Vdc Surge)						
12000	381LQ123M010H012	0.076	0.065	2.20	2.53	22 x 25			47000	381LQ473M016A042	0.021	0.019	5.50	6.33	35 x 40
18000	381LQ183M010H022	0.051	0.043	2.40	2.76	22 x 30			56000	381LQ563M016K052	0.020	0.018	6.00	6.90	30 x 50
18000	381LQ183M010H012	0.051	0.043	2.40	2.76	25 x 25			56000	381LQ563M016A452	0.020	0.018	6.00	6.90	35 x 45
22000	381LQ223M010H032	0.041	0.035	2.60	2.99	22 x 35			35 Vdc (44 Vdc Surge)						
22000	381LQ223M010J022	0.041	0.035	2.60	2.99	25 x 30			4700	381LQ472M035H012	0.106	0.079	2.20	2.53	22 x 25
27000	381LQ273M010H042	0.034	0.029	3.10	3.57	22 x 40			5600	381LQ562M035H022	0.089	0.067	2.40	2.76	22 x 30
27000	381LQ273M010J032	0.034	0.029	3.10	3.57	25 x 35			5600	381LQ562M035J012	0.089	0.067	2.40	2.76	25 x 25
27000	381LQ273M010K012	0.034	0.029	3.10	3.57	30 x 25			6800	381LQ682M035H032	0.073	0.055	2.60	2.99	22 x 35
33000	381LQ333M010H452	0.028	0.023	3.40	3.91	22 x 45			8200	381LQ822M035H042	0.061	0.045	2.90	3.34	22 x 40
33000	381LQ333M010J042	0.028	0.023	3.40	3.91	25 x 40			8200	381LQ822M035J022	0.061	0.045	2.90	3.34	25 x 30
39000	381LQ393M010J452	0.026	0.022	3.70	4.26	25 x 45			10000	381LQ103M035H452	0.050	0.037	3.20	3.68	22 x 45
39000	381LQ393M010K022	0.026	0.023	3.70	4.26	30 x 30			10000	381LQ103M035J032	0.050	0.037	3.20	3.68	25 x 35
39000	381LQ393M010A012	0.026	0.022	3.70	4.26	35 x 25			10000	381LQ103M035K012	0.050	0.037	3.20	3.68	30 x 25
47000	381LQ473M010J052	0.024	0.021	4.20	4.83	25 x 50			12000	381LQ123M035J042	0.041	0.031	3.50	4.03	25 x 40
47000	381LQ473M010K032	0.024	0.022	4.20	4.83	30 x 35			12000	381LQ123M035K022	0.041	0.031	3.50	4.03	30 x 30
47000	381LQ473M010A022	0.024	0.021	4.20	4.83	35 x 30			12000	381LQ123M035A012	0.041	0.031	3.50	4.03	35 x 25
56000	381LQ563M010K042	0.023	0.021	5.00	5.75	30 x 40			15000	381LQ153M035J452	0.033	0.025	3.90	4.49	25 x 45
56000	381LQ563M010A032	0.023	0.020	5.00	5.75	35 x 35			15000	381LQ153M035K032	0.033	0.025	3.90	4.49	30 x 35
68000	381LQ683M010K452	0.022	0.020	5.40	6.21	30 x 45			15000	381LQ153M035A022	0.033	0.025	3.90	4.49	35 x 30
68000	381LQ683M010A042	0.022	0.019	5.40	6.21	35 x 40			18000	381LQ183M035K042	0.028	0.021	4.30	4.95	30 x 40
82000	381LQ823M010A452	0.021	0.019	6.10	7.02	35 x 45			18000	381LQ183M035A032	0.028	0.021	4.30	4.95	35 x 35
100000	381LQ104M010A052	0.020	0.019	6.90	7.94	35 x 50			22000	381LQ223M035K452	0.023	0.017	5.00	5.75	30 x 45
16 Vdc (20 Vdc Surge)									22000	381LQ223M035A042	0.023	0.017	5.00	5.75	35 x 40
10000	381LQ103M016H012	0.075	0.063	2.60	2.99	22 x 25			27000	381LQ273M035K052	0.018	0.014	5.30	6.10	30 x 50
12000	381LQ123M016H022	0.062	0.053	2.90	3.34	22 x 30			27000	381LQ273M035A452	0.018	0.014	5.30	6.10	35 x 45
12000	381LQ123M016J012	0.062	0.053	2.90	3.34	25 x 25			33000	381LQ333M035A052	0.015	0.012	5.90	6.79	35 x 50
15000	381LQ153M016H032	0.050	0.042	3.20	3.68	22 x 35			63 Vdc (79 Vdc Surge)						
18000	381LQ183M016H042	0.041	0.035	3.50	4.03	22 x 40			2200	381LQ222M063H012	0.151	0.113	2.00	2.30	22 x 25
18000	381LQ183M016J022	0.041	0.035	3.50	4.03	25 x 30			2700	381LQ272M063H022	0.123	0.092	2.20	2.53	22 x 30
22000	381LQ223M016H452	0.034	0.029	3.80	4.37	22 x 45			2700	381LQ272M063J012	0.123	0.092	2.20	2.53	25 x 25
22000	381LQ223M016J032	0.034	0.029	3.80	4.37	25 x 35			3300	381LQ332M063H032	0.100	0.075	2.50	2.88	22 x 35
22000	381LQ223M016H012	0.034	0.029	3.80	4.37	30 x 25			3900	381LQ392M063H042	0.085	0.064	2.70	3.11	22 x 40
27000	381LQ273M016H052	0.028	0.023	4.20	4.83	22 x 50			3900	381LQ392M063J022	0.085	0.064	2.70	3.11	25 x 30
27000	381LQ273M016J042	0.028	0.023	4.20	4.83	25 x 40			3900	381LQ392M063K012	0.085	0.064	2.70	3.11	30 x 25
27000	381LQ273M016K022	0.028	0.023	4.20	4.83	30 x 30			4700	381LQ472M063H452	0.071	0.053	3.00	3.45	22 x 45
27000	381LQ273M016A012	0.028	0.023	4.20	4.83	35 x 25			4700	381LQ472M063J032	0.071	0.053	3.00	3.45	25 x 35
33000	381LQ333M016J452	0.023	0.019	4.70	5.41	25 x 45			5600	381LQ562M063H052	0.059	0.044	3.30	3.80	22 x 50
33000	381LQ333M016K032	0.023	0.019	4.70	5.41	30 x 35			5600	381LQ562M063J042	0.059	0.044	3.30	3.80	25 x 40
33000	381LQ333M016A022	0.023	0.020	4.70	5.41	35 x 30			5600	381LQ562M063K022	0.059	0.044	3.30	3.80	30 x 30
39000	381LQ393M016K042	0.022	0.018	5.10	5.87	30 x 40			5600	381LQ562M063A012	0.059	0.044	3.30	3.80	35 x 25
39000	381LQ393M016A032	0.022	0.020	5.10	5.87	35 x 35			6800	381LQ682M063J452	0.049	0.037	3.60	4.14	25 x 45
47000	381LQ473M016K452	0.016	0.014	5.50	6.33	30 x 45			6800	381LQ682M063K032	0.049	0.037	3.60	4.14	30 x 35

Type 381LQ 105 °C Compact, High Ripple, Snap-In Aluminum

Higher Capacitance per Case Size

Additional Voltages available at <http://www.cde.com/catalogs/381LQ.pdf>

Additional Packages Available at http://www.murata.com/catalogs/014eq.pdf							Additional Packages Available at http://www.murata.com/catalogs/014eq.pdf						
		ESR Max @ 25 °C		Ripple Amps @ 105 °C		Nominal Size			ESR Max @ 25 °C		Ripple Amps @ 105 °C		Nominal Size
Cap. (µF)	Catalog Part Number	120 Hz (Ω)	20 kHz (Ω)	120 Hz (A)	20 kHz (A)	D x L (mm)	Cap. (µF)	Catalog Part Number	120 Hz (Ω)	20 kHz (Ω)	120 Hz (A)	20 kHz (A)	D x L (mm)
63 Vdc (79 Vdc Surge)							100 Vdc (125 Vdc Surge)						
6800	381LQ682M063A022	0.049	0.037	3.60	4.14	35 x 30	2200	381LQ222M100J042	0.113	0.073	2.60	2.99	25 x 40
8200	381LQ822M063K042	0.040	0.030	3.90	4.49	30 x 40	2200	381LQ222M100K022	0.113	0.073	2.60	2.99	30 x 30
8200	381LQ822M063A032	0.040	0.030	3.90	4.49	35 x 35	2200	381LQ222M100A012	0.113	0.073	2.60	2.99	35 x 25
10000	381LQ103M063K452	0.033	0.025	4.40	5.06	30 x 45	2700	381LQ272M100J452	0.092	0.060	2.90	3.34	25 x 45
10000	381LQ103M063A042	0.033	0.025	4.40	5.06	35 x 40	2700	381LQ272M100K032	0.092	0.060	2.90	3.34	30 x 35
12000	381LQ123M063K052	0.028	0.021	4.80	5.52	30 x 50	3300	381LQ332M100J052	0.075	0.049	3.20	3.68	25 x 50
12000	381LQ123M063A452	0.028	0.022	4.80	5.52	35 x 45	3300	381LQ332M100K042	0.075	0.049	3.20	3.68	30 x 40
15000	381LQ153M063A052	0.022	0.018	5.40	6.21	35 x 50	3300	381LQ332M100A022	0.075	0.049	3.20	3.68	35 x 30
80 Vdc (100 Vdc Surge)							3900	381LQ392M100K452	0.064	0.043	3.60	4.14	30 x 45
1200	381LQ122M080H012	0.235	0.176	1.50	1.73	22 x 25	3900	381LQ392M100A032	0.064	0.043	3.60	4.14	35 x 35
1500	381LQ152M080H022	0.188	0.141	1.70	1.96	22 x 30	4700	381LQ472M100K052	0.053	0.038	3.80	4.37	30 x 50
1500	381LQ152M080J012	0.188	0.141	1.70	1.96	25 x 25	4700	381LQ472M100A042	0.053	0.037	3.80	4.37	35 x 40
1800	381LQ182M080H032	0.157	0.117	1.80	2.07	22 x 35	5600	381LQ562M100A452	0.044	0.031	4.20	4.83	35 x 45
2200	381LQ222M080H042	0.128	0.096	2.10	2.42	22 x 40	6800	381LQ682M100A052	0.037	0.027	4.70	5.41	35 x 50
2200	381LQ222M080J022	0.128	0.096	2.10	2.42	25 x 30	200 Vdc (250 Vdc Surge)						
2700	381LQ272M080H452	0.104	0.078	2.40	2.76	22 x 45	390	381LQ391M200H012	0.510	0.230	1.31	1.83	22 x 25
2700	381LQ272M080J032	0.104	0.078	2.40	2.76	25 x 35	470	381LQ471M200H022	0.423	0.190	1.45	2.03	22 x 30
2700	381LQ272M080K012	0.104	0.078	2.40	2.76	30 x 25	560	381LQ561M200H022	0.355	0.160	1.67	2.34	22 x 30
3300	381LQ332M080H052	0.085	0.064	2.60	2.99	22 x 50	680	381LQ681M200H042	0.293	0.132	1.75	2.45	22 x 40
3300	381LQ332M080J042	0.085	0.064	2.60	2.99	25 x 40	680	381LQ681M200J022	0.293	0.132	1.75	2.45	25 x 30
3300	381LQ332M080K022	0.085	0.064	2.60	2.99	30 x 30	820	381LQ821M200H452	0.243	0.109	2.04	2.86	22 x 45
3300	381LQ332M080A012	0.085	0.064	2.60	2.99	35 x 25	820	381LQ821M200J032	0.243	0.109	2.04	2.86	25 x 35
3900	381LQ392M080J452	0.072	0.054	3.00	3.45	25 x 45	820	381LQ821M200K012	0.243	0.109	2.04	2.86	30 x 25
3900	381LQ392M080K032	0.072	0.054	3.00	3.45	30 x 35	1000	381LQ102M200H052	0.199	0.090	2.30	3.22	22 x 50
4700	381LQ472M080J052	0.060	0.045	3.30	3.80	25 x 50	1000	381LQ102M200J042	0.199	0.090	2.10	2.90	25 x 40
4700	381LQ472M080K042	0.060	0.045	3.30	3.80	30 x 40	1000	381LQ102M200J452	0.199	0.090	2.30	3.22	25 x 45
4700	381LQ472M080A022	0.060	0.045	3.30	3.80	35 x 30	1000	381LQ102M200K022	0.199	0.090	2.30	3.22	30 x 30
5600	381LQ562M080K452	0.050	0.038	3.70	4.26	30 x 45	1000	381LQ102M200A012	0.216	0.097	2.30	3.22	35 x 25
5600	381LQ562M080A032	0.050	0.038	3.70	4.26	35 x 35	1200	381LQ122M200J452	0.166	0.075	2.40	3.30	25 x 45
6800	381LQ682M080K052	0.041	0.031	3.90	4.49	30 x 50	1200	381LQ122M200J052	0.166	0.075	2.65	3.71	25 x 50
6800	381LQ682M080A042	0.041	0.032	3.90	4.49	35 x 40	1200	381LQ122M200K032	0.166	0.075	2.65	3.71	30 x 35
8200	381LQ822M080A452	0.034	0.027	4.50	5.18	35 x 45	1200	381LQ122M200A022	0.180	0.090	2.65	3.71	35 x 30
100 Vdc (125 Vdc Surge)							1500	381LQ152M200K042	0.133	0.060	2.80	3.92	30 x 40
820	381LQ821M100H012	0.303	0.197	1.40	1.61	22 x 25	1500	381LQ152M200A022	0.114	0.072	2.80	3.92	35 x 30
1200	381LQ122M100H022	0.207	0.135	1.80	2.07	22 x 30	1800	381LQ182M200K452	0.110	0.050	3.08	4.31	30 x 45
1200	381LQ122M100J012	0.207	0.135	1.80	2.07	25 x 25	1800	381LQ182M200A042	0.129	0.084	3.08	4.31	35 x 40
1500	381LQ152M100H032	0.166	0.108	2.10	2.42	22 x 35	2200	381LQ222M200K052	0.090	0.041	3.48	4.87	30 x 50
1500	381LQ152M100J022	0.166	0.108	2.10	2.42	25 x 30	2200	381LQ222M200A452	0.096	0.044	3.48	4.87	35 x 45
1800	381LQ182M100H042	0.138	0.090	2.30	2.65	22 x 40	250 Vdc (300 Vdc Surge)						
1800	381LQ182M100J032	0.138	0.090	2.30	2.65	25 x 35	270	381LQ271M250H012	0.614	0.276	1.10	1.54	22 x 25
1800	381LQ182M100K012	0.138	0.090	2.30	2.65	30 x 25	330	381LQ331M250H022	0.502	0.226	1.20	1.68	22 x 30
2200	381LQ222M100H452	0.113	0.073	2.60	2.99	22 x 45	330	381LQ331M250J012	0.502	0.226	1.20	1.68	25 x 25

Type 381LQ 105 °C Compact, High Ripple, Snap-In Aluminum

Higher Capacitance per Case Size

Additional Voltages available at <http://www.cde.com/catalogs/381LQ.pdf>

		ESR Max		Ripple Amps		Nominal			ESR Max		Ripple Amps		Nominal
		@ 25 °C		@ 105 °C		Size			@ 25 °C		@ 105 °C		Size
Cap.	Catalog	120 Hz	20 kHz	120 Hz	20 kHz	D x L	Cap.	Catalog	120 Hz	20 kHz	120 Hz	20 kHz	D x L
(µF)	Part Number	(Ω)	(Ω)	(A)	(A)	(mm)	(µF)	Part Number	(Ω)	(Ω)	(A)	(A)	(mm)
250 Vdc (300 Vdc Surge)							400 Vdc (450 Vdc Surge)						
390	381LQ391M250H022	0.425	0.191	1.20	1.70	22 x 30	330	381LQ331M400J452	0.553	0.249	1.44	2.02	25 x 45
390	381LQ391M250H032	0.425	0.191	1.30	1.82	22 x 35	330	381LQ331M400K032	0.553	0.249	1.44	2.02	30 x 35
390	381LQ391M250J012	0.425	0.191	1.30	1.82	25 x 25	330	381LQ331M400A022	0.553	0.249	1.44	2.02	35 x 30
470	381LQ471M250H032	0.353	0.159	1.30	1.82	22 x 35	390	381LQ391M400J052	0.468	0.210	1.55	2.17	25 x 50
470	381LQ471M250H042	0.353	0.159	1.40	1.96	22 x 40	390	381LQ391M400K032	0.468	0.210	1.40	1.95	30 x 35
470	381LQ471M250J022	0.353	0.159	1.40	1.96	25 x 30	390	381LQ391M400K042	0.468	0.210	1.55	2.17	30 x 40
470	381LQ471M250K012	0.353	0.159	1.40	1.96	30 x 25	390	381LQ391M400A022	0.468	0.210	1.55	2.17	35 x 30
560	381LQ561M250H042	0.296	0.133	1.40	1.96	22 x 40	470	381LQ471M400K452	0.388	0.175	1.68	2.35	30 x 45
560	381LQ561M250H452	0.296	0.133	1.50	2.10	22 x 45	470	381LQ471M400A032	0.388	0.175	1.68	2.35	35 x 35
560	381LQ561M250J032	0.296	0.133	1.50	2.10	25 x 35	560	381LQ561M400K052	0.326	0.147	1.90	2.66	30 x 50
560	381LQ561M250K012	0.296	0.133	1.50	2.10	30 x 25	560	381LQ561M400A042	0.326	0.147	1.90	2.66	35 x 40
680	381LQ681M250H452	0.244	0.110	1.50	2.10	22 x 45	680	381LQ681M400A452	0.268	0.121	2.12	2.97	35 x 45
680	381LQ681M250H052	0.244	0.110	1.70	2.38	22 x 50	820	381LQ821M400A052	0.200	0.090	2.30	3.20	35 x 50
680	381LQ681M250J042	0.244	0.110	1.70	2.38	25 x 40	420 Vdc (470 Vdc Surge)						
680	381LQ681M250K022	0.244	0.110	1.70	2.38	30 x 30	120	381LQ121M420H022	1.520	0.684	0.75	1.05	22 x 30
680	381LQ681M250A012	0.244	0.110	1.70	2.38	35 x 25	120	381LQ121M420J012	1.520	0.684	0.75	1.05	25 x 25
820	381LQ821M250J452	0.202	0.091	2.00	2.80	25 x 45	150	381LQ151M420H032	1.220	0.550	0.85	1.20	22 x 35
820	381LQ821M250K032	0.202	0.091	2.00	2.80	30 x 35	180	381LQ181M420H042	1.100	0.460	0.90	1.30	22 x 40
820	381LQ821M250A022	0.202	0.091	2.00	2.80	35 x 30	180	381LQ181M420J022	1.100	0.460	0.90	1.30	25 x 30
1000	381LQ102M250J052	0.166	0.075	2.20	3.08	25 x 50	220	381LQ221M420H452	0.830	0.370	1.05	1.50	22 x 45
1000	381LQ102M250K042	0.166	0.075	2.20	3.08	30 x 40	220	381LQ221M420J032	0.830	0.370	1.05	1.50	25 x 35
1000	381LQ102M250A022	0.166	0.075	2.20	3.08	35 x 30	220	381LQ221M420K012	0.830	0.370	1.05	1.50	30 x 25
1200	381LQ122M250K452	0.138	0.062	2.30	3.22	30 x 45	270	381LQ271M420H052	0.675	0.305	1.20	1.70	22 x 50
1200	381LQ122M250A032	0.138	0.062	2.30	3.22	35 x 35	270	381LQ271M420J042	0.675	0.305	1.20	1.70	25 x 40
1500	381LQ152M250A452	0.110	0.050	2.50	3.50	35 x 45	270	381LQ271M420K022	0.675	0.305	1.20	1.70	30 x 30
1800	381LQ182M250A452	0.092	0.041	2.50	3.50	35 x 45	270	381LQ271M420A012	0.675	0.305	1.20	1.70	35 x 25
1800	381LQ182M250A052	0.092	0.041	2.70	3.78	35 x 50	330	381LQ331M420J052	0.550	0.250	1.40	2.00	25 x 50
400 Vdc (450 Vdc Surge)							330	381LQ331M420K032	0.550	0.250	1.40	2.00	30 x 35
100	381LQ101M400H012	1.824	0.821	0.70	0.98	22 x 25	330	381LQ331M420A032	0.550	0.250	1.40	2.00	35 x 35
120	381LQ121M400H022	1.520	0.684	0.75	1.05	22 x 30	390	381LQ391M420K042	0.470	0.210	1.55	2.15	30 x 40
150	381LQ151M400H022	1.216	0.547	0.88	1.23	22 x 30	390	381LQ391M420A032	0.470	0.210	1.55	2.15	35 x 35
180	381LQ181M400H032	1.013	0.458	0.95	1.33	22 x 35	470	381LQ471M420K452	0.390	0.175	1.70	2.40	30 x 45
180	381LQ181M400J022	1.013	0.458	0.95	1.33	25 x 30	470	381LQ471M420A032	0.390	0.175	1.70	2.40	35 x 35
220	381LQ221M400H042	0.829	0.373	1.00	1.40	22 x 45	560	381LQ561M420K052	0.330	0.150	1.90	2.65	30 x 50
220	381LQ221M400H452	0.829	0.373	1.10	1.54	22 x 45	560	381LQ561M420A452	0.330	0.150	1.90	2.65	35 x 45
220	381LQ221M400J032	0.829	0.373	1.10	1.54	25 x 35	680	381LQ681M420A052	0.270	0.120	2.10	2.95	35 x 50
220	381LQ221M400K012	0.829	0.373	1.10	1.54	30 x 25	450 Vdc (500 Vdc Surge)						
270	381LQ271M400H452	0.675	0.304	1.10	1.54	22 x 45	100	381LQ101M450H022	1.824	0.821	0.64	0.90	22 x 30
270	381LQ271M400H052	0.675	0.304	1.22	1.71	22 x 50	100	381LQ101M450J012	1.824	0.821	0.64	0.90	25 x 25
270	381LQ271M400J042	0.675	0.304	1.22	1.71	25 x 40	120	381LQ121M450H032	1.520	0.684	0.72	1.01	22 x 35
270	381LQ271M400K022	0.675	0.304	1.22	1.71	30 x 30	120	381LQ121M450J022	1.520	0.684	0.72	1.01	25 x 30
270	381LQ271M400A012	0.675	0.304	1.22	1.71	35 x 25	150	381LQ151M450H042	1.216	0.547	0.79	1.11	22 x 40

Type 381LQ 105 °C Compact, High Ripple, Snap-In Aluminum

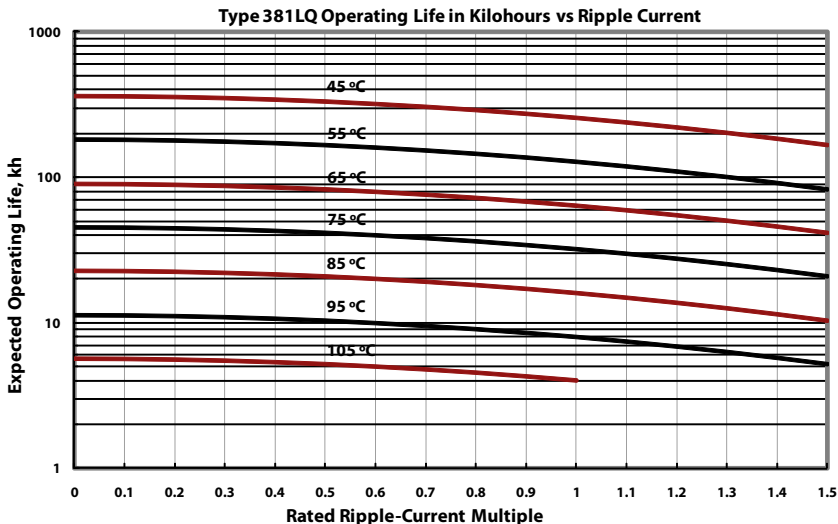
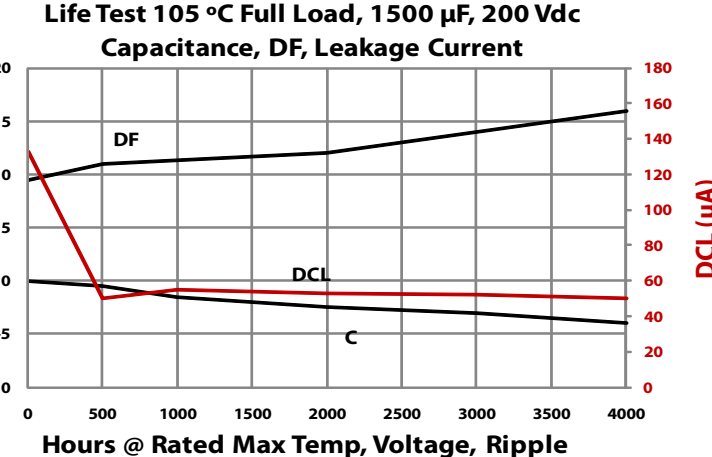
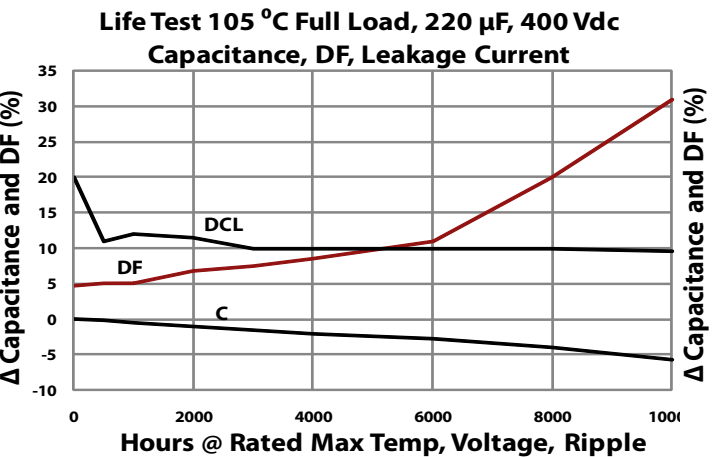
Higher Capacitance per Case Size

Additional Voltages available at <http://www.cde.com/catalogs/381LQ.pdf>

Cap. (μF)	Catalog Part Number	ESR Max		Ripple Amps		Nominal
		@ 25 °C		@ 105 °C		Size
		120 Hz (Ω)	20 kHz (Ω)	120 Hz (A)	20 kHz (A)	D x L (mm)
450 Vdc (500 Vdc Surge)						
150	381LQ151M450K012	1.216	0.547	0.79	1.11	30 x 25
180	381LQ181M450H452	1.013	0.456	0.87	1.22	22 x 45
180	381LQ181M450J032	1.013	0.456	0.80	1.10	25 x 35
180	381LQ181M450J042	1.013	0.456	0.87	1.22	25 x 40
180	381LQ181M450K022	1.013	0.456	0.87	1.22	30 x 30
220	381LQ221M450H052	0.829	0.373	0.90	1.25	22 x 50
220	381LQ221M450J452	0.829	0.373	1.00	1.40	25 x 45
220	381LQ221M450K022	0.829	0.373	1.00	1.40	30 x 30
220	381LQ221M450A012	0.829	0.373	1.00	1.40	35 x 25
270	381LQ271M450J052	0.675	0.304	1.19	1.67	25 x 50
270	381LQ271M450K032	0.675	0.304	1.10	1.50	30 x 35
270	381LQ271M450K042	0.675	0.304	1.19	1.67	30 x 40

Cap. (μF)	Catalog Part Number	ESR Max		Ripple Amps		Nominal
		@ 25 °C		@ 105 °C		Size
		120 Hz (Ω)	20 kHz (Ω)	120 Hz (A)	20 kHz (A)	D x L (mm)
450 Vdc (500 Vdc Surge)						
270	381LQ271M450A022	0.675	0.304	1.19	1.67	35 x 30
330	381LQ331M450K042	0.553	0.249	1.25	1.75	30 x 40
330	381LQ331M450K452	0.553	0.249	1.38	1.93	30 x 45
330	381LQ331M450A032	0.553	0.249	1.38	1.93	35 x 35
390	381LQ391M450K452	0.468	0.210	1.40	1.95	30 x 45
390	381LQ391M450A042	0.468	0.210	1.55	2.17	35 x 40
470	381LQ471M450A452	0.388	0.175	1.74	2.44	35 x 45
560	381LQ561M450A052	0.326	0.147	1.90	2.66	35 x 50
390	381LQ391M450K052	0.680	0.210	1.55	2.17	30 x 50
390	381LQ391M450A042	0.468	0.210	1.55	2.17	35 x 40
470	381LQ471M450A452	0.388	0.175	1.74	2.44	35 x 45
560	381LQ561M450A052	0.326	0.147	1.90	2.66	35 x 50

Typical Performance Curves



Type 381LR 105 °C Highest Ripple, Snap-In Aluminum

Ultra-High Ripple Capabilities



Compared to standard 105 °C snap-ins like the Type 381L/LX Type 381LR can handle an extra 25% ripple current or more. This remarkable capability stems from advances in electrolyte that give extremely low ESR values. In high ripple current applications like motor drives you can save by using fewer capacitors.

Highlights

- The right choice for motor drive bus capacitors
- The right choice for UPS bus capacitors
- Compare to Type 381L
- Up to 2 times the ripple current

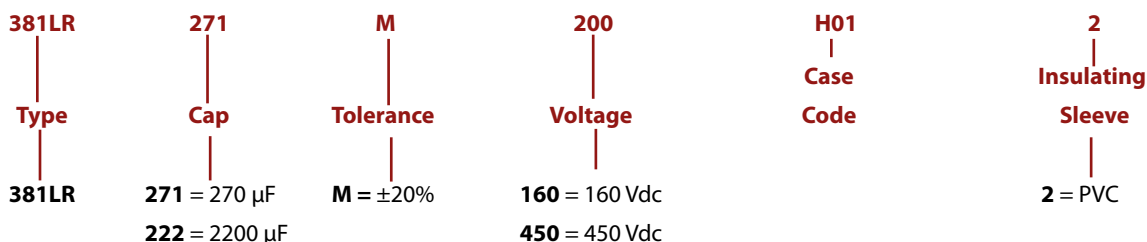
Specifications

Temperature Range	-40 °C to + 105 °C ≤ 315 Vdc -25 °C to + 105 °C ≥ 350 Vdc					
Rated Voltage Range	200 Vdc to 450 Vdc					
Capacitance Range	56 μF to 2,200 μF					
Capacitance Tolerance	± 20%					
Leakage Current	≤3 √CV μA, 4 mA max, 5 minutes					
Ripple Current Multipliers	Ambient Temperature					
	45 °C	60 °C	70 °C	85 °C	105 °C	
	2.35	2.20	2.00	1.70	1.00	
	Frequency					
	50 Hz	60 Hz	120 Hz	500 kHz	1 kHz	10 kHz & Up
	0.75	0.80	1.00	1.20	1.25	1.40
Low Temperature Characteristics	Impedance ratio: Z _{-20°C} /Z _{+25°C} ≤ 3 (200–450Vdc)					
Endurance Life Test	3000 h at full load at 105 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit					
Shelf Life Test	1000 h at 105 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit					
Vibration	10 to 55 Hz, 0.06" and 10 g max, 2 h each plane					
RoHS Compliant						

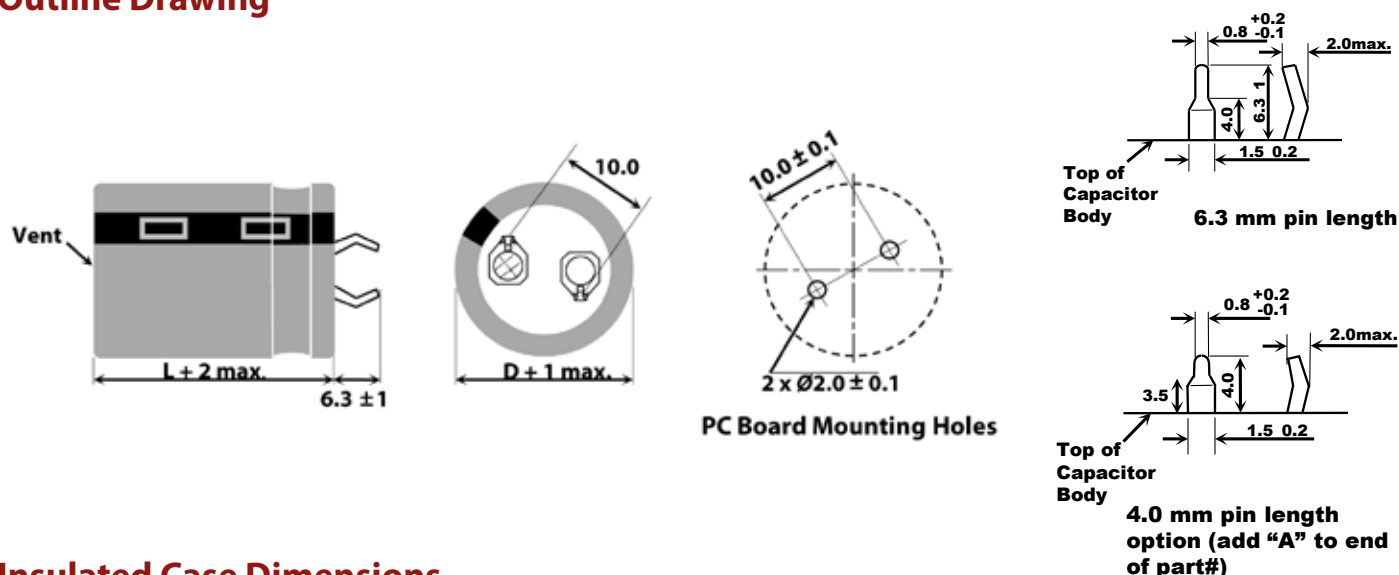
Type 381LR 105 °C Highest Ripple, Snap-In Aluminum

Ultra-High Ripple Capabilities

Part Numbering System



Outline Drawing



Insulated Case Dimensions

Case Code	DIAMETER D		LENGTH L		Typical Weight (grams)	Case Code	DIAMETER D		LENGTH L		Typical Weight (grams)
	mm	inches	mm	inches			mm	inches	mm	inches	
H01	22	0.87	25	0.98	16	K01	30	1.18	25	0.98	30
H02	22	0.87	30	1.18	19	K02	30	1.18	30	1.18	35
H03	22	0.87	35	1.38	22	K03	30	1.18	35	1.38	40
H04	22	0.87	40	1.57	24	K04	30	1.18	40	1.57	44
H45	22	0.87	45	1.77	28	K45	30	1.18	45	1.77	49
H05	22	0.87	50	1.97	31	K05	30	1.18	50	1.97	53
J01	25	0.98	25	0.98	20	A01	35	1.38	25	0.98	42
J02	25	0.98	30	1.18	24	A02	35	1.38	30	1.18	48
J03	25	0.98	35	1.38	27	A03	35	1.38	35	1.38	54
J04	25	0.98	40	1.57	31	A04	35	1.38	40	1.57	60
J45	25	0.98	45	1.77	35	A45	35	1.38	45	1.77	67
J05	25	0.98	50	1.97	38	A05	35	1.38	50	1.97	74

Type 381LR 105 °C Highest Ripple, Snap-In Aluminum

Ultra-High Ripple Capabilities

Ratings

		ESR Max		Ripple Amps		Nominal
		@ 25° C		@ 105 °C		Size
Cap.	Catalog	120 Hz	20 kHz	120 Hz	20 kHz	D x L
(µF)	Part Number	(Ω)	(Ω)	(A)	(A)	(mm)
200 Vdc (250 Vdc Surge)						
270	381LR271M200H012	0.553	0.249	1.42	2.03	22 X 25
330	381LR331M200H022	0.452	0.203	1.56	2.23	22 X 30
390	381LR391M200H022	0.383	0.172	1.71	2.44	22 X 30
390	381LR391M200J012	0.383	0.172	1.71	2.44	25 X 25
470	381LR471M200H032	0.317	0.143	1.85	2.64	22 X 35
470	381LR471M200J022	0.317	0.143	1.85	2.64	25 X 30
560	381LR561M200H042	0.266	0.120	2.14	3.05	22 X 40
560	381LR561M200J022	0.266	0.120	2.14	3.05	25 X 30
560	381LR561M200K012	0.266	0.120	2.14	3.05	30 X 25
680	381LR681M200H452	0.219	0.099	2.42	3.45	22 X 45
680	381LR681M200J032	0.219	0.099	2.42	3.45	25 X 35
680	381LR681M200K022	0.219	0.099	2.42	3.45	30 X 30
820	381LR821M200H052	0.182	0.082	2.63	3.76	22 X 50
820	381LR821M200J042	0.182	0.082	2.63	3.76	25 X 40
820	381LR821M200K022	0.182	0.082	2.63	3.76	30 X 30
820	381LR821M200A012	0.182	0.082	2.63	3.76	35 X 25
1000	381LR102M200J452	0.149	0.067	2.84	4.06	25 X 45
1000	381LR102M200K032	0.149	0.067	2.84	4.06	30 X 35
1000	381LR102M200A022	0.149	0.067	2.84	4.06	35 X 30
1200	381LR122M200K042	0.124	0.062	3.13	4.47	30 X 40
1200	381LR122M200A032	0.124	0.062	3.13	4.47	35 X 35
1500	381LR152M200K052	0.099	0.050	3.56	5.06	30 X 50
1500	381LR152M200A042	0.099	0.050	3.56	5.06	35 X 40
1800	381LR182M200A452	0.083	0.041	3.84	5.48	35 X 45
2200	381LR222M200A052	0.066	0.040	4.12	5.89	35 X 50
250 Vdc (300 Vdc Surge)						
220	381LR221M250H022	0.678	0.305	1.28	1.83	22 X 30
270	381LR271M250H022	0.553	0.249	1.42	2.03	22 X 30
270	381LR271M250J012	0.553	0.249	1.42	2.03	25 X 25
330	381LR331M250H032	0.452	0.203	1.64	2.34	22 X 35
330	381LR331M250J022	0.452	0.203	1.64	2.34	25 X 30
390	381LR391M250H042	0.383	0.172	1.72	2.45	22 X 40
390	381LR391M250J022	0.383	0.172	1.72	2.45	25 X 30
390	381LR391M250K012	0.383	0.172	1.72	2.45	30 X 25
470	381LR471M250H452	0.317	0.143	1.85	2.64	22 X 45
470	381LR471M250J032	0.317	0.143	1.85	2.64	25 X 35
470	381LR471M250K022	0.317	0.143	1.85	2.64	30 X 30
560	381LR561M250J042	0.266	0.120	2.14	3.05	25 X 40
560	381LR561M250K022	0.266	0.120	2.14	3.05	30 X 30
560	381LR561M250A012	0.266	0.120	2.14	3.05	35 X 25
680	381LR681M250J452	0.219	0.099	2.42	3.45	25 X 45

		ESR Max		Ripple Amps		Nominal
		@ 25° C		@ 105 °C		Size
Cap.	Catalog	120 Hz	20 kHz	120 Hz	20 kHz	D x L
(µF)	Part Number	(Ω)	(Ω)	(A)	(A)	(mm)
250 Vdc (300 Vdc Surge)						
680	381LR681M250K032	0.219	0.099	2.42	3.45	30 X 35
680	381LR681M250A022	0.219	0.099	2.42	3.45	35 X 30
820	381LR821M250K042	0.182	0.082	2.63	3.76	30 X 40
820	381LR821M250A032	0.182	0.082	2.63	3.76	35 X 35
1000	381LR102M250K052	0.149	0.067	2.84	4.06	30 X 50
1000	381LR102M250A042	0.149	0.067	2.84	4.06	35 X 40
1200	381LR122M250A452	0.124	0.062	3.13	4.47	35 X 45
1500	381LR152M250A052	0.099	0.050	3.56	5.06	35 X 50
400 Vdc (450 Vdc Surge)						
82	381LR820M400H012	1.617	0.728	0.8	1.14	22 X 25
100	381LR101M400H022	1.326	0.597	0.91	1.3	22 X 30
100	381LR101M400J012	1.326	0.597	0.91	1.3	25 X 25
120	381LR121M400H032	1.105	0.497	1.02	1.46	22 X 35
120	381LR121M400J022	1.105	0.497	1.02	1.46	25 X 30
150	381LR151M400H042	1.105	0.387	1.07	1.53	22 X 40
150	381LR151M400J022	1.105	0.387	1.07	1.53	25 X 30
150	381LR151M400K012	1.105	0.387	1.07	1.53	30 X 25
180	381LR181M400H452	0.737	0.322	1.12	1.6	22 X 45
180	381LR181M400J032	0.737	0.322	1.12	1.6	25 X 35
180	381LR181M400K022	0.737	0.322	1.12	1.6	30 X 30
220	381LR221M400H052	0.603	0.271	1.42	2.03	22 X 50
220	381LR221M400J042	0.603	0.271	1.42	2.03	25 X 40
220	381LR221M400K022	0.603	0.271	1.42	2.03	30 X 30
220	381LR221M400A012	0.603	0.271	1.42	2.03	35 X 25
270	381LR271M400J452	0.491	0.221	1.56	2.23	25 X 45
270	381LR271M400K032	0.491	0.221	1.56	2.23	30 X 35
270	381LR271M400A022	0.491	0.221	1.56	2.23	35 X 30
330	381LR331M400K042	0.402	0.181	1.71	2.44	30 X 40
330	381LR331M400A022	0.402	0.181	1.71	2.44	35 X 30
390	381LR391M400K452	0.34	0.153	1.85	2.64	30 X 45
390	381LR391M400A032	0.34	0.153	1.85	2.64	35 X 35
470	381LR471M400A042	0.282	0.127	2.01	2.87	35 X 40
560	381LR561M400A452	0.237	0.107	2.35	3.36	35 X 45
420 Vdc (470 Vdc Surge)						
68	381LR680M420H012	1.95	0.878	0.76	1.08	22 X 25
82	381LR820M420H022	1.617	0.728	0.8	1.14	22 X 30
82	381LR820M420J012	1.617	0.728	0.8	1.14	25 X 25
100	381LR101M420H022	1.326	0.597	0.91	1.3	22 X 30
100	381LR101M420J012	1.326	0.597	0.91	1.3	25 X 25
120	381LR121M420H032	1.105	0.497	1.02	1.46	22 X 35
120	381LR121M420J022	1.105	0.497	1.02	1.46	25 X 30

Type 381LR 105 °C Highest Ripple, Snap-In Aluminum

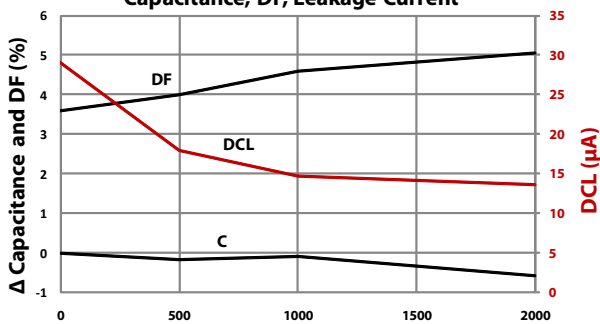
Ultra-High Ripple Capabilities

Cap.	Catalog	ESR Max		Ripple Amps		Nominal
		@ 25° C		@ 105 °C		Size
		120 Hz	20 kHz	120 Hz	20 kHz	D x L
(μF)	Part Number	(Ω)	(Ω)	(A)	(A)	(mm)
420 Vdc (470 Vdc Surge)						
150	381LR151M420K012	0.884	0.398	1.07	1.53	30 X 25
180	381LR181M420H452	0.737	0.332	1.12	1.6	22 X 45
180	381LR181M420J042	0.737	0.332	1.12	1.6	25 X 40
180	381LR181M420K022	0.737	0.332	1.12	1.6	30 X 30
180	381LR181M420A012	0.737	0.332	1.12	1.6	35 X 25
220	381LR221M420J452	0.603	0.271	1.42	2.03	25 X 45
220	381LR221M420K032	0.603	0.271	1.42	2.03	30 X 35
220	381LR221M420A022	0.603	0.271	1.42	2.03	35 X 30
270	381LR271M420J052	0.491	0.221	1.68	2.4	25 X 50
270	381LR271M420K042	0.491	0.221	1.68	2.4	30 X 40
270	381LR271M420A022	0.491	0.221	1.68	2.4	35 X 30
330	381LR331M420K452	0.402	0.181	1.78	2.54	30 X 45
330	381LR331M420A032	0.402	0.181	1.78	2.54	35 X 35
390	381LR391M420K052	0.34	0.153	1.91	2.73	30 X 50
390	381LR391M420A042	0.34	0.153	1.91	2.73	35 X 40
470	381LR471M420A452	0.282	0.127	2.23	3.18	35 X 45
450 Vdc (500 Vdc Surge)						
56	381LR560M450H012	2.368	1.066	0.67	0.95	22 X 25
68	381LR680M450H022	1.95	0.878	0.76	1.08	22 X 30
68	381LR680M450J012	1.95	0.878	0.76	1.08	25 X 25
82	381LR820M450H022	1.617	0.728	0.8	1.14	22 X 30
82	381LR820M450J012	1.617	0.728	0.8	1.14	25 X 25

Cap.	Catalog	ESR Max		Ripple Amps		Nominal
		@ 25° C		@ 105 °C		Size
		120 Hz	20 kHz	120 Hz	20 kHz	D x L
(μF)	Part Number	(Ω)	(Ω)	(A)	(A)	(mm)
450 Vdc (500 Vdc Surge)						
100	381LR101M450H032	1.326	0.597	0.91	1.3	22 X 35
100	381LR101M450J022	1.326	0.597	0.91	1.3	25 X 30
120	381LR121M450H042	1.105	0.497	1.02	1.46	22 X 40
120	381LR121M450J032	1.105	0.497	1.02	1.46	25 X 35
120	381LR121M450K012	1.105	0.497	1.02	1.46	30 X 25
150	381LR151M450H452	0.884	0.396	1.07	1.53	22 X 45
150	381LR151M450J042	0.884	0.396	1.07	1.53	25 X 40
150	381LR151M450K022	0.884	0.396	1.07	1.53	30 X 30
150	381LR151M450A012	0.884	0.396	1.07	1.53	35 X 25
180	381LR181M450H052	0.737	0.332	1.12	1.6	22 X 50
180	381LR181M450J042	0.737	0.332	1.12	1.6	25 X 40
180	381LR181M450K022	0.737	0.332	1.12	1.6	30 X 30
180	381LR181M450A012	0.737	0.332	1.12	1.6	35 X 25
220	381LR221M450J452	0.603	0.271	1.42	2.03	25 X 45
220	381LR221M450K032	0.603	0.271	1.42	2.03	30 X 35
220	381LR221M450A022	0.603	0.271	1.42	2.03	35 X 30
270	381LR271M450K042	0.491	0.221	1.72	2.45	30 X 40
270	381LR271M450A032	0.491	0.221	1.72	2.45	35 X 35
330	381LR331M450K052	0.402	0.181	1.85	2.64	30 X 50
330	381LR331M450A042	0.402	0.181	1.85	2.64	35 X 40
390	381LR391M450A042	0.34	0.153	1.97	2.82	35 X 40
470	381LR471M450A052	0.282	0.127	2.47	3.53	35 X 50

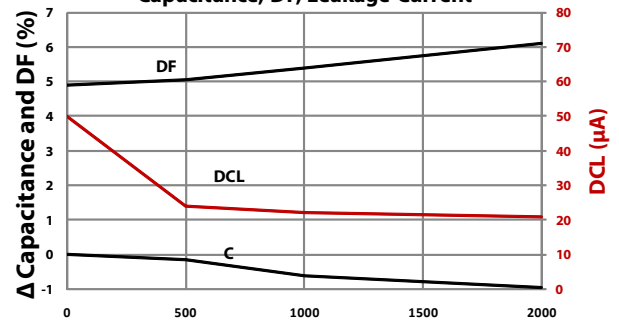
Typical Performance Curves

Life Test 105 °C, Full Load, 220 μF, 400 Vdc
Capacitance, DF, Leakage Current

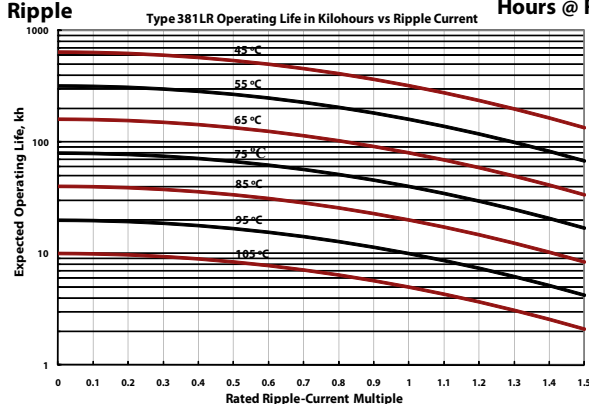


Hours @ Rated Max Temp, Voltage, Ripple

Life Test 105 °C, Full Load, 330 μF, 400 Vdc
Capacitance, DF, Leakage Current



Hours @ Rated Max Temp, Voltage, Ripple



Type 4CMC 85 °C, High Cap, Plug-in, Radial Leaded Aluminum

Rugged Value, High-Capacitance 85 °C Board-Mount Type



Type 4CMC is the PC-mount version of the high-capacitance Type DCMC screw-terminal capacitor and has about 50% more capacitance per can size through 250 V. It's for bus filtering applications where more capacitance or smaller can size is important like welders and energy storage. It delivers higher capacitance than the largest snap-ins and its heavy gauge can, molded high purity top and 14-gauge reverse proof 3 copper pins provide better performance.

