POWER MANAGEMENT

Power Management Group

COILTRONICS®

A leading global brand name in the power magnetics marketplace since 1977.

RoHS 2002/95/EC

Leading-Edge Technology

Cooper Coiltronics® brand magnetics specializes in standard and custom solutions offering the latest in state-of-the-art low profile high power density magnetic components. In working closely with the industry leaders in chipset and core development, we remain at the forefront of innovation and new technology to deliver the optimal mix of packaging, high efficiency and unbeatable reliability. Our designs utilize high frequency, low core loss materials, new and custom core shapes in combination with innovative construction and packaging to provide designers with the highest performance parts available on the market.

Market-Driven Products

Cooper Coiltronics brand magnetics is the first choice in power inductor and transformer solutions to the ever-changing Digital Home, Office and Mobile electronics world. In support of this market, we specialize in inductors and transformers for DC-DC power conversion and switch-mode applications requiring high frequency. Our component solutions can be found in many products requiring power conversion including cellular telephones, digital cameras, MP3 players, notebook and desktop computers & peripherals & LCD displays across the Consumer, Communication, Computer, Industrial and Automotive markets.

Standard Products

Cooper Coiltronics brand product line of power magnetics continually expands to satisfy shifts in technology and related market needs. Categories of Standard Products include:

- Shielded Drum Inductors
- Low Profile Shielded Drum Inductors
- Unshielded Drum Inductors
- High Current Inductors
- Common-Mode Inductors
- Toroidal Inductors
- Transformers
- Custom Magnetics

Custom-Engineered Capabilities

- Inductors and Transformers for DC/DC Converters and Off-Line Switch Mode Power Supplies (To 200 Watts at voltages up to 450Vac [640 Vdc] and Frequencies from 20Khz to 10Mhz)
- Custom SMT Inductors and Transformers

Cooper Coiltronics brand products can provide you with custom designs from print through manufacture. Our design Engineers can take your designated specifications or help you determine what the specifications should be. Either way, we'll get you the right power magnetic solution to your design challenge.

Shielded Drum Inductors and Low Profile Shielded Drum Inductors

Cooper Coiltronics® brand magnetics put forward one of the largest variety of shielded drum core inductors that utilize a magnetic shield reducing EMI effects and have the best power density versus size ratio on the market.

Features:
- Large variety of shapes and sizes
- Maximum Power Density
- Ultra Low Profile (as low as 1.0mm in height)
- Dual Winding: Coupled Inductor, SEPIC, Flyback Transformer, 1:1 Isolation Transformer
- High current
- Magnetic Shielding, Reduced EMI
- Compact Footprint

Standard Product Families:
Shielded Drum:
DR, DRQ, DR124, DR1030, DR1040, DR1050, LDS0705.

Low Profile Shielded Drum:
SD, SDQ, SD3110, SD3112, SD3114, SD3118, SD52, SD53, SD38, SDH3812, SD6020, SD6030, SD7030, SD8328, SD8350.

High Current Inductors

The Cooper Coiltronics® brand high current inductor product lines provide an optimal mix of innovative packaging, high efficiency and unbeatable reliability.

Features:
- Large variety of shapes and sizes
- Low profile (as low as 3mm)
- Low DCR, High Efficiency
- Designed for High Current, Low Voltage Applications
- Foil construction adds higher reliability factor than traditional magnet wire used for higher frequency circuits
- Gapped Ferrite: Maximum Efficiency, Low core loss
- High Temperature Powder Iron: 155°C Maximum Temperature Operation, Organic Binder Eliminates Thermal Aging

Standard Product Families:
HC1, HC2LP, HC3, HC7, HC8, HC8LP, HC9, HCP0703, HCP1104, HCP1305, HCPT1309, HCF1305, FLAT-PAC™(FP2), FLAT-PAC™ (FP3), FLAT-PAC™ 4, (FP4), CPL.

Unshielded Drum Core Inductors

Cooper Coiltronics® brand magnetics offer a wide variety of unshielded drum core inductors in different shapes and sizes to fit all board space constraints.

Features:
- Multiple sizes available
- Miniature Surface Mount Design
- Low Profile
- Small Footprint
- Ferrite Core Material

Standard Product Families:
UNI-PAC™ (UP1B, 2B, 3B, 4B), UNI-PAC™ 0.4C (UP0.4C), UNI-PAC™ 2.8B (UP2.8B), UNI-PAC™ 2C (UP2C), LD.

Toroid Inductors

The Cooper Coiltronics® brand magnetics also offer a mixture of toroid constructed inductors available in surface mount, through hole, and dual winding platforms.

Features:
- Surface Mount and Through-Hole Mounting
- Maximum Power Density
- Dual Winding: Coupled Inductor, SEPIC, Flyback Transformer, 1:1 Isolation Transformer
- Low EMI
- Variety Of Core Materials: Powder Iron, MPP, Gapped Ferrite, Amorphous

Standard Product Families:
ECONO-PAC™, OCTA-PAC®, ™, OCTA-PAC® Plus, MICRO-PAC™, , MICRO-PAC™ Plus, Low Cost Power Inductors (LCPI), Current Sense (CS).

Common-Mode Inductors

Cooper Coiltronics® brand magnetics also offer a variety of surface mount and through hole inductors specifically for common-mode circuits.

Features:
- Variety Of Sizes
- Surface mount and through hole packages
- Wide inductance offering
- Ferrite core material

Standard Product Families:
Common Mode Inductor SMT (CMS), Common Mode Inductor THT (CMT)

Transformers

Cooper Coiltronics® brand magnetics also offer a variety of standard transformers that increase versatility in design needs.

Features:
- Multi-configurable transformer/Inductors
- Variety Of Sizes
- Multi-configurable Power Over Ethernet/PD Flyback and Forward Transformers
- Cold Cathode Fluorescent Lamp (CCFL) Transformers

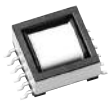
Standard Product Families:
VERSA-PAC® (VP), VERSA-PAC® High Inductance (VPH), Power Over Ethernet/ PD Configurable Transformer (PoE) Flyback and Forward, Cold Cathode Fluorescent Lamp (CCFL)

Custom Magnetics

Cooper Coiltronics® brand magnetics can be customized to meet your application needs. We specialize in designing product to specific requirements and new technology, as well as modifying our standard product platforms to meet your requirements.

Modifications to standard products are available.

All surface mount components are available in tape-and-reel packaging for pick-and-place utilization.



COILTRONICS®

COOPER Bussmann

Inductor Selection Guide

		Product Family	Maximum Current Rating		Maximum Inductance Rating		Winding Configuration	Product Size (mm)			Core	EMI	
			Inductance	Current[1]	Inductance	Current[1]	(if applicable)	L	W	H	Structure	Rating[2]	SMT/THT
High Current		HC3	0.50	78.00	6.0	30.00	-	30.00	25.30	17.50	UI	2	SMT
		HC2 LP	0.47	52.90	6.0	16.50	-	19.20	19.20	11.18	UI	2	SMT
		HCP1305	0.470	38.00	2.200	20.00	-	13.80	12.90	5.00	EI	1	SMT
		HC9	0.200	46.70	47.000	3.65	-	13.80	13.10	7.50	EI	2	SMT
		HCF1305	0.470	32.00	4.700	10.40	-	12.50	12.50	5.00	EI	1	SMT
		FLAT-PAC (FP1308)	0.110	68.00	0.440	32.00	-	13.70	12.95	8.00	UI	2	SMT
		HCP1104	0.200	32.00	0.900	22.00	-	11.50	10.25	4.00	EI	1	SMT
		HCPT1309	0.200	43.10	3.310	11.40	-	13.20	14.00	9.00	EI	1	THT
		HC7	0.47	23.40	4.7	9.20	-	13.00	13.80	5.50	EI	1	SMT
		HC1	0.22	40.50	10.0	5.30	-	13.00	13.00	10.00	UI	2	SMT
		HC7 (HC7-R20)	0.20	35.80	0.20	35.80	-	13.00	14.25	6.00	EI	1	SMT
		HC8	0.15	39.00	47.0	2.40	-	10.40	10.40	4.00	EI	1	SMT
		HC8LP	0.15	29.00	47.0	1.70	-	10.40	10.40	3.50	EI	1	SMT
		FLAT-PAC Single (FP4-S_)	0.100	40.00	0.200	30.00	-	6.80	10.20	5.00	UI	2	SMT
		HCP0703	0.150	26.00	10.000	3.00	-	7.30	7.00	3.00	EI	1	SMT
		FLAT-PAC 5mm (FP2-V_)	0.050	70.00	0.200	19.00	-	7.20	6.70	5.00	UI	2	SMT
		FLAT-PAC Single (FP3-S)	0.100	19.00	15.0	2.00	-	7.25	6.50	3.00	EI	1	SMT
		FLAT-PAC Single (FP2-S_)	0.047	39.00	0.120	18.00	-	7.20	6.70	3.00	UI	2	SMT
		FLAT-PAC Dual (FP2-D_)	0.188	16.00	0.480	9.00	Series	7.20	6.70	3.00	UI	2	SMT
		FLAT-PAC Dual (FP2-D_)	0.047	37.00	0.120	18.00	Parallel	7.20	6.70	3.00	UI	2	SMT
		CPL (Multi-Phase)	See Data Sheet										
Shielded Drum (DR Style)		DRQ127	1.68	8.94	4020.0	0.307	Series	12.50	12.50	8.00	Shld Drum	2	SMT
		DRQ127	0.47	17.90	1000.0	0.610	Parallel	12.50	12.50	8.00	Shld Drum	2	SMT
		DR127	0.47	17.90	1000.0	0.610	-	12.50	12.50	8.00	Shld Drum	2	SMT
		DRQ125	0.47	17.60	1000.0	0.570	Parallel	12.50	12.50	6.00	Shld Drum	2	SMT
		DR125	0.47	17.60	1000.0	0.570	-	12.50	12.50	6.00	Shld Drum	2	SMT
		DRQ125	1.82	8.80	4032.0	0.283	Series	12.50	12.50	6.00	Shld Drum	2	SMT
		DR124	0.47	16.00	1000.0	0.440	-	12.30	12.30	4.50	Shld Drum	2	SMT
		DR1050	0.80	9.70	1000.0	0.430	-	10.50	10.30	5.00	Shld Drum	2	SMT
		DR1040	1.50	6.50	330.0	0.520	-	10.50	10.30	4.00	Shld Drum	2	SMT
		DRQ74	1.18	3.10	4036.0	0.135	Series	7.60	7.60	4.35	Shld Drum	2	SMT
		DRQ74	0.33	6.20	1000.0	0.270	Parallel	7.60	7.60	4.35	Shld Drum	2	SMT
		DR74	0.33	6.26	1000.0	0.270	-	7.60	7.60	4.35	Shld Drum	2	SMT
		DR1030	1.10	7.00	150.0	0.680	-	10.50	10.30	3.00	Shld Drum	2	SMT
		DRQ73	1.22	3.10	3980.0	0.128	Series	7.60	7.60	3.55	Shld Drum	2	SMT
		LDS0705	0.82	7.68	470.0	0.368	-	8.00	7.20	5.00	Shld Drum	2	SMT
		DRQ73	0.33	6.19	1000.0	0.250	Parallel	7.60	7.60	3.55	Shld Drum	2	SMT
		DR73	0.33	6.21	1000.0	0.250	-	7.60	7.60	3.55	Shld Drum	2	SMT
Low Profile Shielded Drum (SD Style)		SD8350	1.80	5.50	100.0	0.800	-	9.50	8.30	4.50	Shld Drum	2	SMT
		SD8328	2.50	4.50	100.0	0.800	-	9.50	8.30	3.00	Shld Drum	2	SMT
		SD7030	3.30	3.00	680.0	0.210	-	7.00	7.00	3.00	Shld Drum	2	SMT
		SD53	1.10	3.25	100.0	0.440	-	5.20	5.20	3.00	Shld Drum	2	SMT
		SD6030	2.70	2.60	680.0	0.160	-	6.00	6.00	3.00	Shld Drum	2	SMT
		SDQ25	0.47	3.71	1000.0	0.127	Parallel	5.20	5.20	2.50	Shld Drum	2	SMT
		SDQ25	1.57	1.86	4032.0	0.063	Series	5.20	5.20	2.50	Shld Drum	2	SMT
		SD25	0.47	3.88	1000.0	0.126	-	5.20	5.20	2.50	Shld Drum	2	SMT
		SD14	0.58	3.52	1000.0	0.117	-	5.20	5.20	1.40	Shld Drum	2	SMT
		SD6020	3.90	1.95	100.0	0.360	-	6.00	6.00	2.00	Shld Drum	2	SMT
		SD52	1.20	2.33	150.0	0.280	-	5.60	5.20	2.00	Shld Drum	2	SMT
		SD18	0.47	3.58	1000.0	0.102	-	5.20	5.20	1.80	Shld Drum	2	SMT
		SDQ12	1.96	1.39	331.0	0.154	Series	5.20	5.20	1.20	Shld Drum	2	SMT
		SDQ12	0.47	2.78	82.0	0.309	Parallel	5.20	5.20	1.20	Shld Drum	2	SMT
		SD20	0.47	3.59	1000.0	0.088	-	5.20	5.20	2.00	Shld Drum	2	SMT
		SD12	0.47	3.19	1000.0	0.086	-	5.20	5.20	1.20	Shld Drum	2	SMT
		SD3118	1.00	2.01	1000.0	0.083	-	3.10	3.10	1.80	Shld Drum	2	SMT
		SD3814	0.47	2.81	680.0	0.100	-	4.00	4.00	1.40	Shld Drum	2	SMT
		SD10	0.47	2.59	470.0	0.110	-	5.20	5.20	1.00	Shld Drum	2	SMT
		SDH3812	0.47	2.69	220.0	0.160	-	4.00	4.00	1.20	Shld Drum	2	SMT
		SD3812	0.47	2.53	220.0	0.160	-	4.00	4.00	1.20	Shld Drum	2	SMT
		SD3114	1.00	1.60	330.0	0.113	-	3.10	3.10	1.40	Shld Drum	2	SMT
		SD3112	1.00	1.39	220.0	0.117	-	3.10	3.10	1.20	Shld Drum	2	SMT
		SD3110	0.50	1.54	220.0	0.106	-	3.10	3.10	1.00	Shld Drum	2	SMT

Note 1 = Current ratings listed are the lower value of the Isat and Irms ratings
Note 2 = EMI Rating: 1) Closed magnetic path - best EMI shield; 2) Small gap, or external shield - some EMI fringing; 3) No shield - Highest EMI
Note 3 = Alternate sizes, terminal styles available

General information needed to select proper inductor:
___I. Inductance and Current requirements
___II. Mounting style (surface mount or thru hole) and size constraints
___III. Frequency of operation (switching frequency)
___IV. Circuit susceptibility to EMI
___V. Consider using two parts in series for lower profiles, higher current ratings or higher inductance values

COOPER Bussmann

Inductor Selection Guide

		Product Family	Maximum Current Rating		Maximum Inductance Rating		Winding Configuration	Product Size (mm)			Core Structure	EMI Rating[2]	SMT/THT
			Inductance	Current[1]	Inductance	Current[1]	(if applicable)	L	W	H			
Unshielded Drum Core		UNI-PAC 4B	0.47	19.20	470.0	0.914	-	22.10	15.00	7.87	Drum	3	SMT
		UNI-PAC 3B (UP3B)	0.47	16.00	330.0	0.750	-	19.30	13.21	6.80	Drum	3	SMT
		UNI-PAC 2C (UP2C)	0.47	12.20	1000.0	0.380	-	12.90	9.40	5.20	Drum	3	SMT
		LD2	10.00	3.45	470.0	0.550		7.80	7.00	5.00	Drum	3	SMT
		UNI-PAC 2B (UP2B)	0.47	10.60	1000.0	0.300	-	13.79	10.41	6.00	Drum	3	SMT
		UNI-PAC 2.8B (UP2.8B)	1.00	3.60	150.0	0.620	-	12.90	9.40	2.80	Drum	3	SMT
		UNI-PAC 1B (UP1B)	0.47	6.00	330.0	0.280	-	8.89	6.10	5.00	Drum	3	SMT
		LD1	1.00	2.60	68.0	0.460		4.50	4.00	3.20	Drum	3	SMT
		UNI-PAC 0.4C (UP0.4C)	1.00	2.88	100.0	0.350	-	6.60	4.45	2.92	Drum	3	SMT
Toroid		OCTA-PAC Plus 4 (CTX_-4A)	0.33	12.20	300.0	0.75	Parallel	13.97	11.43	6.35	Toroid	1	SMT
		OCTA-PAC Plus 4 (CTX_-4A)	1.25	6.09	1211.0	0.37	Series	13.97	11.43	6.35	Toroid	1	SMT
		OCTA-PAC 4 (CTX_-4)	0.47	7.00	300.0	0.62	Parallel	13.97	11.43	6.35	Toroid	1	SMT
		OCTA-PAC 4 (CTX_-4)	1.76	3.50	1192.0	0.31	Series	13.97	11.43	6.35	Toroid	1	SMT
		OCTA-PAC Plus 2 (CTX_-2A)	1.14	5.47	1215.0	0.29	Series	11.43	8.89	5.97	Toroid	1	SMT
		OCTA-PAC Plus 2 (CTX_-2A)	0.33	10.90	300.0	0.58	Parallel	11.43	8.89	5.97	Toroid	1	SMT
		ECONO-PAC 4P (CTX_-4P)	0.47	7.90	300.0	0.54	Parallel	13.97	11.43	6.35	Toroid	1	SMT
		OCTA-PAC Plus 3 (CTX_-3A)	0.33	11.40	300.0	0.54	Parallel	13.97	11.43	4.83	Toroid	1	SMT
		ECONO-PAC 4P (CTX_-4P)	1.95	3.95	1195.0	0.27	Series	13.97	11.43	6.35	Toroid	1	SMT
		OCTA-PAC Plus 3 (CTX_-3A)	1.47	5.72	1185.0	0.27	Series	13.97	11.43	4.83	Toroid	1	SMT
		ECONO-PAC 3P (CTX_-3P)	0.47	6.20	300.0	0.50	Parallel	13.97	11.43	4.83	Toroid	1	SMT
		ECONO-PAC 3P (CTX_-3P)	1.85	3.10	1193.0	0.25	Series	13.97	11.43	4.83	Toroid	1	SMT
		OCTA-PAC Plus 1 (CTX_-1A)	0.33	10.00	300.0	0.47	Parallel	11.43	8.89	4.19	Toroid	1	SMT
		OCTA-PAC Plus 1 (CTX_-1A)	1.61	4.98	1203.0	0.23	Series	11.43	8.89	4.19	Toroid	1	SMT
		ECONO-PAC 2P (CTX_-2P)	2.18	2.95	1201.0	0.21	Series	11.43	8.89	5.97	Toroid	1	SMT
		ECONO-PAC 2P (CTX_-2P)	0.47	5.90	300.0	0.42	Parallel	11.43	8.89	5.97	Toroid	1	SMT
		OCTA-PAC 3 (CTX_-3)	1.54	3.00	1204.0	0.20	Series	13.97	11.43	4.83	Toroid	1	SMT
		OCTA-PAC 3 (CTX_-3)	0.47	6.00	300.0	0.40	Parallel	13.97	11.43	4.83	Toroid	1	SMT
		OCTA-PAC 2 (CTX_-2)	1.69	3.25	1203.0	0.19	Series	11.43	8.89	5.97	Toroid	1	SMT
		OCTA-PAC 2 (CTX_-2)	0.47	6.50	300.0	0.38	Parallel	11.43	8.89	5.97	Toroid	1	SMT
		ECONO-PAC 1P (CTX_-1P)	0.47	5.50	300.0	0.32	Parallel	11.43	8.89	4.19	Toroid	1	SMT
		ECONO-PAC 1P (CTX_-1P)	1.67	2.75	1199.0	0.16	Series	11.43	8.89	4.19	Toroid	1	SMT
		Micro-Pac Plus (MP2A)	0.47	3.52	100.0	0.39	-	7.50	5.20	1.80	Toroid	1	SMT
		OCTA-PAC 1 (CTX_-1)	1.60	2.75	1210.0	0.11	Series	11.43	8.89	4.19	Toroid	1	SMT
		OCTA-PAC 1 (CTX_-1)	0.47	5.50	300.0	0.22	Parallel	11.43	8.89	4.19	Toroid	1	SMT
		Micro-Pac (MP2)	0.47	2.02	47.0	0.31	-	7.50	5.20	1.80	Toroid	1	SMT
		Large Toroid (LCPI) Vertical	various	various	various	various	-	various	various	various	Toroid	1	THT
		Large Toroid (LCPI) Horizontal	various	various	various	various	-	various	various	various	Toroid	1	THT
		Large Toroid (LCPI) w/ Header Vert.	various	various	various	various	-	various	various	various	Toroid	1	THT
		Large Toroid (LCPI) w/ Header Horiz.	various	various	various	various	-	various	various	various	Toroid	1	THT
		Current Sense	various	various	various	various	-	17.15	9.53	20.32	Toroid	1	THT
Transformers		Versa-Pac (VP5/VPH5)	multiple	multiple	multiple	multiple	6 windings	28.50	21.00	10.80	E	2	SMT
		Versa-Pac (VP4/VPH4)	multiple	multiple	multiple	multiple	6 windings	24.60	18.00	10.00	E	2	SMT
		Versa-Pac (VP3/VPH3)	multiple	multiple	multiple	multiple	6 windings	22.30	17.10	8.40	E	2	SMT
		Versa-Pac (VP2/VPH2)	multiple	multiple	multiple	multiple	6 windings	16.80	16.30	7.80	E	2	SMT
		Versa-Pac (VP1/VPH1)	multiple	multiple	multiple	multiple	6 windings	13.00	12.90	6.20	E	2	SMT
		Power Over Ethernet/PD 26W (Forward)	n/a	n/a	n/a	n/a	-	28.50	21.50	10.80	E	2	SMT
		PowerOver Ethernet/PD 13W (Flyback)	n/a	n/a	n/a	n/a	-	24.60	18.00	10.00	E	2	SMT
		Power Over Ethernet/PD 7W (Flyback)	n/a	n/a	n/a	n/a	-	22.30	17.10	8.40	E	2	SMT
		Power Over Ethernet/PD 4W (Flyback)	n/a	n/a	n/a	n/a	-	22.30	17.10	8.40	E	2	SMT
		CCFL 14W	n/a	n/a	n/a	n/a	-	28.50[3]	25.40[3]	15.00[3]	E	2	THT
		CCFL 6W	n/a	n/a	n/a	n/a	-	26.00[3]	16.50[3]	7.10[3]	E	2	SMT
		CCFL 4W	n/a	n/a	n/a	n/a	-	26.00[3]	16.50[3]	5.50[3]	E	2	SMT
		CCFL 2.5W	n/a	n/a	n/a	n/a	-	20.60[3]	14.35[3]	8.00[3]	E	2	SMT
Common-Mode		Common-Mode SMT (CMS3)	78.0	4.75	1600	0.75	-	13.97	11.43	6.00	Toroid	1	SMT
		Common-Mode SMT (CMS2)	30.0	5.35	1600	0.50	-	11.43	8.89	6.00	Toroid	1	SMT
		Common-Mode SMT (CMS1)	5.50	7.00	250	0.85	-	9.40	7.20	2.60	Toroid	1	SMT
		Common-Mode Thru-hole (CMT4) Vert	530	6.50	5400	2.00	-	25.00	15.40	25.50	Toroid	1	THT
		Common-Mode Thru-hole (CMT3) Horz	530	6.50	5400	2.00	-	25.00	25.00	14.00	Toroid	1	THT
		Common-Mode Thru-hole (CMT2)	1600	5.75	30,000	1.50	-	36.50	22.00	44.50	E	2	THT
		Common-Mode Thru-hole (CMT1)	940	6.05	66,000	0.74	-	29.50	22.00	36.50	E	2	THT

Note 1 = Current ratings listed are the lower value of the Isat and Irms ratings

Note 2 = EMI Rating: 1) Closed magnetic path - best EMI shield; 2) Small gap, or external shield - some EMI fringing; 3) No shield - Highest EMI

Note 3 = Alternate sizes, terminal styles available

General information needed to select proper inductor:

___I. Inductance and Current requirements

___II. Mounting style (surface mount or thru hole) and size constraints

___III. Frequency of operation (switching frequency)

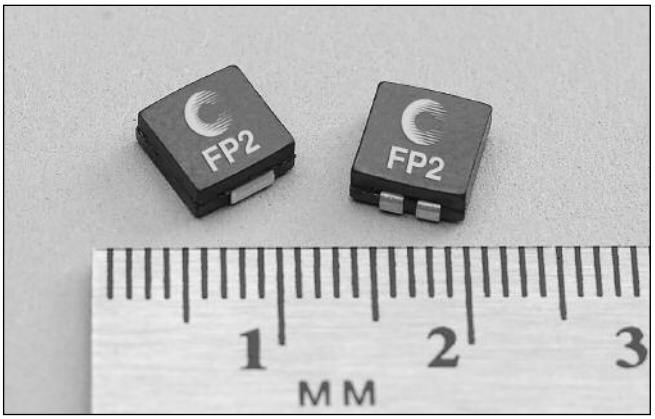
___IV. Circuit susceptibility to EMI

___V. Consider using two parts in series for lower profiles, higher current ratings or higher inductance values

Description

RoHS 2002/95/EC

- 125°C maximum total temperature operation
- Surface mount inductors designed for higher speed switch mode applications requiring lower inductance and high current
- Dual conductors allow for low inductance and high current or high inductance and lower current
- Inductance range from .047uH to 0.480uH
- Current range up to 42 Amps
- Meets UL 94V-0 flammability standard
- Ferrite core material



Applications

- Next generation microprocessors

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +125°C (range is application specific).
- Solder reflow temperature: +260°C max. for 10 seconds max.

Packaging

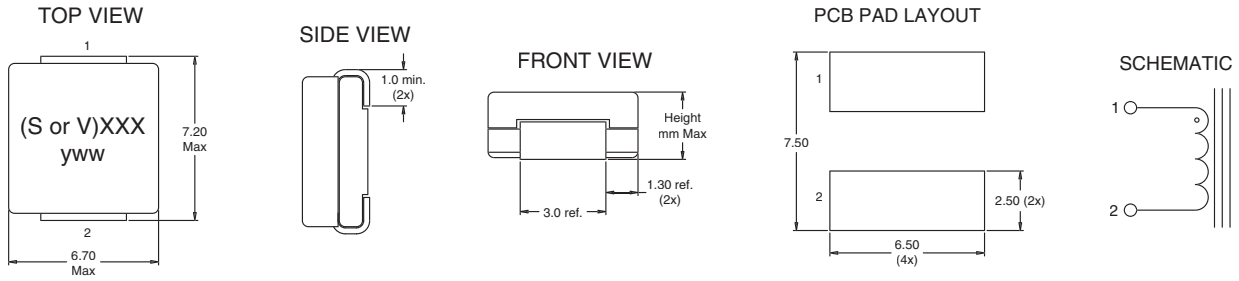
- Supplied in tape and reel packaging, 1700 (FP2-S and FP2-D) and 950 (FP2-S200 and FP2-VXXX) per reel

Parallel Mode							
Part Number	**Inductance µH (rated)**	**OCL(1) µH± 15%**	**I RMS(2) Amps**	**I SAT(3) Amps**	**DCR(4) Ω nom.**	**Height**	**Volt-µ Sec (VµS) ref.(5)**
Single Conductor							
FP2-S047-R	0.047	0.047	39.0	42.0	0.00024	3.00	0.75
FP2-S068-R	0.068	0.068	39.0	32.0	0.00024	3.00	0.75
FP2-S082-R	0.082	0.082	39.0	26.0	0.00024	3.00	0.75
FP2-S100-R	0.100	0.100	39.0	22.0	0.00024	3.00	0.75
FP2-S120-R	0.120	0.120	39.0	18.0	0.00024	3.00	0.75
FP2-S200-R	0.200	0.200	37.0	19.0	0.00028	5.00	0.99
FP2-V050-R	0.050	0.050	37.0	70.0	0.00028	5.00	0.99
FP2-V100-R	0.100	0.100	37.0	40.0	0.00028	5.00	0.99
FP2-V120-R	0.120	0.120	37.0	33.0	0.00028	5.00	0.99
FP2-V150-R	0.150	0.150	37.0	25.5	0.00028	5.00	0.99
Double Conductor							
FP2-D047-R	0.047	0.047	37.0	42.0	0.00026	3.00	0.75
FP2-D068-R	0.068	0.068	37.0	32.0	0.00026	3.00	0.75
FP2-D082-R	0.082	0.082	37.0	26.0	0.00026	3.00	0.75
FP2-D100-R	0.100	0.100	37.0	22.0	0.00026	3.00	0.75
FP2-D120-R	0.120	0.120	37.0	18.0	0.00026	3.00	0.75
Series Mode							
Part Number	**Inductance µH ref. (rated)**	**OCL(1) µH ref.**	**I RMS(2) Amps**	**I SAT(3) Amps**	**DCR(4) Ω ref.**	**Height**	**Volt-µ(5) Sec (VµS) ref.**
Double Conductor							
FP2-D047-R	0.188	0.188	16.0	21.0	0.0013	3.00	1.50
FP2-D068-R	0.272	0.272	16.0	16.0	0.0013	3.00	1.50
FP2-D082-R	0.328	0.328	16.0	13.0	0.0013	3.00	1.50
FP2-D100-R	0.400	0.400	16.0	11.0	0.0013	3.00	1.50
FP2-D120-R	0.480	0.480	16.0	9.0	0.0013	3.00	1.50

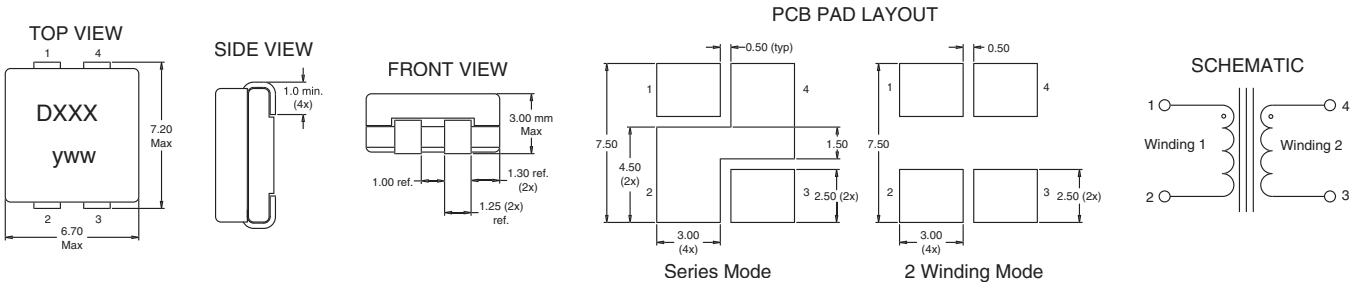
Notes: (1) Open Circuit Inductance Test Parameters: 1MHz, .100Vrms, 0.0Adc.
(2) RMS current for an approximate ΔT of 40°C without core loss. It is recommended that the temperature of the part not exceed 125°C.
(3) Peak current for approximately 30% rolloff at 20°C.
(4) DCR limits 20°C.
(5) Applied Volt-Time product (V-µS) across the inductor. This value represents the applied V-µS at 500KHz necessary to generate a core loss equal to 10% of the total losses for 40°C temperature rise.

Mechanical Diagrams

Single Conductor

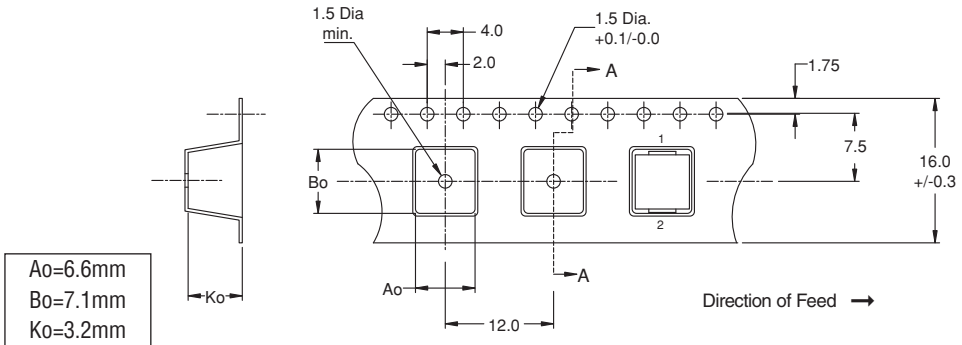


Dual Conductor



Notes: (1) Marking SXXX = S: Single Conductor Style, DXXX = D: Dual Conductor Style, XXX - last three digits of part number. Date Code: yww = y: Last Digit of year, ww: week of year.
(2) All Dimensions are in millimeters unless otherwise specified.
(3) For parallel mode operation, connect terminals 1 to 4 and 2 to 3 on PCB (use Single Conductor PCB Layout) For series mode operation, connect terminals 2 to 4 on PCB (Dual Conductor Model).

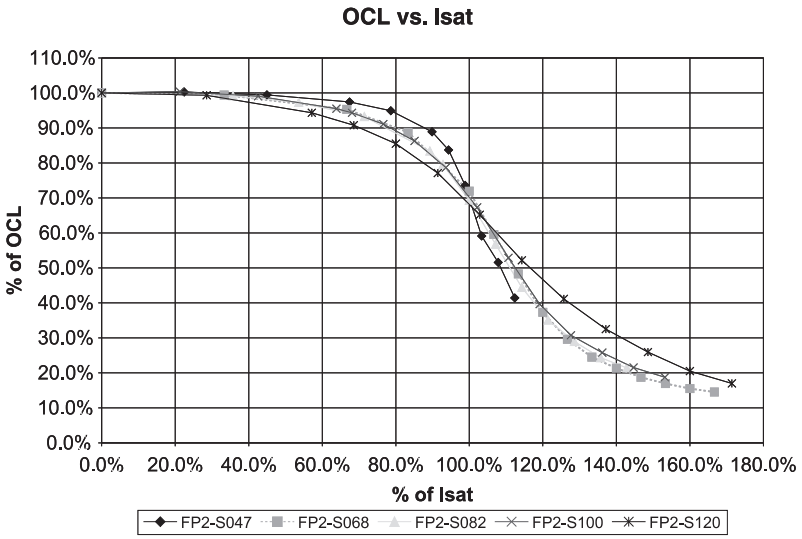
Packaging Information

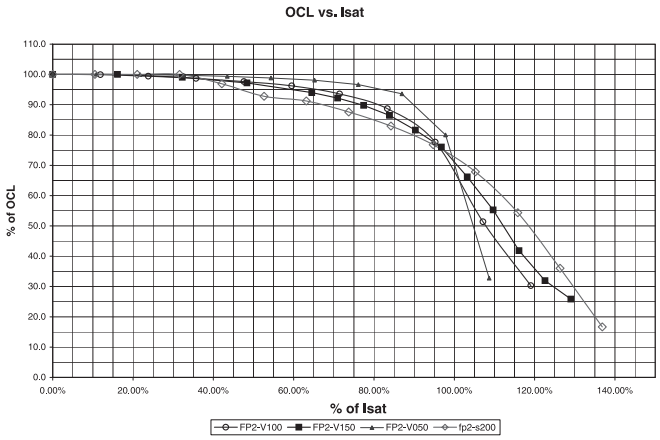


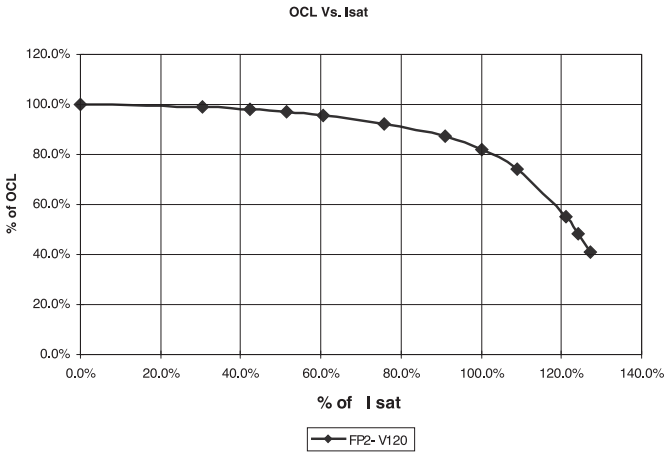
ACTUAL SIZE
FLAT-PAC'S

Ao=6.6mm
Bo=7.1mm
Ko=3.2mm
Ko=5.2mm
(FP2-S200
& FP2V)

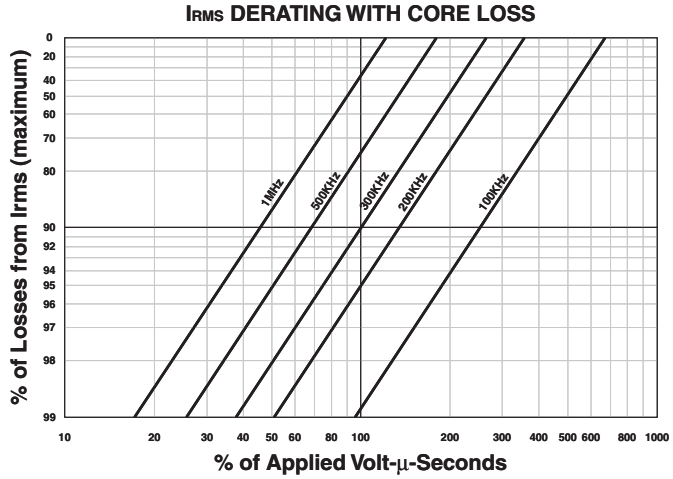
Inductance Characteristics







Core Loss



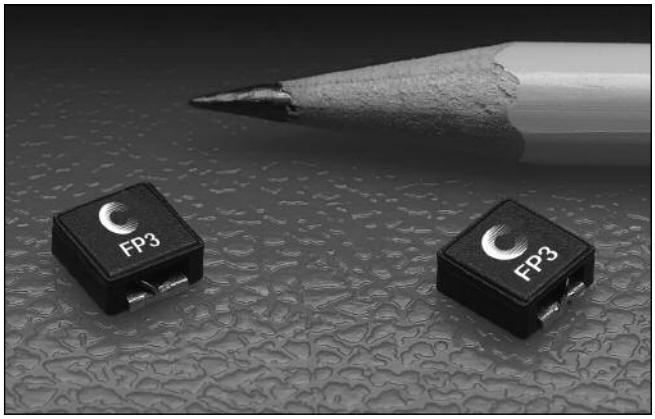
COOPER Bussmann

FLAT-PAC™ 3
Low Profile Inductors

Description

RoHS 2002/95/EC

- 155°C maximum total temperature operation
- Low profile high current inductors
- Inductance range 0.1uh to 15uh
- Design utilizes high temperature powder iron material with a non-organic binder to eliminate thermal aging
- Current rating up to 34.7Adc (Higher peak currents may be attained with a greater rolloff, see rolloff curve)
- Frequency range up to 2MHz



Applications

- Computers and portable power devices
- Energy storage applications
- DC-DC converters
- Input - Output filer application

Environmental Data

- Storage temperature range: -40°C to +155°C
- Operating ambient temperature range: -40°C to +155°C (range is application specific).
- Solder reflow temperature: +260°C max. for 10 seconds max.

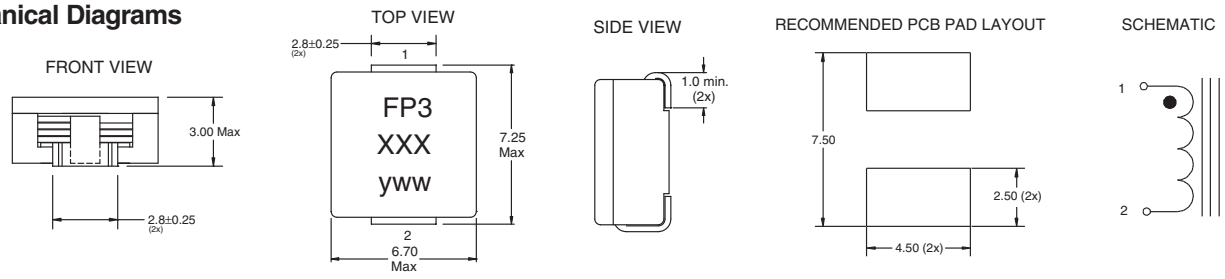
Packaging

- Units supplied in tape and reel packaging. Reel quantity = 1,700 parts per reel.

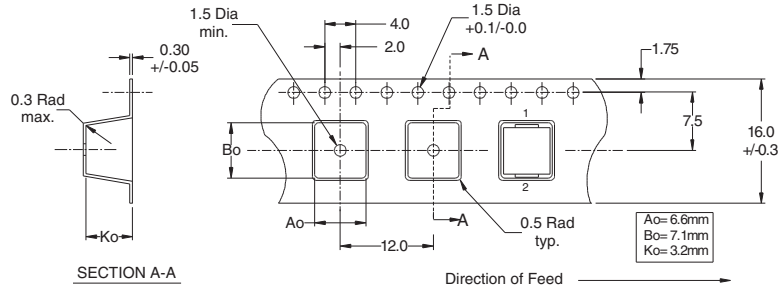
Part Number	Rated Inductance µH	OCL (1) µH ± 15%	Irms (2) Amperes	Isat (3) Amperes Approx. 10%	Isat (4) Amperes Approx. 15%	DCR mOhms @ 20°C (Max.)	K-factor (5)
FP3-R10-R	0.10	0.10	19.0	27	34.7	1.21	803
FP3-R20-R	0.20	0.22	15.3	16	20.8	1.88	482
FP3-R47-R	0.47	0.44	10.9	11.6	14.9	3.67	344
FP3-R68-R	0.68	0.72	9.72	9.0	11.6	4.63	268
FP3-1R0-R	1.00	1.10	6.26	7.4	9.5	11.2	219
FP3-1R5-R	1.50	1.50	5.78	6.2	8.0	13.1	185
FP3-2R0-R	2.00	2.00	5.40	5.4	6.9	15.0	161
FP3-3R3-R	3.30	3.20	3.63	4.3	5.5	30.0	127
FP3-4R7-R	4.70	4.70	3.23	3.5	4.2	40.0	105
FP3-8R2-R	8.20	8.5	2.91	2.6	3.4	74.0	78
FP3-100-R	10.0	10.9	2.30	2.3	3.0	101	69
FP3-150-R	15.0	14.9	2.22	2.0	2.5	127	59

1) OCL (Open Circuit Inductance) Test parameters: 100kHz, 0.1Vrms, 0.0Adc
2) DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 155°C under worst case operating conditions verified in the end application.
3) Isat Amperes Peak for approximately 10% rolloff @ 20°C
4) Isat Amperes Peak for approximately 15% rolloff @ 20°C
5) K-factor: Used to determine B p-p for core loss (see graph). B p-p =K*L*ΔI
B p-p:(Gauss), K: (K factor from table), L: (Inductance in uH), ΔI (Peak to peak ripple current in Amps).

Mechanical Diagrams



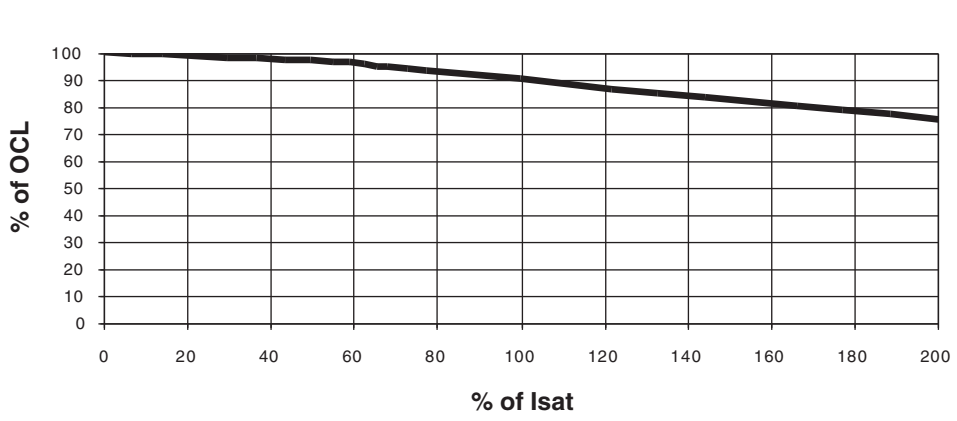
Packaging Information



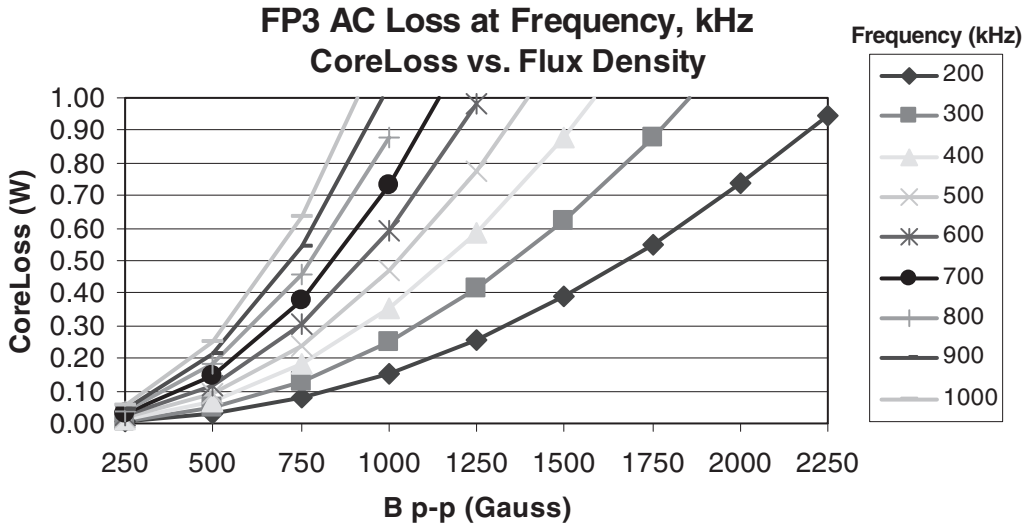
Dimensions in Millimeters

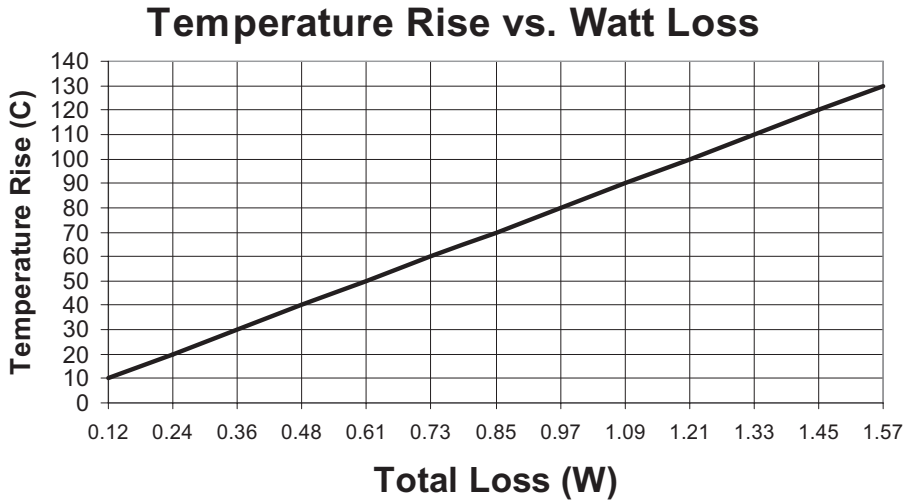
xxx = Inductance value
yww = Date code

Inductance Characteristics



Core Loss





COOPER Bussmann

FLAT-PAC™ 4
5mm Height Inductors (Surface Mount)

RoHS 2002/95/EC

Description

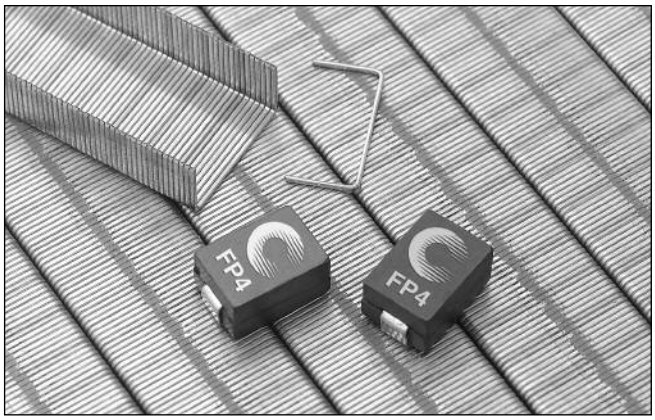
- 155°C maximum total temperature operation
- Surface mount inductors designed for high speed, high current switch mode applications requiring lower inductance
- Gapped ferrite cores for maximum efficiency
- Inductance values from 0.100 uH to 0.200 uH
- Current range up to 64 Amps
- Meets UL 94V-0 flammability standard
- Ferrite core material

Applications

- Voltage regulator modules (VRMs) for servers, microprocessors
- High frequency, high current switching power supplies

Environmental Data

- Storage temperature range: -40°C to +155°C
- Operating ambient temperature range: -40°C to +155°C (range is application specific).
- Solder reflow temperature: +260°C max. for 10 seconds max.



Packaging

- Supplied in tape and reel packaging, 900 parts per reel

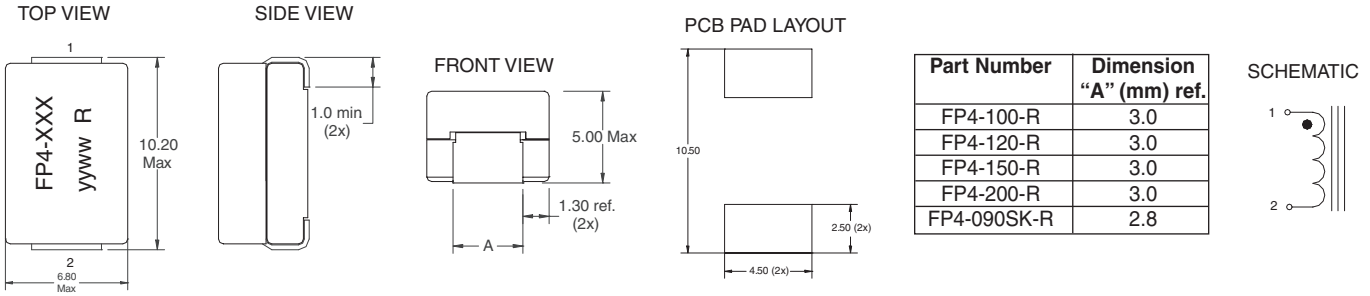
Part Number	Rated Inductance µH	OCL (2) ± 15% µH	Isat (5) Amperes Peak	Irms (4) Amperes	DCR Ω @ 20°C (Nom.)	DCR Ω @ 20°C (Max.)	Volts-µSec (3) (VuSec) (ref.)
FP4-100-R	0.100	0.100	64	40	0.00048	0.00065	1.33
FP4-120-R	0.120	0.120	54	40	0.00048	0.00065	1.33
FP4-150-R	0.150	0.150	42	40	0.00048	0.00065	1.33
FP4-200-R	0.200	0.200	30	40	0.00048	0.00065	1.33

1) Units supplied in Tape & Reel packaging; 900 parts on 13" diameter reel.
2) OCL (Open Circuit Inductance) Test parameters: 1MHz, .100Vrms, 0.0Adc & ISAT @20°C
3) Applied Volt-Time product (V-µS) across the inductor. This value represents the applied V-µS at 500kHz necessary to generate a core loss equal to 10% of the total losses for 40°C temperature rise.
4) DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, airflow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 155°C under worst case operating conditions verified in the end application.
5) Peak Current for approximately 30% rolloff @ 20°C

Part Number	Rated Inductance µH	OCL (2) ± 15% µH	Isat (5) Amperes Peak	Irms (4) Amperes	DCR @ 25°C	Volts-µSec (3) (Vus) (ref.)
FP4-090SK-R	0.090	0.090	72	33	0.423-0.517	1.33

1) Units supplied in Tape & Reel packaging; 900 parts on 13" diameter reel.
2) OCL (Open Circuit Inductance) Test parameters: 100kHz, 1.0Vrms, 0.0Adc & ISAT @25°C
3) Applied Volt-Time product (V-µS) across the inductor. This value represents the applied V-µS at 500kHz necessary to generate a core loss equal to 10% of the total losses for 40°C temperature rise.
4) DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, airflow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 155°C under worst case operating conditions verified in the end application.
5) Peak Current for approximately 20% rolloff @ 25°C

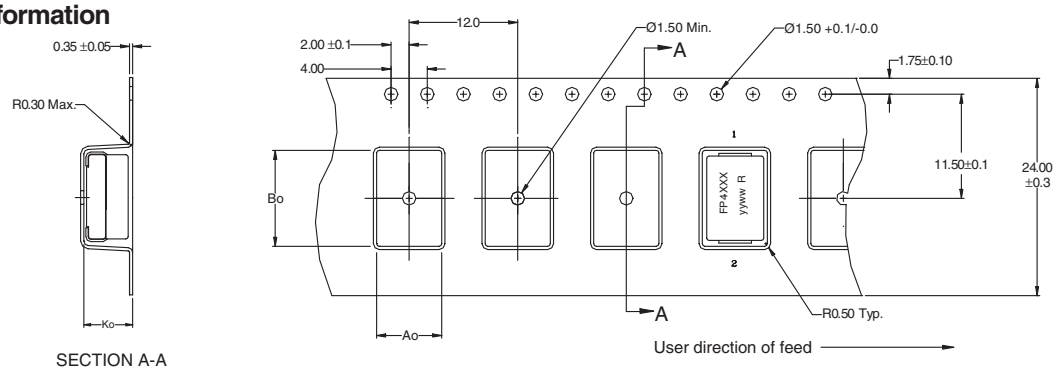
Mechanical Diagrams



Part Number	Dimension "A" (mm) ref.
FP4-100-R	3.0
FP4-120-R	3.0
FP4-150-R	3.0
FP4-200-R	3.0
FP4-090SK-R	2.8

SCHEMATIC

Packaging Information

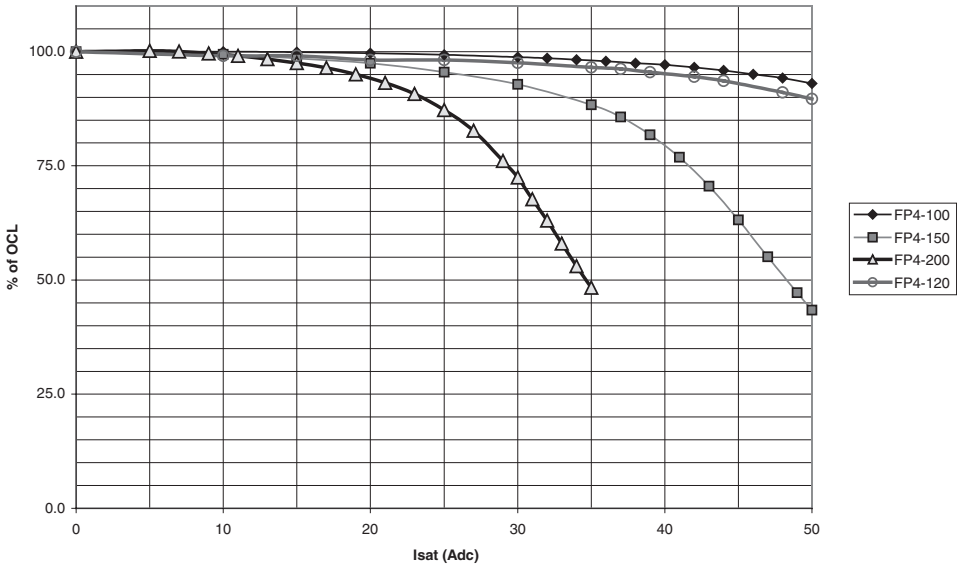


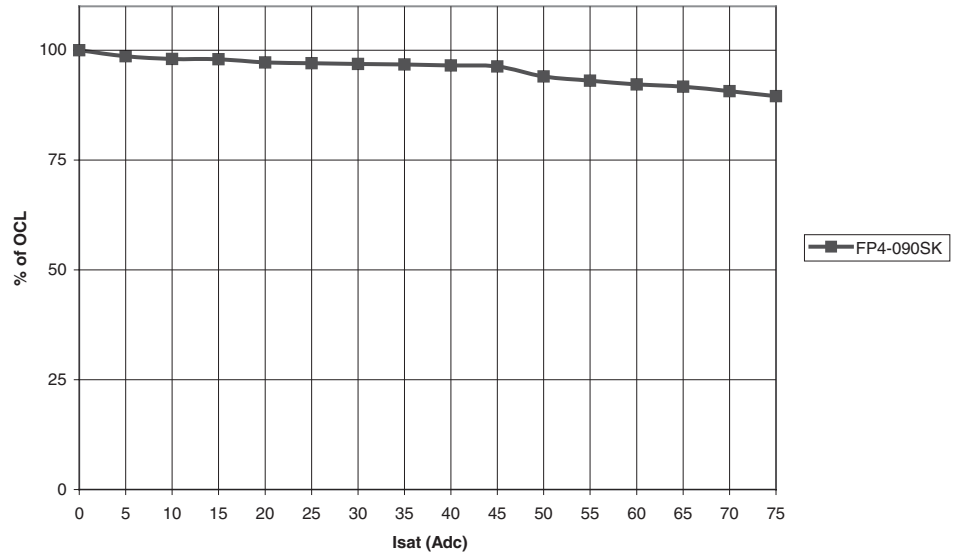
Ao=7.20mm
Bo=10.60mm
Ko=5.40mm

Dimensions in Millimeters

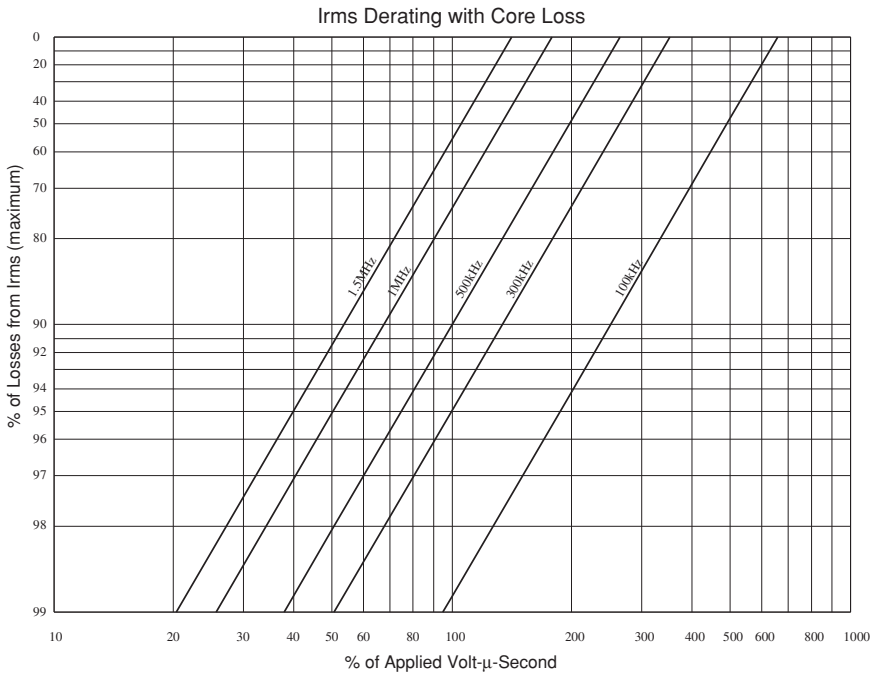
xxx = Inductance value
yww = Date code R = Revision level

Inductance Characteristics





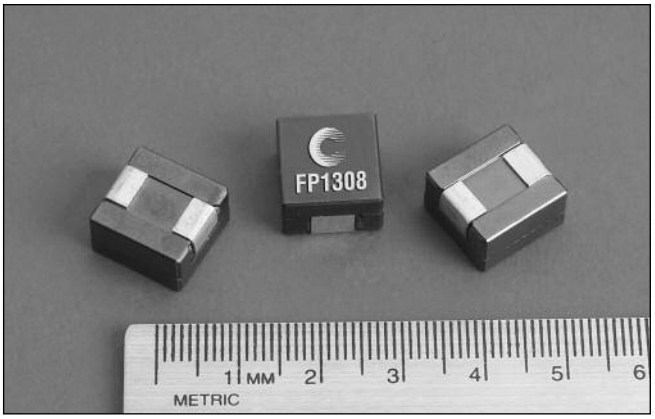
Core Loss


Irms Derating with Core Loss
% of Losses from Irms (maximum)
0
20
40
50
60
70
80
90
92
94
95
96
97
98
99
1.5MHz
1MHz
500kHz
300kHz
100kHz
10
20
30
40
50
60
80
100
200
300
400
500
600
800
1000
% of Applied Volt-µ-Second

Description

RoHS 2002/95/EC

- 125°C maximum total temperature operation
- 12.9mm x 13.7mm x 8.0mm surface mount package
- High current handling capability, compact footprint
- Ferrite core material
- Inductance range from 110nH to 440nH
- Current range from 120 Amps to 32 Amps
- Frequency range up to 2MHz



Applications

- Voltage Regulator Modules (VRM) for servers and microprocessors
- Multi-Phase Buck inductors
- High frequency, high current switching power supplies

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

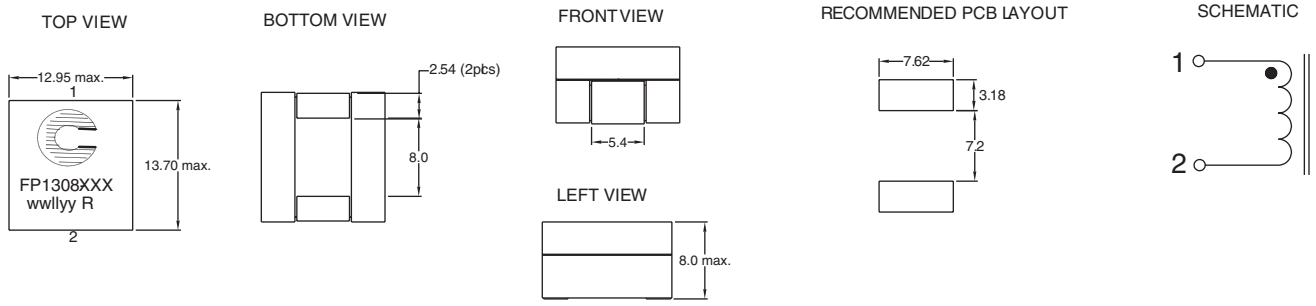
Packaging

- Supplied in tape and reel packaging, 450 per reel

Part Number	Rated Inductance (nH)	OCL (1) nH±10%	Irms(2) Amperes	Isat (3) Amperes	DCR mΩ @25°C (Typical)	DCR mΩ @25°C (Maximum)	K-factor (4)
FP1308-R11-R	110	110	68	120	0.20	0.24	21.330
FP1308-R21-R	210	210	68	72	0.20	0.24	21.333
FP1308-R26-R	260	260	68	60	0.20	0.24	21.335
FP1308-R32-R	320	320	68	45	0.20	0.24	21.340
FP1308-R44-R	440	440	68	32	0.20	0.24	21.366

(1) Open Circuit Inductance Test Parameters: 100kHz, 1.0V, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for 20% maximum rolloff (@25°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in μH), ΔI (Peak to peak ripple current in Amps).
(5) Part Number Definition: FP1308-xxx-R
FP1308 = Product code and size; -xxx = Inductance value in uH; R = decimal point; If no R is present, third character = # of zeros.
-R suffix = RoHS compliant

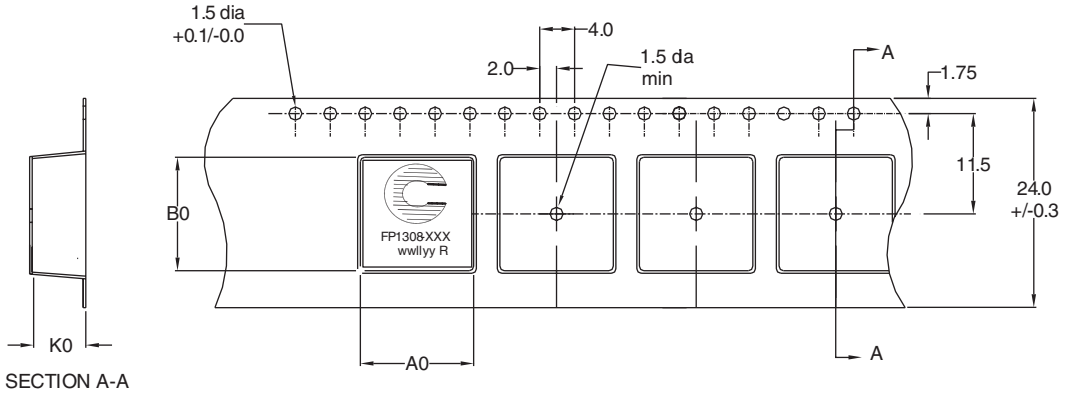
Mechanical Diagrams



Dimensions are in millimeters.

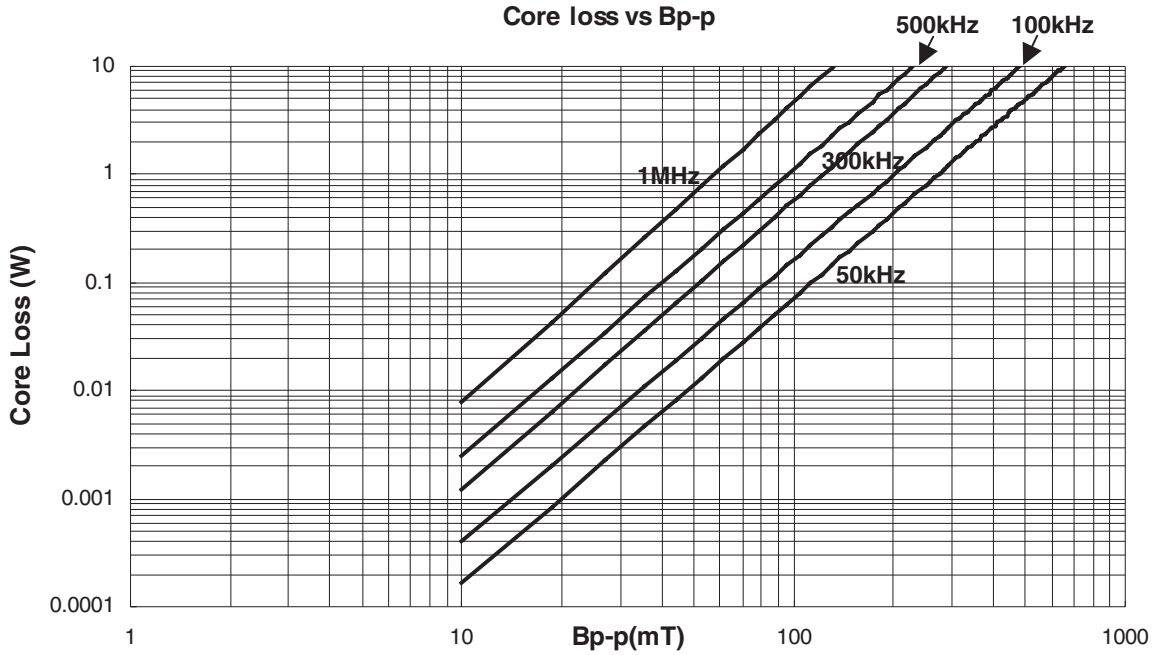
wwlly = Date Code. R = Revision level.

Packaging Information

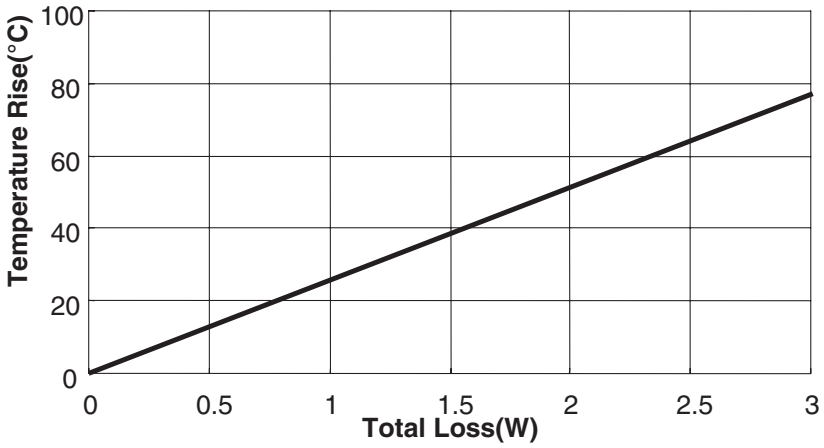


Parts packaged on 13" Diameter reel,
450 parts per reel.

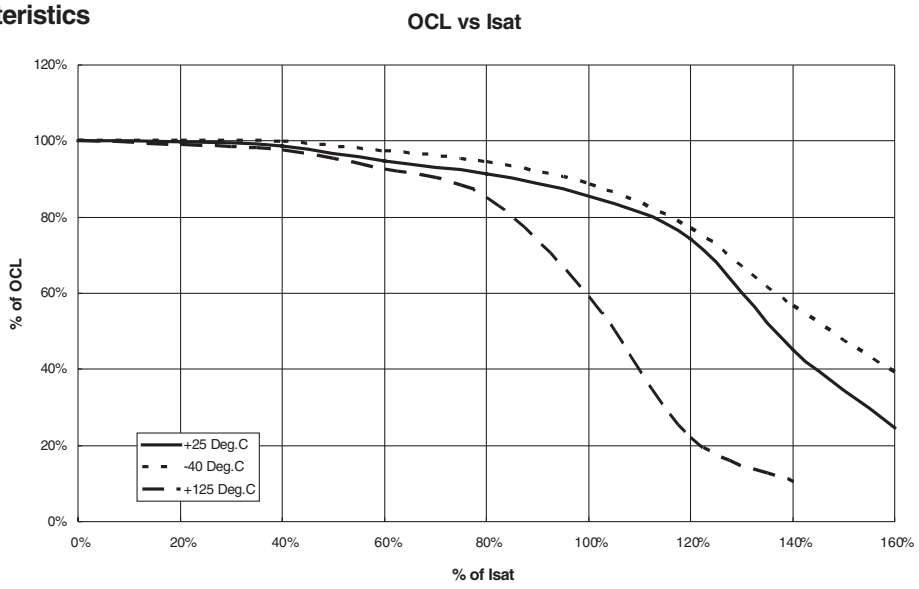
Core Loss



Temperature Rise vs. Loss



Inductance Characteristics



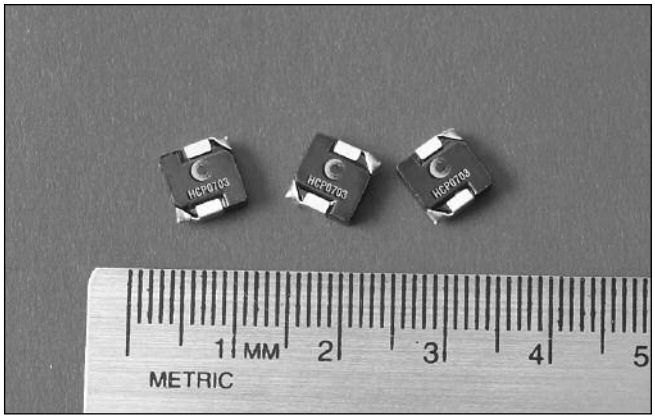
COOPER Bussmann

HCP0703 Series
High Current Pressed Power Inductors

Description

- 125°C maximum total temperature operation
- 7.0mm x 7.3mm x 3.0mm surface mount package
- Pressed powder iron core material
- Enhanced core coating eliminates rusting and provides high insulation impedance
- Inductance range from 0.15µH to 10.0µH
- Current range from 52.0 Amps to 3.0 Amps
- Frequency range up to 1MHz

RoHS 2002/95/EC



Applications

- Notebook power
- VRM, multi-phase buck regulator
- DC-DC converters
- PC workstations/Servers/Desktop
- Routers

Environmental Data

- Storage temperature range: -55°C to +125°C
- Operating temperature range: -55°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

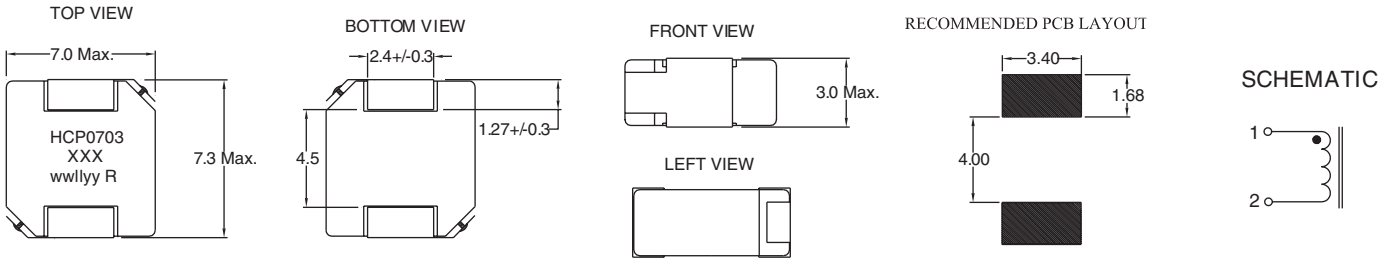
Packaging

- Supplied in tape and reel packaging, 1500 parts per reel

Part Number	Rated Inductance (µH)	OCL (1) µH ± 20%	Irms (2) Amperes	Isat (3) Amperes	DCR mΩ@20°C (Typical)	DCR mΩ@20°C (Maximum)	K-factor (4)
HCP0703-R15-R	0.15	0.15	26	52	1.9	2.5	1100
HCP0703-R22-R	0.22	0.22	23	40	2.5	2.8	922
HCP0703-R47-R	0.47	0.47	17	26	4.0	4.2	559
HCP0703-R68-R	0.68	0.68	15	25	5.0	5.5	435
HCP0703-R82-R	0.82	0.82	13	24	6.8	8.0	360
HCP0703-1R0-R	1.0	1.0	11	22	9.0	10	356
HCP0703-1R5-R	1.5	1.5	9	18	14	15	307
HCP0703-2R2-R	2.2	2.2	8	14	18	20	206
HCP0703-3R3-R	3.3	3.3	6	13.5	28	30	186
HCP0703-4R7-R	4.7	4.7	5.5	10	37	40	171
HCP0703-6R8-R	6.8	6.8	4.5	8	54	60	140
HCP0703-8R2-R	8.2	8.2	4	7.5	64	68	132
HCP0703-100-R	10.0	10.0	3	7.0	102	105	112

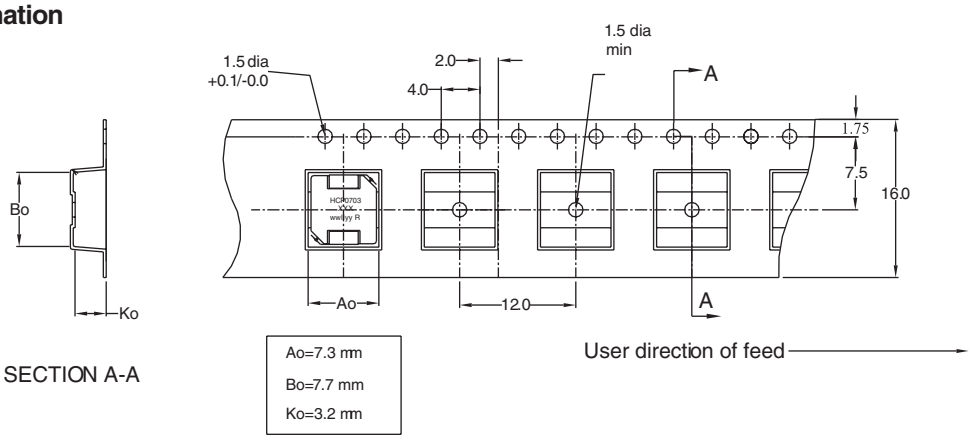
(1) Open Circuit Inductance Test Parameters: 100kHz, 0.25V, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 20% rolloff (@25°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p: (Gauss), K: (K factor from table), L: (Inductance in uH), ΔI (Peak to peak ripple current in Amps).

Mechanical Diagrams

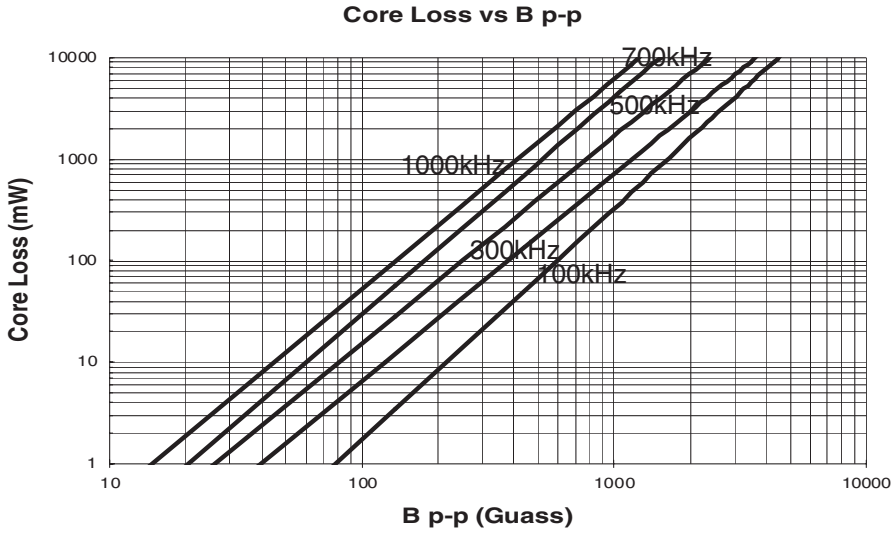


Dimensions are in millimeters.
wwllyy = Date Code. R = Revision Level.

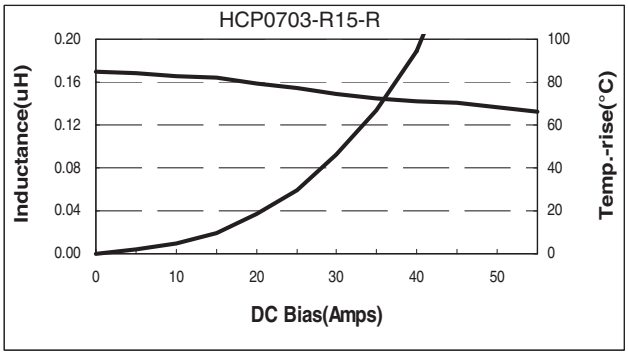
Packaging Information

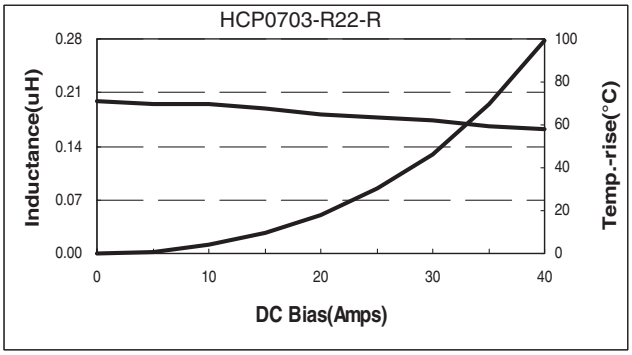


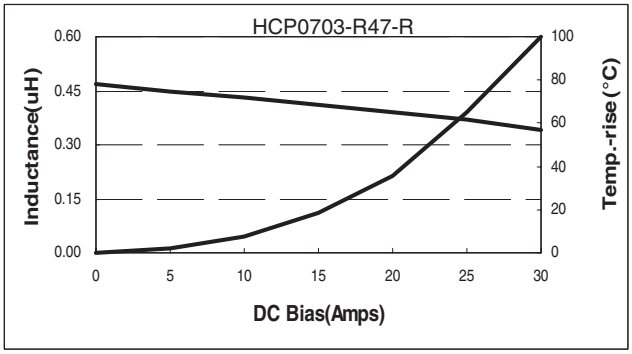
Core Loss

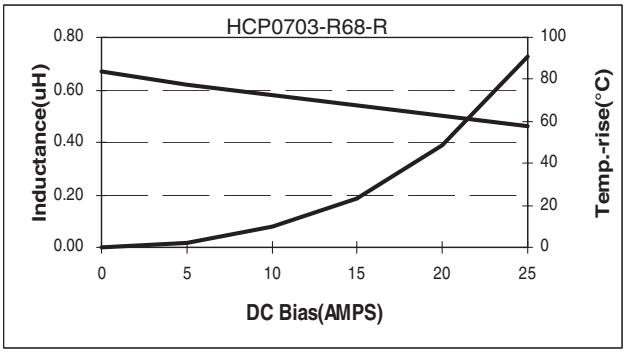


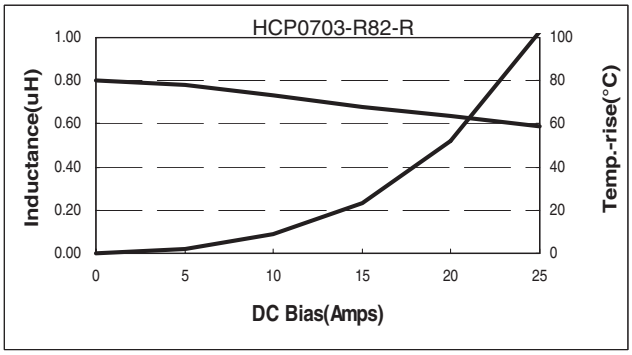
Performance Graphs

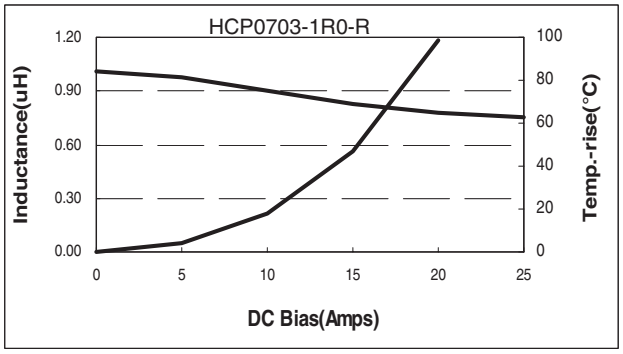


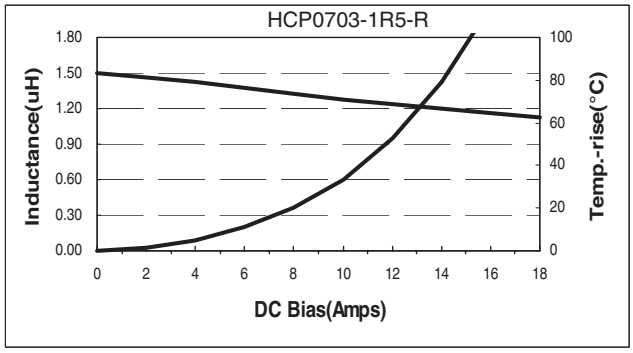




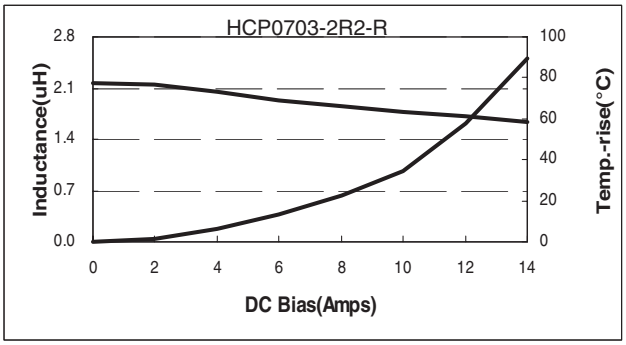


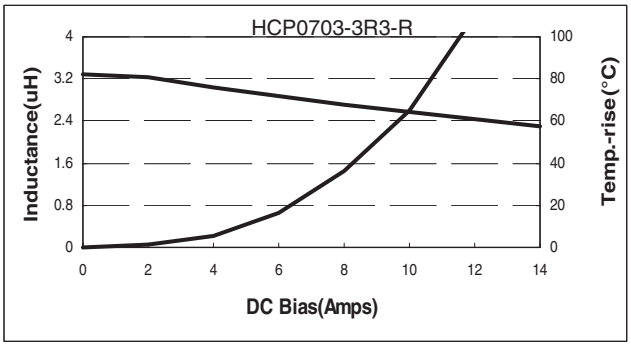


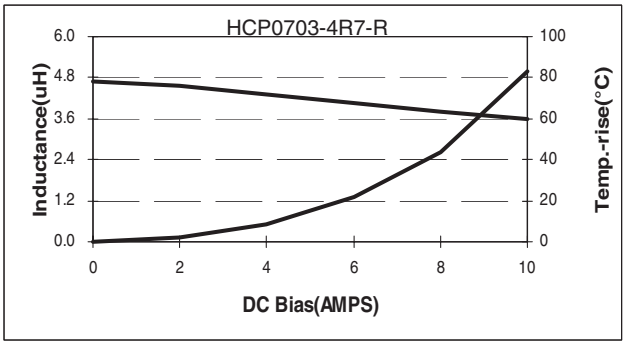


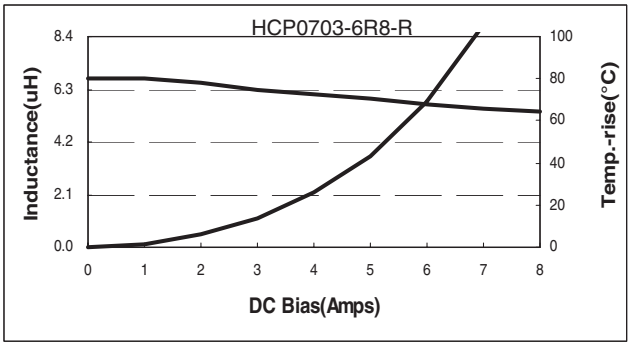


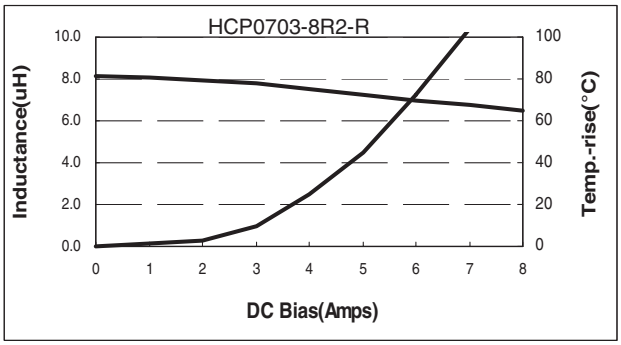
Performance Graphs

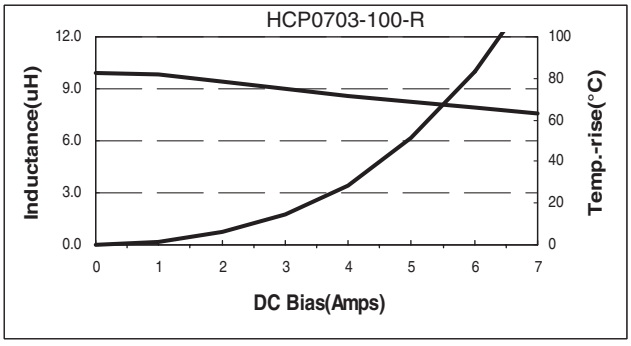












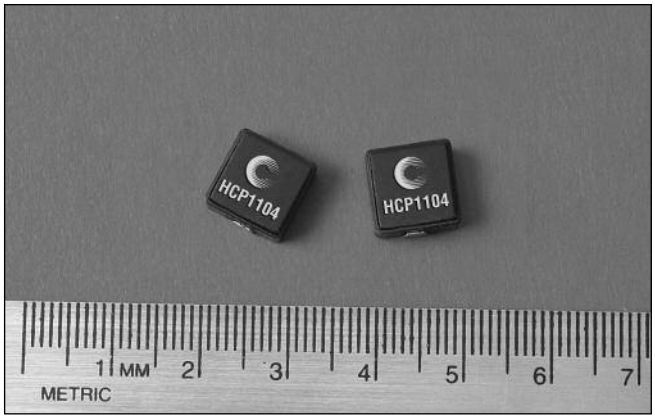
COOPER Bussmann

HCP1104 Series
High Current Pressed Power Inductors

Description

- 125°C maximum total temperature operation
- Low profile surface mount inductors
- 10mm x 11.5mm x 4.0mm package
- Pressed powder iron core material
- Enhanced core coating eliminates rusting and provides high insulation impedance
- Inductance range from 0.2µH to 0.9µH
- Current range from 42.0 Amps to 22 Amps
- Frequency range up to 1MHz

RoHS 2002/95/EC



Applications

- Notebook power
- VRM, multi-phase buck regulator
- DC-DC converters
- PC workstations/Servers
- Routers

Packaging

- Supplied in tape and reel packaging, 950 parts per reel

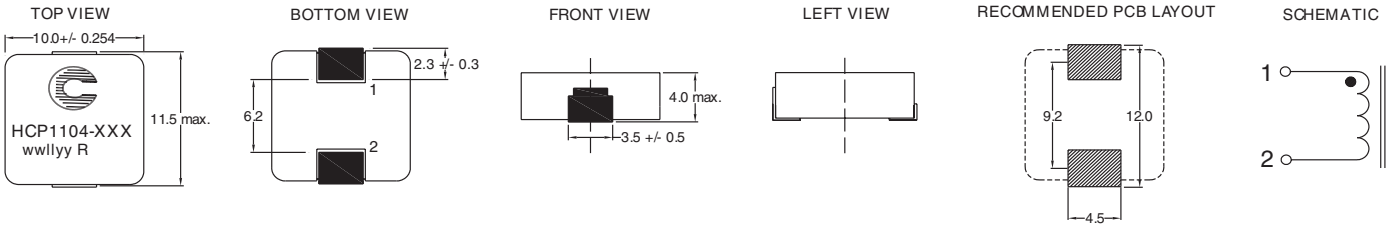
Environmental Data

- Storage temperature range: -55°C to +125°C
- Operating temperature range: -55°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

Part Number	Rated Inductance (µH)	OCL (1) µH ± 20%	Irms (2) Amperes	Isat (3) Amperes	DCR mΩ@20°C (Typical)	DCR mΩ@20°C (Maximum)	K-factor (4)
HCP1104-R20-R	0.20	0.20	32	42	0.7	0.9	505
HCP1104-R36-R	0.36	0.36	30	40	1.0	1.2	289
HCP1104-R45-R	0.45	0.45	30	35	1.25	1.4	334
HCP1104-R56-R	0.56	0.56	25	32	1.60	1.8	287
HCP1104-R90-R	0.90	0.90	22	25	2.30	2.5	168

(1) Open Circuit Inductance Test Parameters: 100kHz, 0.25V, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 20% rolloff (@20°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B-p-p: (Gauss), K: (K factor from table), L: (Inductance in uH), ΔI (Peak to peak ripple current in Amps).

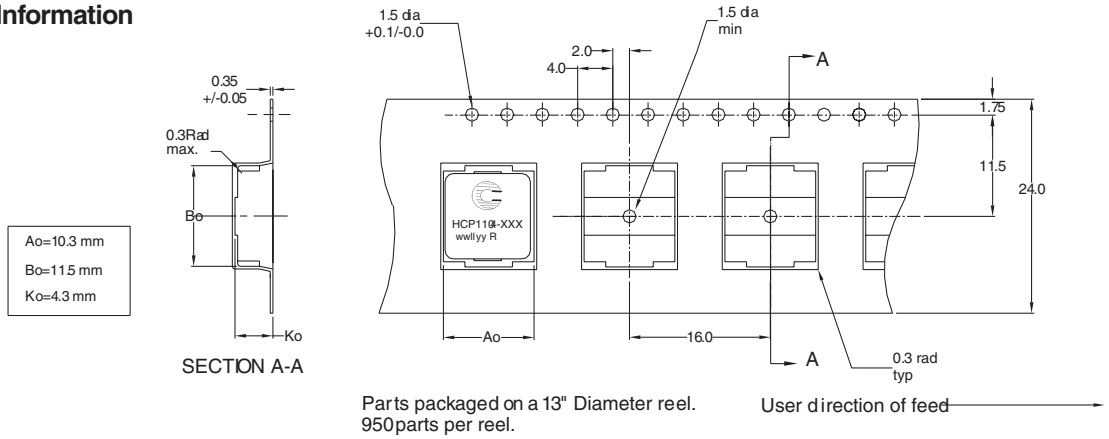
Mechanical Diagrams



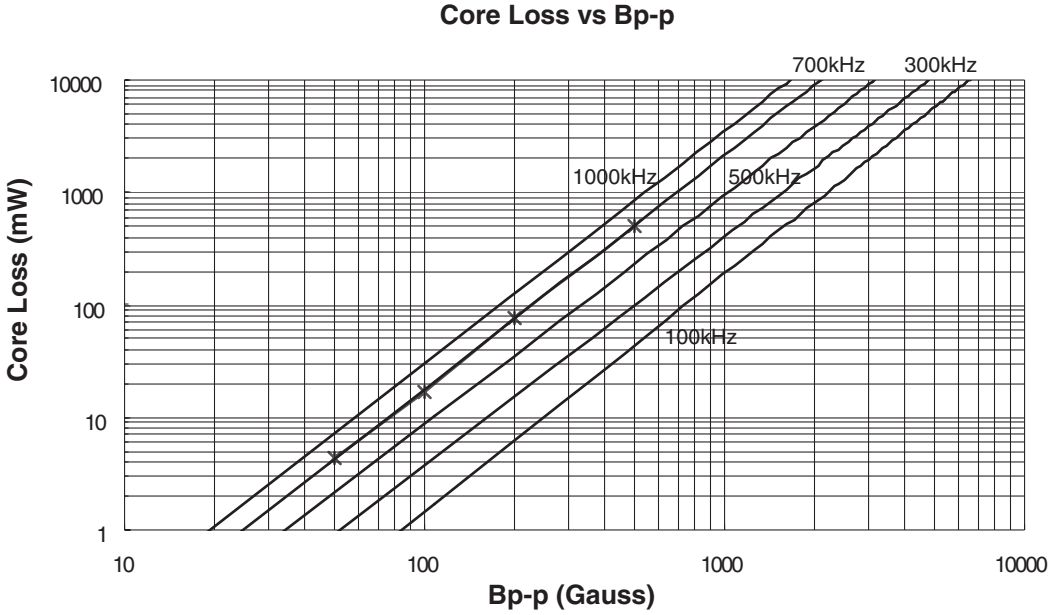
Dimensions are in millimeters.

wwlly = Date Code. R = Revision Level.

