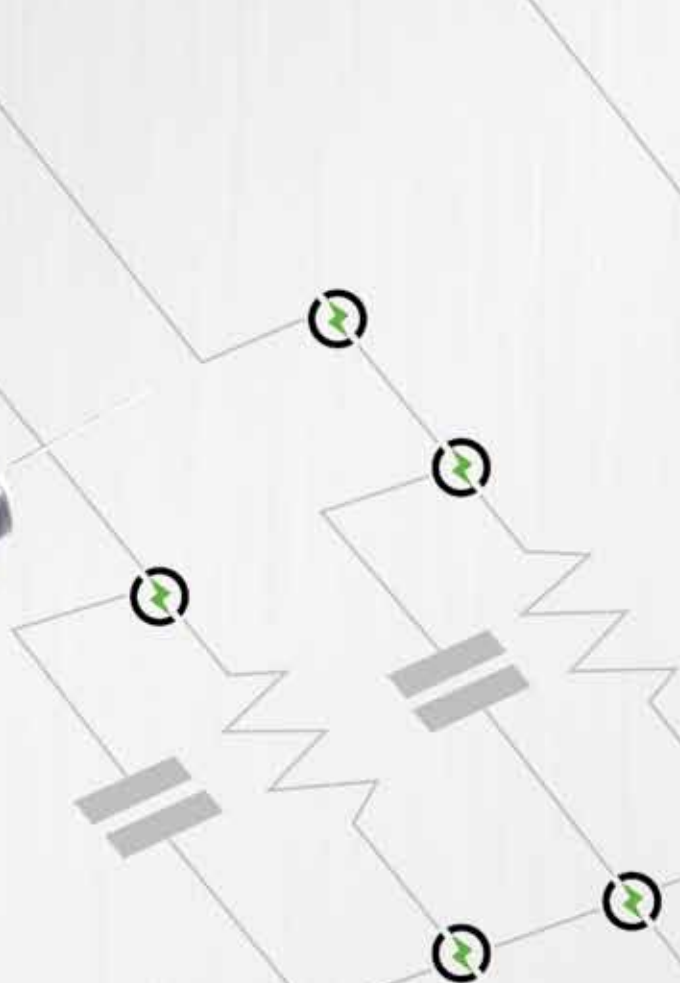




TANTALUM CAPACITOR CATALOG

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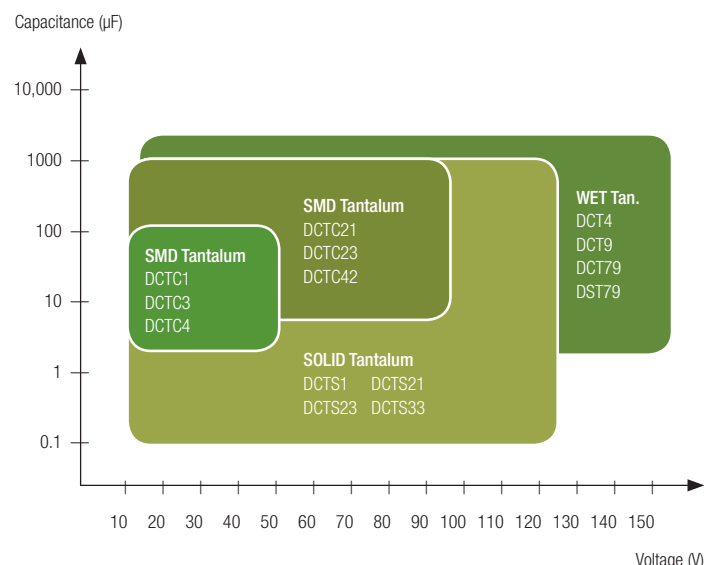
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QUICK SELECTION GUIDE



INTRODUCTION

Due to the manufacturing technology and constant improvements in tantalum powders, tantalum capacitors have the highest CV (product capacitance x voltage) per volume, very long life and high reliability.

These characteristics allow tantalum capacitors to be used both in large volume markets like mobile phones and computers, and in specialty markets such as space, aerospace, military and railways.

TANTALUM CAPACITORS ALSO HAVE THE FOLLOWING ADVANTAGES:

- Wide range of capacitance (less than 1 μF to more than 1000 μF)
- Wide operating temperature range (-55°C to +125°C) higher for non-standard types
- Electrical characteristics stable with temperature
- Low leakage current
- Very low ESR
- Electrical stability after long periods of storage

THE MAIN APPLICATIONS OF TANTALUM CAPACITORS CAN BE DIVIDED INTO THE FOLLOWING GROUPS:

- Filtering
- By pass
- Coupling
- RC time constant
- Energy storage

TANTALUM CAPACITORS ARE DIVIDED INTO TWO GROUPS WITH SEVERAL SUB – GROUPS:

SOLID TANTALUM CAPACITORS:

- Metal cases
- SMD (CHIPS) types

WET TANTALUM CAPACITORS:

- Silver cases
- Tantalum cases



GENERAL INFORMATION

MANUFACTURING

ANODE AND INSULATOR

Tantalum capacitors have the highest ratio of capacitance per volume. This is mainly due to the high dielectric constant of its insulator and to its large surface area.

The basic raw material is a high purity (greater than 99.99%) tantalum powder with a very fine granulation, compressed to form a cylinder or a parallelepiped constituting the anode of the capacitor (positive plate).

The pellet is then sintered at high temperature (1500 to 2000°C), under hard vacuum (10^{-6} torr), firstly to purify the powder and secondly to obtain a strong mechanical structure by welding of the particles.

The insulating part is obtained by anodization to a depth of the tantalum surface which forms a tantalum pentoxide film (Ta_2O_5) with a thickness of about 16 angstroms per anodization volt. The dielectric constant is between 21 and 27, depending upon the anodization conditions.

SOLID ELECTROLYTE: CATHODE AND ENCAPSULATION

The cathode is formed by manganese dioxide which is a grey semi-conductor. It is obtained by dipping the pellets into a manganese nitrate water solution which impregnates the internal structure; this solution is then decomposed in a high temperature oven to obtain manganese dioxide. This operation is repeated several times. The nature and quality of this semi-conductor greatly influence the electrical parameters (especially the series resistance).

To finish the negative plate, a graphite coating and then a silver coating are deposited on the outside surface of the manganese dioxide.

The positive nickel lead is welded on the tantalum wire and the negative lead is either soldered with wire leads, or pasted with a silver epoxy for surface mount models.

WET ELECTROLYTE: CATHODE AND ENCAPSULATION

The cathode (for wet tantalum capacitors) is formed by a sulphuric acid solution. The anodized tantalum pellet is impregnated with this solution and then placed in a silver or tantalum case, into which some equivalent gelled solution has been previously deposited.

The case is then crimped on the internal PTFE bush to create the sealing. The final steps are either the soldering of a glass metal seal, or the crimping of an elastomer seal on the top of the case.

BURN-IN - SORTING - INSPECTION

All the products are then submitted to a final burn-in, with differing severities depending upon the required characteristics of each type (temperature, voltage, time, etc.).

Sorting, marking and inspection operations follow. These procedures are the same for approved and non-approved parts (with exception of periodic testing).

TYPE IDENTIFICATION — ORDERING INFORMATION

THE COMPLETE IDENTIFICATION OF A PRODUCT IS MADE UP OF:

- Type (or model)
- Tolerance
- Testing parameters (standard catalog part vs. tested in accordance with MIL-SPEC standards)
- Rated capacitance
- Rated voltage
- Case size
- RoHS or non-RoHS
- For solid tantalum capacitors specify tape or bulk packaging

THE TYPE

It identifies the basic capacitor (DCTSXX).

Example: DCTS1

THE RATED CAPACITANCE

Expressed in picofarads, the first two digits are significant figures; the third is the number of zeros following:

Example: 102 = 10×10^2 pF = 0.001 μ F
103 = 10×10^3 pF = 0.01 μ F
334 = 33×10^4 pF = 0.33 μ F

THE TOLERANCE

It can be expressed directly in % or identified by a code letter:

X0 = $\pm 20\%$ X9 = $\pm 10\%$ X5 = $\pm 5\%$

Note: The standard tolerance for tantalum capacitors is $\pm 20\%$; if no tolerance is given, it is considered as 20%. A 20% tolerance means in fact -20% to +20% of the nominal value.

THE RATED VOLTAGE

It is expressed directly in volts (V), with three significant figures.

Example: 006 = 6 V DC; 050 = 50 V DC; 100 = 100 V DC

The case size: It is indicated on the technical data sheets following the voltage value and is generally identified by a letter code. It is important to give this information because there can be, for the same type, a standard range and an extended range in which the same value will be available in two different sizes.

THE TESTING PARAMETERS

C indicates a standard catalog part and S indicates tested in accordance with MIL-SPEC standards.

ORDERING INFORMATION EXAMPLE

Part Number = DCTS1105X9040AC

Type: DCTS1

Capacitance = 1 μ F

Tolerance = $\pm 10\%$

Voltage = 40 V DC

Case Size = A

C indicates standard catalog part

F indicates RoHS part

T indicates non-RoHS part

S indicates screened according to MIL

LOT ACCEPTANCE TEST PER MIL-PRF-39003

SOLID TANTALUM DCTS1, DCTS21, DCTS23, DCTS33

GROUP A ACCEPTANCE INSPECTION SUBGROUP 1 (100%)

- 1. Thermal Shock (Ref MIL-STD-202, Method 107, Test Condition B).
- 2. Surge Current when specified, 25°C ± 5 °C subjected to 3 consecutive cycles.
- 3. Seal Test, 125°C ± 5 °C Fluorocarbon liquid (Ref MIL-STD-202, Method 112, Test Condition D).
- 4. Radiographic Inspection (Ref MIL-STD-202, Method 209).

SUBGROUP 2 (5 SAMPLES)

- 5. Mechanical inspection for dimensions.

SUBGROUP 3 (13 SAMPLES)

- 6. Visual inspection for workmanship. Capacitors shall be processed in such a manner as to be uniform in quality when using 2X minimum-4X maximum magnification.
- 7. Visual inspection for materials such as the case, solder and soldering flux.
- 8. Visual inspection for marking including part or identifying number, pin, trademark, CAGE code, date code, lot symbol, capacitance and rated voltage.

SUBGROUP 4 (13 SAMPLES)

- 9. Stability at low and high temperature for DC leakage, capacitance, dissipation factor at each of temperature (+25°C, -55°C, +25°C, +85°C, +125°C, +25°C). Measurement of leakage current is not required for -55°C.

SUBGROUP 5 (13 SAMPLES)

- 10. Surge voltage, subjected to 1000 cycles at 85°C with 1.3 times of rated voltage. Each cycle consists of a 30 s surge voltage followed by a 30 s discharge period and voltage shall be made thru a 33-ohm resistor.

SUBGROUP 6 (13 SAMPLES)

- 11. Solderability (Ref MIL-STD-202, Method 208).

LOT ACCEPTANCE TEST PER MIL-PRF-39006 WET TANTALUM

GROUP A ACCEPTANCE INSPECTION SUBGROUP 1 (100%)

1. DC BURN-IN 48 hours minimum at 85°C +6°C/-0°C with the rated DC voltage applied through a resistor with a maximum value of 1100 ohm.
2. Visually examine using 2X-4X lighted magnification for mechanical damage and leakage of electrolyte after the units have cooled to room temperature.
3. DC Leakage, measured at 25°C. Do not exceed a charge of 5 minutes with the DC rated voltage applied.
4. Check Capacitance at 120Hz ± 5Hz.
 - For capacitors with ≤ 75 V DC, use the DC bias voltage 2.2 V DC, +0.0 V DC, -1.0 V DC
 - For capacitors with >75 V DC, use the DC bias voltage 10.0 V DC, +0.0 V DC, -1.0 V DC
5. Check Dissipation Factor at a frequency of 120Hz ± 5Hz.
 - For capacitors with ≤ 75 V DC, use the DC bias voltage 2.2 V DC, +0.0 V DC, -1.0 V DC
 - For capacitors with >75 V DC, use the DC bias voltage 10.0 V DC, +0.0 V DC, -1.0 V DC
6. Seal Test, 125°C ± 5°C Fluorocarbon liquid. (Ref MIL-STD-202, Method 112, Test Condition D).
7. Seal Test, Helium. (Ref MIL-STD-202, Method 112, Test Condition C).

Note: This test condition only applies to MIL-39006/22 "S" parts.

SUBGROUP 2 (SAMPLE)

MIL-PRF-39006 INSPECTION LOT SAMPLING CRITERIA

LOT SIZE	SAMPLE SIZE PPM-2
1 to 13	100%
14 to 150	13
151 to 280	20
281 to 500	29
501 to 1200	34
1201 to 3200	42
3201 to 10,000	42

8. Mechanical inspection for dimensions.

SUBGROUP 3

9. Solderability Test per MIL-STD-202, Method 208, Category 3 (8 hour ± 15 minutes steam aging), Test Condition "A". Test both lead wires of each capacitor. Terminals shall be immersed in flux and solder to within 0.050" of the capacitor body. There shall be no physical damage after test.

SUBGROUP 4

10. Visual inspection for workmanship. Capacitors shall be processed in such a manner as to be uniform in quality when using 2X minimum-4X maximum magnification. External leads shall not exhibit cuts, nicks, or scrapes exceeding 10% of the diameter for round and flat lead wire parts, except as follows:
 - **For Round Leads:** Within 0.050" beyond the weld area of the component, 10% of the surface area of the leads may exhibit bare base metal.
11. Visual inspection for materials such as the case, solder and soldering flux.
12. Visual inspection for marking including part or identifying number, PIN, trademark, CAGE code, date code, lot symbol, capacitance, and rated voltage.

SOLID TANTALUM CAPACITORS

HERMETICALLY SEALED METAL CASES AXIAL LEADS POLARIZED TYPES

Model	Capacitance Range	Voltage Range	Temperature Range	Main Features	Page
DCTS1 	0.1 μ F 330 μ F	125 V 6.3 V	-55°C +125°C 56 days	Standard range General purpose +125°C	28
DCTS1M 	0.1 μ F 330 μ F	100 V 6.3 V	-55°C +125°C 56 days	Standard range Equivalent to CSR13	28
DCTS23 	1 μ F 1200 μ F	63 V 6.3 V	-55°C +125°C 56 days	Extended range (1) General purpose	33
DCTS23M 	1.2 μ F 1000 μ F	50 V 6.3 V	-55°C +125°C 56 days	Extended range (1) Equivalent to CSR23	33
DCTS33 	1.2 μ F 1000 μ F	63 V 6.3 V	-55°C +125°C 56 days	Extended range (1) Low leakage current	33
DCTS33M 	1.2 μ F 1000 μ F	50 V 6.3 V	-55°C +125°C 56 days	Extended range (1) Equivalent to CSR33	33
DCTS21 	5.6 μ F 330 μ F	50 V 6.3 V	-55°C +125°C 56 days	Very low ESR (3) High ripple current High surge current (2)	36
DCTS21M 	5.6 μ F 330 μ F	50 V 6.3 V	-55°C +125°C 56 days	Equivalent to CSR21	36
DCTS21E 	22 μ F 1000 μ F	50 V 6.3 V	-55°C +125°C 56 days	Similar to DCTS 21 Extended range (1)	36

NOTES CONCERNING THE SELECTION GUIDES

1. Extended range: products offering higher CV (product capacitance - voltage) per volume.
2. High surge current: products which can be used without resistance in series and withstand high surge currents (test conditions: charge under U_R and discharge through a maximum 0.5 Ω resistance).
3. Very low ESR - High ripple current: products to be used in power conversion (power supplies-converters) with specified maximum ESR (Equivalent Series Resistance).
4. Reverse voltage: polar products which can withstand a small reverse voltage.
 - Solid tantalum capacitors: 15% U_R at 20°C and 5% U_R at +85°C
 - Wet tantalum capacitors: 3 volts for DCT79 only

SOLID TANTALUM CAPACITORS

MOLDED CASES SMD – SURFACE MOUNT POLARIZED TYPES

Model	Capacitance Range	Voltage Range	Temperature Range	Main Features	Page
DCTC1 	0.1 μ F 100 μ F	50 V 4 V	-55°C +125°C 56 days	Hybrid circuits General purpose	45
DTCR 	0.1 μ F 100 μ F	50 V 4 V	-55°C +85°C 56 days	Style CWR06	49
DCTC3 	0.1 μ F 150 μ F	50 V 4 V	-55°C +125°C 56 days	Standard chip size General purpose	53
DCTC3E 	0.15 μ F 680 μ F	50 V 4 V	-55°C +125°C 56 days	Standard chip size General purpose Extended range (1)	53
DCTC4 	0.1 μ F 100 μ F	50 V 4 V	-55°C +125°C 56 days	Standard chip size General purpose High surge current (2)	53
DCTC3 Low profile 	1 μ F 330 μ F	50 V 4 V	-55°C +125°C 56 days	Standard chip size General purpose Low profile	58
DCTC4 ESR 	4.7 μ F 1000 μ F	50 V 4 V	-55°C +125°C 56 days	Low ESR (3) High ripple current High surge current (2)	61

NOTES CONCERNING THE SELECTION GUIDES

1. Extended range: products offering higher CV (product capacitance - voltage) per volume.
2. High surge current: products which can be used without resistance in series and withstand high surge currents (test conditions: charge under U_R and discharge through a maximum 0.5 Ω resistance).
3. Very low ESR - High ripple current: products to be used in power conversion (power supplies-converters) with specified maximum ESR (Equivalent Series Resistance).
4. Reverse voltage: polar products which can withstand a small reverse voltage.
 - Solid tantalum capacitors: 15% U_R at 20°C and 5% U_R at +85°C
 - Wet tantalum capacitors: 3 volts for DCT79 only

SOLID TANTALUM CAPACITORS

MOLDED CASES SMD – SURFACE MOUNT POLARIZED TYPES

Model	Capacitance Range	Voltage Range	Temperature Range	Main Features	Page
DCTC21 	5.6 μ F 330 μ F	63 V 6.3 V	-55°C +125°C 56 days	Very low ESR (3) High ripple current High surge current (2)	63
DCTC21E 	10 μ F 680 μ F	100 V 6.3 V	-55°C +85°C 56 days	Very low ESR (3) High ripple current High surge current (2) Extended range (1)	63
DCTC23 	15 μ F 1000 μ F	63 V 6.3 V	-55°C +125°C 56 days	General purpose Extended range (1)	66
DCTC42 	12 μ F 680 μ F	63 V 6.3 V	-55°C +125°C 56 days	Two DCTC21 assembly	69
DCTC42E 	22 μ F 1500 μ F	80 V 6.3 V	-55°C +125°C 56 days	Two DCTC21 assembly Extended range (1)	69

NOTES CONCERNING THE SELECTION GUIDES

1. Extended range: products offering higher CV (product capacitance - voltage) per volume.
2. High surge current: products which can be used without resistance in series and withstand high surge currents (test conditions: charge under U_R and discharge through a maximum 0.5 Ω resistance).
3. Very low ESR - High ripple current: products to be used in power conversion (power supplies-converters) with specified maximum ESR (Equivalent Series Resistance).
4. Reverse voltage: polar products which can withstand a small reverse voltage.
 - Solid tantalum capacitors: 15% U_R at 20°C and 5% U_R at +85°C
 - Wet tantalum capacitors: 3 volts for DCT79 only

WET TANTALUM CAPACITORS

HERMETICALLY SEALED TANTALUM CASES AXIAL LEADS POLARIZED TYPES

Model	Capacitance Range	Voltage Range	Temperature Range	Main Features	Page
DCT79 	1.7 μ F 1200 μ F	125 V 6 V	-55°C +125°C 56 days	Reverse voltage High ripple current	84
DCT79E 	5.6 μ F 2200 μ F	150 V 6 V	-55°C +125°C 56 days	Reverse voltage High ripple current Extended range (1)	84
DCT79 SMD 	1.7 μ F 1200 μ F	125 V 6 V	-55°C +125°C 56 days	Reverse voltage High ripple current	90
DCT79E SMD 	5.6 μ F 2200 μ F	150 V 6 V	-55°C +125°C 56 days	Reverse voltage High ripple current Extended range (1)	90
DST79 	10 μ F 1800 μ F	125 V 25 V	-55°C +125°C 56 days	Very high capacitance Very low ESR	91

WET TANTALUM CAPACITORS

SILVER CASES AXIAL LEADS POLARIZED TYPES

Model	Capacitance Range	Voltage Range	Temperature Range	Main Features	Page
DCT9 	3 μ F 1200 μ F	150 V 6.3 V	-55°C +125°C 56 days	Silver case Glass metal seal	97
DCT9E 	4.7 μ F 2200 μ F	150 V 6.3 V	-55°C +125°C 56 days	Silver case Glass metal seal Extended range (1)	97
DCT4 	4.7 μ F 1000 μ F	125 V 10 V	-55°C +125°C 56 days	Silver case Seal and resin sealing	102
DCT4E 	1.7 μ F 2200 μ F	150 V 6 V	-55°C +125°C 56 days	Silver case Seal and resin sealing Extended range (1)	102

NOTES CONCERNING THE SELECTION GUIDES

1. Extended range: products offering higher CV (product capacitance - voltage) per volume.
2. High surge current: products which can be used without resistance in series and withstand high surge currents (test conditions: charge under U_R and discharge through a maximum 0.5 Ω resistance).
3. Very low ESR - High ripple current: products to be used in power conversion (power supplies-converters) with specified maximum ESR (Equivalent Series Resistance).
4. Reverse voltage: polar products which can withstand a small reverse voltage.
 - Solid tantalum capacitors: 15% U_R at 20°C and 5% U_R at +85°C
 - Wet tantalum capacitors: 3 volts for DCT79 only

WET TANTALUM CAPACITORS

STACKABLE MOLDED CASES — DCT79_DT79E POLARIZED TYPES

Model	Capacitance Range	Voltage Range	Temperature Range	Main Features	Page
DSPE0844 	220 μ F 6000 μ F	125 V 6 V	-55°C +125°C 56 days	Parallel connected Reverse voltage High ripple current	112
DSPE0844S 	27 μ F 150 μ F	375 V 150 V	-55°C +125°C 56 days	Series connected Reverse voltage High ripple current	114

NOTES CONCERNING THE SELECTION GUIDES

1. Extended range: products offering higher CV (product capacitance - voltage) per volume.
2. High surge current: products which can be used without resistance in series and withstand high surge currents (test conditions: charge under U_R and discharge through a maximum 0.5 Ω resistance).
3. Very low ESR - High ripple current: products to be used in power conversion (power supplies-converters) with specified maximum ESR (Equivalent Series Resistance).
4. Reverse voltage: polar products which can withstand a small reverse voltage.
 - Solid tantalum capacitors: 15% U_R at 20°C and 5% U_R at +85°C
 - Wet tantalum capacitors: 3 volts for DCT79 only

GENERAL CHARACTERISTICS



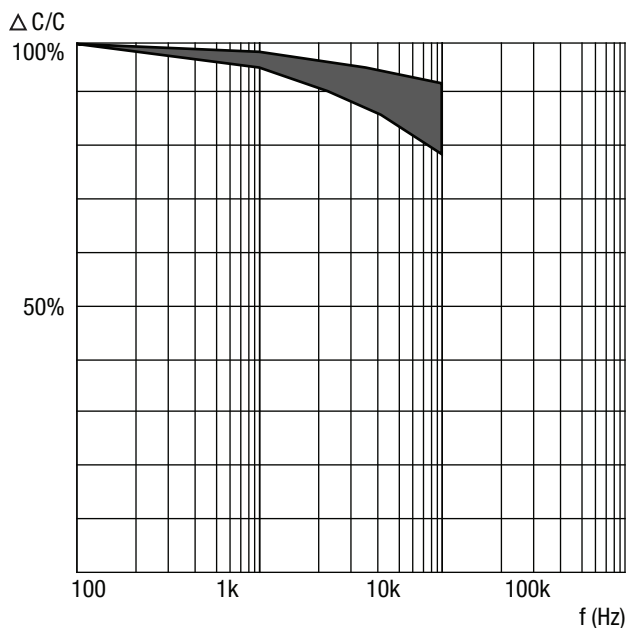
SOLID TANTALUM
CAPACITORS

ELECTRICAL CHARACTERISTICS

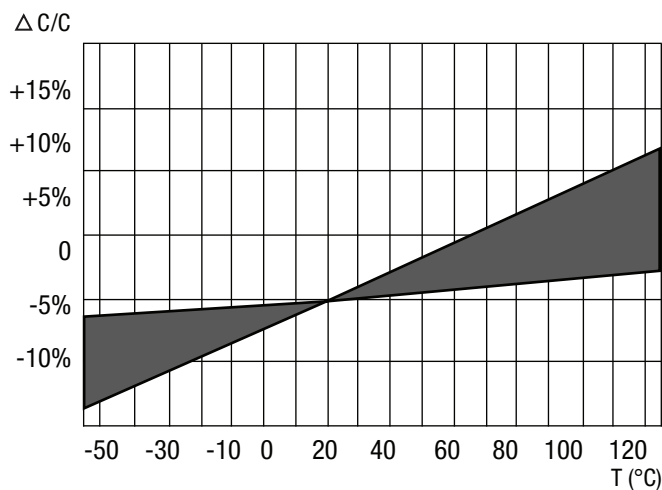
1. CAPACITANCE

The capacitance is defined by a rated value (C_R , indicated on the capacitor) and a tolerance (generally $\pm 20\%$).

CAPACITANCE CHANGE VS. FREQUENCY: STANDARD TYPES



CAPACITANCE CHANGE VS. TEMPERATURE: STANDARD TYPES

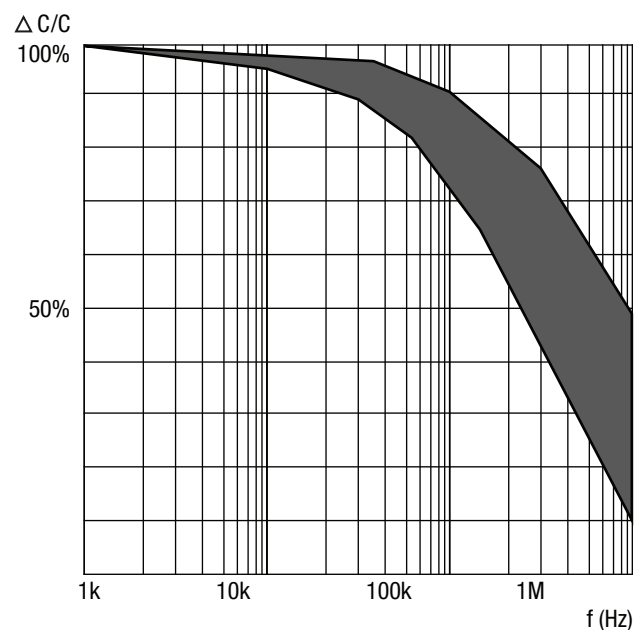


See typical curves above. Maximum changes are given, for each type, on the data sheets.

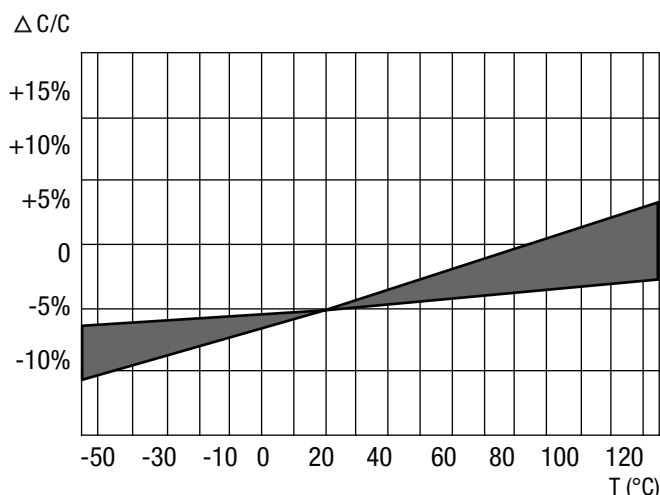
The capacitance is measured, for most of the types, at a 100Hz frequency (1kHz for DCTS21 / DCTS21E / DCTC21 / DCTC21E) under a 0.1 to 1 V AC voltage and a 2.1 to 2.5 V bias. At room temperature, it must be in the range defined “ by the rated value and the tolerance.

Capacitance change vs. applied DC voltage: negligible

CAPACITANCE CHANGE VS. FREQUENCY: DCTC21 AND DCTS21



CAPACITANCE CHANGE VS. TEMPERATURE: DCTC21 AND DCTS21



See typical curves above. Maximum changes are given, for each type, on the data sheets.

2. TOLERANCE (on rated capacitance)

It defines, with the rated capacitance, the range in which the capacitance value must be at room temperature.

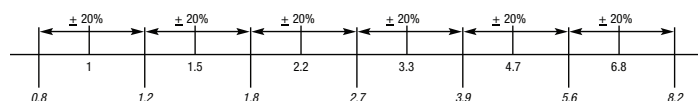
e.g.: Rated capacitance: 100 μF

Tolerance: 20%

The measured capacitance must be between:

$$100 - (20\% \text{ of } 100) = 80 \mu\text{F} \text{ and } 100 + (20\% \text{ of } 100) = 120 \mu\text{F}$$

The standard tolerance for tantalum capacitors is 20%.



The values (and multiples) that are indicated in bold characters (*E6 series) can be supplied with standard tolerances +20% and +10% (+5% on request).

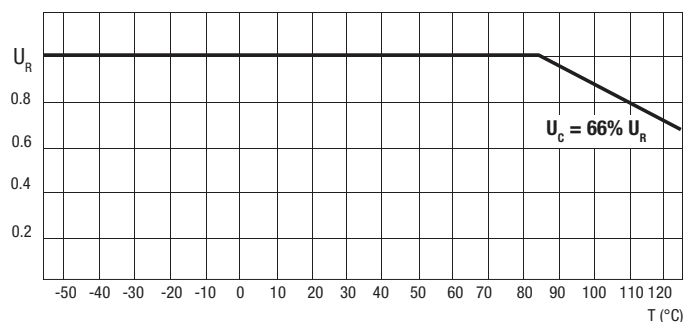
The values (and multiples) that are indicated in italics (*E12 series) can be only supplied with tolerance +10% (+5% on request).

*According to EIA.

3. DIRECT DC VOLTAGE

The rated voltage (U_R), indicated on the capacitor, is the maximum DC voltage which can be applied continuously between -55°C and +85°C.

For the types which can be used up to 125°C, the voltage must be derated between 85°C and +125°C according to the following curve.



The category voltage (U_C) is consequently the maximum DC voltage which can be applied continuously at +125°C.

The surge voltage is the maximum voltage which can be applied for short periods.

It is specified for each type in the data sheets and is generally equal to 1.3 times U_R between -55°C and +85°C and 1.3 times U_C at +125°C.

Tests are performed with charging periods of 30 seconds, through a 1000 Ω resistor, and discharging periods of 330 s. 1000 cycles are done.

ELECTRICAL CHARACTERISTICS

4. REVERSE VOLTAGE

This characteristic is not guaranteed for all types (see data sheets).

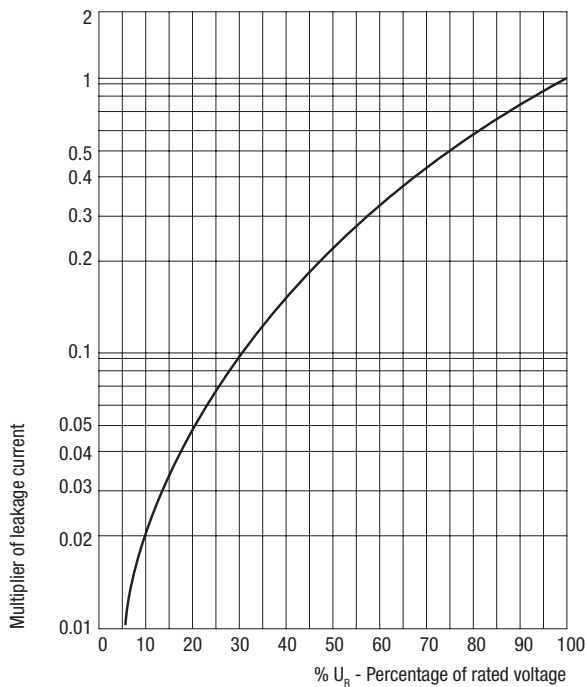
MAXIMUM REVERSE VOLTAGE IS GENERALLY:

- 0.15 times U_R at +20°C
- 0.05 times U_R at +85°C
- 0.01 times U_R at +125°C

TESTS ARE PERFORMED WITH THE FOLLOWING CONDITIONS:

- 125 hours under reverse voltage followed by 125 hours under direct voltage.

LEAKAGE CURRENT CHANGE VS. APPLIED VOLTAGE



5. LEAKAGE CURRENT

Leakage current is the residual current which flows through the capacitor after the charging time, under rated voltage. It is measured after a time not exceeding 5 minutes and is given in μA .

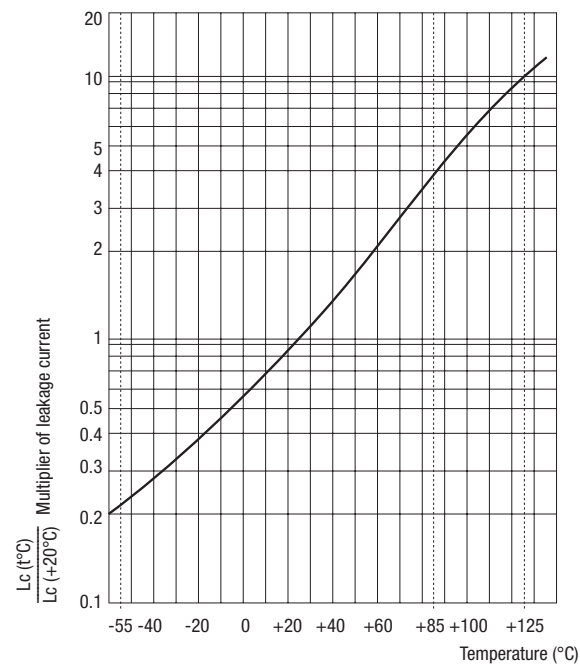
It is equivalent to the insulation resistance of the capacitor and it must be as low as possible.

Maximum leakage current is a function of capacitance and rated voltage values and is given, for each type, in the data sheets.

AT 20°C, THE LIMIT IS GENERALLY:

$L_c \text{ max } (\mu A) = 0.01 \times C_R \times U_R$ with C_R in μF and U_R in V.

LEAKAGE CURRENT CHANGE VS. TEMPERATURE



6. DISSIPATION FACTOR

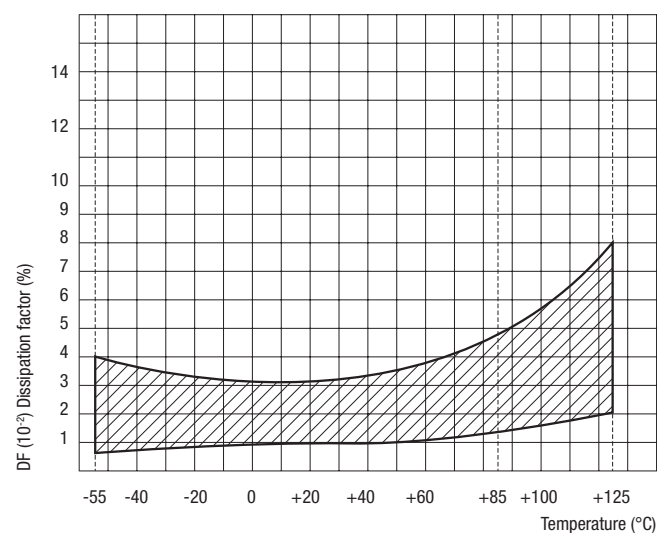
Dissipation factor is generally measured at the same time as the capacitance, with the same conditions. It is a function of the series resistance of the capacitor and the capacitance at low frequency.

$$DF = ESR \times C \times 2\pi f$$

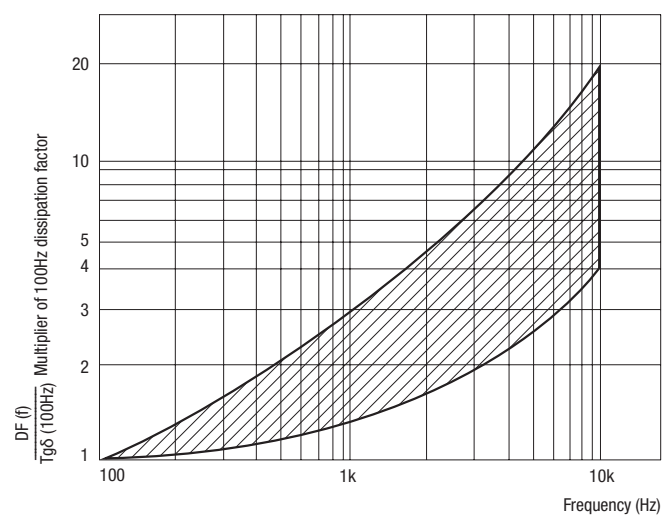
At low frequency, the series resistance is the sum of an ohmic part (leads, contacts, MnO_2 ,...) and the dielectric losses.

Dissipation factor is given in % and maximum limits are given for each type in the data sheets.

DISSIPATION FACTOR CHANGE VS. TEMPERATURE



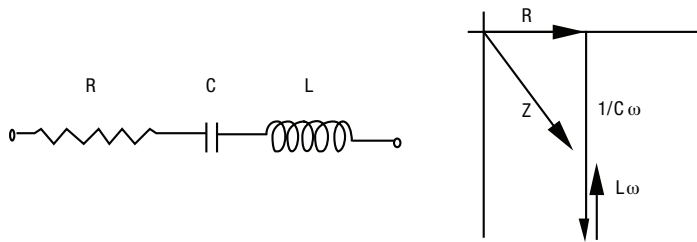
DISSIPATION FACTOR CHANGE VS. FREQUENCY



ELECTRICAL CHARACTERISTICS

7. EQUIVALENT SERIES RESISTANCE OR IMPEDANCE

EQUIVALENT CIRCUIT OF A CAPACITOR



R: Equivalent series resistance of the capacitor
(leads, contacts, MnO_2 , dielectric losses)

L: Inductance mainly due to the leads

C: Capacitance

Equivalent Series Resistance for:

DCTS21	DCTC42	DCTC21
DCTS21E	DCTC42E	DCTC21E
DCTC4ESR		

For these types which are specially designed to be used in power supplies and converters, a maximum ESR is given at a frequency of 100kHz or 500kHz. Parameters such as output ripple voltage and ripple current capability are directly a function of the ESR value.

Impedance (for standard products)

For the others types, a maximum limit is given for the impedance.

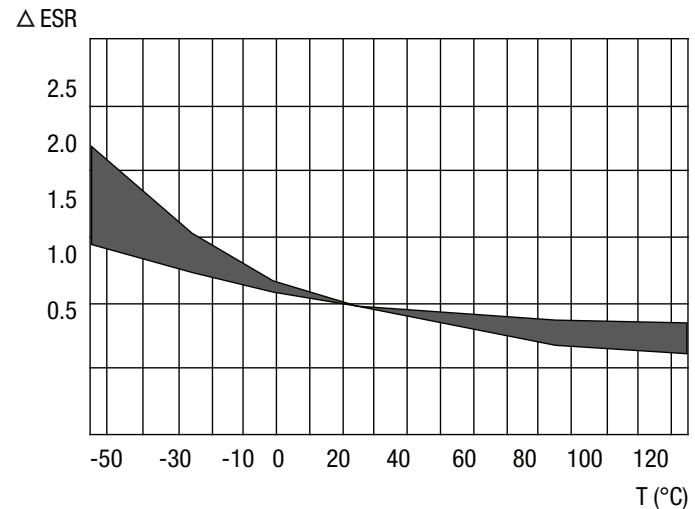
The formula for impedance is: $Z = \sqrt{R^2 + (L\omega - 1/C\omega)^2}$

Examples of impedance curves vs frequency are given in the following pages.