Highlights

- Much better value than large snap-in capacitor
- Ripple Currents to > 50 amps at 55 °C
- 3-leads for reverse proof, strong mounting
- Printed-circuit mounting version of DCMC
- Thermal-Pak™ extended cathode construction

Specifications

Temperature Range	−40 °C to +85 °C							
Rated Voltage Range	16 Vdc to 500 Vdc							
Capacitance Range	210 μF to 420,000 μF							
Capacitance Tolerance	± 20%							
Leakage Current	≤6 √CV μA, 4 mA max, 5 minutes							
Ripple Current Multipliers	Ambient Temperature							
	45 °C	55 °C	65 °C	75 °C	85 °C			
	2.00	2.00	1.73	1.41	1.00			
	Frequency							
		50 Hz	60 Hz	120 Hz	360 Hz	1 kHz	5 kHz	10 kHz & Up
	16 to 50 V	0.80	0.85	1.00	1.05	1.08	1.08	1.08
63 to 250 V	0.80	0.83	1.00	1.15	1.20	1.20	1.20	
300 to 500 V	0.78	0.80	1.00	1.30	1.40	1.40	1.40	
Low Temperature Characteristics	Impedance ratio: Z _{−20°C} /Z _{+25°C} ≤ 8 (16–50 Vdc) ≤ 4 (63–100 Vdc) ≤ 3 (150–500 Vdc)							
Endurance Life Test	2000 h at full load at 85 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit							
DC Life Test	3000 h at rated voltage, 85 °C Δ Capacitance ±10% ESR 200% of limit DCL 100% of limit							
Shelf Life Test	500 h at 85 °C Capacitance 100% of limit ESR 100% of limit DCL 100% of limit							
Vibration	10 to 55 Hz, 0.06″ and 10 g max, 2 h each plane							
RoHS Compliant								

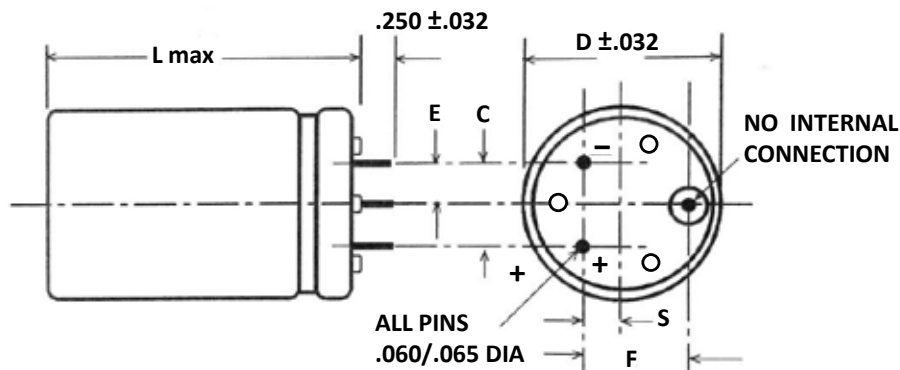
Type 4CMC 85 °C, High Cap, Plug-in, Radial Leaded Aluminum

Rugged Value, High-Capacitance 85 °C Board-Mount Type

Part Numbering System

4CMC	382	M	250	BH	8
Type	Capacitance	Tolerance	Voltage	Case Code	Insulation
	382 = 3800 µF 212 = 2100 µF	M = ±20% T = -10% +50% U = -10 +75%	6R3 = 6.3 V 063 = 63 V 250 = 250 V	see table	0 = Bare can 8 = PVC 9 = Polyester

Outline Drawing



Insulated Case Dimensions

Case Code	Inches						Millimeters					
	D ± .031	L MAX	C ± .015	S ± .031	E ± .031	F ± .015	D ± .78	L MAX	C ± .78	S ± .78	E ± .78	F ± .38
AK	1.375	1.75	0.50	0.175	0.25	0.55	34.93	44.45	12.70	4.45	6.35	13.97
AA	1.375	2.25	0.50	0.175	0.25	0.55	34.93	57.15	12.70	4.45	6.35	13.97
AH	1.375	2.75	0.50	0.175	0.25	0.55	34.98	69.85	12.70	4.45	6.35	13.97
AB	1.375	3.25	0.50	0.175	0.25	0.55	34.93	82.55	12.70	4.45	6.35	13.97
AJ	1.375	3.75	0.50	0.175	0.25	0.55	34.93	95.25	12.70	4.45	6.35	13.97
AC	1.375	4.25	0.50	0.175	0.25	0.55	34.93	107.95	12.70	4.45	6.35	13.97
AD	1.375	4.75	0.50	0.175	0.25	0.55	34.93	120.65	12.70	4.45	6.35	13.97
AE	1.375	5.25	0.50	0.175	0.25	0.55	34.93	133.35	12.70	4.45	6.35	13.97
AF	1.375	5.75	0.50	0.175	0.25	0.55	34.93	146.05	12.70	4.45	6.35	13.97
EA	1.75	2.25	0.70	0.375	0.35	0.90	44.45	57.15	17.78	9.53	8.89	22.86
EH	1.75	2.75	0.70	0.375	0.35	0.90	44.45	69.85	17.78	9.53	8.89	22.86
EB	1.75	3.25	0.70	0.375	0.35	0.90	44.45	82.55	17.78	9.53	8.89	22.86
EJ	1.75	3.75	0.70	0.375	0.35	0.90	44.45	95.25	17.78	9.53	8.89	22.86
EC	1.75	4.25	0.70	0.375	0.35	0.90	44.45	107.95	17.78	9.53	8.89	22.86
ED	1.75	4.75	0.70	0.375	0.35	0.90	44.45	120.65	17.78	9.53	8.89	22.86
EE	1.75	5.25	0.70	0.375	0.35	0.90	44.45	133.35	17.78	9.53	8.89	22.86
EF	1.75	5.75	0.70	0.375	0.35	0.90	44.45	146.05	17.78	9.53	8.89	22.86
BA	2.00	2.25	0.80	0.425	0.40	1.00	50.80	57.15	20.32	10.80	10.16	25.40
BH	2.00	2.75	0.80	0.425	0.40	1.00	50.80	69.85	20.32	10.80	10.16	25.40
BB	2.00	3.25	0.80	0.425	0.40	1.00	50.80	82.55	20.32	10.80	10.16	25.40
BJ	2.00	3.75	0.80	0.425	0.40	1.00	50.80	95.25	20.32	10.80	10.16	25.40
BC	2.00	4.25	0.80	0.425	0.40	1.00	50.80	107.95	20.32	10.80	10.16	25.40
BD	2.00	4.75	0.80	0.425	0.40	1.00	50.80	120.65	20.32	10.80	10.16	25.40
BE	2.00	5.25	0.80	0.425	0.40	1.00	50.80	133.25	20.32	10.80	10.16	25.40
BF	2.00	5.75	0.80	0.425	0.40	1.00	50.80	146.05	20.32	10.80	10.16	25.40

Type 4CMC 85 °C, High Cap, Plug-in, Radial Leaded Aluminum

Rugged Value, High-Capacitance 85 °C Board-Mount Type

Ratings

Additional Low Voltages Available at <http://www.cde.com/catalogs/4CMC.pdf>

Cap. (μF)	Catalog Part Number	ESR Max. 25 °C		Ripple Amps, 85 °C		Nom Size
		120 Hz	20 kHz	120 Hz	20 kHz	D X L
		(mΩ)	(mΩ)	(A)	(A)	(in)
200 Vdc (250 Vdc Surge)						
1200	4CMC122M200AK8	105.2	60.4	3.1	4.1	1 3/8 X 1 3/4
1900	4CMC192M200AA8	66.6	38.2	4.5	5.9	1 3/8 X 2 1/4
2700	4CMC272M200AH8	48.0	27.6	5.4	7.2	1 3/8 X 2 3/4
2700	4CMC272M200EA8	60.0	34.4	5.3	7.0	1 3/4 X 2 1/4
3500	4CMC352M200AB8	37.8	21.7	6.6	8.7	1 3/8 X 3 1/4
3500	4CMC352M200BA8	44.2	30.7	6.6	7.9	2 X 2 1/4
3700	4CMC372M200EH8	38.1	21.9	6.9	9.1	1 3/4 X 2 3/4
4300	4CMC432M200AJ8	29.9	17.2	7.8	10.2	1 3/8 X 3 3/4
4800	4CMC482M200EB8	29.4	16.9	8.5	11.2	1 3/4 X 3 1/4
5000	4CMC502M200BH8	33.1	23.0	8.2	9.8	2 X 2 3/4
5100	4CMC512M200AC8	25.7	14.7	8.8	11.7	1 3/8 X 4 1/4
5800	4CMC582M200AD8	22.6	13.0	9.8	12.9	1 3/8 X 4 3/4
5900	4CMC592M200EJ8	24.1	13.8	9.7	12.7	1 3/4 X 3 3/4
6600	4CMC662M200AE8	20.3	11.6	10.9	14.4	1 3/8 X 5 1/4
6800	4CMC682M200BB8	25.6	17.8	9.8	11.8	2 X 3 1/4
7100	4CMC712M200EC8	20.5	11.8	10.8	14.3	1 3/4 X 4 1/4
7400	4CMC742M200AF8	23.1	13.3	10.7	14.2	1 3/8 X 5 3/4
8100	4CMC812M200BJ8	21.0	14.6	12.2	14.6	2 X 3 3/4
8200	4CMC822M200ED8	17.9	10.3	12.2	16.1	1 3/4 X 4 3/4
9300	4CMC932M200EE8	16.0	9.2	13.7	18.1	1 3/4 X 5 1/4
9500	4CMC952M200BC8	19.1	13.3	12.8	15.4	2 X 4 1/4
10000	4CMC103M200EF8	14.5	8.3	15.4	20.3	1 3/4 X 5 3/4
11000	4CMC113M200BD8	15.7	10.9	14.6	17.5	2 X 4 3/4
12000	4CMC123M200BE8	14.1	9.8	16.0	19.2	2 X 5 1/4
14000	4CMC143M200BF8	12.8	8.9	17.3	20.8	2 X 5 3/4
250 Vdc (300 Vdc Surge)						
890	4CMC891M250AK8	137.0	78.6	2.6	3.4	1 3/8 X 1 3/4
1500	4CMC152M250AA8	86.5	49.7	3.7	4.9	1 3/8 X 2 1/4
1900	4CMC192M250EA8	68.7	39.4	4.8	6.3	1 3/4 X 2 1/4
2100	4CMC212M250AH8	62.3	35.7	4.5	6.0	1 3/8 X 2 3/4
2700	4CMC272M250BA8	54.2	37.6	5.8	7.0	2 X 2 1/4
2700	4CMC272M250AB8	48.8	28.0	5.5	7.2	1 3/8 X 3 1/4
2800	4CMC282M250EH8	47.8	27.4	6.1	8.1	1 3/4 X 2 3/4
3200	4CMC322M250AJ8	38.6	22.1	6.5	8.5	1 3/8 X 3 3/4
3700	4CMC372M250EB8	36.8	21.1	7.6	10.0	1 3/4 X 3 1/4
3800	4CMC382M250BH8	40.5	28.1	7.2	8.7	2 X 2 3/4
3900	4CMC392M250AC8	33.0	18.9	7.4	9.7	1 3/8 X 4 1/4
4400	4CMC442M250AD8	29.0	16.6	8.2	10.8	1 3/8 X 4 3/4
4500	4CMC452M250EJ8	30.1	17.3	8.6	11.4	1 3/4 X 3 3/4
5000	4CMC502M250AE8	25.9	14.9	9.1	12.0	1 3/8 X 5 1/4
5000	4CMC502M250BB8	31.2	21.7	8.7	10.4	2 X 3 1/4
5400	4CMC542M250EC8	25.5	14.7	9.7	12.8	1 3/4 X 4 1/4

Cap. (μF)	Catalog Part Number	ESR Max. 25 °C		Ripple Amps, 85 °C		Nom Size
		120 Hz	20 kHz	120 Hz	20 kHz	D X L
		(mΩ)	(mΩ)	(A)	(A)	(in)
250 Vdc (300 Vdc Surge)						
5600	4CMC562M250AF8	29.4	16.9	9.0	11.9	1 3/8 X 5 3/4
6200	4CMC622M250BJ8	25.5	17.7	10.7	12.9	2 X 3 3/4
6300	4CMC632M250ED8	22.3	12.8	11.0	14.5	1 3/4 X 4 3/4
7200	4CMC722M250EE8	19.8	11.4	12.3	16.3	1 3/4 X 5 1/4
7300	4CMC732M250BC8	21.7	15.1	11.7	14.0	2 X 4 1/4
8100	4CMC812M250EF8	18.0	10.3	13.8	18.3	1 3/4 X 5 3/4
8500	4CMC852M250BD8	19.0	13.2	12.9	15.5	2 X 4 3/4
9700	4CMC972M250BE8	17.0	11.8	14.2	17.0	2 X 5 1/4
11000	4CMC113M250BF8	15.4	10.7	15.4	18.4	2 X 5 3/4
300 Vdc (350 Vdc Surge)						
520	4CMC521M300AK8	245.0	141.0	2.2	2.9	1 3/8 X 1 3/4
870	4CMC871M300AA8	148.0	84.7	3.1	4.1	1 3/8 X 2 1/4
1200	4CMC122M300AH8	106.0	60.7	4.0	5.3	1 3/8 X 2 3/4
1300	4CMC132M300EA8	111.0	63.8	4.2	5.5	1 3/4 X 2 1/4
1600	4CMC162M300BA8	93.2	51.9	5.0	6.7	2 X 2 1/4
1600	4CMC162M300AB8	82.7	47.5	4.8	6.3	1 3/8 X 3 1/4
1800	4CMC182M300EH8	99.2	56.9	4.8	6.3	1 3/4 X 2 3/4
1900	4CMC192M300AJ8	68.0	39.0	5.6	7.4	1 3/8 X 3 3/4
2200	4CMC222M300BH8	67.1	37.4	6.3	8.4	2 X 2 3/4
2300	4CMC232M300AC8	57.9	33.2	6.4	8.4	1 3/8 X 4 1/4
2300	4CMC232M300EB8	76.1	43.7	5.8	7.7	1 3/4 X 3 1/4
2600	4CMC262M300AD8	50.6	29.0	7.1	9.4	1 3/8 X 4 3/4
2900	4CMC292M300AE8	45.0	25.8	7.8	10.3	1 3/8 X 5 1/4
2900	4CMC292M300BB8	51.6	28.7	7.6	10.2	2 X 3 1/4
2900	4CMC292M300EJ8	61.9	35.5	6.8	8.9	1 3/4 X 3 3/4
3300	4CMC332M300AF8	50.7	29.1	7.6	10.1	1 3/8 X 5 3/4
3500	4CMC352M300EC8	52.2	30.0	7.7	10.2	1 3/4 X 4 1/4
3600	4CMC362M300BJ8	51.2	28.5	8.1	10.8	2 X 3 3/4
4000	4CMC402M300ED8	45.3	26.0	8.6	11.4	1 3/4 X 4 3/4
4300	4CMC432M300BC8	43.3	24.1	9.2	12.3	2 X 4 1/4
4600	4CMC462M300EE8	40.1	23.0	9.5	12.6	1 3/4 X 5 1/4
4900	4CMC492M300BD8	38.0	21.2	10.2	13.7	2 X 4 3/4
5100	4CMC512M300EF8	36.0	20.6	10.4	13.7	1 3/4 X 5 3/4
5700	4CMC572M300BE8	33.3	18.5	11.3	15.1	2 X 5 1/4
6400	4CMC642M300BF8	29.9	16.7	12.3	16.5	2 X 5 3/4
350 Vdc (400 Vdc Surge)						
430	4CMC431M350AK8	264.1	151.6	2.1	2.8	1 3/8 X 1 3/4
710	4CMC711M350AA8	158.9	91.2	3.1	4.0	1 3/8 X 2 1/4
1000	4CMC102M350EA8	119.2	68.4	4.1	5.4	1 3/4 X 2 1/4
1000	4CMC102M350AH8	113.9	65.4	3.7	4.9	1 3/8 X 2 3/4
1200	4CMC122M350BA8	98.1	54.6	4.8	6.4	2 X 2 1/4
1300	4CMC132M350EH8	105.1	60.3	4.6	6.1	1 3/4 X 2 3/4

Type 4CMC 85 °C, High Cap, Plug-in, Radial Leaded Aluminum

Rugged Value, High-Capacitance 85 °C Board-Mount Type

Additional Low Voltages Available at <http://www.cde.com/catalogs/4CMC.pdf>

							ESR Max. 25 °C							Ripple Amps, 85 °C		Nom Size
Cap. (µF)	Catalog Part Number	120 Hz (mΩ)	20 kHz (mΩ)	120 Hz (A)	20 kHz (A)	D X L (in)										
350 Vdc (400 Vdc Surge)																
1300	4CMC132M350AB8	89.0	51.1	4.5	6.0	1 3/8 X 3 1/4										
1600	4CMC162M350BH8	71.8	40.0	6.0	8.1	2 X 2 3/4										
1600	4CMC162M350AJ8	73.2	42.0	5.2	6.9	1 3/8 X 3 3/4										
1700	4CMC172M350EB8	80.6	46.3	5.7	7.5	1 3/4 X 3 1/4										
1800	4CMC182M350AC8	62.3	35.8	6.0	7.9	1 3/8 X 4 1/4										
2100	4CMC212M350BB8	55.1	30.7	7.3	9.7	2 X 3 1/4										
2100	4CMC212M350AD8	54.4	31.2	6.7	8.8	1 3/8 X 4 3/4										
2100	4CMC212M350EJ8	65.5	37.6	6.5	8.6	1 3/4 X 3 3/4										
2400	4CMC242M350AE8	48.3	27.7	7.4	9.8	1 3/8 X 5 1/4										
2500	4CMC252M350EC8	55.3	31.7	7.4	9.7	1 3/4 X 4 1/4										
2600	4CMC262M350BJ8	47.9	26.7	8.7	11.7	2 X 3 3/4										
2700	4CMC272M350AF8	54.5	31.3	7.4	9.7	1 3/8 X 5 3/4										
2900	4CMC292M350ED8	47.9	27.5	8.3	11.0	1 3/4 X 4 3/4										
3100	4CMC312M350BC8	45.7	25.5	9.0	12.1	2 X 4 1/4										
3300	4CMC332M350EE8	42.4	24.3	9.4	12.4	1 3/4 X 5 1/4										
3600	4CMC362M350BD8	40.1	22.4	9.9	13.3	2 X 4 3/4										
3700	4CMC372M350EF8	38.0	21.8	10.6	14.0	1 3/4 X 5 3/4										
4200	4CMC422M350BE8	35.1	19.6	11.0	14.7	2 X 5 1/4										
4700	4CMC472M350BF8	31.6	17.6	12.0	16.0	2 X 5 3/4										
400 Vdc (450 Vdc Surge)																
320	4CMC321M400AK28	382.0	195.0	1.7	2.4	1 3/8 X 1 3/4										
590	4CMC591M400AA28	212.0	108.0	2.6	3.7	1 3/8 X 2 1/4										
800	4CMC801M400AH28	156.0	79.4	3.2	4.5	1 3/8 X 2 3/4										
840	4CMC841M400EA8	154.0	78.8	3.6	5.0	1 3/4 X 2 1/4										
1000	4CMC102M400BA8	130.0	72.2	4.2	5.6	2 X 2 1/4										
1000	4CMC102M400AB28	119.0	60.9	3.9	5.5	1 3/8 X 3 1/4										
1200	4CMC122M400EH8	107.0	54.6	4.6	6.4	1 3/4 X 2 3/4										
1300	4CMC132M400AJ28	96.9	49.5	4.5	6.4	1 3/8 X 3 3/4										
1400	4CMC142M400BH8	93.6	52.1	5.3	7.1	2 X 2 3/4										
1500	4CMC152M400EB8	87.4	44.6	5.5	7.7	1 3/4 X 3 1/4										
1500	4CMC152M400AC28	81.8	41.7	0.5	0.8	1 3/8 X 4 1/4										
1600	4CMC162M400AD28	78.6	40.1	5.5	7.8	1 3/8 X 4 3/4										
1800	4CMC182M400EJ8	71.0	36.2	6.3	8.8	1 3/4 X 3 3/4										
1800	4CMC182M400AE28	69.5	35.4	6.2	8.7	1 3/8 X 5 1/4										
1900	4CMC192M400BB8	71.9	40.0	6.4	8.5	2 X 3 1/4										
2000	4CMC202M400AF28	77.9	39.7	6.2	8.6	1 3/8 X 5 3/4										
2100	4CMC212M400EC8	59.9	30.5	7.1	9.9	1 3/4 X 4 1/4										
2300	4CMC232M400BJ8	58.4	32.5	7.9	10.6	2 X 3 3/4										
2500	4CMC252M400ED8	51.9	26.5	8.0	11.2	1 3/4 X 4 3/4										
2700	4CMC272M400BC8	49.3	27.5	8.7	11.6	2 X 4 1/4										
2900	4CMC292M400EE8	45.8	23.4	9.0	12.7	1 3/4 X 5 1/4										
3200	4CMC322M400EF8	41.1	21.0	10.2	14.3	1 3/4 X 5 3/4										

							ESR Max. 25 °C		Ripple Amps, 85 °C		Nom Size
Cap. (µF)	Catalog Part Number	120 Hz (mΩ)	20 kHz (mΩ)	120 Hz (A)	20 kHz (A)	D X L (in)					
400 Vdc (450 Vdc Surge)											
3200	4CMC322M400BD8	42.8	23.8	9.6	12.9	2 X 4 3/4					
3600	4CMC362M400BE8	37.9	21.1	10.6	14.2	2 X 5 1/4					
4100	4CMC412M400BF8	34.0	18.9	11.5	15.4	2 X 5 3/4					
450 Vdc (500 Vdc Surge)											
330	4CMC331M450AK8	281.0	143.0	1.8	2.5	1 3/8 X 1 3/4					
490	4CMC491M450AA8	188.0	95.7	2.5	3.4	1 3/8 X 2 1/4					
600	4CMC601M450AH8	138.0	70.4	3.0	4.1	1 3/8 X 2 3/4					
690	4CMC691M450EA8	163.0	83.3	3.3	4.6	1 3/4 X 2 1/4					
860	4CMC861M450BA8	116.0	64.8	4.1	5.6	2 X 2 1/4					
860	4CMC861M450AB8	106.0	54.0	3.6	5.1	1 3/8 X 3 1/4					
930	4CMC931M450EH8	121.0	61.5	4.1	5.7	1 3/4 X 2 3/4					
1000	4CMC102M450AJ8	86.1	43.9	4.2	5.9	1 3/8 X 3 3/4					
1100	4CMC112M450BH8	98.9	55.1	4.8	6.5	2 X 2 3/4					
1200	4CMC122M450EB8	92.4	47.1	5.0	7.0	1 3/4 X 3 1/4					
1200	4CMC122M450AC8	72.7	37.1	4.8	6.8	1 3/8 X 4 1/4					
1300	4CMC132M450AD8	69.9	35.7	5.1	7.2	1 3/8 X 4 3/4					
1500	4CMC152M450BB8	75.9	42.2	5.8	7.8	2 X 3 1/4					
1500	4CMC152M450AE8	61.8	31.5	5.7	8.0	1 3/8 X 5 1/4					
1500	4CMC152M450EJ8	75.1	38.3	5.7	8.0	1 3/4 X 3 3/4					
1600	4CMC162M450AF8	69.3	35.4	5.7	8.0	1 3/8 X 5 3/4					
1800	4CMC182M450EC8	63.3	32.3	6.5	9.1	1 3/4 X 4 1/4					
1900	4CMC192M450BJ8	61.7	34.3	7.2	9.7	2 X 3 3/4					
2100	4CMC212M450ED8	54.8	28.0	7.3	10.3	1 3/4 X 4 3/4					
2200	4CMC222M450BC8	52.1	29.0	7.9	10.6	2 X 4 1/4					
2300	4CMC232M450EE8	48.4	24.7	8.3	11.6	1 3/4 X 5 1/4					
2600	4CMC262M450EF8	43.5	22.2	9.3	13.0	1 3/4 X 5 3/4					
2600	4CMC262M450BD8	45.7	25.4	8.7	11.7	2 X 4 3/4					
3100	4CMC312M450BE8	38.8	21.6	9.8	13.1	2 X 5 1/4					
3400	4CMC342M450BF8	35.0	19.5	10.7	14.3	2 X 5 3/4					
500 Vdc (550 Vdc Surge)											
210	4CMC211M500AK8	487.0	287.0	1.5	2.1	1 3/8 X 1 3/4					
310	4CMC311M500AA8	325.0	191.0	2.1	3.0	1 3/8 X 2 1/4					
440	4CMC441M500EA8	238.0	140.0	2.9	4.0	1 3/4 X 2 1/4					
450	4CMC451M500AH8	225.0	133.0	2.6	3.7	1 3/8 X 2 3/4					
560	4CMC561M500BA8	193.0	114.0	3.4	4.6	2 X 2 1/4					
590	4CMC591M500AB8	173.0	102.0	3.2	4.5	1 3/8 X 3 1/4					
630	4CMC631M500EH8	165.0	97.2	3.7	5.2	1 3/4 X 2 3/4					
730	4CMC731M500AJ8	140.0	82.6	3.8	5.3	1 3/8 X 3 3/4					
780	4CMC781M500BH8	134.0	78.7	4.4	5.9	2 X 2 3/4					
820	4CMC821M500EB8	126.0	74.4	4.5	6.4	1 3/4 X 3 1/4					
820	4CMC821M500AC8	125.0	73.6	4.2	5.9	1 3/8 X 4 1/4					
900	4CMC901M500AD8	113.0	66.4	4.6	6.5	1 3/8 X 4 3/4					

Type 4CMC 85 °C, High Cap, Plug-in, Radial Leaded Aluminum

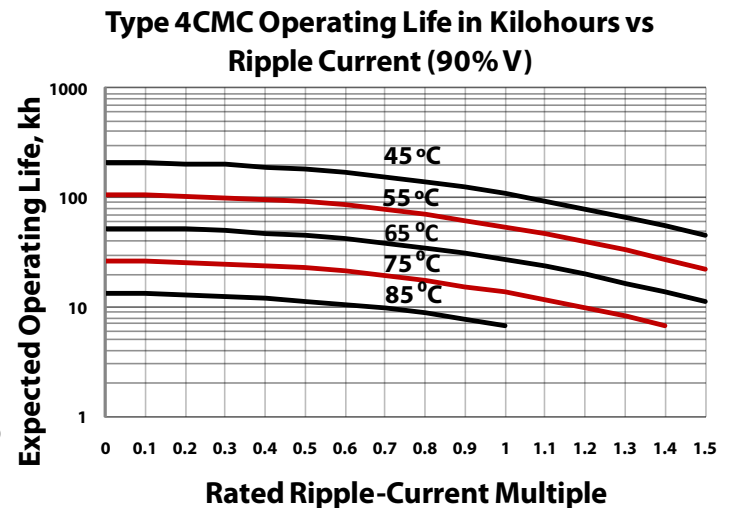
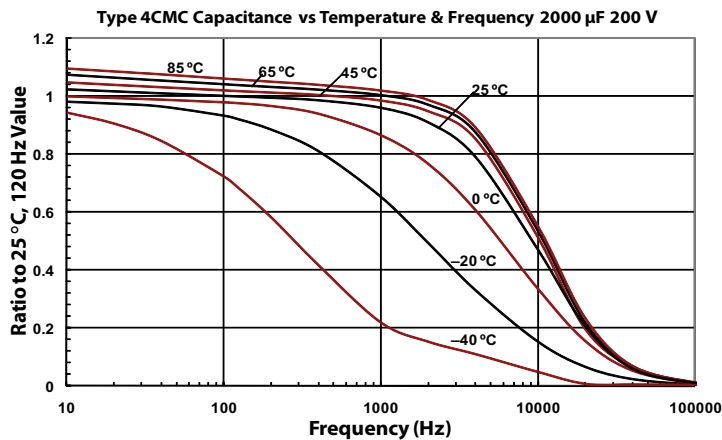
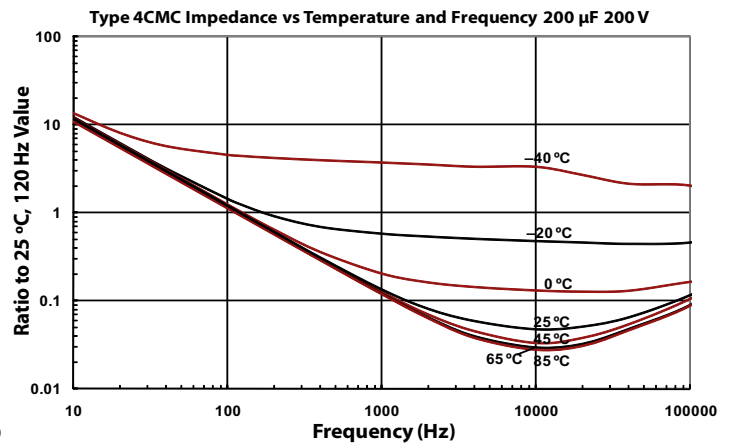
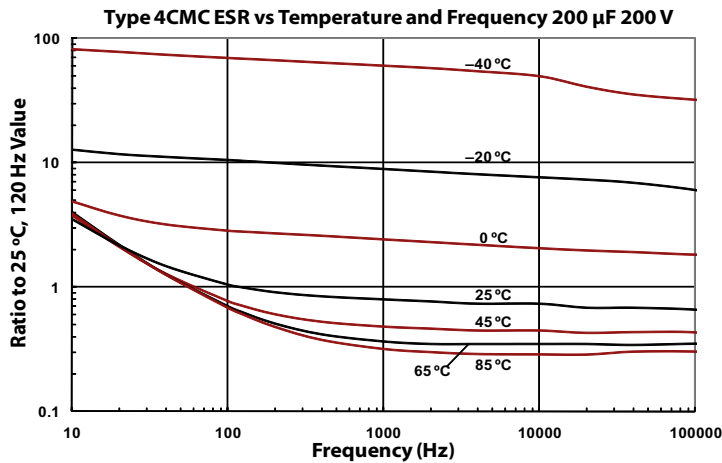
Rugged Value, High-Capacitance 85 °C Board-Mount Type

Additional Low Voltages Available at <http://www.cde.com/catalogs/4CMC.pdf>

Cap. (μF)	Catalog Part Number	ESR Max. 25 °C		Ripple Amps, 85 °C		Nom Size
		120 Hz	20 kHz	120 Hz	20 kHz	D X L
		(mΩ)	(mΩ)	(A)	(A)	(in)
500 Vdc (550 Vdc Surge)						
1000	4CMC102M500BB8	103.0	60.3	5.3	7.1	2 X 3 1/4
1000	4CMC102M500AE8	99.0	58.5	5.2	7.3	1 3/8 X 5 1/4
1000	4CMC102M500EJ8	103.0	60.4	5.2	7.3	1 3/4 X 3 3/4
1100	4CMC112M500AF8	114.0	67.3	5.1	7.1	1 3/8 X 5 3/4
1200	4CMC122M500EC8	86.4	50.9	5.9	8.3	1 3/4 X 4 1/4
1300	4CMC132M500BJ8	83.2	49.0	6.6	8.9	2 X 3 3/4

Cap. (μF)	Catalog Part Number	ESR Max. 25 °C		Ripple Amps, 85 °C		Nom Size
		120 Hz	20 kHz	120 Hz	20 kHz	D X L
		(mΩ)	(mΩ)	(A)	(A)	(in)
500 Vdc (550 Vdc Surge)						
1400	4CMC142M500ED8	74.8	44.0	6.7	9.4	1 3/4 X 4 3/4
1500	4CMC152M500BC8	70.2	41.3	7.3	9.7	2 X 4 1/4
1600	4CMC162M500EE8	66.0	38.8	7.5	10.6	1 3/4 X 5 1/4
1800	4CMC182M500EF8	59.1	34.8	8.5	11.9	1 3/4 X 5 3/4
1800	4CMC182M500BD8	60.7	35.8	8.1	10.8	2 X 4 3/4
2100	4CMC212M500BE8	52.1	30.7	9.0	12.1	2 X 5 1/4
2300	4CMC232M500BF8	46.9	27.6	9.8	13.2	2 X 5 3/4

Typical Performance Curves



Type 400C 95 °C Long Life, Plug-in, Radial Leaded Aluminum

Very Long Life Board-Mount Type



The Type 400C is the PC-mount equivalent for Type 500C screw-terminal long life grade capacitor. It's for bus filtering applications where long life is critical like telecom systems and industrial power supplies. Type 400C delivers 2 to 3 times the life of Type 4CMC, and above 250 V it has nearly the same capacitance. Its extended cathode foil assures cool operation with heatflow from the capacitor element to the can in all mounting orientations.

Highlights

- More than 10 years life in most applications
- Ripple Currents to > 50 amps at 55 °C
- 3-leads
- Printed-circuit mounting
- Thermal-Pak™ extended cathode construction

Specifications

Temperature Range	−40 °C to +95 °C						
Rated Voltage Range	100 Vdc to 500 Vdc						
Capacitance Range	170 μF to 29,000 μF						
Capacitance Tolerance	± 20%						
Leakage Current	≤3 √CV μA, 4 mA max, 5 minutes						
Ripple Current Multipliers	Ambient Temperature						
	45 °C	55 °C	65 °C	75 °C	85 °C	95 °C	
	2.00	1.82	1.59	1.33	1.00	0.48	
	Frequency	50 Hz	60 Hz	120 Hz	360 Hz	1 kHz	5 kHz & up
	100 to 160 V	0.80	0.85	1.00	1.05	1.08	1.08
	200 to 350 V	0.80	0.83	1.00	1.15	1.20	1.20
	400 to 500 V	0.78	0.80	1.00	1.30	1.40	1.40
Low Temperature Characteristics	Impedance ratio: Z _{−20°C} /Z _{+25°C} ≤ 4 (100 Vdc) ≤ 3 (150–500 Vdc)						
Endurance Life Test	3000 h at full load at 85 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit						
Shelf Life Test	500 h at 95 °C Δ Capacitance 100% of limit ESR 100% of limit DCL 100% of limit						
Vibration	10 to 55 Hz, 0.06” and 10 g max, 2 h each plane						
RoHS Compliant							

Type 400C 95 °C Long Life, Plug-in, Radial Leaded Aluminum

Very Long Life Board-Mount Type

Part Numbering System

400C
Type

242
Capacitance
242 = 2400 μ F
171 = 170 μ F

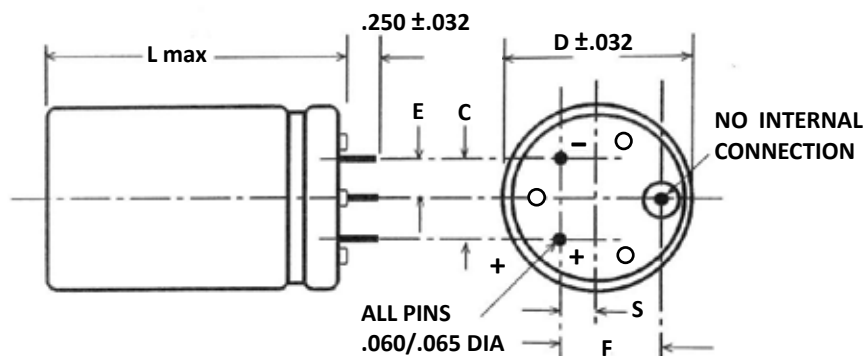
M
Tolerance
M = $\pm 20\%$
T = $-10\% +50\%$
U = $-10\% +75\%$

450
Voltage
100 = 100 V
450 = 450 V

BD
Case Code
see table

8
Insulation
0 = bare can
8 = PVC
9 = Polyester

Outline Drawing



Insulated Case Dimensions

Case Code	Inches						Millimeters					
	D $\pm$.031	L MAX	C $\pm$.015	S $\pm$.031	E $\pm$.031	F $\pm$.015	D $\pm$.78	L MAX	C $\pm$.78	S $\pm$.78	E $\pm$.78	F $\pm$.38
AK	1.375	1.75	0.50	0.175	0.25	0.55	34.93	44.45	12.70	4.45	6.35	13.97
AA	1.375	2.25	0.50	0.175	0.25	0.55	34.93	57.15	12.70	4.45	6.35	13.97
AH	1.375	2.75	0.50	0.175	0.25	0.55	34.98	69.85	12.70	4.45	6.35	13.97
AB	1.375	3.25	0.50	0.175	0.25	0.55	34.93	82.55	12.70	4.45	6.35	13.97
AJ	1.375	3.75	0.50	0.175	0.25	0.55	34.93	95.25	12.70	4.45	6.35	13.97
AC	1.375	4.25	0.50	0.175	0.25	0.55	34.93	107.95	12.70	4.45	6.35	13.97
AD	1.375	4.75	0.50	0.175	0.25	0.55	34.93	120.65	12.70	4.45	6.35	13.97
AE	1.375	5.25	0.50	0.175	0.25	0.55	34.93	133.35	12.70	4.45	6.35	13.97
AF	1.375	5.75	0.50	0.175	0.25	0.55	34.93	146.05	12.70	4.45	6.35	13.97
EA	1.75	2.25	0.70	0.375	0.35	0.90	44.45	57.15	17.78	9.53	8.89	22.86
EH	1.75	2.75	0.70	0.375	0.35	0.90	44.45	69.85	17.78	9.53	8.89	22.86
EB	1.75	3.25	0.70	0.375	0.35	0.90	44.45	82.55	17.78	9.53	8.89	22.86
EJ	1.75	3.75	0.70	0.375	0.35	0.90	44.45	95.25	17.78	9.53	8.89	22.86
EC	1.75	4.25	0.70	0.375	0.35	0.90	44.45	107.95	17.78	9.53	8.89	22.86
ED	1.75	4.75	0.70	0.375	0.35	0.90	44.45	120.65	17.78	9.53	8.89	22.86
EE	1.75	5.25	0.70	0.375	0.35	0.90	44.45	133.35	17.78	9.53	8.89	22.86
EF	1.75	5.75	0.70	0.375	0.35	0.90	44.45	146.05	17.78	9.53	8.89	22.86
BA	2.00	2.25	0.80	0.425	0.40	1.00	50.80	57.15	20.32	10.80	10.16	25.40
BH	2.00	2.75	0.80	0.425	0.40	1.00	50.80	69.85	20.32	10.80	10.16	25.40
BB	2.00	3.25	0.80	0.425	0.40	1.00	50.80	82.55	20.32	10.80	10.16	25.40
BJ	2.00	3.75	0.80	0.425	0.40	1.00	50.80	95.25	20.32	10.80	10.16	25.40
BC	2.00	4.25	0.80	0.425	0.40	1.00	50.80	107.95	20.32	10.80	10.16	25.40
BD	2.00	4.75	0.80	0.425	0.40	1.00	50.80	120.65	20.32	10.80	10.16	25.40
BE	2.00	5.25	0.80	0.425	0.40	1.00	50.80	133.25	20.32	10.80	10.16	25.40
BF	2.00	5.75	0.80	0.425	0.40	1.00	50.80	146.05	20.32	10.80	10.16	25.40

Type 400C 95 °C Long Life, Plug-in, Radial Leaded Aluminum

Very Long Life Board-Mount Type

Ratings

Additional Low Voltages available at <http://www.cde.com/catalogs/400C.pdf>

		ESR Max. 25 °C		Ripple Amps. 85 °C		Nominal Size
Cap.	Catalog Part	120 Hz	20 kHz	120 Hz	20 kHz	D X L
(µF)	Number	(mΩ)	(mΩ)	(A)	(A)	(in)
200 Vdc (250 Vdc Surge)						
920	400C921M200AK8	126.00	71.30	3.40	4.50	1 3/8 X 1 3/4
1400	400C142M200AA8	84.50	48.20	4.70	6.30	1 3/8 X 2 1/4
2000	400C202M200EA8	61.70	39.30	6.10	7.60	1 3/4 X 2 1/4
2000	400C202M200AH8	59.30	34.20	5.80	7.70	1 3/8 X 2 3/4
2600	400C262M200AB8	46.10	26.80	7.10	9.30	1 3/8 X 3 1/4
2600	400C262M200BA8	51.80	35.90	6.80	8.20	2 X 2 1/4
2800	400C282M200EH8	44.10	27.90	7.70	9.70	1 3/4 X 2 3/4
3200	400C322M200AJ8	38.00	22.40	8.20	10.70	1 3/8 X 3 3/4
3500	400C352M200BH8	36.70	25.10	8.70	10.50	2 X 2 3/4
3700	400C372M200EB8	34.20	21.80	9.50	11.90	1 3/4 X 3 1/4
3800	400C382M200AC8	32.50	19.50	9.40	12.10	1 3/8 X 4 1/4
4200	400C422M200AD8	29.80	17.80	10.20	13.20	1 3/8 X 4 3/4
4500	400C452M200EJ8	28.10	18.10	10.80	13.50	1 3/4 X 3 3/4
4700	400C472M200BB8	28.50	19.60	10.40	12.50	2 X 3 1/4
4800	400C482M200AE8	26.80	16.30	11.30	14.50	1 3/8 X 5 1/4
5300	400C532M200AF8	24.50	15.10	12.40	15.80	1 3/8 X 5 3/4
5400	400C542M200EC8	24.10	15.60	12.10	15.00	1 3/4 X 4 1/4
5700	400C572M200BJ8	23.50	16.30	12.80	15.40	2 X 3 3/4
6300	400C632M200ED8	21.20	13.90	13.60	16.80	1 3/4 X 4 3/4
6800	400C682M200BC8	20.10	14.10	14.00	16.70	2 X 4 1/4
7100	400C712M200EE8	19.00	12.60	15.20	18.60	1 3/4 X 5 1/4
7800	400C782M200BD8	17.80	12.50	15.30	18.30	2 X 4 3/4
8000	400C802M200EF8	17.40	11.70	17.00	20.70	1 3/4 X 5 3/4
9300	400C932M200BE8	15.60	11.20	16.90	20.00	2 X 5 1/4
10000	400C103M200BF8	14.30	10.40	18.30	21.50	2 X 5 3/4
250 Vdc (300 Vdc Surge)						
670	400C671M250AK8	160.00	87.20	3.00	4.10	1 3/8 X 1 3/4
1000	400C102M250AH8	75.10	41.50	5.20	7.00	1 3/8 X 2 3/4
1000	400C102M250AA8	107.00	58.80	4.20	5.70	1 3/8 X 2 1/4
1500	400C152M250EA8	75.70	45.90	5.50	7.10	1 3/4 X 2 1/4
1900	400C192M250AB8	58.20	32.50	6.30	8.50	1 3/8 X 3 1/4
1900	400C192M250BA8	61.90	40.50	6.20	7.70	2 X 2 1/4
2000	400C202M250EH8	54.30	32.60	7.00	9.00	1 3/4 X 2 3/4
2300	400C232M250AJ8	47.80	26.90	7.30	9.80	1 3/8 X 3 3/4
2500	400C252M250BH8	44.10	28.50	7.90	9.90	2 X 2 3/4
2700	400C272M250EB8	42.00	25.40	8.50	11.00	1 3/4 X 3 1/4
2700	400C272M250AC8	40.80	23.30	8.40	11.10	1 3/8 X 4 1/4
3000	400C302M250AD8	37.30	21.30	9.20	12.10	1 3/8 X 4 3/4
3300	400C332M250EJ8	34.50	21.00	9.70	12.50	1 3/4 X 3 3/4
3400	400C342M250BB8	34.10	22.20	9.50	11.80	2 X 3 1/4
3500	400C352M250AE8	33.40	19.30	10.10	13.30	1 3/8 X 5 1/4
3800	400C382M250AF8	30.40	17.90	11.20	14.60	1 3/8 X 5 3/4

		ESR Max. 25 °C		Ripple Amps. 85 °C		Nominal Size
Cap.	Catalog Part	120 Hz	20 kHz	120 Hz	20 kHz	D X L
(µF)	Number	(mΩ)	(mΩ)	(A)	(A)	(in)
250 Vdc (300 Vdc Surge)						
3900	400C392M250EC8	29.40	18.10	10.90	13.90	1 3/4 X 4 1/4
4200	400C422M250BJ8	28.00	18.40	11.80	14.50	2 X 3 3/4
4600	400C462M250ED8	25.70	16.00	12.30	15.60	1 3/4 X 4 3/4
4900	400C492M250BC8	23.90	15.90	12.80	15.70	2 X 4 1/4
5100	400C512M250EE8	23.00	14.50	13.80	17.40	1 3/4 X 5 1/4
5700	400C572M250BD8	21.10	14.10	14.10	17.20	2 X 4 3/4
5800	400C582M250EF8	21.00	13.30	15.40	19.40	1 3/4 X 5 3/4
6800	400C682M250BE8	18.40	12.50	15.60	19.00	2 X 5 1/4
7500	400C752M250BF8	16.80	11.50	16.90	20.40	2 X 5 3/4
300 Vdc (350 Vdc Surge)						
490	400C491M300AK8	240.00	118.00	2.20	3.10	1 3/8 X 1 3/4
740	400C741M300AA8	161.00	79.40	3.10	4.40	1 3/8 X 2 1/4
1000	400C102M300AH8	112.00	55.80	3.80	5.40	1 3/8 X 2 3/4
1200	400C122M300EA8	102.00	51.50	4.40	6.20	1 3/4 X 2 1/4
1400	400C142M300AB8	86.20	43.40	4.70	6.60	1 3/8 X 3 1/4
1500	400C152M300BA8	92.10	47.20	5.00	7.00	2 X 2 1/4
1700	400C172M300EH8	75.00	36.90	5.50	7.80	1 3/4 X 2 3/4
1700	400C172M300AJ8	70.30	35.90	5.40	7.60	1 3/8 X 3 3/4
2000	400C202M300AC8	59.60	30.80	6.20	8.60	1 3/8 X 4 1/4
2100	400C212M300BH8	66.10	33.30	6.40	9.00	2 X 2 3/4
2200	400C222M300EB8	57.70	28.70	6.70	9.50	1 3/4 X 3 1/4
2400	400C242M300AD8	51.90	27.30	6.90	9.50	1 3/8 X 4 3/4
2700	400C272M300AE8	46.10	24.60	7.70	10.50	1 3/8 X 5 1/4
2700	400C272M300EJ8	47.10	23.70	7.70	10.80	1 3/4 X 3 3/4
2800	400C282M300BB8	50.90	25.90	7.70	10.70	2 X 3 1/4
3000	400C302M300AF8	41.60	22.60	8.50	11.60	1 3/8 X 5 3/4
3200	400C322M300EC8	41.60	21.20	8.60	12.10	1 3/4 X 4 1/4
3400	400C342M300BJ8	41.60	21.40	9.50	13.20	2 X 3 3/4
3800	400C382M300ED8	36.20	18.70	9.80	13.60	1 3/4 X 4 3/4
4100	400C412M300BC8	35.90	18.40	10.30	14.30	2 X 4 1/4
4200	400C422M300EE8	32.20	16.90	11.00	15.20	1 3/4 X 5 1/4
4700	400C472M300BD8	31.10	16.30	11.40	15.70	2 X 4 3/4
4800	400C482M300EF8	29.10	15.50	12.30	16.90	1 3/4 X 5 3/4
5600	400C562M300BE8	26.70	14.40	12.70	17.30	2 X 5 1/4
6200	400C622M300BF8	24.30	13.20	13.80	18.70	2 X 5 3/4
350 Vdc (400 Vdc Surge)						
360	400C361M350AK8	295.00	138.00	2.00	2.90	1 3/8 X 1 3/4
540	400C541M350AA8	197.00	92.90	2.80	4.00	1 3/8 X 2 1/4
800	400C801M350AH8	137.00	65.10	3.40	5.00	1 3/8 X 2 3/4
920	400C921M350EA8	123.00	58.20	4.00	5.80	1 3/4 X 2 1/4
1000	400C102M350AB8	105.00	50.60	4.20	6.10	1 3/8 X 3 1/4
1100	400C112M350BA8	109.00	52.40	4.60	6.60	2 X 2 1/4

Type 400C 95 °C Long Life, Plug-in, Radial Leaded Aluminum

Very Long Life Board-Mount Type

Additional Low Voltages available at <http://www.cde.com/catalogs/400C.pdf>

		ESR Max. 25 °C		Ripple Amps. 85 °C		Nominal Size
Cap.	Catalog Part	120 Hz	20 kHz	120 Hz	20 kHz	
(µF)	Number	(mΩ)	(mΩ)	(A)	(A)	(in)
350 Vdc (400 Vdc Surge)						
1200	400C122M350EH8	90.50	41.90	5.00	7.30	1 3/4 X 2 3/4
1200	400C122M350AJ8	85.80	41.70	4.90	7.00	1 3/8 X 3 3/4
1500	400C152M350BH8	78.60	37.10	5.80	8.50	2 X 2 3/4
1500	400C152M350AC8	72.60	35.70	5.60	8.00	1 3/8 X 4 1/4
1600	400C162M350EB8	69.50	32.50	6.10	8.90	1 3/4 X 3 1/4
1700	400C172M350AD8	63.10	31.40	6.30	8.90	1 3/8 X 4 3/4
2000	400C202M350EJ8	56.70	26.80	7.00	10.20	1 3/4 X 3 3/4
2000	400C202M350BB8	60.50	28.80	7.00	10.20	2 X 3 1/4
2000	400C202M350AE8	55.90	28.30	7.00	9.80	1 3/8 X 5 1/4
2200	400C222M350AF8	50.40	25.90	7.70	10.80	1 3/8 X 5 3/4
2400	400C242M350EC8	49.90	23.90	7.90	11.40	1 3/4 X 4 1/4
2500	400C252M350BJ8	49.40	23.80	8.70	12.60	2 X 3 3/4
2800	400C282M350ED8	43.40	21.00	8.90	12.80	1 3/4 X 4 3/4
3000	400C302M350BC8	42.50	20.40	9.40	13.60	2 X 4 1/4
3100	400C312M350EE8	38.50	18.90	10.00	14.30	1 3/4 X 5 1/4
3400	400C342M350BD8	36.80	18.00	10.50	15.00	2 X 4 3/4
3500	400C352M350EF8	34.70	17.30	11.30	16.00	1 3/4 X 5 3/4
4100	400C412M350BE8	31.50	15.80	11.70	16.50	2 X 5 1/4
4500	400C452M350BF8	28.60	14.50	12.70	17.90	2 X 5 3/4
400 Vdc (450 Vdc Surge)						
300	400C301M400AK8	341.00	116.00	1.80	3.20	1 3/8 X 1 3/4
450	400C451M400AA8	228.00	77.70	2.60	4.40	1 3/8 X 2 1/4
600	400C601M400AH8	158.00	54.40	3.20	5.40	1 3/8 X 2 3/4
750	400C751M400EA8	141.00	54.80	3.70	6.00	1 3/4 X 2 1/4
840	400C841M400AB8	122.00	42.20	3.90	6.60	1 3/8 X 3 1/4
930	400C931M400BA8	124.00	52.50	4.30	6.60	2 X 2 1/4
1000	400C102M400AJ8	99.00	34.70	4.60	7.70	1 3/8 X 3 3/4
1000	400C102M400EH8	104.00	39.60	4.60	7.50	1 3/4 X 2 3/4
1200	400C122M400AC8	83.60	29.70	5.20	8.80	1 3/8 X 4 1/4
1300	400C132M400EB8	79.50	30.70	5.70	9.20	1 3/4 X 3 1/4
1300	400C132M400BH8	89.30	37.20	5.50	8.50	2 X 2 3/4
1400	400C142M400AD8	72.60	26.10	5.80	9.80	1 3/8 X 4 3/4
1600	400C162M400AE8	64.30	23.40	6.50	10.80	1 3/8 X 5 1/4
1600	400C162M400EJ8	64.70	25.20	6.60	10.50	1 3/4 X 3 3/4
1700	400C172M400BB8	68.60	28.90	6.60	10.20	2 X 3 1/4
1800	400C182M400AF8	57.80	21.40	7.20	11.90	1 3/8 X 5 3/4
2000	400C202M400EC8	57.00	22.40	7.40	11.80	1 3/4 X 4 1/4
2100	400C212M400BJ8	55.90	23.80	8.20	12.60	2 X 3 3/4
2300	400C232M400ED8	49.50	19.70	8.40	13.20	1 3/4 X 4 3/4
2400	400C242M400BC8	48.20	20.30	8.90	13.70	2 X 4 1/4
2600	400C262M400EE8	43.90	17.70	9.40	14.80	1 3/4 X 5 1/4
2800	400C282M400BD8	41.60	18.00	9.90	15.00	2 X 4 3/4

		ESR Max. 25 °C		Ripple Amps. 85 °C		Nominal Size
Cap.	Catalog Part	120 Hz	20 kHz	120 Hz	20 kHz	
(µF)	Number	(mΩ)	(mΩ)	(A)	(A)	D X L (in)
400 Vdc (450 Vdc Surge)						
2900	400C292M400EF8	39.50	16.10	10.60	16.60	1 3/4 X 5 3/4
3400	400C342M400BE8	35.60	15.70	11.00	16.60	2 X 5 1/4
3700	400C372M400BF8	32.20	14.40	12.00	17.90	2 X 5 3/4
450 Vdc (500 Vdc Surge)						
250	400C251M450AK8	367.00	123.00	1.80	3.10	1 3/8 X 1 3/4
370	400C371M450AA8	245.00	82.60	2.50	4.30	1 3/8 X 2 1/4
500	400C501M450AH8	170.00	57.80	3.10	5.30	1 3/8 X 2 3/4
630	400C631M450EA8	151.00	57.60	3.60	5.80	1 3/4 X 2 1/4
700	400C701M450AB8	131.00	44.80	3.80	6.50	1 3/8 X 3 1/4
780	400C781M450BA8	132.00	54.80	4.20	6.50	2 X 2 1/4
850	400C851M450AJ8	107.00	36.80	4.40	7.50	1 3/8 X 3 3/4
850	400C851M450EH8	111.00	41.70	4.50	7.30	1 3/4 X 2 3/4
1000	400C102M450AC8	89.90	31.40	5.00	8.50	1 3/8 X 4 1/4
1000	400C102M450BH8	95.40	38.90	5.30	8.30	2 X 2 3/4
1100	400C112M450EB8	85.30	32.20	5.50	9.00	1 3/4 X 3 1/4
1200	400C122M450AD8	78.00	27.60	5.60	9.50	1 3/8 X 4 3/4
1400	400C142M450AE8	69.10	24.70	6.30	10.50	1 3/8 X 5 1/4
1400	400C142M450EJ8	69.40	26.50	6.30	10.20	1 3/4 X 3 3/4
1400	400C142M450BB8	73.30	30.20	6.40	9.90	2 X 3 1/4
1500	400C152M450AF8	62.10	22.50	7.00	11.60	1 3/8 X 5 3/4
1600	400C162M450EC8	61.10	23.50	7.10	11.50	1 3/4 X 4 1/4
1700	400C172M450BJ8	59.70	24.80	7.90	12.30	2 X 3 3/4
1900	400C192M450ED8	53.00	20.70	8.10	12.90	1 3/4 X 4 3/4
2000	400C202M450BC8	51.40	21.20	8.60	13.40	2 X 4 1/4
2100	400C212M450EE8	46.90	18.50	9.10	14.50	1 3/4 X 5 1/4
2400	400C242M450EF8	42.20	16.90	10.20	16.20	1 3/4 X 5 3/4
2400	400C242M450BD8	44.40	18.80	9.50	14.70	2 X 4 3/4
2800	400C282M450BE8	37.90	16.40	10.70	16.30	2 X 5 1/4
3100	400C312M450BF8	34.30	15.00	11.60	17.60	2 X 5 3/4
500 Vdc (550 Vdc Surge)						
170	400C171M500AK8	403.00	147.00	1.70	2.80	1 3/8 X 1 3/4
260	400C261M500AA8	269.00	98.60	2.40	3.90	1 3/8 X 2 1/4
380	400C381M500AH8	187.00	68.90	2.90	4.80	1 3/8 X 2 3/4
400	400C401M500EA8	241.00	137.00	3.30	5.30	1 3/4 X 2 1/4
490	400C491M500AB8	144.00	53.20	3.60	5.90	1 3/8 X 3 1/4
510	400C511M500BA8	192.00	116.00	3.90	6.10	2 X 2 1/4
580	400C581M500EH8	167.00	95.80	4.20	6.80	1 3/4 X 2 3/4
610	400C611M500AJ8	117.00	43.60	4.20	6.90	1 3/8 X 3 3/4
710	400C711M500BH8	133.00	80.80	5.10	7.80	2 X 2 3/4
720	400C721M500AC8	133.00	77.50	4.80	7.80	1 3/8 X 4 1/4
760	400C761M500EB8	129.00	74.00	5.20	8.30	1 3/4 X 3 1/4
800	400C801M500AD8	85.80	32.60	5.40	8.70	1 3/8 X 4 3/4

Type 400C 95 °C Long Life, Plug-in, Radial Leaded Aluminum

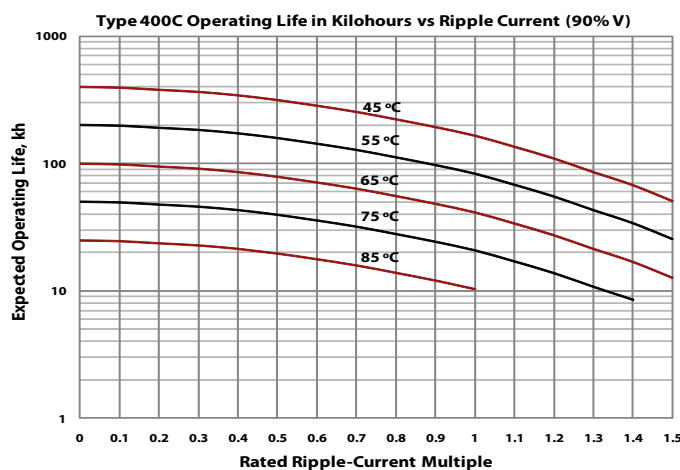
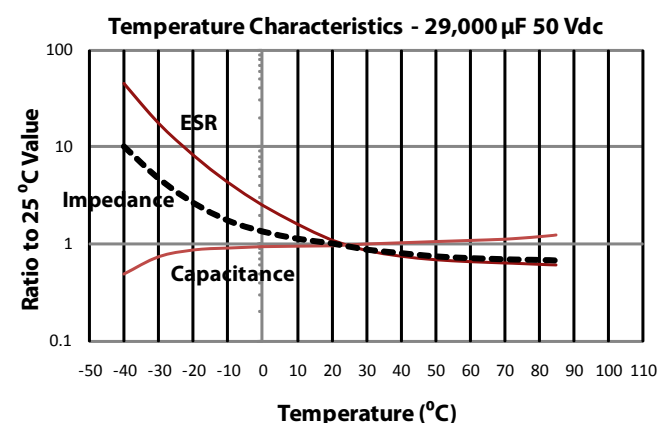
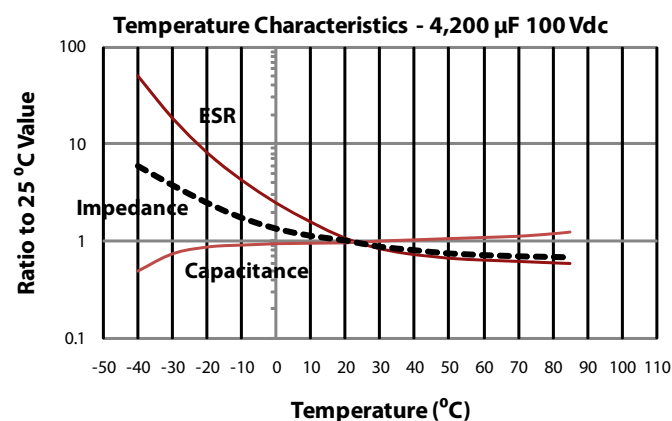
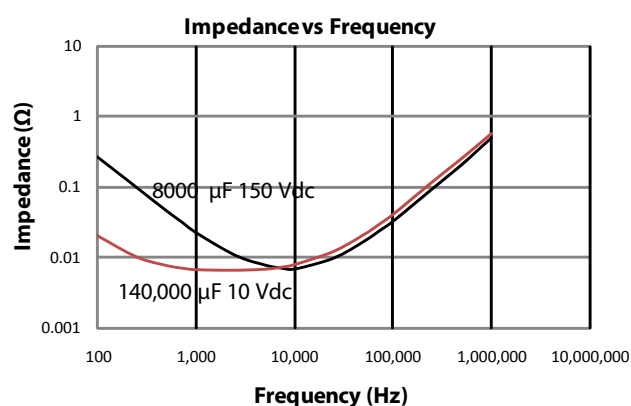
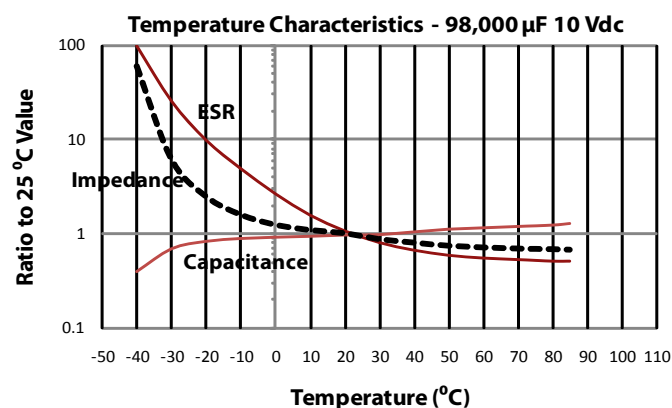
Very Long Life Board-Mount Type

Additional Low Voltages available at <http://www.cde.com/catalogs/400C.pdf>

Cap. (μF)	Catalog Part Number	ESR Max. 25 °C		Ripple Amps. 85 °C		Nominal Size
		120 Hz	20 kHz	120 Hz	20 kHz	D X L
		(mΩ)	(mΩ)	(A)	(A)	(in)
500 Volts (550 Vdc Surge)						
940	400C941M500EJ8	105.00	60.60	6.00	9.50	1 3/4 X 3 3/4
950	400C951M500AE8	75.90	29.10	6.00	9.70	1 3/8 X 5 1/4
960	400C961M500BB8	103.00	62.50	6.10	9.40	2 X 3 1/4
1100	400C112M500AF8	68.30	26.40	6.60	10.70	1 3/8 X 5 3/4
1100	400C112M500EC8	88.40	51.70	6.80	10.70	1 3/4 X 4 1/4
1200	400C122M500BJ8	83.50	51.30	7.50	11.60	2 X 3 3/4

International Low Voltages available at https://www.microm.com/catalog/10001p						
		ESR Max. 25 °C		Ripple Amps. 85 °C		Nominal Size
Cap.	Catalog Part	120 Hz	20 kHz	120 Hz	20 kHz	D X L
(μF)	Number	(mΩ)	(mΩ)	(A)	(A)	(in)
500 Volts (550 Vdc Surge)						
1300	400C132M500ED8	76.70	45.20	7.60	12.00	1 3/4 X 4 3/4
1400	400C142M500BC8	70.70	43.80	8.20	12.60	2 X 4 1/4
1500	400C152M500EE8	68.00	40.50	8.60	13.50	1 3/4 X 5 1/4
1600	400C162M500BD8	61.50	38.40	9.10	13.90	2 X 4 3/4
1700	400C172M500EF8	61.20	36.80	9.70	15.10	1 3/4 X 5 3/4
1900	400C192M500BE8	53.10	33.60	10.20	15.40	2 X 5 1/4
2100	400C212M500BF8	48.00	30.70	11.10	16.70	2 X 5 3/4

Typical Performance Curves



Type 420C 85 °C Long Life, Inverter Grade, Plug-in, Aluminum

Best Value, High Ripple, Board-Mount Type



Type 420C is the PC-mount version of the Type 520C screw terminal, computer grade capacitor and the 85 °C version of the Type 450C Inverter Grade capacitor. It delivers the ripple current capability and exceptional life needed for motor-drive bus capacitors and approaches the performance of the 450C at a lower cost. The extended cathode foil of the 420C assures cool operation and heat flow from the capacitor element to the can in all orientations.