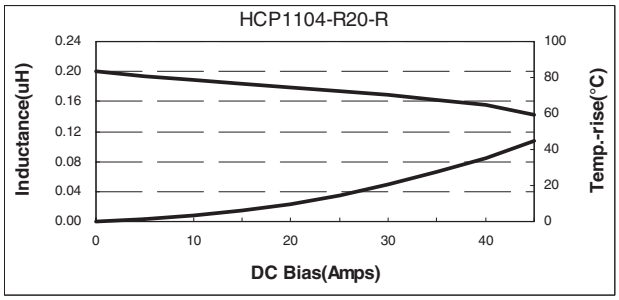
Packaging Information

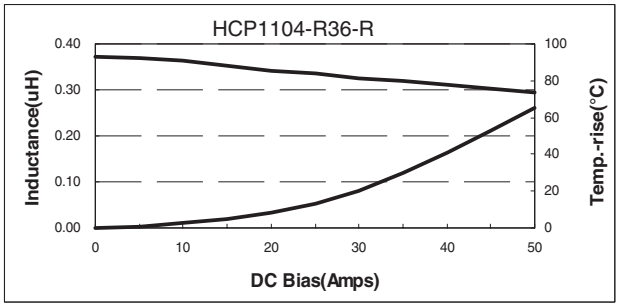


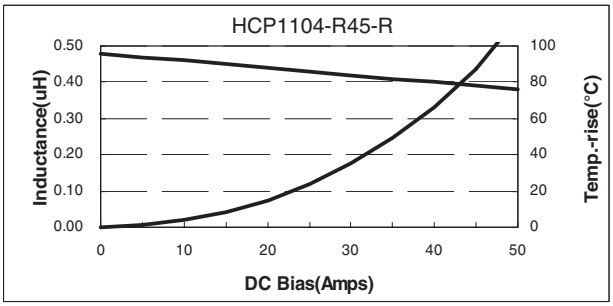
Core Loss

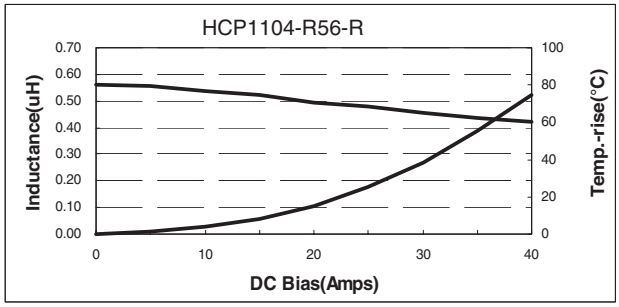


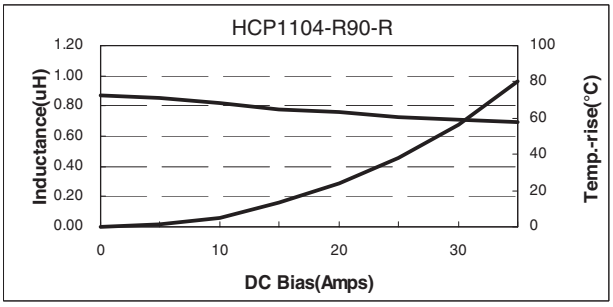
Performance Graphs











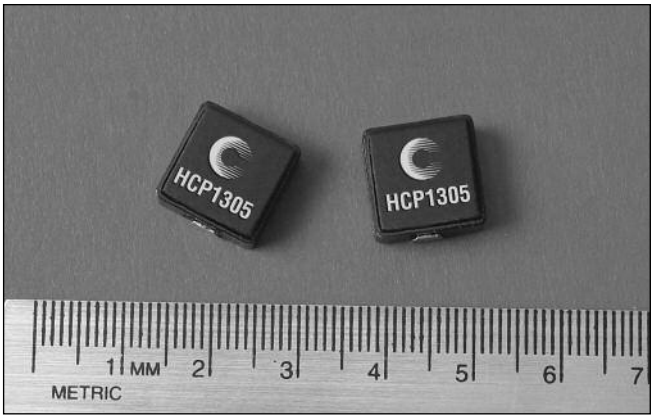
COOPER Bussmann

HCP1305 Series
High Current Pressed Power Inductors

Description

- 125°C maximum temperature operation
- 12.9mm x 13.8mm x 5.0mm surface mount package
- Pressed powder iron core material
- Enhanced core coating eliminates rusting and provides high insulation impedance
- Inductance range from 0.47µH to 2.2µH
- Current range from 65.0 Amps to 20 Amps
- Frequency range up to 1MHz

RoHS 2002/95/EC



Applications

- Notebook power
- VRM, multi-phase buck regulator
- DC-DC converters
- PC workstations/Servers/Desktop
- Routers

Environmental Data

- Storage temperature range: -55°C to +125°C
- Operating temperature range: -55°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

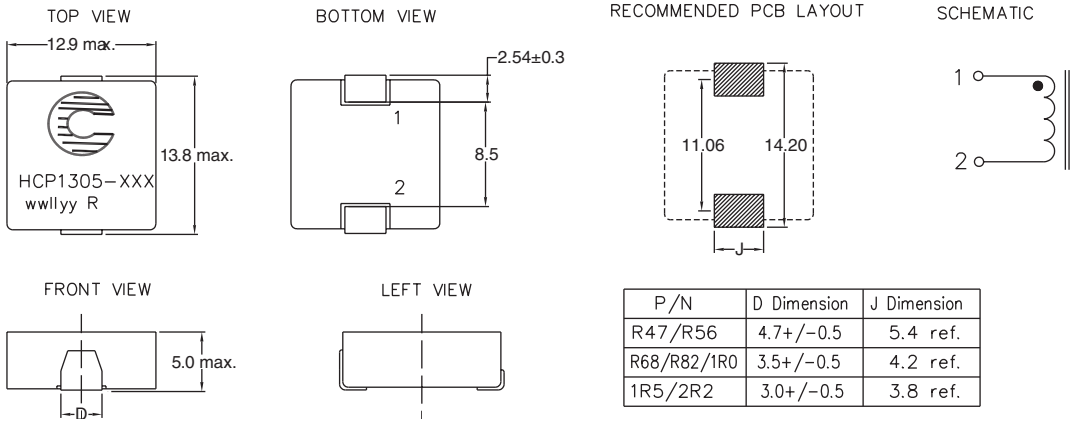
Packaging

- Supplied in tape and reel packaging, 400 parts per reel

Part Number	Rated Inductance (µH)	OCL (1) µH ± 20%	Irms (2) Amperes	Isat (3) Amperes	DCR mΩ@20°C (Typical)	DCR mΩ@20°C (Maximum)	K-factor (4)
HCP1305-R47-R	0.47	0.47	38	65	1.1	1.3	181
HCP1305-R56-R	0.56	0.56	36	55	1.3	1.5	130
HCP1305-R68-R	0.68	0.68	34	53	1.5	1.7	172
HCP1305-R82-R	0.82	0.82	31	52	2.0	2.3	167
HCP1305-1R0-R	1.0	1.0	29	50	2.1	2.5	134
HCP1305-1R5-R	1.5	1.5	23	48	3.4	4.1	105
HCP1305-2R2-R	2.2	2.2	20	32	4.6	5.5	77

(1) Open Circuit Inductance Test Parameters: 100kHz, 0.25V, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 20% rolloff (@20°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p: (Gauss), K: (K factor from table), L: (Inductance in uH), ΔI (Peak to peak ripple current in Amps).

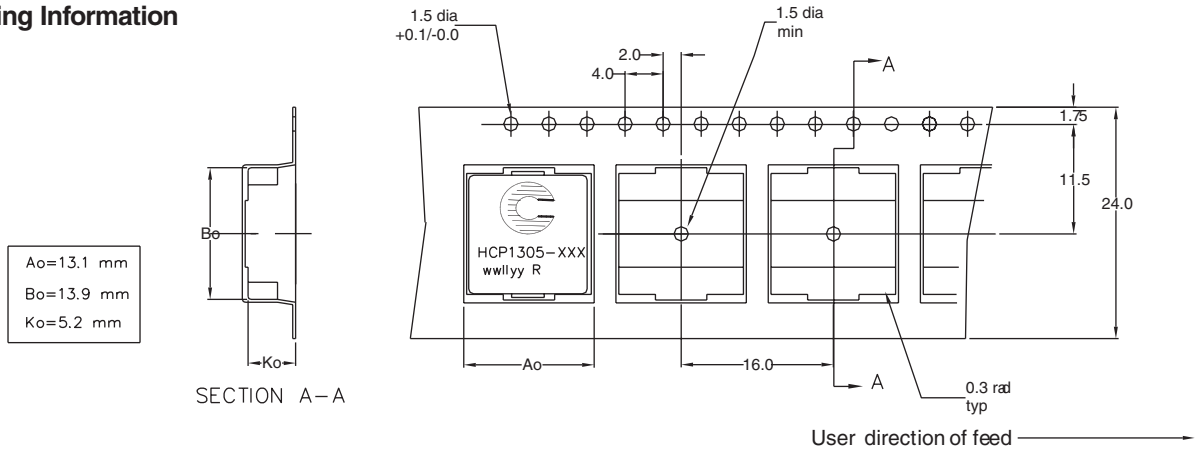
Mechanical Diagrams



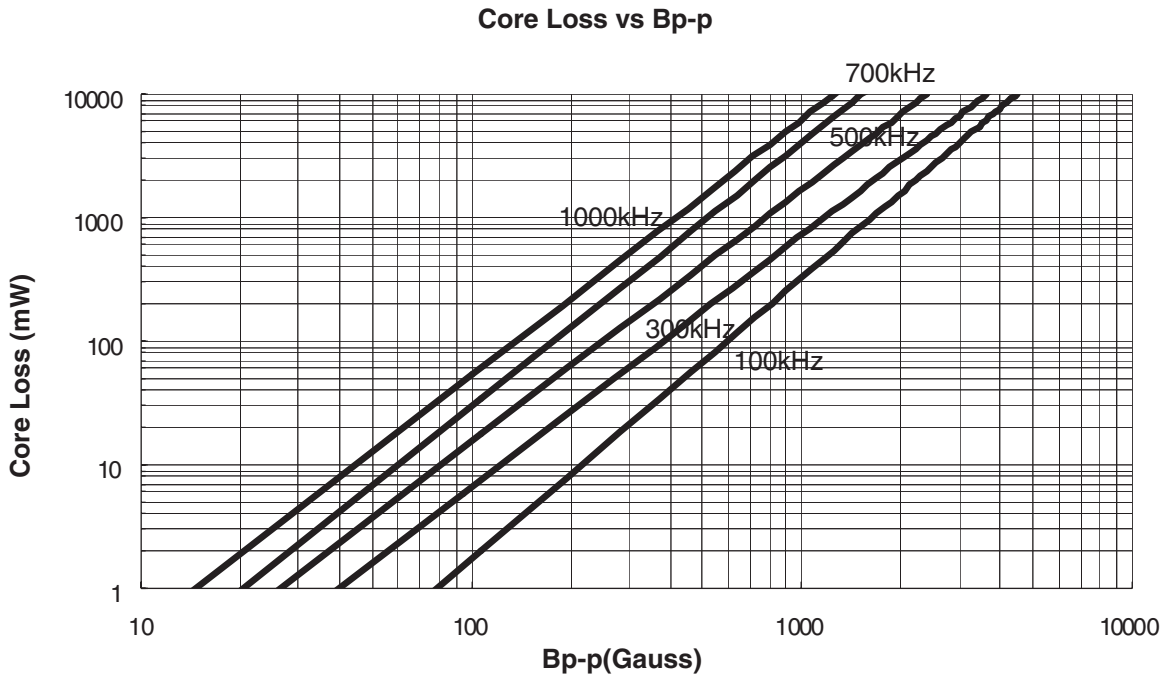
P/N	D Dimension	J Dimension
R47/R56	4.7+/-0.5	5.4 ref.
R68/R82/1R0	3.5+/-0.5	4.2 ref.
1R5/2R2	3.0+/-0.5	3.8 ref.

Dimensions are in millimeters.
wwlly = Date Code. R = Revision Level.

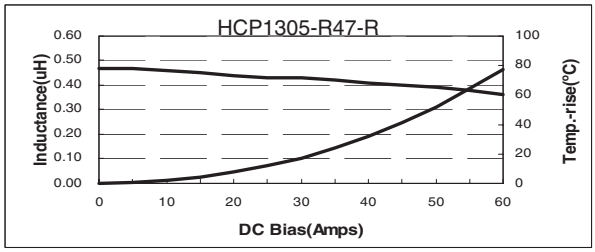
Packaging Information

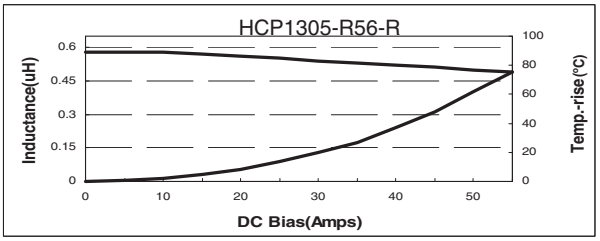


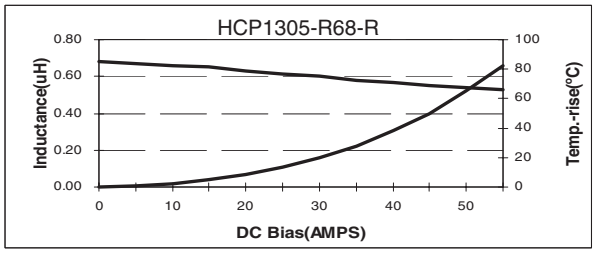
Core Loss

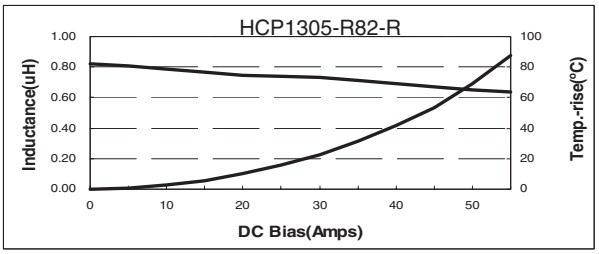


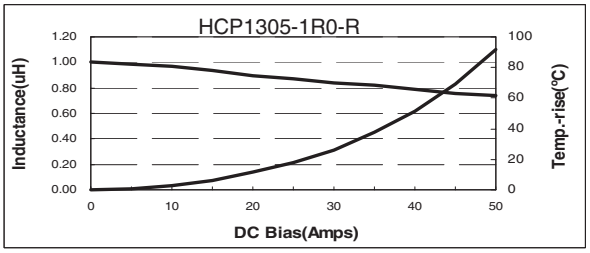
Performance Graphs

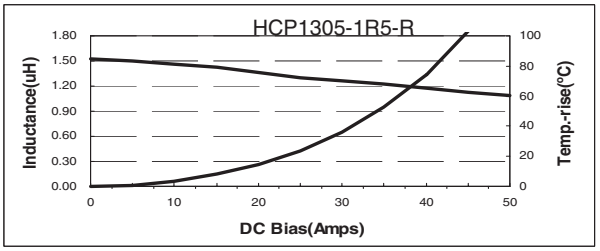


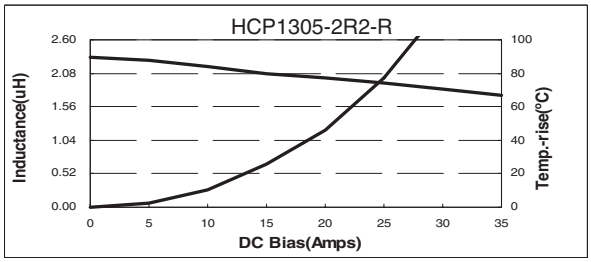












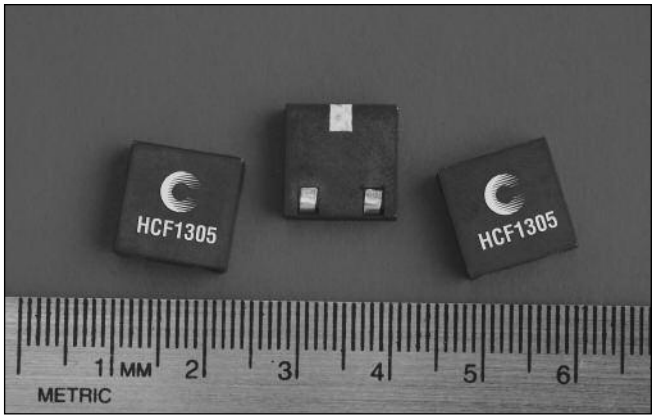
COOPER Bussmann

HCF1305 Series
Power Inductors

Description

RoHS 2002/95/EC

- 125°C maximum total temperature operation
- 12.5mm x 12.5mm x 5.0mm ferrite core material package
- Low profile surface mount inductors designed for higher speed switch mode applications requiring low voltage and high current
- Design utilizes ferrite core with high DC bias resistance and low core loss
- Inductance range from 0.47µH to 4.7µH
- Current range from 36.0 Amps to 10.4 Amps
- Frequency range 100kHz to 1MHz



Applications

- Next generation processors
- High current DC-DC converters
- VRM, multi-phase buck regulators
- PC Workstations, Routers, Servers
- Telecom soft switches, Base stations

Packaging

- Supplied in tape and reel packaging, 600 parts per reel

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

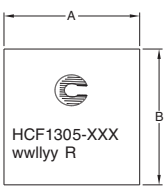
Part Number	Rated Inductance (µH)	OCL (1) µH ± 20%	Irms (2) Amperes	Isat (3) Amperes	Isat2 (4) Amperes	DCR mΩ@20°C (Typical)	DCR mΩ@20°C (Maximum)	K-factor (5)
HCF1305-R47-R	0.47	0.47	32.0	36.0	30.0	0.83	1.00	21
HCF1305-R56-R	0.56	0.56	32.0	30.0	22.5	0.83	1.00	21
HCF1305-1R0-R	1.00	1.00	22.0	24.0	20.0	1.58	1.90	14
HCF1305-1R2-R	1.20	1.20	22.0	20.0	15.0	1.58	1.90	14
HCF1305-1R8-R	1.80	1.80	16.3	18.0	15.0	2.58	3.10	10
HCF1305-2R2-R	2.20	2.20	16.3	15.0	11.2	2.58	3.10	10
HCF1305-3R0-R	3.00	3.00	13.2	14.4	12.0	4.08	4.90	8.3
HCF1305-3R3-R	3.30	3.30	13.2	12.5	9.0	4.08	4.90	8.3
HCF1305-4R0-R	4.00	4.00	10.9	12.0	10.0	6.0	7.2	6.9
HCF1305-4R7-R	4.70	4.70	10.9	10.4	7.5	6.0	7.2	6.9

1) OCL: Open Circuit Inductance test parameters: 100kHz, 0.1Vrms, 0.0Adc. OCL@-40°C can be lower than OCL@20°C by 15% max.
2) Irms: DC current for an approximate DT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
3) Isat1: Amperes Peak for approximately 30% rolloff (@25°C)
4) Isat2: Amperes Peak for approximately 30% rolloff (@125°C)
5) K-factor: Used to determine B p-p for core loss (see graph). B p-p = K*L*ΔI
B p-p:(mT), K: (K factor from table), L: (Inductance in µH), ΔI (Peak to peak ripple current in Amps).

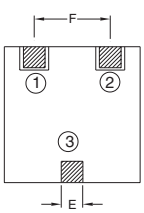
Part number definition:
HCF1305-XXX-R
HCF1305 = Product code and size
XXX = Inductance value in uH.
R = Decimal point. If no R is present, third character = #of zeros
-R suffix indicates RoHS compliant

Mechanical Diagrams

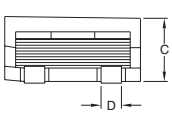
TOP VIEW



BOTTOM VIEW



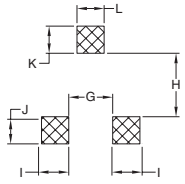
FRONT VIEW



DIMENSION TABLE

A: 12.5max	G: 4.00 Ref
B: 12.5max	H: 5.40 Ref.
C: 5.0max	I: 3.00 Ref.
D: 2.00 ref	J: 4.00 Ref.
E: 2.40 +/- 0.10	K: 4.00 Ref.
F: 6.90 +/- 0.30	L: 3.4 Ref.

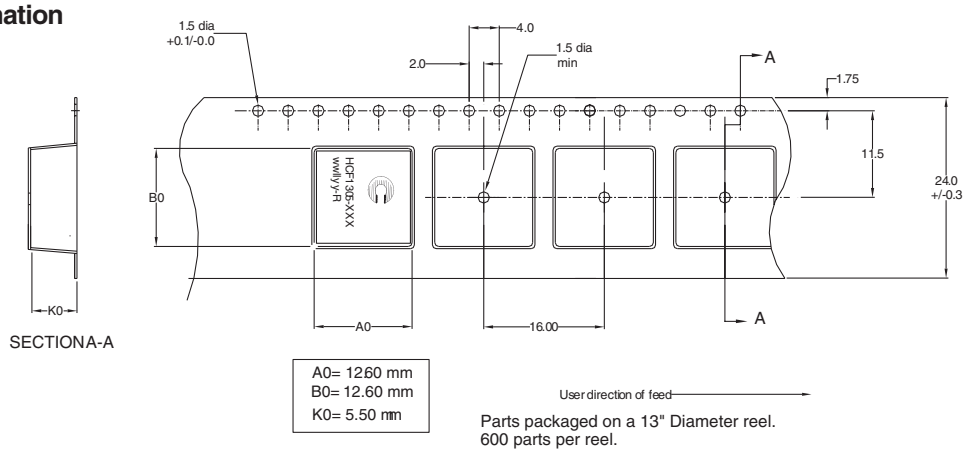
RECOMMENDED PCBLAYOUT



SCHEMATIC

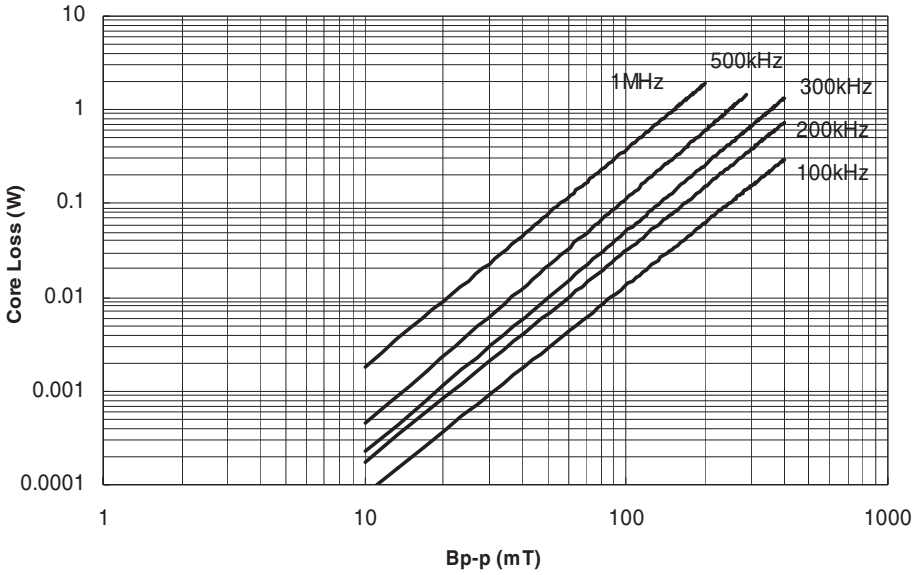
Dimensions in Millimeters
wwllyy=Date code, R=Revision Level

Packaging Information

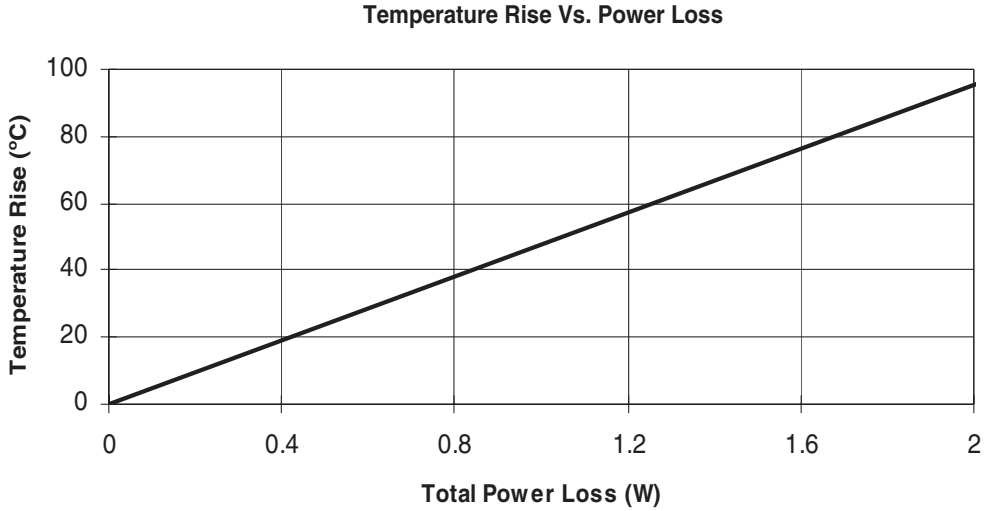


Parts packaged on a 13" Diameter reel.
600 parts per reel.

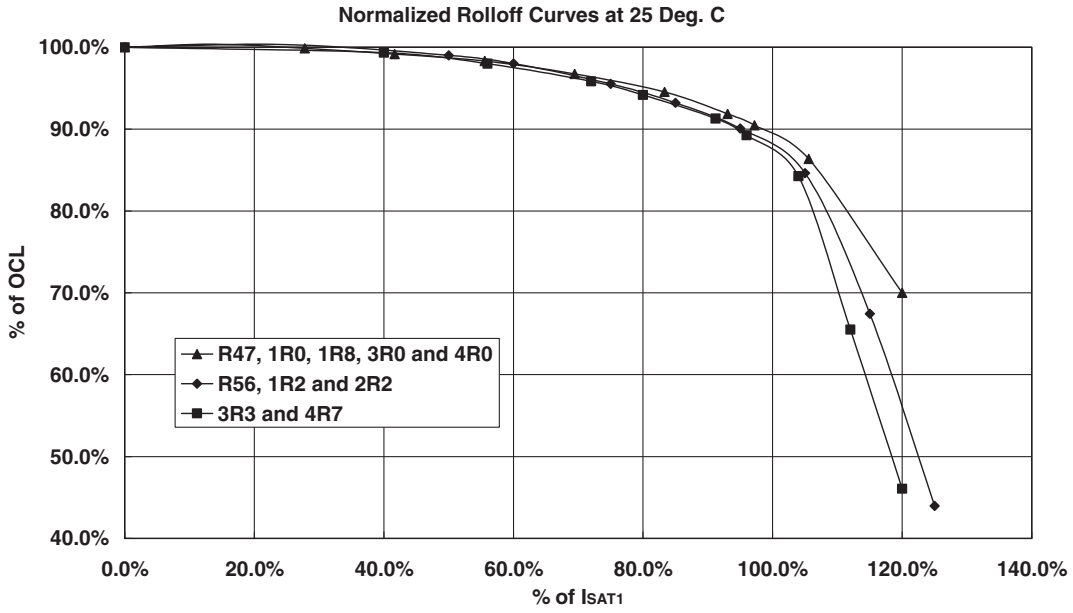
Core Loss

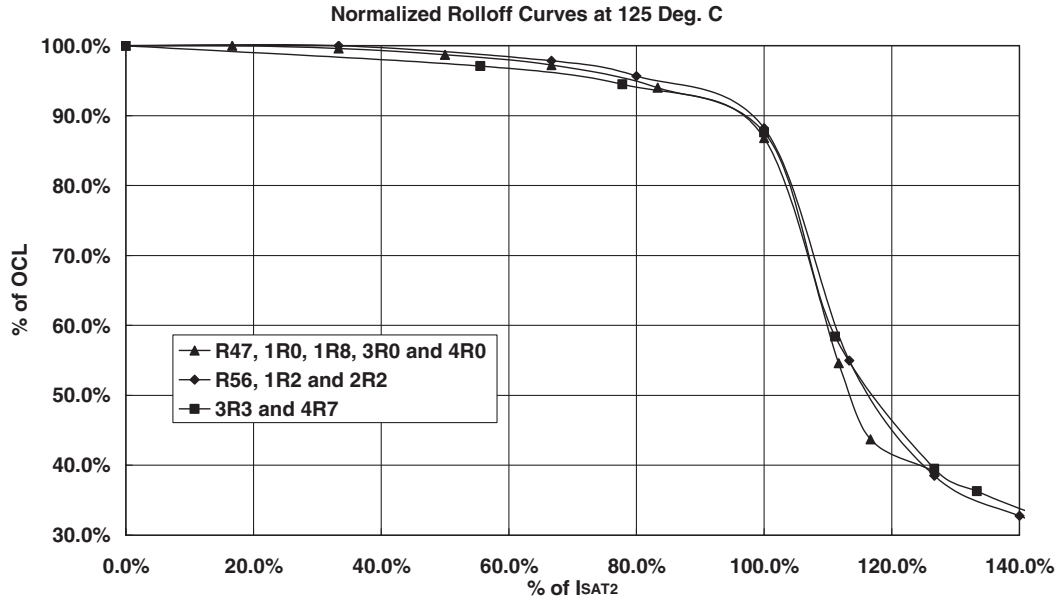


Temperature Rise vs. Total Loss



Inductance Characteristics





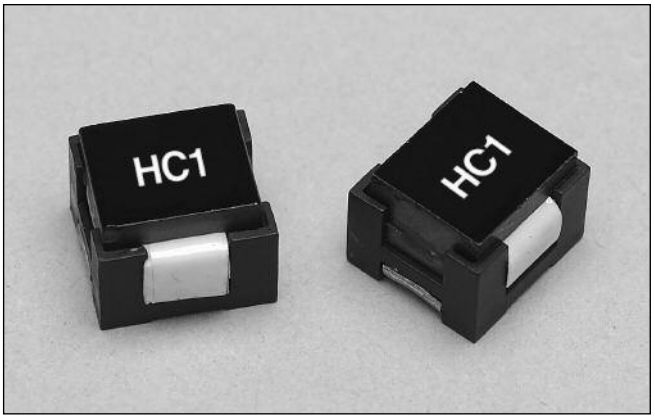
COOPER Bussmann

HIGH CURRENT 1
Power Inductors

Description

RoHS 2002/95/EC

- Designed for high current, low voltage applications
- Low DCR, high efficiency
- Foil construction for higher frequency circuit designs
- Suited for IR and vapor reflow solder
- Frequency range 1kHz to 1MHz
- Ferrite core material



Applications

- Next generation microprocessors
- High current DC-DC converters
- Computers

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +85°C (range is application specific).
- Solder reflow temperature: +260°C max. for 10 seconds max.

Packaging

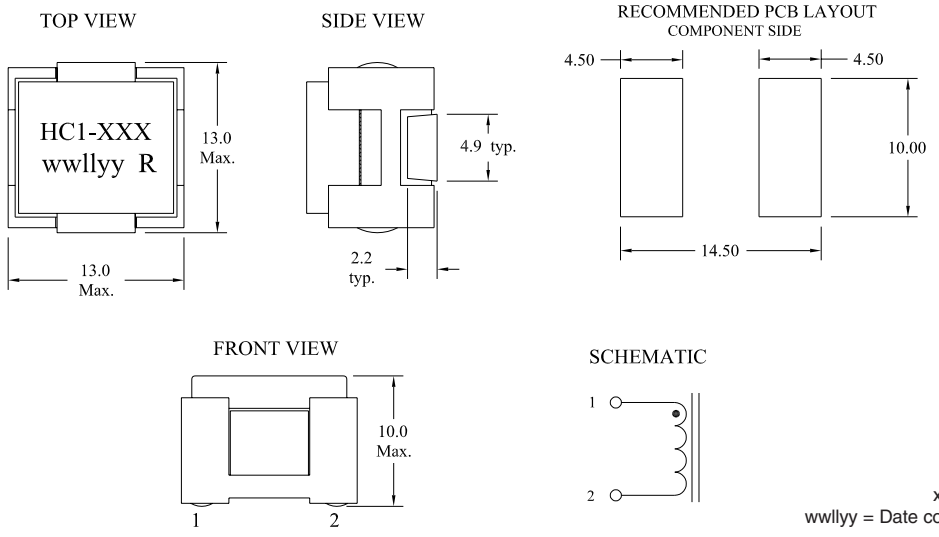
- Supplied in tape and reel packaging, 250 per reel

Part Number	Rated Inductance µH	OCL (1) ± 15% µH	Irms (2) Amperes (Approx.)	Isat (3) Amperes (Approx.)	DCR (Ω) Max. @ 20°C	Volt-µSec (4) (VµS) (ref.)
HC1-R22-R	0.22	0.218	51.42	40.5	0.00036	1.83
HC1-R30-R	0.30	0.291	51.42	31.8	0.00036	1.83
HC1-R57-R	0.57	0.572	37.83	33.4	0.00068	3.66
HC1-R87-R	0.87	0.866	28.01	31.0	0.00123	5.49
HC1-1R0-R	1.0	1.12	28.01	25.4	0.00123	5.49
HC1-1R7-R	1.7	1.66	22.30	22.2	0.0020	7.33
HC1-2R3-R	2.3	2.29	22.30	16.7	0.0020	7.33
HC1-3R6-R	3.6	3.59	16.76	13.4	0.0035	9.16
HC1-5R1-R	5.1	5.15	12.79	11.2	0.0057	10.99
HC1-7R8-R	7.8	7.85	12.79	6.7	0.0057	10.99
HC1-100-R	10	10.5	12.79	5.3	0.0057	10.99

1) OCL (Open Circuit Inductance) Test parameters: 300KHz, .25Vrms, 0.0Adc & Isat.
2) Irms Amperes for approximately ΔT of 40°C. DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
3) Isat Amperes Peak for approximately 30% rolloff @ 20°C
4) Applied Volt-Time product (V-µS) across the inductor. This value represents the applied V-µS at 200kHz necessary to generate a core loss equal to 10% of the total losses for 40°C temperature rise. See Core Loss Graph.

Units supplied in tape & reel packaging; 250 parts on 13" diameter reel.

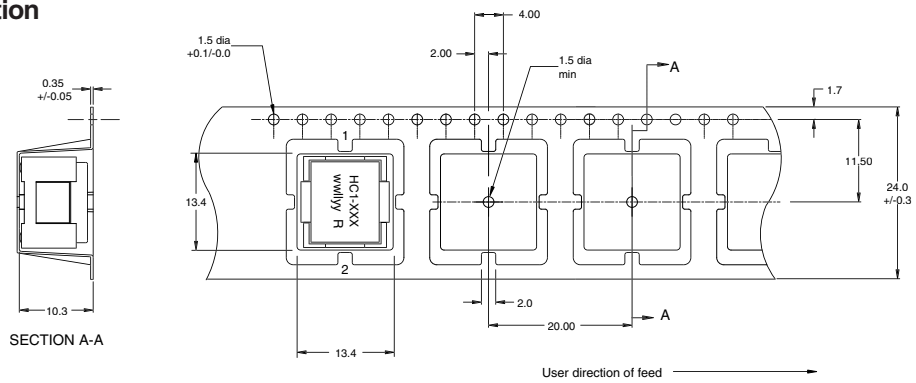
Mechanical Diagrams



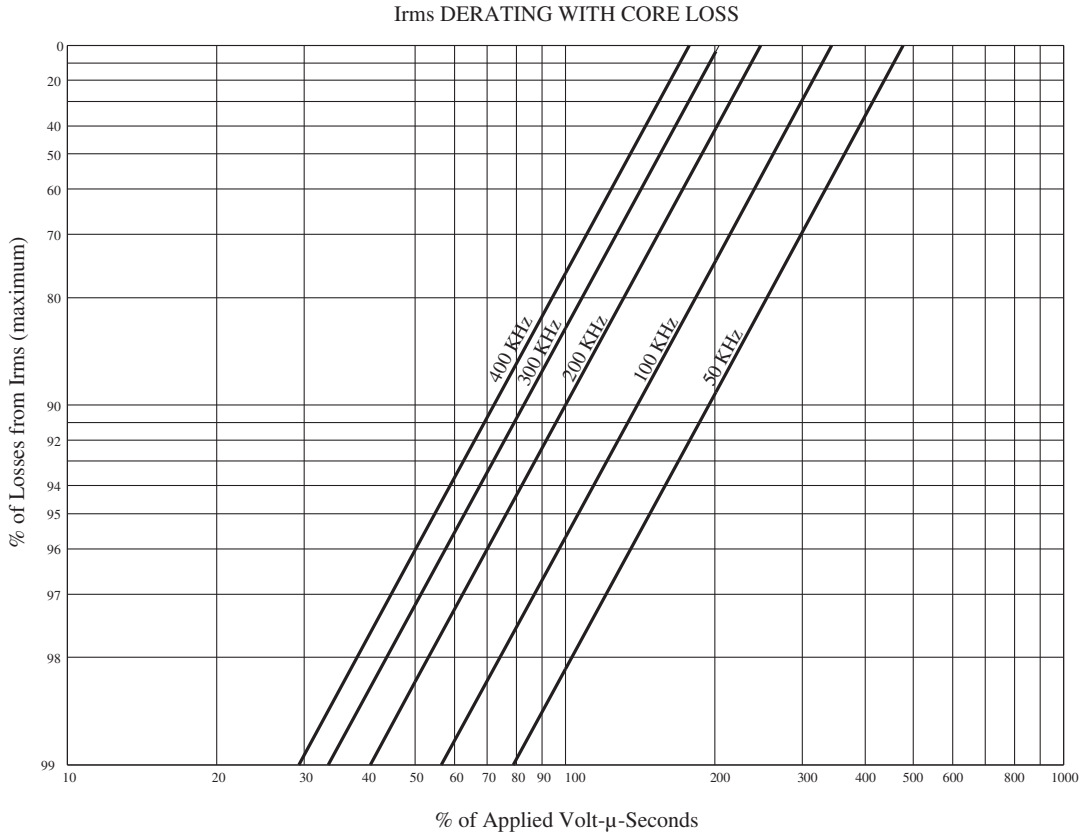
Dimensions in Millimeters

xxx = Inductance value
wwllyy = Date code R = Revision level

Packaging Information

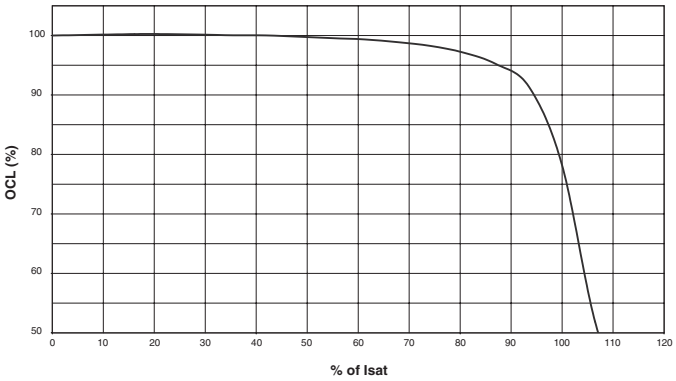


Core Loss

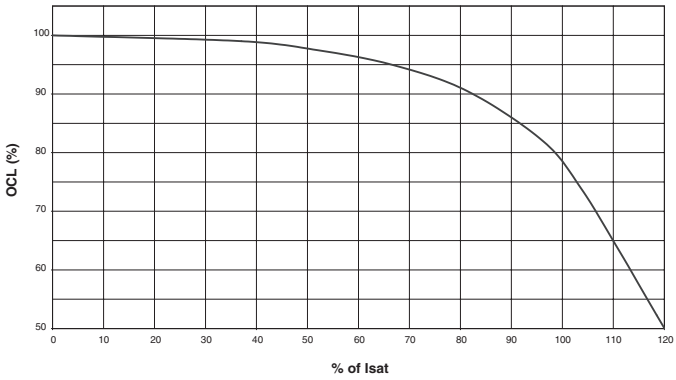


Inductance Characteristics

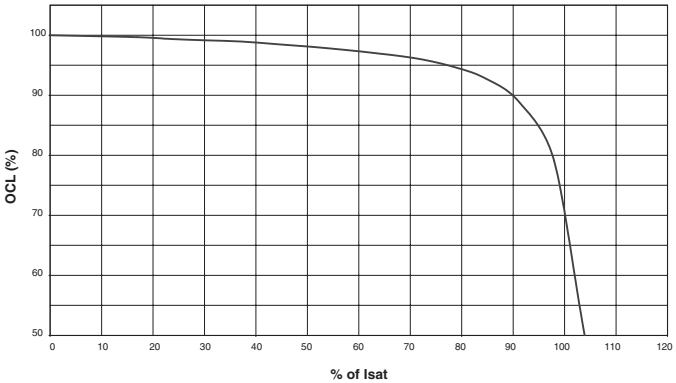
HC1 Inductor (R87)



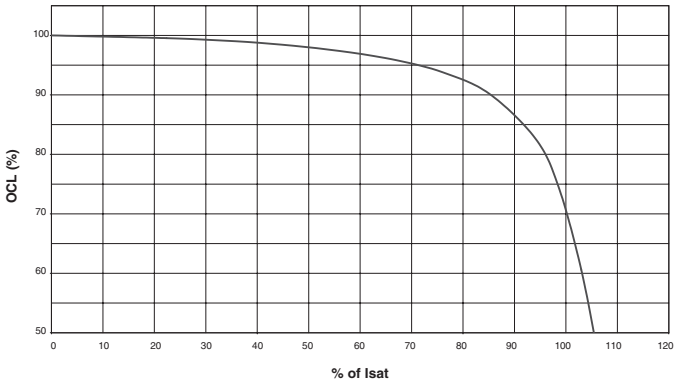
HC1 Inductor (R22, 7R8)



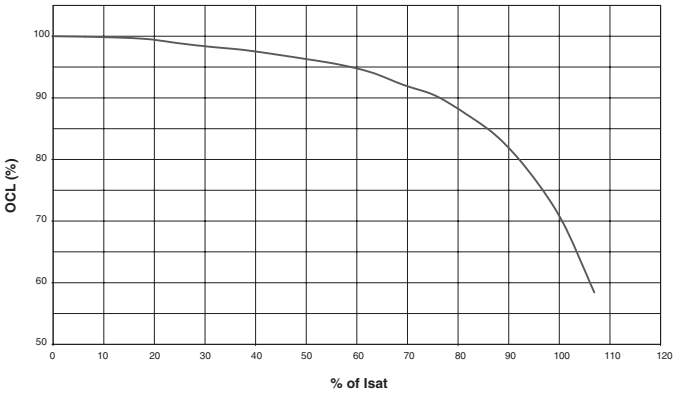
HC1 Inductor (1R7)



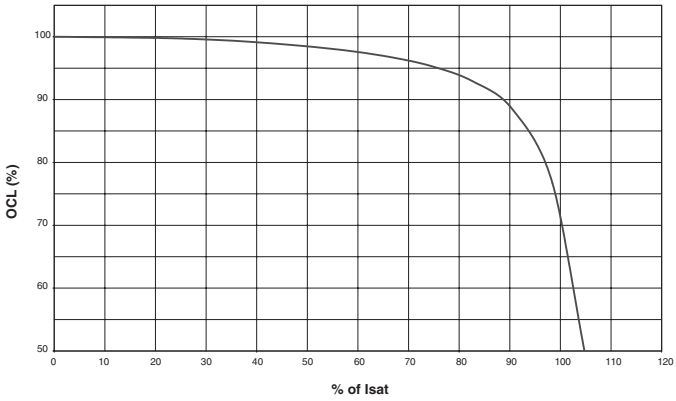
HC1 Inductor (R57, 2R3, 3R6, 5R1)



HC1 Inductor (R30, 100)



HC1 Inductor (1R0)



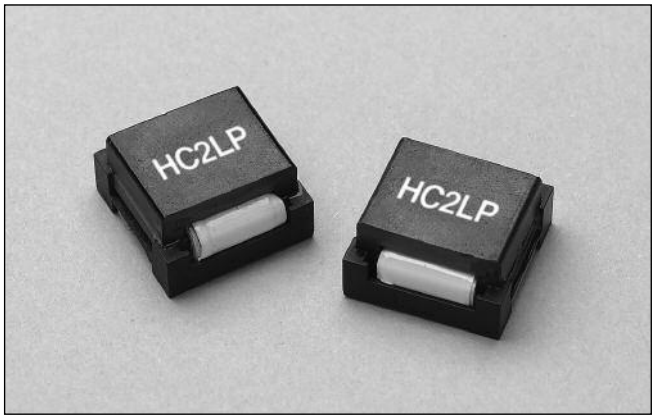
COOPER Bussmann

HIGH CURRENT 2LP
Low Profile Power Inductors

Description

RoHS 2002/95/EC

- Compact footprint for high density, high current/low voltage applications
- Foil technology that adds higher reliability factor over the traditional magnet wire used for higher frequency circuit designs
- Frequency Range up to 1MHz
- Ferrite core material



Applications

- Next generation microprocessors
- Energy storage applications
- DC-DC converters
- Computers

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +85°C (range is application specific).
- Solder reflow temperature: +260°C max. for 10 seconds max.

Packaging

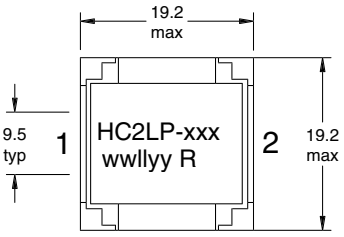
- Supplied in tape and reel packaging, 44mm width, 130 parts per 13" reel

Part Number	Rated Inductance µH	OCL (1) µH ± 20%	Irms (2) Amperes (Typ.)	Isat (3) Amperes (Typ.)	DCR (4) Ohms (Max.)	Volts (5) µSec
HC2LP-R47-R	.47	.52	52.9	63.75	.0006	6.87
HC2LP-R68-R	.68	.63	52.9	50.00	.0006	6.87
HC2LP-1R0-R	1.0	1.15	33.0	42.50	.0013	10.31
HC2LP-2R2-R	2.2	2.00	24.3	31.90	.0023	13.75
HC2LP-4R7-R	4.7	4.55	17.0	21.25	.0046	20.62
HC2LP-6R0-R	6.0	6.00	17.0	16.50	.0046	20.62

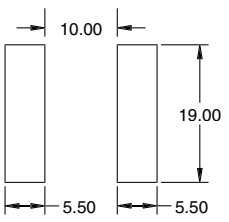
1) Open Circuit Inductance Test Parameters: 300kHz, 0.250 Vrms, 0.0 Adc
2) DC current for an approximate temperature change of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
3) Peak current for approximately 30% roll-off
4) Values @ 20°C
5) Applied Volt-Time product (V-µS) across the inductor. This value represents the applied V-µS at 300KHz necessary to generate a core loss equal to 10% of the total losses for 40°C temperature rise.

Mechanical Diagrams

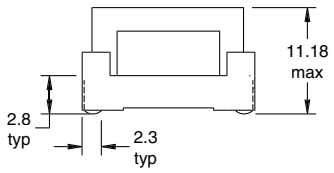
TOP VIEW



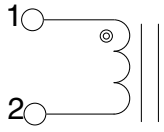
RECOMMENDED PCB PAD LAYOUT



FRONT VIEW

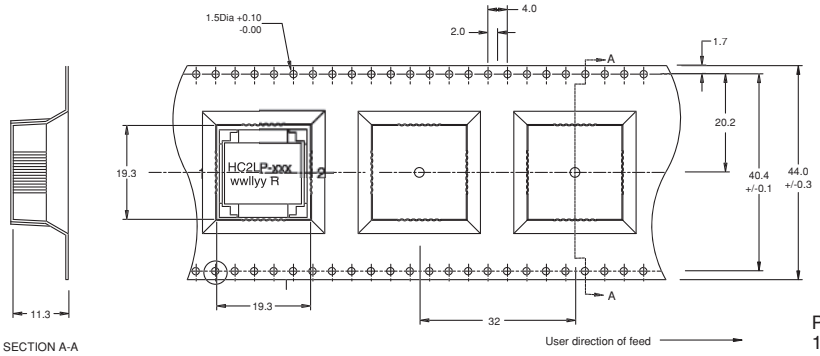


SCHEMATIC



xxx = Inductance value
wwllyy = Date code R = Revision level

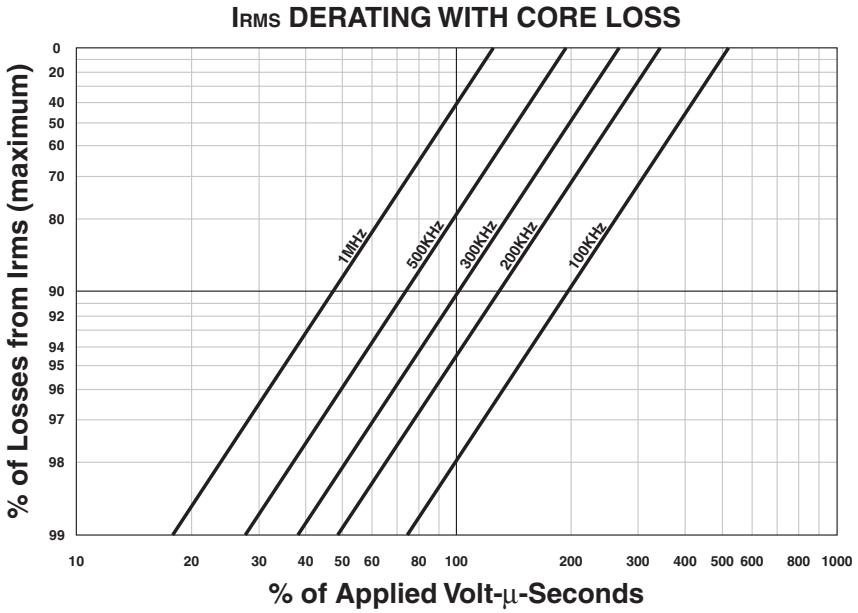
Packaging Information



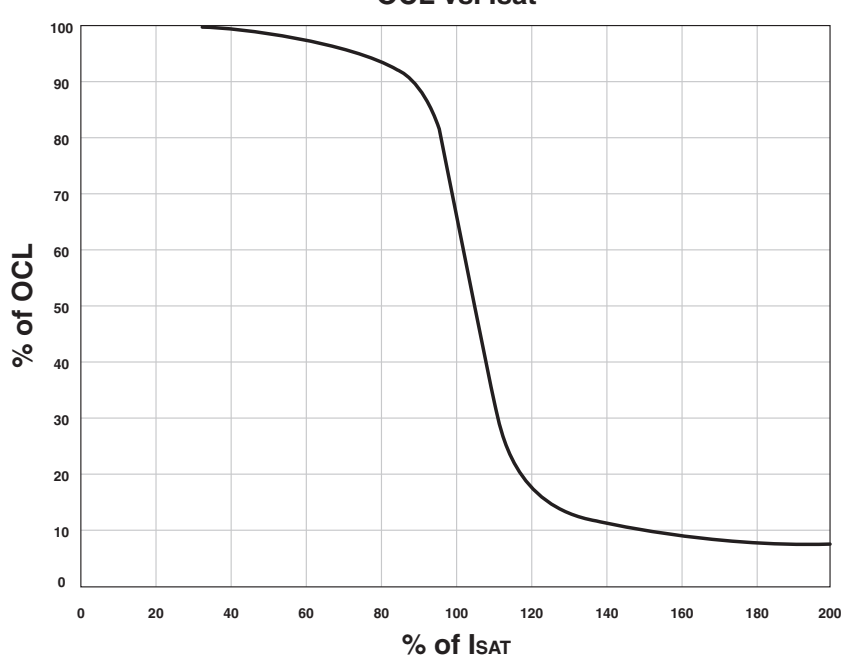
Dimensions in Millimeters

Parts packaged on 13" Diameter reel, 130 parts per reel.

Core Loss



Inductance Characteristics



Description

- High Density, high current/low voltage applications
- Foil technology that adds higher reliability factor over the traditional magnet wire used for higher frequency circuit designs
- Current range from 78.0 to 33.8 Amps
- Inductance range from 0.50uH to 6.52uH
- Ferrite core material

RoHS 2002/95/EC

Applications

- Next generation microprocessors
- Energy storage applications
- DC-DC converters
- Computers

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +85°C
- Solder reflow temperature: +260°C max. for 10 seconds max.

Packaging

- Supplied in bulk packaging, 24 parts per tray

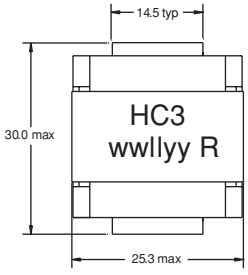
Part Number	Rated Inductance µH	OCL (1) nominal +/-20% µH	Irms (2) Amperes (Typ.)	Isat (3) Amperes (Typ.)	DCR (mΩ) max. @ 20°C	Volts (4) µSec (VµS) (ref.)
HC3-R50-R	0.50	0.50	78.00	120	0.42	17.33
HC3-1R0-R	1.0	1.05	78.00	78	0.42	17.33
HC3-2R2-R	2.2	2.05	55.50	60	0.70	26.01
HC3-3R3-R	3.3	3.63	42.45	46	1.20	34.65
HC3-4R7-R	4.7	4.98	33.80	38	2.17	43.30
HC3-5R6-R	5.6	5.68	33.80	34.5	2.17	43.30
HC3-6R0-R	6.0	6.52	33.80	30.0	2.17	43.30

1) Test Parameters: 300kHz, 0.25 Vrms
2) DC current for approximately ΔT of 40°C without core loss
   De-rating is necessary for AC currents. PCB layout, trace thickness and width, air flow and proximity of other heat generating components will affect temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case conditions verified in the end application.
3) Peak current for approximately 30% rolloff (@20°C)
4) Applied Volt-Time product (V-µS) across the inductor. This value represents the applied V-µS at 300kHz necessary to generate a core loss equal to 10% of the total losses for a 40°C temperature rise.

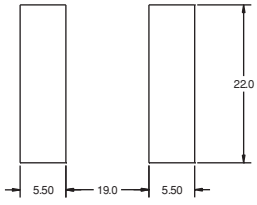
Part number definition:
HC3-XXX-R
HC3 = Product code and size
XXX = Inductance value in uH.
R = Decimal point. If no R is present, third character = #of zeros
-R suffix indicates RoHS compliant

Mechanical Diagrams

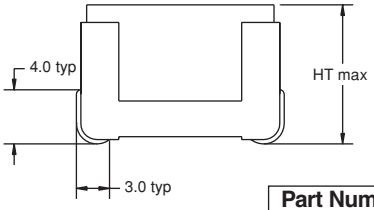
TOP VIEW



RECOMMENDED PCB PAD LAYOUT



FRONT VIEW

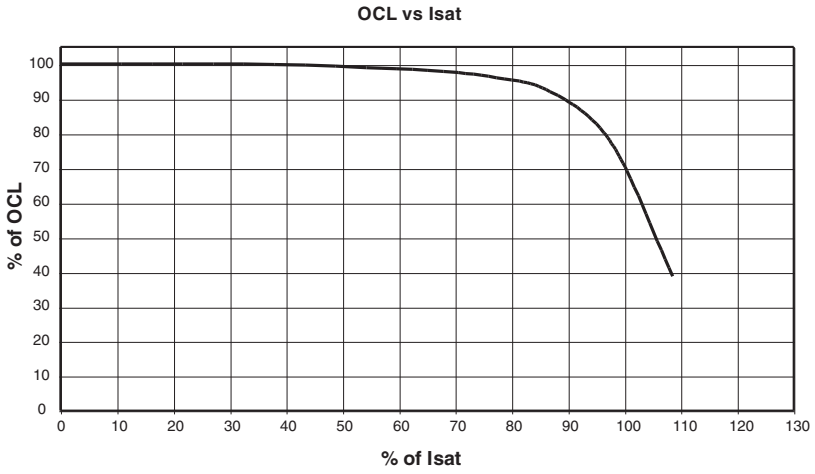


SCHEMATIC

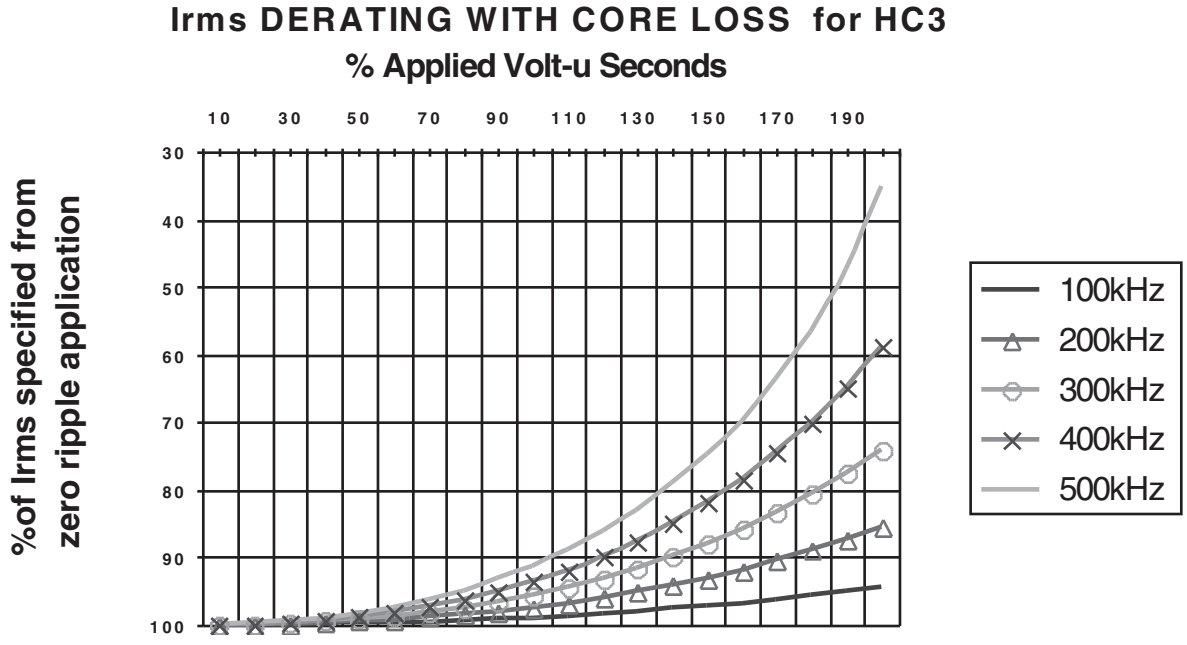
wwllyy = Date code R = Revision level

Part Number	Height max
HC3-R50-R	18.0
HC3-1R0-R	17.5
HC3-2R2-R	17.5
HC3-3R3-R	17.5
HC3-4R7-R	17.5
HC3-5R6-R	17.5
HC3-6R0-R	17.5

Inductance Characteristics



Core Loss



COOPER Bussmann

COILTRONICS

HC7 Series
HIGH CURRENT 7
Power Inductors

Description

RoHS 2002/95/EC

- 155°C maximum total temperature operation
- Surface mount inductors designed for higher speed switch mode applications requiring lower inductance, low voltage and high current
- Design utilizes high temperature powder iron material with a non-organic binder to eliminate thermal aging
- Inductance range from 0.22 uH to 4.81 uH
- Current range from 35.8 to 9.8 Amps
- Frequency range 1kHz to 500kHz

Applications

- Next generation microprocessors
- High current DC-DC converters
- VRM, multi-phase buck regulator
- PC, Workstations, Routers
- Telecom soft switches, Base Stations

Environmental Data

- Storage temperature range: -40°C to +155°C
- Operating ambient temperature range: -40°C to +155°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds max.

Packaging

- Supplied in tape and reel packaging, 610 parts per reel

Part Number	Rated Inductance µH	OCL (1) nominal +/-20% µH	Irms (2) Amperes (Typ.)	Isat (3) Amperes 15% rolloff	Isat (4) Amperes 30% rolloff	DCR (mΩ) max. @ 20°C	Volts (5) µSec (VµS)
HC7-R20-R	.20	0.220	35.80	45.8	86.5	0.67	2.27
HC7-R47-R	.47	0.534	23.40	27.5	51.9	1.60	3.83
HC7-1R0-R	1.0	1.05	20.30	19.6	37.1	2.10	5.36
HC7-1R5-R	1.5	1.73	14.20	15.3	28.8	4.30	6.90
HC7-2R2-R	2.2	2.58	13.00	12.5	23.6	5.20	8.40
HC7-3R9-R	3.9	3.61	10.40	10.6	20.0	7.90	10.0
HC7-4R7-R	4.7	4.81	9.80	9.2	17.3	9.00	12.6

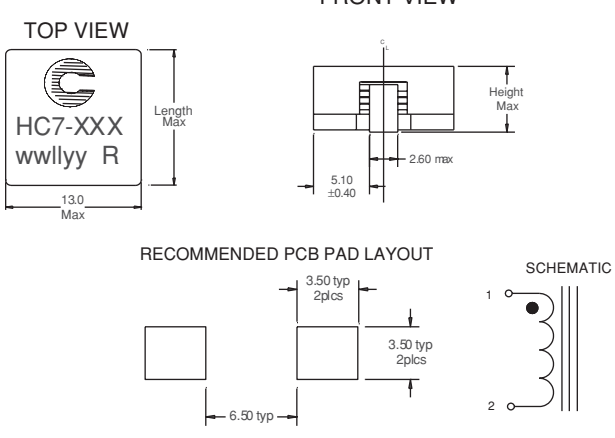
1) Test Parameters: 100KHz, 1.0Vrms
2) Irms Amperes for approximately ΔT of 40°C above 85°C ambient
3) Isat Amperes Peak for approximately 15% rolloff (@20°C)
4) Isat Amperes Peak for approximately 30% rolloff (@20°C)
5) Applied Volt-Time product (V-µS) across the inductor. This value represents the applied V-µS at operating frequency necessary to generate additional core loss which contributes to the 40°C temperature rise. De-rating of the Irms is required to prevent excessive temperature rise. The 100% V-uS rating is equivalent to a ripple current Ip-p of 20% of Isat (30% rolloff option).

It is recommended that the temperature of the part not exceed 155°C under worst case operating conditions verified in the end application.

Units supplied in tape and reel packaging. 13" reels 610 parts per reel.
Carrier tape width = 24 mm. Meets EIA standard

Part number definition:
HC7-XXX-R
HC7 = Product code and size
XXX = Inductance value in uH.
R = Decimal point. If no R is present, third character = #of zeros
-R suffix indicates RoHS compliant

Mechanical Diagrams



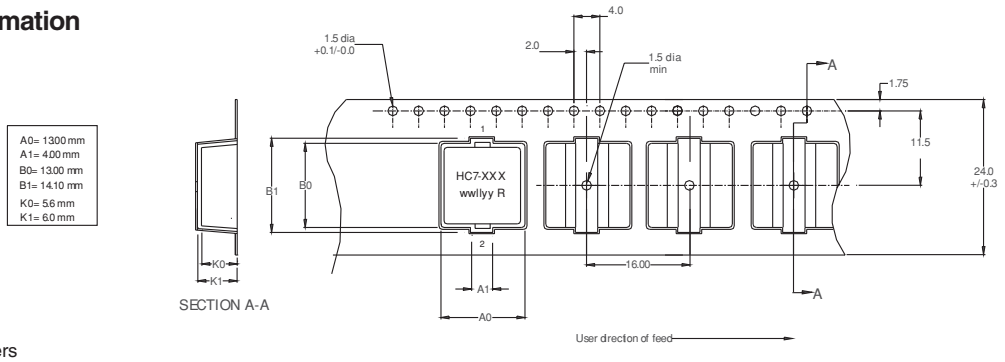
wwllyy = Date code R = Revision level

Maximum Dimension

Part Number	Height mm	Length mm
HC7-R20-R	6.0	14.25
HC7-R47-R	5.5	13.8
HC7-1R0-R	5.5	13.8
HC7-1R5-R	5.5	13.8
HC7-2R2-R	5.5	13.8
HC7-3R9-R	5.5	13.8
HC7-4R7-R	5.5	13.8

Dimensions in Millimeters.
All dimensions I+/- 0.2 mm unless otherwise specified.
All soldering surfaces are coplanar within 0.15 mm.

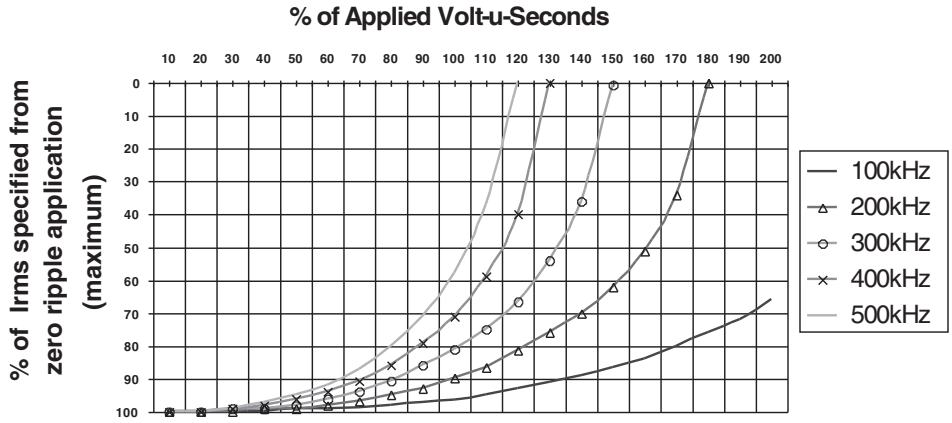
Packaging Information



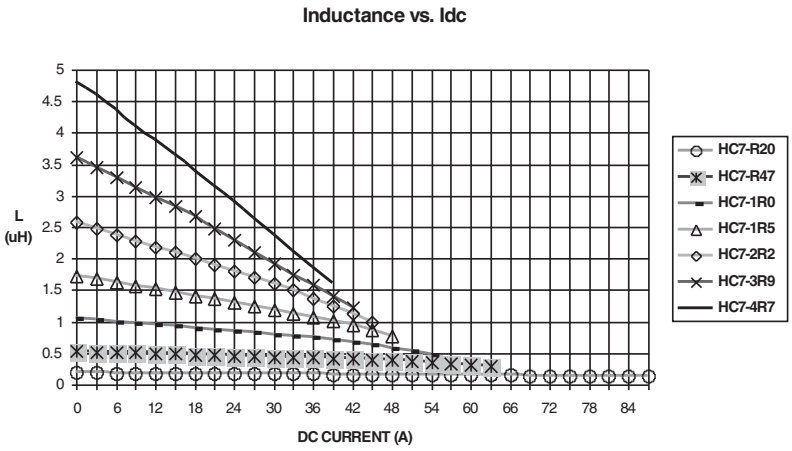
Dimensions in Millimeters

Core Loss

Irms DERATING WITH CORE LOSS



Inductance Characteristics



RoHS 2002/95/EC

Description

- Surface mount inductors, 4.0mm height, designed for higher speed switch mode applications requiring low voltage and high current
- 155°C maximum total operating temperature
- Design utilizes high temperature powder iron material with a non-organic binder to eliminate thermal aging
- Inductance offering expanded for applications requiring higher inductance.
- Inductance Range from 0.175 uH to 47.3 uH
- Current Range from 39.0 to 2.4 Amps
- Frequency Range 1kHz to 500kHz

Applications

- Next generation microprocessors
- High current DC-DC converters
- VRM, multi-phase buck regulator
- PC, Workstations, Routers
- Telecom soft switches, Base Stations

Environmental Data

- Storage temperature range: -40°C to +155°C
- Operating ambient temperature range: -40°C to +155°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds max.

Packaging

- Supplied in tape and reel packaging, 800 parts per reel

Part Number	Rated Inductance µH	OCL (1) nominal +/-20% µH	Irms (2) Amperes (Typ.)	Isat (3) Amperes 15% rolloff	Isat (4) Amperes 30% rolloff	DCR (mΩ) max. @ 20°C	Volts (5) µSec (VµS) (ref.)
HC8-R15-R	0.15	0.175	39.0	43	76	0.80	1.5
HC8-R39-R	0.39	0.390	28.3	26	45	1.55	2.5
HC8-R75-R	0.75	0.766	18.8	18.5	32.7	3.40	3.5
HC8-1R2-R	1.2	1.32	16.0	14.4	25.5	4.70	4.5
HC8-1R9-R	1.9	1.90	12.4	11.8	20.9	7.7	5.5
HC8-2R6-R	2.6	2.65	10.2	10.0	17.7	11.4	6.5
HC8-3R5-R	3.5	3.52	8.50	8.7	15.3	16.5	7.5
HC8-4R5-R	4.5	4.52	8.00	7.7	13.5	18.6	8.5
HC8-5R6-R	5.6	5.65	6.70	6.9	12.1	26.3	9.5
HC8-6R9-R	6.9	6.90	6.40	6.2	10.9	28.9	10.5
HC8-8R2-R	8.2	8.27	5.50	5.7	10.0	39.6	11.5
HC8-100-R	10.0	9.77	5.20	5.2	9.2	43.6	12.5
HC8-150-R	15.0	15.02	4.10	4.2	7.4	68.6	15.5
HC8-220-R	22.0	21.40	3.40	3.5	6.2	99.5	18.6
HC8-330-R	33.0	31.65	2.70	2.9	5.1	154	22.6
HC8-470-R	47.0	47.28	2.20	2.4	4.2	237	27.6

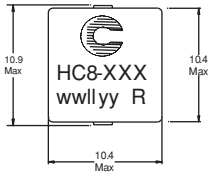
1) Test Parameters: 100KHz, 1.0Vrms
2) Irms Amperes for approximately ΔT of 40°C above 85°C ambient
3) Isat Amperes Peak for approximately 15% rolloff (@20°C)
4) Isat Amperes Peak for approximately 30% rolloff (@20°C)
5) Applied Volt-Time product (V-µS) across the inductor. This value represents the applied V-µS at operating frequency necessary to generate additional core loss which contributes to the 40°C temperature rise. De-rating of the Irms is required to prevent excessive temperature rise. The 100% V-uS rating is equivalent to a ripple current Ip-p of 20% of Isat (30% rolloff option).

It is recommended that the temperature of the part not exceed 155°C under worst case operating conditions verified in the end application.

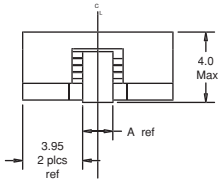
Part number definition:
HC8-XXX-R
HC8 = Product code and size
XXX = Inductance value in uH.
R = Decimal point. If no R is present, third character = #of zeros
-R suffix indicates RoHS compliant

Mechanical Diagrams

TOP VIEW



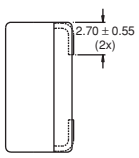
FRONT VIEW



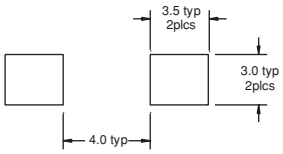
FRONT VIEW TABLE

PN	A mm
R15	2.1
R39	2.1
R75	2.1
1R	2.1
1R9 thru 470	2.7

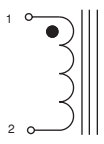
SIDE VIEW



RECOMMENDED PCB PAD LAYOUT

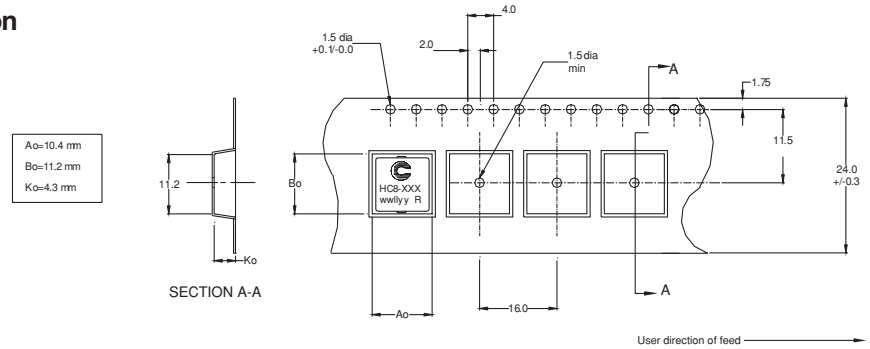


SCHEMATIC



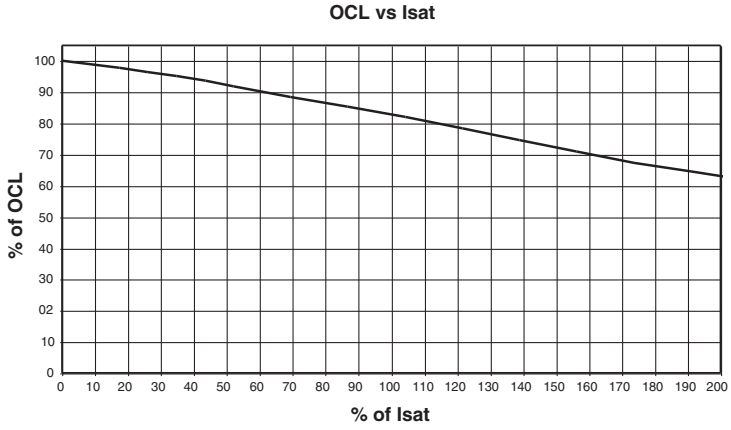
wwllyy = Date code R = Revision level
xxx = Inductance value

Packaging Information

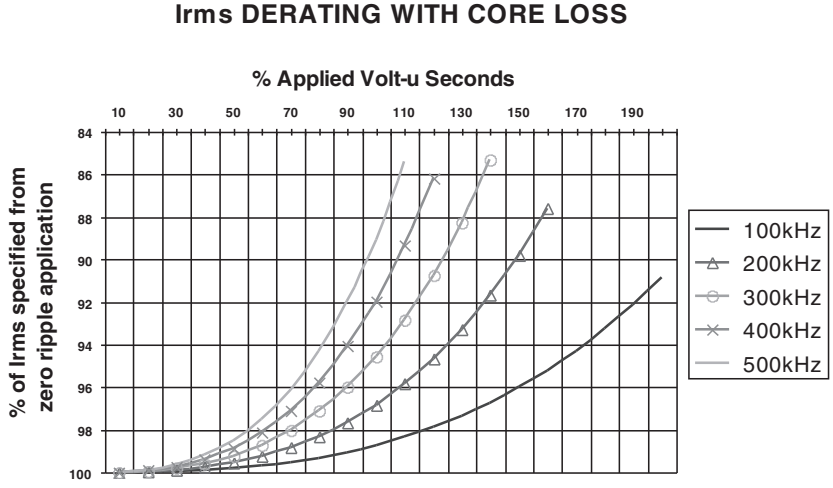


Dimensions in Millimeters

Inductance Characteristics



Core Loss



COOPER Bussmann

HC8LP Series
Power Inductors

Description

RoHS 2002/95/EC

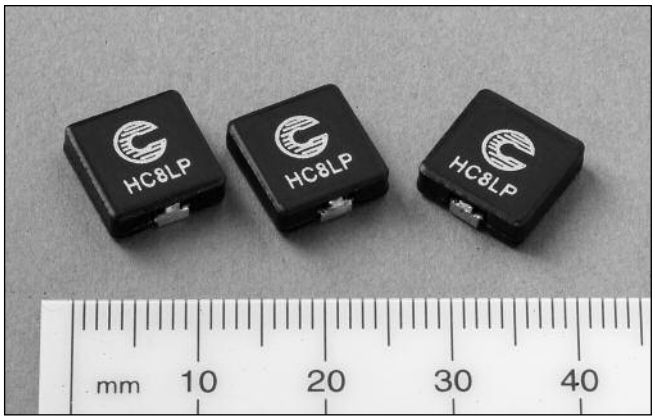
- 155°C maximum temperature operation
- Low profile surface mount inductors designed for higher speed switch mode applications requiring low voltage, and high current
- Design utilizes high temperature powder iron material with a non-organic binder to eliminate thermal aging
- Inductance range from 0.17 uH to 47.9 uH
- Current range from 29 Amps to 1.8 Amps
- Frequency range 1kHz to 500kHz

Applications

- Next generation processors
- High current DC-DC converters
- VRM, multi-phase buck regulator
- PC Workstations, Routers, Servers
- Telecom soft switches, Base stations

Environmental Data

- Storage temperature range: -40°C to +155°C
- Operating temperature range: -40°C to +155°C (Range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds max.



Packaging

- Supplied in tape and reel packaging, 800 parts per reel

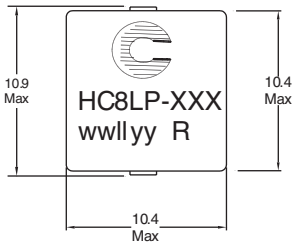
Part Number	Rated Inductance µH	OCL (1) nominal +/-20% µH	Irms (2) Amperes (Typ.)	Isat (3) Amperes 15% rolloff	Isat (4) Amperes 30% rolloff	DCR (mΩ) max. @ 20°C	Volts (5) µSec (VµS) (ref.)
HC8LP-R15-R	0.15	0.170	29.0	31	56	1.40	7.8
HC8LP-R39-R	0.39	0.430	20.2	19	34	2.80	4.7
HC8LP-R75-R	0.75	0.830	15.6	13.5	24	4.70	3.4
HC8LP-1R2-R	1.2	1.35	12.4	10.1	18.7	7.50	2.6
HC8LP-1R9-R	1.9	1.92	10.1	8.7	15.5	11.5	4.1
HC8LP-2R6-R	2.6	2.67	8.3	7.4	13.1	17.1	4.8
HC8LP-3R5-R	3.5	3.56	6.9	6.4	11.4	24.5	5.6
HC8LP-4R5-R	4.5	4.57	6.5	5.6	10.0	27.6	6.3
HC8LP-5R6-R	5.6	5.71	5.5	5.1	9.0	38.9	7.1
HC8LP-6R9-R	6.9	6.98	5.2	4.6	8.1	42.8	7.8
HC8LP-8R2-R	8.2	8.37	4.5	4.2	7.4	58.0	8.6
HC8LP-100-R	10.0	9.90	4.3	6.8	3.8	62.9	9.3
HC8LP-150-R	15.0	15.20	3.4	3.1	5.5	99.4	11.6
HC8LP-220-R	22.0	21.70	2.8	2.6	4.6	149	13.7
HC8LP-330-R	33.0	32.10	2.3	2.1	3.8	224	16.8
HC8LP-470-R	47.0	47.90	1.8	1.7	3.1	344	20.3

1) Open Circuit Inductance test parameters: 100KHz, 1.0V, 0.0Adc
2) Irms: DC current for an approximate DT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 155°C under worst case operating conditions verified in the end application.
3) Isat Amperes Peak for approximately 15% rolloff (@20°C)
4) Isat Amperes Peak for approximately 30% rolloff (@20°C)
5) Applied Volt-Time product (V-µS) across the inductor. This value represents the applied V-µS at operating frequency necessary to generate additional core loss which contributes to the 40°C temperature rise. De-rating of the Irms is required to prevent excessive temperature rise. The 100% V-uS rating is equivalent to a ripple current Ip-p of 20% of Isat (30% rolloff option).

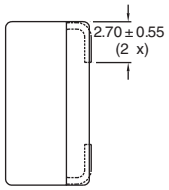
Part number definition:
HC8LP-xxx-R
HC8LP = Product code and size
xxx = Inductance in µH. R = decimal point.
If no R is present third character = # of zeros.
-R suffix indicates RoHS compliant

Mechanical Diagrams

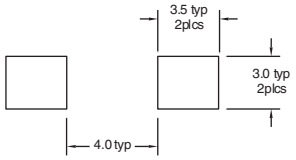
TOP VIEW



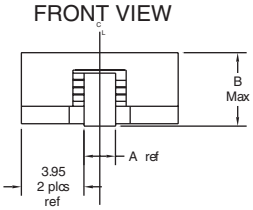
SIDE VIEW



RECOMMENDED PCB PAD LAYOUT



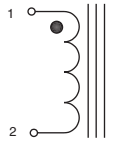
FRONT VIEW



FRONT VIEW
Dimesional Table

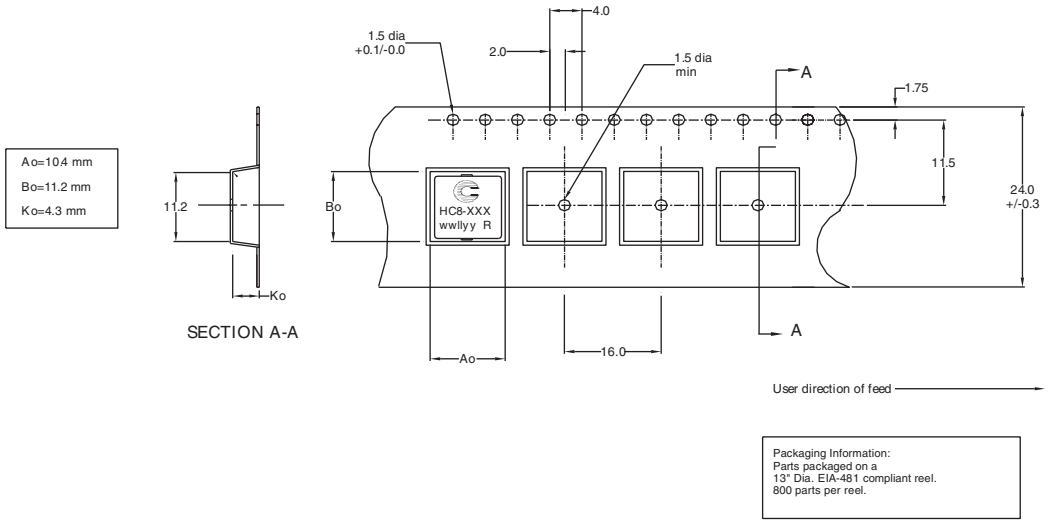
PN	A ref mm	B max mm
R15	2.1	3.5
R39	2.1	3.5
R75	2.1	3.5
1R2	2.1	3.3
1R9 thru 470	2.7	3.5

SCHEMATIC



Dimensions in Millimeters
wwllyy = Date Code, R = Revision Level

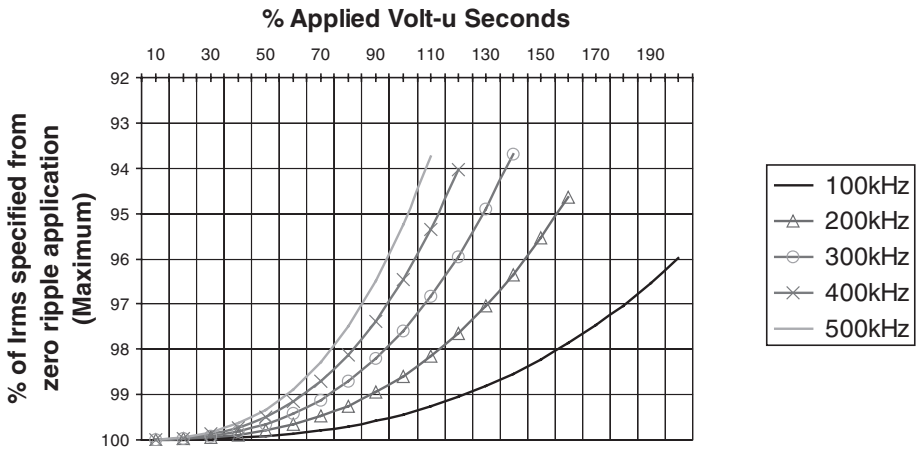
Packaging Information



Packaging Information:
Parts packaged on a
13" Dia. EIA-481 compliant reel.
800 parts per reel.

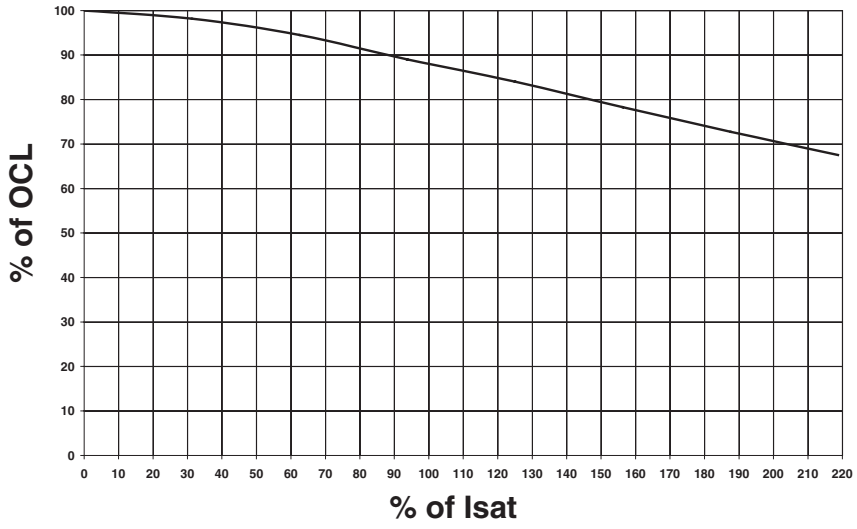
Core Loss

Irms DERATING WITH CORE LOSS



Rolloff

OCL vs Isat



Description

RoHS 2002/95/EC

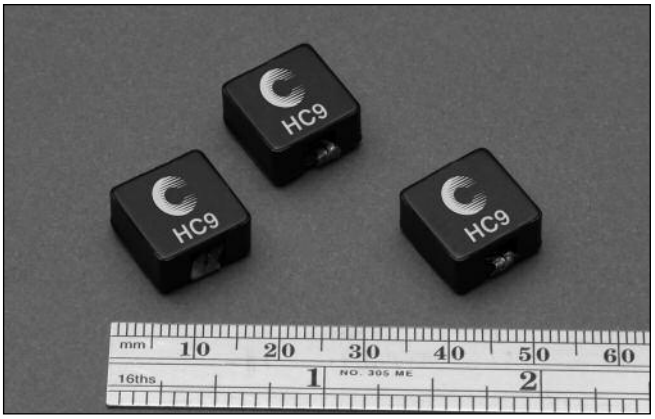
- 155°C maximum total temperature operation
- Surface mount inductors designed for higher speed switch mode applications requiring lower inductance, low voltage and high current
- Design utilizes high temperature powder iron material with a non-organic binder to eliminate thermal aging
- Inductance Range from 0.2 uH to 47.0 uH
- Current Range from 95.0 Amps to 3.65 Amps
- Frequency Range 1kHz to 500kHz

Applications

- Next generation processors
- High current DC-DC converters
- VRM, multi-phase buck regulator
- PC, Workstations, Routers, Servers

Environmental Data

- Storage temperature range: -40°C to +155°C
- Operating temperature range: -40°C to +155°C (range is application specific)
- Solder reflow temperature: +260°C max for 10 seconds maximum



Packaging

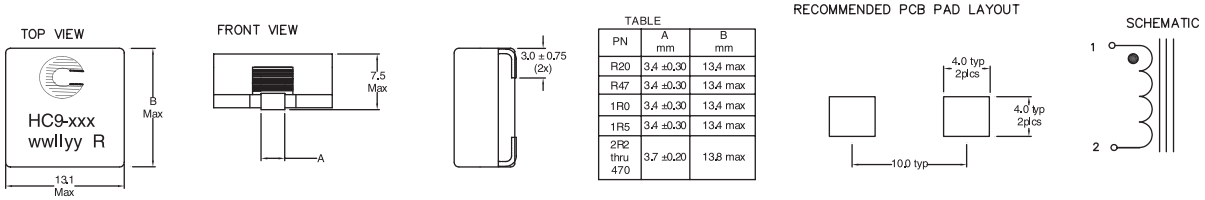
- Supplied in tape and reel packaging, 450 parts per reel

Part Number	Rated Inductance µH	OCL (1) nominal +/-15% µH	Irms (2) Amperes (Typ.)	Isat (3) Amperes 20% rolloff	Isat (4) Amperes 30% rolloff	DCR (mΩ) max. @ 20°C	Volts (5) µSec (VµS)
HC9-R20-R	0.20	0.218	46.7	65	95	0.50	2.87
HC9-R47-R	0.47	0.544	33.7	40	57	0.88	4.78
HC9-1R0-R	1.0	1.04	23.7	28	41	1.87	6.70
HC9-1R5-R	1.5	1.70	21.0	22	32	2.27	8.46
HC9-2R2-R	2.2	2.53	17.2	18	26	3.37	10.4
HC9-3R3-R	3.3	3.52	14.3	15	22	4.87	12.4
HC9-4R3-R	4.3	4.67	13.0	13.2	19.1	5.90	14.4
HC9-6R8-R	6.8	7.45	10.3	11.4	15.1	9.40	18.1
HC9-100-R	10.0	10.9	8.50	8.6	12.5	14.0	22.0
HC9-220-R	22.0	22.4	6.30	6.0	8.7	25.7	31.5
HC9-330-R	33.0	34.5	4.42	4.8	7.0	48.8	37.3
HC9-470-R	47.0	49.2	3.65	3.9	5.7	72.3	44.8

1) Test Parameters: 100KHz, 1.0Vrms
2) Irms Amperes for approximately ΔT of 40°C without core loss. De-rating is necessary for AC currents. PCB layout, trace thickness and width, airflow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 155°C under worst case conditions verified in the end application.
3) Peak current for approximately 20% rolloff @20°C
4) Peak current for approximately 30% rolloff @20°C
5) Applied Volt-Time product (V-µS) across the inductor. This value represents the applied V-µS at operating frequency necessary to generate additional core loss which contributes to the 40°C temperature rise. De-rating of the Irms is required to prevent excessive temperature rise. The 100% V-uS rating is equivalent to a ripple current Ip-p of 20% of Isat (30% rolloff option).

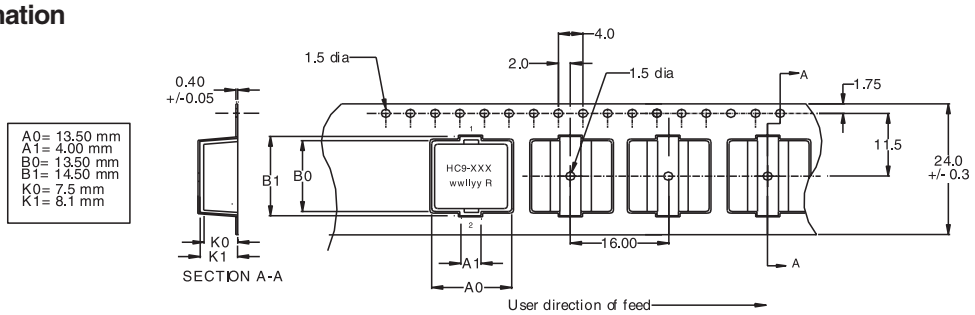
Part number definition:
First 3 characters = Product code and size.
Last 3 characters = Inductance in µH. R = decimal point.
If no R is present third character = # of zeros.

Mechanical Diagrams



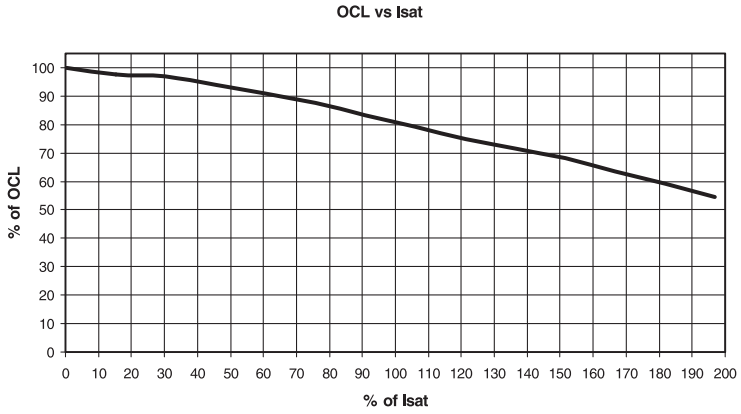
Dimensions in Millimeters. All dimensions +/-0.2 mm unless otherwise specified.
wwllyy = Date Code, R = Revision Level

Packaging Information

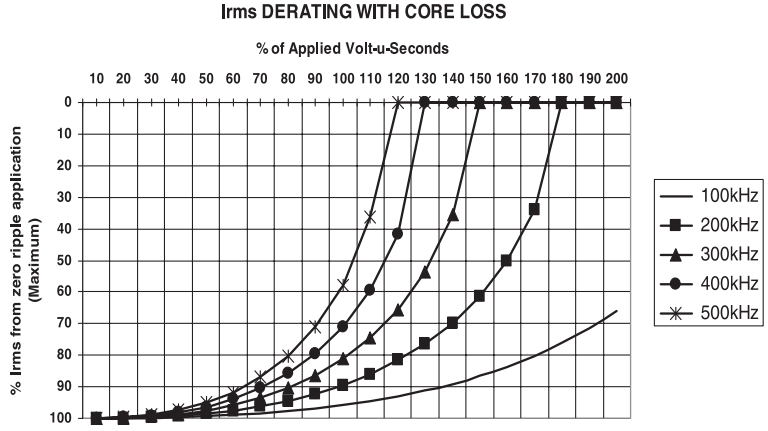


Dimensions in Millimeters

Rolloff



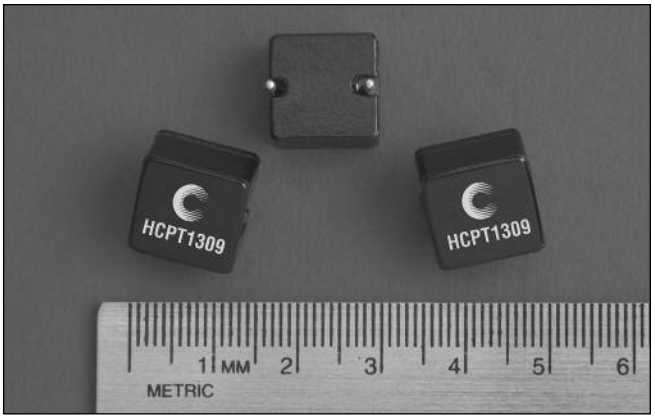
Core Loss



Description

- 105°C maximum total temperature operation
- 13.2mm x 13.2mm x 9.0mm through hole package
- Core material: Powder Iron
- Inductance range from 0.20µH to 3.3µH
- Current range from 90.0 Amps to 11.4 Amps
- Frequency range up to 1MHz

RoHS 2002/95/EC



Applications

- Next generation processors
- High current DC-DC converters
- VRM, multi-phase buck regulator
- Desktop computers
- Video game power

Environmental Data

- Storage temperature range: -40°C to +105°C
- Operating temperature range: -40°C to +105°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

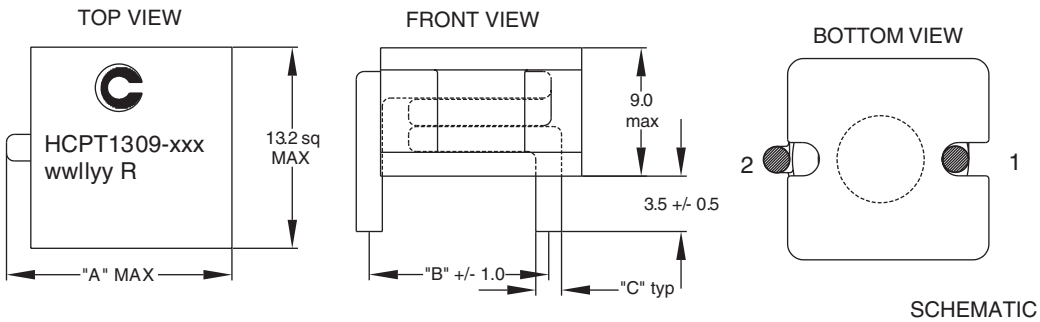
Packaging

- Supplied in bulk packaging, 100 parts per tray

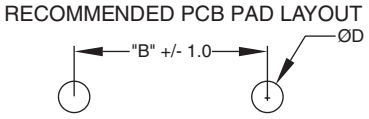
Part Number	OCL (1) nominal +/- 20% (µH)	Irms (2) Amperes	Isat Amperes (3) Peak 20% rolloff @20°C	Isat Amperes (4) Peak 30% rolloff @20°C	DCR (mΩ) nom @20°C	K-factor (5)
HCPT1309-R20-R	0.20	43.1	72.2	90.0	0.426	154.1
HCPT1309-R47-R	0.49	34.0	43.3	55.0	0.624	92.4
HCPT1309-1R0-R	0.96	19.4	30.9	40.0	1.90	66.0
HCPT1309-1R5-R	1.59	13.7	24.1	30.6	3.82	51.4
HCPT1309-2R2-R	2.27	12.5	19.7	25.0	4.10	42.0
HCPT1309-3R3-R	3.31	11.4	16.7	21.0	4.80	35.6

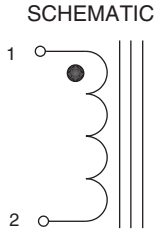
(1) OCL: Open Circuit Inductance test parameters: 100kHz, 0.1Vrms, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 105°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 20% rolloff (@20°C)
(4) Isat Amperes peak for approximately 30% rolloff (@20°C)
(5) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p: (Gauss), K: (K factor from table), L: (Inductance in uH), ΔI (Peak to peak ripple current in Amps).

Mechanical Diagrams



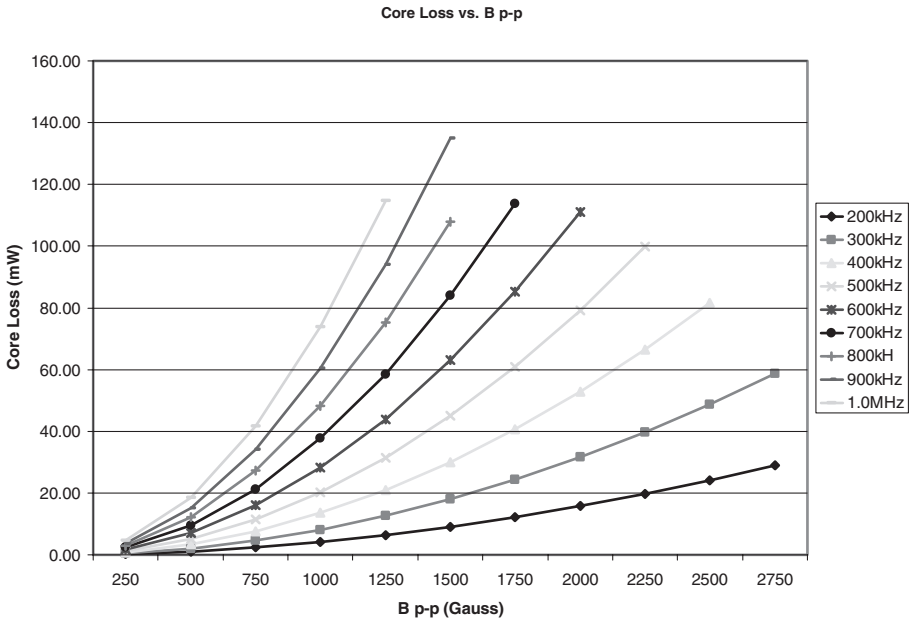
Dimension Table				
Part No	"A"	"B"	"C"	"D"
HCPT1309-R20	14.0	12.2	1.63	2.13
HCPT1309-R47	14.0	12.2	1.63	2.13
HCPT1309-1R0	13.7	12.0	1.29	1.6
HCPT1309-1R5	13.5	11.8	1.15	1.40
HCPT1309-2R2	13.5	11.8	1.15	1.40
HCPT1309-3R3	13.5	11.8	1.15	1.40



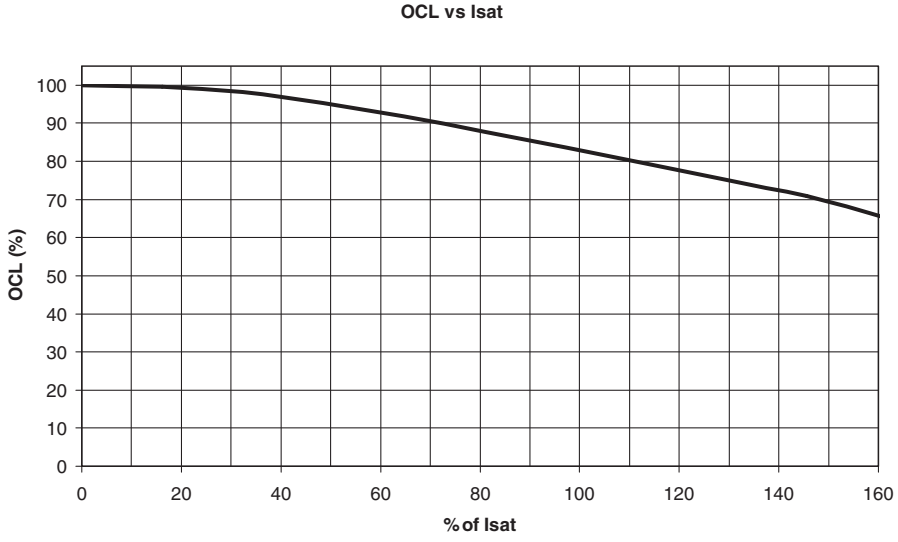


Dimensions are in millimeters.
wwllyy = Date Code. R = Revision Level.