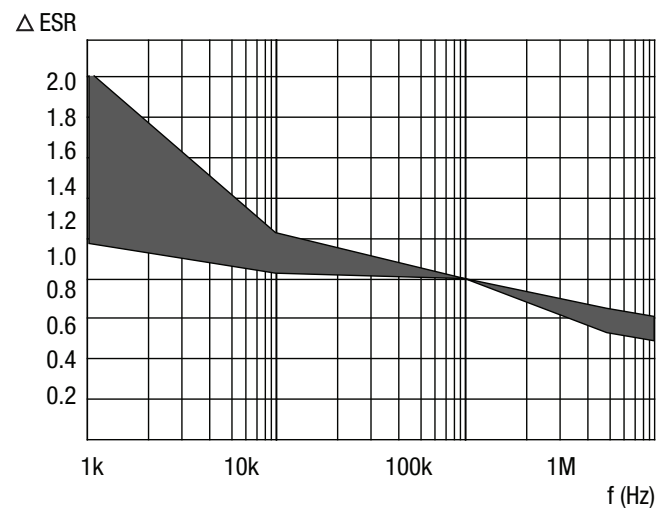
It can be seen that:

- At low frequencies, impedance is a function of capacitance
- At high frequencies, impedance is a function of inductance
- At medium frequencies, it is a function of the ESR

MAXIMUM ESR

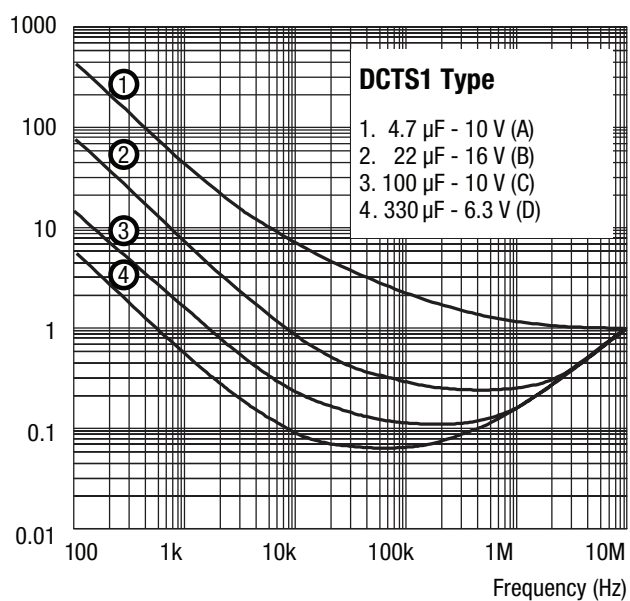


MAXIMUM IMPEDANCE



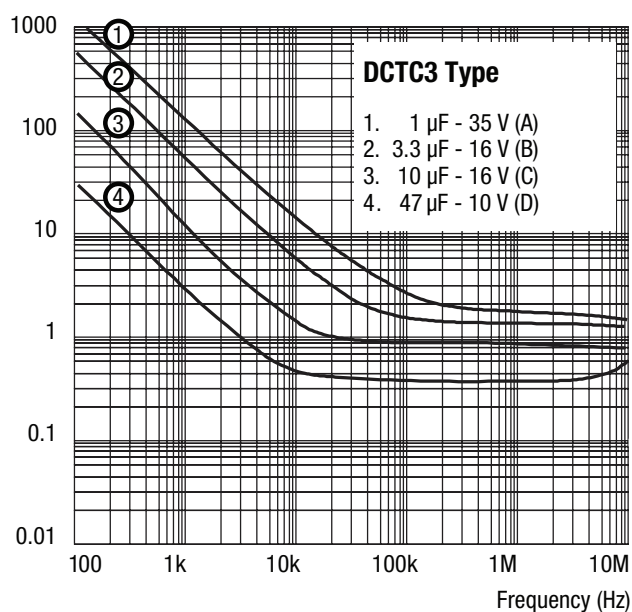
DCTS1 TYPE

Impedance (Ohms)



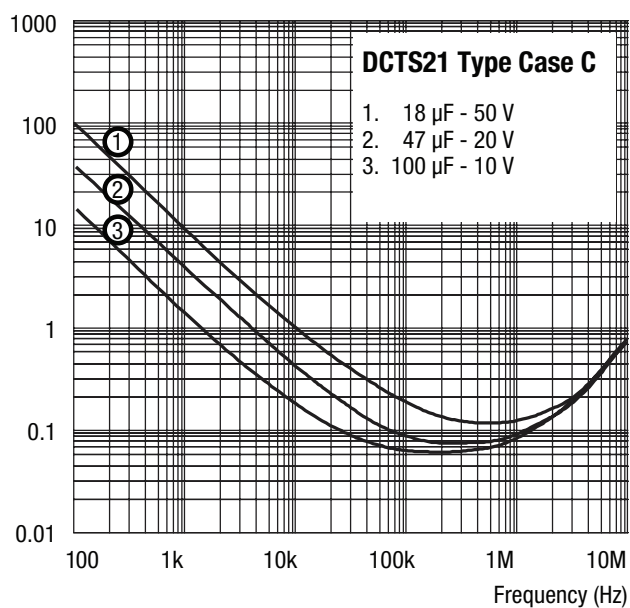
DCTC3 TYPE

Impedance (Ohms)



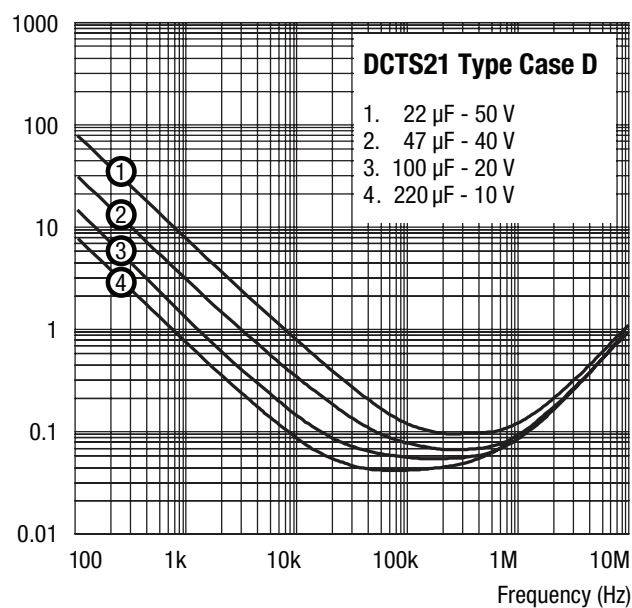
DCTS21 TYPE CASE C

Impedance (Ohms)



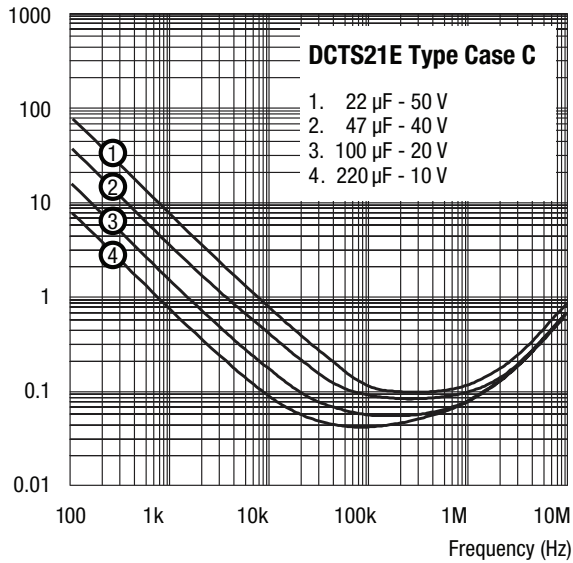
DCTS21 TYPE CASE D

Impedance (Ohms)



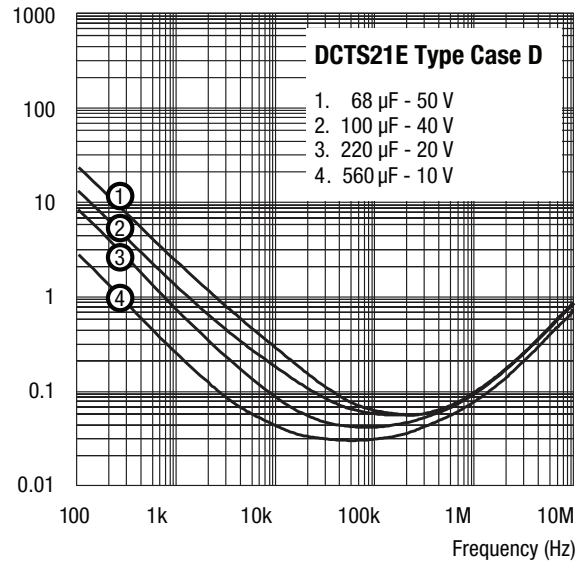
DCTS21E TYPE CASE C

Impedance (Ohms)



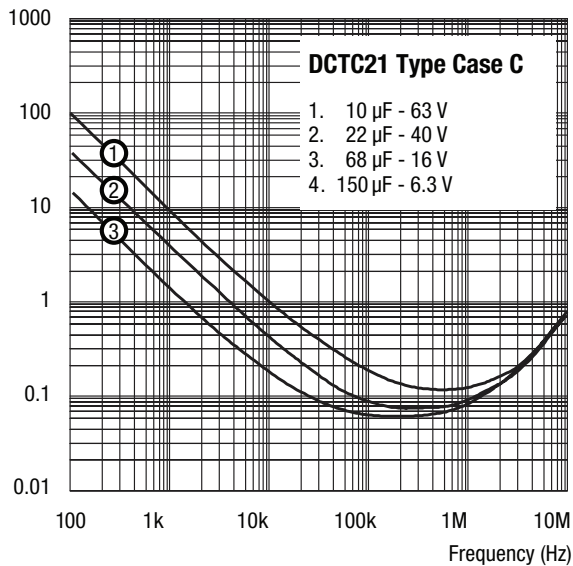
DCTS21E TYPE CASE D

Impedance (Ohms)



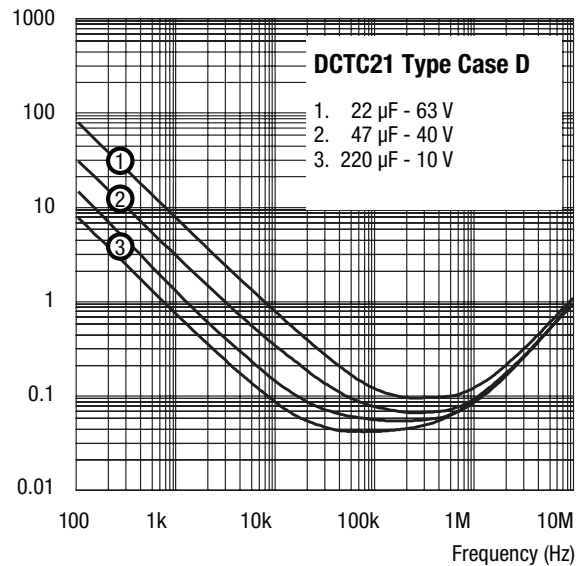
DCTC21 TYPE CASE C

Impedance (Ohms)



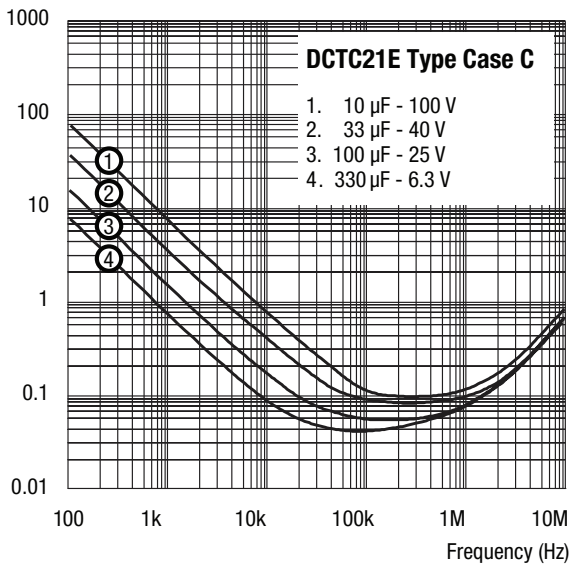
DCTC21 TYPE CASE D

Impedance (Ohms)



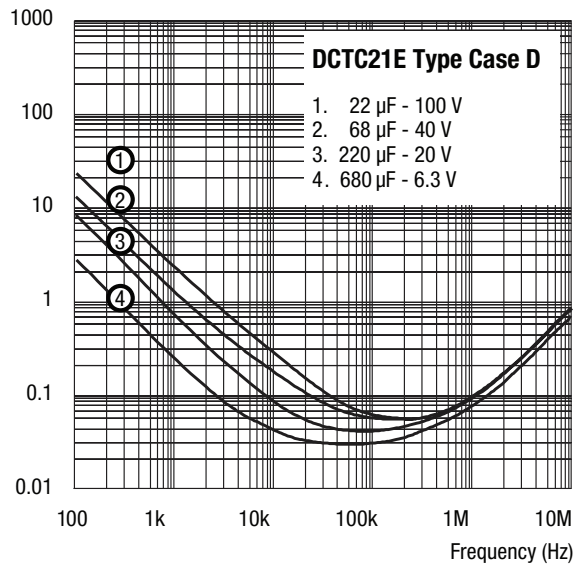
DCTC21E TYPE CASE C

Impedance (Ohms)



DCTC21E TYPE CASE D

Impedance (Ohms)



ELECTRICAL CHARACTERISTICS

8. MAXIMUM RIPPLE CURRENT MAXIMUM RIPPLE VOLTAGE

The maximum value of the ripple current, or ripple voltage that can be applied to the capacitor is only limited by the thermal effect. Since, as the electrolyte is in this case a solid semi-conductor, there is no damage and physical change in the structure when a ripple current is flowing through it.

However, as the series resistance is not zero, heating will occur that will be proportional to the ESR and to the square of ripple current ($P = ESR \times I_{rms}^2$).

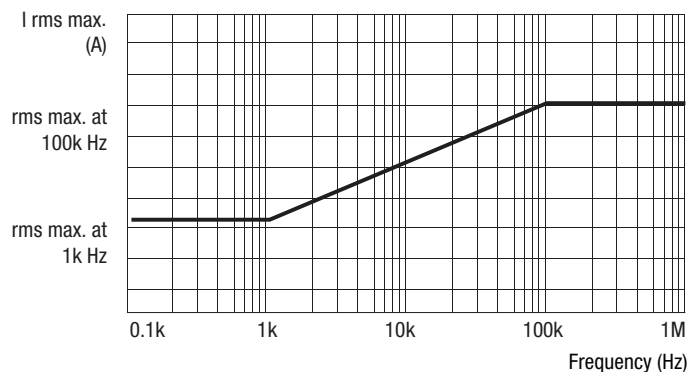
TYPES

DCTC21	DCTS21	DCTC4
DCTC21E	DCTS21E	DCTC4ESR
DCTC42		

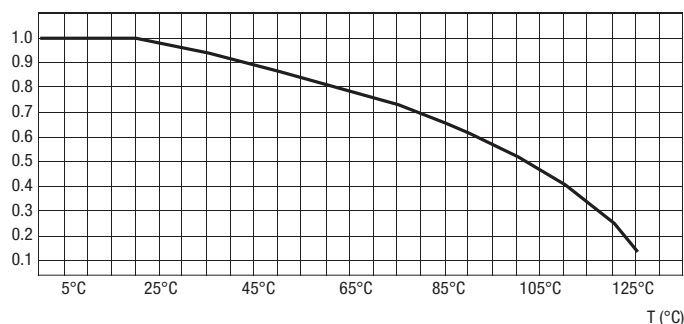
For these products, for which a maximum ESR is given, the maximum ripple current is also given in the data sheets. This value has been calculated with the maximum ESR values and a maximum dissipated power per case size.

As the ESR changes in frequency, maximum ripple currents are given for two frequencies (1kHz and 100kHz). For other frequencies, apply the rule given by the curve below.

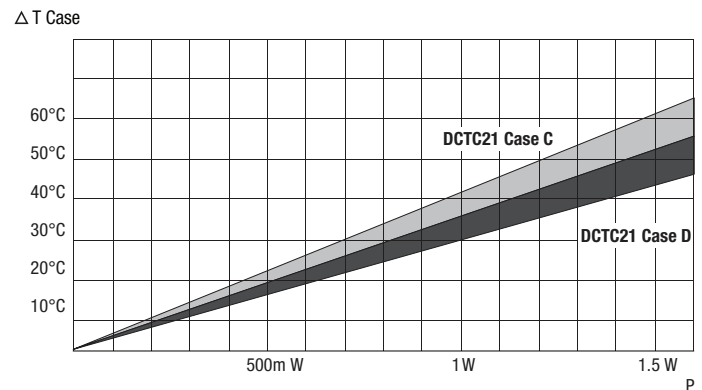
As there is heating due to the ripple current, it is also necessary to derate the maximum ripple current when the room temperature is higher than 20°C:



COEFFICIENT TO APPLY TO THE MAXIMUM RIPPLE CURRENT VS. TEMPERATURE



TYPICAL HEATING OF THE CASE VS DISSIPATED POWER ARE GIVEN ON THE CURVES BELOW (DCTC21 TYPE)



OTHERS TYPES

The same rule will be used to calculate the maximum ripple voltage:

$$I_{rms \max} = (P_{\max} / ESR_{\max})$$

MAXIMUM DISSIPATED POWER IS AS FOLLOWS

Metal cases (DCTS1, DCTS23, DCTS33,...):

- Case A: 0.090 W
- Case B: 0.100 W
- Case C: 0.125 W
- Case D: 0.180 W

SMD cases (DCTC3, DCTC3E,...):

- Case A: 0.075 W
- Case B: 0.085 W
- Case C: 0.110 W
- Case D: 0.150 W
- Case S: 0.060 W
- Case T: 0.070 W
- Case U: 0.090 W
- Case V: 0.0125 W

SMD cases (DCTC1, DTCR):

- Cases A, B, C, D: 0.030 W
- Cases E, F, G, H: 0.050 W

These values should be derated at elevated temperature as follows:

- At +85°C: 0.9
- At +125°C: 0.4

For maximum values of ESR, it will be possible to use the maximum impedance value given at 100kHz or to measure the ESR of capacitors.

Maximum ripple voltage can be calculated with the value of maximum ripple current and the following formula:

$$U_{rms} = Z (\text{impedance}) \times I_{rms}$$

ELECTRICAL CHARACTERISTICS

NOTE FOR ALL TYPES

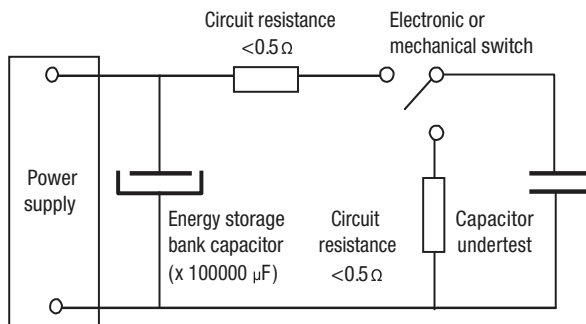
In addition to the requirements due to thermal effects, maximum ripple currents and voltages will be limited by the following parameters:

- The sum of DC voltage and positive peak of AC voltage must be less than maximum allowable DC voltage of the capacitor.
- The negative peak of AC voltage cannot exceed the maximum allowable reverse voltage.

9. CHARGE DISCHARGE / SURGE CURRENT

For standard types of solid tantalum capacitors, it is necessary to limit the surge current by placing a resistance in series with the capacitor. The value of this resistance will be calculated by using the rule of $3\ \Omega$ per volt ($I_{max} = 0.33\text{ A}$).

However, some types can be used without limit on the surge current ; these types are listed with the reference "high surge current" (eg: DCTS23, DCTS33, DCTS21 and DCTS21E, and DTC4, DTC4 ESR, DTC42, DTC42E, DTC21 and DTC21E).



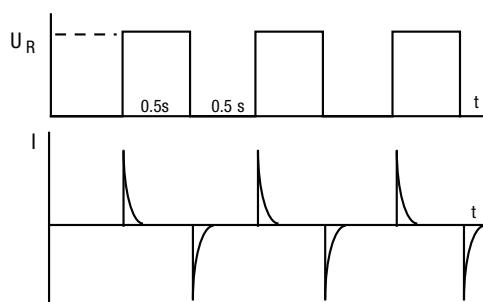
The high surge current test is performed to check that these capacitors can be used in low impedance circuits, and to make sure of their capability to withstand high surge currents.

The test circuit is the following one:

The test being performed under rated voltage with a maximum $0.5\ \Omega$ circuit resistance, the peak surge current will be a minimum equal to $I_p = U_R / 0.5$ (if the ESR of the capacitor is considered as negligible).

e.g.: high surge current test performed on a DCTS21 $100\ \mu\text{F}$ - 20 V (ESR= $75\text{ m}\Omega$, negligible compared to $0.5\ \Omega$) Surge current = $20 / 0.5 = 40\text{ A}$ during a few tens of μs .

Depending upon the type, this test can be 100% performed or on a sampling basis, during 3 to 5 cycles. During periodic testing, 1 million cycles are performed.



ENVIRONMENTAL / MECHANICAL / RELIABILITY – LIFE TIME CHARACTERISTICS

ENVIRONMENTAL CHARACTERISTICS

1. ENVIRONMENTAL CATEGORY

Environmental category defines the temperature range over which the capacitor can be used continuously, and also the number of days for the Humidity test (this test is performed periodically at 40°C with a 93% moisture rate).

Note: For types with a temperature range of -55°C to +125°C, it is necessary to derate the voltage for temperatures higher than 85°C (see page 15).

2. THERMAL SHOCKS — RAPID CHANGES OF TEMPERATURE

This test is performed to check that the capacitors can withstand sudden temperature changes. The two-chamber method is used, one at -55°C, the other one at +85°C or +125°C, depending upon the type. Five cycles are performed, with 30 min at low temperature and 30 min at high temperature, during the periodic testing or on 100% of the batch. Electrical characteristics are measured after this test.

3. HUMIDITY TEST

This test is performed during the periodic testing, with the following conditions:

Temperature: 40°C
Humidity: 90 - 95%
DC voltage: 0 V
Time: 21 or 56 days

Electrical characteristics are measured after this test.

MECHANICAL CHARACTERISTICS

1. VIBRATION

This test is performed during periodic testing, with the following conditions:

METAL CASES:

High frequency, MIL-STD-202 method 204, condition D (80G Peak)

- Frequency: 10 to 2000Hz
- Amplitude: 1.5 mm to 196 m/s²
- Duration and direction of motion: 4 hours in each of two mutually perpendicular directions: Total 8 hours, one parallel and other perpendicular to the axis

2. SHOCKS

This test is performed just after the vibration test, with the following conditions for all types:

- Acceleration: 981 m/s²
- Pulse width: 6 ms
- Shape: 1/2 sinewave
- Number of shocks: 3 for each of the 3 directions

RELIABILITY – LIFE TIME

1. RELIABILITY

Reliability of a component can be defined as its probability to work without failure, in defined conditions and during a fixed time.

Reliability is not only a function of the component quality, but also of the application and environmental conditions. The parameter which is most commonly used to define reliability is the failure rate in time, generally expressed in % per 1000 hours.

1-1. ESTABLISHED FAILURE RATE CAPACITORS

(DCTS1M, DCTS23M, DCTS33M, DCTS21M, DTCR)

This types, equivalent to MIL types, can be supplied with a fixed failure rate.

This failure rate is coded with the following letters:

M = 1.0% / 1000 h
P = B = 0.1% / 1000 h
R = C = 0.01% / 1000 h
S = D = 0.001% / 1000 h

The rate is calculated by recording the failures life test and according to the Weibull method.

The desired failure rate code letter must be added just after the type reference (ie: DCTS1MC = DCTS1M with a failure rate of 0.01% / 1000 hours).

1-2. CALCULATION OF A COMPONENT FAILURE RATE USED IN EQUIPMENT

The failure rate is calculated with parameters which are functions of the capacitor (capacitance, case type, approvals, high surge current test) and others representative of application conditions (voltage, temperature, resistance in series, environmental conditions).

Example:

DCTS21E 150 µF - 25 V used under 12 volts, at 40°C, without series resistance, in a satellite in orbit:

$$\begin{aligned}\pi_t &= 1.2 \quad \pi_v = 1.38 \quad \pi_R = 1 \quad \pi_B = 1 \\ \pi_C &= 1.8 \quad \pi_E = 0.5 \quad \pi_q = 1 \\ \lambda &= 4 \times 1.2 \times 1.38 \times 1 \times 1 \times 1.8 \times 0.5 \times 1 \cdot 10^{-9} / \text{h} = \\ &= 6 \cdot 10^{-9} / \text{h} = 0.0006\% \text{ defect} / 1000 \text{ hours}\end{aligned}$$

2. LIFE TIME

There is no known damaging mechanism in time for solid tantalum capacitors; that is why it is difficult to give a precise life time.

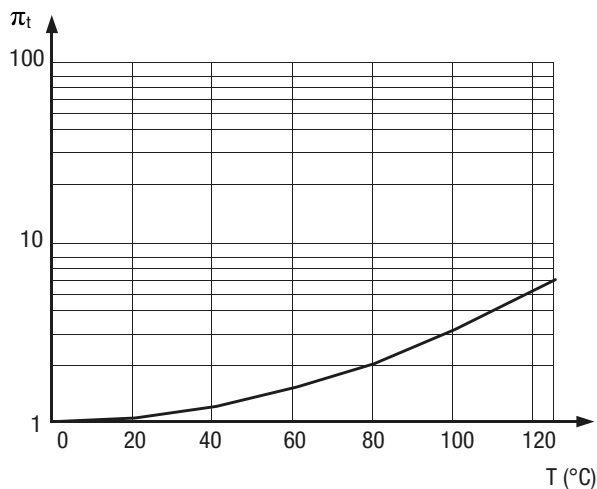
However, life tests at 85°C under rated voltage and 125°C under derated voltage are periodically performed.

In addition, during qualification programs for new types, life testing at 85°C and 125°C has been performed for 10,000 hours and no significant parameter changes have been observed.

RELIABILITY CALCULATION

$$\lambda = 4 \cdot \pi_t \cdot \pi_v \cdot \pi_R \cdot \pi_B \cdot \pi_C \cdot \pi_E \cdot \pi_q \cdot 10^{-9} / h$$

π_t = TEMPERATURE INFLUENCE



Formula:

$$\pi_t = \exp(1.8 \cdot (t/t_m)^2)$$

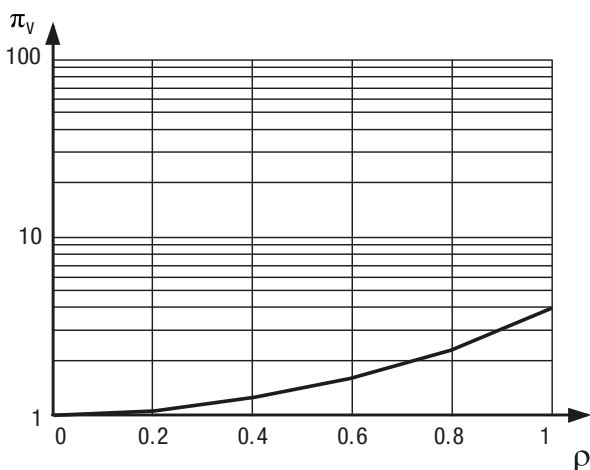
with:

t = appl. temperature

t_m = maximum temperature

Curve for t_m = 125°C

π_v = INFLUENCE OF APPLIED VOLTAGE VS RATED VOLTAGE



Formula:

$$\pi_v = \exp((\rho / 0.85)^2)$$

$\rho = \frac{\text{peak voltage}}{\text{rated voltage}}$

Curve $\pi_v = f(\rho)$

π_R = INFLUENCE OF CIRCUIT RESISTOR IN SERIES

V = using voltage

R = circuit resistance between capacitor and power supply

1. Types with high surge current test: $\pi_R = 1$

2. Others types: π_R = function of R/V in Ω/V

R/V ≥ 3

$\pi_R = 1$

R/V = 2

$\pi_R = 1.5$

R/V = 1

$\pi_R = 3$

R/V = 0.8

$\pi_R = 4.5$

R/V = 0.6

$\pi_R = 6$

R/V = 0.4

$\pi_R = 9$

R/V = 0.2

$\pi_R = 12$

R/V = 0.1

$\pi_R = 15$

π_E = INFLUENCE OF SURROUNDINGS CONDITIONS

Satellite in orbit

$\pi_E = 0.5$

Ground; stationary; protected

$\pi_E = 1.0$

Ground; stationary; non protected

$\pi_E = 2.5$

Ground; mobile; soft conditions

$\pi_E = 4.0$

Aircraft; soft conditions

$\pi_E = 4.0$

Ship; soft conditions

$\pi_E = 4.0$

Ground; mobile; hard conditions

$\pi_E = 5.5$

Ship; hard conditions

$\pi_E = 7.0$

Aircraft; hard conditions

$\pi_E = 10.0$

Satellite; launching

$\pi_E = 12.0$

π_B = INFLUENCE OF CASE TYPE

Metal case

$\pi_B = 1$

Molded case

$\pi_B = 3$

Dipped

$\pi_B = 5$

π_C = INFLUENCE OF CAPACITANCE

0.1 μF

$\pi_C = 0.75$

150 μF

$\pi_C = 1.8$

330 μF

$\pi_C = 2.0$

1000 μF

$\pi_C = 3.0$

π_q = INFLUENCE OF QUALIFICATION

Products tested in accordance w/MIL-SPEC

$\pi_q = 1.0$

Others products

$\pi_q = 1.0$

METAL CASES



SOLID TANTALUM
CAPACITORS

HERMETICALLY SEALED METAL CASES AXIAL LEADS – POLARIZED TYPES

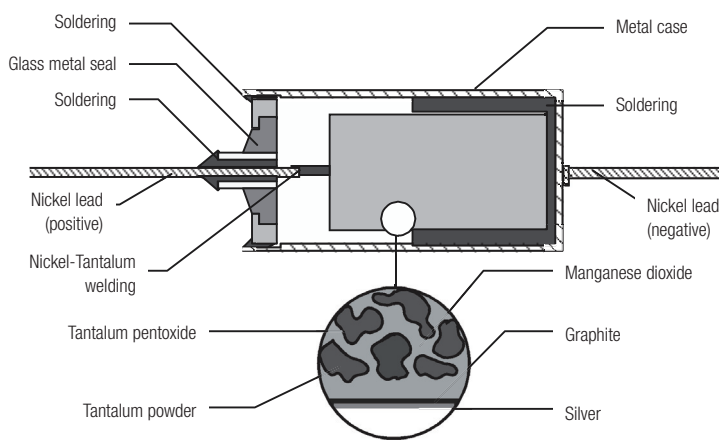
Applicable for types:

General purpose: DCTS1, DCTS1M

Extended ranges: DCTS23, DCTS23M, DCTS33, DCTS33M

Special for power supplies and converters: DCTS21, DCTS21E

CONSTRUCTION



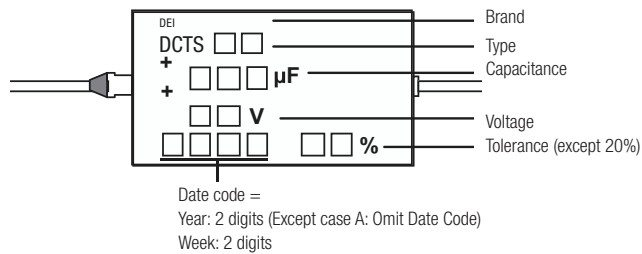
PACKAGING

Depending upon the quantities, there will be different types for packaging:

- Small quantities: loose in plastic bags or boxes
- Intermediate quantities: taped in plastic bags
- Big quantities: taped on reel

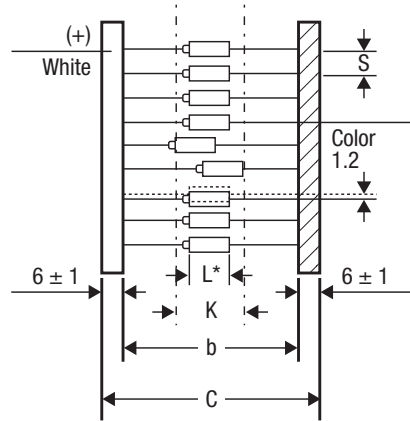
Dimensions about taping and reels are given on the next page.

MARKING



TAPING: DIMENSIONS

LENGTH OF THE CAPACITOR



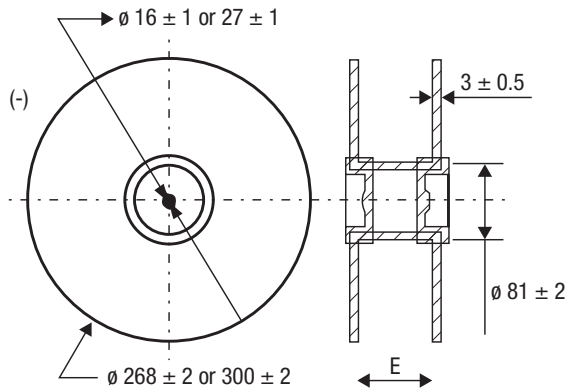
TAPE DIMENSIONS (in mm)

Case Code	L. Max.	K. Max.	$b \pm 2^*$	C. Max.	$S \pm 0.5^{**}$	Qty per reel Std/Max.
A	8.1	9.5	53	70	5	3500
B	12.8	14.2	53	70	5	2500
C	18.2	19.6	73	90	10	500
D	20.8	22.2	73	90	10	400

* The size b of 53 mm for B case is the standard dimension.

** Max. cumulative tolerance on 10 capacitors: ± 2 mm.

REEL SIZES (in mm)



Size E of reels according to case sizes.

A = 67

B = 67

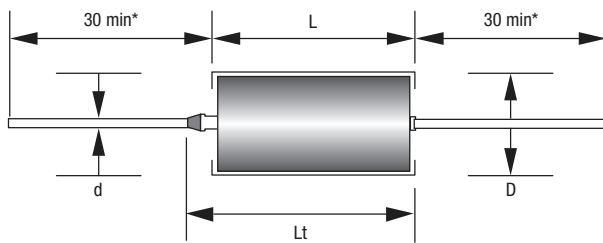
C - D = 87

HERMETICALLY SEALED METAL CASES AXIAL LEADS POLARIZED TYPES



DIMENSIONS (in mm)

Case code	Dimensions with insulating sleeve			
	Lt. max	L. max	D. max	d +10% -0.05
A	10.2	8.1	3.6	0.5
B	15.0	12.8	4.9	0.5
C	20.5	18.2	7.5	0.6
D	24.0	20.8	9.1	0.6



* 23 mm for capacitors delivered on tape.

MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

	DCTS1	DCTS1M
Operating temperature	-55°C +125°C	-55°C +125°C
Humidity	56 days	56 days
Capacitance range	0.1 μ F - 330 μ F	0.1 μ F - 330 μ F
Tolerance	20%...10%	20%...10%
Voltage range	6.3 V...125 V	6.3 V...100 V
High surge current	no	3 cycles-100%
MAXIMUM CAPACITANCE CHANGE		
-55°C	-10%	-10%
+85°C	+12%	+8%
+125°C	+15%	+12%
MAXIMUM DF		
+20°C	see table	see table
-55°C	1.5 x lim 20°C	= lim 20°C
+85°C	1.5 x lim 20°C	= lim 20°C
+125°C	2.0 x lim 20°C	= lim 20°C
MAXIMUM LEAKAGE CURRENT		
+20°C	see table	see table
+85°C	0.1 x $C_R U_R$	20 x lim 20°C
+125°C	0.125 x $C_R U_R$	25 x lim 20°C
MAXIMUM IMPEDANCE		
(20°C): case A	10 Ω	10 Ω
(20°C): case B	5 Ω	5 Ω
(20°C): case C	2 Ω	2 Ω
(20°C): case D	1 Ω	1 Ω
MAXIMUM REVERSE VOLTAGE		
+20°C	-	15% U_R
+85°C	-	5% U_R
+125°C	-	1% U_R
MAXIMUM SURGE VOLTAGE		
+85°C	1.3 x U_R	1.3 x U_R
+125°C	1.3 x U_C	1.3 x U_C

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DCTS1				DCTS1M			
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Leakage Current			Max. DF +20°C (%)	Maximum Leakage Current			Max. DF +25°C (%)
		+20°C (μA)	+85°C (μA)	+125°C (μA)		+25°C (μA)	+85°C (μA)	+125°C (μA)	
RATED VOLTAGE (+85°C) 6.3 V (6 V FOR DCTS1M) - CATEGORY VOLTAGE (+125°C) 4 V									
5.6	A	1	3.5	4.4	6	0.3	6	7.5	4
6.8	A	1	4.2	5.3	6	0.3	6	7.5	6
47	B	2.9	29	36	6	1.5	24	30	6
56	B	3.5	35	44	6	1.5	24	30	6
120	C	7.5	75	94	6	-	-	-	-
150	C	9.4	94	117	6	4.5	90	113	8
180	C	11.3	113	141	6	5.5	110	138	8
270	D	17	170	212	6	6.5	130	163	8
330	D	20.8	208	260	8	7.5	150	188	8
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V									
3.9	A	1	3.9	4.8	6	0.3	6	7.5	4
4.7	A	1	4.7	5.8	6	0.4	7	8.8	4
27	B	2.7	27	34	6	2	40	50	6
33	B	3.3	33	41	6	2.5	50	63	6
39	B	3.9	39	49	6	2.5	50	63	6
82	C	8.2	82	102	6	4	80	100	6
100	C	10	100	125	6	5	100	125	8
120	C	12	120	150	6	6	120	150	8
180	D	18	180	225	6	9	180	226	8
220	D	22	220	275	8	10	200	250	8
RATED VOLTAGE (+85°C) 16 V (15 V FOR DCTS1M) - CATEGORY VOLTAGE (+125°C) 10 V									
1.8	A	1	2.8	3.6	6	-	-	-	-
2.2	A	1	3.5	4.4	6	-	-	-	-
2.7	A	1	4.3	5.4	6	0.3	6	7.5	4
3.3	A	1	5.2	6.6	6	0.4	8	10	4
12	B	1.9	19	24	6	-	-	-	-
15	B	2.4	24	30	6	-	-	-	-
18	B	2.8	28	35	6	2	35	44	6
22	B	3.5	35	43.7	6	2	40	50	6
39	C	6.2	62	77.5	6	-	-	-	-
47	C	7.5	75	93.7	6	-	-	-	-
56	C	8.9	89	111	6	4	80	100	6
68	C	10.8	108	135	6	5	100	125	6
82	D	13.1	131	163	6	-	-	-	-
100	D	16	160	200	6	-	-	-	-
120	D	19.2	192	240	8	9	180	226	8
150	D	24	240	300	8	10	200	250	8
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V									
1.2	A	-	-	-	-	0.3	6	7.5	4
1.5	A	-	-	-	-	0.3	6	7.5	4
1.8	A	-	-	-	-	0.3	6	7.5	4
2.2	A	-	-	-	-	0.4	8	10	4
8.2	B	-	-	-	-	1	20	25	6
10	B	-	-	-	-	1.5	30	38	6
12	B	-	-	-	-	1.8	35	44	6
15	B	-	-	-	-	2	40	50	6
27	C	-	-	-	-	2.5	50	63	6
33	C	-	-	-	-	3.5	70	88	6
39	C	-	-	-	-	4	80	100	6
47	C	-	-	-	-	4.5	90	113	6
56	D	-	-	-	-	5.5	110	138	6
68	D	-	-	-	-	7	140	175	6
82	D	-	-	-	-	8	160	200	6
100	D	-	-	-	-	10	200	250	8
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V									
1.2	A	1	3	3.7	6	-	-	-	-
1.5	A	1	3.7	4.6	6	-	-	-	-
8.2	B	2	20	25	6	-	-	-	-
10	B	2.5	25	31.2	6	-	-	-	-
27	C	6.7	67	84	6	-	-	-	-
33	C	8.2	82	102	6	-	-	-	-
56	D	14	140	175	6	-	-	-	-
68	D	17	170	212	6	-	-	-	-

HERMETICALLY SEALED METAL CASES

AXIAL LEADS – POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DCTS1				DCTS1M			
Capacitance 100Hz +20°C (µF)	Case Code	Maximum Leakage Current			Max. DF +20°C (%)	Maximum Leakage Current			Max. DF +25°C (%)
		+20°C (µA)	+85°C (µA)	+125°C (µA)		+25°C (µA)	+85°C (µA)	+125°C (µA)	
RATED VOLTAGE (+85°C) 40 V (35 V FOR DCTS1M) - CATEGORY VOLTAGE (+125°C) 25 V (23 V FOR DCTS1M)									
0.1	A	1	1	1	6	-	-	-	-
0.12	A	1	1	1	6	-	-	-	-
0.15	A	1	1	1	6	-	-	-	-
0.18	A	1	1	1	6	-	-	-	-
0.22	A	1	1	1.1	6	-	-	-	-
0.27	A	1	1	1.3	6	-	-	-	-
0.33	A	1	1.3	1.6	6	-	-	-	-
0.39	A	1	1.5	1.9	6	-	-	-	-
0.47	A	1	1.8	2.3	6	-	-	-	-
0.56	A	1	2.2	2.8	6	-	-	-	-
0.68	A	1	2.7	3.4	6	-	-	-	-
0.82	A	1	3.2	4.1	6	-	-	-	-
1	A	1	4	5	6	-	-	-	-
1.2	A	1	4.8	6	6	-	-	-	-
1.5	B	1	6	7.5	6	-	-	-	-
1.8	B	1	7.2	9	6	-	-	-	-
2.2	B	1	8.8	11	6	-	-	-	-
2.7	B	1	10	13.5	6	-	-	-	-
3.3	B	1.3	13	16.2	6	-	-	-	-
3.9	B	1.5	15	18.7	6	-	-	-	-
4.7	B	1.8	18	22.5	6	-	-	-	-
5.6	B	2.2	22	27.5	6	1.3	25	32	4
6.8	B	2.7	27	33.7	6	1.5	30	38	6
8.2	C	3.2	32	40	6	-	-	-	-
10	C	4	40	50	6	-	-	-	-
12	C	4.8	48	60	6	-	-	-	-
15	C	6	60	75	6	-	-	-	-
18	C	7.2	72	90	6	-	-	-	-
22	C	8.8	88	110	6	4	80	100	6
27	D	10.8	108	135	6	4.5	90	113	6
33	D	13.2	132	165	6	5.5	110	138	6
39	D	15.6	156	195	6	7	140	175	6
47	D	18.8	188	235	6	8	160	200	6
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 32 V									
0.1	A	1	1	1	6	0.3	5	6.3	2
0.12	A	1	1	1	6	0.3	5	6.3	2
0.15	A	1	1	1	6	0.3	5	6.3	2
0.18	A	1	1	1.1	6	0.3	5	6.3	2
0.22	A	1	1.1	1.3	6	0.3	5	6.3	2
0.27	A	1	1.3	1.6	6	0.3	5	6.3	2
0.33	A	1	1.6	2	6	0.3	5	6.3	2
0.39	A	1	1.9	2.4	6	0.3	5	6.3	2
0.47	A	1	2.3	2.9	6	0.3	5	6.3	2
0.56	A	1	2.8	3.5	6	0.3	5	6.3	2
0.68	A	1	3.4	4.2	6	0.3	5	6.3	2
0.82	A	1	4.1	5.1	6	0.3	5	6.3	2
1	A	1	5	6.2	6	0.4	8	10	2
1.2	B	1	6	7.5	6	0.4	9	11	4
1.5	B	1	7.5	9.3	6	0.6	12	15	4
1.8	B	1	9	11.2	6	0.7	14	18	4
2.2	B	1.1	11	13.7	6	0.8	17	22	4
2.7	B	1.3	13	16.2	6	1	20	25	4
3.3	B	1.6	16	20	6	1.2	25	32	4
3.9	B	1.9	19	24	6	1.5	30	38	4
4.7	B	2.3	23	29	6	1.7	35	44	4
5.6	C	2.8	28	35	6	2.2	45	56	4
6.8	C	3.4	34	42	6	2.2	45	56	6
8.2	C	4.1	41	51	6	2.5	50	63	6
10	C	5	50	62	6	2.5	50	63	6
12	C	6	60	75	6	3	60	75	6
15	C	7.5	75	93	6	4	80	100	6
18	C	9	90	112	6	4.5	90	113	6
22	D	11	110	137	6	5.5	110	138	6

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DCTS1				DCTS1M			
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Leakage Current			Max. DF +20°C (%)	Maximum Leakage Current			Max. DF +25°C (%)
		+20°C (μA)	+85°C (μA)	+125°C (μA)		+25°C (μA)	+85°C (μA)	+125°C (μA)	
RATED VOLTAGE (+85°C) 63 V - CATEGORY VOLTAGE (+125°C) 40 V									
0.1	A	1	1	1	6	-	-	-	-
0.12	A	1	1	1	6	-	-	-	-
0.15	A	1	1	1.1	6	-	-	-	-
0.18	A	1	1.1	1.4	6	-	-	-	-
0.22	A	1	1.3	1.7	6	-	-	-	-
0.27	A	1	1.7	2.1	6	-	-	-	-
0.33	A	1	2	2.5	6	-	-	-	-
0.39	A	1	2.4	3	6	-	-	-	-
0.47	A	1	2.9	3.7	6	-	-	-	-
0.56	A	1	3.5	4.4	6	-	-	-	-
0.68	A	1	4.2	5.3	6	-	-	-	-
0.82	B	1	5.1	6.4	6	-	-	-	-
1	B	1	6.3	7.8	6	-	-	-	-
1.2	B	1	7.5	9.4	6	-	-	-	-
1.5	B	1	9.4	11.8	6	-	-	-	-
1.8	B	1.1	11	13.7	6	-	-	-	-
2.2	B	1.3	13	16.2	6	-	-	-	-
2.7	B	1.7	17	21.2	6	-	-	-	-
3.3	B	2	20	25	6	-	-	-	-
3.9	B	2.4	24	30	6	-	-	-	-
4.7	C	2.9	29	37	6	-	-	-	-
5.6	C	3.5	35	44	6	-	-	-	-
6.8	C	4.2	42	53	6	-	-	-	-
8.2	C	5.1	51	64	6	-	-	-	-
10	C	6.3	63	78	6	-	-	-	-
12	D	7.5	75	94	6	-	-	-	-
15	D	9.4	94	118	6	-	-	-	-
18	D	11.3	113	141	6	-	-	-	-
22	D	13.8	138	173	6	-	-	-	-
RATED VOLTAGE (+85°C) 80 V (75 V FOR DCTS1M) - CATEGORY VOLTAGE (+125°C) 50 V									
0.1	A	1	1	1	6	0.3	5	6.3	2
0.12	A	1	1	1.2	6	0.3	5	6.3	2
0.15	A	1	1.2	1.5	6	0.3	5	6.3	2
0.18	A	1	1.4	1.8	6	0.3	5	6.3	2
0.22	A	1	1.7	2.2	6	0.3	5	6.3	2
0.27	A	1	2.1	2.7	6	0.3	5	6.3	2
0.33	A	1	2.6	3.3	6	0.3	5	6.3	2
0.39	A	1	3.1	3.9	6	0.3	5	6.3	2
0.47	A	1	3.7	4.7	6	0.3	5	6.3	2
0.56	A	1	4.4	5.6	6	0.3	5	6.3	2
0.68	A	1	5.4	6.8	6	0.3	5	6.3	2
0.82	B	1	6.5	8.2	6	0.3	5	6.3	2
1	B	1	8	10	6	0.3	5	6.3	2
1.2	B	1	9.6	12	6	0.3	5	6.3	4
1.5	B	1.2	12	15	6	0.6	10	13	4
1.8	B	1.4	14	18	6	0.7	10	13	4
2.2	B	1.7	17	22	6	0.8	15	19	4
2.7	B	2.1	21	27	6	1	15	19	4
3.3	B	2.6	26	33	6	1.2	20	25	4
3.9	B	3.1	31	39	6	1.5	20	25	4
4.7	C	3.7	37	47	6	3	60	75	4
5.6	C	4.4	44	56	6	3	60	75	4
6.8	C	5.4	54	68	6	5	100	125	6
8.2	C	6.5	65	82	6	5	100	125	6
10	C	8	80	100	6	5	100	125	6
12	D	9.6	96	120	6	5	100	125	6
15	D	12	120	150	6	7	140	175	6

HERMETICALLY SEALED METAL CASES AXIAL LEADS – POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DCTS1				DCTS1M			
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Leakage Current			Max. DF +20°C (%)	Maximum Leakage Current			Max. DF +25°C (%)
		+20°C (μA)	+85°C (μA)	+125°C (μA)		+25°C (μA)	+85°C (μA)	+125°C (μA)	
RATED VOLTAGE (+85°C) 100 V - CATEGORY VOLTAGE (+125°C) 63 V									
0.1	A	1	1	1.2	6	0.3	5	6.3	2
0.12	A	1	1.2	1.5	6	0.3	5	6.3	2
0.15	A	1	1.5	1.8	6	0.3	5	6.3	2
0.18	A	1	1.8	2.2	6	0.3	5	6.3	2
0.22	A	1	2.2	2.7	6	0.3	5	6.3	2
0.27	A	1	2.7	3.3	6	0.3	5	6.3	2
0.33	A	1	3.3	4.1	6	0.3	5	6.3	2
0.39	A	1	3.9	4.8	6	0.3	5	6.3	2
0.47	A	1	4.7	5.8	6	0.3	5	6.3	2
0.56	A	1	5.6	7	6	0.3	5	6.3	2
0.68	B	1	6.8	8.5	6	0.3	5	6.3	2
0.82	B	1	8.2	10	6	0.4	5	6.3	2
1	B	1	10	12	6	0.5	5	6.3	2
1.2	B	1.2	12	15	6	0.5	5	6.3	4
1.5	B	1.5	15	18	6	0.7	10	13	4
1.8	B	1.8	18	22	6	0.7	10	13	4
2.2	B	2.2	22	27	6	0.9	15	19	4
2.7	B	2.7	27	33	6	1.1	15	19	4
3.3	C	3.3	33	41	6	1.5	30	38	6
3.9	C	3.9	39	48	6	1.5	30	38	6
4.7	C	4.7	47	58	6	2.5	50	63	6
5.6	C	5.6	56	70	6	2.5	50	63	6
6.8	C	6.8	68	85	6	2.5	50	63	6
8.2	D	8.2	82	102	6	-	-	-	-
10	D	10	100	125	6	-	-	-	-
RATED VOLTAGE (+85°C) 125 V - CATEGORY VOLTAGE (+125°C) 80 V									
0.1	A	1	1.2	1.5	6	-	-	-	-
0.12	A	1	1.5	1.8	6	-	-	-	-
0.15	A	1	1.8	2.3	6	-	-	-	-
0.18	A	1	2.2	2.8	6	-	-	-	-
0.22	A	1	2.7	3.4	6	-	-	-	-
0.27	A	1	3.3	4.2	6	-	-	-	-
0.33	A	1	4.1	5.1	6	-	-	-	-
0.39	B	1	4.8	6	6	-	-	-	-
0.47	B	1	5.8	7.3	6	-	-	-	-
0.56	B	1	7	8.7	6	-	-	-	-
0.68	B	1	8.5	10	6	-	-	-	-
0.82	B	1	10	12	6	-	-	-	-
1	B	1.2	12	15	6	-	-	-	-
1.2	B	1.5	15	18	6	-	-	-	-
1.5	B	1.8	18	23	6	-	-	-	-
1.8	B	2.2	22	28	6	-	-	-	-
2.2	B	2.7	27	34	6	-	-	-	-
2.7	C	3.3	33	42	6	-	-	-	-
3.3	C	4.1	41	51	6	-	-	-	-
3.9	C	4.8	48	60	6	-	-	-	-
4.7	C	5.8	58	73	6	-	-	-	-
5.6	C	7	70	87	6	-	-	-	-
6.8	C	8.5	85	106	6	-	-	-	-
8.2	D	10.2	102	128	6	-	-	-	-
10	D	12.5	125	156	6	-	-	-	-

HERMETICALLY SEALED METAL CASES AXIAL LEADS POLARIZED TYPES

DCTS23 / DCTS23M
DCTS33 / DCTS33M

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

	DCTS23	DCTS23M	DCTS33	DCTS33M
Operating temp.	-55°C +125°C	-55°C +125°C	-55°C +125°C	-55°C +125°C
Humidity	56 days	56 days	56 days	56 days
Capacitance range	1 μ F - 1200 μ F	1.2 μ F - 1000 μ F	1.2 μ F - 1000 μ F	1.2 μ F - 1000 μ F
Tolerance	20%...10%	20%...10%	20%...10%	20%...10%
Voltage range	6.3 V...63 V	6.3 V...50 V	6.3 V...50 V	6.3 V...50 V
High surge current	1 million cycles	3 cycles-100%	1 million cycles	3 cycles-100%

MAXIMUM CAPACITANCE CHANGE

-55°C	-10%	-10%	-10%	-10%
+85°C	+12%	+8%	+8%	+8%
+125°C	+15%	+12%	+12%	+12%

MAXIMUM DF

+20°C	see table	see table	see table	see table
-55°C	= lim 20°C	= lim 20°C	= lim 20°C	= lim 20°C
+85°C	= lim 20°C	= lim 20°C	= lim 20°C	= lim 20°C
+125°C	= lim 20°C	= lim 20°C	= lim 20°C	= lim 20°C

MAXIMUM LEAKAGE CURRENT

+20°C	see table	see table	see table	see table
+85°C	0.1 x $C_R U_R$	10 x lim 20°C	0.1 x $C_R U_R$	-
+125°C	0.125 x $C_R U_R$	12.5 x lim 20°C	0.125 x $C_R U_R$	-

MAXIMUM IMPEDANCE

(20°C): case A	10 Ω	10 Ω	10 Ω	10 Ω
(20°C): case B	5 Ω	5 Ω	5 Ω	5 Ω
(20°C): case C	2 Ω	2 Ω	2 Ω	2 Ω
(20°C): case D	1 Ω	1 Ω	1 Ω	1 Ω

MAXIMUM REVERSE VOLTAGE

+20°C	15% U_R	15% U_R	15% U_R	15% U_R
+85°C	5% U_R	5% U_R	5% U_R	5% U_R
+125°C	1% U_R	1% U_R	1% U_R	1% U_R

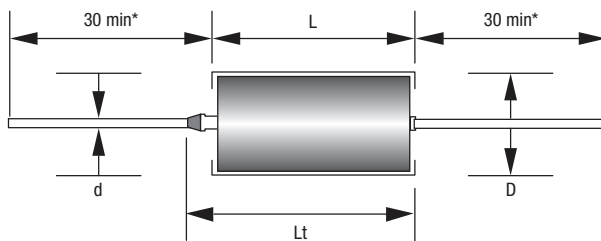
MAXIMUM SURGE VOLTAGE

+85°C	1.3 x U_R	1.3 x U_R	1.3 x U_R	1.3 x U_R
+125°C	1.3 x U_C	1.3 x U_C	1.3 x U_C	1.3 x U_C



DIMENSIONS (in mm)

Case code	Dimensions with insulating sleeve			
	Lt. max	L. max	D. max	d +10% -0.05
A	10.2	8.1	3.6	0.5
B	15.0	12.8	4.9	0.5
C	20.5	18.2	7.5	0.6
D	24.0	20.8	9.1	0.6



(*) 23 mm for capacitors delivered on tape.

MARKING, PACKAGING, CONSTRUCTION: see general characteristics

HERMETICALLY SEALED METAL CASES

AXIAL LEADS – POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DCTS23		DCTS23M		DCTS33		DCTS33M	
Capacitance 100Hz +20°C (µF)	Case Code	Max. Leak. Current +20°C (µA)	Max. DF +20°C (%)	Max. Leak. Current +25°C (µA)	Max. DF +25°C (%)	Max. Leak. Current +20°C (µA)	Max. DF +20°C (%)	Max. Leak. Current +25°C (µA)	Max. DF +25°C (%)
RATED VOLTAGE (+85°C) 6.3 V (6 V FOR DCTS23M / DCTS33M) - CATEGORY VOLTAGE (+125°C) 4 V									
10	A	-	-	0.9	6	-	-	0.5	6
12	A	1	6	1	6	1	6	0.5	6
15	A	1	6	-	-	1	6	-	-
100	B	6.3	8	6	8	1	8	1	8
120	B	7.5	8	-	-	1	8	-	-
330	C	20.8	10	15	8	2	10	2	8
390	C	24.5	10	15	10	2.4	10	2	10
470	C	29.6	10	15	10	2.9	10	2	10
680	D	42.8	10	20	10	4.2	10	5	10
820	D	51.6	10	20	10	5.1	10	5	10
1000	D	63.0	10	30	10	6.3	10	5	10
1200	D	75.6	10	-	-	-	-	-	-
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V									
6.8	A	-	-	1	6	-	-	0.5	6
8.2	A	1	6	1.2	6	1	6	0.5	6
10	A	1	6	-	-	1	6	-	-
47	B	4.7	6	5	6	1	6	1	6
56	B	5.6	6	6	6	1	6	1	6
68	B	6.8	8	7	6	1	8	1	6
82	B	8.2	8	8	6	1	8	1	6
220	C	22	10	15	8	2.2	10	1	8
270	C	27	10	15	8	2.7	10	2	8
390	D	39	10	20	10	3.9	10	2	10
470	D	47	10	20	10	4.7	10	4	10
560	D	56	10	30	10	5.6	10	4	10
RATED VOLTAGE (+85°C) 16 V (15 V FOR DCTS23M / DCTS33M)- CATEGORY VOLTAGE (+125°C) 10 V									
4.7	A	-	-	1	4	-	-	0.5	4
5.6	A	1	6	1.3	4	1	6	0.5	4
6.8	A	1	6	-	-	1	6	-	-
33	B	5.2	6	6	6	1	6	1	6
39	B	6.2	8	6	6	1	8	1	6
150	C	24	10	15	8	2.4	10	1	8
180	C	28.8	10	15	8	2.8	10	2	8
220	D	-	-	20	8	-	-	2	8
270	D	43.2	10	20	8	4.3	10	2	8
330	D	52.8	10	20	8	5.2	10	2	8
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V									
2.7	A	-	-	0.8	4	-	-	0.5	4
3.3	A	-	-	1	4	-	-	0.5	4
3.9	A	1	6	1.2	4	1	6	0.5	4
4.7	A	1	6	-	-	1	6	-	-
18	B	-	-	4	6	-	-	1	6
22	B	-	-	4	6	-	-	1	6
27	B	5.4	6	5	6	1	6	1	6
56	C	-	-	9	6	-	-	1	6
68	C	-	-	10	6	-	-	1	6
82	C	-	-	10	6	-	-	1	6
100	C	20	10	15	6	2	10	1	6
120	C	24	10	15	6	2.4	10	1	6
150	D	-	-	20	8	-	-	2	8
180	D	36	10	20	8	3.6	10	2	8
220	D	44	10	-	-	4.4	10	-	-
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V									
2.2	A	1	6	-	-	1	6	-	-
2.7	A	1	6	-	-	1	6	-	-
3.3	A	1	6	-	-	1	6	-	-
12	B	3	6	-	-	1	6	-	-
15	B	3.7	6	-	-	1	6	-	-
18	B	4.5	6	-	-	1	6	-	-
22	B	5.5	6	-	-	1	6	-	-
56	C	14	8	-	-	1.4	8	-	-
68	C	17	8	-	-	1.7	8	-	-
82	C	20.5	10	-	-	2	10	-	-
100	D	25	10	-	-	2.5	10	-	-
120	D	30	10	-	-	3	10	-	-
150	D	37.5	10	-	-	3.7	10	-	-

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

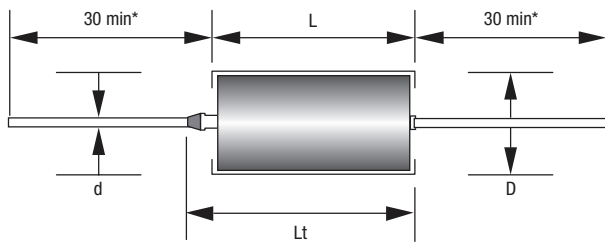
		DCTS23		DCTS23M		DCTS33		DCTS33M	
Capacitance 100Hz +20°C (μF)	Case Code	Max. Leak. Current +20°C (μA)	Max. DF +20°C (%)	Max. Leak. Current +25°C (μA)	Max. DF +25°C (%)	Max. Leak. Current +20°C (μA)	Max. DF +20°C (%)	Max. Leak. Current +25°C (μA)	Max. DF +25°C (%)
RATED VOLTAGE (+85°C) 40 V (35 V FOR DCTS23M / DCTS33M) - CATEGORY VOLTAGE (+125°C) 25 V (23 V FOR DCTS23M / DCTS33M)									
1.2	A	-	-	-	-	1	6	-	-
1.5	A	1	6	-	-	1	6	-	-
1.8	A	1	6	1	4	1	6	0.5	4
8.2	B	3.2	6	3.5	6	1	6	1	6
10	B	4	6	4	6	1	6	1	6
27	C	10.8	8	-	-	1	8	-	-
33	C	13.2	8	10	6	1.3	8	1	6
39	C	15.6	8	10	6	1.5	8	1	6
47	C	18.8	8	10	6	1.8	8	1	6
56	D	22.4	10	15	6	2.2	10	2	6
68	D	27.2	10	15	6	2.7	10	2	6
82	D	32.8	10	-	-	3.2	10	-	-
100	D	40	10	-	-	4	10	-	-
120	D	48	10	-	-	-	-	-	-
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 32 V									
1.2	A	1	6	0.9	4	1	6	0.5	4
1.5	A	1	6	1.2	4	1	6	0.5	4
5.6	B	2.8	6	4.5	4	1	6	1	4
6.8	B	3.4	6	4.5	6	1	6	1	6
22	C	11	8	10	6	1.1	8	1	6
27	C	13.5	8	10	6	1.3	8	1	6
33	D	16.5	8	10	6	1.6	8	1	6
39	D	19.5	8	10	6	1.9	8	1	6
47	D	23.5	10	-	-	-	-	-	-
56	D	28	10	-	-	-	-	-	-
68	D	34	10	-	-	-	-	-	-
RATED VOLTAGE (+85°C) 63 V - CATEGORY VOLTAGE (+125°C) 40 V									
1	A	1	6	-	-	-	-	-	-
4.7	B	2.9	6	-	-	-	-	-	-
5.6	B	3.5	6	-	-	-	-	-	-
15	C	9.4	8	-	-	-	-	-	-
18	C	11.3	8	-	-	-	-	-	-
22	C	13.8	8	-	-	-	-	-	-
27	D	17	8	-	-	-	-	-	-
33	D	20.8	10	-	-	-	-	-	-
39	D	24.5	10	-	-	-	-	-	-
47	D	29.6	10	-	-	-	-	-	-

HERMETICALLY SEALED METAL CASES AXIAL LEADS – POLARIZED TYPES



DIMENSIONS (in mm)

Case code	Dimensions with insulating sleeve			
	Lt. max	L. max	D. max	d +10% -0.05
C	20.5	18.2	7.5	0.6
D	24.0	20.8	9.1	0.6



(*) 23 mm for capacitors delivered on tape.

MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

	DCTS21	DCTS21M	DCTS21E
Operating temp.	-55°C +125°C	-55°C +125°C	-55°C +125°C
Humidity	56 days	56 days	56 days
Capacitance range	5.6 μ F - 330 μ F	5.6 μ F - 330 μ F	22 μ F - 1000 μ F
Tolerance	20%...10%	20%...10%	20%...10%
Voltage range	6.3 V...50 V	6.3 V...50 V	6.3 V...50 V
High surge current	1 million cycles	3 cycles-100%	1 million cycles
MAXIMUM CAPACITANCE CHANGE			
-55°C	-10%	-10%	-10%
+85°C	+8%	+8%	+8%
+125°C	+12%	+12%	+12%
MAXIMUM DF			
+20°C	see table	see table	see table
-55°C	= 2 x lim 20°C	= 2 x lim 20°C	= 2 x lim 20°C
+85°C	= 1.5 x lim 20°C	= 1.5 x lim 20°C	= 1.5 x lim 20°C
+125°C	= 1.5 x lim 20°C	= 1.5 x lim 20°C	= 1.5 x lim 20°C
MAXIMUM LEAKAGE CURRENT			
+20°C	see table	see table	see table
+85°C	0.1 x $C_R U_R$	20 x lim 20°C	0.1 x $C_R U_R$
+125°C	0.125 x $C_R U_R$	25 x lim 20°C	0.125 x $C_R U_R$
MAXIMUM ESR			
+20°C (100kHz)	see table	see table	see table
MAXIMUM RIPPLE CURRENT			
+20°C (1kHz)	see table	see table	see table
+20°C (100kHz)	see table	see table	see table
MAXIMUM REVERSE VOLTAGE			
+20°C	15% U_R	15% U_R	15% U_R
+85°C	5% U_R	5% U_R	5% U_R
+125°C	1% U_R	1% U_R	1% U_R
MAXIMUM SURGE VOLTAGE			
+85°C	1.3 x U_R	1.3 x U_R	1.3 x U_R
+125°C	1.3 x U_C	1.3 x U_C	1.3 x U_C

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DCTS21					DCTS21M				
Capacitance 100Hz +20°C (μF)	Case Code	Max. Leak. Current +20°C (μA)	Max. DF 1 kHz +20°C (%)	Max. ESR 100kHz +20°C (mΩ)	Max. I rms 1kHz +20°C (A)	Max. I rms 100kHz +20°C (A)	Max. Leak. Current +25°C (μA)	Max. DF +25°C (%)	Max. ESR 100kHz +25°C (mΩ)	Max. I rms 1kHz +25°C (A)	Max. I rms 100kHz +25°C (A)
RATED VOLTAGE (+85°C) 6.3 V (6 V FOR DCTS21M) - CATEGORY VOLTAGE (+125°C) 4 V											
120	C	7.6	8	70	2.5	3.2	-	-	-	-	-
150	C	9.4	10	65	2	3.3	4.5	10	65	2	3.3
180	C	-	-	-	-	-	5.5	10	60	2.4	3.4
270	D	17	10	50	3.4	4.1	6.5	10	50	3.4	4.1
330	D	20.8	12	45	3.8	4.3	7.5	12	45	3.8	4.3
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V											
82	C	8.2	8	85	1.8	2.9	4	8	85	1.8	2.9
100	C	10	8	75	2.2	3	5	8	75	2.2	3
120	C	-	-	-	-	-	6	8	70	2.5	3.2
180	D	18	8	60	3.4	3.7	9	8	60	3.4	3.7
220	D	22	10	55	3.4	3.9	10	10	55	3.4	3.9
RATED VOLTAGE (+85°C) 16 V (15 V FOR DCTS21M) - CATEGORY VOLTAGE (+125°C) 10 V											
56	C	8.9	6	100	1.8	2.6	4	6	100	1.8	2.6
68	C	10.8	6	95	2.2	2.7	5	6	95	2.2	2.7
120	D	19.2	8	70	2.8	3.5	9	8	70	2.8	3.5
150	D	24	8	65	3.1	3.6	10	8	65	3.1	3.6
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V											
27	C	-	-	-	-	-	2.5	5	145	1.2	2.2
33	C	-	-	-	-	-	3.5	5	130	1.4	2.3
39	C	7.8	5	120	1.7	2.4	4	5	120	1.7	2.4
47	C	9.4	6	110	1.8	2.5	4.5	6	110	1.8	2.5
56	D	-	-	-	-	-	5.5	6	100	2.2	2.9
68	D	-	-	-	-	-	7	6	95	2.4	3
82	D	16.4	6	85	2.5	3.1	8	6	85	2.5	3.1
100	D	20	8	75	2.5	3.3	10	8	75	2.5	3.3
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V											
27	C	6.7	5	145	1.2	2.2	-	-	-	-	-
33	C	8.2	5	130	1.4	2.3	-	-	-	-	-
56	D	14	6	100	2.2	2.9	-	-	-	-	-
68	D	17	6	95	2.4	3	-	-	-	-	-
RATED VOLTAGE (+85°C) 35 V (or 40V) (35 V FOR DCTS21M) - CATEGORY VOLTAGE (+125°C) 23 V (or 25 V)											
22	C	7.7	4	160	1.5	2.1	4	4	160	1.5	2.1
27	D	9.5	4	145	1.9	2.4	4.5	4	145	1.9	2.4
33	D	11.6	5	130	1.9	2.5	5.5	5	130	1.9	2.5
39	D	13.7	5	120	2	2.6	7	5	120	2	2.6
47	D	16.5	5	110	2.2	2.7	8	5	110	2.2	2.7
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 32 V											
5.6	C	2.8	3	300	0.6	1.5	2.2	3	300	0.6	1.5
6.8	C	3.4	3	275	0.7	1.6	2.2	3	275	0.7	1.6
8.2	C	4.1	3	250	0.9	1.6	2.5	3	250	0.9	1.6
10	C	5	3	230	1.1	1.7	2.5	3	230	1.1	1.7
12	C	6	3	210	1.3	1.8	3	3	210	1.3	1.8
15	C	7.5	3	190	1.4	1.9	4	3	190	1.4	1.9
18	C	9	4	175	1.4	2.0	4.5	4	175	1.4	2.0
22	D	11	4	160	1.7	2.3	5.5	4	160	1.7	2.3

HERMETICALLY SEALED METAL CASES
AXIAL LEADS – POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

DCTS21E						
Capacitance 100Hz +20°C (µF)	Case Code	Max. Leak. Current +20°C (µA)	Max. DF 1 kHz +20°C (%)	Max. ESR 100kHz +20°C (mΩ)	Max. I rms 1kHz +20°C (A)	Max. I rms 100kHz +20°C (A)
RATED VOLTAGE (+85°C) 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V						
330	C	20.8	12	45	2.4	3.9
390	C	24.6	12	40	2.6	4.1
470	C	29.6	14	40	2.6	4.2
680	D	42.8	18	35	4.0	5.2
820	D	51.7	18	30	4.0	5.2
1000	D	63	22	30	4.1	5.7
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V						
220	C	22	10	55	2.2	3.6
270	C	27	10	50	2.4	3.7
390	D	39	12	40	3.8	4.5
470	D	47	14	40	3.8	4.5
560	D	56	14	35	3.9	4.8
RATED VOLTAGE (+85°C) 16 V - CATEGORY VOLTAGE (+125°C) 10 V						
150	C	24	10	65	2.0	3.3
180	C	28.8	10	60	2.4	3.4
270	D	43.2	10	50	3.4	4.1
330	D	52.8	12	45	3.8	4.3
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V						
100	C	20	8	75	2.2	3.0
120	C	24	8	70	2.5	3.2
180	D	36	10	60	3.4	3.7
220	D	44	10	55	3.4	3.9
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V						
56	C	14	6	100	1.8	2.6
68	C	17	6	95	2.2	2.7
82	C	20.5	6	85	2.2	2.9
150	D	37.5	10	65	2.8	3.6
RATED VOLTAGE (+85°C) 35 V (or 40 V) - CATEGORY VOLTAGE (+125°C) 23 V (or 25 V)						
33	C	11.5	5	130	1.4	2.3
39	C	13.6	5	120	1.7	2.4
47	C	16.4	6	110	1.8	2.5
56	D	19.6	6	100	2.2	2.9
68	D	23.8	6	95	2.4	3.0
82	D	28.7	6	85	2.5	3.1
100	D	35	8	75	2.5	3.3
120	D	42	8	70	2.8	3.5
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 32 V						
22	C	11	4	160	1.5	2.1
27	C	13.5	5	145	1.5	2.2
33	D	16.5	5	130	1.9	2.5
39	D	19.5	5	120	2.0	2.6
47	D	23.5	6	110	2.2	2.7
56	D	28	6	100	2.2	2.9
68	D	34	6	95	2.4	3.0
RATED VOLTAGE (+85°C) 63 V - CATEGORY VOLTAGE (+125°C) 40 V						
47	D	29.6	10	110	2.2	2.7

MOLDED CASES SMD – SURFACE MOUNT POLARIZED TYPES



SOLID TANTALUM
CAPACITORS

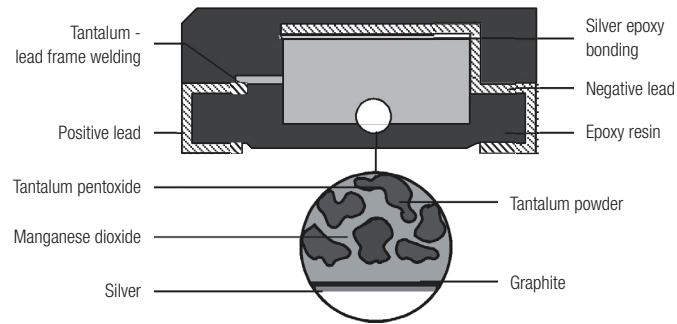
MOLDED CASES SMD – SURFACE MOUNT POLARIZED TYPES

Applicable for types:

General purpose: DTC1, DTC3, DTC3E, DTC23, DTCR

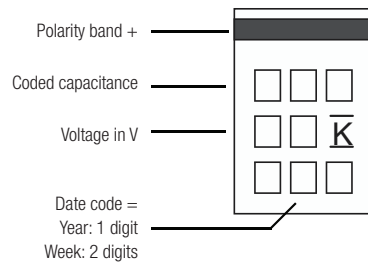
Power supplies and converters: DTC21, DTC21E, DTC42, DTC42E, DTC4, DTC4S ESR

CONSTRUCTION



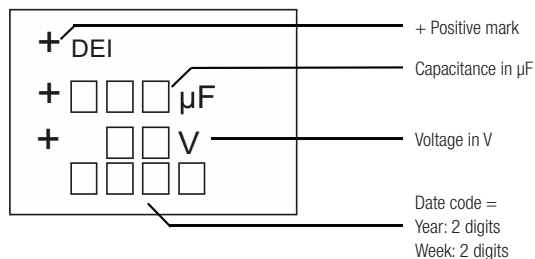
MARKING

DTC3 - DTC3E - DTC4 - DTC4 ESR



Note: K indicates +/-10%

DTC21 - DTC21E - DTC42 - DTC42E - DTC23



PACKAGING

DTC3, DTC3E, DTC4, DTC4 ESR:

On tape (see next page)

DTC21, DTC21E, DTC23, DTC42, DTC42E:

Boxes or plastic bags, on tape (see data sheet DTC21)

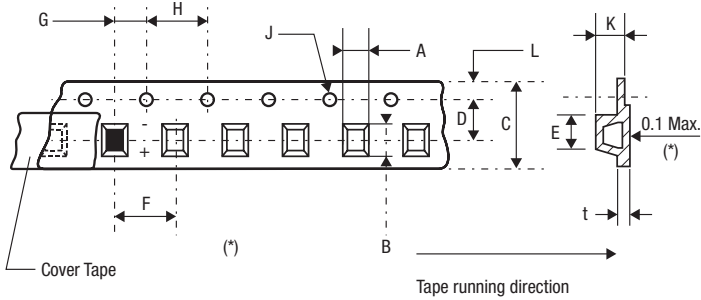
CAPACITANCE CODING

Code	C in μF	Code	C in μF
104	0.1	685	6.8
154	0.15	106	10
224	0.22	156	15
334	0.33	226	22
474	0.47	336	33
684	0.68	476	47
105	1.0	686	68
155	1.5	107	100
225	2.2	157	150
335	3.3	-	-
475	4.7	108	1000

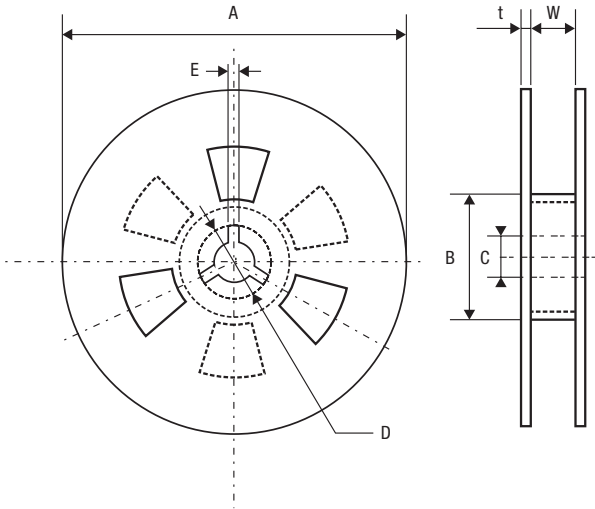
TAPING: DIMENSIONS

TAPING FOR DCTC3 - DCTC3E - DCTC4

DIMENSIONS



REEL SIZES (in mm)



A = 178 ± 2.0
B = 50 min.
C = 13 ± 0.5
D = 21.0 ± 0.8
E = 2.0 ± 0.5
W = 10.0 ± 1.5 (for sizes) A, B
W = 14.0 ± 1.5 (for sizes) C, D
t = 3.0 max.

Semitransparent emboss plastic tape.
Polyester cover tape.

TAPE DIMENSIONS (in mm)

Case Code	Size A	Size B	Size C	Size D
A	2.3 ± 0.2	3.3 ± 0.2	3.6 ± 0.2	4.7 ± 0.2
B	4.2 ± 0.2	3.8 ± 0.2	6.4 ± 0.2	7.7 ± 0.2
C	8.0 ± 0.3	8.0 ± 0.3	12 ± 0.3	12 ± 0.3
D	3.5 ± 0.1	3.5 ± 0.05	5.5 ± 0.1	5.5 ± 0.1
E	5.0 max.	5.0 max.	8.4 max.	8.4 max.
F	4.0 ± 0.1	4.0 ± 0.1	8.0 ± 0.1	8.0 ± 0.1
G	2.0 ± 0.1			
H	4.0 ± 0.1			
J	(Dia.) 1.5 +0.1 -0			
t	0.4 max.			
K	2.4 max.	2.4 max.	4.5 max.	4.5 max.
L	1.75 +0.15 -0.40			

Quantity per reel:
(Sizes) A, B = 2000 max.
(Sizes) C, D = 500 max.

MOLDED CASES SMD – SURFACE MOUNT POLARIZED TYPES

SOLDERING: PREFERRED CONDITIONS

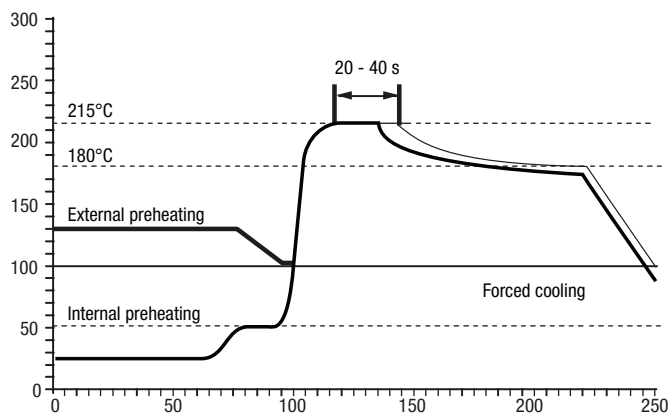
**DCTC21, DCTC21E, DCTC3, DCTC4, DCTC3E, DCTC4 ESR,
DCTC23, DCTC42, DCTC42E, DCTC1, DTCR types:**

Vapor phase or infrared (see temperature profiles below) and soldering iron.