Highlights

- For motor drives and UPS systems
- ESRs to 6.9 mΩ
- Printed-circuit mounting
- Thermal-Pak™ extended cathode construction

Specifications

Temperature Range	-40 °C to +85 °C							
Rated Voltage Range	100 Vdc to 500 Vdc							
Capacitance Range	160 μF to 27,000 μF							
Capacitance Tolerance	± 20%							
Leakage Current	≤3 √CV μA, 4 mA max, 5 minutes							
Ripple Current Multipliers	Ambient Temperature							
	45 °C	55 °C	65 °C	75 °C	85 °C			
	1.80	1.63	1.45	1.25	1.00			
	Frequency							
	50 Hz	60 Hz	120 Hz	360 Hz	1 kHz	5 kHz	10 kHz	
	1 3/8" & 1 3/4" Diameters							
	100 to 350 V	0.91	0.93	1.00	1.06	1.08	1.09	1.09
	400 to 500 V	0.82	0.86	1.00	1.14	1.20	1.23	1.23
	2" Diameters							
	100 to 350 V	0.92	0.94	1.00	1.05	1.07	1.08	1.08
400 to 500 V	0.82	0.86	1.00	1.14	1.20	1.23	1.27	
Low Temperature Characteristics	Impedance ratio: Z _{-20 °C} /Z _{+25 °C} ≤ 3 (100–500 Vdc)							
Endurance Life Test	4000 h at full load at 85 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit							
Shelf Life Test	500 h at 85 °C Δ Capacitance 100% of limit ESR 100% of limit DCL 100% of limit							
Vibration	10 to 55 Hz, 0.06" and 10 g max, 2 h each plane							
RoHS Compliant								

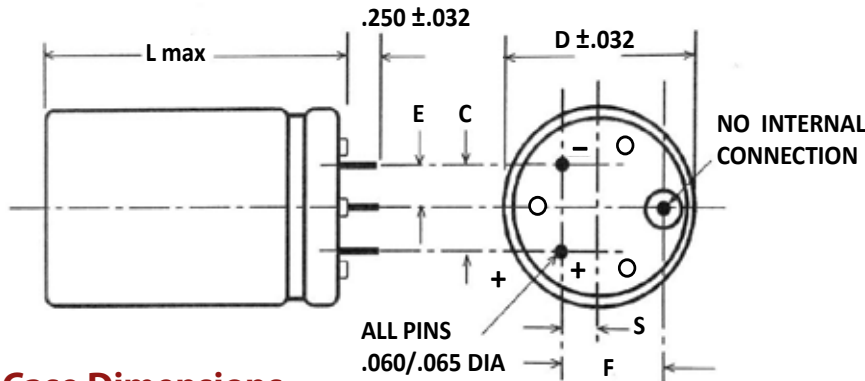
Type 420C 85 °C Long Life, Inverter Grade, Plug-in, Aluminum

Best Value, High Ripple, Board-Mount Type

Part Numbering System

420C Type	242 Capacitance 242 = 2400 μ F 221 = 220 μ F	M Tolerance M = $\pm 20\%$ T = $-10\% +50\%$ U = $-10 +75\%$	250 Voltage 100 = 100 V 250 = 250 V	EB Case Code see table	8 Insulation 0 = Bare can 8 = PVC 9 = Polyester
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Outline Drawing



Insulated Case Dimensions

Case	Inches						Millimeters					
Code	D $\pm$.031	L MAX	C $\pm$.015	S $\pm$.031	E $\pm$.031	F $\pm$.015	D $\pm$.78	L MAX	C $\pm$.78	S $\pm$.78	E $\pm$.78	F $\pm$.38
AK	1.375	1.75	0.50	0.175	0.25	0.55	34.93	44.45	12.70	4.45	6.35	13.97
AA	1.375	2.25	0.50	0.175	0.25	0.55	34.93	57.15	12.70	4.45	6.35	13.97
AH	1.375	2.75	0.50	0.175	0.25	0.55	34.98	69.85	12.70	4.45	6.35	13.97
AB	1.375	3.25	0.50	0.175	0.25	0.55	34.93	82.55	12.70	4.45	6.35	13.97
AJ	1.375	3.75	0.50	0.175	0.25	0.55	34.93	95.25	12.70	4.45	6.35	13.97
AC	1.375	4.25	0.50	0.175	0.25	0.55	34.93	107.95	12.70	4.45	6.35	13.97
AD	1.375	4.75	0.50	0.175	0.25	0.55	34.93	120.65	12.70	4.45	6.35	13.97
AE	1.375	5.25	0.50	0.175	0.25	0.55	34.93	133.35	12.70	4.45	6.35	13.97
AF	1.375	5.75	0.50	0.175	0.25	0.55	34.93	146.05	12.70	4.45	6.35	13.97
EA	1.75	2.25	0.70	0.375	0.35	0.90	44.45	57.15	17.78	9.53	8.89	22.86
EH	1.75	2.75	0.70	0.375	0.35	0.90	44.45	69.85	17.78	9.53	8.89	22.86
EB	1.75	3.25	0.70	0.375	0.35	0.90	44.45	82.55	17.78	9.53	8.89	22.86
EJ	1.75	3.75	0.70	0.375	0.35	0.90	44.45	95.25	17.78	9.53	8.89	22.86
EC	1.75	4.25	0.70	0.375	0.35	0.90	44.45	107.95	17.78	9.53	8.89	22.86
ED	1.75	4.75	0.70	0.375	0.35	0.90	44.45	120.65	17.78	9.53	8.89	22.86
EE	1.75	5.25	0.70	0.375	0.35	0.90	44.45	133.35	17.78	9.53	8.89	22.86
EF	1.75	5.75	0.70	0.375	0.35	0.90	44.45	146.05	17.78	9.53	8.89	22.86
BA	2.00	2.25	0.80	0.425	0.40	1.00	50.80	57.15	20.32	10.80	10.16	25.40
BH	2.00	2.75	0.80	0.425	0.40	1.00	50.80	69.85	20.32	10.80	10.16	25.40
BB	2.00	3.25	0.80	0.425	0.40	1.00	50.80	82.55	20.32	10.80	10.16	25.40
BJ	2.00	3.75	0.80	0.425	0.40	1.00	50.80	95.25	20.32	10.80	10.16	25.40
BC	2.00	4.25	0.80	0.425	0.40	1.00	50.80	107.95	20.32	10.80	10.16	25.40
BD	2.00	4.75	0.80	0.425	0.40	1.00	50.80	120.65	20.32	10.80	10.16	25.40
BE	2.00	5.25	0.80	0.425	0.40	1.00	50.80	133.25	20.32	10.80	10.16	25.40
BF	2.00	5.75	0.80	0.425	0.40	1.00	50.80	146.05	20.32	10.80	10.16	25.40

Type 420C 85 °C Long Life, Inverter Grade, Plug-in, Aluminum

Best Value, High Ripple, Board-Mount Type

Ratings

Additional Low Voltages Available at <http://www.cde.com/catalogs/420C.pdf>

		ESR Max. 25 °C		Ripple Amps. 85 °C		Nominal Size
Cap.	Catalog Part	120 Hz	20 kHz	120 Hz	20 kHz	D X L
(µF)	Number	(mΩ)	(mΩ)	(A)	(A)	(in)
200 Vdc (250 Vdc Surge)						
900	420C901M200AK8	130.00	73.40	3.60	4.80	1 3/8 X 1 3/4
1300	420C132M200AA8	87.60	49.60	5.00	6.70	1 3/8 X 2 1/4
2000	420C202M200EA8	63.50	40.20	6.50	8.10	1 3/4 X 2 1/4
2000	420C202M200AH8	61.40	35.10	6.20	8.20	1 3/8 X 2 3/4
2500	420C252M200AB8	47.70	27.60	7.50	9.90	1 3/8 X 3 1/4
2500	420C252M200BA8	53.20	36.50	7.20	8.70	2 X 2 1/4
2700	420C272M200EH8	45.50	28.50	8.20	10.30	1 3/4 X 2 3/4
3100	420C312M200AJ8	39.30	23.00	8.70	11.40	1 3/8 X 3 3/4
3400	420C342M200BH8	37.70	25.60	9.20	11.20	2 X 2 3/4
3600	420C362M200EB8	35.20	22.30	10.00	12.60	1 3/4 X 3 1/4
3700	420C372M200AC8	33.60	20.00	9.90	12.90	1 3/8 X 4 1/4
4100	420C412M200AD8	30.80	18.30	10.80	14.00	1 3/8 X 4 3/4
4400	420C442M200EJ8	29.00	18.50	11.40	14.30	1 3/4 X 3 3/4
4500	420C452M200BB8	29.30	20.00	11.00	13.40	2 X 3 1/4
4700	420C472M200AE8	27.70	16.70	12.00	15.40	1 3/8 X 5 1/4
5100	420C512M200AF8	25.30	15.50	13.20	16.80	1 3/8 X 5 3/4
5300	420C532M200EC8	24.80	16.00	12.80	15.90	1 3/4 X 4 1/4
5600	420C562M200BJ8	24.10	16.60	13.60	16.40	2 X 3 3/4
6100	420C612M200ED8	21.80	14.20	14.40	17.80	1 3/4 X 4 3/4
6600	420C662M200BC8	20.60	14.30	14.80	17.80	2 X 4 1/4
6900	420C692M200EE8	19.60	12.90	16.10	19.80	1 3/4 X 5 1/4
7600	420C762M200BD8	18.20	12.70	16.30	19.50	2 X 4 3/4
7800	420C782M200EF8	17.90	11.90	18.00	22.00	1 3/4 X 5 3/4
9100	420C912M200BE8	16.00	11.30	18.00	21.30	2 X 5 1/4
10000	420C103M200BF8	14.70	10.50	19.40	23.00	2 X 5 3/4
250 Vdc (300 Vdc Surge)						
600	420C601M250AK8	176.00	75.90	3.10	4.70	1 3/8 X 1 3/4
900	420C901M250AA8	118.00	51.30	4.30	6.60	1 3/8 X 2 1/4
1000	420C102M250AH8	82.60	36.30	5.30	8.00	1 3/8 X 2 3/4
1300	420C132M250EA8	82.30	41.20	5.70	8.00	1 3/4 X 2 1/4
1700	420C172M250AB8	63.80	28.40	6.50	9.80	1 3/8 X 3 1/4
1700	420C172M250BA8	66.60	37.20	6.40	8.60	2 X 2 1/4
1800	420C182M250EH8	59.10	29.20	7.20	10.20	1 3/4 X 2 3/4
2000	420C202M250AJ8	52.40	23.70	7.50	11.20	1 3/8 X 3 3/4
2300	420C232M250BH8	47.50	26.10	8.20	11.10	2 X 2 3/4
2400	420C242M250EB8	45.70	22.80	8.80	12.40	1 3/4 X 3 1/4
2400	420C242M250AC8	44.60	20.60	8.60	12.70	1 3/8 X 4 1/4
2700	420C272M250AD8	40.80	18.80	9.40	13.80	1 3/8 X 4 3/4
2900	420C292M250EJ8	37.40	18.90	10.00	14.10	1 3/4 X 3 3/4
3000	420C302M250BB8	36.70	20.40	9.80	13.20	2 X 3 1/4
3100	420C312M250AE8	36.50	17.20	10.40	15.20	1 3/8 X 5 1/4
3400	420C342M250AF8	33.2	15.9	11.5	16.6	1 3/8 X 5 3/4

		ESR Max. 25 °C		Ripple Amps. 85 °C		Nominal Size
Cap.	Catalog Part	120 Hz	20 kHz	120 Hz	20 kHz	D X L
(µF)	Number	(mΩ)	(mΩ)	(A)	(A)	(in)
250 Vdc (300 Vdc Surge)						
3500	420C352M250EC8	31.9	16.3	11.3	15.8	1 3/4 X 4 1/4
3700	420C372M250BJ8	30.1	16.9	12.2	16.3	2 X 3 3/4
4100	420C412M250ED8	27.9	14.5	12.7	17.6	1 3/4 X 4 3/4
4400	420C442M250BC8	25.7	14.6	13.3	17.6	2 X 4 1/4
4600	420C462M250EE8	24.9	13.2	14.2	19.6	1 3/4 X 5 1/4
5100	420C512M250BD8	22.7	13.0	14.6	19.3	2 X 4 3/4
5200	420C522M250EF8	22.6	12.2	16.0	21.8	1 3/4 X 5 3/4
6000	420C602M250BE8	19.7	11.5	16.2	21.2	2 X 5 1/4
6700	420C672M250BF8	18.0	10.7	17.5	22.8	2 X 5 3/4
450	420C451M300AK8	262.00	126.00	2.30	3.30	1 3/8 X 1 3/4
680	420C681M300AA8	175.00	84.70	3.20	4.50	1 3/8 X 2 1/4
1000	420C102M300AH8	122.00	59.50	3.90	5.60	1 3/8 X 2 3/4
1100	420C112M300EA8	111.00	54.10	4.50	6.50	1 3/4 X 2 1/4
1300	420C132M300AB8	93.70	46.20	4.80	6.80	1 3/8 X 3 1/4
1400	420C142M300BA8	98.90	49.30	5.20	7.40	2 X 2 1/4
1500	420C152M300AJ8	76.40	38.20	5.60	7.90	1 3/8 X 3 3/4
1500	420C152M300EH8	81.10	38.90	5.60	8.10	1 3/4 X 2 3/4
1800	420C182M300AC8	64.70	32.70	6.40	9.00	1 3/8 X 4 1/4
1900	420C192M300BH8	71.00	34.80	6.60	9.40	2 X 2 3/4
2000	420C202M300EB8	62.40	30.20	6.90	10.00	1 3/4 X 3 1/4
2200	420C222M300AD8	56.30	28.90	7.10	10.00	1 3/8 X 4 3/4
2500	420C252M300AE8	49.90	26.10	7.90	11.00	1 3/8 X 5 1/4
2500	420C252M300EJ8	50.90	24.90	7.90	11.30	1 3/4 X 3 3/4
2600	420C262M300BB8	54.70	27.10	7.90	11.30	2 X 3 1/4
2700	420C272M300AF8	45.00	23.90	8.80	12.10	1 3/8 X 5 3/4
3000	420C302M300EC8	44.90	22.20	8.90	12.70	1 3/4 X 4 1/4
3200	420C322M300BJ8	44.70	22.30	9.80	13.90	2 X 3 3/4
3400	420C342M300ED8	39.00	19.60	10.10	14.30	1 3/4 X 4 3/4
3700	420C372M300BC8	38.50	19.20	10.70	15.10	2 X 4 1/4
3900	420C392M300EE8	34.70	17.70	11.40	15.90	1 3/4 X 5 1/4
4300	420C432M300BD8	33.30	17.00	11.80	16.60	2 X 4 3/4
4400	420C442M300EF8	31.30	16.20	12.80	17.80	1 3/4 X 5 3/4
5100	420C512M300BE8	28.60	14.90	13.20	18.30	2 X 5 1/4
5700	420C572M300BF8	26.00	13.80	14.40	19.70	2 X 5 3/4
350 Vdc (400 Vdc Surge)						
350	420C351M350AK8	301.00	141.00	2.10	3.10	1 3/8 X 1 3/4
520	420C521M350AA8	201.00	94.40	3.00	4.30	1 3/8 X 2 1/4
700	420C701M350AH8	140.00	66.20	3.60	5.30	1 3/8 X 2 3/4
880	420C881M350EA8	126.00	58.90	4.20	6.20	1 3/4 X 2 1/4
980	420C981M350AB8	107.00	51.40	4.50	6.50	1 3/8 X 3 1/4
1100	420C112M350BA8	111.00	53.00	4.90	7.10	2 X 2 1/4
1200	420C122M350EH8	92.20	42.50	5.30	7.80	1 3/4 X 2 3/4

Type 420C 85 °C Long Life, Inverter Grade, Plug-in, Aluminum

Best Value, High Ripple, Board-Mount Type

Additional Low Voltages Available at <http://www.cde.com/catalogs/420C.pdf>

		ESR Max. 25 °C		Ripple Amps. 85 °C		Nominal Size
Cap.	Catalog Part	120 Hz	20 kHz	120 Hz	20 kHz	D X L
(µF)	Number	(mΩ)	(mΩ)	(A)	(A)	(in)
350 Vdc (400 Vdc Surge)						
1200	420C122M350AJ8	87.50	42.30	5.20	7.50	1 3/8 X 3 3/4
1400	420C142M350AC8	74.00	36.20	6.00	8.50	1 3/8 X 4 1/4
1500	420C152M350EB8	70.90	33.00	6.50	9.50	1 3/4 X 3 1/4
1500	420C152M350BH8	80.0	37.5	6.2	9.1	2 X 2 3/4
1700	420C172M350AD8	64.3	31.9	6.7	9.5	1 3/8 X 4 3/4
1900	420C192M350EJ8	57.7	27.1	7.5	10.9	1 3/4 X 3 3/4
1900	420C192M350AE8	57.0	28.7	7.4	10.5	1 3/8 X 5 1/4
2000	420C202M350BB8	61.6	29.1	7.5	10.9	2 X 3 1/4
2100	420C212M350AF8	51.3	26.2	8.2	11.5	1 3/8 X 5 3/4
2300	420C232M350EC8	50.9	24.2	8.4	12.2	1 3/4 X 4 1/4
2400	420C242M350BJ8	50.2	24.0	9.3	13.4	2 X 3 3/4
2600	420C262M350ED8	44.2	21.3	9.5	13.7	1 3/4 X 4 3/4
2800	420C282M350BC8	43.3	20.6	10.1	14.6	2 X 4 1/4
3000	420C302M350EE8	39.2	19.1	10.7	15.3	1 3/4 X 5 1/4
3300	420C332M350BD8	37.4	18.2	11.2	16.0	2 X 4 3/4
3400	420C342M350EF8	35.3	17.5	12.0	17.1	1 3/4 X 5 3/4
3900	420C392M350BE8	32.1	16.0	12.5	17.7	2 X 5 1/4
4300	420C432M350BF8	29.0	14.7	13.6	19.1	2 X 5 3/4
400 Vdc (450 Vdc Surge)						
290	420C291M400AK8	341.00	155.00	2.00	2.90	1 3/8 X 1 3/4
440	420C441M400AA8	228.00	104.00	2.80	4.10	1 3/8 X 2 1/4
600	420C601M400AH8	158.00	73.00	3.40	5.00	1 3/8 X 2 3/4
740	420C741M400EA8	141.00	63.90	4.00	5.90	1 3/4 X 2 1/4
830	420C831M400AB8	122.00	56.60	4.20	6.20	1 3/8 X 3 1/4
920	420C921M400BA8	124.00	56.80	4.60	6.90	2 X 2 1/4
1000	420C102M400EH8	104.00	46.20	5.00	7.50	1 3/4 X 2 3/4
1000	420C102M400AJ8	98.90	46.50	4.90	7.10	1 3/8 X 3 3/4
1200	420C122M400BH8	89.30	40.30	5.90	8.80	2 X 2 3/4
1200	420C122M400AC8	83.60	39.80	5.60	8.10	1 3/8 X 4 1/4
1300	420C132M400EB8	79.50	35.80	6.10	9.20	1 3/4 X 3 1/4
1400	420C142M400AD8	72.60	35.00	6.30	9.10	1 3/8 X 4 3/4
1600	420C162M400AE8	64.30	31.40	7.00	10.00	1 3/8 X 5 1/4
1600	420C162M400EJ8	64.70	29.40	7.00	10.40	1 3/4 X 3 3/4
1700	420C172M400BB8	68.60	31.30	7.10	10.50	2 X 3 1/4
1800	420C182M400AF8	57.80	28.70	7.80	11.00	1 3/8 X 5 3/4
1900	420C192M400EC8	57.00	26.20	7.90	11.70	1 3/4 X 4 1/4
2000	420C202M400BJ8	55.90	25.70	8.80	13.00	2 X 3 3/4
2200	420C222M400ED8	49.50	23.00	9.00	13.20	1 3/4 X 4 3/4
2400	420C242M400BC8	48.20	22.00	9.50	14.10	2 X 4 1/4
2500	420C252M400EE8	43.90	20.60	10.10	14.70	1 3/4 X 5 1/4
2800	420C282M400EF8	39.50	18.80	11.40	16.50	1 3/4 X 5 3/4
2800	420C282M400BD8	41.60	19.50	10.60	15.50	2 X 4 3/4

		ESR Max. 25 °C		Ripple Amps. 85 °C		Nominal Size
Cap.	Catalog Part	120 Hz	20 kHz	120 Hz	20 kHz	D X L
(µF)	Number	(mΩ)	(mΩ)	(A)	(A)	(in)
400 Vdc (450 Vdc Surge)						
3300	420C332M400BE8	35.60	17.00	11.80	17.10	2 X 5 1/4
3700	420C372M400BF8	32.20	15.60	12.90	18.50	2 X 5 3/4
450 Vdc (500 Vdc Surge)						
220	420C221M450AK8	383.00	171.00	1.90	2.80	1 3/8 X 1 3/4
330	420C331M450AA8	256.00	115.00	2.60	3.90	1 3/8 X 2 1/4
500	420C501M450AH8	178.00	80.30	3.20	4.80	1 3/8 X 2 3/4
570	420C571M450EA8	157.00	69.10	3.80	5.70	1 3/4 X 2 1/4
630	420C631M450AB8	137.00	62.20	4.00	5.90	1 3/8 X 3 1/4
700	420C701M450BA8	138.00	60.90	4.40	6.60	2 X 2 1/4
760	420C761M450EH8	116.00	50.10	4.70	7.20	1 3/4 X 2 3/4
760	420C761M450AJ8	111.00	51.10	4.60	6.80	1 3/8 X 3 3/4
910	420C911M450AC8	93.80	43.60	5.30	7.80	1 3/8 X 4 1/4
940	420C941M450BH8	99.10	43.30	5.60	8.50	2 X 2 3/4
1000	420C102M450EB8	88.80	38.80	5.80	8.80	1 3/4 X 3 1/4
1100	420C112M450AD8	81.40	38.20	5.90	8.70	1 3/8 X 4 3/4
1200	420C122M450EJ8	72.20	31.80	6.70	10.00	1 3/4 X 3 3/4
1200	420C122M450AE8	72.00	34.30	6.60	9.60	1 3/8 X 5 1/4
1300	420C132M450AF8	64.70	31.20	7.30	10.60	1 3/8 X 5 3/4
1300	420C132M450BB8	76.10	33.50	6.70	10.10	2 X 3 1/4
1500	420C152M450EC8	63.50	28.30	7.50	11.30	1 3/4 X 4 1/4
1600	420C162M450BJ8	62.00	27.60	8.30	12.50	2 X 3 3/4
1700	420C172M450ED8	55.10	24.80	8.50	12.70	1 3/4 X 4 3/4
1800	420C182M450BC8	53.30	23.60	9.10	13.60	2 X 4 1/4
1900	420C192M450EE8	48.80	22.20	9.60	14.20	1 3/4 X 5 1/4
2100	420C212M450BD8	46.10	20.80	10.10	15.00	2 X 4 3/4
2200	420C222M450EF8	43.90	20.30	10.80	15.90	1 3/4 X 5 3/4
2500	420C252M450BE8	39.30	18.20	11.30	16.60	2 X 5 1/4
2800	420C282M450BF8	35.50	16.60	12.30	17.90	2 X 5 3/4
500 Vdc (550 Vdc Surge)						
160	420C161M500AK8	416.00	151.00	1.80	3.00	1 3/8 X 1 3/4
240	420C241M500AA8	278.00	101.00	2.50	4.20	1 3/8 X 2 1/4
350	420C351M500AH8	193.00	70.50	3.10	5.10	1 3/8 X 2 3/4
370	420C371M500EA8	248.00	140.00	3.50	5.60	1 3/4 X 2 1/4
460	420C461M500AB8	148.00	54.50	3.80	6.30	1 3/8 X 3 1/4
480	420C481M500BA8	197.00	118.00	4.10	6.50	2 X 2 1/4
540	420C541M500EH8	172.00	97.80	4.50	7.20	1 3/4 X 2 3/4
570	420C571M500AJ8	121.00	44.60	4.40	7.30	1 3/8 X 3 3/4
670	420C671M500BH8	137.00	82.30	5.40	8.30	2 X 2 3/4
670	420C671M500AC8	137.00	79.30	5.10	8.30	1 3/8 X 4 1/4
710	420C711M500EB8	132.00	75.50	5.50	8.80	1 3/4 X 3 1/4
750	420C751M500AD8	88.40	33.30	5.70	9.30	1 3/8 X 4 3/4
880	420C881M500EJ8	108.00	61.90	6.40	10.10	1 3/4 X 3 3/4

Type 420C 85 °C Long Life, Inverter Grade, Plug-in, Aluminum

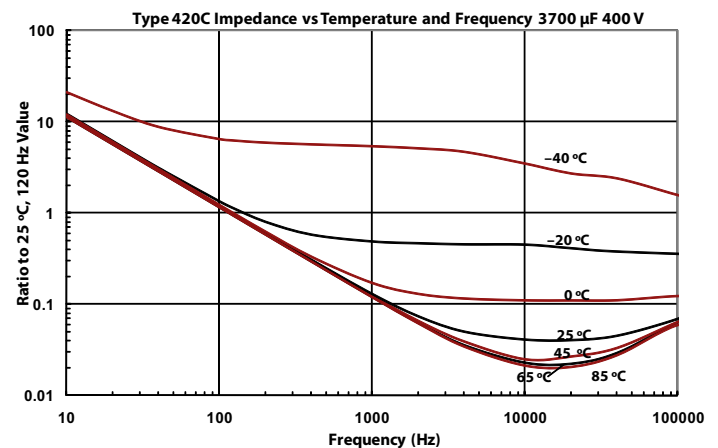
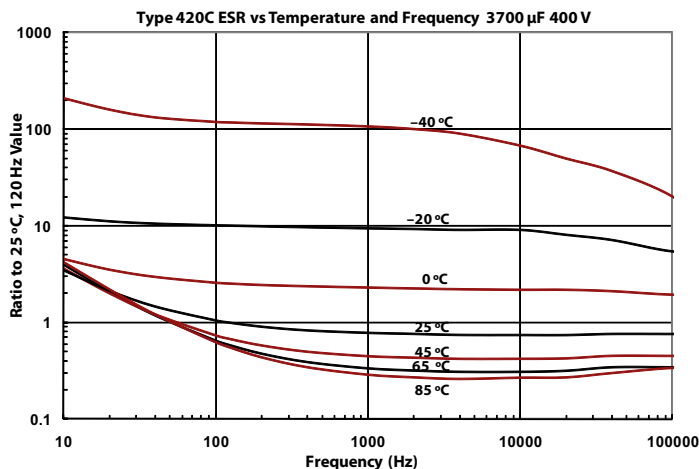
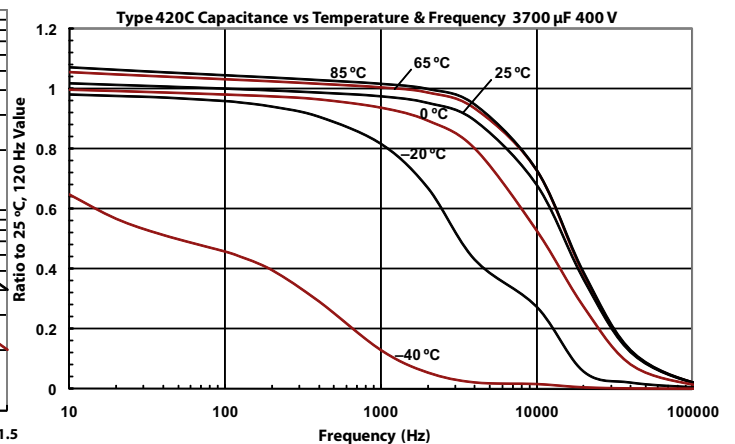
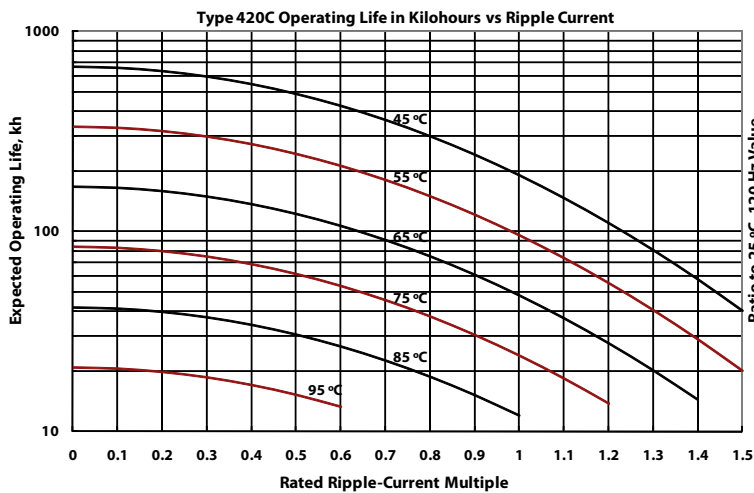
Best Value, High Ripple, Board-Mount Type

Additional Low Voltages Available at <http://www.cde.com/catalogs/420C.pdf>

		ESR Max. 25 °C		Ripple Amps. 85 °C		Nominal Size
Cap.	Catalog Part	120 Hz	20 kHz	120 Hz	20 kHz	D X L
(μF)	Number	(mΩ)	(mΩ)	(A)	(A)	(in)
500 Vdc (550 Vdc Surge)						
890	420C891M500BB8	105.00	63.70	6.40	10.00	2 X 3 1/4
890	420C891M500AE8	78.20	29.70	6.30	10.30	1 3/8 X 5 1/4
1000	420C102M500EC8	90.90	52.70	7.20	11.40	1 3/4 X 4 1/4
1000	420C102M500AF8	70.30	27.00	7.00	11.40	1 3/8 X 5 3/4
1100	420C112M500BJ8	85.80	52.20	8.00	12.30	2 X 3 3/4
1200	420C122M500ED8	78.90	46.10	8.10	12.80	1 3/4 X 4 3/4

		ESR Max. 25 °C		Ripple Amps. 85 °C		Nominal Size
Cap.	Catalog Part	120 Hz	20 kHz	120 Hz	20 kHz	
(μF)	Number	(mΩ)	(mΩ)	(A)	(A)	(in)
500 Vdc (550 Vdc Surge)						
1300	420C132M500BC8	72.60	44.60	8.70	13.40	2 X 4 1/4
1400	420C142M500EE8	69.90	41.30	9.10	14.30	1 3/4 X 5 1/4
1500	420C152M500EF8	62.90	37.50	10.30	16.10	1 3/4 X 5 3/4
1500	420C152M500BD8	63.10	39.10	9.70	14.80	2 X 4 3/4
1800	420C182M500BE8	54.50	34.20	10.80	16.40	2 X 5 1/4
2000	420C202M500BF8	49.20	31.30	11.70	17.80	2 X 5 3/4

Typical Performance Curves



Type 450C 105 °C Highest Ripple, Inverter Grade, Plug-in, Aluminum

Ultra-High Ripple Capabilities in a Plug-In Configuration



Type 450C is the 105 °C version of the Type 420C Inverter Grade capacitor, and it is the PC-mount version of the Type 550C. It delivers the ripple-current capability and exceptional life needed for motor-drive and inverter bus capacitors. It is a significantly better value than comparable 105 °C snap-in capacitors. The extended cathode foil of the 450C assures cool operation and heat flow from the capacitor element to the can in all orientations.

Highlights

- Better value than large 105 °C snap-in capacitors
- Especially for motor drives and UPS systems
- ESRs to 6.9 mΩ
- Printed-circuit mounting
- Thermal-Pak™ extended cathode construction

Specifications

Temperature Range	–40 °C to +105 °C																																																								
Rated Voltage Range	100 Vdc to 500 Vdc																																																								
Capacitance Range	150 μF to 24,000 μF																																																								
Capacitance Tolerance	± 20%																																																								
Leakage Current	≤3 √CV μA, 4 mA max, 5 minutes																																																								
Ripple Current Multipliers	Ambient Temperature																																																								
	<table><tr><td>45 °C</td><td>55 °C</td><td>65 °C</td><td>75 °C</td><td>85 °C</td><td>95 °C</td><td>105 °C</td></tr><tr><td>1.66</td><td>1.52</td><td>1.37</td><td>1.20</td><td>1.00</td><td>0.75</td><td>0.36</td></tr></table>	45 °C	55 °C	65 °C	75 °C	85 °C	95 °C	105 °C	1.66	1.52	1.37	1.20	1.00	0.75	0.36																																										
	45 °C	55 °C	65 °C	75 °C	85 °C	95 °C	105 °C																																																		
	1.66	1.52	1.37	1.20	1.00	0.75	0.36																																																		
	Frequency																																																								
	<table><tr><td></td><td>50 Hz</td><td>60 Hz</td><td>120 Hz</td><td>360 Hz</td><td>1 kHz</td><td>5 kHz</td><td>10 kHz</td></tr><tr><td colspan="8">1 3/8" & 1 3/4" Diameters</td></tr><tr><td>100 to 350 V</td><td>0.91</td><td>0.93</td><td>1.00</td><td>1.06</td><td>1.08</td><td>1.09</td><td>1.09</td></tr><tr><td>400 to 500 V</td><td>0.82</td><td>0.86</td><td>1.00</td><td>1.14</td><td>1.20</td><td>1.23</td><td>1.23</td></tr><tr><td colspan="8">2" Diameters</td></tr><tr><td>100 to 350 V</td><td>0.92</td><td>0.94</td><td>1.00</td><td>1.05</td><td>1.07</td><td>1.08</td><td>1.08</td></tr><tr><td>400 to 500 V</td><td>0.82</td><td>0.86</td><td>1.00</td><td>1.14</td><td>1.20</td><td>1.23</td><td>1.27</td></tr></table>		50 Hz	60 Hz	120 Hz	360 Hz	1 kHz	5 kHz	10 kHz	1 3/8" & 1 3/4" Diameters								100 to 350 V	0.91	0.93	1.00	1.06	1.08	1.09	1.09	400 to 500 V	0.82	0.86	1.00	1.14	1.20	1.23	1.23	2" Diameters								100 to 350 V	0.92	0.94	1.00	1.05	1.07	1.08	1.08	400 to 500 V	0.82	0.86	1.00	1.14	1.20	1.23	1.27
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Low Temperature Characteristics	Impedance ratio: Z _{–20°C} /Z _{+25°C} ≤ 3 (100–500 Vdc)																																																								
Endurance Life Test	5000 h at full load at 85 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit																																																								
Shelf Life Test	500 h at 105 °C Capacitance 100% of limit ESR 100% of limit DCL 100% of limit																																																								
Vibration	10 to 55 Hz, 0.06" and 10 g max, 2 h each plane																																																								
RoHS Compliant																																																									

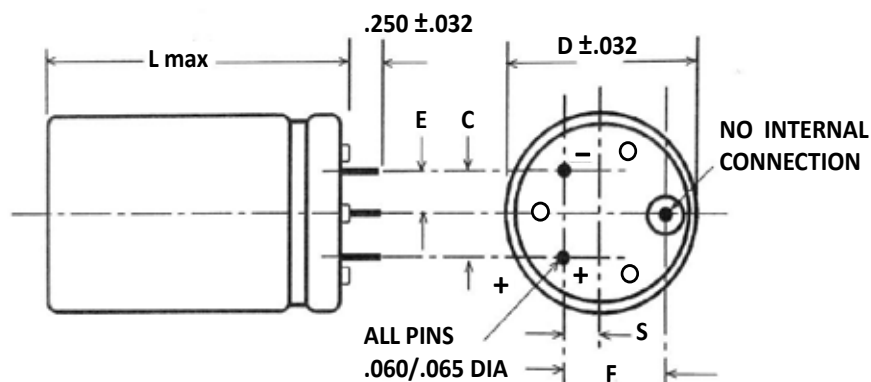
Type 450C 105 °C Highest Ripple, Inverter Grade, Plug-in, Aluminum

Ultra-High Ripple Capabilities in a Plug-In Configuration

Part Numbering System

450C	222	M	100	AK	8
Type	Capacitance	Tolerance	Voltage	Case Code	Insulation
	222 = 2200 µF 151 = 150 µF	M = ±20% T = -10% +50% U = -10% +75%	100 = 100 V 450 = 450 V		0 = Bare can 8 = PVC 9 = Polyester

Outline Drawing



Insulated Case Dimensions

Case Code	Inches						Millimeters					
	D ± .031	L MAX	C ± .015	S ± .031	E ± .031	F ± .015	D ± .78	L MAX	C ± .78	S ± .78	E ± .78	F ± .38
AK	1.375	1.75	0.50	0.175	0.25	0.55	34.93	44.45	12.70	4.45	6.35	13.97
AA	1.375	2.25	0.50	0.175	0.25	0.55	34.93	57.15	12.70	4.45	6.35	13.97
AH	1.375	2.75	0.50	0.175	0.25	0.55	34.98	69.85	12.70	4.45	6.35	13.97
AB	1.375	3.25	0.50	0.175	0.25	0.55	34.93	82.55	12.70	4.45	6.35	13.97
AJ	1.375	3.75	0.50	0.175	0.25	0.55	34.93	95.25	12.70	4.45	6.35	13.97
AC	1.375	4.25	0.50	0.175	0.25	0.55	34.93	107.95	12.70	4.45	6.35	13.97
AD	1.375	4.75	0.50	0.175	0.25	0.55	34.93	120.65	12.70	4.45	6.35	13.97
AE	1.375	5.25	0.50	0.175	0.25	0.55	34.93	133.35	12.70	4.45	6.35	13.97
AF	1.375	5.75	0.50	0.175	0.25	0.55	34.93	146.05	12.70	4.45	6.35	13.97
EA	1.75	2.25	0.70	0.375	0.35	0.90	44.45	57.15	17.78	9.53	8.89	22.86
EH	1.75	2.75	0.70	0.375	0.35	0.90	44.45	69.85	17.78	9.53	8.89	22.86
EB	1.75	3.25	0.70	0.375	0.35	0.90	44.45	82.55	17.78	9.53	8.89	22.86
EJ	1.75	3.75	0.70	0.375	0.35	0.90	44.45	95.25	17.78	9.53	8.89	22.86
EC	1.75	4.25	0.70	0.375	0.35	0.90	44.45	107.95	17.78	9.53	8.89	22.86
ED	1.75	4.75	0.70	0.375	0.35	0.90	44.45	120.65	17.78	9.53	8.89	22.86
EE	1.75	5.25	0.70	0.375	0.35	0.90	44.45	133.35	17.78	9.53	8.89	22.86
EF	1.75	5.75	0.70	0.375	0.35	0.90	44.45	146.05	17.78	9.53	8.89	22.86
BA	2.00	2.25	0.80	0.425	0.40	1.00	50.80	57.15	20.32	10.80	10.16	25.40
BH	2.00	2.75	0.80	0.425	0.40	1.00	50.80	69.85	20.32	10.80	10.16	25.40
BB	2.00	3.25	0.80	0.425	0.40	1.00	50.80	82.55	20.32	10.80	10.16	25.40
BJ	2.00	3.75	0.80	0.425	0.40	1.00	50.80	95.25	20.32	10.80	10.16	25.40
BC	2.00	4.25	0.80	0.425	0.40	1.00	50.80	107.95	20.32	10.80	10.16	25.40
BD	2.00	4.75	0.80	0.425	0.40	1.00	50.80	120.65	20.32	10.80	10.16	25.40
BE	2.00	5.25	0.80	0.425	0.40	1.00	50.80	133.25	20.32	10.80	10.16	25.40
BF	2.00	5.75	0.80	0.425	0.40	1.00	50.80	146.05	20.32	10.80	10.16	25.40

Type 450C 105 °C Highest Ripple, Inverter Grade, Plug-in, Aluminum

Ultra-High Ripple Capabilities in a Plug-In Configuration

Ratings

Additional Low Voltages Available at <http://www.cde.com/catalogs/450C.pdf>

		ESR Max. 25 °C		Ripple Amps, 85 °C		Nom Size
Cap. (μF)	Catalog Part Number	120 Hz (mΩ)	20 kHz (mΩ)	120 Hz (A)	20 kHz (A)	D X L (in)
100 Vdc (125 Vdc Surge)						
2200	450C222M100AK8	74.9	50.9	4.2	5.2	1 3/8 X 1 3/4
3300	450C332M100AA8	50.3	34.2	5.8	7.3	1 3/8 X 2 1/4
4000	450C402M100AH8	36.8	24.9	7.0	8.8	1 3/8 X 2 3/4
4800	450C482M100EA8	40.1	27.2	7.5	9.4	1 3/4 X 2 1/4
5800	450C582M100AB8	28.5	19.4	8.6	10.7	1 3/8 X 3 1/4
6100	450C612M100BA8	37.0	25.1	8.4	10.5	2 X 2 1/4
6600	450C662M100EH8	28.7	19.5	9.5	11.9	1 3/4 X 2 3/4
7100	450C712M100AJ8	23.5	15.9	9.9	12.4	1 3/8 X 3 3/4
8200	450C822M100BH8	26.3	17.8	10.7	13.4	2 X 2 3/4
8400	450C842M100AC8	20.1	13.6	11.3	14.1	1 3/8 X 4 1/4
8700	450C872M100EB8	22.2	15.1	11.7	14.6	1 3/4 X 3 1/4
9800	450C982M100AD8	17.7	12.0	12.6	15.8	1 3/8 X 4 3/4
11000	450C113M100AE8	15.9	10.8	13.9	17.4	1 3/8 X 5 1/4
11000	450C113M100EJ8	18.3	12.4	13.3	16.6	1 3/4 X 3 3/4
11000	450C113M100BB8	20.4	13.8	12.9	16.1	2 X 3 1/4
12000	450C123M100AF8	18.1	12.3	13.7	17.1	1 3/8 X 5 3/4
13000	450C133M100EC8	15.6	10.6	14.9	18.6	1 3/4 X 4 1/4
14000	450C143M100BJ8	16.8	11.4	15.9	19.9	2 X 3 3/4
15000	450C153M100ED8	13.7	9.3	16.8	21.0	1 3/4 X 4 3/4
16000	450C163M100BC8	14.4	9.8	17.3	21.6	2 X 4 1/4
17000	450C173M100EE8	12.3	8.4	18.8	23.4	1 3/4 X 5 1/4
18000	450C183M100BD8	12.7	8.6	19.0	23.7	2 X 4 3/4
19000	450C193M100EF8	11.3	7.6	21.0	26.2	1 3/4 X 5 3/4
22000	450C223M100BE8	11.1	7.5	21.0	26.2	2 X 5 1/4
24000	450C243M100BF8	10.2	6.9	22.7	28.4	2 X 5 3/4
160 Vdc (200 Vdc Surge)						
1200	450C122M160AK8	113.0	65.2	4.2	5.6	1 3/8 X 1 3/4
1800	450C182M160AA8	75.7	44.1	5.9	7.7	1 3/8 X 2 1/4
2600	450C262M160EA8	56.2	36.8	7.5	9.3	1 3/4 X 2 1/4
3000	450C302M160AH8	53.2	31.3	7.3	9.5	1 3/8 X 2 3/4
3300	450C332M160AB8	41.4	24.7	8.9	11.5	1 3/8 X 3 1/4
3300	450C332M160BA8	47.9	34.1	8.3	9.9	2 X 2 1/4
3600	450C362M160EH8	40.2	26.0	9.5	11.8	1 3/4 X 2 3/4
4000	450C402M160AJ8	34.2	20.6	10.2	13.1	1 3/8 X 3 3/4
4500	450C452M160BH8	33.9	23.8	10.7	12.7	2 X 2 3/4
4700	450C472M160EB8	31.2	20.4	11.7	14.4	1 3/4 X 3 1/4
4800	450C482M160AC8	29.4	18.0	11.6	14.8	1 3/8 X 4 1/4
5300	450C532M160AD8	26.9	16.5	12.7	16.2	1 3/8 X 4 3/4
5800	450C582M160EJ8	25.7	16.9	13.3	16.3	1 3/4 X 3 3/4
6000	450C602M160BB8	26.4	18.6	12.7	15.1	2 X 3 1/4
6100	450C612M160AE8	24.2	15.1	14.0	17.8	1 3/8 X 5 1/4
6700	450C672M160AF8	22.2	14.1	15.4	19.3	1 3/8 X 5 3/4

		ESR Max. 25 °C		Ripple Amps, 85 °C		Nom Size
Cap. (μF)	Catalog Part Number	120 Hz (mΩ)	20 kHz (mΩ)	120 Hz (A)	20 kHz (A)	D X L (in)
160 Vdc (200 Vdc Surge)						
6900	450C692M160EC8	22.0	14.7	14.9	18.2	1 3/4 X 4 1/4
7400	450C742M160BJ8	21.7	15.5	15.7	18.6	2 X 3 3/4
8000	450C802M160ED8	19.4	13.1	16.7	20.3	1 3/4 X 4 3/4
8700	450C872M160BC8	18.7	13.4	17.1	20.1	2 X 4 1/4
9100	450C912M160EE8	17.5	11.9	18.6	22.6	1 3/4 X 5 1/4
10000	450C103M160EF8	16.0	11.0	20.8	25.1	1 3/4 X 5 3/4
10000	450C103M160BD8	16.5	11.9	18.7	22.0	2 X 4 3/4
12000	450C123M160BE8	14.5	10.7	20.7	24.1	2 X 5 1/4
13000	450C133M160BF8	13.4	9.9	22.3	25.9	2 X 5 3/4
200 Vdc (250 Vdc Surge)						
880	450C881M200AK8	142.0	78.9	3.8	5.0	1 3/8 X 1 3/4
1300	450C132M200AA8	95.5	53.3	5.3	7.0	1 3/8 X 2 1/4
1900	450C192M200EA8	68.4	42.5	6.8	8.7	1 3/4 X 2 1/4
2000	450C202M200AH8	66.9	37.7	6.5	8.6	1 3/8 X 2 3/4
2500	450C252M200AB8	51.9	29.5	7.9	10.5	1 3/8 X 3 1/4
2500	450C252M200BA8	56.7	38.1	7.7	9.3	2 X 2 1/4
2700	450C272M200EH8	49.0	30.1	8.6	11.0	1 3/4 X 2 3/4
3000	450C302M200AJ8	42.7	24.6	9.1	12.0	1 3/8 X 3 3/4
3300	450C332M200BH8	40.3	26.7	9.8	12.0	2 X 2 3/4
3500	450C352M200EB8	37.9	23.5	10.6	13.4	1 3/4 X 3 1/4
3600	450C362M200AC8	36.5	21.3	10.4	13.6	1 3/8 X 4 1/4
4000	450C402M200AD8	33.4	19.5	11.4	14.9	1 3/8 X 4 3/4
4300	450C432M200EJ8	31.2	19.5	12.1	15.2	1 3/4 X 3 3/4
4400	450C442M200BB8	31.2	20.9	11.7	14.3	2 X 3 1/4
4500	450C452M200AE8	29.9	17.7	12.6	16.4	1 3/8 X 5 1/4
5000	450C502M200AF8	27.3	16.4	13.9	17.9	1 3/8 X 5 3/4
5100	450C512M200EC8	26.6	16.8	13.5	17.0	1 3/4 X 4 1/4
5500	450C552M200BJ8	25.7	17.3	14.5	17.6	2 X 3 3/4
6000	450C602M200ED8	23.4	14.9	15.2	19.0	1 3/4 X 4 3/4
6400	450C642M200BC8	22.0	14.9	15.7	19.1	2 X 4 1/4
6700	450C672M200EE8	21.0	13.5	17.0	21.2	1 3/4 X 5 1/4
7400	450C742M200BD8	19.4	13.3	17.3	20.9	2 X 4 3/4
7600	450C762M200EF8	19.1	12.5	19.0	23.6	1 3/4 X 5 3/4
8900	450C892M200BE8	16.9	11.8	19.1	22.9	2 X 5 1/4
9800	450C982M200BF8	15.5	10.9	20.7	24.7	2 X 5 3/4
250 Vdc (300 Vdc Surge)						
550	450C551M250AK8	210.0	87.3	3.1	4.8	1 3/8 X 1 3/4
830	450C831M250AA8	141.0	58.9	4.3	6.7	1 3/8 X 2 1/4
1000	450C102M250AH8	98.1	41.6	5.4	8.2	1 3/8 X 2 3/4
1200	450C122M250EA8	96.1	45.9	5.8	8.3	1 3/4 X 2 1/4
1500	450C152M250BA8	76.5	40.6	6.6	9.0	2 X 2 1/4
1600	450C162M250AB8	75.7	32.5	6.5	10.0	1 3/8 X 3 1/4
1700	450C172M250EH8	69.2	32.6	7.2	10.6	1 3/4 X 2 3/4

Type 450C 105 °C Highest Ripple, Inverter Grade, Plug-in, Aluminum

Ultra-High Ripple Capabilities in a Plug-In Configuration

Additional Low Voltages Available at <http://www.cde.com/catalogs/450C.pdf>

		ESR Max. 25 °C		Ripple Amps, 85 °C		Nom Size
Cap. (µF)	Catalog Part Number	120 Hz (mΩ)	20 kHz (mΩ)	120 Hz (A)	20 kHz (A)	D X L (in)
250 Vdc (300 Vdc Surge)						
1900	450C192M250AJ8	62.0	27.0	7.6	11.5	1 3/8 X 3 3/4
2100	450C212M250BH8	54.7	28.5	8.4	11.6	2 X 2 3/4
2200	450C222M250EB8	53.4	25.4	8.9	12.9	1 3/4 X 3 1/4
2300	450C232M250AC8	52.7	23.3	8.7	13.0	1 3/8 X 4 1/4
2500	450C252M250AD8	48.2	21.3	9.5	14.2	1 3/8 X 4 3/4
2700	450C272M250EJ8	43.6	21.0	10.2	14.7	1 3/4 X 3 3/4
2800	450C282M250BB8	42.2	22.2	10.1	13.9	2 X 3 1/4
2900	450C292M250AE8	43.0	19.4	10.5	15.7	1 3/8 X 5 1/4
3100	450C312M250AF8	38.9	17.9	11.6	17.1	1 3/8 X 5 3/4
3200	450C322M250EC8	37.1	18.1	11.5	16.4	1 3/4 X 4 1/4
3400	450C342M250BJ8	34.6	18.4	12.5	17.1	2 X 3 3/4
3800	450C382M250ED8	32.4	16.0	12.9	18.4	1 3/4 X 4 3/4
4100	450C412M250BC8	29.4	15.9	13.6	18.5	2 X 4 1/4
4200	450C422M250EE8	28.9	14.5	14.5	20.5	1 3/4 X 5 1/4
4700	450C472M250BD8	26.0	14.1	14.9	20.3	2 X 4 3/4
4800	450C482M250EF8	26.2	13.4	16.3	22.8	1 3/4 X 5 3/4
5600	450C562M250BE8	22.4	12.5	16.6	22.3	2 X 5 1/4
6200	450C622M250BF8	20.4	11.5	18.0	24.0	2 X 5 3/4
300 Vdc (350 Vdc Surge)						
380	450C381M300AK8	283.0	134.0	2.4	3.5	1 3/8 X 1 3/4
570	450C571M300AA8	189.0	89.9	3.3	4.8	1 3/8 X 2 1/4
800	450C801M300AH8	131.0	63.1	4.1	6.0	1 3/8 X 2 3/4
960	450C961M300EA8	119.0	56.7	4.8	6.9	1 3/4 X 2 1/4
1100	450C112M300AB8	101.0	49.0	5.1	7.3	1 3/8 X 3 1/4
1200	450C122M300BA8	106.0	53.2	5.5	7.8	2 X 2 1/4
1300	450C132M300EH8	87.0	40.8	6.0	8.7	1 3/4 X 2 3/4
1300	450C132M300AJ8	82.4	40.4	5.9	8.4	1 3/8 X 3 3/4
1500	450C152M300AC8	69.7	34.6	6.7	9.5	1 3/8 X 4 1/4
1600	450C162M300BH8	75.8	37.7	7.0	9.9	2 X 2 3/4
1700	450C172M300EB8	66.9	31.7	7.3	10.7	1 3/4 X 3 1/4
1800	450C182M300AD8	60.6	30.5	7.5	10.6	1 3/8 X 4 3/4
2100	450C212M300AE8	53.7	27.5	8.4	11.7	1 3/8 X 5 1/4
2100	450C212M300EJ8	54.5	26.1	8.4	12.1	1 3/4 X 3 3/4
2100	450C212M300BB8	58.4	29.3	8.4	11.9	2 X 3 1/4
2300	450C232M300AF8	48.4	25.1	9.3	12.9	1 3/8 X 5 3/4
2500	450C252M300EC8	48.1	23.3	9.5	13.6	1 3/4 X 4 1/4
2600	450C262M300BJ8	47.6	24.1	10.4	14.7	2 X 3 3/4
2900	450C292M300ED8	41.8	20.5	10.7	15.3	1 3/4 X 4 3/4
3100	450C312M300BC8	41.1	21.5	11.3	15.6	2 X 4 1/4
3300	450C332M300EE8	37.1	18.4	12.0	17.1	1 3/4 X 5 1/4
3600	450C362M300BD8	35.5	18.3	12.5	17.5	2 X 4 3/4
3700	450C372M300EF8	33.5	16.9	13.5	19.1	1 3/4 X 5 3/4