Core Loss



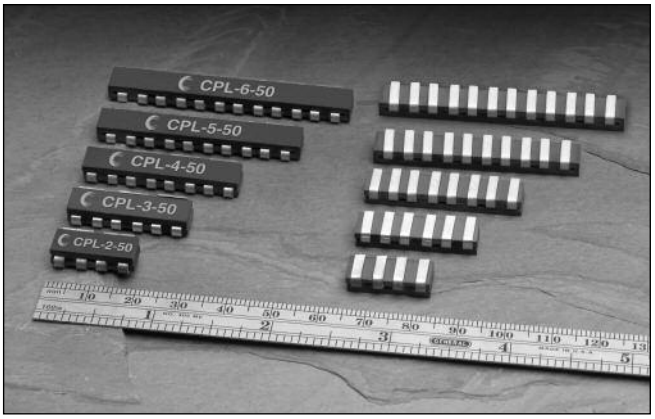
Inductance Characteristics



Description

- Designed exclusively for use with Volterra VPR-Devices(A)
- High current multi-phase inductor applications
- Ferrite core material
- 50nH per phase coupled inductor
- 125°C maximum temperature operation
- Frequency range up to 2MHz
- Patents pending
- For tape and reel parts add TR after part number: CPL-x-xxTR-R

RoHS 2002/95/EC



Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

Packaging

- Supplied in bulk trays or tape and reel:

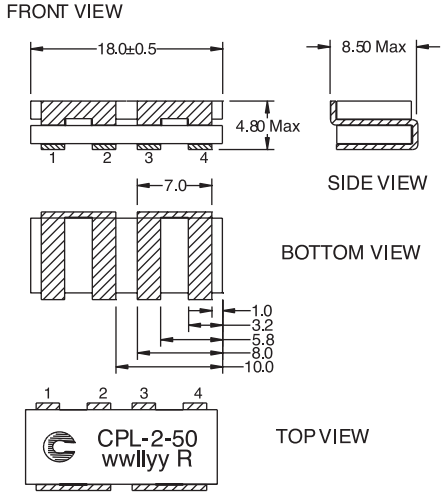
CPL-2-50-R: 120 per tray	CPL-2-50TR-R: 750 per reel
CPL-3-50-R: 90 per tray	CPL-3-50TR-R: 750 per reel
CPL-4-50-R: 75 per tray	CPL-4-50TR-R: 750 per reel
CPL-5-50-R: 60 per tray	CPL-5-50TR-R: 750 per reel
CPL-6-50-R: 45 per tray	CPL-6-50TR-R: 750 per reel

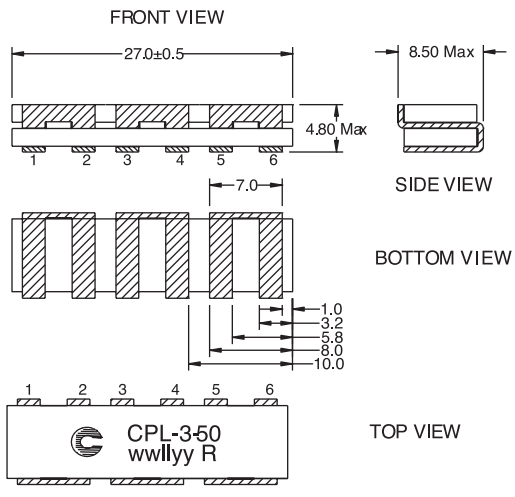
		Functional Specifications				Test Specifications				
Part Number	Inductance Phases	DCR (Ω) nom. @ 25°C	DCR (Ω) max. @ 25°C	Rated (3) Inductance per phase (nH)	I Rated per phase (Adc) (3)	Pin Number	OCL (nH) notes 1&2	Pin Number	OCL (nH) notes 1&2	Magnetizing Inductance @ 5Adc (25°C)
CPL-2-50-R	2	0.0005	0.0006	50 ± 20%	40	(1-2)	365 ± 18%	(3-4)	365 ± 18%	300
CPL-3-50-R	3	0.0005	0.0006	50 ± 20%	40	(3-4)	490 ± 20%	(1-2), (5-6)	365 ± 18%	400
CPL-4-50-R	4	0.0005	0.0006	50 ± 20%	40	(3-4), (5-6)	490 ± 20%	(1-2), (7-8)	365 ± 18%	400
CPL-5-50-R	5	0.0005	0.0006	50 ± 20%	40	(3-4), (5-6), (7-8)	490 ± 20%	(1-2), (9-10)	365 ± 18%	400
CPL-6-50-R	6	0.0005	0.0006	50 ± 20%	40	(3-4), 5-6), (7-8), (9-10)	490 ± 20%	(1-2), (11-12)	365 ± 18%	400

(1) OCL (Open Circuit Inductance)
(2) Test parameters: 1MHz, 0.1Vrms, 0.0Adc.
(3) The rated current and rated inductance per phase is determined by Volterra's testing and circuit design. Additional information can be provided by contacting Volterra.

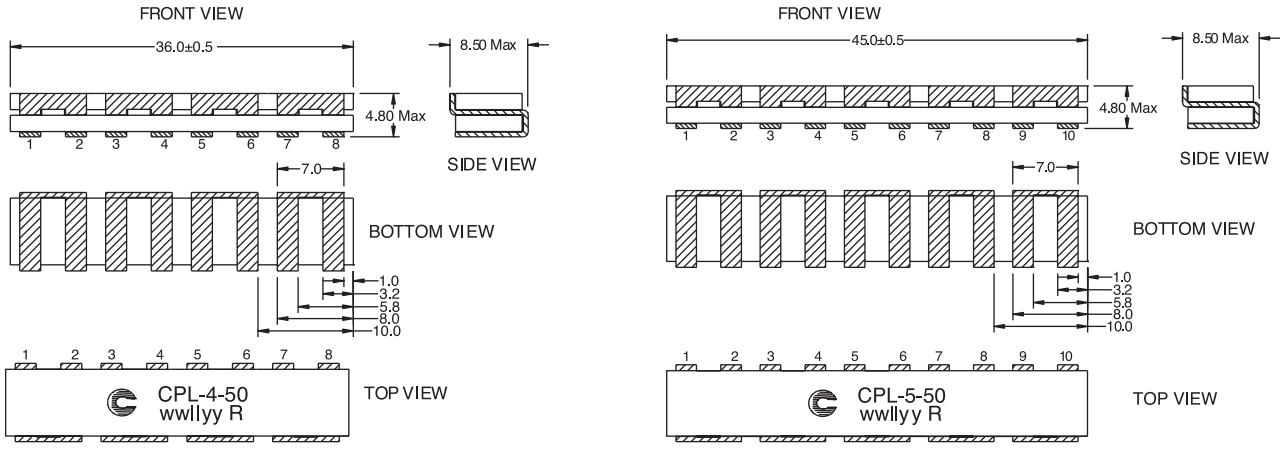
(A) This device is licensed for use only when incorporated within a voltage regulator employing power regulating devices manufactured by Volterra Semiconductor Corp. No license is granted expressly or by implication to use this device with power regulating devices manufactured by any company other than Volterra.

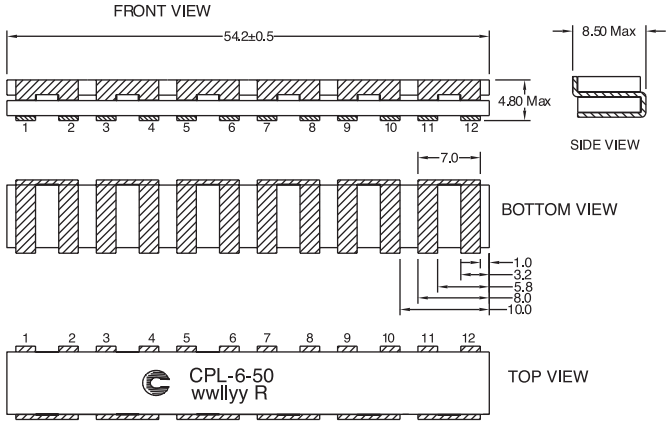
Mechanical Diagrams





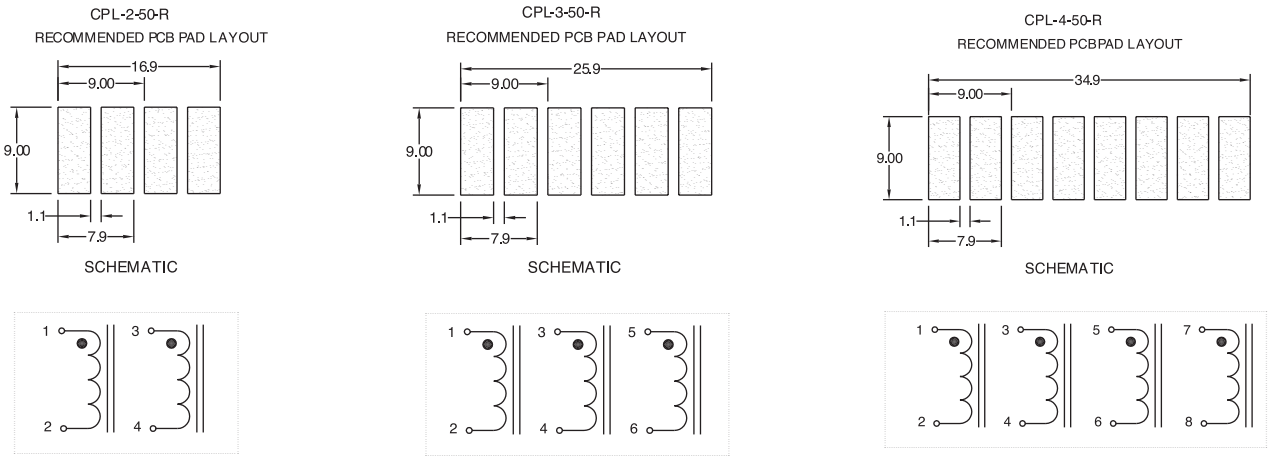
Mechanical Diagrams





Dimensions are in millimeters. All dimensions +/-0.2 mm unless otherwise specified. wwllyy = (date code) R = revision level

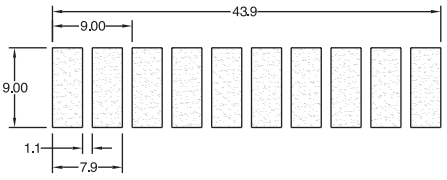
Schematic/PCB Layout



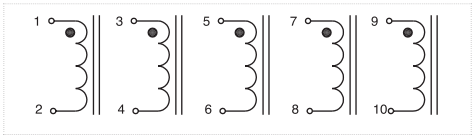
Schematic/PCB Layout

CPL-5-50-R

RECOMMENDED PCB PAD LAYOUT

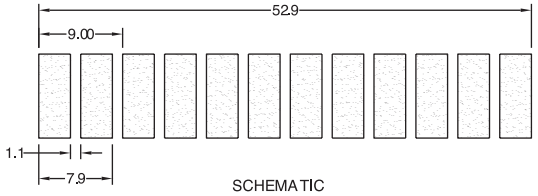


SCHEMATIC

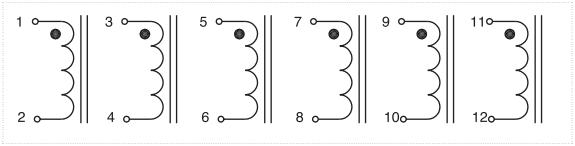


CPL-6-50-R

RECOMMENDED PCB PAD LAYOUT



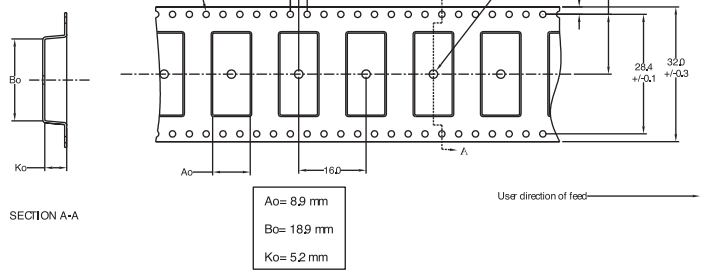
SCHEMATIC



Dimensions are in millimeters. All dimensions +/-0.2 mm unless otherwise specified.

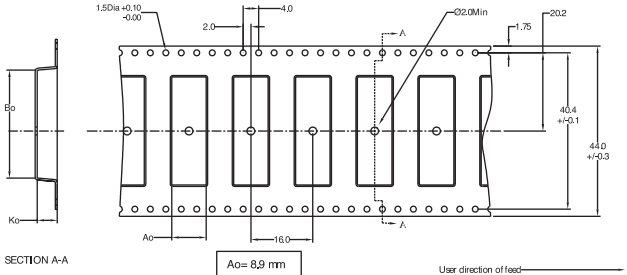
Packaging Information (Tape and Reel)

CPL-2-50TR-R



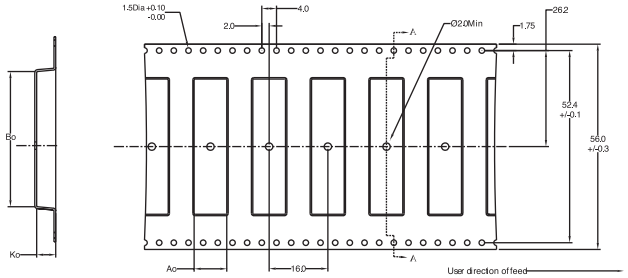
Ao= 8.9 mm
Bo= 18.9 mm
Ko= 5.2 mm

CPL-3-50TR-R



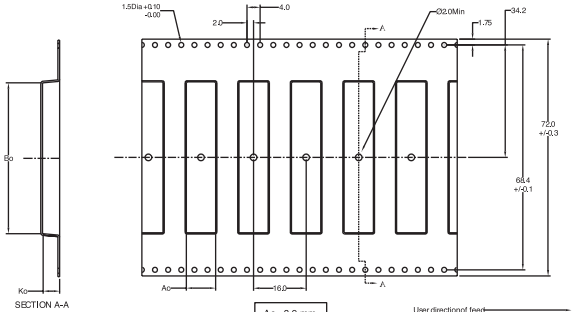
Ao= 8.9 mm
Bo= 27.9mm
Ko= 5.2 mm

CPL-4-50TR-R



Ao= 8.9 mm
Bo= 36.9 mm
Ko= 5.2 mm

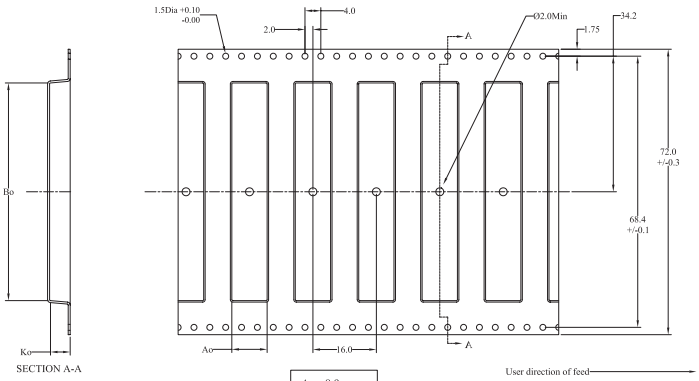
CPL-5-50TR-R



Ao= 8.9 mm
Bo= 45.9 mm
Ko= 5.2 mm

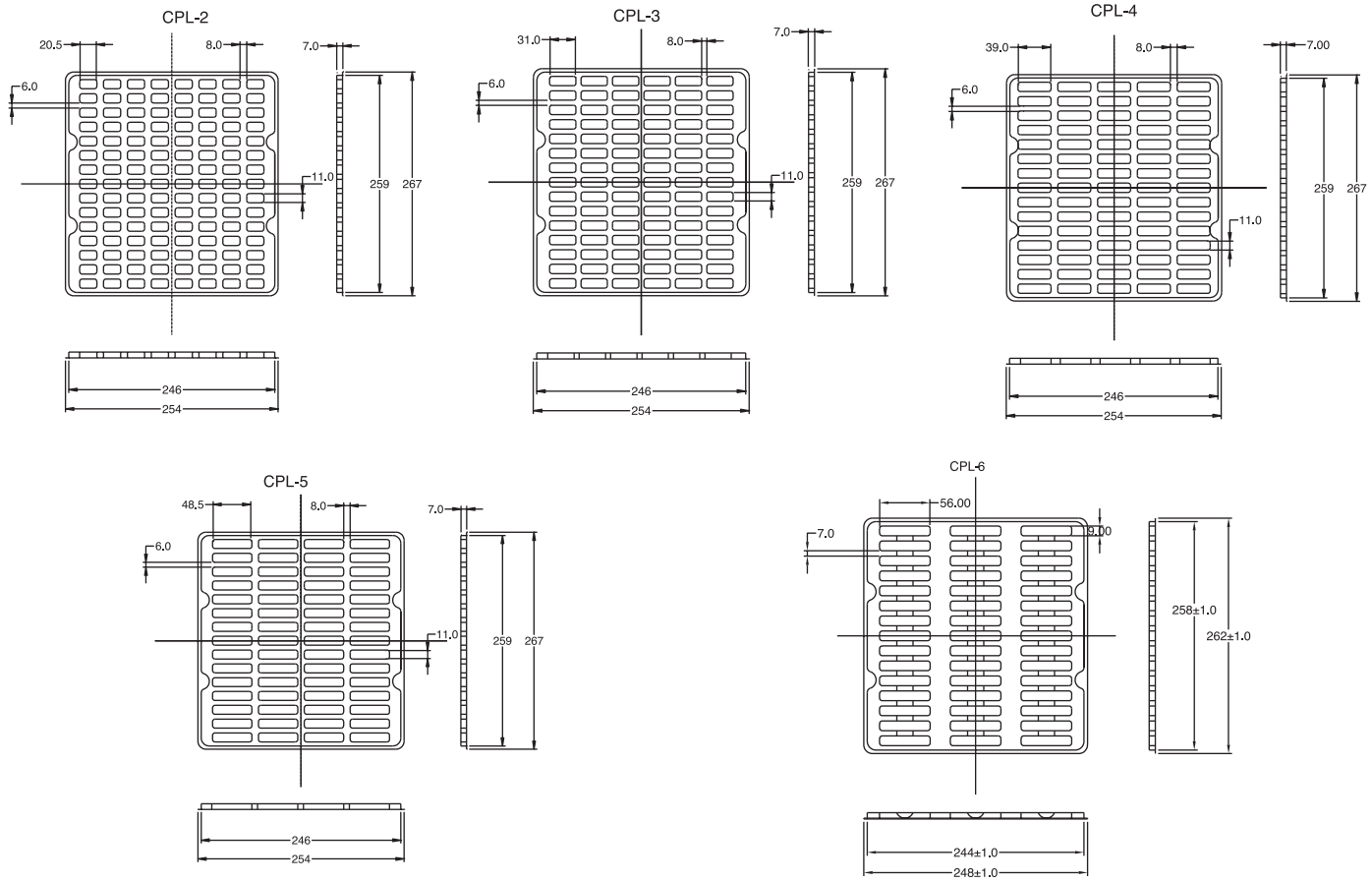
Packaging Information (Tape and Reel)

CPL-6-50TR-R



Ao= 8.9 mm
Bo= 54.9 mm
Ko= 5.2 mm

Packaging Information (Bulk Tray)



Notes:
Material: 0.8 PVC with internal Anti-Stat
Tolerances: x.xx = ± 0.20, x.x = ± 0.50, x = ± 2.0 unless otherwise specified.
Trays are stackable when rotated 180°.
All dimensions are in mm.

COOPER Bussmann

DR1030 Series
Low Profile Power Inductors

RoHS 2002/95/EC

Description

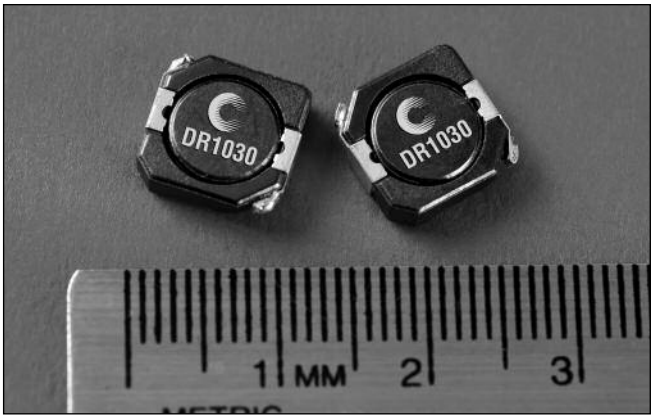
- 125°C maximum total temperature operation
- Low profile surface mount inductors
- 10.3mm x 10.5mm x 3.0mm shielded drum core
- Ferrite core material
- Inductance range from 1.1µH to 150µH
- Current range from 9.5 Amps to 0.68 Amps
- Frequency range up to 1MHz

Applications

- Computer, DVD players, and portable power devices
- Notebook power, LCD panels
- DC-DC converters
- Input/output filter, Buck/Boost regulators

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum



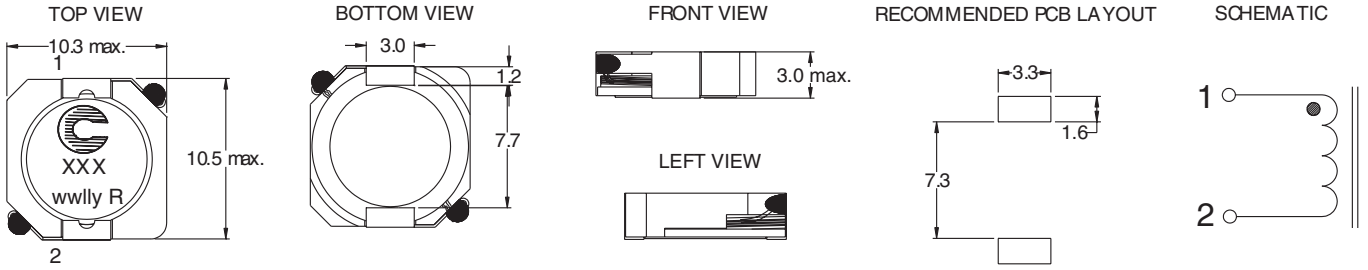
Packaging

- Supplied in tape and reel packaging, 1000 parts per reel

Part Number	Rated Inductance (µH)	OCL (1) µH ± 30%	Irms (2) Amperes	Isat (3) Amperes	DCR mΩ@20°C (Typical)	DCR mΩ@20°C (Maximum)	K-factor (4)
DR1030-1R1-R	1.1	1.1	7.0	9.50	6.5	7.9	22
DR1030-1R8-R	1.8	1.9	5.9	7.41	9.1	11.0	17
DR1030-2R8-R	2.8	2.8	5.1	6.08	12.1	14.5	14
DR1030-3R9-R	3.9	4.0	4.3	5.13	16.4	20.0	12
DR1030-5R2-R	5.2	5.2	3.7	4.75	22.9	27.5	10
DR1030-6R8-R	6.8	6.8	3.5	3.90	24.9	30.0	9.0
DR1030-8R2-R	8.2	8.4	3.3	3.54	28.4	34.1	8.0
DR1030-100-R	10	10.4	2.8	3.18	40.2	48.0	7.0
DR1030-150-R	15	14.8	2.3	2.66	57.3	68.8	6.0
DR1030-220-R	22	22.8	1.8	2.19	95.5	114.6	4.5
DR1030-330-R	33	32.4	1.6	1.81	113.6	136.3	4
DR1030-470-R	47	47.9	1.3	1.52	166.6	200.0	3.4
DR1030-680-R	68	66.6	1.1	1.24	253.1	303.7	2.9
DR1030-820-R	82	82.4	1.0	1.14	332.4	382.3	2.6
DR1030-101-R	100	100	0.86	1.05	375.0	450.0	2.4
DR1030-121-R	120	119.3	0.8	0.95	523.4	602.0	1.9
DR1030-151-R	150	155.3	0.68	0.86	590.0	700	1.4

(1) Open Circuit Inductance Test Parameters: 100kHz, 0.1V, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 35% rolloff max. (@25°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in uH), ΔI (Peak to peak ripple current in Amps).
(5) Part Number definition: DR1030-xxx-R
DR1030 = Product code and size, xxx = Inductance value in µH, R = decimal point. If no R is present third character = # of zeros. -R suffix = RoHS compliant

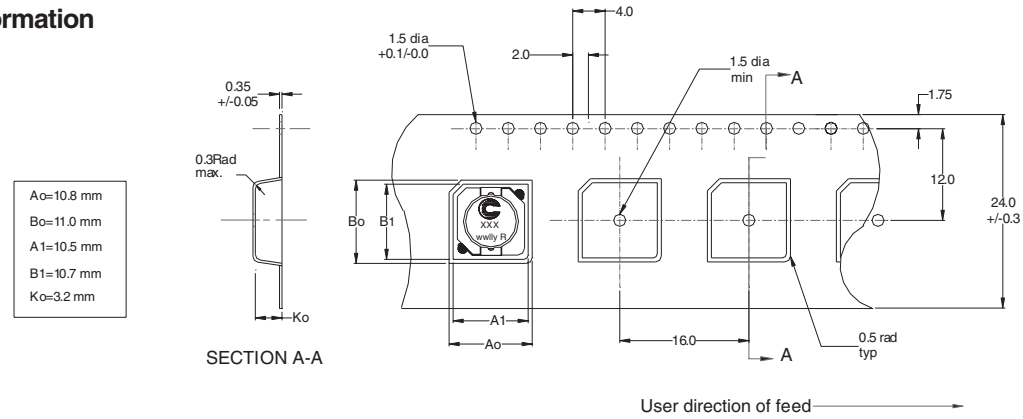
Mechanical Diagrams



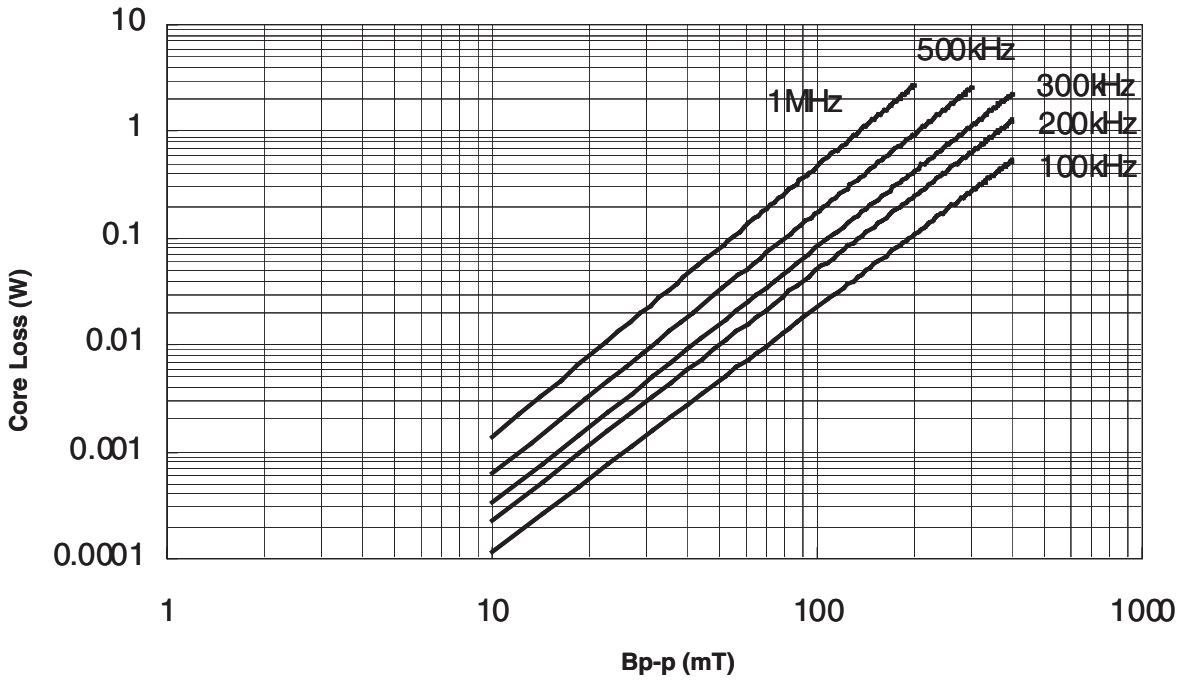
Dimensions are in millimeters.

XXX = Inductance in µH. R = decimal point. If no R is present third character = #of zeros.
wwlly = Date Code. R = Revision Level.

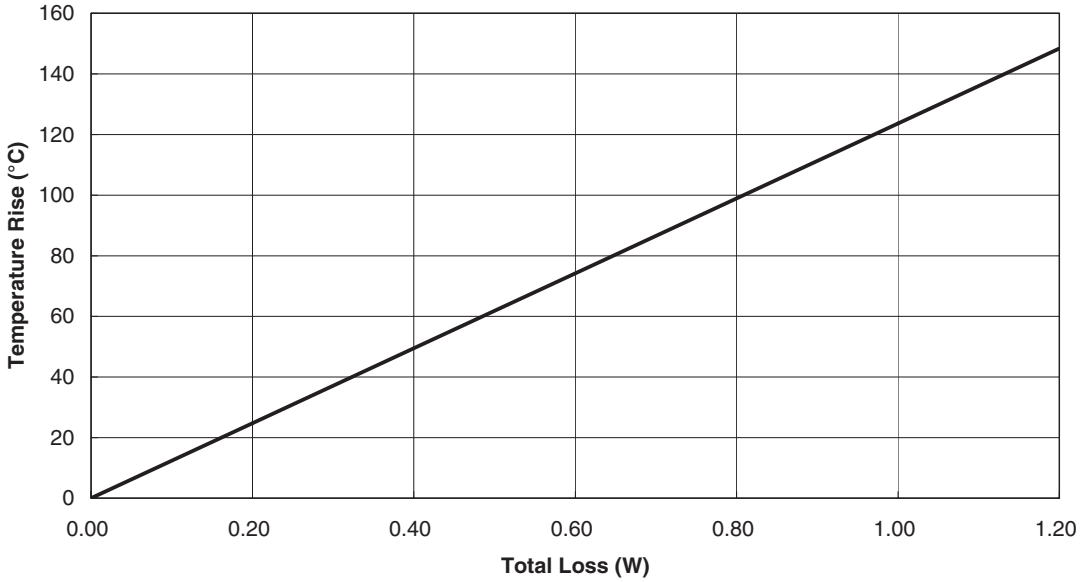
Packaging Information



Core Loss

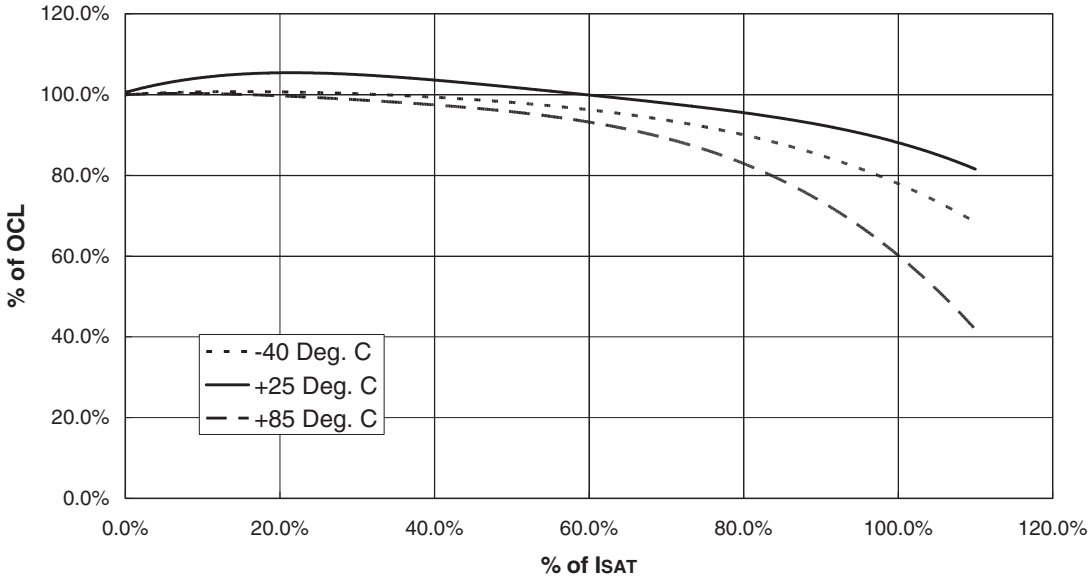


Temperature Rise vs. Total Loss



Inductance Characteristics

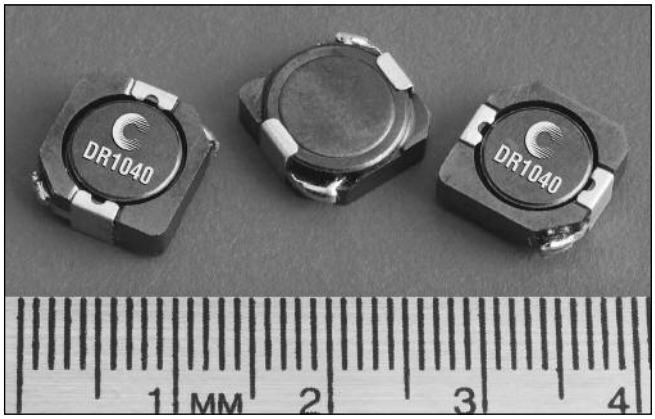
OCL vs. ISAT



COOPER Bussmann

DR1040 Series
Low Profile Power Inductors

RoHS 2002/95/EC



Description

- 125°C maximum total temperature operation
- Low profile surface mount inductor
- 10.3mm x 10.5mm x 4.0mm shielded drum core
- Ferrite core material
- Inductance range from 1.5µH to 330µH
- Current range from 10.0 Amps to 0.52 Amps
- Frequency range up to 1MHz

Applications

- Notebook power, Portable devices
- Wireless modems, ADSL line cards
- Point of load power supplies
- Battery chargers, Video Cards
- MP3 player, PDA's, DVD players
- LED driver for notebook computer
- Navigation system, LCD backlighting
- Buck, Boost, or Forward inductor

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

Packaging

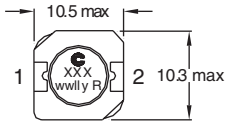
- Supplied in tape and reel packaging, 850 per reel

Part Number	Rated Inductance (µH)	OCL (1) µH±30%	Irms(2) Amperes	Isat (3) Amperes	DCR (Ω) mΩ @20°C (Typical)	DCR (Ω) mΩ @20°C (Maximum)	K-factor (4)
DR1040-1R5-R	1.5	1.4	6.50	10.00	6.0	8.1	15.48
DR1040-2R5-R	2.5	2.4	6.10	7.80	7.0	9.0	12.04
DR1040-3R8-R	3.8	3.6	5.50	6.40	9.6	13.0	9.85
DR1040-5R2-R	5.2	5.2	5.40	5.50	14.0	17.0	8.33
DR1040-7R0-R	7.0	6.8	4.50	4.80	17.0	20.0	7.22
DR1040-8R2-R	8.2	8.1	3.98	4.60	24.0	29.0	6.37
DR1040-100-R	10	9.6	3.80	4.40	26.0	35.0	5.70
DR1040-150-R	15	14.9	3.10	3.60	37.0	50.0	4.71
DR1040-220-R	22	21.1	2.50	2.90	54.0	73.0	4.01
DR1040-330-R	33	32.6	2.20	2.45	69.0	93.0	3.28
DR1040-470-R	47	45.8	1.90	2.10	95.0	128	2.78
DR1040-680-R	68	65.3	1.42	1.65	152	183	2.30
DR1040-820-R	82	86.8	1.29	1.47	214	260	2.04
DR1040-101-R	100	101.4	1.25	1.35	225	304	1.90
DR1040-151-R	150	148.3	0.85	1.15	356	430	1.57
DR1040-221-R	220	216.2	0.70	0.92	530	640	1.27
DR1040-331-R	330	323.4	0.52	0.70	810	1090	1.03

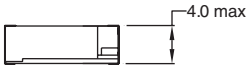
(1) Open Circuit Inductance Test Parameters: 100kHz, 0.25V, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 30°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 35% rolloff (@25°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in µH), ΔI (Peak to peak ripple current in Amps).
(5) Part Number Definition: DR1040-xxx-R
DR1040 = Product code and size; -xxx = Inductance value in uH;
R = decimal point; If no R is present, third character = # of zeros.
-R suffix = RoHS compliant

Mechanical Diagrams

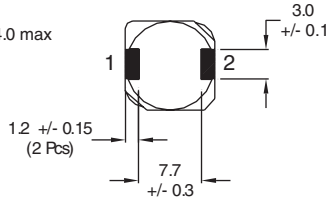
TOP VIEW



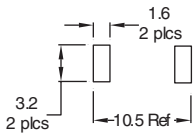
SIDE VIEW



BOTTOM VIEW



RECOMMENDED PCB LAYOUT

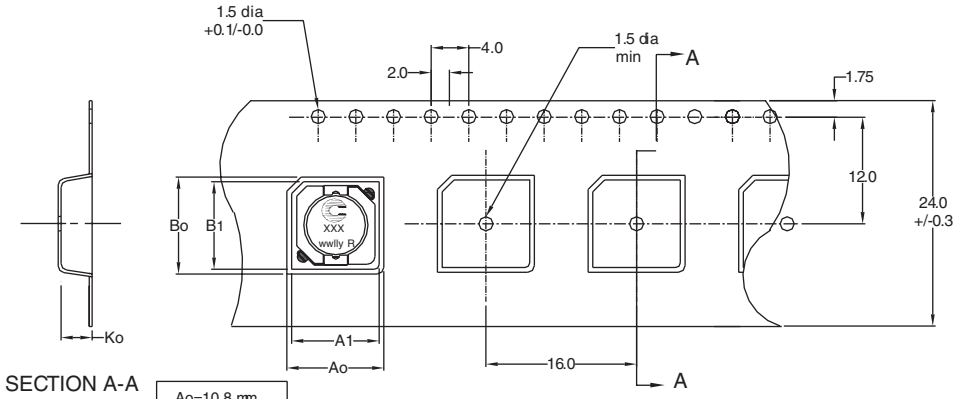


SCHEMATIC

Dimensions are in millimeters.

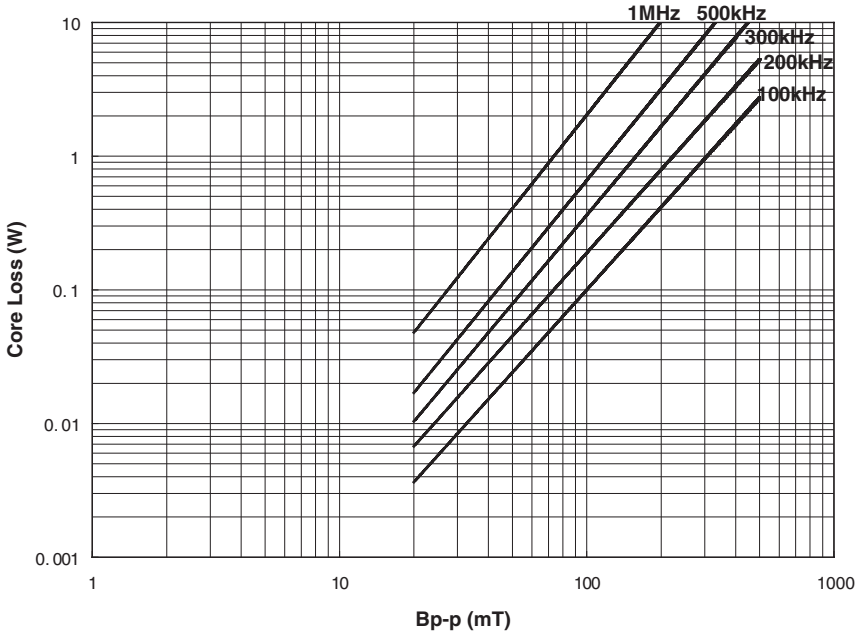
xxx = Inductance value in uH. R = decimal point. If no R is present third character = # of zeros. wwllyy = Date code, R = Revision level.

Packaging Information



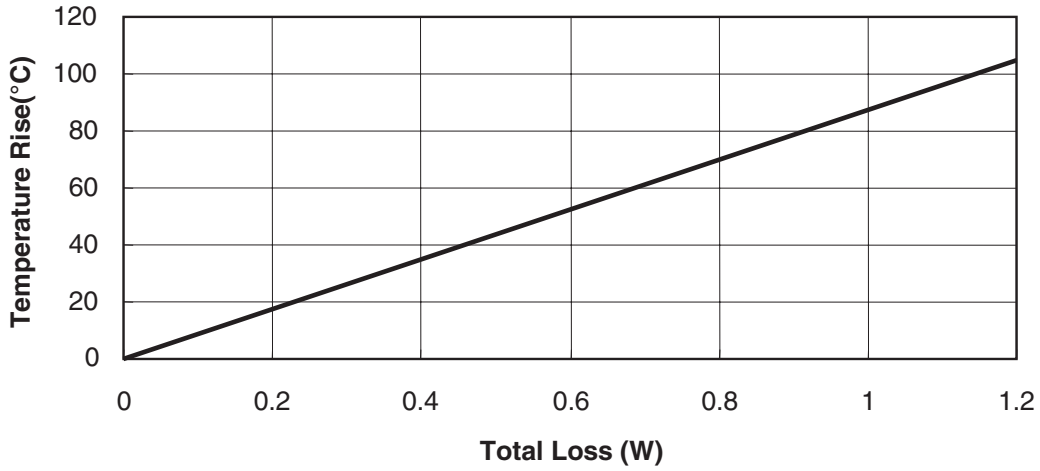
Parts packaged on 13" Diameter reel,
850 parts per reel.

Core Loss

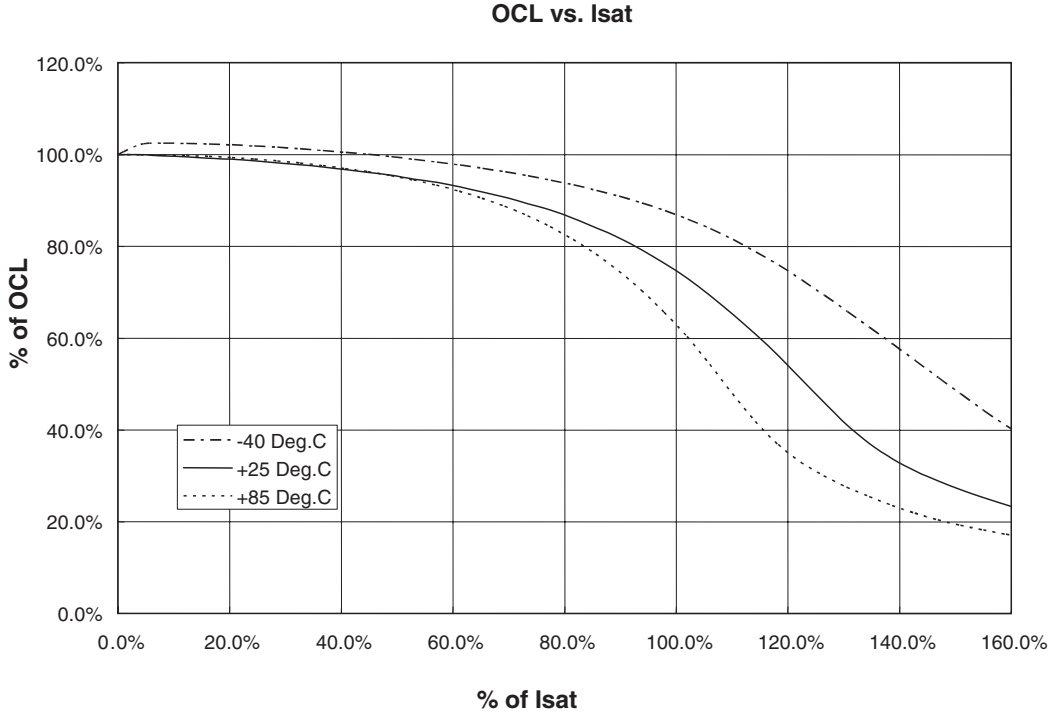


SHIELDED DRUM (DR1040)

Temperature Rise vs. Loss



Inductance Characteristics



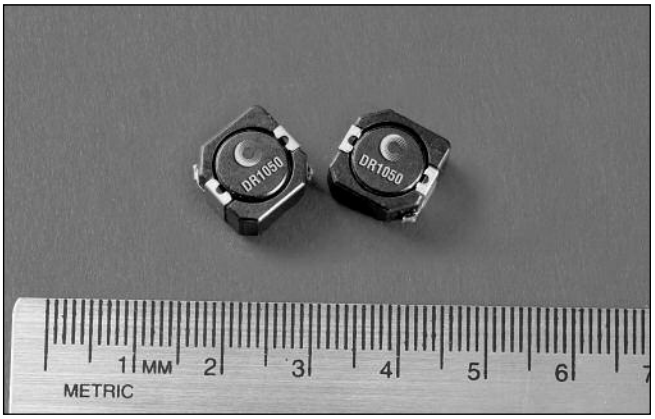
COOPER Bussmann

DR1050 Series
Low Profile Power Inductors

RoHS 2002/95/EC

Description

- 125°C maximum total temperature operation
- Low profile surface mount inductor
- 10.3mm x 10.5mm x 5.0mm shielded drum core
- Ferrite core material
- Inductance range from 0.7µH to 1000µH
- Current range from 13.5 Amps to 0.43 Amps
- Frequency range up to 1MHz



Applications

- Computer, DVD players, and portable power devices
- Notebook power, LCD panels
- DC-DC converters
- Buck, boost, forward, and resonant converters
- Noise filtering and filter chokes

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

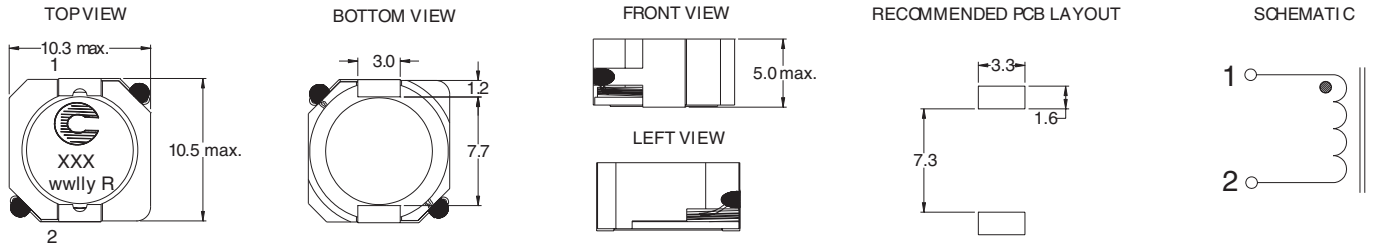
Packaging

- Supplied in tape and reel packaging, 500 per reel

Part Number	Rated Inductance (µH)	OCL (1) µH±30%	Irms(2) Amperes	Isat (3) Amperes	DCR (Ω) mΩ @20°C (Typical)	DCR (Ω) mΩ @20°C (Maximum)	K-factor (4)
DR1050-R80-R	0.8	0.70	9.70	13.50	3.2	4.0	20.47
DR1050-1R5-R	1.5	1.37	8.60	10.50	4.0	5.0	14.62
DR1050-2R2-R	2.2	2.27	7.52	9.25	5.6	6.8	11.37
DR1050-3R3-R	3.3	3.21	6.50	8.20	8.0	10.0	9.30
DR1050-4R7-R	4.7	4.43	6.13	6.70	9.5	11.9	7.87
DR1050-6R8-R	6.8	6.30	5.45	5.80	13.0	16.5	6.82
DR1050-8R2-R	8.2	8.09	5.24	5.00	15.1	19.0	6.02
DR1050-100-R	10	10.1	4.80	4.58	18.0	22.5	5.39
DR1050-120-R	12	11.6	3.94	4.10	24.3	30.4	4.87
DR1050-150-R	15	14.8	3.80	3.70	26.0	32.5	4.45
DR1050-180-R	18	17.5	3.39	3.30	32.8	41.0	4.09
DR1050-220-R	22	23.5	3.12	3.00	38.7	48.4	3.53
DR1050-270-R	27	26.9	2.82	2.80	42.6	53.3	3.30
DR1050-330-R	33	34.3	2.56	2.50	57.5	71.9	2.92
DR1050-390-R	39	38.3	2.35	2.35	60.7	75.9	2.77
DR1050-470-R	47	47.1	2.06	2.10	89.0	111	2.50
DR1050-560-R	56	56.7	1.96	1.94	98.0	123	2.27
DR1050-680-R	68	67.2	1.84	1.70	111	139	2.09
DR1050-820-R	82	84.4	1.60	1.58	147	184	1.86
DR1050-101-R	100	97.5	1.52	1.45	164	205	1.73
DR1050-121-R	120	118.3	1.30	1.30	223	279	1.57
DR1050-151-R	150	149.2	1.26	1.15	238	298	1.40
DR1050-181-R	180	183.7	1.18	1.08	273	341	1.26
DR1050-221-R	220	221.8	1.00	0.98	377	472	1.15
DR1050-271-R	270	263.5	0.96	0.90	410	513	1.06
DR1050-331-R	330	320.6	0.83	0.80	554	693	0.96
DR1050-391-R	390	396.5	0.76	0.72	648	810	0.86
DR1050-471-R	470	480.5	0.64	0.62	855	1069	0.78
DR1050-561-R	560	572.6	0.62	0.60	970	1213	0.72
DR1050-681-R	680	707.9	0.56	0.55	1095	1369	0.64
DR1050-821-R	820	818.7	0.54	0.50	1185	1481	0.60
DR1050-102-R	1000	1000.2	0.43	0.48	1528	1950	0.54

(1) Open Circuit Inductance Test Parameters: 100kHz, 0.1V, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 35% rolloff (@25°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in µH), ΔI (Peak to peak ripple current in Amps).
(5) Part Number Definition: DR1050-xxx-R
DR1050 = Product code and size; -xxx = Inductance value in uH;
R = decimal point; If no R is present, third character = # of zeros.
-R suffix = RoHS compliant

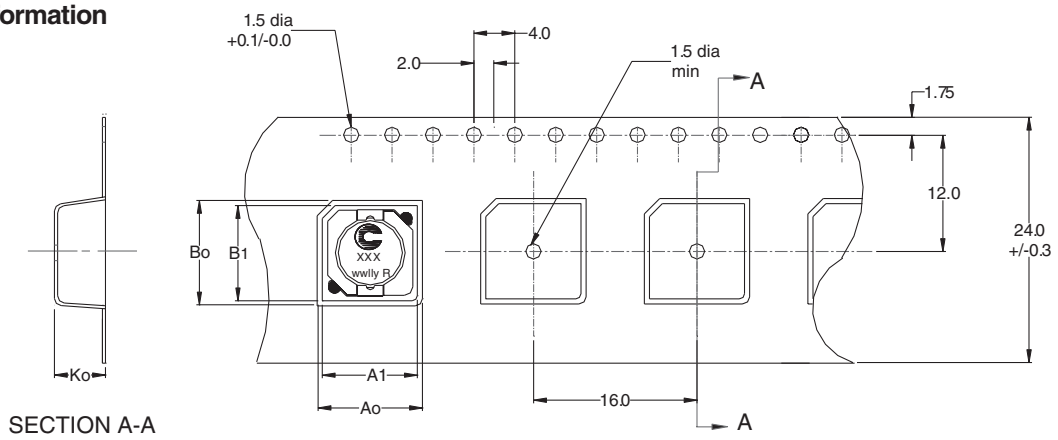
Mechanical Diagrams



Dimensions are in millimeters.

xxx = Inductance value in uH. R = decimal point. If no R is present third character = # of zeros. wwllyy = Date code, R = Revision level.

Packaging Information

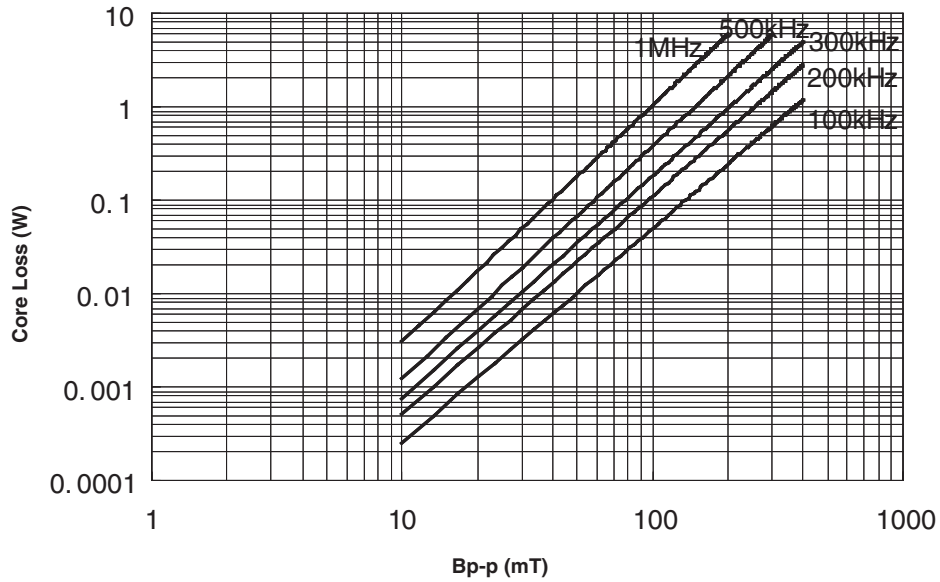


Ao=10.8 mm
Bo=11.0mm
A1=10.5 mm
B1=10.7mm
Ko=5.3 mm

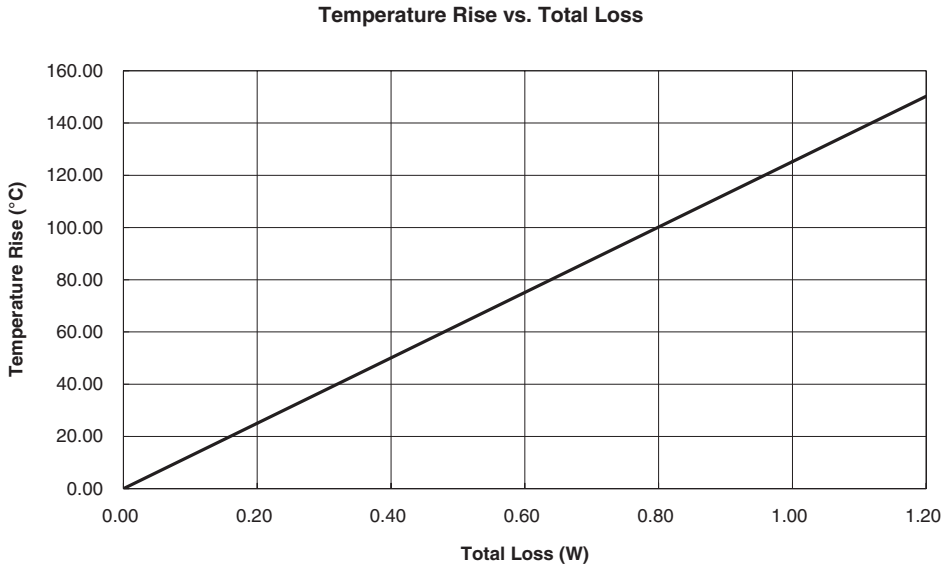
User direction of feed

Parts packaged on 13" Diameter reel,
500 parts per reel.

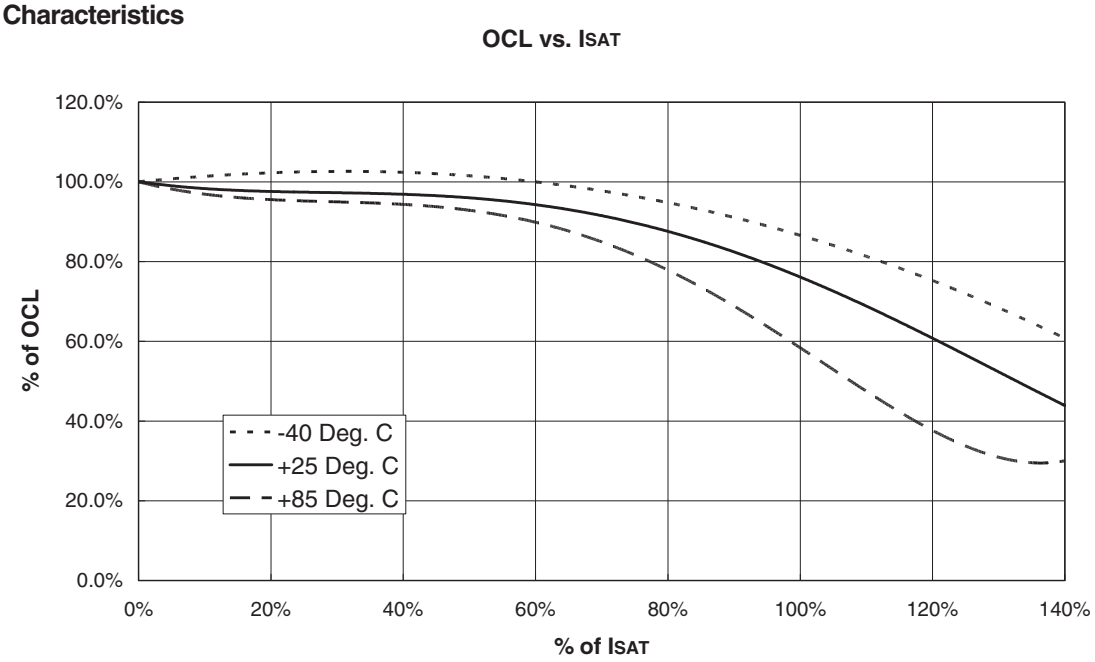
Core Loss



Temperature Rise vs. Loss



Inductance Characteristics

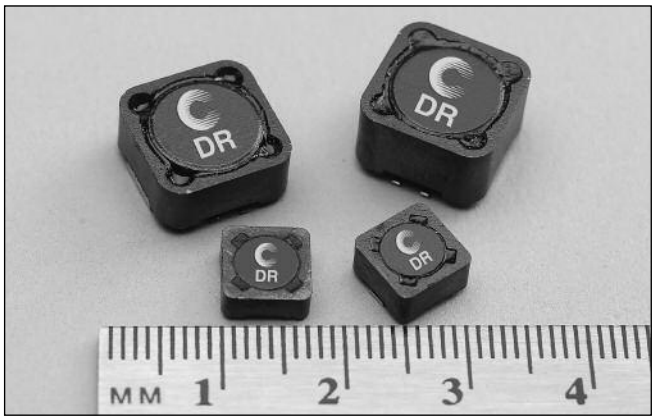


SHIELDED DRUM (DR1050)

COOPER Bussmann

DR Series
High Power Density, High Efficiency, Shielded Inductors

RoHS 2002/95/EC



Description

- 125°C maximum total temperature operation
- Four sizes of shielded drum core inductors
- Inductance range from 0.33uH to 1000uH
- Current range up to 56 Amps peak
- Magnetic shielding
- Secure mounting
- Ferrite core material

Applications

- Computer, DVD players, and portable power devices
- LCD panels
- DC-DC converters
- Buck, boost, forward, and resonant converters
- Noise filtering and filter chokes

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds max.

Packaging

- Supplied in tape and reel packaging, 1350 (DR73), 1100 (DR74), 600 (DR125), and 350 (DR127) per reel

Part Number	Rated Inductance (µH)	OCL(1) +/-20% (µH)	Irms(2) Amperes	Isat(3) Amperes Peak	DCR(4) (Ω) Typ.	Volt-uSec(5) Typ.
DR73-R33-R	0.33	0.306	6.21	14.4	0.0073	1.98
DR73-1R0-R	1.00	0.992	5.28	7.97	0.0102	3.56
DR73-1R5-R	1.50	1.482	4.67	6.52	0.0130	4.36
DR73-2R2-R	2.20	2.070	4.15	5.52	0.0165	5.15
DR73-3R3-R	3.30	3.540	3.31	4.22	0.0259	6.73
DR73-4R7-R	4.70	4.422	3.09	3.78	0.0297	7.52
DR73-6R8-R	6.80	6.480	2.55	3.12	0.0435	9.11
DR73-8R2-R	8.20	8.930	2.19	2.66	0.0592	10.7
DR73-100-R	10.0	10.30	2.08	2.47	0.0656	11.5
DR73-150-R	15.0	15.01	1.83	2.05	0.0844	13.9
DR73-220-R	22.0	22.65	1.62	1.67	0.107	17.0
DR73-330-R	33.0	34.41	1.31	1.35	0.166	21.0
DR73-470-R	47.0	48.62	1.08	1.14	0.241	24.9
DR73-680-R	68.0	68.91	0.89	0.96	0.358	29.7
DR73-820-R	82.0	80.37	0.86	0.89	0.384	32.1
DR73-101-R	100	101.4	0.73	0.79	0.527	36.0
DR73-151-R	150	150.9	0.58	0.65	0.851	44.0
DR73-221-R	220	223.3	0.52	0.53	1.05	53.5
DR73-331-R	330	325.5	0.42	0.44	1.59	64.5
DR73-471-R	470	465.8	0.35	0.37	2.36	77.2
DR73-681-R	680	676.5	0.29	0.31	3.47	93.1
DR73-821-R	820	821.7	0.27	0.28	3.93	103
DR73-102-R	1000	995.0	0.26	0.25	4.34	113
DR74-R33-R	0.33	0.294	6.26	18.4	0.0074	1.71
DR74-1R0-R	1.00	0.952	5.39	10.2	0.0099	3.08
DR74-1R5-R	1.50	1.422	4.94	8.35	0.0118	3.76
DR74-2R2-R	2.20	1.986	4.76	7.06	0.0126	4.45
DR74-3R3-R	3.30	3.396	3.94	5.40	0.0183	5.81
DR74-4R7-R	4.70	5.182	3.34	4.37	0.0254	7.18
DR74-6R8-R	6.80	7.344	2.60	3.67	0.0418	8.55
DR74-8R2-R	8.20	8.566	2.53	3.40	0.0441	9.23
DR74-100-R	10.0	9.882	2.41	3.17	0.0489	9.92
DR74-150-R	15.0	16.09	2.11	2.48	0.0637	12.7
DR74-220-R	22.0	21.73	1.75	2.13	0.0925	14.7

(1) Open Circuit Inductance Test Parameters: 100KHz, 0.25Vrms, 0.0Adc.
(2) RMS current for an approximate ΔT of 40°C without core loss. It is recommended that the temperature of the part not exceed 125°C.
(3) Peak current for approximate 30% roll off at 20°C.
(4) DCR limits @ 20°C.
(5) Applied Volt-Time product (V-µS) across the inductor. This value represent the applied V-µS at 100KHz necessary to generate a core loss equal to 10% of the total losses for 40°C temperature rise.

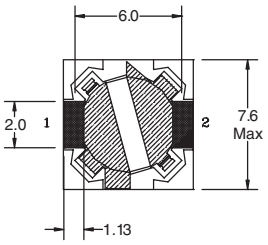
Part Number	Rated Inductance (µH)	OCL(1) +/-20% (µH)	Irms(2) Amperes	Isat(3) Amperes Peak	DCR(4) (Ω) Typ.	Volt-uSec(5) Typ.
DR74-330-R	33.0	33.01	1.41	1.73	0.143	18.1
DR74-470-R	47.0	49.64	1.15	1.41	0.216	22.2
DR74-680-R	68.0	69.67	1.03	1.19	0.265	26.3
DR74-820-R	82.0	80.95	0.91	1.11	0.345	28.4
DR74-101-R	100	101.6	0.86	0.99	0.383	31.8
DR74-151-R	150	150.0	0.69	0.81	0.591	38.6
DR74-221-R	220	227.0	0.56	0.66	0.907	47.5
DR74-331-R	330	335.6	0.45	0.54	1.41	57.8
DR74-471-R	470	465.3	0.40	0.46	1.74	68.1
DR74-681-R	680	671.2	0.33	0.38	2.58	81.7
DR74-821-R	820	812.7	0.31	0.35	2.93	89.9
DR74-102-R	1000	1009	0.27	0.31	3.89	100
DR125-R47-R	0.47	0.456	17.6	33.0	0.0018	3.17
DR125-1R0-R	1.00	0.894	15.0	23.6	0.0024	4.43
DR125-1R5-R	1.50	1.478	13.8	18.3	0.0029	5.70
DR125-2R2-R	2.20	2.208	10.9	15.0	0.0045	6.97
DR125-3R3-R	3.30	3.084	9.26	12.7	0.0063	8.23
DR125-4R7-R	4.70	5.274	7.18	9.71	0.0105	10.8
DR125-6R8-R	6.80	6.588	6.64	8.68	0.0123	12.0
DR125-8R2-R	8.20	8.048	5.54	7.86	0.0176	13.3
DR125-100-R	10.0	9.654	5.35	7.17	0.0189	14.6
DR125-150-R	15.0	15.35	4.27	5.69	0.0298	18.4
DR125-220-R	22.0	22.36	3.70	4.71	0.0396	22.2
DR125-330-R	33.0	33.74	3.28	3.84	0.0505	27.2
DR125-470-R	47.0	47.47	2.71	3.24	0.0740	32.3
DR125-680-R	68.0	67.91	2.22	2.70	0.101	38.6
DR125-820-R	82.0	86.89	2.05	2.39	0.128	43.7
DR125-101-R	100	102.7	1.78	2.20	0.170	47.5
DR125-151-R	150	151.1	1.48	1.81	0.248	57.6
DR125-221-R	220	216.8	1.19	1.51	0.384	69.0
DR125-331-R	330	332.6	1.06	1.22	0.482	85.5
DR125-471-R	470	473.1	0.87	1.02	0.718	102
DR125-681-R	680	679.8	0.70	0.85	1.10	122
DR125-821-R	820	828.0	0.60	0.77	1.49	135
DR125-102-R	1000	1008	0.57	0.70	1.69	149
DR125-124-R	120000	120630	0.060	0.069	150	1521
DR127-R47-R	0.47	0.419	17.9	56.0	0.00195	3.50
DR127-1R0-R	1.00	0.821	15.5	40.0	0.00313	4.90
DR127-1R5-R	1.50	1.357	13.5	31.1	0.00341	6.30
DR127-2R2-R	2.20	2.027	12.5	25.5	0.00402	7.70
DR127-3R3-R	3.30	2.831	10.5	21.5	0.00567	9.10
DR127-4R7-R	4.70	4.841	8.25	16.5	0.00917	11.9
DR127-6R8-R	6.80	7.387	7.34	13.3	0.0116	14.7
DR127-8R2-R	8.20	8.861	6.32	12.2	0.0157	16.1
DR127-100-R	10.0	10.47	6.04	11.2	0.0172	17.5
DR127-150-R	15.0	14.09	5.03	9.66	0.0247	20.3
DR127-220-R	22.0	22.93	4.00	7.57	0.0391	25.9
DR127-330-R	33.0	33.92	3.23	6.22	0.0600	31.5
DR127-470-R	47.0	47.05	2.95	5.28	0.0719	37.1
DR127-680-R	68.0	66.48	2.44	4.44	0.105	44.1
DR127-820-R	82.0	79.75	2.09	4.06	0.143	48.3
DR127-101-R	100	99.31	1.96	3.64	0.163	53.9
DR127-151-R	150	144.9	1.59	3.01	0.247	65.1
DR127-221-R	220	221.5	1.29	2.43	0.376	80.5
DR127-331-R	330	323.6	1.04	2.01	0.574	97.3
DR127-471-R	470	467.1	0.85	1.68	0.861	117
DR127-681-R	680	676.7	0.76	1.39	1.08	141
DR127-821-R	820	818.1	0.65	1.27	1.47	155
DR127-102-R	1000	1005	0.61	1.14	1.66	172

(1) Open Circuit Inductance Test Parameters: 100KHz, 0.25Vrms, 0.0Adc.
(2) RMS current for an approximate ΔT of 40°C without core loss. It is recommended that the temperature of the part not exceed 125°C.
(3) Peak current for approximate 30% roll off at 20°C.
(4) DCR limits @ 20°C.
(5) Applied Volt-Time product (V-µS) across the inductor. This value represent the applied V-µS at 100KHz necessary to generate a core loss equal to 10% of the total losses for 40°C temperature rise.

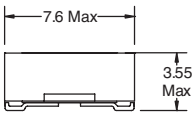
Mechanical Diagrams

DR73 Series

BOTTOM VIEW

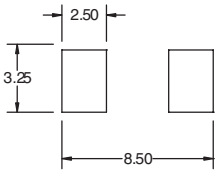


FRONT VIEW

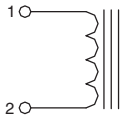


TOP VIEW

RECOMMENDED PCB LAYOUT

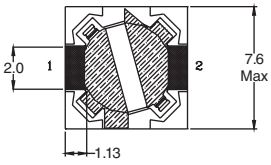


SCHEMATIC

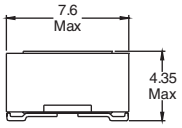


DR74 Series

BOTTOM VIEW

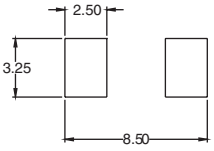


FRONT VIEW

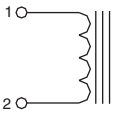


TOP VIEW

RECOMMENDED PCB LAYOUT

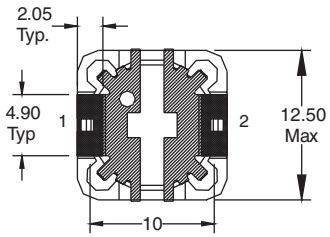


SCHEMATIC

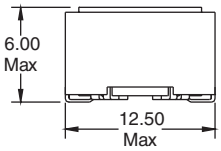


DR125 Series

BOTTOM VIEW

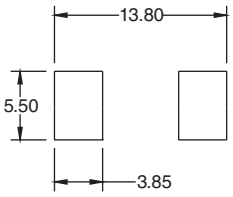


FRONT VIEW

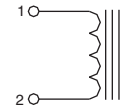


TOP VIEW

RECOMMENDED PCB LAYOUT

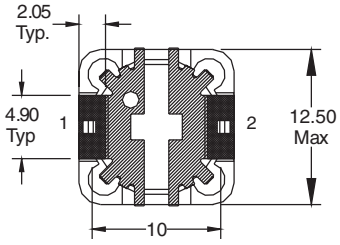


SCHEMATIC

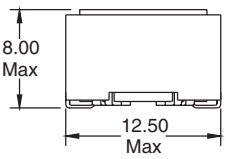


DR127 Series

BOTTOM VIEW

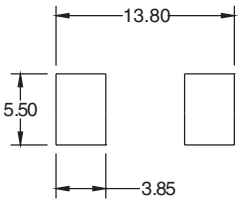


FRONT VIEW

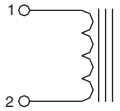


TOP VIEW

RECOMMENDED PCB LAYOUT



SCHEMATIC

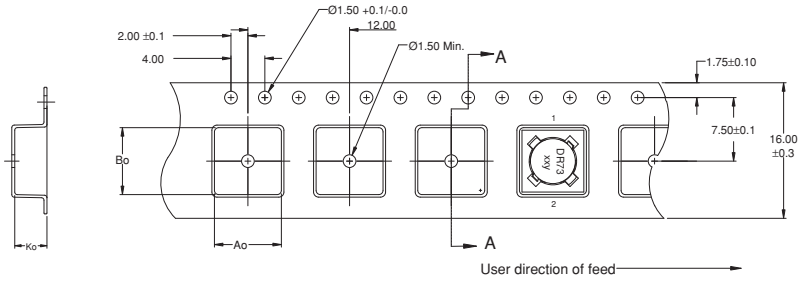


Dimensions in Millimeters.

= Inductance value per family chart
wwllyy = (date code) R = revision level

Packaging Information

DR73 Series

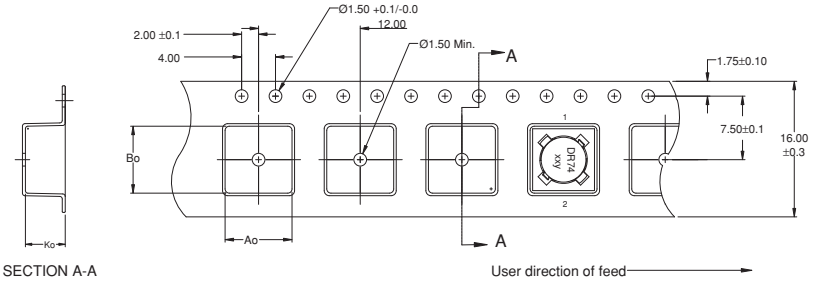


ACTUAL SIZE
DR73

Ao=7.90mm
Bo=7.90mm
Ko=3.80mm

Parts packaged on 13" Diameter reel,
1,350 parts per reel.

DR74 Series

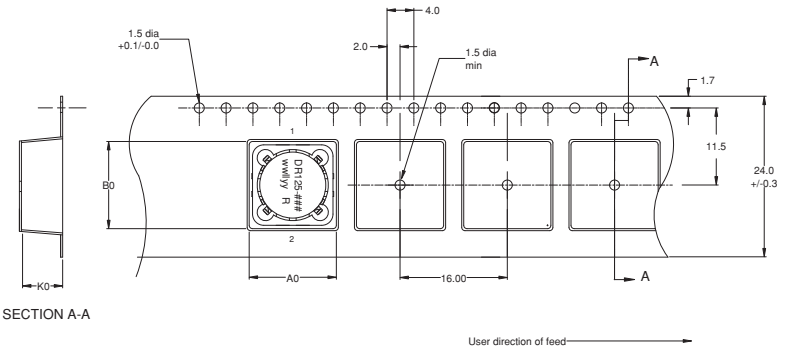


ACTUAL SIZE
DR74

Ao=7.90mm
Bo=7.90mm
Ko=4.70mm

Parts packaged on 13" Diameter reel,
1,100 parts per reel.

DR125 Series

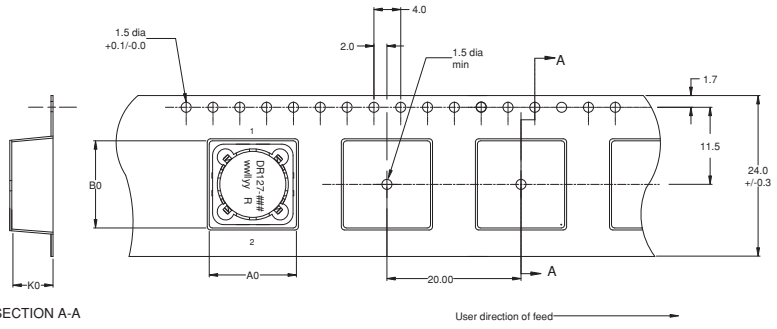


ACTUAL SIZE
DR125

Ao=13.0mm
Bo=13.0mm
Ko=6.30mm

Parts packaged on 13" Diameter reel,
600 parts per reel.

DR127 Series



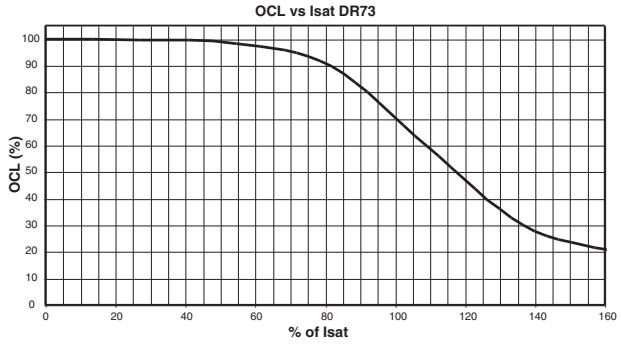
ACTUAL SIZE
DR127

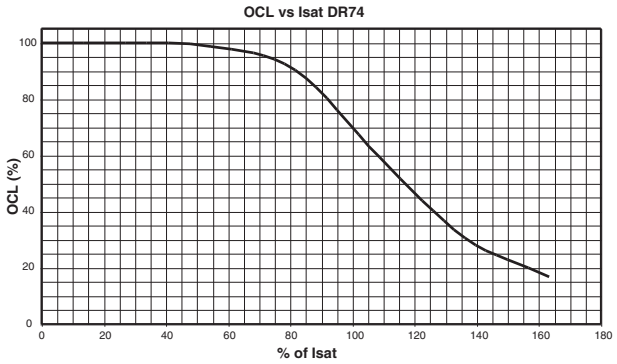
Ao=13.0mm
Bo=13.0mm
Ko=8.30mm

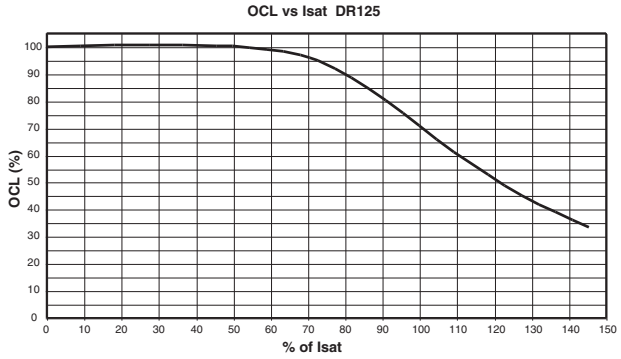
Parts packaged on 13" Diameter reel,
350 parts per reel.

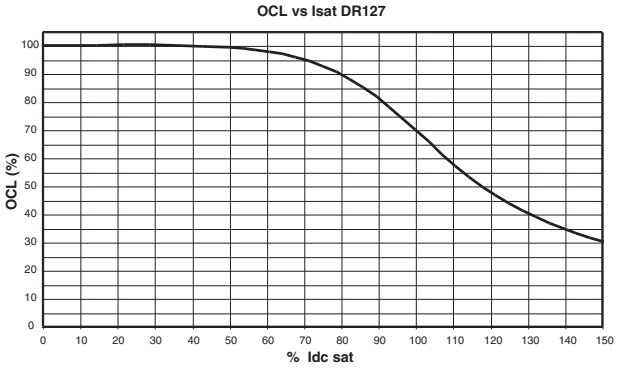
Dimensions are in millimeters.

Inductance Characteristics

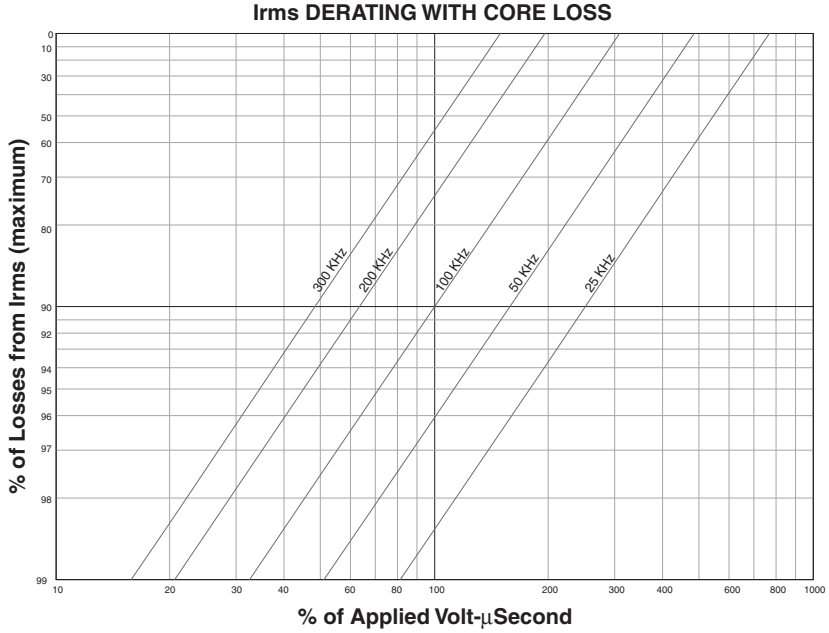








Core Loss



COOPER Bussmann

DR124 Series
Low Profile Power Inductors

Description

RoHS 2002/95/EC

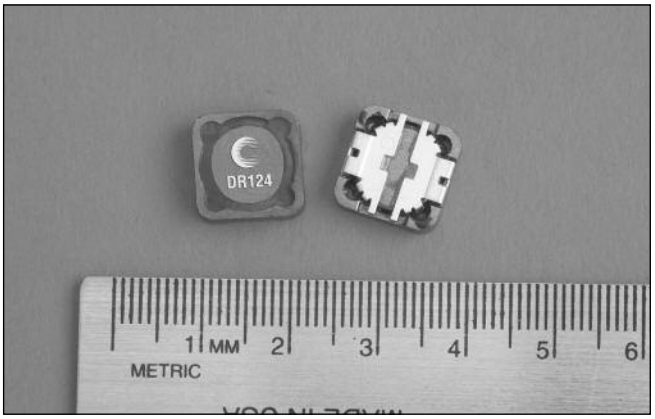
- 125°C maximum total temperature operation
- Low profile surface mount inductor
- 12.3mm x 12.3mm x 4.5mm shielded drum core
- Ferrite core material
- Inductance range from 0.47µH to 1000µH
- Current range from 24.4 Amps to 0.44 Amps
- Frequency range up to 1MHz

Applications

- Notebook power, LCD panels
- Computer, DVD players, and portable power devices
- DC-DC converters
- Buck, boost, forward, and resonant converters
- Noise filtering and filter chokes

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum



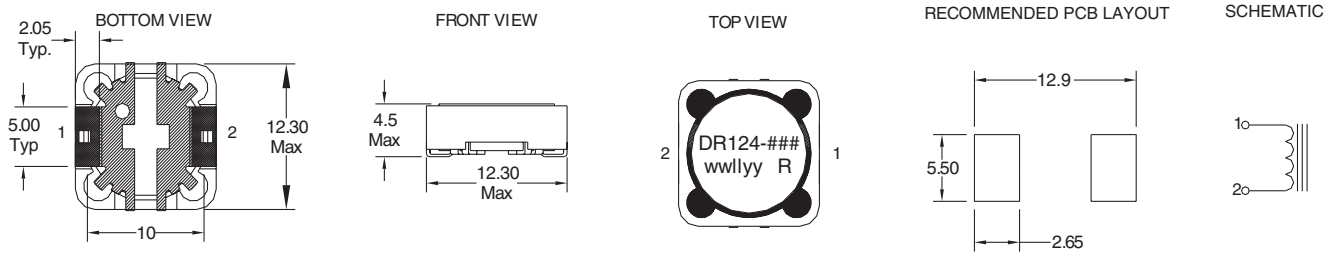
Packaging

- Supplied in tape and reel packaging, 750 per reel

Part Number	Rated Inductance (µH)	OCL (1) µH±20%	Irms(2) Amperes	Isat (3) Amperes	DCR (Ω) mΩ @20°C (Typical)	DCR (Ω) mΩ @20°C (Maximum)	K-factor (4)
DR124-R47-R	0.47	0.42	16.0	24.40	2.2	2.7	17.51
DR124-1R0-R	1.0	0.83	13.9	18.00	3.00	3.6	12.50
DR124-1R5-R	1.5	1.37	11.1	14.00	4.75	5.7	9.73
DR124-2R2-R	2.2	2.04	9.1	11.45	5.92	7.1	7.96
DR124-3R9-R	3.9	3.80	7.0	8.40	12.50	15.0	5.84
DR124-4R7-R	4.7	4.88	6.5	7.65	13.50	16.2	5.15
DR124-6R8-R	6.8	6.10	5.6	6.47	18.06	21.7	4.61
DR124-8R2-R	8.2	7.45	5.2	6.22	21.67	26.0	4.17
DR124-100-R	10	8.94	4.5	5.80	23.33	28.0	3.81
DR124-120-R	12	11.5	4.1	4.96	31.67	38.0	3.50
DR124-150-R	15	14.2	3.6	4.62	37.30	44.8	3.02
DR124-180-R	18	16.2	3.4	4.32	46.97	56.4	2.82
DR124-220-R	22	20.7	3.2	3.83	53.99	64.8	2.50
DR124-270-R	27	25.7	2.8	3.44	66.67	80.0	2.24
DR124-330-R	33	31.2	2.6	3.12	80.83	97.0	2.04
DR124-390-R	39	37.3	2.3	2.85	110.00	132.0	1.86
DR124-470-R	47	44.0	2.2	2.63	124.66	149.6	1.72
DR124-560-R	56	54.9	2.0	2.35	144.32	173.2	1.54
DR124-680-R	68	67.1	1.8	2.13	183.33	220.0	1.39
DR124-820-R	82	80.5	1.7	1.94	212.72	255.3	1.27
DR124-101-R	100	95.1	1.5	1.79	256.67	308.0	1.17
DR124-121-R	120	111	1.3	1.65	311.18	373.4	1.08
DR124-151-R	150	146	1.3	1.44	371.02	445.2	0.94
DR124-181-R	180	179	1.1	1.30	501.66	602.0	0.87
DR124-221-R	220	216	1.0	1.15	558.00	669.6	0.77
DR124-271-R	270	256	0.88	1.09	725.00	870.0	0.71
DR124-331-R	330	327	0.83	0.92	825.00	990.0	0.63
DR124-471-R	470	460	0.68	0.74	1242.50	1491.0	0.53
DR124-681-R	680	669	0.56	0.65	1845.83	2215.0	0.45
DR124-821-R	820	825	0.53	0.62	2109.17	2351.0	0.40
DR124-102-R	1000	998	0.44	0.53	2898.00	3477.00	0.37

(1) Open Circuit Inductance Test Parameters: 100kHz, 0.25V, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 25% rolloff (@25°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in µH), ΔI (Peak to peak ripple current in Amps).
(5) Part Number Definition: DR124-xxx-R
DR124 = Product code and size; -xxx = Inductance value in uH;
R = decimal point; If no R is present, third character = # of zeros.
-R suffix = RoHS compliant

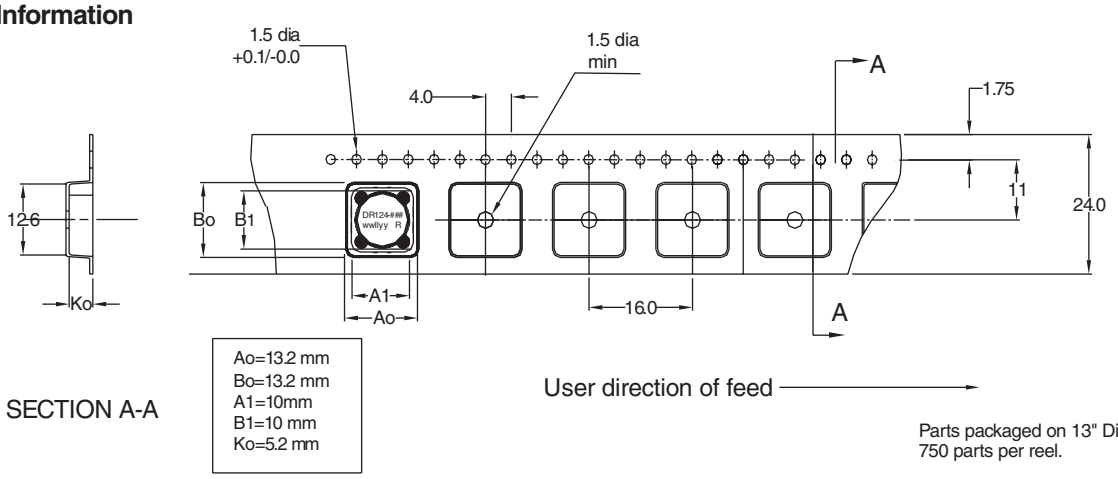
Mechanical Diagrams



Dimensions are in millimeters.

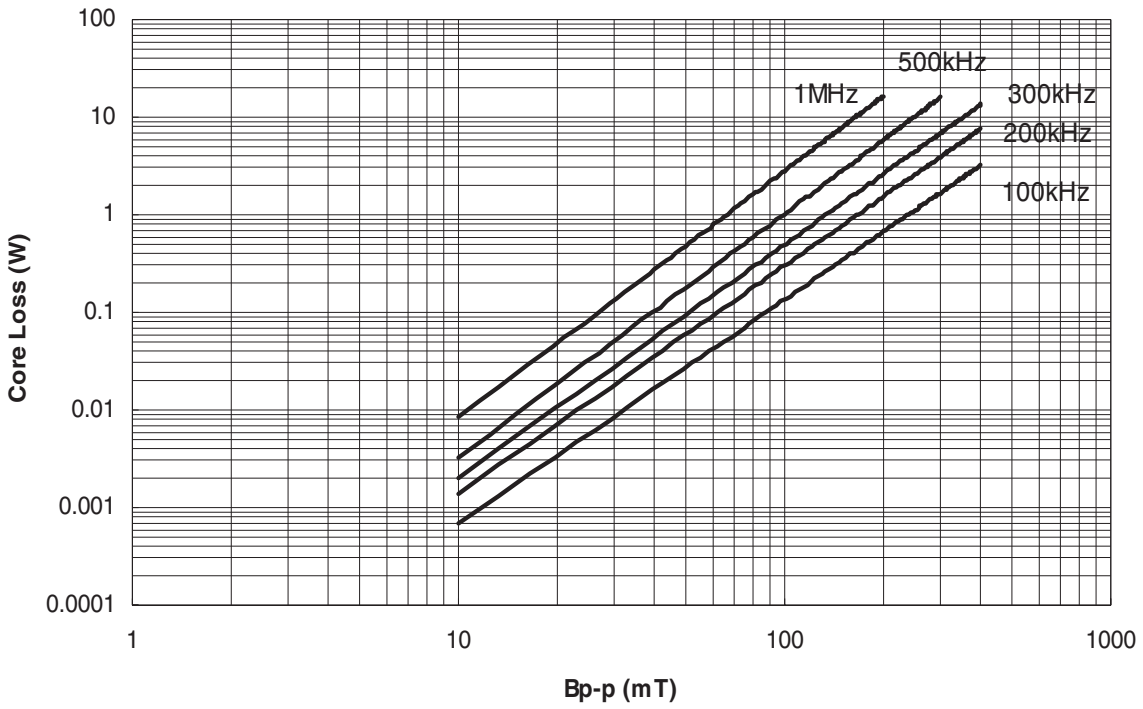
wwlly = Date code, R = Revision level.

Packaging Information

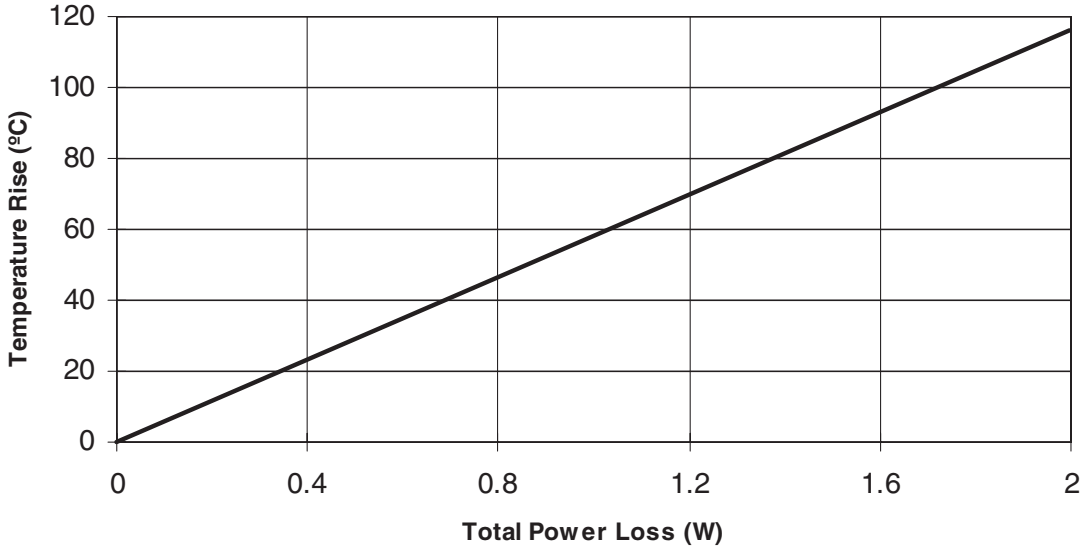


Parts packaged on 13" Diameter reel,
750 parts per reel.

Core Loss

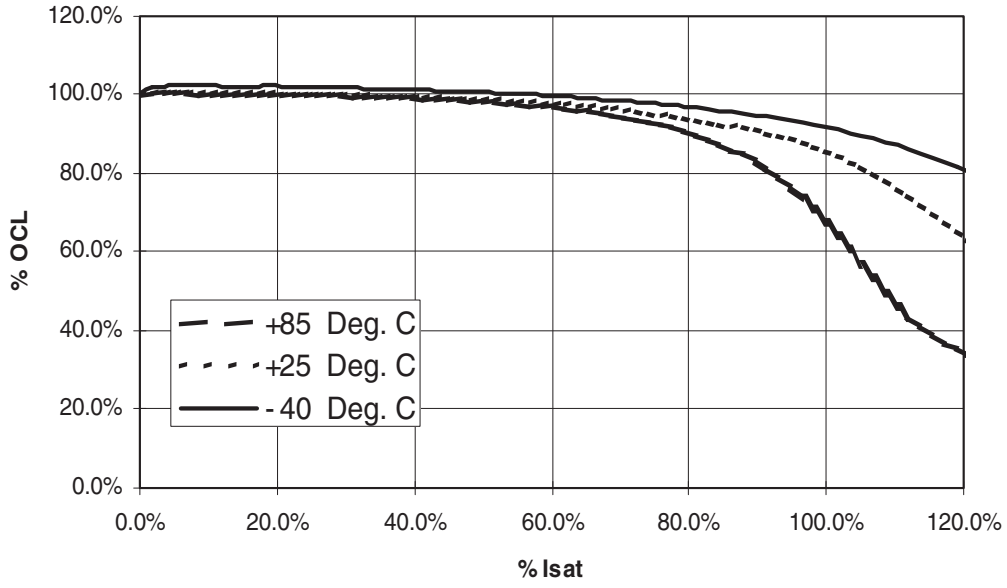


Temperature Rise vs. Loss



Inductance Characteristics

OCL Vs. Isat



COOPER Bussmann

COILTRONICS

DRQ Series
Dual Winding, Shielded Inductors/Transformer

RoHS 2002/95/EC

Description

- 125°C maximum total temperature operation
- Dual winding inductors that can be used as either a single inductor, or in coupled inductor/transformer applications (1:1 turns ratio)
- Four sizes of shielded drum core inductors
- Windings can be connected in series or parallel, offering a broad range of inductance and current ratings
- Peak current ratings from 0.13 Amps to 56 Amps
- RMS current ratings from 0.128 Amps to 17.9 Amps
- Inductance ratings from 0.33µH to 4.02mH
- Surface Mount
- 200 VAC Isolation between windings
- Ferrite core material

Applications

- As a transformer: SEPIC, flyback
- As an inductor: Buck, boost, coupled inductor
- DC/DC converters
- VRM inductor for CPU and DDR power supplies
- Input and output filter chokes

Environmental Data

- Storage temperature: -40°C to +125°C
- Operating temperature: -40°C to +125°C (Range is application specific).
- Solder reflow temperature: 260°C max. for 10 seconds max.