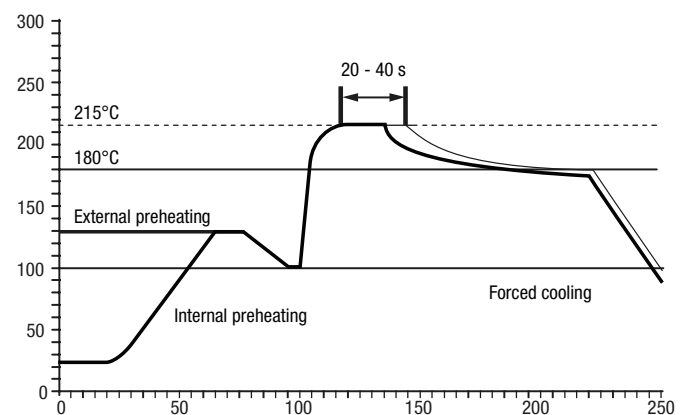
DCTC3, DCTC4, DCTC3E, DCTC4 ESR:

Double-Wave-Soldering (see temperature profiles below).

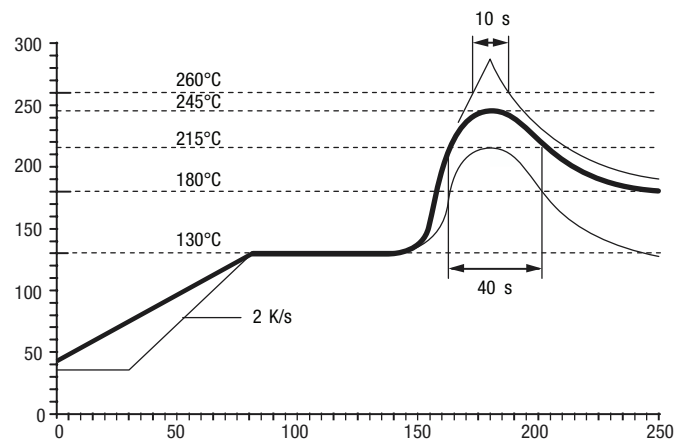
VAPOR PHASE SOLDERING, BATCH SYSTEM WITH PREHEATING



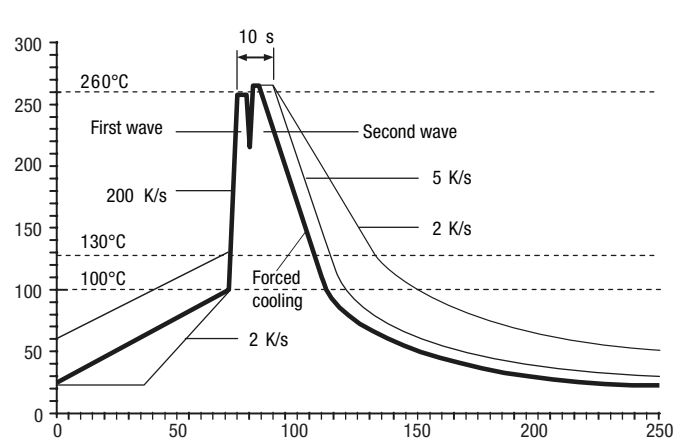
VAPOR PHASE SOLDERING, IN-LINE SYSTEM WITH PREHEATING



INFRARED SOLDERING



DOUBLE-WAVE-SOLDERING



Bold line: preferred temperature / time profile

Fine line: temperature / time profile limit

ATTENTION

For models DCTC21, DCTC21E, DCTC23, DCTC42 and DCTC42E, for which the nominal voltage (U_r) is ≥ 40 volts; due to their substantial volume and the thermo-mechanical constraints brought about during the soldering of circuits by the method "infrared forced convection", it is highly recommended to solder manually using a soldering iron. Numerous experiments demonstrate that this solution although difficult to control gives very good results compared with the above-mentioned automated method.

For soldering ovens using "infrared forced convection", their mode of operation depends on the coefficient of absorption of the surface of the material and the thermal mass of the various components subjected to the infrared radiation. The temperature of the various components under these conditions is not easily managed or controlled during the passage through the oven. For some components, temperatures within the components were found to be above 15°C higher than the external temperatures.

The parameters which affect the temperature of components are:

- Time and power
- Mass of the component
- Size of the component
- Dimension of the circuit
- Coefficient of absorption of the surfaces
- Density of components
- Wavelength of radiation of the source
- Relation between energy of radiation and energy of convection

The standard profile of this process is given on the previous page.

A period of pre-heating is necessary to allow the evacuation of solvents contained in solder flux before starting the flux "wetting".

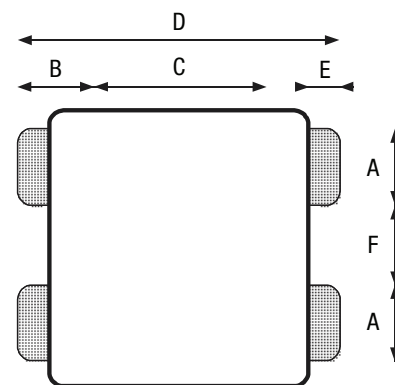
RECOMMENDATIONS:

- Pre-heat the board (to eliminate any residual moisture) before the application of the solder flux. 4 hours minimum at +70 °C.
- For double-sided boards, do not clean after the first passage. This results in a higher level of humidity which could affect the quality of the soldering during the second passage.
- A minimum solder joint is preferable. The solder does not have to run too high up the connections.
- Good solder joints are achieved with connections having a good solderability (check the angle of wetting).
- The mechanical adhesion of the component on the board is best assured when the connecting pad is directly in contact with the board.

RECOMMENDED MOUNTING PAD GEOMETRY

DCTC21, DCTC21E, DCTC23, DCTC42, DCTC42E

VAPOR PHASE OR INFRARED SOLDERING (in mm)

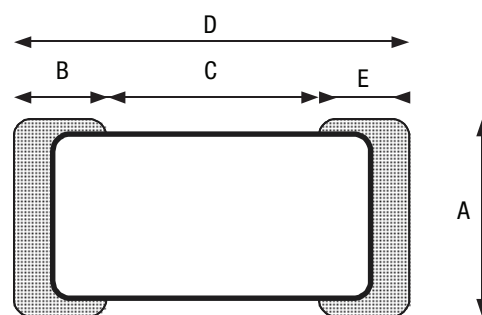


Case code	A (min.)	B (nom)	C (nom)	D (nom)	E (nom)	F (nom)
C	2.6	3.3	7.6	14.2	1.35	2.3
D	3.6	3.3	7.6	14.2	1.35	3.8

RECOMMENDED MOUNTING PAD GEOMETRY

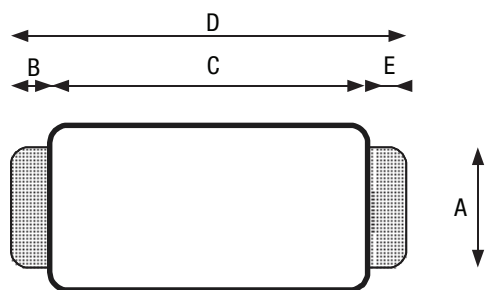
DCTC3, DCTC3E, DCTC3 LOW PROFILE, DCTC4, DCTC4 ESR

VAPOR PHASE OR INFRARED SOLDERING (in mm)



Case code	A (min.)	B (nom)	C (nom)	D (nom)	E (nom)
A	1.80	2.15	1.35	5.65	1.23
B	2.80	2.15	1.65	5.95	1.23
C	2.80	2.70	3.15	8.55	1.28
V/D/E	3.00	2.70	4.45	9.85	1.28

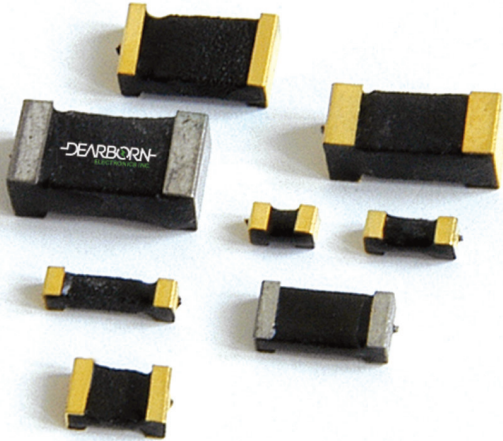
MOLDED CASES SMD – SURFACE MOUNT
POLARIZED TYPES



Case code	A (min.)	B (nom)	C (nom)	D (nom)	E (nom)
A	0.87	2.15	1.35	5.65	1.23
B	1.54	2.15	1.65	5.95	1.23
C	1.54	2.70	3.15	8.55	1.28
V/D/E	1.68	2.70	4.45	9.85	1.28

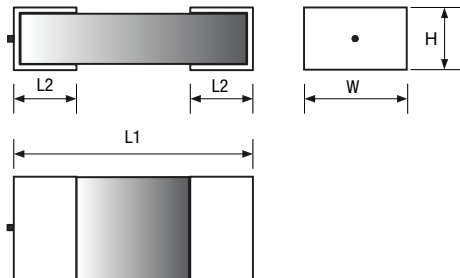
SMD – SURFACE MOUNT
POLARIZED TYPES

DCTC1



DIMENSIONS (in mm)

Case code	IEC L1 x W	L1 ±0.4	W ±0.4	H ±0.4	L2 ±0.15
A	10.05	2.54	1.27	1.27	0.76
B	15.05	3.81	1.27	1.27	0.76
C	20.05	5.08	1.27	1.27	0.76
D	15.10	3.81	2.54	1.27	0.76
E	20.10	5.08	2.54	1.27	0.76
F	22.13	5.59	3.43	1.78	0.76
G	26.11	6.73	2.79	2.79	1.27
H	28.15	7.24	3.81	2.79	1.27



Polarity indication is given by anode tantalum wire protruding in the center of the positive end cap.
Terminal max. length: 0.38 mm

MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

	DCTC1
Operating temperature	-55°C +125°C
Humidity	56 days
Capacitance range	0.1 µF - 100 µF
Tolerance	20%...10%
Voltage range	4 V...50 V
High surge current	no
MAXIMUM CAPACITANCE CHANGE	
-55°C	-12%
+85°C	+10%
+125°C	+15%
MAXIMUM DF	
+20°C	see table
-55°C	see table
+85°C	see table
+125°C	see table
MAXIMUM LEAKAGE CURRENT	
+20°C	see table
+85°C	see table
+125°C	see table
MAXIMUM ESR	
+20°C (100kHz)	-
MAXIMUM REVERSE VOLTAGE	
+20°C	15% U _R
+85°C	5% U _R
+125°C	1% U _R
MAXIMUM SURGE VOLTAGE	
+85°C	1.3 x U _R
+125°C	1.3 x U _C

SMD – SURFACE MOUNT POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DCTC1				
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Leakage Current		Maximum DF 100Hz		
		+20°C (μA)	+85°C (μA) / +125°C (μA)*	+20°C (%)	-55°C / +85°C (%)	+125°C (%)
RATED VOLTAGE (+85°C) 4 V - CATEGORY VOLTAGE (+125°C) 2.5 V						
2.2	A	1.0	1.0	8	15	15
4.7	B	1.0	1.9	8	15	15
6.8	C	1.0	2.7	8	15	15
10	D	1.0	4.0	8	15	15
15	E	1.0	6.0	8	15	15
33	F	1.3	13.2	8	15	15
68	G	2.7	27.2	8	15	15
100	H	4.0	40.0	8	15	15
RATED VOLTAGE (+85°C) 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V						
1.5	A	1.0	1.0	8	15	15
3.3	B	1.0	2.1	8	15	15
4.7	C	1.0	3.0	8	15	15
6.8	D	1.0	4.3	8	15	15
10	E	1.0	6.3	8	15	15
22	F	1.4	13.9	8	15	15
47	G	3.0	29.6	8	15	15
68	H	4.3	42.8	8	15	15
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V						
1	A	1.0	1.0	6	12	15
2.2	B	1.0	2.2	6	12	15
3.3	C	1.0	3.3	6	12	15
4.7	D	1.0	4.7	6	12	15
6.8	E	1.0	6.8	6	12	15
15	F	1.5	15.0	6	12	15
33	G	3.3	33.0	6	12	15
47	H	4.7	47.0	6	12	15
RATED VOLTAGE (+85°C) 16 V - CATEGORY VOLTAGE (+125°C) 10 V						
0.68	A	1.0	1.1	6	12	15
1.5	B	1.0	2.4	6	12	15
2.2	C	1.0	3.5	6	12	15
3.3	D	1.0	5.3	6	12	15
4.7	E	1.0	7.5	6	12	15
10	F	1.6	16.0	6	12	15
22	G	3.5	35.2	6	12	15
33	H	5.3	52.8	6	12	15
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V						
0.47	A	1.0	1.0	6	12	15
1	B	1.0	2.0	6	12	15
1.5	C	1.0	3.0	6	12	15
2.2	D	1.0	4.4	6	12	15
3.3	E	1.0	6.6	6	12	15
6.8	F	1.4	13.6	6	12	15
15	G	3.0	30.0	6	12	15
22	H	4.4	44.0	6	12	15
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V						
0.33	A	1.0	1.0	6	12	15
0.68	B	1.0	1.7	6	12	15
1	C	1.0	2.5	6	12	15
1.5	D	1.0	3.8	6	12	15
2.2	E	1.0	5.5	6	12	15
4.7	F	1.2	11.8	6	12	15
6.8	G	1.7	17.0	6	12	15
10	G	2.5	25.0	6	12	15
15	H	3.8	37.5	6	12	15
RATED VOLTAGE (+85°C) 40 V - CATEGORY VOLTAGE (+125°C) 25 V						
0.22	A	1.0	1.0	6	12	15
0.47	B	1.0	1.9	6	12	15
0.68	C	1.0	2.7	6	12	15
1	D	1.0	4.0	6	12	15
1.5	E	1.0	6.0	6	12	15
3.3	F	1.3	13.2	6	12	15
4.7	G	1.9	18.8	6	12	15
6.8	H	2.7	27.2	6	12	15
10	H	4.0	40.0	6	12	15

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DCTC1				
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Leakage Current		Maximum DF		
		+20°C (μA)	+85°C (μA) / +125°C (μA)*	+20°C (%)	-55°C / +85°C (%)	+125°C (%)
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 32 V						
0.1	A	1.0	1.0	6	12	15
0.15	A	1.0	1.0	6	12	15
0.22	B	1.0	1.1	6	12	15
0.33	B	1.0	1.7	6	12	15
0.47	C	1.0	2.4	6	12	15
0.68	D	1.0	3.4	6	12	15
1	E	1.0	5.0	6	12	15
1.5	F	1.0	7.5	6	12	15
2.2	F	1.1	11.0	6	12	15
3.3	G	1.7	16.5	6	12	15
4.7	H	2.4	23.5	6	12	15

* Measured with category voltage U_c @ +125°C.

TERMINATIONS

Terminations are made of Nickel, nickel plated, on which four plating finishes may be achieved:

STANDARD TERMINATION:

G: Gold plating for standard epoxy bonding & soldering paste

UPON REQUEST:

G+: Additional gold plating for ball-bonding or ultrasonic bonding

T: Tinning electrolytic (90% Sn - 10% Pb)

F: Tinning electrolytic (100% Sn)

PACKING

Standard: Bulk

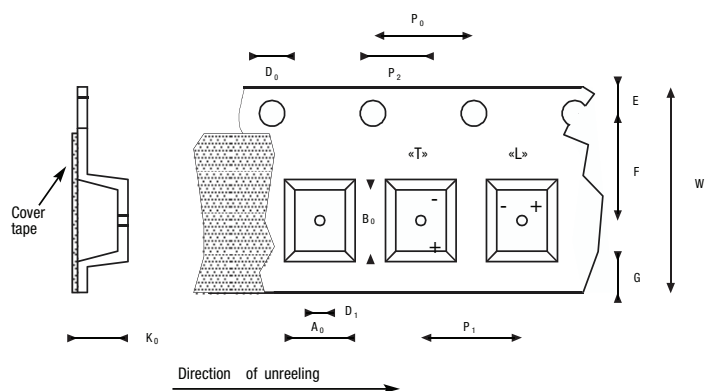
Optional: Tape & reel

When ordering add the suffix "R" just after the termination code.

HOW TO ORDER

Ex.: DCTC1E 1μF 10% 50V G R

TAPE AND REEL PACKAGING (PER IEC 286-3)



TAPE DIMENSIONS (in mm)

W ± 0.3	E ± 0.1	F ± 0.05	P ₀ ± 0.1	D ₀ +0.1 -0	D ₁ ± 0.1	G min.	P ₁ ± 0.1	P ₂ ± 0.05
8.0	1.75	3.5	4.0	1.5	1.0	0.75	4/8	2.0
12.0	1.75	5.5	4.0	1.5	1.5	0.75	8.0	2.0
16.0	1.75	7.5	4.0	1.5	2.0	0.75	8.0	2.0

Notes: A₀ B₀ K₀ are defined by component size.

Reel diameter: 180 mm (nominal).

Diameter of central hole: 12.8 mm.

TAPE WIDTH, MAXIMUM PER REEL, COMPONENTS POSITION AND PITCH (P₁)

Case code	Tape width (mm)	Quantity per Reel	Position	Pitch P ₁ (mm)
A	8.0	2800	T	4.0
B	8.0	1400	L	8.0
C	8.0	1400	L	8.0
D	8.0	1400	L	8.0
E	8.0	1400	L	8.0
F	12.0	1000	T	8.0
G	16.0	600	T	8.0
H	16.0	600	T	8.0

Note: the minimum quantity per reel is 50% of the above mentioned one.

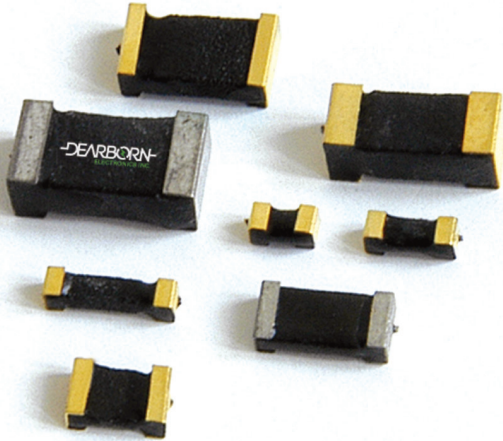
COMPONENT POSITION

T = Transversal (+ termination away from the sprocket hole)

L = Longitudinal (+ termination in the direction of unreeling)

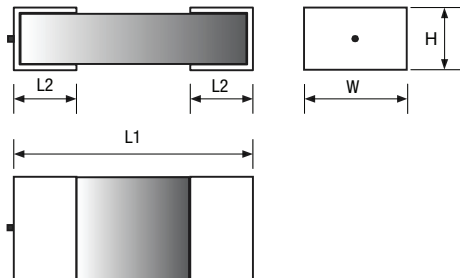
SMD – SURFACE MOUNT POLARIZED TYPES

DTCR – LOW ESR



DIMENSIONS (in mm)

Case code	IEC L1 x W	L1 ±0.4	W ±0.4	H ±0.4	L2 ±0.15
A	10.05	2.54	1.27	1.27	0.76
B	15.05	3.81	1.27	1.27	0.76
C	20.05	5.08	1.27	1.27	0.76
D	15.10	3.81	2.54	1.27	0.76
E	20.10	5.08	2.54	1.27	0.76
F	22.13	5.59	3.43	1.78	0.76
G	26.11	6.73	2.79	2.79	1.27
H	28.15	7.24	3.81	2.79	1.27



Polarity indication is given by anode tantalum wire protruding in the center of the positive end cap.
Terminal Max. length: 0.38 mm

MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

	DTCR – LOW ESR
Operating temperature	-55°C +125°C
Humidity	56 days
Capacitance range	0.1 µF - 100 µF
Tolerance	20%...10%...5%
Voltage range	4 V...50 V
High surge current	optional 100%-10 cycles
MAXIMUM CAPACITANCE CHANGE	
-55°C	-10%
+85°C	+10%
+125°C	+15%
MAXIMUM DF	
+20°C	see table
-55°C	see table
+85°C	see table
+125°C	see table
MAXIMUM LEAKAGE CURRENT	
+20°C	see table
+85°C	see table
+125°C	see table
MAXIMUM ESR	
+20°C (100kHz)	see table
MAXIMUM REVERSE VOLTAGE	
+20°C	15% U _R
+85°C	5% U _R
+125°C	1% U _R
MAXIMUM SURGE VOLTAGE	
+85°C	1.3 x U _R
+125°C	1.3 x U _C

SMD – SURFACE MOUNT POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DTCR - LOW ESR						
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Leakage Current			Maximum DF 100Hz			Max. ESR 100kHz +20°C (Ω)
		+20°C (μA)	+85°C (μA)	+125°C (μA)*	+20°C (%)	-55°C (%)	+85°C / +125°C (%)	
RATED VOLTAGE (+85°C) 4 V - CATEGORY VOLTAGE (+125°C) 2.7 V								
2.2	A	1.0	10.0	12.0	6	8	8	8.0
4.7	B	1.0	10.0	12.0	6	8	8	8.0
6.8	C	1.0	10.0	12.0	6	8	8	5.5
10	D	1.0	10.0	12.0	8	10	8	4.0
15	E	1.0	10.0	12.0	8	12	10	3.5
33	F	2.0	20.0	24.0	8	12	10	2.2
68	G	3.0	30.0	36.0	10	12	12	1.1
100	H	4.0	40.0	48.0	10	12	12	0.9
RATED VOLTAGE (+85°C) 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V								
1.5	A	1.0	10.0	12.0	6	8	8	8.0
3.3	B	1.0	10.0	12.0	6	8	8	8.0
4.7	C	1.0	10.0	12.0	6	8	8	5.5
6.8	D	1.0	10.0	12.0	6	8	8	4.5
10	E	1.0	10.0	12.0	8	12	10	3.5
22	F	2.0	20.0	24.0	8	12	10	2.2
47	G	3.0	30.0	36.0	10	12	12	1.1
68	H	4.0	40.0	48.0	10	12	12	0.9
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6 V								
1	A	1.0	10.0	12.0	6	8	8	12.0
2.2	B	1.0	10.0	12.0	6	8	8	8.0
3.3	C	1.0	10.0	12.0	6	8	8	5.5
4.7	D	1.0	10.0	12.0	6	8	8	4.5
6.8	E	1.0	10.0	12.0	6	8	8	3.5
15	F	2.0	20.0	24.0	8	10	8	2.5
33	G	3.0	30.0	36.0	10	12	12	1.1
47	H	5.0	50.0	60.0	10	12	12	0.9
RATED VOLTAGE (+85°C) 15 V - CATEGORY VOLTAGE (+125°C) 10 V								
0.68	A	1.0	10.0	12.0	6	8	8	12.0
1.5	B	1.0	10.0	12.0	6	8	8	8.0
2.2	C	1.0	10.0	12.0	6	8	8	5.5
3.3	D	1.0	10.0	12.0	6	8	8	5.0
4.7	E	1.0	10.0	12.0	6	8	8	4.0
10	F	2.0	20.0	24.0	6	8	8	2.5
22	G	4.0	40.0	48.0	6	8	8	1.1
33	H	5.0	50.0	60.0	8	10	8	0.9
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V								
0.47	A	1.0	10.0	12.0	8	10	8	16.0
0.68	B	1.0	10.0	12.0	6	8	8	14.0
1	B	1.0	10.0	12.0	6	8	8	12.0
1.5	C	1.0	10.0	12.0	6	8	8	6.0
2.2	D	1.0	10.0	12.0	6	8	8	5.0
3.3	E	1.0	10.0	12.0	6	8	8	4.0
6.8	F	2.0	20.0	24.0	6	8	8	2.4
15	G	3.0	30.0	36.0	6	8	8	1.1
22	H	4.0	40.0	48.0	6	8	8	0.9
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 17 V								
0.33	A	1.0	10.0	12.0	6	8	8	15.0
0.68	B	1.0	10.0	12.0	6	8	8	10.0
1	C	1.0	10.0	12.0	6	8	8	6.5
1.5	D	1.0	10.0	12.0	6	8	8	6.5
2.2	E	1.0	10.0	12.0	6	8	8	3.5
4.7	F	2.0	20.0	24.0	6	8	8	2.5
6.8	G	2.0	20.0	24.0	6	8	8	1.2
10	G	3.0	30.0	36.0	6	8	8	1.4
15	H	4.0	40.0	48.0	6	8	8	1.0
RATED VOLTAGE (+85°C) 35 V - CATEGORY VOLTAGE (+125°C) 23 V								
0.22	A	1.0	10.0	12.0	6	8	8	24.0
0.47	B	1.0	10.0	12.0	6	8	8	17.0
0.68	C	1.0	10.0	12.0	6	8	8	10.0
1	D	1.0	10.0	12.0	6	8	8	6.5
1.5	E	1.0	10.0	12.0	6	8	8	4.5
3.3	F	1.0	10.0	12.0	6	8	8	2.5
4.7	G	2.0	20.0	24.0	6	8	8	1.5
6.8	H	3.0	30.0	36.0	6	8	8	1.3

STANDARD RATINGS - ELECTRICAL CHARACTERISTICS

		DTCR - LOW ESR						
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Leakage Current			Maximum DF 100Hz			Max. ESR 100kHz +20°C (Ω)
		+20°C (μA)	+85°C (μA)	+125°C (μA)*	+20°C (%)	-55°C (%)	+85°C / +125°C (%)	
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 33 V								
0.1	A	1.0	10.0	12.0	6	8	8	75.0
0.15	A	1.0	10.0	12.0	6	8	8	25.0
0.22	B	1.0	10.0	12.0	6	8	8	17.0
0.33	B	1.0	10.0	12.0	6	8	8	12.0
0.47	C	1.0	10.0	12.0	6	8	8	8.0
0.68	D	1.0	10.0	12.0	6	8	8	7.0
1	E	1.0	10.0	12.0	6	8	8	6.0
1.5	F	1.0	10.0	12.0	6	8	8	4.0
2.2	F	2.0	20.0	24.0	6	8	8	2.5
3.3	G	2.0	20.0	24.0	6	8	8	2.0
4.7	H	3.0	30.0	36.0	6	8	8	1.5

* Measured with category voltage U_c @ +125°C

TERMINATIONS

Terminations are made of Nickel, nickel plated, on which four plating finishes may be achieved:

STANDARD TERMINATION:

G: Gold plating for standard epoxy bonding & soldering paste

UPON REQUEST:

G+: Additional gold plating for ball-bonding or ultrasonic bonding

T: Tinning electrolytic (90% Sn - 10% Pb)

F: Tinning electrolytic (100% Sn)

PACKING

Standard: Bulk

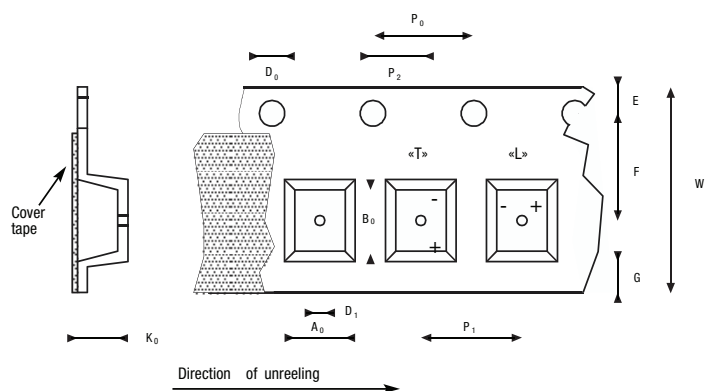
Optional: Tape & reel

When ordering add the suffix "R" just after the termination code.

HOW TO ORDER

Ex.: DTCR E 1 μF 10% 50 V G R

TAPE AND REEL PACKAGING (PER IEC 286-3)



TAPE DIMENSIONS (in mm)

W ± 0.3	E ± 0.1	F ± 0.05	P ₀ ± 0.1	D ₀ +0.1 -0	D ₁ ± 0.1	G min.	P ₁ ± 0.1	P ₂ ± 0.05
8.0	1.75	3.5	4.0	1.5	1.0	0.75	4/8	2.0
12.0	1.75	5.5	4.0	1.5	1.5	0.75	8.0	2.0
16.0	1.75	7.5	4.0	1.5	2.0	0.75	8.0	2.0

Notes: A₀ B₀ K₀ are defined by component size
 Reel diameter: 180 mm (nominal)
 Diameter of central hole: 12.8 mm

TAPE WIDTH, MAXIMUM PER REEL, COMPONENTS POSITION AND PITCH (P₁)

Case code	Tape width (mm)	Quantity per Reel	Position	Pitch P ₁ (mm)
A	8.0	2800	T	4.0
B	8.0	1400	L	8.0
C	8.0	1400	L	8.0
D	8.0	1400	L	8.0
E	8.0	1400	L	8.0
F	12.0	1000	T	8.0
G	16.0	600	T	8.0
H	16.0	600	T	8.0

Note:

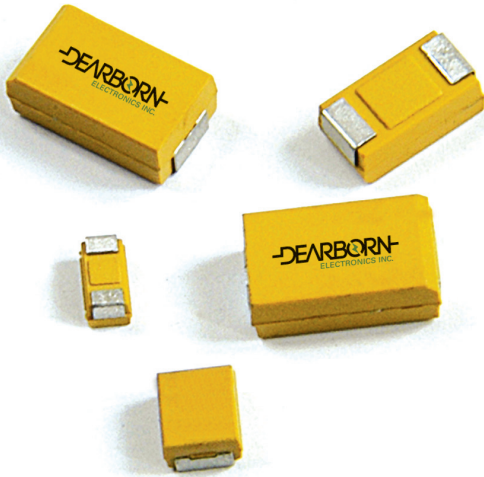
The minimum quantity per reel is 50% of the above mentioned one.

COMPONENT POSITION

T = Transversal (+ termination away from the sprocket hole)

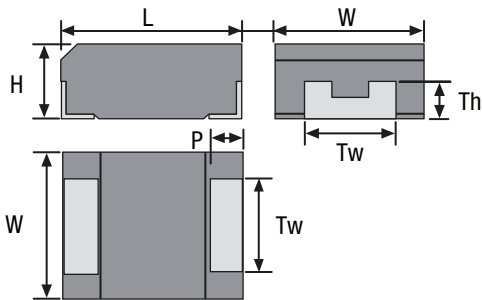
L = Longitudinal (+ termination in the direction of unreeling)

MOLDED CASES SMD – SURFACE MOUNT SN-PB OR SN PLATED – POLARIZED TYPES

DCTC3 / DCTC4
DCTC3E

DIMENSIONS (in mm)

Case code	L	W	H	P	Tw	Th min.
A	3.2±0.2	1.6±0.2	1.6±0.2	0.8±0.3	1.2±0.1	0.7
B	3.5±0.2	2.8±0.2	1.9±0.2	0.8±0.3	2.2±0.1	0.7
C	6.0±0.3	3.2±0.3	2.5±0.3	1.3±0.3	2.2±0.1	1.0
D	7.3±0.3	4.3±0.3	2.8±0.3	1.3±0.3	2.4±0.1	1.0



MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

	DCTC3	DCTC4	DCTC3E
Operating temp.	-55°C +125°C	-55°C +125°C	-55°C +125°C
Humidity	56 days	56 days	56 days
Capacitance range	0.1 µF - 150 µF	0.1 µF - 100 µF	0.15 µF - 680 µF
Tolerance	20%...10%	20%...10%	20%...10%
Voltage range	4 V...50 V	4 V...50 V	4 V...50 V
High surge current	N/A	1 million cycles	N/A
MAXIMUM CAPACITANCE CHANGE			
-55°C	-10%	-10%	-10%
+85°C	+10%	+10%	+10%
+125°C	+12%	+12%	+15%
MAXIMUM DF			
+20°C	see table	see table	see table
-55°C	= 1.5 x lim 20°C	= 1.5 x lim 20°C	see table
+85°C	= 1.5 x lim 20°C	= 1.5 x lim 20°C	see table
+125°C	= 2.0 x lim 20°C	= 2.0 x lim 20°C	see table
MAXIMUM LEAKAGE CURRENT			
+20°C	see table	see table	see table
+85°C	see table	see table	see table
+125°C	see table	see table	see table
MAXIMUM ESR			
+20°C (100kHz)	-	see table	see table
MAXIMUM IMPEDANCE			
+20°C (100kHz)	see table	-	-
MAXIMUM RIPPLE CURRENT			
+20°C (100kHz)	-	see table	-
MAXIMUM REVERSE VOLTAGE			
+20°C	15% U _R	15% U _R	15% U _R
+85°C	5% U _R	5% U _R	5% U _R
+125°C	1% U _R	1% U _R	1% U _R
MAXIMUM SURGE VOLTAGE			
+85°C	1.3 x U _R	1.3 x U _R	1.3 x U _R
+125°C	1.3 x U _C	1.3 x U _C	1.3 x U _C

MOLDED CASES SMD – SURFACE MOUNT SN-PB OR SN PLATED – POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DCTC3 / DCTC4				DCTC3	DCTC4	
Capacitance 100kHz +20°C (μF)	Case Code	Maximum Leakage Current			Max. DF 100kHz +20°C (%)	Max. Imped. 100kHz +20°C (Ω)	Max. ESR 100kHz +20°C (Ω)	Max. I rms 100kHz +20°C (mA)
		+20°C (μA)	+85°C (μA)	+125°C (μA)				
RATED VOLTAGE (+85°C) 4 V - CATEGORY VOLTAGE (+125°C) 2.5 V								
3.3	A	0.5	5	6.2	6	9	9.0	88
4.7	A	0.5	5	6.2	6	8	7.5	97
10	B	0.5	5	6.2	6	4.5	4.0	140
*15	A	0.6	6	7.5	6	4	-	-
15	B	0.6	6	7.5	6	3.5	3.5	150
22	C	0.9	9	11	6	3	2.2	224
*33	B	1.3	13	16	6	3.5	-	-
33	C	1.3	13	16	6	2.5	1.8	247
*68	C	2.7	27	34	6	1.6	-	-
68	D	2.7	27	34	6	1.8	1.0	387
100	D	4	40	50	8	1.5	0.8	433
RATED VOLTAGE (+85°C) 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V								
2.2	A	0.5	5	6.2	6	10	9.0	88
3.3	A	0.5	5	6.2	6	7	7.5	97
6.8	B	0.5	5	6.2	6	4.5	4.0	140
*10	A	0.6	6	7.5	6	4	-	-
10	B	0.6	6	7.5	6	3.5	3.5	150
15	C	0.9	9	11	6	3	2.0	234
*22	B	1.3	13	17	6	3.5	-	-
22	C	1.3	13	17	6	2.5	1.8	247
*47	C	2.9	29.6	37	6	1.6	-	-
47	D	2.9	29.6	37	6	1.8	1.1	365
68	D	4.0	40	50	6	1.5	0.9	408
100	D	6.3	63	78.7	8	1.5	0.8	433
*150	D	9.4	94.5	118	8	0.7	-	-
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V								
1.5	A	0.5	5	6.2	6	10.5	8.0	94
2.2	A	0.5	5	6.2	6	7	7.5	97
4.7	B	0.5	5	6.2	6	4.5	4.0	140
6.8	B	0.6	6.8	8.5	6	3.5	3.5	150
10	C	1.0	10	12	6	3	2.0	234
*15	B	1.5	15	18.7	6	3.5	-	-
15	C	1.5	15	18.7	6	2.5	1.8	247
*33	C	3.0	30	37	6	1.6	-	-
33	D	3.0	30	37	6	1.8	0.9	408
47	D	4.7	47	58.7	6	1.5	0.8	433
*68	D	6.8	68	85	6	0.8	-	-
*100	D	10.0	100	125	8	0.7	-	-
RATED VOLTAGE (+85°C) 16 V - CATEGORY VOLTAGE (+125°C) 10 V								
1	A	0.5	5	6.2	4	11	10.0	84
1.5	A	0.5	5	6.2	6	8	8.0	94
*3.3	A	0.5	5	6.2	6	6	-	-
3.3	B	0.5	5	6.2	6	5	4.0	140
4.7	B	0.7	7.5	9.4	6	3.5	3.5	150
*6.8	B	1.1	11	14	6	3.5	-	-
6.8	C	1.1	11	14	6	3	1.9	240
*10	B	1.6	16	20	6	3.5	-	-
10	C	1.6	16	20	6	2.5	1.8	247
*15	C	2.4	24	30	6	1.8	-	-
*22	C	3.5	35	44	6	1.6	-	-
22	D	3.5	35	44	6	1.8	0.9	408
33	D	5.0	50	62	6	1.5	0.8	433
*47	D	7.5	75	94	6	0.8	-	-

* Values do not apply to DCTC4.

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DCTC3 / DCTC4				DCTC3	DCTC4	
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Leakage Current			Max. DF 100kHz +20°C (%)	Max. Imped. 100Hz +20°C (Ω)	Max. ESR 100kHz +20°C (Ω)	Max. I rms 100kHz +20°C (mA)
		+20°C (μA)	+85°C (μA)	+125°C (μA)				
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V								
0.68	A	0.5	5	6.2	4	13	12.0	76
1	A	0.5	5	6.2	4	9	10.0	84
*1.5	A	0.5	5	6.2	6	8	-	-
*2.2	A	0.5	5	6.2	6	7	-	-
2.2	B	0.5	5	6.2	6	6	3.5	150
3.3	B	0.7	7	8.5	6	4.5	3.5	150
*4.7	B	0.9	9	11	6	3.5	-	-
4.7	C	0.9	9	11	6	3	2.4	214
6.8	C	1.3	13.6	17	6	2.5	1.9	240
*10	C	2.0	20	25	6	1.8	-	-
15	D	3.0	30	37	6	1.8	1.0	387
22	D	4.4	44	55	6	1.5	0.8	433
*33	D	6.6	66	82.5	6	0.9	-	-
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V								
0.47	A	0.5	5	6.2	4	14	14.0	71
0.68	A	0.5	5	6.2	4	10	10.0	84
1.5	B	0.5	5	6.2	6	7	5.0	120
3.3	C	0.8	8	10	6	3.5	2.5	209
4.7	C	1.1	11.7	14.6	6	2.8	2.4	214
*6.8	C	1.7	17	21.2	6	1.9	-	-
10	D	2.5	25	31	6	2	1.2	350
15	D	3.7	37.5	46.8	6	1.5	1.0	387
*22	D	5.5	55	68.7	6	0.9	-	-
RATED VOLTAGE (+85°C) 35 V - CATEGORY VOLTAGE (+125°C) 23 V								
0.1	A	0.5	5	6.2	4	28	20.0	54
0.15	A	0.5	5	6.2	4	23	19.0	58
0.22	A	0.5	5	6.2	4	19	18.0	62
0.33	A	0.5	5	6.2	4	15	15.0	68
0.47	B	0.5	5	6.2	4	11	8.0	89
0.68	B	0.5	5	6.2	4	8	6.5	100
1	B	0.5	5	6.2	4	7	5.0	110
1.5	C	0.5	5	6.3	6	6	4.5	156
2.2	C	0.7	7.7	9.6	6	4	3.5	177
3.3	C	1.1	11.5	14.4	6	3	2.5	210
4.7	D	1.6	16	20	6	2.5	1.5	315
6.8	D	2.3	23.8	29.7	6	2	1.3	340
10	D	3.5	35	43.7	6	1.5	1.0	387
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 33 V								
0.1	A	0.5	5	6.2	4	27	20.0	56
0.15	B	0.5	5	6.2	4	22	16.0	69
0.22	B	0.5	5	6.2	4	18	14.0	76
0.33	B	0.5	5	6.2	4	14	10.0	82
0.47	C	0.5	5	6.2	4	9	8.0	117
0.68	C	0.5	5	6.2	4	7	7.0	125
1	C	0.5	5	6.2	4	6	5.5	140
1.5	D	0.7	7.5	9.3	6	5	3.5	195
2.2	D	1.1	11	13.7	6	3.5	2.5	250
3.3	D	1.6	16.5	20.6	6	2	2.0	274
4.7	D	2.3	23.5	29.3	6	1.5	1.4	327

* Values do not apply to DCTC4.