		ESR Max. 25 °C		Ripple Amps, 85 °C		Nom Size
Cap. (µF)	Catalog Part Number	120 Hz (mΩ)	20 kHz (mΩ)	120 Hz (A)	20 kHz (A)	D X L (in)
300 Vdc (350 Vdc Surge)						
4300	450C432M300BE8	30.5	16.1	14.0	19.3	2 X 5 1/4
4700	450C472M300BF8	27.6	14.8	15.3	20.8	2 X 5 3/4
350 Vdc (400 Vdc Surge)						
300	450C301M350AK8	325.0	150.0	2.2	3.3	1 3/8 X 1 3/4
460	450C461M350AA8	217.0	100.0	3.1	4.6	1 3/8 X 2 1/4
600	450C601M350AH8	151.0	70.3	3.8	5.6	1 3/8 X 2 3/4
770	450C771M350EA8	135.0	61.9	4.5	6.6	1 3/4 X 2 1/4
860	450C861M350AB8	116.0	54.5	4.7	6.9	1 3/8 X 3 1/4
960	450C961M350BA8	119.0	57.4	5.2	7.5	2 X 2 1/4
1000	450C102M350EH8	99.0	44.7	5.6	8.3	1 3/4 X 2 3/4
1000	450C102M350AJ8	94.4	44.9	5.5	8.0	1 3/8 X 3 3/4
1200	450C122M350AC8	79.8	38.4	6.3	9.1	1 3/8 X 4 1/4
1300	450C132M350BH8	85.6	40.7	6.6	9.6	2 X 2 3/4
1400	450C142M350EB8	76.1	34.7	6.9	10.2	1 3/4 X 3 1/4
1500	450C152M350AD8	69.3	33.8	7.0	10.1	1 3/8 X 4 3/4
1700	450C172M350EJ8	62.0	28.5	7.9	11.6	1 3/4 X 3 3/4
1700	450C172M350BB8	65.8	31.6	7.9	11.4	2 X 3 1/4
1700	450C172M350AE8	61.4	30.3	7.8	11.2	1 3/8 X 5 1/4
1800	450C182M350AF8	55.2	27.7	8.7	12.3	1 3/8 X 5 3/4
2000	450C202M350EC8	54.6	25.4	8.9	13.0	1 3/4 X 4 1/4
2100	450C212M350BJ8	53.7	26.0	9.8	14.1	2 X 3 3/4
2300	450C232M350ED8	47.4	22.3	10.0	14.6	1 3/4 X 4 3/4
2500	450C252M350BC8	46.2	23.1	10.7	15.1	2 X 4 1/4
2600	450C262M350EE8	42.0	20.0	11.3	16.4	1 3/4 X 5 1/4
2900	450C292M350BD8	40.0	19.7	11.8	16.8	2 X 4 3/4
3000	450C302M350EF8	37.8	18.3	12.7	18.3	1 3/4 X 5 3/4
3500	450C352M350BE8	34.2	17.3	13.2	18.6	2 X 5 1/4
3800	450C382M350BF8	30.9	15.8	14.4	20.1	2 X 5 3/4
400 Vdc (450 Vdc Surge)						
270	450C271M400AK8	356.0	161.0	2.1	3.1	1 3/8 X 1 3/4
410	450C411M400AA8	238.0	108.0	3.0	4.4	1 3/8 X 2 1/4
600	450C601M400AH8	166.0	75.7	3.7	5.4	1 3/8 X 2 3/4
690	450C691M400EA8	147.0	65.8	4.3	6.4	1 3/4 X 2 1/4
770	450C771M400AB8	127.0	58.7	4.5	6.6	1 3/8 X 3 1/4
860	450C861M400BA8	129.0	60.6	5.0	7.3	2 X 2 1/4
930	450C931M400EH8	108.0	47.6	5.3	8.1	1 3/4 X 2 3/4
930	450C931M400AJ8	103.4	48.2	5.2	7.7	1 3/8 X 3 3/4
1100	450C112M400AC8	87.4	41.2	6.0	8.7	1 3/8 X 4 1/4
1200	450C122M400EB8	83.0	36.9	6.6	9.9	1 3/4 X 3 1/4
1200	450C122M400BH8	92.9	43.0	6.3	9.3	2 X 2 3/4
1300	450C132M400AD8	75.9	36.2	6.7	9.7	1 3/8 X 4 3/4
1500	450C152M400BB8	71.4	33.3	7.6	11.1	2 X 3 1/4

Type 450C 105 °C Highest Ripple, Inverter Grade, Plug-in, Aluminum

Ultra-High Ripple Capabilities in a Plug-In Configuration

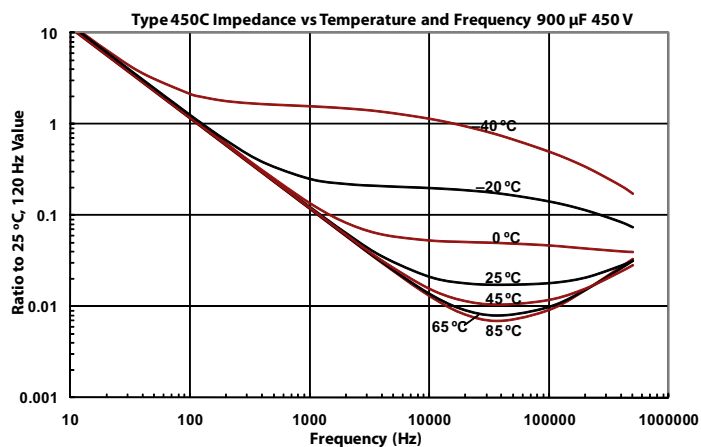
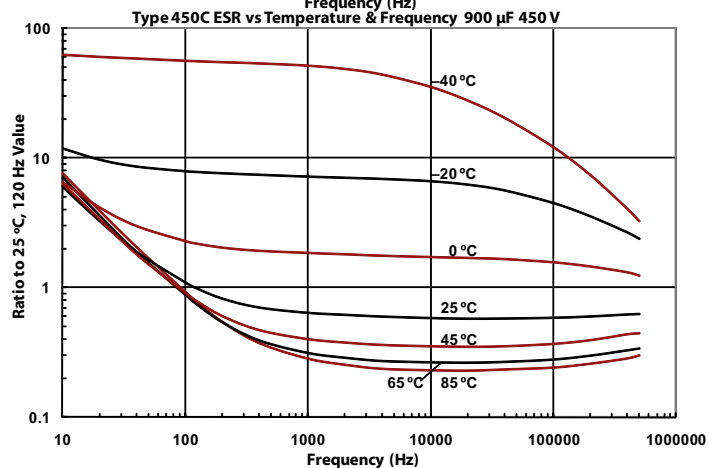
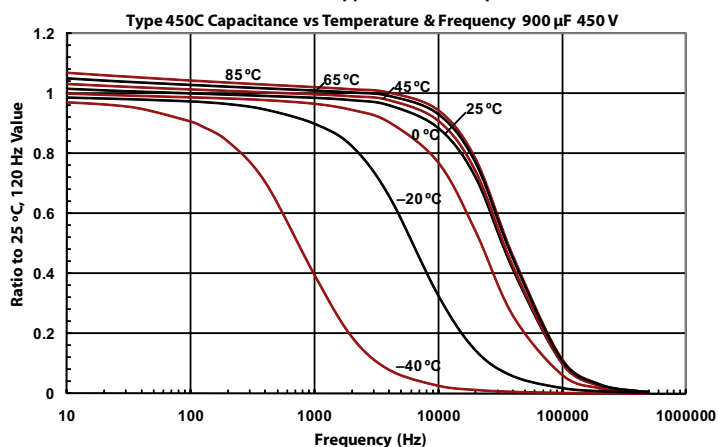
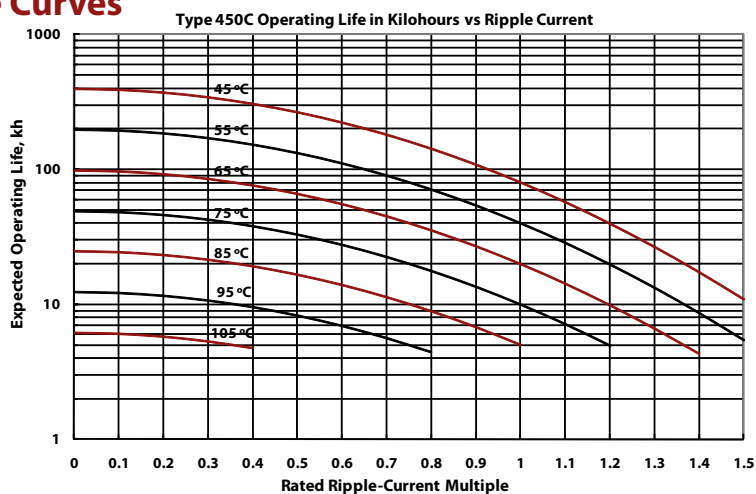
Additional Low Voltages Available at <http://www.cde.com/catalogs/450C.pdf>

Cap. (µF)	Catalog Part Number	ESR Max. 25 °C		Ripple Amps, 85 °C		Nom Size D X L (in)
		120 Hz	20 kHz	120 Hz	20 kHz	
		(mΩ)	(mΩ)	(A)	(A)	
400 Vdc (450 Vdc Surge)						
1500	450C152M400AE8	67.2	32.5	7.5	10.8	1 3/8 X 5 1/4
1500	450C152M400EJ8	67.5	30.3	7.5	11.3	1 3/4 X 3 3/4
1600	450C162M400AF8	60.4	29.6	8.3	11.9	1 3/8 X 5 3/4
1800	450C182M400EC8	59.4	26.9	8.5	12.6	1 3/4 X 4 1/4
1900	450C192M400BJ8	58.2	27.4	9.4	13.7	2 X 3 3/4
2100	450C212M400ED8	51.6	23.7	9.6	14.2	1 3/4 X 4 3/4
2200	450C222M400BC8	50.1	24.3	10.2	14.7	2 X 4 1/4
2300	450C232M400EE8	45.7	21.2	10.8	15.9	1 3/4 X 5 1/4
2600	450C262M400EF8	41.1	19.4	12.2	17.8	1 3/4 X 5 3/4
2600	450C262M400BD8	43.3	20.7	11.4	16.4	2 X 4 3/4
3100	450C312M400BE8	37.0	18.1	12.7	18.2	2 X 5 1/4
3400	450C342M400BF8	33.4	16.6	13.9	19.7	2 X 5 3/4
450 Vdc (500 Vdc Surge)						
210	450C211M450AK8	384.0	171.0	2.0	3.1	1 3/8 X 1 3/4
310	450C311M450AA8	256.0	115.0	2.9	4.3	1 3/8 X 2 1/4
400	450C401M450AH8	178.0	80.4	3.5	5.3	1 3/8 X 2 3/4
520	450C521M450EA8	157.0	69.2	4.1	6.3	1 3/4 X 2 1/4
580	450C581M450AB8	137.0	62.3	4.3	6.4	1 3/8 X 3 1/4
650	450C651M450BA8	138.0	63.3	4.8	7.1	2 X 2 1/4
700	450C701M450EH8	116.0	50.1	5.2	7.9	1 3/4 X 2 3/4
710	450C711M450AJ8	111.0	51.1	5.1	7.5	1 3/8 X 3 3/4
840	450C841M450AC8	93.9	43.6	5.8	8.5	1 3/8 X 4 1/4
870	450C871M450BH8	99.2	45.0	6.1	9.1	2 X 2 3/4
920	450C921M450EB8	88.9	38.8	6.4	9.6	1 3/4 X 3 1/4
990	450C991M450AD8	81.5	38.3	6.5	9.5	1 3/8 X 4 3/4
1100	450C112M450EJ8	72.3	31.8	7.3	11.0	1 3/4 X 3 3/4
1100	450C112M450AE8	72.1	34.3	7.2	10.5	1 3/8 X 5 1/4
1200	450C122M450AF8	64.8	31.2	8.0	11.6	1 3/8 X 5 3/4
1200	450C122M450BB8	76.3	34.9	7.4	10.9	2 X 3 1/4
1400	450C142M450BJ8	62.1	28.7	9.1	13.5	2 X 3 3/4
1400	450C142M450EC8	63.6	28.3	8.2	12.3	1 3/4 X 4 1/4
1600	450C162M450ED8	55.2	24.8	9.3	13.9	1 3/4 X 4 3/4
450 Vdc (500 Vdc Surge)						
1700	450C172M450BC8	53.4	25.4	9.9	14.4	2 X 4 1/4
1800	450C182M450EE8	48.9	22.3	10.5	15.5	1 3/4 X 5 1/4
2000	450C202M450EF8	44.0	20.3	11.8	17.4	1 3/4 X 5 3/4
2000	450C202M450BD8	46.2	21.6	11.0	16.1	2 X 4 3/4
2300	450C232M450BE8	39.4	18.9	12.3	17.8	2 X 5 1/4
2600	450C262M450BF8	35.6	17.3	13.4	19.3	2 X 5 3/4
500 Volts (550 Vdc Surge)						
150	450C151M500AK8	440.0	158.0	1.9	3.2	1 3/8 X 1 3/4
230	450C231M500AA8	294.0	106.0	2.7	4.5	1 3/8 X 2 1/4
330	450C331M500AH8	204.0	73.8	3.3	5.5	1 3/8 X 2 3/4
350	450C351M500EA8	262.0	146.0	3.7	6.0	1 3/4 X 2 1/4
430	450C431M500AB8	157.0	57.0	4.1	6.7	1 3/8 X 3 1/4
440	450C441M500BA8	208.0	122.0	4.4	6.9	2 X 2 1/4
500	450C501M500EH8	182.0	102.0	4.8	7.7	1 3/4 X 2 3/4
530	450C531M500AJ8	128.0	46.7	4.7	7.8	1 3/8 X 3 3/4
620	450C621M500BH8	144.0	85.3	5.7	9.0	2 X 2 3/4
630	450C631M500AC8	145.0	82.8	5.4	8.9	1 3/8 X 4 1/4
660	450C661M500EB8	140.0	78.6	5.9	9.5	1 3/4 X 3 1/4
700	450C701M500AD8	93.5	34.7	6.1	9.9	1 3/8 X 4 3/4
820	450C821M500EJ8	114.0	64.4	6.8	10.9	1 3/4 X 3 3/4
830	450C831M500BB8	111.0	66.0	6.9	10.7	2 X 3 1/4
830	450C831M500AE8	82.7	31.0	6.8	11.0	1 3/8 X 5 1/4
930	450C931M500AF8	74.3	28.2	7.5	12.2	1 3/8 X 5 3/4
970	450C971M500EC8	96.0	54.8	7.6	12.2	1 3/4 X 4 1/4
1000	450C102M500BJ8	90.4	54.1	8.5	13.3	2 X 3 3/4
1100	450C112M500ED8	83.3	48.0	8.6	13.7	1 3/4 X 4 3/4
1200	450C122M500BC8	76.4	46.2	9.3	14.5	2 X 4 1/4
1300	450C132M500EE8	73.7	42.8	9.7	15.4	1 3/4 X 5 1/4
1400	450C142M500EF8	66.3	38.9	11.0	17.3	1 3/4 X 5 3/4
1400	450C142M500BD8	66.4	40.5	10.3	15.9	2 X 4 3/4
1700	450C172M500BE8	57.3	35.4	11.5	17.7	2 X 5 1/4
1900	450C192M500BF8	51.8	32.3	12.6	19.1	2 X 5 3/4

Type 450C 105 °C Highest Ripple, Inverter Grade, Plug-in, Aluminum

Ultra-High Ripple Capabilities in a Plug-In Configuration

Typical Performance Curves



Type MLP 85 °C Flatpack, Ultra Long Life, Aluminum Electrolytic

Very Low Profile



The MLP's high-energy storage and box-shape make it perfect for voltage holdup or filtering in military SEM-E modules, telecom circuit packs and computer cards. The MLP delivers up to 20 joules of energy storage in a 1/2" height with 50 year's life at +45 °C. You can readily heatsink it to double the ripple-current capability. The MLP is the square-peg component that fits the square-holes in electronic assemblies.

Highlights

- Low-profile replacement for snap-ins
- Double the ripple capability with a heatsink
- Nearly hermetic welded seal assures 50-year life
- Withstands more than 80,000 feet altitude

Specifications

Temperature Range	–55°C to +85°C ≤250 Vdc –40°C to +85°C ≥300 Vdc							
Rated Voltage Range	7.5 Vdc to 450 Vdc							
Capacitance Range	110 μF to 47,000 μF							
Capacitance Tolerance	±20%							
Leakage Current	≤ 0.002 CV μA, @ 25 °C and 5 min.							
Ripple Current Multipliers	Ambient Temperature, No Heatsink							
	45 °C	55 °C	65 °C	75 °C	85 °C			
	1.00	0.90	0.75	0.56	0.27			
	Case Temperature							
	45 °C	55 °C	65 °C	75 °C	85 °C			
	3.79	3.32	2.77	2.08	1.00			
Ripple Current Multipliers	Frequency							
		50 Hz	60 Hz	120 Hz	360 Hz	1 kHz	5 kHz	10 kHz & up
	7.5 to 63 V	0.94	0.95	1.00	1.04	1.05	1.06	1.06
	80 to 450 V	0.80	0.85	1.00	1.17	1.24	1.28	1.29
Low Temperature Characteristics	Impedance ratio: Z _{–55°C} /Z _{+25°C} ≤ 10 (7.5 - 20 Vdc) ≤ 2 (25 – 250 Vdc) Impedance ratio: Z _{–20°C} /Z _{+25°C} ≤ 4 (300–450Vdc)							
Endurance Life Test	2000 h @ full load at +85 °C Δ Capacitance ±10% ESR 200% of limit DCL 100% of limit							
Shelf Life Test	500 h at 85 °C Capacitance 100% of limit ESR 100% of limit DCL 100% of limit							
Vibration	10 Hz to 2 kHz, 0.06" pp max and 10g. MIL-STD-202, Meth. 204							

Type MLP 85 °C Flatpack, Ultra Long Life, Aluminum Electrolytic

Very Low Profile

Thermal Resistance	Large Sides Heatsinked	Case Length	1.5"	2.0"	3.0"
		Insulation	°C/W	°C/W	°C/W
	one	None	3.0	1.8	1.2
		Polyester	4.3	2.6	1.7
	both	None	2.8	1.7	1.1
		Polyester	4.0	2.4	1.6
ESL	<30 nH measured 1/4" from case at 1 MHz				
Weight	Case EK 30 g typical Case EA 42 g typical Case EB 66 g typical				
Terminals	18 AWG copper wire with 60/40 tin-lead electroplate, 20 amps max				
Double the Ripple Current	Attach the MLP to an external heatsink and you can easily double the ripple current capability and assure long life through cooler operation. The broad, flat top and bottom on the MLP are ideal for cooling the capacitor and removing the heat caused by ripple current.				
Ripple Current Capability	The ripple current capability is set by the maximum permissible internal core temperature, 88 °C. This assures that the case does not inflate beyond 0.5 inch height.				
Air Cooled	The ripple currents in the ratings tables are for 85 °C case temperatures. For air temperatures without a heatsink use the multipliers Ambient Temperature, No Heatsink.				
Heatsink Cooled	Temperature rise from the internal hottest spot, the core, to ambient air is $\Delta T = I^2(ESR)(\theta_{cc} + \theta_{ca})$ where θ_{cc} is the thermal resistance from core to case and θ_{ca} from case to ambient. To calculate maximum ripple capability with the MLP attached to a heatsink use the maximum core temperature and the values for θ_{cc} .				
Example	As an illustration, suppose you operate an insulated MLP332M080EB1C in 65 °C air and attach it to a commercial heatsink with a free-air thermal resistance of 2.7 °C/W. Use a good thermal grease between the MLP and the heatsink, and the total thermal resistance is 2.7 + 1.7 or 4.4 °C/W. The power which would heat the core to 88 °C is (88-65)/4.4 or 4.75 W. For an ESR of 31 mΩ, 4.7 W equates to a ripple current of 12.3 A.				

Part Numbering System

MLP	102	M	200	EB	0	A
Type	Capacitance	Tolerance	Rated Voltage	Case Code	Insulation	Mounting Style
MLP	821=820 µF 102 = 1000 µF	M=±20%	Vdc	EK, L=1.5 in. EA, L=2.0 in. EB, L=3.0 in.	0 = bare can 1 = polyester	A = mounting tabs B = four leads C = two leads/no tabs D = hook leads/tabs E = hook leads/no tabs

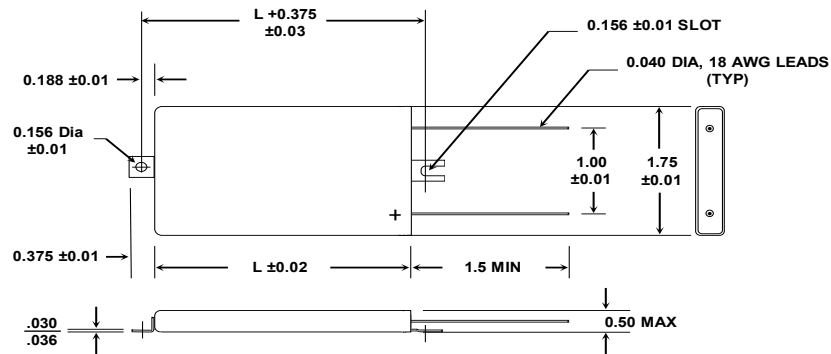
Type MLP 85 °C Flatpack, Ultra Long Life, Aluminum Electrolytic

Very Low Profile

Outline Drawings

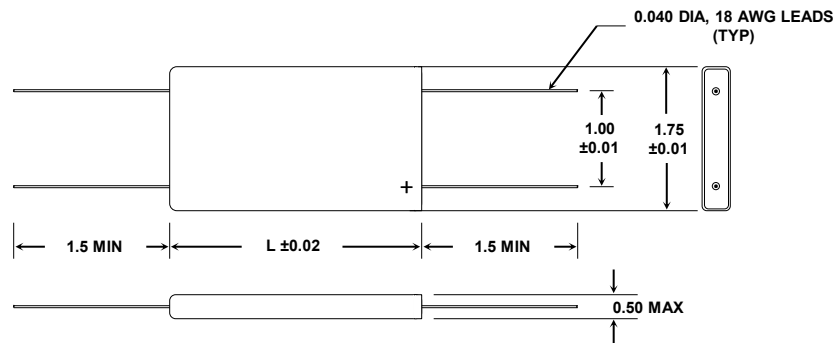
Style A: Mounting Tabs

Mounting tabs and negative lead are welded to the case.



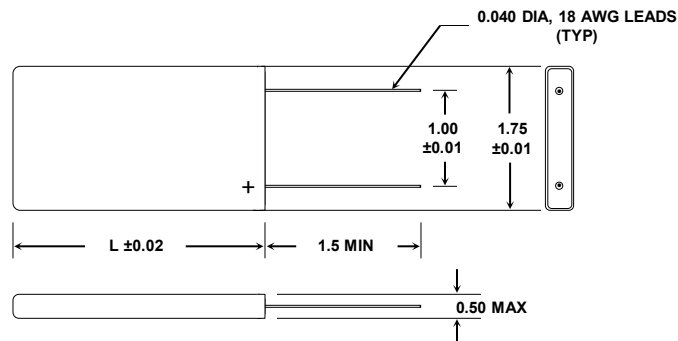
Style B: Four Leads

Three negative leads are welded to the case.



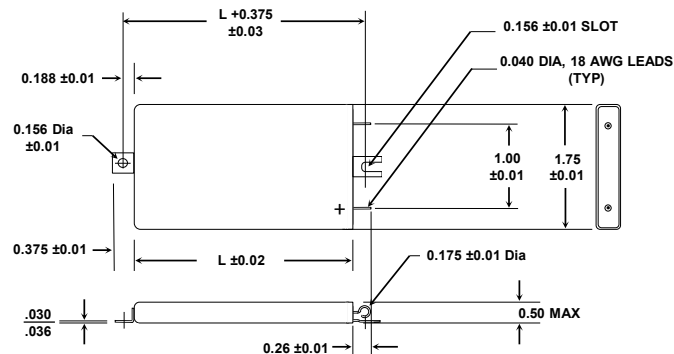
Style C: No Tabs

The negative lead is welded to the case.



Style D: Hook Leads

Mounting tabs and negative lead are welded to the case.



Case Code	Length L (in)	Weight (g)
EK	1.5	30
EA	2.0	42
EB	3.0	66

Type MLP 85 °C Flatpack, Ultra Long Life, Aluminum Electrolytic

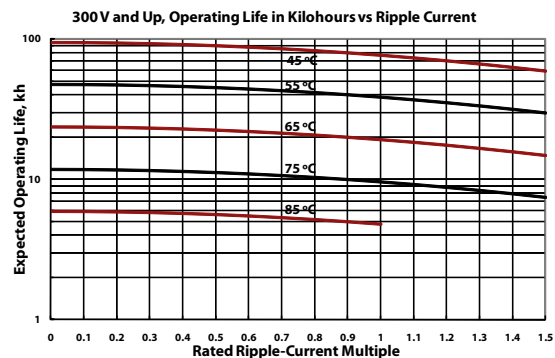
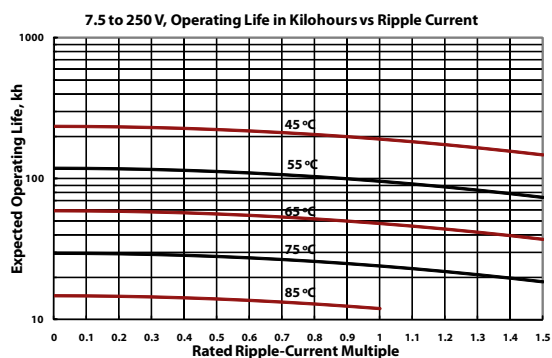
Very Low Profile

Ratings

Cap. (μF)	Catalog Part Number	ESR max 25 °C (mΩ)		Ripple (A) Case @ 85 °C		Length (Inches)
		120 Hz	20 kHz	120 Hz	20 kHz	
7.5 Vdc (10 Vdc Surge)						
19,000	MLP193M7R5EK0A	76	66	4.2	4.5	1.5
28,000	MLP283M7R5EA0A	50	44	5.8	6.2	2.0
47,000	MLP473M7R5EB0A	30	26	9.1	9.8	3.0
10 Vdc (13 Vdc Surge)						
17000	MLP173M010EK0A	77	67	4.2	4.5	1.5
26000	MLP263M010EA0A	51	45	5.8	6.1	2.0
43000	MLP433M010EB0A	30	27	9.0	9.6	3.0
16 Vdc (20 Vdc Surge)						
13000	MLP133M016EK0A	81	69	4.1	4.4	1.5
21000	MLP213M016EA0A	53	46	5.7	6.1	2.0
38000	MLP383M016EB0A	31	27	9.0	9.6	3.0
20 Vdc (25 Vdc Surge)						
9600	MLP962M020EK0A	84	69	4.0	4.4	1.5
14000	MLP143M020EA0A	56	46	5.5	6.1	2.0
24000	MLP243M020EB0A	33	27	8.7	9.6	3.0
25 Vdc (30 Vdc Surge)						
8000	MLP802M025EK0A	87	69	3.9	4.4	1.5
12000	MLP123M025EA0A	57	46	5.5	6.1	2.0
20000	MLP203M025EB0A	34	27	8.6	9.6	3.0
35 Vdc (50 Vdc Surge)						
5600	MLP562M035EK0A	90	70	3.4	4.4	1.5
8400	MLP842M035EA0A	59	46	5.4	6.1	2.0
14000	MLP143M035EB0A	35	27	8.4	9.6	3.0
50 Vdc (63 Vdc Surge)						
4400	MLP442M050EK0A	97	70	3.7	4.4	1.5
6600	MLP662M050EA0A	62	46	5.2	6.1	2.0
11000	MLP113M050EB0A	36	27	8.3	9.6	3.0
63 Vdc (75 Vdc Surge)						
2200	MLP222M063EK0A	101	76	3.7	4.2	1.5
3300	MLP332M063EA0A	64	50	5.2	5.8	2.0
5600	MLP562M063EB0A	36	29	8.3	9.3	3.0
80 Vdc (100 Vdc Surge)						
1500	MLP152M080EK0A	106	77	3.6	4.2	1.5
2100	MLP212M080EA0A	72	52	4.9	5.7	2.0
3300	MLP332M080EB0A	44	31	7.5	9.0	3.0

Cap. (μF)	Catalog Part Number	ESR max 25 °C (mΩ)		Ripple (A) Case @ 85 °C		Length (Inches)
		120 Hz	20 kHz	120 Hz	20 kHz	
100 Vdc (125 Vdc Surge)						
1100	MLP112M100EK0A	112	78	3.5	4.2	1.5
1600	MLP162M100EA0A	76	54	4.7	5.6	2.0
2700	MLP272M100EB0A	46	33	7.4	8.7	3.0
150 Vdc (180 Vdc Surge)						
500	MLP501M150EK0A	355	248	1.9	2.3	1.5
770	MLP771M150EA0A	238	166	2.7	3.2	2.0
1300	MLP132M150EB0A	143	100	4.2	5.0	3.0
200 Vdc (250 Vdc Surge)						
400	MLP401M200EK0A	388	253	1.9	2.3	1.5
600	MLP601M200EA0A	261	168	2.6	3.2	2.0
1000	MLP102M200EB0A	158	100	3.8	5.0	3.0
250 Vdc (300 Vdc Surge)						
330	MLP331M250EK0A	426	258	1.8	2.3	1.5
490	MLP491M250EA0A	285	172	2.4	3.1	2.0
820	MLP821M250EB0A	172	103	3.8	4.9	3.0
300 Vdc (350 Vdc Surge)						
220	MLP221M300EK0A	597	393	1.5	1.9	1.5
330	MLP331M300EA0A	399	262	2.1	2.5	2.0
560	MLP561M300EB0A	240	157	3.2	4.0	3.0
350 Vdc (400 Vdc Surge)						
150	MLP151M350EK0A	1000	734	1.2	1.4	1.5
220	MLP221M350EA0A	683	503	1.6	1.8	2.0
370	MLP371M350EB0A	420	310	2.3	2.8	3.0
400 Vdc (450 Vdc Surge)						
130	MLP131M400EK0A	1320	970	1.0	1.2	1.5
200	MLP201M400EA0A	882	648	1.4	1.6	2.0
330	MLP331M400EB0A	530	390	2.1	2.5	3.0
420 Vdc (475 Vdc Surge)						
130	MLP131M420EK0A	1320	970	1.0	1.2	1.5
200	MLP201M420EA0A	882	648	1.4	1.6	2.0
330	MLP331M420EB0A	530	390	2.1	2.5	3.0
450 Vdc (500 Vdc Surge)						
110	MLP111M450EK0A	1456	1190	0.96	1.1	1.5
170	MLP171M450EA0A	973	797	1.3	1.5	2.0
280	MLP281M450EB0A	585	480	2.0	2.3	3.0

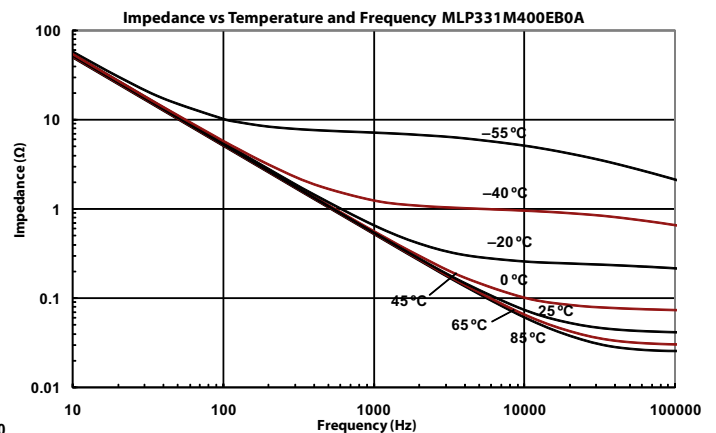
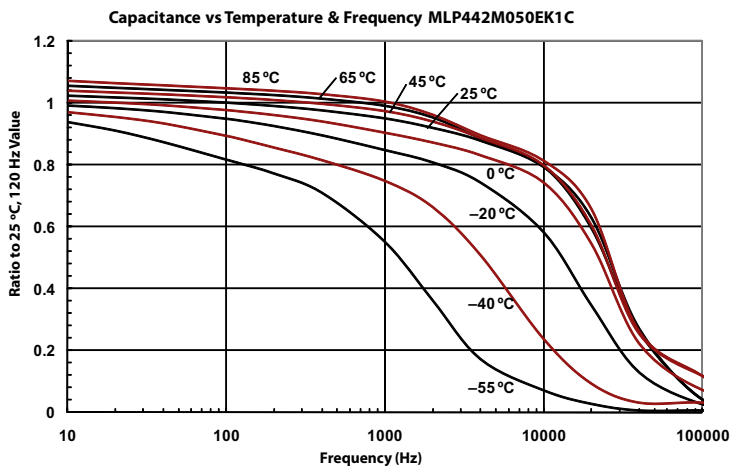
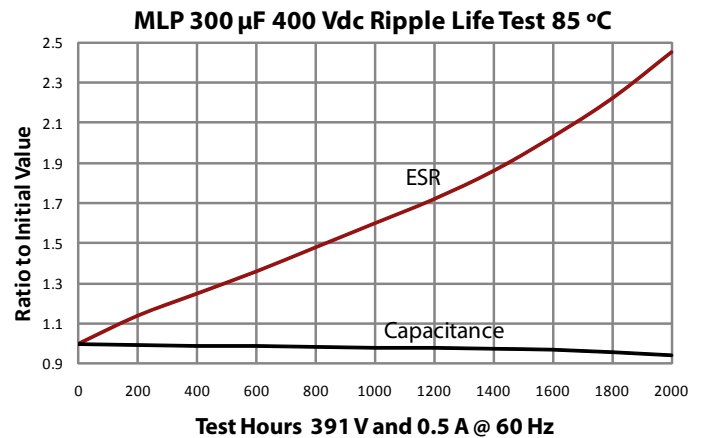
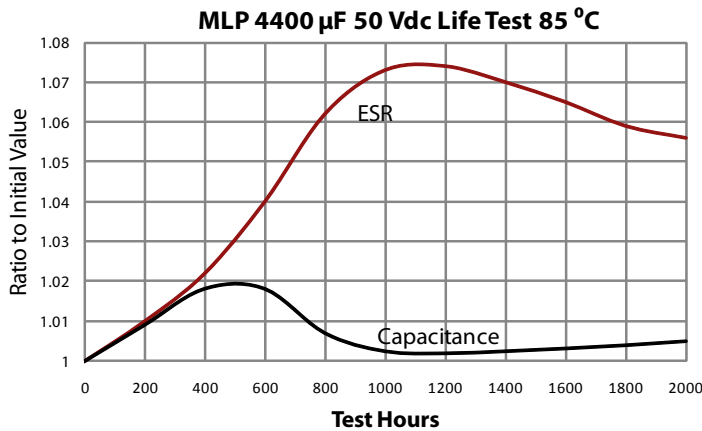
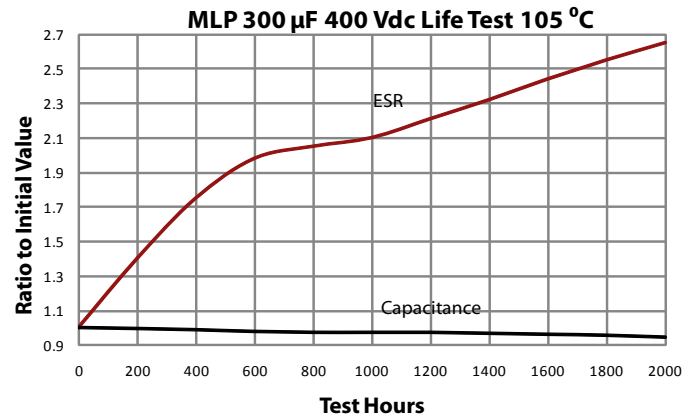
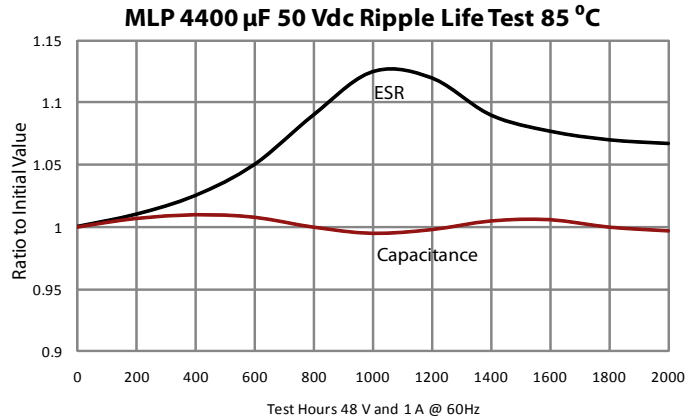
Typical Performance Curves



Type MLP 85 °C Flatpack, Ultra Long Life, Aluminum Electrolytic

Very Low Profile

Typical Performance Curves



Type MLS 125 °C Flatpack, Ultra Long Life, Aluminum Electrolytic

Rugged Stainless-Steel Case



The Type MLS extends the super performance of the MLP from a maximum operating temperature of 85 °C to 125 °C. While the MLP is inherently capable of operation at 125 °C, its flat aluminum case can't withstand the higher temperature without inflating from internal pressure. The MLS incorporates a rugged, stainless steel case which assures flatness to beyond 125 °C. The MLS is perfect for hi-rel military systems and applications operating above 85 °C.

Highlights

- Near-hermetic welded seal
- Stainless-steel case
- 100 years expected operating life
- Withstands more than 80,000 feet altitude

Specifications

Temperature Range	-55 °C to +125 °C								
Rated Voltage Range	5.0 Vdc to 250 Vdc								
Capacitance Range	220 μF to 47,000 μF								
Capacitance Tolerance	±20%								
Leakage Current	≤ 0.002 CV μA, @ 25 °C and 5 mins.								
Ripple Current Multipliers	Case Temperature								
	45 °C	55 °C	65 °C	75 °C	85 °C	95 °C	105 °C	115 °C	125 °C
	1.41	1.32	1.22	1.12	1.00	0.87	0.71	0.50	0.00
	Ambient Temperature, No Heatsink								
	45 °C	55 °C	65 °C	75 °C	85 °C	95 °C	105 °C	115 °C	125 °C
	0.63	0.58	0.54	0.49	0.44	0.38	0.31	0.22	0.00
	Frequency								
		50 Hz	60 Hz	120 Hz	360 Hz	1 kHz	5 kHz	10 kHz & up	
	5 to 40 V	0.95	0.96	1.00	1.03	1.04	1.04	1.04	
	60 to 250 V	0.80	0.84	1.00	1.18	1.25	1.30	1.30	
Low Temperature Characteristics	Impedance ratio: $Z_{-55\text{ °C}}/Z_{+25\text{ °C}}$ ≤ 10 (5 - 20 Vdc) ≤ 2 (25 - 250 Vdc)								
Endurance Life Test	10,000 h @ full load at 85 °C Δ Capacitance ±10% ESR 200% of limit DCL 100% of limit								
DC Life Test	2000 h at rated voltage & 125 °C Δ Capacitance ±10% ESR 200% of limit DCL 100% of limit								
Shelf Life Test	500 h at 125 °C Capacitance 100% of limit ESR 100% of limit DCL 100% of limit								
Vibration	10 Hz to 2 kHz, 0.06" pp max and 10g. MIL-STD-202, Meth. 204								

Type MLS 125 °C Flatpack, Ultra Long Life, Aluminum Electrolytic

Rugged Stainless-Steel Case

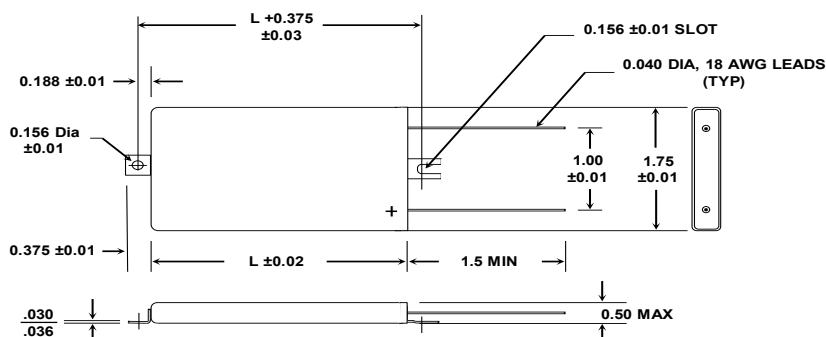
Thermal Resistance	Large Sides Heatsinked	Case Length	1.5"	2.0"	3.0"
		Insulation	°C/W	°C/W	°C/W
	one	None	3.3	1.8	1.3
		Polyester	4.5	2.6	1.6
	both	None	2.8	2.2	1.1
		Polyester	4.0	3.2	1.6
ESL	≤30 nH measured 1/4" from case at 1 MHz				
Weight	Case EK 43 g typical Case EA 76 g typical Case EB 92 g typical				
Terminals	18 AWG copper wire with 60/40 tin-lead electroplate, 20 amps max				
Ripple Current Capability	The ripple current capability is set by the maximum permissible internal core temperature, 125 °C.				
Air Cooled	The ripple currents in the ratings tables are for 85 °C case temperatures. For air temperatures without a heatsink use the multipliers Ambient Temperature, No Heatsink.				
Heatsink Cooled	Temperature rise from the internal hottest spot, the core, to ambient air is $\Delta T = I^2(ESR)(\theta_{cc} + \theta_{ca})$ where θ_{cc} is the thermal resistance from core to case and θ_{ca} from case to ambient. To calculate maximum ripple capability with the MLS attached to a heatsink use the maximum core temperature and the values for θ_{cc} .				
Example	As an illustration, suppose you operate an insulated MLS332M060EB1C in 65 °C air and attach it to a commercial heatsink with a free-air thermal resistance of 2.7 °C/W. Use a good thermal grease between the MLS and the heatsink, and the total thermal resistance is 2.7 + 1.8 or 4.5 °C/W. The power which would heat the core to 125 °C is (125 - 65)/4.5 or 13.3 W. For an ESR of 31 mΩ, 13.3 W equates to a ripple current of 20.7 A, however, the wire leads are rated for only 20 A.				

Part Numbering System

MLS	821	M	200	EB	0	A
Type	Capacitance	Tolerance	Rated Voltage	Case Code	Insulation	Mounting Style
MLS	821=820 μF 102 = 1000 μF	M=±20%	Vdc	EK, L=1.5 in. EA, L=2.0 in. EB, L=3.0 in.	0 = bare can 1 = polyester	A = mounting tabs C = two leads/no tabs D = hook leads/tabs

Outline Drawings

Style A: Mounting Tabs

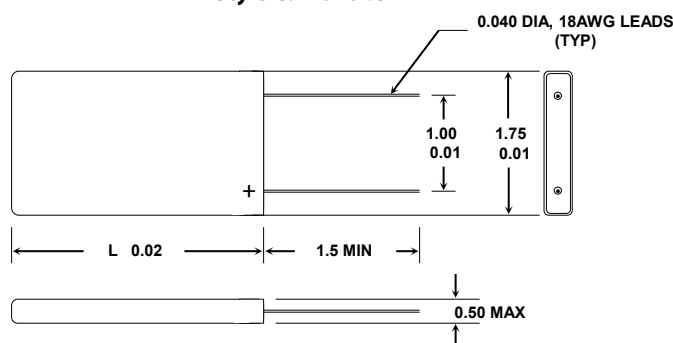


Type MLS 125 °C Flatpack, Ultra Long Life, Aluminum Electrolytic

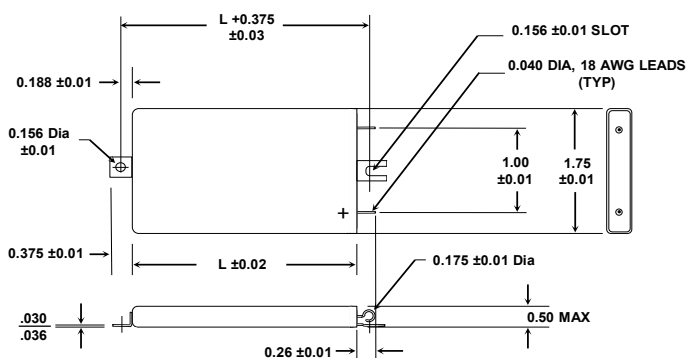
Rugged Stainless-Steel Case

Outline Drawings

Style C: No Tabs



Style D: Hook Leads



Case Code	Length L (in)	Weight (g)
EK	1.5	43
EA	2.0	76
EB	3.0	92

Ratings

Mounting tabs are welded to the case.

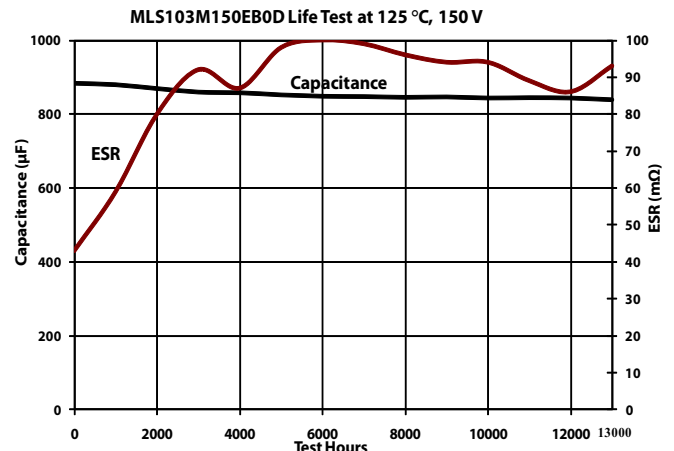
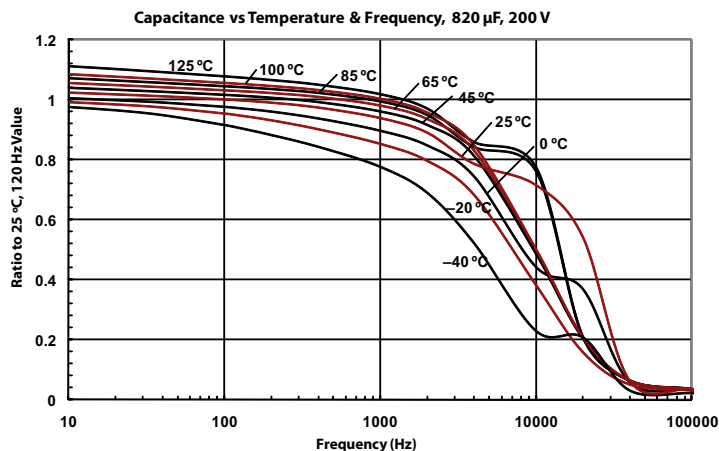
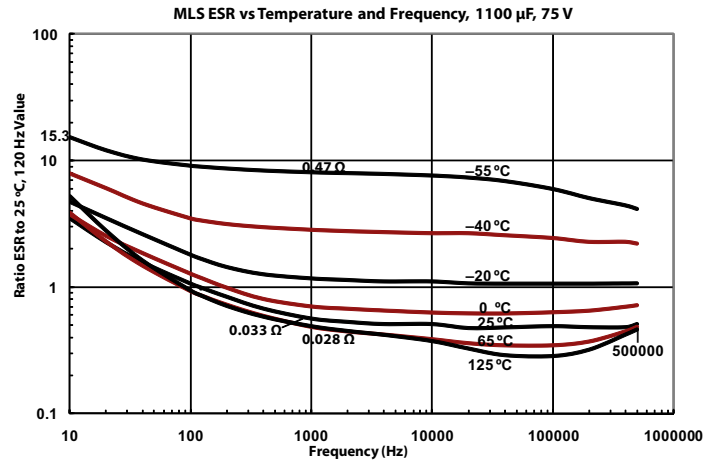
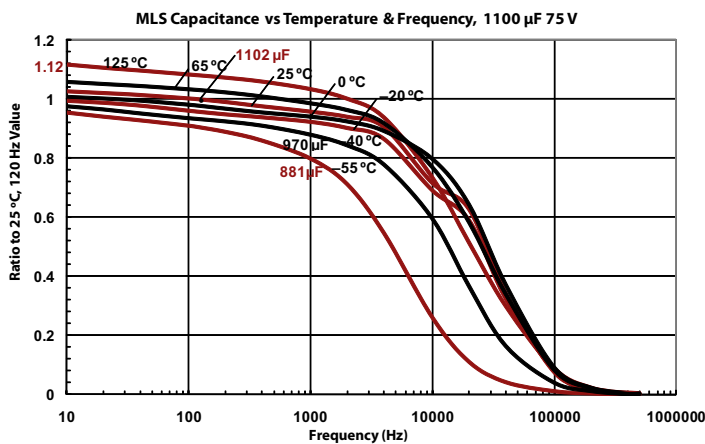
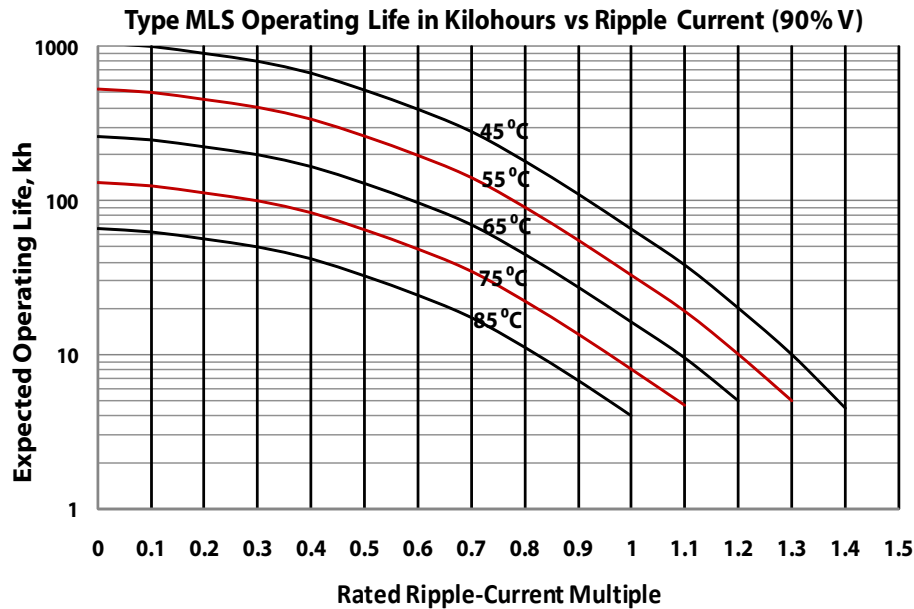
		ESR max		Ripple (A)		
Cap		25 °C (mΩ)		Case @ 85°C		Length
(μF)	Catalog Part Number	120 Hz	20 kHz	120 Hz	20 kHz	(inches)
5 Vdc (7.5 Vdc Surge) [105 °C: 7.5 Vdc (10 Vdc Surge)]						
19,000	MLS193M5R0EK0C	76	66	12.6	13.6	1.5
28,000	MLS283M5R0EA0c	50	44	19.9	21.4	2.0
47,000	MLS473M5R0EB0C	30	26	32.0	34.4	3.0
7.5 Vdc (10 Vdc Surge) [105 °C: 10 Vdc (13 Vdc Surge)]						
17,000	MLS173M7R5EK0C	77	67	12.5	13.5	1.5
26,000	MLS263M7R5EA0c	51	45	19.8	21.1	2.0
43,000	MLS433M7R5EB0C	31	27	31.5	33.8	3.0
10 Vdc (15 Vdc Surge) [105 °C: 16 Vdc (20 Vdc Surge)]						
13,000	MLS133M010EK0C	81	69	12.2	13.3	1.5
23,000	MLS233M010EA0C	51	45	19.8	21.1	2.0
38,000	MLS383M010EB0C	31	27	31.5	33.8	3.0
20 Vdc (30 Vdc Surge) [105 °C: 30 Vdc (40 Vdc Surge)]						
6,800	MLS682M020EK0C	84	69	11.0	12.2	1.5
10,000	MLS103M020EA0C	56	46	13.6	15.0	2.0
17,000	MLS173M020EB0C	33	27	17.6	19.5	3.0
40 Vdc (50 Vdc Surge) [105 °C: 50 Vdc (63 Vdc Surge)]						
4,400	MLS442M040EK0C	97	70	10.3	12.1	1.5
6,600	MLS662M040EA0C	62	46	12.9	15.0	2.0
11,000	MLS113M040EB0C	36	27	16.9	19.5	3.0
60 Vdc (75 Vdc Surge) [105 °C: 80 Vdc (100 Vdc Surge)]						
1,500	MLS152M060EK0C	106	77	9.8	11.5	1.5

		ESR max		Ripple (A)		
Cap		25 °C (mΩ)		Case @ 85°C		Length
(μF)	Catalog Part Number	120 Hz	20 kHz	120 Hz	20 kHz	(inches)
2,100	MLS212M060EA0C	72	52	11.9	14.1	2.0
3,300	MLS332M060EB0C	44	31	15.3	18.2	3.0
75 Vdc (100 Vdc Surge) [105 °C: 100 Vdc (125 Vdc Surge)]						
1,100	MLS112M075EK0C	112	78	9.6	11.5	1.5
1,600	MLS162M075EA0C	76	54	11.6	13.8	2.0
2,700	MLS272M075EB0C	46	33	14.9	17.6	3.0
100 Vdc (125 Vdc Surge) [105 °C: 150 Vdc (180 Vdc Surge)]						
500	MLS501M100EK0C	355	248	5.4	6.4	1.5
770	MLS771M100EA0C	238	166	6.6	7.8	2.0
1,300	MLS132M100EB0C	143	100	8.5	10.1	3.0
150 Vdc (175 Vdc Surge) [105 °C: 200 Vdc (250 Vdc Surge)]						
400	MLS401M150EK0C	388	253	5.1	6.4	1.5
600	MLS601M150EA0C	261	168	6.3	7.8	2.0
1,000	MLS102M150EB0C	158	100	8.1	10.1	3.0
200 Vdc (225 Vdc Surge) [105 °C: 250 Vdc (300 Vdc Surge)]						
330	MLS331M200EK0C	426	258	4.9	6.2	1.5
490	MLS491M200EA0C	285	172	6.0	7.7	2.0
820	MLS821M200EB0C	172	103	7.7	10.0	3.0
250 Vdc (275 Vdc Surge) [105 °C: 250 Vdc (300 Vdc Surge)]						
220	MLS221M250EK0C	597	393	4.1	5.1	1.5
330	MLS331M250EA0C	399	262	5.0	6.3	2.0
560	MLS561M250EB0C	240	157	6.5	8.1	3.0

Type MLS 125 °C Flatpack, Ultra Long Life, Aluminum Electrolytic

Rugged Stainless-Steel Case

Typical Performance Curves



Type 3186 85 °C Aluminum Electrolytic, Screw Terminal

Best Value 85 °C High Capacitance Screw Terminal Type



While Type 3186's standard encasement is by compression with the capacitor element captured on an aluminum peg in the can bottom and a phenolic peg in the top, rilled construction is available. With rilled construction the element is secured by rills, spoon shaped dimples in the side of the can. Rilled construction offers the industry's highest vibration and shock withstanding and excellent heat transfer. Besides increasing ripple current handling, the rilled construction extends the great value of the Type 3186 into military and transportation applications that require rugged mechanical capability.