Packaging

- Supplied in tape and reel packaging, 1350 (DRQ73), 1100 (DRQ74), 600 (DRQ125), and 350 (DRQ127) per reel

		Parallel Ratings					Series Ratings				
Part Number	**Rated Inductance (µH)**	**OCL (1) +/-20% (µH)**	**I rms (2) Amperes**	**I sat (3) Amperes Peak**	**DCR Ω (4) typ.**	**Volt (5) µ-Sec**	**OCL (1) +/-20% (µH)**	**I rms (2) Amperes**	**I sat (3) Amperes Peak**	**DCR Ω (4) typ.**	**Volt (5) µ-Sec**
DRQ73-R33-R	0.33	0.306	6.19	14.4	0.0074	1.98	1.224	3.10	7.18	0.0296	3.96
DRQ73-1R0-R	1.00	0.992	5.25	7.97	0.0103	3.56	3.968	2.63	3.99	0.0411	7.12
DRQ73-1R5-R	1.50	1.482	4.64	6.52	0.0132	4.36	5.928	2.32	3.26	0.0527	8.72
DRQ73-2R2-R	2.20	2.070	4.11	5.52	0.0167	5.15	8.280	2.06	2.76	0.0669	10.3
DRQ73-3R3-R	3.30	3.540	3.31	4.22	0.0259	6.73	14.16	1.66	2.11	0.1035	13.5
DRQ73-4R7-R	4.70	4.422	3.09	3.78	0.0297	7.52	17.69	1.55	1.89	0.1188	15.0
DRQ73-6R8-R	6.80	6.480	2.55	3.12	0.0435	9.11	25.92	1.28	1.56	0.1742	18.2
DRQ73-8R2-R	8.20	8.930	2.19	2.66	0.0592	10.7	35.72	1.10	1.33	0.2368	21.4
DRQ73-100-R	10.0	10.30	2.08	2.47	0.0656	11.5	41.20	1.04	1.24	0.2623	23.0
DRQ73-150-R	15.0	15.01	1.83	2.05	0.0844	13.9	60.04	0.916	1.03	0.339	27.8
DRQ73-220-R	22.0	22.65	1.62	1.67	0.107	17.0	90.60	0.811	0.83	0.429	34.0
DRQ73-330-R	33.0	34.41	1.31	1.35	0.166	21.0	137.6	0.653	0.68	0.665	42.0
DRQ73-470-R	47.0	48.62	1.08	1.14	0.241	24.9	194.5	0.542	0.57	0.965	49.8
DRQ73-680-R	68.0	68.91	0.89	0.96	0.358	29.7	275.6	0.444	0.48	1.43	59.4
DRQ73-820-R	82.0	80.37	0.86	0.89	0.384	32.1	321.5	0.430	0.44	1.54	64.2
DRQ73-101-R	100	101.4	0.73	0.79	0.527	36.0	405.6	0.367	0.39	2.11	72.0
DRQ73-151-R	150	150.9	0.58	0.65	0.851	44.0	603.6	0.289	0.32	3.41	88.0
DRQ73-221-R	220	223.3	0.52	0.53	1.05	53.5	893.2	0.260	0.27	4.20	107
DRQ73-331-R	330	325.5	0.42	0.44	1.59	64.5	1302	0.211	0.22	6.36	129
DRQ73-471-R	470	465.8	0.35	0.37	2.36	77.2	1863	0.173	0.18	9.44	154
DRQ73-681-R	680	676.5	0.29	0.31	3.47	93.1	2706	0.143	0.15	13.88	186
DRQ73-821-R	820	821.7	0.27	0.28	3.93	103	3287	0.134	0.14	15.72	206
DRQ73-102-R	1000	995.0	0.26	0.25	4.34	113	3980	0.128	0.13	17.36	226

1) Open Circuit Inductance Test Parameters: 100kHz, 0.25 Vrms, 0.0 Adc Parallel: (1,2 - 4,2) Series: (1 - 4) tie (2 - 3)
2) RMS current for an approximate ΔT of 40°C without core loss. It is recommended that the temperature of the part not exceed 125°C.
3) Peak current for approximately 30% roll-off at 20°C
4) DCR limits @ 20°C
5) Applied Volt-Time product (V-µS) across the inductor. This value represents the applied V-µS at 100KHz necessary to generate a core loss equal to 10% of the total losses for a 40°C temperature rise.
6) Turns Ratio (1-2):(3-4) 1:1

		Parallel Ratings					Series Ratings				
Part Number	Rated Inductance (µH)	OCL (1) +/-20% (µH)	I rms (2) Amperes	I sat (3) Amperes Peak	DCR Ω (4) typ.	Volt (5) µ-Sec	OCL (1) +/-20% (µH)	I rms (2) Amperes	I sat (3) Amperes Peak	DCR Ω (4) typ.	Volt (5) µ-Sec
DRQ74-R33-R	0.33	0.294	6.20	18.4	0.0074	1.71	1.176	3.10	9.18	0.0295	3.42
DRQ74-1R0-R	1.00	0.952	5.33	10.2	0.0100	3.08	3.808	2.66	5.10	0.0400	6.16
DRQ74-1R5-R	1.50	1.422	4.96	8.35	0.0115	3.76	5.688	2.48	4.17	0.0461	7.52
DRQ74-2R2-R	2.20	1.986	4.66	7.06	0.0130	4.45	7.944	2.33	3.53	0.0521	8.9
DRQ74-3R3-R	3.30	3.396	3.94	5.40	0.0183	5.81	13.58	1.97	2.70	0.0732	11.6
DRQ74-4R7-R	4.70	5.182	3.34	4.37	0.0254	7.18	20.73	1.67	2.19	0.102	14.4
DRQ74-6R8-R	6.80	7.344	2.60	3.67	0.0418	8.55	29.38	1.30	1.84	0.167	17.1
DRQ74-8R2-R	8.20	8.566	2.53	3.40	0.0441	9.23	34.26	1.27	1.70	0.177	18.5
DRQ74-100-R	10.0	9.882	2.41	3.17	0.0489	9.92	39.53	1.20	1.58	0.196	19.8
DRQ74-150-R	15.0	16.09	2.11	2.48	0.0637	12.7	64.36	1.05	1.24	0.255	25.4
DRQ74-220-R	22.0	21.73	1.75	2.13	0.0925	14.7	86.92	0.874	1.07	0.371	29.4
DRQ74-330-R	33.0	33.01	1.41	1.73	0.143	18.1	132.0	0.702	0.87	0.574	36.2
DRQ74-470-R	47.0	49.64	1.15	1.41	0.216	22.2	198.6	0.573	0.71	0.865	44.4
DRQ74-680-R	68.0	69.67	1.03	1.19	0.265	26.3	278.7	0.517	0.60	1.06	52.6
DRQ74-820-R	82.0	80.95	0.91	1.11	0.345	28.4	323.8	0.453	0.55	1.38	56.8
DRQ74-101-R	100	101.6	0.86	0.99	0.383	31.8	406.4	0.430	0.49	1.53	63.6
DRQ74-151-R	150	150.0	0.69	0.81	0.591	38.6	600.0	0.346	0.41	2.37	77.2
DRQ74-221-R	220	227.0	0.56	0.66	0.907	47.5	908.0	0.279	0.33	3.63	95
DRQ74-331-R	330	335.6	0.45	0.54	1.41	57.8	1342	0.224	0.27	5.66	116
DRQ74-471-R	470	465.3	0.40	0.46	1.74	68.1	1861	0.202	0.23	6.97	136
DRQ74-681-R	680	671.2	0.33	0.38	2.58	81.7	2685	0.166	0.19	10.3	163
DRQ74-821-R	820	812.7	0.31	0.35	2.93	89.9	3251	0.156	0.17	11.7	180
DRQ74-102-R	1000	1009	0.27	0.31	3.89	100	4036	0.135	0.16	15.6	200
DRQ125-R47-R	0.47	0.456	17.6	33.0	0.0018	3.17	1.824	8.80	16.5	0.0078	6.34
DRQ125-1R0-R	1.00	0.894	15.0	23.6	0.0024	4.43	3.576	7.51	11.8	0.0096	8.86
DRQ125-1R5-R	1.50	1.478	13.8	18.3	0.0029	5.70	5.912	6.89	9.15	0.0114	11.40
DRQ125-2R2-R	2.20	2.208	10.9	15.0	0.0045	6.97	8.832	5.46	7.50	0.0182	13.9
DRQ125-3R3-R	3.30	3.084	9.26	12.7	0.0063	8.23	12.34	4.63	6.35	0.0253	16.5
DRQ125-4R7-R	4.70	5.274	7.18	9.71	0.0105	10.8	21.10	3.59	4.86	0.0420	21.6
DRQ125-6R8-R	6.80	6.588	6.64	8.68	0.0123	12.0	26.35	3.32	4.34	0.0492	24.0
DRQ125-8R2-R	8.20	8.048	5.54	7.86	0.0176	13.3	32.19	2.77	3.93	0.0705	26.6
DRQ125-100-R	10.0	9.654	5.35	7.17	0.0189	14.6	38.62	2.67	3.59	0.0757	29.2
DRQ125-150-R	15.0	15.35	4.27	5.69	0.0298	18.4	61.40	2.13	2.85	0.120	36.8
DRQ125-220-R	22.0	22.36	3.70	4.71	0.0396	22.2	89.44	1.84	2.36	0.159	44.4
DRQ125-330-R	33.0	33.74	3.28	3.84	0.0505	27.2	135.0	1.64	1.92	0.203	54.4
DRQ125-470-R	47.0	47.47	2.71	3.24	0.0740	32.3	189.9	1.35	1.62	0.297	64.6
DRQ125-680-R	68.0	67.91	2.22	2.70	0.101	38.6	271.6	1.11	1.35	0.440	77.2
DRQ125-820-R	82.0	86.89	2.05	2.39	0.128	43.7	347.6	1.03	1.20	0.515	87.4
DRQ125-101-R	100	102.7	1.78	2.20	0.170	47.5	410.8	0.892	1.10	0.682	95.0
DRQ125-151-R	150	151.1	1.48	1.81	0.248	57.6	604.4	0.739	0.905	0.991	115.2
DRQ125-221-R	220	216.8	1.19	1.51	0.384	69.0	867.2	0.594	0.755	1.54	138
DRQ125-331-R	330	332.6	1.06	1.22	0.482	85.5	1330	0.530	0.610	1.93	171
DRQ125-471-R	470	473.1	0.87	1.02	0.718	102	1892	0.434	0.510	2.87	204
DRQ125-681-R	680	679.8	0.70	0.85	1.10	122	2719	0.350	0.425	4.42	244
DRQ125-821-R	820	828.0	0.60	0.77	1.49	135	3312	0.301	0.385	5.96	270
DRQ125-102-R	1000	1008	0.57	0.70	1.69	149	4032	0.283	0.350	6.76	298

1) Open Circuit Inductance Test Parameters: 100kHz, 0.25 Vrms, 0.0 Adc
Parallel: (1,2 - 4,2) Series: (1 - 4) tie (2 - 3)
2) RMS current for an approximate ΔT of 40°C without core loss. It is recommended that the temperature of the part not exceed 125°C.
3) Peak current for approximately 30% roll-off at 20°C
4) DCR limits @ 20°C
5) Applied Volt-Time product (V-µS) across the inductor. This value represents the applied V-µS at 100KHz necessary to generate a core loss equal to 10% of the total losses for a 40°C temperature rise.
6) Turns Ratio (1-2):(3-4) 1:1

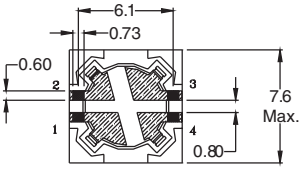
		Parallel Ratings					Series Ratings				
Part Number	Rated Inductance (µH)	OCL (1) +/-20% (µH)	I rms (2) Amperes	I sat (3) Amperes Peak	DCR Ω (4) typ.	Volt (5) µ-Sec	OCL (1) +/-20% (µH)	I rms (2) Amperes	I sat (3) Amperes Peak	DCR Ω (4) typ.	Volt (5) µ-Sec
DRQ127-R47-R	0.47	0.419	17.9	56.0	0.00195	3.50	1.676	8.94	28	0.0078	7.00
DRQ127-1R0-R	1.00	0.821	15.5	40.0	0.00261	4.90	3.284	7.74	20	0.0104	9.80
DRQ127-1R5-R	1.50	1.357	13.5	31.1	0.00341	6.30	5.428	6.77	15.6	0.0137	12.60
DRQ127-2R2-R	2.20	2.027	12.5	25.5	0.00373	7.70	8.108	6.23	12.7	0.0161	15.4
DRQ127-3R3-R	3.30	2.831	10.4	21.5	0.00567	9.10	11.32	5.23	10.8	0.0229	18.2
DRQ127-4R7-R	4.70	4.841	8.25	16.5	0.00917	11.9	19.36	4.13	8.24	0.0367	23.8
DRQ127-6R8-R	6.80	7.387	7.34	13.3	0.0116	14.7	29.55	3.67	6.67	0.0465	29.4
DRQ127-8R2-R	8.20	8.861	6.32	12.2	0.0157	16.1	35.44	3.16	6.09	0.0627	32.2
DRQ127-100-R	10.0	10.47	6.04	11.2	0.0172	17.5	41.88	3.02	5.60	0.0686	35.0
DRQ127-150-R	15.0	14.09	5.03	9.66	0.0247	20.3	56.36	2.51	4.83	0.0990	40.6
DRQ127-220-R	22.0	22.93	4.00	7.57	0.0391	25.9	91.72	2.00	3.78	0.157	51.8
DRQ127-330-R	33.0	33.92	3.23	6.22	0.0600	31.5	135.7	1.61	3.11	0.241	63.0
DRQ127-470-R	47.0	47.05	2.95	5.28	0.0719	37.1	188.2	1.47	2.64	0.288	74.2
DRQ127-680-R	68.0	66.48	2.44	4.44	0.105	44.1	265.9	1.22	2.22	0.421	88.2
DRQ127-820-R	82.0	79.75	2.09	4.06	0.143	48.3	319.0	1.04	2.03	0.573	96.6
DRQ127-101-R	100	99.31	1.96	3.64	0.163	53.9	397.2	0.980	1.82	0.653	107.8
DRQ127-151-R	150	144.9	1.59	3.01	0.247	65.1	579.6	0.796	1.51	0.989	130.2
DRQ127-221-R	220	221.5	1.29	2.43	0.376	80.5	886.0	0.645	1.22	1.50	161
DRQ127-331-R	330	323.6	1.04	2.01	0.574	97.3	1294	0.522	1.01	2.30	195
DRQ127-471-R	470	467.1	0.85	1.68	0.861	117	1868	0.427	0.838	3.44	234
DRQ127-681-R	680	676.7	0.76	1.39	1.08	141	2707	0.380	0.697	4.32	282
DRQ127-821-R	820	818.1	0.65	1.27	1.47	155	3272	0.325	0.633	5.88	310
DRQ127-102-R	1000	1005	0.61	1.14	1.66	172	4020	0.307	0.571	6.64	344

1) Open Circuit Inductance Test Parameters: 100kHz, 0.25 Vrms, 0.0 Adc
Parallel: (1,2 - 4,2) Series: (1 - 4) tie (2 - 3)
2) RMS current for an approximate ΔT of 40°C without core loss. It is recommended that the temperature of the part not exceed 125°C.
3) Peak current for approximately 30% roll-off at 20°C
4) DCR limits @ 20°C
5) Applied Volt-Time product (V-µS) across the inductor. This value represents the applied V-µS at 100KHz necessary to generate a core loss equal to 10% of the total losses for a 40°C temperature rise.
6) Turns Ratio (1-2):(3-4) 1:1

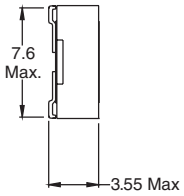
Mechanical Diagrams

DRQ73 Series

BOTTOM VIEW

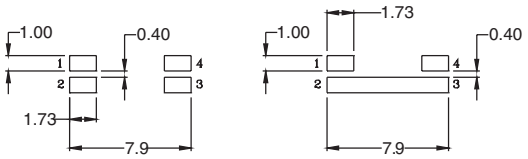


FRONT VIEW

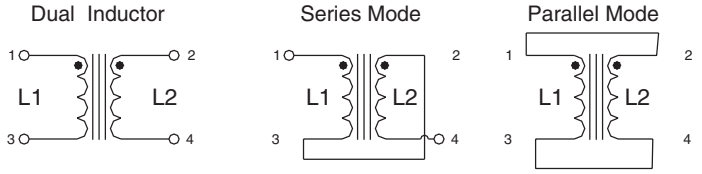


TOP VIEW

RECOMMENDED PCB LAYOUT

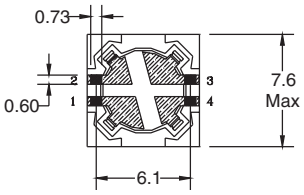


SCHEMATIC

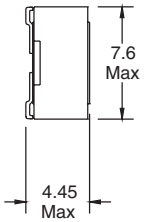


DRQ74 Series

BOTTOM VIEW

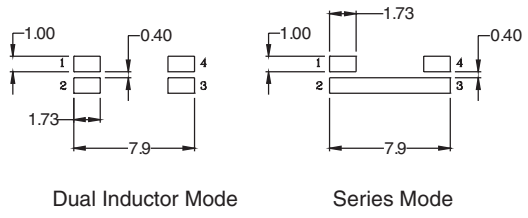


FRONT VIEW

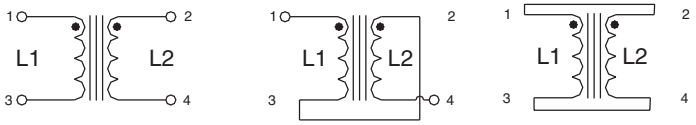


TOP VIEW

RECOMMENDED PCB LAYOUT



SCHEMATIC

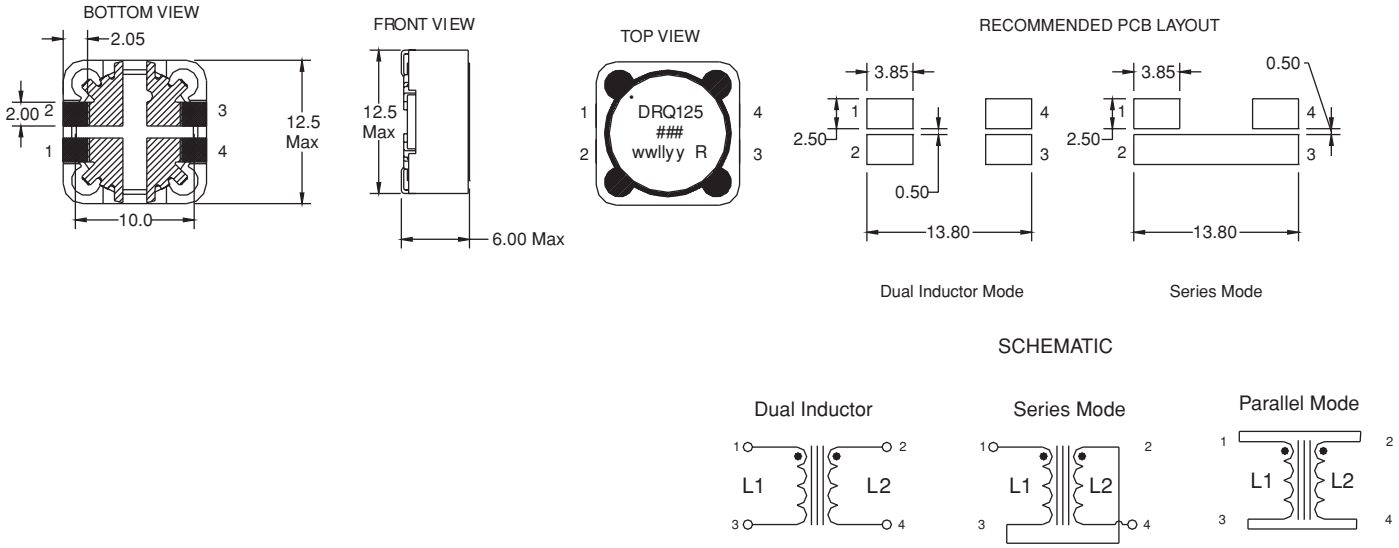


Dimensions in Millimeters.

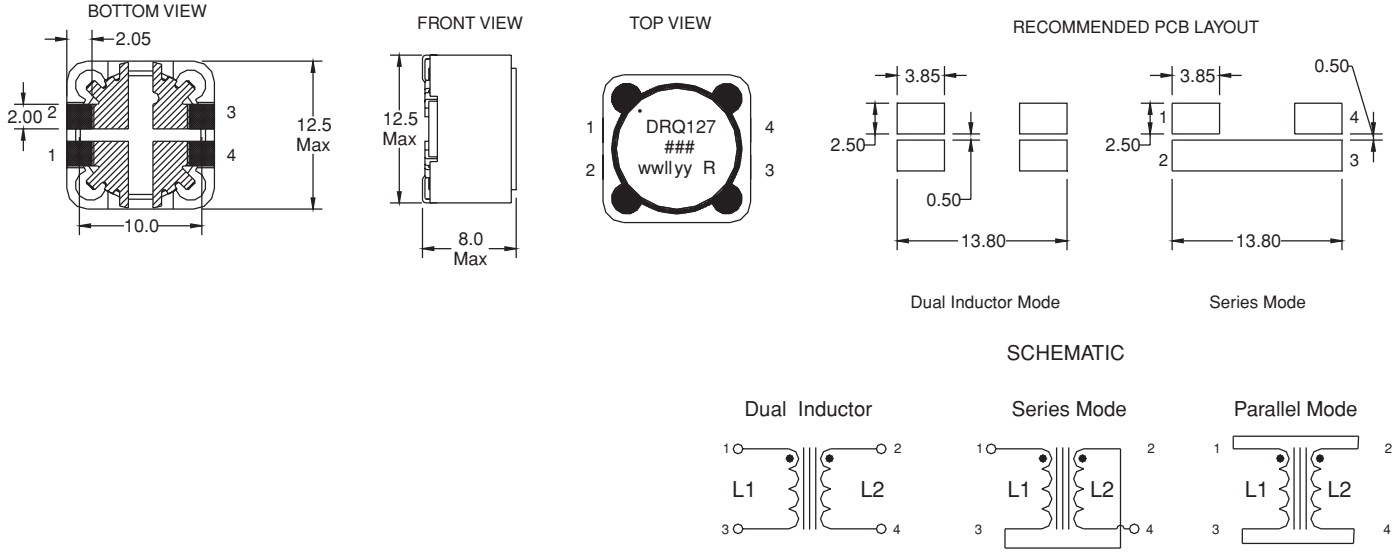
= Inductance value per family chart
Dot indicates pin #1

Mechanical Diagrams

DRQ125 Series



DRQ127 Series



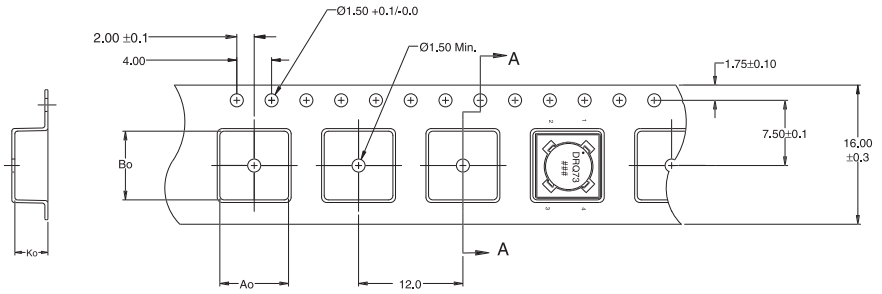
SHIELDED DRUM (DRQ)

Dimensions in Millimeters.

= Inductance value per family chart
wwllyy = (date code) R = revision level
Dot indicates pin #1

Packaging Information

DRQ73 Series



Ao=7.90mm
Bo=7.90mm
Ko=3.80mm

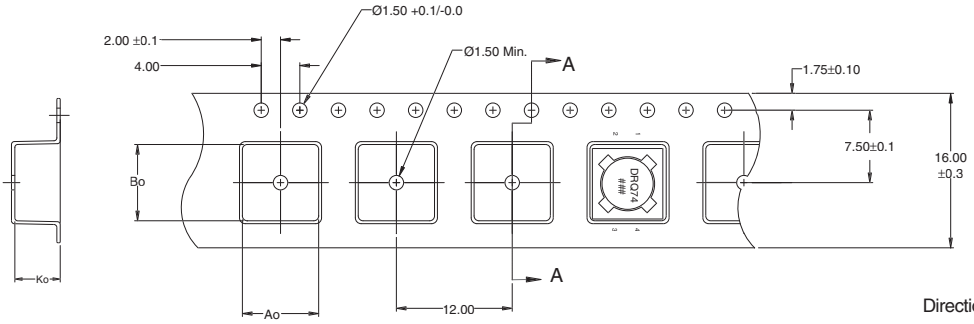
SECTION A-A

ACTUAL SIZE
DRQ73

Direction of Feed →

Parts packaged on 13" Diameter reel,
1,350 parts per reel.

DRQ74 Series



Ao=7.90mm
Bo=7.90mm
Ko=4.70mm

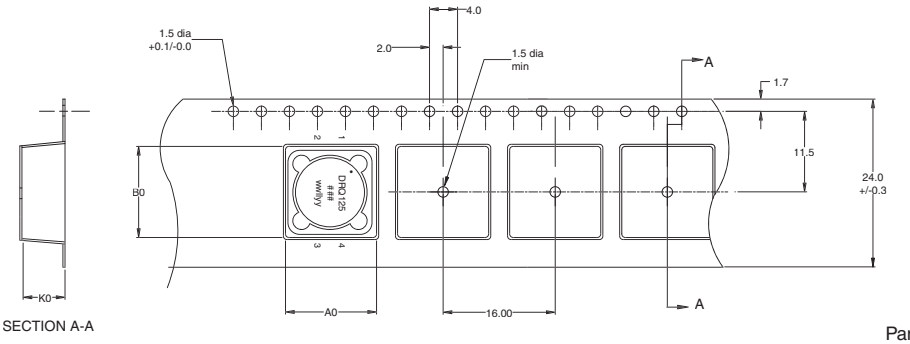
SECTION A-A

ACTUAL SIZE
DRQ74

Direction of Feed →

Parts packaged on 13" Diameter reel,
1,100 parts per reel.

DRQ125 Series



Ao=13.00mm
Bo=13.00mm
Ko=6.30mm

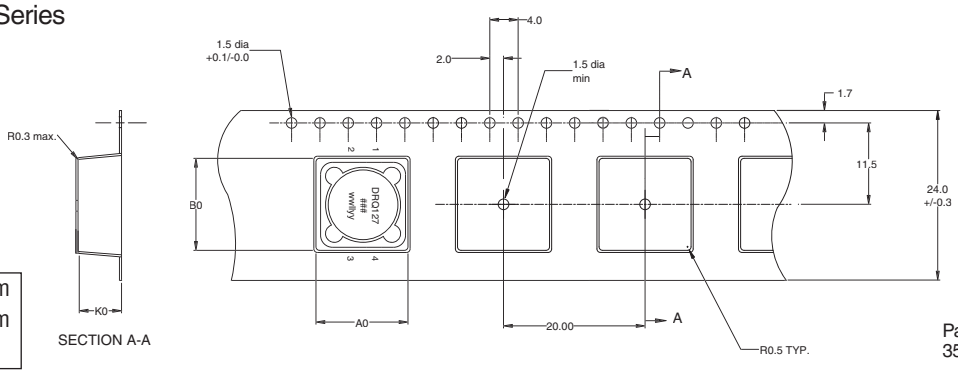
SECTION A-A

ACTUAL SIZE
DRQ125

Direction of Feed →

Parts packaged on 13" Diameter reel,
600 parts per reel.

DRQ127 Series



Ao=13.00mm
Bo=13.00mm
Ko=8.30mm

SECTION A-A

ACTUAL SIZE
DRQ127

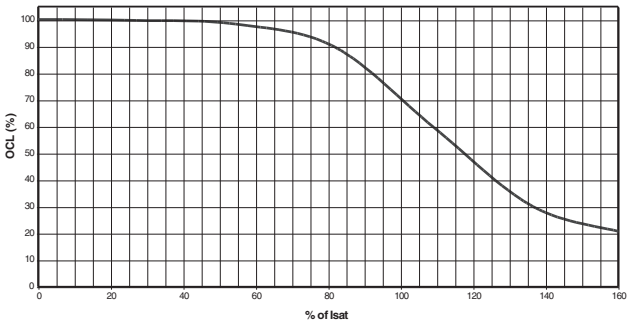
Direction of Feed →

Parts packaged on 13" Diameter reel,
350 parts per reel.

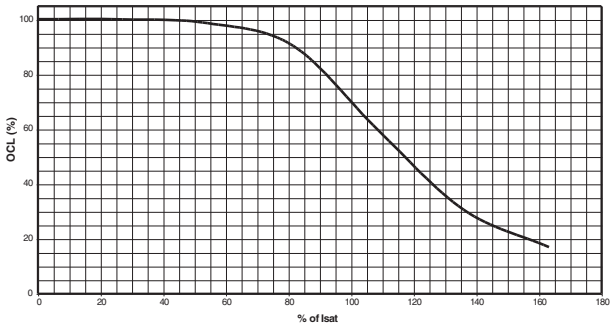
Dimensions are in millimeters.

Inductance Characteristics

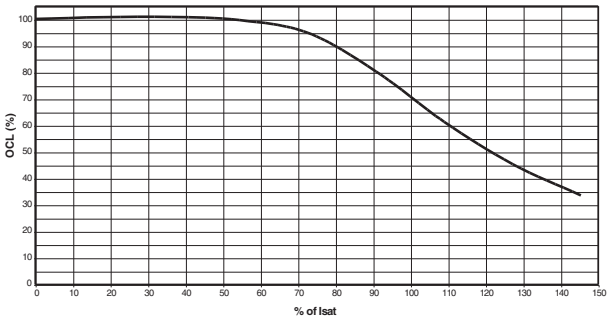
OCL vs Isat DRQ73



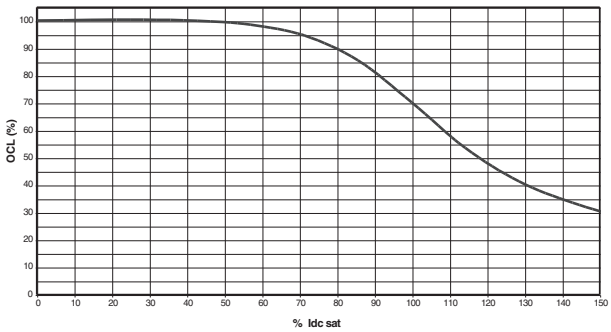
OCL vs Isat DRQ74



OCL vs Isat DRQ125

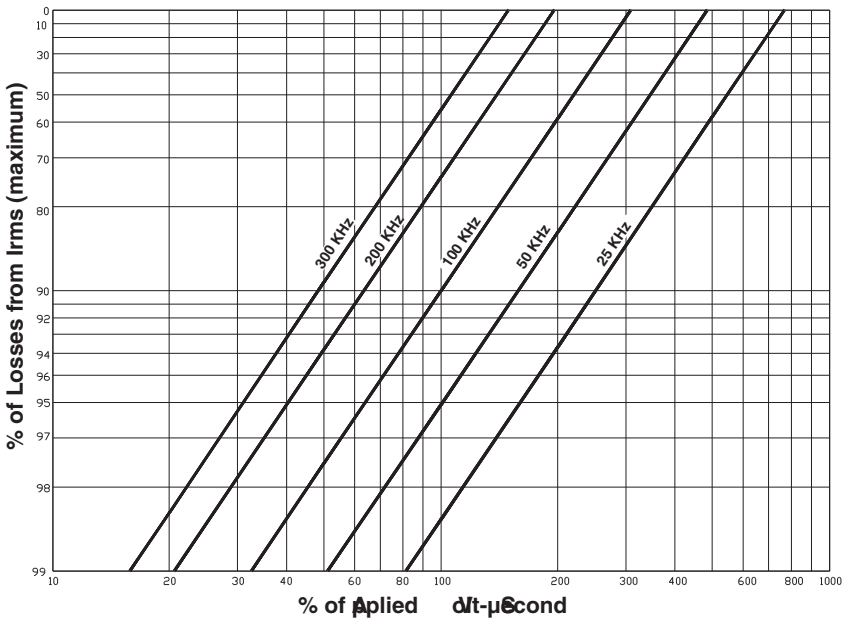


OCL vs Isat DRQ127



Core Loss

Irms DERATING WITH CORE LOSS



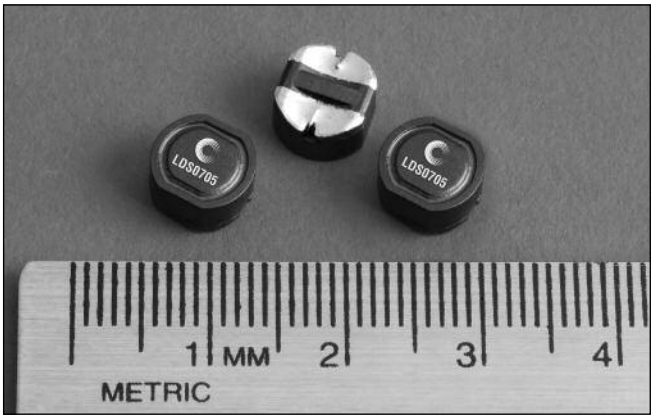
COOPER Bussmann

LDS0705 Series
Shielded Power Inductors

Description

- 125°C maximum temperature operation
- 7.8mm x 7.0mm x 5.0mm shielded drum core
- Ferrite core material
- Metalized core mounting utilizes board space
- Inductance range from 0.82µH to 470µH
- Current range from 8.57 Amps to 0.368 Amps
- Frequency range up to 1MHz

RoHS 2002/95/EC



Applications

- Buck or Boost Inductor
- Noise filtering and output filter chokes
- Battery Power, DC-DC converters
- Notebook power, PDA's, Hand held computers
- DVD players
- Cellular phones

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

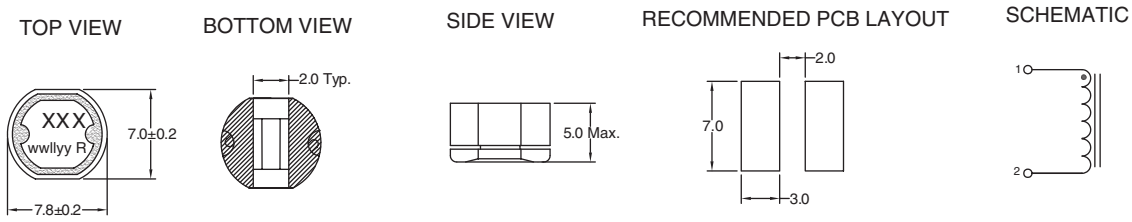
Packaging

- Supplied in tape and reel packaging, 1000 per reel

Part Number	Rated Inductance (µH)	OCL (1) µH	Irms(2) Amperes	Isat (3) Amperes	DCR (Ω) @20°C (Typical)	K-factor (4)
LDS0705-R82M-R	0.82	0.861±20%	7.68	8.57	0.0040	24.8
LDS0705-1R5M-R	1.5	1.42±20%	6.17	6.67	0.0061	19.3
LDS0705-2R2M-R	2.2	2.13±20%	5.06	5.45	0.009	15.8
LDS0705-3R3M-R	3.3	2.97±20%	4.19	4.62	0.013	13.4
LDS0705-4R7M-R	4.7	5.08±20%	3.32	3.53	0.021	10.2
LDS0705-6R8M-R	6.8	6.34±20%	3.11	3.16	0.024	9.2
LDS0705-8R2M-R	8.2	7.75±20%	2.67	2.86	0.033	8.3
LDS0705-100M-R	10.0	9.30±20%	2.54	2.61	0.036	7.6
LDS0705-150M-R	15.0	14.78±20%	2.04	2.07	0.056	6.0
LDS0705-220M-R	22.0	21.53±20%	1.66	1.71	0.084	5.0
LDS0705-330M-R	33.0	32.50±20%	1.48	1.40	0.107	4.0
LDS0705-470M-R	47.0	45.71±20%	1.21	1.18	0.158	3.4
LDS0705-680M-R	68.0	69.76±20%	0.985	0.952	0.240	2.8
LDS0705-820M-R	82.0	83.67±20%	0.850	0.870	0.323	2.5
LDS0705-101M-R	100.0	98.9±20%	0.808	0.800	0.357	2.3
LDS0705-151M-R	150.0	152.0±20%	0.649	0.645	0.554	1.9
LDS0705-221M-R	220.0	216.5±20%	0.584	0.541	0.68	1.6
LDS0705-331M-R	330.0	329.9±20%	0.470	0.438	1.06	1.3
LDS0705-471M-R	470.0	467.0±20%	0.387	0.368	1.56	1.1

(1) Open Circuit Inductance Test Parameters: 100kHz, 0.1V, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 30°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 15% rolloff (@25°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in µH), ΔI (Peak to peak ripple current in Amps).
(5) Part Number Definition: LDS0705-xxx-R
LDS0705 = Product code and size; -xxx = Inductance value in uH;
R = decimal point; If no R is present, third character = # of zeros.
M = Inductance tolerance +/- 20% -R suffix = RoHS compliant

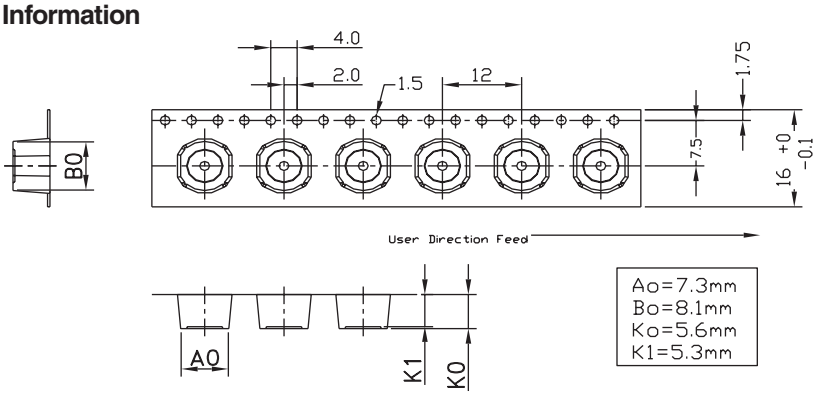
Mechanical Diagrams



Dimensions are in millimeters.

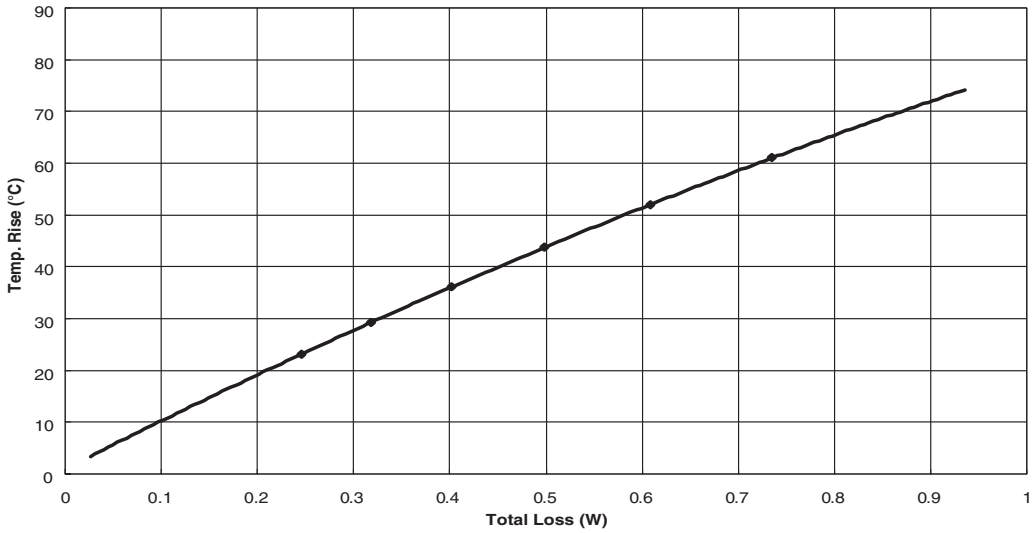
xxx = Inductance in uH. R = decimal point. If no R is present third character = # of zeros.
wwllyy = Date code, R = Revision level.

Packaging Information

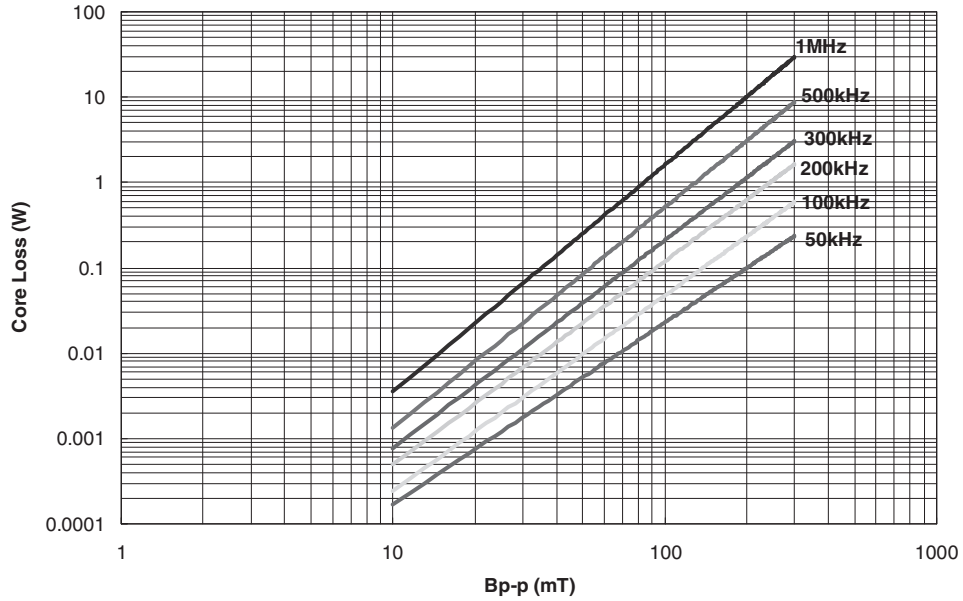


Parts packaged on 13" Diameter reel,
1,000 parts per reel.

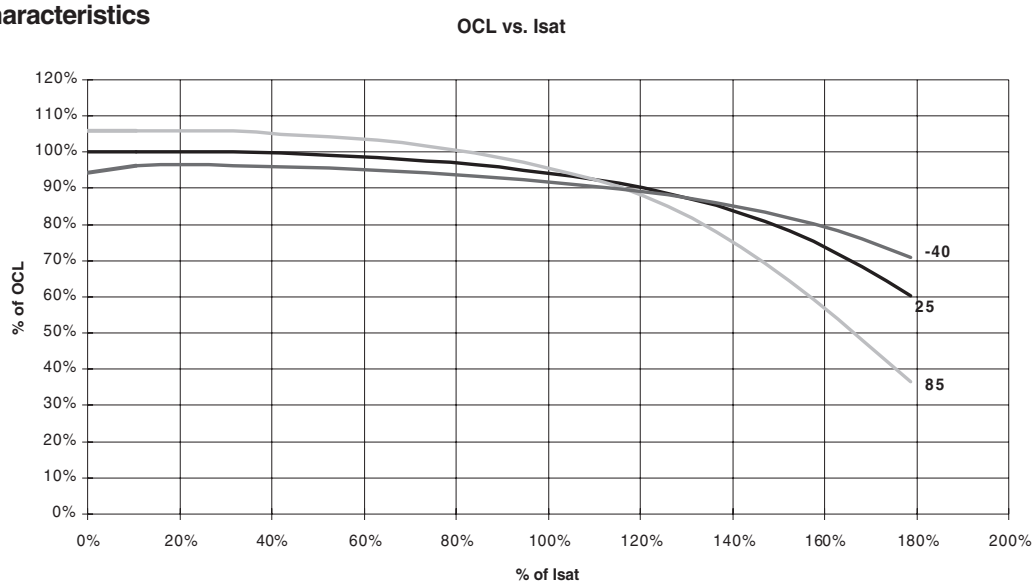
Temperature Rise vs. Watt Loss



Core Loss



Inductance Characteristics



COOPER Bussmann

SD3110 Series
Low Profile Power Inductors

Description

RoHS 2002/95/EC

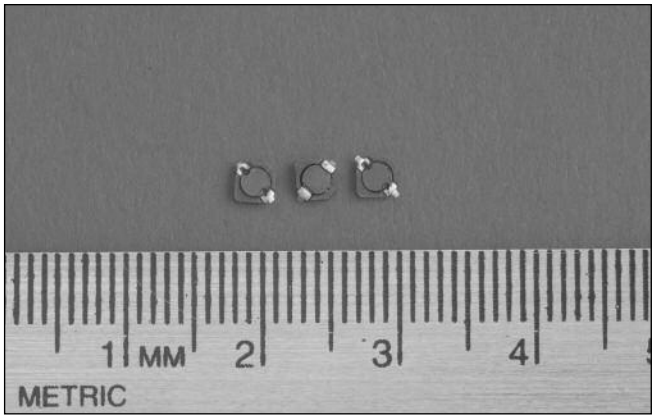
- 125°C maximum total temperature operation
- 3.1mm x 3.1mm x 1.0mm shielded drum core
- Ferrite core material
- Inductance range from 0.5uH to 220uH
- Current range from 2.27 Amps to 0.106 Amps
- Frequency range up to 1MHz

Applications

- Cellular phones, Digital cameras, CD players, PDA's
- Small LCD displays
- LED driver and LED flash circuits
- Hard disk drives
- Backlighting
- EL panel

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum



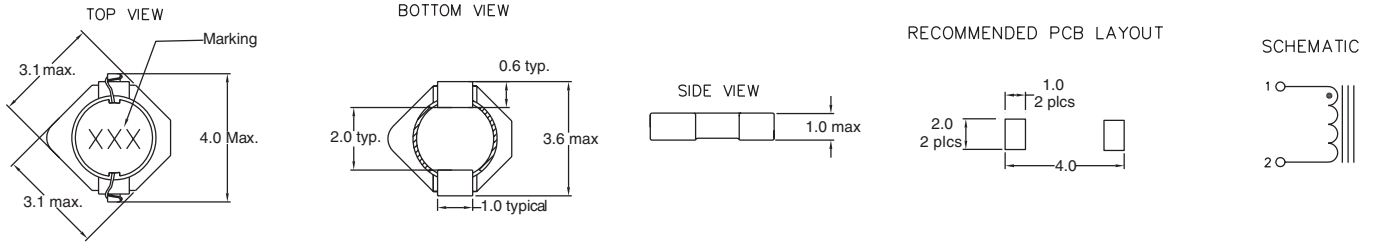
Packaging

- Supplied in tape and reel packaging, 4100 per reel

Part Number	Rated Inductance (µH)	OCL (1) (µH)	Part Marking Designator	Irms (2) Amperes	Isat (3) Amperes	DCR (Ω) typ. @ 20°C	K-factor (4)
SD3110-R50-R	0.50	0.44+/-30%	A	1.54	2.27	0.0420	216
SD3110-R82-R	0.82	0.82+/-30%	B	1.30	1.67	0.0589	191
SD3110-1R0-R	1.0	1.05+/-30%	C	1.21	1.47	0.0683	169
SD3110-1R5-R	1.5	1.60+/-30%	D	0.99	1.19	0.103	137
SD3110-2R2-R	2.2	2.27+/-30%	E	0.82	1.00	0.149	115
SD3110-3R3-R	3.3	3.48+/-30%	F	0.72	0.81	0.195	93
SD3110-4R7-R	4.7	4.96+/-30%	G	0.59	0.68	0.285	78
SD3110-6R8-R	6.8	6.70+/-30%	H	0.54	0.58	0.346	67
SD3110-8R2-R	8.2	8.01+/-30%	I	0.48	0.53	0.432	61
SD3110-100-R	10.0	10.18+/-30%	J	0.44	0.47	0.505	54
SD3110-150-R	15.0	15.32+/-20%	K	0.36	0.38	0.764	44
SD3110-220-R	22.0	21.49+/-20%	L	0.30	0.32	1.13	37
SD3110-330-R	33.0	32.72+/-20%	M	0.26	0.26	1.50	30
SD3110-470-R	47.0	46.29+/-20%	N	0.22	0.22	2.06	25
SD3110-680-R	68.0	68.04+/-20%	O	0.179	0.182	3.13	21
SD3110-820-R	82.0	82.65+/-20%	P	0.167	0.166	3.57	19
SD3110-101-R	100	101+/-20%	Q	0.146	0.150	4.72	17
SD3110-151-R	150	149+/-20%	R	0.127	0.123	6.16	14
SD3110-221-R	220	219+/-20%	S	0.106	0.120	9.46	12

(1) Open Circuit Inductance Test Parameters: 100kHz, 0.1V, 0.0Adc.
(2) Irms: DC current for an approximate DT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 30% rolloff (@20°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in uH), ΔI (Peak to peak ripple current in Amps).

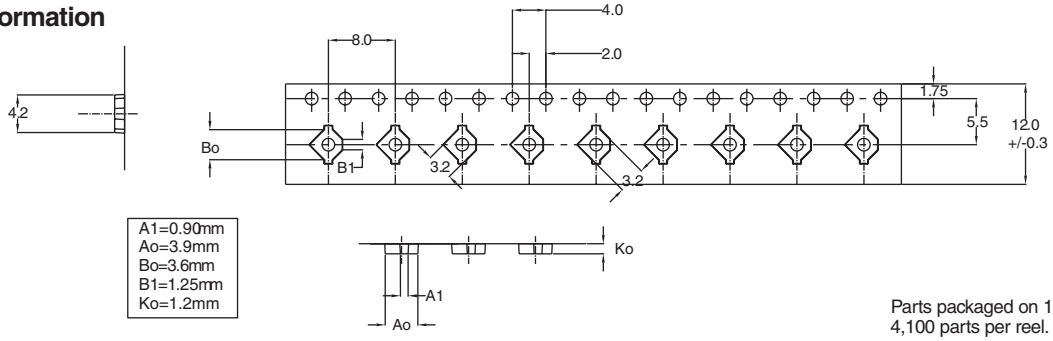
Mechanical Diagrams



Dimensions are in millimeters.

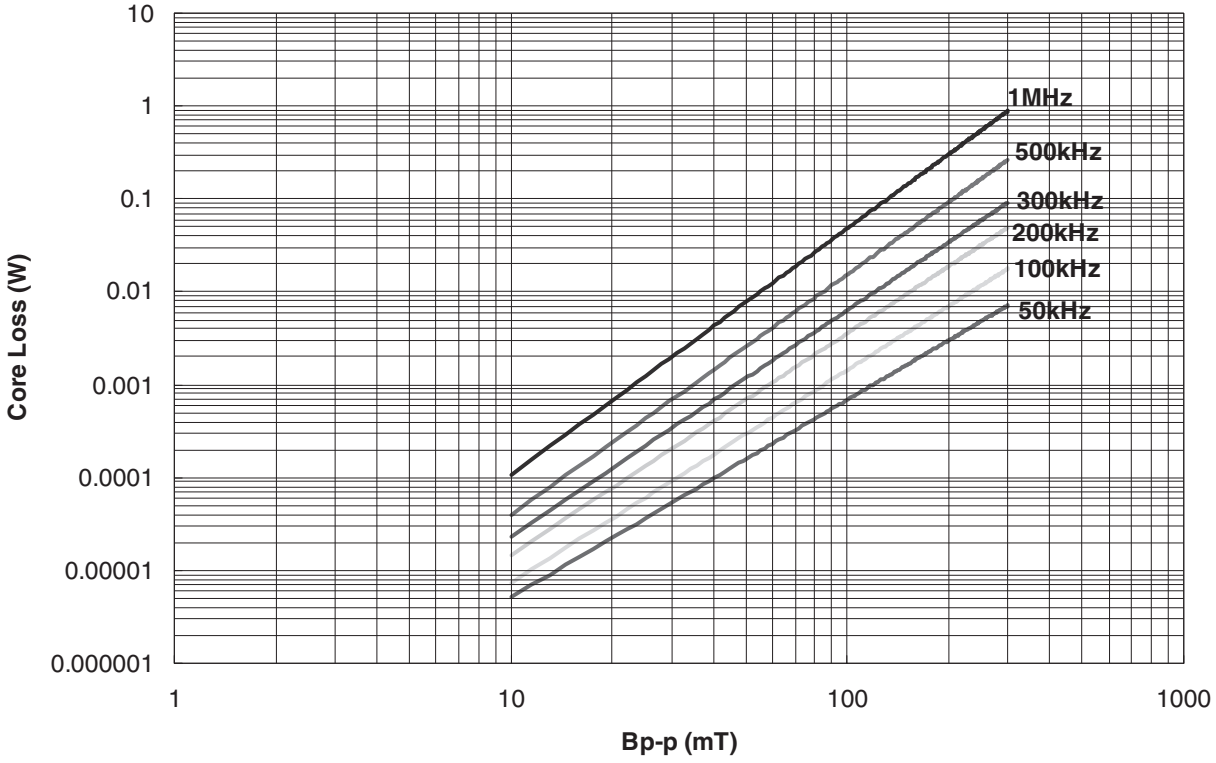
Part Marking:
3 Digit Marking: (1st digit: Indicates inductance value per letter in Part Marking Designator); (2nd digit: Bi-weekly production date code); (3rd digit: Last digit of the year produced).

Packaging Information

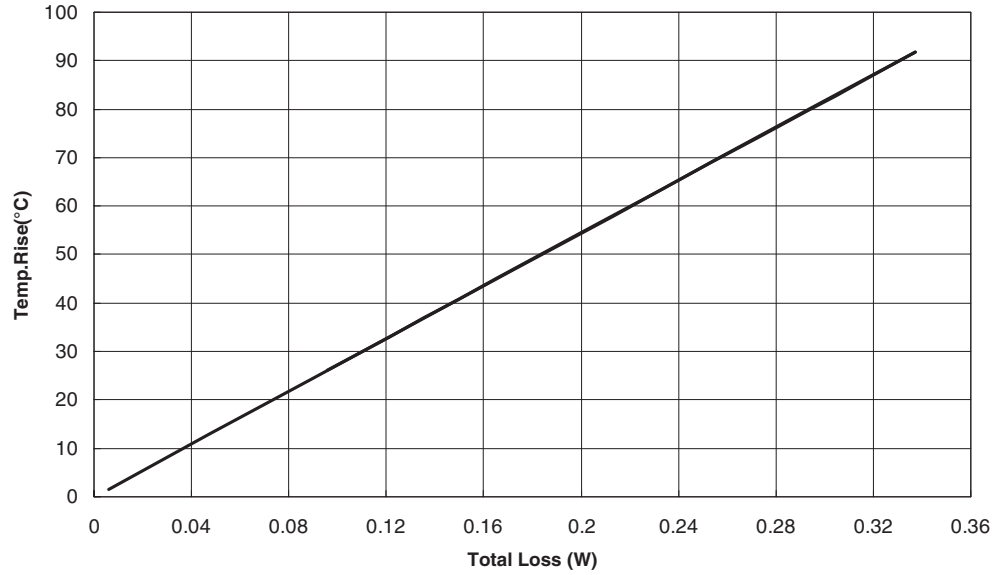


Parts packaged on 13" Diameter reel,
4,100 parts per reel.

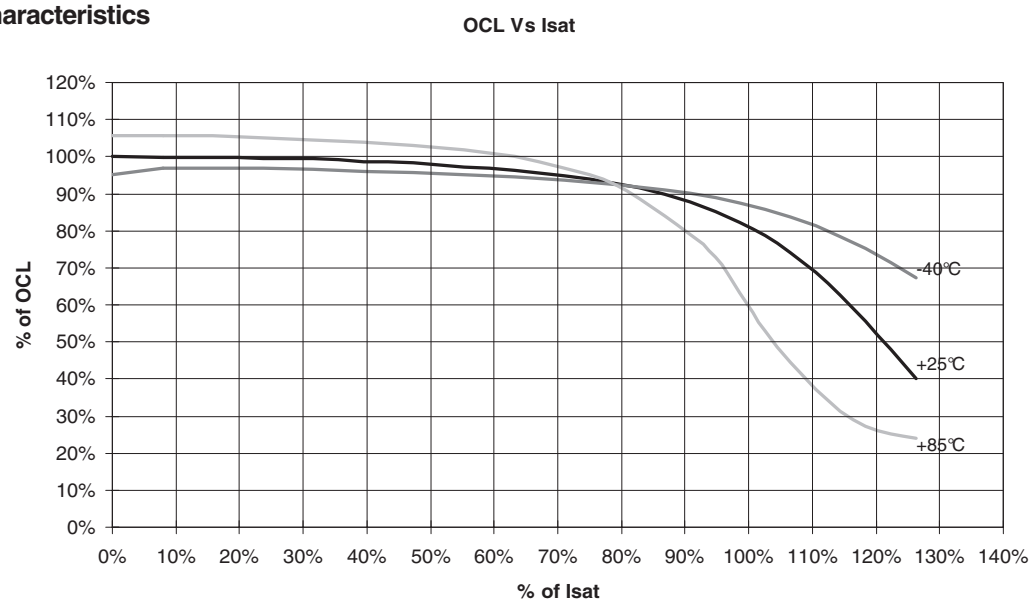
Core Loss



Temperature Rise vs. Loss



Inductance Characteristics



COOPER Bussmann

SD3112 Series
Low Profile Power Inductors

Description

RoHS 2002/95/EC

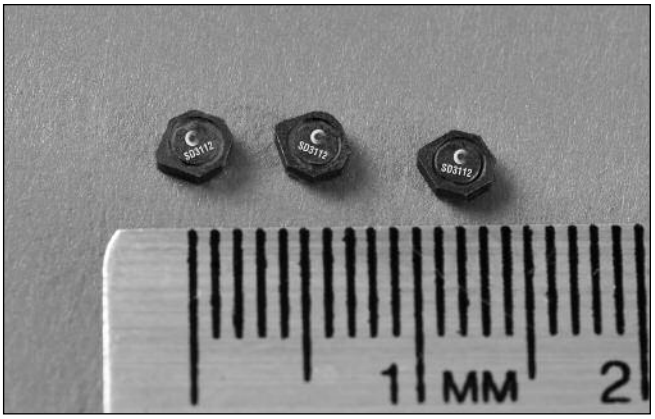
- 125°C maximum total temperature operation
- 3.1mm x 3.1mm x 1.2mm shielded drum core
- Ferrite core material
- Inductance range from 1.0uH to 220uH
- Current range from 1.65 Amps to 0.113 Amps
- Frequency range up to 4MHz

Applications

- Cellular phones, Digital cameras, CD players, PDA's
- Small LCD displays
- LED driver and LED flash circuits
- Hard disk drives
- Backlighting
- EL panel

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum



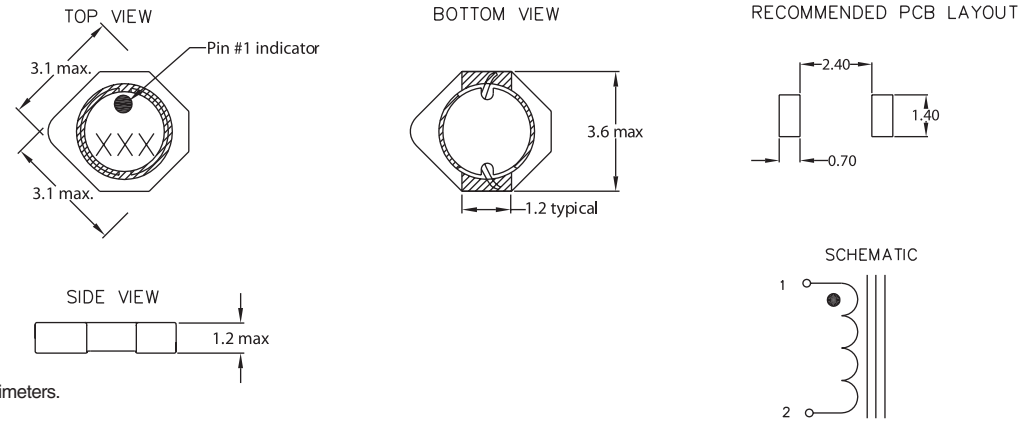
Packaging

- Supplied in tape and reel packaging, 4100 per reel

Part Number	Rated Inductance (µH)	OCL (1) (µH)	Part Marking Designator	Irms (2) Amperes	Isat (3) Amperes	DCR (Ω) typ. @ 20°C	K-factor (4)
SD3112-1R0-R	1.0	1.11+/-30%	A	1.39	1.65	0.069	135
SD3112-1R5-R	1.5	1.70+/-30%	B	1.16	1.33	0.099	110
SD3112-2R2-R	2.2	2.41+/-30%	C	0.97	1.12	0.140	92
SD3112-3R3-R	3.3	3.24+/-30%	D	0.90	0.97	0.165	79
SD3112-4R7-R	4.7	4.72+/-30%	E	0.74	0.80	0.246	66
SD3112-6R8-R	6.8	6.47+/-30%	F	0.68	0.68	0.291	56
SD3112-8R2-R	8.2	8.50+/-30%	G	0.57	0.60	0.408	49
SD3112-100-R	10.0	10.01+/-30%	H	0.55	0.55	0.446	45
SD3112-150-R	15.0	15.28+/-20%	I	0.45	0.44	0.654	37
SD3112-220-R	22.0	21.66+/-20%	J	0.37	0.37	0.953	31
SD3112-330-R	33.0	33.30+/-20%	K	0.30	0.30	1.48	25
SD3112-470-R	47.0	47.44+/-20%	L	0.270	0.25	1.85	21
SD3112-680-R	68.0	68.10+/-20%	M	0.228	0.211	2.56	17
SD3112-820-R	82.0	83.19+/-20%	N	0.213	0.190	2.93	16
SD3112-101-R	100.0	99.8+/-20%	O	0.184	0.174	3.95	14
SD3112-151-R	150.0	149.4+/-20%	P	0.149	0.142	6.01	12
SD3112-221-R	220.0	219.9+/-20%	Q	0.121	0.117	9.12	10

(1) Open Circuit Inductance Test Parameters: 100kHz, 0.1V, 0.0Adc.
(2) Irms: DC current for an approximate DT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 30% rolloff (@20°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in uH), ΔI (Peak to peak ripple current in Amps).

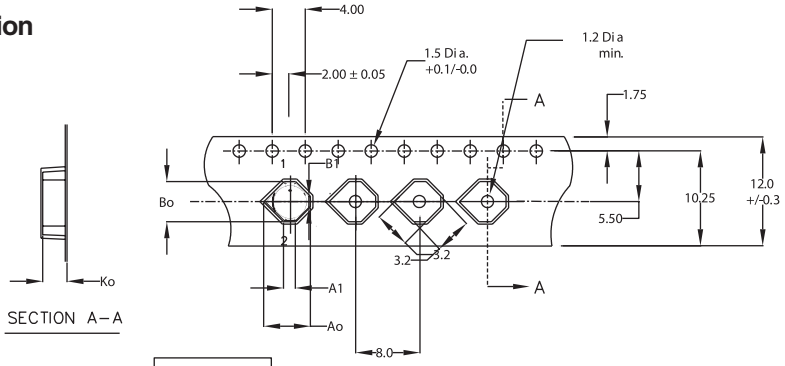
Mechanical Diagrams



Dimensions are in millimeters.

Part Marking:
3 Digit Marking: (1st digit: Indicates inductance value per letter in Part Marking Designator); (2nd digit: Bi-weekly production date code); (3rd digit: Last digit of the year produced).

Packaging Information

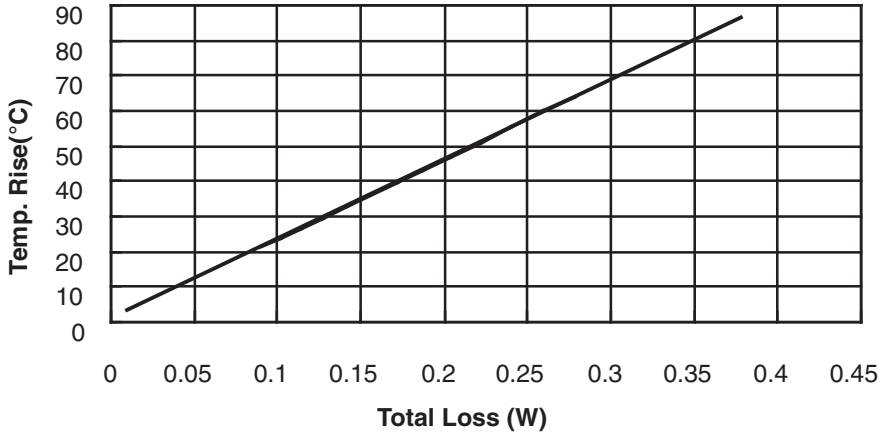


Ao = 3.9 mm
A1 = 0.93 mm
Bo = 3.60 mm
B1 = 1.25 mm
Ko = 1. 60 mm

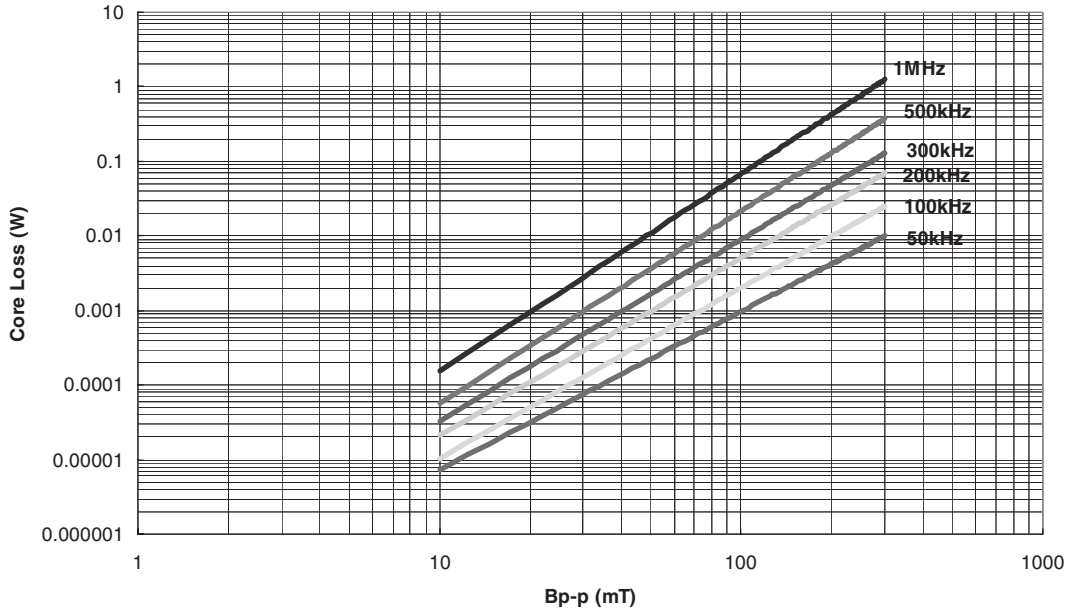
Direction of feed

Parts packaged on 13" Diameter reel,
4,100 parts per reel.

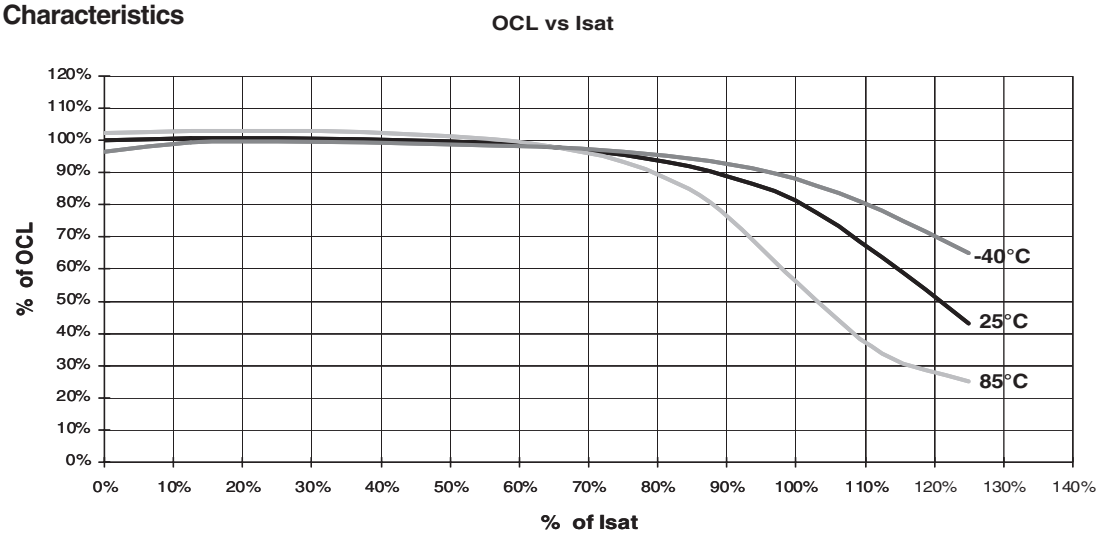
DC Current vs. Temperature



Core Loss

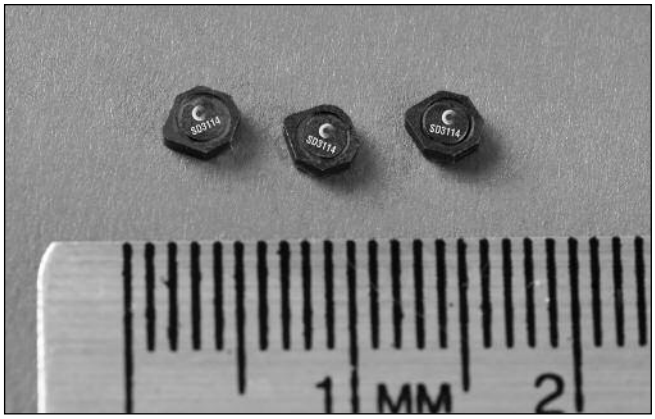


Inductance Characteristics



SD3114 Series
Low Profile Power Inductors

RoHS 2002/95/EC



Description

- 125°C maximum total temperature operation
- 3.1mm x 3.1mm x 1.4mm shielded drum core
- Ferrite core material
- Inductance range from 1.0uH to 330uH
- Current range from 2.59 Amps to 0.106 Amps
- Frequency range up to 4MHz

Applications

- Cellular phones, Digital cameras, CD players, PDA's
- Small LCD displays
- LED driver and LED flash circuits
- Hard disk drives
- Backlighting
- EL panel

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

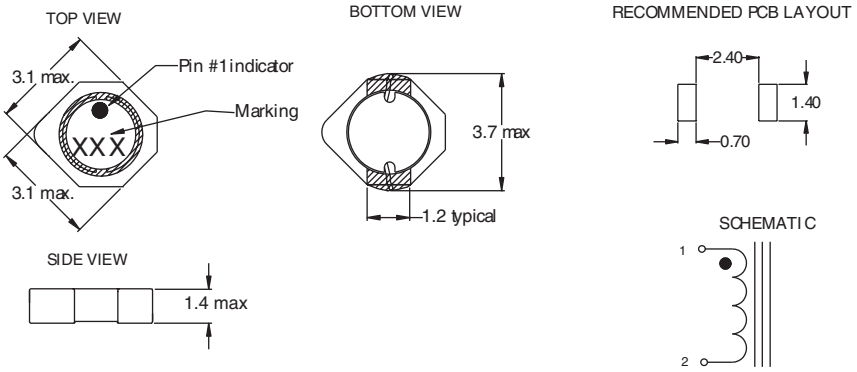
Packaging

- Supplied in tape and reel packaging, 4100 per reel

Part Number	Rated Inductance (µH)	OCL (1) (µH)	Part Marking Designator	Irms (2) Amperes	Isat (3) Amperes	DCR (Ω) typ. @ 20°C	K-factor (4)
SD3114-1R0-R	1.0	1.16+/-30%	A	1.60	2.35	0.058	98
SD3114-1R5-R	1.5	1.44+/-30%	B	1.39	2.11	0.077	79
SD3114-2R2-R	2.2	2.12+/-30%	C	1.17	1.74	0.110	67
SD3114-3R3-R	3.3	3.36+/-30%	D	0.95	1.38	0.167	54
SD3114-4R7-R	4.7	4.90+/-30%	E	0.77	1.14	0.251	45
SD3114-6R8-R	6.8	6.72+/-30%	F	0.71	0.98	0.296	37
SD3114-8R2-R	8.2	8.10+/-30%	G	0.68	0.89	0.329	34
SD3114-100-R	10.0	10.4+/-30%	H	0.57	0.78	0.458	30
SD3114-150-R	15.0	14.9+/-20%	I	0.48	0.66	0.650	25
SD3114-220-R	22.0	22.5+/-20%	J	0.43	0.53	0.821	21
SD3114-330-R	33.0	33.1+/-20%	K	0.35	0.44	1.23	17
SD3114-470-R	47.0	47.5+/-20%	L	0.280	0.37	1.86	14
SD3114-680-R	68.0	68.6+/-20%	M	0.239	0.305	2.62	12
SD3114-820-R	82.0	81.8+/-20%	N	0.227	0.280	2.91	11
SD3114-101-R	100.0	101.1+/-20%	O	0.213	0.252	3.30	10
SD3114-151-R	150.0	149.0+/-20%	P	0.172	0.207	5.07	8
SD3114-221-R	220.0	220.9+/-20%	Q	0.140	0.170	7.67	6
SD3114-331-R	330.0	329.5+/-20%	R	0.113	0.139	11.78	5

(1) Open Circuit Inductance Test Parameters: 100kHz, 0.1V, 0.0Adc.
(2) Irms: DC current for an approximate DT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 30% rolloff (@20°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in uH), ΔI (Peak to peak ripple current in Amps).

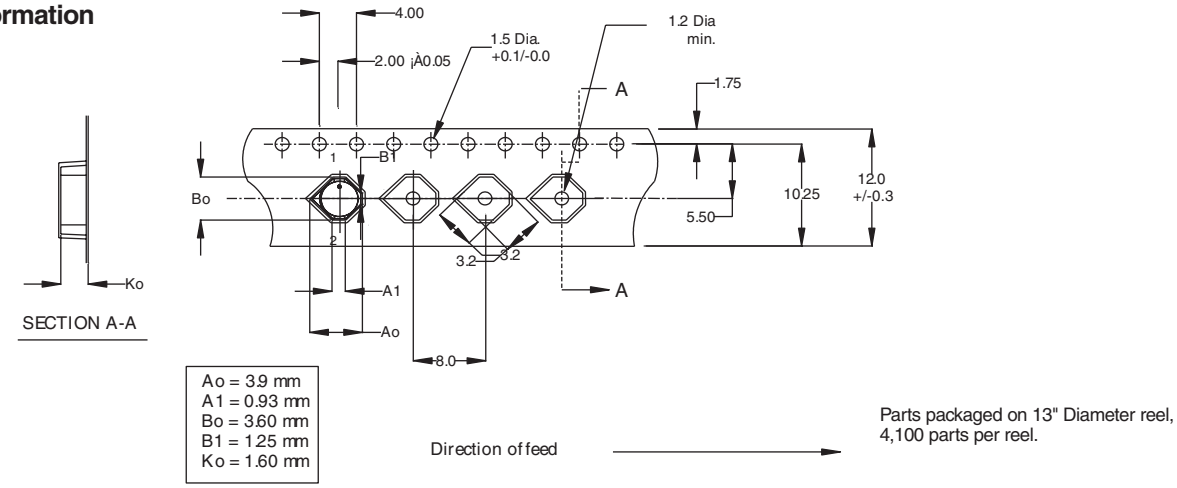
Mechanical Diagrams



Dimensions are in millimeters.

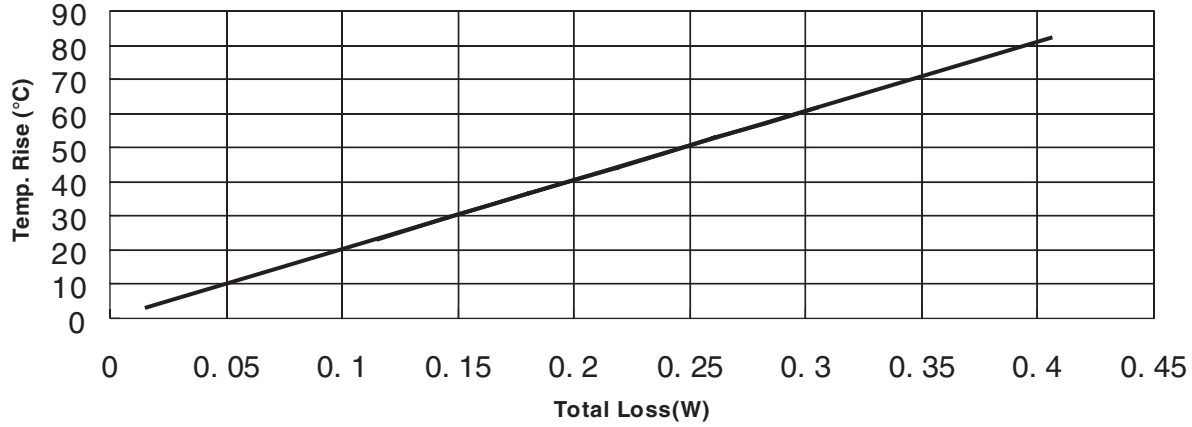
Part Marking:
3 Digit Marking: (1st digit: Indicates inductance value per letter in Part Marking Designator); (2nd digit: Bi-weekly production date code); (3rd digit: Last digit of the year produced).

Packaging Information

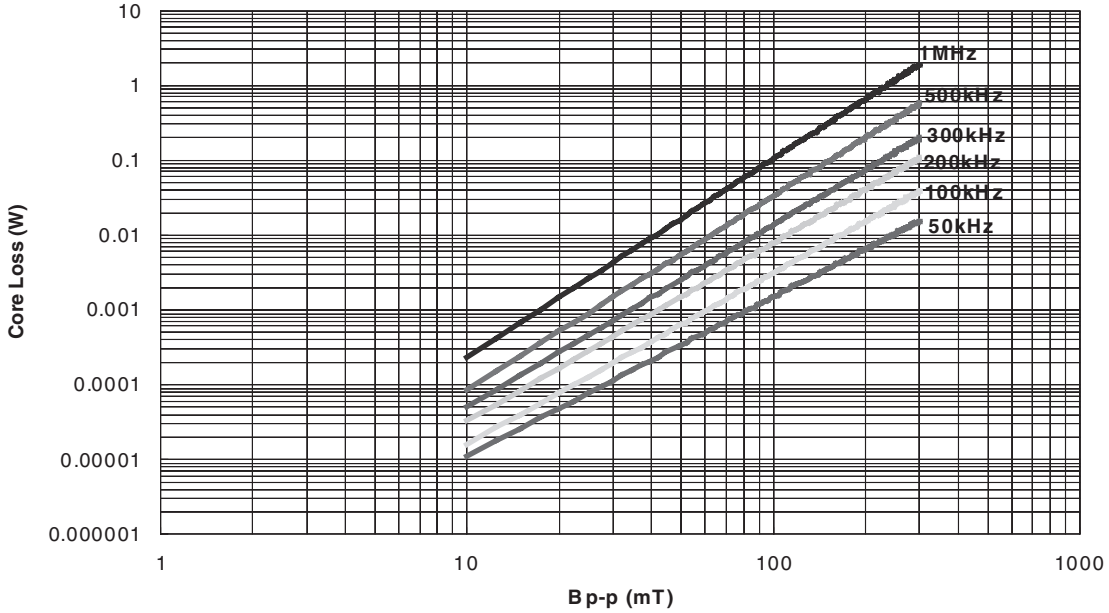


Parts packaged on 13" Diameter reel, 4,100 parts per reel.

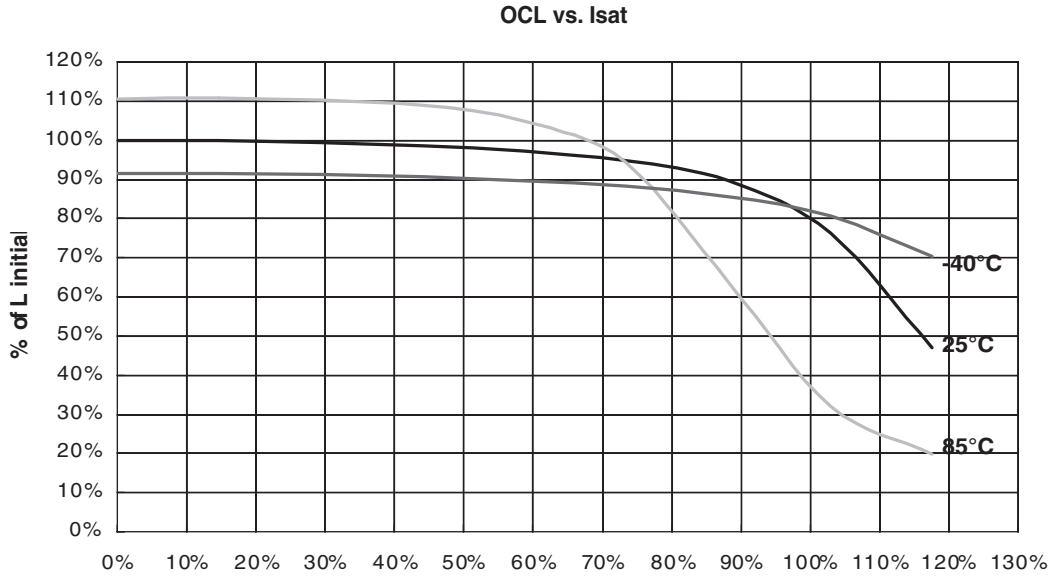
DC Current vs. Temperature



Core Loss



Inductance Characteristics



COOPER Bussmann

SD3118 Series
Low Profile Power Inductors

Description

RoHS 2002/95/EC

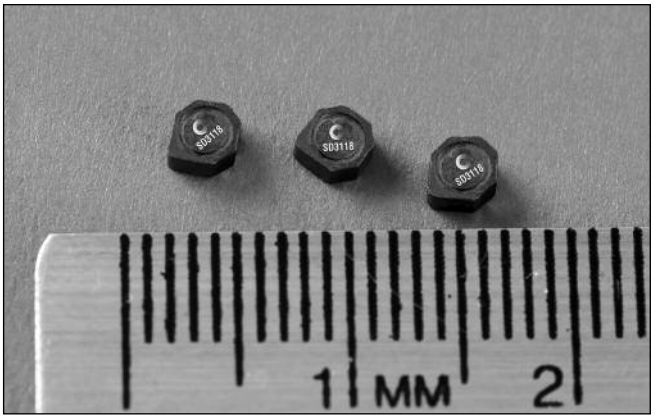
- 125°C maximum total temperature operation
- 3.1mm x 3.1mm x 1.8mm shielded drum core
- Ferrite core material
- Inductance range from 1.0uH to 1000uH
- Current range from 2.94 Amps to 0.083 Amps
- Frequency range up to 4MHz

Applications

- Cellular phones, Digital cameras, CD players, PDA's
- Small LCD displays
- LED driver and LED flash circuits
- Hard disk drives
- Backlighting
- EL panel

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum



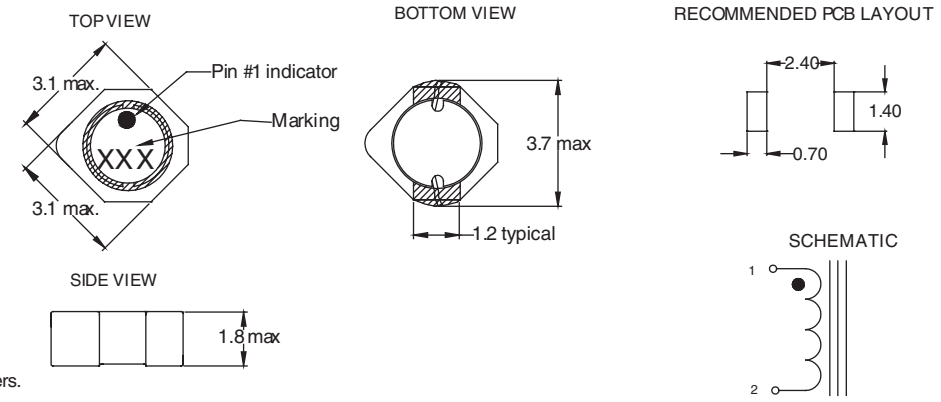
Packaging

- Supplied in tape and reel packaging, 4100 per reel

Part Number	Rated Inductance (µH)	OCL (1) (µH)	Part Marking Designator	Irms (2) Amperes	Isat (3) Amperes	DCR (Ω) typ. @ 20°C	K-factor (4)
SD3118-1R0-R	1.0	1.04+/-30%	A	2.01	3.07	0.041	84
SD3118-1R5-R	1.5	1.44+/-30%	B	1.81	2.42	0.051	68
SD3118-2R2-R	2.2	2.12+/-30%	C	1.50	2.00	0.074	57
SD3118-3R3-R	3.3	3.36+/-30%	D	1.22	1.59	0.113	56
SD3118-4R7-R	4.7	4.90+/-30%	E	1.02	1.31	0.162	39
SD3118-6R8-R	6.8	6.72+/-30%	F	0.85	1.12	0.232	32
SD3118-8R2-R	8.2	8.10+/-30%	G	0.81	1.02	0.257	29
SD3118-100-R	10.0	10.4+/-30%	H	0.75	0.90	0.295	26
SD3118-150-R	15.0	14.9+/-20%	I	0.62	0.75	0.440	21
SD3118-220-R	22.0	22.5+/-20%	J	0.50	0.61	0.676	18
SD3118-330-R	33.0	33.1+/-20%	K	0.41	0.51	0.986	14
SD3118-470-R	47.0	47.5+/-20%	L	0.370	0.42	1.21	12
SD3118-221-R	220.0	221.9+/-20%	M	0.182	0.177	4.77	6
SD3118-331-R	330.0	329.9+/-20%	N	0.146	0.145	7.40	5
SD3118-471-R	470.0	470.1+/-20%	O	0.131	0.122	9.20	4
SD3118-681-R	680.0	680.3+/-20%	P	0.107	0.101	13.70	3
SD3118-102-R	1000.0	999.4+/-20%	Q	0.087	0.083	20.90	3

(1) Open Circuit Inductance Test Parameters: 100kHz, 0.1V, 0.0Adc.
(2) Irms: DC current for an approximate DT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 30% rolloff (@20°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in uH), ΔI (Peak to peak ripple current in Amps).

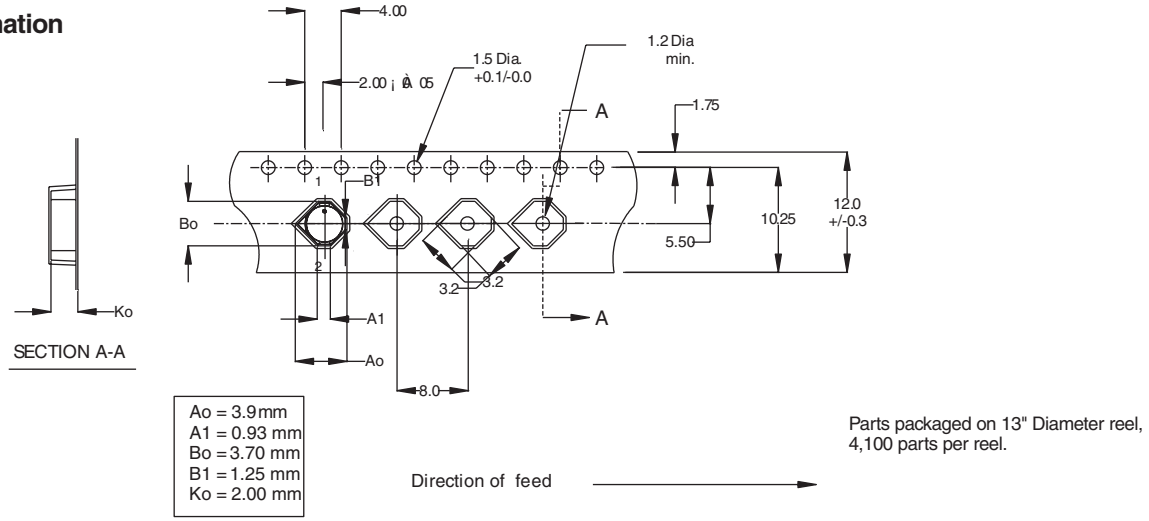
Mechanical Diagrams



Dimensions are in millimeters.

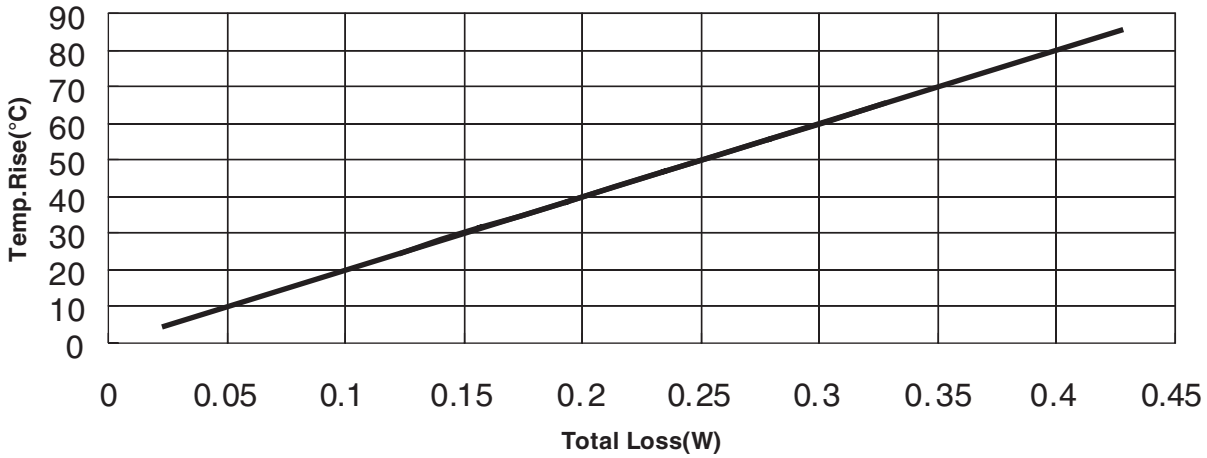
Part Marking:
3 Digit Marking: (1st digit: Indicates inductance value per letter in Part Marking Designator); (2nd digit: Bi-weekly production date code); (3rd digit: Last digit of the year produced).

Packaging Information

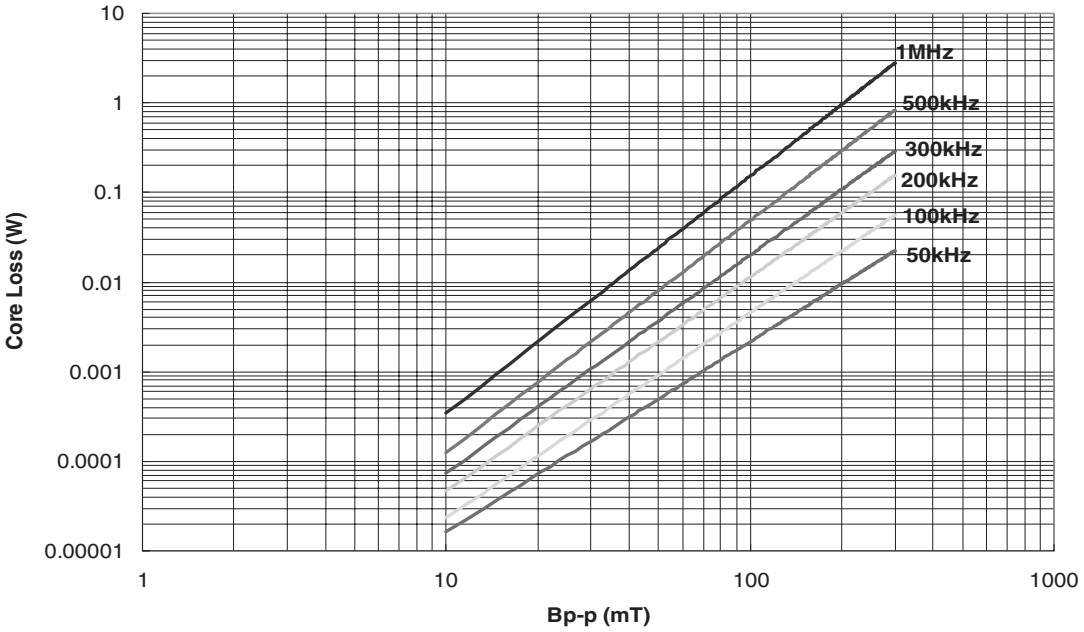


Parts packaged on 13" Diameter reel,
4,100 parts per reel.

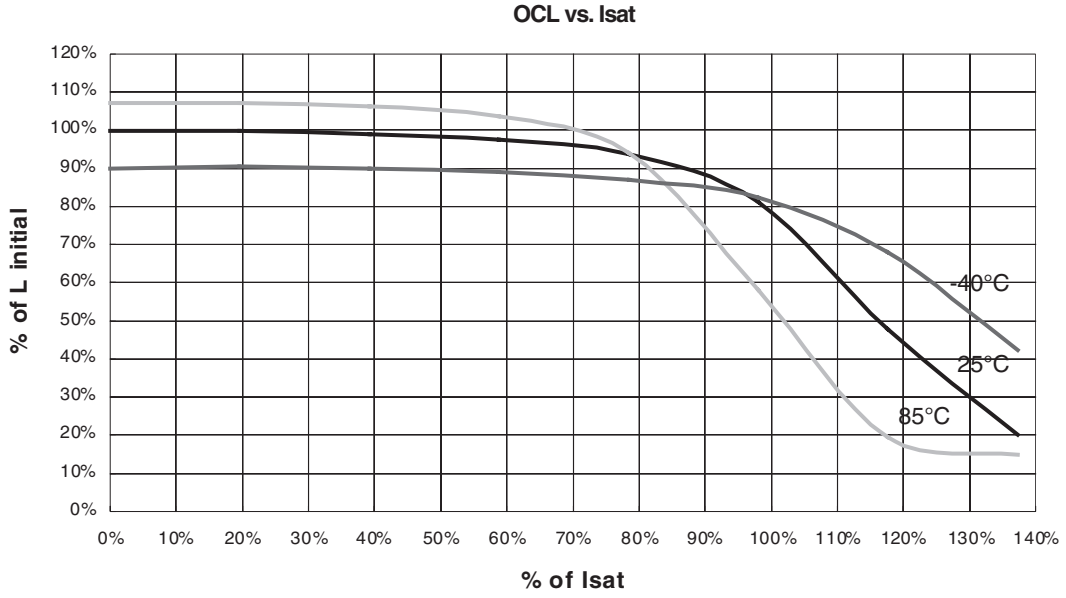
DC Current vs. Temperature



Core Loss



Inductance Characteristics



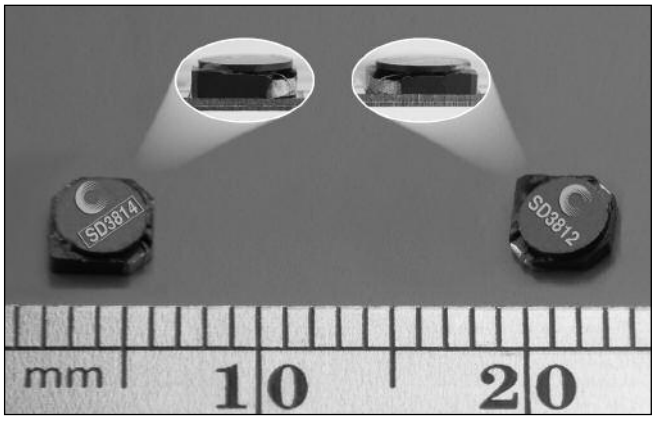
COOPER Bussmann

SD38 Series
Low Profile, Shielded Inductors

Description

RoHS 2002/95/EC

- 3.8mm x 3.8mm shielded drum cores available in two heights: 1.2mm and 1.4mm
- Current range from 4.44 to 0.100 Amps
- Inductance range from 0.47 uH to 680 uH
- Ferrite shielded, low EMI
- Ferrite core material



Applications

- Digital cameras, cellular phones, CD players, and PDAs
- PCMCIA cards
- GPS systems

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +85°C (range is application specific). Temperature rise is approximately 40°C at rated rms current
- Solder reflow temperature: +260°C max for 10 seconds max.

Packaging

- Supplied in tape and reel packaging, 4,150 parts per 13" reel

Part Number	Rated Inductance (µH)	OCL (1) +/-15% (µH)	Part Marking Designator	Irms (2) Amperes	Isat (3) Amperes	DCR (4) (Ω) Typ.	Volt (5) u-sec Typ.
SD3812-R47-R	0.47	0.405	A	2.53	3.89	0.030	2.52
SD3812-1R0-R	1.0	0.845	B	2.00	2.69	0.048	3.64
SD3812-1R2-R	1.2	1.125	C	1.71	2.33	0.066	4.20
SD3812-1R5-R	1.5	1.445	D	1.58	2.06	0.078	4.76
SD3812-2R2-R	2.2	2.205	E	1.32	1.67	0.111	5.88
SD3812-3R3-R	3.3	3.125	F	1.10	1.40	0.159	7.0
SD3812-4R7-R	4.7	4.805	G	0.87	1.13	0.256	8.7
SD3812-6R8-R	6.8	6.845	H	0.80	0.95	0.299	10.4
SD3812-8R2-R	8.2	8.405	I	0.690	0.854	0.406	11.5
SD3812-100-R	10.0	10.125	J	0.662	0.778	0.441	12.6
SD3812-150-R	15.0	15.125	K	0.539	0.636	0.665	15.4
SD3812-220-R	22.0	21.125	L	0.499	0.538	0.776	18.2
SD3812-330-R	33.0	32.805	M	0.399	0.432	1.212	22.7
SD3812-470-R	47.0	47.045	N	0.327	0.361	1.809	27.2
SD3812-680-R	68.0	68.445	O	0.269	0.299	2.666	32.8
SD3812-820-R	82.0	80.645	P	0.259	0.276	2.885	36
SD3812-101-R	100.0	99.405	Q	0.217	0.248	4.099	39
SD3812-151-R	150.0	149.645	R	0.178	0.202	6.130	48
SD3812-221-R	220.0	218.405	S	0.160	0.167	7.585	59
SD3814-R47-R	0.47	0.360	A	2.81	4.44	0.020	2.16
SD3814-R82-R	0.82	0.752	B	2.18	3.08	0.033	3.12
SD3814-1R2-R	1.2	1.001	C	1.85	2.67	0.046	3.60
SD3814-1R5-R	1.5	1.286	D	1.76	2.35	0.051	4.08
SD3814-2R2-R	2.2	1.962	E	1.43	1.90	0.077	5.04
SD3814-3R3-R	3.3	2.781	F	1.31	1.60	0.093	6.0
SD3814-4R7-R	4.7	4.276	G	1.06	1.29	0.141	7.4
SD3814-6R8-R	6.8	6.768	H	0.87	1.03	0.207	9.4
SD3814-8R2-R	8.2	8.228	I	0.753	0.930	0.279	10.3
SD3814-100-R	10.0	9.830	J	0.713	0.851	0.311	11.3
SD3814-150-R	15.0	14.458	K	0.574	0.702	0.481	13.7
SD3814-220-R	22.0	21.186	L	0.519	0.580	0.589	16.6
SD3814-330-R	33.0	32.151	M	0.418	0.471	0.908	20.4
SD3814-470-R	47.0	47.210	N	0.346	0.388	1.322	24.7
SD3814-680-R	68.0	67.324	O	0.285	0.325	1.951	29.5

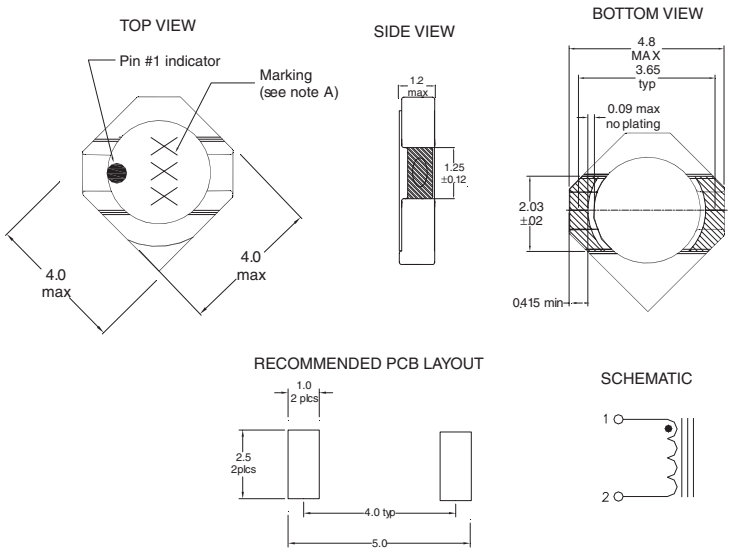
(1) Test Parameters: 100KHz, 0.100Vrms, 0.0Adc.
(2) RMS current for an approximate ΔT of 40°C without core loss. It is recommended that the temperature of the part not exceed 125°C. De-rating is necessary for AC currents.
(3) Peak current for approximately 30% rolloff at 20°C.
(4) DCR limits @ 20°C.
(5) Applied Volt-Time product (V-uS) across the inductor at 100kHz necessary to generate a core loss equal to 10% of the total losses for 40°C temperature rise. De-rating of the Irms is required to prevent excessive temperature rise.