MOLDED CASES SMD – SURFACE MOUNT SN-PB OR SN PLATED – POLARIZED TYPES

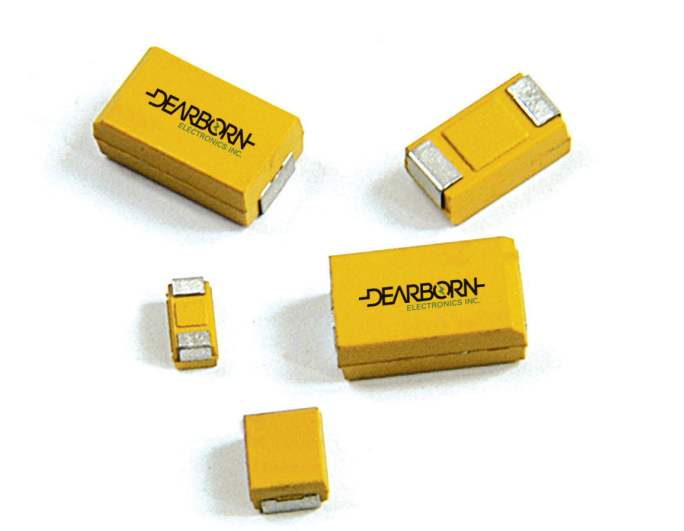
STANDARD RATINGS – ELECTRICAL CHARACTERISTICS (EXTENDED RANGE)

		DCTC3E							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Leakage Current			Maximum DF 100Hz				Max. ESR 100kHz +20°C (Ω)
		+20°C (μA)	+85°C (μA)	+125°C (μA)	-55°C (%)	+20°C (%)	+85°C (%)	+125°C (%)	
RATED VOLTAGE (+85°C) 4 V - CATEGORY VOLTAGE (+125°C) 2.5 V									
33	A	1.3	13.2	16.5	9	6	9	12	4.0
68	A	2.8	28	35	45	30	45	60	4.0
68	B	2.7	27.2	34	9	6	9	12	3.5
100	A	4.0	40	50	45	30	45	60	4.0
150	B	6.0	60	75	18	12	18	24	2.0
330	C	13.2	132	165	15	10	15	20	1.2
470	D	18.8	188	235	12	8	12	16	0.8
680	D	27.2	272	340	18	12	18	24	0.5
RATED VOLTAGE (+85°C) 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V									
15	A	0.9	9.4	11.8	9	6	9	12	4.0
22	A	1.4	13.9	17.3	9	6	9	12	4.0
33	A	2.0	20	25.0	18	12	18	24	2.5
47	A	2.9	29	36.2	9	6	9	12	1.6
47	B	2.9	29.6	37.0	9	6	9	12	3.5
68	B	4.1	41	51.2	12	8	12	16	1.0
100	B	6.3	63	78.7	22.5	15	22.5	30	3.0
100	C	6.3	63	78.7	12	8	12	15	1.2
220	C	13.2	132	165.0	15	10	15	20	1.2
330	D	19.8	198	247.0	12	8	12	15	0.5
470	D	28.2	282	352.5	18	12	18	24	0.5
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V									
6.8	A	0.6	6.8	8.5	9	6	9	12	6.0
10	A	1.0	10	12.5	9	6	9	12	4.0
15	A	1.5	15	18.7	12	8	12	16	6.0
22	A	2.2	22	27.5	15	10	15	20	6.0
22	B	2.2	22	27.5	9	6	9	12	3.0
33	B	3.3	33	41.2	9	6	9	12	3.5
47	B	4.7	47	58.7	12	8	12	16	1.0
47	C	4.7	47	58.7	9	6	9	12	1.2
68	C	6.8	68	85	9	6	9	12	1.2
100	C	10.0	100	125	12	8	12	16	1.2
150	C	15.0	150	187.5	15	10	15	20	1.2
150	D	15.0	150	187.5	12	8	12	15	0.7
220	D	22.0	220	275	12	8	12	15	0.5
330	D	33.0	330	412.5	15	10	15	20	0.5
RATED VOLTAGE (+85°C) 16 V - CATEGORY VOLTAGE (+125°C) 10 V									
4.7	A	0.7	7.5	9.4	9	6	9	12	6.0
6.8	A	1.1	11	13.7	9	6	9	12	7.0
10	A	1.6	16	20	15	10	15	20	7.0
15	B	2.4	24	30	9	6	9	12	3.0
22	B	3.6	36	45	9	6	9	12	2.2
33	C	5.3	53	66	9	6	9	12	1.2
47	C	7.5	75	93.7	9	6	9	12	1.2
68	D	10.9	109	136	9	6	9	12	0.7
100	D	16.0	160	200	12	8	12	15	0.7
150	D	24.0	240	300	18	12	18	24	0.7
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V									
3.3	A	0.7	6.6	8.2	9	6	9	12	7.0
4.7	A	1.0	10	12.5	12	8	12	16	6.0
6.8	B	1.3	13.6	17.0	9	6	9	12	3.5
10	B	2.0	20	25.0	9	6	9	12	3.0
15	C	3.0	30	37.5	9	6	9	12	1.7
22	C	4.4	44	55.0	9	6	9	12	1.2
33	C	6.6	66	82.5	9	6	9	12	1.2
47	D	9.4	94	117.5	9	6	9	12	0.7
68	D	13.6	136	170.0	12	8	12	16	0.7

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS (EXTENDED RANGE)

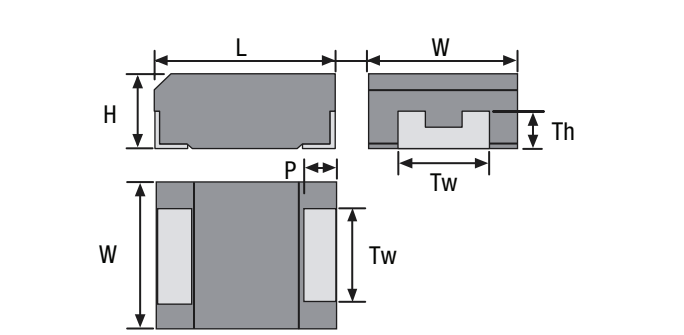
		DCTC3E							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Leakage Current			Maximum DF 100Hz				Max. ESR 100kHz +20°C (Ω)
		+20°C (μA)	+85°C (μA)	+125°C (μA)	-55°C (%)	+20°C (%)	+85°C (%)	+125°C (%)	
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V									
1.5	A	0.5	5	6.2	9	6	9	12	10.0
2.2	B	0.5	5.5	6.8	9	6	9	12	4.5
3.3	B	0.9	8.3	10.3	9	6	9	12	3.5
4.7	B	1.2	12	15	9	6	9	12	1.5
6.8	B	1.7	17	21.2	12	8	12	16	3.0
10	C	2.5	25	31.2	9	6	9	12	1.5
15	C	3.8	38	47.5	9	6	9	12	1.5
22	C	5.5	55	68.7	12	8	12	16	1.5
33	D	8.3	83	103.7	9	6	9	12	0.7
47	D	11.8	118	147.5	15	10	15	20	0.7
RATED VOLTAGE (+85°C) 35 V - CATEGORY VOLTAGE (+125°C) 23 V									
0.47	A	0.5	5	6.2	6	4	6	9	14.0
0.68	A	0.5	5	6.2	6	4	6	9	10.0
1	A	0.5	5	6.2	6	4	6	9	10.0
1.5	B	0.5	5.2	6.6	9	6	9	12	5.0
2.2	B	0.8	7.7	9.6	9	6	9	12	4.0
3.3	B	1.2	12	15.0	9	6	9	12	3.5
4.7	C	1.6	16.4	20.5	9	6	9	12	2.5
6.8	C	2.4	24	29.7	9	6	9	12	2.0
10	C	3.5	35	43.7	9	6	9	12	2.0
15	D	5.3	52.5	65.6	9	6	9	12	0.8
22	D	7.7	77	96.2	9	6	9	12	0.7
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 33 V									
0.15	A	0.5	5	6.2	6	4	6	9	19.0
0.47	B	0.5	5	6.2	6	4	6	9	9.0
0.68	B	0.5	5	6.2	6	4	6	9	8.0
1.5	C	0.7	7.5	9.3	9	6	9	12	4.5
2.2	C	1.1	11	13.7	9	6	9	12	3.5
6.8	D	3.4	34	42.5	9	6	9	12	1.0

MOLDED CASES SMD – SURFACE MOUNT
SN-PB OR SN PLATED – POLARIZED TYPES



DIMENSIONS (in mm)

Case code	L	W	H	P	Tw	Th min.
S	3.2±0.2	1.6±0.2	1.2±0.2	0.8±0.3	1.2±0.1	0.3
T	3.5±0.2	2.8±0.2	1.2±0.2	0.8±0.3	2.2±0.1	0.3
U	6.0±0.3	3.2±0.3	1.5±0.3	1.3±0.3	2.2±0.1	0.5
V	7.3±0.3	4.3±0.3	2.0±0.3	1.3±0.3	2.4±0.1	1.1



MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

	DCTC3E - Low Profile
Operating temperature	-55°C +125°C
Humidity	56 days
Capacitance range	1 µF - 330 µF
Tolerance	20%...10%
Voltage range	4 V...50 V
High surge current	N/A
MAXIMUM CAPACITANCE CHANGE	
-55°C	-10%
+85°C	+10%
+125°C	+15%
MAXIMUM DF	
+20°C	see table
-55°C	see table
+85°C	see table
+125°C	see table
MAXIMUM LEAKAGE CURRENT	
+20°C	see table
+85°C	see table
+125°C	see table
MAXIMUM ESR	
+20°C (100kHz)	see table
MAXIMUM REVERSE VOLTAGE	
+20°C	15% U _R
+85°C	5% U _R
+125°C	1% U _R
MAXIMUM SURGE VOLTAGE	
+85°C	1.3 x U _R
+125°C	1.3 x U _C

STANDARD RATINGS - ELECTRICAL CHARACTERISTICS

		DCTC3E - Low Profile							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Leakage Current			Maximum DF 100Hz				Max. ESR 100kHz +20°C (Ω)
		+20°C (μA)	+85°C (μA)	+125°C (μA)	-55°C (%)	+20°C (%)	+85°C (%)	+125°C (%)	
RATED VOLTAGE (+85°C) 4 V - CATEGORY VOLTAGE (+125°C) 2.5 V									
6.8	S	0.5	5	6.2	9	6	9	12	15.0
10	S	0.5	5	6.2	9	6	9	12	15.0
15	T	0.6	6	7.5	9	6	9	12	5.0
22	S	0.9	9	11	15	10	15	20	10.0
22	T	0.9	9	11	9	6	9	12	5.0
33	U	1.3	13	16.5	9	6	9	12	1.8
47	T	1.9	19	23.5	9	6	9	12	1.8
47	U	1.9	19	23.5	9	6	9	12	1.8
68	U	2.7	27	34	9	6	9	12	1.8
100	T	4.0	40	50	45	30	45	60	5.0
150	V	6.0	60	75	11	8	11	14	0.7
220	V	8.8	88	110	11	8	11	14	0.7
330	V	13.2	132	165	18	12	18	24	0.7
RATED VOLTAGE (+85°C) 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V									
4.7	S	0.5	5	6.2	9	6	9	12	15.0
6.8	S	0.5	5	6.2	9	6	9	12	15.0
10	T	0.6	6	7.8	9	6	9	12	5.0
15	S	0.9	9	11	22.5	15	22.5	30	10.0
15	T	0.9	9	11	9	6	9	12	5.0
22	T	1.4	14	17.5	12	8	12	16	5.0
22	U	1.3	13	17.3	9	6	9	12	1.8
33	T	2.0	20	25	18	12	18	24	6.0
33	U	2.0	20	25	9	6	9	12	1.8
47	U	2.9	29	36	9	6	9	12	1.8
100	U	6.0	60	75	15	10	15	20	1.8
100	V	6.0	60	75	11	8	11	14	0.7
150	V	9.0	90	112	11	8	11	14	0.7
220	V	13.2	132	165	18	12	18	20	0.7
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V									
3.3	S	0.5	5	6.2	9	6	9	12	15.0
4.7	S	0.5	5	6.2	9	6	9	12	15.0
6.8	S	0.7	7	8.7	15	10	15	20	15.0
6.8	T	0.6	6.8	8.5	9	6	9	12	5.0
10	S	1.0	10	12.5	15	10	15	20	15.0
10	T	1.0	10	12.5	9	6	9	12	5.0
15	T	1.5	15	18.7	12	8	12	16	5.0
15	U	1.5	15	18.7	9	6	9	12	1.8
22	T	2.2	22	27.5	18	12	18	24	8.0
22	U	2.2	22	27.5	9	6	9	12	1.8
33	U	3.3	33	41.2	9	6	9	12	1.8
33	V	3.3	33	41.2	9	6	9	12	0.7
47	U	4.7	47	58.7	15	10	15	20	2.2
47	V	4.7	47	58.7	9	6	9	12	0.7
68	U	6.8	68	85	15	10	15	20	1.8
68	V	6.8	68	85	9	6	9	12	0.7
100	V	10	100	125	11	8	11	14	0.7
150	V	15	150	187.5	12	8	12	16	0.7
RATED VOLTAGE (+85°C) 16 V - CATEGORY VOLTAGE (+125°C) 10 V									
2.2	S	0.5	5	6.2	9	6	9	12	15.0
4.7	T	0.7	7.5	9.4	9	6	9	12	5.0
10	T	1.6	16	20	12	8	12	16	8.0
10	U	1.6	16	20	9	6	9	12	1.8
15	U	2.4	24	30	9	6	9	12	1.8
22	U	3.6	36	45	15	10	15	20	3.0
33	U	5.3	53	66.2	18	12	18	24	3.0
47	V	7.5	75	94	9	6	9	12	0.7
100	V	16	160	200	18	12	18	24	0.7
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V									
1.0	S	0.5	5	6.2	9	6	9	12	18.0
1.5	S	0.5	5	6.2	9	6	9	12	15.0
3.3	T	0.7	6.6	8.2	9	6	9	12	5.0
6.8	U	1.3	13.6	17	9	6	9	12	1.9
10	U	2	20	25	9	6	9	12	1.8
22	V	4.4	44	55	9	6	9	12	0.7
33	V	6.6	66	82.5	12	8	12	16	0.7

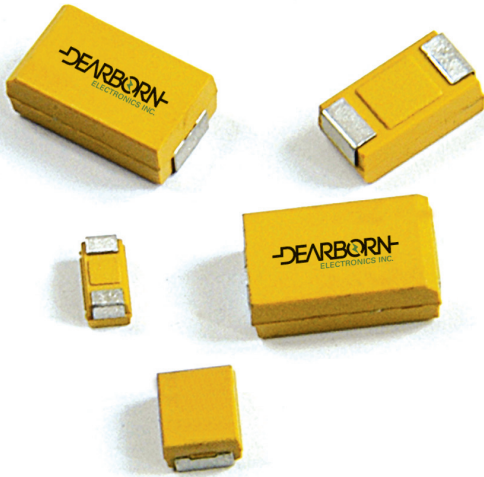
DCTC3E -
LOW PROFILE

MOLDED CASES SMD – SURFACE MOUNT
SN–PB OR SN PLATED – POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

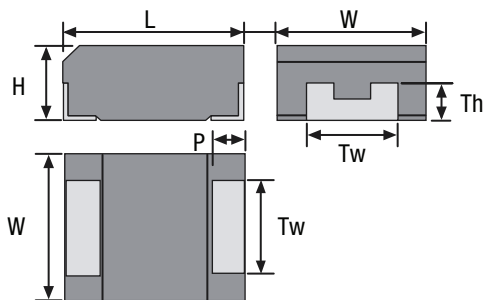
		DCTC3E - Low Profile							
Capacitance 100Hz +20°C (µF)	Case Code	Maximum Leakage Current			Maximum DF 100Hz				Max. ESR 100kHz +20°C (Ω)
		+20°C (µA)	+85°C (µA)	+125°C (µA)	-55°C (%)	+20°C (%)	+85°C (%)	+125°C (%)	
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V									
22	V	5.5	55	68.7	9	6	9	12	0.7
RATED VOLTAGE (+85°C) 35 V - CATEGORY VOLTAGE (+125°C) 23 V									
10	V	3.5	35	43.7	9	5	9	12	2.0
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 33 V									
1	V	0.5	5	6.2	6	4	6	8	6.0

MOLDED CASES SMD – SURFACE MOUNT SN-PB OR SN PLATED – POLARIZED TYPES



DIMENSIONS (in mm)

Case code	L	W	H	P	Tw	Th min.
V	7.3±0.3	4.3±0.3	2.0±0.3	1.3±0.3	2.4±0.1	1.0
D	7.3±0.3	4.3±0.3	2.8±0.3	1.3±0.3	2.4±0.1	1.0
E	7.3±0.3	4.3±0.3	4.0±0.3	1.3±0.3	2.4±0.1	1.0



MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

	DCTC4 ESR
Operating temperature	-55°C +125°C
Humidity	56 days
Capacitance range	4.7 µF - 1000 µF
Tolerance	20%...10%
Voltage range	4 V...50 V
High surge current	100% - 4 cycles
MAXIMUM CAPACITANCE CHANGE	
-55°C	-10%
+85°C	+10%
+125°C	+12%
MAXIMUM DF	
+20°C	see table
-55°C	see table
+85°C	see table
+125°C	see table
MAXIMUM LEAKAGE CURRENT	
+20°C	see table
+85°C	see table
+125°C	see table
MAXIMUM ESR	
+20°C (100kHz)	see table
MAXIMUM REVERSE VOLTAGE	
+20°C	15% U_R
+85°C	5% U_R
+125°C	1% U_R
MAXIMUM SURGE VOLTAGE	
+85°C	1.3 x U_R
+125°C	1.3 x U_C

MOLDED CASES SMD – SURFACE MOUNT SN-PB OR SN PLATED – POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DCTC4 ESR - LOW ESR						
Capacitance 1kHz +20°C (μF)	Case Code	Maximum Leakage Current			Maximum DF 100Hz		Max. ESR 100kHz +20°C (mΩ)	Max. I rms 100kHz +20°C (A)
		+20°C (μA)	+85°C (μA)	+125°C (μA)	-55°C /+20°C (%)	+85°C / +125°C (%)		
RATED VOLTAGE (+85°C) 4 V - CATEGORY VOLTAGE (+125°C) 2.5 V								
1000	E	40	400	500	12	12	70	1.5
RATED VOLTAGE (+85°C) 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V								
68	D	4.3	42.8	53.6	4	4	175	0.9
100	V	6.3	63.0	78.8	8	8	150	0.9
150	E	9.5	94.5	118.1	6	6	100	1.3
220	D	13.9	138.6	173.3	8	8	100	1.2
220	E	13.9	138.6	173.3	8	8	100	1.3
330	D	20.8	207.9	259.9	8	8	100	1.2
330	E	20.8	207.9	259.9	8	8	100	1.3
470	D	29.6	296.1	370.1	12	12	125	1.1
470	E	29.6	296.1	370.1	10	10	65	1.6
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V								
47	D	4.7	47	58.8	4	4	200	0.9
68	V	6.8	68	85	6	6	140	0.9
68	D	6.8	68	85	6	6	150	1.0
68	E	6.8	68	85	4	4	150	1.0
100	V	10	100	125	8	8	150	0.9
100	D	10	100	125	8	8	100	1.2
100	E	10	100	125	6	6	100	1.3
150	D	15	150	187.5	8	8	100	1.2
150	E	15	150	187.5	8	8	100	1.3
220	V	22	220	275	12	12	150	0.9
220	D	22	220	275	8	8	125	1.1
220	E	22	220	275	8	8	100	1.3
330	D	33	330	412.5	10	10	125	1.1
330	E	33	330	412.5	10	10	60	1.7
RATED VOLTAGE (+85°C) 16 V - CATEGORY VOLTAGE (+125°C) 10 V								
33	D	5.3	52.8	66	4	4	225	0.8
47	D	7.5	75	94	6	6	150	1.0
68	D	10.9	109	136	6	6	150	1.0
100	D	16	160	200	8	8	125	1.1
100	E	16	160	200	8	8	100	1.3
150	E	24	240	300	8	8	100	1.3
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V								
15	D	3	30	37.5	4	4	275	0.7
22	D	4.4	44	55	4	4	225	0.8
33	D	6.6	66	82.5	6	6	200	0.9
47	D	9.4	94	117.5	6	6	175	0.9
47	E	9.4	94	117.5	4	4	150	1.0
68	D	13.6	136	170	8	8	150	1.0
68	E	13.6	136	170	6	6	150	1.0
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V								
15	D	3.8	37.5	46.9	6	6	275	0.7
15	E	3.8	37.5	46.9	4	4	200	0.9
22	D	5.5	55.0	68.8	6	6	200	0.9
22	E	5.5	55.0	68.8	4	4	225	0.9
33	D	8.3	82.5	103.2	6	6	300	0.7
33	E	8.3	82.5	103.2	4	4	175	1.0
47	E	11.8	117.5	146.9	6	6	200	0.9
68	E	17.0	170.0	212.5	8	8	200	0.9
RATED VOLTAGE (+85°C) 35 V - CATEGORY VOLTAGE (+125°C) 23 V								
6.8	E	2.4	23.8	29.8	4	4	300	0.7
10	D	3.5	35.0	43.8	6	6	300	0.7
10	E	3.5	35.0	43.8	4	4	250	0.8
15	D	5.3	52.5	65.7	6	6	300	0.7
15	E	5.3	52.5	65.7	6	6	225	0.9
22	D	7.7	77.0	96.3	6	6	300	0.7
22	E	7.7	77.0	96.3	6	6	275	0.8
33	E	11.6	115.5	144.4	6	6	250	0.8
47	E	16.5	164.5	205.6	8	8	300	0.7
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 32 V								
4.7	D	2.4	23.5	29.4	6	6	300	0.7
4.7	E	2.4	23.5	29.4	4	4	300	0.7
6.8	D	3.4	34.0	42.5	8	8	300	0.7
15	E	7.5	75.0	93.7	8	8	300	0.7

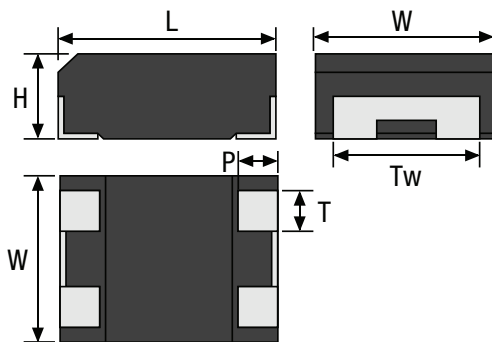
MOLDED CASES SMD – SURFACE MOUNT SN-PB OR SN PLATED – POLARIZED TYPES

DCTC21 / DCTC21E



DIMENSIONS (in mm)

Case code	L -0.1 +0.5	W -0.1 +0.5	H -0.1 +0.5	P -0.3 +0.3	Tw -0.3 +0.3	T -0.3 +0.3
C	11	9	4.5	1.5	7	2
D	11	12.5	5.5	1.5	10.5	3



MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

	DCTC21	DCTC21E
Operating temp.	-55°C +125°C	-55°C +125°C
Humidity	56 days	56 days
Capacitance range	5.6 µF - 330 µF	10 µF - 680 µF
Tolerance	20%...10%	20%...10%
Voltage range	6.3 V...63 V	6.3 V...100V
High surge current	1 million cycles	1 million cycles
MAXIMUM CAPACITANCE CHANGE		
-55°C	-10%	-10%
+85°C	+8%	+8%
+125°C	+12%	+12%
MAXIMUM DF		
+20°C	see table	see table
-55°C	= 2.0 x lim 20°C	= 2.0 x lim 20°C
+85°C	= 1.5 x lim 20°C	= 1.5 x lim 20°C
+125°C	= 1.5 x lim 20°C	= 1.5 x lim 20°C
MAXIMUM LEAKAGE CURRENT		
+20°C	see table	see table
+85°C	see table	see table
+125°C	see table	see table
MAXIMUM RIPPLE CURRENT		
+20°C (1kHz)	see table	see table
+20°C (100kHz)	see table	see table
MAXIMUM REVERSE VOLTAGE		
+20°C	10% U_R	10% U_R
+85°C	5% U_R	5% U_R
+125°C	1% U_R	1% U_R
MAXIMUM SURGE VOLTAGE		
+85°C	1.3 x U_R	1.3 x U_R
+125°C	1.3 x U_C	1.3 x U_C

MOLDED CASES SMD – SURFACE MOUNT POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DCTC21						
Capacitance 1kHz +20°C (μF)	Case Code	Maximum Leakage Current			Max. DF 1kHz +20°C (%)	Max. ESR 500kHz +20°C (Ω)	Max. I rms	
		+20°C (μA)	+85°C (μA)	+125°C (μA)			1kHz +20°C (A)	500kHz +20°C (A)
RATED VOLTAGE (+85°C) 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V								
120	C	7.6	76	95	8	40	2.5	3.2
150	C	9.4	94	117	10	35	2.0	3.3
270	D	17.0	170	212	10	30	3.4	4.1
330	D	20.8	208	260	12	25	3.8	4.3
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V								
82	C	8.2	82	102	8	45	1.8	2.9
100	C	10.0	100	125	8	40	2.2	3.0
180	D	18.0	180	225	8	35	3.4	3.7
220	D	22.0	220	275	10	30	3.4	3.9
RATED VOLTAGE (+85°C) 16 V - CATEGORY VOLTAGE (+125°C) 10 V								
56	C	8.9	89	111	6	55	1.8	2.6
68	C	10.8	108	135	6	50	2.2	2.7
120	D	19.2	192	240	8	40	2.8	3.5
150	D	24.0	240	300	8	35	3.1	3.6
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V								
39	C	7.8	78	97	5	65	1.7	2.4
47	C	9.4	94	117	6	60	1.8	2.5
82	D	16.4	164	205	6	45	2.5	3.1
100	D	20.0	200	250	8	40	2.5	3.3
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V								
27	C	6.7	67	83	5	75	1.2	2.2
33	C	8.2	82	102	5	70	1.4	2.3
56	D	14.0	140	175	6	55	2.2	2.9
68	D	17.0	170	212	6	50	2.4	3.0
RATED VOLTAGE (+85°C) 40 V - CATEGORY VOLTAGE (+125°C) 25 V								
22	C	8.8	88	110	4	85	1.5	2.1
33	D	13.2	132	165	5	70	1.9	2.5
47	D	18.8	188	235	5	60	2.2	2.7
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 32 V								
15	C	7.5	75	93	3	100	1.4	1.9
18	C	9.0	90	112	4	90	1.4	2.0
22	D	11.0	110	137	4	85	1.7	2.3
RATED VOLTAGE (+85°C) 63 V - CATEGORY VOLTAGE (+125°C) 40 V								
5.6	C	3.5	35	44	3	155	0.6	1.5
6.8	C	4.2	42	53	3	140	0.7	1.6
8.2	C	5.1	51	64	3	130	0.9	1.6
10	C	6.3	63	78	3	120	1.1	1.7
18	D	11.3	113	141	4	90	1.5	2.1
22	D	13.8	138	173	4	85	1.7	2.3

TERMINATIONS

Four plating finishes may be achieved.

STANDARD TERMINATION:

T: Tinning electrolytic (Sn - Pb)

UPON REQUEST:

S: Hot solder dipped (add 0.4 mm to dimensions L and H)

A: Silver plating for epoxy bonding

F: Tinning electrolytic (100% Sn)

HOW TO ORDER

Ex.: DCTC21 C 33 μF 10% 25 V T

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS (EXTENDED RANGE)

		DCTC 21E						
Capacitance 1kHz +20°C (μF)	Case Code	Maximum Leakage Current			Max. DF 1kHz +20°C (%)	Max. ESR 500kHz +20°C (Ω)	Max. I rms	
		+20°C (μA)	+85°C (μA)	+125°C (μA)			1kHz +20°C (A)	500kHz +20°C (A)
RATED VOLTAGE (+85°C) 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V								
270	C	17.0	170	212	16	45	2.0	2.9
330	C	20.8	208	260	20	45	2.0	2.9
560	D	35.3	353	441	24	35	2.5	3.6
680	D	42.8	428	535	30	35	2.5	3.6
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V								
180	C	18.0	180	225	12	50	1.9	2.7
220	C	22.0	220	275	12	45	2.0	2.9
390	D	39.0	390	487	20	35	2.5	3.6
470	D	47.0	470	587	22	35	2.5	3.6
RATED VOLTAGE (+85°C) 16 V - CATEGORY VOLTAGE (+125°C) 10 V								
120	C	19.2	192	240	10	55	1.8	2.6
150	C	24.0	240	300	12	50	2.0	2.9
270	D	43.2	432	540	16	45	2.3	3.5
330	D	52.8	528	660	20	45	2.5	3.6
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V								
82	C	16.4	164	205	6	65	1.7	2.4
100	C	20.0	200	250	8	60	1.7	2.5
180	D	36.0	360	450	12	50	2.1	3.0
220	D	44.0	440	550	12	45	2.2	3.1
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V								
39	C	9.7	97	121	5	95	1.4	2.0
47	C	11.7	117	146	6	85	1.5	2.1
82	D	20.5	205	256	6	65	1.8	2.6
100	D	25.0	250	312	8	60	1.9	2.7
RATED VOLTAGE (+85°C) 40 V - CATEGORY VOLTAGE (+125°C) 25 V								
33	C	13.2	132	165	5	100	1.3	1.9
56	D	22.4	224	280	6	80	1.6	2.3
68	D	27.2	272	340	6	75	1.7	2.4
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 32 V								
22	C	11.0	110	137	5	125	1.2	1.7
47	D	23.5	235	293	6	85	1.6	2.3
RATED VOLTAGE (+85°C) 63 V - CATEGORY VOLTAGE (+125°C) 40 V								
12	C	7.5	75	93	5	160	1.1	1.5
15	C	9.4	94	117	5	145	1.1	1.6
33	D	20.8	208	260	5	100	1.5	2.1
RATED VOLTAGE (+85°C) 100 V - CATEGORY VOLTAGE (+125°C) 63 V								
10	C	10.0	100	125	5	175	1.0	1.4
22	D	22.0	220	275	5	125	1.3	1.9

Note: Please consult us for use above 125°C.

PACKING

Standard: Bulk

Optional: Tape & reel

When ordering add the suffix "R" just after the termination code.

HOW TO ORDER

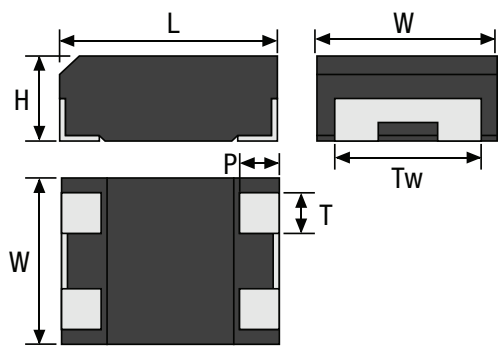
Ex.: DCTC21E C 33μF 10% 40 V T R

MOLDED CASES SMD –SURFACE MOUNT
POLARIZED TYPES



DIMENSIONS (in mm)

Case code	L -0.1 +0.5	W -0.1 +0.5	H -0.1 +0.5	P -0.3 +0.3	Tw -0.3 +0.3	T -0.3 +0.3
C	11	9	4.5	1.5	7	2
D	11	12.5	5.5	1.5	10.5	3



MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

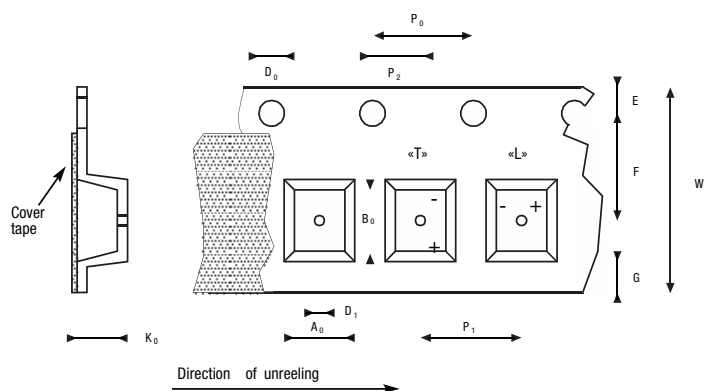
	DCTC23
Operating temp.	-55°C +125°C
Humidity	56 days
Capacitance range	15 µF - 1000 µF
Tolerance	20%...10%
Voltage range	6.3 V...63 V
High surge current	1 million cycles
MAXIMUM CAPACITANCE CHANGE	
-55°C	-10%
+85°C	+8%
+125°C	+12%
MAXIMUM DF	
+20°C (100Hz)	see table
-55°C (100Hz)	= lim 20°C
+85°C (100Hz)	= lim 20°C
+125°C (100Hz)	= lim 20°C
MAXIMUM LEAKAGE CURRENT	
+20°C (under U_R)	see table
+85°C (under U_R)	see table
+125°C (under U_R)	see table
MAXIMUM IMPEDANCE	
+20°C (100kHz)	see table
MAXIMUM REVERSE VOLTAGE	
+20°C	10% U_R
+85°C	5% U_R
+125°C	1% U_R
MAXIMUM SURGE VOLTAGE	
+85°C	1.3 x U_R
+125°C	1.3 x U_C

STANDARD RATINGS - ELECTRICAL CHARACTERISTICS

DCTC23						
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Leakage Current			Max. DF 100Hz +20°C (%)	Max. Imped. 100kHz +20°C (Ω)
		+20°C (μA)	+85°C (μA)	+125°C (μA)		
RATED VOLTAGE (+85°C) 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V						
330	C	20.8	208	259	10	1
390	C	24.5	245	307	10	1
470	C	29.6	296	370	10	1
680	D	42.8	428	535	10	0.5
820	D	51.6	516	645	10	0.5
1000	D	63	630	787	10	0.5
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V						
220	C	22	220	275	10	1
270	C	27	270	337	10	1
390	D	39	390	487	10	0.5
470	D	47	470	587	10	0.5
560	D	56	560	700	10	0.5
RATED VOLTAGE (+85°C) 16 V - CATEGORY VOLTAGE (+125°C) 10 V						
150	C	24	240	300	10	1
180	C	28.8	288	360	10	1
270	D	43.2	432	540	10	0.5
330	D	52.8	528	660	10	0.5
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V						
100	C	20	200	250	10	1
120	C	24	240	300	10	1
150	C	30	300	375	10	1
180	D	36	360	450	10	0.5
220	D	44	440	550	10	0.5
270	D	54	540	675	10	0.5
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V						
33	C	8.2	82.5	103	8	1
47	C	11.7	117	146	8	1
68	C	17.0	170	212	8	1
82	C	20.5	205	256	10	1
100	D	25.0	250	312	10	0.5
120	D	30.0	300	375	10	0.5
150	D	37.5	375	468	10	0.5
RATED VOLTAGE (+85°C) 40 V - CATEGORY VOLTAGE (+125°C) 25 V						
33	C	13.2	132	165	8	1
39	C	15.6	156	195	8	1
47	D	18.8	188	235	10	0.5
68	D	27.2	272	340	10	0.5
82	D	32.8	328	410	10	0.5
100	D	40.0	400	500	10	0.5
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 32V						
22	C	11.0	110	137	8	1
27	C	13.5	135	168	8	1
47	D	23.5	235	293	10	0.5
56	D	28.0	280	350	10	0.5
RATED VOLTAGE (+85°C) 63 V - CATEGORY VOLTAGE (+125°C) 40 V						
15	C	9.4	94.5	118	8	1
18	C	11.3	113	141	8	1
33	D	20.7	207	259	10	0.5
39	D	24.5	245	307	10	0.5

Notes: See notes of DCTC21.

TAPE AND REEL PACKAGING (PER IEC 286-3)



TAPE DIMENSIONS (in mm)

W ± 0.3	E ± 0.1	F ± 0.05	P ₀ ± 0.1	D ₀ +0.1 -0	D ₁ ± 0.1	G min.	P ₁ ± 0.1	P ₂ ± 0.05
24.0	1.75	11.5	4.0	1.5	1.5	0.75	12.0	2.0
24.0	1.75	11.5	4.0	1.5	1.5	0.75	16.0	2.0

Notes: A₀ B₀ K₀ are defined by component size

Reel diameter: 330 mm (nominal)

Diameter of central hole: 12.8 mm

TAPE WIDTH, MAXIMUM PER REEL, COMPONENTS POSITION AND PITCH (P₁)

Case code	Tape width (mm)	Quantity per Reel	Position	Pitch P ₁ (mm)
C	24.0	800	T	12.0
D	24.0	400	L	16.0

Note: The minimum quantity per reel is 50% of the above mentioned one.

COMPONENT POSITION

T = Transversal (+ termination away from the sprocket hole)

L = Longitudinal (+ termination in the direction of unreeling)

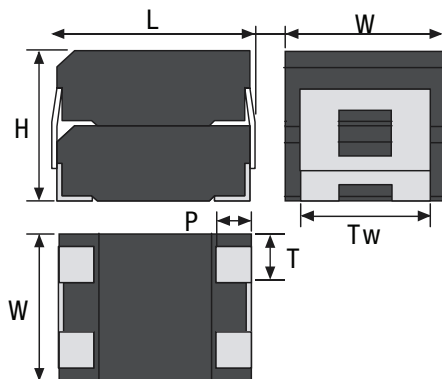
MOLDED CASES SMD – SURFACE MOUNT SN-PB OR SN PLATED – POLARIZED TYPES

DCTC42 / DCTC42E



DIMENSIONS (in mm)

Case code	L -0.1 +0.5	W -0.1 +0.5	H -0.1 +0.5	P -0.3 +0.3	Tw -0.3 +0.3	T -0.3 +0.3
C	12	9	9.5	1.5	7	2
D	12	12.5	11.5	1.5	10.5	3



MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

	DCTC42	DCTC42E
Operating temp.	-55°C +125°C	-55°C +125°C
Humidity	56 days	56 days
Capacitance range	12 µF - 680 µF	22 µF - 1500 µF
Tolerance	20%...10%	20%...10%
Voltage range	6.3 V...63 V	6.3 V...80 V
High surge current	1 million cycles	1 million cycles
MAXIMUM CAPACITANCE CHANGE		
-55°C	-10%	-10%
+85°C	+8%	+8%
+125°C	+12%	+12%
MAXIMUM DF (1kHz)		
+20°C	see table	see table
-55°C	= 2.0 x lim 20°C	= 2.0 x lim 20°C
+85°C	= 1.5 x lim 20°C	= 1.5 x lim 20°C
+125°C	= 1.5 x lim 20°C	= 1.5 x lim 20°C
MAXIMUM LEAKAGE CURRENT		
+20°C	see table	see table
+85°C	see table	see table
+125°C	see table	see table
MAXIMUM ESR		
+20°C (500kHz)	see table	see table
MAXIMUM RIPPLE CURRENT		
+20°C (1kHz)	see table	see table
+20°C (100kHz)	see table	see table
MAXIMUM REVERSE VOLTAGE		
+20°C	10% U_R	10% U_R
+85°C	5% U_R	5% U_R
+125°C	1% U_R	1% U_R
MAXIMUM SURGE VOLTAGE		
+85°C	1.3 x U_R	1.3 x U_R
+125°C	1.3 x U_C	1.3 x U_C

MOLDED CASES SMD – SURFACE MOUNT SN-PB OR SN PLATED – POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DCTC42						
Capacitance 1kHz +20°C (μF)	Case Code	Maximum Leakage Current			Max. DF 1kHz +20°C (%)	Max. ESR 500kHz +20°C (mΩ)	Maximum I rms	
		+20°C (μA)	+85°C (μA)	+125°C (μA)			1kHz +20°C (A)	500kHz +20°C (A)
RATED VOLTAGE (+85°C) 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V								
270	C	17.0	170	212	8	25	5.0	6.4
330	C	20.8	208	260	10	25	5.6	6.6
560	D	35.3	353	441	10	25	6.8	8.2
680	D	42.8	428	535	12	25	7.6	8.6
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V								
160	C	16	160	200	8	25	3.6	5.8
220	C	22	220	275	8	25	4.4	6.0
390	D	39	390	487	8	25	6.8	7.4
470	D	47	470	587	10	25	6.8	7.8
RATED VOLTAGE (+85°C) 16 V - CATEGORY VOLTAGE (+125°C) 10 V								
120	C	19.2	192	240	6	35	3.6	5.2
150	C	24.0	240	300	6	30	4.4	5.4
270	D	43.2	432	540	8	25	5.6	7.0
330	D	52.8	528	660	8	25	6.2	7.2
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V								
82	C	16.4	164	205	5	35	3.4	4.8
100	C	20	200	250	6	35	3.6	5.0
180	D	36	360	450	6	25	5.0	6.2
220	D	44	440	550	8	25	5.0	6.6
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V								
56	C	14	140	175	4	40	2.4	4.4
68	C	17	170	212	5	40	2.8	4.6
120	D	30	300	375	6	30	4.4	5.8
150	D	37.5	375	469	6	30	4.8	6.0
RATED VOLTAGE (+85°C) 40 V - CATEGORY VOLTAGE (+125°C) 25 V								
47	C	18.8	188	235	4	45	3.0	4.2
68	D	27.2	272	340	5	35	3.8	5.0
100	D	40	400	500	5	30	4.4	5.4
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 32 V								
33	C	16.5	165	206	3	50	2.8	3.8
39	C	19.5	195	244	4	45	2.8	4.0
47	D	23.5	235	294	4	45	3.4	4.6
RATED VOLTAGE (+85°C) 63 V - CATEGORY VOLTAGE (+125°C) 40 V								
12	C	7.6	76	94	3	80	1.2	3.0
15	C	9.5	95	118	3	70	1.4	3.2
18	C	11.3	113	142	3	65	1.8	3.2
22	C	13.9	139	173	3	60	2.2	3.4
39	D	24.6	246	307	4	45	3.0	4.2
47	D	29.6	296	370	4	45	3.4	4.6

Notes: See notes of DCTC21.