Highlights

- Rilled cans withstand high shock and vibration
- High ripple current capability
- High capacitance per can

Specifications

Temperature Range	-40 °C to +85 °C					
Rated Voltage Range	16 Vdc to 500 Vdc					
Capacitance Range	220 uF to 1.0 F					
Capacitance Tolerance	-10% +75% ≤ 160 Vdc -10% +50% ≥ 200 Vdc					
Leakage Current	≤6√CV μA (6 mA max.) at 5 minutes					
Ripple Current Multipliers	Ambient Temperature					
	45 °C	55 °C	65 °C	75 °C	85 °C	
	2.24	2.00	1.73	1.41	1.00	
	Frequency					
		60 Hz	120 Hz	300 Hz	1000 Hz	≥10 kHz
	16 – 100 V	0.90	1.00	1.15	1.25	1.30
200 – 500 V	0.90	1.00	1.25	1.40	1.50	
Low Temperature Characteristics	Impedance ratio: Z _{-20 °C} /Z _{+25 °C} ≤ 8 (16–50 Vdc) ≤ 4 (63–100 Vdc) ≤ 3 (150–500 Vdc)					
Endurance Life Test	2,000 h @ full load at 85 °C ΔCapacitance ±10% ESR 200% of limit DCL 100% of limit					
Shelf Life Test	500 h @ 85 °C ΔCapacitance ±10% ESR 175% of limit DCL 100% of limit					
Vibration	10 to 55 Hz, 0.06" & 10 g max for compression, 15 g max for rilled, 1.5 h each of 2 axes					
RoHS Compliant						

Type 3186 85 °C Aluminum Electrolytic, Screw Terminal

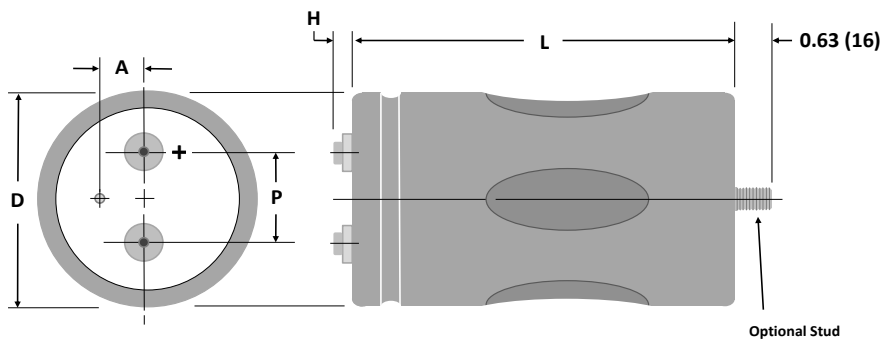
Best Value 85 °C High Capacitance Screw Terminal Type

Part Numbering System

3186	GH	562	T	400	M	P	A1
Type	Case Code	Capacitance	Tolerance	Voltage	Terminal	Insulation	Construction*
		562=5600 µF 223=22000 µF 821=820 µF	M= ±20% S= -10 +30% T= -10 +50% U= -10 +75%	016=16 Vdc 450=450 Vdc	A=high post B=low post D=high current low post K=high current high post M=M5 high post J=M6 low post	P=0.008" PVC N=none with mounting clamp/bracket R=0.008" PVC X=none	A1=compression R1=rilled S1=stud & compression** T1=stud & rilled**

Outline Drawing

* Construction code is also a sequence number, e.g., A1, A2,---,A9, B1,B2,---, for customer specifications. Sequence number 1 in A1, R1, S1 and T1 denotes the standard catalog capacitor with no special requirements.



Stud Dimensions

Case	Stud	P ± 0.039"
Diam.	Thread	(±1.0 mm)
1.375	M8	0.470" (12.0)
1.750	M8	0.470" (12.0)
2.000	M12	0.630" (16.0)
2.500	M12	0.630" (16.0)
3.000	M12	0.630" (16.0)

Can Dimensions Insulation Adders

	Diameter (D)		Length (L)		Standing Height (H)	
	(in)	(mm)	(in)	(mm)	(in)	(mm)
0.008" PVC	0.02	0.51	0.032	0.81	0.024	0.61

Terminal Dimensions

Terminal Style	For Case Diameters	Code	Post Diameter		H max		Thread	min Full Thread		Torque	
			in	mm	in	mm		in	mm	in-lb	N-m
Low Post	1 3/8 to 3	B	0.314	8.0	0.094	2.4	10-32	0.218	5.5	25	2.82
High Post	1 3/8 to 3	A	0.314	8.0	0.281	7.1	10-32	0.375	9.5	25	2.82
High Current, Low	2 1/2 & 3	D	0.684	17.4	0.125	3.2	¼-28	0.344	8.7	60	6.78
High Current, High	2 1/2 & 3	K	0.684	17.4	0.281	7.1	¼-28	0.469	11.9	60	6.78
M5 Post, Small	1 3/8 to 2	M	0.314	8.0	0.281	7.1	M5	0.375	9.5	25	2.82
M6 Low Post	3	J	0.684	17.4	0.125	3.2	M6	0.344	8.7	60	6.78

Type 3186 85 °C Aluminum Electrolytic, Screw Terminal

Best Value 85 °C High Capacitance Screw Terminal Type

Case Dimensions, Uninsulated Bare Can

Case Code	Diam. (D)		Length (L)		Terminal Space(P)		Vent Plug (A)		Typical Weight		Optional Bracket Part No.
	±0.031 (in)	±0.8 (mm)	±0.062 (in)	±1.6 (mm)	±0.014 (in)	±0.4 (mm)					
BA	1.375	34.9	2.125	54.0	0.5	12.7	0.39	8.0	2.5	72	115058-06
BB	1.375	34.9	2.625	66.7	0.5	12.7	0.39	8.0	3.2	90	115058-06
BC	1.375	34.9	3.125	79.4	0.5	12.7	0.39	8.0	3.7	105	115058-06
BD	1.375	34.9	3.625	92.1	0.5	12.7	0.39	8.0	4.2	120	115058-06
BE	1.375	34.9	4.125	104.8	0.5	12.7	0.39	8.0	4.7	135	115058-06
BF	1.375	34.9	4.625	117.5	0.5	12.7	0.39	8.0	6.0	170	115058-06
BG	1.375	34.9	5.125	130.2	0.5	12.7	0.39	8.0	7.7	220	115058-06
BH	1.375	34.9	5.625	142.9	0.5	12.7	0.39	8.0	9.5	270	115058-06
DA	1.750	44.5	2.125	54.0	0.75	19.1	0.453	11.5	5.6	160	115058-15
DB	1.750	44.5	2.625	66.7	0.75	19.1	0.453	11.5	6.1	175	115058-15
DC	1.750	44.5	3.125	79.4	0.75	19.1	0.453	11.5	6.3	180	115058-15
DD	1.750	44.5	3.625	92.1	0.75	19.1	0.453	11.5	7.2	205	115058-15
DE	1.750	44.5	4.125	104.8	0.75	19.1	0.453	11.5	7.7	220	115058-15
DF	1.750	44.5	4.625	117.5	0.75	19.1	0.453	11.5	8.2	235	115058-15
DG	1.750	44.5	5.125	130.2	0.75	19.1	0.453	11.5	8.8	250	115058-15
DH	1.750	44.5	5.625	142.9	0.75	19.1	0.453	11.5	9.5	270	115058-15
EA	2.000	50.8	2.125	54.0	0.875	22.2	0.5	12.7	6.0	170	115058-09
EB	2.000	50.8	2.625	66.7	0.875	22.2	0.5	12.7	6.3	180	115058-09
EC	2.000	50.8	3.125	79.4	0.875	22.2	0.5	12.7	6.7	190	115058-09
ED	2.000	50.8	3.625	92.1	0.875	22.2	0.5	12.7	7.7	220	115058-09
EE	2.000	50.8	4.125	104.8	0.875	22.2	0.5	12.7	8.9	255	115058-09
EF	2.000	50.8	4.625	117.5	0.875	22.2	0.5	12.7	10.2	290	115058-09
EG	2.000	50.8	5.125	130.2	0.875	22.2	0.5	12.7	11.2	320	115058-09
EH	2.000	50.8	5.625	142.9	0.875	22.2	0.5	12.7	12.3	350	115058-09
FB	2.500	63.5	2.625	66.7	1.125	28.6	0.625	15.9	10.5	300	115058-14
FC	2.500	63.5	3.125	79.4	1.125	28.6	0.625	15.9	13.0	370	115058-14
FD	2.500	63.5	3.625	92.1	1.125	28.6	0.625	15.9	14.0	400	115058-14
FE	2.500	63.5	4.125	104.8	1.125	28.6	0.625	15.9	15.6	445	115058-14
FF	2.500	63.5	4.625	117.5	1.125	28.6	0.625	15.9	21.0	600	115058-14
FG	2.500	63.5	5.125	130.2	1.125	28.6	0.625	15.9	22.8	650	115058-14
FH	2.500	63.5	5.625	142.9	1.125	28.6	0.625	15.9	21.0	600	115058-14
GC	3.000	76.2	3.125	79.4	1.25	31.8	0.75	19.0	18.2	520	115058-11
GD	3.000	76.2	3.625	92.1	1.25	31.8	0.75	19.0	20.0	570	115058-11
GE	3.000	76.2	4.125	104.8	1.25	31.8	0.75	19.0	21.0	600	115058-11
GF	3.000	76.2	4.625	117.5	1.25	31.8	0.75	19.0	25.2	720	115058-11
GG	3.000	76.2	5.125	130.2	1.25	31.8	0.75	19.0	29.8	850	115058-11
GH	3.000	76.2	5.625	142.9	1.25	31.8	0.75	19.0	34.0	970	115058-11
GJ	3.000	76.2	5.875	149.2	1.25	31.8	0.75	19.0	36.8	1050	115058-11
GN	3.000	76.2	8.625	219.1	1.25	31.8	0.75	19.0	51.1	1460	115058-11

Type 3186 85 °C Aluminum Electrolytic, Screw Terminal

Best Value 85 °C High Capacitance Screw Terminal Type

Ratings

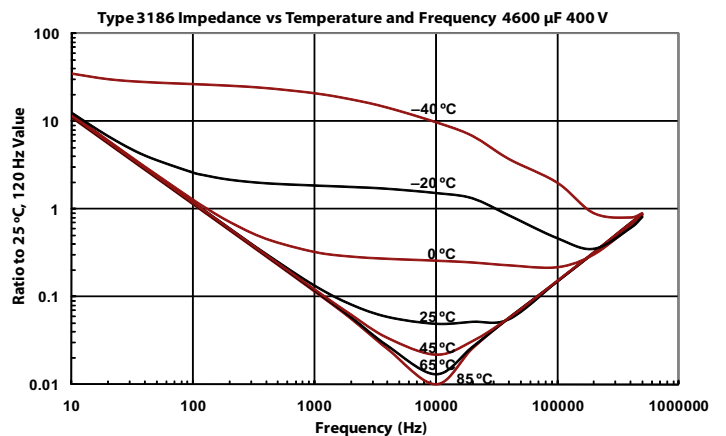
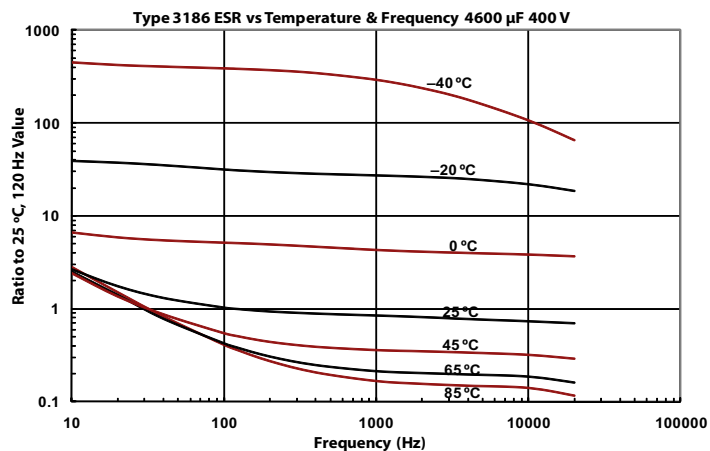
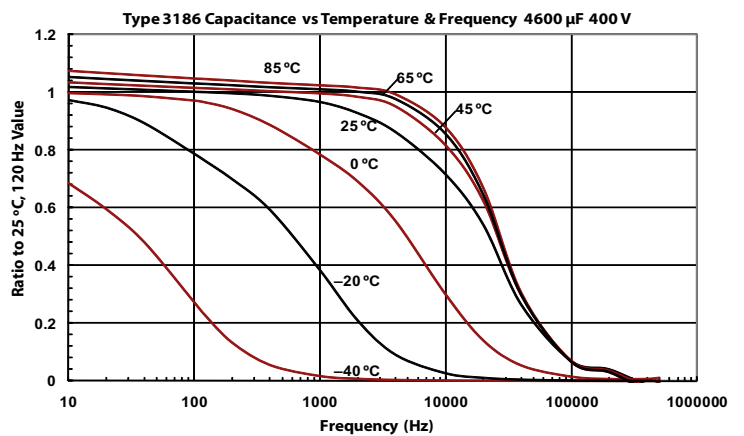
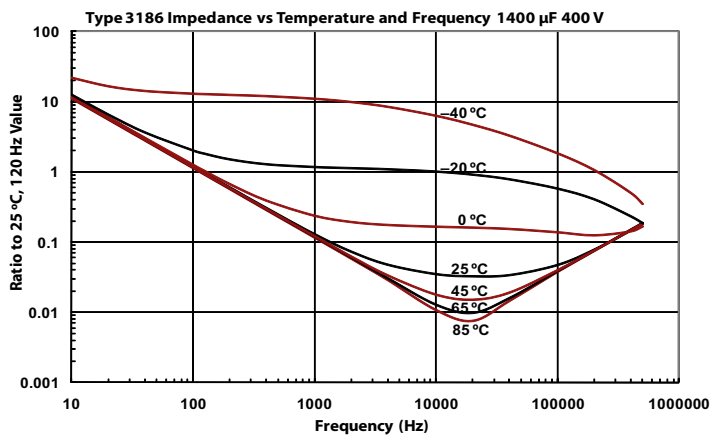
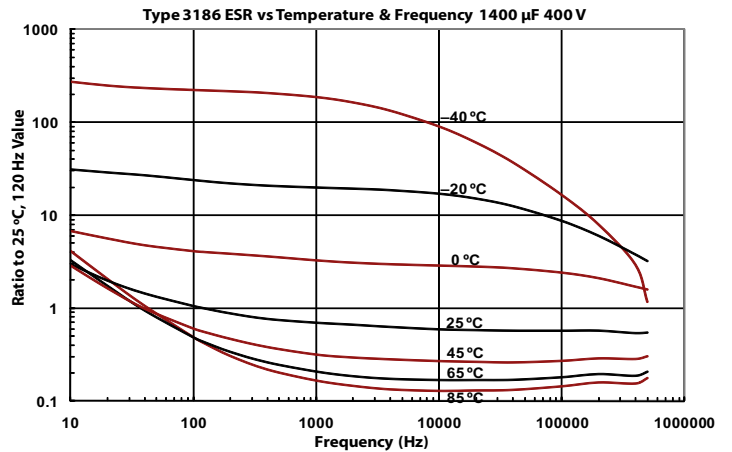
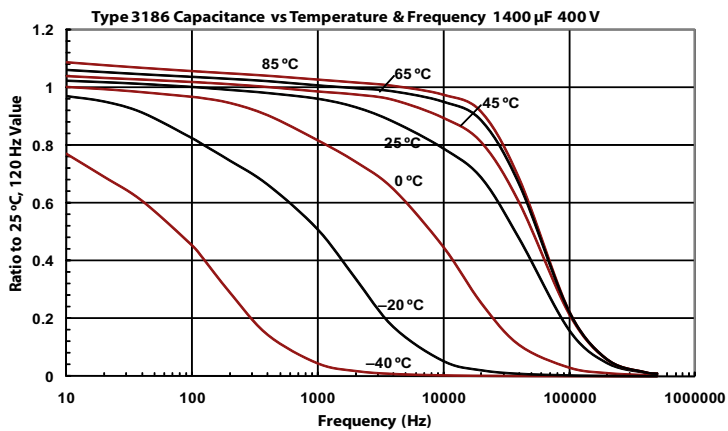
Additional Low Voltages and Smaller Sizes available at <http://www.cde.com/catalogs/3186.pdf>

Capacitance (μF)	Catalog Part Number	ESR max 120 Hz, 25 °C (mΩ)	Ripple max 120 Hz, 85 °C rilled(A)	Case Size DxL (in)
200 Volts (250 Volts Surge)				
10000	3186FE103T200APA1	22.0	11.0	2.50 X 4.125
12000	3186FF123T200APA1	17.0	12.0	2.50 X 4.625
12000	3186GE123T200APA1	26.0	11.0	3.00 X 4.125
15000	3186FH153T200APA1	16.0	14.0	2.50 X 5.625
15000	3186GF153T200APA1	23.0	12.0	3.00 X 4.625
22000	3186GH223T200APA1	17.0	15.0	3.00 X 5.625
33000	3186GN333T200APA1	15.0	17.0	3.00 X 8.625
250 Volts (300 Volts Surge)				
6800	3186FE682T250APA1	24.0	10.0	2.50 X 4.125
8200	3186FF822T250APA1	19.0	11.0	2.50 X 4.625
10000	3186FH103T250APA1	17.0	14.0	2.50 X 5.625
10000	3186GE103T250APA1	25.0	11.0	3.00 X 4.125
12000	3186GF123T250APA1	22.0	12.0	3.00 X 4.625
15000	3186GH153T250APA1	19.0	14.0	3.00 X 5.625
22000	3186GN223T250APA1	16.0	17.0	3.00 X 8.625
350 Volts (400 Volts Surge)				
2700	3186FE272T350APA1	54.0	6.6	2.50 X 4.125
3900	3186FF392T350APA1	37.0	8.7	2.50 X 4.625
4700	3186FH472T350APA1	33.0	9.6	2.50 X 5.625
4700	3186GE472T350APA1	33.0	9.6	3.00 X 4.125
5600	3186GF562T350APA1	33.0	10.0	3.00 X 4.625
6800	3186GH682T350APA1	28.0	11.0	3.00 X 5.625
12000	3186GN123T350APA1	18.0	18.0	3.00 X 8.625
400 Volts (450 Volts Surge)				
2700	3186FE272T400APA1	48.0	7.3	2.50 X 4.125
3300	3186FF332T400APA1	39.0	8.5	2.50 X 4.625
3900	3186FH392T400APA1	37.0	9.4	2.50 X 5.625
3900	3186GE392T400APA1	37.0	9.4	3.00 X 4.125
4700	3186GF472T400APA1	34.0	10.0	3.00 X 4.625
5600	3186GH562T400APA1	28.0	11.0	3.00 X 5.625
10000	3186GN103T400APA1	18.0	18.0	3.00 X 8.625
450 Volts (525 Volts Surge)				
2200	3186FE222T450APA1	53.0	6.7	2.50 X 4.125
2700	3186FF272T450APA1	45.0	7.7	2.50 X 4.625
3300	3186FH332T450APA1	35.0	9.5	2.50 X 5.625
3300	3186GE332T450APA1	35.0	9.5	3.00 X 4.125
3900	3186GF392T450APA1	36.0	9.8	3.00 X 4.625
4700	3186GH472T450APA1	31.0	11.0	3.00 X 5.625
8200	3186GN822T450APA1	23.0	14.0	3.00 X 8.625
500 Volts (550 Volts Surge)				
820	3186EE821T500APA1	132.0	3.4	2.00 X 4.125
1200	3186EG122T500APA1	90.0	4.6	2.00 X 5.125
2200	3186FG222T500APA1	59.0	6.6	2.50 X 5.125
3300	3186GH332T500APA1	43.0	8.6	3.00 X 5.625

Type 3186 85 °C Aluminum Electrolytic, Screw Terminal

Best Value 85 °C High Capacitance Screw Terminal Type

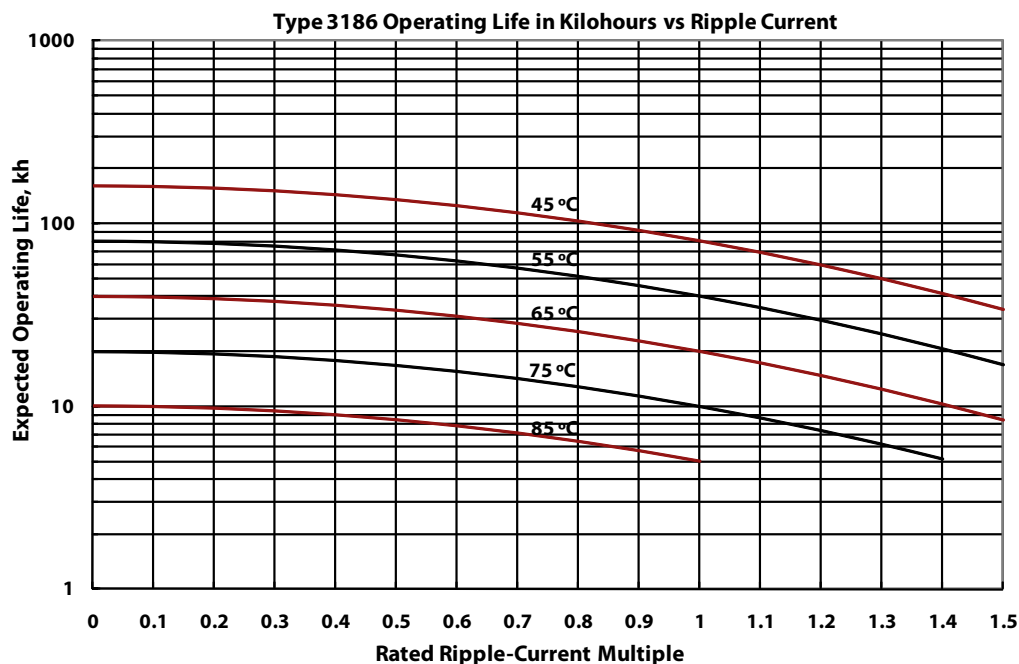
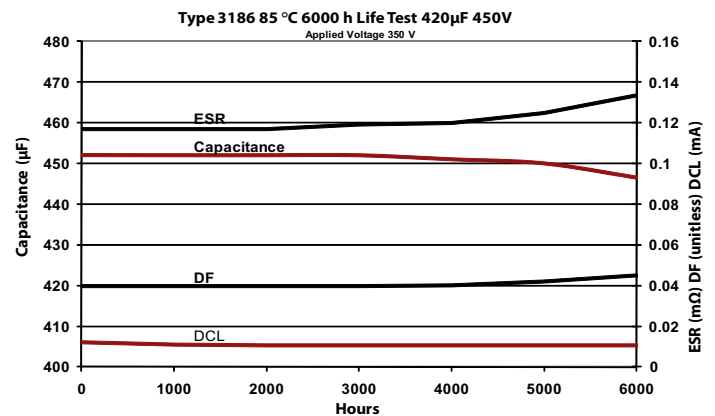
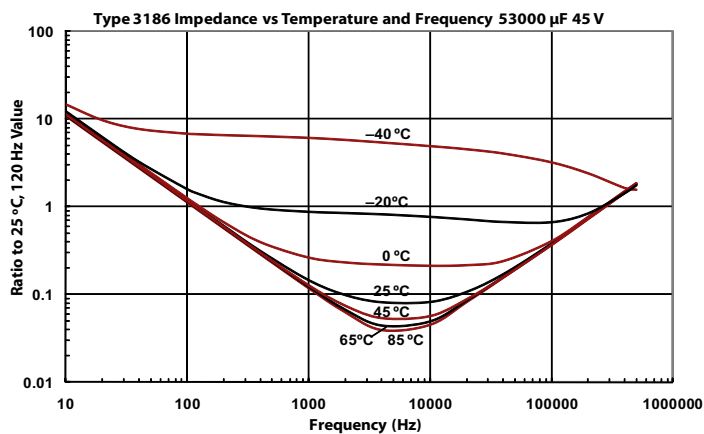
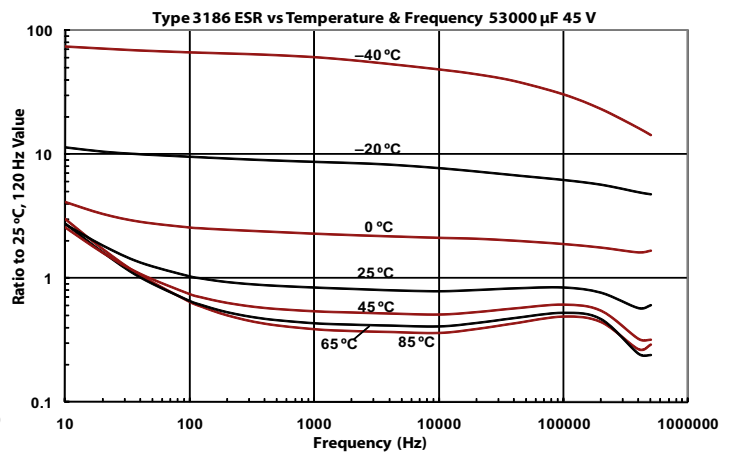
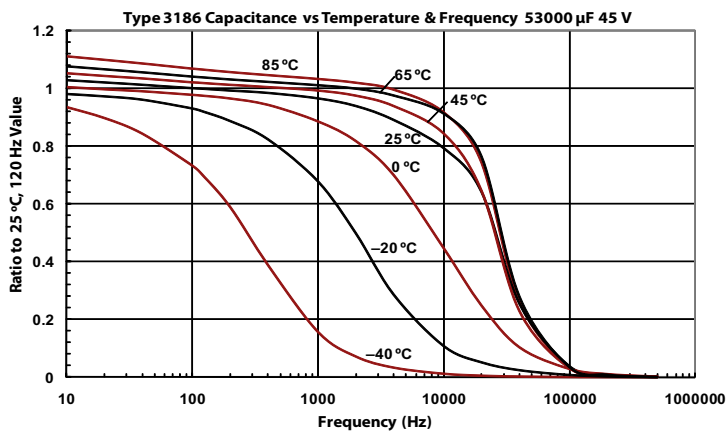
Typical Performance Curves



Type 3186 85 °C Aluminum Electrolytic, Screw Terminal

Best Value 85 °C High Capacitance Screw Terminal Type

Typical Performance Curves



Type DCMC 85 °C High Capacitance, Screw Terminal, Aluminum

Highest Capacitance Screw Terminal Type



With more capacitance and often more ripple-current capability than the best-value Type 3186 capacitor, the Type DCMC capacitor is the better choice for high-capacitance, power supply filters and energy storage applications such as welding equipment, UPS systems and computer hold-up power. The extended cathode foil of the DCMC assures cool operation with heatflow from the capacitor element to the can.

Highlights

- Highest capacitance value
- Right for Power Supply and UPS systems
- Thermal-Pak™ extended cathode construction

Specifications

Temperature Range	−40 °C to +85 °C							
Rated Voltage Range	6.3 Vdc to 550 Vdc							
Capacitance Range	110 μF to 2.7 F							
Capacitance Tolerance	−10% +75% ≤ 100 Vdc −10% +50% ≥ 160 Vdc							
Leakage Current	≤ 6 √CV μA, 6 mA max, at 5 min							
Ripple Current Multipliers	Ambient Temperature							
	45 °C	55 °C	65 °C	75 °C	85 °C			
	2.24	2.00	1.73	1.41	1.00			
	Frequency							
		50 Hz	60 Hz	120 Hz	360 Hz	1 kHz	5 kHz	10 kHz & up
	1 3/8" & 1 3/4" Diameters 6.3 to 160 V 200 to 350 V 400 to 550 V	0.92	0.94	1.00	1.05	1.10	1.10	1.12
		0.80	0.85	1.00	1.17	1.30	1.30	1.32
		0.78	0.83	1.00	1.20	1.35	1.36	1.40
	2" & 2 1/2" Diameters 6.3 to 160 V 200 to 350 V 400 to 550 V	0.93	0.95	1.00	1.04	1.07	1.11	1.12
		0.81	0.87	1.00	1.13	1.20	1.24	1.26
		0.79	0.83	1.00	1.17	1.26	1.30	1.34
	3" & 3 1/2" Diameters 6.3 to 160 V 200 to 350 V 400 to 550 V	0.95	0.96	1.00	1.02	1.04	1.05	1.05
		0.85	0.88	1.00	1.08	1.12	1.14	1.17
		0.82	0.84	1.00	1.13	1.20	1.24	1.27
Low Temperature Characteristics	Impedance ratio: Z _{−20°C} /Z _{+25°C} ≤ 20 (6.3–10 Vdc) ≤ 8 (16–50 Vdc) ≤ 4 (63–100 Vdc) ≤ 3 (150–550 Vdc)							
Endurance Life Test	2000 h @ full load at 85 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit							
Shelf Life Test	500 h @ 85 °C Capacitance 100% of limit ESR 100% of limit DCL 100% of limit							
Vibration	5 to 55 Hz, 0.06" and 10 g max, 1.5 h each of 2 axes							
RoHS Compliant								

Type DCMC 85 °C High Capacitance, Screw Terminal, Aluminum

Highest Capacitance Screw Terminal Type

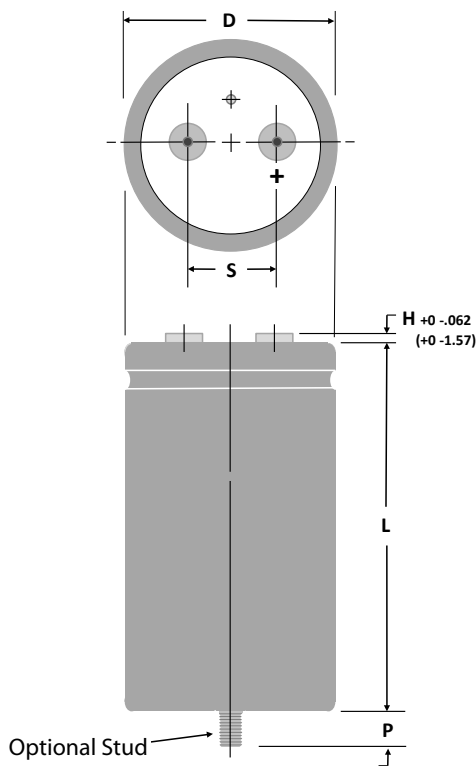
Part Numbering System

DCMC	472	U	400	DC	2	B	S
Type	Capacitance	Tolerance	Voltage	Case Code	Insulation	Terminal	Can Style
100 = 10 μ F	101 = 100 μ F	M = $\pm$ 20%	6R3 = 6.3 Vdc		0 = None	A = Low Post	Blank =
492 = 4900 μ F	433 = 43,000 μ F	U = -10%+75%	063 = 63 Vdc		1 = Polyester	B = High Post	Standard
		T = 10%+50%	400 = 400 Vdc		2 = PVC	D = High Current, Low Post	Can
						E = High Current, High Post	S = Stud
						F or M = M5 Post	Bottom
						G = M6 Low Post	P = Stud
						H = M6 High Post	with Thermal Pad

Polyester insulation is not available for 3.5-inch diameter units.

Standard insulation is 0.008-in PVC sleeve with 0.01-in polypropylene end disk.

Outline Drawing



NOTE: With the stud-mount feature, a thermally-conductive disk can be inserted in the bottom flush with the outer insulating sleeve. This reduces the thermal resistance through the can bottom by 0.3 °C/W. Can Style P.

Stud Dimensions

Case Diam.	Stud Thread	P $\pm$ 0.039" ($\pm$ 1.0 mm)
1.375	M8	0.470" (12.0)
1.750	M8	0.470" (12.0)
2.000	M12	0.630" (16.0)
2.500	M12	0.630" (16.0)
3.000	M12	0.630" (16.0)
3.500	M12	0.630" (16.0)

Terminal Dimensions

Terminal Style	For Case Diameters	Code	Post Diameter in mm	H max in mm	Thread	min Full Thread in mm	Torque in-lb N-m
Low Post	1 $\frac{3}{8}$ to 3	A	0.314 8.0	0.094 2.4	10-32	0.218 5.5	25 2.82
High Post	1 $\frac{3}{8}$ to 3	B	0.314 8.0	0.281 7.1	10-32	0.375 9.5	25 2.82
High Current, Low	2 $\frac{1}{2}$ to 3 $\frac{1}{2}$	D	0.684 17.4	0.125 3.2	$\frac{1}{4}$ -28	0.344 8.7	60 6.78
High Current, High	2 $\frac{1}{2}$ to 3 $\frac{1}{2}$	E	0.684 17.4	0.281 7.1	$\frac{1}{4}$ -28	0.469 11.9	60 6.78
M5 Post, Small	1 $\frac{3}{8}$ to 2	M	0.314 8.0	0.281 7.1	M5	0.375 9.5	25 2.82
M5 Post	2 $\frac{1}{2}$ & 3	F	0.512 13.0	0.230 5.8	M5	0.344 8.7	25 2.82
M6 Low Post	2 $\frac{1}{2}$ to 3 $\frac{1}{2}$	G	0.684 17.4	0.125 3.2	M6	0.344 8.7	60 6.78
M6 High Post	2 $\frac{1}{2}$ to 3 $\frac{1}{2}$	H	0.684 17.4	0.281 7.1	M6	0.469 11.9	60 6.78

NOTE: Only high post and M5 post terminals are available at 550 Vdc as they meet the required creepage distance.

Type DCMC 85 °C High Capacitance, Screw Terminal, Aluminum

Highest Capacitance Screw Terminal Type

Uninsulated Case Dimensions

For insulated case, add 0.024"(0.610 mm) to "D" and 0.030"(0.762 mm) to height.

Case Code	Diam. (D)		Length (L)		Terminals (S)		Typical Weight	
	±.031 Inches	±.78 mm	±.062 Inches	±1.57 mm	±0.015 Inches	±.38 mm	oz	g
AK	1.375	34.93	1.625	41.28	0.50	12.70	1.9	54
AA	1.375	34.93	2.125	53.98	0.50	12.70	2.0	57
AH	1.375	34.93	2.625	66.68	0.50	12.70	2.7	77
AB	1.375	34.93	3.125	79.38	0.50	12.70	3.3	94
AJ	1.375	34.93	3.625	92.08	0.50	12.70	3.8	108
AC	1.375	34.93	4.125	104.78	0.50	12.70	4.4	125
AD	1.375	34.93	4.625	117.48	0.50	12.70	5.1	145
AE	1.375	34.93	5.125	130.18	0.50	12.70	6.8	193
AF	1.375	34.93	5.625	142.88	0.50	12.70	8.1	230
EA	1.750	44.45	2.125	53.98	0.75	19.05	2.7	76
EH	1.750	44.45	2.625	66.68	0.75	19.05	3.8	108
EB	1.750	44.45	3.125	79.38	0.75	19.05	5.1	145
EJ	1.750	44.45	3.625	92.08	0.75	19.05	6.8	193
EC	1.750	44.45	4.125	104.78	0.75	19.05	8.1	230
ED	1.750	44.45	4.625	117.48	0.75	19.05	9.0	255
EE	1.750	44.45	5.125	130.18	0.75	19.05	9.5	269
EF	1.750	44.45	5.625	142.88	0.75	19.05	10.5	298
BA	2.000	50.80	2.125	53.98	0.88	22.23	5.4	153
BH	2.000	50.80	2.625	66.68	0.88	22.23	6.1	173
BB	2.000	50.80	3.125	79.38	0.88	22.23	6.8	193
BJ	2.000	50.80	3.625	92.08	0.88	22.23	8.2	232
BC	2.000	50.80	4.125	104.78	0.88	22.23	9.5	269
BD	2.000	50.80	4.625	117.48	0.88	22.23	10.3	292
BE	2.000	50.80	5.125	130.18	0.88	22.23	10.7	303
BF	2.000	50.80	5.625	142.88	0.88	22.23	13.0	369
CH	2.500	63.50	2.625	66.68	1.13	28.58	9.2	261
CB	2.500	63.50	3.125	79.38	1.13	28.58	10.4	295
CJ	2.500	63.50	3.625	92.08	1.13	28.58	12.7	361
CC	2.500	63.50	4.125	104.78	1.13	28.58	15.0	425
CD	2.500	63.50	4.625	117.48	1.13	28.58	17.2	488
CE	2.500	63.50	5.125	130.18	1.13	28.58	19.3	547
CF	2.500	63.50	5.625	142.88	1.13	28.58	21.4	607
DB	3.000	76.20	3.125	79.38	1.25	31.75	16.7	473
DJ	3.000	76.20	3.625	92.08	1.25	31.75	20.0	567
DC	3.000	76.20	4.125	104.78	1.25	31.75	22.2	629
DD	3.000	76.20	4.625	117.48	1.25	31.75	25.5	723
DE	3.000	76.20	5.125	130.18	1.25	31.75	30.0	850
DF	3.000	76.20	5.625	142.88	1.25	31.75	31.9	904
DP	3.000	76.20	5.875	149.23	1.25	31.75	32.8	931
DN	3.000	76.20	7.625	193.68	1.25	31.75	39.5	1119
DG	3.000	76.20	8.625	219.08	1.25	31.75	43.3	1227
FC	3.500	88.90	4.125	104.78	1.25	31.75	30.0	850
FD	3.500	88.90	4.625	117.48	1.25	31.75	34.4	976
FE	3.500	88.90	5.125	130.18	1.25	31.75	40.5	1148
FF	3.500	88.90	5.625	142.88	1.25	31.75	43.1	1221
FP	3.500	88.90	5.875	149.23	1.25	31.75	44.3	1257
FN	3.500	88.90	7.625	193.68	1.25	31.75	53.3	1512
FG	3.500	88.90	8.625	219.08	1.25	31.75	58.5	1658

Type DCMC 85 °C High Capacitance, Screw Terminal, Aluminum

Highest Capacitance Screw Terminal Type

Ratings

Additional Low Voltages and Smaller Sizes available at www.cde.com/catalogs/DCMC.pdf

Cap. (µF)	Catalog Part Number	ESR Max. @ 25 °C 120 H (mΩ)	Ripple Max. @ 85 °C 120 Hz (A)	Nominal Size D x L (inches)
200 Vdc (250 Vdc Surge)				
5500	DCMC552T200CH2B	42.2	6.6	2 1/2 x 2 5/8
7100	DCMC712T200CB2B	31.2	9.6	2 1/2 x 3 1/8
10000	DCMC103T200CJ2B	22.3	11.6	2 1/2 x 3 5/8
11000	DCMC113T200CC2B	20.3	12.7	2 1/2 x 4 1/8
11000	DCMC113T200DB2B	30.3	10.8	3 x 3 1/8
12000	DCMC123T200CD2B	17.3	14.7	2 1/2 x 4 5/8
13000	DCMC133T200CE2B	15.8	15.9	2 1/2 x 5 1/8
13000	DCMC133T200DJ2B	23.7	12.0	3 x 3 5/8
15000	DCMC153T200CF2B	13.7	16.5	2 1/2 x 5 5/8
15000	DCMC153T200DC2B	19.7	14.3	3 x 4 1/8
18000	DCMC183T200DD2B	16.9	16.1	3 x 4 5/8
21000	DCMC213T200FC2B	17.1	16.5	3 1/2 x 4 1/8
22000	DCMC223T200DE2B	14.8	18.2	3 x 5 1/8
24000	DCMC243T200DF2B	13.3	19.5	3 x 5 5/8
25000	DCMC253T200FD2B	15.3	20.5	3 1/2 x 4 5/8
26000	DCMC263T200DP2B	12.7	19.7	3 x 5 7/8
28000	DCMC283T200FE2B	13.4	19.8	3 1/2 x 5 1/8
31000	DCMC313T200FF2B	12.0	21.6	3 1/2 x 5 5/8
33000	DCMC333T200DN2B	10.8	23.7	3 x 7 5/8
33000	DCMC333T200FP2D	11.5	22.7	3 1/2 x 5 7/8
37000	DCMC373T200DG2B	9.6	25.2	3 x 8 5/8
44000	DCMC443T200FN2D	9.3	28.2	3 1/2 x 7 5/8
51000	DCMC513T200FG2D	7.9	31.1	3 1/2 x 8 5/8
250 Vdc (300 Vdc Surge)				
4100	DCMC412T250CH2B	51.8	6.3	2 1/2 x 2 5/8
5200	DCMC522T250CB2B	32.1	9.5	2 1/2 x 3 1/8
6400	DCMC642T250CJ2B	25.1	10.4	2 1/2 x 3 5/8
7800	DCMC782T250DB2B	27.6	10.9	3 x 3 1/8
8200	DCMC822T250CC2B	20.8	13.0	2 1/2 x 4 1/8
10000	DCMC103T250CD2B	17.8	14.5	2 1/2 x 4 5/8
10000	DCMC103T250DJ2B	21.6	13.6	3 x 3 5/8
11000	DCMC113T250CE2B	15.5	14.8	2 1/2 x 5 1/8
12000	DCMC123T250CF2B	13.8	16.5	2 1/2 x 5 5/8
12000	DCMC123T250DC2B	17.6	15.2	3 x 4 1/8
13000	DCMC133T250DD2B	16.3	16.4	3 x 4 5/8
15000	DCMC153T250DE2B	14.3	18.0	3 x 5 1/8
16000	DCMC163T250FC2D	19.5	15.9	3 1/2 x 4 1/8
18000	DCMC183T250DF2B	12.0	20.6	3 x 5 5/8
18000	DCMC183T250FD2D	17.1	19.4	3 1/2 x 4 5/8
19000	DCMC193T250DP2B	11.5	20.6	3 x 5 7/8
21000	DCMC213T250FE2D	15.1	18.7	3 1/2 x 5 1/8
23000	DCMC233T250FF2D	13.4	20.4	3 1/2 x 5 5/8
24000	DCMC243T250FP2D	12.9	21.4	3 1/2 x 5 7/8
27000	DCMC273T250DN2D	9.5	27.2	3 x 7 5/8
30000	DCMC303T250DG2B	7.0	29.6	3 x 8 5/8

Cap. (µF)	Catalog Part Number	ESR Max. @ 25 °C 120 H (mΩ)	Ripple Max. @ 85 °C 120 Hz (A)	Nominal Size D x L (inches)
250 Vdc (300 Vdc Surge)				
33000	DCMC333T250FN2D	10.6	26.2	3 1/2 x 7 5/8
38000	DCMC383T250FG2D	9.2	28.8	3 1/2 x 8 5/8
27000	DCMC273T250DN2D	9.5	27.2	3 x 7 5/8
30000	DCMC303T250DG2B	7.0	29.6	3 x 8 5/8
33000	DCMC333T250FN2D	10.6	26.2	3 1/2 x 7 5/8
38000	DCMC383T250FG2D	9.2	28.8	3 1/2 x 8 5/8
300 Vdc (350 Vdc Surge)				
2600	DCMC262T300CH2B	60.5	5.1	2 1/2 x 2 5/8
3300	DCMC332T300CB2B	46.5	7.0	2 1/2 x 3 1/8
4200	DCMC422T300CJ2B	38.1	7.9	2 1/2 x 3 5/8
4800	DCMC482T300DB2B	42.8	8.4	3 x 3 1/8
5200	DCMC522T300CC2B	29.9	10.4	2 1/2 x 4 1/8
6000	DCMC602T300DJ2B	34.0	10.5	3 x 3 5/8
6100	DCMC612T300CD2B	25.5	12.5	2 1/2 x 4 5/8
7100	DCMC712T300CE2B	22.2	12.3	2 1/2 x 5 1/8
7400	DCMC742T300DC2B	26.2	11.9	3 x 4 1/8
8000	DCMC802T300CF2B	19.8	14.3	2 1/2 x 5 5/8
8700	DCMC872T300DD2B	23.6	13.6	3 x 4 5/8
10000	DCMC103T300DE2B	20.5	15.1	3 x 5 1/8
10000	DCMC103T300FC2D	21.0	15.3	3 1/2 x 4 1/8
11000	DCMC113T300DF2B	18.0	16.8	3 x 5 5/8
12000	DCMC123T300DP2B	17.0	19.5	3 x 5 7/8
12000	DCMC123T300FD2D	18.2	16.4	3 1/2 x 4 5/8
13000	DCMC133T300FE2D	16.0	18.1	3 1/2 x 5 1/8
15000	DCMC153T300FF2D	14.3	19.8	3 1/2 x 5 5/8
16000	DCMC163T300DN2B	13.2	21.8	3 x 7 5/8
16000	DCMC163T300FP2D	13.5	20.9	3 1/2 x 5 7/8
19000	DCMC193T300DG2B	10.8	23.7	3 x 8 5/8
22000	DCMC223T300FN2D	11.0	25.9	3 1/2 x 7 5/8
26000	DCMC263T300FG2D	9.3	28.6	3 1/2 x 8 5/8
350 Vdc (400 Vdc Surge)				
2000	DCMC202T350CH2B	86.9	4.6	2 1/2 x 2 5/8
2500	DCMC252T350CB2B	61.0	6.6	2 1/2 x 3 1/8
3100	DCMC312T350CJ2B	48.5	7.5	2 1/2 x 3 5/8
3700	DCMC372T350CC2B	39.9	9.0	2 1/2 x 4 1/8
3800	DCMC382T350DB2B	54.0	8.1	3 x 3 1/8
4200	DCMC422T350CD2B	34.0	10.5	2 1/2 x 4 5/8
4600	DCMC462T350DJ2B	41.7	9.8	3 x 3 5/8
4800	DCMC482T350CE2B	29.6	10.7	2 1/2 x 5 1/8
5400	DCMC542T350CF2B	26.2	11.9	2 1/2 x 5 5/8
5500	DCMC552T350DC2B	34.7	10.8	3 x 4 1/8
6300	DCMC632T350DD2B	29.6	12.2	3 x 4 5/8
7200	DCMC722T350DE2B	25.8	13.4	3 x 5 1/8
7700	DCMC772T350FC2D	29.9	12.8	3 1/2 x 4 1/8
8200	DCMC822T350DF2B	22.9	14.9	3 x 5 5/8

Type DCMC 85 °C High Capacitance, Screw Terminal, Aluminum

Highest Capacitance Screw Terminal Type

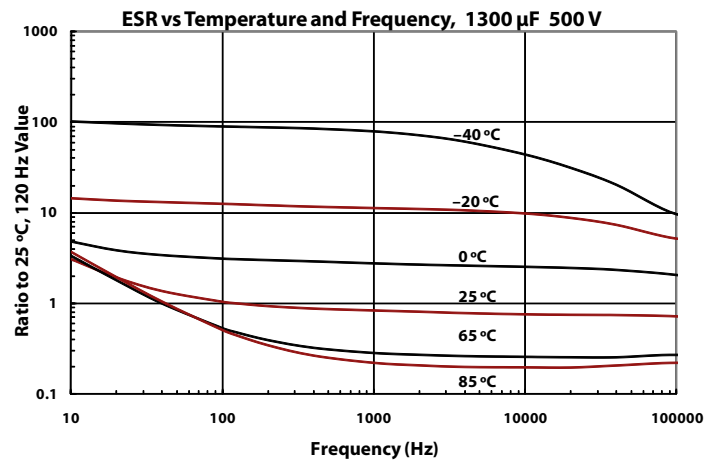
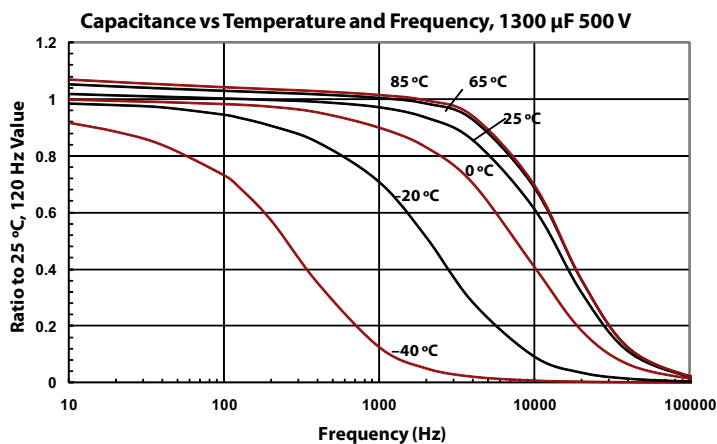
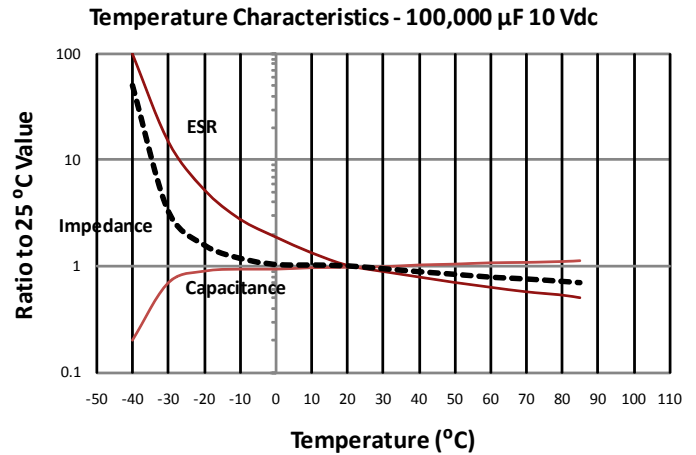
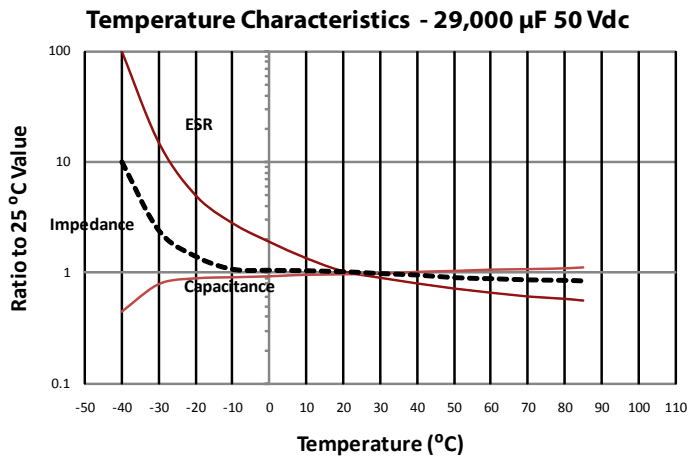
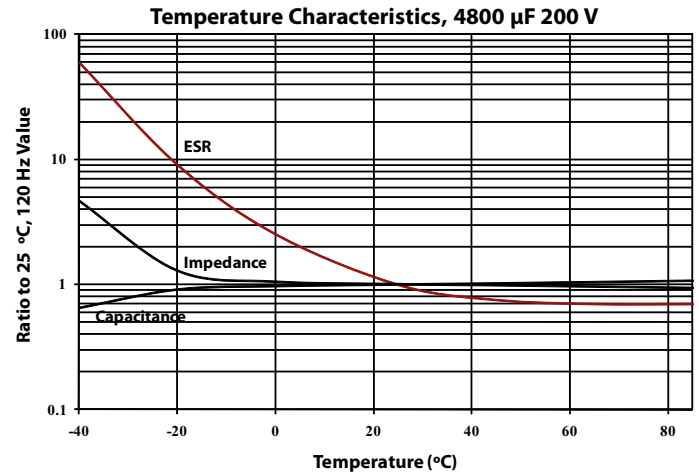
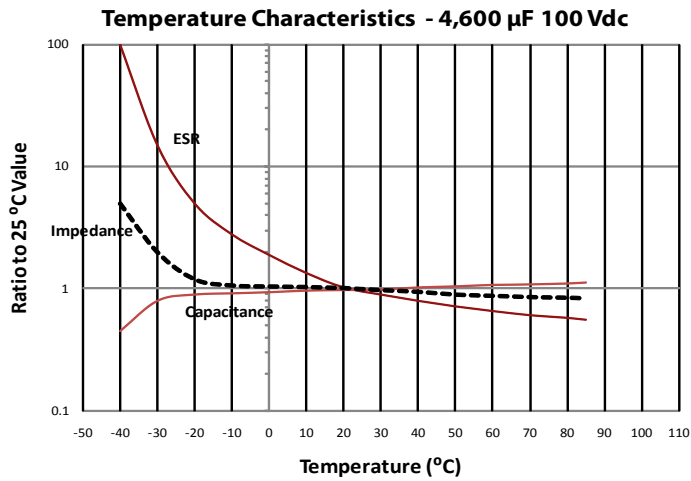
Additional Low Voltages and Smaller Sizes available at www.cde.com/catalogs/DCMC.pdf