Part Number	Rated Inductance (µH)	OCL (1) +/-15% (µH)	Part Marking Designator	Irms (2) Amperes	Isat (3) Amperes	DCR (4) (Ω) Typ.	Volt (5) u-sec Typ.
SD3814-820-R	82.0	81.101	P	0.270	0.296	2.174	32
SD3814-101-R	100.0	98.794	Q	0.228	0.268	3.048	36
SD3814-151-R	150.0	149.026	R	0.191	0.219	4.359	44
SD3814-221-R	220.0	217.342	S	0.170	0.181	5.480	53
SD3814-331-R	330.0	326.812	T	0.136	0.148	8.59	65
SD3814-471-R	470.0	470.031	U	0.111	0.123	12.85	78
SD3814-681-R	680.0	680.320	V	0.100	0.102	15.78	94

(1) Test Parameters: 100KHz, 0.100Vrms, 0.0Adc.
(2) RMS current for an approximate ΔT of 40°C without core loss. It is recommended that the temperature of the part not exceed 125°C. De-rating is necessary for AC currents.
(3) Peak current for approximately 30% rolloff at 20°C.
(4) DCR limits @ 20°C.
(5) Applied Volt-Time product (V-uS) across the inductor at 100kHz necessary to generate a core loss equal to 10% of the total losses for 40°C temperature rise. De-rating of the Irms is required to prevent excessive temperature rise.

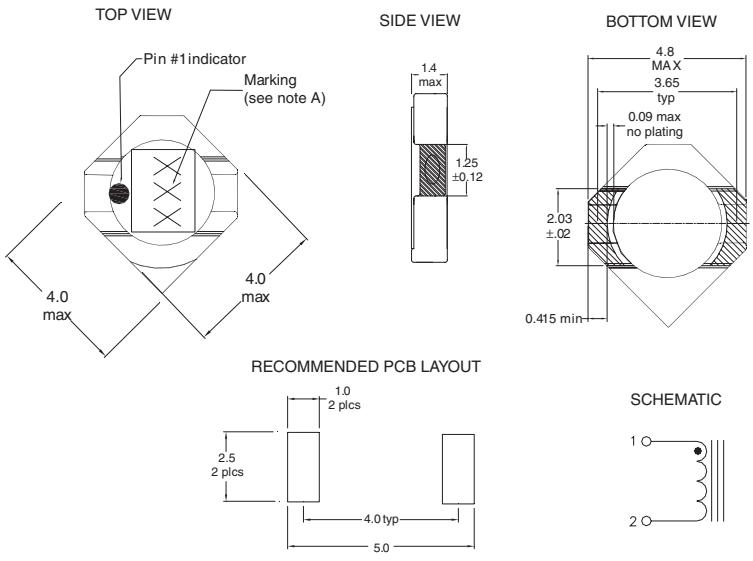
Mechanical Diagrams

SD3812 Series



Note A: 3 digit marking. First digit indicates inductance value per chart above.
Second digit indicates bi-weekly date code.
Third digit of year produced. Box indicates SD3814 part.

SD3814 Series

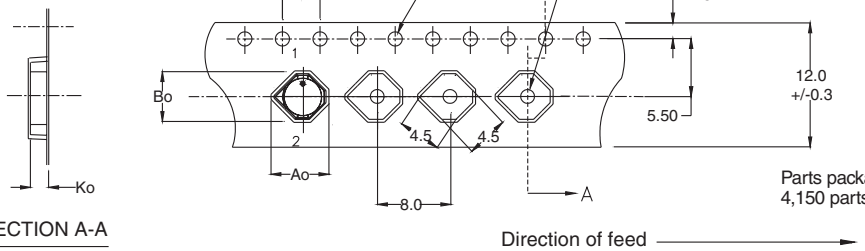


Note A: 3 digit marking. First digit indicates inductance value per chart above.
Second digit indicates bi-weekly date code.
Third digit of year produced. Box indicates SD3814 part.

Packaging Information

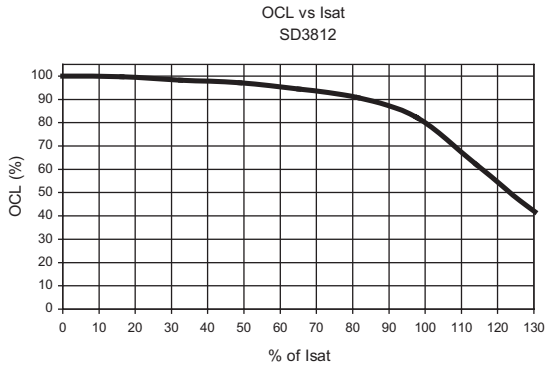
SD3812/SD3814 Series

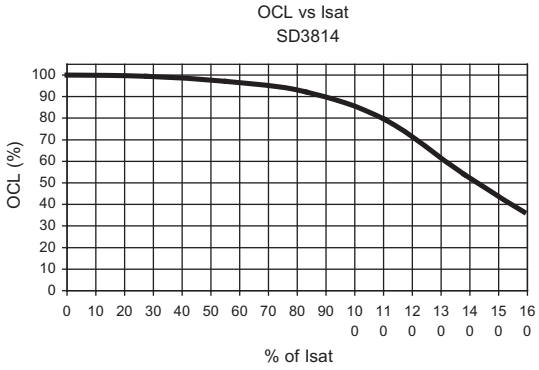
Ao=5.1mm
Bo=4.6mm
Ko=1.6mm



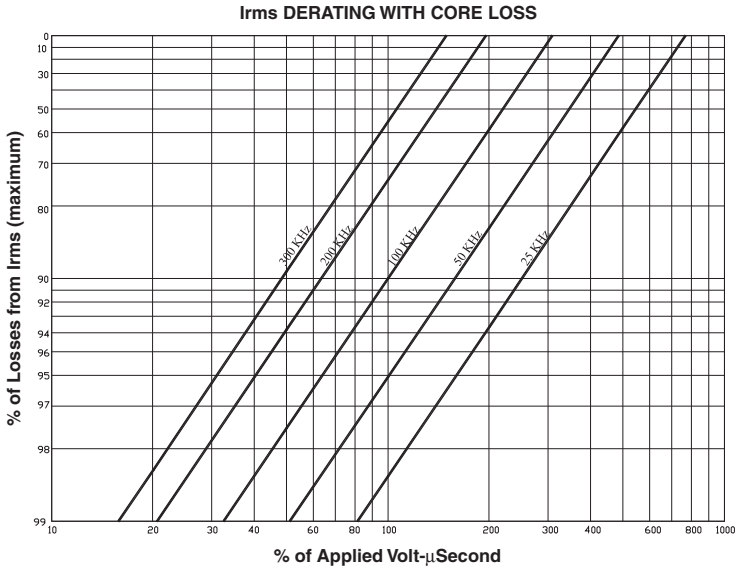
Parts packaged on 13" Diameter reel, 4,150 parts per reel.

Inductance Characteristics





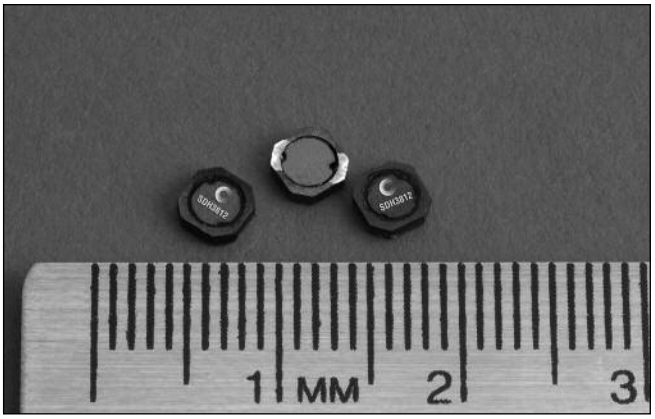
Core Loss



COOPER Bussmann

SDH3812 Series
Low Profile, High Power, Shielded Inductors

RoHS 2002/95/EC



Description

- 125°C maximum total temperature operation
- 3.8mm x 3.8mm x 1.2mm shielded drum core
- High power density, compact footprint
- Inductance range from 0.47uH to 220uH
- Current range from 4.2 Amps to 0.16 Amps
- Ferrite shielded, low EMI
- Ferrite core material

Applications

- Buck or Boost inductor
- Noise filtering output filter chokes
- LED photo flash
- Handheld devices
- Notebook and battery power
- Cellular phones / PDA's / GPS systems
- Digital cameras / MP3 players / IP phones

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

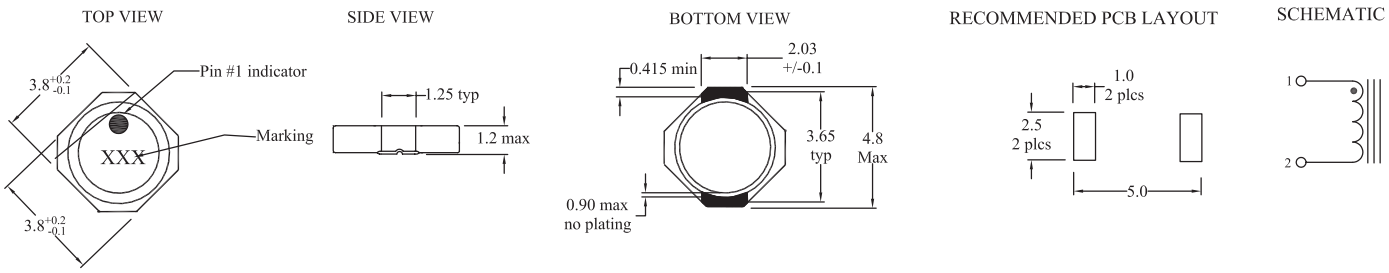
Packaging

- Supplied in tape and reel packaging, 4150 per reel

Part Number	Rated Inductance (µH)	OCL (1) µH ± 20%	Part Marking Designator	Irms (2) Amperes	Isat (3) Amperes	DCR Ω @20°C (Typical)	DCR Ω @20°C (Maximum)	K-factor (4)
SDH3812-R47-R	0.47	0.43	A	2.69	4.20	0.027	0.032	145.2
SDH3812-1R0-R	1.0	0.89	B	2.07	3.00	0.045	0.054	100.6
SDH3812-1R2-R	1.2	1.17	C	1.77	2.60	0.062	0.074	87.1
SDH3812-1R5-R	1.5	1.49	D	1.67	2.30	0.069	0.083	76.9
SDH3812-2R2-R	2.2	2.23	E	1.37	1.90	0.104	0.124	62.2
SDH3812-3R3-R	3.3	3.17	F	1.14	1.60	0.148	0.177	52.3
SDH3812-4R7-R	4.7	4.96	G	0.94	1.25	0.220	0.264	42.2
SDH3812-6R8-R	6.8	6.70	H	0.85	1.05	0.265	0.317	35.3
SDH3812-8R2-R	8.2	8.01	I	0.73	0.96	0.342	0.410	33.5
SDH3812-100-R	10.0	9.67	J	0.69	0.88	0.398	0.478	30.4
SDH3812-150-R	15.0	14.45	K	0.56	0.72	0.612	0.735	23.8
SDH3812-220-R	22.0	22.00	L	0.50	0.61	0.750	0.900	20.1
SDH3812-330-R	33.0	32.90	M	0.41	0.49	1.132	1.358	16.1
SDH3812-470-R	47.0	46.20	N	0.34	0.41	1.583	1.900	13.8
SDH3812-680-R	68.0	67.40	O	0.31	0.34	2.000	2.400	11.4
SDH3812-820-R	82.0	81.80	P	0.26	0.31	2.750	3.300	10.3
SDH3812-101-R	100.0	97.50	Q	0.25	0.28	3.042	3.650	9.4
SDH3812-151-R	150.0	149.00	R	0.20	0.22	4.542	5.450	7.6
SDH3812-221-R	220.0	218.50	S	0.16	0.19	7.017	8.420	6.3

(1) Open Circuit Inductance Test Parameters: 100kHz, 0.1V, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for 30% maximum rolloff (@25°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in uH), ΔI (Peak to peak ripple current in Amps).
(5) Part Number Definition: SDH3812-xxx-R
SDH3812 = Product code and size; -xxx = Inductance value in uH;
R = decimal point; If no R is present, third character = # of zeros.
-R suffix = RoHS compliant

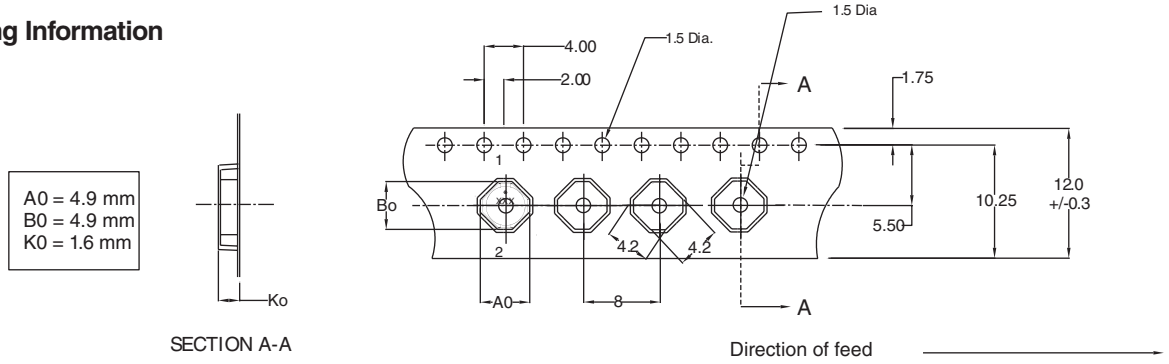
Mechanical Diagrams



Dimensions are in millimeters.

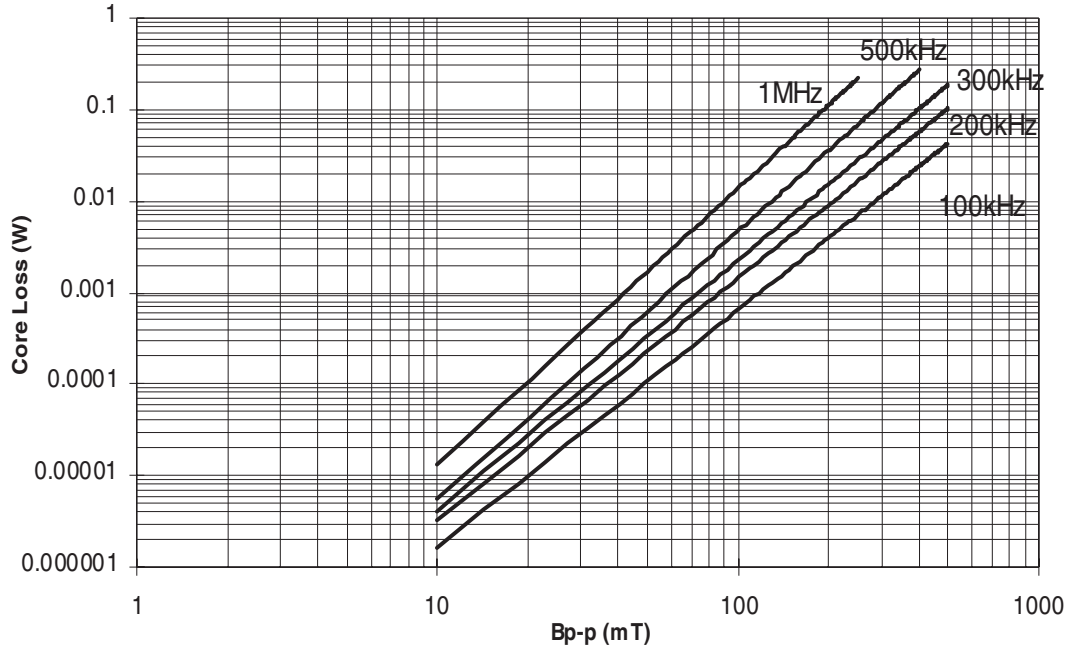
Part Marking:
3 Digit Marking: (1st digit: Indicates inductance value per Part Marking Designator in chart above); (2nd digit: Bi-weekly production date code); (3rd digit: Last digit of the year produced).

Packaging Information

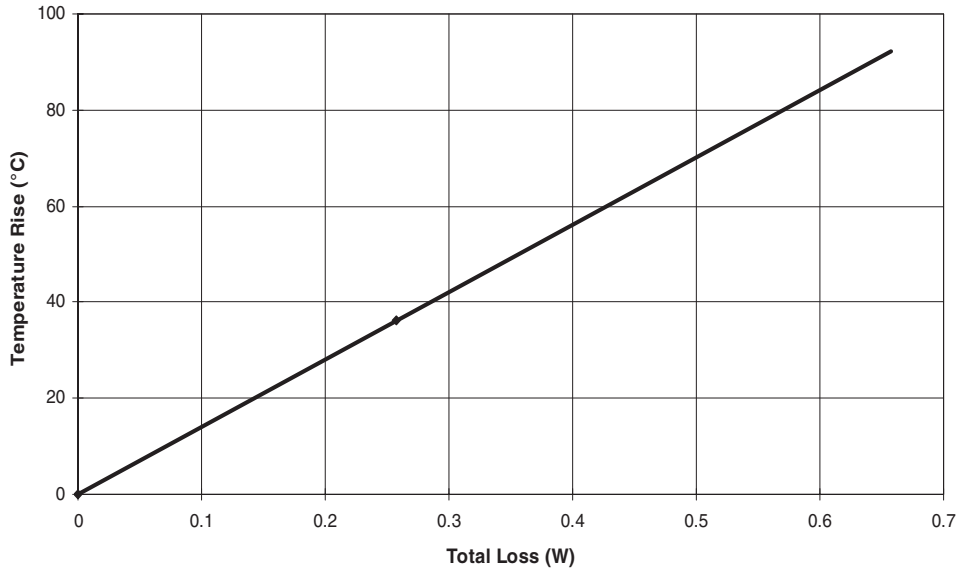


Parts packaged on 13" Diameter reel,
4,150 parts per reel.

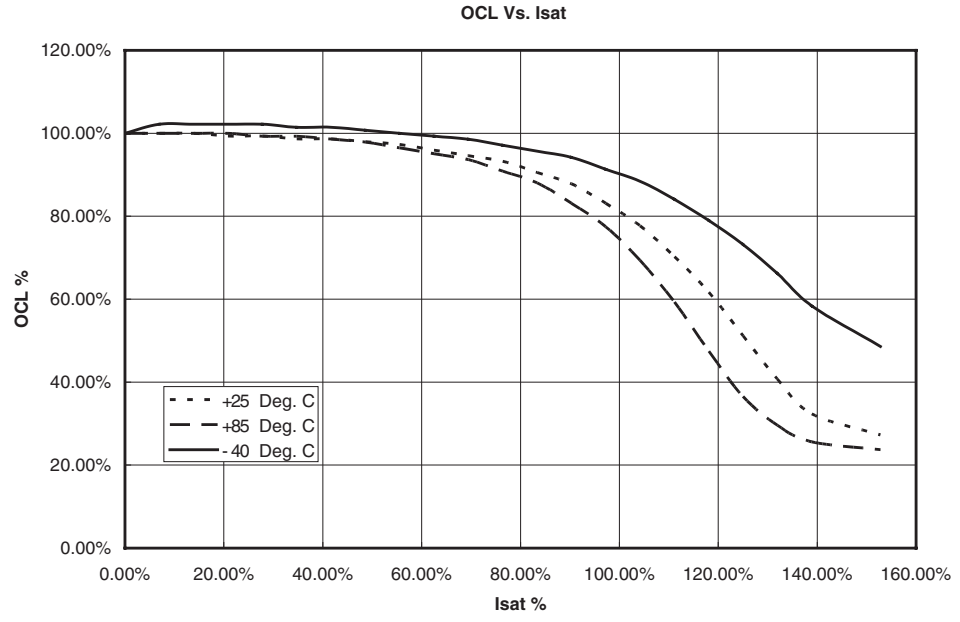
Core Loss



Temperature Rise vs. Loss



Inductance Characteristics



COOPER Bussmann

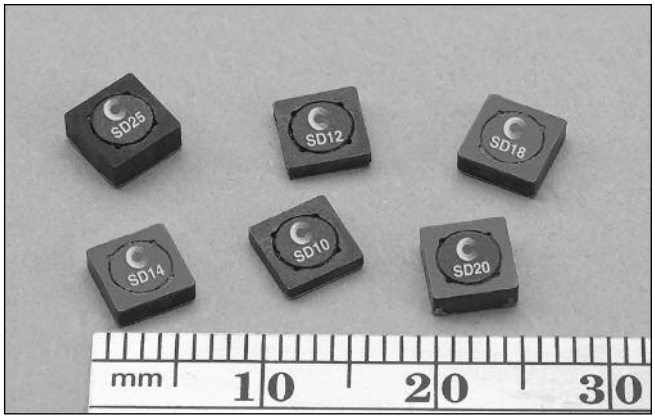
COILTRONICS

SD Series
High Power Density, Low Profile, Shielded Inductors

Description

RoHS 2002/95/EC

- Six sizes of shielded drum core inductors with low profiles (as low as 1.0mm) and high power density
- Inductance range from .47uH to 1000uH
- Current range from 6.00 to 0.088 Amps
- Ferrite shielded, low EMI
- Ferrite core material



Applications

- Digital cameras, CD players, cellular phones, and PDAs
- PCMCIA cards
- GPS systems

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +85°C (range is application specific). Temperature rise is approximately 40°C at rated rms current
- Solder reflow temperature: +260°C max. for 10 seconds max.

Packaging

- Supplied in tape and reel packaging, 3800 (SD10, SD12, SD14 and SD18), 2900 (SD20 and SD25) per reel

Part Number	Rated Inductance (µH)	OCL (1) +/-20% (µH)	Part Marking	Irms (2) Amperes	Isat (3) Amperes	DCR (4) (Ω) Typ.	Volt u-sec Typ.
SD10-R47-R	0.470	0.453	A	2.59	3.54	0.0249	2.1
SD10-1R0-R	1.00	1.119	B	1.93	2.25	0.0448	3.3
SD10-1R5-R	1.50	1.563	C	1.60	1.91	0.0653	3.9
SD10-2R2-R	2.20	2.081	D	1.35	1.65	0.0912	4.5
SD10-3R3-R	3.30	3.339	E	1.24	1.31	0.1078	5.7
SD10-4R7-R	4.70	4.893	F	1.04	1.08	0.1535	6.9
SD10-6R2-R	6.20	6.743	G	0.94	0.92	0.218	8.1
SD10-8R2-R	8.20	8.889	H	0.800	0.800	0.2607	9.3
SD10-100-R	10.0	10.07	J	0.760	0.752	0.336	9.9
SD10-150-R	15.0	15.55	K	0.613	0.605	0.4429	12.3
SD10-220-R	22.0	22.21	L	0.498	0.506	0.6718	14.7
SD10-330-R	33.0	32.20	M	0.412	0.420	0.9807	17.7
SD10-470-R	47.0	46.63	N	0.337	0.349	1.47	21.3
SD10-680-R	68.0	70.01	O	0.301	0.285	1.84	26.1
SD10-820-R	82.0	83.48	P	0.258	0.261	2.50	28.5
SD10-101-R	100	102.0	Q	0.225	0.236	3.29	31.5
SD10-151-R	150	149.2	R	0.200	0.195	4.15	38.1
SD10-221-R	220	222.2	S	0.161	0.160	6.41	46.5
SD10-331-R	330	330.4	T	0.130	0.131	9.83	56.7
SD10-471-R	470	468.3	U	0.117	0.110	12.10	67.5
SD12-R47-R	0.470	0.490	A	3.19	3.86	0.0246	2.84
SD12-1R2-R	1.20	1.21	B	2.62	2.45	0.0366	4.47
SD12-1R5-R	1.50	1.69	C	2.19	2.08	0.0521	5.28
SD12-2R2-R	2.20	2.25	D	1.83	1.80	0.0747	6.09
SD12-3R3-R	3.30	3.61	E	1.55	1.42	0.1043	7.71
SD12-4R7-R	4.70	4.41	F	1.46	1.29	0.1177	8.53
SD12-6R2-R	6.20	6.25	G	1.21	1.08	0.1699	10.15
SD12-8R2-R	8.20	8.41	H	1.02	0.931	0.2399	11.77
SD12-100-R	10.0	10.89	J	0.938	0.818	0.2844	13.40
SD12-150-R	15.0	15.21	K	0.782	0.692	0.4089	15.83
SD12-220-R	22.0	22.09	L	0.628	0.574	0.6338	19.08
SD12-330-R	33.0	32.49	M	0.519	0.474	0.9289	23.14
SD12-470-R	47.0	47.61	N	0.428	0.391	1.37	28.01
SD12-680-R	68.0	68.89	O	0.341	0.325	2.16	33.70

(1) Open Circuit Inductance Test Parameters: 100KHz, 0.25Vrms, 0.0Adc.
(2) RMS current for an approximate ΔT of 40°C without core loss. It is recommended that the temperature of the part not exceed 125°C.
(3) SD10,12,18,25 Peak current for approximate 30% roll off at 20°C.
SD14 Peak current for approximate 20% roll off at 20°C.
(4) DCR limits @ 20°C.
5) Applied Volt-Time product (V-uS) across the inductor at 100kHz necessary to generate a core loss equal to 10% of the total losses for 40°C temperature rise.

Part Number	Rated Inductance (µH)	OCL (1) +/-20% (µH)	Part Marking	Irms (2) Amperes	Isat (3) Amperes	DCR (4) (Ω) Typ.	Volt u-sec Typ.
SD12-820-R	82.0	82.81	P	0.326	0.297	2.36	36.95
SD12-101-R	100	98.0	Q	0.308	0.273	2.64	40.19
SD12-151-R	150	151.3	R	0.251	0.220	3.96	49.94
SD12-221-R	220	222.0	S	0.229	0.181	4.76	60.49
SD12-331-R	330	334.9	T	0.186	0.148	7.25	74.30
SD12-471-R	470	462.3	U	0.167	0.126	8.95	87.29
SD12-681-R	680	670.8	V	0.149	0.104	11.30	105
SD12-821-R	820	800.9	W	0.129	0.095	14.93	115
SD12-102-R	1000	992.3	X	0.121	0.086	17.20	128
SD14-R58-R	0.58	0.61	A	3.52	4.84	0.0220	3.38
SD14-R87-R	0.87	0.88	B	3.2	3.96	0.0243	4.13
SD14-1R2-R	1.2	1.23	C	2.7	3.35	0.0344	4.88
SD14-1R5-R	1.5	1.63	D	2.53	2.91	0.0390	5.63
SD14-2R0-R	2	2.09	E	2.37	2.56	0.0445	6.38
SD14-2R5-R	2.5	2.62	F	2.05	2.29	0.0595	7.1
SD14-3R2-R	3.2	3.19	G	1.94	2.08	0.0663	7.9
SD14-4R5-R	4.5	4.53	H	1.64	1.74	0.0935	9.4
SD14-6R9-R	6.9	6.98	J	1.35	1.41	0.1363	11.6
SD14-8R8-R	8.8	8.88	K	1.14	1.25	0.1913	13.1
SD14-100-R	10	9.93	L	1.1	1.18	0.2058	13.9
SD14-150-R	15	14.68	M	0.98	0.969	0.2609	16.9
SD14-220-R	22	21.93	N	0.806	0.793	0.3853	20.6
SD14-330-R	33	32.55	O	0.654	0.651	0.5852	25.1
SD14-470-R	47	47.57	P	0.525	0.538	0.9055	30.4
SD14-680-R	68	68.21	Q	0.474	0.449	1.11	36
SD14-820-R	82	83	R	0.408	0.407	1.50	40
SD14-101-R	100	99.25	S	0.386	0.373	1.68	44
SD14-151-R	150	152.4	T	0.315	0.301	2.52	54
SD14-221-R	220	222	U	0.258	0.249	3.77	66
SD14-331-R	330	335.1	V	0.206	0.203	5.92	81
SD14-471-R	470	471.4	W	0.173	0.171	8.34	96
SD14-681-R	680	683.3	X	0.156	0.142	10.3	115
SD14-821-R	820	823.4	Y	0.134	0.129	13.9	126
SD14-102-R	1000	1008	Z	0.126	0.117	15.8	140
SD18-R47-R	0.47	0.49	A	3.58	4.63	0.0201	2.35
SD18-R82-R	0.82	0.81	B	3.24	3.60	0.0247	3.02
SD18-1R2-R	1.20	1.21	C	2.97	2.95	0.0294	3.70
SD18-1R5-R	1.50	1.69	D	2.73	2.49	0.0345	4.37
SD18-2R2-R	2.20	2.25	E	2.55	2.16	0.0398	5.04
SD18-3R3-R	3.30	3.61	F	2.07	1.71	0.0605	6.38
SD18-4R7-R	4.70	4.41	G	1.77	1.54	0.0824	7.06
SD18-6R2-R	6.20	6.25	H	1.61	1.30	0.1000	8.40
SD18-8R2-R	8.20	8.41	J	1.38	1.12	0.1351	9.74
SD18-100-R	10.0	10.89	K	1.28	0.982	0.1584	11.09
SD18-150-R	15.0	15.21	L	1.06	0.831	0.2278	13.10
SD18-220-R	22.0	22.09	M	0.876	0.689	0.3366	15.79
SD18-330-R	33.0	32.49	N	0.715	0.568	0.5057	19.15
SD18-470-R	47.0	47.61	O	0.578	0.470	0.7732	23.18
SD18-680-R	68.0	68.89	P	0.514	0.390	0.9798	27.89
SD18-820-R	82.0	82.81	Q	0.446	0.356	1.30	30.58
SD18-101-R	100	102.01	R	0.419	0.321	1.47	33.94
SD18-151-R	150	151.29	S	0.345	0.263	2.18	41.33
SD18-221-R	220	222.01	T	0.296	0.217	2.95	50.06
SD18-331-R	330	334.89	U	0.248	0.177	4.20	61.49
SD18-471-R	470	479.61	V	0.201	0.148	6.39	73.58
SD18-681-R	680	681.21	W	0.167	0.124	9.28	87.70
SD18-821-R	820	823.69	X	0.145	0.113	12.35	96.43
SD18-102-R	1000	1004	Y	0.136	0.102	14.01	107

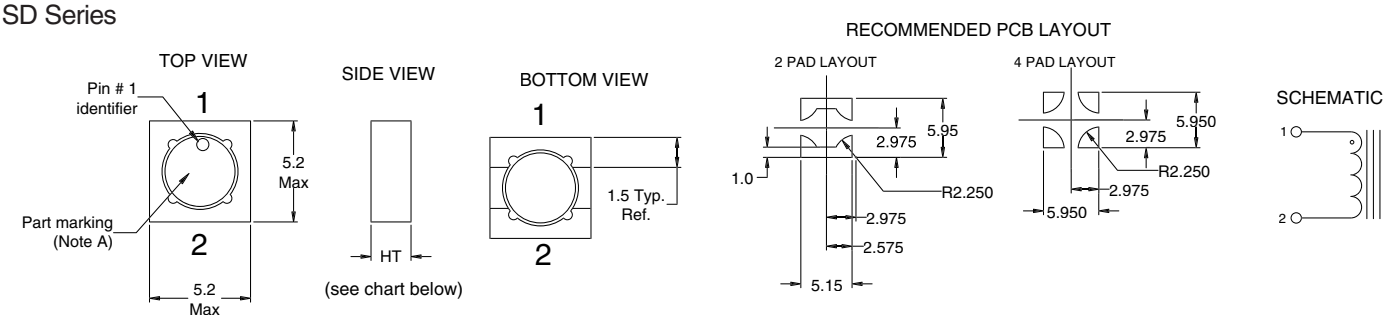
(1) Open Circuit Inductance Test Parameters: 100KHz, 0.25Vrms, 0.0Adc.
(2) RMS current for an approximate ΔT of 40°C without core loss. It is recommended that the temperature of the part not exceed 125°C.
(3) SD10,12,18,25 Peak current for approximate 30% roll off at 20°C.
SD14 Peak current for approximate 20% roll off at 20°C.
(4) DCR limits @ 20°C.
5) Applied Volt-Time product (V-uS) across the inductor at 100kHz necessary to generate a core loss equal to 10% of the total losses for 40°C temperature rise.

Part Number	Rated Inductance (µH)	OCL (1) +/-20% (µH)	Part Marking	Irms (2) Amperes	Isat (3) Amperes	DCR (4) (Ω) Typ.	Volt u-sec Typ.
SD20-R47-R	0.47	0.490	A	3.59	4.00	0.0200	2.28
SD20-1R2-R	1.20	1.21	B	3.07	2.55	0.0275	3.58
SD20-1R5-R	1.50	1.69	C	2.88	2.15	0.0312	4.23
SD20-2R2-R	2.20	2.25	D	2.45	1.87	0.0429	4.88
SD20-3R3-R	3.30	3.61	E	2.17	1.47	0.0547	6.18
SD20-4R7-R	4.70	4.41	F	2.05	1.33	0.0612	6.83
SD20-6R2-R	6.20	6.25	G	1.89	1.12	0.0720	8.13
SD20-8R2-R	8.20	8.41	H	1.61	0.966	0.1000	9.43
SD20-100-R	10.0	9.61	J	1.53	0.903	0.1100	10.08
SD20-150-R	15.0	15.21	K	1.25	0.718	0.1655	12.68
SD20-220-R	22.0	22.09	L	1.12	0.596	0.2053	15.28
SD20-330-R	33.0	32.49	M	0.913	0.491	0.3100	18.53
SD20-470-R	47.0	47.61	N	0.745	0.406	0.4650	22.43
SD20-680-R	68.0	68.89	O	0.610	0.337	0.6947	26.98
SD20-820-R	82.0	82.81	P	0.576	0.308	0.7785	29.58
SD20-101-R	100	98.01	Q	0.495	0.283	1.06	32.18
SD20-151-R	150	151.3	R	0.435	0.228	1.37	39.98
SD20-221-R	220	222.0	S	0.356	0.188	2.04	48.43
SD20-331-R	330	327.6	T	0.294	0.155	2.99	58.83
SD20-471-R	470	470.9	U	0.263	0.129	3.74	70.53
SD20-681-R	680	681.2	V	0.216	0.107	5.56	84.83
SD20-821-R	820	823.7	W	0.204	0.098	6.22	93.28
SD20-102-R	1000	1004.9	X	0.172	0.088	8.73	103
SD25-R47-R	0.47	0.466	A	3.88	6.00	0.0177	2.13
SD25-R82-R	0.82	0.770	B	3.58	4.67	0.0208	2.74
SD25-1R2-R	1.20	1.15	C	3.33	3.81	0.0240	3.34
SD25-1R5-R	1.50	1.61	D	3.12	3.23	0.0274	3.95
SD25-2R2-R	2.20	2.14	E	2.93	2.80	0.0311	4.56
SD25-3R3-R	3.30	3.43	F	2.64	2.21	0.0384	5.78
SD25-4R7-R	4.70	5.03	G	2.39	1.83	0.0467	6.99
SD25-6R8-R	6.80	6.93	H	2.19	1.56	0.0556	8.21
SD25-8R2-R	8.20	7.99	J	1.92	1.45	0.0724	8.82
SD25-100-R	10.0	10.35	K	1.80	1.27	0.0824	10.03
SD25-150-R	15.0	14.45	L	1.67	1.08	0.0956	11.86
SD25-220-R	22.0	22.81	M	1.34	0.857	0.1478	14.90
SD25-330-R	33.0	33.07	N	1.11	0.711	0.2149	17.94
SD25-470-R	47.0	47.89	O	0.919	0.592	0.3156	21.58
SD25-680-R	68.0	68.64	P	0.741	0.482	0.4850	25.84
SD25-820-R	82.0	82.17	Q	0.713	0.441	0.5242	28.27
SD25-101-R	100	100.79	R	0.670	0.398	0.5937	31.31
SD25-151-R	150	148.4	S	0.553	0.328	0.8723	38.00
SD25-221-R	220	222.4	T	0.446	0.268	1.34	46.51
SD25-331-R	330	332.2	U	0.359	0.219	2.07	56.85
SD25-471-R	470	472.4	V	0.293	0.184	3.10	67.79
SD25-681-R	680	677.2	W	0.262	0.154	3.88	81.17
SD25-821-R	820	826.7	X	0.230	0.139	5.04	89.68
SD25-102-R	1000	1003.4	Y	0.216	0.126	5.70	98.80

(1) Open Circuit Inductance Test Parameters: 100KHz, 0.25Vrms, 0.0Adc.
(2) RMS current for an approximate ΔT of 40°C without core loss. It is recommended that the temperature of the part not exceed 125°C.
(3) SD10,12,18,25 Peak current for approximate 30% roll off at 20°C.
SD14 Peak current for approximate 20% roll off at 20°C.
(4) DCR limits @ 20°C.
5) Applied Volt-Time product (V-uS) across the inductor at 100kHz necessary to generate a core loss equal to 10% of the total losses for 40°C temperature rise.

Mechanical Diagrams

SD Series

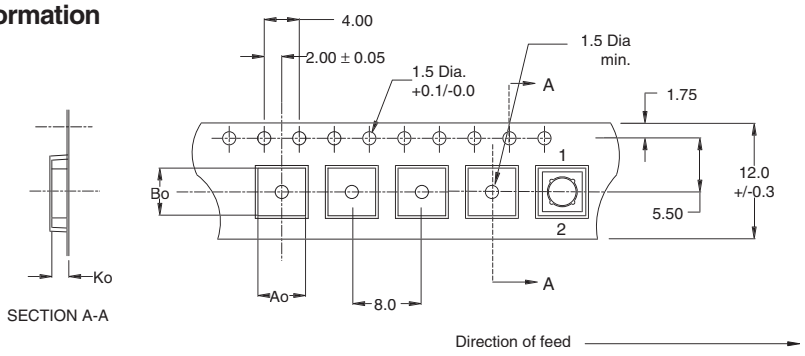


Series	HT
SD10	1.0mm max
SD12	1.2mm max
SD14	1.45mm max
SD18	1.8mm max
SD20	2.0mm max
SD25	2.5mm max

A) Part Marking: Line 1: (1st digit indicates the inductance value per part marking designator in chart above)
(2nd digit is a bi-weekly production date code)
(3rd digit is the last digit of the year produced)
Line 2: XX (indicates the product size code)

Packaging Information

SD10 Series

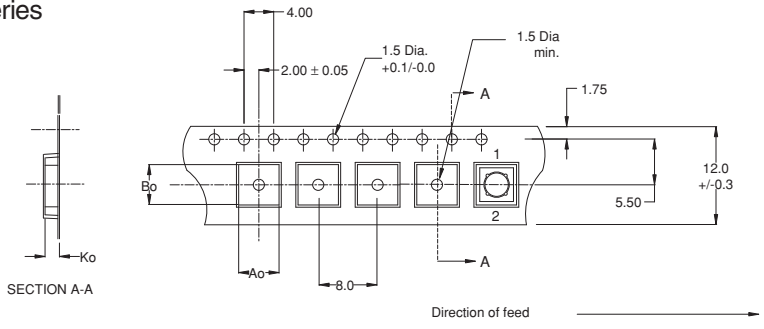


Ao=5.45mm
Bo=5.45mm
Ko=1.20mm

ACTUAL SIZE
SD10

Parts packaged on 13" Diameter reel, 3,800 parts per reel.

SD12/14/18 Series



Ao=5.45mm
Bo=5.45mm
Ko=2.00mm

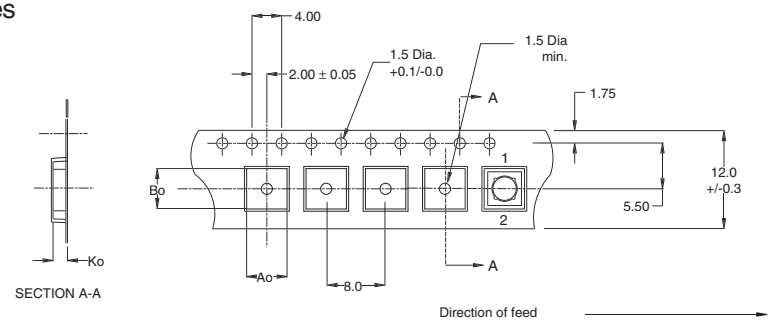
ACTUAL SIZE
SD12

ACTUAL SIZE
SD14

ACTUAL SIZE
SD18

Parts packaged on 13" Diameter reel, 3,800 parts per reel.

SD20/25 Series



Ao=5.45mm
Bo=5.45mm
Ko=2.70mm

ACTUAL SIZE
SD20

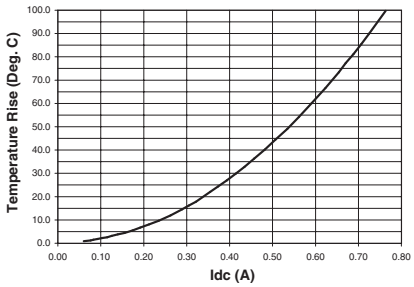
ACTUAL SIZE
SD25

Parts packaged on 13" Diameter reel, 2,900 parts per reel.

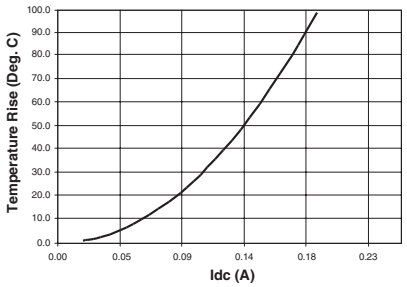
Dimensions are in millimeters.

DC Current vs. Temperature

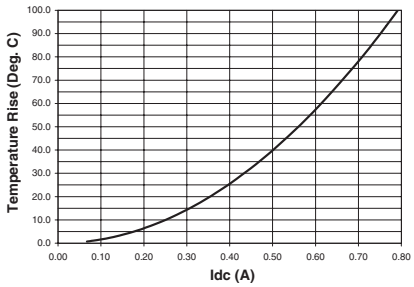
SD10-220



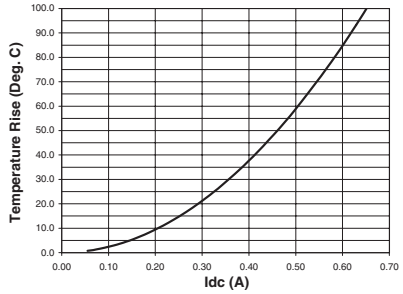
SD10-471



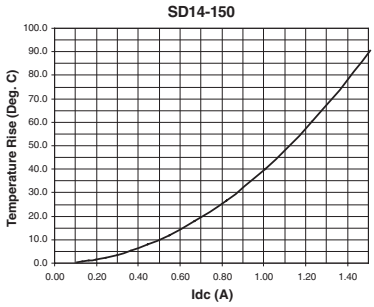
SD12-330



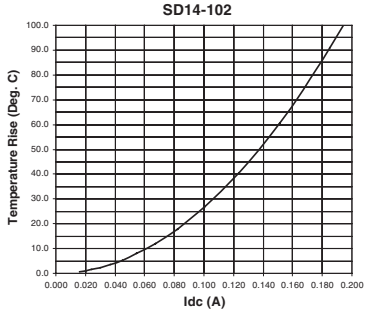
SD12-470



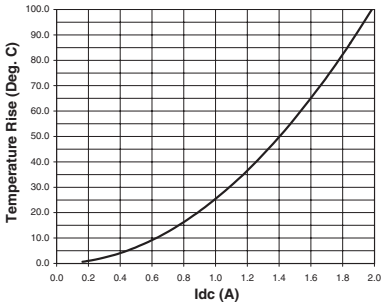
SD14-150



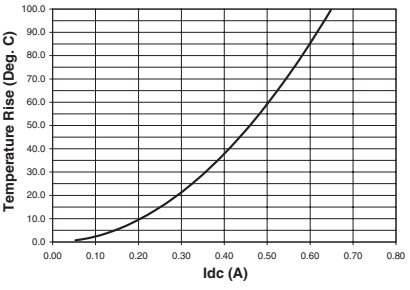
SD14-102



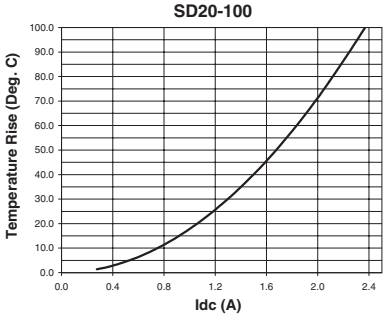
SD18-100



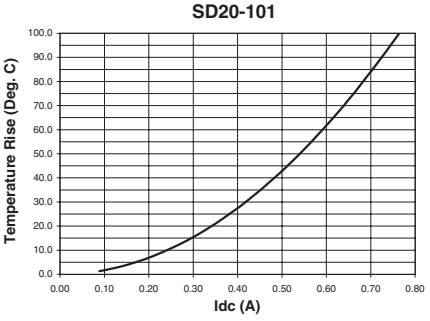
SD18-101



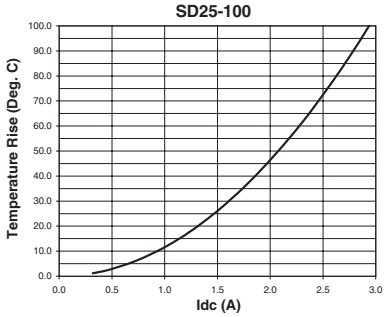
SD20-100

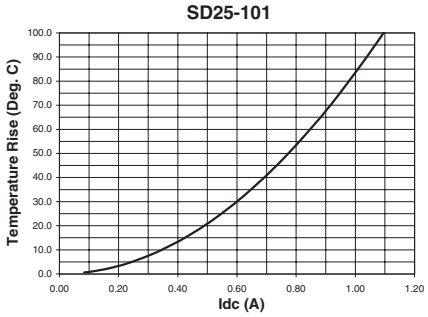


SD20-101

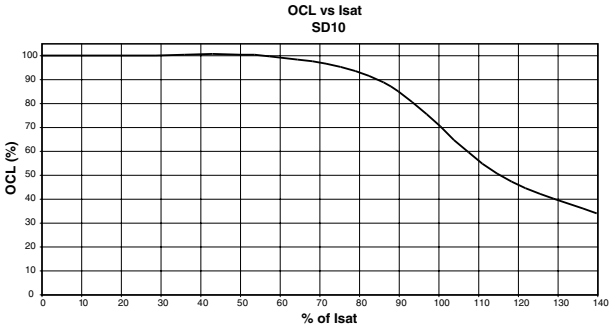


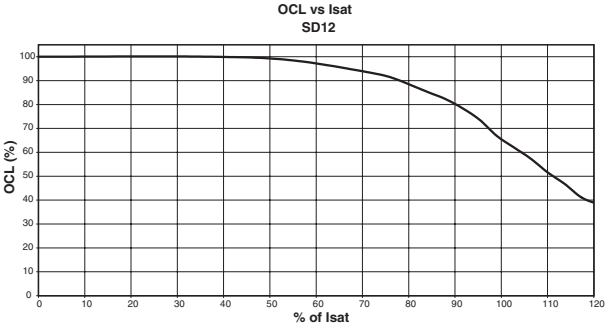
DC Current vs. Temperature

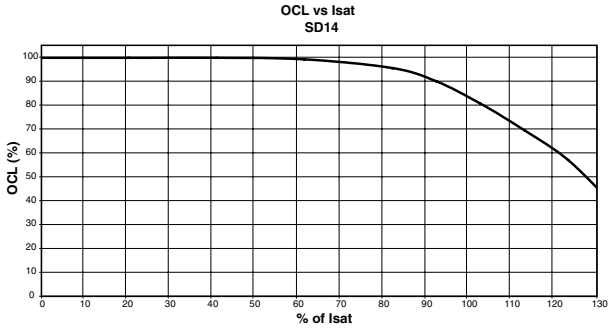


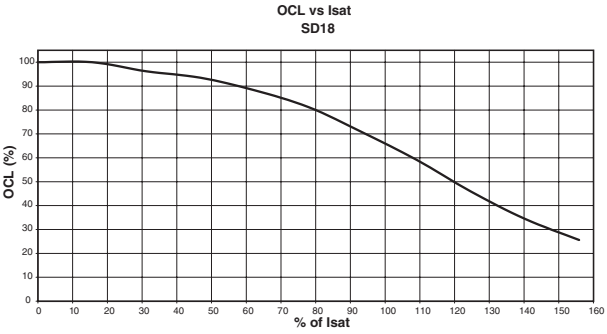


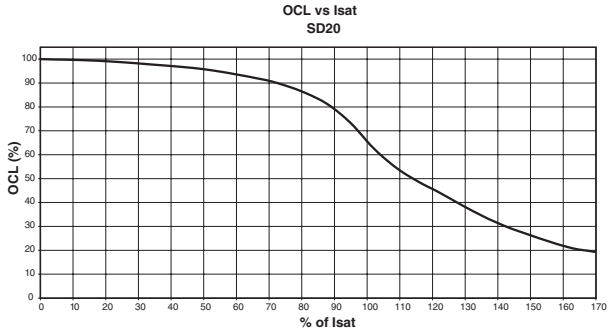
Inductance Characteristics

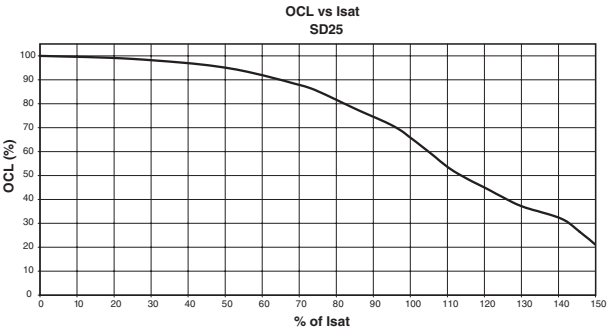




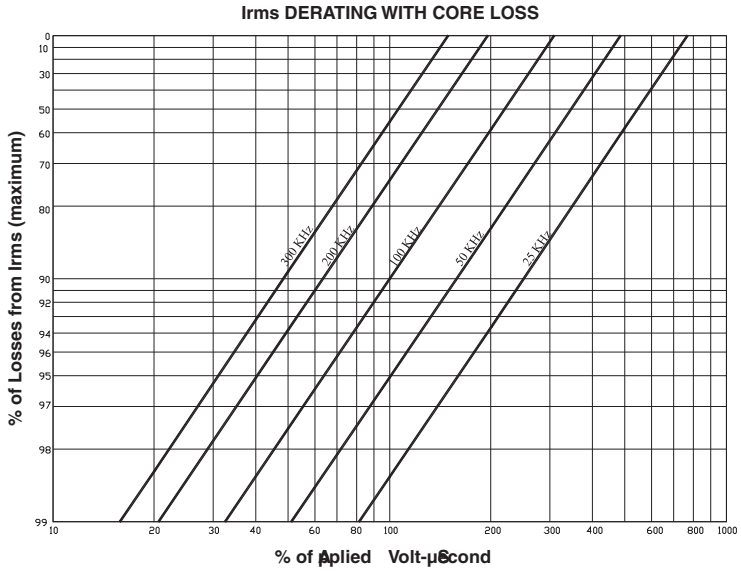








Core Loss


Irms DERATING WITH CORE LOSS
% of Losses from Irms (maximum)
0
10
30
50
60
70
80
90
92
94
96
95
97
98
99
300 KHz
200 KHz
100 KHz
50 KHz
25 KHz
10
20
30
40
60
80
100
200
300
400
600
800
1000
% of Applied Volt-µSecond

COOPER Bussmann

COILTRONICS

SDQ Series
Low Profile Dual Winding Shielded Inductor/Transformer

Description

RoHS 2002/95/EC

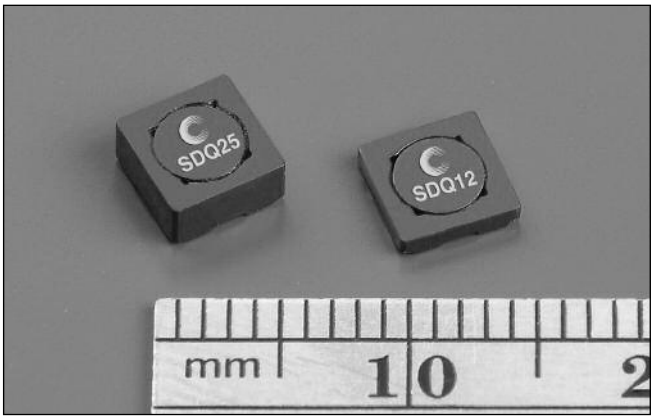
- Dual winding inductors that can be used as either a single inductor, or in coupled inductor/transformer applications (1:1 turns ratio)
- Windings can be connected in series or parallel, offering a broad range of inductance and current ratings
- Current Range from 6.43 to 0.063 Amps
- Inductance range from 0.47µH to 4.03mH
- Ferrite shielded, low EMI
- Ferrite core material

Applications

- As a transformer: SEPIC, flyback
- As an inductor: Buck, boost, coupled inductor
- Digital cameras, CD players, cellular phones, and PDA's
- PCMCIA cards
- GPS systems

Environmental Data

- Storage temperature: -40°C to +125°C
- Operating temperature: -40°C to +85°C (Range is application specific). Temperature rise is approximately 40°C at rated rms current.
- Solder reflow temperature: 260°C max. for 10 seconds max.



Packaging

- Supplied in tape and reel packaging, SDQ12 (3,800, SDQ25 (2,900) parts per reel

			Parallel Ratings					Series Ratings				
Part Number	Rated Inductance (µH)	Part Marking	OCL (1) +/-20% (µH)	I rms (2) Amperes	I sat (3) Amperes	DCR Ω (4) typ.	Volt (5) µ-Sec typ.	OCL (1) +/-20% (µH)	I rms (2) Amperes	I sat (3) Amperes	DCR Ω (4) typ.	Volt (5) µ-Sec typ.
SDQ12-R47-R	0.47	A	0.49	2.78	4.34	0.0325	2.45	1.96	1.39	2.17	0.1298	4.90
SDQ12-1R0-R	1	B	0.81	2.49	3.38	0.0403	3.15	3.24	1.25	1.69	0.1611	6.30
SDQ12-1R5-R	1.5	C	1.69	1.69	2.34	0.0870	4.55	6.76	0.847	1.17	0.3481	9.10
SDQ12-2R2-R	2.2	D	2.25	1.60	2.03	0.0977	5.25	9.00	0.800	1.01	0.3908	10.5
SDQ12-3R3-R	3.3	E	3.61	1.28	1.60	0.1527	6.65	14.44	0.640	0.800	0.6106	13.3
SDQ12-4R7-R	4.7	F	4.41	1.12	1.45	0.1990	7.35	17.64	0.560	0.724	0.7959	14.7
SDQ12-6R2-R	6.2	G	6.25	1.02	1.22	0.2387	8.75	25.00	0.512	0.608	0.9548	17.5
SDQ12-8R2-R	8.2	H	8.41	0.868	1.05	0.3318	10.15	33.64	0.434	0.524	1.33	20.3
SDQ12-100-R	10	J	9.61	0.831	0.981	0.3620	10.85	38.44	0.416	0.490	1.45	21.7
SDQ12-150-R	15	K	15.21	0.658	0.779	0.5766	13.65	60.84	0.329	0.390	2.31	27.3
SDQ12-220-R	22	L	22.09	0.548	0.647	0.8332	16.45	88.36	0.274	0.323	3.33	32.9
SDQ12-330-R	33	M	32.49	0.439	0.533	1.29	19.95	130.0	0.220	0.267	5.18	39.9
SDQ12-470-R	47	N	47.61	0.401	0.441	1.55	24.15	190.4	0.201	0.220	6.21	48.3
SDQ12-680-R	68	O	68.89	0.326	0.366	2.36	29.05	275.6	0.163	0.183	9.43	58.1
SDQ12-820-R	82	P	82.81	0.309	0.334	2.62	31.85	331.2	0.154	0.167	10.49	63.7

1) Test Parameters: 100kHz,.0.25 Vrms 0.0Adc
2) Rms current for approximately ΔT of 40°C without core loss. It is recommended that the temperature of the part not to exceed 125°C. De-rating is necessary for AC currents
3) Peak current for approximately 30% rolloff @20°C
4) DCR limits @20°C
5) Applied Volt-Time product (V-µS) across the inductor at 100kHz necessary to generate a core loss equal to 10% of the total losses for a 40°C temperature rise. De-rating of the Irms is required to prevent excessive temperature rise.

Part number definition:
First 3 characters = Product code and size.
Last 3 characters = Inductance in uH. R = Decimal point. If no R is present, third character = # of zeros.

SDQ12-XXX-R
SDQ12 = Product code and Size
XXX = Inductance in uH, R = Decimal point
If no R is present, third character = # of zeros.
-R suffix indicated RoHS compliant

COOPER Bussmann

COILTRONICS

SDQ Series
Low Profile Dual Winding
Shielded Inductor/Transformer

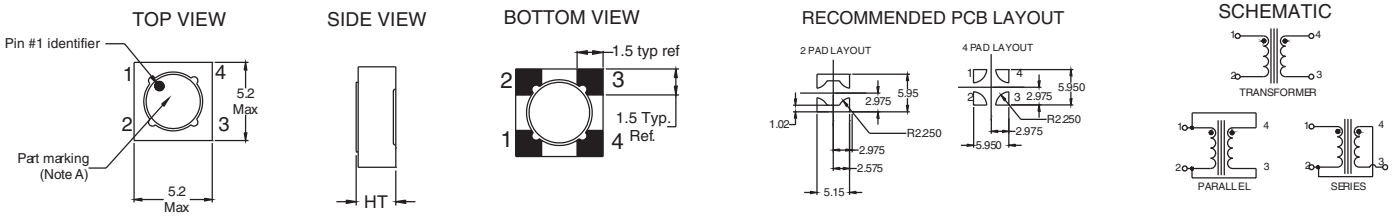
			Parallel Ratings					Series Ratings				
Part Number	**Rated Inductance (µH)**	**Part Marking**	**OCL (1) +/-20% (µH)**	**I rms (2) Amperes**	**I sat (3) Amperes**	**DCR Ω (4) typ.**	**Volt (5) µ-Sec typ.**	**OCL (1) +/-20% (µH)**	**I rms (2) Amperes**	**I sat (3) Amperes**	**DCR Ω (4) typ.**	**Volt (5) µ-Sec typ.**
SDQ25-R47-R	0.47	A	0.392	3.71	6.43	0.0181	2.31	1.57	1.86	3.21	0.0725	4.62
SDQ25-R82-R	0.82	B	0.648	3.37	5.00	0.0221	2.97	2.59	1.68	2.50	0.0883	5.94
SDQ25-1R0-R	1	C	0.97	3.15	4.09	0.0252	3.63	3.87	1.58	2.05	0.1007	7.26
SDQ25-1R5-R	1.5	D	1.35	2.97	3.46	0.0283	4.29	5.41	1.49	1.73	0.1130	8.58
SDQ25-2R2-R	2.2	E	2.31	2.67	2.65	0.0351	5.61	9.25	1.34	1.32	0.1402	11.2
SDQ25-3R3-R	3.3	F	2.89	2.50	2.37	0.0399	6.27	11.55	1.25	1.18	0.1595	12.5
SDQ25-4R7-R	4.7	G	5	1.96	1.80	0.0653	8.25	20.00	0.98	0.900	0.2612	16.5
SDQ25-6R8-R	6.8	H	6.73	1.84	1.55	0.0741	9.57	26.91	0.918	0.776	0.2964	19.1
SDQ25-8R2-R	8.2	J	8.71	1.57	1.36	0.1015	10.9	34.85	0.785	0.682	0.4059	21.8
SDQ25-100-R	10	K	9.8	1.53	1.29	0.1068	11.6	39.20	0.765	0.643	0.4273	23.1
SDQ25-150-R	15	L	14.79	1.24	1.05	0.1632	14.2	59.17	0.619	0.523	0.6526	28.4
SDQ25-220-R	22	M	22.47	1.01	0.849	0.2431	17.5	89.89	0.507	0.425	0.9724	35.0
SDQ25-330-R	33	N	33.8	0.812	0.692	0.3795	21.5	135.2	0.406	0.346	1.52	42.9
SDQ25-470-R	47	O	47.43	0.749	0.584	0.4461	25.4	189.7	0.374	0.292	1.78	50.8
SDQ25-680-R	68	P	69.19	0.603	0.484	0.6865	30.7	276.8	0.302	0.242	2.75	61.4
SDQ25-820-R	82	Q	81.61	0.580	0.446	0.7435	33.3	326.4	0.290	0.223	2.97	66.7
SDQ25-101-R	100	R	98.57	0.499	0.405	1.00	36.6	394.3	0.249	0.203	4.02	73.3
SDQ25-151-R	150	S	150.2	0.408	0.328	1.50	45.2	600.6	0.204	0.164	6.00	90.4
SDQ25-221-R	220	T	223.1	0.326	0.269	2.36	55.1	892.4	0.163	0.135	9.42	110
SDQ25-331-R	330	U	329.7	0.292	0.222	2.93	67.0	1318.7	0.146	0.111	11.71	134
SDQ25-471-R	470	V	472.4	0.243	0.185	4.25	80.2	1889.6	0.121	0.093	16.99	160
SDQ25-681-R	680	W	677.4	0.197	0.155	6.45	96.0	2709.8	0.098	0.077	25.78	192
SDQ25-821-R	820	X	824.3	0.186	0.140	7.25	106	3297.3	0.093	0.070	28.99	212
SDQ25-102-R	1000	Y	1008.2	0.160	0.127	9.82	117	4032.8	0.080	0.063	39.26	234

1) Test Parameters: 100kHz,.0.25 Vrms 0.0Adc
2) Rms current for approximately ΔT of 40°C without core loss. It is recommended that the temperature of the part not to exceed 125°C. De-rating is necessary for AC currents
3) Peak current for approximately 30% rolloff @20°C
4) DCR limits @20°C
5) Applied Volt-Time product (V-µS) across the inductor at 100kHz necessary to generate a core loss equal to 10% of the total losses for a 40°C temperature rise. De-rating of the Irms is required to prevent excessive temperature rise.

Part number definition:
First 3 characters = Product code and size.
Last 3 characters = Inductance in uH. R = Decimal point. If no R is present, third character = # of zeros.

SDQ12-XXX-R
SDQ12 = Product code and Size
XXX = Inductance in uH, R = Decimal point
If no R is present, third character = # of zeros.
-R suffix indicated RoHS compliant

Mechanical Diagrams

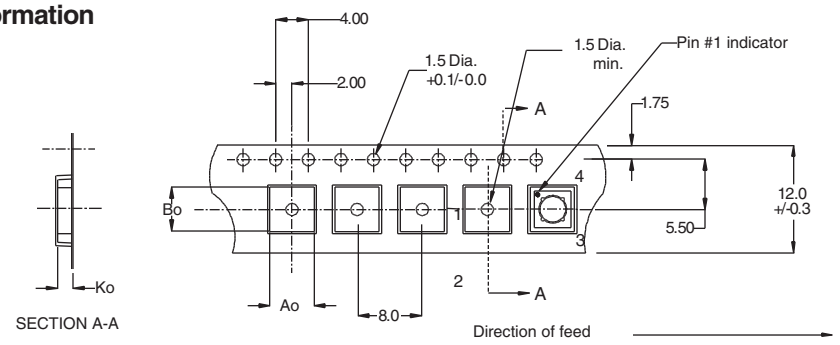


Series	HT
SDQ12	1.2mm max
SDQ25	2.5mm max

A) Part marking: Line 1 (1st digit inductance value per part marking designator in chart above)
(2nd digit is a bi-weekly production date code)
(3rd digit is the last digit of the year produced)
Line 2: xx (indicates the product size code)

Packaging Information

SDQ12 Series

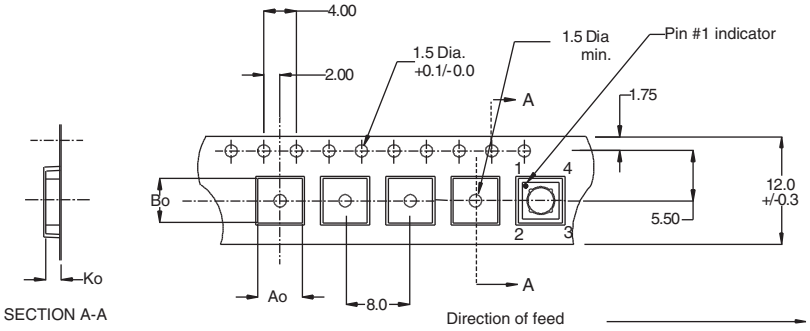


Ao=5.45 mm
Bo=5.45 mm
Ko=2.00 mm

ACTUAL SIZE
SDQ12

Parts packaged on 13" Diameter reel,
3,800 parts per reel.

SDQ25 Series

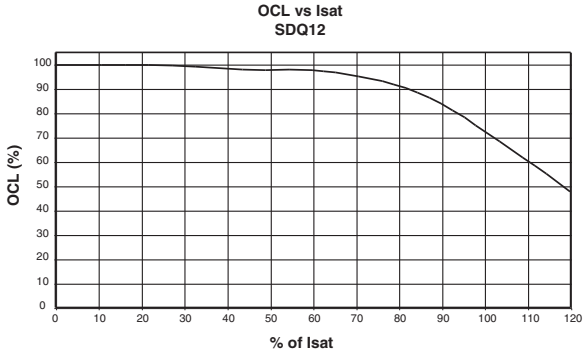


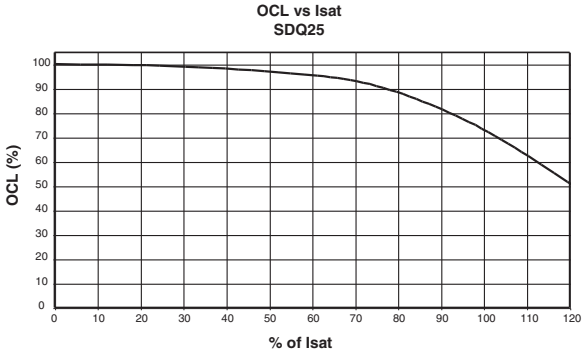
Ao=5.45 mm
Bo=5.45 mm
Ko=2.70 mm

ACTUAL SIZE
SDQ25

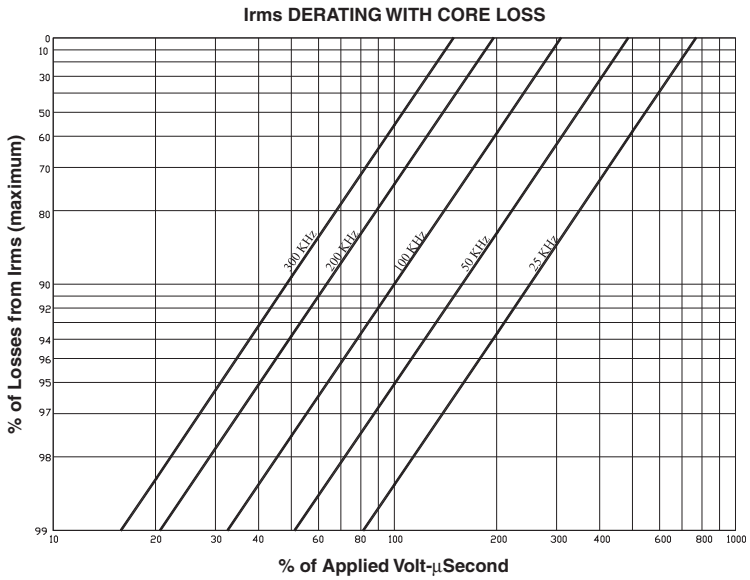
Parts packaged on 13" Diameter reel,
2,900 parts per reel.

Inductance Characteristics





Core Loss



COOPER Bussmann

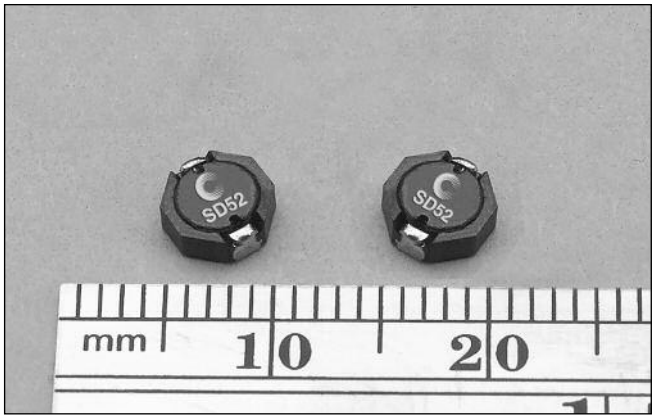
COILTRONICS

SD52 Series
High Power Density, Low Profile, Shielded Inductors

Description

RoHS 2002/95/EC

- 125°C maximum total temperature operation
- Octagonal shape shielded drum core
- 2mm max height
- Inductance range from 1.2uH to 100uH
- Current range from 3.14 to 0.35 Amps
- Ferrite shielded, low EMI
- Ferrite core material



Applications

- Digital cameras, CD players, cellular phones, and PDAs
- PCMCIA cards
- GPS systems

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +125°C (range is application specific).
- Solder reflow temperature: +260°C max. for 10 seconds max.

Packaging

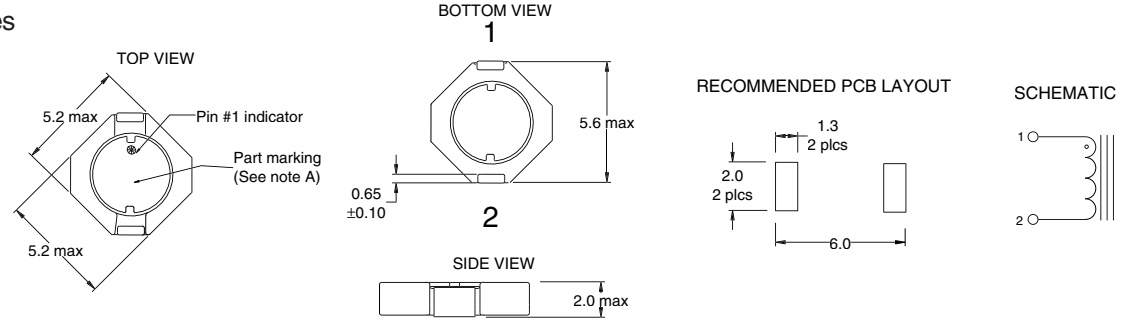
- Supplied in tape and reel packaging, 3500 per reel

Part Number	Rated Inductance (µH)	OCL (1) +/-20% (µH)	Part Marking	Irms (2) Amperes	Isat (3) Amperes	DCR (4) (Ω) Typ.	Volt u-sec Typ.
SD52-1R2-R	1.20	1.20	A	2.33	3.14	0.0279	1.49
SD52-2R2-R	2.20	2.20	B	1.98	2.30	0.0385	2.03
SD52-3R5-R	3.50	3.50	C	1.73	1.82	0.0503	2.57
SD52-4R7-R	4.70	4.70	D	1.63	1.64	0.0568	2.84
SD52-6R8-R	6.80	6.80	E	1.39	1.28	0.0777	3.65
SD52-100-R	10.0	10.0	F	1.11	1.11	0.1215	4.19
SD52-150-R	15.0	15.0	G	0.97	0.88	0.1618	5.27
SD52-220-R	22.0	22.0	H	0.86	0.73	0.2042	6.35
SD52-270-R	27.0	27.0	J	0.73	0.65	0.2864	7.16
SD52-330-R	33.0	33.0	K	0.70	0.61	0.3074	7.70
SD52-470-R	47.0	47.0	L	0.58	0.50	0.4465	9.32
SD52-680-R	68.0	68.0	M	0.47	0.42	0.6829	11.21
SD52-101-R	100	100	N	0.39	0.35	1.0000	13.37
SD52-151-R	150	150	O	0.31	0.28	1.6100	17.00

(1) Open Circuit Inductance Test Parameters: 100KHz, 0.25Vrms, 0.0Adc.
(2) RMS current for an approximate ΔT of 40°C without core loss. It is recommended that the temperature of the part not exceed 125°C.
(3) Peak current for approximate 30% roll off at 20°C.
(4) DCR limits @ 20°C.
5) Applied Volt-Time product (V-uS) across the inductor at 100kHz necessary to generate a core loss equal to 10% of the total losses for 40°C temperature rise.

Mechanical Diagrams

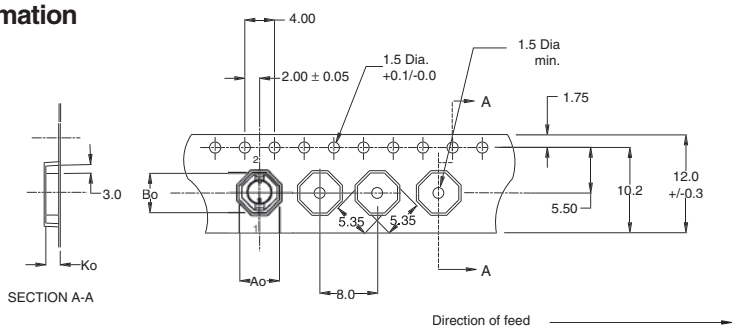
SD52 Series



A) Part Marking: Line 1: (1st digit indicates the inductance value per part marking designator in chart above)
(2nd digit is a bi-weekly production date code)
(3rd digit is the last digit of the year produced)
Line 2: 52 (indicates the product size code)

Packaging Information

SD52 Series



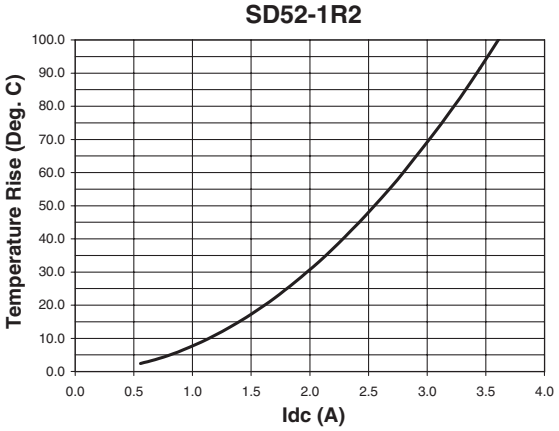
Ao=5.72mm
Bo=5.72mm
Ko=2.30mm

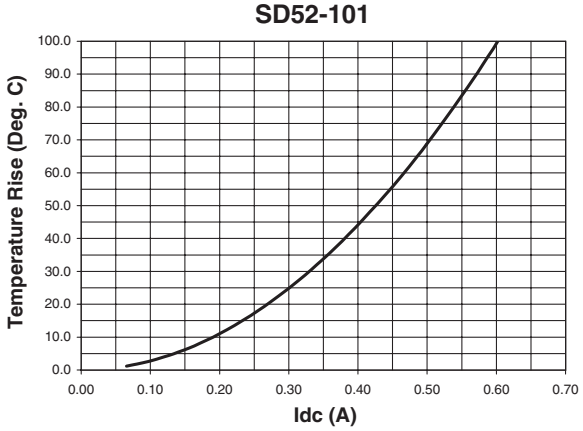
Dimensions are in millimeters.

ACTUAL SIZE
SD52

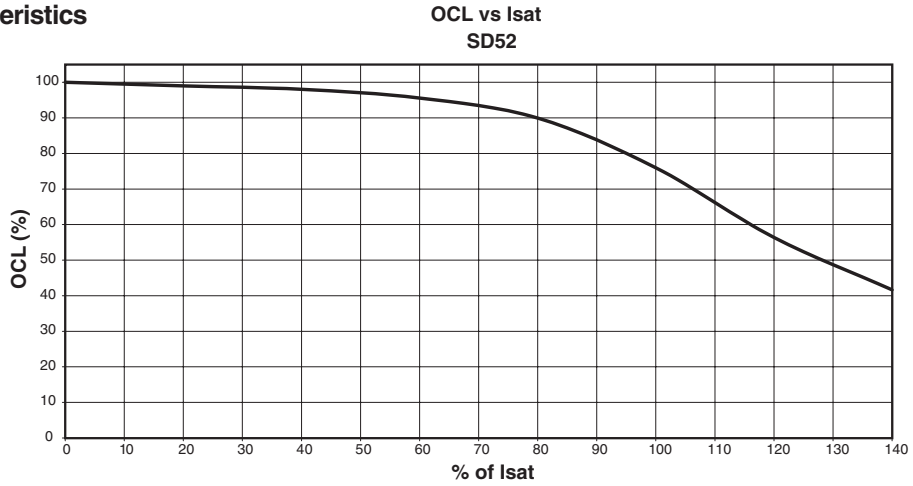
Parts packaged on 13" Diameter reel,
3,500 parts per reel.

DC Current vs. Temperature

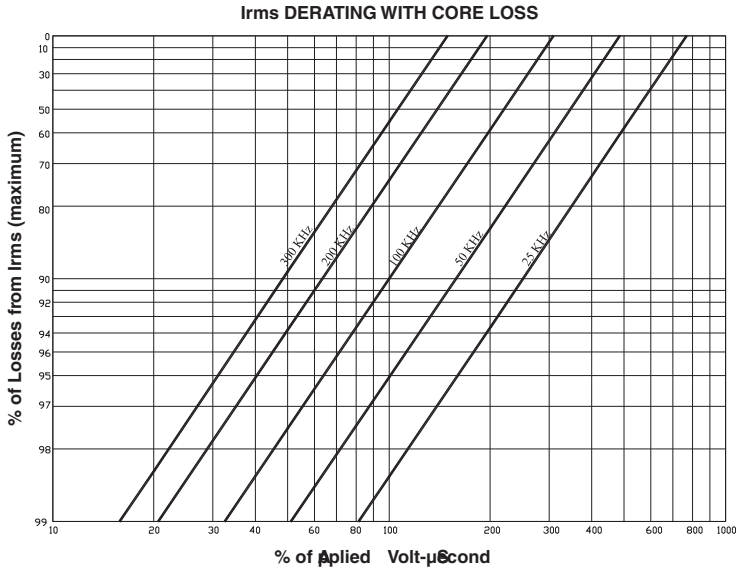




Inductance Characteristics



Core Loss

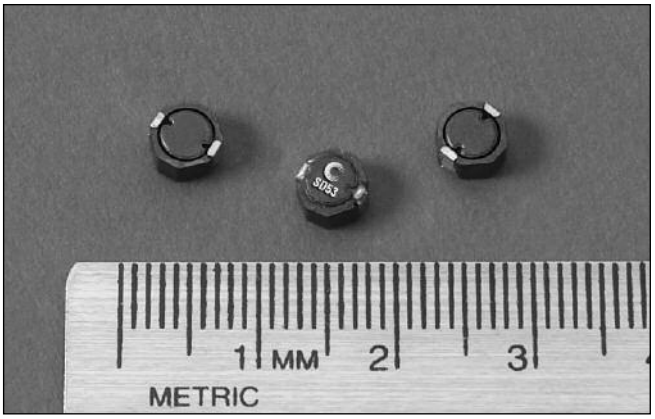

Irms DERATING WITH CORE LOSS
% of Losses from Irms (maximum)
0
10
30
50
60
70
80
90
92
94
96
95
97
98
99
10
20
30
40
60
80
100
200
300
400
600
800
1000
300 KHz
200 KHz
100 KHz
50 KHz
25 KHz
% of Applied Volt-µSecond

COILTRONICS

COOPER Bussmann

SD53 Series
Low Profile, Shielded Inductors

RoHS 2002/95/EC



Description

- 125°C maximum total temperature operation
- Octagonal shape utilizes board space
- 5.2mm x 5.2mm x 3.0mm surface mount package
- Shielded drum core reduces EMI
- Ferrite core material
- Inductance range from 1.1uH to 100uH
- Current range from 4.08 Amps to 0.44 Amps

Applications

- High Power LED driver
- White LED and OLED displays
- DSL modems, digital cameras
- Buck, Boost Inductor
- Cellular phones, Smart phones
- MP3 players, Digital radio player
- PDA, Palmtop, and wireless handhelds
- Battery power, TFT - LCD Bias supply

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

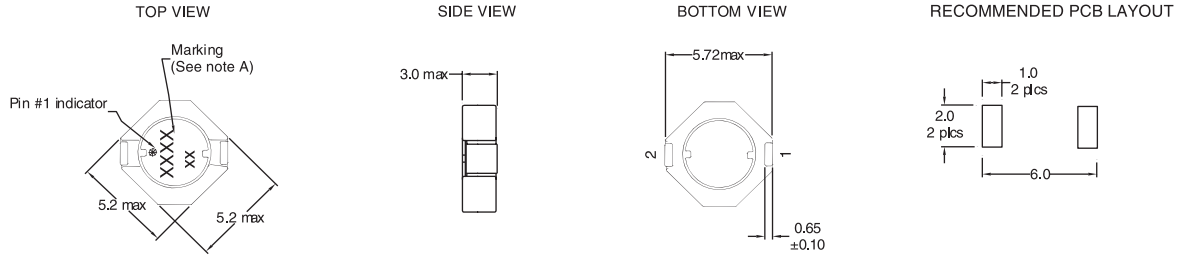
Packaging

- Supplied in tape and reel packaging, 2600 per reel

Part Number	Rated Inductance (µH)	OCL (1) µH ± 20%	Part Marking	Irms (2) Amperes	Isat (3) Amperes	DCR Ω @20°C (Typical)	DCR Ω @20°C (Maximum)	K-factor (4)
SD53-1R1-R	1.10	1.10	A	3.25	4.80	0.017	0.020	48
SD53-2R0-R	2.00	2.00	B	2.64	3.30	0.023	0.027	35
SD53-3R3-R	3.30	3.30	C	2.26	2.60	0.029	0.034	28
SD53-4R7-R	4.70	4.70	D	2.01	2.10	0.039	0.045	21
SD53-6R8-R	6.80	6.80	E	1.65	1.85	0.059	0.068	20
SD53-100-R	10.0	10.0	F	1.41	1.40	0.077	0.090	15
SD53-150-R	15.0	15.0	G	1.10	1.10	0.122	0.142	12
SD53-220-R	22.0	22.0	H	0.81	0.94	0.179	0.208	10
SD53-330-R	33.0	33.0	I	0.75	0.76	0.221	0.257	8
SD53-470-R	47.0	47.0	J	0.64	0.64	0.303	0.352	7
SD53-680-R	68.0	68.0	K	0.52	0.58	0.452	0.525	6
SD53-101-R	100	100	L	0.44	0.45	0.689	0.801	5

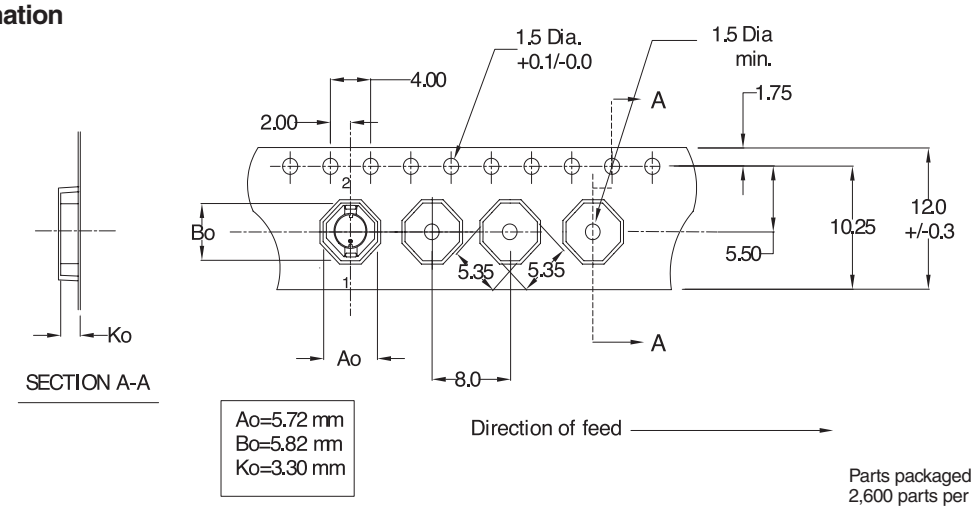
(1) Open Circuit Inductance Test Parameters: 100kHz, 0.1V, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 30% rolloff (@25°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in uH), ΔI (Peak to peak ripple current in Amps).
(5) Part Number Definition: SD53-xxx-R
SD53 = Product code and size; -xxx = Inductance value in uH;
R = decimal point; If no R is present, third character = # of zeros.
-R suffix = RoHS compliant

Mechanical Diagrams



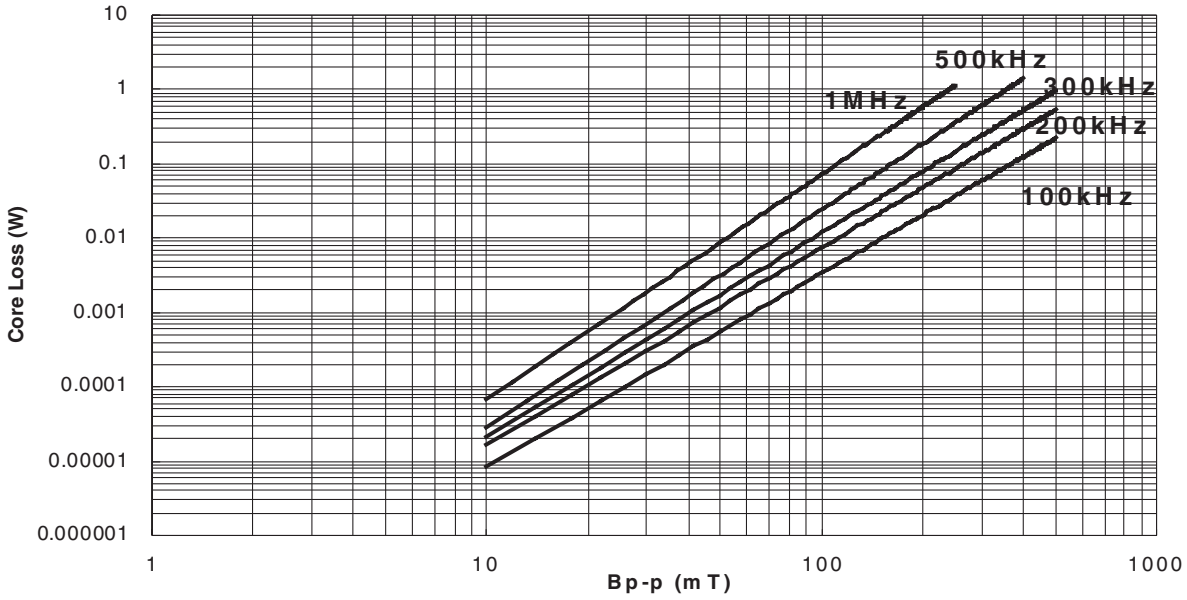
Dimensions are in millimeters.
Note A. Part Marking:
4 Digit Marking: Line 1: (1st digit: Indicates inductance value per Part Marking Designator in chart above); (2nd digit: Bi-weekly production date code); (3rd digit: Last digit of the year produced), (4th digit: Manufacturing code). Line 2: 53 (Indicates the product size code)

Packaging Information

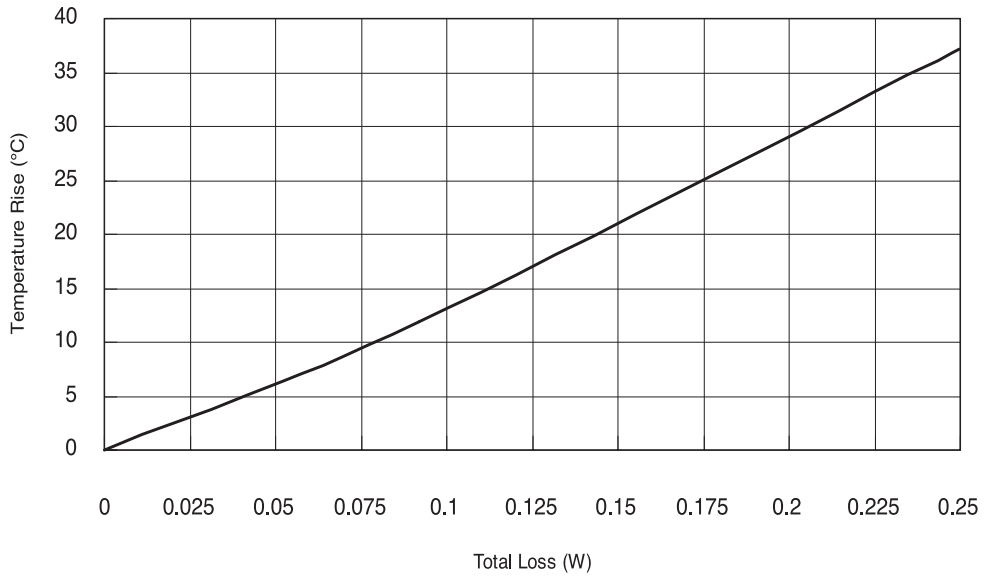


Parts packaged on 13" Diameter reel,
2,600 parts per reel.

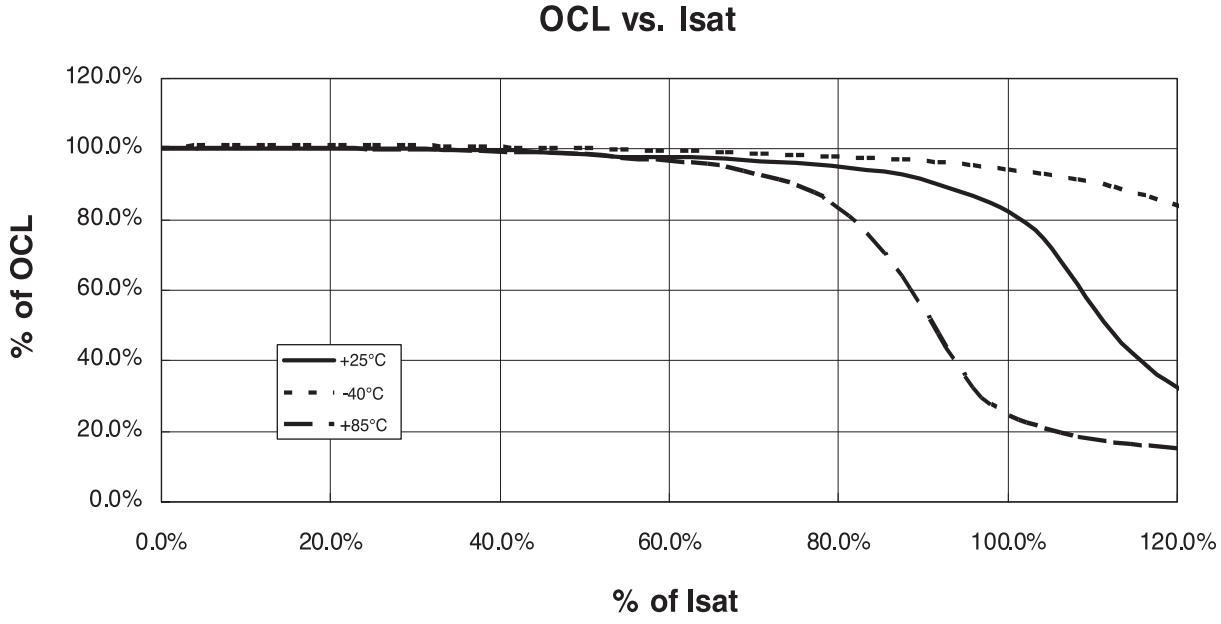
Core Loss



Temperature Rise vs. Loss



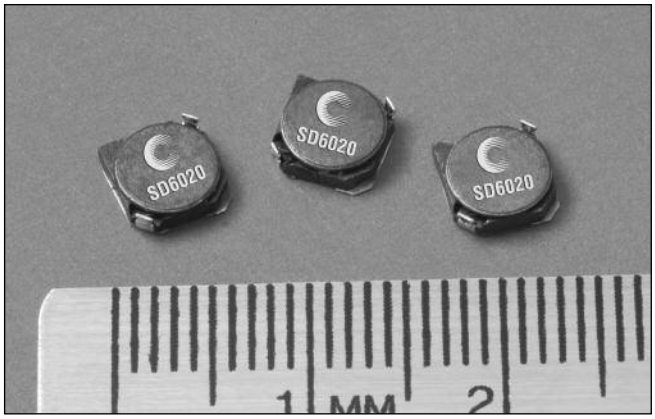
Inductance Characteristics



COOPER Bussmann

SD6020 Series
Low Profile Power Inductors

RoHS 2002/95/EC



Description

- 125°C maximum temperature operation
- Low profile surface mount inductors
- 6.0mm x 6.0mm x 2.0mm shielded drum core
- Ferrite core material
- Inductance range from 4.1uH to 100uH
- Current range from 2.0 Amps to 0.36 Amps
- Frequency range up to 1MHz

Applications

- Palmtop Computers
- Digital Cameras
- Digital Cordless Phones, PCS Phones
- Cable/DSL Modems, PC Cards
- Wireless Handsets, Hand-Held Instruments
- Battery Backup/power
- DC-DC converters, Buck/Boost regulators

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

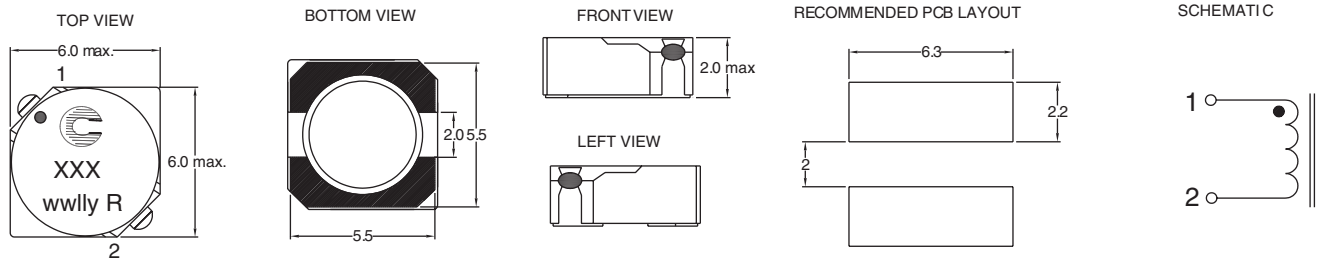
Packaging

- Supplied in tape and reel packaging, 2600 per reel

Part Number	Rated Inductance (µH)	OCL (1) µH ± 30%	Irms (2) Amperes	Isat (3) Amperes	DCR mΩ@20°C (Typical)	DCR mΩ@20°C (Maximum)	K-factor (4)
SD6020-4R1-R	4.1	3.9	2.22	1.95	47.5	57.0	28.5
SD6020-5R4-R	5.4	5.5	1.80	1.60	63.3	76.0	24.0
SD6020-6R2-R	6.2	6.5	1.63	1.40	80.0	96.0	22.2
SD6020-8R9-R	8.9	8.5	1.47	1.25	96.7	116.0	19.3
SD6020-100-R	10	9.7	1.39	1.20	103.3	124.0	18.1
SD6020-120-R	12	11	1.31	1.10	115.0	138.0	17.1
SD6020-150-R	15	13	1.07	0.97	163.3	196.0	15.4
SD6020-180-R	18	16	1.10	0.85	175.0	210.0	13.9
SD6020-220-R	22	20	0.94	0.80	241.7	290.0	12.7
SD6020-270-R	27	27	0.82	0.75	275.0	330.0	10.9
SD6020-330-R	33	29	0.76	0.65	320.8	385.0	10.5
SD6020-390-R	39	37	0.63	0.57	416.7	500.0	9.2
SD6020-470-R	47	45	0.61	0.54	495.8	595.0	8.2
SD6020-560-R	56	55	0.57	0.50	515.0	618.0	7.8
SD6020-680-R	68	68	0.50	0.43	700.0	840.0	6.7
SD6020-820-R	82	80	0.48	0.41	815.0	978.0	6.3
SD6020-101-R	100	94	0.42	0.36	1000.0	1200.0	5.8

(1) Open Circuit Inductance Test Parameters: 100kHz, 0.1V, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for 35% rolloff (@25°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in uH), ΔI (Peak to peak ripple current in Amps).
(5) Part Number Definition: SD6020-xxx-R
SD6020 = Product code and size; -xxx = Inductance value in uH;
R = decimal point; If no R is present, third character = # of zeros.
-R suffix = RoHS compliant

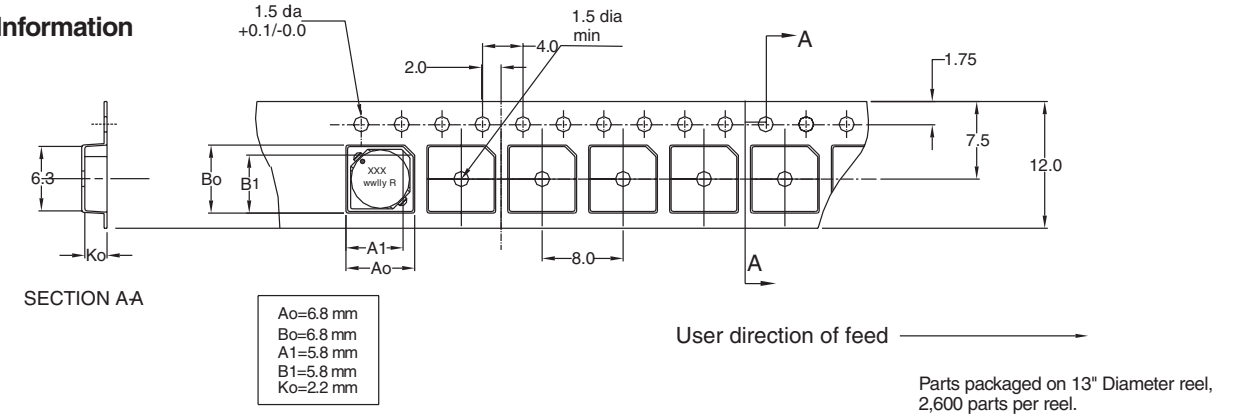
Mechanical Diagrams



Dimensions are in millimeters.