PACKING

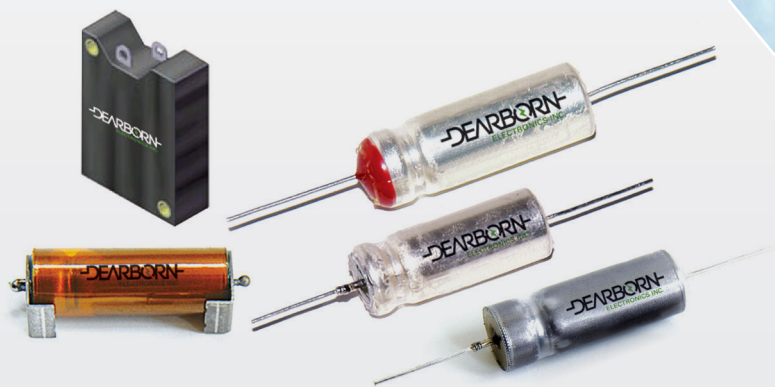
Standard: Bulk

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS (EXTENDED RANGE)

		DCTC42E						
Capacitance 1kHz +20°C (μF)	Case Code	Maximum Leakage Current			Max. DF	Max. ESR	Maximum I rms	
		+20°C (μA)	+85°C (μA)	+125°C (μA)	1kHz +20°C (%)	500kHz +20°C (mΩ)	1kHz +20°C (A)	500kHz +20°C (A)
RATED VOLTAGE (+85°C) 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V								
560	C	35.3	353	441	16	30	4.0	5.8
680	C	42.8	428	535	20	30	4.0	5.8
1200	D	75.6	756	945	24	25	5.0	7.2
1500	D	94.5	945	1181	30	25	5.0	7.2
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V								
390	C	39	390	487	12	30	3.8	5.4
470	C	47	470	587	12	30	4.0	5.8
820	D	82	820	1025	20	25	5.0	7.2
1000	D	100	1000	1250	22	25	5.0	7.2
RATED VOLTAGE (+85°C) 16 V - CATEGORY VOLTAGE (+125°C) 10 V								
270	C	43.2	432	540	10	30	3.6	5.2
330	C	52.8	528	660	12	25	4.0	5.8
560	D	89.6	896	1120	16	25	4.6	7.0
680	D	109.0	1088	1360	20	25	5.0	7.2
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V								
180	C	36	360	450	6	35	3.4	4.8
220	C	44	440	550	8	35	3.4	5.0
390	D	78	780	975	12	30	4.2	6.0
470	D	94	940	1175	12	30	4.4	6.2
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V								
82	C	20.5	205	256	5	50	2.8	4.0
100	C	25	250	312	6	45	3.0	4.2
180	D	45	450	562	6	35	3.6	5.2
220	D	55	550	687	8	35	3.8	5.4
RATED VOLTAGE (+85°C) 40 V - CATEGORY VOLTAGE (+125°C) 25 V								
68	C	27.2	272	340	5	50	2.6	3.8
120	D	48	480	600	6	40	3.2	4.6
150	D	60	600	750	6	40	3.4	4.8
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 32 V								
47	C	23.5	235	294	5	65	2.4	3.4
100	D	50	500	625	6	45	3.2	4.6
RATED VOLTAGE (+85°C) 63 V - CATEGORY VOLTAGE (+125°C) 40 V								
27	C	17.0	170	213	5	80	2.2	3.0
33	C	20.8	208	260	5	75	2.2	3.2
68	D	42.8	428	535	5	50	3.0	4.2
RATED VOLTAGE (+85°C) 80 V - CATEGORY VOLTAGE (+125°C) 50 V								
22	C	22	220	275	5	90	2.0	2.8
47	D	47	470	587	5	70	2.6	3.8

NOTES

GENERAL CHARACTERISTICS



WET TANTALUM
CAPACITORS

ELECTRICAL CHARACTERISTICS

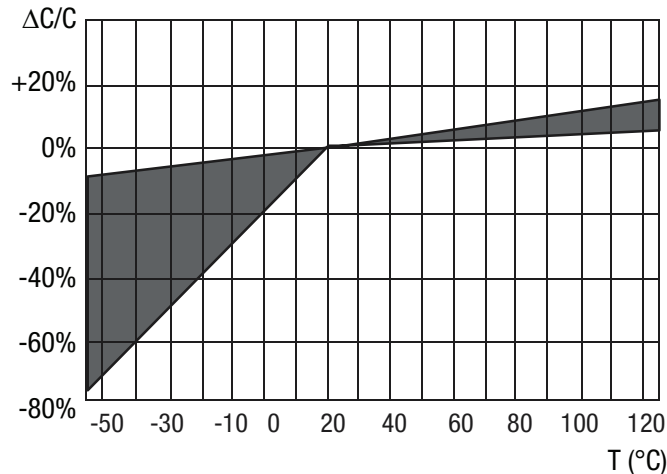
1. CAPACITANCE

The capacitance is defined by a rated value (C_R , indicated on the capacitor) and a tolerance (generally $\pm 20\%$).

The capacitance is measured at a 100Hz frequency under a 0.1 to 1 V AC voltage and a 2.1 to 2.5 V bias (or 9 to 10 V for $U_R \geq 100$ V).

At room temperature, it must be in the range defined by the rated value and the tolerance.

CAPACITANCE CHANGE VS. TEMPERATURE



Maximum changes are given for each type on the data sheet.

2. TOLERANCE (on rated capacitance)

It defines, with the rated capacitance, the range in which the capacitance value must be at room temperature.

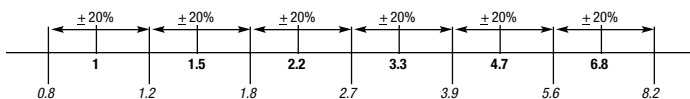
e.g.: Rated capacitance: 100 μ F

Tolerance: 20%

The measured capacitance must be between:

$100 - (20\% \text{ of } 100) = 80 \mu\text{F}$ and $100 + (20\% \text{ of } 100) = 120 \mu\text{F}$

The standard tolerance for tantalum capacitors is 20%.



The values (and multiples) that are indicated in bold characters (*E6 series) can be supplied with standard tolerances $\pm 20\%$ and $\pm 10\%$ ($\pm 5\%$ on request).

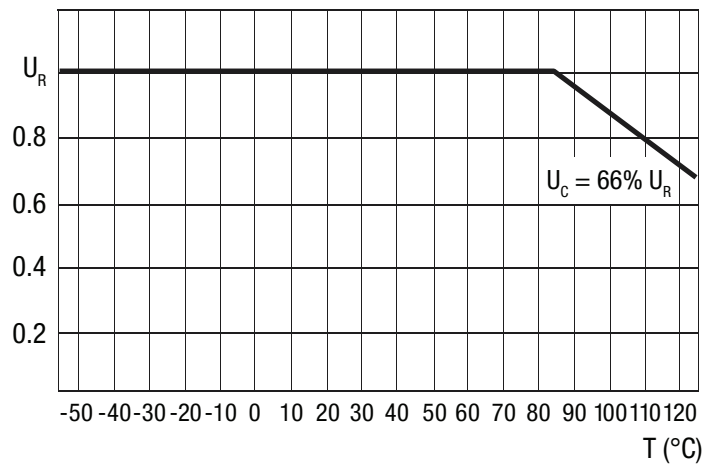
The values (and multiples) that are indicated in italics (*E12 series) can be only supplied with tolerance $\pm 10\%$ ($\pm 5\%$ on request).

*According to EIA.

3. DIRECT DC VOLTAGE

The **rated voltage (U_R)**, indicated on the capacitor, is the maximum DC voltage which can be applied continuously between -55°C and $+85^\circ\text{C}$.

For the types which can be used up to $+125^\circ\text{C}$, the voltage must be derated between $+85^\circ\text{C}$ and $+125^\circ\text{C}$ according to the following curve.



The **category voltage (U_C)** is consequently the maximum DC voltage which can be applied continuously at $+125^\circ\text{C}$.

The **maximum working voltage (U_S)** at $+200^\circ\text{C}$ specified for DCT79 type is equal to $U_R \times 0.5$. Please consult us for this type of use.

The surge voltage is the maximum voltage which can be applied for short periods.

It is given for each type in the data sheet and is generally equal to 1.15 times U_R between -55°C and $+85^\circ\text{C}$ and 1.15 times U_C at $+125^\circ\text{C}$.

Tests are performed with charging periods of 30 seconds through a 1000 Ω resistor, and discharging periods of 330 s 1000 cycles are done.

4. REVERSE VOLTAGE

Capacitors in silver cases (DCT4 and DCT9 types) cannot withstand any reverse voltage: it will cause damage, more or less rapidly depending upon the voltage value. It is therefore necessary to be sure that the bias voltage is high enough to avoid that the AC voltage creates a reverse voltage (negative peak).

Capacitors in tantalum cases (DCT79 type) can withstand 3 V DC reverse voltage. over the entire standard temperature range (-55°C to +125°C).

5. LEAKAGE CURRENT

Leakage current is the residual current which flows through the capacitor after the charging time. under rated voltage. It is measured after a time not exceeding 5 minutes and is given in μA .

It is equivalent to the insulation resistance of the capacitor and it must be as low as possible.

Maximum leakage current is a function of capacitance and rated voltage values and is given. for each type. in the data sheets.

6. DISSIPATION FACTOR

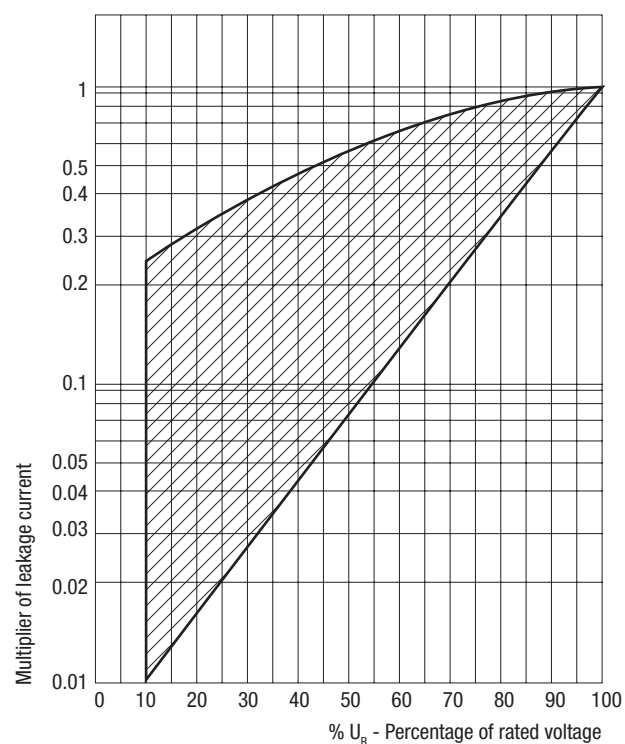
Dissipation factor is generally measured at the same time as the capacitance, with the same conditions. It is a function of the series resistance of the capacitor and the capacitance at low frequency.

$$DF = ESR \times C \times 2\pi f$$

At low frequency, the series resistance is the sum of an ohmic part (leads, contacts, electrolyte,...) and the dielectric losses.

Dissipation factor is given in % and maximum limits are given for each type in the data sheets.

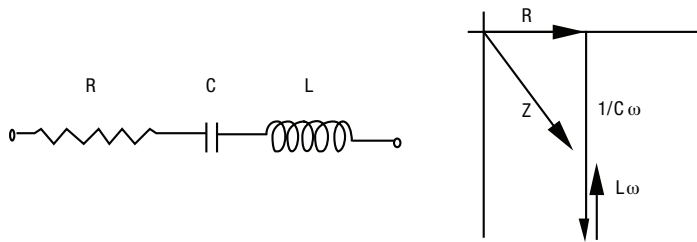
LEAKAGE CURRENT CHANGE VS. APPLIED VOLTAGE



ELECTRICAL CHARACTERISTICS

7. EQUIVALENT SERIES RESISTANCE OR IMPEDANCE

EQUIVALENT CIRCUIT OF A CAPACITOR



R: equivalent series resistance of the capacitor
(leads, contacts, electrolyte, dielectric losses)

L: inductance mainly due to the leads

C: capacitance

EQUIVALENT SERIES RESISTANCE

It is specified at 100Hz and -55°C and the formula for impedance is:

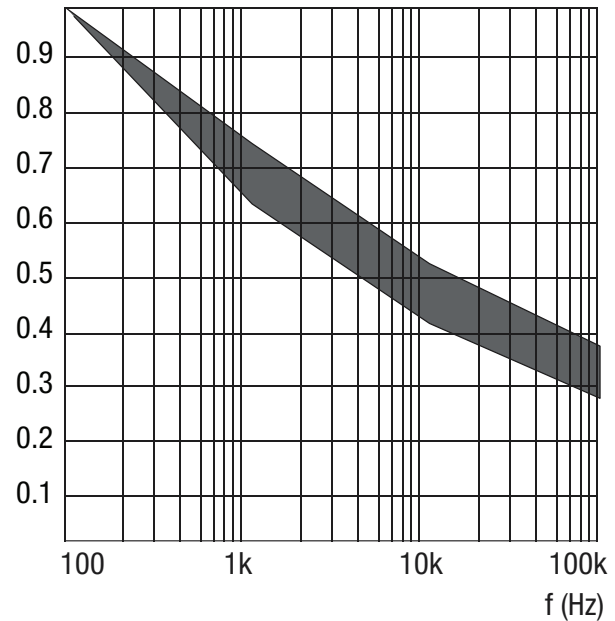
$$Z = \sqrt{R^2 + (L\omega - 1/C\omega)^2}$$

It can be seen that:

- At low frequencies, impedance is a function of capacitance
- At high frequencies, impedance is a function of inductance
- At medium frequencies, it is a function of the ESR

ESR CHANGE VS. FREQUENCY

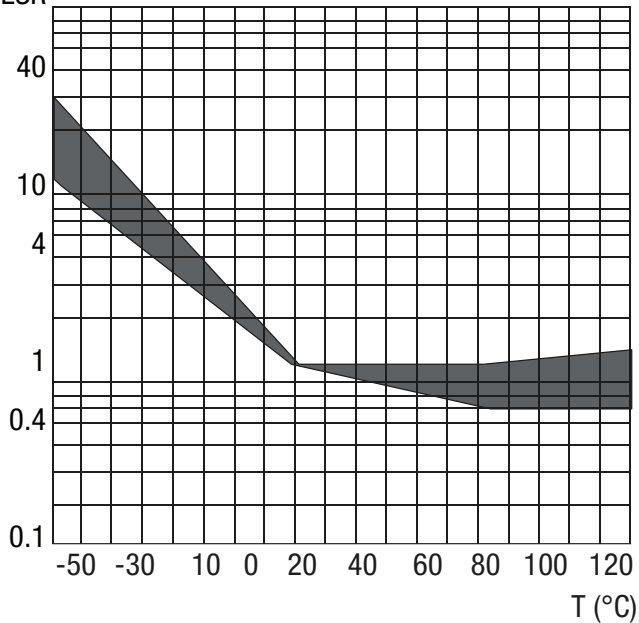
Δ ESR



EQUIVALENT SERIES RESISTANCE

ESR CHANGE VS. TEMPERATURE

Δ ESR



8. MAXIMUM RIPPLE CURRENT

8-1. TYPES DCT79 - DCT79E - DST79

Maximum ripple currents which are indicated in the data sheets are given for the following conditions:

- Temperature: +85°C
- Frequency: 40kHz
- Applied voltage: 0.66 U_R

If conditions are different, use the multipliers given in the table below to calculate the new maximum current.

Frequency		100Hz				1kHz				10kHz				40kHz				100kHz			
Temp. (°C)		+55	+85	+105	+125	+55	+85	+105	+125	+55	+85	+105	+125	+55	+85	+105	+125	+55	+85	+105	+125
Peak voltage in % of U_R	66%	0.60	0.60	0.46	0.27	0.72	0.72	0.55	0.32	0.88	0.88	0.68	0.40	1.0	1.0	0.77	0.45	1.1	1.1	0.85	0.50
	70%	0.60	0.58	0.44	-	0.72	0.70	0.52	-	0.88	0.85	0.64	-	1.0	0.97	0.73	-	1.1	1.07	0.80	-
	80%	0.60	0.52	0.35	-	0.72	0.62	0.42	-	0.88	0.76	0.52	-	1.0	0.87	0.59	-	1.1	0.96	0.65	-
	90%	0.60	0.46	-	-	0.72	0.55	-	-	0.88	0.67	-	-	1.0	0.77	-	-	1.1	0.85	-	-
	100%	0.60	0.39	-	-	0.72	0.45	-	-	0.88	0.55	-	-	1.0	0.63	-	-	1.1	0.69	-	-

8-2. TYPES DCT4 - DCT4E - DCT9 - DCT9E

Maximum ripple currents which are indicated in the data sheets are given for the following conditions:

- Temperature: -55°C to +85°C
- Frequency: From 100Hz to 100kHz and more

Correction vs. Temperature

If the temperature is higher than 85°C, decrease linearly the maximum value from 100% at +85°C to 80% at +125°C.

Correction vs. Frequency

If frequency is lower than 100Hz, apply the following multipliers to the maximum ripple currents:

- 75Hz: 0.7985
- 60Hz: 0.65
- 50Hz: 0.55
- 25Hz: 0.55

8-3. OTHERS RULES (FOR ALL TYPES)

- The sum of the positive peak AC voltage and the DC bias voltage must be lower than the rated voltage.
- The negative peak must not create any reverse voltage (or maximum 3 volts for DCT79 and DCT79E types).
- Because of the increase of the series resistance at low temperature, it is better to not apply directly the maximum ripple current but to increase this gradually to raise the capacitor temperature.

ENVIRONMENTAL / MECHANICAL / RELIABILITY – LIFE TIME CHARACTERISTICS

ENVIRONMENTAL CHARACTERISTICS

1. ENVIRONMENTAL CATEGORY

Environmental category defines the temperature range over which the capacitor can be used continuously, and also the number of days for the humidity test (this test is performed periodically at 40°C with a 93% moisture rate).

Note: It is necessary to derate the voltage for temperatures higher than 85°C (see page 74).

DCT9 and **DCT9E** types can be used at a maximum temperature of 175°C, under 0.5 times rated voltage.

DCT79 and **DCT79E** types can be used at a maximum temperature of 200°C, under 0.5 times rated voltage.

However, as this is not the standard temperature requirement, it is necessary to indicate on the order by adding the letters "HT" (High Temperature) just after the type.

2. THERMAL SHOCKS — RAPID CHANGES OF TEMPERATURE

This test is performed to check that the capacitors can withstand sudden temperature changes. The two-chamber method is used with one at -55°C, the other at +125°C. Five cycles are performed with 30 min at low temperature and 30 min at high temperature, during periodic tests (30 cycles for DCT79 type). Electrical characteristics are measured after this test.

3. HUMIDITY TEST

This test is performed during the periodic testing, with the following conditions:

- Temperature: 40°C
- Humidity: 90 - 95%
- DC voltage: 0 V
- Time: 21 or 56 days

Electrical characteristics are measured after this test.

2. SHOCKS

This test is performed just after the vibration test, with the following conditions for all types:

- Acceleration: 981 m/s²
- Pulse width: 6 ms
- Shape: 1/2 sinewave
- Number of shocks: 3 for each of the 3 directions

RELIABILITY – LIFE TIME

Reliability of a component can be defined as its probability to work without failure, in defined conditions and during a fixed time.

Reliability is not only a function of the component quality, but also of the application and environmental conditions. The parameter which is most commonly used to define reliability is the failure rate in time, generally expressed in % per 1000 hours.

CALCULATION OF A COMPONENT FAILURE RATE USED IN EQUIPMENT

The failure rate is calculated with parameters which are functions of the capacitor (capacitance, case type, approvals, high surge current test) and other ones which are representative of application conditions (voltage, temperature, resistance in series, environmental conditions).

Example:

DCT79E 2200 µF-6.3 V used under 3 volts at 40°C in a satellite in orbit:

$$\pi_t = 1.2 \quad \pi_v = 1.38$$

$$\pi_c = 1.4 \quad \pi_E = 0.5 \quad \pi_q = 1$$

$$\lambda = 3 \times 1.2 \times 1.38 \times 1.4 \times 0.5 \times 1 \cdot 10^{-9} / h = 3.5 \cdot 10^{-9} / h = 0.00035\% \text{ defect} / 1000 \text{ hours}$$

MECHANICAL CHARACTERISTICS

1. VIBRATION

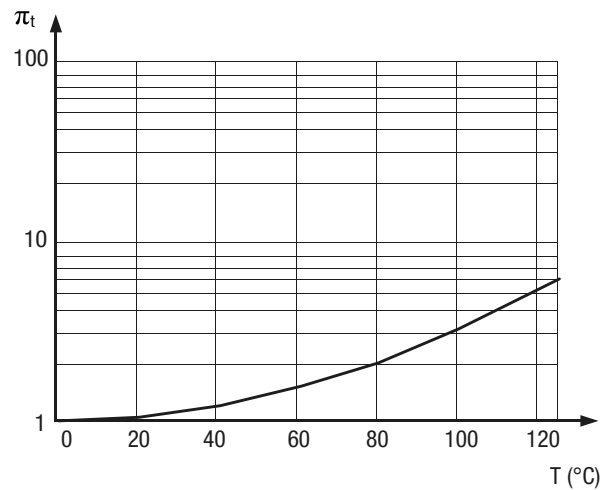
This test is performed during periodic testing, with the following conditions:

- Vibration: High Frequency. MIL-STD-202; Method 204. Condition D (80G Peak)
- Frequency: 10 to 2000Hz
- Amplitude: 1.5 mm or 196 m/s²
- Time: 6 hours

RELIABILITY CALCULATION

$$\lambda = 3 \cdot \pi_t \cdot \pi_v \cdot \pi_c \cdot \pi_e \cdot \pi_q \cdot 10^{-9} / h$$

π_t = TEMPERATURE INFLUENCE



Formula:

$$\pi_t = \exp (1.8 \cdot (t / t_m)^2)$$

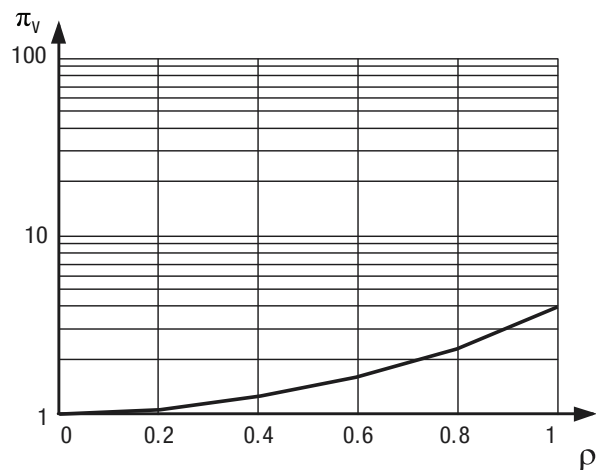
with:

t = appl. temperature

t_m = maximum temperature

Curve for t_m = 125°C

π_v = INFLUENCE OF APPLIED VOLTAGE VS RATED VOLTAGE



Formula:

$$\pi_v = \exp ((\rho / 0.85)^2)$$

$$\rho = \frac{\text{peak voltage}}{\text{rated voltage}}$$

Curve $\pi_v = f(\rho)$

π_c = INFLUENCE OF CAPACITANCE

3.3 μ F

20 μ F

1000 μ F

2200 μ F

$\pi_c = 0.9$

$\pi_c = 1.0$

$\pi_c = 1.3$

$\pi_c = 1.4$

π_q = INFLUENCE OF QUALIFICATION

Products tested in accordance w/ MIL-SPEC

Others products

$\pi_q = 1.0$

$\pi_q = 2.0$

π_e = INFLUENCE OF SURROUNDINGS CONDITIONS

Satellite in orbit

Ground; stationary; protected

Ground; stationary; non protected

Ground; mobile; soft conditions

Aircraft; soft conditions

Ship; soft conditions

Ground; mobile; hard conditions

Ship; hard conditions

Aircraft; hard conditions

Satellite; launching

$\pi_e = 0.5$

$\pi_e = 1.0$

$\pi_e = 2.5$

$\pi_e = 6.0$

$\pi_e = 6.0$

$\pi_e = 6.0$

$\pi_e = 8.0$

$\pi_e = 10.0$

$\pi_e = 15.0$

$\pi_e = 20.0$

SAFETY LEAFLET

PRODUCT SAFETY INFORMATION SHEET

This should be read in conjunction with the Product Data Sheet/Specification.

Failure to observe the ratings, and the information on this sheet may result in a safety hazard.

1. MATERIAL CONTENT

Wet Tantalum Capacitors contain hazardous materials.

The operating section contains:

- Liquid Electrolyte - Gelled Dilute Sulphuric Acid
- Solid Tantalum Anode

The device contains solder coated terminal wires and the materials listed below:

- Silver Case or Tantalum Case
- Silicon Rubber "O" Rings
- P.T.F.E. Spacers
- Filled epoxy resin end cap on Silver Case Product

2. PHYSICAL FORM

These Capacitors are physically small and are cylindrical with axial leads.

3. INTRINSIC PROPERTIES

3.1 Operating Silver Cased Product

These capacitors will operate satisfactorily providing the sum of the applied DC and the peak AC ripple voltage does not exceed the rated DC voltage.

There must be no reversal of polarity. The maximum ripple currents and voltages and DC polarizing voltages are specified in the data sheets.

Tantalum Case devices will stand up to 3 V DC reverse voltage for short periods of time.

A reverse application of the rated voltage will result in loss of capacitance, early short circuit failure and may result in fire or explosion. It may also cause consequential failure of other associated components in circuit, e.g. diodes, transformers, etc.

3.2 Non-Operating

Wet Tantalum capacitors contain electrolyte which is a conducting material. If electrolyte leaks onto a printed circuit board or similar insulated support short circuits are possible.

All electrolytes are corrosive to some extent. No electrolyte should be allowed to come in contact with the skin, eyes etc. and if they do appropriate medical treatment is necessary.

TANTALUM CASES



WET TANTALUM
CAPACITORS

HERMETICALLY SEALED TANTALUM CASES AXIAL LEADS – POLARIZED TYPES

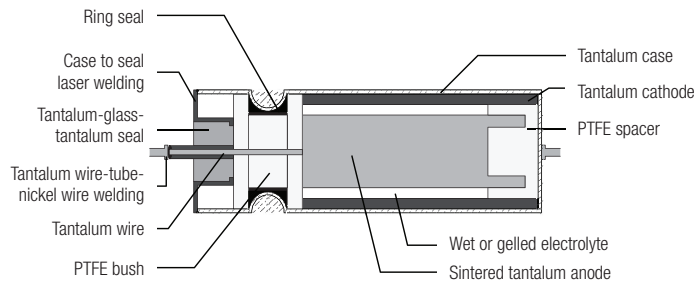
Applicable for types:

Standard range: DCT79

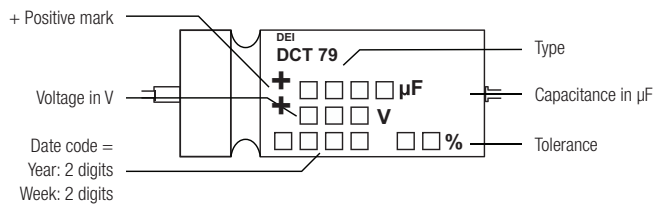
Extended range: DCT79E

Standard range: DST79

CONSTRUCTION



MARKING



PACKAGING

In cardboard boxes.

SILVER CASES AXIAL LEADS – POLARIZED TYPES

Applicable for types:

Standard range - Glass metal seal: DCT9

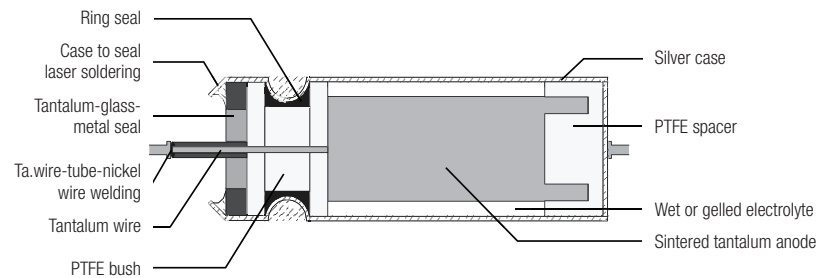
Extended range - Glass metal seal: DCT9E

Standard range - Epoxy end seal: DCT4

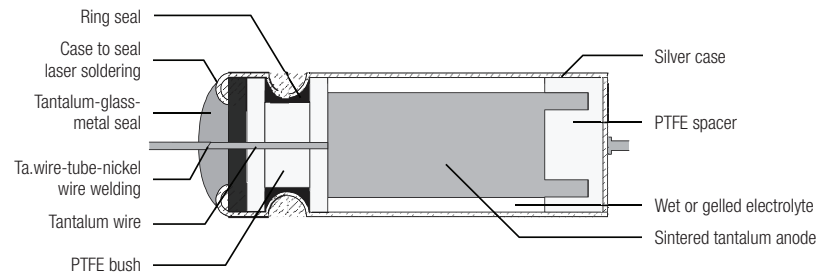
Extended range - Epoxy end seal: DCT4E

CONSTRUCTION

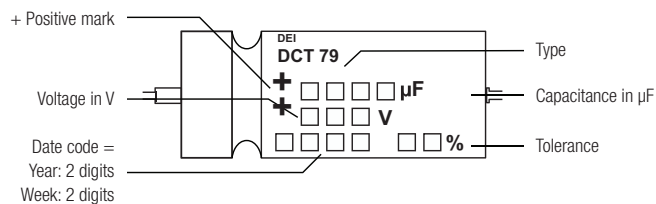
DCT9 - DCT9E



DCT4 - DCT4E



MARKING



PACKAGING

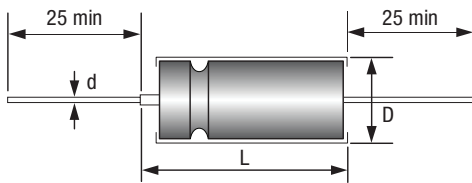
In cardboard boxes.

HERMETICALLY SEALED TANTALUM CASES AXIAL LEADS – POLARIZED TYPES



DIMENSIONS WITH INSULATING SLEEVE (in mm)

Case code	L Max.	D Max.	d $\begin{smallmatrix} +10\% \\ -0.05 \end{smallmatrix}$
A	18	5.6	0.6
B	23	7.4	0.6
C	26	10.1	0.6
D	34	10.1	0.6



MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

	DCT79	DCT79E
Operating temperature	-55°C - +125°C	-55°C - +125°C
Humidity	56 days	56 days
Capacitance range	1.7 μ F - 1200 μ F	5.6 μ F - 2200 μ F
Tolerance	20%...10%	20%...10%
Voltage range	6 V...125 V	6 V...150 V
MAXIMUM CAPACITANCE CHANGE		
-55°C	see table	see table
+85°C	see table	see table
+125°C	see table	see table
MAXIMUM DF		
+20°C	see table	see table
+85°C	= lim 20°C	= lim 20°C
+125°C	= lim 20°C	= lim 20°C
MAXIMUM IMPEDANCE		
-55°C (100Hz)	see table	see table
MAXIMUM LEAKAGE CURRENT		
+20°C	see table	see table
+85°C	see table	see table
+125°C	= lim +85°C	= lim +85°C
MAXIMUM RIPPLE CURRENT		
+85°C (40kHz)	see table	see table
MAXIMUM REVERSE VOLTAGE		
+20°C	3 V	3 V
+85°C	3 V	3 V
+125°C	3 V	3 V
MAXIMUM SURGE VOLTAGE		
+85°C	1.15 x U_R	1.15 x U_R
+125°C	1.15 x U_C	1.15 x U_C

STANDARD RATINGS - ELECTRICAL CHARACTERISTICS

		DCT79 / DCT79 SMD							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Capacitance Change			Max. DF +20°C (%)	Max. Imped. 100Hz -55°C (Ω)	Maximum Leakage Current		Max. I rms 40kHz +85°C (mA)
		-55°C (%)	+85°C (%)	+125°C (%)			+20°C (μA)	+85°C (μA)	
RATED VOLTAGE (+85°C) 6 V - 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V									
30	A	-40	+10	+12	9	100	1	2	820
68	A	-40	+14	+16	15	60	1	2	960
140	B	-40	+14	+16	21	40	1	3	1200
220	B	-44	+16	+18	36	30	1	6.5	1370
270	B	-44	+17	+20	41	25	1	6.5	1375
330	C	-44	+14	+16	36	20	2	7.9	1800
560	C	-64	+17.5	+20	50	25	2	13	1900
1000	D	-80	+25	+25	68	22	3	14	2388
1200	D	-80	+25	+25	86	20	3	14	2388
RATED VOLTAGE (+85°C) 8 V - CATEGORY VOLTAGE (+125°C) 5 V									
25	A	-40	+10.5	+12	7.5	100	1	2	820
56	A	-40	+14	+16	14	59	1	2	900
120	B	-44	+17.5	+20	20	50	1	2	1230
220	B	-44	+16	+18	37	30	1	7	1370
290	C	-64	+17.5	+20	34	25	2	6	1770
430	C	-64	+17.5	+20	46	25	2	14	1825
850	D	-80	+25	+25	60	22	3	16	2456
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V									
20	A	-32	+10.5	+12	6	175	1	2	820
47	A	-36	+14	+16	13	100	1	2	855
100	B	-36	+14	+16	15	60	1	4	1200
150	B	-32	+14	+16	28	45	1	7	1271
180	B	-35	+14	+16	29	40	1	7	1365
250	C	-40	+14	+16	30	30	2	10	1720
390	C	-64	+17.5	+20	44	25	2	15	1800
680	D	-80	+25	+25	42	20	3	16	2487
750	D	-80	+25	+25	50	23	3	16	2487
820	D	-80	+25	+25	53	22	3	16	2360
RATED VOLTAGE (+85°C) 15 V - 16 V - CATEGORY VOLTAGE (+125°C) 10 V									
15	A	-24	+10.5	+12	5	155	1	2	780
33	A	-28	+14	+16	10	90	1	2	820
70	B	-28	+14	+16	13	75	1	4	1150
120	B	-28	+14	+16	18	50	1	7	1450
170	C	-32	+14	+16	25	35	2	10	1480
220	C	-41	+13	+15	21	40	2	6	1490
270	C	-56	+17.5	+20	32	30	2	14	1740
330	C	-58	+18	+20	40	30	2	14	1760
470	D	-75	+25	+25	33	24	3	18	2100
540	D	-80	+25	+25	40	23	3	18	2300
560	D	-80	+25	+25	36	23	3	18	2300
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V									
10	A	-16	+8	+9	4	220	1	2	715
22	A	-20	+10	+12	6.6	140	1	2	825
50	B	-28	+13	+15	11	70	1	2	1130
100	B	-28	+13	+15	15	50	1	9	1435
120	C	-32	+13	+15	21	38	2	6	1450
180	C	-48	+13	+15	26	32	2	13	1700
330	D	-60	+25	+25	28	27	3	20	2000
350	D	-64	+25	+25	35	24	3	20	2246
390	D	-68	+25	+25	32	24	3	20	2025
560	D	-65	+25	+30	46	15	9	36	2040
RATED VOLTAGE (+85°C) 30 V - CATEGORY VOLTAGE (+125°C) 20 V									
8	A	-16	+8	+12	4	275	1	2	640
15	A	-20	+10	+12	5	175	1	2	780
40	B	-24	+10.5	+12	10	65	1	5	1120
68	B	-24	+13	+15	13	60	1	8	1285
100	C	-28	+10.5	+12	17	40	2	12	1477
150	C	-48	+13	+15	23	35	2	12	1525
300	D	-60	+25	+25	30	25	3	20	2100
RATED VOLTAGE (+85°C) 40 V - CATEGORY VOLTAGE (+125°C) 25 V									
12	A	-24	+8	+10	6	234	1	2	450
56	B	-28	+13	+15	14	78	1	9	1100
100	C	-40	+13	+15	18	48	2	17	1450
220	D	-55	+23	+23	22	27	3	22	1900