Cap. (µF)	Catalog Part Number	ESR Max. @ 25 °C 120 H (mΩ)	Ripple Max. @ 85 °C 120 Hz (A)	Nominal Size D x L (inches)	Cap. (µF)	Catalog Part Number	ESR Max. @ 25 °C 120 H (mΩ)	Ripple Max. @ 85 °C 120 Hz (A)	Nominal Size D x L (inches)
350 Vdc (400 Vdc Surge)					450 Vdc (500 Vdc Surge)				
8400	DCMC842T350DP2B	21.7	17.2	3 x 5 7/8	5000	DCMC502T450FC2D	31.8	12.5	3 1/2 x 4 1/8
8800	DCMC882T350FD2D	25.7	13.8	3 1/2 x 4 5/8	5600	DCMC562T450DF2B	28.8	13.3	3 x 5 5/8
10000	DCMC103T350FE2D	22.5	15.3	3 1/2 x 5 1/8	5800	DCMC582T450DP2B	27.3	15.4	3 x 5 7/8
11000	DCMC113T350DN2B	17.1	19.1	3 x 7 5/8	5800	DCMC582T450FD2D	27.0	13.5	3 1/2 x 4 5/8
11000	DCMC113T350FF2D	20.0	16.7	3 1/2 x 5 5/8	6800	DCMC682T450FE2D	23.5	15.0	3 1/2 x 5 1/8
12000	DCMC123T350FP2D	18.9	17.7	3 1/2 x 5 7/8	7300	DCMC732T450FF2D	21.1	16.3	3 1/2 x 5 5/8
13000	DCMC133T350DG2B	14.2	20.7	3 x 8 5/8	7700	DCMC772T450FP2D	20.0	17.2	3 1/2 x 5 7/8
16000	DCMC163T350FN2D	14.9	22.3	3 1/2 x 7 5/8	7900	DCMC792T450DN2B	21.3	17.1	3 x 7 5/8
18000	DCMC183T350FG2D	12.4	24.8	3 1/2 x 8 5/8	9000	DCMC902T450DG2B	17.6	18.6	3 x 8 5/8
400 Vdc (450 Vdc Surge)					10000	DCMC103T450FN2D	15.9	21.6	3 1/2 x 7 5/8
1700	DCMC172T400CH2B	93.1	4.7	2 1/2 x 2 5/8	12000	DCMC123T450FG2D	13.3	24.0	3 1/2 x 8 5/8
2100	DCMC212T400CB2B	65.3	6.4	2 1/2 x 3 1/8	500 Vdc (550 Vdc Surge)				
2600	DCMC262T400CJ2B	52.0	7.2	2 1/2 x 3 5/8	800	DCMC801T500CH2B	170.6	3.0	2 1/2 x 2 5/8
3100	DCMC312T400CC2B	42.8	8.7	2 1/2 x 4 1/8	1100	DCMC112T500CB2B	122.0	4.7	2 1/2 x 3 1/8
3200	DCMC322T400DB2B	57.5	7.8	3 x 3 1/8	1400	DCMC142T500CJ2B	95.1	5.3	2 1/2 x 3 5/8
3900	DCMC392T400CD2B	35.6	10.3	2 1/2 x 4 5/8	1700	DCMC172T500CC2B	79.7	6.4	2 1/2 x 4 1/8
3900	DCMC392T400DJ2B	44.9	9.4	3 x 3 5/8	1700	DCMC172T500DB2B	86.4	6.4	3 x 3 1/8
4000	DCMC402T400CE2B	31.7	10.3	2 1/2 x 5 1/8	2100	DCMC212T500CE2B	61.1	7.8	2 1/2 x 5 1/8
4700	DCMC472T400CF2B	28.1	11.5	2 1/2 x 5 5/8	2200	DCMC222T500CD2B	68.3	7.6	2 1/2 x 4 5/8
4700	DCMC472T400DC2B	37.0	10.5	3 x 4 1/8	2200	DCMC222T500DJ2B	67.4	7.1	3 x 3 5/8
5300	DCMC532T400DD2B	31.5	11.8	3 x 4 5/8	2500	DCMC252T500CF2B	54.7	8.3	2 1/2 x 5 5/8
6000	DCMC602T400DE2B	27.4	13.0	3 x 5 1/8	2500	DCMC252T500DC2B	55.4	8.6	3 x 4 1/8
6400	DCMC642T400FC2D	31.9	12.4	3 1/2 x 4 1/8	3000	DCMC302T500DD2B	48.1	9.5	3 x 4 5/8
6800	DCMC682T400DF2B	24.4	14.4	3 x 5 5/8	3400	DCMC342T500DE2B	43.1	10.4	3 x 5 1/8
7100	DCMC712T400DP2B	23.1	16.7	3 x 5 7/8	3500	DCMC352T500FC2D	40.1	11.1	3 1/2 x 4 1/8
7400	DCMC742T400FD2D	27.4	13.4	3 1/2 x 4 5/8	3900	DCMC392T500DF2B	37.5	11.6	3 x 5 5/8
8400	DCMC842T400FE2D	23.9	14.8	3 1/2 x 5 1/8	4100	DCMC412T500DP2B	35.5	13.5	3 x 5 7/8
9400	DCMC942T400FF2D	21.2	16.2	3 1/2 x 5 5/8	4100	DCMC412T500FD2D	34.1	12.0	3 1/2 x 4 5/8
9600	DCMC962T400DN2B	18.2	18.6	3 x 7 5/8	4800	DCMC482T500FE2D	30.0	13.2	3 1/2 x 5 1/8
9900	DCMC992T400FP2D	20.1	17.2	3 1/2 x 5 7/8	5400	DCMC542T500FF2D	28.0	14.2	3 1/2 x 5 5/8
11000	DCMC113T400DG2B	15.1	20.1	3 x 8 5/8	5700	DCMC572T500FP2D	26.0	15.1	3 1/2 x 5 7/8
13000	DCMC133T400FN2D	15.8	21.7	3 1/2 x 7 5/8	5700	DCMC572T500DN2B	27.9	15.0	3 x 7 5/8
15000	DCMC153T400FG2D	13.1	24.1	3 1/2 x 8 5/8	6600	DCMC662T500DG2B	23.1	16.2	3 x 8 5/8
450 Vdc (500 Vdc Surge)					7900	DCMC792T500FN2D	20.5	19.1	3 1/2 x 7 5/8
1200	DCMC122T450CH2B	115.8	4.0	2 1/2 x 2 5/8	9200	DCMC922T500FG2D	16.7	21.4	3 1/2 x 8 5/8
1700	DCMC172T450CB2B	81.1	6.0	2 1/2 x 3 1/8	550 Vdc (600 Vdc Surge)				
2000	DCMC202T450CJ2B	66.5	6.4	2 1/2 x 3 5/8	1400	DCMC142T550CC2B	170.5	4.9	2 1/2 x 4 1/8
2400	DCMC242T450CC2B	54.7	7.7	2 1/2 x 4 1/8	1700	DCMC172T550CD2B	132.6	5.9	2 1/2 x 4 5/8
2500	DCMC252T450DB2B	65.7	7.3	3 x 3 1/8	1900	DCMC192T550CE2B	111.7	6.8	2 1/2 x 5 1/8
2800	DCMC282T450CD2B	46.4	9.0	2 1/2 x 4 5/8	2200	DCMC222T550DC2B	90.4	7.8	3 x 4 1/8
3000	DCMC302T450DJ2B	52.2	8.7	3 x 3 5/8	2300	DCMC232T550CF2B	86.5	7.8	2 1/2 x 5 5/8
3300	DCMC332T450CE2B	40.4	9.2	2 1/2 x 5 1/8	2500	DCMC252T550DD2B	79.6	8.4	3 x 4 5/8
3900	DCMC392T450CF2B	35.4	10.3	2 1/2 x 5 5/8	2900	DCMC292T550DE2B	64.0	9.7	3 x 5 1/8
3900	DCMC392T450DC2B	40.1	10.1	3 x 4 1/8	3400	DCMC342T550DF2B	54.6	10.9	3 x 5 5/8
4100	DCMC412T450DD2B	37.5	10.8	3 x 4 5/8	3700	DCMC372T550DP2B	50.2	12.2	3 x 5 7/8
4700	DCMC472T450DE2B	32.5	12.0	3 x 5 1/8	5100	DCMC512T550DN2B	36.4	16.2	3 x 7 5/8

Type DCMC 85 °C High Capacitance, Screw Terminal, Aluminum

Highest Capacitance Screw Terminal Type

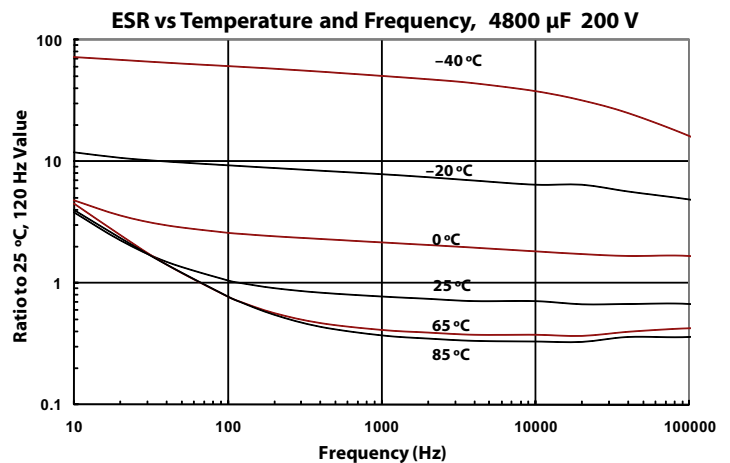
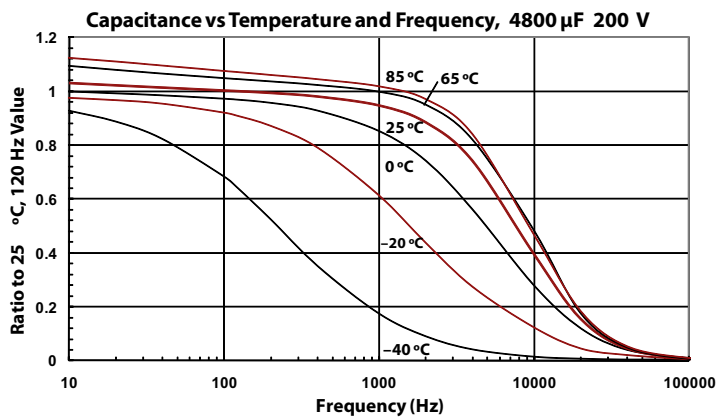
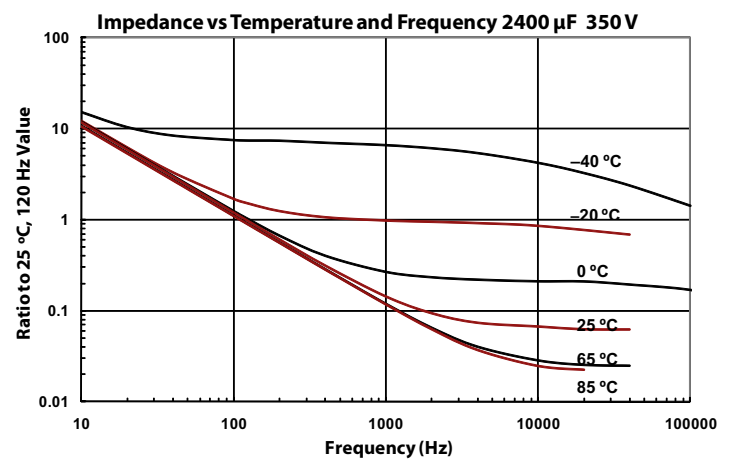
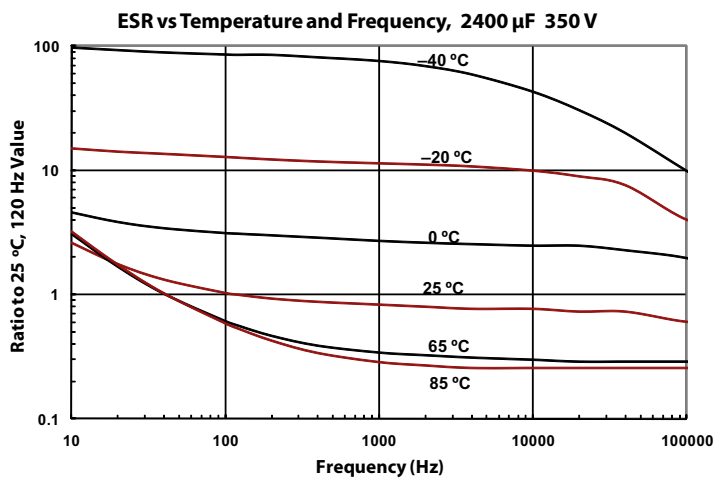
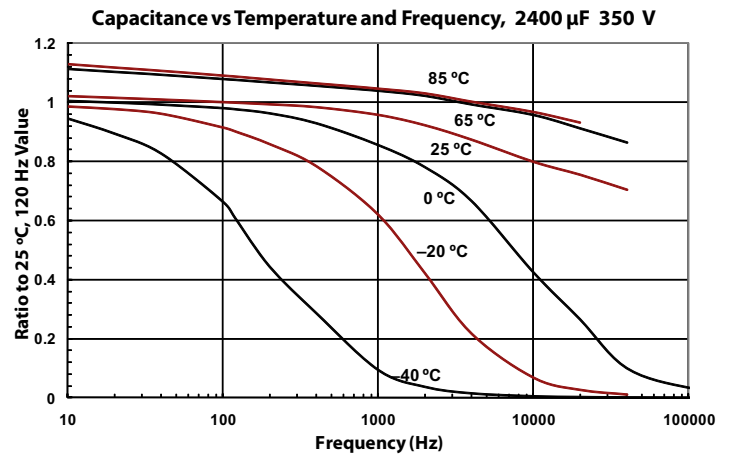
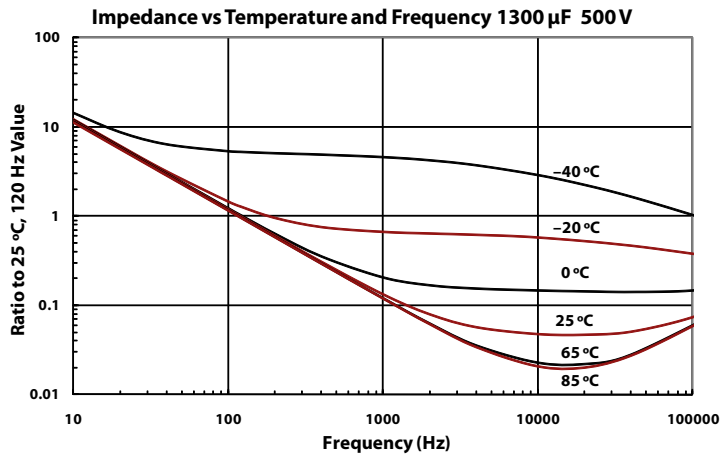
Typical Performance Curves



Type DCMC 85 °C High Capacitance, Screw Terminal, Aluminum

Highest Capacitance Screw Terminal Type

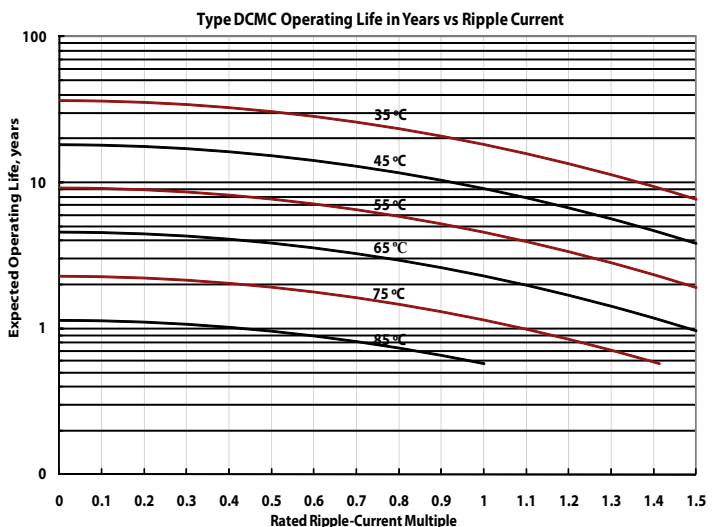
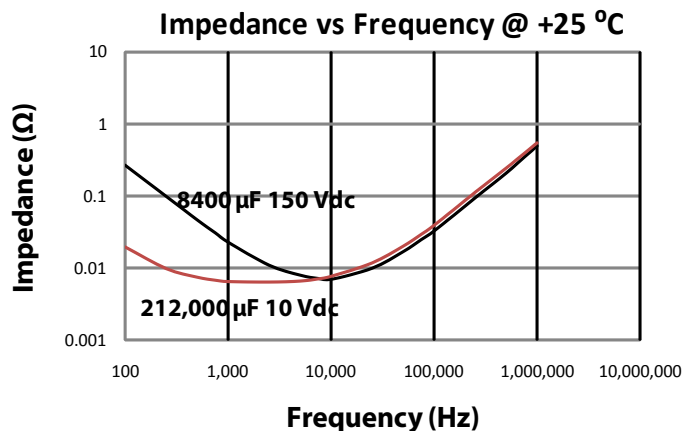
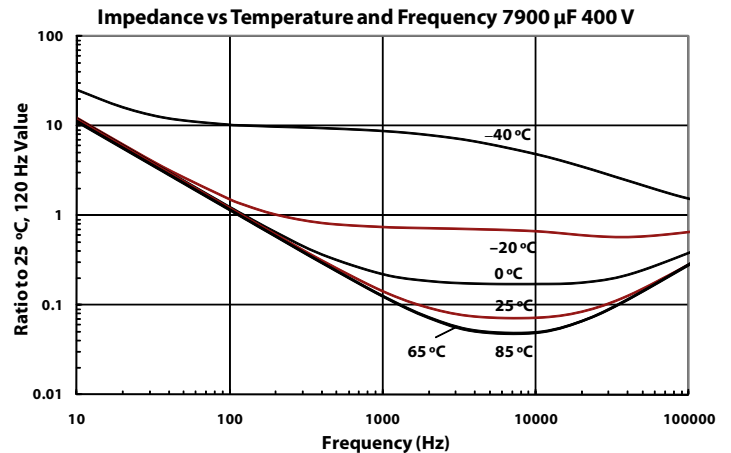
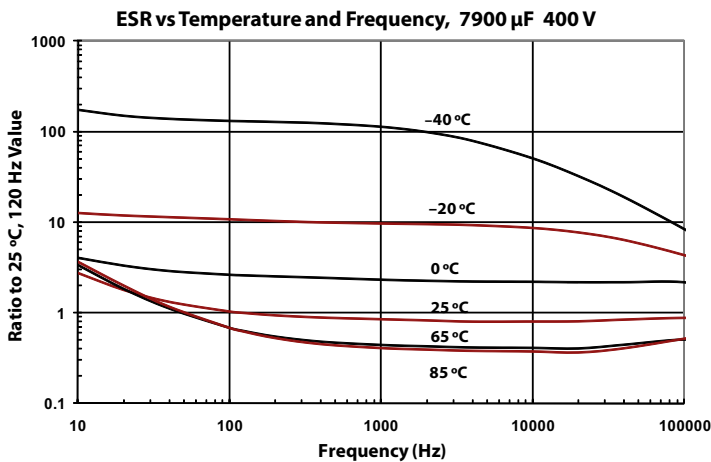
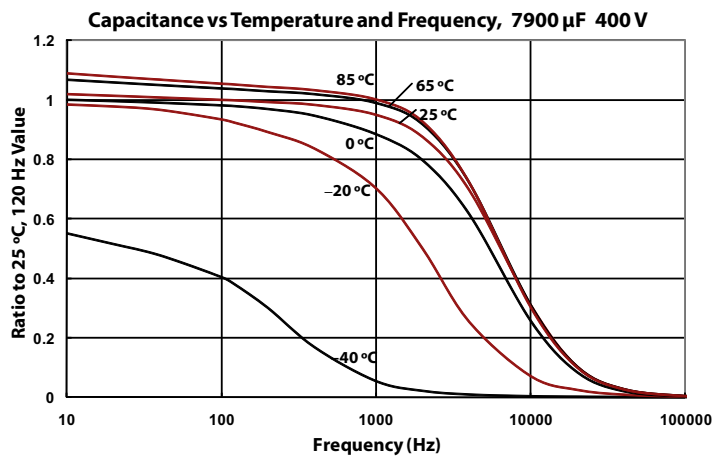
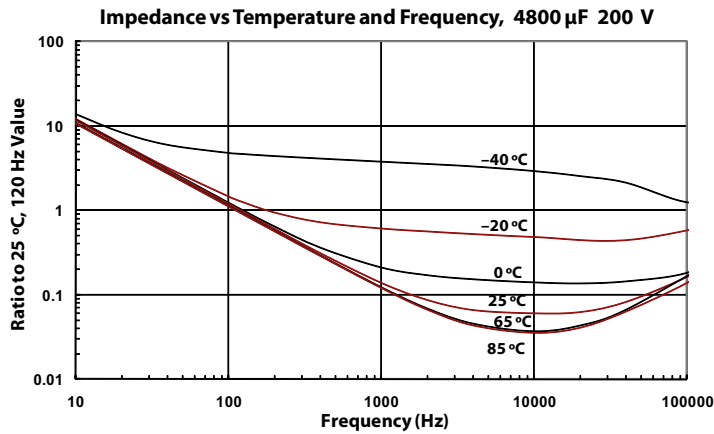
Typical Performance Curves



Type DCMC 85 °C High Capacitance, Screw Terminal, Aluminum

Highest Capacitance Screw Terminal Type

Typical Performance Curves



Type 3188 85 °C Best Value, Screw Terminal, Aluminum

85 °C Long Life Screw Terminal Type



Type 3188 has twice the life of the 3186 and twice the ripple-current capability. While the standard encasement is by compression with the capacitor element captured on an aluminum peg in the can bottom and a phenolic peg in the top, rilled construction is available. With rilled construction the element is secured by rills, spoon shaped dimples in the side of the can. Rilled construction offers the industry's highest vibration and shock withstanding and excellent heat transfer. Besides increasing ripple-current handling, the rilled construction facilitates use in military and transportation applications.

Highlights

- Rilled cans withstand high shock and vibration.
- 2 times the ripple-current capability
- High capacitance per can

Specifications

Temperature Range	-40 °C to +85 °C					
Rated Voltage Range	16 Vdc to 450 Vdc					
Capacitance Range	270 μF to 1.0 F					
Capacitance Tolerance	-10% +75% ≤ 100 Vdc -10% +50% ≥ 200 Vdc					
Leakage Current	≤6√CV μA (6 mA max.) at 5 minutes					
Ripple Current Multipliers	Ambient Temperature					
	45 °C	55 °C	65 °C	75 °C	85 °C	
	2.24	2.00	1.73	1.41	1.00	
	Frequency					
		60 Hz	120 Hz	300 Hz	1000 Hz	
					≥10 kHz	
	16 – 100 V	0.90	1.00	1.15	1.25	1.30
	200 – 450 V	0.90	1.00	1.25	1.40	1.50
Low Temperature Characteristics	Impedance ratio: Z _{-20°C} /Z _{+25°C} ≤ 8 (16–50 Vdc) ≤ 4 (63–100 Vdc) ≤ 3 (150–450 Vdc)					
Endurance Life Test	4,000 h @ full load at 85 °C ΔCapacitance ±10% ESR 200% of limit DCL 100% of limit					
Shelf Life Test	500 h @ 85 °C ΔCapacitance ±10% ESR 175% of limit DCL 100% of limit					
Vibration	10 to 55 Hz, 0.06" & 10 g max for compression, 15 g max for rilled, 1.5 h ea. of 2 axes					
RoHS Compliant						

Type 3188 85 °C Best Value, Screw Terminal, Aluminum

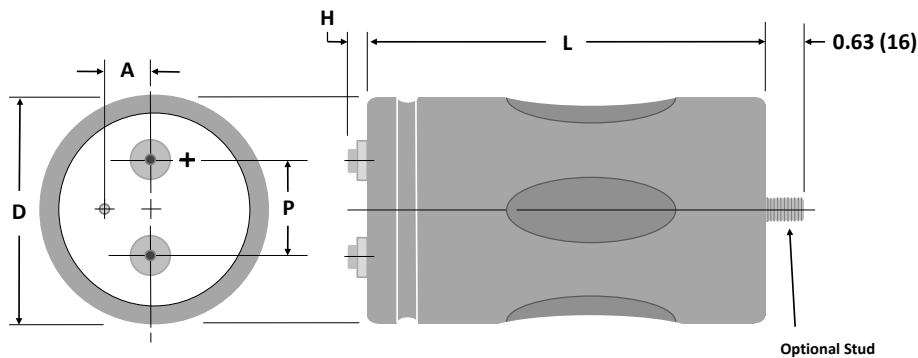
85 °C Long Life Screw Terminal Type

Part Numbering System

3188	GH	562	T	400	M	P	A1
Type	Case Code	Capacitance	Tolerance	Voltage	Terminal	Insulation	Construction*
		562=5600 µF 223=22000 µF 821=820 µF	M= ±20% S= -10 +30% T= -10 +50% U= -10 +75%	016=16 Vdc 450=450 Vdc	A=high post B=low post D=high current low post K=high current high post M=M5 high post J=M6 low post	P=0.008" PVC with mounting clamp/bracket R=0.008" PVC	A1=compression R1=rilled S1=stud & compression** T1=stud & rilled**

* Construction code is also a sequence number, e.g., A1, A2,---,A9, B1,B2,---, for customer specifications. Sequence number 1 in A1, R1, S1 and T1 denotes the standard catalog capacitor with no special requirements.

Outline Drawing



Stud Dimensions

Case	Stud	P ± 0.039"
Diam.	Thread	(±1.0 mm)
1.375	M8	0.470" (12.0)
1.750	M8	0.470" (12.0)
2.000	M12	0.630" (16.0)
2.500	M12	0.630" (16.0)
3.000	M12	0.630" (16.0)

Can Dimensions Insulation Adders

	Diameter (D)		Length (L)		Standing Height (H)	
	(in)	(mm)	(in)	(mm)	(in)	(mm)
0.008" PVC	0.02	0.51	0.032	0.81	0.024	0.61

Terminal Dimensions

Terminal Style	For Case	Code	Post Diameter		H max		Thread	min Full Thread		Torque	
	Diameters		in	mm	in	mm		in	mm	in-lb	N-m
Low Post	1 3/8 to 3	B	0.314	8.0	0.094	2.4	10-32	0.218	5.5	25	2.82
High Post	1 3/8 to 3	A	0.314	8.0	0.281	7.1	10-32	0.375	9.5	25	2.82
High Current, Low	2 1/2 & 3	D	0.684	17.4	0.125	3.2	¼-28	0.344	8.7	60	6.78
High Current, High	2 1/2 & 3	K	0.684	17.4	0.281	7.1	¼-28	0.469	11.9	60	6.78
M5 Post, Small	1 3/8 to 2	M	0.314	8.0	0.281	7.1	M5	0.375	9.5	25	2.82
M6 Low Post	3	J	0.684	17.4	0.125	3.2	M6	0.344	8.7	60	6.78

Type 3188 85 °C Best Value, Screw Terminal, Aluminum

85 °C Long Life Screw Terminal Type

Case Dimensions, Uninsulated Bare Can

Case Code	Diameter (D)		Length (L)		Pitch (P)		Plug (A)		Typical		Optional Bracket Part No.
	±0.031 (Inches)	±0.79 (mm)	±0.062 (Inches)	±1.157 (mm)	±0.014 (Inches)	±0.356 (mm)	A (Inches)	A (mm)	Weight (oz)	Weight (g)	
BA	1.375	34.9	2.125	54.0	0.500	12.7	0.390	9.9	2.53	72	115058-06
BB	1.375	34.9	2.625	66.7	0.500	12.7	0.390	9.9	3.17	90	115058-06
BC	1.375	34.9	3.125	79.4	0.500	12.7	0.390	9.9	3.70	105	115058-06
BD	1.375	34.9	3.625	92.1	0.500	12.7	0.390	9.9	4.22	120	115058-06
BE	1.375	34.9	4.125	104.8	0.500	12.7	0.390	9.9	4.75	135	115058-06
BF	1.375	34.9	4.625	117.5	0.500	12.7	0.390	9.9	5.98	170	115058-06
BG	1.375	34.9	5.125	130.2	0.500	12.7	0.390	9.9	7.74	220	115058-06
BH	1.375	34.9	5.625	142.9	0.500	12.7	0.390	9.9	9.50	270	115058-06
DA	1.75	44.5	2.125	54.0	0.750	19.1	0.453	11.5	5.63	160	115058-15
DB	1.75	44.5	2.625	66.7	0.750	19.1	0.453	11.5	6.16	175	115058-15
DC	1.75	44.5	3.125	79.4	0.750	19.1	0.453	11.5	6.34	180	115058-15
DD	1.75	44.5	3.625	92.1	0.750	19.1	0.453	11.5	7.22	205	115058-15
DE	1.75	44.5	4.125	104.8	0.750	19.1	0.453	11.5	7.74	220	115058-15
DF	1.75	44.5	4.625	117.5	0.750	19.1	0.453	11.5	8.27	235	115058-15
DG	1.75	44.5	5.125	130.2	0.750	19.1	0.453	11.5	8.80	250	115058-15
DH	1.75	44.5	5.625	142.9	0.750	19.1	0.453	11.5	9.50	270	115058-15
EA	2	50.8	2.125	54.0	0.875	22.2	0.500	12.7	5.98	170	115058-09
EB	2	50.8	2.625	66.7	0.875	22.2	0.500	12.7	6.34	180	115058-09
EC	2	50.8	3.125	79.4	0.875	22.2	0.500	12.7	6.69	190	115058-09
ED	2	50.8	3.625	92.1	0.875	22.2	0.500	12.7	7.74	220	115058-09
EE	2	50.8	4.125	104.8	0.875	22.2	0.500	12.7	8.98	255	115058-09
EF	2	50.8	4.625	117.5	0.875	22.2	0.500	12.7	10.21	290	115058-09
EG	2	50.8	5.125	130.2	0.875	22.2	0.500	12.7	11.26	320	115058-09
EH	2	50.8	5.625	142.9	0.875	22.2	0.500	12.7	8.80	250	115058-09
FB	2.5	63.5	2.625	66.7	1.125	28.6	0.625	15.9	10.56	300	115058-14
FC	2.5	63.5	3.125	79.4	1.125	28.6	0.625	15.9	13.02	370	115058-14
FD	2.5	63.5	3.625	92.1	1.125	28.6	0.625	15.9	14.08	400	115058-14
FE	2.5	63.5	4.125	104.8	1.125	28.6	0.625	15.9	15.66	445	115058-14
FF	2.5	63.5	4.625	117.5	1.125	28.6	0.625	15.9	21.12	600	115058-14
FG	2.5	63.5	5.125	130.2	1.125	28.6	0.625	15.9	22.88	650	115058-14
FH	2.5	63.5	5.625	142.9	1.125	28.6	0.625	15.9	21.12	600	115058-14
GC	3	76.2	3.125	79.4	1.250	31.8	0.750	19.1	18.30	520	115058-11
GD	3	76.2	3.625	92.1	1.250	31.8	0.750	19.1	20.06	570	115058-11
GE	3	76.2	4.125	104.8	1.250	31.8	0.750	19.1	21.12	600	115058-11
GF	3	76.2	4.625	117.5	1.250	31.8	0.750	19.1	25.34	720	115058-11
GG	3	76.2	5.125	130.2	1.250	31.8	0.750	19.1	29.92	850	115058-11
GH	3	76.2	5.625	142.9	1.250	31.8	0.750	19.1	34.14	970	115058-11
GJ	3	76.2	5.875	149.2	1.250	31.8	0.750	19.1	36.96	1050	115058-11
GN	3	76.2	8.625	219.1	1.250	31.8	0.750	19.1	51.39	1460	115058-11

Type 3188 85 °C Best Value, Screw Terminal, Aluminum

85 °C Long Life Screw Terminal Type

Ratings

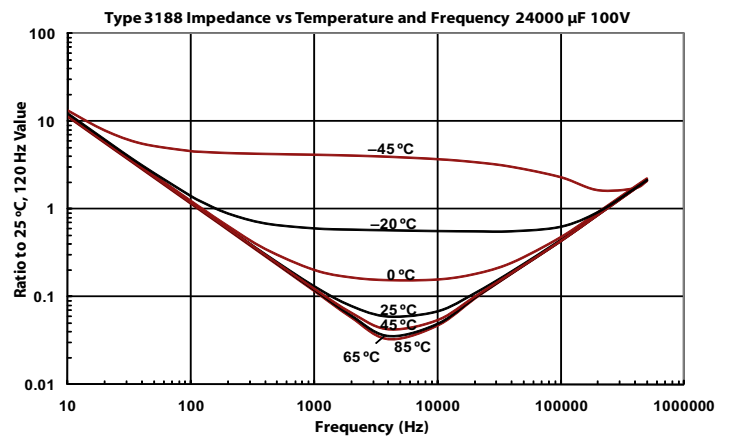
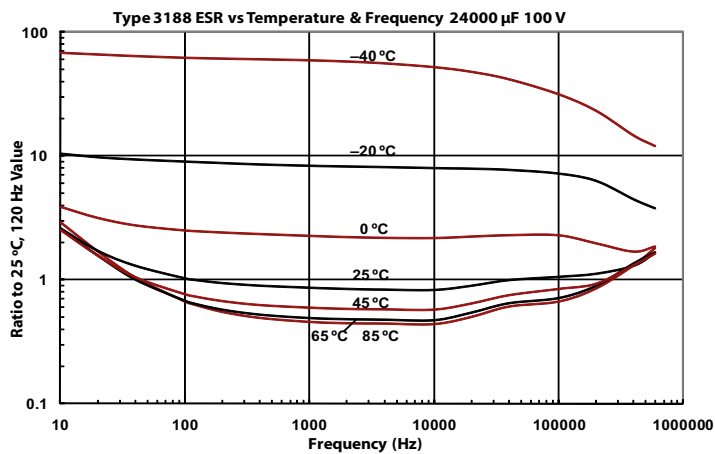
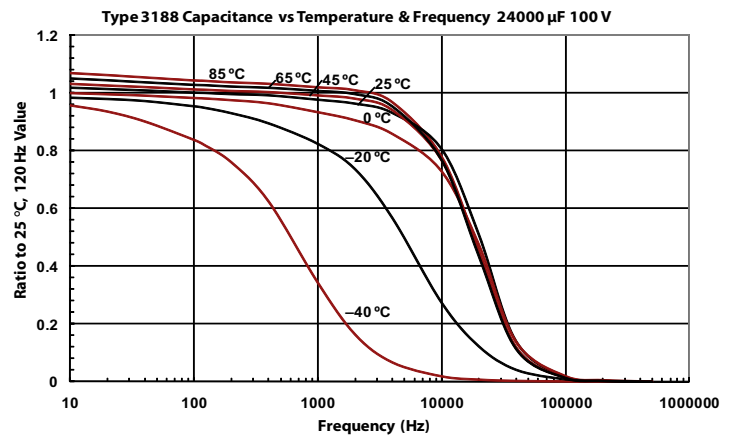
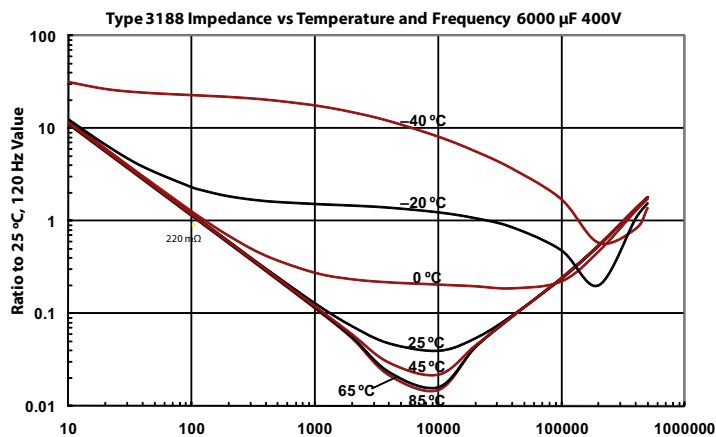
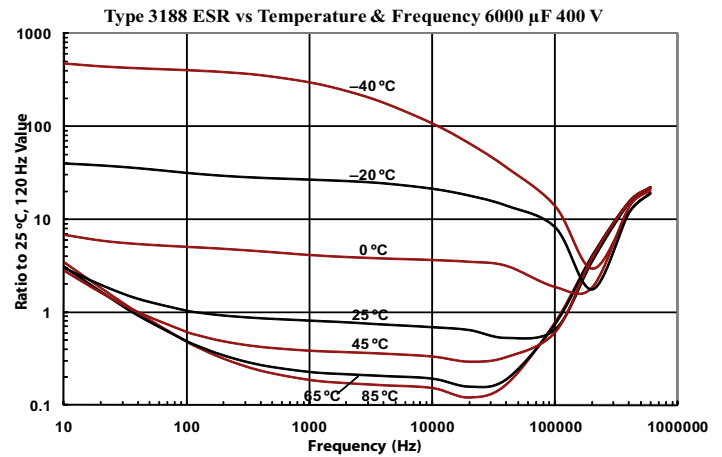
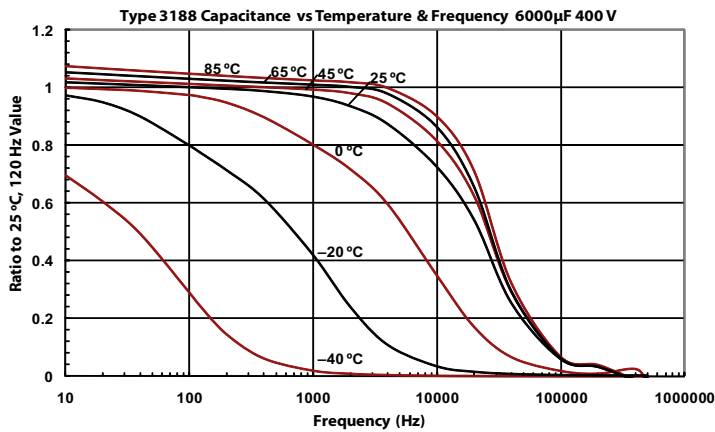
Additional Low Voltages and Smaller Sizes available at <http://www.cde.com/catalogs/3188.pdf>

Capacitance (μF)	Catalog Part Number	ESR max 120 Hz, 25°C (mΩ)	Ripple max 120 Hz, 85 °C (A)	Case Size DxL (in)
200 Volts (250 Volts Surge)				
6800	3188FE682T200APA1	24.0	14.00	2.50 X 4.125
8200	3188FF822T200APA1	21.0	16.00	2.50 X 4.625
10000	3188FH103T200APA1	17.0	20.00	2.50 X 5.625
10000	3188GE103T200APA1	25.0	16.00	3.00 X 4.125
12000	3188GF123T200APA1	22.0	18.00	3.00 X 4.625
15000	3188GH153T200APA1	19.0	21.00	3.00 X 5.625
22000	3188GN223T200APA1	15.0	25.00	3.00 X 8.625
250 Volts (300 Volts Surge)				
4700	3188FE472T250APA1	25.0	14.00	2.50 X 4.125
5600	3188FF562T250APA1	20.0	16.00	2.50 X 4.625
6800	3188FH682T250APA1	17.0	18.00	2.50 X 5.625
6800	3188GE682T250APA1	17.0	18.00	3.00 X 4.125
8200	3188GF822T250APA1	24.0	16.00	3.00 X 4.625
10000	3188GH103T250APA1	18.0	21.00	3.00 X 5.625
12000	3188GN123T250APA1	16.0	25.00	3.00 X 8.625
350 Volts (400 Volts Surge)				
2700	3188FE272T350APA1	47.0	10.00	2.50 X 4.125
3300	3188FF332T350APA1	39.0	12.00	2.50 X 4.625
3900	3188FH392T350APA1	34.0	13.00	2.50 X 5.625
3900	3188GE392T350APA1	34.0	13.00	3.00 X 4.125
4700	3188GF472T350APA1	34.0	14.00	3.00 X 4.625
5600	3188GH562T350APA1	28.0	16.00	3.00 X 5.625
10000	3188GN103T350APA1	18.0	25.00	3.00 X 8.625
400 Volts (450 Volts Surge)				
2200	3188FE222T400APA1	45.0	9.80	2.50 X 4.125
2700	3188FF272T400APA1	47.0	10.70	2.50 X 4.625
3300	3188FH332T400APA1	35.0	13.00	2.50 X 5.625
3300	3188GE332T400APA1	35.0	13.00	3.00 X 4.125
3900	3188GF392T400APA1	37.0	13.00	3.00 X 4.625
4700	3188GH472T400APA1	31.0	15.00	3.00 X 5.625
8200	3188GN822T400APA1	24.0	22.00	3.00 X 8.625
450 Volts (525 Volts Surge)				
2200	3188FF222T450APA1	46.0	10.50	2.50 X 4.625
3300	3188GF332T450APA1	34.0	13.80	3.00 X 4.625
3900	3188GH392T450APA1	22.0	19.10	3.00 X 5.625

Type 3188 85 °C Best Value, Screw Terminal, Aluminum

85 °C Long Life Screw Terminal Type

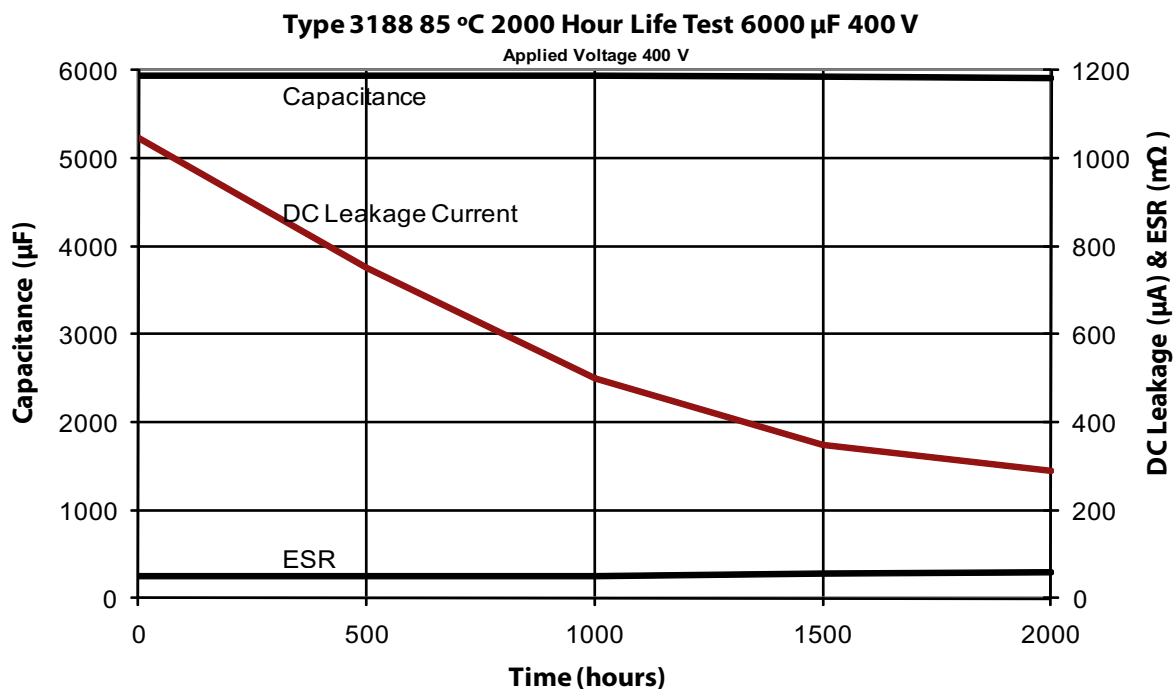
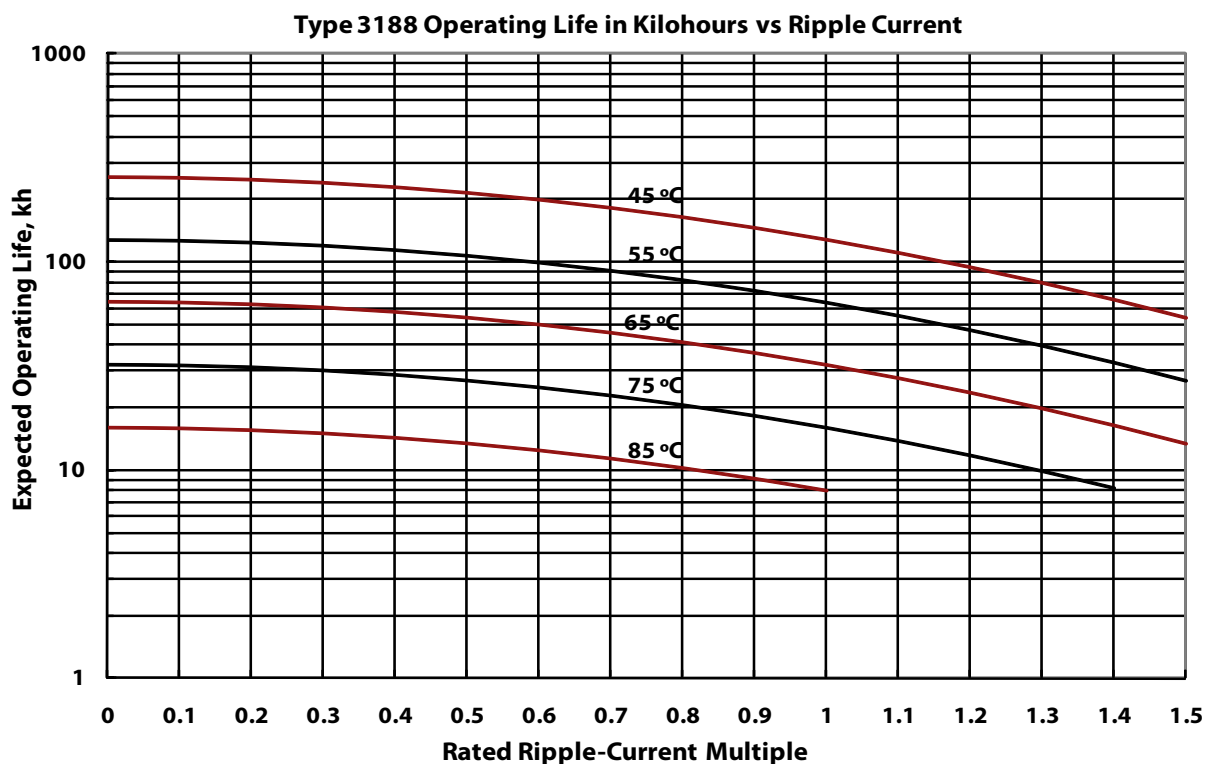
Typical Performance Curves



Type 3188 85 °C Best Value, Screw Terminal, Aluminum

85 °C Long Life Screw Terminal Type

Typical Performance Curves



Type 500C 95 °C Long Life, Screw Terminal, Aluminum

Long Life, High Capacitance Screw Terminal Type



Type 500C capacitors are designed for mainframe computers and other long life UPS and power supply filter applications. They deliver nearly as much capacitance as the Type DCMC capacitors, but with two times the life expectancy. They are an excellent choice for high ripple applications. The extended cathode foil of the 500C assures cool operation with heat flow from the capacitor element to the can.

Highlights

- Long-life, High-Capacitance
- Better for Power-supply and UPS systems
- Thermal-Pak™ extended cathode construction

Specifications

Temperature Range	–40 °C to +95 °C								
Rated Voltage Range	6.3 Vdc to 500 Vdc								
Capacitance Range	100 μF to 2.6 F								
Capacitance Tolerance	–10% +75% ≤ 160 Vdc –10% +50% ≥ 200 Vdc								
Leakage Current	≤3 √CV μA, 4 mA max, 5 minutes								
Ripple Current Multipliers	Ambient Temperature								
	45 °C	55 °C	65 °C	75 °C	85 °C				
	2.00	1.82	1.59	1.33	1.00				
	Frequency		50 Hz	60 Hz	120 Hz	360 Hz	1 kHz	5 kHz	10 kHz & up
	1 3/8" & 1 3/4" Diameters								
	6.3 to 160 V		0.91	0.93	1.00	1.06	1.08	1.10	1.10
	200 to 350 V		0.76	0.81	1.00	1.24	1.36	1.43	1.44
	400 to 500 Vx		0.76	0.81	1.00	1.24	1.37	1.44	1.45
	2" & 2 1/2" Diameters								
	6.3 to 160 V		0.93	0.95	1.00	1.04	1.06	1.06	1.07
	200 to 350 V		0.78	0.83	1.00	1.20	1.29	1.34	1.35
	400 to 500 V		0.77	0.82	1.00	1.22	1.33	1.39	1.40
	3" & 3 1/2" Diameters								
	6.3 to 160 V		0.95	0.97	1.00	1.03	1.04	1.04	1.04
	200 to 350 V		0.84	0.88	1.00	1.12	1.17	1.20	1.20
400 to 500 V		0.79	0.84	1.00	1.18	1.26	1.31	1.32	
Low Temperature Characteristics	Impedance ratio: Z _{–20°C} /Z _{+25°C} ≤ 20 (6.3–10 Vdc) ≤ 8 (16–50 Vdc) ≤ 4 (63–100 Vdc) ≤ 3 (150–550 Vdc)								
Endurance Life Test	5000 h at full load at 85 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit								
Shelf Life Test	500 h at 95 °C Capacitance 100% of limit ESR 100% of limit DCL 100% of limit								
Vibration	10 to 55 Hz, 0.06" and 10 g max, 1.5 h each of 2 axes								
RoHS Compliant									

Type 500C 95 °C Long Life, Screw Terminal, Aluminum

Long Life, High Capacitance Screw Terminal Type

Part Numbering System

500C	492	T	200	CB	2	B	S
Type	Capacitance	Tolerance	Voltage	Case Code	Insulation	Terminal	Can Style
100 = 10 μF 101 = 100 μF 492 = 4900 μF 433 = 43,000 μF	M = ±20% U = -10%+75% T = 10%+50%	6R3 = 6.3 Vdc 063 = 63 Vdc 200 = 200 Vdc	0 = None 1 = Polyester 2 = PVC	A = Low Post B = High Post D = High Current, Low Post E = High Current, High Post F or M = M5 Post G = M6 Low Post H = M6 High Post	Blank = Standard Can S = Stud Bottom P = Stud with Thermal Pad		

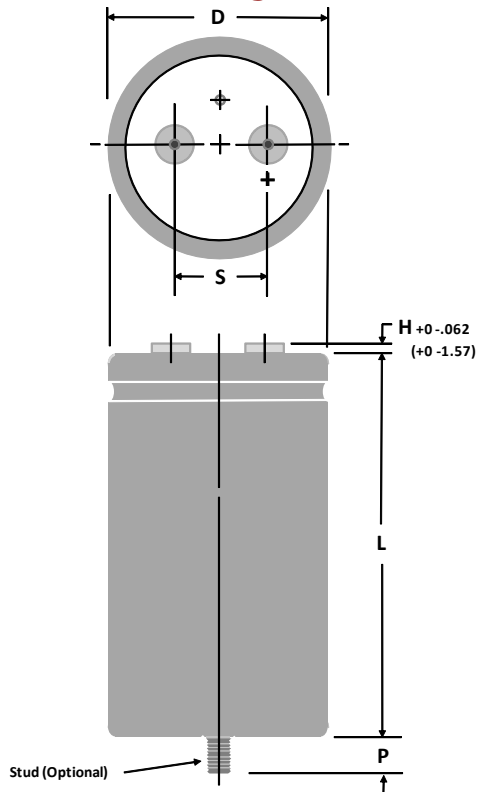
Standard insulation is 0.008-in PVC sleeve with 0.01-in polypropylene end disk.
Polyester insulation is not available for 3.5 inch diameter units.

Outline Drawing

The drawing shows a horizontal rectangle representing the capacitor body. Below the rectangle, a dimension line with arrows at both ends is labeled 'D', indicating the diameter of the capacitor.

Standard insulation is 0.008-in PVC sleeve with 0.01-in polypropylene end disk.
Polyester insulation is not available for 3.5 inch diameter units.

Outline Drawing



NOTE: With the stud-mount feature, a thermally-conductive disk can be inserted in the bottom flush with the outer insulating sleeve. This reduces the thermal resistance through the can bottom by 0.3 °C/W. Can Style P.

Stud Dimensions

Case Diam.	Stud Thread	P ± 0.039" (±1.0 mm)
1.375	M8	0.470" (12.0)
1.750	M8	0.470" (12.0)
2.000	M12	0.630" (16.0)
2.500	M12	0.630" (16.0)
3.000	M12	0.630" (16.0)
3.500	M12	0.630" (16.0)

Terminal Dimensions

Terminal Style	For Case Diameters	Code	Post Diameter in mm	H max in mm	Thread	min Full Thread in mm	Torque in-lb N-m
Low Post	1 ³ / ₈ to 3	A	0.314 8.0	0.094 2.4	10-32	0.218 5.5	25 2.82
High Post	1 ³ / ₈ to 3	B	0.314 8.0	0.281 7.1	10-32	0.375 9.5	25 2.82
High Current, Low	2 ¹ / ₂ to 3 ¹ / ₂	D	0.684 17.4	0.125 3.2	¼-28	0.344 8.7	60 6.78
High Current, High	2 ¹ / ₂ to 3 ¹ / ₂	E	0.684 17.4	0.281 7.1	¼-28	0.469 11.9	60 6.78
M5 Post, Small	1 ³ / ₈ to 2	M	0.314 8.0	0.281 7.1	M5	0.375 9.5	25 2.82
M5 Post	2 ¹ / ₂ & 3	F	0.512 13.0	0.230 5.8	M5	0.344 8.7	25 2.82
M6 Low Post	2 ¹ / ₂ to 3 ¹ / ₂	G	0.684 17.4	0.125 3.2	M6	0.344 8.7	60 6.78
M6 High Post	2 ¹ / ₂ to 3 ¹ / ₂	H	0.684 17.4	0.281 7.1	M6	0.469 11.9	60 6.78

NOTE: Only high post and M5 post terminals are available at 550 Vdc as they meet the required creepage distance.

Type 500C 95 °C Long Life, Screw Terminal, Aluminum

Long Life, High Capacitance Screw Terminal Type

Uninsulated Case Dimensions

For insulated case, add 0.024"(0.610 mm) to "D" and 0.030"(0.762 mm) to length.