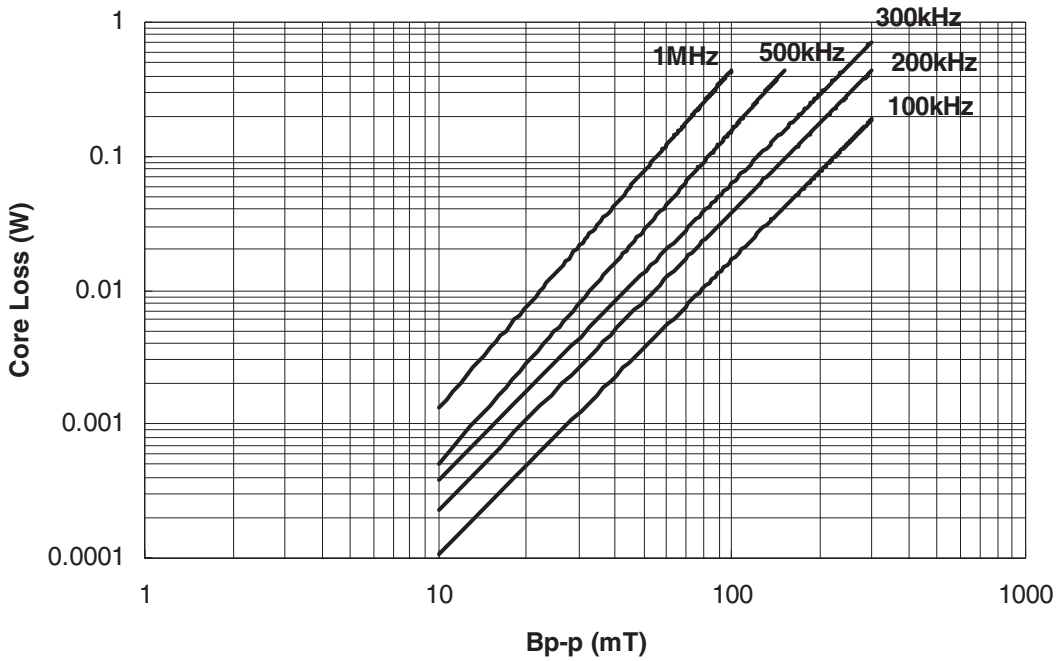
xxx = Inductance value in uH. R = decimal point. If no R is present third character = #0f zeros.
wwllyy = Date code, R = Revision level.

Packaging Information

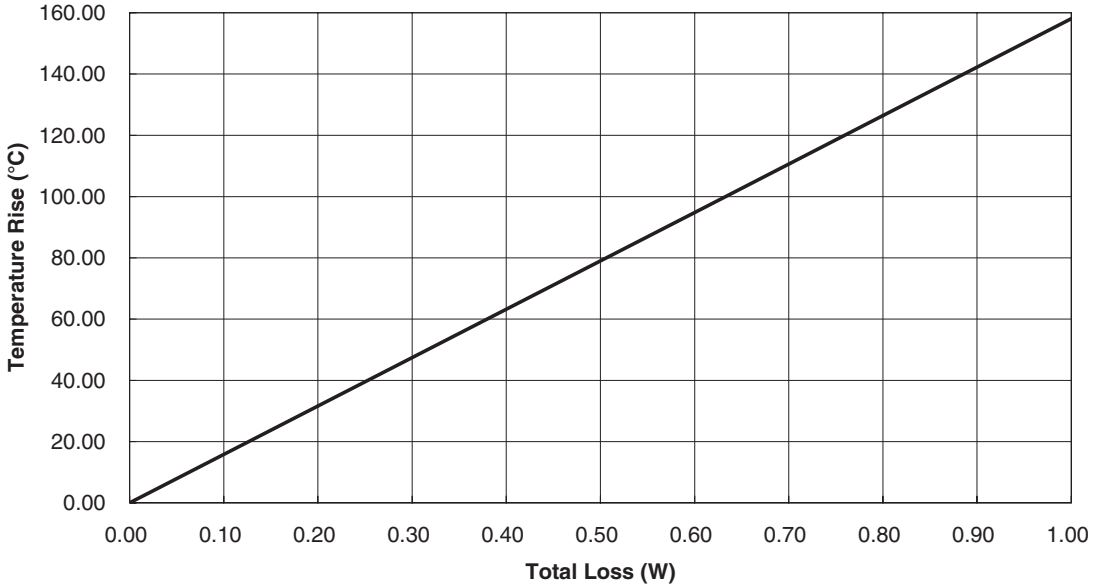


Parts packaged on 13" Diameter reel,
2,600 parts per reel.

Core Loss

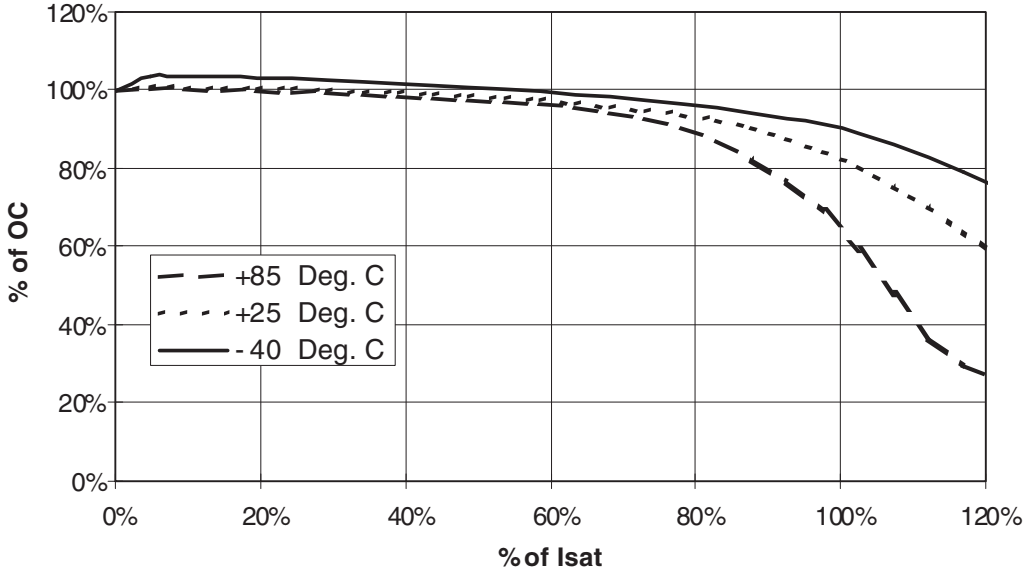


Temperature Rise vs. Loss



Inductance Characteristics

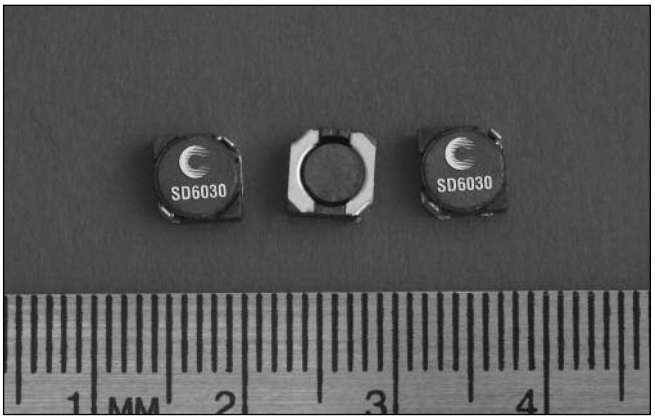
OCL Vs. Isat



COOPER Bussmann

SD6030 Series
Low Profile Power Inductors

RoHS 2002/95/EC



Description

- 125°C maximum total temperature operation
- Low profile surface mount inductors
- 6.0mm x 6.0mm x 3.0mm surface mount package
- Ferrite core material
- Shielded drum core reduces EMI
- Inductance range from 2.7µH to 680µH
- Current range from 4.08 Amps to 0.16 Amps
- Frequency range up to 1MHz

Applications

- Notebook computers, Digital cameras
- DSL modems, PDA's
- High Power LED driver
- MP3, CD players, GPS receivers
- Cellular phones, Smart phones
- Wireless notebook adapters
- Battery power, TFT-LCD Bias supplies
- PCMCIA, Cardbus32, MiniPCI cards

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

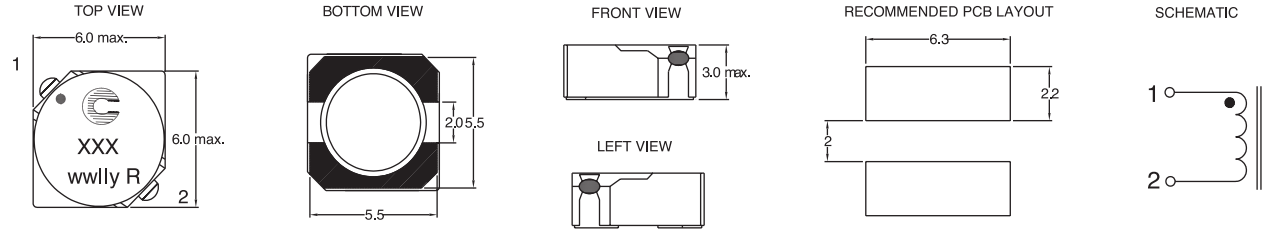
Packaging

- Supplied in tape and reel packaging, 2600 per reel

Part Number	Rated Inductance (µH)	OCL (1) µH ± 30%	Irms (2) Amperes	Isat (3) Amperes	DCR mΩ@20°C (Typical)	DCR mΩ@20°C (Maximum)	K-factor (4)
SD6030-2R7-R	2.7	2.7	4.08	2.60	13	18	34
SD6030-3R3-R	3.3	3.3	3.54	2.40	18	24	30
SD6030-4R2-R	4.2	4.1	3.11	2.20	23	31	27
SD6030-5R0-R	5.0	4.9	2.81	1.90	28	38	24
SD6030-5R8-R	5.8	5.8	2.58	1.80	33	45	22
SD6030-7R8-R	7.8	7.8	2.38	1.60	39	53	19
SD6030-100-R	10	9.3	2.15	1.30	48	65	17
SD6030-120-R	12	11.3	1.99	1.20	56	76	16
SD6030-150-R	15	14.1	1.71	1.10	76	103	14
SD6030-180-R	18	17.1	1.65	1.00	82	110	13
SD6030-220-R	22	20.4	1.57	0.90	90	122	12
SD6030-270-R	27	26.0	1.31	0.85	130	175	11
SD6030-330-R	33	32.4	1.26	0.75	140	189	9.3
SD6030-360-R	36	34.4	1.19	0.70	157	212	8.7
SD6030-440-R	44	44.0	1.10	0.62	185	250	7.9
SD6030-520-R	52	52.0	0.99	0.58	226	305	7.2
SD6030-680-R	68	65.6	0.92	0.52	263	355	6.5
SD6030-820-R	82	81.6	0.80	0.46	343	463	5.9
SD6030-101-R	100	94.4	0.76	0.42	385	520	5.6
SD6030-121-R	120	110.1	0.70	0.40	517	620	5.6
SD6030-151-R	150	144.5	0.64	0.35	608	730	5.0
SD6030-181-R	180	175.7	0.55	0.32	817	980	4.5
SD6030-221-R	220	210.9	0.50	0.30	1000	1200	4.0
SD6030-271-R	270	264.2	0.44	0.27	1300	1560	3.6
SD6030-331-R	330	313.5	0.38	0.25	1733	2080	3.3
SD6030-391-R	390	373.7	0.35	0.22	2083	2500	3.0
SD6030-471-R	470	460.0	0.33	0.20	2250	2700	2.8
SD6030-561-R	560	546.2	0.30	0.18	2767	3320	2.5
SD6030-681-R	680	659.4	0.27	0.16	3458	4150	2.3

(1) Open Circuit Inductance Test Parameters: 100kHz, 0.1V, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for 35% rolloff (@25°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in uH), ΔI (Peak to peak ripple current in Amps).
(5) Part Number Definition: SD6030-xxx-R
SD6030 = Product code and size; -xxx = Inductance value in uH;
R = decimal point; If no R is present, third character = # of zeros.
-R suffix = RoHS compliant

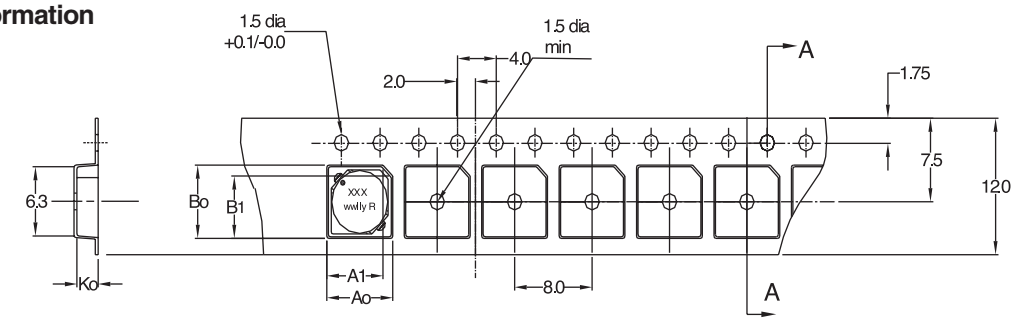
Mechanical Diagrams



Dimensions are in millimeters.

xxx = Inductance value in uH. R = decimal point. If no R is present third character = # of zeros.
wwlyy = Date code, R = Revision level.

Packaging Information



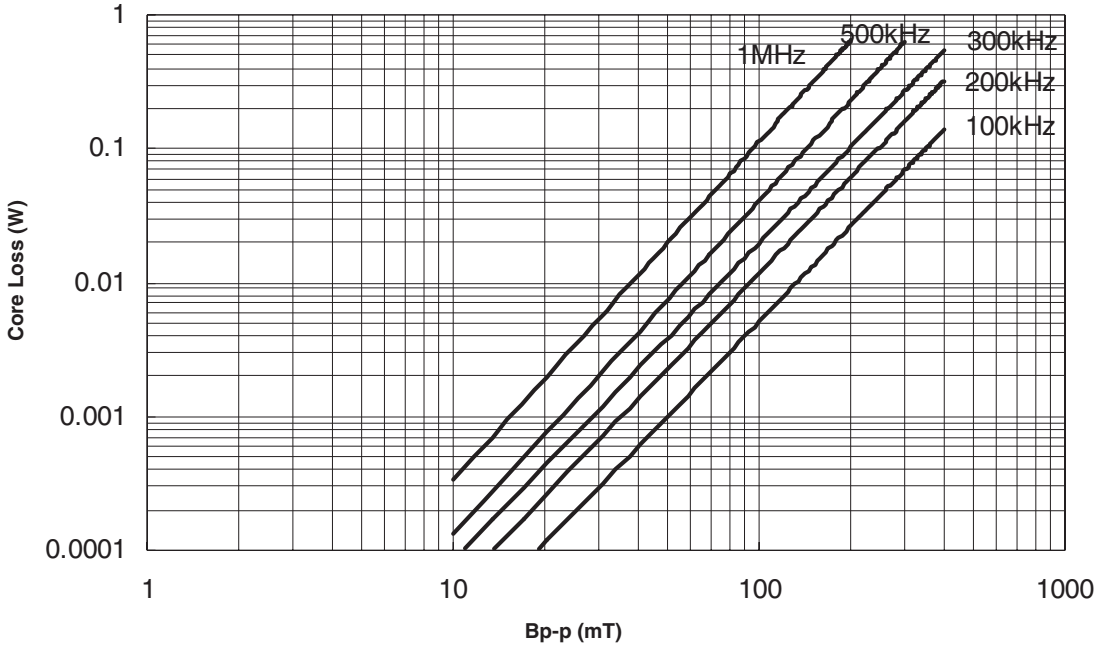
SECTION A-A

Ao=6.8 mm
Bo=6.8 mm
A1=5.8 mm
B1=5.8 mm
Ko=3.2 mm

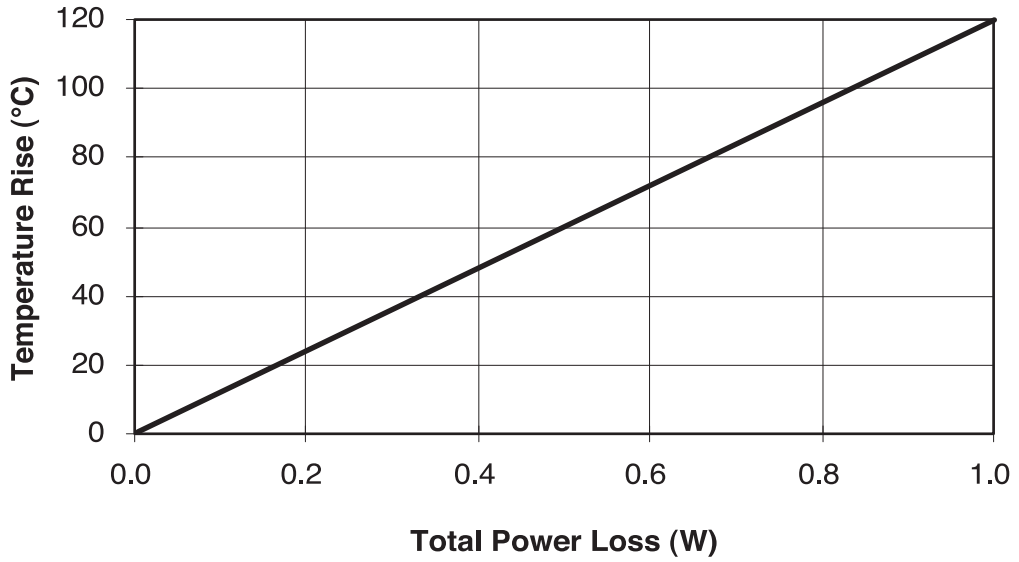
User direction of feed

Parts packaged on 13" Diameter reel,
2,600 parts per reel.

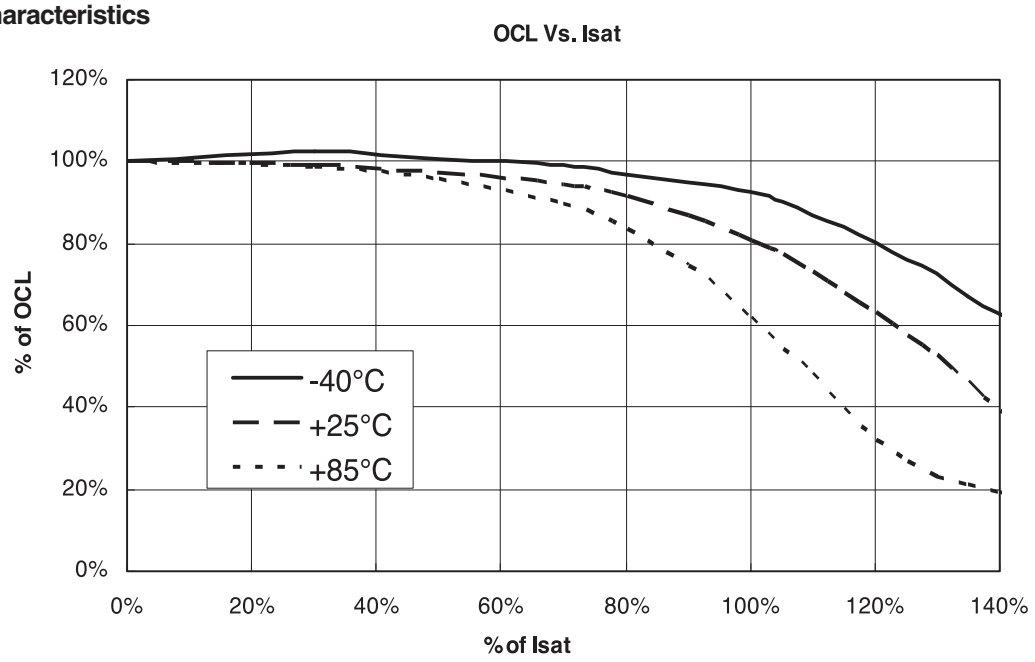
Core Loss



Temperature Rise vs. Loss



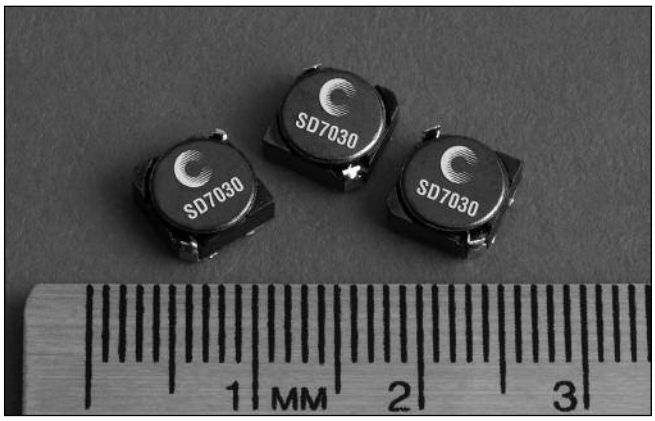
Inductance Characteristics



COOPER Bussmann

SD7030 Series
Low Profile Power Inductors

RoHS 2002/95/EC



Description
- 125°C maximum total temperature operation
- Low profile surface mount inductors
- 7.0mm x 7.0mm x 3.0mm shielded drum core
- Ferrite core material
- Inductance range from 3.3µH to 680µH
- Current range from 3.7 Amps to 0.21 Amps
- Frequency range up to 1MHz

Applications
- PDA's, Wireless handsets
- Handheld computers
- MP3 players, CD players, organizers
- Portable computers, GPS receivers
- ADSL/DSL/Cable modems
- Buck and Boost inductor
- Battery power, Li-Ion, 2-cell
- Digital still camera
- White LED driver

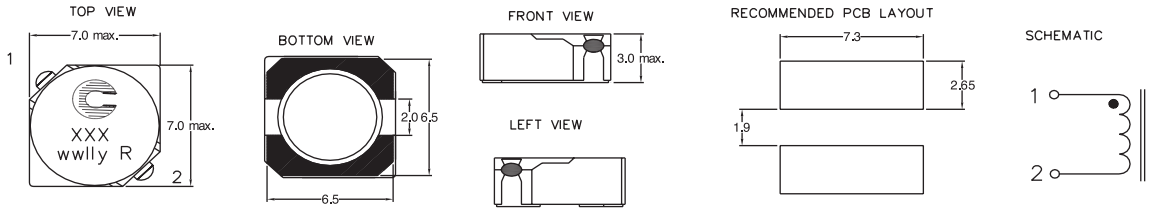
Environmental Data
- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

Packaging
- Supplied in tape and reel packaging, 1500 per reel

Part Number	Rated Inductance (µH)	OCL (1) µH ± 30%	Irms (2) Amperes	Isat (3) Amperes	DCR mΩ@25°C (Typical)	DCR mΩ@25°C (Maximum)	K-factor (4)
SD7030-3R3-R	3.3	3.3	3.7	3.00	20	24	22
SD7030-3R9-R	3.9	4.1	3.4	2.60	22	27	19
SD7030-5R0-R	5.0	4.9	3.2	2.40	26	31	17
SD7030-6R0-R	6.0	5.8	2.8	2.25	29	35	16
SD7030-7R3-R	7.3	7.0	2.3	2.10	45	54	13
SD7030-8R0-R	8.0	7.8	2.2	1.85	48	58	12
SD7030-100-R	10	10.0	2.1	1.70	54	65	11
SD7030-120-R	12	11.5	1.9	1.55	58	70	10
SD7030-150-R	15	14.6	1.7	1.40	70	84	9.3
SD7030-180-R	18	17.3	1.7	1.32	79	95	8.8
SD7030-220-R	22	21.0	1.4	1.20	107	128	7.6
SD7030-260-R	26	24.9	1.3	1.05	118	142	6.9
SD7030-300-R	30	30.0	1.2	0.97	138	165	6.4
SD7030-390-R	39	39.7	1.1	0.86	175	210	5.7
SD7030-440-R	44	43.4	1.1	0.80	198	238	5.3
SD7030-560-R	56	54.4	0.99	0.73	231	277	4.9
SD7030-680-R	68	66.6	0.85	0.65	253	304	4.3
SD7030-820-R	82	81.4	0.82	0.60	325	390	4.0
SD7030-101-R	100	95.5	0.70	0.54	446	535	3.6
SD7030-121-R	120	115.2	0.67	0.50	629	755	3.3
SD7030-151-R	150	145	0.57	0.44	715	858	2.9
SD7030-181-R	180	174	0.54	0.40	805	966	2.7
SD7030-221-R	220	211	0.51	0.36	1102	1322	2.4
SD7030-271-R	270	264	0.44	0.33	1259	1475	2.2
SD7030-331-R	330	317	0.38	0.30	1438	1725	2.0
SD7030-391-R	390	381	0.36	0.27	1857	2228	1.8
SD7030-471-R	470	460	0.34	0.25	2150	2581	1.7
SD7030-561-R	560	561.0	0.29	0.23	2857	3428	1.5
SD7030-681-R	680	677.2	0.28	0.21	3206	3847	1.4

(1) Open Circuit Inductance Test Parameters: 100kHz, 0.1V, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 35% rolloff (@25°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in uH), ΔI (Peak to peak ripple current in Amps).
(5) Part Number Definition: SD7030-xxx-R
SD7030 = Product code and size; -xxx = Inductance value in uH;
R = decimal point; If no R is present, third character = # of zeros.
-R suffix = RoHS compliant

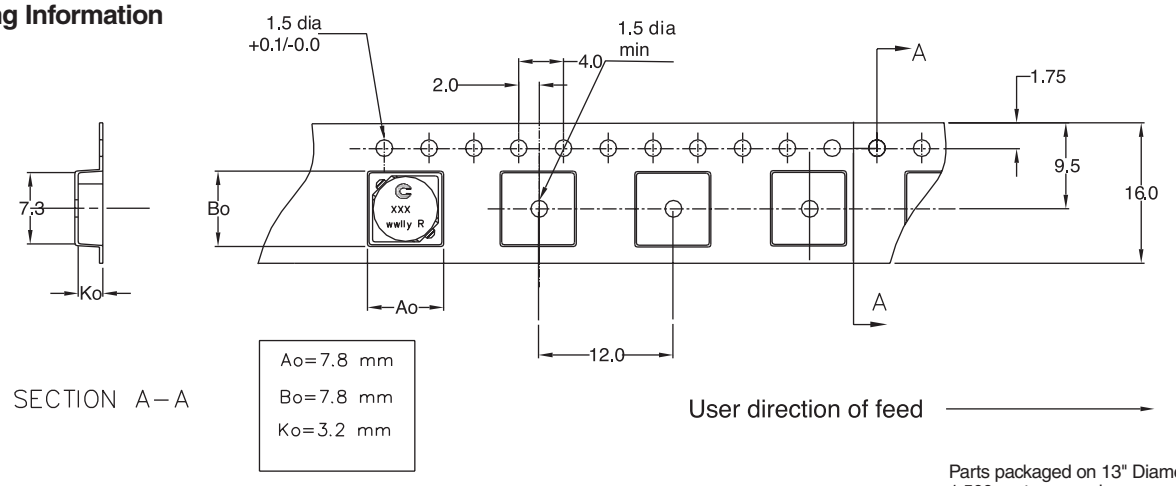
Mechanical Diagrams



Dimensions are in millimeters.

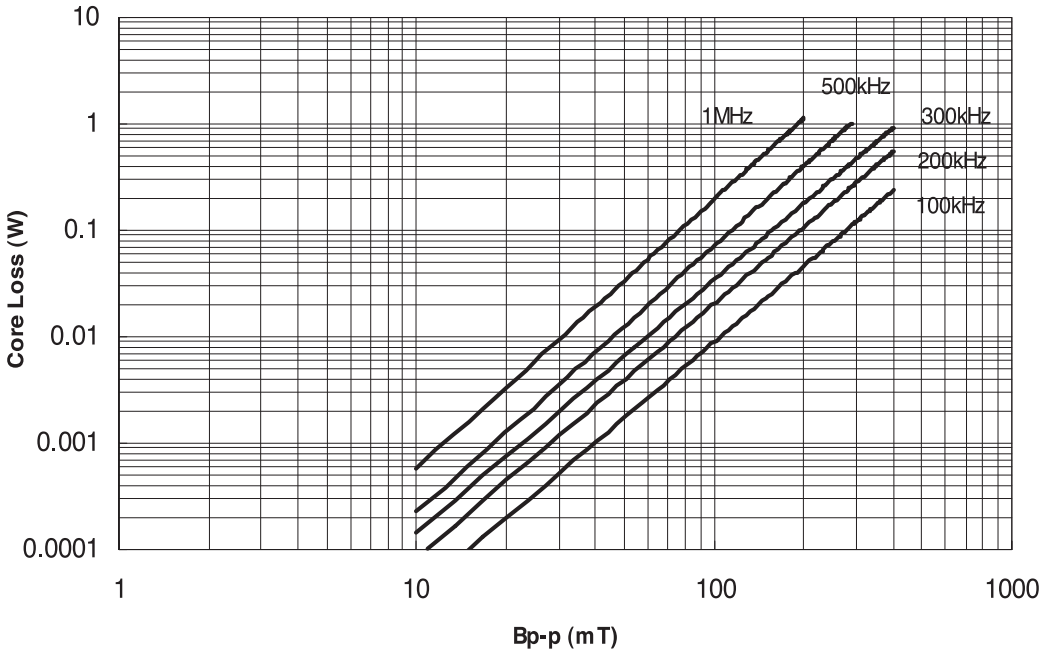
xxx = Inductance value in uH. R = decimal point. If no R is present third character = # of zeros.
wwllyy = Date code, R = Revision level.

Packaging Information

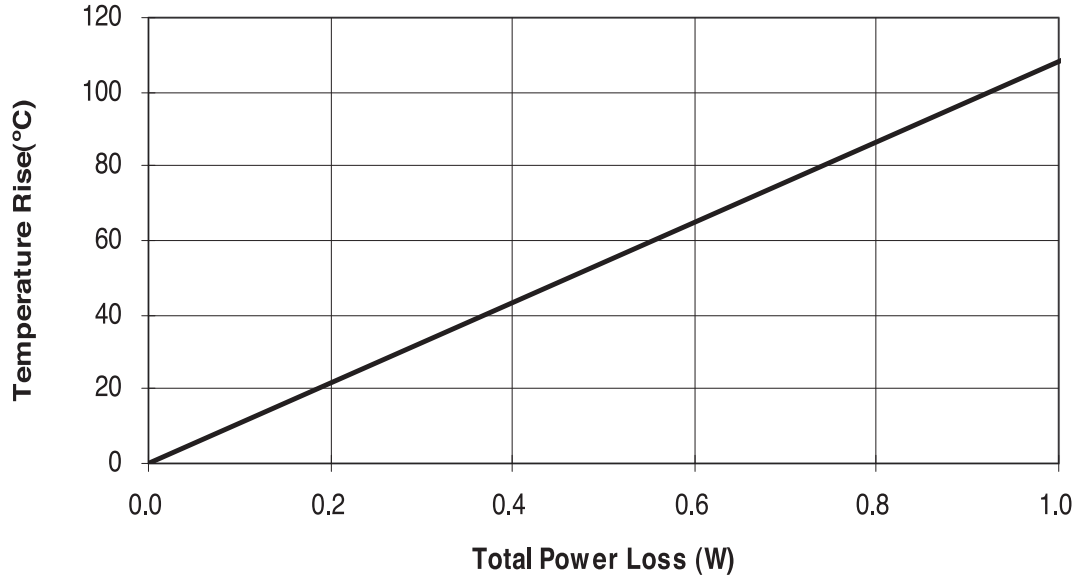


Parts packaged on 13" Diameter reel,
1,500 parts per reel.

Core Loss

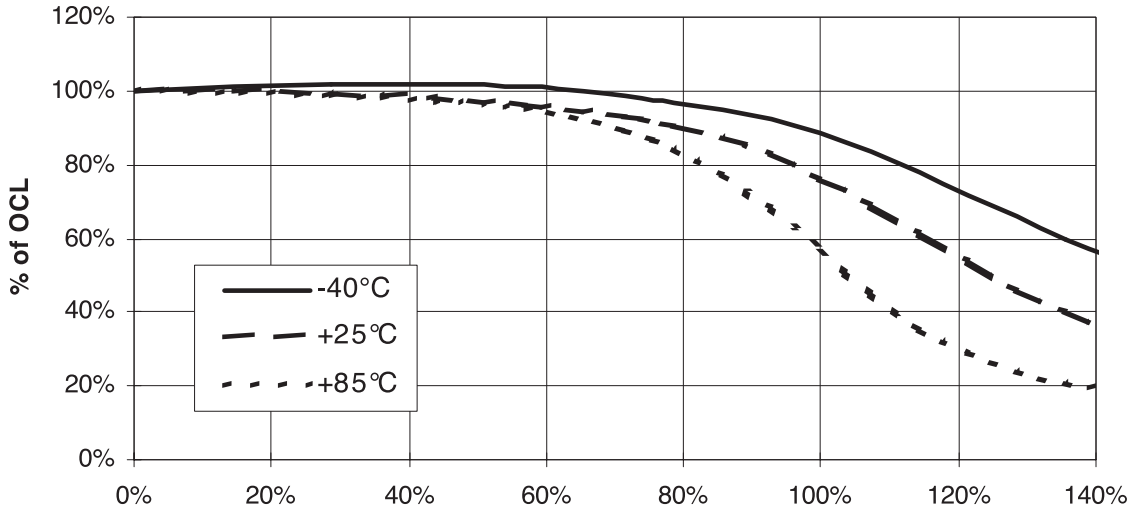


Temperature Rise vs. Loss



Inductance Characteristics

OCL Vs. Isat



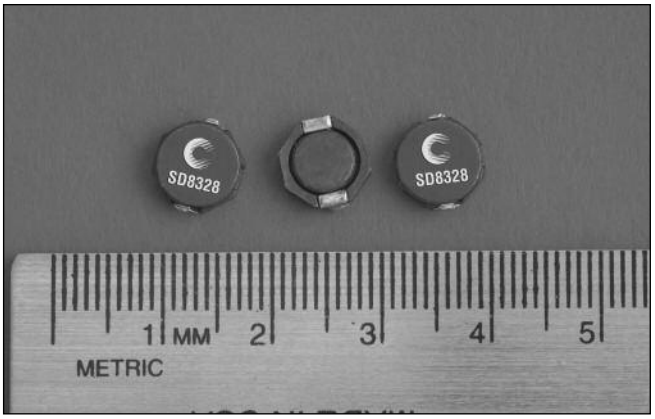
COOPER Bussmann

SD8328 Series
Low Profile Power Inductors

Description

- 125°C maximum temperature operation
- Low profile surface mount inductor
- 8.3mm x 9.5mm x 3.0mm shielded drum core
- Ferrite core material
- Inductance range from 2.7µH to 100µH
- Current range from 6.6 Amps to 0.8 Amps
- Frequency range up to 1MHz

RoHS 2002/95/EC



Applications

- Buck or Boost inductor
- Noise filtering output filter chokes
- Notebook power/display
- LCD Monitors/Displays/Televisions
- Battery chargers, LCD bias supplies
- Battery and Industrial power systems
- Computer, DVD players
- Portable power devices, DC-DC converters

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

Packaging

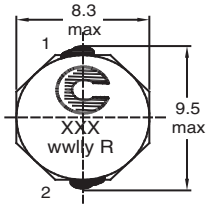
- Supplied in tape and reel packaging, 1280 per reel

Part Number	Rated Inductance (µH)	OCL (1) µH±30%	Irms(2) Amperes	Isat (3) Amperes	DCR (Ω) mΩ @20°C (Typical)	DCR (Ω) mΩ @20°C (Maximum)	K-factor (4)
SD8328-2R5-R	2.5	2.7	6.6	4.5	12	15.6	43
SD8328-3R3-R	3.3	3.4	6.1	4.0	14	18.0	33
SD8328-4R7-R	4.7	5.0	4.5	3.6	19	24.7	23
SD8328-7R3-R	7.3	7.6	3.4	2.9	30	39	15
SD8328-100-R	10	9.1	3.3	2.6	36	45	11
SD8328-150-R	15	14.5	2.35	2.0	53	69	7.2
SD8328-220-R	22	21.1	1.85	1.7	76	99	4.9
SD8328-330-R	33	31.9	1.45	1.4	120	156	3.3
SD8328-470-R	47	44.9	1.30	1.2	150	194	2.3
SD8328-680-R	68	64.2	0.98	1.0	220	286	1.6
SD8328-101-R	100	97.0	0.80	0.8	330	430	1.1

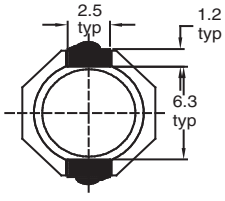
(1) Open Circuit Inductance Test Parameters: 100kHz, 0.1V, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 35% rolloff (@25°C)
(4) K-factor: Used to determine B p-p for core loss (see graph). B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in µH), ΔI (Peak to peak ripple current in Amps).
(5) Part Number Definition: SD8328-xxx-R
SD8328 = Product code and size; -xxx = Inductance value in uH; R = decimal point; If no R is present, third character = # of zeros.
-R suffix = RoHS compliant

Mechanical Diagrams

TOP VIEW

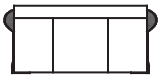


BOTTOM VIEW

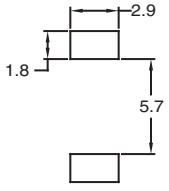


FRONT VIEW

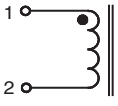
LEFT VIEW



RECOMMENDED PCB LAYOUT



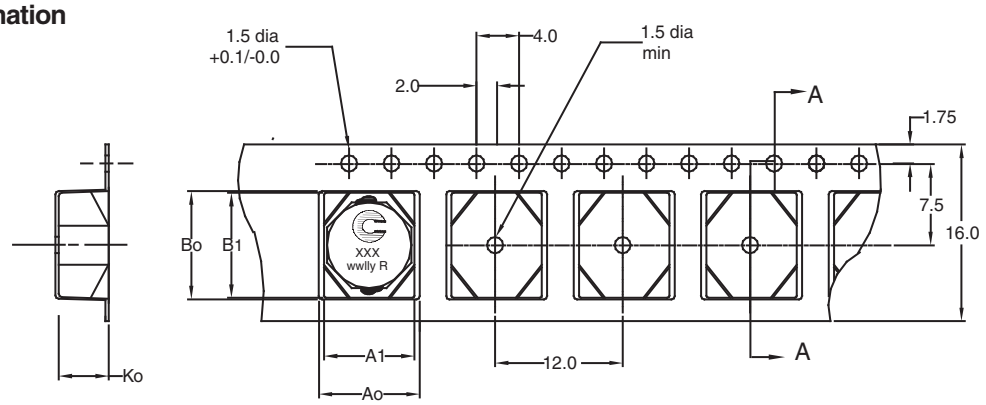
SCHEMATIC



Dimensions are in millimeters.

xxx = Inductance value in uH. R = decimal point. If no R is present third character = # of zeros. wwllyy = Date code, R = Revision level.

Packaging Information



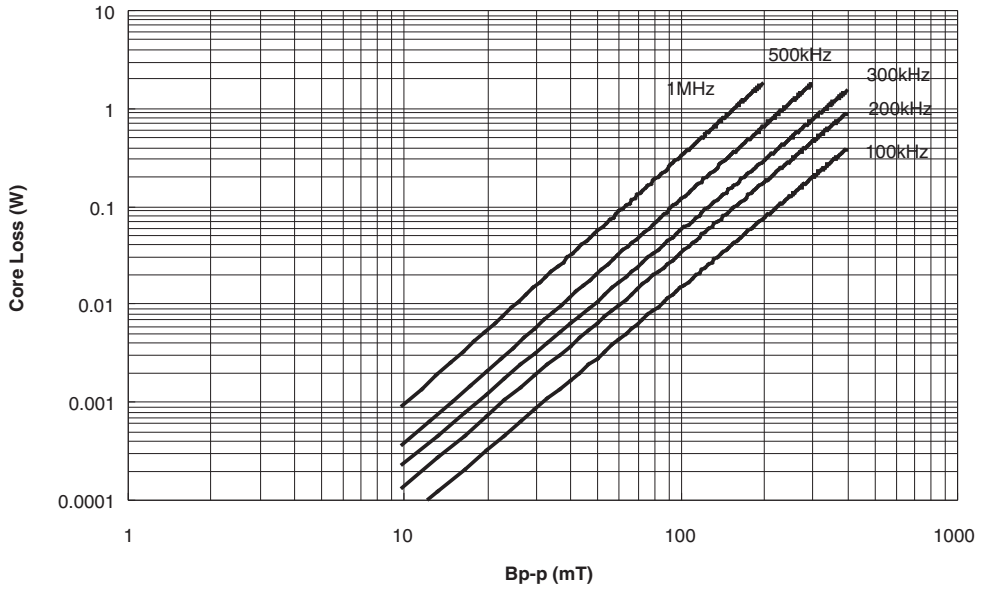
SECTION A-A

Ao=9.5 mm
Bo=10.0 mm
A1=8.5 mm
B1=9.7 mm
Ko=3.2 mm

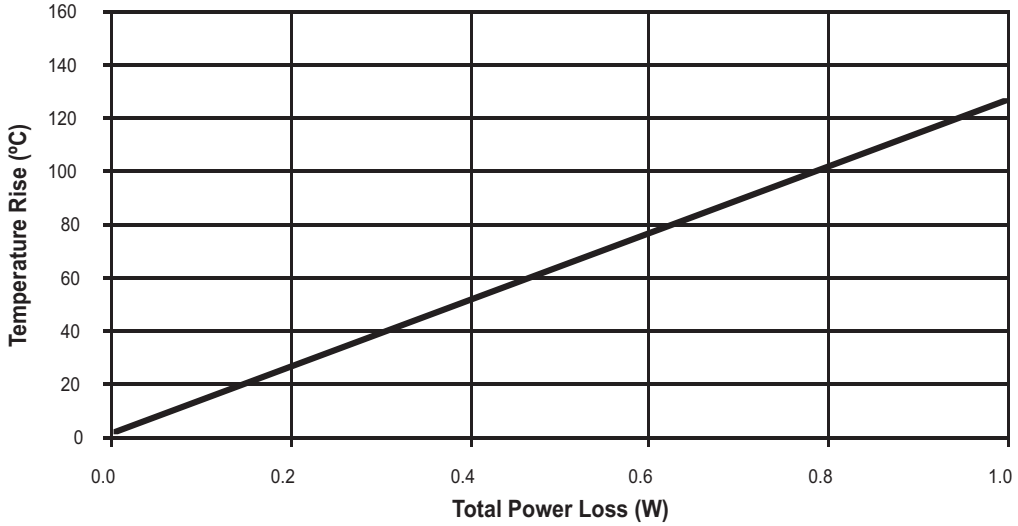
User direction of feed

Parts packaged on 13" Diameter reel,
1,280 parts per reel.

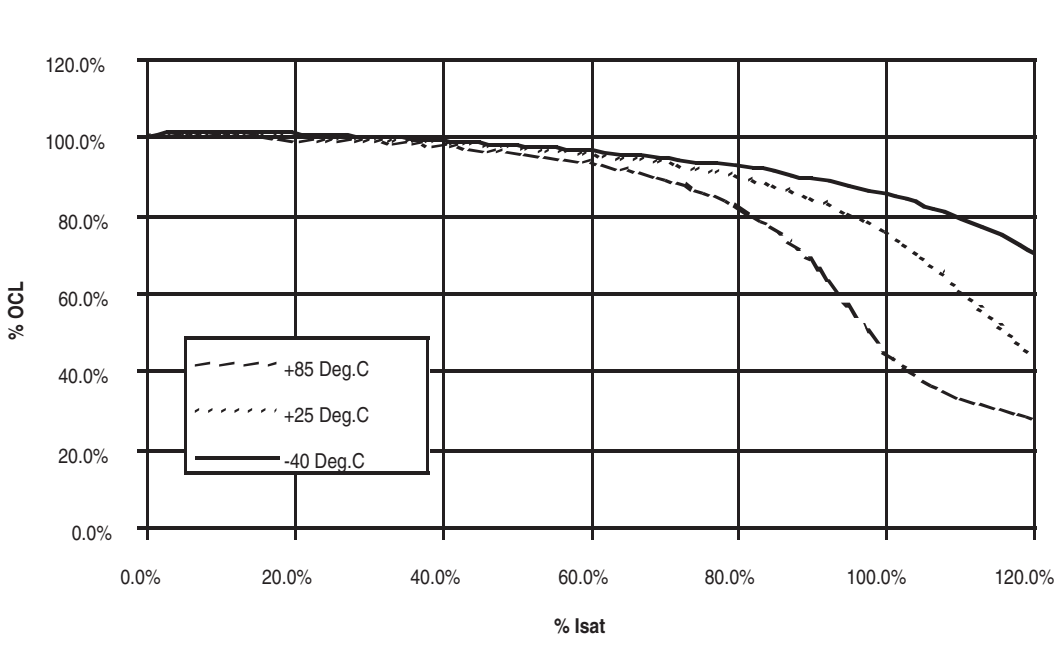
Core Loss



Temperature Rise vs. Loss



Inductance Characteristics



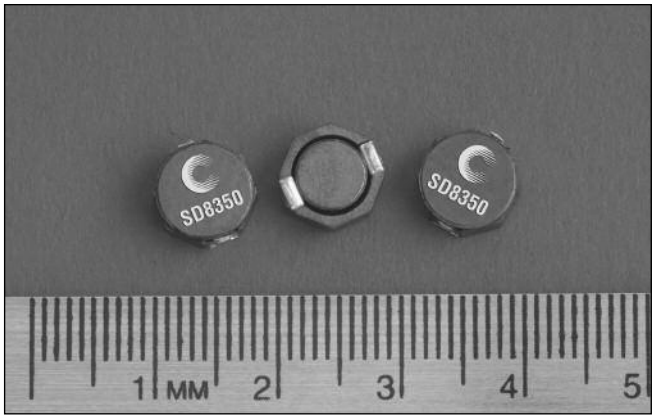
COOPER Bussmann

SD8350 Series
Shielded Power Inductors

Description

- 125°C maximum total temperature operation
- Low profile surface mount inductor
- 8.3mm x 9.5mm x 4.5mm shielded drum core
- Ferrite core material
- Inductance range from 1.5µH to 100µH
- Current range from 9.1 Amps to 0.8 Amps
- Frequency range up to 1MHz

RoHS 2002/95/EC



Applications

- Server/Notebook power
- High Power LED driver, Portable devices
- Base Station, Telecom, and Networking
- Battery Chargers, RAM power supply
- Industrial and Automotive power systems
- Noise filtering output filter chokes
- Buck/Boost converters, Output converters

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

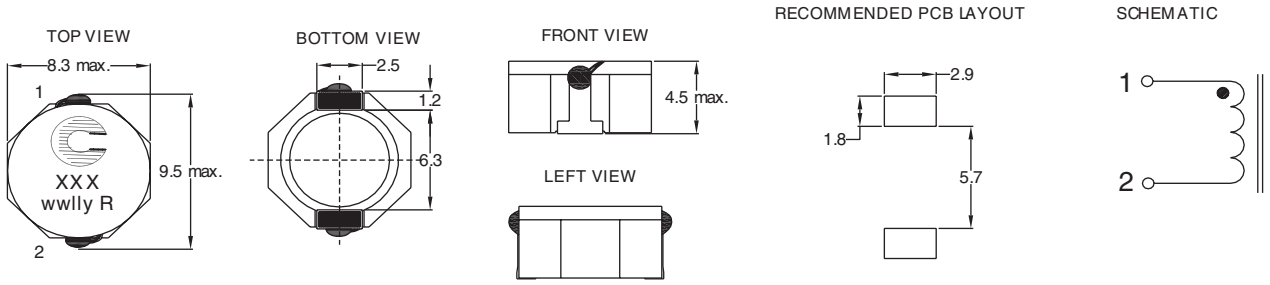
Packaging

- Supplied in tape and reel packaging, 750 per reel

Part Number	Rated Inductance (µH)	OCL (1) µH±30%	Irms(2) Amperes	Isat (3) Amperes	DCR (Ω) mΩ @20°C (Typical)	DCR (Ω) mΩ @20°C (Maximum)	K-factor (4)
SD8350-1R8-R	1.8	1.5	5.50	9.1	11.8	14.0	16.0
SD8350-3R9-R	3.9	3.2	4.50	6.3	16.2	19.0	9.6
SD8350-4R7-R	4.7	4.2	4.10	5.5	18.5	22.0	8.5
SD8350-6R8-R	6.8	6.8	3.90	4.4	20.8	25.0	7.6
SD8350-100-R	10	9.9	3.20	4.0	31.4	36.0	6.3
SD8350-150-R	15	13.6	2.30	2.9	45.0	53.0	5.3
SD8350-220-R	22	20.4	1.80	2.6	63.5	75.0	4.4
SD8350-330-R	33	31.4	1.40	2.2	111.4	125.0	3.5
SD8350-470-R	47	44.9	1.30	1.8	130.0	150.0	2.9
SD8350-680-R	68	65.1	1.00	1.5	200.8	240.0	2.4
SD8350-101-R	100	99.7	0.80	1.3	308.0	360.0	2.0

(1) Open Circuit Inductance Test Parameters: 100kHz, 0.1V, 0.0Adc.
(2) Irms: DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 35% rolloff (@25°C)
(4) K-factor: Used to determine B p-p for core loss (see graph).
B p-p = K*L*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in µH), ΔI (Peak to peak ripple current in Amps).
(5) Part Number Definition: SD8350-xxx-R
SD8350 = Product code and size; -xxx = Inductance value in uH;
R = decimal point; If no R is present, third character = # of zeros.
-R suffix = RoHS compliant

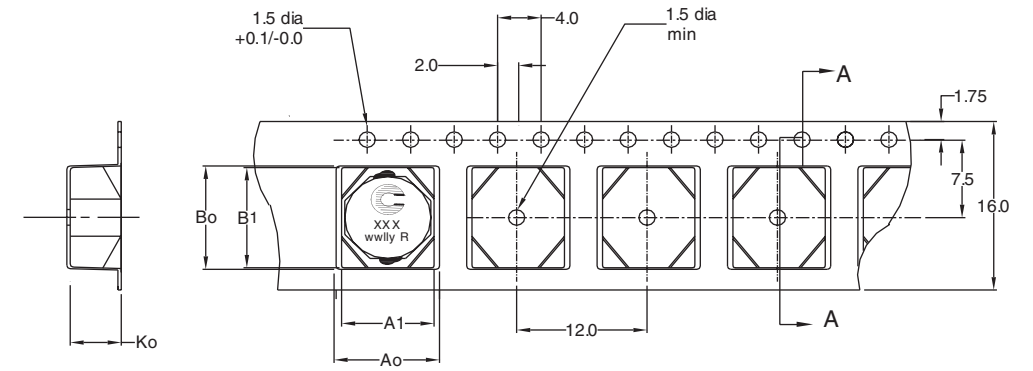
Mechanical Diagrams



Dimensions are in millimeters.

xxx = Inductance value in uH. R = decimal point. If no R is present third character = # of zeros. wwllyy = Date code, R = Revision level.

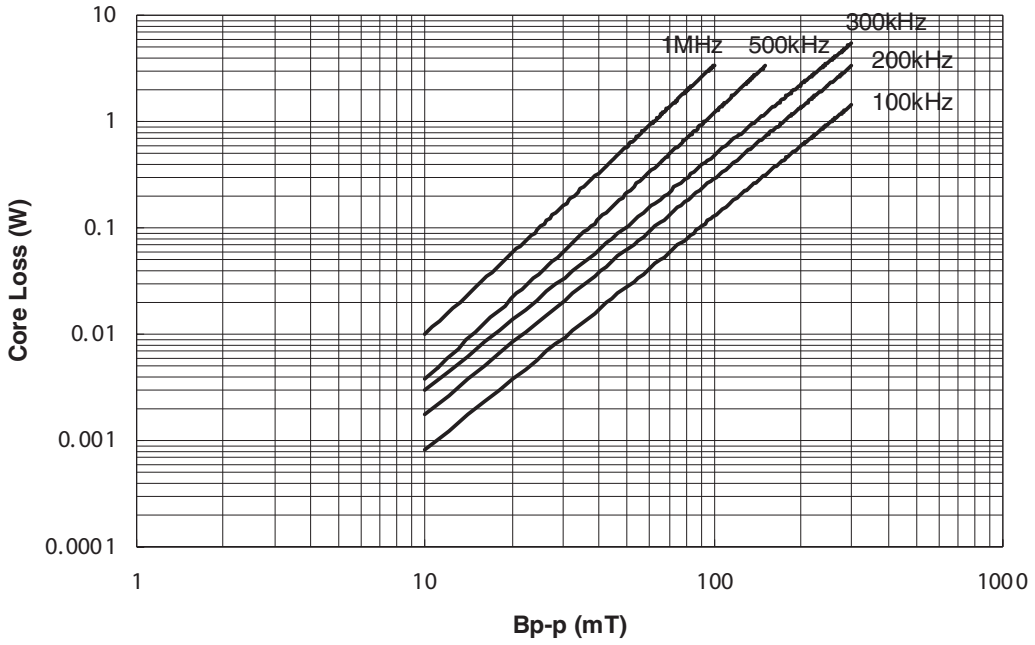
Packaging Information



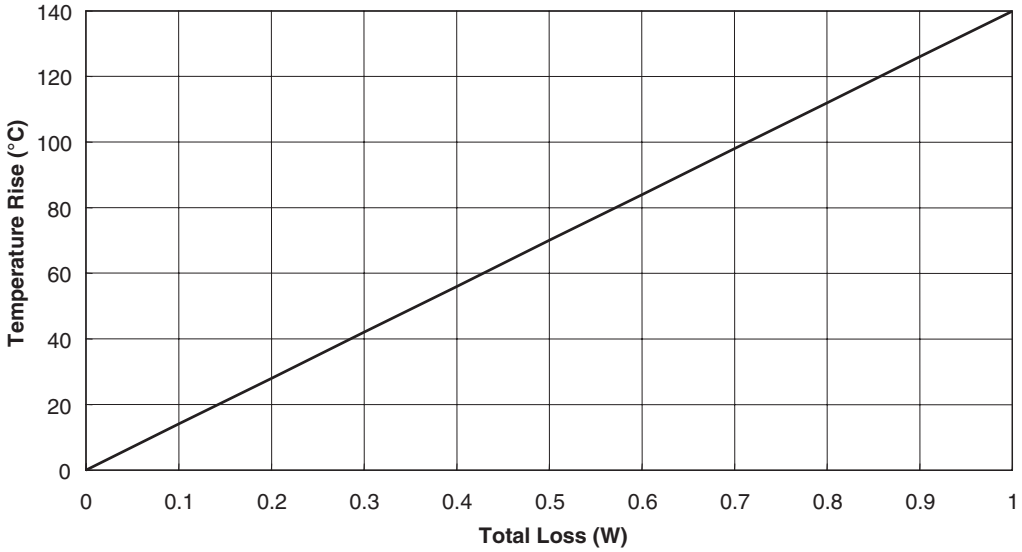
Ao=9.5 mm
Bo=10.0 mm
A1=8.5 mm
B1=9.7 mm
Ko=4.6 mm

Parts packaged on 13" Diameter reel,
750 parts per reel.

Core Loss

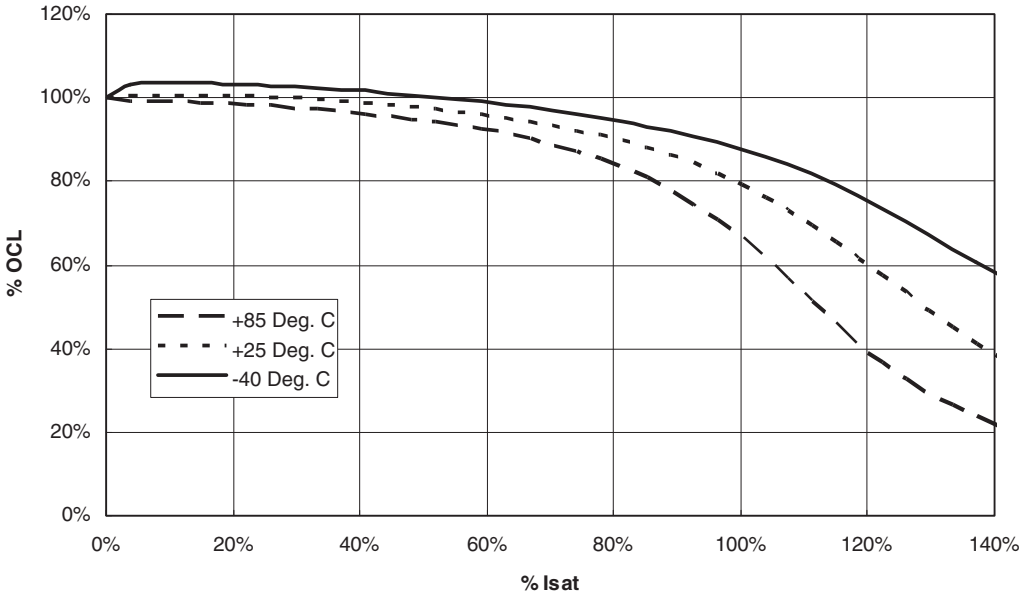


Temperature Rise vs. Loss



Inductance Characteristics

OCL Vs. Isat



COILTRONICS®

COOPER Bussmann

UNI-PAC™ 2.8
Low Cost, Low Profile 2.8mm Power Inductors (Surface Mount)

RoHS 2002/95/EC

Description

- Miniature size and rugged construction
- Low DCR and high efficiency
- Suited for IR and vapor reflow solder
- Designed for high shock environments
- Frequency range 1kHz to 2MHz
- Ferrite core material

Applications

- DC-DC converters
- Filter inductors
- Signal conditioning
- Energy storage applications
- Computer, pager and battery powered equipment

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +85°C range is application specific. Temperature rise is approximately 40°C at rated RMS current. Maximum operating temperature is 125°C including ambient.
- Solder reflow temperature: +260°C max. for 10 seconds max.

Packaging

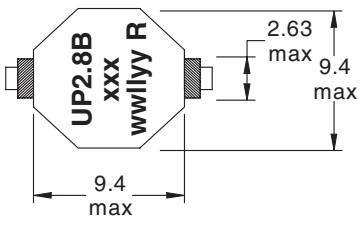
- Supplied in tape and reel packaging, 1,750 per reel

Part Number	Inductance µH (Rated)	OCL (1) µH ± 20%	Irms (2) Amperes	Isat (3) Amperes	DCR (4) Ohms (Max.)
UP2.8B-1R0-R	1.0	0.98	3.6	8.0	.0286
UP2.8B-1R5-R	1.5	1.59	3.3	6.4	.0349
UP2.8B-2R2-R	2.2	2.44	3.1	5.2	.0356
UP2.8B-3R3-R	3.3	3.24	2.8	4.5	.0474
UP2.8B-4R7-R	4.7	4.15	2.7	3.9	.0478
UP2.8B-6R8-R	6.8	6.73	2.4	3.2	.067
UP2.8B-100-R	10	10	2.1	2.7	.080
UP2.8B-150-R	15	15	1.7	2.2	.120
UP2.8B-220-R	22	22	1.5	1.7	.190
UP2.8B-330-R	33	33	1.3	1.5	.250
UP2.8B-470-R	47	47	1.0	1.2	.340
UP2.8B-680-R	68	68	.89	1.0	.480
UP2.8B-101-R	100	100	.78	.84	.622
UP2.8B-151-R	150	150	.62	.74	.971

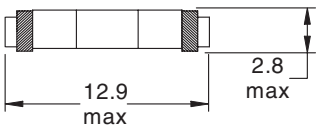
1) Open Circuit Inductance Test Parameters: 100kHz, 0.250 Vrms, 0.0 Adc
2) RMS current, delta temp. of 40° C ambient temperature of 85° C
3) Peak current for approximately 10% roll-off @ 20°C
4) Values @ 20° C

Mechanical Diagrams

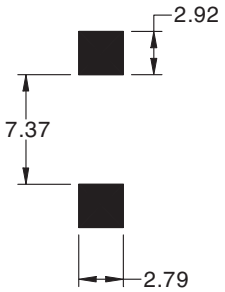
TOP VIEW



FRONT VIEW



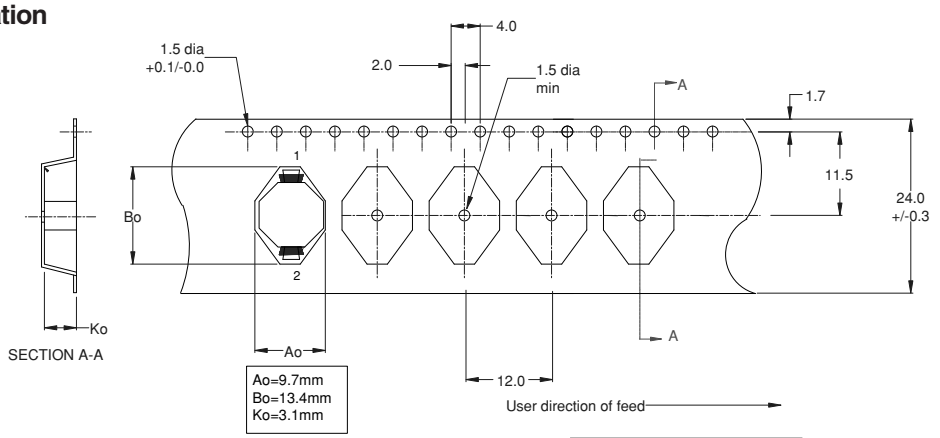
Recommended PCB Layout



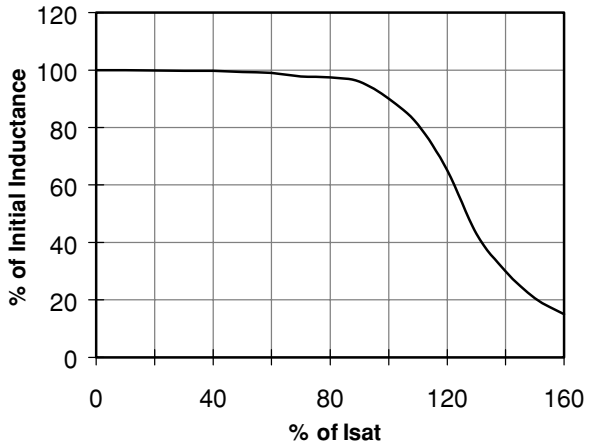
Component View

Dimensions in Millimeters.
wwllyy = date code R = (revision level)
xxx = Inductance value per family chart

Packaging Information



Inductance Characteristics



COOPER Bussmann

COILTRONICS

UNI-PAC™ 0.4C
Low Cost, Low Profile
Power Inductors (Surface Mount)

RoHS 2002/95/EC

Description

- Miniature size and rugged construction
- Designed for high shock environments
- Suited for IR and vapor reflow solder
- Frequency range 1kHz to 2MHz
- Ferrite core material

Applications

- Computer, pager and battery powered equipment

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +85°C range is application specific. Temperature rise is approximately 40°C at rated RMS current. Maximum operating temperature is 125°C including ambient.
- Solder reflow temperature: +260°C max. for 10 seconds max.

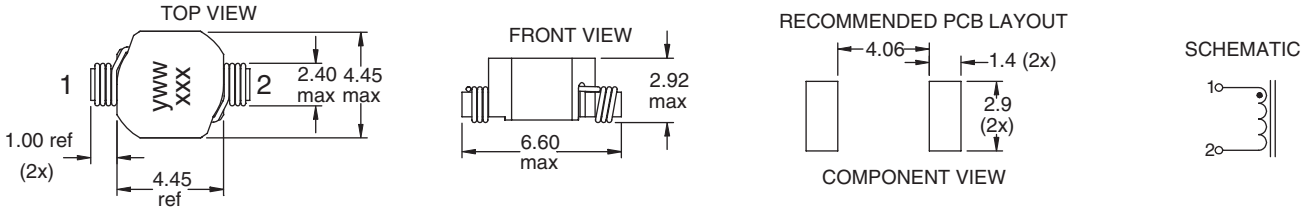
Packaging

- Supplied in tape and reel packaging, 2,500 per reel

Part Number	Inductance µH (Rated)	OCL (1) µH ± 20%	Irms (2) Amperes	Isat (3) Amperes	DCR (4) Ohms (Max)
UP0.4C-1R0-R	1.0	1.16	2.88	3.33	0.030
UP0.4C-1R5-R	1.5	1.49	2.58	2.94	0.034
UP0.4C-2R2-R	2.2	2.27	2.15	2.38	0.050
UP0.4C-3R3-R	3.3	3.22	1.89	2.00	0.060
UP0.4C-4R7-R	4.7	4.95	1.55	1.61	0.088
UP0.4C-6R8-R	6.8	7.06	1.30	1.35	0.128
UP0.4C-100-R	10	9.53	1.16	1.16	0.156
UP0.4C-150-R	15	14.5	0.95	0.94	0.250
UP0.4C-220-R	22	21.8	0.76	0.77	0.360
UP0.4C-270-R	27	27.5	0.69	0.68	0.480
UP0.4C-330-R	33	32.2	0.64	0.63	0.560
UP0.4C-390-R	39	39.0	0.59	0.57	0.650
UP0.4C-470-R	47	46.5	0.53	0.53	0.820
UP0.4C-680-R	68	68.2	0.45	0.43	1.10
UP0.4C-101-R	100	102.5	0.37	0.35	1.58

1) Open Circuit Inductance Test Parameters: 100kHz, 0.250 Vrms, 0.0 Adc
2) RMS current, delta temp. of 40°C ambient temperature of 85°C
3) Peak current for approximately 30% roll-off @ 20°C
4) Values @ 20°C

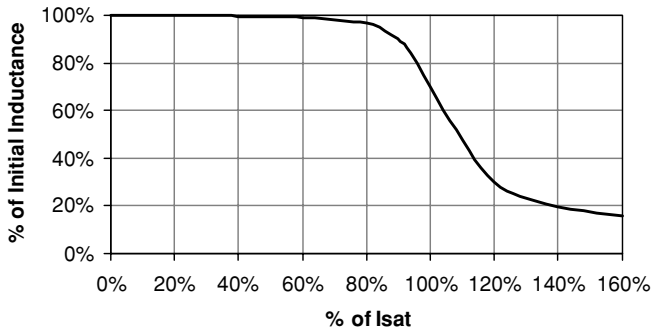
Mechanical Diagrams



Dimensions in Millimeters.

yww = Date Code xxx = Inductance value per family chart

Inductance Characteristics



COILTRONICS®

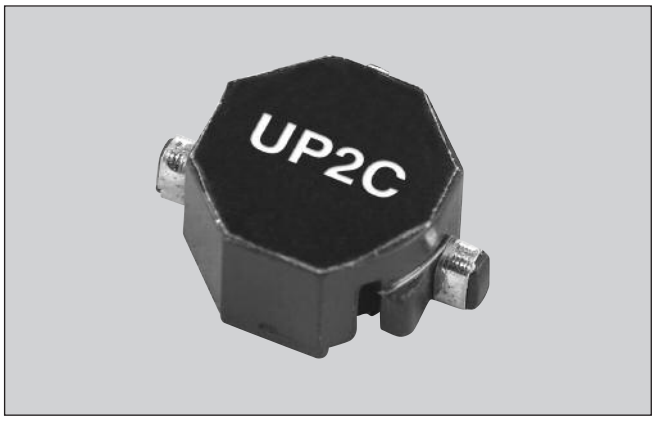
COOPER Bussmann

UNI-PAC™ 2C
Low Cost Power Inductors (Surface Mount)

RoHS 2002/95/EC

Description

- Miniature surface mount design with rugged case to eliminate core breakage
- Inductance range from 0.470uH to 1000uH
- Current range up to 18.6 Amps peak
- Meets UL94V-0 flammability standard
- Ferrite core material



Applications

- PDA, computer, and flash memory programs

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +85°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds max.

Packaging

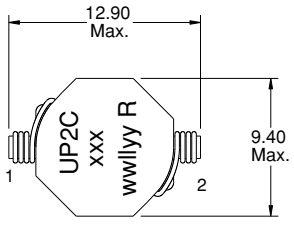
- Supplied in tape and reel packaging, 900 per reel

Part Number	Inductance µH (rated)	OCL(1) µH±20%	I RMS(2) Amperes	I SAT(3) Amperes	DCR(4) mΩ typ.	Volts(5) µS (typ)
UP2C-R47-R	0.470	0.48	12.2	18.6	2.5	4.15
UP2C-1R0-R	1.0	1.03	9.80	11.8	3.9	7.0
UP2C-1R5-R	1.5	1.45	8.10	10.0	5.6	8.3
UP2C-2R2-R	2.2	2.00	7.50	8.67	6.6	9.6
UP2C-3R3-R	3.3	3.30	5.90	6.84	10.5	12.1
UP2C-4R7-R	4.7	4.41	5.62	6.20	11.7	13.4
UP2C-6R8-R	6.8	7.16	4.42	4.82	18.0	17.3
UP2C-100-R	10.0	10.56	3.61	3.94	28.3	21.1
UP2C-150-R	15.0	15.97	3.17	3.17	36.9	26.2
UP2C-220-R	22.0	22.33	2.61	2.65	54.0	31.3
UP2C-330-R	33.0	32.11	2.16	2.20	79.7	37.7
UP2C-470-R	47.0	47.90	1.77	1.83	118.5	45.4
UP2C-680-R	68.0	65.03	1.57	1.53	151.7	54.3
UP2C-101-R	100.0	97.85	1.26	1.24	233.1	67.1
UP2C-151-R	150.0	141.9	1.04	1.02	351.4	81.2
UP2C-221-R	220.0	207.8	0.82	0.85	545.0	97.8
UP2C-331-R	330.0	318.2	0.67	0.70	824.3	120
UP2C-471-R	470.0	470.8	0.56	0.58	1191.4	144
UP2C-681-R	680.0	689.7	0.46	0.48	1774.2	173
UP2C-102-R	1000.0	1080.0	0.38	0.40	2657.1	209

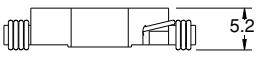
Notes: (1) Open Circuit Inductance Test Parameters: 100KHz, .250Vrms, 0.0Adc.
(2) RMS current for an approximate ΔT of 40°C without core loss, at an ambient temperature of 85°C.
(3) Peak current for approximately 30% rolloff @ 20°C.
(4) DCR limits 20°C.
(5) Applied volt-time product (V-uS) across the inductor. This value represents the applied v-us at 300KHz necessary to generate a core loss equal to 10% of the total losses for a 40° temperature rise.

Mechanical Diagrams

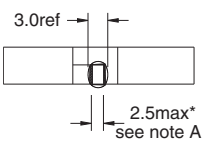
TOP VIEW



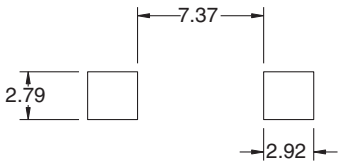
FRONT VIEW



SIDE VIEW

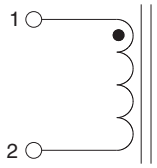


PCB PAD LAYOUT



COMPONENT VIEW

SCHEMATIC



Dimensions in Millimeters.
wwllyy = (date code) R = revision level
xxx = Inductance value per family chart

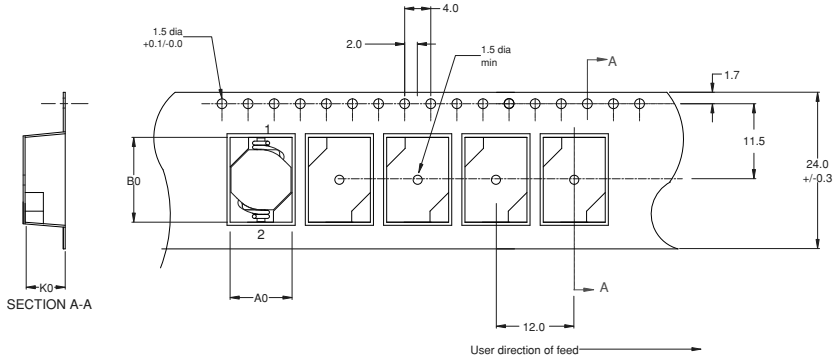
(A) 2.5mm max is width of copper at seating plane. The width above the seating plane may exceed 2.5mm.

COOPER Bussmann

COILTRONICS

UNI-PAC™ 2C
Low Cost Power Inductors
(Surface Mount)

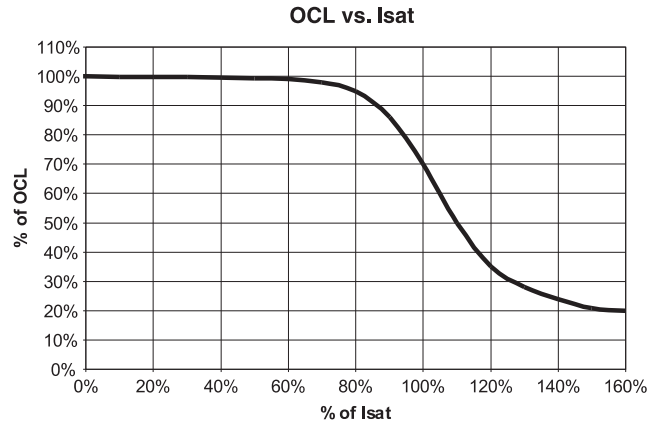
Packaging Information



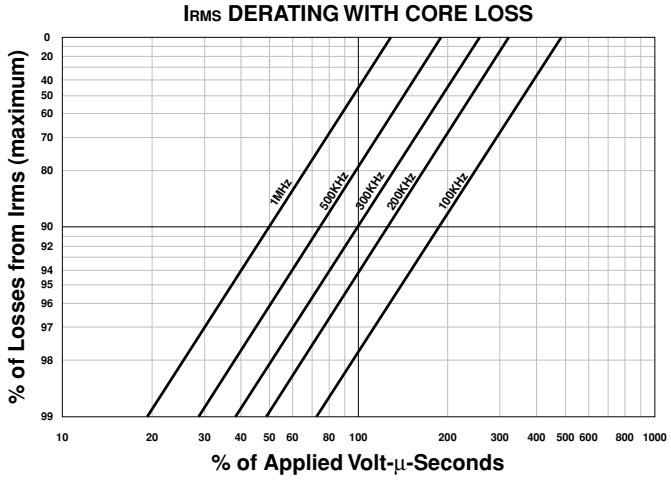
ACTUAL SIZE
UNIPAC 2C

Ao=9.50mm
Bo=13.0mm
Ko=5.7mm

Inductance Characteristics



Core Loss



COOPER Bussmann

COILTRONICS®

UNI-PAC™ Power Inductors (Surface Mount)

Description

RoHS 2002/95/EC

- Miniature surface mount design
- Inductance range from 0.470uH to 1000uH
- Current range from 19.2 to .47 Amps
- Maximum power density
- Ideal for applications requiring low inductance and high current in a miniature package
- Modified standard products are available
- Protective case eliminates core breakage
- Meets UL 94V-0 flammability standard
- Ferrite core material

Applications

- DC-DC converters on board level and industrial products

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +85°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds max.

Packaging

- Supplied in tape and reel packaging, 900 (UP1B), 550 (UP2B), 450 (UP3B), and 275 (UP4B) per reel

Part Number	Inductance µH (rated)	OCL(1) µH±20%	I RMS(2) Amperes	I SAT(3) Amperes	DCR(4) Ohms max.
UP1B-R47-R	0.47	0.569	6.0	7.7	0.0097
UP1B-1R0-R	1.0	1.20	4.4	5.3	0.0177
UP1B-1R5-R	1.5	1.61	4.2	4.5	0.0200
UP1B-2R2-R	2.2	2.62	3.1	3.5	0.0363
UP1B-3R3-R	3.3	3.79	2.9	3.0	0.0428
UP1B-4R7-R	4.7	5.15	2.2	2.6	0.0544
UP1B-6R8-R	6.8	6.87	1.7	2.2	0.0897
UP1B-100-R	10.0	11.00	1.5	1.9	0.1107
UP1B-150-R	15.0	16.00	1.2	1.5	0.1747
UP1B-220-R	22.0	23.50	1.0	1.2	0.2541
UP1B-330-R	33.0	36.00	0.82	0.99	0.3670
UP1B-470-R	47.0	48.50	0.72	0.87	0.4740
UP1B-680-R	68.0	73.52	0.58	0.67	0.7320
UP1B-101-R	100.0	112.67	0.47	0.53	1.11
UP1B-151-R	150.0	152.40	0.40	0.46	1.61
UP1B-221-R	220.0	223.10	0.36	0.38	1.96
UP1B-331-R	330.0	331.90	0.28	0.31	3.10
UP2B-R47-R	0.47	0.595	10.6	11.4	0.0049
UP2B-1R0-R	1.0	1.00	9.3	9.9	0.0065
UP2B-1R5-R	1.5	1.46	8.3	7.9	0.0081
UP2B-2R2-R	2.2	2.56	7.2	6.1	0.0107
UP2B-3R3-R	3.3	3.23	6.5	5.1	0.0128
UP2B-4R7-R	4.7	4.77	5.5	4.2	0.0165
UP2B-6R8-R	6.8	6.63	5.0	3.6	0.0202
UP2B-100-R	10.0	9.73	4.3	3.3	0.0267
UP2B-150-R	15.0	15.43	3.5	2.4	0.0410
UP2B-220-R	22.0	22.50	2.8	2.0	0.0617
UP2B-330-R	33.0	33.13	2.1	1.7	0.0917
UP2B-470-R	47.0	48.65	1.7	1.4	0.1388
UP2B-680-R	68.0	68.17	1.5	1.2	0.1787
UP2B-820-R	82.0	84.1	1.34	1.03	0.2235
UP2B-101-R	100.0	102.60	1.2	0.95	0.2707
UP2B-151-R	150.0	150	1.0	0.77	0.4100

Notes: (1) Open Circuit Inductance Test Parameters: 100KHz, .250Vrms, 0.0Adc.
(2) RMS current for an approximate ΔT of 40°C. at an ambient temperature of 85˚C.
(3) Peak current for approximately 30% rolloff UP1B, 3B, 4B. 10% rolloff UP2B @ 20°C
(4) DCR limits 20°C.

COOPER Bussmann

COILTRONICS®

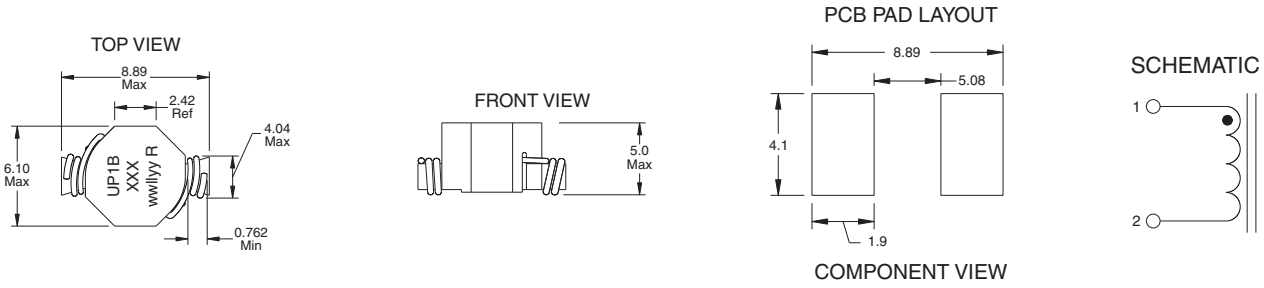
UNI-PAC™ Power Inductors (Surface Mount)

Part Number	Inductance µH (rated)	OCL[1] µH±20%	I RMS[2] Amperes	I SAT[3] Amperes	DCR[4] Ohms max.
UP2B-221-R	220.0	223	0.773	0.637	0.6717
UP2B-331-R	330.0	338	0.676	0.510	0.8783
UP2B-471-R	470.0	471	0.553	0.427	1.31
UP2B-681-R	680.0	700	0.452	0.355	1.97
UP2B-821-R	820.0	823	0.423	0.334	2.24
UP2B-102-R	1000.0	1005	0.369	0.300	2.96
UP3B-R47-R	0.47	0.452	16.0	25.1	0.0021
UP3B-1R0-R	1.0	1.34	12.5	15.3	0.0034
UP3B-1R5-R	1.5	2.08	10.0	12.0	0.0053
UP3B-2R2-R	2.2	3.01	9.2	10.2	0.0074
UP3B-3R3-R	3.3	3.96	8.0	9.3	0.0083
UP3B-4R7-R	4.7	5.00	6.5	7.7	0.0114
UP3B-6R8-R	6.8	7.70	5.8	6.2	0.0183
UP3B-100-R	10.0	11.00	4.3	5.2	0.0260
UP3B-150-R	15.0	16.38	3.9	4.3	0.0317
UP3B-220-R	22.0	23.93	3.1	3.7	0.0490
UP3B-330-R	33.0	33.85	2.4	3.0	0.0688
UP3B-470-R	47.0	51.00	1.9	2.4	0.1082
UP3B-680-R	68.0	69.50	1.6	2.0	0.1558
UP3B-101-R	100.0	101.40	1.4	1.8	0.2053
UP3B-151-R	150.0	152.9	1.2	1.4	0.2960
UP3B-331-R	330.0	332.80	0.75	0.98	0.7330
UP4B-R47-R	0.47	0.473	19.2	51.7	0.0019
UP4B-1R0-R	1.0	0.916	17.3	37.3	0.0023
UP4B-1R5-R	1.5	1.52	13.4	28.9	0.0039
UP4B-2R2-R	2.2	2.27	12.0	23.7	0.0048
UP4B-3R3-R	3.3	3.14	11.0	20.2	0.0057
UP4B-4R7-R	4.7	5.34	8.6	15.6	0.0093
UP4B-6R8-R	6.8	6.66	8.3	14.1	0.0100
UP4B-100-R	10.0	9.77	6.8	11.5	0.0150
UP4B-150-R	15.0	15.61	5.5	9.1	0.0230
UP4B-220-R	22.0	22.61	4.5	7.6	0.0340
UP4B-330-R	33.0	34.30	3.7	6.1	0.0520
UP4B-470-R	47.0	48.10	3.1	5.2	0.0740
UP4B-680-R	68.0	69.14	2.4	4.3	0.1200
UP4B-101-R	100.0	99.42	2.0	3.6	0.1700
UP4B-151-R	150.0	146.90	1.7	3.0	0.2392
UP4B-221-R	220.0	221.40	1.4	2.4	0.3571
UP4B-331-R	330.0	330.00	1.1	2.0	0.5800
UP4B-471-R	470.0	470.10	0.91	1.7	0.8330

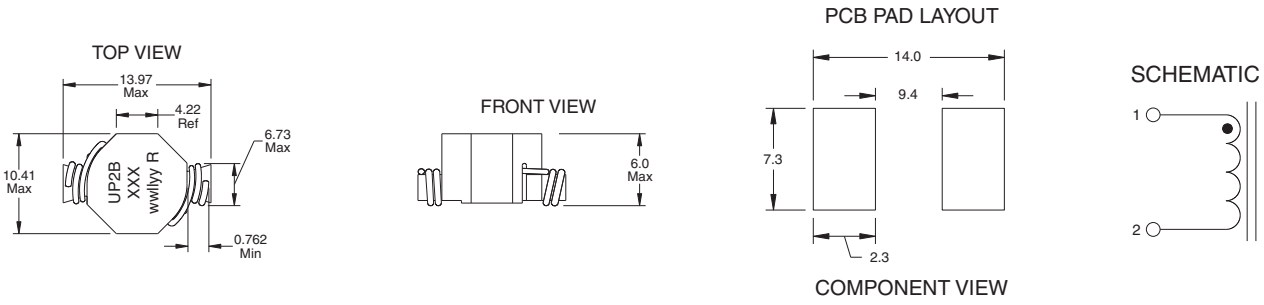
Notes: (1) Open Circuit Inductance Test Parameters: 100KHz, .250Vrms, 0.0Adc.
(2) RMS current for an approximate ΔT of 40°C. at an ambient temperature of 85˚C.
(3) Peak current for approximately 30% rolloff UP1B, 3B, 4B. 10% rolloff UP2B @ 20°C
(4) DCR limits 20°C.

Mechanical Diagrams

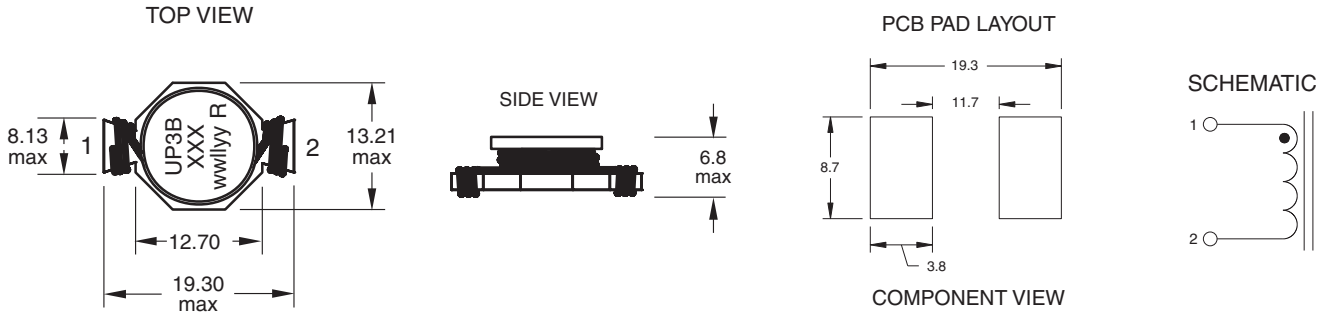
UP1B Series



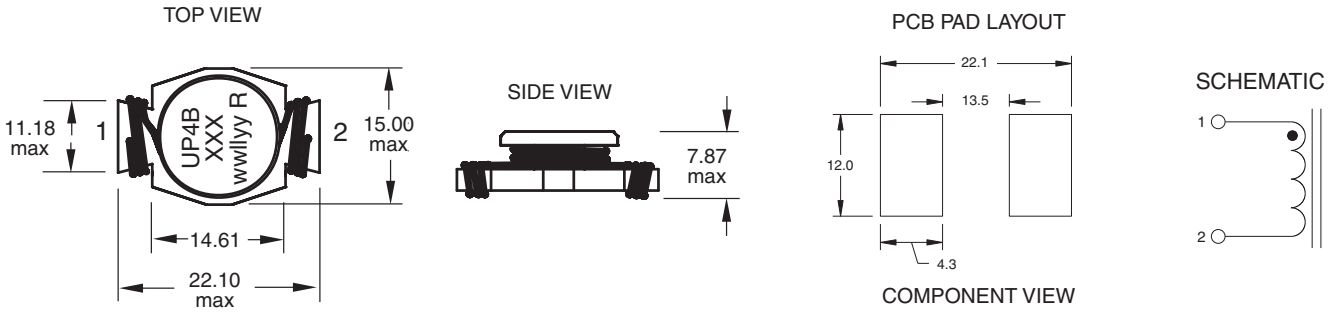
UP2B Series



UP3B Series



UP4B Series

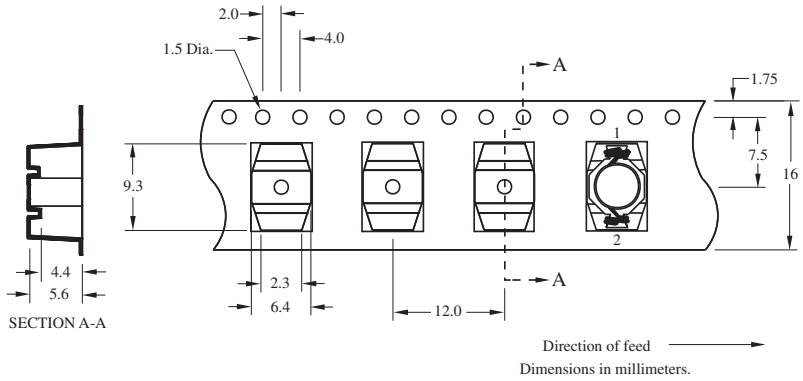


Dimensions in Millimeters.

wwllyy = (date code) R = revision level
xxx = Inductance value per family chart

Packaging Information

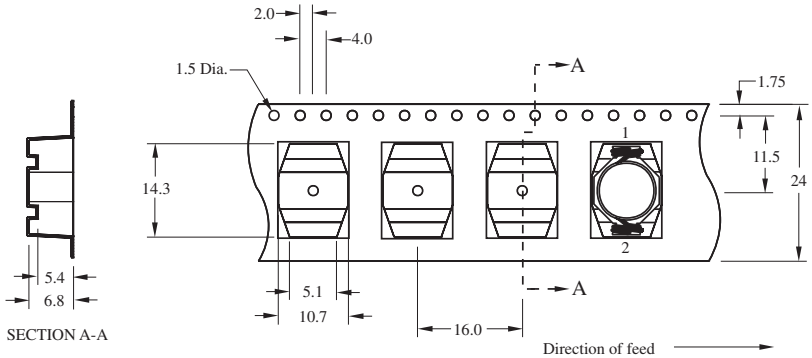
UP1B Series



ACTUAL SIZE
UNI-PAC 1B

Parts packaged on 13" Diameter reel,
900 parts per reel.

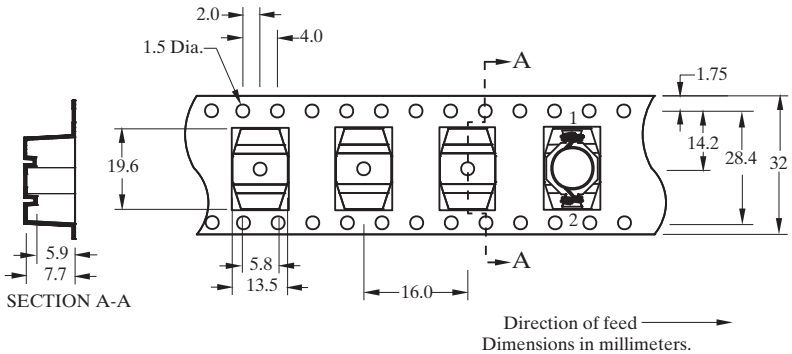
UP2B Series



ACTUAL SIZE
UNI-PAC 2B

Parts packaged on 13" Diameter reel,
550 parts per reel.

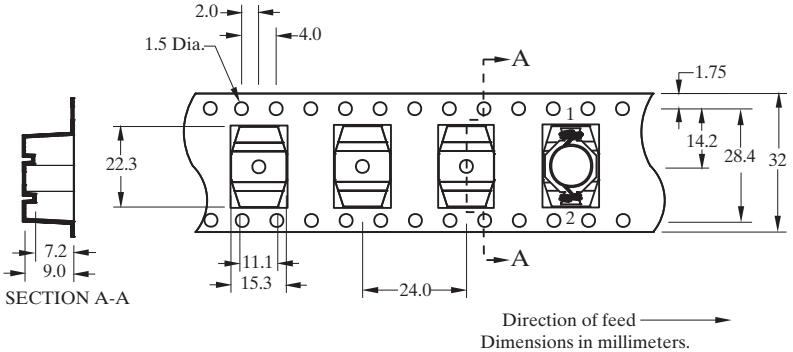
UP3B Series



ACTUAL SIZE
UNI-PAC 3B

Parts packaged on 13" Diameter reel,
450 parts per reel.

UP4B Series

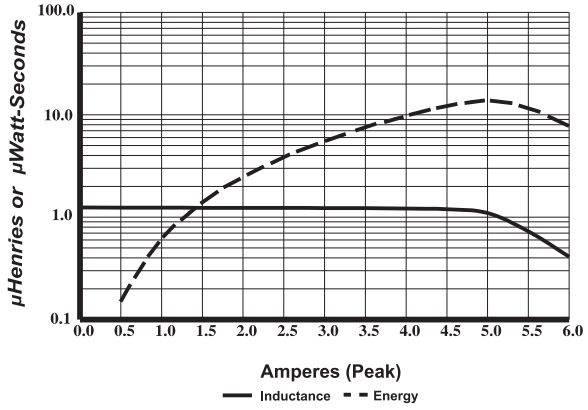


ACTUAL SIZE
UNI-PAC 4B

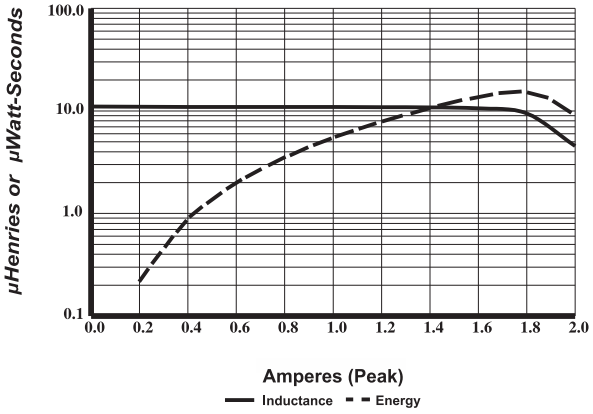
Parts packaged on 13" Diameter reel,
275 parts per reel.