HERMETICALLY SEALED TANTALUM CASES

AXIAL LEADS – POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DCT79 / DCT79 SMD							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Capacitance Change			Max. DF +20°C (%)	Max. Imped. 100Hz -55°C (Ω)	Maximum Leakage Current		Max. I rms 40kHz +85°C (mA)
		-55°C (%)	+85°C (%)	+125°C (%)			+20°C (μA)	+85°C (μA)	
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 30 V									
5	A	-16	+5	+6	3	400	1	2	580
10	A	-20	+8	+9	4	250	1	2	715
25	B	-20	+10.5	+12	8	95	1	5	1065
47	B	-24	+13	+15	11	70	1	9	1215
60	C	-16	+10.5	+12	12	45	2	12	1335
82	C	-32	+13	+15	15	45	2	10	1460
160	D	-50	+23	+23	17	27	3	22	2040
RATED VOLTAGE (+85°C) 60 V - 63 V - CATEGORY VOLTAGE (+125°C) 40 V									
4	A	-16	+5	+6	2.8	550	1	2	525
8.2	A	-20	+8	+9	4	275	1	2	625
20	B	-16	+10.5	+12	+7	105	1	5	1026
39	B	-24	+10	+12	10	90	1	9	1185
50	C	-16	+10.5	+12	10	50	2	12	1341
68	C	-30	+10.5	+12	13	50	2	10	1393
140	D	-40	+20	+20	16	28	3	22	1990
150	D	-40	+20	+20	17	27	3	22	1865
RATED VOLTAGE (+85°C) 75 V - 80 V - CATEGORY VOLTAGE (+125°C) 50 V									
3.5	A	-16	+5	+6	2.5	650	1	2	525
6.8	A	-20	+8	+9	3	300	1	2	610
15	B	-16	+8	+9	6	150	1	5	1000
33	B	-24	+10	+12	10	90	1	9	1079
40	C	-16	+10.5	+12	9	60	2	12	1293
56	C	-28	+10.5	+15	11	60	2	10	1396
68	C	-30	+14	+15	13	50	2	10	1522
100	D	-35	+20	+20	12	36	9	36	1500
110	D	-35	+20	+20	11	29	3	24	1990
120	D	-36	+20	+20	12	28	3	24	1914
150	D	-48	+21	+22	17	30	9	36	1914
RATED VOLTAGE (+85°C) 100 V - CATEGORY VOLTAGE (+125°C) 65 V									
2.5	A	-16	+7	+8	2	950	1	2	505
4.7	A	-16	+7	+8	3	500	1	2	565
11	B	-16	+8	+8	5	200	1	4	835
22	B	-16	+7	+8	7.5	100	1	9	1065
30	C	-16	+8	+8	7	80	2	12	1240
33	C	-16	+8	+8	7	93	2	10	1200
39	C	-16	+8	+8	8	90	2	10	1282
43	C	-20	+8	+8	8	70	2	10	1389
47	C	-20	+7	+8	8	70	2	10	1389
68	D	-24	+15	+15	8	42	3	26	1859
82	D	-24	+15	+15	10	39	3	24	1859
86	D	-24	+15	+15	10	30	3	24	1859
RATED VOLTAGE (+85°C) 125 V - CATEGORY VOLTAGE (+125°C) 85 V									
1.7	A	-16	+7	+8	2	1250	1	2	415
2.2	A	-16	+7	+8	2	1250	1	2	452
2.7	A	-16	+7	+8	3	780	1	2	452
3.3	A	-16	+7	+8	3	600	1	2	495
3.6	A	-16	+7	+8	2.7	600	1	2	520
3.9	A	-16	+7	+8	3.5	557	1	2	495
9	B	-16	+7	+8	5	240	1	5	755
14	B	-16	+7	+8	6	167	1	7	1050
15	B	-16	+7	+8	6	167	1	7	1050
18	C	-16	+7	+8	5	129	2	9	1130
25	C	-16	+7	+8	6	93	2	10	1335
27	C	-16	+7	+8	6	106	2	13	1282
56	D	-25	+15	+15	6	32	3	28	1859

STANDARD RATINGS - ELECTRICAL CHARACTERISTICS (EXTENDED RANGE)

		DCT79E / DCT79E SMD							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Capacitance Change			Max. DF +20°C (%)	Max. Imped. 100Hz -55°C (Ω)	Maximum Leakage Current		Max. I rms 40kHz +85°C (mA)
		-55°C (%)	+85°C (%)	+125°C (%)			+20°C (μA)	+85°C (μA)	
RATED VOLTAGE (+85°C) 6 V - 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V									
120	A	-41	+15	+16	21	81	1.5	3	820
150	A	-42	+16	+16	34	80	2	9	820
160	A	-42	+16	+16	41	80	2	9	820
220	A	-64	+13	+16	50	36	2	9	1000
470	B	-60	+20	+20	90	46	2	10	1281
560	B	-68	+20	+20	106	48	2	10	1255
820	B	-88	+16	+20	155	18	3	14	1500
1500	C	-90	+20	+25	172	18	5	20	1900
2200	D	-90	+25	+25	170	13	6	24	2300
RATED VOLTAGE (+85°C) 8 V - CATEGORY VOLTAGE (+125°C) 5 V									
120	A	-44	+17.5	+20	32	80	2	6	820
180	A	-60	+13	+16	41	45	2	9	1000
430	B	-64	+17.5	+20	64	54	2	10	1230
680	B	-83	+16	+20	130	22	3	14	1500
1500	C	-90	+20	+25	170	18	5	20	1900
1800	D	-90	+25	+30	138	14	7	25	2300
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V									
68	A	-40	+15	+16	21	85	1.5	3	820
82	A	-40	+16	+16	25	84	2	6	820
100	A	-40	+16	+16	30	82	2	6	820
150	A	-55	+13	+13	34	54	2	9	900
300	B	-54	+16	+18	60	52	2	10	1195
330	B	-54	+17	+18	65	52	2	10	1195
350	B	-60	+18	+18	68	52	2	10	1195
390	B	-60	+19	+20	74	54	2	10	1195
470	C	-65	+18	+20	44	25	2	15	1800
560	B	-77	+16	+20	106	27	3	16	1450
850	C	-84	+25	+25	111	36	4	16	1720
1000	C	-80	+25	+25	92	36	4	16	1720
1200	C	-80	+20	+25	137	18	5	20	1850
1500	D	-88	+25	+30	114	15	7	25	2360
1800	D	-88	+30	+30	138	24	7	25	2360
2200	D	-88	+30	+30	170	22	8	26	2360
RATED VOLTAGE (+85°C) 15 V - 16 V - CATEGORY VOLTAGE (+125°C) 10 V									
47	A	-28	+16	+16	20	100	1.5	3	760
56	A	-28	+16	+16	22	100	1.5	3	760
82	A	-35	+12	+16	20	43	2	6	915
100	A	-44	+13	+16	30	72	2	9	900
220	B	-35	+16	+16	42	62	2	10	1215
270	B	-45	+18	+18	55	60	2	12	1215
290	B	-54	+18	+18	60	65	2	12	1215
330	C	-58	+18	+20	40	30	2	14	1760
390	B	-66	+16	+20	74	31	3	16	1450
680	C	-80	+25	+25	80	42	5	20	1582
750	C	-80	+25	+25	95	42	6	24	1582
820	C	-77	+20	+25	95	22	6	24	1800
850	D	-80	+25	+25	95	24	8	32	2300
1000	D	-77	+25	+25	92	17	8	32	2300
1200	D	-84	+25	+30	103	25	8	32	2300
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V									
27	A	-20	+12	+12	11	140	1.5	3	715
33	A	-24	+14	+14	13	130	1.5	3	715
39	A	-28	+16	+16	16	120	2	9	715
43	A	-28	+16	+16	18	120	2	9	715
68	A	-40	+12	+15	22	90	2	9	850
150	B	-35	+15	+15	32	62	2	10	1130
160	B	-35	+15	+15	34	60	2	10	1130
180	B	-48	+14	+15	34	60	2	10	1130
220	C	-52	+18	+20	33	33	2	13	1614
270	B	-62	+13	+16	55	33	2	16	1400
390	C	-70	+25	+25	48	48	7	28	1396
470	C	-76	+25	+25	48	48	7	28	1398
540	C	-80	+25	+25	60	48	7	28	1398
560	C	-72	+20	+25	60	24	7	28	1750
680	D	-72	+25	+25	60	19	8	32	2100
820	D	-80	+25	+25	82	26	8	32	1862
850	D	-80	+25	+25	95	26	8	32	1970

HERMETICALLY SEALED TANTALUM CASES

AXIAL LEADS – POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS (EXTENDED RANGE)

		DCT79E / DCT79E SMD							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Capacitance Change			Max. DF +20°C (%)	Max. Imped. 100Hz -55°C (Ω)	Maximum Leakage Current		Max. I rms 40kHz +85°C (mA)
		-55°C (%)	+85°C (%)	+125°C (%)			+20°C (μA)	+85°C (μA)	
RATED VOLTAGE (+85°C) 30 V - CATEGORY VOLTAGE (+125°C) 20 V									
25	A	-24	+12	+12	11	160	1.5	3	640
33	A	-30	+12	+14	12	160	2	9	640
47	A	-23	+12	+15	20	57	2	6	830
56	A	-38	+12	+15	22	100	2	9	800
120	B	-32	+15	+15	30	60	2	10	1185
150	B	-35	+15	+15	32	60	2	10	1185
170	B	-48	+15	+15	34	65	2	12	1185
220	B	-60	+13	+16	42	36	3	16	1200
300	C	-60	+15	+15	43	44	6	24	1559
330	C	-65	+25	+25	45	52	6	24	1373
350	C	-70	+25	+25	48	52	8	32	1477
390	C	-75	+25	+25	55	52	8	32	1477
430	C	-80	+25	+25	60	54	8	32	1477
470	C	-65	+20	+25	64	25	8	32	1500
560	D	-65	+25	+30	40	20	9	36	2000
RATED VOLTAGE (+85°C) 40 V - CATEGORY VOLTAGE (+125°C) 25 V									
15	A	-20	+10	+12	7	140	1	2	660
18	A	-20	+12	+12	10	200	1.5	4	580
22	A	-24	+12	+12	11	190	1.5	4	580
33	A	-20	+10	+12	12	88	3	8	795
68	B	-24	+13	+15	15	60	1	8	1285
100	B	-40	+15	+15	25	60	2	10	1285
120	B	-32	+15	+15	30	62	2	12	1241
150	C	-48	+14	+15	23	35	2	12	1525
270	C	-60	+25	+25	37	52	7	28	1373
330	C	-65	+25	+25	43	52	8	32	1373
390	D	-75	+25	+25	43	30	8	32	1900
470	D	-80	+25	+25	45	30	9	36	1900
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 30 V									
18	A	-24	+12	+12	10	200	1.5	3	580
22	A	-24	+12	+12	11	190	2	9	580
33	A	-29	+10	+12	12	135	2	9	700
100	B	-40	+15	+15	25	67	3	15	1150
120	B	-42	+12	+15	22.5	49	4	24	1200
270	C	-46	+20	+25	37	29	8	32	1450
330	D	-46	+25	+30	38	22	9	36	1900
350	D	-70	+25	+25	40	30	9	36	1900
390	D	-75	+25	+25	43	30	9	36	1900
430	D	-80	+25	+25	45	31	10	40	1900
RATED VOLTAGE (+85°C) 60 V - 63 V - CATEGORY VOLTAGE (+125°C) 40 V									
10	A	-20	+8	+9	4	250	1	2	572
12	A	-20	+8	+9	7	233	2	4	572
15	A	-22	+9	+9	8	220	2	9	562
27	A	-24	+10	+12	10	144	3	12	700
47	B	-24	+13	+15	13	70	1	9	1150
56	B	-26	+14	+15	18	72	2	12	1150
82	B	-36	+15	+15	22	70	2	12	1150
100	B	-36	+12	+15	19	54	4	20	1100
100	C	-37	+14	+15	18	42	2	11	1420
120	C	-40	+18	+18	20	49	3	18	1420
220	C	-40	+16	+20	30	29	8	32	1400
270	D	-45	+20	+25	26	23	9	36	1850
330	D	-72	+25	+25	32	31	10	40	1850

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS (EXTENDED RANGE)

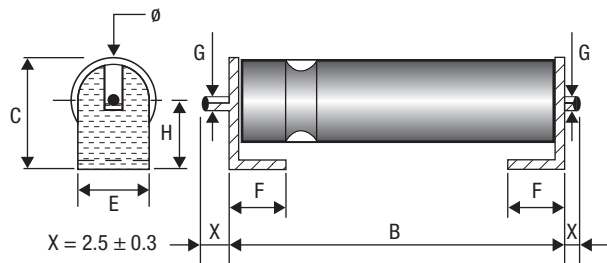
		DCT79E / DCT79E SMD							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Capacitance Change			Max. DF +20°C (%)	Max. Imped. 100Hz -55°C (Ω)	Maximum Leakage Current		Max. I rms 40kHz +85°C (mA)
		-55°C (%)	+85°C (%)	+125°C (%)			+20°C (μA)	+85°C (μA)	
RATED VOLTAGE (+85°C) 75 V - 80 V - CATEGORY VOLTAGE (+125°C) 50 V									
8.2	A	-22	+9	+9	6	280	1.5	3	610
9	A	-22	+9	+9	6	280	2	4	572
22	A	-19	+10	+12	8.5	157	3	12	600
43	B	-24	+10.5	+12	15	89	2	10	1051
47	B	-30	+14	+14	15	87	2	10	1051
56	B	-28	+10.5	+15	11	72	2	12	1051
68	B	-36	+15	+15	21	86	2	12	1051
82	B	-30	+12	+15	15	63	4	24	1000
82	C	-32	+14	+15	15	45	2	10	1335
100	C	-36	+17	+18	19	60	8	32	1335
150	C	-40	+20	+20	25	60	9	36	1335
180	C	-35	+16	+20	28	30	9	36	1335
220	D	-40	+20	+22	24.4	24	10	40	1850
250	D	-68	+25	+25	40	33	10	40	1850
270	D	-68	+25	+25	42	35	11	44	1850
RATED VOLTAGE (+85°C) 100 V - CATEGORY VOLTAGE (+125°C) 65 V									
5.6	A	-17	+8	+8	6	475	2	5	530
10	A	-17	+10	+12	4.5	200	3	12	800
30	B	-16	+8	+8	10	99	3	15	1065
33	B	-16	+8	+8	14	95	3	15	1065
39	B	-20	+12	+12	10	80	2	12	1300
56	C	-28	+14	+15	11	60	2	10	1335
68	C	-30	+14	+15	11.3	40	10	40	1600
100	D	-35	+20	+20	11	36	3	24	1859
120	D	-35	+15	+17	25	30	12	48	2000
RATED VOLTAGE (+85°C) 125 V - CATEGORY VOLTAGE (+125°C) 85 V									
6.8	A	-14	+10	+12	6	300	3	12	700
18	B	-16	+8	+8	8	133	2	10	1065
27	B	-18	+12	+15	7.2	90	5	24	1200
39	C	-16	+8	+8	8	90	2	10	1282
47	C	-23	+10	+10	7.9	50	2	10	1500
68	D	-24	+15	+15	8	42	3	26	1859
82	D	-24	+15	+17	10	32	3	24	1900
RATED VOLTAGE (+85°C) 150 V - CATEGORY VOLTAGE (+125°C) 100 V									
1.7	A	-16	+8	+8	3	780	1	3	495
2.5	A	-16	+8	+8	3	780	1	3	495
3.0	A	-16	+8	+8	3	600	1	3	495
3.3	A	-16	+8	+8	3	600	1	3	495
14	B	-16	+8	+8	10	167	2	10	1065
18	B	-16	+8	+8	10	133	2	10	1065
25	C	-16	+8	+8	20	93	2	20	1335
47	C	-24	+10	+10	20	70	2	20	1335
56	D	-24	+15	+15	30	47	3	30	1860
82	D	-24	+18	+18	30	39	3	30	1860

Note: Voltage 6 V, 8 V, 15 V, 30 V, 50 V, 60 V and 75 V concern the MIL standard range.

HERMETICALLY SEALED TANTALUM CASES
FOR SURFACE MOUNT SMD – POLARIZED TYPES

DIMENSIONS WITH INSULATING SLEEVE (in mm)

Case code	A max.	B ±0.5	F ±0.5	H Max.	E ±0.4	C Max.	G Max.	Ø Max.
A	17.7	13.5	4.0	4.8	3.8	7.5	2.0	5.8
B	22.0	18.5	4.0	5.9	5.3	9.5	2.0	7.4
C	26.6	21.5	4.0	7.5	8.4	12.5	2.0	10.1
D	34.0	29.5	4.0	7.5	8.4	12.5	2.0	10.1



MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

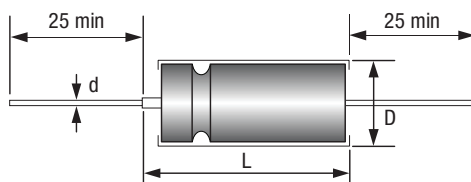
	DCT79 SMD	DCT79E SMD
Operating temperature	-55°C +125°C	-55°C +125°C
Humidity	56 days	56 days
Capacitance range	1.7 µF - 1200 µF	5.6 µF - 2200 µF
Tolerance	20%...10%	20%...10%
Voltage range	6 V...125 V	6 V...150 V
MAXIMUM CAPACITANCE CHANGE		
-55°C	see table	see table
+85°C	see table	see table
+125°C	see table	see table
MAXIMUM DF		
+20°C	see table	see table
+85°C	= lim 20°C	= lim 20°C
+125°C	= lim 20°C	= lim 20°C
MAXIMUM IMPEDANCE		
-55°C (100Hz)	see table	see table
MAXIMUM LEAKAGE CURRENT		
+20°C	see table	see table
+85°C	see table	see table
+125°C	= lim +85°C	= lim +85°C
MAXIMUM RIPPLE CURRENT		
+85°C (40kHz)	see table	see table
MAXIMUM REVERSE VOLTAGE		
+20°C	3 V	3 V
+85°C	3 V	3 V
+125°C	3 V	3 V
MAXIMUM SURGE VOLTAGE		
+85°C	1.15 x U _R	1.15 x U _R
+125°C	1.15 x U _C	1.15 x U _C

HERMETICALLY SEALED TANTALUM CASES VERY HIGH CAPACITANCE – VERY LOW ESR HIGH RIPPLE CURRENT – POLARIZED TYPES – AXIAL LEADS



DIMENSIONS WITH INSULATING SLEEVE (in mm)

Case code	L Max.	D Max.	d $\begin{matrix} +10\% \\ -0.05 \end{matrix}$
A	18	5.6	0.6
B	23	7.4	0.6
C	26	10.1	0.6
D	34	10.1	0.6
X	32.6	7.4	0.6



MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

	DST79
Operating temperature	-55°C +125°C
Humidity	56 days
Capacitance range	10 μ F - 1800 μ F
Tolerance	20%...10%
Voltage range	25 V...125 V
MAXIMUM CAPACITANCE CHANGE	
-55°C	see table
+85°C	see table
+125°C	see table
MAXIMUM DF	
+20°C	see table
+85°C	= lim 20°C
+125°C	= lim 20°C
MAXIMUM IMPEDANCE	
-55°C (100Hz)	see table
MAXIMUM LEAKAGE CURRENT	
+20°C	see table
+85°C	see table
+125°C	= lim +85°C
MAXIMUM ESR	
+25°C (120Hz)	see table
+25°C (40kHz)	see table
MAXIMUM RIPPLE CURRENT	
+85°C (40kHz)	see table
MAXIMUM REVERSE VOLTAGE	
- No continuous reverse voltage - Transient reverse voltage surges are acceptable under the following conditions - The peak reverse voltage is ≤ 1.5 V and the product of the peak current times the duration of the reverse transient is ≤ 0.05 A-second - The repetition rate of the reverse voltage surges is < 10 Hz	
MAXIMUM SURGE VOLTAGE	
+85°C	$1.15 \times U_R$
+125°C	$1.15 \times U_C$

HERMETICALLY SEALED TANTALUM CASES VERY HIGH CAPACITANCE – VERY LOW ESR HIGH RIPPLE CURRENT – POLARIZED TYPES – AXIAL LEADS

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DST79									
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Capacitance Change			Max. DF +20°C (%)	Max. Imped. 120Hz -55°C (Ω)	Maximum Leakage Current		Max. I rms 40kHz +85°C (mA)	Maximum ESR	
		-55°C (%)	+85°C (%)	+125°C (%)			+20°C (μA)	+85°C (μA)		120Hz (Ω)	40kHz (Ω)
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 15 V											
120	A	-42	+8	+12	14	25	1	5	1250	1.3	0.50
560	B	-65	+10	+15	42	12	2	10	2100	0.8	0.30
1200	C	-70	+12	+18	70	7	5	20	2600	0.6	0.23
1800	D	-75	+12	+20	81	6	4	25	3100	0.5	0.20
RATED VOLTAGE (+85°C) 30 V - CATEGORY VOLTAGE (+125°C) 20 V											
100	A	-38	+8	+12	11	25	1	5	1200	1.3	0.50
470	B	-65	+10	+18	36	15	2	10	1800	0.8	0.30
1000	C	-70	+10	+18	63	7	7	25	2500	0.7	0.25
1500	D	-72	+10	+20	81	7	5	30	3000	0.6	0.20
RATED VOLTAGE (+85°C) 40 V - CATEGORY VOLTAGE (+125°C) 25 V											
1000	D	-60	+10	+20	40	8	8	65	2750	0.7	0.25
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 30 V											
68	A	-25	+8	+15	9	35	1	5	1050	1.5	0.60
220	B	-50	+8	+15	18	18	2	10	1800	0.9	0.40
470	C	-50	+8	+15	31	10	3	25	2100	0.7	0.30
680	D	-60	+10	+20	43	8	5	40	2750	0.6	0.20
750	D	-60	+10	+20	40	8	6	55	2750	0.7	0.27
RATED VOLTAGE (+85°C) 60 V - CATEGORY VOLTAGE (+125°C) 40 V											
47	A	-25	+8	+12	9	44	1	5	1050	2.0	0.80
150	B	-40	+8	+15	15	20	2	10	1650	1.1	0.40
390	C	-50	+8	+15	31	13	3	25	2100	0.9	0.40
560	D	-60	+8	+15	40	8	5	40	2750	0.8	0.30
700	D	-60	+10	+20	42	8	7	60	2750	0.7	0.27
RATED VOLTAGE (+85°C) 63 V - CATEGORY VOLTAGE (+125°C) 40 V											
500	D	-60	+8	+15	40	8	5	40	2750	0.8	0.30
RATED VOLTAGE (+85°C) 75 V - CATEGORY VOLTAGE (+125°C) 50 V											
33	A	-25	+5	+9	8	66	1	5	1050	2.5	1.00
110	B	-35	+6	+10	12	24	2	10	1650	1.3	0.50
330	C	-50	+10	+20	29	12	3	30	2100	1.0	0.40
470	D	-60	+10	+20	38	10	5	50	2750	0.9	0.30
RATED VOLTAGE (+85°C) 100 V - CATEGORY VOLTAGE (+125°C) 65 V											
15	A	-18	+3	+10	5	125	1	5	1050	3.5	1.40
68	B	-30	+4	+12	12	37	2	10	1650	2.1	0.80
150	C	-38	+6	+12	21	22	3	25	2100	1.6	0.70
220	D	-50	+6	+12	23	18	5	50	2750	1.2	0.40
RATED VOLTAGE (+85°C) 125 V - CATEGORY VOLTAGE (+125°C) 85 V											
10	A	-15	+3	+10	5	175	1	5	1050	5.5	2.10
47	B	-25	+5	+12	10	47	2	10	1650	2.3	0.90
90	X	-22	+4	+15	10	25	5	25	2000	1.3	0.50
100	C	-25	+5	+10	16	35	3	25	2100	1.8	0.80
150	D	-35	+6	+12	21	22	5	50	2750	1.6	0.60

Note: Development Rating – subject to change. consult us.

MOLDED CASES
AXIAL LEADS OR SMD – SURFACE MOUNT
POLARIZED TYPES

Applicable for types:

Standard range / Extended range:

DCT79 / DCT79E
DST79

Standard range:

SMD available only up to 175°C

HOW TO ORDER

Add "HT" after the type.

Ex.: DCT79 HT D 56 µF 20% 125 V

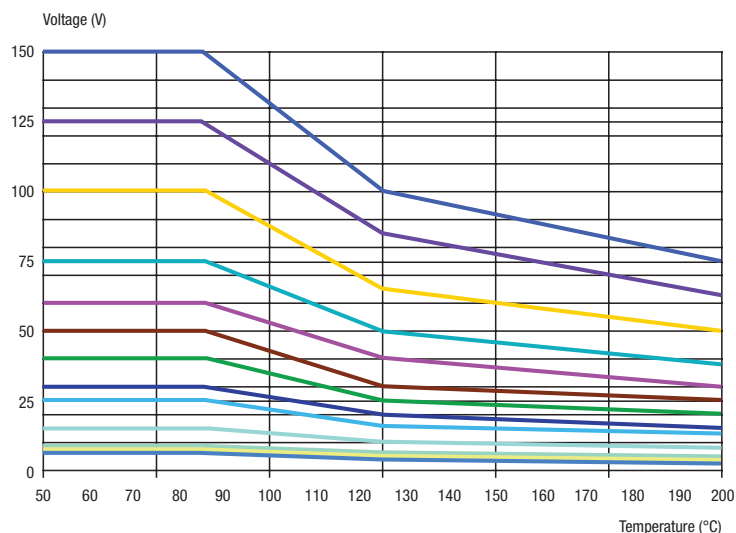
ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

Operating temperature	-55°C +200°C
Humidity	56 days
Capacitance range	1.7 µF - 2200 µF
Tolerance	20%...10%
Voltage range	6 V...150 V
MAXIMUM VOLTAGE	
+125°C	DCT79 / DCT79E / DST79
+150°C	0.6 x U _R
+175°C	0.55 x U _R
+200°C	0.5 x U _R

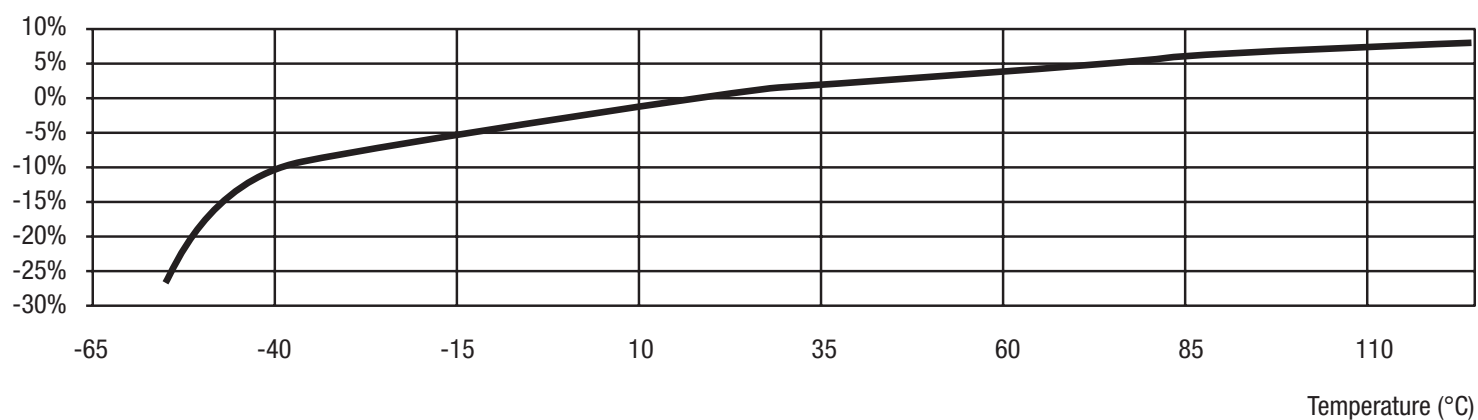
HIGH TEMPERATURE WET TANTALUM CAPACITORS & ASSEMBLIES

- High capacitance in small volume
- High voltage up to 150V
- Low leakage current
- High reliability in time
- High reliability at high temperature up to 200°C
- Hermetically sealed
- High Vibration Level
- Exceptional Shock Performance
- Good temperature stability from -40°C to 200°C
- Designed for down hole applications
- All DCT79 / DCT79E / DST79 models available for high temperature applications

DERATING VOLTAGE VS. TEMPERATURE (°C)



$$DC (\%) = f (T^{\circ})$$

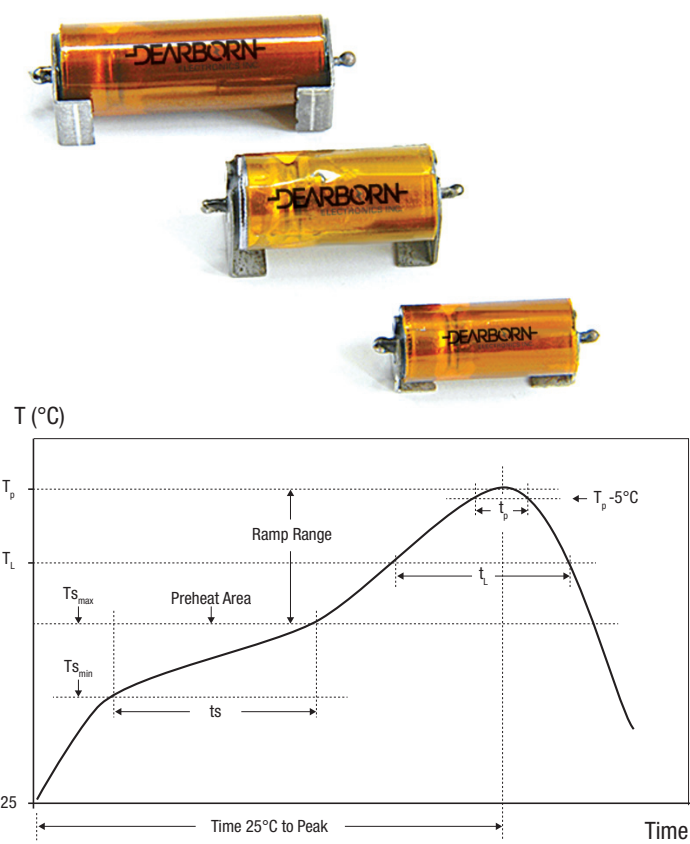


SILVER CASES



WET TANTALUM
CAPACITORS

REFLOW SOLDER PROFILE FOR DCT79SMD



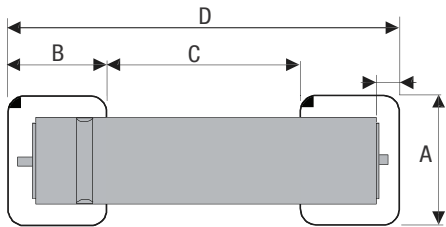
AVERAGE RAMP-UP RATE (T_{smax} TO T_p) 3°C/SECOND MAX.
AVERAGE RAMP-DOWN RATE (T_p TO T_{smax}) 6°C/SECOND MAX.

	T_p	t_p	T_L	t_L	T_{smin}	T_{smax}	t_s	Time 25°C to Peak Temp.
Pb Free Assembly	245°C	10 s	217°C	60 s	150°C	200°C	60 s to 120 s	8 min. max.
Sn-Pb Eutectic Assembly	220°C	10 s	183°C	60 s	100°C	150°C	60 s to 120 s	6 min. max.

Note: All temperatures refer to topside of the package. Measured on the package body surface.

DIMENSIONS (in mm)

Case code	A (Min)	B (Nom)	C	D (Nom)	E (Nom)
A	4.7	5.9	5.2	17.1	1.75
B	6.2	5.9	9.7	21.5	1.75
C	9.3	5.9	13.2	25.0	1.75
D	9.3	5.9	21.2	33.0	1.75



Notes: For this models, due to their substantial volume and the thermo-mechanical constraints brought about during the soldering of circuits by the method "infrared forced convection". We advise as far as it is possible by the design of the card to make this soldering manually using a soldering iron. Numerous experiments demonstrate that this solution although difficult to control gives very good results compared with the abovementioned automated method.

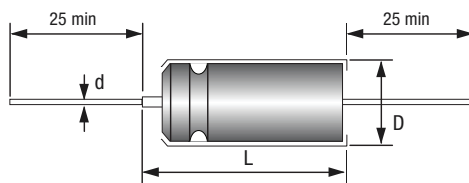
HERMETICALLY SEALED SILVER CASES AXIAL LEADS – POLARIZED TYPES

DCT9 / DCT9E



DIMENSIONS WITH INSULATING SLEEVE (in mm)

Case code	L Max.	D Max.	d $\begin{smallmatrix} +10\% \\ -0.05 \end{smallmatrix}$
A	18	5.8	0.6
B	23	7.4	0.6
C	26	10.1	0.6
D	34	10.1	0.6



MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

	DCT9	DCT9E
Operating temperature	-55°C +125°C	-55°C +125°C
Humidity	56 days	56 days
Capacitance range	3.0 μ F - 1200 μ F	4.7 μ F - 2200 μ F
Tolerance	20%...10%	20%...10%
Voltage range	6.3 V...150 V	6.3 V...150 V
MAXIMUM CAPACITANCE CHANGE		
-55°C	see table	see table
+85°C	see table	see table
+125°C	see table	see table
MAXIMUM DF		
+20°C	see table	see table
+85°C	= lim 20°C	= lim 20°C
+125°C	= lim 20°C	= lim 20°C
MAXIMUM IMPEDANCE		
-55°C	see table	see table
MAXIMUM LEAKAGE CURRENT		
+20°C	see table	see table
+85°C	see table	see table
+125°C	= lim +85°C	= lim +85°C
MAXIMUM RIPPLE CURRENT		
+85°C (100kHz)	see table	see table
MAXIMUM REVERSE VOLTAGE		
+20°C	0 V	0 V
+85°C	0 V	0 V
+125°C	0 V	0 V
MAXIMUM SURGE VOLTAGE		
+85°C	1.15 x U_R	1.15 x U_R
+125°C	1.15 x U_C	1.15 x U_C

HERMETICALLY SEALED SILVER CASES

AXIAL LEADS – POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DCT9							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Capacitance Change			Max. DF +20°C (%)	Max. Imped. 100Hz -55°C (Ω)	Maximum Leakage Current		Max. I rms 100kHz +85°C (mA)
		-55°C (%)	+85°C (%)	+125°C (%)			+20°C (μA)	+85°C (μA)	
RATED VOLTAGE (+85°C) 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V									
68	A	-44	+14	+16	20	72	1	2	80
270	B	-54	+17.5	+20	50	30	1	7	250
560	C	-64	+17.5	+20	60	30	2	16	500
1200	D	-80	+25	+25	100	24	4	16	800
RATED VOLTAGE (+85°C) 8 V - CATEGORY VOLTAGE (+125°C) 5 V									
56	A	-40	+14	+16	28	59	1	2	160
220	B	-44	+17.5	+20	59	30	1	7	270
430	C	-64	+17.5	+20	116	25	1	14	410
850	D	-80	+25	+25	115	22	1.5	16	670
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V									
47	A	-36	+14	+16	18	120	1	2	80
150	B	-36	+14	+16	50	52	1	6	250
180	B	-36	+14	+16	54	48	1	7	250
330	C	-64	+17.5	+20	74	35	2	16	410
390	C	-64	+17.5	+20	88	30	2	16	500
680	D	-80	+25	+25	43	32	4	16	670
820	D	-80	+25	+25	62	28	4	16	850
RATED VOLTAGE (+85°C) 16 V - CATEGORY VOLTAGE (+125°C) 10 V									
33	A	-28	+14	+16	12	108	1	2	80
120	B	-28	+17.5	+20	36	60	1	7	250
220	C	-56	+17.5	+20	55	40	2	16	410
270	C	-56	+17.5	+20	61	36	2	16	500
560	D	-80	+25	+25	51	28	6	24	850
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V									
22	A	-20	+10.5	+12	8	168	1	2	80
100	B	-28	+13	+15	30	60	1	10	250
120	C	-38	+13	+15	32	42	2	12	410
180	C	-48	+13	+15	54	38	2	18	500
390	D	-70	+25	+25	33	29	7	28	850
RATED VOLTAGE (+85°C) 30 V - CATEGORY VOLTAGE (+125°C) 20 V									
8	A	-16	+8	+12	6	275	1	2	80
15	A	-20	+10.5	+12	8	175	1	2	80
68	B	-28	+13	+15	26	65	1	8	250
150	C	-48	+13	+15	28	40	2	18	500
270	D	-60	+25	+25	30	30	8	32	800
RATED VOLTAGE (+85°C) 40 V - CATEGORY VOLTAGE (+125°C) 25 V									
12	A	-24	+8	+10	8	300	1	2	60
56	B	-28	+13	+15	25	84	1	9	250
100	C	-40	+13	+15	19	54	2	17	500
120	D	-50	+20	+20	23	60	9	36	550
220	D	-55	+25	+25	29	32	8	32	780
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 32 V									
10	A	-24	+8	+9	6	300	1	2	80
47	B	-28	+13	+15	21	90	1	9	250
82	C	-32	+12	+12	26	55	2	16	500
180	D	-50	+20	+20	15	27	7	12	750
RATED VOLTAGE (+85°C) 60 V - 63 V - CATEGORY VOLTAGE (+125°C) 40 V									
8.2	A	-24	+8	+9	5	330	1	2	60
20	B	-28	+10.5	+12	11	125	1	5	230
27	B	-28	+10.5	+12	15	110	1	7	230
39	B	-28	+10.5	+12	20	108	1	9	250
68	C	-32	+10.5	+12	31	60	2	16	500
150	D	-40	+20	+20	28	34	8	32	750

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

		DCT9							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Capacitance Change			Max. DF +20°C (%)	Max. Imped. 100Hz -55°C (Ω)	Maximum Leakage Current		Max. I rms 100kHz +85°C (mA)
		-55°C (%)	+85°C (%)	+125°C (%)			+20°C (μA)	+85°C (μA)	
RATED VOLTAGE (+85°C) 75 V - 80 V - CATEGORY VOLTAGE (+125°C) 50 V									
3.5	A	-16	+5	+6	4	650	1	2	60
6.8	A	-20	+8	+9	4	360	1	2	60
33	B	-24	+10.5	+15	15	108	1	10	250
56	C	-28	+10.5	+15	25	72	2	17	500
100	D	-35	+20	+20	24	36	9	36	750
RATED VOLTAGE (+85°C) 100 V - CATEGORY VOLTAGE (+125°C) 63 V									
4.7	A	-16	+7	+8	3.5	600	1	2	60
10	B	-17	+10	+12	8	250	1	12	230
12	B	-17	+10	+12	10	220	1	12	230
22	B	-16	+7	+8	11.5	120	1	9	250
30	C	-16	+7	+8	16	90	2	15	340
39	C	-20	+7	+8	18	87	2	17	340
43	C	-20	+7	+8	20	85	2	17	340
47	C	-20	+7	+8	21	84	2	17	500
82	D	-25	+15	+15	20	50	9	36	750
RATED VOLTAGE (+85°C) 125 V - CATEGORY VOLTAGE (+125°C) 80 V									
3.3	A	-10	+7	+8	4	750	1	2	50
3.9	A	-16	+7	+8	4	720	1	2	50
14	B	-16	+7	+8	14	210	1	7	210
15	B	-16	+7	+8	13.5	200	1	7	250
27	C	-16	+7	+8	20	112	2	13	500
56	D	-25	+15	+15	17	60	10	40	750
RATED VOLTAGE (+85°C) 150 V - CATEGORY VOLTAGE (+125°C) 100 V									
3.0	A	-16	+7	+8	16	710	1	3	110
11	B	-16	+7	+8	16	200	2	12	190
14	C	-16	+7	+8	20	175	4	24	260
22	C	-16	+7	+8	20	110	4	24	260

HERMETICALLY SEALED SILVER CASES

AXIAL LEADS – POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS (EXTENDED RANGE)