Case Code	Diam. (D)		Length (L)		Terminals (S)		Typical Weight	
	±.031 Inches	±.78 mm	±.062 Inches	±1.57 mm	±0.015 Inches	±.38 mm	oz	g
AK	1.375	34.93	1.625	41.28	0.50	12.70	1.9	54
AA	1.375	34.93	2.125	53.98	0.50	12.70	2.0	57
AH	1.375	34.93	2.625	66.68	0.50	12.70	2.7	77
AB	1.375	34.93	3.125	79.38	0.50	12.70	3.3	94
AJ	1.375	34.93	3.625	92.08	0.50	12.70	3.8	108
AC	1.375	34.93	4.125	104.78	0.50	12.70	4.4	125
AD	1.375	34.93	4.625	117.48	0.50	12.70	5.1	145
AE	1.375	34.93	5.125	130.18	0.50	12.70	6.8	193
AF	1.375	34.93	5.625	142.88	0.50	12.70	8.1	230
EA	1.750	44.45	2.125	53.98	0.75	19.05	2.7	76
EH	1.750	44.45	2.625	66.68	0.75	19.05	3.8	108
EB	1.750	44.45	3.125	79.38	0.75	19.05	5.1	145
EJ	1.750	44.45	3.625	92.08	0.75	19.05	6.8	193
EC	1.750	44.45	4.125	104.78	0.75	19.05	8.1	230
ED	1.750	44.45	4.625	117.48	0.75	19.05	9.0	255
EE	1.750	44.45	5.125	130.18	0.75	19.05	9.5	269
EF	1.750	44.45	5.625	142.88	0.75	19.05	10.5	298
BA	2.000	50.80	2.125	53.98	0.88	22.23	5.4	153
BH	2.000	50.80	2.625	66.68	0.88	22.23	6.1	173
BB	2.000	50.80	3.125	79.38	0.88	22.23	6.8	193
BJ	2.000	50.80	3.625	92.08	0.88	22.23	8.2	232
BC	2.000	50.80	4.125	104.78	0.88	22.23	9.5	269
BD	2.000	50.80	4.625	117.48	0.88	22.23	10.3	292
BE	2.000	50.80	5.125	130.18	0.88	22.23	10.7	303
BF	2.000	50.80	5.625	142.88	0.88	22.23	13.0	369
CH	2.500	63.50	2.625	66.68	1.13	28.58	9.2	261
CB	2.500	63.50	3.125	79.38	1.13	28.58	10.4	295
CJ	2.500	63.50	3.625	92.08	1.13	28.58	12.7	361
CC	2.500	63.50	4.125	104.78	1.13	28.58	15.0	425
CD	2.500	63.50	4.625	117.48	1.13	28.58	17.2	488
CE	2.500	63.50	5.125	130.18	1.13	28.58	19.3	547
CF	2.500	63.50	5.625	142.88	1.13	28.58	21.4	607
DB	3.000	76.20	3.125	79.38	1.25	31.75	16.7	473
DJ	3.000	76.20	3.625	92.08	1.25	31.75	20.0	567
DC	3.000	76.20	4.125	104.78	1.25	31.75	22.2	629
DD	3.000	76.20	4.625	117.48	1.25	31.75	25.5	723
DE	3.000	76.20	5.125	130.18	1.25	31.75	30.0	850
DF	3.000	76.20	5.625	142.88	1.25	31.75	31.9	904
DP	3.000	76.20	5.875	149.23	1.25	31.75	32.8	931
DN	3.000	76.20	7.625	193.68	1.25	31.75	39.5	1119
DG	3.000	76.20	8.625	219.08	1.25	31.75	43.3	1227
FC	3.500	88.90	4.125	104.78	1.25	31.75	30.0	850
FD	3.500	88.90	4.625	117.48	1.25	31.75	34.4	976
FE	3.500	88.90	5.125	130.18	1.25	31.75	40.5	1148
FF	3.500	88.90	5.625	142.88	1.25	31.75	43.1	1221
FP	3.500	88.90	5.875	149.23	1.25	31.75	44.3	1257
FN	3.500	88.90	7.625	193.68	1.25	31.75	53.3	1512
FG	3.500	88.90	8.625	219.08	1.25	31.75	58.5	1658

Type 500C 95 °C Long Life, Screw Terminal, Aluminum

Long Life, High Capacitance Screw Terminal Type

Ratings

Additional Low Voltages and Smaller Sizes available at www.cde.com/catalogs/500C.pdf

Cap. (μF)	Catalog Part Number	ESR Max. @ 25 °C 120 Hz (mΩ)	Ripple Max. @ 85 °C 120 Hz (A)	Nominal Size D x L (inches)	Cap. (μF)	Catalog Part Number	ESR Max. @ 25 °C 120 Hz (mΩ)	Ripple Max. @ 85 °C 120 Hz (A)	Nominal Size D x L (inches)
200 Vdc (250 Vdc Surge)					250 Vdc (300 Vdc Surge)				
3500	500C352T200CH2B	42.2	8.60	2 1/2 x 2 5/8	25000	500C253T250FN2D	10.5	30.00	3 1/2 x 7 5/8
4900	500C492T200CB2B	31.2	10.60	2 1/2 x 3 1/8	29000	500C293T250FG2D	9.2	33.00	3 1/2 x 8 5/8
6200	500C622T200CJ2B	22.3	13.20	2 1/2 x 3 5/8	300 Vdc (350 Vdc Surge)				
7600	500C762T200CC2B	20.3	14.40	2 1/2 x 4 1/8	2200	500C222T300CH2B	60.5	7.20	2 1/2 x 2 5/8
7600	500C762T200DB2B	30.3	12.10	3 x 3 1/8	2900	500C292T300CB2B	46.5	8.70	2 1/2 x 3 1/8
9000	500C902T200CD2B	17.3	16.20	2 1/2 x 4 5/8	3700	500C372T300CJ2B	38.1	10.10	2 1/2 x 3 5/8
9800	500C982T200DJ2B	23.7	14.30	3 x 3 5/8	4100	500C412T300DB2B	42.8	10.10	3 x 3 1/8
10000	500C103T200CE2B	15.8	17.60	2 1/2 x 5 1/8	4500	500C452T300CC2B	29.9	11.90	2 1/2 x 4 1/8
12000	500C123T200CF2B	13.7	19.40	2 1/2 x 5 5/8	5200	500C522T300DJ2B	34.0	11.90	3 x 3 5/8
12000	500C123T200DC2B	19.7	16.30	3 x 4 1/8	5300	500C532T300CD2B	25.5	13.40	2 1/2 x 4 5/8
14000	500C143T200DD2B	16.9	18.30	3 x 4 5/8	6100	500C612T300CE2B	22.2	14.80	2 1/2 x 5 1/8
15000	500C153T200FC2B	17.1	19.30	3 1/2 x 4 1/8	6400	500C642T300DC2B	26.2	14.20	3 x 4 1/8
16000	500C163T200FG2B	14.8	20.20	3 x 5 1/8	6900	500C692T300CF2B	19.8	16.20	2 1/2 x 5 5/8
18000	500C183T200DF2B	13.3	22.00	3 x 5 5/8	7500	500C752T300DD2B	23.6	15.50	3 x 4 5/8
19000	500C193T200DP2B	15.3	20.70	3 x 5 7/8	8700	500C872T300DE2B	20.5	17.20	3 x 5 1/8
20000	500C203T200FD2B	12.7	23.30	3 1/2 x 4 5/8	8900	500C892T300FC2D	21.0	17.40	3 1/2 x 4 1/8
21000	500C213T200FE2D	13.4	23.30	3 1/2 x 5 1/8	9800	500C982T300DF2B	18.0	18.90	3 x 5 5/8
24000	500C243T200FF2D	12.0	25.30	3 1/2 x 5 5/8	10000	500C103T300DP2B	17.0	19.70	3 x 5 7/8
25000	500C253T200FP2D	11.5	26.30	3 1/2 x 5 7/8	10000	500C103T300FD2D	18.2	19.40	3 1/2 x 4 5/8
26000	500C263T200DN2B	11.7	26.40	3 x 7 5/8	12000	500C123T300FE2D	16.0	21.30	3 1/2 x 5 1/8
31000	500C313T200DG2B	9.6	29.60	3 x 8 5/8	13000	500C133T300FF2D	14.3	23.20	3 1/2 x 5 5/8
35000	500C353T200FN2D	9.3	32.10	3 1/2 x 7 5/8	14000	500C143T300FP2D	13.5	24.20	3 1/2 x 5 7/8
40000	500C403T200FG2D	7.9	35.50	3 1/2 x 8 5/8	15000	500C153T300DN2B	13.2	24.90	3 x 7 5/8
250 Vdc (300 Vdc Surge)					17000	500C173T300DG2B	10.8	27.90	3 x 8 5/8
2600	500C262T250CH2B	51.6	7.80	2 1/2 x 2 5/8	19000	500C193T300FN2D	11.0	29.50	3 1/2 x 7 5/8
3700	500C372T250CB2B	32.0	10.50	2 1/2 x 3 1/8	22000	500C223T300FG2D	9.3	32.60	3 1/2 x 8 5/8
4700	500C472T250CJ2B	25.0	12.40	2 1/2 x 3 5/8	350 Vdc (400 Vdc Surge)				
5600	500C562T250DB2B	27.6	12.60	3 x 3 1/8	1500	500C152T350CH2B	86.9	6.00	2 1/2 x 2 5/8
5800	500C582T250CC2B	20.7	14.30	2 1/2 x 4 1/8	2100	500C212T350CB2B	61.0	7.60	2 1/2 x 3 1/8
6900	500C692T250CD2B	17.7	16.10	2 1/2 x 4 5/8	2700	500C272T350CJ2B	48.5	8.90	2 1/2 x 3 5/8
7200	500C722T250DJ2B	21.6	15.00	3 x 3 5/8	2900	500C292T350DB2B	54.0	9.00	3 x 3 1/8
7900	500C792T250CE2B	15.5	17.70	2 1/2 x 5 1/8	3300	500C332T350CC2B	39.9	10.30	2 1/2 x 4 1/8
8800	500C882T250DC2B	17.6	17.30	3 x 4 1/8	3700	500C372T350DJ2B	41.7	10.80	3 x 3 5/8
9000	500C902T250CF2B	13.8	19.40	2 1/2 x 5 5/8	3900	500C392T350CD2B	34.0	11.60	2 1/2 x 4 5/8
10000	500C103T250DD2B	16.3	18.60	3 x 4 5/8	4500	500C452T350CE2B	29.6	12.80	2 1/2 x 5 1/8
11000	500C113T250FC2D	19.5	18.10	3 1/2 x 4 1/8	4600	500C462T350DC2B	34.7	12.30	3 x 4 1/8
12000	500C123T250DE2B	14.3	20.60	3 x 5 1/8	5100	500C512T350CF2B	26.2	14.10	2 1/2 x 5 5/8
13000	500C133T250FD2D	17.2	19.90	3 1/2 x 4 5/8	5400	500C542T350DD2B	29.6	13.90	3 x 4 5/8
14000	500C143T250DF2B	12.0	23.20	3 x 5 5/8	6200	500C622T350DE2B	25.8	15.30	3 x 5 1/8
15000	500C153T250DP2B	11.5	23.90	3 x 5 7/8	6400	500C642T350FC2D	29.9	14.60	3 1/2 x 4 1/8
15000	500C153T250FE2D	15.1	22.00	3 1/2 x 5 1/8	7000	500C702T350DF2B	22.9	16.70	3 x 5 5/8
17000	500C173T250FF2D	13.2	24.20	3 1/2 x 5 5/8	7500	500C752T350DP2B	21.7	17.40	3 x 5 7/8
18000	500C183T250FP2D	12.8	24.80	3 1/2 x 5 7/8	7500	500C752T350FD2D	25.7	16.30	3 1/2 x 4 5/8
21000	500C213T250DN2D	9.6	30.90	3 x 7 5/8	8700	500C872T350FE2D	22.5	18.00	3 1/2 x 5 1/8
24000	500C243T250DG2D	7.0	34.60	3 x 8 5/8	9800	500C982T350FF2D	20.0	19.60	3 1/2 x 5 5/8

Type 500C 95 °C Long Life, Screw Terminal, Aluminum

Long Life, High Capacitance Screw Terminal Type

Additional Low Voltages and Smaller Sizes available at www.cde.com/catalogs/500C.pdf

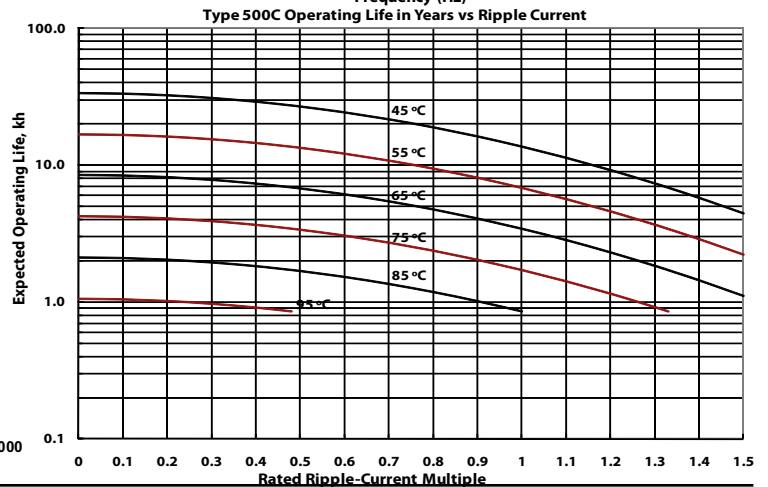
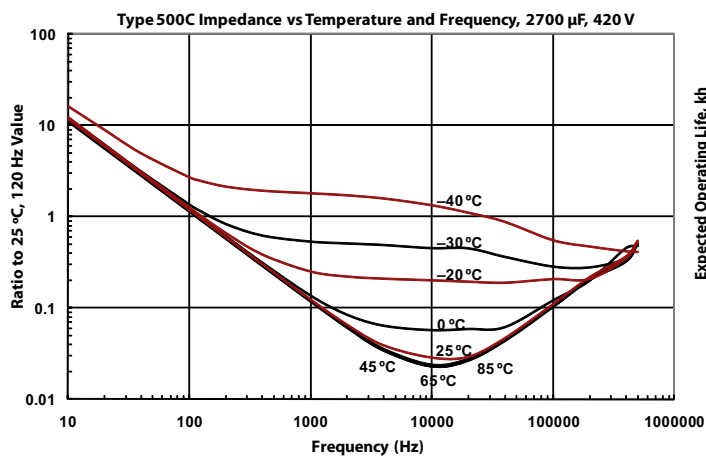
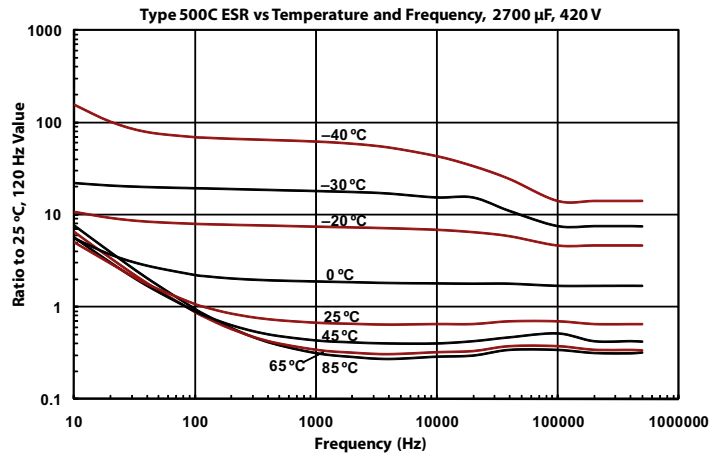
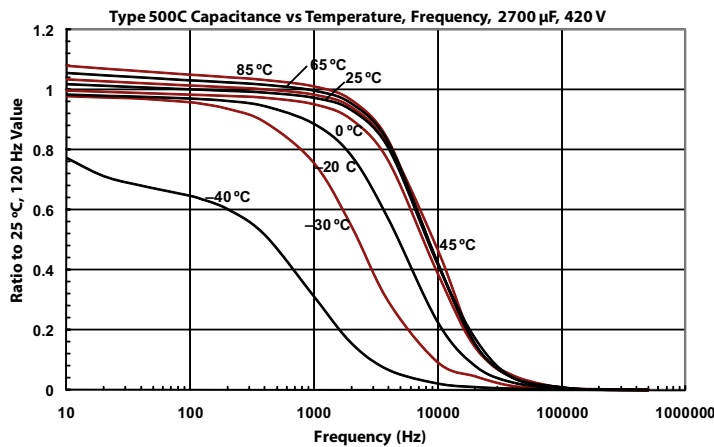
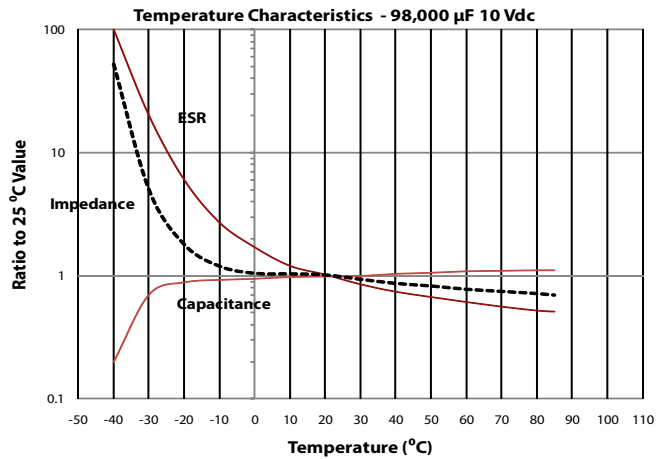
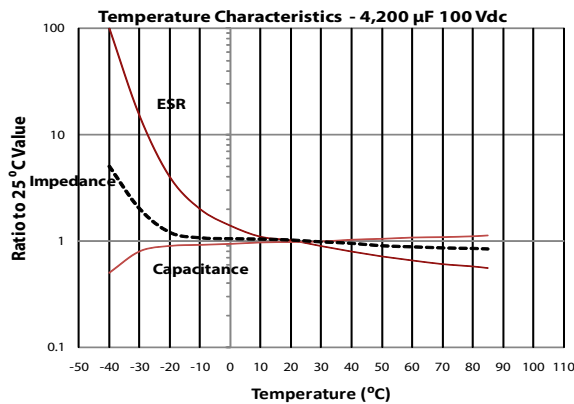
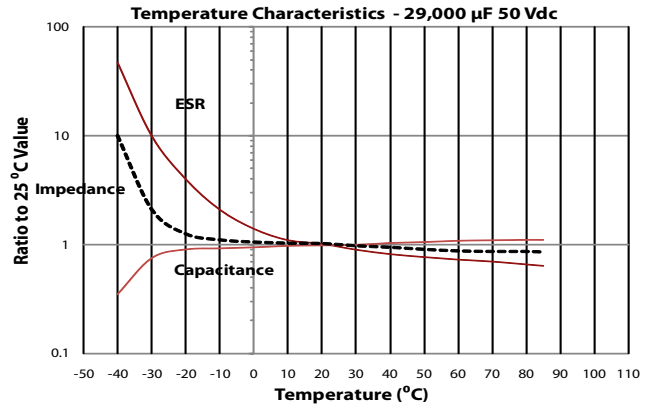
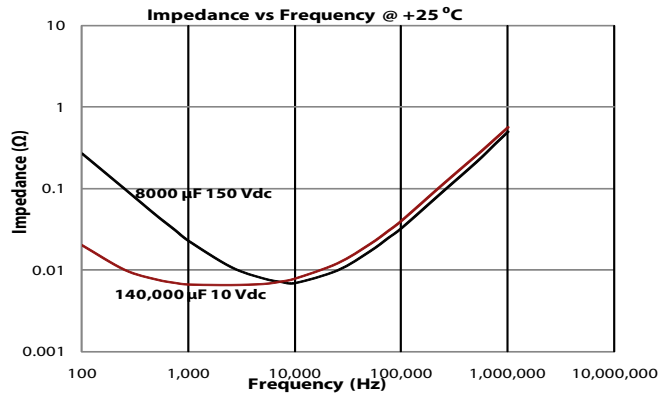
Cap. (µF)	Catalog Part Number	ESR Max. @ 25 °C 120 Hz (mΩ)	Ripple Max. @ 85 °C 120 Hz (A)	Nominal Size D x L (inches)
350 Vdc (400 Vdc Surge)				
10000	500C103T350DN2B	17.1	21.80	3 x 7 5/8
10000	500C103T350FP2D	18.9	20.40	3 1/2 x 5 7/8
12000	500C123T350DG2B	14.2	24.30	3 x 8 5/8
15000	500C153T350FN2D	14.9	25.40	3 1/2 x 7 5/8
17000	500C173T350FG2D	12.4	28.30	3 1/2 x 8 5/8
400 Vdc (450 Vdc Surge)				
1200	500C122T400CH2B	93.1	5.80	2 1/2 x 2 5/8
1700	500C172T400CB2B	65.3	7.30	2 1/2 x 3 1/8
2100	500C212T400CJ2B	52.0	8.60	2 1/2 x 3 5/8
2300	500C232T400DB2B	57.5	8.80	3 x 3 1/8
2600	500C262T400CC2B	42.8	9.90	2 1/2 x 4 1/8
3000	500C302T400DJ2B	44.9	10.40	3 x 3 5/8
3100	500C312T400CD2B	35.6	11.30	2 1/2 x 4 5/8
3500	500C352T400CE2B	31.7	12.40	2 1/2 x 5 1/8
3600	500C362T400DC2B	37.0	11.90	3 x 4 1/8
4000	500C402T400CF2B	31.5	12.80	2 1/2 x 5 5/8
4300	500C432T400DD2B	28.1	14.20	3 x 4 5/8
4900	500C492T400DE2B	27.4	14.80	3 x 5 1/8
5100	500C512T400FC2D	31.9	14.10	3 1/2 x 4 1/8
5600	500C562T400DF2B	24.4	16.20	3 x 5 5/8
5900	500C592T400DP2B	23.1	16.90	3 x 5 7/8
6000	500C602T400FD2D	27.4	15.80	3 1/2 x 4 5/8
6900	500C692T400FE2D	23.9	17.50	3 1/2 x 5 1/8
7800	500C782T400FF2D	21.2	19.00	3 1/2 x 5 5/8
8200	500C822T400DN2B	18.2	21.20	3 x 7 5/8
8300	500C832T400FP2D	20.1	19.80	3 1/2 x 5 7/8
9500	500C952T400DG2B	15.1	23.60	3 x 8 5/8
11000	500C113T400FN2D	15.8	24.70	3 1/2 x 7 5/8
13000	500C133T400FG2D	13.1	27.50	3 1/2 x 8 5/8
450 Vdc (500 Vdc Surge)				
1100	500C112T450CH2B	116.0	5.20	2 1/2 x 2 5/8
1500	500C152T450CB2B	81.1	6.60	2 1/2 x 3 1/8
1900	500C192T450CJ2B	66.5	7.60	2 1/2 x 3 5/8
2100	500C212T450DB2B	63.8	8.30	3 x 3 1/8
2400	500C242T450CC2B	54.7	8.80	2 1/2 x 4 1/8
2700	500C272T450DJ2B	49.8	9.90	3 x 3 5/8
2800	500C282T450CD2B	46.4	9.90	2 1/2 x 4 5/8
3200	500C322T450CE2B	40.4	11.00	2 1/2 x 5 1/8
3300	500C332T450DC2B	38.2	11.80	3 x 4 1/8
3600	500C362T450CF2B	35.4	12.10	2 1/2 x 5 5/8
3900	500C392T450DD2B	35.7	12.60	3 x 4 5/8
4500	500C452T450DE2B	30.9	14.00	3 x 5 1/8
4600	500C462T450FC2D	30.3	14.50	3 1/2 x 4 1/8
5100	500C512T450DF2B	27.4	15.30	3 x 5 5/8

Cap. (µF)	Catalog Part Number	ESR Max. @ 25 °C 120 Hz (mΩ)	Ripple Max. @ 85 °C 120 Hz (A)	Nominal Size D x L (inches)
450 Vdc (500 Vdc Surge)				
5400	500C542T450DP2B	26.0	15.90	3 x 5 7/8
5400	500C542T450FD2D	25.7	16.30	3 1/2 x 4 5/8
6300	500C632T450FE2D	22.4	18.00	3 1/2 x 5 1/8
7100	500C712T450FF2D	19.9	19.70	3 1/2 x 5 5/8
7500	500C752T450FP2D	18.8	20.50	3 1/2 x 5 7/8
7500	500C752T450DN2B	20.3	20.00	3 x 7 5/8
8700	500C872T450DG2B	16.8	22.40	3 x 8 5/8
9700	500C972T450FN2D	15.1	25.20	3 1/2 x 7 5/8
11000	500C113T450FG2D	12.7	28.00	3 1/2 x 8 5/8
500 Vdc (550 Vdc Surge)				
770	500C771T500CH2B	171.0	4.30	2 1/2 x 2 5/8
1100	500C112T500CB2B	122.0	5.40	2 1/2 x 3 1/8
1400	500C142T500CJ2B	95.1	6.40	2 1/2 x 3 5/8
1600	500C162T500DB2B	86.4	7.10	3 x 3 1/8
1700	500C172T500CC2B	78.1	7.40	2 1/2 x 4 1/8
2000	500C202T500CD2B	66.3	8.30	2 1/2 x 4 5/8
2100	500C212T500DJ2B	67.4	8.50	3 x 3 5/8
2200	500C222T500CE2B	61.1	8.90	2 1/2 x 5 1/8
2400	500C242T500CF2B	54.7	9.70	2 1/2 x 5 5/8
2400	500C242T500DC2B	55.4	9.80	3 x 4 1/8
2800	500C282T500DD2B	48.1	10.90	3 x 4 5/8
3300	500C332T500DE2B	43.1	11.80	3 x 5 1/8
3400	500C342T500FC2D	40.1	12.60	3 1/2 x 4 1/8
3700	500C372T500DF2B	37.5	13.10	3 x 5 5/8
3900	500C392T500DP2B	35.5	13.60	3 x 5 7/8
4000	500C402T500FD2D	34.1	14.20	3 1/2 x 4 5/8
4600	500C462T500FE2D	30.0	15.60	3 1/2 x 5 1/8
5200	500C522T500FF2D	28.0	16.60	3 1/2 x 5 5/8
5400	500C542T500DN2B	27.9	17.10	3 x 7 5/8
5500	500C552T500FP2D	26.0	17.40	3 1/2 x 5 7/8
6300	500C632T500DG2B	23.1	19.10	3 x 8 5/8
7600	500C762T500FN2D	20.5	21.80	3 1/2 x 7 5/8
8800	500C882T500FG2D	16.7	24.40	3 1/2 x 8 5/8
550 Vdc (600 Vdc Surge)				
1400	500C142T550CC2B	170.5	4.90	2 1/2 x 4 1/8
1700	500C172T550CD2B	132.6	5.90	2 1/2 x 4 5/8
1900	500C192T550CE2B	111.7	6.80	2 1/2 x 5 1/8
2200	500C222T550DC2B	90.4	7.80	3 x 4 1/8
2300	500C232T550CF2B	86.5	7.80	2 1/2 x 5 5/8
2500	500C252T550DD2B	79.6	8.40	3 x 4 5/8
2900	500C292T550DE2B	64.0	9.70	3 x 5 1/8
3400	500C342T550DF2F	54.6	10.90	3 x 5 5/8
3700	500C372T550DP2B	50.2	12.24	3 x 5 7/8
5100	500C512T550DN2B	36.4	16.22	3 x 7 5/8

Type 500C 95 °C Long Life, Screw Terminal, Aluminum

Long Life, High Capacitance Screw Terminal Type

Typical Performance Curves



Type 520C 85 °C Long Life, Inverter Grade, Aluminum

High Ripple, Long Life Screw Terminal Type



Type 520C is the 85 °C version of the Type 550C Inverter-Grade capacitor. It delivers the ripple-current capability and exceptional life needed for motor-drive bus capacitors and approaches the performance of the 550C at lower cost. It is rated for 8000 h life with full ripple current, rated voltage, 85 °C and 100 lfm airflow while mounted horizontally. Horizontal mounting is more severe than vertical mounting. The extended cathode foil of the 520C assures heat flow from the capacitor element to the can in all orientations.

Highlights

- 8,000 hour load life
- Ripple current to 55 amps
- ESRs to 8 mΩ
- Best value high ripple current
- Thermal-Pak™ extended cathode construction

Specifications

Temperature Range	-40 °C to +85 °C							
Rated Voltage Range	200 Vdc to 500 Vdc							
Capacitance Range	84 µF to 39,000 µF							
Capacitance Tolerance	-10% +50%							
Leakage Current	≤3 √CV µA, 5 mA max, 5 minutes							
Ripple Current Multipliers	Ambient Temperature							
	45 °C	55 °C	65 °C	75 °C	85 °C			
	1.80	1.63	1.45	1.25	1.00			
	Frequency							
		50 Hz	60 Hz	120 Hz	360 Hz	1 kHz	5 kHz	10 kHz & up
	1 3/8" & 1 3/4" Diameters							
	200 to 350 V	0.76	0.81	1.00	1.24	1.36	1.43	1.44
	400 to 500 V	0.76	0.81	1.00	1.24	1.37	1.44	1.45
	2" & 2 1/2" Diameters							
	200 to 350 V	0.78	0.83	1.00	1.20	1.29	1.34	1.35
	400 to 500 V	0.77	0.82	1.00	1.22	1.33	1.39	1.40
	3" & 3 1/2" Diameters							
	200 to 350 V	0.84	0.88	1.00	1.12	1.17	1.20	1.20
	400 to 500 V	0.79	0.84	1.00	1.18	1.26	1.31	1.32
Low Temperature Characteristics	Impedance ratio: Z _{-20°C} /Z _{+25°C} ≤ 3 (200-500 Vdc)							
Endurance Life Test	8000 h at full load at 85 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit							
Shelf Life Test	500 h at 85 °C Capacitance 100% of limit ESR 100% of limit DCL 100% of limit							
Vibration	10 to 55 Hz, 0.06" and 10 g max, 1.5 h each of 2 axes							
RoHS Compliant								

Type 520C 85 °C Long Life, Inverter Grade, Aluminum

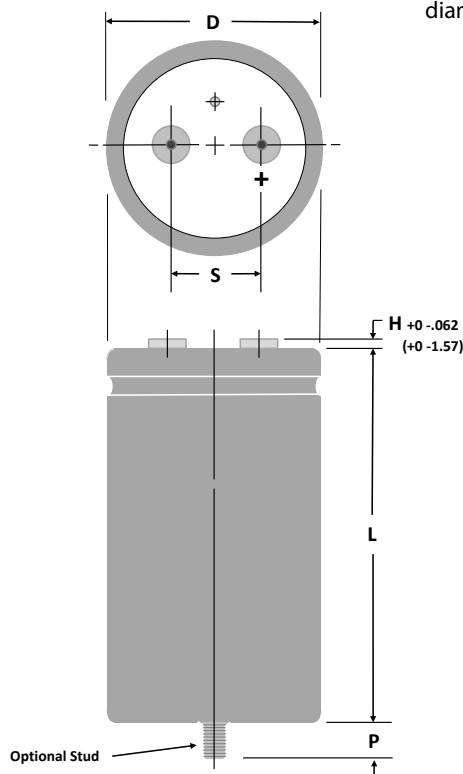
High Ripple, Long Life Screw Terminal Type

Part Numbering System

520C	572	T	400	DF	2	B	S
Type	Capacitance	Tolerance	Voltage	Case Code	Insulation	Terminal	Can Style
	572 = 5700 µF	M = ±20% U = -10%+75% T = 10%+50%	200 = 200 Vdc 400 = 400 Vdc		0 = None 1 = Polyester 2 = PVC	A = Low Post B = High Post D = High Current, Low Post E = High Current, High Post F or M = M5 Post G = M6 Low Post H = M6 High Post	Blank = Standard Can S = Stud Bottom P = Stud with Thermal Pad

Standard insulation is 0.008-in PVC sleeve with 0.01-in polypropylene end disk.
Polyester insulation is not available for 3.5 inch diameter units.

Outline Drawing



Stud Dimensions

Case Diam.	Stud Thread	P ± 0.039" (±1.0 mm)
1.375	M8	0.470" (12.0)
1.750	M8	0.470" (12.0)
2.000	M12	0.630" (16.0)
2.500	M12	0.630" (16.0)
3.000	M12	0.630" (16.0)
3.500	M12	0.630" (16.0)

NOTE: With the stud-mount feature, a thermally-conductive disk can be inserted in the bottom flush with the outer insulating sleeve. This reduces the thermal resistance through the can bottom by 0.3 °C/W. Can Style P.

Terminal Dimensions

Terminal Style	For Case Diameters	Code	Post Diameter in mm	H max in mm	Thread	min Full Thread in mm	Torque in-lb N-m
Low Post	1 3/8 to 3	A	0.314 8.0	0.094 2.4	10-32	0.218 5.5	25 2.82
High Post	1 3/8 to 3	B	0.314 8.0	0.281 7.1	10-32	0.375 9.5	25 2.82
High Current, Low	2 1/2 to 3 1/2	D	0.684 17.4	0.125 3.2	1/4-28	0.344 8.7	60 6.78
High Current, High	2 1/2 to 3 1/2	E	0.684 17.4	0.281 7.1	1/4-28	0.469 11.9	60 6.78
M5 Post, Small	1 3/8 to 2	M	0.314 8.0	0.281 7.1	M5	0.375 9.5	25 2.82
M5 Post	2 1/2 & 3	F	0.512 13.0	0.230 5.8	M5	0.344 8.7	25 2.82
M6 Low Post	2 1/2 to 3 1/2	G	0.684 17.4	0.125 3.2	M6	0.344 8.7	60 6.78
M6 High Post	2 1/2 to 3 1/2	H	0.684 17.4	0.281 7.1	M6	0.469 11.9	60 6.78

Type 520C 85 °C Long Life, Inverter Grade, Aluminum

High Ripple, Long Life Screw Terminal Type

Uninsulated Case Dimensions

For insulated case, add 0.024"(0.610 mm) to "D" and 0.030"(0.762 mm) to length.

Case Code	Diam. (D)		Length (L)		Terminals (S)		Typical Weight	
	±.031 Inches	±.78 mm	±.062 Inches	±1.57 mm	±0.015 Inches	±.38 mm	oz	g
AK	1.375	34.93	1.625	41.28	0.50	12.70	1.9	54
AA	1.375	34.93	2.125	53.98	0.50	12.70	2.0	57
AH	1.375	34.93	2.625	66.68	0.50	12.70	2.7	77
AB	1.375	34.93	3.125	79.38	0.50	12.70	3.3	94
AJ	1.375	34.93	3.625	92.08	0.50	12.70	3.8	108
AC	1.375	34.93	4.125	104.78	0.50	12.70	4.4	125
AD	1.375	34.93	4.625	117.48	0.50	12.70	5.1	145
AE	1.375	34.93	5.125	130.18	0.50	12.70	6.8	193
AF	1.375	34.93	5.625	142.88	0.50	12.70	8.1	230
EA	1.750	44.45	2.125	53.98	0.75	19.05	2.7	76
EH	1.750	44.45	2.625	66.68	0.75	19.05	3.8	108
EB	1.750	44.45	3.125	79.38	0.75	19.05	5.1	145
EJ	1.750	44.45	3.625	92.08	0.75	19.05	6.8	193
EC	1.750	44.45	4.125	104.78	0.75	19.05	8.1	230
ED	1.750	44.45	4.625	117.48	0.75	19.05	9.0	255
EE	1.750	44.45	5.125	130.18	0.75	19.05	9.5	269
EF	1.750	44.45	5.625	142.88	0.75	19.05	10.5	298
BA	2.000	50.80	2.125	53.98	0.88	22.23	5.4	153
BH	2.000	50.80	2.625	66.68	0.88	22.23	6.1	173
BB	2.000	50.80	3.125	79.38	0.88	22.23	6.8	193
BJ	2.000	50.80	3.625	92.08	0.88	22.23	8.2	232
BC	2.000	50.80	4.125	104.78	0.88	22.23	9.5	269
BD	2.000	50.80	4.625	117.48	0.88	22.23	10.3	292
BE	2.000	50.80	5.125	130.18	0.88	22.23	10.7	303
BF	2.000	50.80	5.625	142.88	0.88	22.23	13.0	369
CH	2.500	63.50	2.625	66.68	1.13	28.58	9.2	261
CB	2.500	63.50	3.125	79.38	1.13	28.58	10.4	295
CJ	2.500	63.50	3.625	92.08	1.13	28.58	12.7	361
CC	2.500	63.50	4.125	104.78	1.13	28.58	15.0	425
CD	2.500	63.50	4.625	117.48	1.13	28.58	17.2	488
CE	2.500	63.50	5.125	130.18	1.13	28.58	19.3	547
CF	2.500	63.50	5.625	142.88	1.13	28.58	21.4	607
DB	3.000	76.20	3.125	79.38	1.25	31.75	16.7	473
DJ	3.000	76.20	3.625	92.08	1.25	31.75	20.0	567
DC	3.000	76.20	4.125	104.78	1.25	31.75	22.2	629
DD	3.000	76.20	4.625	117.48	1.25	31.75	25.5	723
DE	3.000	76.20	5.125	130.18	1.25	31.75	30.0	850
DF	3.000	76.20	5.625	142.88	1.25	31.75	31.9	904
DP	3.000	76.20	5.875	149.23	1.25	31.75	32.8	931
DN	3.000	76.20	7.625	193.68	1.25	31.75	39.5	1119
DG	3.000	76.20	8.625	219.08	1.25	31.75	43.3	1227
FC	3.500	88.90	4.125	104.78	1.25	31.75	30.0	850
FD	3.500	88.90	4.625	117.48	1.25	31.75	34.4	976
FE	3.500	88.90	5.125	130.18	1.25	31.75	40.5	1148
FF	3.500	88.90	5.625	142.88	1.25	31.75	43.1	1221
FP	3.500	88.90	5.875	149.23	1.25	31.75	44.3	1257
FN	3.500	88.90	7.625	193.68	1.25	31.75	53.3	1512
FG	3.500	88.90	8.625	219.08	1.25	31.75	58.5	1658

Type 520C 85 °C Long Life, Inverter Grade, Aluminum

High Ripple, Long Life Screw Terminal Type

Ratings

Additional Smaller Sizes available at www.cde.com/catalogs/520C.pdf

Cap. (µF)	Catalog Part Number	ESR Max. @ 25 °C 120 Hz (mΩ)	Ripple Max. @ 85 °C 120 Hz (A)	Nominal Size D x L (inches)
200 Vdc (250 Vdc Surge)				
3200	520C322T200CH2B	44.3	9.0	2 1/2 x 2 5/8
4400	520C442T200CB2B	32.8	11.1	2 1/2 x 3 1/8
5700	520C572T200CJ2B	23.4	13.8	2 1/2 x 3 5/8
6400	520C642T200DB2B	31.8	12.6	3 x 3 1/8
7000	520C702T200CC2B	21.3	15.1	2 1/2 x 4 1/8
8200	520C822T200CD2B	18.2	17.0	2 1/2 x 4 5/8
8200	520C822T200DJ2B	24.9	15.0	3 x 3 5/8
9500	520C952T200CD2B	16.6	18.4	2 1/2 x 5 1/8
10000	520C103T200DC2B	20.7	17.1	3 x 4 1/8
11000	520C113T200CF2B	14.4	20.4	2 1/2 x 5 5/8
12000	520C123T200DD2B	17.7	19.2	3 x 4 5/8
14000	520C143T200DE2B	18.0	19.7	3 x 5 1/8
15000	520C153T200FC2D	15.6	21.7	3 1/2 x 4 1/8
16000	520C163T200DF2B	14.0	23.0	3 x 5 5/8
16000	520C163T200DP2B	16.1	21.7	3 x 5 7/8
17000	520C173T200FD2D	13.3	24.4	3 1/2 x 4 5/8
20000	520C203T200FE2D	14.1	24.4	3 1/2 x 5 1/8
22000	520C223T200DN2D	12.3	27.6	3 x 7 5/8
23000	520C233T200FF2D	12.6	26.5	3 1/2 x 5 5/8
24000	520C243T200FP2D	12.0	27.5	3 1/2 x 5 7/8
26000	520C263T200DG2D	10.1	31.0	3 x 8 5/8
34000	520C343T200FN2D	9.7	33.6	3 1/2 x 7 5/8
39000	520C393T200FG2D	8.3	37.2	3.5 x 8 5/8
250 Vdc (300 Vdc Surge)				
2100	520C212T250CH2B	54.2	8.2	2 1/2 x 2 5/8
3000	520C302T250CB2B	33.6	11.0	2 1/2 x 3 1/8
3900	520C392T250CJ2B	26.3	13.0	2 1/2 x 3 5/8
4300	520C432T250DB2B	29.0	13.2	3 x 3 1/8
4700	520C472T250CC2B	21.8	15.0	2 1/2 x 4 1/8
5600	520C562T250CD2B	18.6	16.8	2 1/2 x 4 5/8
5600	520C562T250DJ2B	22.7	15.7	3 x 3 5/8
6400	520C642T250CD2B	16.3	18.6	2 1/2 x 5 1/8
6800	520C682T250DC2B	18.5	18.2	3 x 4 1/8
7300	520C732T250CF2B	14.5	20.3	2 1/2 x 5 5/8
8000	520C802T250DD2B	17.1	19.5	3 x 4 5/8
9300	520C932T250DE2B	15.0	21.6	3 x 5 1/8
10000	520C103T250FC2D	20.4	19.0	3 1/2 x 4 1/8
11000	520C113T250DF2B	12.6	24.3	3 x 5 5/8
11000	520C113T250DP2B	12.1	25.1	3 x 5 7/8
12000	520C123T250FD2D	18.1	20.9	3 1/2 x 4 5/8
14000	520C143T250FE2D	15.8	23.0	3 1/2 x 5 1/8
15000	520C153T250FF2D	13.9	25.3	3 1/2 x 5 5/8
16000	520C163T250DN2B	9.1	32.2	3 x 7 5/8

Cap. (µF)	Catalog Part Number	ESR Max. @ 25 °C 120 Hz (mΩ)	Ripple Max. @ 85 °C 120 Hz (A)	Nominal Size D x L (inches)
250 Vdc (300 Vdc Surge)				
16000	520C163T250FP2D	13.5	26.0	3 1/2 x 5 7/8
18000	520C183T250DG2D	7.4	36.2	3 x 8 5/8
22000	520C223T250FN2D	11.0	31.5	3 1/2 x 7 5/8
26000	520C263T250FG2D	9.6	34.6	3 1/2 x 8 5/8
300 Vdc (350 Vdc Surge)				
1600	520C162T300CH2B	59.5	7.8	2 1/2 x 2 5/8
2200	520C222T300CB2B	48.8	9.1	2 1/2 x 3 1/8
2900	520C292T300CJ2B	40.0	10.6	2 1/2 x 3 5/8
3400	520C342T300DB2B	44.9	10.6	3 x 3 1/8
3500	520C352T300CC2B	31.4	12.5	2 1/2 x 4 1/8
4100	520C412T300CD2B	26.8	14.0	2 1/2 x 4 5/8
4300	520C432T300DJ2B	35.7	12.5	3 x 3 5/8
4800	520C482T300CD2B	23.3	15.5	2 1/2 x 5 1/8
5300	520C532T300DC2B	27.5	14.9	3 x 4 1/8
5400	520C542T300CF2B	20.7	17.0	2 1/2 x 5 5/8
6300	520C632T300DD2B	24.8	16.3	3 x 4 5/8
7200	520C722T300DE2B	21.5	18.0	3 x 5 1/8
7400	520C742T300FC2D	22.1	18.2	3 1/2 x 4 1/8
8200	520C822T300DF2B	18.9	19.8	3 x 5 5/8
8700	520C872T300DP2B	17.9	20.6	3 x 5 7/8
8800	520C882T300FD2D	19.1	20.3	3 1/2 x 4 5/8
10000	520C103T300FE2D	16.8	22.3	3 1/2 x 5 1/8
11000	520C113T300FF2D	15.0	24.4	3 1/2 x 5 5/8
12000	520C123T300DN2B	13.8	26.1	3 x 7 5/8
12000	520C123T300FP2D	14.2	25.3	3 1/2 x 5 7/8
14000	520C143T300DG2B	11.3	29.3	3 x 8 5/8
17000	520C173T300FN2D	11.5	30.9	3 1/2 x 7 5/8
20000	520C203T300FG2D	9.8	34.2	3 1/2 x 8 5/8
350 Vdc (400 Vdc Surge)				
1500	520C152T350CH2B	91.3	6.3	2 1/2 x 2 5/8
2000	520C202T350CB2B	64.0	8.0	2 1/2 x 3 1/8
2600	520C262T350CJ2B	51.0	9.4	2 1/2 x 3 5/8
3100	520C312T350DB2B	56.6	9.5	3 x 3 1/8
3200	520C322T350CC2B	41.9	10.8	2 1/2 x 4 1/8
3800	520C382T350CD2B	35.7	12.1	2 1/2 x 4 5/8
4000	520C402T350DJ2B	43.8	11.3	3 x 3 5/8
4400	520C442T350CD2B	31.1	13.5	2 1/2 x 5 1/8
4800	520C482T350DC2B	36.5	12.9	3 x 4 1/8
4900	520C492T350CF2B	27.6	14.7	2 1/2 x 5 5/8
5700	520C572T350DD2B	31.0	14.5	3 x 4 5/8
6600	520C662T350DE2B	27.1	16.1	3 x 5 1/8
6800	520C682T350FC2D	31.4	15.3	3 1/2 x 4 1/8
7500	520C752T350DF2B	24.1	17.5	3 x 5 5/8

Type 520C 85 °C Long Life, Inverter Grade, Aluminum

High Ripple, Long Life Screw Terminal Type

Additional Smaller Sizes available at www.cde.com/catalogs/520C.pdf

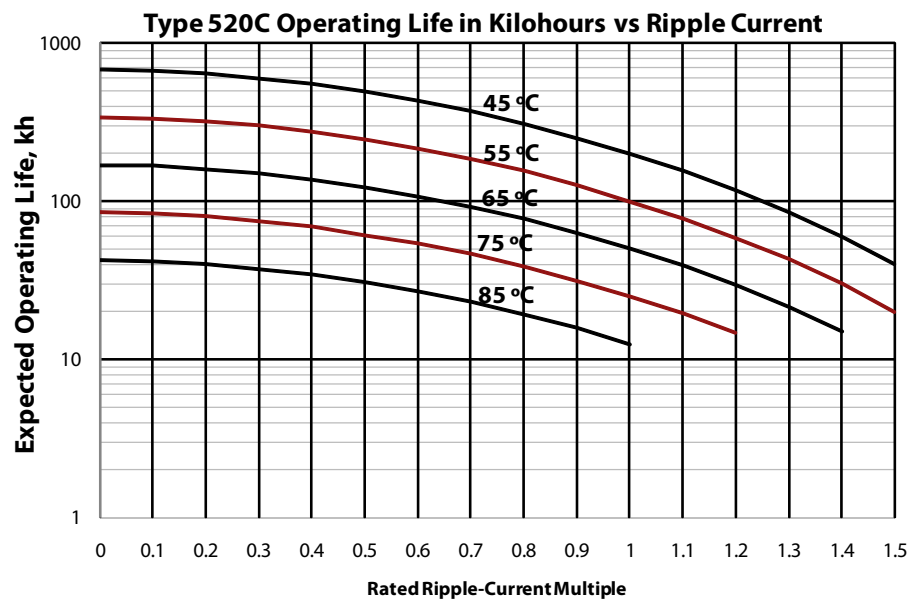
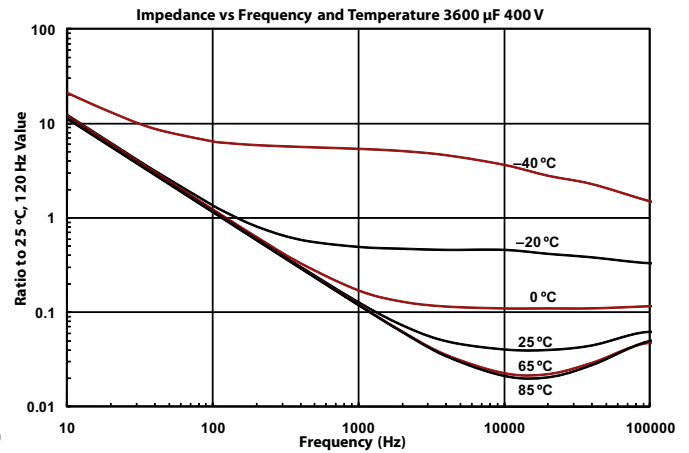
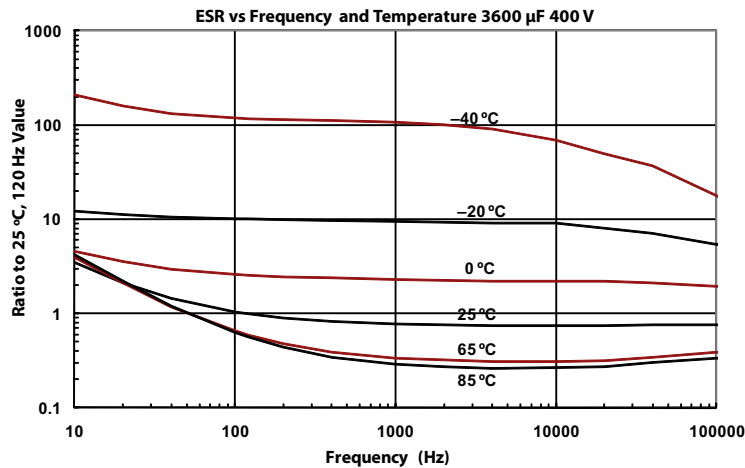
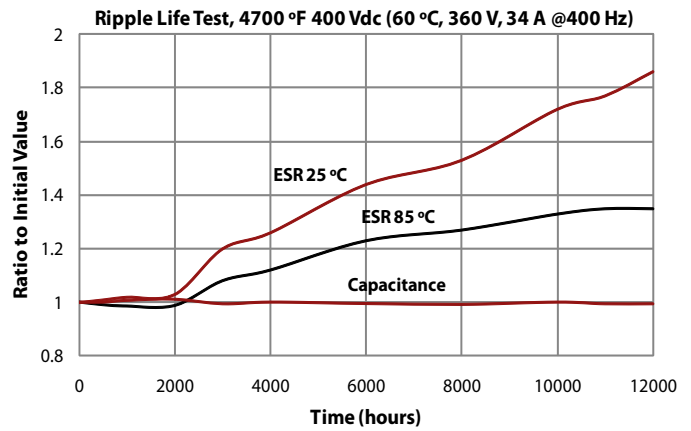
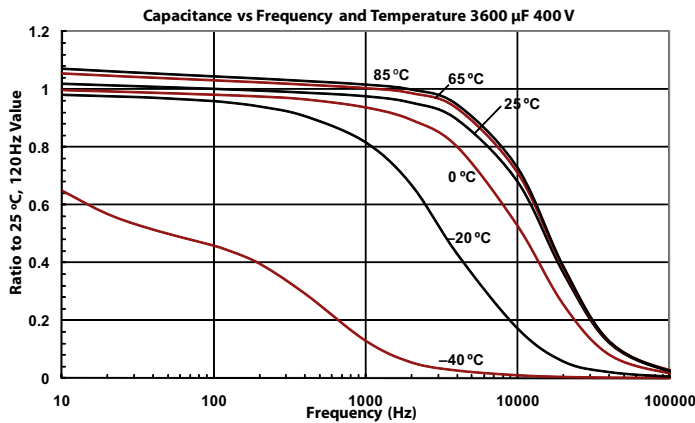
Cap. (µF)	Catalog Part Number	ESR Max. @ 25 °C 120 Hz (mΩ)	Ripple Max. @ 85 °C 120 Hz (A)	Nominal Size D x L (inches)
350 Vdc (400 Vdc Surge)				
7900	520C792T350DP2B	22.8	18.3	3 x 5 7/8
8000	520C802T350FD2D	27.0	17.1	3 1/2 x 4 5/8
9200	520C922T350FE2D	23.6	18.9	3 1/2 x 5 1/8
10000	520C103T350FF2D	21.0	20.6	3 1/2 x 5 5/8
10000	520C103T350FF2D	21.0	20.6	3 1/2 x 5 5/8
11000	520C113T350FP2D	19.9	21.4	3 1/2 x 5 7/8
13000	520C133T350DG2B	14.9	25.5	3 x 8 5/8
15000	520C153T350FN2D	15.7	26.7	3 1/2 x 7 5/8
18000	520C183T350FG2D	13.0	29.7	3 1/2 x 8 5/8
400 Vdc (450 Vdc Surge)				
1100	520C112T400CH2B	97.8	6.1	2 1/2 x 2 5/8
1600	520C162T400CB2B	68.6	7.7	2 1/2 x 3 1/8
2000	520C202T400CJ2B	54.6	9.1	2 1/2 x 3 5/8
2400	520C242T400CC2B	44.9	10.4	2 1/2 x 4 1/8
2400	520C242T400DB2B	60.4	9.2	3 x 3 1/8
2900	520C292T400CD2B	47.1	10.6	2 1/2 x 4 5/8
3000	520C302T400DJ2B	47.1	10.9	3 x 3 5/8
3300	520C332T400CD2B	33.0	13.0	2 1/2 x 5 1/8
3700	520C372T400DC2B	38.8	12.5	3 x 4 1/8
3800	520C382T400CF2B	33.0	13.5	2 1/2 x 5 5/8
4400	520C442T400DD2B	29.5	14.9	3 x 4 5/8
5000	520C502T400DE2B	28.8	15.6	3 x 5 1/8
5200	520C522T400FC2D	33.5	14.8	3 1/2 x 4 1/8
5700	520C572T400DF2B	25.6	17.0	3 x 5 5/8
6100	520C612T400DP2B	24.3	17.7	3 x 5 7/8
6100	520C612T400FD2D	28.8	16.6	3 1/2 x 4 5/8
7000	520C702T400FE2D	25.1	18.3	3 1/2 x 5 1/8
8000	520C802T400FF2D	22.3	20.0	3 1/2 x 5 5/8
8400	520C842T400DN2B	19.1	22.2	3 x 7 5/8
8500	520C852T400FP2D	21.1	20.8	3 1/2 x 5 7/8
9800	520C982T400DG2B	15.8	24.8	3 x 8 5/8
12000	520C123T400FN2D	16.6	25.9	3 1/2 x 7 5/8
14000	520C143T400FG2D	13.8	28.8	3 1/2 x 8 5/8
450 Vdc (500 Vdc Surge)				
920	520C921T450CH2B	114.0	5.6	2 1/2 x 2 5/8
1300	520C132T450CB2B	81.9	7.0	2 1/2 x 3 1/8
1600	520C162T450CJ2B	63.5	8.4	2 1/2 x 3 5/8
1900	520C192T450DB2B	52.6	9.8	3 x 3 1/8
2000	520C202T450CC2B	49.8	9.9	2 1/2 x 4 1/8
2400	520C242T450CD2B	42.3	11.1	2 1/2 x 4 5/8

Cap. (µF)	Catalog Part Number	ESR Max. @ 25 °C 120 Hz (mΩ)	Ripple Max. @ 85 °C 120 Hz (A)	Nominal Size D x L (inches)
450 Vdc (500 Vdc Surge)				
2500	520C252T450DJ2B	40.3	11.8	3 x 3 5/8
2700	520C272T450CE2B	38.9	12.0	2 1/2 x 5 1/8
3100	520C312T450CF2B	32.7	13.5	2 1/2 x 5 5/8
3100	520C312T450DC2B	33.0	13.6	3 x 4 1/8
3600	520C362T450DD2B	27.8	15.3	3 x 4 5/8
4200	520C422T450DE2B	23.9	17.1	3 x 5 1/8
4300	520C432T450FC2D	23.9	17.5	3 1/2 x 4 1/8
4700	520C472T450DF2B	21.3	18.7	3 x 5 5/8
5000	520C502T450DP2B	20.0	19.5	3 x 5 7/8
5000	520C502T450FD2D	20.0	19.9	3 1/2 x 4 5/8
5800	520C582T450FE2D	17.6	21.8	3 1/2 x 5 1/8
6600	520C662T450FF2D	15.1	24.2	3 1/2 x 5 5/8
7000	520C702T450FP2D	14.3	25.2	3 1/2 x 5 7/8
7000	520C702T450DN2B	15.0	25.0	3 x 7 5/8
8100	520C812T450DG2B	12.5	27.9	3 x 8 5/8
9500	520C952T450FN2D	11.0	32.0	3 1/2 x 7 5/8
11000	520C113T450FG2D	9.1	35.5	3 1/2 x 8 5/8
500 Vdc (550 Vdc Surge)				
630	520C631T500CH2B	165.0	4.7	2 1/2 x 2 5/8
890	520C891T500CB2B	118.0	5.9	2 1/2 x 3 1/8
1100	520C112T500CJ2B	91.9	7.0	2 1/2 x 3 5/8
1300	520C132T500DB2B	77.1	8.1	3 x 3 1/8
1400	520C142T500CC2B	73.1	8.2	2 1/2 x 4 1/8
1600	520C162T500CD2B	63.2	9.1	2 1/2 x 4 5/8
1700	520C172T500DJ2B	60.1	9.7	3 x 3 5/8
1900	520C192T500CD2B	54.9	10.1	2 1/2 x 5 1/8
2100	520C212T500DC2B	49.4	11.1	3 x 4 1/8
2200	520C222T500CF2B	46.2	11.4	2 1/2 x 5 5/8
2500	520C252T500DD2B	42.0	12.5	3 x 4 5/8
2900	520C292T500DE2B	36.5	13.8	3 x 5 1/8
3000	520C302T500FC2D	35.7	14.4	3 1/2 x 4 1/8
3300	520C332T500DF2B	32.4	15.1	3 x 5 5/8
3500	520C352T500DP2B	30.6	15.8	3 x 5 7/8
3500	520C352T500FD2D	30.3	16.1	3 1/2 x 4 5/8
4000	520C402T500FE2D	26.4	17.8	3 1/2 x 5 1/8
4600	520C462T500FF2D	23.4	19.5	3 1/2 x 5 5/8
4800	520C482T500FP2D	22.2	20.3	3 1/2 x 5 7/8
4800	520C482T500DN2B	23.9	19.8	3 x 7 5/8
5600	520C562T500DG2B	19.7	22.2	3 x 8 5/8
6700	520C672T500FN2D	17.3	25.4	3 1/2 x 7 5/8

Type 520C 85 °C Long Life, Inverter Grade, Aluminum

High Ripple, Long Life Screw Terminal Type

Typical Performance Curves



Type 550C 105 °C High Ripple, Inverter Grade, Aluminum

Ultra-Ripple, Long Life Screw Terminal Type



Type 550C is the standard for motor drive and other high-ripple, long-life applications. It boasts more than 25% extra ripple capability per can size, but less capacitance than Type 520C. Expected operating life is more than 100,000 hours in typical applications. Type 550C is rated for 10,000 h life with full ripple current, rated voltage, 85 °C and 100 lfm airflow while mounted horizontally. Horizontal mounting is more severe than vertical mounting. The extended cathode foil of the 550C assures heat flow from the capacitor element to the can in all orientations.