Inductance Characteristics

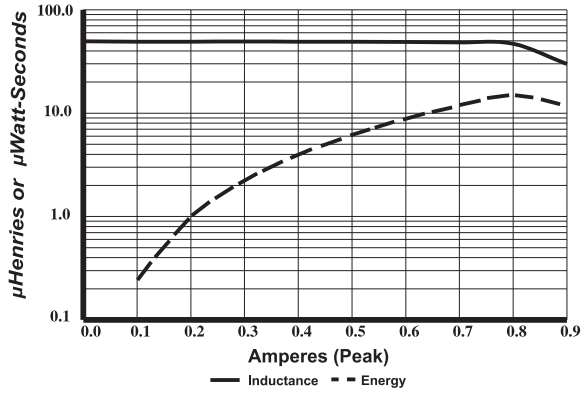
UP1B-1R0
Typical Inductance & Energy vs Saturation Current



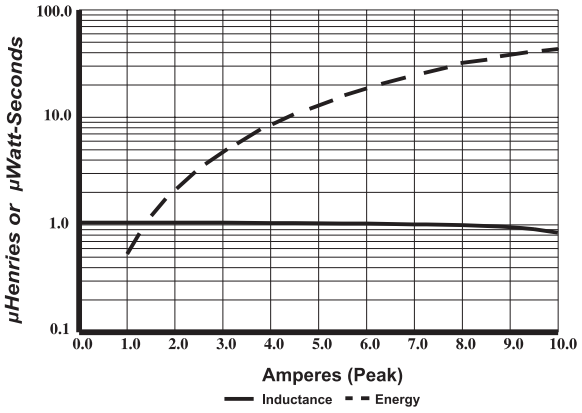
UP1B-100
Typical Inductance & Energy vs Saturation Current



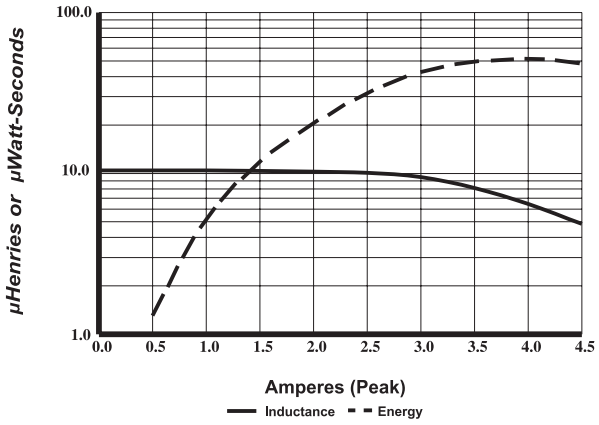
UP1B-470
Typical Inductance & Energy vs Saturation Current



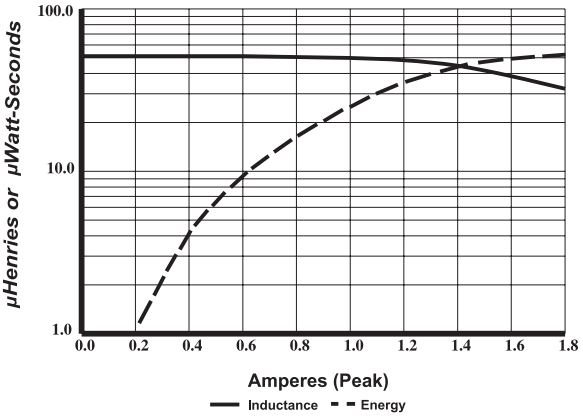
UP2B-1R0
Typical Inductance & Energy vs Saturation Current



UP2B-100
Typical Inductance & Energy vs Saturation Current

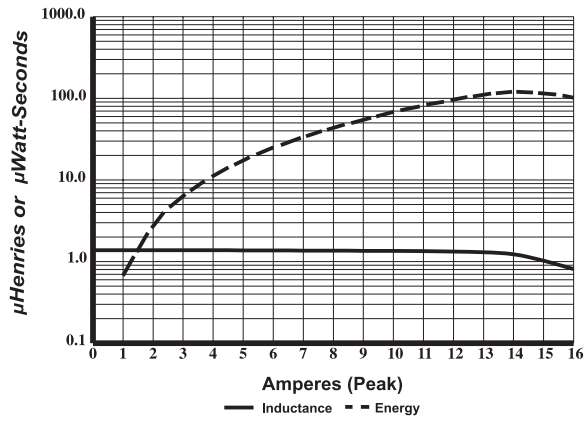


UP2B-470
Typical Inductance & Energy vs Saturation Current

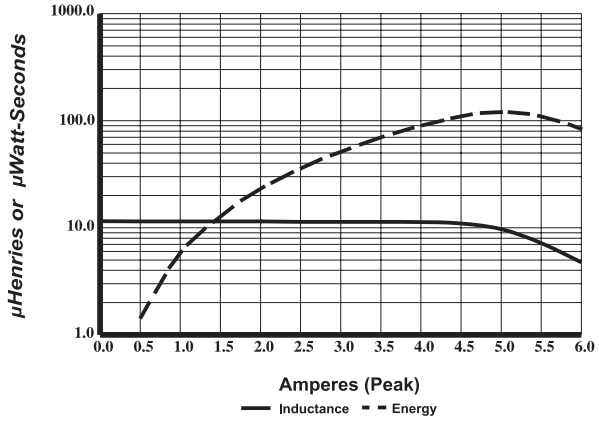


Inductance Characteristics

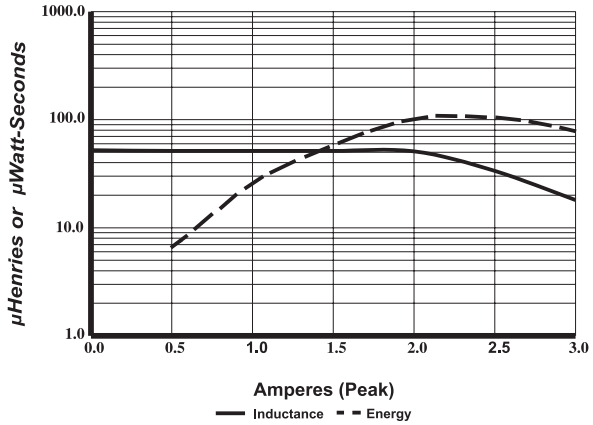
UP3B-1R0
Typical Inductance & Energy vs Saturation Current



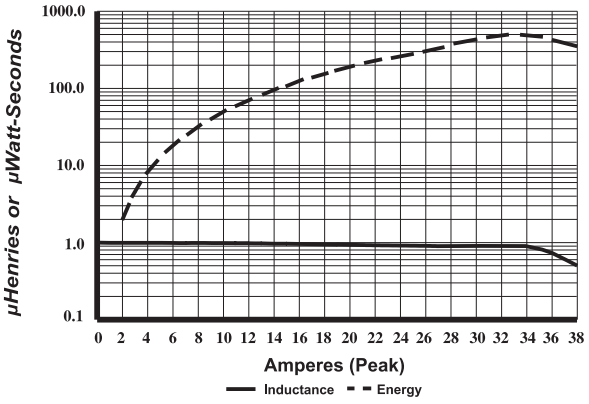
UP3B-100
Typical Inductance & Energy vs Saturation Current



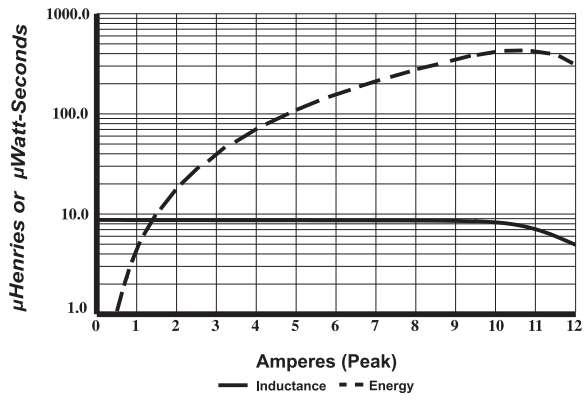
UP3B-470
Typical Inductance & Energy vs Saturation Current



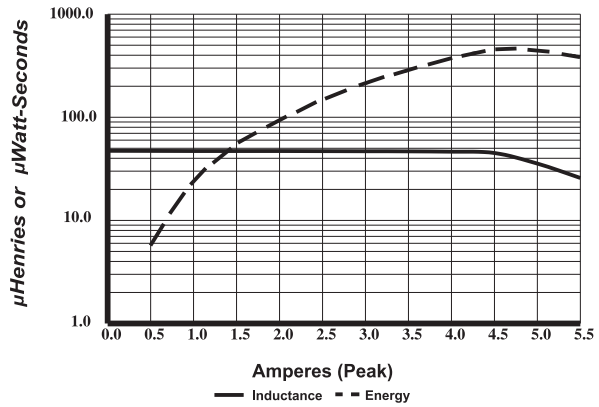
UP4B-1R0
Typical Inductance & Energy vs Saturation Current



UP4B-100
Typical Inductance & Energy vs Saturation Current



UP4B-470
Typical Inductance & Energy vs Saturation Current

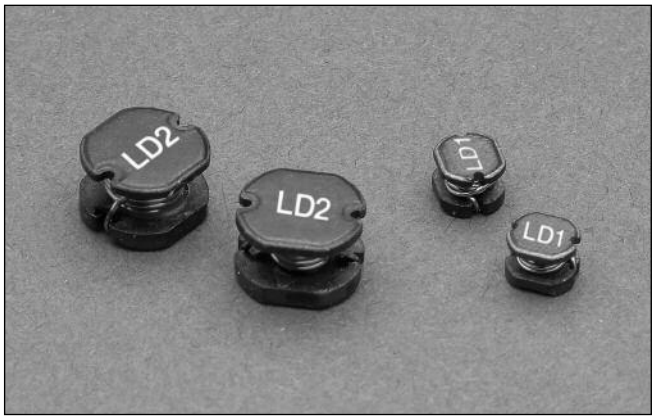


COOPER Bussmann

COILTRONICS

LD Series
Metalized Drum Core
Power Inductor

RoHS 2002/95/EC



Description

- Metalized drum core design utilizes board space
- Current Range from 4.46 to 0.52 Amps
- Inductance range from 1.0 uH to 470uH
- Ferrite core material

Applications

- Buck or Boost inductor
- Noise filtering and output filter chokes
- Computers
- Power Supplies
- Test Equipment Instrumentation

Environmental Data

- Storage temperature: -25°C to +85°C
- Operating ambient temperature: -20°C to +80°C (Range is application specific). Temperature rise is approximately 40°C at rated rms current.
- Solder reflow temperature: 260°C max. for 10 seconds max.

Packaging

- Supplied in tape and reel packaging, LD1 (2,000), LD2 (1,000) parts per reel

Part Number	Rated Inductance (µH)	OCL (1) Nominal	Irms (2) Amperes	Isat (3) Amperes	DCR (4) (Ω) (Max.)
LD1-1R0-R	1.0	1.00	2.66	4.46	0.0330
LD1-1R4-R	1.4	1.40	2.47	3.41	0.0380
LD1-1R8-R	1.8	1.80	2.35	3.05	0.0420
LD1-2R2-R	2.2	2.20	2.22	2.76	0.0470
LD1-2R7-R	2.7	2.70	2.11	2.52	0.0520
LD1-3R3-R	3.3	3.30	2.00	2.32	0.0580
LD1-3R9-R	3.9	3.90	1.75	2.14	0.0760
LD1-4R7-R	4.7	4.70	1.57	2.00	0.0940
LD1-5R6-R	5.6	5.60	1.51	1.75	0.1010
LD1-6R8-R	6.8	6.80	1.41	1.56	0.1170
LD1-8R2-R	8.2	8.20	1.32	1.41	0.1320
LD1-100-R	10	10.0	1.13	1.28	0.1820
LD1-120-R	12	12.0	1.05	1.18	0.2100
LD1-150-R	15	15.0	0.99	1.05	0.2350
LD1-180-R	18	18.0	0.83	0.98	0.3380
LD1-220-R	22	22.0	0.78	0.89	0.3780
LD1-270-R	27	27.0	0.67	0.87	0.5220
LD1-330-R	33	33.0	0.66	0.75	0.5400
LD1-390-R	39	39.0	0.63	0.68	0.5870
LD1-470-R	47	47.0	0.52	0.61	0.8440
LD1-560-R	56	56.0	0.50	0.57	0.9370
LD1-680-R	68	68.0	0.46	0.52	1.12

Notes:
1) Open Circuit Inductance Test Parameters: 100kHz, 0.25Vrms, 0.0Adc +/-20% except for LD1-330 to LD1-680 and LD2-470 to LD2-471 which is +/-10%
2) RMS current for for an approximate T of 40°C. It is recommended that the temperature of the part not exceed 125°C
3) Peak current for an approximate 10% rolloff at 20°C
4) DCR limits @ 20°C

COOPER Bussmann

COILTRONICS

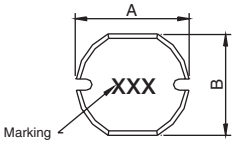
LD Series
Metalized Drum Core
Power Inductor

Part Number	Rated Inductance (µH)	OCL (1) Nominal	Irms (2) Amperes	Isat (3) Amperes	DCR (4) (Ω) (Max.)
LD2-100-R	10	10.0	3.83	3.45	0.0700
LD2-120-R	12	12.0	3.57	3.20	0.0800
LD2-150-R	15	15.0	3.38	2.85	0.0900
LD2-180-R	18	18.0	3.19	2.60	0.1000
LD2-220-R	22	22.0	3.13	2.45	0.1100
LD2-270-R	27	27.0	2.81	2.10	0.1200
LD2-330-R	33	33.0	2.70	2.01	0.1300
LD2-390-R	39	39.0	2.42	1.85	0.1600
LD2-470-R	47	47.0	2.25	1.64	0.1800
LD2-560-R	56	56.0	1.96	1.50	0.2400
LD2-680-R	68	68.0	1.88	1.35	0.2800
LD2-820-R	82	82	1.63	1.28	0.3700
LD2-101-R	100	100	1.53	1.15	0.4300
LD2-121-R	120	120	1.43	1.09	0.4700
LD2-151-R	150	150	1.23	0.95	0.6400
LD2-181-R	180	180	1.15	0.87	0.7100
LD2-221-R	220	220	1.00	0.79	0.9600
LD2-271-R	270	270	0.94	0.73	1.11
LD2-331-R	330	330	0.83	0.64	1.26
LD2-391-R	390	390	0.78	0.58	1.77
LD2-471-R	470	470	0.74	0.55	1.96

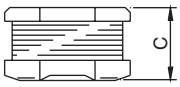
Notes:
1) Open Circuit Inductance Test Parameters: 100kHz, 0.25Vrms, 0.0Adc +/-20% except for LD1-330 to LD1-680 and LD2-470 to LD2-471 which is +/-10%
2) RMS current for for an approximate T of 40°C. It is recommended that the temperature of the part not exceed 125°C
3) Peak current for an approximate 10% rolloff at 20°C
4) DCR limits @ 20°C

Mechanical Diagrams

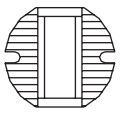
TOP VIEW



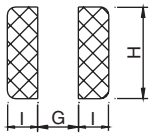
FRONT VIEW



BOTTOM VIEW

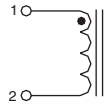


RECOMMENDED PCB LAYOUT



Component Side

SCHEMATIC



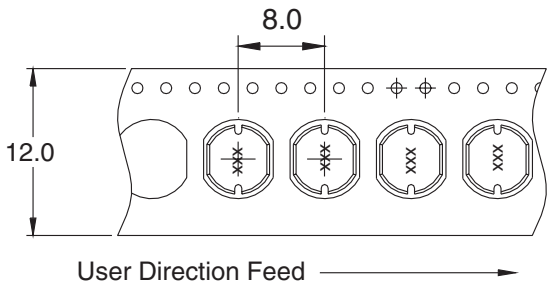
Marking:
LD1: xxx=inductance value per family chart
LD2: "C" logo
xxx=inductance value

Dimension	A +/-0.3	B +/-0.3	C +/-0.3	G ref	H ref	I ref
LD1	4.5	4.0	3.2	1.5	4.5	1.75
LD2	7.8	7.0	5.0	2.0	7.5	3.0

Dimensions in millimeters.

Packaging Information

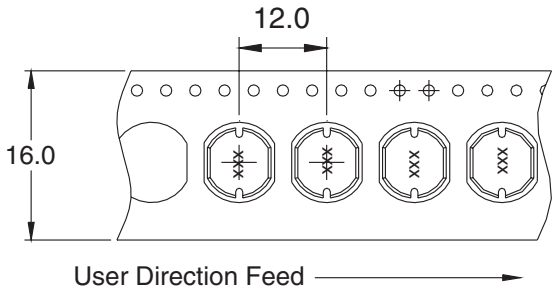
LD1 Series



ACTUAL SIZE
LD1

Parts packaged on 13" Diameter reel,
2,000 parts per reel.

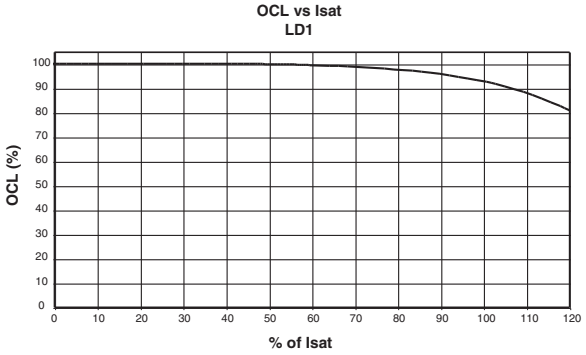
LD2 Series

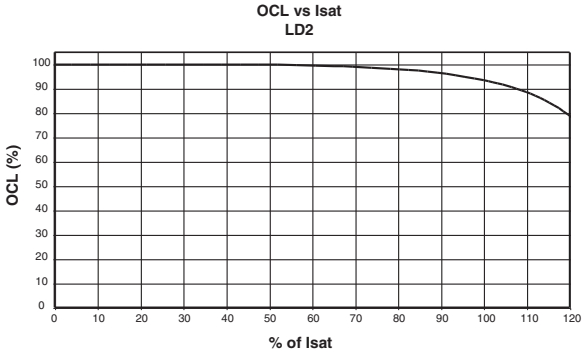


ACTUAL SIZE
LD2

Parts packaged on 13" Diameter reel,
1,000 parts per reel.

Inductance Characteristics





COOPER Bussmann

MICRO-PAC™ Low Profile Power Inductors (Surface Mount)

Description

RoHS 2002/95/EC

- High performance, ferrite-based, low profile, surface mount inductors
- Small footprint and closed magnetic field construction allow for low EMI
- Low DCR and high efficiency
- Ferrite core material

Applications

- PC cards, cellular telephones, pagers, and disk drives
- GPS systems

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +85°C (range is application specific).
- Solder reflow temperature: +260°C max. for 10 seconds max.

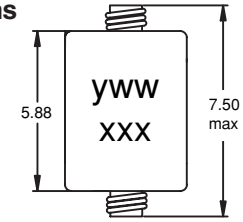
Packaging

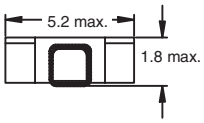
- Supplied in tape and reel packaging, 3900 per reel

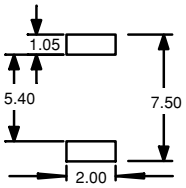
Part Number	Inductance µH	OCL (1) µH ± 20%	Irms (2) Amperes (Typ.)	Isat (3) Amperes (Typ.)	DCR (4) Ohms (Max.)	Q (5) (Typ.)	SRF MHz (Typ.)
MP2-R47-R	0.47	0.40	2.02	3.40	0.075	10	300
MP2-1R0-R	1.0	1.02	1.67	2.10	0.103	20	160
MP2-1R5-R	1.5	1.59	1.51	1.70	0.118	25	155
MP2-2R2-R	2.2	2.29	1.39	1.40	0.130	32	150
MP2-3R3-R	3.3	3.58	1.25	1.10	0.156	42	140
MP2-4R7-R	4.7	4.60	1.18	1.00	0.180	46	130
MP2-6R8-R	6.8	7.02	1.06	0.80	0.202	46	110
MP2-100-R	10.0	9.95	0.98	0.68	0.240	55	100
MP2-150-R	15.0	15.30	0.88	0.54	0.300	65	60
MP2-220-R	22.0	21.80	0.80	0.45	0.360	65	45
MP2-330-R	33.0	33.70	0.64	0.37	0.556	65	35
MP2-470-R	47.0	46.40	0.52	0.31	0.833	65	28

1) Open Circuit Inductance Test Parameters: 100kHz, 0.250 Vrms, 0.0 Adc
2) RMS current, delta temp. of 40° C ambient temperature of 85° C
3) Peak current for approximately 30% roll-off
4) Values @ 20° C
5) Measured @ 300KHz

Mechanical Diagrams



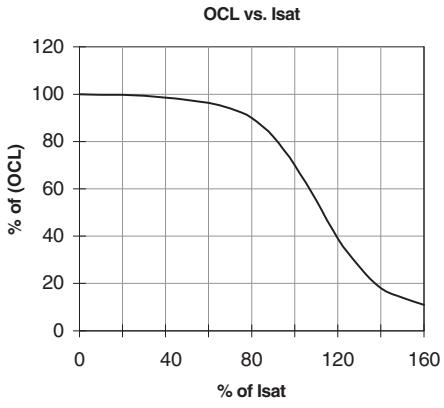




Dimensions in Millimeters.
Specifications are subject to change without notice.

yww = Date Code
xxx = Inductance value per family chart

Inductance Characteristics



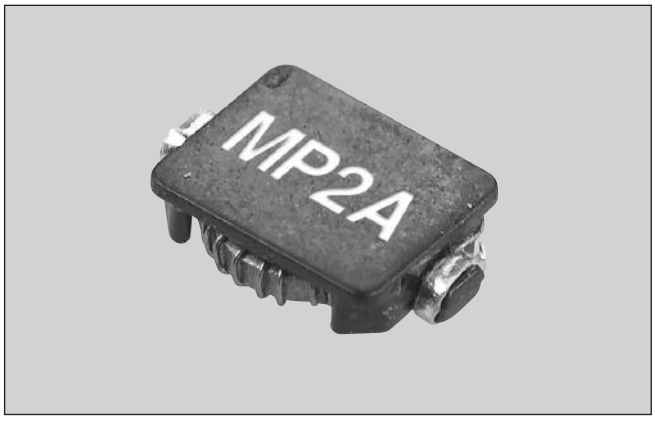
COOPER Bussmann

MICRO-PAC PLUS™
Low Profile Power Inductors
(Surface Mount)

Description

RoHS 2002/95/EC

- High performance, low profile, surface mount power inductors with a molybdenum permalloy core
- Small footprint and closed magnetic field construction ensure low EMI
- Low DCR and high efficiency
- Frequency range up to 500kHz
- MPP core material



Applications

- PC cards, cellular telephones, pagers, and disk drives
- GPS systems

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +85°C (range is application specific).
- Solder reflow temperature: +260°C max for 10 seconds max

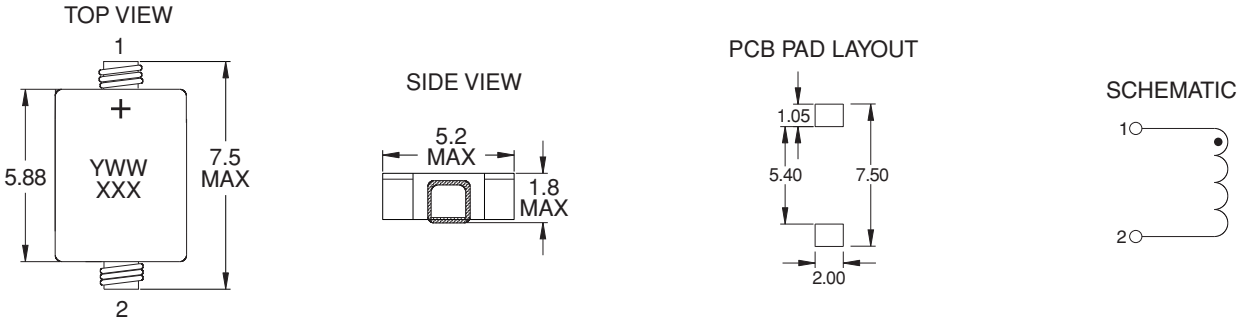
Packaging

- Supplied in tape and reel packaging, 3900 per reel

Part Number	Inductance µH (rated)	OCL(1) µH±20%	DCR(2) typ. Ω	I RMS(3) Amperes	I SAT(4) Amperes	Volt(5) µsec
MP2A-R47-R	0.47	0.47	0.024	3.52	5.80	1.20
MP2A-R68-R	0.68	0.68	0.027	3.31	4.83	1.27
MP2A-1R0-R	1.00	1.21	0.067	2.11	3.63	2.00
MP2A-1R5-R	1.50	1.54	0.073	2.02	3.22	2.09
MP2A-2R2-R	2.20	2.30	0.086	1.87	2.64	2.26
MP2A-3R3-R	3.30	3.21	0.098	1.75	2.23	2.42
MP2A-4R7-R	4.70	4.86	0.117	1.60	1.81	2.64
MP2A-6R8-R	6.80	6.85	0.136	1.49	1.53	2.84
MP2A-8R2-R	8.20	8.54	0.167	1.34	1.54	3.15
MP2A-100-R	10.00	10.02	0.179	1.29	1.42	3.26
MP2A-150-R	15.00	15.18	0.217	1.18	1.16	3.59
MP2A-220-R	22.00	21.40	0.311	0.98	0.97	4.30
MP2A-330-R	33.00	32.74	0.476	0.79	0.79	5.32
MP2A-470-R	47.00	46.48	0.727	0.64	0.66	6.57
MP2A-680-R	68.00	68.53	1.108	0.52	0.54	8.11
MP2A-820-R	82.00	81.15	1.463	0.45	0.50	9.32
MP2A-101-R	100.00	99.65	2.015	0.39	0.45	10.94

Notes: (1) Open Circuit Inductance Test Parameters: 100 kHz, .25Vrms, 0.0Adc.
(2) DCR limits 20°C.
(3) RMS current for an approximate ΔT of 40°C without core loss. It is recommended that the temperature of the part not exceed 125°C.
(4) Peak current for approximately 30% rolloff at 20°C.
(5) Applied Volt-Time product (V-µS) across the inductor. This value represents the applied V-µS at 300KHz necessary to generate a core loss equal to 10% of the total losses for 40°C temperature rise.

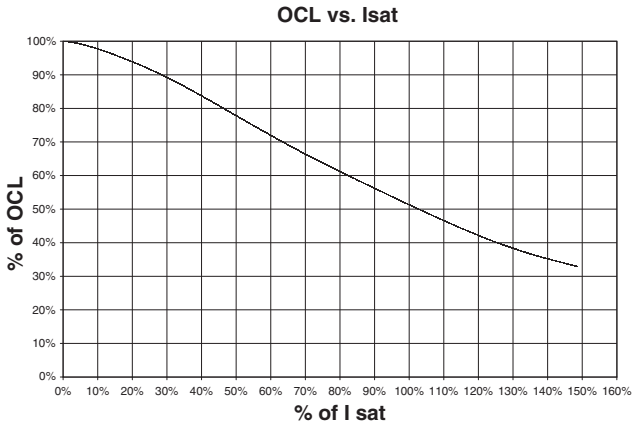
Mechanical Diagrams



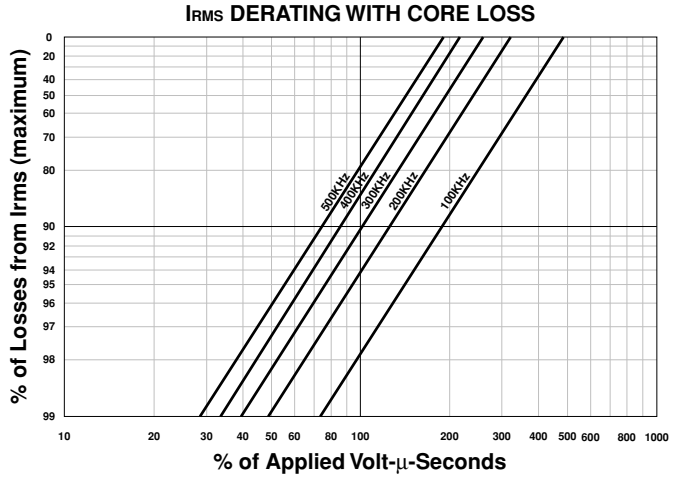
Dimensions in Millimeters.
Specifications are subject to change without notice.

yww = Date Code
xxx = Inductance value per family chart

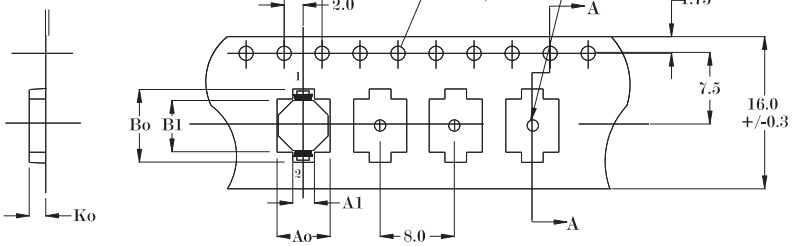
Inductance Characteristics



Core Loss



Packaging Information for MICRO-PAC™ & MICRO-PAC™ PLUS



Ao=5.6mm
A1=2.3mm
Bo=8.5mm
B1=6.3mm
Ko=2.1mm

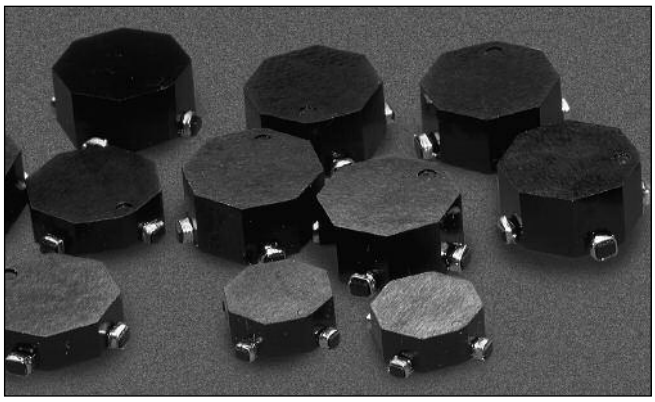
ACTUAL SIZE
MICRO-PAC PLUS

Parts packaged on 13" Diameter reel,
3,900 parts per reel.

Description

RoHS 2002/95/EC

- Surface mount magnetics that can be used as single or coupled inductors or 1:1 transformers that provide isolation between two windings
- OCTA-PAC's are designed around high frequency, low loss MPP core material
- ECONO-PAC's are a lower cost version of OCTA-PAC's offering high saturation flux density, Powder Iron core material
- OCTA-PAC PLUS's offer higher current ratings and higher saturation flux densities than OCTA-PAC and ECONO-PAC, Amorphous metal core material
- Secure 4 Terminal Mounting
- Inductor more versatile inductance combination by series or parallel connections



Applications

- Computer and portable power devices
- LCD panels, DVD players
- Inductor: DC-DC converters
- Buck, boost, forward, and resonant converters
- Noise filtering and filter chokes
- Transformers: 1:1 300Vdc isolation, flyback, sepic

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +85°C (range is application specific).
- Solder reflow temperature: +260°C max. for 10 seconds max.

Packaging

- Supplied in tape and reel packaging, 1100 (EP01, OPA1, and OP01), 800 (EP02, OP02, OPA2, EP03, OPA3, and OP03), and 600 (EP04, OPA4, and OP04) per reel

Legend

Marking
- CTX___-__ (First three digits CTX; Second 2-3 digits = Inductance Value; Last 1-2 digits, product size & type)

Product Size/Type
- CTX___-1 (-1 = size; no suffix = OCTA-PAC®)
- CTX___-1P (-1 = size; P suffix = ECONO-PAC™)
- CTX___-1A (-1 = size; A suffix = OCTA-PAC® PLUS)

	PARALLEL				SERIES			
Part Number	Open Circuit Inductance µH +/-20%	Full Load Inductance µH min.	Full Load Current Adc	DC Resistance ohms max.	Open Circuit Inductance µH +/-20%	Full Load Inductance µH min.	Full Load Current Adc	DC Resistance ohms max.
CTX0.47-1P-R	.42	.31	5.50	.005	1.67	1.25	2.75	.021
CTX0.68-1P-R	.60	.43	5.10	.006	2.40	1.74	2.55	.025
CTX1-1P-R	1.07	.73	4.50	.008	4.28	2.92	2.25	.032
CTX2-1P-R	2.02	1.36	3.40	.013	8.08	5.44	1.70	.054
CTX5-1P-R	4.83	3.37	2.00	.040	19.31	13.47	1.00	.161
CTX8-1P-R	8.08	5.31	1.80	.052	32.33	21.23	.90	.207
CTX10-1P-R	9.62	6.23	1.70	.057	38.48	24.94	.85	.227
CTX15-1P-R	15.03	9.62	1.40	.087	60.12	38.47	.70	.348
CTX20-1P-R	20.46	14.12	1.00	.158	81.83	56.47	.50	.634
CTX25-1P-R	25.40	17.07	.96	.177	101.60	68.29	.48	.708
CTX33-1P-R	32.33	22.27	.80	.250	129.32	89.06	.40	1.001
CTX50-1P-R	50.52	33.57	.70	.316	202.07	134.27	.35	1.263
CTX68-1P-R	68.40	43.65	.66	.373	273.61	174.61	.33	1.490
CTX100-1P-R	99.01	63.64	.54	.557	396.06	254.55	.27	2.227
CTX150-1P-R	150.72	96.64	.44	.844	602.87	386.56	.22	3.376
CTX200-1P-R	198.41	130.79	.36	1.208	793.65	523.16	.18	4.831
CTX300-1P-R	299.87	190.05	.32	1.525	1199.46	760.19	.16	6.100
CTX0.47-2P-R	.54	.42	5.90	.006	2.18	1.69	2.95	.024
CTX0.68-2P-R	.85	.64	5.40	.007	3.40	2.55	2.70	.029
CTX1-2P-R	1.22	.89	5.00	.008	4.90	3.57	2.50	.033
CTX2-2P-R	2.18	1.56	3.90	.014	8.70	6.26	1.95	.055
CTX5-2P-R	4.90	3.57	2.50	.032	19.58	14.26	1.25	.128
CTX8-2P-R	7.65	5.31	2.30	.040	30.60	21.23	1.15	.158
CTX10-2P-R	9.83	6.73	2.10	.045	39.30	26.92	1.05	.179
CTX15-2P-R	14.99	10.51	1.60	.085	59.98	42.02	.80	.339
CTX20-2P-R	19.58	13.37	1.50	.097	78.34	53.48	.75	.387
CTX25-2P-R	24.79	16.60	1.40	.109	99.14	66.38	.70	.436
CTX33-2P-R	32.67	21.29	1.30	.126	130.70	85.17	.65	.503
CTX50-2P-R	49.10	35.31	.82	.305	196.38	141.24	.41	1.221
CTX68-2P-R	68.85	47.93	.76	.362	275.40	191.71	.38	1.445
CTX100-2P-R	99.14	69.56	.62	.541	396.58	278.22	.31	2.162
CTX150-2P-R	148.10	100.07	.56	.665	592.42	400.27	.28	2.660
CTX200-2P-R	201.59	138.49	.46	.951	806.34	553.97	.23	3.804
CTX300-2P-R	300.42	197.52	.42	1.176	1201.70	790.08	.21	4.703

Part Number	PARALLEL Open Circuit Inductance µH +/-20%	PARALLEL Full Load Inductance µH min.	PARALLEL Full Load Current Adc	PARALLEL DC Resistance ohms max.	SERIES Open Circuit Inductance µH +/-20%	SERIES Full Load Inductance µH min.	SERIES Full Load Current Adc	SERIES DC Resistance ohms max.
CTX0.47-3P-R	.46	.35	6.20	.006	1.85	1.42	3.10	.025
CTX0.68-3P-R	.67	.50	5.70	.007	2.66	1.98	2.85	.028
CTX1-3P-R	.91	.65	5.40	.008	3.63	2.62	2.70	.032
CTX2-3P-R	1.85	1.24	4.60	.011	7.40	4.97	2.30	.045
CTX5-3P-R	4.74	3.04	3.20	.022	18.94	12.15	1.60	.090
CTX8-3P-R	8.16	4.90	2.80	.030	32.63	19.60	1.40	.119
CTX10-3P-R	9.79	5.71	2.70	.033	39.15	22.85	1.35	.131
CTX15-3P-R	14.50	8.50	2.20	.050	58.02	34.01	1.10	.198
CTX20-3P-R	20.15	13.12	1.50	.111	80.59	52.48	.75	.443
CTX25-3P-R	25.33	16.16	1.40	.125	101.31	64.66	.70	.499
CTX33-3P-R	32.63	20.32	1.30	.146	130.54	81.30	.65	.571
CTX50-3P-R	50.02	33.06	.92	.277	200.10	132.24	.46	1.108
CTX68-3P-R	68.84	44.15	.84	.328	275.35	176.61	.42	1.312
CTX100-3P-R	101.31	65.50	.68	.501	405.22	262.02	.34	2.005
CTX150-3P-R	149.85	90.92	.64	.621	599.40	363.68	.32	2.483
CTX200-3P-R	200.10	116.51	.60	.731	800.38	466.03	.30	2.925
CTX300-3P-R	298.39	172.12	.50	.926	1193.55	688.50	.25	3.702
CTX0.47-4P-R	.49	.37	7.90	.005	1.95	1.49	3.95	.019
CTX0.68-4P-R	.76	.56	7.20	.006	3.05	2.24	3.60	.023
CTX1-4P-R	1.10	.81	5.90	.008	4.39	3.24	2.95	.033
CTX2-4P-R	1.95	1.42	4.60	.014	7.81	5.69	2.30	.055
CTX5-4P-R	5.15	3.56	3.30	.027	20.62	14.23	1.65	.107
CTX8-4P-R	7.81	5.15	3.00	.033	31.23	20.61	1.50	.131
CTX10-4P-R	9.88	6.70	2.50	.047	39.53	26.79	1.25	.187
CTX15-4P-R	14.76	9.52	2.30	.057	59.05	38.09	1.15	.228
CTX20-4P-R	20.62	13.44	1.90	.084	82.47	53.76	.95	.337
CTX25-4P-R	25.65	17.17	1.60	.115	102.60	68.68	.80	.461
CTX33-4P-R	33.21	22.93	1.30	.166	132.86	91.72	.65	.662
CTX50-4P-R	48.80	32.21	1.20	.201	195.20	128.83	.60	.805
CTX68-4P-R	67.37	43.04	1.10	.238	269.50	172.16	.55	.952
CTX100-4P-R	99.09	69.54	.72	.565	396.38	278.15	.36	2.259
CTX150-4P-R	149.45	101.46	.64	.696	597.80	405.83	.32	2.784
CTX200-4P-R	200.11	131.37	.60	.810	800.44	525.47	.30	3.240
CTX300-4P-R	298.93	188.03	.54	1.003	1195.72	752.13	.27	4.011
CTX0.47-1-R	.40	.26	5.50	.005	1.60	1.05	2.75	.020
CTX0.68-1-R	.63	.41	4.50	.006	2.50	1.63	2.25	.024
CTX1-1-R	.90	.56	4.20	.007	3.60	2.24	2.10	.028
CTX2-1-R	2.03	1.00	4.10	.010	8.10	4.01	2.05	.040
CTX5-1-R	4.90	2.66	2.30	.030	19.60	10.64	1.15	.122
CTX8-1-R	8.10	4.08	2.00	.039	32.40	16.34	1.00	.157
CTX10-1-R	10.00	4.85	1.90	.044	40.00	19.40	.95	.176
CTX15-1-R	14.40	8.74	1.10	.080	57.60	34.96	.55	.319
CTX20-1-R	19.60	11.54	1.00	.146	78.40	46.15	.50	.583
CTX25-1-R	25.60	16.35	.74	.167	102.40	65.42	.37	.668
CTX33-1-R	32.40	19.84	.72	.293	129.60	79.37	.36	1.171
CTX50-1-R	50.63	29.34	.64	.365	202.50	117.38	.32	1.461
CTX68-1-R	67.60	39.73	.54	.516	270.40	158.92	.27	2.064
CTX100-1-R	99.23	58.72	.44	.784	396.90	234.88	.22	3.137
CTX150-1-R	148.23	85.16	.38	.965	592.90	340.64	.19	3.861
CTX200-1-R	202.50	107.60	.37	1.142	810.00	430.39	.19	4.567
CTX300-1-R	302.50	191.38	.22	1.431	1210.00	765.54	.11	5.724
CTX0.47-2-R	.42	.29	6.50	.005	1.69	1.17	3.25	.019
CTX0.68-2-R	.75	.50	5.50	.006	3.01	1.98	2.75	.024
CTX1-2-R	1.18	.76	4.60	.007	4.70	3.04	2.30	.028
CTX2-2-R	2.30	1.27	4.50	.010	9.21	5.07	2.25	.038
CTX5-2-R	4.70	2.66	3.00	.021	18.80	10.65	1.50	.084
CTX8-2-R	7.94	4.18	2.60	.027	31.77	16.72	1.30	.108
CTX10-2-R	10.58	5.18	2.50	.031	42.30	20.72	1.25	.125
CTX15-2-R	15.23	8.53	1.70	.059	60.91	34.10	.85	.236
CTX20-2-R	20.73	12.36	1.30	.107	82.91	49.46	.65	.426
CTX25-2-R	24.86	16.09	1.00	.117	99.45	64.35	.50	.466
CTX33-2-R	31.77	15.90	1.40	.105	127.09	63.59	.70	.420
CTX50-2-R	51.18	28.79	.92	.210	204.73	115.16	.46	.839
CTX68-2-R	67.87	38.71	.78	.303	271.47	154.83	.39	1.214
CTX100-2-R	99.45	57.45	.63	.457	397.81	229.79	.32	1.828

Part Number	PARALLEL				SERIES			
	Open Circuit Inductance µH +/-20%	Full Load Inductance µH min.	Full Load Current Adc	DC Resistance ohms max.	Open Circuit Inductance µH +/-20%	Full Load Inductance µH min.	Full Load Current Adc	DC Resistance ohms max.
CTX150-2-R	147.39	93.46	.43	.560	589.57	373.84	.22	2.241
CTX200-2-R	198.58	122.94	.39	.796	794.30	491.76	.20	3.184
CTX300-2-R	300.80	169.06	.38	1.231	1203.20	676.24	.19	4.929
CTX0.47-3-R	.38	.27	6.00	.005	1.54	1.08	3.00	.020
CTX0.68-3-R	.60	.42	5.00	.006	2.40	1.67	2.50	.024
CTX1-3-R	.86	.57	4.80	.007	3.46	2.28	2.40	.028
CTX2-3-R	1.94	1.05	4.70	.010	7.78	4.22	2.35	.040
CTX5-3-R	4.70	2.56	3.00	.019	18.82	10.26	1.50	.077
CTX8-3-R	7.78	3.74	2.80	.025	31.10	14.98	1.40	.099
CTX10-3-R	9.60	4.38	2.70	.028	38.40	17.54	1.35	.111
CTX15-3-R	15.00	7.26	2.00	.043	60.00	29.06	1.00	.172
CTX20-3-R	20.18	10.76	1.50	.078	80.74	43.04	.75	.312
CTX25-3-R	24.58	15.64	.98	.086	98.30	62.56	.49	.346
CTX33-3-R	32.86	19.69	.96	.083	131.42	78.77	.48	.331
CTX50-3-R	50.78	27.18	.94	.239	203.14	108.71	.47	.956
CTX68-3-R	67.42	36.53	.80	.277	269.66	146.11	.40	1.109
CTX100-3-R	101.40	52.48	.70	.345	405.60	209.93	.35	1.381
CTX150-3-R	149.78	97.16	.38	.430	599.14	388.63	.19	1.718
CTX200-3-R	198.74	119.18	.39	.619	794.98	476.71	.20	2.475
CTX300-3-R	301.06	157.44	.40	.951	1204.22	629.75	.20	3.083
CTX0.47-4-R	.44	.32	7.00	.004	1.76	1.29	3.50	.016
CTX0.68-4-R	.78	.55	6.00	.005	3.14	2.21	3.00	.020
CTX1-4-R	1.23	.85	5.00	.006	4.90	3.41	2.50	.024
CTX2-4-R	1.76	1.06	4.90	.007	7.06	4.24	2.45	.028
CTX5-4-R	4.90	2.59	4.40	.014	19.60	10.37	2.20	.056
CTX8-4-R	8.28	4.29	3.50	.018	33.12	17.14	1.75	.072
CTX10-4-R	9.60	4.82	3.40	.019	38.42	19.28	1.70	.078
CTX15-4-R	14.16	6.76	3.00	.024	56.64	27.03	1.50	.096
CTX20-4-R	19.60	10.68	2.10	.055	78.40	42.73	1.05	.220
CTX25-4-R	25.92	13.32	2.00	.063	103.68	53.27	1.00	.253
CTX33-4-R	33.12	16.82	1.80	.072	132.50	67.27	.90	.287
CTX50-4-R	50.18	25.03	1.50	.111	200.70	100.11	.75	.443
CTX68-4-R	67.08	35.29	1.20	.157	268.32	141.15	.60	.630
CTX100-4-R	99.23	54.56	.92	.302	396.90	218.25	.46	1.210
CTX150-4-R	148.23	77.17	.82	.372	592.90	308.69	.41	1.488
CTX200-4-R	200.70	111.08	.64	.545	802.82	444.32	.32	2.180
CTX300-4-R	298.12	147.92	.62	.672	1192.46	591.66	.31	2.687

		Parallel Ratings					Series Ratings				
Part Number	**Rated Inductance (µH)**	**OCL (1) nominal +/-25% (µH)**	**I sat. (2) Amperes Peak**	**I rms. (3) Amperes**	**DCR Ω (4) max. @ 20°C.**	**Volt (7) µ-Sec**	**OCL (1) nominal +/-25% (µH)**	**I sat. (2) Amperes Peak**	**I rms. (3) Amperes**	**DCR Ω (4) max. @ 20°C.**	**Volt (7) µ-Sec**
CTX0.33-1A-R	0.33	0.402	12.5	10.0	0.0037	.93	1.61	6.25	4.98	0.015	1.86
CTX0.68-1A-R	0.68	0.752	9.4	9.0	0.0046	1.24	3.01	4.69	4.48	0.0185	2.49
CTX1-1A-R	1.0	1.18	7.5	7.26	0.0070	1.55	4.70	3.75	3.63	0.0282	3.11
CTX2-1A-R	2.0	2.30	5.36	5.64	0.012	2.17	9.21	2.68	2.82	0.0470	4.35
CTX5-1A-R	5.0	4.70	3.75	4.27	0.020	3.11	18.8	1.88	2.13	0.082	6.21
CTX8-1A-R	8.0	7.94	2.88	3.37	0.033	4.04	31.77	1.44	1.69	0.130	8.08
CTX10-1A-R	10.0	10.58	2.5	2.84	0.046	4.66	42.30	1.25	1.42	0.183	9.32
CTX15-1A-R	15.0	15.23	2.08	2.07	0.087	5.59	60.91	1.04	1.03	0.348	11.2
CTX20-1A-R	20.0	20.73	1.79	1.71	0.127	6.52	82.91	0.89	0.86	0.507	13.0
CTX25-1A-R	25.0	24.86	1.63	1.46	0.173	7.14	99.45	0.82	0.73	0.693	14.3
CTX33-1A-R	33.0	34.26	1.39	1.22	0.249	8.39	137.1	0.69	0.61	0.995	16.8
CTX50-1A-R	50.0	51.18	1.14	0.99	0.381	10.3	204.7	0.57	0.49	1.524	20.5
CTX68-1A-R	68.0	67.87	0.99	0.92	0.437	11.8	271.5	0.49	0.46	1.749	23.6
CTX100-1A-R	100.0	99.45	0.82	0.74	0.686	14.3	397.8	0.41	0.37	2.745	28.6
CTX150-1A-R	150.0	147.4	0.67	0.67	0.832	17.4	589.6	0.33	0.33	3.329	34.8
CTX200-1A-R	200.0	198.6	0.58	0.62	0.963	20.2	794.3	0.29	0.31	3.854	40.4
CTX300-1A-R	300.0	300.8	0.47	0.56	1.181	24.9	1203	0.23	0.28	4.726	49.7
CTX0.33-2A-R	0.33	0.284	18.8	10.9	0.0033	.85	1.14	9.38	5.47	0.0132	1.71
CTX0.68-2A-R	0.68	0.675	12.5	9.4	0.0045	1.28	2.70	6.25	4.68	0.0180	2.56
CTX1-2A-R	1.0	1.26	9.38	8.22	0.0058	1.71	5.06	4.69	4.11	0.0233	3.42
CTX2-2A-R	2.0	1.98	7.50	6.74	0.0090	2.14	7.90	3.75	3.37	0.035	4.27
CTX5-2A-R	5.0	5.06	4.69	4.34	0.021	3.42	20.22	2.34	2.17	0.084	6.84
CTX8-2A-R	8.0	7.90	3.75	3.50	0.032	4.27	31.60	1.88	1.75	0.129	8.55
CTX10-2A-R	10.0	11.38	3.13	2.89	0.047	5.13	45.50	1.56	1.45	0.188	10.3
CTX15-2A-R	15.0	15.48	2.68	2.69	0.054	5.98	61.94	1.34	1.35	0.218	12.0
CTX20-2A-R	20.0	20.22	2.34	2.24	0.078	6.84	80.90	1.17	1.12	0.313	13.7
CTX25-2A-R	25.0	25.60	2.08	1.89	0.111	7.69	102.38	1.04	0.94	0.443	15.4
CTX33-2A-R	33.0	34.84	1.79	1.56	0.162	8.97	139.4	0.89	0.78	0.649	17.9
CTX50-2A-R	50.0	49.38	1.50	1.28	0.240	10.7	197.5	0.75	0.64	0.961	21.4
CTX68-2A-R	68.0	66.44	1.29	1.07	0.342	12.4	265.8	0.65	0.54	1.367	24.8
CTX100-2A-R	100.0	102.38	1.04	0.75	0.695	15.4	409.5	0.52	0.38	2.778	30.8
CTX150-2A-R	150.0	152.9	0.85	0.68	0.842	18.8	611.8	0.43	0.34	3.366	37.6
CTX200-2A-R	200.0	197.5	0.75	0.64	0.950	21.4	790.0	0.38	0.32	3.800	42.7
CTX300-2A-R	300.0	303.7	0.60	0.58	1.174	26.5	1215	0.30	0.29	4.697	53.0
CTX0.33-3A-R	0.33	0.368	15.0	11.4	0.0032	0.97	1.47	7.50	5.72	0.0128	1.93
CTX0.68-3A-R	0.68	0.688	11.3	9.3	0.0048	1.29	2.75	5.63	4.64	0.0194	2.58
CTX1-3A-R	1.0	1.08	9.0	8.38	0.0059	1.61	4.20	4.50	4.19	0.0238	3.22
CTX2-3A-R	2.0	2.11	6.43	7.26	0.0079	2.26	8.43	3.21	3.63	0.0317	4.51
CTX5-3A-R	5.0	5.20	4.09	5.24	0.015	3.54	20.81	2.05	2.62	0.061	7.09
CTX8-3A-R	8.0	8.43	3.21	4.23	0.023	4.51	33.77	1.61	2.12	0.093	9.02
CTX10-3A-R	10.0	9.68	3.00	3.64	0.032	4.83	38.70	1.50	1.82	0.126	9.67
CTX15-3A-R	15.0	15.52	2.37	3.25	0.039	6.12	62.09	1.18	1.63	0.158	12.2
CTX20-3A-R	20.0	20.81	2.05	2.43	0.071	7.09	83.25	1.02	1.22	0.282	14.2
CTX25-3A-R	25.0	24.77	1.88	2.34	0.076	7.73	99.07	0.94	1.17	0.306	15.5
CTX33-3A-R	33.0	33.71	1.61	1.93	0.112	9.02	134.8	0.80	0.96	0.449	18.0
CTX50-3A-R	50.0	49.71	1.32	1.56	0.171	11.0	198.8	0.66	0.78	0.686	21.9

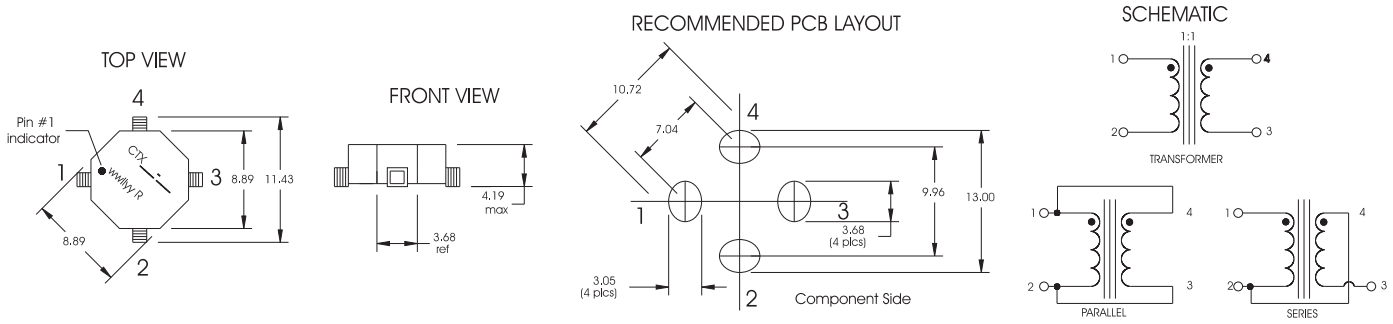
1) Open Circuit Inductance Test Parameters: 100kHz, 0.250 Vrms, 0.0 Adc
Parallel: (1,4 - 3,2) Series: (1 - 3) tie (2 - 4)
2) Peak current for approximately 30% roll-off
3) RMS current, delta temp. of 40° C ambient temperature of 85° C
4) DCR @ 20°C
5) Hipot rating: winding to winding: 300Vdc min.
6) Turns Ratio: (1-2):(4-3) 1:1
7) Applied volt-time product (v-us) across the inductor. This value represents the applied V-us at 300KHz necessary to generate a core loss equal to 10% of the total losses for a 40°C temperature rise.

		Parallel Ratings					Series Ratings				
Part Number	**Rated Inductance (µH)**	**OCL (1) nominal +/-25% (µH)**	**I sat. (2) Amperes Peak**	**I rms. (3) Amperes**	**DCR Ω (4) max. @ 20°C.**	**Volt (7) µ-Sec**	**OCL (1) nominal +/-25% (µH)**	**I sat. (2) Amperes Peak**	**I rms. (3) Amperes**	**DCR Ω (4) max. @ 20°C.**	**Volt (7) µ-Sec**
CTX68-3A-R	68.0	68.80	1.13	1.28	0.253	12.9	275.2	0.56	0.64	1.013	25.8
CTX100-3A-R	100.0	99.07	0.94	1.05	0.379	15.5	396.3	0.47	0.53	1.514	30.9
CTX150-3A-R	150.0	149.7	0.76	0.86	0.571	19.0	598.7	0.38	0.43	2.283	38.0
CTX200-3A-R	200.0	198.8	0.66	0.71	0.829	21.9	795.3	0.33	0.35	3.315	43.8
CTX300-3A-R	300.0	296.2	0.54	0.56	1.309	26.7	1185	0.27	0.28	5.236	53.5
CTX0.33-4A-R	0.33	0.313	22.5	12.2	0.0030	0.98	1.25	11.25	6.09	0.0119	1.96
CTX0.68-4A-R	0.68	0.744	15.0	10.6	0.0040	1.47	2.98	7.50	5.28	0.0158	2.94
CTX1-4A-R	1.0	1.39	11.25	9.23	0.0052	1.96	5.57	5.63	4.62	0.0207	3.93
CTX2-4A-R	2.0	2.18	9.00	8.38	0.0063	2.45	8.70	4.50	4.19	0.0251	4.91
CTX5-4A-R	5.0	4.26	6.43	7.21	0.0085	3.44	17.05	3.21	3.61	0.0339	6.87
CTX8-4A-R	8.0	8.70	4.50	5.49	0.015	4.91	34.80	2.25	2.74	0.059	9.81
CTX10-4A-R	10.0	10.53	4.09	4.67	0.020	5.40	42.11	2.05	2.33	0.081	10.8
CTX15-4A-R	15.0	14.70	3.46	3.87	0.029	6.38	58.81	1.73	1.94	0.117	12.8
CTX20-4A-R	20.0	19.58	3.00	3.62	0.034	7.36	78.30	1.50	1.81	0.135	14.7
CTX25-4A-R	25.0	25.14	2.65	3.02	0.048	8.34	100.51	1.32	1.51	0.193	16.7
CTX33-4A-R	33.0	34.80	2.25	2.49	0.071	9.81	139.2	1.13	1.25	0.283	19.6
CTX50-4A-R	50.0	50.11	1.88	2.05	0.104	11.8	200.4	0.94	1.03	0.418	23.6
CTX68-4A-R	68.0	68.21	1.61	1.70	0.153	13.7	272.8	0.80	0.85	0.612	27.5
CTX100-4A-R	100.0	100.57	1.32	1.37	0.235	16.7	402.3	0.66	0.69	0.939	33.4
CTX150-4A-R	150.0	153.5	1.07	1.10	0.365	20.6	613.9	0.54	0.55	1.462	41.2
CTX200-4A-R	200.0	200.4	0.94	0.92	0.521	23.6	801.8	0.47	0.46	2.085	47.1
CTX300-4A-R	300.0	302.8	0.76	0.75	0.787	29.0	1211	0.38	0.37	3.148	57.9

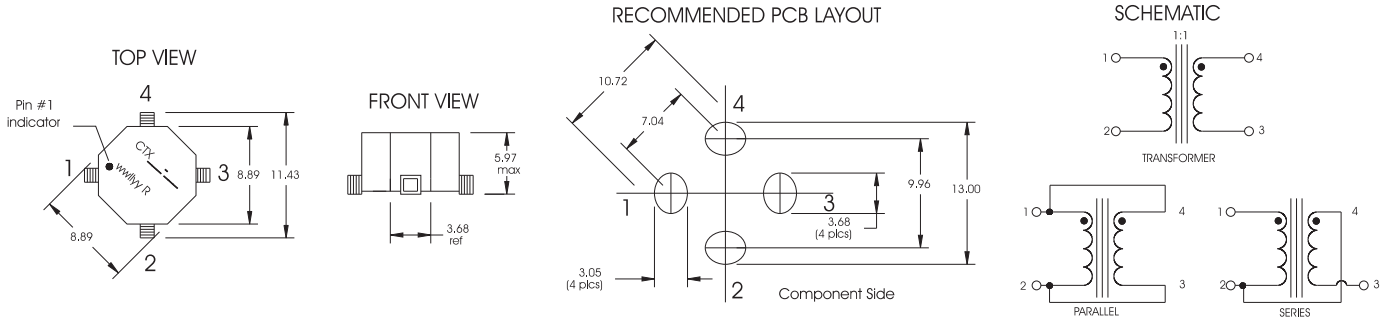
1) Open Circuit Inductance Test Parameters: 100kHz, 0.250 Vrms, 0.0 Adc
   Parallel: (1,4 - 3,2) Series: (1 - 3) tie (2 - 4)
2) Peak current for approximately 30% roll-off
3) RMS current, delta temp. of 40° C ambient temperature of 85° C
4) DCR @ 20°C
5) Hipot rating: winding to winding: 300Vdc min.
6) Turns Ratio: (1-2):(4-3) 1:1
7) Applied volt-time product (v-us) across the inductor. This value represents the applied V-us at 300KHz necessary to generate a core loss equal to 10% of the total losses for a 40°C temperature rise.

Mechanical Diagrams

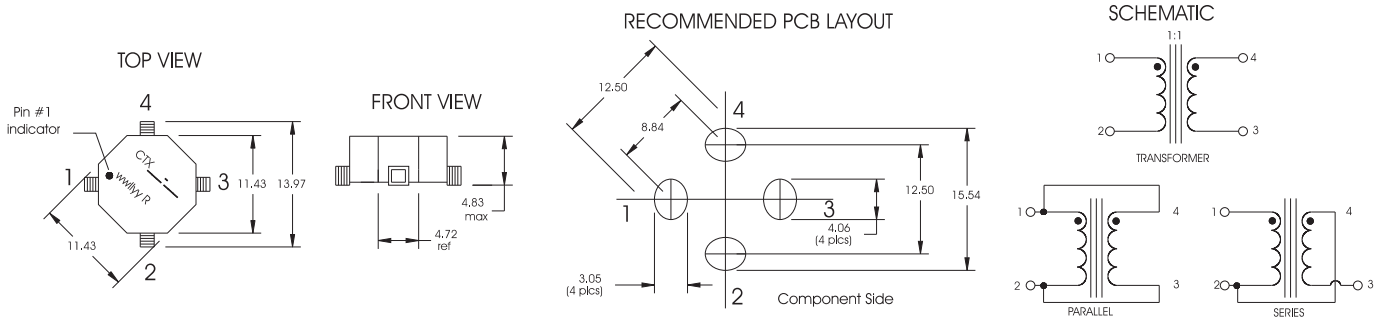
CTX 1, 1P, 1A Series



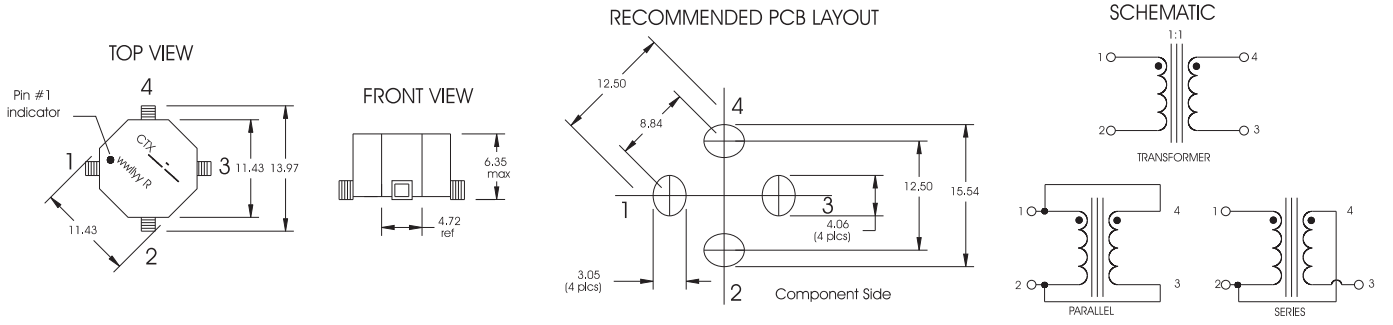
CTX 2, 2P, 2A Series



CTX 3, 3P, 3A Series



CTX 4, 4P, 4A Series

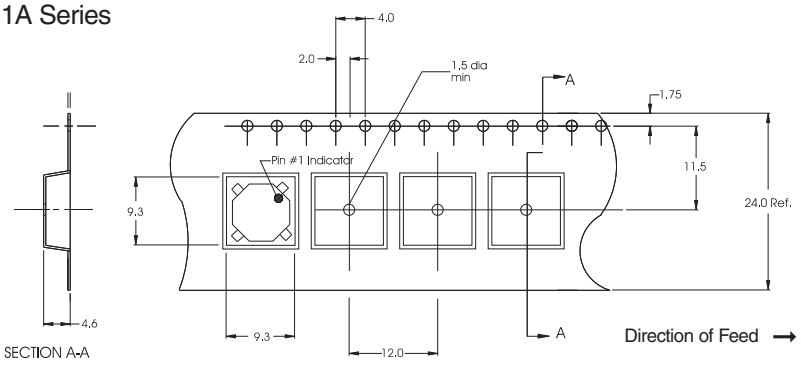


Dimensions in Millimeters.

wwllyy = (date code) R = revision level

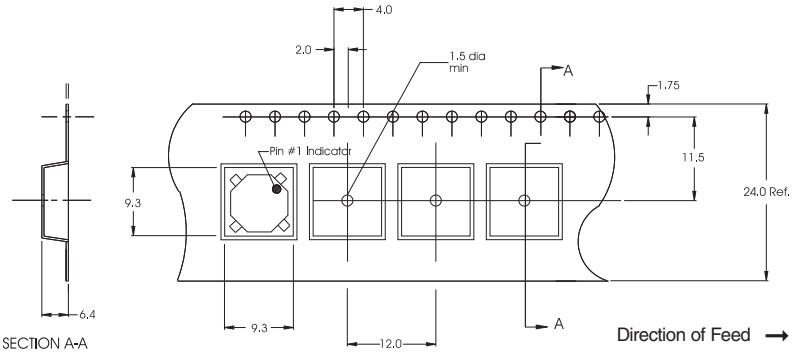
Packaging Information

CTX 1, 1P, 1A Series



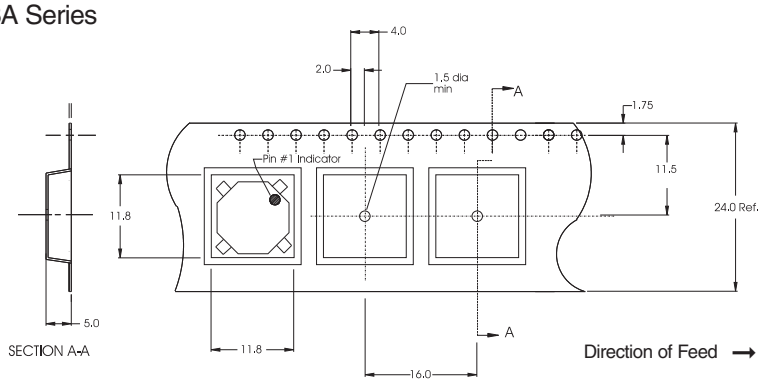
Parts packaged on 13" Diameter reel, 1,100 parts per reel.

CTX 2, 2P, 2A Series



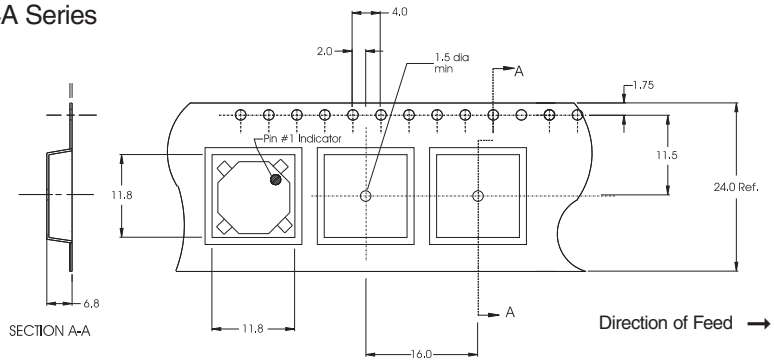
Parts packaged on 13" Diameter reel, 800 parts per reel.

CTX 3, 3P, 3A Series



Parts packaged on 13" Diameter reel, 800 parts per reel.

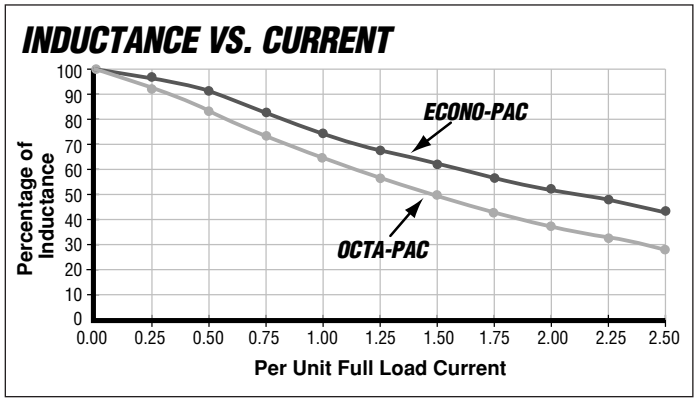
CTX 4, 4P, 4A Series

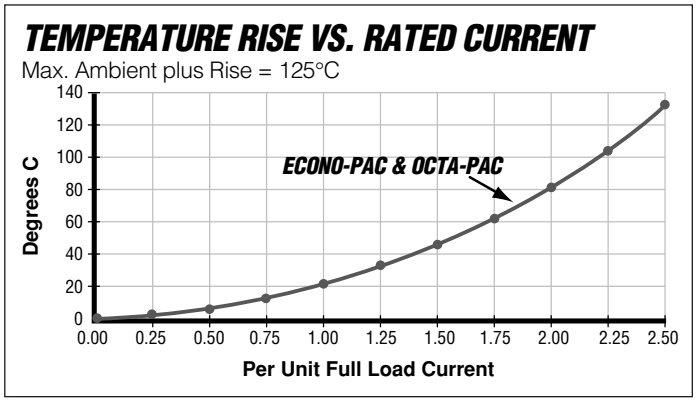


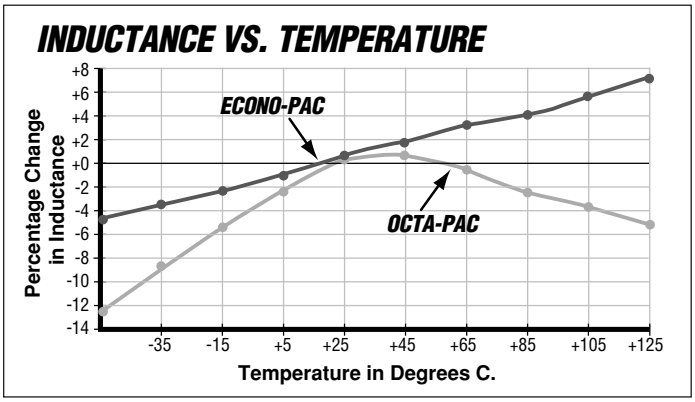
Parts packaged on 13" Diameter reel, 600 parts per reel.

Dimensions are in millimeters.

Performance Characteristics

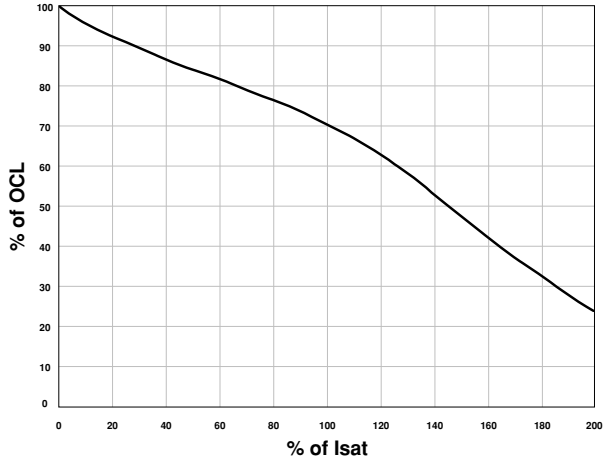




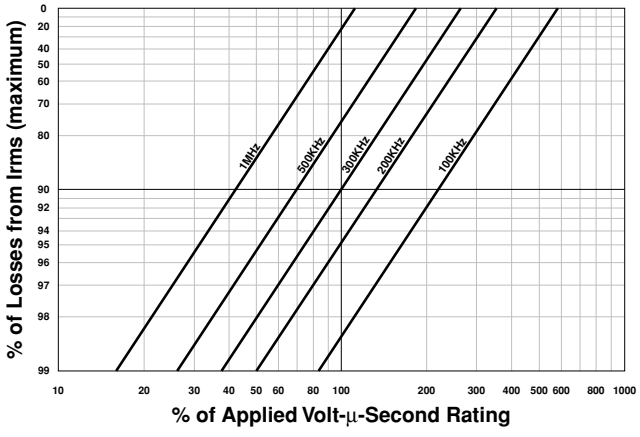


- **INDUCTANCE VS. CURRENT:**
  Inductance will fall off as DC Current is increased.
  (See Inductance vs. Current graph).
- **FREQUENCY RESPONSE:**
  Wide-band frequency response to 1 megaHertz.
- **CURRENT LIMITATION:**
  The maximum allowable currents are defined by the internal "hot-spot" temperatures which are limited to 130°C, including ambient.

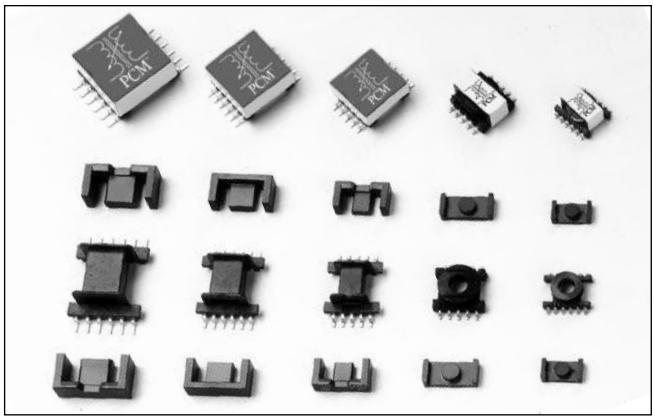
OCTA-PAC® PLUS Typical Inductance vs. DC Current



OCTA-PAC® PLUS Winding Loss Derating with Core Loss



RoHS 2002/95/EC



Description

- Six winding, surface mount devices that offer more than 500 usable inductor or transformer configurations
- High power density and low profile
- Low radiated noise and tightly coupled windings
- Power range from 1 Watt – 70 Watts
- Frequency range to over 1MHz
- 500 VAC Isolation
- Ferrite core material

Applications

- Inductors: buck, boost, coupled, choke, filter, resonant, noise filtering, differential, forward, common mode
- Transformers: flyback, feed forward, push-pull, multiple output, inverter, step-up, step-down, gate drive, base drive, wide band, pulse, control, impedance, isolation, bridging, ringer, converter, auto

Environmental Data

- Storage temperature range: -55°C to 125°C
- Operating ambient temperature range: -40°C to +85°C (range is application specific). The internal "hot spot" temperature defines the maximum allowable currents, which are limited to 130°C, including ambient
- Solder reflow temperature: +260°C max for 10 seconds max.

Packaging

- Supplied in tape and reel packaging, 600 (VP01), 300 (VP02), and 200 (VP03) per reel
- Supplied in bulk packaging (VP04 and VP05)
- VP04 & VP05 tape and reel packaging available. Please contact factory for details.

Part [1] Number	L(BASE) µH (NOM)[2]	ISAT(BASE) Amps (TYP)[3][4]	IRMS(BASE) Amps (TYP)[3][5]	R(BASE) Ohms (MAX)[6]	Volt-µSEC(BASE) µVs (MAX)[7]	EPEAK(BASE) µJ (TYP)[8]	Leakage Inductance (BASE) µH (TYP)	Thermal Resistance °C/Watt (TYP)[9]
VPH1-1400-R[10]	201.6 +/-30%	0.04	0.55	0.344	32.9	0.11	0.212	60.7
VP1-1400-R[10]	89.6 +/-30%	0.06	0.85	0.145	21.8	0.11	0.096	60.7
VPH1-0190-R	27.4 +/-20%	0.29	0.55	0.344	32.9	0.77	0.212	60.7
VP1-0190-R	12.2 +/-20%	0.43	0.85	0.145	21.8	0.77	0.096	60.7
VPH1-0102-R	14.7 +/-20%	0.53	0.55	0.344	32.9	1.45	0.212	60.7
VP1-0102-R	6.5 +/-20%	0.80	0.85	0.145	21.8	1.45	0.096	60.7
VPH1-0076-R	10.9 +/-20%	0.72	0.55	0.344	32.9	1.92	0.212	60.7
VP1-0076-R	4.9 +/-20%	1.06	0.85	0.145	21.8	1.92	0.096	60.7
VPH1-0059-R	8.5 +/-20%	0.92	0.55	0.344	32.9	2.48	0.212	60.7
VP1-0059-R	3.8 +/-20%	1.37	0.85	0.145	21.8	2.48	0.096	60.7
VPH2-1600-R[10]	160 +/-30%	0.07	0.95	0.159	48.3	0.29	0.165	44.0
VP2-1600-R[10]	78.4 +/-30%	0.10	1.26	0.090	33.7	0.29	0.083	44.0
VPH2-0216-R	21.6 +/-20%	0.53	0.95	0.159	48.3	2.11	0.165	44.0
VP2-0216-R	10.6 +/-20%	0.76	1.26	0.090	33.7	2.11	0.083	44.0
VPH2-0116-R	11.6 +/-20%	0.99	0.95	0.159	48.3	3.94	0.165	44.0
VP2-0116-R	5.7 +/-20%	1.41	1.26	0.090	33.7	3.94	0.083	44.0
VPH2-0083-R	8.3 +/-20%	1.39	0.95	0.159	48.3	5.47	0.165	44.0
VP2-0083-R	4.1 +/-20%	1.95	1.26	0.090	33.7	5.47	0.083	44.0
VPH2-0066-R	6.6 +/-20%	1.74	0.95	0.159	48.3	7.01	0.165	44.0
VP2-0066-R	3.2 +/-20%	2.50	1.26	0.090	33.7	7.01	0.083	44.0
VPH3-0780-R[10]	132 +/-30%	0.07	0.97	0.14	39.8	0.24	0.125	43.4
VP3-0780-R[10]	63.2 +/-30%	0.10	1.47	0.061	27.7	0.24	0.058	43.4
VPH3-0138-R	23.3 +/-20%	0.41	0.97	0.14	39.8	1.36	0.125	43.4
VP3-0138-R	11.2 +/-20%	0.59	1.47	0.061	27.7	1.36	0.058	43.4
VPH3-0084-R	14.2 +/-20%	0.67	0.97	0.14	39.8	2.23	0.125	43.4
VP3-0084-R	6.8 +/-20%	0.97	1.47	0.061	27.7	2.23	0.058	43.4
VPH3-0055-R	9.3 +/-20%	1.02	0.97	0.14	39.8	3.38	0.125	43.4
VP3-0055-R	4.5 +/-20%	1.46	1.47	0.061	27.7	3.38	0.058	43.4
VPH3-0047-R	7.94 +/-20%	1.19	0.97	0.14	39.8	4.00	0.125	43.4
VP3-0047-R	3.8 +/-20%	1.73	1.47	0.061	27.7	4.00	0.058	43.4

Part [1] Number	L(BASE) µH (NOM)[2]	ISAT(BASE) Amps (TYP)[3][4]	IRMS(BASE) Amps (TYP)[3][5]	R(BASE) Ohms (MAX)[6]	Volt-µSEC(BASE) µVs (MAX)[7]	EPEAK(BASE) µJ (TYP)[8]	Leakage Inductance (BASE) µH (TYP)	Thermal Resistance °C/Watt (TYP)[9]
VPH4-0860-R[10]	159.65 +/-30%	0.11	1.41	0.0828	64.6	0.57	0.156	39.4
VP4-0860-R[10]	87.0 +/-30%	0.15	1.70	0.057	44.7	0.57	0.075	39.4
VPH4-0140-R	23.7 +/-20%	0.65	1.41	0.0828	64.6	3.54	0.156	39.4
VP4-0140-R	11.3 +/-20%	0.95	1.70	0.057	44.7	3.54	0.075	39.4
VPH4-0075-R	12.7 +/-20%	1.21	1.41	0.0828	64.6	6.55	0.156	39.4
VP4-0075-R	6.1 +/-20%	1.75	1.70	0.057	44.7	6.55	0.075	39.4
VPH4-0060-R	10.1 +/-20%	1.52	1.41	0.0828	64.6	8.16	0.156	39.4
VP4-0060-R	4.9 +/-20%	2.18	1.70	0.057	44.7	8.16	0.075	39.4
VPH4-0047-R	7.94 +/-20%	1.94	1.41	0.0828	64.6	10.52	0.156	39.4
VP4-0047-R	3.8 +/-20%	2.81	1.70	0.057	44.7	10.52	0.075	39.4
VPH5-1200-R[10]	173 +/-30%	0.14	1.70	0.0711	98.4	1.11	0.235	30.3
VP5-1200-R[10]	76.8 +/-30%	0.20	2.08	0.047	65.6	1.11	0.105	30.3
VPH5-0155-R	22.3 +/-20%	1.05	1.70	0.0711	98.4	8.83	0.235	30.3
VP5-0155-R	9.9 +/-20%	1.60	2.08	0.047	65.6	8.83	0.105	30.3
VPH5-0083-R	12 +/-20%	1.96	1.70	0.0711	98.4	16.07	0.235	30.3
VP5-0083-R	5.3 +/-20%	2.95	2.08	0.047	65.6	16.07	0.105	30.3
VPH5-0067-R	9.65 +/-20%	2.43	1.70	0.0711	98.4	19.83	0.235	30.3
VP5-0067-R	4.3 +/-20%	3.63	2.08	0.047	65.6	19.83	0.105	30.3
VPH5-0053-R	7.63 +/-20%	3.07	1.70	0.0711	98.4	25.10	0.235	30.3
VP5-0053-R	3.4 +/-20%	4.59	2.08	0.047	65.6	25.10	0.105	30.3

(1) The first three digits in the part number signify the size of the package. The next four digits specify the A_L, or nanoHenries per turn squared.

(2) L_{BASE} = Nominal Inductance of a single winding.

(3) I_{BASE} is the lessor of $I_{SAT(BASE)}$ and $I_{RMS(BASE)}$.

(4) Peak current that will result in 30% saturation of the core. This current value assumes that equal current flows in all six windings. For applications in which all windings are not simultaneously driven (i.e. flyback, SEPIC, Cuk, etc.), the saturation current per winding may be calculated as follows:

$$I_{SAT} = \frac{6 \times I_{SAT(BASE)}}{\text{Number of Windings Driven}}$$

(5) RMS Current that results in a surface temperature of approximately 40°C above ambient. The 40°C rise occurs when the specified current flows through each of the six windings.

(6) Maximum DC Resistance of each winding.

(7) For multiple windings in series, the volt-µsecond$_{TOTAL}$ (µVs) capability varies as the number of windings in series (S):

$$\text{Volt-µsec}_{TOTAL} = S \times \text{Volt-µsec}_{(BASE)}$$

For multiple windings in parallel, the volt-µsecond$_{TOTAL}$ (µVs) capability is as shown in the table above.

(8) Maximum Energy capability of each winding. This is based on 30% saturation of the core:

$$\text{Energy}_{SERIES} = S^2 \times \frac{1}{2} \times 0.7L_{BASE} \times I^2_{SAT(BASE)}$$

$$\text{Energy}_{PARALLEL} = P^2 \times \frac{1}{2} \times 0.7L_{BASE} \times I^2_{SAT(BASE)}$$

For multiple windings, the energy capability varies as the square of the number of windings. For example, six windings (either parallel or series) can store 36 times more energy than one winding.

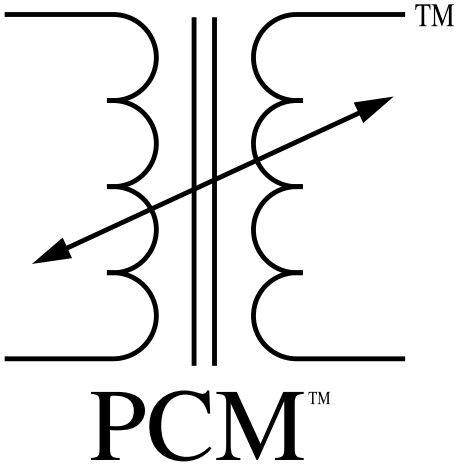
(9) Thermal Resistance is the approximate surface temperature rise per Watt of heat loss under still-air conditions. Heat loss is a combination of core loss and wire loss. The number assumes the underlying PCB copper area equals 150% of the component area.

(10) These devices are designed for feed-forward applications, where load current dominates magnitizing current.

VERSA-PAC temperature rise depends on total power losses and size. Any other **PCM** configurations other than those suggested could run hotter than acceptable.

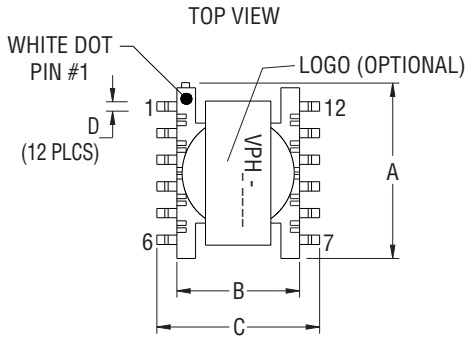
Certain topologies or applications must be analyzed for needed requirements and matched with the best **VERSA-PAC** size and configuration. Proper consideration must be used with all parameters, especially those associated with current rating, energy storage, or maximum volt-seconds.

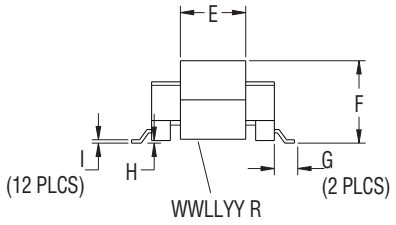
VERSA-PAC should not be used in off-line or safety related applications. The breakdown voltage from one winding to any other winding is 500 VAC maximum.

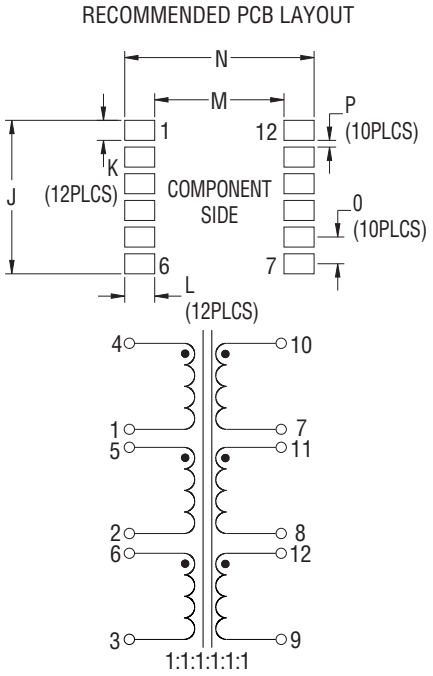


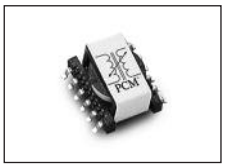
Mechanical Diagrams

VP1 and VPH1







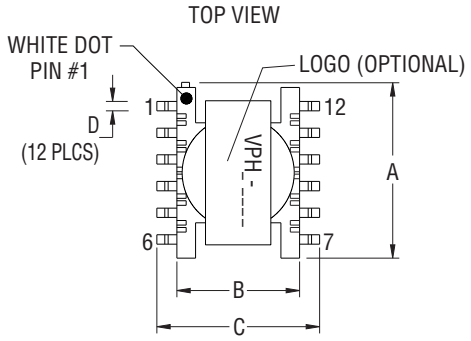


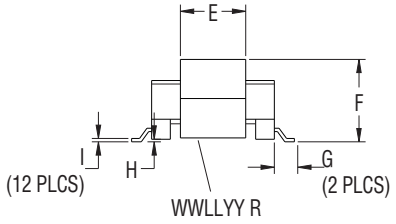
NOTES

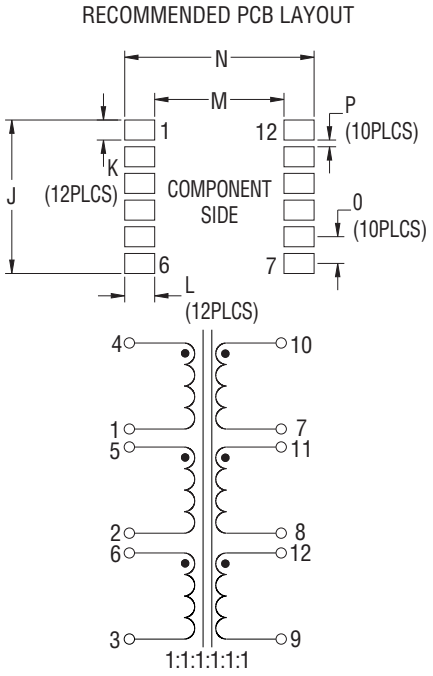
1) Tolerances A - I are ± 0.25 mm unless specified otherwise.
2) Tolerances J - P are +/- 0.1 mm unless specified otherwise.
3) Marking as shown
   a) Dot for pin #1 identification
   b) On top of unit: -- VPHx-xxx (product code, size, 4 digit part number per family table.)
   c) On top of unit: Versa Pac Logo (optional)
   d) On bottom of unit: wwllyy = (date code) R = (revision level)
4) All soldering surfaces must be coplanar within 0.102 mm.

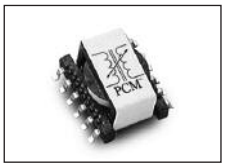
	A mm max	B mm ref	C mm max	D mm ref	E mm ref	F mm max	G mm ref	H mm ref	I mm ref	J mm ref	K mm	L mm	M mm ref	N mm max	O mm	P mm
VP1 and VPH1	12.9	9.2	13.0	0.7	5.9	6.2	1.5	0.1	0.25	11.5	1.5	2.25	9.7	14.2	2.0	0.5

VP2 and VPH2









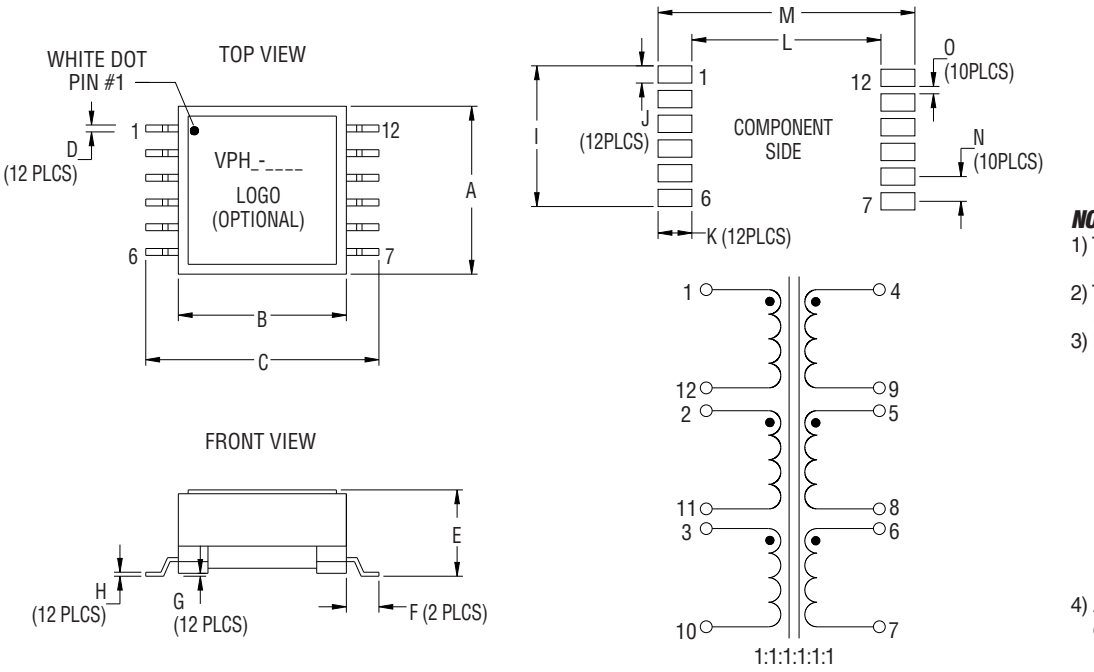
NOTES

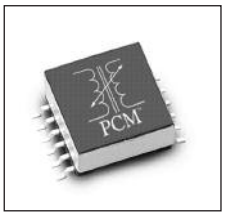
1) Tolerances A - I are ± 0.25 mm unless specified otherwise.
2) Tolerances J - P are +/- 0.1 mm unless specified otherwise.
3) Marking as shown
   a) Dot for pin #1 identification
   b) On top of unit: -- VPHx-xxx (product code, size, 4 digit part number per family table.)
   c) On top of unit: Versa Pac Logo (optional)
   d) On bottom of unit: wwllyy = (date code) R = (revision level)
4) All soldering surfaces must be coplanar within 0.102 mm.

	A mm max	B mm ref	C mm max	D mm ref	E mm ref	F mm max	G mm ref	H mm ref	I mm ref	J mm ref	K mm	L mm	M mm ref	N mm max	O mm	P mm
VP2 and VPH2	16.3	12.0	16.8	0.7	6.7	7.8	2.0	0.1	0.30	14.25	1.75	2.5	13.0	18.0	2.5	0.75

Mechanical Diagrams

VP3 and VPH3



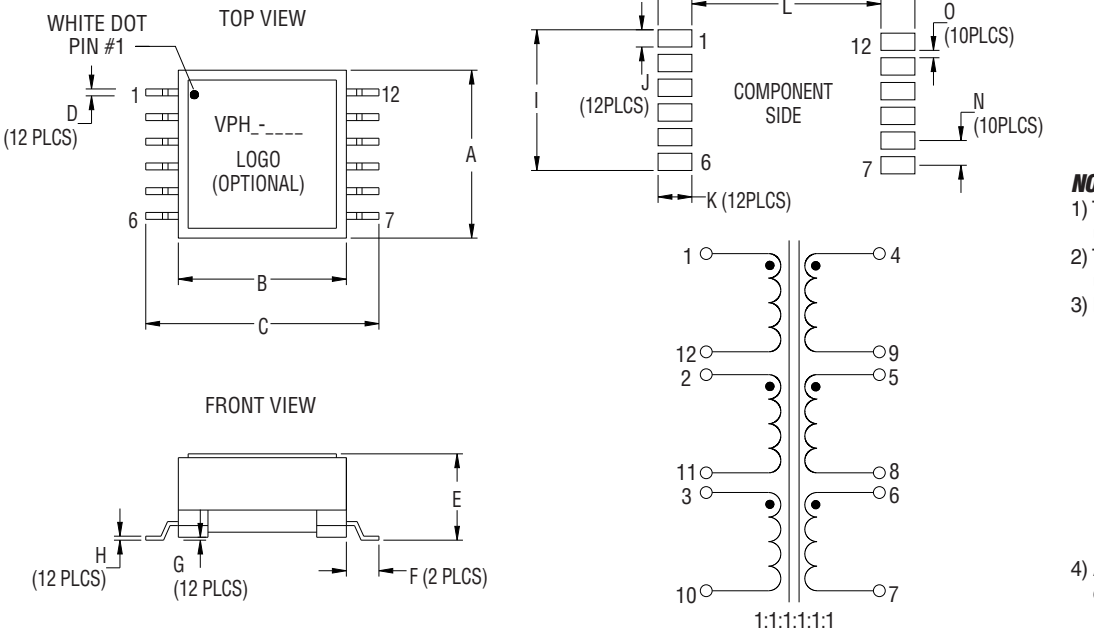


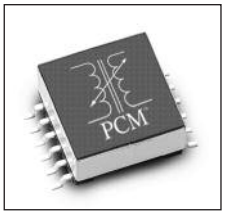
NOTES

1) Tolerances A - I are ± 0.25 mm unless specified otherwise.
2) Tolerances J - P are +/- 0.1 mm unless specified otherwise.
3) Marking as shown
   a) Dot for pin #1 identification
   b) On top of unit: -- VPHx-xxx (product code, size, 4 digit part number per family table.)
   c) On top of unit: Versa Pac Logo (optional)
   d) On bottom of unit: wwllyy = (date code) R = (revision level)
4) All soldering surfaces must be coplanar within 0.102 mm.

	A mm max	B mm ref	C mm max	D mm ref	E mm max	F mm ref	G mm ref	H mm ref	I mm ref	J mm	K mm	L mm ref	M mm max	N mm	O mm
VP3 and VPH3	17.1	16.0	22.3	0.7	8.4	3.0	0.1	0.4	14.49	1.79	3.43	16.88	23.74	2.54	0.75

VP4 and VPH4





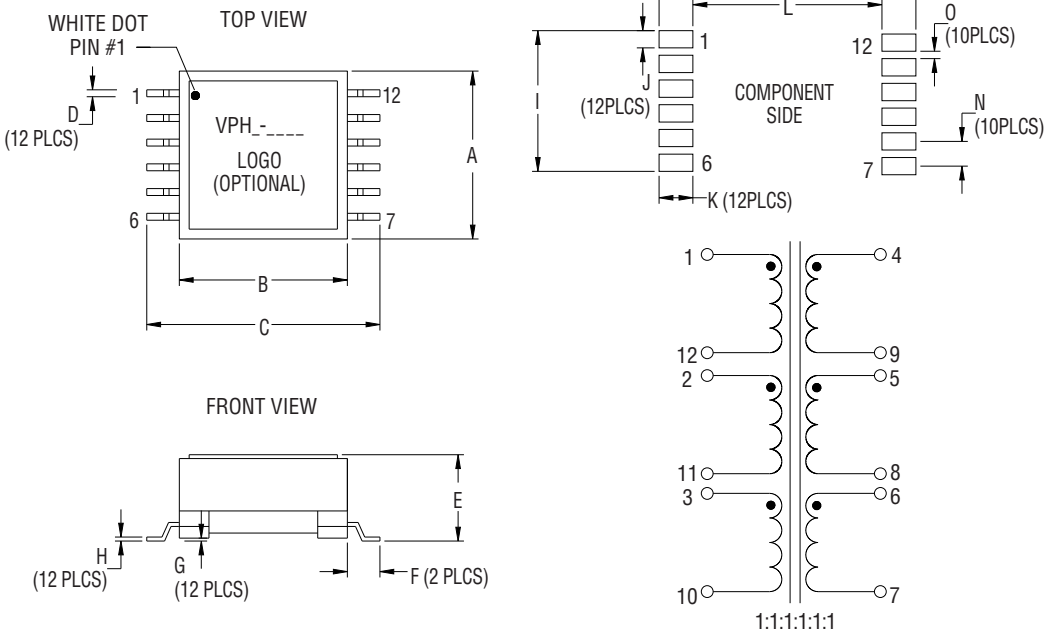
NOTES

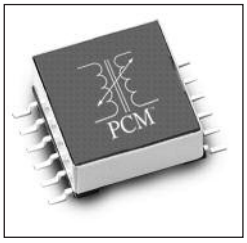
1) Tolerances A - I are ± 0.25 mm unless specified otherwise.
2) Tolerances J - P are +/- 0.1 mm unless specified otherwise.
3) Marking as shown
   a) Dot for pin #1 identification
   b) On top of unit: -- VPHx-xxx (product code, size, 4 digit part number per family table.)
   c) On top of unit: Versa Pac Logo (optional)
   d) On bottom of unit: wwllyy = (date code) R = (revision level)
4) All soldering surfaces must be coplanar within 0.102 mm.

	A mm max	B mm ref	C mm max	D mm ref	E mm max	F mm ref	G mm ref	H mm ref	I mm ref	J mm	K mm	L mm ref	M mm max	N mm	O mm
VP4 and VPH4	18.0	18.0	24.6	0.7	10.0	3.3	0.1	0.4	14.25	1.75	3.43	19.14	26.0	2.5	0.75

Mechanical Diagrams

VP5 and VPH5



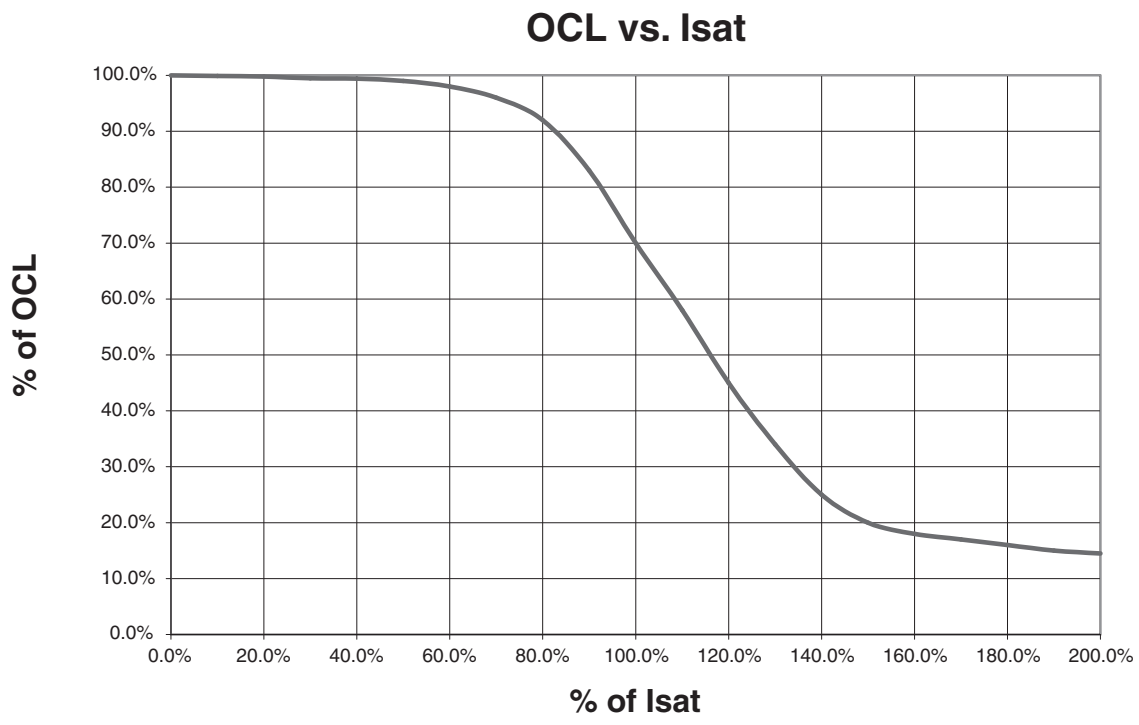


NOTES

1) Tolerances A - I are ± 0.25 mm unless specified otherwise.
2) Tolerances J - P are +/- 0.1 mm unless specified otherwise.
3) Marking as shown
   a) Dot for pin #1 identification
   b) On top of unit: -- VPHx-xxx (product code, size, 4 digit part number per family table.)
   c) On top of unit: Versa Pac Logo (optional)
   d) On bottom of unit: wwllyy = (date code) R = (revision level)
4) All soldering surfaces must be coplanar within 0.102 mm.