		DCT9E							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Capacitance Change			Max. DF +20°C (%)	Max. Imped. 100Hz -55°C (Ω)	Maximum Leakage Current		Max. I rms 100kHz +85°C (mA)
		-55°C (%)	+85°C (%)	+125°C (%)			+20°C (μA)	+85°C (μA)	
RATED VOLTAGE (+85°C) 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V									
180	A	-60	+13	+16	30	55	1	10	90
220	A	-65	+16	+16	40	22	2	9	90
680	B	-80	+20	+20	55	20	3	14	280
820	B	-88	+16	+20	115	22	2	17	280
1500	C	-90	+20	+25	115	22	6	25	540
1800	D	-80	+20	+25	72	16	7	25	800
2200	D	-90	+25	+30	125	16	6	25	800
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V									
120	A	-50	+16	+16	32	50	2	9	80
150	A	-55	+13	+16	25	65	1	10	90
470	B	-70	+20	+20	35	21	3	16	280
560	B	-77	+16	+20	80	34	2	17	280
1000	C	-75	+20	+25	67	12	5	20	540
1200	C	-88	+20	+25	95	22	3	25	540
1500	D	-88	+25	+30	85	18	6	25	800
RATED VOLTAGE (+85°C) 16 V - CATEGORY VOLTAGE (+125°C) 10 V									
100	A	-44	+13	+16	25	88	1	10	80
390	B	-66	+16	+20	55	38	2	17	280
680	C	-70	+15	+20	50	13	5	20	510
820	C	-77	+20	+25	85	27	4	25	510
1000	D	-80	+30	+30	60	21	6	35	750
1200	D	-70	+25	+25	55	17	8	28	750
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V									
82	A	-40	+16	+16	25	50	2	9	70
330	B	-60	+20	+20	30	21	3	16	280
1000	D	-70	+25	+25	40	21	8	28	750
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V									
68	A	-40	+12	+15	17	110	1	10	80
270	B	-62	+13	+16	38	40	2	17	280
470	C	-60	+15	+20	33	18	6	24	510
560	C	-72	+20	+25	58	25	5	35	510
680	D	-80	+25	+30	38	24	6	35	750
820	D	-60	+25	+25	40	17	9	30	750
RATED VOLTAGE (+85°C) 30 V - CATEGORY VOLTAGE (+125°C) 20 V									
56	A	-32	+16	+16	20	55	2	9	70
180	B	-40	+16	+16	21	27	3	16	280
220	B	-40	+16	+16	23	25	3	16	280
390	C	-55	+20	+25	27	15	6	24	510
680	D	-60	+25	+25	36	20	7	25	750
RATED VOLTAGE (+85°C) 40 V - CATEGORY VOLTAGE (+125°C) 25 V									
39	A	-35	+10	+12	12	140	2	10	70
47	A	-45	+16	+20	16	60	2	9	70
150	B	-52	+13	+16	22	50	4	35	270
330	C	-60	+20	+25	22	30	6	40	500
470	D	-70	+25	+30	35	28	6	40	750
560	D	-55	+25	+25	26	29	8	28	750
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 32 V									
33	A	-24	+12	+12	16	120	2	9	70
120	B	-35	+15	+15	18	26	3	18	280
160	C	-35	+20	+25	22	32	3	32	420
270	C	-40	+20	+25	30	24	7	28	500
390	D	-45	+20	+25	25	20	8	32	750

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS (EXTENDED RANGE)

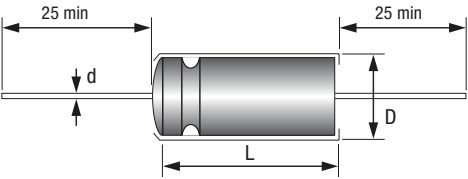
		DCT9E							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Capacitance Change			Max. DF +20°C (%)	Max. Imped. 100Hz -55°C (Ω)	Maximum Leakage Current		Max. I rms 100kHz +85°C (mA)
		-55°C (%)	+85°C (%)	+125°C (%)			+20°C (μA)	+85°C (μA)	
RATED VOLTAGE (+85°C) 60 V - 63 V - CATEGORY VOLTAGE (+125°C) 40 V									
27	A	-24	+10	+12	8	180	2	15	70
100	B	-36	+12	+15	15	70	4	25	280
220	C	-40	+16	+20	23	36	5	35	510
270	D	-65	+25	+30	26	35	6	40	750
330	D	-45	+20	+25	23	24	9	36	750
RATED VOLTAGE (+85°C) 75 V - 80 V - CATEGORY VOLTAGE (+125°C) 50 V									
8.2	A	-16	+12	+12	12	200	1.5	7	60
10	A	-16	+12	+12	12	175	1.5	7	60
12	A	-16	+12	+12	12	155	2	9	70
15	A	-16	+12	+12	12	130	3	12	70
18	A	-16	+12	+12	12	100	3	12	70
22	A	-19	+10	+12	6	190	2	15	70
39	B	-25	+15	+15	20	95	3	15	250
47	B	-25	+15	+15	20	75	3.5	20	260
56	B	-25	+15	+15	20	70	3.5	20	260
68	B	-25	+15	+15	12	42	4	24	280
82	B	-30	+12	+15	12	80	4	25	280
100	C	-30	+16	+20	18	33	8	32	500
120	C	-30	+16	+20	18	28	8	32	500
150	C	-30	+16	+20	18	24	8	32	500
180	C	-35	+16	+20	19	36	5	40	510
220	D	-60	+20	+25	21	30	6	40	750
270	D	-40	+20	+25	18	22	10	40	750
RATED VOLTAGE (+85°C) 100 V - CATEGORY VOLTAGE (+125°C) 63 V									
10	A	-17	+10	+12	4	250	2	15	60
33	B	-25	+15	+15	15	85	4	24	250
39	B	-20	+12	+15	7	96	4	30	250
43	B	-25	+10	+10	15	70	5	24	250
47	B	-25	+10	+10	17	65	5	24	250
56	C	-30	+10	+15	26	45	5	24	500
68	C	-30	+14	+16	8	50	5	50	500
82	C	-30	+10	+15	30	30	10	40	500
120	D	-40	+15	+20	15	36	6	50	750
150	D	-30	+20	+25	25	34	12	48	750
RATED VOLTAGE (+85°C) 125 V - CATEGORY VOLTAGE (+125°C) 80 V									
4.7	A	-15	+6	+6	4	570	1	2	50
5.6	A	-18	+9	+10	7	375	3	12	50
6.8	A	-14	+10	+12	4	360	2	15	50
8.2	A	-17	+12	+12	14	270	4	15	50
18	B	-20	+15	+15	10	120	2	7	250
22	B	-20	+15	+15	15	115	2	9	250
27	B	-18	+12	+15	5	110	4	30	250
33	C	-18	+10	+10	18	90	2	14	500
39	C	-20	+10	+10	18	72	2	15	500
47	C	-26	+16	+16	6	65	5	50	500
68	D	-30	+20	+20	20	40	10	40	750
82	D	-30	+16	+17	8	40	6	50	750
100	D	-30	+20	+25	20	38	12	48	750
120	D	-30	+20	+25	20	38	12	48	750
RATED VOLTAGE (+85°C) 150 V - CATEGORY VOLTAGE (+125°C) 100 V									
5.6	A	-18	+10	+12	15	375	3	12	50
14	B	-20	+12	+15	20	175	4	24	250
22	B	-20	+12	+15	20	110	4	24	250
39	C	-40	+14	+16	20	95	6	40	400
56	D	-40	+15	+20	40	70	8	40	700

SEALED SILVER CASES AXIAL LEADS – POLARIZED TYPES



DIMENSIONS WITH INSULATING SLEEVE (in mm)

Case code	L Max.	D Max.	d ^{+10%} -0.05
A	17	5.8	0.6
B	19	7.4	0.6
C	23	10.1	0.6
D	28	10.1	0.6



MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

	DCT4	DCT4E
Operating temperature	-55°C +125°C	-55°C +125°C
Humidity	56 days	56 days
Capacitance range	4.7 µF - 1000 µF	1.7 µF - 2200 µF
Tolerance	20%...10%	20%...10%
Voltage range	10 V...125 V	6.3 V...150 V
MAXIMUM CAPACITANCE CHANGE		
-55°C	see table	see table
+85°C	see table	see table
+125°C	see table	see table
MAXIMUM DF		
+20°C	see table	see table
+85°C	= lim 20°C	= lim 20°C
+125°C	= lim 20°C	= lim 20°C
MAXIMUM IMPEDANCE		
-55°C (100Hz)	see table	see table
MAXIMUM LEAKAGE CURRENT		
+20°C	see table	see table
+85°C	see table	see table
+125°C	= 1.6 x lim +85°C	= lim +85°C
MAXIMUM RIPPLE CURRENT		
+85°C (100kHz)	see table	see table
MAXIMUM REVERSE VOLTAGE		
+20°C	0 V	0 V
+85°C	0 V	0 V
+125°C	0 V	0 V
MAX SURGE VOLTAGE		
+85°C	1.15 x U _R	1.15 x U _R
+125°C	1.15 x U _C	1.15 x U _C

STANDARD RATINGS - ELECTRICAL CHARACTERISTICS

		DCT4							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Capacitance Change			Max. DF +20°C (%)	Max. Imped. 100Hz -55°C (Ω)	Maximum Leakage Current		Max. I rms 100kHz +85°C (mA)
		-55°C (%)	+85°C (%)	+125°C (%)			+20°C (μA)	+85°C (μA)	
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V									
47	A	-60	+12	+15	32	125	1	5	80
150	B	-60	+12	+15	36	100	2	10	250
470	C	-70	+12	+15	45	80	5	25	500
1000	D	-70	+20	+25	80	50	8	40	850
RATED VOLTAGE (+85°C) 16 V - CATEGORY VOLTAGE (+125°C) 10 V									
33	A	-50	+12	+15	29	125	1	5	80
100	B	-50	+12	+15	32	100	2	10	250
330	C	-60	+12	+15	40	90	5	25	500
680	D	-70	+20	+25	65	75	8	40	800
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V									
22	A	-50	+12	+15	22	175	1	5	80
68	B	-50	+12	+15	27	125	2	10	250
180	C	-60	+12	+15	32	100	5	25	500
390	D	-70	+20	+25	50	90	8	40	850
RATED VOLTAGE (+85°C) 40 V - CATEGORY VOLTAGE (+125°C) 25 V									
12	A	-25	+8	+10	20	400	1	5	60
39	B	-25	+8	+10	24	125	2	10	250
120	C	-50	+8	+10	32	100	5	25	500
270	D	-60	+16	+20	50	90	8	40	820
RATED VOLTAGE (+85°C) 63 V - CATEGORY VOLTAGE (+125°C) 40 V									
8.2	A	-25	+8	+10	16	400	1	5	60
27	B	-25	+8	+10	24	175	2	10	250
82	C	-40	+8	+10	26	125	5	25	500
150	D	-40	+16	+20	45	100	8	40	750
RATED VOLTAGE (+85°C) 100 V - CATEGORY VOLTAGE (+125°C) 63 V									
5.6	A	-20	+8	+10	15	500	1	5	60
15	B	-20	+8	+10	20	300	2	10	250
56	C	-40	+8	+10	24	125	5	25	500
120	D	-40	+15	+17	42	100	8	40	750
RATED VOLTAGE (+85°C) 110 - 125 V - CATEGORY VOLTAGE (+125°C) 80 V									
4.7	A	-15	+8	+10	15	550	1	5	50
12	B	-15	+8	+10	15	400	2	10	250
39	C	-40	+8	+10	18	125	5	25	500
82	D	-40	+12	+15	40	100	8	40	750

SEALED SILVER CASES

AXIAL LEADS – POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS (EXTENDED RANGE)

		DCT4E							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Capacitance Change			Max. DF +20°C (%)	Max. Imped. 100Hz -55°C (Ω)	Maximum Leakage Current		Max. I rms 100kHz +85°C (mA)
		-55°C (%)	+85°C (%)	+125°C (%)			+20°C (μA)	+85°C (μA)	
RATED VOLTAGE (+85°C) 6 V – 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V									
27	A	-50	+15	+15	9	110	1	2	130
30	A	-40	+12	+12	8	100	1	2	140
68	A	-40	+16	+16	18	59	1	2	160
120	B	-50	+20	+20	18	48	1	3	330
140	B	-40	+16	+16	18	40	1	3	330
200	A	-58	+13	+13	40	25	2	9	180
220	A	-65	+16	+16	40	22	2	9	90
270	B	-44	+20	+20	70	25	1	7	270
290	C	-70	+20	+20	45	24	2	7	410
330	C	-40	+16	+16	43	22	2	8	410
560	B	-80	+20	+20	42	21	3	14	210
560	C	-64	+20	+20	110	25	2	13	340
820	B	-80	+20	+20	68	20	3	14	280
1000	D	-80	+25	+25	100	20	3	14	530
1200	C	-85	+25	+25	82	20	5	20	510
1200	D	-80	+25	+25	60	20	3	12	530
1500	C	-85	+20	+25	82	10	5	20	540
1800	D	-80	+25	+25	72	16	7	25	650
2200	D	-80	+20	+25	80	15	9	30	800
RATED VOLTAGE (+85°C) 8 V - CATEGORY VOLTAGE (+125°C) 5 V									
22	A	-50	+15	+15	7	115	1	2	130
25	A	-40	+12	+12	7	100	1	2	140
56	A	-40	+12	+12	15	60	1	2	160
100	B	-50	+20	+20	32	52	1	3	330
120	B	-50	+20	+20	40	48	1	4	330
180	A	-54	+13	+16	36	28	2	9	180
220	B	-44	+20	+20	57	30	1	7	270
260	C	-70	+20	+20	60	37	2	8.5	410
290	C	-70	+20	+20	55	24	2	9.5	410
430	B	-80	+20	+20	42	20	3	14	280
430	C	-64	+20	+20	84	25	2	14	340
620	B	-80	+20	+20	53	17	3	14	290
680	B	-80	+20	+20	55	15	3	14	300
850	C	-80	+25	+25	65	25	4	16	430
850	D	-80	+25	+25	50	22	4	16	670
1200	C	-80	+25	+25	82	13	5	20	460
1400	C	-85	+20	+25	84	11	5	20	480
1600	D	-80	+25	+25	68	18	7	25	650
1800	D	-80	+25	+25	70	16	8	28	670
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V									
18	A	-40	+15	+15	5	130	1	2	130
20	A	-32	+12	+12	5	120	1	2	140
47	A	-36	+16	+16	15	90	1	2	160
85	B	-45	+20	+20	13	61	1	3.5	270
100	A	-50	+16	+16	15	60	1	4	160
100	B	-36	+16	+16	13	60	1	4	270
120	A	-45	+13	+16	32	35	2	9	160
140	A	-50	+16	+16	32	40	2	9	160
150	A	-50	+16	+16	32	40	2	9	90
180	B	-36	+16	+16	46	40	1	7	270
220	C	-60	+20	+20	30	40	2	9	410
250	C	-40	+16	+16	32	35	2	10	410
330	C	-64	+20	+20	75	25	2	16	340
390	C	-64	+20	+20	75	25	2	16	340
470	B	-65	+16	+20	35	16	3	16	300
510	B	-70	+20	+20	45	15	3	16	300
560	B	-70	+20	+20	50	21	3	16	280
680	D	-72	+25	+30	32	19	8	32	610
750	C	-75	+25	+25	67	22	5	20	410
750	D	-80	+25	+25	44	23	4	16	670
1000	C	-75	+20	+25	67	12	5	20	470
1200	C	-75	+20	+25	82	12	5	20	540
1200	D	-75	+30	+30	60	18	8	32	670
1300	D	-75	+25	+25	63	17	7	25	670
1500	D	-75	+25	+25	66	17	8	28	800

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS (EXTENDED RANGE)

		DCT4E							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Capacitance Change			Max. DF +20°C (%)	Max. Imped. 100Hz -55°C (Ω)	Maximum Leakage Current		Max. I rms 100kHz +85°C (mA)
		-55°C (%)	+85°C (%)	+125°C (%)			+20°C (μA)	+85°C (μA)	
RATED VOLTAGE (+85°C) 15 V - 16 V - CATEGORY VOLTAGE (+125°C) 10 V									
13	A	-30	+15	+15	5	160	1	2	120
15	A	-24	+12	+12	5	145	1	2	130
22	A	-20	+12	+12	7	140	1	3	160
33	A	-28	+16	+16	10	100	1	2	160
55	B	-35	+20	+20	11	70	1	3.5	270
68	B	-24	+15	+15	26	60	1	8	270
70	B	-28	+16	+16	11	63	1	4	270
82	A	-38	+13	+16	28	45	2	9	160
100	A	-40	+16	+16	28	40	2	9	80
120	B	-28	+20	+20	27	50	1	7	270
150	C	-55	+20	+20	25	40	2	9	410
170	C	-32	+16	+16	22	38	2	10	410
220	B	-60	+20	+20	24	38	3	16	270
270	B	-60	+20	+20	30	32	3	16	270
270	C	-56	+20	+20	50	30	2	16	340
330	B	-60	+16	+20	30	18	3	16	300
360	B	-60	+20	+20	38	23	3	16	270
390	B	-60	+20	+20	38	21	3	16	280
540	C	-70	+25	+25	45	23	5	20	610
540	D	-80	+25	+25	15	32	3	24	610
560	C	-70	+25	+25	55	20	5	20	440
680	C	-65	+20	+25	50	13	5	20	440
750	C	-70	+25	+25	52	13	6	24	440
820	C	-70	+15	+20	60	13	6	24	510
820	D	-70	+30	+30	60	20	10	40	610
1000	D	-70	+30	+30	60	19	10	40	610
1100	D	-70	+25	+25	53	18	8	25	700
1200	D	-70	+25	+25	55	17	8	28	750
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V									
82	A	-40	+16	+16	25	50	2	9	70
270	B	-60	+20	+20	24	24	3	16	270
330	B	-60	+20	+20	30	21	3	16	280
560	C	-70	+15	+20	40	20	5	20	510
1000	D	-70	+25	+25	40	21	8	28	750
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V									
9	A	-20	+15	+15	4	210	1	2	120
10	A	-16	+9	+9	4	190	1	2	130
12	A	-16	+12	+12	12	155	2	9	70
15	A	-16	+12	+12	12	130	3	12	70
22	A	-20	+12	+12	7	140	1	3	160
39	B	-28	+12	+12	18	90	1	9	250
45	B	-35	+20	+20	15	78	1	5	270
50	A	-35	+15	+15	18	80	2	9	160
50	B	-35	+20	+20	15	70	1	5	270
68	A	-35	+12	+15	22	50	2	9	160
100	B	-28	+15	+15	15	50	1	10	270
100	C	-50	+20	+20	23	45	2	10	410
110	C	-55	+20	+20	25	42	2	11	410
120	C	-30	+20	+20	18	28	6	26	420
180	B	-45	+16	+16	23	40	2	18	270
180	C	-48	+15	+15	46	32	2	18	340
220	B	-45	+16	+16	24	38	3	16	270
270	B	-45	+13	+16	24	19	3	16	300
270	D	-45	+20	+25	23	23	9	36	550
350	C	-60	+25	+25	27	26	7	28	410
350	D	-70	+25	+25	25	24	7	28	580
430	C	-60	+25	+25	27	19	7	28	410
470	C	-60	+25	+25	33	18	6	24	410
510	C	-60	+25	+25	33	16	7	28	440
560	C	-60	+20	+25	35	14	7	28	440
680	D	-72	+25	+30	32	19	8	32	610
750	D	-60	+25	+25	36	18	8	29	610
820	D	-60	+25	+25	40	17	9	30	610

SEALED SILVER CASES

AXIAL LEADS – POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS (EXTENDED RANGE)

		DCT4E							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Capacitance Change			Max. DF +20°C (%)	Max. Imped. 100Hz -55°C (Ω)	Maximum Leakage Current		Max. I rms 100kHz +85°C (mA)
		-55°C (%)	+85°C (%)	+125°C (%)			+20°C (μA)	+85°C (μA)	
RATED VOLTAGE (+85°C) 30 V - CATEGORY VOLTAGE (+125°C) 20 V									
7	A	-20	+15	+15	4	275	1	2	110
8	A	-16	+12	+12	4	235	1	2	130
15	A	-20	+12	+12	8	175	1	2	160
35	B	-30	+20	+20	12	85	1	4	230
39	A	-28	+10	+12	10	70	2	9	140
40	B	-24	+12	+12	10	80	1	5	270
56	A	-32	+15	+15	20	55	2	9	70
68	B	-24	+15	+15	26	60	1	8	270
80	C	-45	+20	+20	15	52	2	10	410
100	C	-28	+12	+12	16	45	2	12	410
150	B	-40	+12	+15	20	24	3	16	300
150	C	-48	+15	+15	38	35	2	18	340
180	B	-40	+13	+16	21	22	3	16	300
200	B	-40	+16	+16	21	21	3	16	300
220	B	-40	+16	+16	23	38	3	16	270
300	C	-55	+25	+25	25	18	7	28	360
300	D	-60	+25	+25	27	25	4	31	550
330	C	-45	+20	+25	25	16	6	24	440
390	C	-55	+20	+25	27	15	6	24	510
430	C	-55	+25	+25	27	15	7	28	440
470	C	-55	+20	+25	29	14	8	32	440
470	D	-55	+30	+30	25	23	8	32	550
560	D	-65	+25	+30	28	20	9	36	590
620	D	-60	+25	+25	32	22	8	29	590
680	D	-60	+25	+25	36	20	7	25	750
RATED VOLTAGE (+85°C) 35 V - 40 V - CATEGORY VOLTAGE (+125°C) 23 V - 25 V									
6.8	A	-20	+9	+9	4	300	1	2	70
27	B	-25	+15	+15	20	90	5	24	250
39	A	-32	+15	+15	18	80	2	9	70
47	A	-32	+15	+15	16	60	2	9	70
100	C	-30	+20	+20	18	33	8	32	420
150	B	-40	+16	+16	20	38	3	16	270
150	D	-30	+20	+25	25	34	12	48	750
220	D	-40	+20	+20	16	24	9	36	450
330	C	-55	+20	+25	26	25	6	24	500
400	D	-60	+25	+25	28	31	8	29	750
470	C	-55	+20	+20	26	24	7	25	500
470	D	-55	+20	+20	26	29	7	25	750
480	D	-60	+25	+25	28	25	8	29	750
560	D	-60	+25	+25	29	24	8	32	750
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 32 V									
4.5	A	-20	+10	+10	3	380	1	2	110
5	A	-16	+6	+6	3	355	1	2	130
5.6	A	-16	+12	+12	5	375	3	12	130
10	A	-24	+9	+9	5	250	1	2	160
22	A	-24	+12	+12	16	125	2	9	130
22	B	-25	+20	+20	10	95	1	4	230
25	A	-24	+12	+12	14	90	1	5	270
25	B	-20	+12	+12	10	90	1	4	270
33	A	-24	+12	+12	16	120	2	9	70
47	B	-28	+15	+15	18	70	1	9	270
55	C	-30	+20	+20	12	55	2	11	410
60	B	-25	+12	+15	12	60	4	24	270
60	C	-16	+12	+12	12	50	2	12	410
82	B	-35	+15	+15	20	45	2	16	270
82	C	-32	+15	+15	21	45	2	16	340
120	B	-35	+15	+15	18	26	3	18	280
150	C	-40	+25	+25	30	33	7	28	370
150	D	-50	+20	+20	17	29	5	32	460
160	C	-40	+25	+25	30	32	12	48	370
160	D	-50	+20	+20	15	27	5	32	460
270	C	-40	+20	+25	24	24	7	28	500
330	D	-46	+25	+30	24	22	9	36	550
360	D	-45	+25	+25	24	21	8	32	750
390	D	-45	+20	+25	25	20	8	32	750

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS (EXTENDED RANGE)

		DCT4E							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Capacitance Change			Max. DF +20°C (%)	Max. Imped. 100Hz -55°C (Ω)	Maximum Leakage Current		Max. I rms 100kHz +85°C (mA)
		-55°C (%)	+85°C (%)	+125°C (%)			+20°C (μA)	+85°C (μA)	
RATED VOLTAGE (+85°C) 60 V - 63 V - CATEGORY VOLTAGE (+125°C) 40 V									
3.6	A	-20	+10	+10	3	485	1	2	100
4	A	-16	+6	+6	3	405	1	2	110
8.2	A	-24	+9	+9	4	275	1	2	140
18	B	-25	+15	+15	7	125	1	4.5	210
20	A	-20	+12	+12	7	120	1	5	140
20	B	-16	+12	+12	6	105	1	5	270
27	A	-20	+12	+12	14	90	3	12	70
39	B	-28	+12	+12	18	90	1	9	230
45	C	-25	+15	+15	10	57	2	11	410
50	B	-30	+15	+15	9	60	2	12	230
50	C	-16	+12	+12	9	55	2	12	410
68	B	-25	+12	+15	12	60	4	24	270
68	C	-32	+12	+12	27	50	2	16	340
100	B	-30	+15	+15	15	28	4	20	280
140	C	-30	+16	+20	18	32	7	28	420
140	D	-40	+20	+20	21	28	8	32	430
220	C	-35	+15	+20	18	17	7	28	510
270	D	-45	+20	+25	23	23	9	36	550
300	D	-45	+20	+20	21	23	8	32	550
330	D	-45	+20	+20	23	24	9	36	750
RATED VOLTAGE (+85°C) 75 V - 80 V - CATEGORY VOLTAGE (+125°C) 50 V									
3	A	-20	+10	+10	2	625	1	2	100
3.5	A	-16	+6	+6	2	505	1	2	110
6.8	A	-20	+9	+9	4	300	1	2	140
8.2	A	-16	+12	+12	12	175	1.5	7	140
10	A	-16	+12	+12	12	165	1.5	7	140
12	A	-16	+12	+12	12	155	2	9	70
13	B	-20	+15	+15	6	160	1	4	190
15	A	-14	+10	+12	12	150	3	12	140
15	B	-16	+9	+9	6	135	1	5	270
18	A	-16	+12	+12	12	125	3	12	140
22	A	-16	+10	+12	12	100	3	12	140
33	B	-24	+15	+15	15	90	1	10	230
35	C	-20	+15	+15	13	68	2	11	410
39	B	-25	+15	+15	20	75	3.5	20	230
40	C	-16	+12	+12	13	60	2	12	410
47	B	-18	+10	+12	20	75	3.5	20	270
56	B	-20	+12	+15	20	70	2	16	270
56	C	-28	+15	+15	22	60	2	17	300
68	B	-25	+15	+15	12	42	4	24	270
82	B	-25	+12	+15	12	30	4	24	300
82	C	-20	+12	+15	18	33	9	36	420
100	C	-30	+20	+20	18	33	8	32	420
100	D	-35	+20	+20	18	31	5	36	420
110	C	-25	+16	+20	18	33	8	32	420
110	D	-35	+20	+20	15	29	5	36	400
120	C	-30	+20	+20	18	28	6	26	420
150	C	-30	+20	+20	18	25	7	28	440
180	C	-30	+16	+20	18	17	8	32	440
180	D	-30	+20	+20	16	28	9	36	470
220	D	-40	+20	+20	16	24	9	36	450
240	D	-40	+20	+20	17	23	9	36	450
270	D	-40	+20	+20	18	22	10	40	450
RATED VOLTAGE (+85°C) 100 V - CATEGORY VOLTAGE (+125°C) 63 V									
2.5	A	-15	+4	+4	2	710	1	2	100
4.7	A	-16	+6	+6	3	500	1	2	130
8.2	A	-12	+12	+12	12	250	3	12	130
10	A	-12	+12	+12	12	200	3	12	130
10	B	-16	+12	+12	12	200	3	12	60
11	B	-15	+6	+6	4	200	1	4	230
22	B	-16	+6	+6	10	100	1	9	230
27	C	-20	+15	+15	8	90	2	11	230
30	C	-15	+8	+8	8	85	2	12	340
33	B	-18	+15	+15	20	85	4	24	250

SEALED SILVER CASES AXIAL LEADS – POLARIZED TYPES

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS (EXTENDED RANGE)

		DCT4E							
Capacitance 100Hz +20°C (μF)	Case Code	Maximum Capacitance Change			Max. DF +20°C (%)	Max. Imped. 100Hz -55°C (Ω)	Maximum Leakage Current		Max. I rms 100kHz +85°C (mA)
		-55°C (%)	+85°C (%)	+125°C (%)			+20°C (μA)	+85°C (μA)	
RATED VOLTAGE (+85°C) 100 V - CATEGORY VOLTAGE (+125°C) 63 V									
39	B	-18	+15	+15	20	80	4	24	250
43	C	-20	+8	+8	16	70	2	17	300
47	B	-25	+10	+10	17	65	5	24	250
56	C	-20	+15	+15	18	45	9	36	400
68	C	-20	+15	+15	18	40	9	36	400
68	D	-25	+15	+15	25	40	6	30	450
82	C	-30	+10	+15	30	30	10	40	500
86	D	-25	+15	+15	15	30	5	35	370
120	D	-40	+20	+20	25	36	12	48	450
150	D	-30	+20	+25	25	34	12	48	750
RATED VOLTAGE (+85°C) 125 V - CATEGORY VOLTAGE (+125°C) 80 V									
1.7	A	-15	+4	+4	2	1090	1	2	100
3.6	A	-16	+5	+5	4	615	1	2	110
6.8	A	-16	+12	+12	12	300	3	12	130
8.2	A	-17	+12	+12	14	270	4	15	50
9	A	-16	+12	+12	12	250	4	15	130
9	B	-15	+6	+6	9	220	1	5	210
10	B	-16	+10	+10	10	210	1	5	190
14	B	-16	+7	+7	10	160	1	7	190
18	C	-15	+10	+10	16	135	4	12	340
25	C	-16	+10	+10	16	120	2	13	260
27	B	-25	+15	+15	20	90	5	24	250
47	C	-30	+10	+15	18	50	10	40	500
56	D	-25	+15	+15	18	32	10	40	330
80	D	-20	+20	+20	20	34	9	50	400
82	D	-40	+20	+20	25	40	12	48	400
120	D	-30	+20	+25	20	38	12	48	750
RATED VOLTAGE (+85°C) 150 V - CATEGORY VOLTAGE (+125°C) 100 V									
3	A	-20	+15	+15	15	750	1	4	100
6.8	B	-15	+10	+10	15	300	2	5	190
11	B	-20	+15	+15	15	200	2	12	190
14	C	-15	+10	+10	20	175	4	24	260
22	C	-20	+15	+15	20	136	4	24	260

CUSTOM DESIGN

Custom assemblies are manufactured according to the specified needs of the customer. Custom assemblies can be designed by Dearborn according to performance specifications or assembled precisely with customer requirements in terms of raw materials and dimensional specifications.

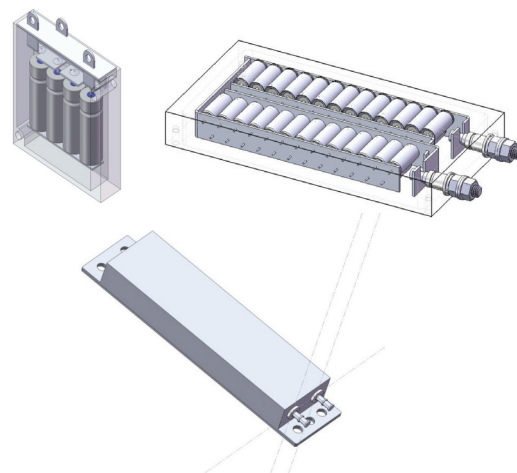
Specific items can include packaging, mechanical interface, terminals, connectors, assemblies, capacitor banks in parallel to provide higher levels of capacitance, low ESR and low ESL.

Benefits: saves manufacturing time, ease of implementation into the design, final assembly testing completed, prescreened lots to provide consistence of electrical performance.

PLEASE GO TO

www.dearbornelectronics.com

to access the custom design questionnaire.



STACKABLE MOLDED CASES

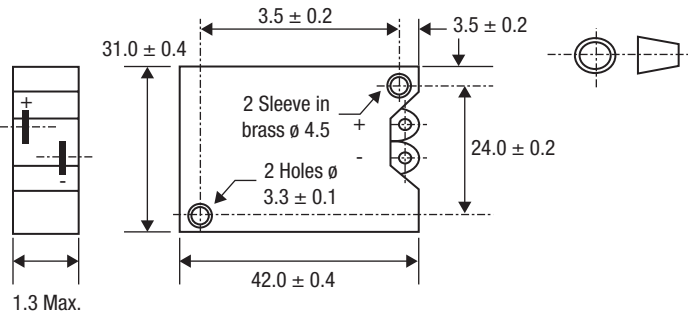


WET TANTALUM
CAPACITORS

ASSEMBLED IN PARALLEL
POLARIZED TYPES – HIGH RIPPLE CURRENT



DIMENSIONS (in mm)



Note: U_R = Rated Voltage
 U_C = Upper Category Voltage

MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

	DSPE0844
Operating temperature	-55°C +125°C
Humidity	56 days
Capacitance range	220 µF - 6000 µF
Tolerance	20%...10%
Voltage range	6 V...125 V
MAXIMUM CAPACITANCE CHANGE	
-55°C	see table
+85°C	see table
+125°C	see table
MAXIMUM DF	
+20°C	see table
+85°C	= lim 20°C
+125°C	= lim 20°C
MAXIMUM IMPEDANCE	
-55°C (100Hz)	see table
MAXIMUM LEAKAGE CURRENT	
+20°C	see table
+85°C	see table
+125°C	= lim +85°C
MAXIMUM RIPPLE CURRENT	
+85°C (40kHz)	see table
MAXIMUM REVERSE VOLTAGE	
+20°C	3 V
+85°C	3 V
+125°C	3 V
MAXIMUM SURGE VOLTAGE	
+85°C	1.15 x U_R
+125°C	1.15 x U_C

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

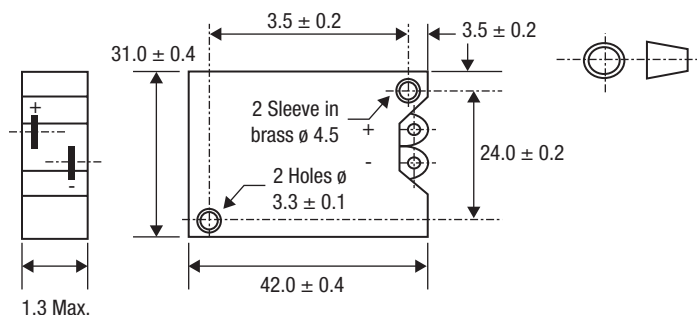
	DSPE0844									
Capacitance 100Hz +20°C (μF)	Maximum Capacitance Change			Maximum Leakage Current		Maximum DF			Max. Imped. 100Hz -55°C (Ω)	Max. I rms 100kHz +85°C (mA)
	-55°C (%)	+85°C (%)	+125°C (%)	+20°C (μA)	+85°C +125°C(μA)	100Hz +20°C (%)	100Hz -55°C (%)	100Hz +125°C (%)		
RATED VOLTAGE (+85°C) 6 V - CATEGORY VOLTAGE (+125°C) 4 V										
6000	-90	25	25	18	54	170	1360	170	22	5.7
RATED VOLTAGE (+85°C) 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V										
5600	-90	25	25	18	54	170	1240	170	22	5.7
RATED VOLTAGE (+85°C) 8 V - CATEGORY VOLTAGE (+125°C) 5 V										
5000	-88	25	25	21	75	138	1000	138	24	5.7
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V										
3900	-88	25	25	21	75	114	920	114	23	5.7
4100	-88	25	25	21	75	114	950	114	23	5.7
4700	-88	25	25	21	75	114	1000	114	23	5.7
5100	-88	25	25	21	75	138	1100	138	24	5.7
RATED VOLTAGE (+85°C) 15 V - CATEGORY VOLTAGE (+125°C) 10 V										
3400	-84	25	25	24	96	103	900	103	25	5.5
RATED VOLTAGE (+85°C) 16 V - CATEGORY VOLTAGE (+125°C) 10 V										
3300	-84	25	25	24	96	103	850	103	25	5.5
RATED VOLTAGE (+85°C) 20 V - CATEGORY VOLTAGE (+125°C) 13 V										
2350	-80	25	25	24	96	60	700	60	24	4.7
2600	-80	25	25	24	96	95	800	95	24	4.7
2800	-80	25	25	24	96	95	800	95	26	4.7
RATED VOLTAGE (+85°C) 25 V - CATEGORY VOLTAGE (+125°C) 16 V										
1500	-80	25	25	24	96	60	450	60	24	4.7
1800	-80	25	25	24	96	60	500	60	24	4.7
1950	-80	25	25	24	96	60	550	60	24	4.7
2200	-80	25	25	24	96	60	650	60	24	4.7
2400	-80	25	25	24	96	95	700	95	26	4.7
RATED VOLTAGE (+85°C) 30 V - CATEGORY VOLTAGE (+125°C) 20 V										
1350	-80	25	25	27	108	45	400	45	24	4.6
1650	-80	25	25	27	108	40	450	40	24	4.7
RATED VOLTAGE (+85°C) 40 V - CATEGORY VOLTAGE (+125°C) 25 V										
1200	-75	25	25	24	96	43	400	43	24	4.6
1300	-80	25	25	27	108	45	450	45	24	4.6
RATED VOLTAGE (+85°C) 50 V - CATEGORY VOLTAGE (+125°C) 30 V										
900	-70	25	25	27	108	40	280	40	33	4.4
1100	-70	25	25	27	108	40	360	40	30	4.6
RATED VOLTAGE (+85°C) 63 V - CATEGORY VOLTAGE (+125°C) 40 V										
750	-70	24	25	27	108	40	200	40	33	4.4
820	-70	24	25	27	108	40	200	40	33	4.4
1000	-72	25	25	30	120	32	300	32	31	4.5
RATED VOLTAGE (+85°C) 75 V - CATEGORY VOLTAGE (+125°C) 50 V										
330	-35	20	20	9	72	11	120	13	29	4.8
340	-35	20	20	9	72	11	120	13	29	4.8
390	-36	20	20	9	72	12	120	13	28	4.6
410	-48	21	22	27	108	17	160	18	30	4.6
470	-48	21	22	27	108	17	160	18	30	4.6
500	-48	21	22	27	108	17	300	18	30	4.6
560	-60	22	22	30	120	37	300	37	32	4.5
600	-60	22	22	30	120	37	320	37	32	4.5
680	-60	22	22	30	120	37	320	37	32	4.5
750	-68	24	25	30	120	40	340	40	33	4.5
RATED VOLTAGE (+85°C) 100 V - CATEGORY VOLTAGE (+125°C) 63 V										
270	-24	15	15	9	72	8	85	11	42	4.5
280	-24	18	18	9	72	10	85	12	39	4.5
300	-24	20	20	9	72	10	90	12	30	4.5
RATED VOLTAGE (+85°C) 125 V - CATEGORY VOLTAGE (+125°C) 83 V										
220	-35	20	20	9	72	11	100	13	36	4.5
235	-35	20	20	9	72	11	100	13	36	4.5

DSPE0844S

ASSEMBLED IN SERIES POLARIZED TYPES



DIMENSIONS (in mm)



Note: U_R = Rated Voltage
 U_C = Upper Category Voltage

MARKING, PACKAGING, CONSTRUCTION: see general characteristics

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

	DSPE0844S
Operating temperature	-55°C +125°C
Humidity	56 days
Capacitance range	27 μ F - 150 μ F
Tolerance	20%...10%
Voltage range	150 V...375 V
MAXIMUM DF	
+20°C	see table
MAXIMUM LEAKAGE CURRENT	
+20°C	see table
MAXIMUM RIPPLE CURRENT	
+85°C (40kHz)	see table

Extension of the DSPE0844 module range to include higher voltages by series connections.

By connecting the inner units of the well known DSPE0844 modular capacitor in series instead of a parallel configuration working voltages up to 375 V can be achieved.

Overall dimensions remain the same as the DSPE0844 range and are as shown.

STANDARD RATINGS – ELECTRICAL CHARACTERISTICS

DSPE0844S			
Capacitance 100Hz +20°C (μ F)	Max. Leakage Current +20°C (μ F)	Max. DF 100Hz +20°C (%)	Max. I rms 40Hz +85°C (A)
RATED VOLTAGE (+85°C) 6 V - CATEGORY VOLTAGE (+125°C) 4 V			
150	3	45	1.5
RATED VOLTAGE (+85°C) 6.3 V - CATEGORY VOLTAGE (+125°C) 4 V			
100	3	32	1.5
RATED VOLTAGE (+85°C) 8 V - CATEGORY VOLTAGE (+125°C) 5 V			
68	3	37	1.5
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V			
33	3	11	1.5
RATED VOLTAGE (+85°C) 10 V - CATEGORY VOLTAGE (+125°C) 6.3 V			
27	3	10	1.5



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