Highlights

- 10,000 hour load life
- Ripple current to 105 amps
- ESRs to 7 mΩ

Specifications

Temperature Range	-40 °C to +105 °C									
Rated Voltage Range	200 Vdc to 500 Vdc									
Capacitance Range	91 μF to 35,000 μF									
Capacitance Tolerance	-10% +50%									
Leakage Current	≤3 √CV μA, 4 mA max, 5 minutes									
Ripple Current Multipliers	Ambient Temperature									
	45 °C	55 °C	65 °C	75 °C	85 °C	95 °C	105 °C			
	1.66	1.52	1.37	1.20	1.00	0.75	0.36			
	Frequency			50 Hz	60 Hz	120 Hz	360 Hz	1 kHz	5 kHz	10 kHz & up
	1 3/8" & 2 1/2" Diameters									
	200 to 350 V		0.77	0.82	1.00	1.21	1.32	1.37	1.38	
	400 to 500 V		0.73	0.78	1.00	1.33	1.53	1.66	1.68	
	3" & 3 1/2" Diameters									
	200 to 350 V		0.80	0.85	1.00	1.17	1.24	1.28	1.29	
	400 to 500 V		0.73	0.79	1.00	1.31	1.51	1.63	1.65	
	Low Temperature Characteristics	Impedance ratio: Z _{-20°C} /Z _{+25°C} ≤ 3 (200-500 Vdc)								
	Endurance Life Test	10,000 h at full load at 105 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit								
Shelf Life Test	500 h at 105 °C Capacitance 100% of limit ESR 100% of limit DCL 100% of limit									
Vibration	10 to 55 Hz, 0.06" and 10 g max, 1.5 h each of two axis									
RoHS Compliant										

Type 550C 105 °C High Ripple, Inverter Grade, Aluminum

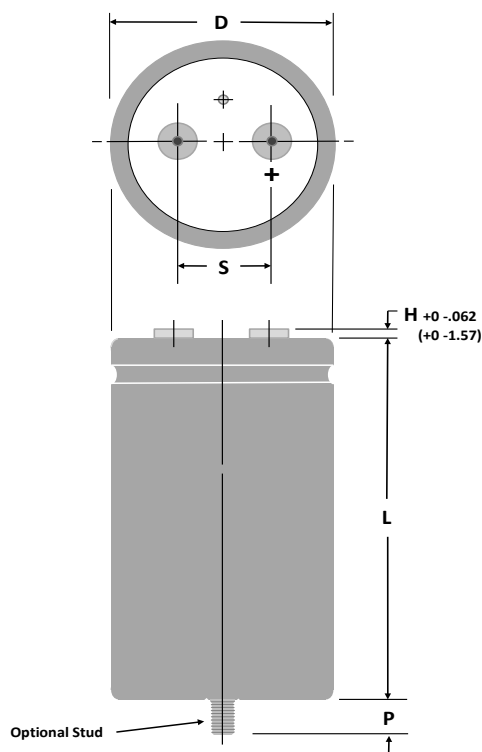
Ultra-Ripple, Long Life Screw Terminal Type

Part Numbering System

550C	812	T	450	FG	2	D	S
Type	Capacitance	Tolerance	Voltage	Case Code	Insulation	Terminal	Can Style
	812 = 8100 µF	M = ±20% U = -10%+75% T = 10%+50%	200 = 200 Vdc		0 = None 1 = Polyester 2 = PVC	A = Low Post B = High Post D = High Current, Low Post E = High Current, High Post F = M5 Post M = M5 Post, Small G = M6 Low Post H = M6 High Post	Blank = Standard Can S = Stud Bottom P = Stud with Thermal Pad

Standard insulation is 0.008-in PVC sleeve with 0.01-in polypropylene end disk.
Polyester insulation is not available for 3.5 inch diameter units.

Outline Drawing



Stud Dimensions

Case Diam.	Stud Thread	P ± 0.039" (±1.0 mm)
1.375	M8	0.470" (12.0)
1.750	M8	0.470" (12.0)
2.000	M12	0.630" (16.0)
2.500	M12	0.630" (16.0)
3.000	M12	0.630" (16.0)
3.500	M12	0.630" (16.0)

NOTE: With the stud-mount feature, a thermally-conductive disk can be inserted in the bottom flush with the outer insulating sleeve. This reduces the thermal resistance through the can bottom by 0.3 °C/W. Can Style P.

Terminal Dimensions

Terminal Style	For Case Diameters	Code	Post Diameter in mm	H max in mm	Thread	min Full Thread in mm	Torque in-lb N-m
Low Post	1 3/8 to 3	A	0.314 8.0	0.094 2.4	10-32	0.218 5.5	25 2.82
High Post	1 3/8 to 3	B	0.314 8.0	0.281 7.1	10-32	0.375 9.5	25 2.82
High Current, Low	2 1/2 to 3 1/2	D	0.684 17.4	0.125 3.2	1/4-28	0.344 8.7	60 6.78
High Current, High	2 1/2 to 3 1/2	E	0.684 17.4	0.281 7.1	1/4-28	0.469 11.9	60 6.78
M5 Post, Small	1 3/8 to 2	M	0.314 8.0	0.281 7.1	M5	0.375 9.5	25 2.82
M5 Post	2 1/2 & 3	F	0.512 13.0	0.230 5.8	M5	0.344 8.7	25 2.82
M6 Low Post	2 1/2 to 3 1/2	G	0.684 17.4	0.125 3.2	M6	0.344 8.7	60 6.78
M6 High Post	2 1/2 to 3 1/2	H	0.684 17.4	0.281 7.1	M6	0.469 11.9	60 6.78

NOTE: Only high post and M5 post terminals are available at 550 Vdc as they meet the required creepage distance.

Type 550C 105 °C High Ripple, Inverter Grade, Aluminum

Ultra-Ripple, Long Life Screw Terminal Type

Uninsulated Case Dimensions

For insulated case, add 0.024"(0.610 mm) to "D" and 0.030"(0.762 mm) to length.

Case Code	Diam. (D)		Length (L)		Terminals (S)		Typical Weight	
	±.031 Inches	±.78 mm	±.062 Inches	±1.57 mm	±0.015 Inches	±.38 mm	oz	g
AK	1.375	34.93	1.625	41.28	0.50	12.70	1.9	54
AA	1.375	34.93	2.125	53.98	0.50	12.70	2.0	57
AH	1.375	34.93	2.625	66.68	0.50	12.70	2.7	77
AB	1.375	34.93	3.125	79.38	0.50	12.70	3.3	94
AJ	1.375	34.93	3.625	92.08	0.50	12.70	3.8	108
AC	1.375	34.93	4.125	104.78	0.50	12.70	4.4	125
AD	1.375	34.93	4.625	117.48	0.50	12.70	5.1	145
AE	1.375	34.93	5.125	130.18	0.50	12.70	6.8	193
AF	1.375	34.93	5.625	142.88	0.50	12.70	8.1	230
EA	1.750	44.45	2.125	53.98	0.75	19.05	2.7	76
EH	1.750	44.45	2.625	66.68	0.75	19.05	3.8	108
EB	1.750	44.45	3.125	79.38	0.75	19.05	5.1	145
EJ	1.750	44.45	3.625	92.08	0.75	19.05	6.8	193
EC	1.750	44.45	4.125	104.78	0.75	19.05	8.1	230
ED	1.750	44.45	4.625	117.48	0.75	19.05	9.0	255
EE	1.750	44.45	5.125	130.18	0.75	19.05	9.5	269
EF	1.750	44.45	5.625	142.88	0.75	19.05	10.5	298
BA	2.000	50.80	2.125	53.98	0.88	22.23	5.4	153
BH	2.000	50.80	2.625	66.68	0.88	22.23	6.1	173
BB	2.000	50.80	3.125	79.38	0.88	22.23	6.8	193
BJ	2.000	50.80	3.625	92.08	0.88	22.23	8.2	232
BC	2.000	50.80	4.125	104.78	0.88	22.23	9.5	269
BD	2.000	50.80	4.625	117.48	0.88	22.23	10.3	292
BE	2.000	50.80	5.125	130.18	0.88	22.23	10.7	303
BF	2.000	50.80	5.625	142.88	0.88	22.23	13.0	369
CH	2.500	63.50	2.625	66.68	1.13	28.58	9.2	261
CB	2.500	63.50	3.125	79.38	1.13	28.58	10.4	295
CJ	2.500	63.50	3.625	92.08	1.13	28.58	12.7	361
CC	2.500	63.50	4.125	104.78	1.13	28.58	15.0	425
CD	2.500	63.50	4.625	117.48	1.13	28.58	17.2	488
CE	2.500	63.50	5.125	130.18	1.13	28.58	19.3	547
CF	2.500	63.50	5.625	142.88	1.13	28.58	21.4	607
DB	3.000	76.20	3.125	79.38	1.25	31.75	16.7	473
DJ	3.000	76.20	3.625	92.08	1.25	31.75	20.0	567
DC	3.000	76.20	4.125	104.78	1.25	31.75	22.2	629
DD	3.000	76.20	4.625	117.48	1.25	31.75	25.5	723
DE	3.000	76.20	5.125	130.18	1.25	31.75	30.0	850
DF	3.000	76.20	5.625	142.88	1.25	31.75	31.9	904
DP	3.000	76.20	5.875	149.23	1.25	31.75	32.8	931
DN	3.000	76.20	7.625	193.68	1.25	31.75	39.5	1119
DG	3.000	76.20	8.625	219.08	1.25	31.75	43.3	1227
FC	3.500	88.90	4.125	104.78	1.25	31.75	30.0	850
FD	3.500	88.90	4.625	117.48	1.25	31.75	34.4	976
FE	3.500	88.90	5.125	130.18	1.25	31.75	40.5	1148
FF	3.500	88.90	5.625	142.88	1.25	31.75	43.1	1221
FP	3.500	88.90	5.875	149.23	1.25	31.75	44.3	1257
FN	3.500	88.90	7.625	193.68	1.25	31.75	53.3	1512
FG	3.500	88.90	8.625	219.08	1.25	31.75	58.5	1658

Type 550C 105 °C High Ripple, Inverter Grade, Aluminum

Ultra-Ripple, Long Life Screw Terminal Type

Ratings

Additional Smaller Sizes available at www.cde.com/catalogs/550C.pdf

		ESR Max	Ripple Current Max		Nominal Size
		@ 25 °C	@ 85 °C	@ 105 °C	
Cap.	Catalog	120 Hz	120 Hz	120 Hz	D x L
(µF)	Part Number	(mΩ)	(A)	(A)	(in)
200 Vdc (250 Vdc Surge)					
2,800	550C282T200CH2B	39.1	10.5	3.8	2 1/2 x 2 5/8
4,000	550C402T200CB2B	28.1	13.2	4.7	2 1/2 x 3 1/8
5,100	550C512T200CJ2B	22.0	15.6	5.6	2 1/2 x 3 5/8
6,200	550C622T200CC2B	17.8	18.1	6.5	2 1/2 x 4 1/8
7,300	550C732T200CD2B	15.2	20.3	7.3	2 1/2 x 4 5/8
7,300	550C732T200DJ2B	18.3	19.1	6.9	3 x 3 5/8
8,500	550C852T200CE2B	13.4	22.5	8.1	2 1/2 x 5 1/8
9,000	550C902T200DC2B	15.2	21.9	7.9	3 x 4 1/8
9,600	550C962T200CF2B	11.9	24.5	8.8	2 1/2 x 5 5/8
11,000	550C113T200DD2B	13.0	24.5	8.8	3 x 4 5/8
12,000	550C123T200DE2B	11.5	27.0	9.7	3 x 5 1/8
13,000	550C133T200FC2B	15.5	23.8	8.6	3 1/2 x 4 1/8
14,000	550C143T200DF2B	10.3	29.4	10.6	3 x 5 5/8
15,000	550C153T200DP2D	9.8	30.6	11.0	3 x 5 7/8
16,000	550C163T200FD2B	13.2	26.8	9.6	3 1/2 x 4 5/8
18,000	550C183T200FE2B	11.7	29.4	10.6	3 1/2 x 5 1/8
20,000	550C203T200FF2D	10.5	31.9	11.5	3 1/2 x 5 5/8
21,000	550C213T200DN2D	8.2	36.8	13.2	3 x 7 5/8
22,000	550C223T200FP2D	10.0	33.2	11.9	3 1/2 x 5 7/8
24,000	550C243T200DG2D	7.1	40.4	14.6	3 x 8 5/8
30,000	550C303T200FN2D	8.0	40.6	14.6	3 1/2 x 7 5/8
35,000	550C353T200FG2D	6.8	44.9	16.2	3 1/2x 8 5/8
250 Vdc (300 Vdc Surge)					
2,100	550C212T250CH2B	50.5	9.3	3.3	2 1/2 x 2 5/8
4,200	550C422T250DB2B	28.9	14.5	5.2	3 X 3 1/8
4,600	550C462T250CC2B	23.4	15.8	5.7	2 1/2 X 4 1/8
5,400	550C542T250CD2B	19.9	17.8	6.4	2 1/2 X 4 5/8
5,400	550C542T250DJ2B	22.3	17.3	6.2	3 X 3 5/8
6,200	550C622T250CE2B	17.1	19.9	7.2	2 1/2 X 5 1/8
6,600	550C662T250DC2B	18.5	19.9	7.1	3 X 4 1/8
7,100	550C712T250CF2B	15.2	21.7	7.8	2 1/2 X 5 5/8
7,800	550C782T250DD2B	15.8	22.3	8.0	3 X 4 5/8
9,000	550C902T250DE2B	13.9	24.6	8.9	3 X 5 1/8
9,700	550C972T250FC2D	16.5	23.1	8.3	3 1/2 X 4 1/8
10,000	550C103T250DF2B	12.4	26.8	9.6	3 X 5 5/8
11,000	550C113T250DP2B	11.4	28.2	10.2	3 X 5 7/8
11,000	550C113T250FD2D	14.3	25.8	9.3	3 1/2 X 4 5/8
13,000	550C133T250FE2D	12.5	28.4	10.2	3 1/2 X 5 1/8
15,000	550C153T250DN2D	9.4	34.4	12.4	3 X 7 5/8
15,000	550C153T250FF2D	11.0	31.2	11.2	3 1/2 X 5 5/8
16,000	550C163T250FP2D	10.5	32.3	11.6	3 1/2 X 5 7/8
250 Vdc (300 Vdc Surge)					
17,000	550C173T250DG2D	7.9	38.3	13.8	3 X 8 5/8
22,000	550C223T250FN2D	8.5	39.5	14.2	3 1/2 X 7 5/8
25,000	550C253T250FG2D	7.2	43.7	15.7	3 1/2X 8 5/8
300 Vdc (350 Vdc Surge)					
1,600	550C162T300CH2B	78.2	7.4	2.7	2 1/2 X 2 5/8
2,200	550C222T300CB2B	56.1	9.3	3.4	2 1/2 X 3 1/8
2,800	550C282T300CJ2B	43.8	11.1	4.0	2 1/2 X 3 5/8
3,400	550C342T300DB2B	37.7	12.7	4.6	3 X 3 1/8
3,500	550C352T300CC2B	35.9	12.8	4.6	2 1/2 X 4 1/8
4,100	550C412T300CD2B	30.6	14.4	5.2	2 1/2 X 4 5/8
4,400	550C442T300DJ2B	29.5	15.1	5.4	3 X 3 5/8
4,700	550C472T300CE2B	26.7	15.9	5.7	2 1/2 X 5 1/8
5,300	550C532T300CF2B	23.4	17.5	6.3	2 1/2 X 5 5/8
5,400	550C542T300DC2B	24.4	17.3	6.2	3 X 4 1/8
6,400	550C642T300DD2B	20.8	19.4	7.0	3 X 4 5/8
7,200	550C722T300FC2D	18.8	21.7	7.8	3 1/2 X 4 1/8
7,400	550C742T300DE2B	18.2	21.5	7.7	3 X 5 1/8
8,300	550C832T300DF2B	16.2	23.4	8.4	3 X 5 5/8
8,600	550C862T300FD2D	16.0	24.3	8.8	3 1/2 X 4 5/8
8,800	550C882T300DP2B	15.4	24.3	8.8	3 X 5 7/8
9,900	550C992T300FE2D	14.0	26.8	9.7	3 1/2 X 5 1/8
11,000	550C113T300FF2D	12.1	29.6	10.7	3 1/2 X 5 5/8
12,000	550C123T300FP2D	11.5	30.8	11.1	3 1/2 X 5 7/8
12,000	550C123T300DN2B	12.4	30.0	10.8	3 X 7 5/8
14,000	550C143T300DG2D	10.5	33.3	12.0	3 X 8 5/8
16,000	550C163T300FN2D	9.2	38.1	13.7	3 1/2 X 7 5/8
18,000	550C183T300FG2D	7.7	42.3	15.2	3 1/2X 8 5/8
350 Vdc (400 Vdc Surge)					
1,300	550C132T350CH2B	86.7	7.1	2.5	2 1/2 X 2 5/8
1,800	550C182T350CB2B	62.1	8.8	3.2	2 1/2 X 3 1/8
2,300	550C232T350CJ2B	48.5	10.5	3.8	2 1/2 X 3 5/8
2,800	550C282T350CC2B	40.0	12.1	4.4	2 1/2 X 4 1/8
2,800	550C282T350DB2B	41.2	12.2	4.4	3 X 3 1/8
3,300	550C332T350CD2B	34.0	13.6	4.9	2 1/2 X 4 5/8
3,600	550C362T350DJ2B	32.2	14.5	5.2	3 X 3 5/8
3,800	550C382T350CE2B	29.7	15.1	5.4	2 1/2 X 5 1/8
4,300	550C432T350CF2B	25.8	16.7	6.0	2 1/2 X 5 5/8
4,400	550C442T350DC2B	26.6	16.6	6.0	3 X 4 1/8
5,100	550C512T350DD2B	22.7	18.6	6.7	3 X 4 5/8
5,800	550C582T350FC2D	20.5	20.8	7.5	3 1/2 X 4 1/8
5,900	550C592T350DE2B	19.8	20.6	7.4	3 X 5 1/8

Type 550C 105 °C High Ripple, Inverter Grade, Aluminum

Ultra-Ripple, Long Life Screw Terminal Type

Additional Smaller Sizes available at www.cde.com/catalogs/550C.pdf

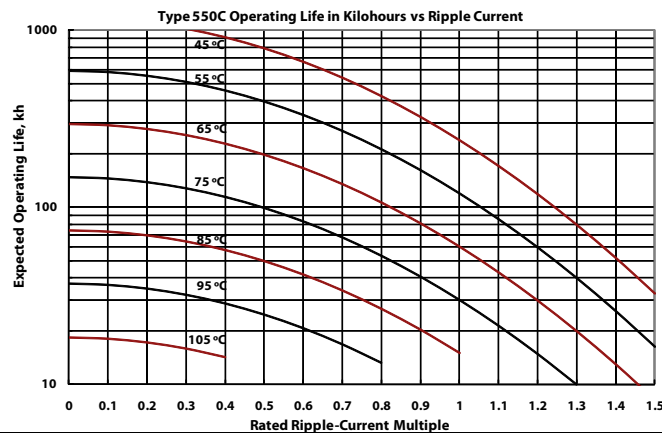
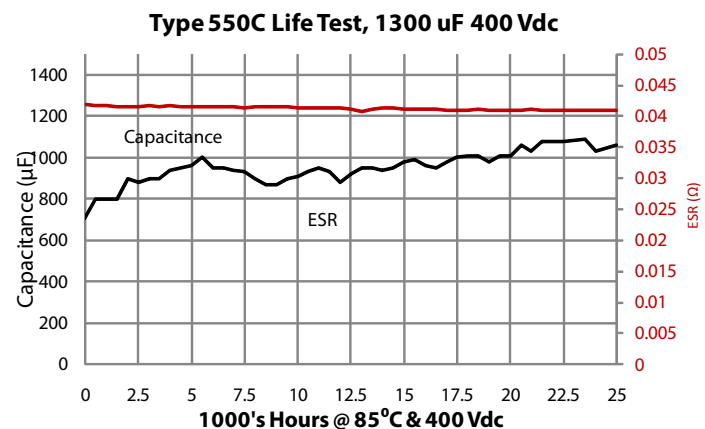
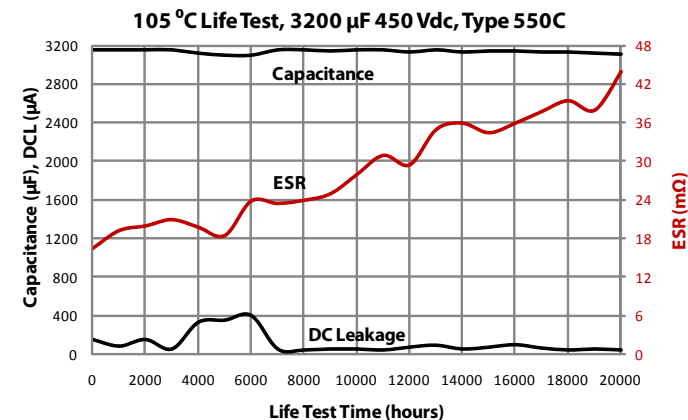
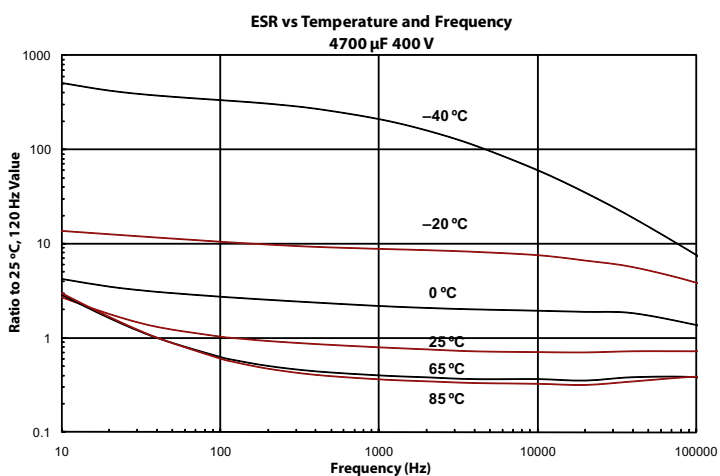
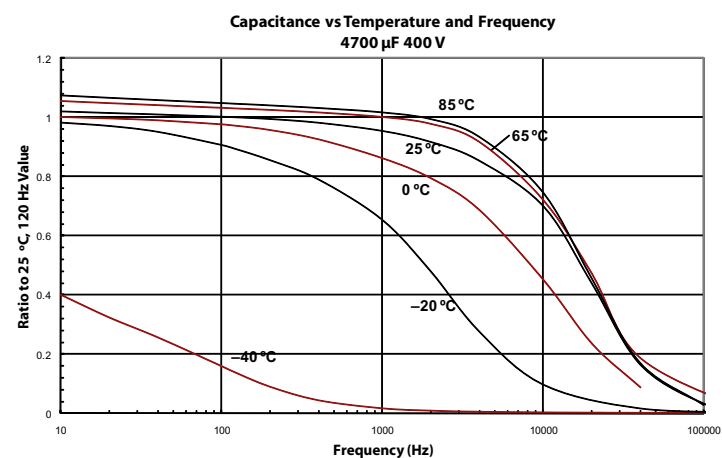
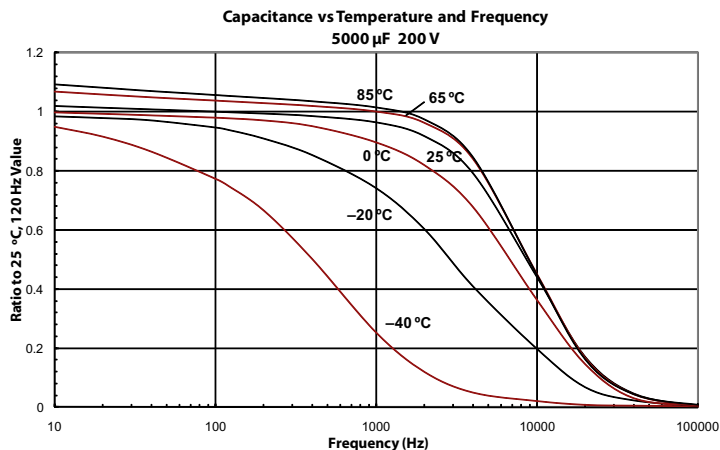
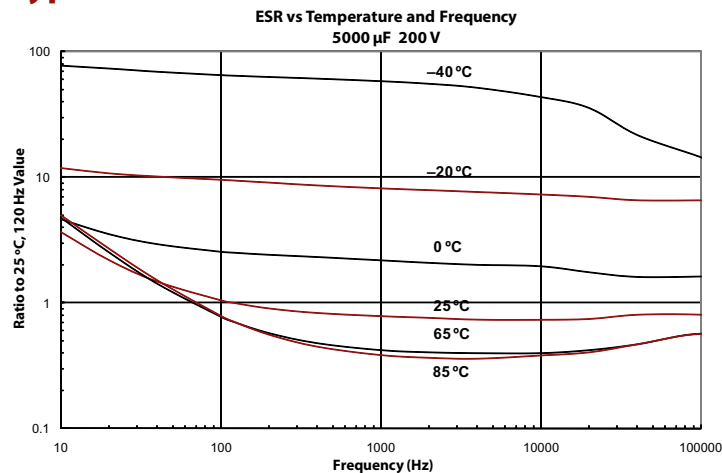
		ESR Max	Ripple Current Max		Nominal Size
		@ 25 °C	@ 85 °C	@ 105 °C	
Cap.	Catalog	120 Hz	120 Hz	120 Hz	D x L
(µF)	Part Number	(mΩ)	(A)	(A)	(in)
350 Vdc (400 Vdc Surge)					
6,700	550C672T350DF2B	17.7	22.4	8.1	3 X 5 5/8
6,900	550C692T350FD2D	17.5	23.3	8.4	3 1/2 X 4 5/8
7,100	550C712T350DP2B	16.8	23.3	8.4	3 X 5 7/8
8,000	550C802T350FE2D	15.3	25.7	9.3	3 1/2 X 5 1/8
9,000	550C902T350FF2D	13.2	28.4	10.2	3 1/2 X 5 5/8
9,500	550C952T350FP2D	12.5	29.6	10.6	3 1/2 X 5 7/8
9,600	550C962T350DN2B	13.3	29.0	10.4	3 X 7 5/8
11,000	550C113T350DG2D	11.1	32.3	11.6	3 X 8 5/8
13,000	550C133T350FN2D	9.9	36.6	13.2	3 1/2 X 7 5/8
15,000	550C153T350FG2D	8.3	40.7	14.6	3 1/2 X 8 5/8
400 Vdc (450 Vdc Surge)					
990	550C991T400CH2B	95.2	6.7	2.4	2 1/2 X 2 5/8
1,400	550C142T400CB2B	68.2	8.4	3.0	2 1/2 X 3 1/8
1,800	550C182T400CJ2B	53.2	10.0	3.6	2 1/2 X 3 5/8
2,200	550C222T400CC2B	43.8	11.6	4.2	2 1/2 X 4 1/8
2,200	550C222T400DB2B	45.7	11.6	4.2	3 X 3 1/8
2,600	550C262T400CD2B	37.3	13.0	4.7	2 1/2 X 4 5/8
2,800	550C282T400DJ2B	35.7	13.7	4.9	3 X 3 5/8
3,000	550C302T400CE2B	32.5	14.4	5.2	2 1/2 X 5 1/8
3,400	550C342T400CF2B	28.9	15.8	5.7	2 1/2 X 5 5/8
3,400	550C342T400DC2B	29.3	15.8	5.7	3 X 4 1/8
4,000	550C402T400DD2B	25.0	17.7	6.4	3 X 4 5/8
4,600	550C462T400BF2D	22.2	20.0	7.2	3 1/2 X 4 1/8
4,700	550C472T400DE2B	21.4	19.8	7.1	3 X 5 1/8
5,300	550C532T400DF2B	19.0	21.6	7.8	3 X 5 5/8
5,400	550C542T400FD2D	18.9	22.4	8.1	3 1/2 X 4 5/8
5,600	550C562T400DP2B	18.1	22.4	8.1	3 X 5 7/8
6,200	550C622T400FE2D	16.5	24.7	8.9	3 1/2 X 5 1/8
7,100	550C712T400FF2D	14.3	27.3	9.8	3 1/2 X 5 5/8
7,500	550C752T400FP2D	13.5	28.4	10.2	3 1/2 X 5 7/8
7,800	550C782T400DN2B	14.6	27.6	9.9	3 X 7 5/8
9,000	550C902T400DG2D	12.4	30.6	11.0	3 X 8 5/8
9,700	550C972T400FN2D	10.9	34.9	12.6	3 1/2 X 7 5/8
11,000	550C113T400FG2D	9.2	38.7	13.9	3 1/2 X 8 5/8
450 Vdc (500 Vdc Surge)					
700	550C701T450CH2B	108.0	6.3	2.3	2 1/2 X 2 5/8
980	550C981T450CB2B	77.3	7.9	2.9	2 1/2 X 3 1/8
1,300	550C132T450CJ2B	57.3	9.7	3.5	2 1/2 X 3 5/8
1,500	550C152T450CC2B	49.6	10.9	3.9	2 1/2 X 4 1/8
1,500	550C152T450DB2B	47.4	11.3	4.1	3 X 3 1/8
1,800	550C182T450CD2B	42.2	12.2	4.4	2 1/2 X 4 5/8

Cap. (μF)	Catalog Part Number	ESR Max	Ripple Current Max		Nominal Size D x L (in)
		@ 25 °C	@ 85 °C	@ 105 °C	
		120 Hz (mΩ)	120 Hz (A)	120 Hz (A)	
450 Vdc (500 Vdc Surge)					
2,000	550C202T450DJ2B	37.0	13.5	4.8	3 X 3 5/8
2,100	550C212T450CE2B	34.9	13.9	5.0	2 1/2 X 5 1/8
2,400	550C242T450CF2B	30.5	15.3	5.5	2 1/2 X 5 5/8
2,400	550C242T450DC2B	30.6	15.5	5.6	3 X 4 1/8
2,900	550C292T450DD2B	26.1	17.4	6.3	3 X 4 5/8
3,200	550C322T450FC2D	22.9	19.6	7.1	3 1/2 X 4 1/8
3,300	550C332T450DE2B	22.7	19.2	6.9	3 X 5 1/8
3,700	550C372T450DF2B	20.2	20.9	7.5	3 X 5 5/8
3,800	550C382T450FD2D	19.5	22.1	7.9	3 1/2 X 4 5/8
4,000	550C402T450DP2B	19.2	21.8	7.8	3 X 5 7/8
4,400	550C442T450FE2D	17.0	24.3	8.8	3 1/2 X 5 1/8
5,000	550C502T450FF2D	15.1	26.5	9.6	3 1/2 X 5 5/8
5,300	550C532T450FP2D	14.3	27.6	9.9	3 1/2 X 5 7/8
5,500	550C552T450DN2B	15.5	26.8	9.6	3 X 7 5/8
6,400	550C642T450DG2B	13.1	29.8	10.7	3 X 8 5/8
7,100	550C712T450FN2D	11.3	34.3	12.3	3 1/2 X 7 5/8
8,100	550C812T450FG2D	9.5	38.2	13.7	3 1/2 X 8 5/8
500 Vdc (550 Vdc Surge)					
680	550C681T500CH2B	197.0	4.7	1.7	2 1/2 X 2 5/8
960	550C961T500CB2B	141.0	5.9	2.1	2 1/2 X 3 1/8
1,200	550C122T500CJ2B	109.0	7.0	2.5	2 1/2 X 3 5/8
1,400	550C142T500DB2B	86.2	8.4	3.0	3 X 3 1/8
1,500	550C152T500CC2B	85.3	8.3	3.0	2 1/2 X 4 1/8
1,800	550C182T500CD2B	72.4	9.3	3.4	2 1/2 X 4 5/8
1,900	550C192T500DJ2B	66.0	10.1	3.6	3 X 3 5/8
2,000	550C202T500CE2B	66.4	10.1	3.6	2 1/2 X 5 1/8
2,300	550C232T500DC2B	53.9	11.6	4.2	3 X 4 1/8
2,300	550C232T500CF2B	55.7	11.4	4.1	2 1/2 X 5 5/8
2,700	550C272T500DD2B	45.2	13.2	4.7	3 X 4 5/8
3,100	550C312T500DE2B	38.9	14.7	5.3	3 X 5 1/8
3,200	550C322T500FC2D	38.8	15.1	5.4	3 1/2 X 4 1/8
3,500	550C352T500DF2B	34.5	16.1	5.8	3 X 5 5/8
3,700	550C372T500DP2B	32.4	16.8	6.0	3 X 5 7/8
3,800	550C382T500FD2D	32.3	17.1	6.2	3 1/2 X 4 5/8
4,300	550C432T500FE2D	28.4	18.8	6.8	3 1/2 X 5 1/8
4,900	550C492T500FF2D	24.3	20.9	7.5	3 1/2 X 5 5/8
5,200	550C522T500FP2D	23.0	21.8	7.9	3 1/2 X 5 7/8
5,400	550C542T500DN2B	26.1	20.9	7.5	3 X 7 5/8
6,000	550C602T500DG2B	19.7	24.2	8.7	3 X 8 5/8
7,000	550C702T500FN2D	17.0	27.9	10.1	3 1/2 X 7 5/8
8,400	550C842T500DG2D	14.3	31.0	11.2	3.5 X 8 5/8

Type 550C 105 °C High Ripple, Inverter Grade, Aluminum

Ultra-Ripple, Long Life Screw Terminal Type

Typical Performance Curves



Type 500R 85 °C High Ripple Current, Inverter Grade, Aluminum

New Higher Ripple Current than Type 500C Screw Terminal Type



The Type 500R is a higher ripple-current version of CDE's long-life Type 500C specifically designed to provide the ripple current capability and long life required for high reliability inverter applications. Like the 500C, the 500R has an endurance rating of 5,000 hours at +85 °C with the rated ripple current applied, and it is offered in the 350 V to 500 V ratings appropriate for use as dc-link bus capacitors in inverter applications.

Highlights

- Large can sizes
- Screw terminals, english and metric
- 5000 hour rated ripple current life
- Higher ripple current than 500C
- 350 to 500 Vdc ratings
- RoHS compliant

Specifications

Temperature Range	−40 °C to +85 °C							
Rated Voltage Range	350 Vdc to 500 Vdc							
Capacitance Range	1,100 uF to 18,000 μF							
Capacitance Tolerance	±20%							
Leakage Current	≤3 √CV μA,5 mA max, 5 minutes							
Ripple Current Multipliers	Ambient Temperature							
	45 °C	55 °C	65 °C	75 °C	85 °C			
	2.00	1.82	1.59	1.33	1.00			
	Frequency	50 Hz	60 Hz	120 Hz	360 Hz	1 kHz	5 kHz	10 kHz & up
	2 & 2½" diameters							
	350 V	0.78	0.83	1.00	1.20	1.29	1.34	1.35
	400–500 V	0.77	0.82	1.00	1.22	1.33	1.39	1.40
	3 & 3½" diameters							
	350 V	0.84	0.88	1.00	1.12	1.17	1.20	1.20
400–500 V	0.79	0.84	1.00	1.18	1.26	1.31	1.32	
Low Temperature Characteristics	Impedance ratio: Z _{−20°C} /Z _{+25°C} ≤ 3 (350–500 Vdc)							
Endurance Life Test	5000 h at full load at 85 °C Δ Capacitance ±20% ESR 200% of limit DCL 100% of limit							
Shelf Life Test	500 h at 85 °C Capacitance 100% of limit ESR 100% of limit DCL 100% of limit							
Vibration	10 to 55 Hz, 0.06" and 10 g max, 1.5 h each of 2 axes							
RoHS Compliant								

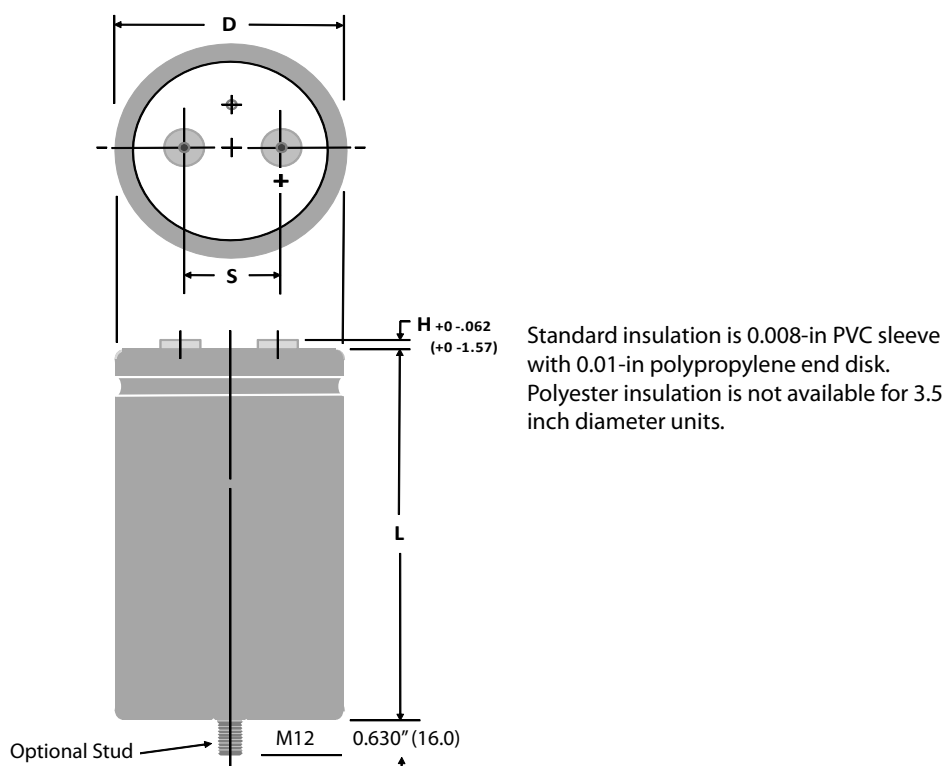
Type 500R 85 °C High Ripple Current, Inverter Grade, Aluminum

New Higher Ripple Current than Type 500C Screw Terminal Type

Part Numbering System

500R	103	M	350	DN	2	E	S
Type	Capacitance	Tolerance	Voltage	Case Code	Insulation	Terminal	Can Style
	472 = 4700 μF 103 = 10,000 μF	M = ±20% U = -10%+75% T = 10%+50%	350 = 350 Vdc 500 = 500 Vdc		0= None 1= Polyester 2= PVC	A = Low Post B = High Post D = High Current, Low Post E = High Current, High Post F or M = M5 Post G = M6 Low Post H = M6 High Post	Blank= Standard Can S= Stud Bottom P= Stud with Thermal Pad

Outline Drawing



NOTE: With the stud-mount feature, a thermally-conductive disk can be inserted in the bottom flush with the outer insulating sleeve. This reduces the thermal resistance through the can bottom by 0.3 °C/W. Can Style P.

Terminal Dimensions

Terminal Style	For Case Diameters	Code	Post Diameter in mm	H max in mm	Thread	min Full Thread in mm	Torque in-lb N-m
Low Post	2 to 3	A	0.314 8.0	0.094 2.4	10-32	0.218 5.5	25 2.82
High Post	2 to 3	B	0.314 8.0	0.281 7.1	10-32	0.375 9.5	25 2.82
High Current, Low	2½ to 3½	D	0.684 17.4	0.125 3.2	¼-28	0.344 8.7	60 6.78
High Current, High	2½ to 3½	E	0.684 17.4	0.281 7.1	¼-28	0.469 11.9	60 6.78
M5 Post, Small	1⅝ to 2	M	0.314 8.0	0.281 7.1	M5	0.375 9.5	25 2.82
M5 Post	2½ & 3	F	0.512 13.0	0.230 5.8	M5	0.344 8.7	25 2.82
M6 Low Post	2½ to 3½	G	0.684 17.4	0.125 3.2	M6	0.344 8.7	60 6.78
M6 High Post	2½ to 3½	H	0.684 17.4	0.281 7.1	M6	0.469 11.9	60 6.78

Type 500R 85 °C High Ripple Current, Inverter Grade, Aluminum

New Higher Ripple Current than Type 500C Screw Terminal Type

Uninsulated Case Dimensions

For insulated case, add 0.024"(0.610 mm) to "D" and 0.030"(0.762 mm) to length.

Case Code	Diameter (D)		Length (L)		Terminals (S)		Typical Weight	
	±0.031 in	±0.78 mm	±0.062 in	±1.57 mm	±0.015 in	±0.38 mm	oz	g
BC	2.000	50.80	4.125	104.78	0.88	22.23	9.5	269
BD	2.000	50.80	4.625	117.48	0.88	22.23	10.3	292
BE	2.000	50.80	5.125	130.18	0.88	22.23	10.7	303
BF	2.000	50.80	5.625	142.88	0.88	22.23	13.0	369
CH	2.500	63.50	2.625	66.68	1.13	28.58	9.2	261
CJ	2.500	63.50	3.625	92.08	1.13	28.58	12.7	361
CC	2.500	63.50	4.125	104.78	1.13	28.58	15.0	425
CD	2.500	63.50	4.625	117.48	1.13	28.58	17.2	488
CE	2.500	63.50	5.125	130.18	1.13	28.58	19.3	547
CF	2.500	63.50	5.625	142.88	1.13	28.58	21.4	607
DB	3.000	76.20	3.125	79.38	1.25	31.75	16.7	473
DJ	3.000	76.20	3.625	92.08	1.25	31.75	20.0	567
DC	3.000	76.20	4.125	104.78	1.25	31.75	22.2	629
DD	3.000	76.20	4.625	117.48	1.25	31.75	25.5	723
DE	3.000	76.20	5.125	130.18	1.25	31.75	30.0	850
DF	3.000	76.20	5.625	142.88	1.25	31.75	31.9	904
DP	3.000	76.20	5.875	149.23	1.25	31.75	32.8	931
DN	3.000	76.20	7.625	193.68	1.25	31.75	39.5	1119
DG	3.000	76.20	8.625	219.08	1.25	31.75	43.3	1227
FC	3.500	88.90	4.125	104.78	1.25	31.75	30.0	850
FD	3.500	88.90	4.625	117.48	1.25	31.75	34.4	976
FE	3.500	88.90	5.125	130.18	1.25	31.75	40.5	1148
FF	3.500	88.90	5.625	142.88	1.25	31.75	43.1	1221
FP	3.500	88.90	5.875	149.23	1.25	31.75	44.3	1257
FN	3.500	88.90	7.625	193.68	1.25	31.75	53.3	1512
FG	3.500	88.90	8.625	219.08	1.25	31.75	58.5	1658

Type 500R 85 °C High Ripple Current, Inverter Grade, Aluminum

New Higher Ripple Current than Type 500C Screw Terminal Type

Ratings

Cap (μF)	Catalog Part Number	ESR Max. 25 °C		Ripple Amps. 85 °C		Nominal Size D x L (in)
		120 Hz	10kHz	120 Hz	>3 kHz	
		(mΩ)	(mΩ)	(A)	(A)	
350 Vdc (400 Vdc Surge)						
2200	500R222M350BC2B	47	37.6	8.0	11.3	2 X 4 1/8
2200	500R222M350BD2B	43	34.4	9.0	12.6	2 X 4 5/8
2700	500R272M350BE2B	38	30.4	10.0	14.0	2 X 5 1/8
2800	500R282M350CJ2E	36	28.8	10.0	14.0	2 1/2 X 3 5/8
3100	500R312M350BF2B	33	26.4	11.0	15.4	2 X 5 5/8
3300	500R332M350CC2E	30	24.0	12.0	16.8	2 1/2 X 4 1/8
3600	500R362M350CD2E	24	19.2	14.0	19.6	2 1/2 X 4 5/8
3900	500R392M350CE2E	23	18.4	15.0	21.0	2 1/2 X 5 1/8
3900	500R392M350DJ2E	23	18.4	14.0	19.6	3 X 3 5/8
4700	500R472M350CF2E	19	15.2	16.0	22.4	2 1/2 X 5 5/8
4700	500R472M350DC2E	19	15.2	16.0	22.4	3 X 4 1/8
5000	500R502M350CP2E	18	14.4	18.0	25.2	2 1/2 X 5 7/8
5600	500R562M350DD2E	16	12.8	18.0	25.2	3 X 4 5/8
6200	500R622M350DE2E	15	12.0	19.0	26.6	3 X 5 1/8
6800	500R682M350DF2E	14	11.2	21.0	29.4	3 X 5 5/8
6800	500R682M350FC2E	16	12.8	20.2	28.3	3 1/2 X 4 1/8
7000	500R702M350CN2E	13	10.4	23.0	32.2	2 1/2 X 7 5/8
7200	500R722M350DP2E	13	10.4	22.0	30.8	3 X 5 7/8
7700	500R772M350FD2E	14	11.2	21.6	30.2	3 1/2 X 4 5/8
8200	500R822M350CG2E	12	9.6	24.0	33.6	2 1/2 X 8 5/8
8200	500R822M350FE2E	12	9.6	24.0	33.6	3 1/2 X 5 1/8
10000	500R103M350DN2E	9	7.2	28.0	39.2	3 X 7 5/8
10000	500R103M350FF2E	10	8.0	27.7	38.8	3 1/2 X 5 5/8
10800	5051082M350FP2E	9	7.2	28.4	39.8	3 1/2 X 5 7/8
12000	500R123M350DG2E	8	6.4	32.5	45.5	3 X 8 5/8
15000	500R153M350FN2E	6	4.8	38.1	53.4	3 1/2 X 7 5/8
18000	500R183M350FG2E	6	4.8	44.6	62.5	3 1/2 X 8 5/8
400 Vdc (450 Vdc Surge)						
2,200	500R222M400BC2B	44.0	35.2	8.3	11.7	2 X 4 1/8
2,200	500R222M400BD2B	40.0	32.0	9.7	13.5	2 X 4 5/8
2,700	500R272M400BE2B	37.0	29.6	10.5	14.7	2 X 5 1/8
2,700	500R272M400CJ2E	37.0	29.6	10.1	14.2	2 1/2 X 3 5/8
3,000	500R302M400BF2B	35.0	28.0	11.0	15.4	2 X 5 5/8
3,300	500R332M400CC2E	31.0	24.8	11.8	16.5	2 1/2 X 4 1/8
3,600	500R362M400CD2E	27.0	21.6	13.1	18.3	2 1/2 X 4 5/8
3,900	500R392M400CE2E	25.0	20.0	13.8	19.3	2 1/2 X 5 1/8
3,900	500R392M400DJ2E	26.0	20.8	13.7	19.1	3 X 3 5/8
4,700	500R472M400CF2E	22.0	17.6	15.4	21.5	2 1/2 X 5 5/8
4,800	500R482M400DC2E	22.0	17.6	15.2	21.3	3 X 4 1/8
5,000	500R502M400CP2E	20.0	16.0	17.1	24.0	2 1/2 X 5 7/8
5,600	500R562M400DD2E	19.0	15.2	16.8	23.6	3 X 4 5/8
6,300	500R632M400DE2E	17.0	13.6	18.6	26.0	3 X 5 1/8

Cap (μF)	Catalog Part Number	ESR Max. 25 °C		Ripple Amps. 85 °C		Nominal Size D x L (in)
		120 Hz (mΩ)	10kHz (mΩ)	120 Hz (A)	>3 kHz (A)	
400 Vdc (450 Vdc Surge)						
6,700	500R672M400FC2E	16.0	12.8	20.0	28.1	3 1/2 X 4 1/8
6,800	500R682M400DF2E	16.0	12.8	19.9	27.9	3 X 5 5/8
6,900	500R692M400CN2E	15.0	12.0	21.2	29.7	2 1/2 X 7 5/8
7,200	500R722M400DP2E	15.0	12.0	20.7	29.0	3 X 5 7/8
7,300	500R732M400FD2E	14.0	11.2	21.6	30.2	3 1/2 X 4 5/8
8,200	500R822M400CG2E	13.0	10.4	24.1	33.7	2 1/2 X 8 5/8
8,200	500R822M400FE2E	13.0	10.4	24.0	33.6	3 1/2 X 5 1/8
9,200	500R922M400DN2E	12.0	9.6	24.4	34.2	3 X 7 5/8
10,000	500R103M400DG2E	10.0	8.0	27.6	38.6	3 X 8 5/8
10,000	500R103M400FF2E	10.0	8.0	27.3	38.2	3 1/2 X 5 5/8
11,000	5051102M400FP2E	10.0	8.0	28.3	39.7	3 1/2 X 5 7/8
13,000	500R133M400FN2E	8.0	6.4	32.9	46.0	3 1/2 X 7 5/8
15,000	500R153M400FG2E	7.0	5.6	38.4	53.7	3 1/2 X 8 5/8
420 Vdc (470 Vdc Surge)						
1,600	500R162M420BC2B	81.0	64.8	6.7	9.4	2 X 4 1/8
1,700	500R172M420BD2B	75.0	60.0	7.7	10.7	2 X 4 5/8
1,900	500R192M420CJ2E	71.0	56.8	7.2	10.1	2 1/2 X 3 5/8
2,100	500R212M420BE2B	62.0	49.6	8.7	12.2	2 X 5 1/8
2,200	500R222M420BF2B	58.0	46.4	9.2	12.9	2 X 5 5/8
2,400	500R242M420CC2E	58.0	46.4	8.6	12.0	2 1/2 X 4 1/8
2,600	500R262M420CD2E	50.0	40.0	9.6	13.5	2 1/2 X 4 5/8
2,800	500R282M420CE2E	46.0	36.8	10.2	14.3	2 1/2 X 5 1/8
2,800	500R282M420DJ2E	49.0	39.2	10.7	14.9	3 X 3 5/8
3,400	500R342M420CF2E	39.0	31.2	11.5	16.1	2 1/2 X 5 5/8
3,400	500R342M420DC2E	40.0	32.0	12.2	17.1	3 X 4 1/8
3,600	500R362M420CP2E	37.0	29.6	12.8	18.0	2 1/2 X 5 7/8
4,000	500R402M420DD2E	35.0	28.0	13.4	18.7	3 X 4 5/8
4,500	500R452M420DE2E	29.0	23.2	15.2	21.3	3 X 5 1/8
4,900	500R492M420CN2E	27.0	21.6	16.3	22.8	2 1/2 X 7 5/8
4,900	500R492M420DF2E	26.0	20.8	16.7	23.4	3 X 5 5/8
5,000	500R502M420FC2E	28.0	22.4	15.3	21.4	3 1/2 X 4 1/8
5,200	500R522M420DP2E	26.0	20.8	17.1	23.9	3 X 5 7/8
5,500	500R552M420FD2E	26.0	20.8	16.8	23.5	3 1/2 X 4 5/8
5,900	500R592M420CG2E	23.0	18.4	18.6	26.1	2 1/2 X 8 5/8
6,400	500R642M420FE2E	22.0	17.6	19.9	27.9	3 1/2 X 5 1/8
6,600	500R662M420DN2E	20.0	16.0	20.3	28.4	3 X 7 5/8
7,400	500R742M420FF2E	18.0	14.4	23.0	32.2	3 1/2 X 5 5/8
7,800	500R782M420DG2E	17.0	13.6	22.8	31.9	3 X 8 5/8
8,000	5050C83M420FP2E	17.0	13.6	24.5	34.3	3 1/2 X 5 7/8
8,600	500R862M420FN2E	16.0	12.8	27.4	38.4	3 1/2 X 7 5/8
11,000	500R113M420FG2E	13.0	10.4	32.8	46.0	3 1/2 X 8 5/8

Type 500R 85 °C High Ripple Current, Inverter Grade, Aluminum

New Higher Ripple Current than Type 500C Screw Terminal Type

Cap (µF)	Catalog Part Number	ESR Max. 25 °C		Ripple Amps. 85 °C		Nominal Size
		120 Hz (mΩ)	10kHz (mΩ)	120 Hz (A)	>3 kHz (A)	D x L (in)
450 Vdc (500 Vdc Surge)						
1400	500R142M450BC2B	104	83.2	6.0	8.4	2 X 4 1/8
1600	500R162M450BD2B	89	71.2	7.0	9.8	2 X 4 5/8
1900	500R192M450BE2B	73	58.4	8.1	11.4	2 X 5 1/8
2000	500R202M450BF2B	71	56.8	8.4	11.8	2 X 5 5/8
2000	500R202M450CJ2E	72	57.6	7.9	11.0	2 1/2 X 3 5/8
2500	500R252M450CC2E	55	44.0	9.6	13.5	2 1/2 X 4 1/8
2700	500R272M450CD2E	51	40.8	10.2	14.3	2 1/2 X 4 5/8
2900	500R292M450DJ2E	50	40.0	10.5	14.8	3 X 3 5/8
3100	500R312M450CE2E	45	36.0	11.1	15.5	2 1/2 X 5 1/8
3500	500R352M450CF2E	40	32.0	12.0	16.8	2 1/2 X 5 5/8
3600	500R362M450DC2E	41	32.8	12.1	16.9	3 X 4 1/8
3700	500R372M450CP2E	38	30.4	13.4	18.7	2 1/2 X 5 7/8
4200	500R422M450DD2E	35	28.0	13.4	18.7	3 X 4 5/8
4700	500R472M450DE2E	30	24.0	14.9	20.9	3 X 5 1/8
5200	500R522M450CN2E	27	21.6	17.0	23.8	2 1/2 X 7 5/8
5200	500R522M450DF2E	26	20.8	17.0	23.8	3 X 5 5/8
5500	500R552M450FC2E	29	23.2	15.0	21.0	3 1/2 X 4 1/8
5600	500R562M450DP2E	26	20.8	18.0	25.2	3 X 5 7/8
5900	500R592M450FD2E	25	20.0	17.1	24.0	3 1/2 X 4 5/8
6200	500R622M450CG2E	23	18.4	19.3	27.0	2 1/2 X 8 5/8
6900	500R692M450DN2E	21	16.8	21.0	29.4	3 X 7 5/8
6900	500R692M450FE2E	22	17.6	19.9	27.9	3 1/2 X 5 1/8
7800	500R782M450FF2E	21	16.8	21.3	29.8	3 1/2 X 5 5/8
8000	5050C83M450FP2E	19	15.2	23.2	32.5	3 1/2 X 5 7/8
8200	500R822M450DG2E	17	13.6	23.0	32.2	3 X 8 5/8
9400	500R942M450FN2E	17	13.6	26.1	36.6	3 1/2 X 7 5/8
11000	500R113M450FG2E	13	10.4	32.4	45.3	3 1/2 X 8 5/8

Cap (µF)	Catalog Part Number	ESR Max. 25 °C		Ripple Amps. 85 °C		Nominal Size D x L (in)
		120 Hz (mΩ)	10kHz (mΩ)	120 Hz (A)	>3 kHz (A)	
500 Vdc (550 Vdc Surge)						
1100	500R112M500BC2B	136	108.8	5.3	7.4	2 X 4 1/8
1300	500R132M500BD2B	115	92.0	6.0	8.3	2 X 4 5/8
1500	500R152M500BE2B	98	78.4	6.7	9.4	2 X 5 1/8
1600	500R162M500CJ2E	93	74.4	6.8	9.5	2 1/2 X 3 5/8
1800	500R182M500BF2B	79	63.2	7.7	10.8	2 X 5 5/8
2000	500R202M500CC2E	76	60.8	8.1	11.4	2 1/2 X 4 1/8
2200	500R222M500CD2E	70	56.0	8.5	11.9	2 1/2 X 4 5/8
2300	500R232M500DJ2E	68	54.4	9.0	12.6	3 X 3 5/8
2400	500R242M500CE2E	62	49.6	9.3	13.0	2 1/2 X 5 1/8
2800	500R282M500CF2E	55	44.0	10.5	14.7	2 1/2 X 5 5/8
2800	500R282M500DC2E	54	43.2	10.5	14.7	3 X 4 1/8
2900	500R292M500CP2E	52	41.6	10.9	15.3	2 1/2 X 5 7/8
3300	500R332M500DD2E	48	38.4	11.2	15.7	3 X 4 5/8
3700	500R372M500DE2E	41	32.8	12.6	17.6	3 X 5 1/8
3700	500R372M500FC2E	42	33.6	13.0	18.1	3 1/2 X 4 1/8
4100	500R412M500CN2E	38	30.4	14.3	20.1	2 1/2 X 7 5/8
4100	500R412M500DF2E	37	29.6	13.9	19.4	3 X 5 5/8
4200	500R422M500FD2E	37	29.6	14.5	20.3	3 1/2 X 4 5/8
4400	500R442M500DP2E	35	28.0	14.3	20.0	3 X 5 7/8
4900	500R492M500CG2E	32	25.6	16.4	22.9	2 1/2 X 8 5/8
5400	500R542M500FE2E	29	23.2	17.2	24.0	3 1/2 X 5 1/8
5600	500R562M500FF2E	26	20.8	19.1	26.7	3 1/2 X 5 5/8
5700	500R572M500DN2E	25.971	20.8	19.2	26.9	3 X 7 5/8
6000	5050C63M500FP2E	26	20.8	20.0	27.9	3 1/2 X 5 7/8
6800	500R682M500DG2E	23	18.4	23.0	32.2	3 X 8 5/8
8200	500R822M500FN2E	18	14.4	25.7	35.9	3 1/2 X 7 5/8
8800	500R882M500FG2E	17	13.6	26.8	37.6	3 1/2 X 8 5/8

Type 500R 85 °C High Ripple Current, Inverter Grade, Aluminum

New Higher Ripple Current than Type 500C Screw Terminal Type

Typical Performance Curves