	A mm max	B mm ref	C mm max	D mm ref	E mm max	F mm ref	G mm ref	H mm ref	I mm ref	J mm	K mm	L mm ref	M mm max	N mm	O mm
VP5 and VPH5	21.0	21.0	28.5	0.7	10.8	2.95	0.1	0.4	17.25	2.25	3.15	22.7	29.0	3.0	0.75

Inductance Characteristics



HOW TO USE MULTIPLE WINDINGS

Discrete inductors combine like resistors, when connected in series or parallel. For example, inductors in series add and inductors in parallel reduce in a way similar to Ohm's Law.

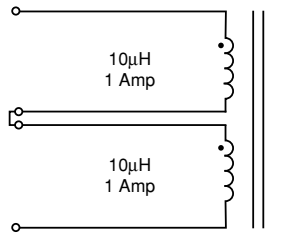
$$L_{Series} = L1 + L2 + L3...Ln$$

$$L_{Parallel} = 1/[1/L1 + 1/L2 + 1/L3....1/Ln]$$

Windings on the same magnetic core behave differently. Two windings in series result in four times the inductance of a single winding. This is because the inductance varies proportionately to the square of the turns.

Paralleled **VERSA-PAC** windings result in no change to the net inductance because the total number of turns remains unchanged; only the effective wire size becomes larger. Two parallel windings result in approximately twice the current carrying capability of a single winding. The net inductance of a given **PCM** configuration is based on the number of windings in series squared multiplied by the inductance of a single winding (L_{BASE}). The current rating of a **PCM** configuration is derived by multiplying the maximum current rating of one winding (I_{BASE}) by the number of windings in parallel. Examples of simple two-winding devices are shown below:

Series Connected (2 Windings)

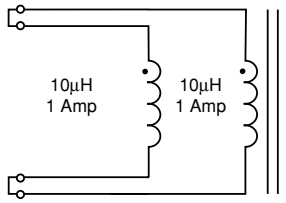


$L_{TOTAL} = L_{BASE} \times S^2$ $I_{MAX} = I_{BASE} \times P$

$= 10\ \mu H \times 2^2$ $= 1\ Amp \times 1$

$= 40\ \mu H$ $= 1\ Amp$

Parallel Connected (2 Windings)



$L_{TOTAL} = L_{BASE} \times S^2$ $I_{MAX} = I_{BASE} \times P$

$= 10\ \mu H \times 1^2$ $= 1\ Amp \times 2$

$= 10\ \mu H$ $= 2\ Amps$

Where:

L_{BASE} = Inductance of a single winding

P = Number of windings in parallel (use 1 with all windings in series)

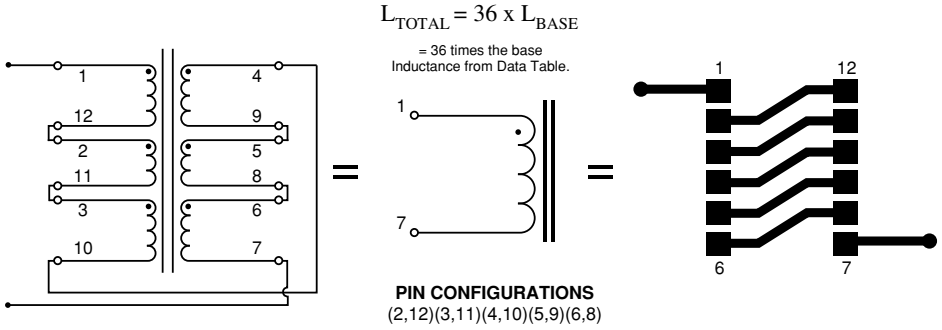
S = Number of windings in series

I_{BASE} = Maximum current rating of one winding

HOW TO PIN-CONFIGURE VERSA-PAC®

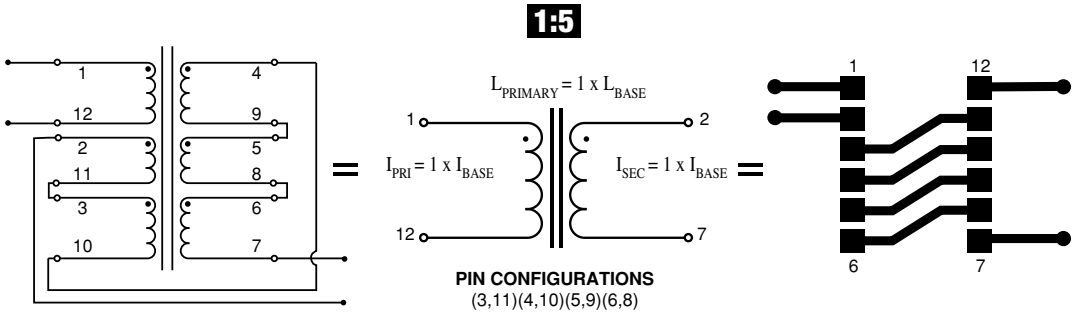
Each **VERSA-PAC** can be configured in a variety of ways by simply connecting pins together on the Printed Circuit Board (PCB). As shown below, the connections on the PCB are equal to the pin configuration statement shown at the bottom of the schematic symbol. Connecting a number of windings in parallel will increase the current carrying capability, while connecting in series will multiply the inductance. Each **VERSA-PAC** part can be configured in at least 6 combinations for inductor use or configured in at least 15 turns ratios for transformer applications. Given 25 **VERSA-PAC** part numbers, this allows for at least 500 magnetic configurations. The **PCM** configurations can either be created by the designer or simply chosen from the existing **PCM** diagrams. The following inductor example shows 6 windings in series, which result in an inductance of 36 times the base inductance and 1 times the base current.

INDUCTOR EXAMPLE
FOR SIZES VP3, VP4 AND VP5



Each VERSA-PAC may be used in at least 15 transformer applications. More than 375 transformer combinations may be achieved using the available 25 VERSA-PAC parts.

TRANSFORMER EXAMPLE
FOR SIZES VP3, VP4 AND VP5



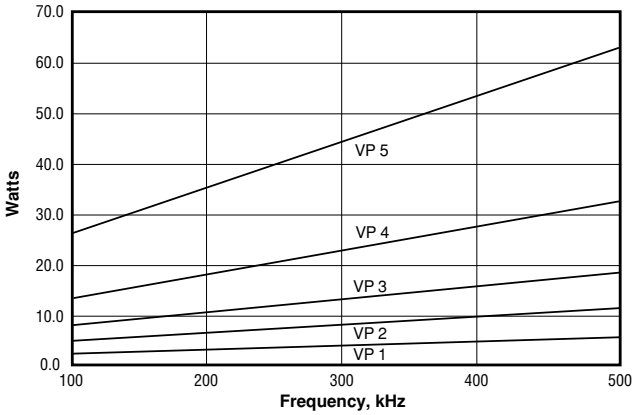
The PCM configurations may be selected from the examples on the following pages or created by the designer. Six PCM inductor and fifteen PCM transformer configurations and equivalent circuit schematics are shown. The printed circuit board layout in each example illustrates the connections to obtain the desired inductance or turns ratio. The examples may be used by the PCB designer to configure **VERSA-PAC** as desired.

To assist the designer, **VERSA-PAC** phasing, coupling and thermal issues have been considered in each of the PCM configurations illustrated. Additionally, the inductance and current ratings, as a function of the respective base values from the following Data Tables, are shown in each PCM example. Turns ratios are also given for each PCM Transformer shown.

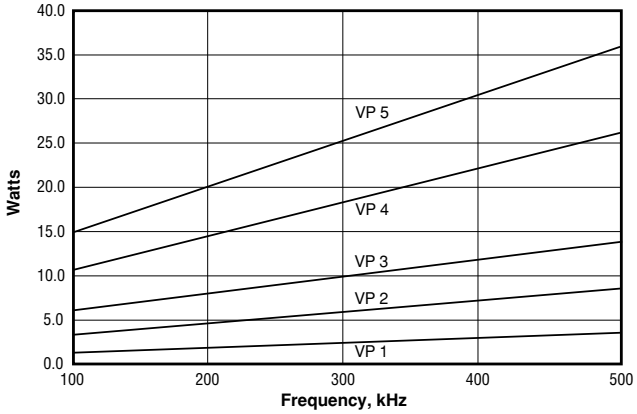
It is important to carefully select the proper **VERSA-PAC** part in order to minimize the component size without exceeding the RMS current capability or saturating the core. The Data Tables indicate maximum ratings.

VERSA-PAC® Performance Characteristics

Bipolar (Push-Pull) Power vs Frequency



Unipolar (Flyback) Power vs Frequency

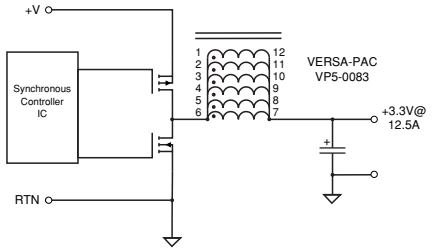


These curves represent typical power handling capability.
Indicated power levels may not be achievable with all configurations.

3.3V Buck Converter

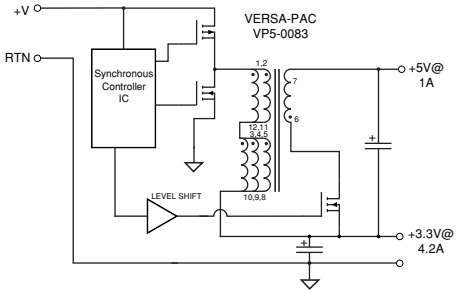
This circuit utilizes the gap of the VP5-0083 to handle the 12.5 Amp output current without saturating. In each of the five **VERSA-PAC** sizes, the gap is varied to achieve a selection of specific inductance and current values (see **VERSA-PAC** Data Table).

All six windings are connected in parallel to minimize AC/DC copper losses and to maximize heat dissipation. With **VERSA-PAC,** this circuit works well at or above 300 KHz. Also, the closed flux-path EFD geometry enables much lower radiation characteristics than open-path bobbin core style components.



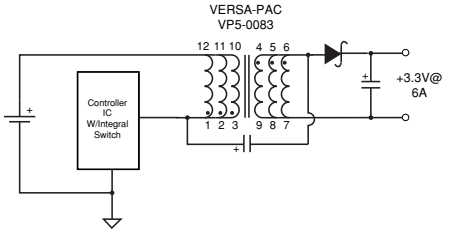
5V to 3.3V Buck Converter With 5V Output

This circuit minimizes both board space and cost by eliminating a second regulator. **VERSA-PAC**'s gap serves to prevent core saturation during the switch on-time and also stores energy for the +5V load which is delivered during the flyback interval. The +3.3V buck winding is configured by placing two windings in series while the +5V is generated by an additional flyback winding stacked on the 3.3V output. Extra windings are paralleled with primary windings to handle more current. The turns ratio of 2:1 adds 1.67V to the +3.3V during the flyback interval to achieve +5V.



LITHIUM-ION BATTERY TO 3.3V SEPIC CONVERTER

The voltage of a Lithium-Ion Battery varies above and below +3.3V depending on the degree of charge. The SEPIC configuration takes advantage of **VERSA-PAC**'s multiple tightly coupled windings. This results in lower ripple current which lowers noise and core losses substantially. The circuit does not require a snubber to control the voltage "spike" associated with switch turn-off, and is quite efficient due to lower RMS current in the windings.



COOPER Bussmann

Power Over Ethernet (PoE)/PD Configurable Transformer

RoHS 2002/95/EC

Description

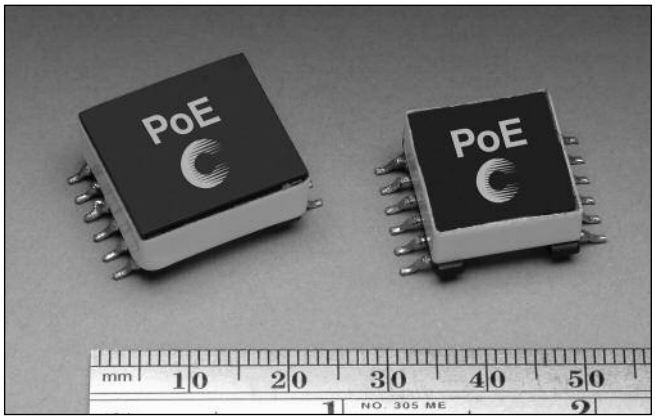
- Versatile design allows multiple output variations
- Flyback topology, 250Khz switching frequency
- Input range from 29.5-60V
- 1500VAC isolation between primary and secondary
- Three power levels 4, 7, and 13watts
- Low leakage inductance
- 11.0 Volt @ 0.10 Amp Feedback Winding
- Ferrite core material

Applications

- For IEEE 802.3af-compliant Power over Ethernet applications
- UPS, VoiP Phone, Wireless LAN Access point, Bluetooth Access point, Network Camera, Building Access Systems
- Retail Point-of-information systems
- Vending/Gaming Machines

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +85°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds max.



Packaging

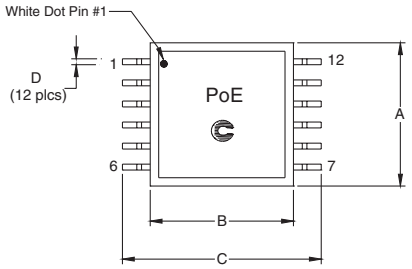
- Packaging Information: 4 and 7 Watts 200 parts per 13" reel, 13 Watts 140 parts per 13" reel

Part Number	Watts	Inductance (uH)	Output	DCR/ PRI (ohms)	DCR/ SEC (ohms)	Leakage Inductance (uH) typ.	Pri Current Pk (Adc)	Turn Ratio Schematic 1: Pins pri(3-1):fb(5-6):v1(12-7):v2(11-8):v3(10-9) Schematic 2: Pins pri(3-1):fb(5-6):v1(12-10):v2(11-9)	Schematic	Dimensions
PoE4W3x3.3-R	4	200	(3)x3.3V@0.45A	0.500	0.07	2.75	0.65	1 : 0.52 : 0.16 : 0.16 : 0.16 +/-1%	1	Size 1
PoE4W3x5.0-R	4	200	(3)x5.0V@0.30A	0.500	0.27	2.50	0.65	1 : 0.52 : 0.26 : 0.26 : 0.26 +/-1%	1	Size 1
PoE4W2x12-R	4	200	(2)x12.0V@0.20A	0.500	0.740	1.40	0.65	1 : 0.52 : 0.60 : 0.60 +/-1%	2	Size 1
PoE7W3x3.3-R	7	100	(3)x3.3V@0.75A	0.275	0.03	1.00	1.00	1 : 0.529 : 0.176 : 0.176 : 0.176 +/-1%	1	Size 1
PoE7W3x5.0-R	7	100	(3)x5.0V@0.50A	0.275	0.095	1.00	1.00	1 : 0.529 : 0.265 : 0.265 : 0.265 +/-1%	1	Size 1
PoE7W2x12-R	7	100	(2)x12.0V@0.30A	0.275	0.250	1.00	1.00	1 : 0.529 : 0.588 : 0.588 +/-1%	2	Size 1
PoE13W3x3.3-R	13	100	(3)x3.3V@1.35A	0.250	0.032	1.50	1.60	1 : 0.529 : 0.176 : 0.176 : 0.176 +/-3%	1	Size 2
PoE13W3x5.0-R	13	100	(3)x5.0V@0.90A	0.250	0.075	1.20	1.60	1 : 0.529 : 0.265 : 0.265 : 0.265 +/-3%	1	Size 2
PoE13W2x12-R	13	100	(2)x12.0V@0.60A	0.250	0.280	1.00	1.70	1 : 0.529 : 0.647 : 0.647 +/-3%	2	Size 2
Part Number	Watts	Inductance (uH)	Output	DCR/ PRI (ohms)	DCR/ SEC V1/V2/V3	Leakage Inductance (uH) typ.	Pri Current Pk (Adc)	Turn Ratio Schematic 2: Pins pri(3-1):fb(5-6):v1(12-10):v2(11-9) Schematic 3: Pins pri(1-3):fb(5-6):v3(12-11):v2(8-7)	Schematic	Dimensions
PoE13W3VERS-R	13	100	V1:7.0V@1.1A, V2:(1)x3.3V@1.1A, V3:1.8V@1.1A	0.250	0.025/0.042:0/085	1.00	1.70	1 : 0.529 : 0.350 : 0.176 : 0.088 +/-3%	3	Size 2
PoE13W2VERS-R	13	100	V1:5.0V@1.6A, V2:3.3V@1.6A	0.250	0.023/0.038/na	1.20	1.70	1 : 0.529 : 0.265 : 0.176 +/-3%	2	Size 2

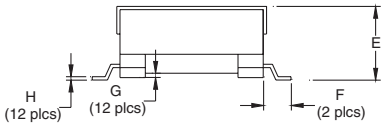
1) Test Parameters: 100kHz, 0.100 Vrms, 0.0Adc
2) DCR limits maximum @ 20°C
3) Leakage Inductance 200kHz, 0.01Vrms, 0.0Adc
4) Feedback DCR 1.0 Ohms maximum @20°C

Mechanical Diagrams

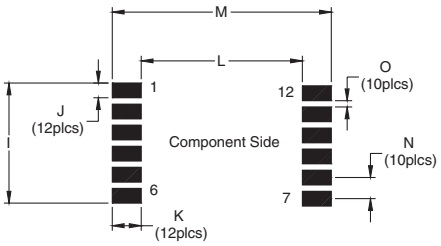
TOP VIEW



FRONT VIEW



RECOMMENDED PCB LAYOUT



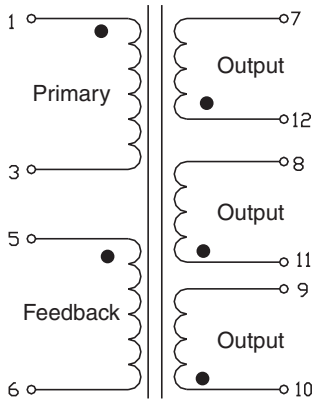
DIMENSIONS

	A mm max.	B mm ref.	C mm max.	D mm ref.	E mm max.	F mm ref.	G mm ref.	H mm ref.	I mm ref.	J mm	K mm	L mm ref.	M mm max.	N mm	O mm
Size 1	17.1	16.0	22.3	0.7	8.4	3.0	0.1	0.4	14.49	1.79	3.43	16.88	23.74	2.54	0.75
Size 2	18.0	18.0	24.6	0.7	10.0	3.3	0.1	0.4	14.25	1.75	3.43	19.14	26.0	2.5	0.75

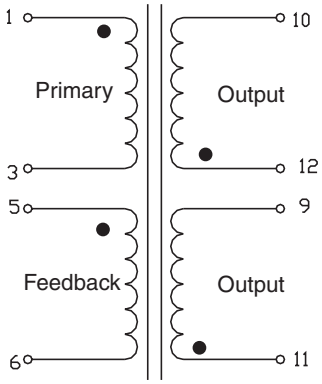
1) Tolerances A - H are ± 0.25mm unless specified otherwise.
2) Tolerances I - O are ± 0.10mm unless specified otherwise
2) All soldering surfaces are coplaner to within ± 0.102mm.

Schematic Diagrams

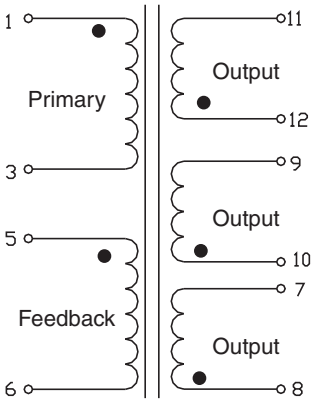
SCHEMATIC 1



SCHEMATIC 2

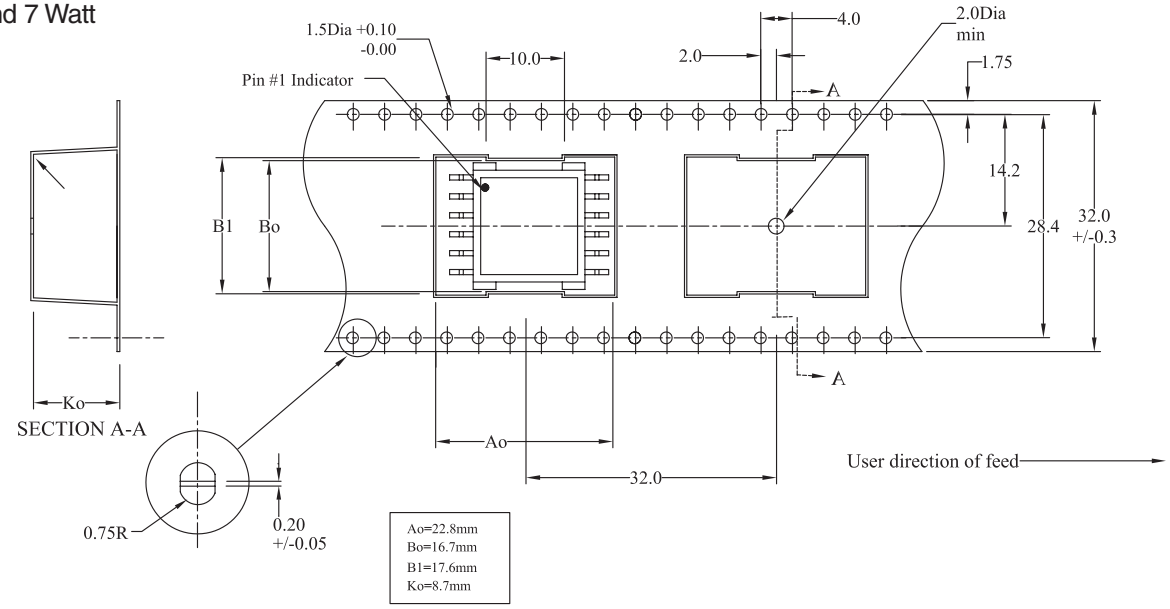


SCHEMATIC 3

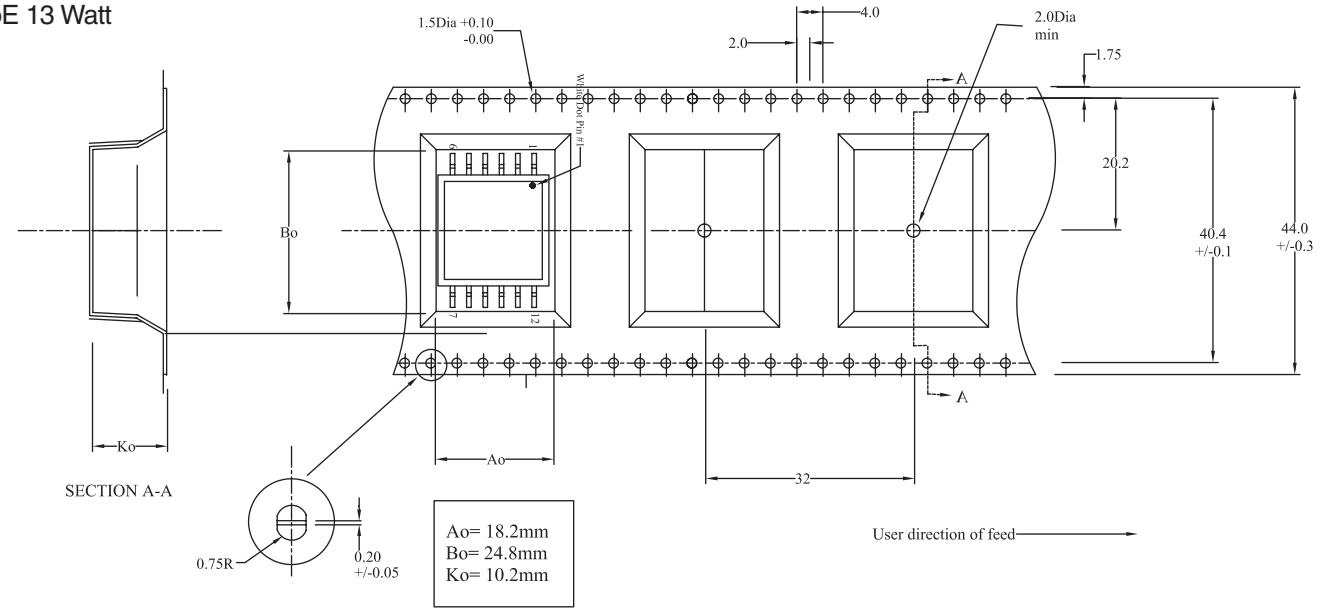


Mechanical Diagrams

PoE 4 and 7 Watt



PoE 13 Watt



COOPER Bussmann

Power Over Ethernet (PoE)/PD Configurable Transformer

RoHS 2002/95/EC

Description

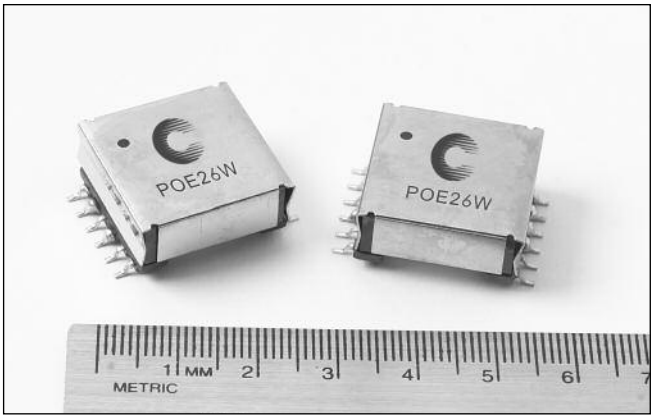
- Versatile design allows multiple output variations
- Forward topology, 300Khz switching frequency
- Input range from 29.5-60V
- 1500VAC isolation between primary and secondary
- Power 26watts
- Low leakage inductance

Applications

- For IEEE 802.3af-compliant Power over Ethernet applications
- UPS, VoiP Phone, Wireless LAN Access point, Bluetooth Access point, Network Camera, Building Access Systems
- Retail Point-of-information systems
- Vending/Gaming Machines

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +85°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum



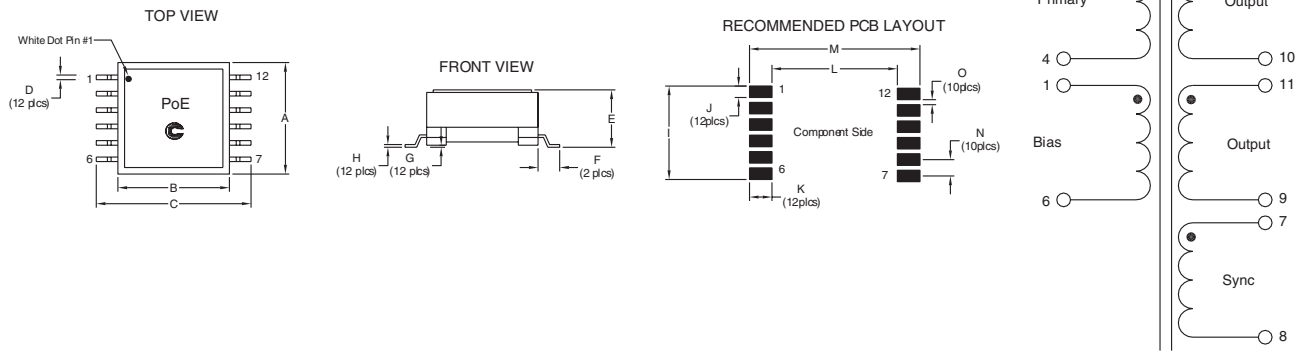
Packaging

- Packaging information: 115 parts per 13" reel

Part Number	Watts	Primary Induct. (uH)	Output	Bias	Sync	DCR/ Pri (ohms) max	DCR/ Sec (ohms) max	DCR/ Bias (ohms) max	DCR/ Sync (ohms) max	Leakage Induct. (uh) typ.	Pri Current Pk (Adc)	Turns ratio pins Pri (2 - 4): V1 (12 - 10): V2 (11 - 9): Bias (1 - 6): Sync (7 - 8)
PoE26W3.3VS5-R	26	160	(2)x3.3V@4.0A	10.0V@0.1A	5V@0.1A	0.100	0.025	0.90	0.42	1.0	2.6	1:0.29:0.29:0.83:0.42 +/-2%
PoE26W3.3VS10-R	26	160	(2)x3.3V@4.0A	10.0V@0.1A	10V@0.1A	0.100	0.025	0.90	0.90	1.0	2.6	1:0.29:0.29:0.83:0.83 +/-2%
PoE26W5V-R	26	160	(2)x5.0V@2.6A	10.0V@0.1A	5.0V@0.1A	0.100	0.050	0.90	0.42	1.0	2.6	1:0.42:0.42:0.83:0.42 +/-2%

(1) Test parameters: 100kHz, 0.100Vrms, 0.0Adc
(2) DCR limits maximum @ 20°C
(3) Leakage Inductance 300kHz, 0.01Vrms, 0.0Adc

Mechanical Diagram

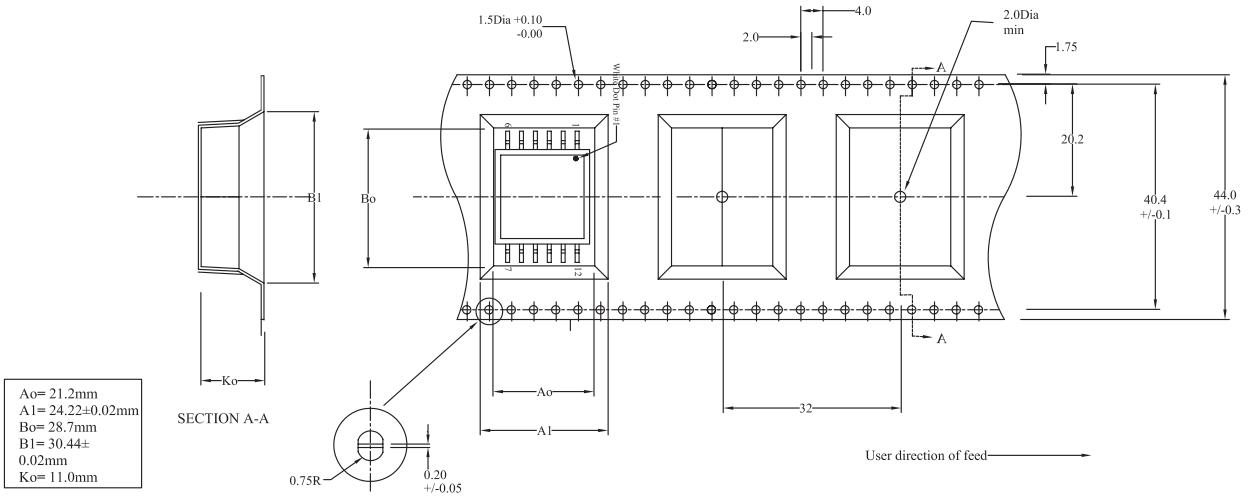


DIMENSIONS

	A mm max.	B mm ref.	C mm max.	D mm ref.	E mm max.	F mm ref.	G mm ref.	H mm ref.	I mm ref.	J mm	K mm	L mm ref.	M mm max.	N mm	O mm
	21.5	22.0	28.5	0.7	10.8	2.95	0.1	0.4	17.25	2.25	3.15	23.2	29.5	3.0	0.75

1) Tolerances A - H are ± 0.25mm unless specified otherwise.
2) Tolerances I - O are ± 0.10mm unless specified otherwise
2) All soldering surfaces are coplaner to within ± 0.102mm.

Packaging Information



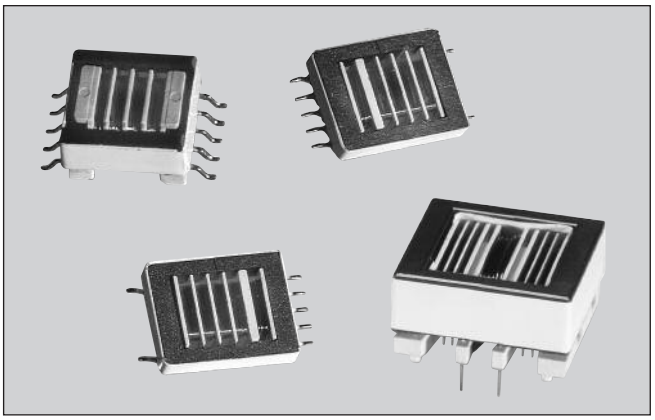
COOPER Bussmann

CCFL TRANSFORMERS
Cold Cathode Fluorescent Lamp Inverter Transformers

Description

RoHS 2002/95/EC

- Transformers for use in CCFL power supplies, available in through-hole and surface mount recess or gull wing versions, incorporating floating or fixed secondary technology
- Supply output current up to 30 milli-Amps
- Frequency range from 40 to 80 KHz
- Deliver output power from 2.5 to 14 Watts
- Operate in royer and other topologies
- Ferrite core material



Applications

- CCFL power supplies

Environmental Data

- Storage temperature range: -40°C to +85°C
- Operating ambient temperature range: 0°C to +70°C
- Solder reflow temperature: +260°C max. for 10 seconds max.

Packaging

- Supplied in bulk packaging

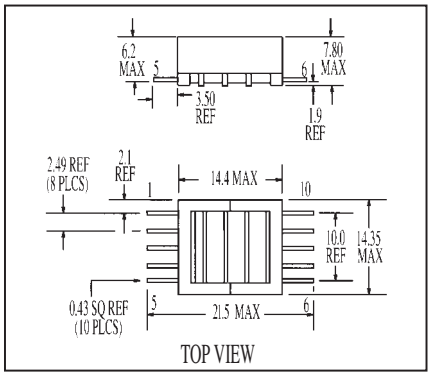
Part Number	Schematic Diagram	Pout Watts	Lp µH[1]	DCRp Ohms Max	DCRs Ohms Max	TR Ns/Np	Vpri Volts Max[2]	Vsec Volts Max[2]	Is Max A rms	Vpri Abnormal[3]	Vsec Abnormal[3]	Mechanical Dimensions	PCB Pad Layout
2.5 WATT VERSIONS													
CTX110652-R	A	2.5	43	0.220	285	67	20	1340	.005	30	2000	A	A
CTX110655-R	B	2.5	43	0.220	285	67	20	1340	.005	30	2000	A	A
CTX110657-R	B	2.5	26	0.212	285	86	15	1340	.005	23	2000	A	A
CTX110659-R	B	2.5	19	0.190	285	100	13	1340	.005	23	2000	A	A
CTX210652-R	A	2.5	43	0.220	285	67	20	1340	.005	30	2000	B	B
CTX210655-R	B	2.5	43	0.220	285	67	20	1340	.005	30	2000	B	B
CTX210657-R	B	2.5	26	0.212	285	86	15	1340	.005	23	2000	B	B
CTX210659-R	B	2.5	19	0.190	285	100	13	1340	.005	23	2000	B	B
4 WATT VERSIONS													
CTX210403-R	C	4	44	0.220	165	50	26	1340	.007	40	2000	C	C
CTX210407-R	C	4	27	0.160	220	86	15	1340	.007	23	2000	C	C
CTX210409-R	C	4	20	0.160	220	100	13	1340	.007	23	2000	C	C
CTX210411-R	C	4	20	0.160	330	125	10	1340	.007	16	2000	C	C
CTX310403-R	C	4	44	0.220	165	50	26	1340	.007	40	2000	D	D
CTX310407-R	C	4	27	0.160	220	86	15	1340	.007	23	2000	D	D
CTX310409-R	C	4	20	0.160	220	100	13	1340	.007	23	2000	D	D
CTX310411-R	C	4	20	0.160	330	125	10	1340	.007	16	2000	D	D
6 WATT VERSIONS													
CTX110600-R	D	6	44	0.160	176	67	20	1340	.011	30	2000	E	E
CTX110603-R	C	6	44	0.160	132	50	26	1340	.011	40	2000	E	E
CTX110605-R	C	6	44	0.160	176	67	20	1340	.011	30	2000	E	E
CTX110607-R	C	6	27	0.132	176	86	15	1340	.011	23	2000	E	E
CTX110609-R	C	6	20	0.132	176	100	13	1340	.011	23	2000	E	E
CTX110611-R	C	6	20	0.132	291	125	11	1340	.011	16	2000	E	E
CTX210600-R	D	6	44	0.160	176	67	20	1340	.011	30	2000	F	C
CTX210603-R	C	6	44	0.160	132	50	26	1340	.011	40	2000	F	C
CTX210605-R	C	6	44	0.160	176	67	20	1340	.011	30	2000	F	C
CTX210607-R	C	6	27	0.132	176	86	15	1340	.011	23	2000	F	C
CTX210609-R	C	6	20	0.132	176	100	13	1340	.011	23	2000	F	C
CTX210611-R	C	6	20	0.132	291	125	11	1340	.011	16	2000	F	C
14 Watt Versions													
CTX410805-R	E	14	24	0.030	262	67	20	1340	.030	30	2000	G	F
CTX410807-R	E	14	16	0.024	272	86	15	1340	.030	23	2000	G	F
CTX410809-R	E	14	16	0.024	314	100	13	1340	.030	23	2000	G	F

[1]Inductances are nominal values [2]Continuous RMS Voltage [3]Maximum Instantaneous RMS Voltage

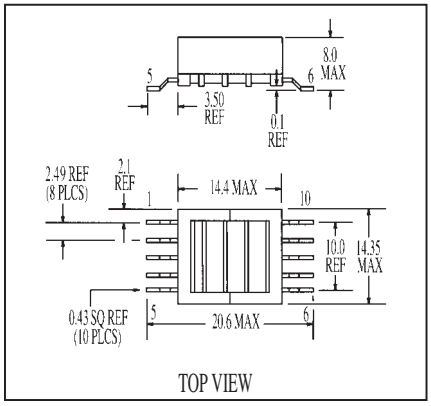
Mechanical Diagrams

2.5 Watt Versions

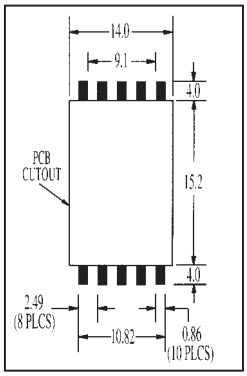
Mechanical A



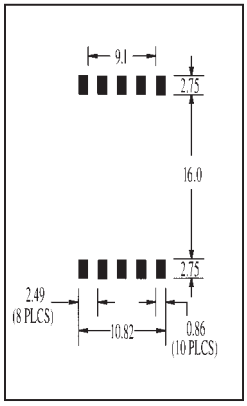
Mechanical B



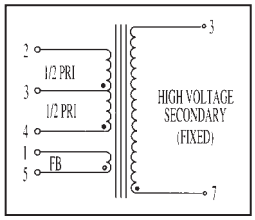
Pad Layout A



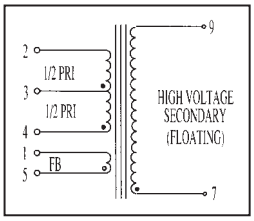
Pad Layout B



Schematic A



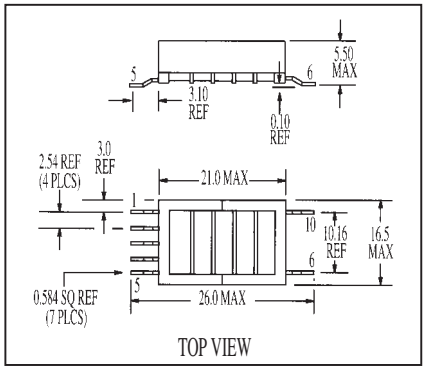
Schematic B



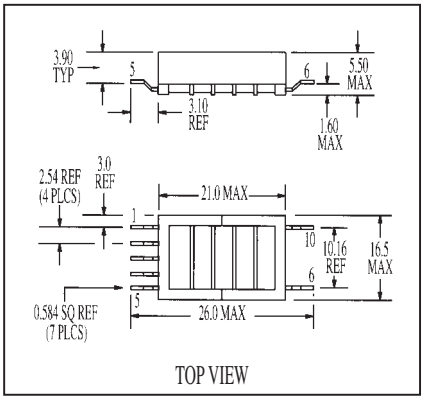
Dimensions are in millimeters

4 Watt Versions

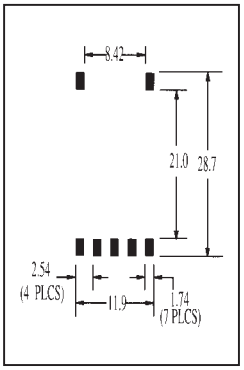
Mechanical C



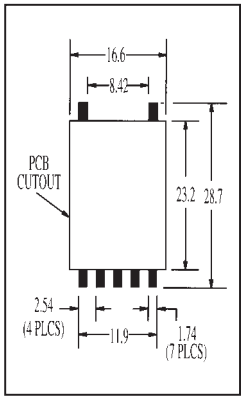
Mechanical D



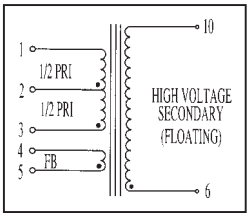
Pad Layout C



Pad Layout D



Schematic C

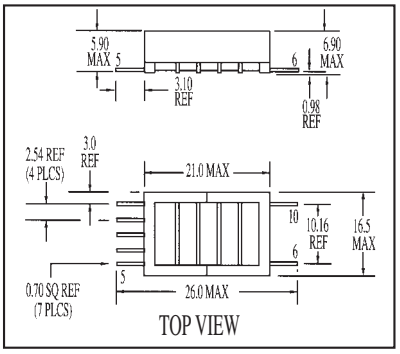


Dimensions are in millimeters

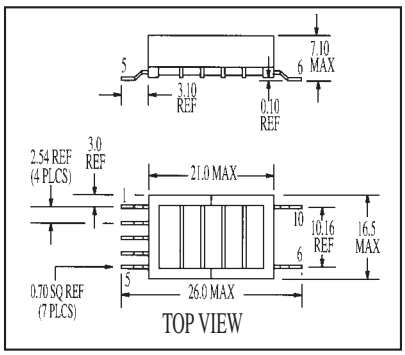
Mechanical Diagrams

6 Watt Versions

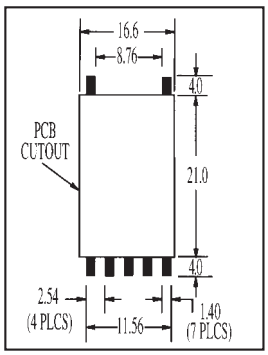
Mechanical E



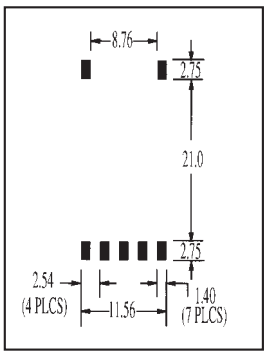
Mechanical F



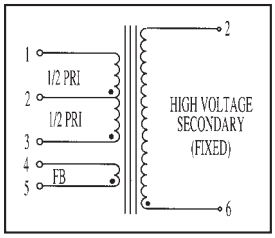
Pad Layout E



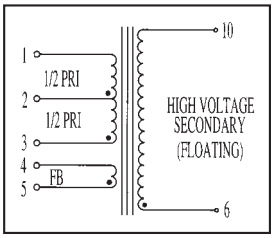
Pad Layout C



Schematic D



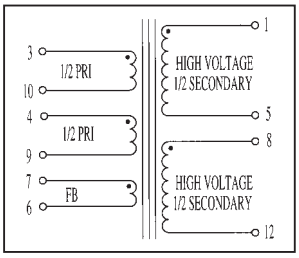
Schematic C



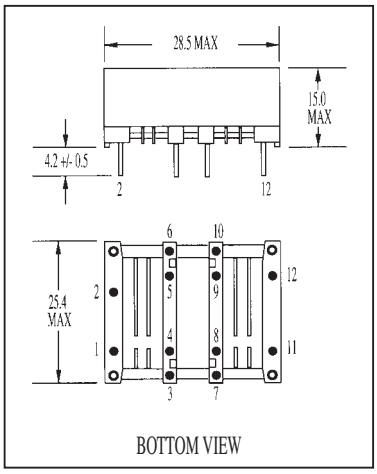
Dimensions are in millimeters

14 Watt Versions

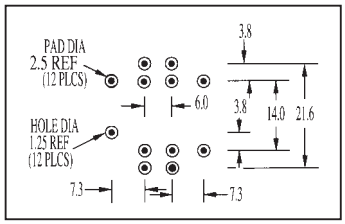
Schematic E



Mechanical G



Pad Layout F

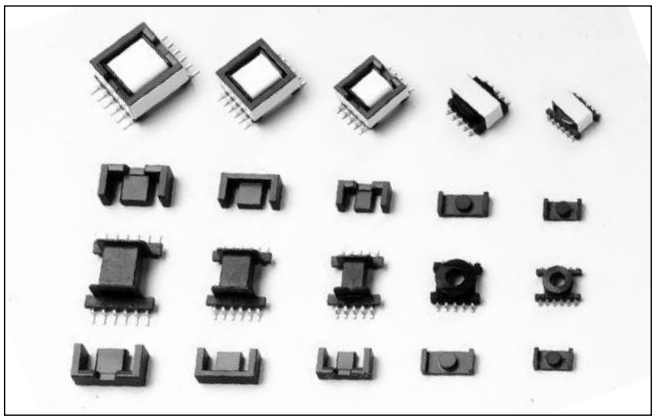


Dimensions are in millimeters

COOPER Bussmann

STANDARD GEOMETRIES
Low Cost Magnetic Components

RoHS 2002/95/EC



Description

- Low cost magnetic components for custom specifications
- Power range from 1 Watt to 120 Watts
- Frequency range from 20kHz to .5MHz
- High power density and low radiated noise
- Meets UL 94V-0 flammability standard
- Ferrite core material

Applications

- Inductors: buck, boost, coupled, choke, filter, resonant, noise filtering, differential, forward, common mode
- Transformers: flyback, feed forward, push-pull, multiple output, inverter, step-up, step-down, gate drive, base drive, wide band, pulse, control, impedance, isolation, bridging, ringer, converter, auto

Environmental Data

- Storage temperature range: -55°C to +125°C
- Operating ambient temperature range: -40°C to +85°C (range is application specific). The internal "hot spot" temperature defines the maximum allowable currents, which are limited to 130°C, including ambient
- Solder reflow temperature: +260°C max. for 10 seconds max.

Packaging

- Supplied in tape and reel packaging (SG01, SG02, SG03, SG06 and SG07)
- Supplied in bulk packaging (SG04, SG05, SG08 and SG09)
- Consult the factory for SG04 and SG05 tape and reel packaging

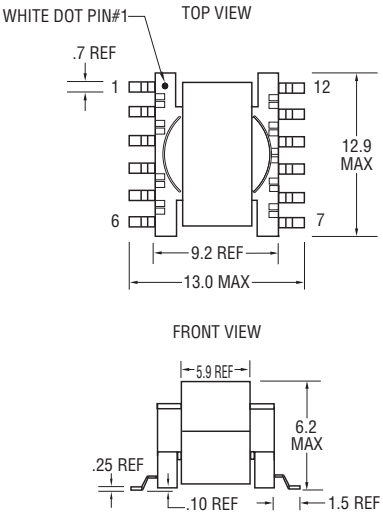
STANDARD GEOMETRIES SIZES 1 TO 5 CORE AND BOBBIN PARAMETERS					
Specifications	**SG1**	**SG2**	**SG3**	**SG4**	**SG5**
Core	ER 11/5	ER 14.5/6	EFD 15	EFD 17	EFD 20
AL-1, nH/T^2	1400	1600	780	1028	1200
AL-2, nH/T^2	190	216	138	140	155
AL-3, nH/T^2	102	116	84	75	83
AL-4, nH/T^2	76	83	55	60	67
AL-5, nH/T^2	59	66	47	47	53
Ae, min. core area, cm^2	0.0900	0.1520	0.1220	0.1960	0.3100
le, mag. path lgth., cm	1.46	1.90	3.40	4.12	4.70
Ve, core volume, cm^3	0.170	0.330	0.510	0.940	1.460
MLT, ave. turn length, cm	2.1666	2.7051	2.6805	3.2202	3.8359
Wa, usable wdg. area, cm^2 *	0.0171	0.0302	0.0915	0.1051	0.1441
WaAc, cm^4	0.0015	0.0046	0.0112	0.0206	0.0447
UL flammability rating	94V-0	94V-0	94V-0	94V-0	94V-0

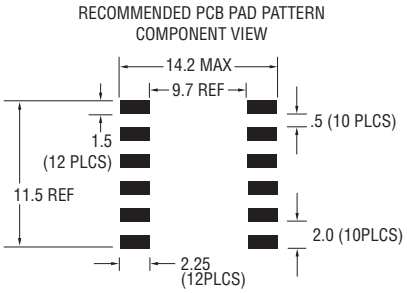
STANDARD GEOMETRIES SIZES 6 TO 9 CORE AND BOBBIN PARAMETERS				
Specifications	**SG6**	**SG7**	**SG8**	**SG9**
Core	EE8.3	EF12.6	EE13	SEE16
AL-1, nH/T^2	675	1075	1100	1254
AL-2, nH/T^2	96	95	128	153
AL-3, nH/T^2	——	——	——	——
AL-4, nH/T^2	58	57	77	92
AL-5, nH/T^2	——	——	——	——
Ae, min. core area, cm^2	0.0600	0.1003	0.1380	0.1848
le, mag. path lgth., cm	1.92	2.96	3.06	3.55
Ve, core volume, cm^3	0.1564	0.3860	0.5479	0.8552
MLT, ave. turn length, cm	2.0880	2.5480	3.2300	3.7780
Wa, usable wdg. area, cm^2 *	0.0317	0.0769	0.1114	0.1849
WaAc, cm^4	0.00190	0.00772	0.01540	0.03416
UL flammability rating	94V-0	94V-0	94V-0	94V-0

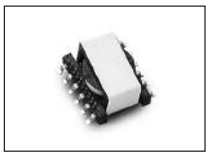
* Fill Factor considered

Mechanical Diagrams

SG SIZE 1
ER 11/5





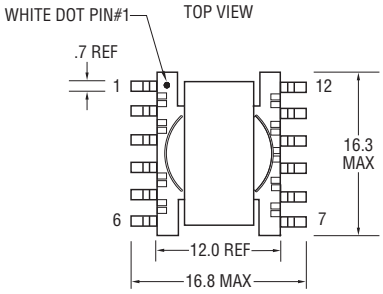


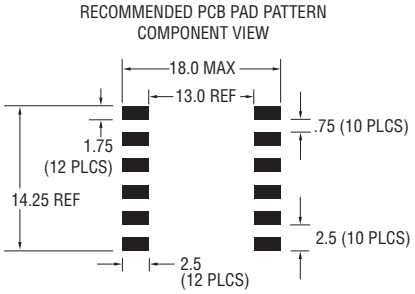
PACKAGING INFORMATION

Parts packaged on 13" reels,
600 parts per reel.

Bulk packaging also available.

SG SIZE 2
ER 14.5/6



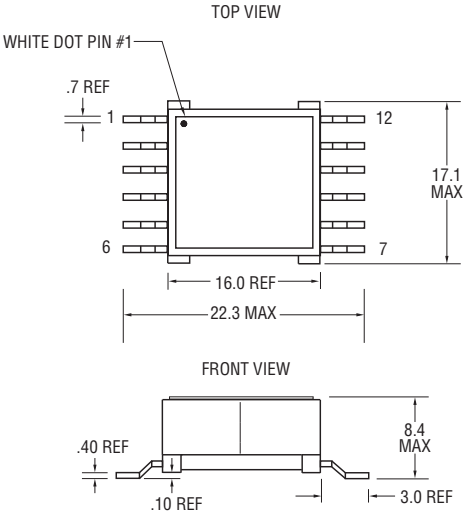


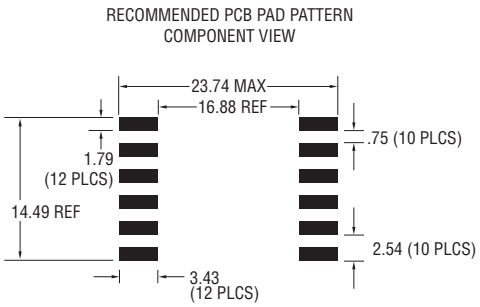
PACKAGING INFORMATION

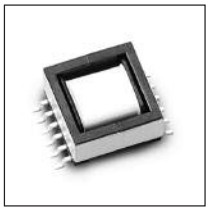
Parts packaged on 13" reels,
300 parts per reel.

Bulk packaging also available.

SG SIZE 3
EFD 15





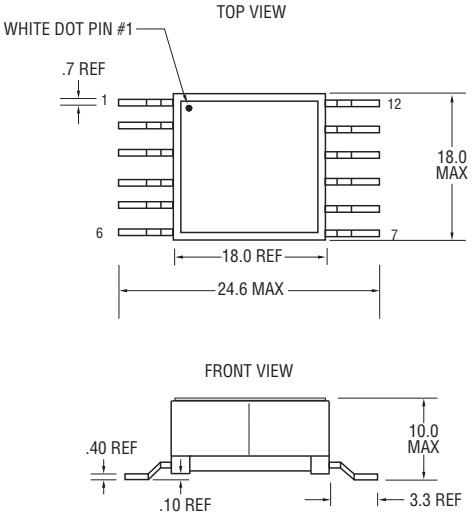


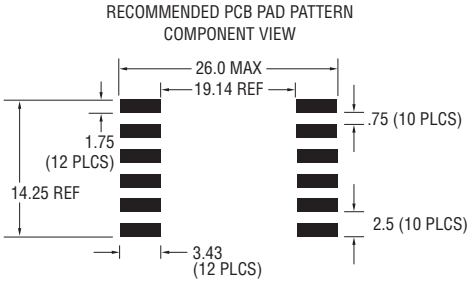
PACKAGING INFORMATION

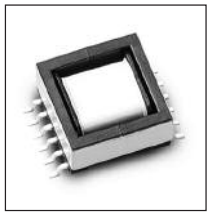
Parts packaged on 13" reels,
200 parts per reel.

Bulk packaging also available.

SG SIZE 4
EFD 17





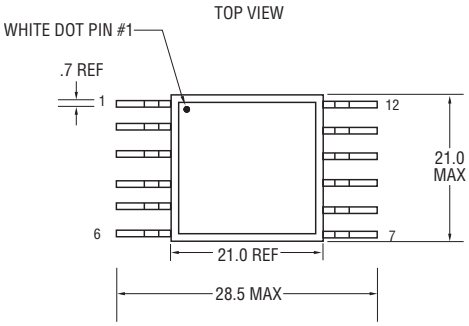


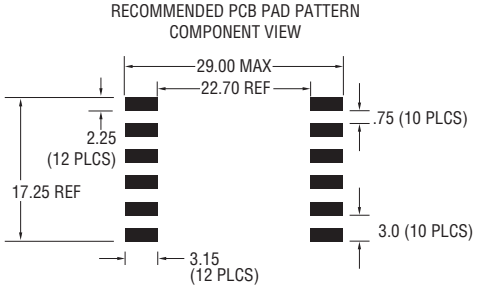
PACKAGING INFORMATION

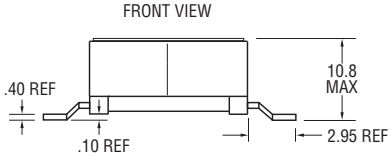
Parts packaged in pick and place compatible bulk trays, 9.8" x 6.7", 6 rows by 7 columns, 42 parts per tray.

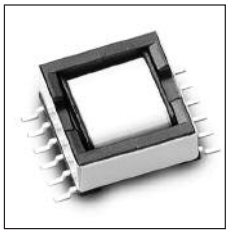
Consult factory for tape and reel packaging.

SG SIZE 5
EFD 20







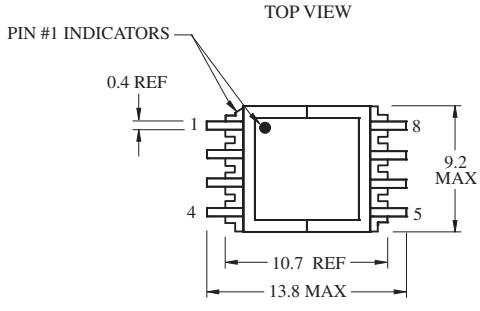


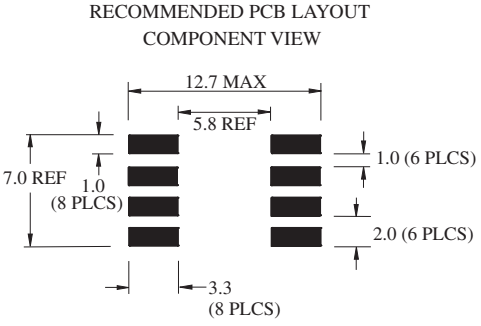
PACKAGING INFORMATION

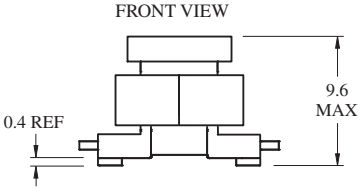
Parts packaged in pick and place compatible bulk trays, 9.8" x 6.7", 5 rows by 7 columns, 35 parts per tray.

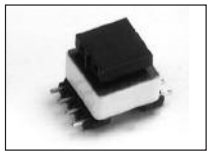
Consult factory for tape and reel packaging.

SG SIZE 6
EE 8.3







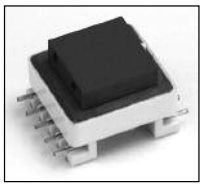


PACKAGING INFORMATION

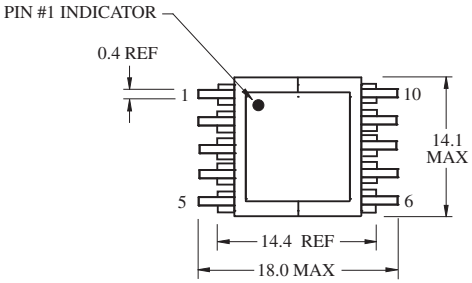
Parts packaged on 13" reels, 400 parts per reel.

Bulk packaging also available.

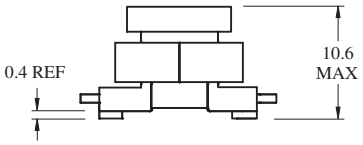
SG SIZE 7
EF 12.6



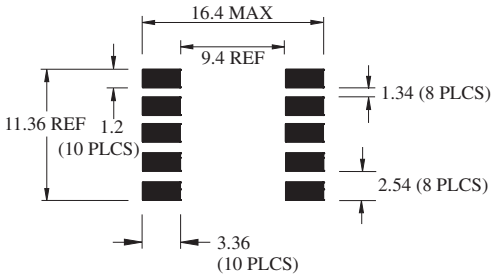
TOP VIEW



FRONT VIEW



RECOMMENDED PCB LAYOUT
COMPONENT VIEW

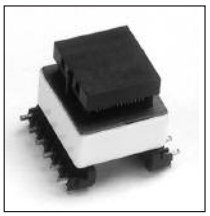


PACKAGING INFORMATION

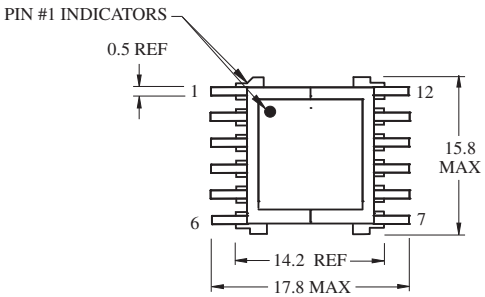
Parts packaged on 13" reels,
250 parts per reel.

Bulk packaging also available.

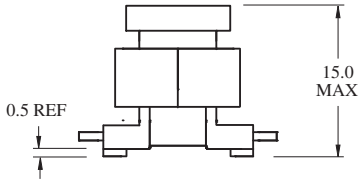
SG SIZE 8
EE 13



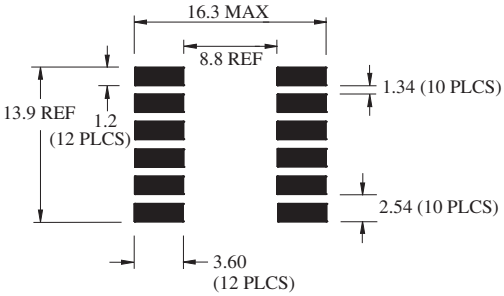
TOP VIEW



FRONT VIEW



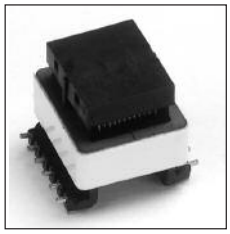
RECOMMENDED PCB LAYOUT
COMPONENT VIEW



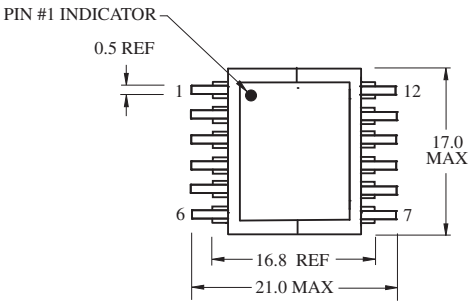
PACKAGING INFORMATION

Parts packaged in pick and
place compatible bulk trays,
6 rows by 10 columns.
Total parts per tray = 60.

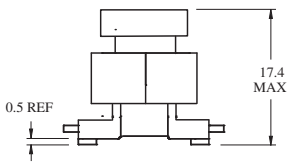
SG SIZE 9
SEE 16



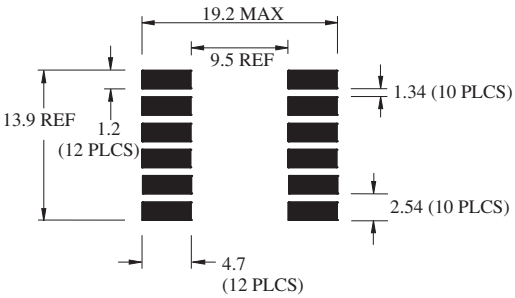
TOP VIEW



FRONT VIEW



RECOMMENDED PCB LAYOUT
COMPONENT VIEW

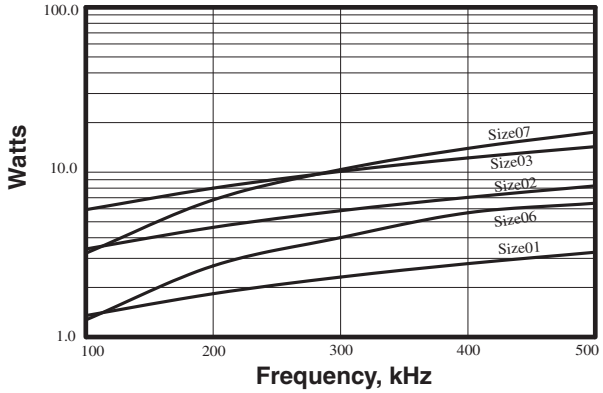


PACKAGING INFORMATION

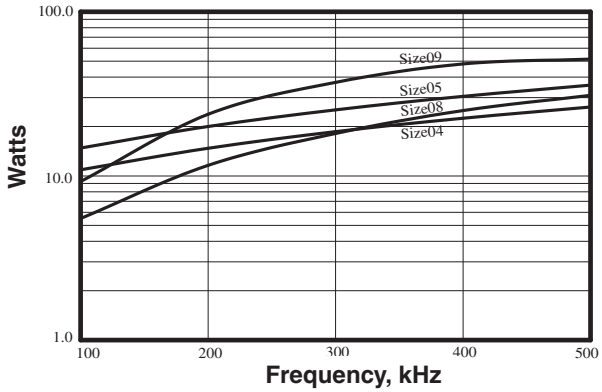
Parts packaged in pick and
place compatible bulk trays,
5 rows by 10 columns.
Total parts per tray = 50.

Performance Specifications

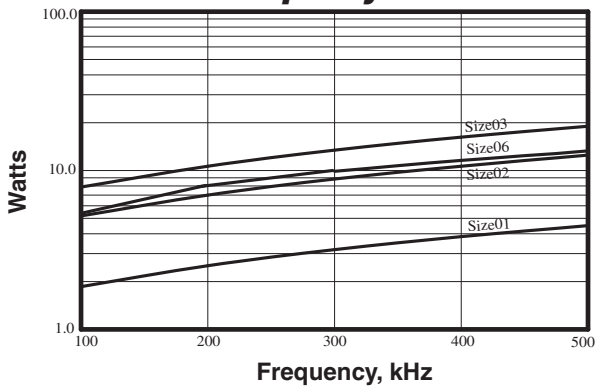
Unipolar (Flyback) Power vs Frequency



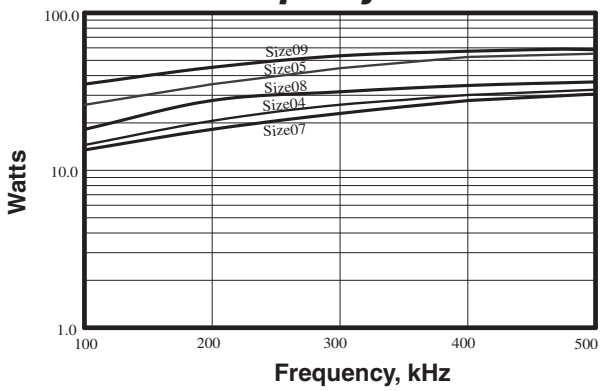
Unipolar (Flyback) Power vs Frequency



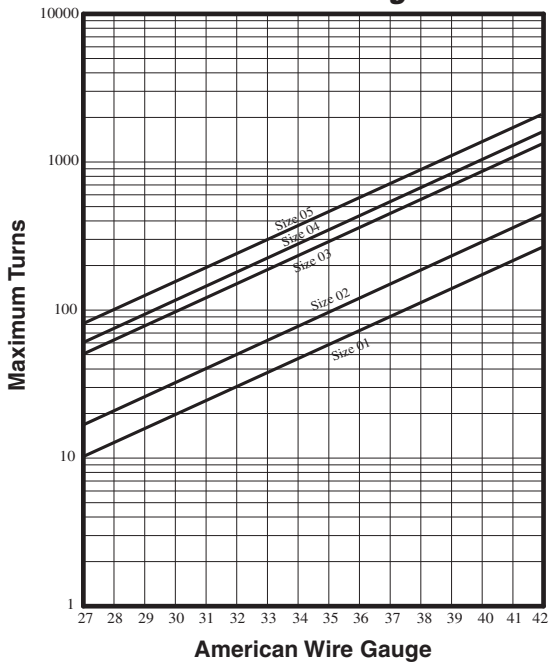
Bipolar (Push-Pull) Power vs Frequency



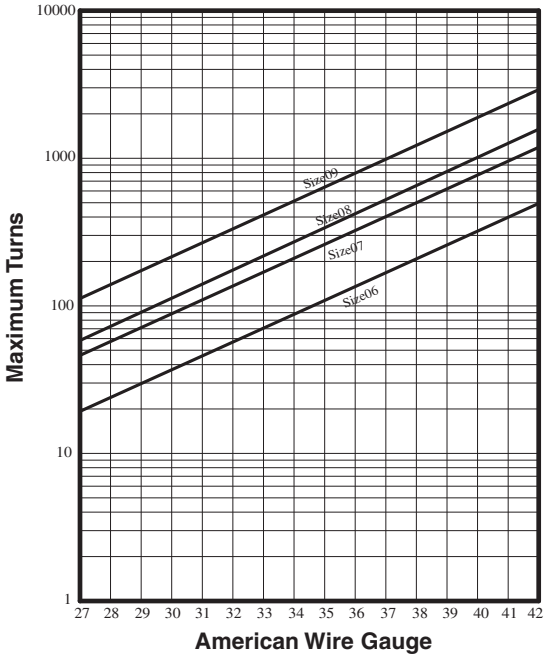
Bipolar (Push-Pull) Power vs Frequency



Maximum Turns vs American Wire Gauge



Maximum Turns vs American Wire Gauge

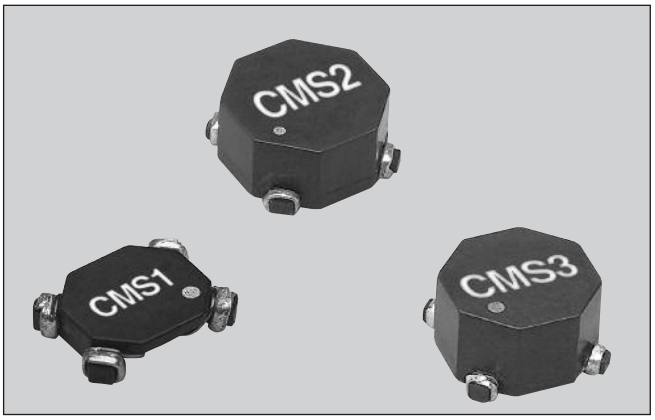


COILTRONICS

COOPER Bussmann

CMS-SERIES
Common Mode Inductors (Surface Mount)

RoHS 2002/95/EC



Description

- 160°C maximum total temperature
- Three sizes of surface mount torroidal common mode inductors that provide 300Vdc isolation
- Inductance range from 5.5uH to 1600uH
- Current range up to 7.0 Amps
- Noise attenuation up to 44 dB
- Frequency range up to 100 MHz
- Meets UL94V-0 flammability standard
- Ferrite core material

Applications

- EMI filters
- DC-DC brick power supplies
- Discrete output supplies
- Discrete and point-of-use power supplies (PUPS)

Environmental Data

- Storage temperature range: -40°C to +160°C
- Operating ambient temperature range: -40°C to +160°C (range is application specific)
- Solder reflow temperature: +260°C max for 10 seconds max.

Packaging

- Supplied in tape and reel packaging, 2,000 (CMS1), 800 (CMS2), and 600 (CMS3) per reel

Part Number	OCL (uH) minimum (1-2) & (3-4)	I rms. Amperes Max *	DCR (Ω) typ @ 20°C (1-2)	DCR (Ω) typ @ 20°C (4-3)	Leakage Inductance (uH) typ	Interwinding Capacitance (pF) typ
CMS1-1-R	4.5	7.00	0.0027	0.0027	0.05	2.0
CMS1-2-R	8	5.70	0.0040	0.0040	0.09	2.1
CMS1-3-R	12.6	4.10	0.0077	0.0077	0.14	2.2
CMS1-4-R	18	3.80	0.0089	0.0089	0.20	2.3
CMS1-5-R	25	3.60	0.0100	0.0100	0.28	2.4
CMS1-6-R	32.8	3.10	0.0138	0.0138	0.36	2.5
CMS1-7-R	41.5	2.60	0.019	0.019	0.45	2.6
CMS1-8-R	51.2	2.20	0.026	0.026	0.056	2.7
CMS1-9-R	62	1.90	0.035	0.035	0.68	2.7
CMS1-10-R	73.7	1.65	0.048	0.048	0.81	2.8
CMS1-11-R	100	1.35	0.070	0.070	1.10	2.9
CMS1-12-R	131	1.15	0.100	0.100	1.45	3.0
CMS1-13-R	166	1.00	0.138	0.138	1.83	3.1
CMS1-14-R	205	0.85	0.186	0.186	2.25	3.2
CMS2-1-R	25	5.35	0.005	0.005	0.22	2.0
CMS2-2-R	40	4.40	0.008	0.008	0.34	2.3
CMS2-3-R	57	3.60	0.012	0.012	0.47	2.5
CMS2-4-R	102	2.80	0.019	0.019	0.80	2.8
CMS2-5-R	160	2.30	0.029	0.029	1.25	3.1
CMS2-6-R	230	1.85	0.044	0.044	1.75	3.4
CMS2-7-R	270	1.60	0.060	0.060	2.00	3.6
CMS2-8-R	360	1.35	0.084	0.084	2.60	3.9
CMS2-9-R	460	1.10	0.120	0.120	3.30	4.1
CMS2-10-R	575	0.94	0.170	0.170	4.00	4.3
CMS2-11-R	700	0.80	0.230	0.230	5.00	4.6
CMS2-12-R	915	0.67	0.330	0.330	6.30	4.9
CMS2-13-R	1070	0.58	0.440	0.440	7.30	5.1
CMS2-14-R	1340	0.50	0.620	0.620	9.00	5.4
CMS3-1-R	28	5.70	0.005	0.005	0.31	2.80
CMS3-2-R	45	5.10	0.006	0.006	0.46	3.05
CMS3-3-R	64	4.75	0.007	0.007	0.64	3.30

Definitions:
OCL = Open Circuit Inductance
DCR = Direct Current Resistance
Irms = rms current for approx. a 40°C temperature rise at an ambient temperature of 85°C.
*Operating Temperature: 160°C Max. Inductance values are sustained up to 160°C.

Electrical Characteristics:
OCL (1-2) 0.10Vrms, 100kHz, 0.0Adc: (See Chart)
OCL (4-3) 0.10Vrms, 100kHz, 0.0Adc: (See Chart)
DCR (1-2) typ @ 20°C: (See Chart)
DCR (4-3) typ @ 20°C: (See Chart)
Hipot rating: winding to winding: 300Vdc min. for 1 second.
Turns Ratio: (1-2):(4-3) 1:1

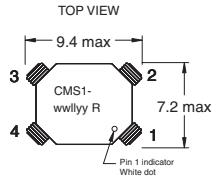
Part Number	OCL (uH) minimum (1-2) & (3-4)	I rms. Amperes Max *	DCR (Ω) typ @ 20°C (1-2)	DCR (Ω) typ @ 20°C (4-3)	Leakage Inductance (uH) typ	Interwinding Capacitance (pF) typ
CMS3-4-R	88	3.95	0.010	0.010	0.85	3.50
CMS3-5-R	146	3.10	0.017	0.017	1.30	3.70
CMS3-6-R	217	2.85	0.020	0.020	1.90	3.90
CMS3-7-R	258	2.45	0.027	0.027	2.20	4.15
CMS3-8-R	350	2.00	0.040	0.040	3.00	4.40
CMS3-9-R	400	1.70	0.053	0.053	3.30	4.65
CMS3-10-R	518	1.45	0.076	0.076	4.20	4.85
CMS3-11-R	648	1.20	0.107	0.107	5.10	5.10
CMS3-12-R	790	1.05	0.145	0.145	6.10	5.35
CMS3-13-R	1030	0.88	0.210	0.210	7.80	5.55
CMS3-14-R	1310	0.75	0.300	0.300	9.60	5.80

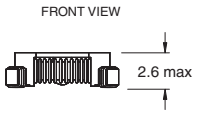
Definitions:
OCL = Open Circuit Inductance
DCR = Direct Current Resistance
Irms = rms current for approx. a 40°C temperature rise at an ambient temperature of 85°C.
*Operating Temperature: 160°C Max. Inductance values are sustained up to 160°C.

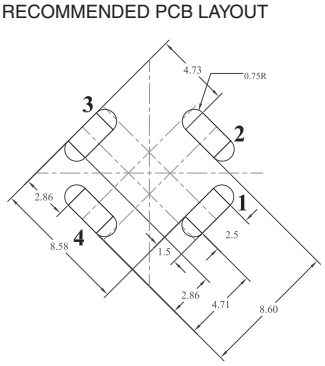
Electrical Characteristics:
OCL (1-2) 0.10Vrms, 100kHz, 0.0Adc: (See Chart)
OCL (4-3) 0.10Vrms, 100kHz, 0.0Adc: (See Chart)
DCR (1-2) typ @ 20°C: (See Chart)
DCR (4-3) typ @ 20°C: (See Chart)
Hipot rating: winding to winding: 300Vdc min. for 1 second.
Turns Ratio: (1-2):(4-3) 1:1

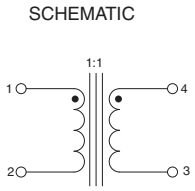
Mechanical Diagrams

CMS1 Series

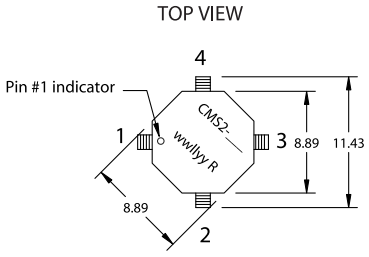


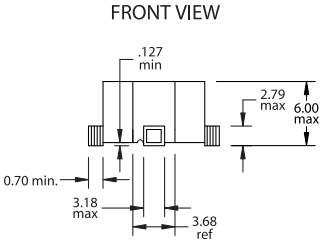


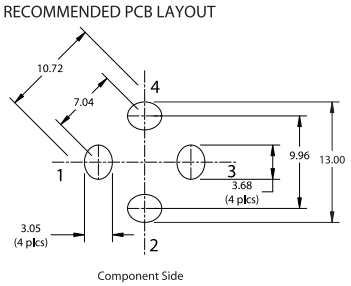


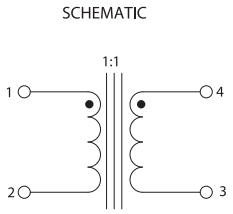


CMS2 Series

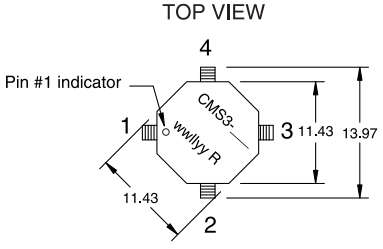


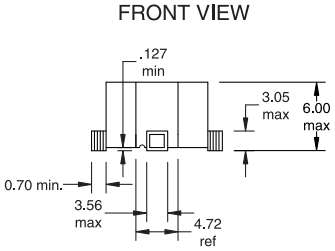


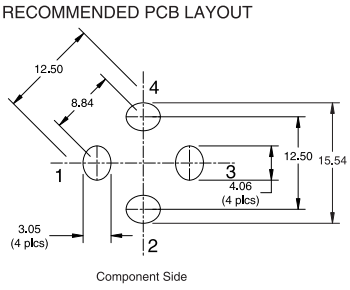


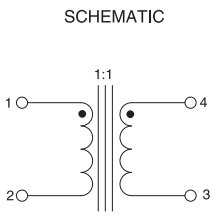


CMS3 Series





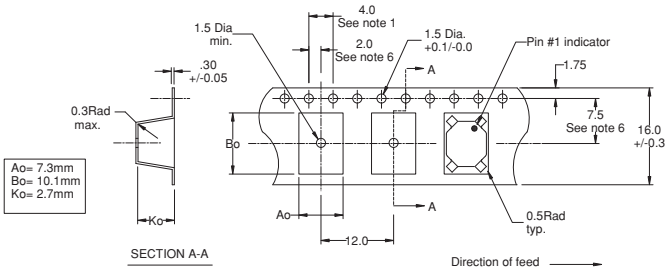




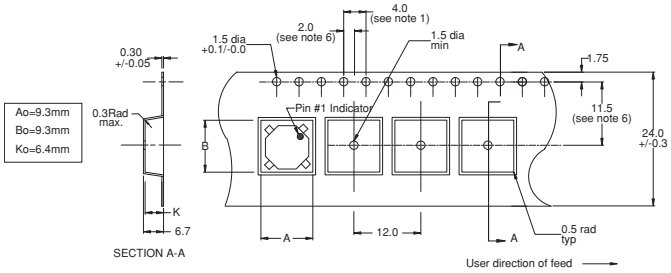
wwllyy = Date code R = Revision level

Packaging Information

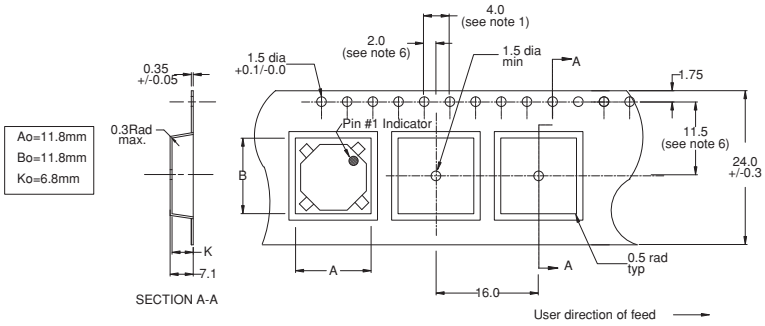
CMS1 Series



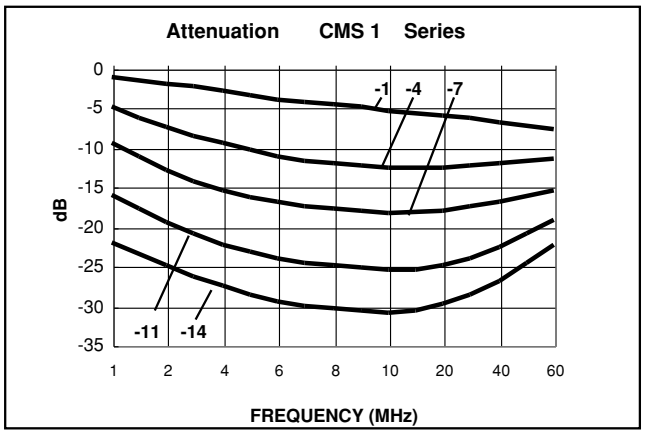
CMS2 Series

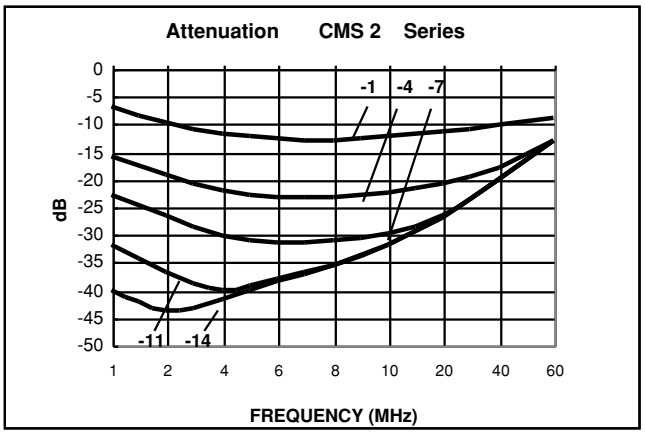


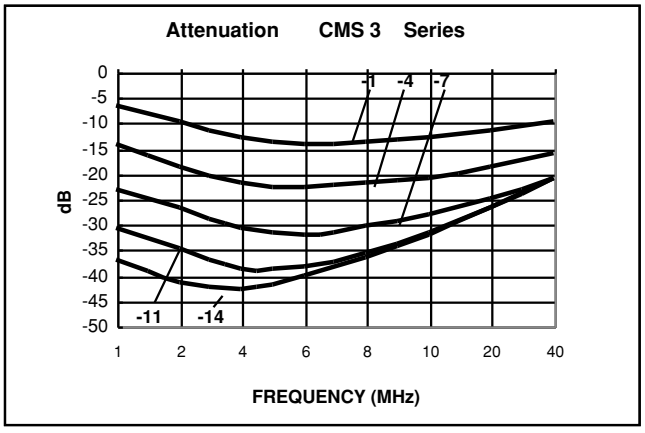
CMS3 Series



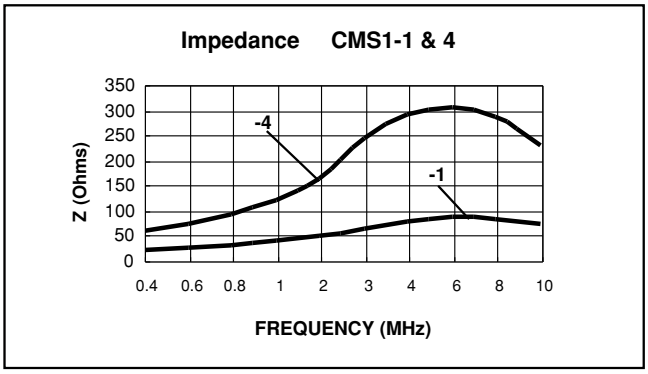
Attenuation Curves

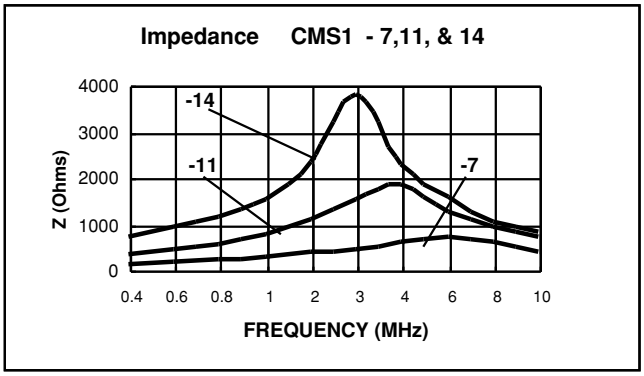


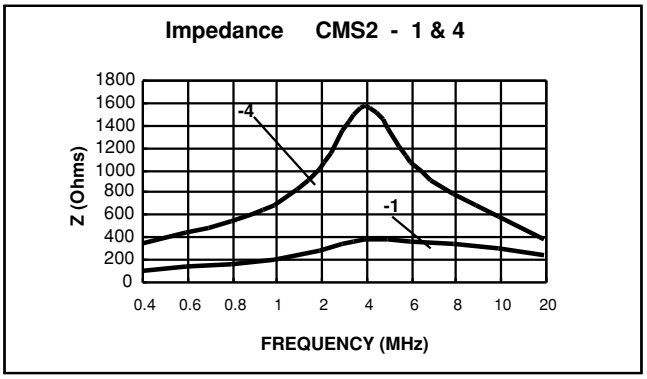


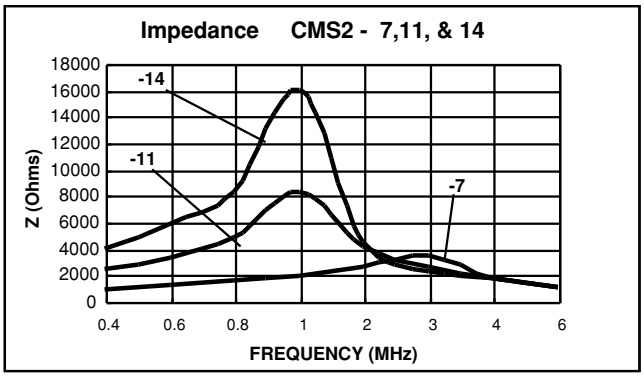


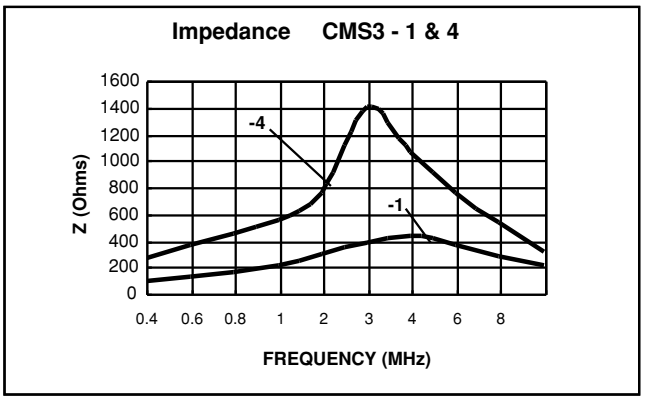
Impedance Curves

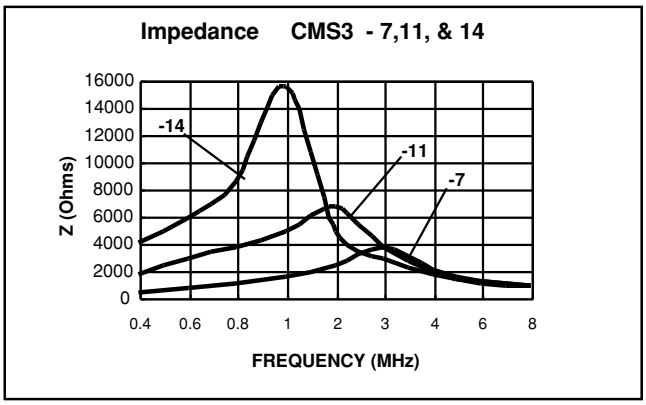










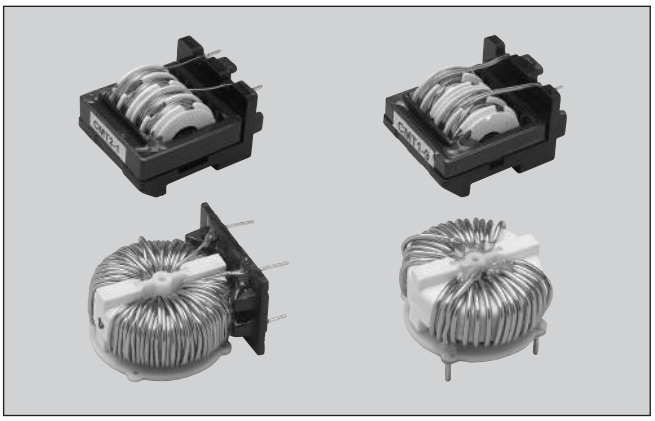


COOPER Bussmann

COILTRONICS

CMT-SERIES
Common Mode Inductors (Through-Hole)

RoHS 2002/95/EC



Description

- Four sizes of through-hole off-line common mode inductors
- Inductance range from 0.53 - 66 mH
- Current range up to 6.5 Amps
- Noise attenuation up to 68 dB
- Frequency range up to 6 MHz
- Meets UL94V-0 flammability standard
- Ferrite core material

Applications

- Protects AC input from effects of switching regulators
- Off-line power supplies
- EMI filters
- DC-DC converters
- Computer, TV, VCR, audio and office equipment

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating ambient temperature range: -40°C to +85°C range is application specific. The internal "hot-spot" temperature defines the maximum allowable currents, which are limited to 130°C, including ambient.

Packaging

- Supplied in bulk packaging

Part Number	OCL (mH) min (1-2)	OCL (mH) min (4-3)	I rms. Amperes max	DCR (Ω) typ @ 20°C (1-2)	DCR (Ω) typ @ 20°C (4-3)
CMT1-1-R	66.0	66.0	0.74	1.20	1.20
CMT1-2-R	49.0	49.0	0.88	0.85	0.85
CMT1-3-R	28.0	28.0	1.13	0.50	0.50
CMT1-4-R	21	21	1.37	0.35	0.35
CMT1-5-R	13	13	1.76	0.20	0.20
CMT1-6-R	7.50	7.50	2.27	0.13	0.13
CMT1-7-R	4.20	4.20	2.89	0.08	0.08
CMT1-8-R	2.40	2.40	3.85	0.045	0.045
CMT1-9-R	1.85	1.85	4.53	0.033	0.033
CMT1-10-R	0.94	0.94	6.05	0.018	0.018
CMT2-1-R	30	30	1.50	0.350	0.350
CMT2-2-R	20	20	1.95	0.220	0.220
CMT2-3-R	12	12	2.45	0.135	0.135
CMT2-4-R	8.0	8.0	2.80	0.100	0.100
CMT2-5-R	6.0	6.0	3.40	0.070	0.070
CMT2-6-R	4.8	4.8	3.95	0.053	0.053
CMT2-7-R	3.2	3.2	4.40	0.042	0.042
CMT2-8-R	2.4	2.4	4.75	0.037	0.037
CMT2-9-R	2.0	2.0	5.45	0.028	0.028
CMT2-10-R	1.6	1.6	5.75	0.026	0.026
CMT3-1-R	5.4	5.4	2.0	0.12	0.12
CMT3-2-R	3.5	3.5	2.6	0.08	0.08
CMT3-3-R	2.7	2.7	3.0	0.055	0.055
CMT3-4-R	1.3	1.3	4.0	0.032	0.032
CMT3-5-R	0.92	0.92	5.0	0.021	0.021
CMT3-6-R	0.53	0.53	6.5	0.013	0.013
CMT4-1-R	5.4	5.4	2.0	0.12	0.12
CMT4-2-R	3.5	3.5	2.6	0.08	0.08
CMT4-3-R	2.7	2.7	3.0	0.055	0.055
CMT4-4-R	1.3	1.3	4.0	0.032	0.032
CMT4-5-R	0.92	0.92	5.0	0.021	0.021
CMT4-6-R	0.53	0.53	6.5	0.013	0.013

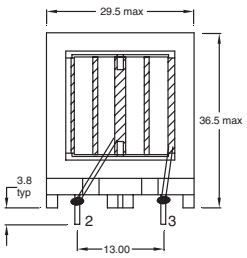
Definitions:
OCL = Open Circuit Inductance
DCR = Direct Current Resistance
Irms = rms current for 40°C max temperature rise at worst case ambient temperature of 85°C

Electrical Characteristics:
OCL (1-2) 0.10Vrms, 10kHz, 0.0Adc: (See Chart)
OCL (4-3) 0.10Vrms, 10kHz, 0.0Adc: (See Chart)
DCR (1-2) typ @ 20°C: (See Chart)
DCR (4-3) typ @ 20°C: (See Chart)
Hipot rating: winding to winding: 2400 Vac for 1 second.
Turns Ratio: (1-2):(4-3) 1:1

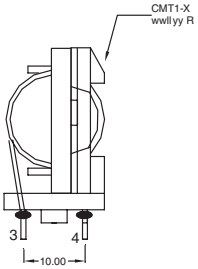
Mechanical Diagrams

CMT1 Series

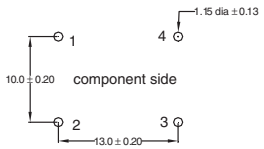
FRONT VIEW



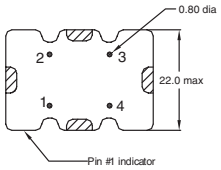
SIDE VIEW



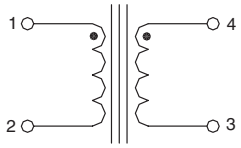
RECOMMENDED PCB LAYOUT



BOTTOM VIEW

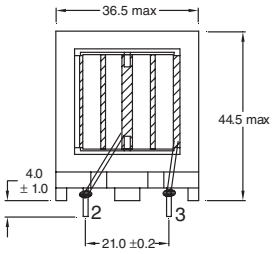


SCHEMATIC

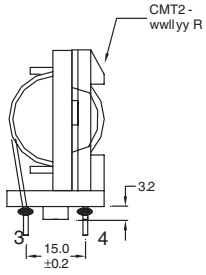


CMT2 Series

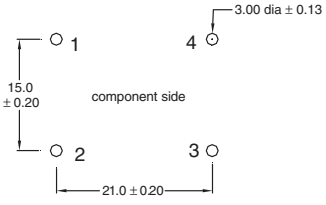
FRONT VIEW



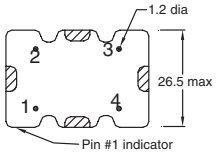
SIDE VIEW



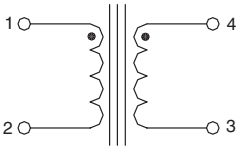
RECOMMENDED PCB LAYOUT



BOTTOM VIEW

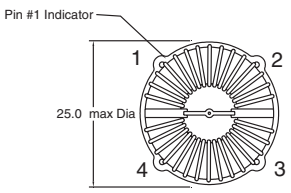


SCHEMATIC

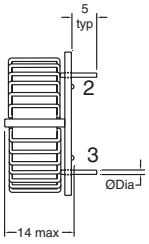


CMT3 Series

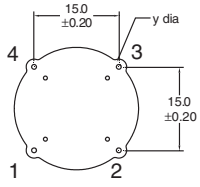
TOP VIEW



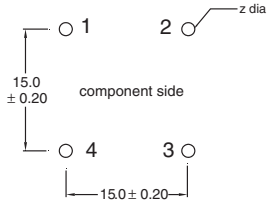
SIDE VIEW



BOTTOM VIEW



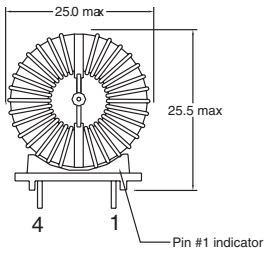
RECOMMENDED PCB LAYOUT



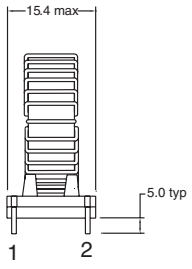
	"Y" Dia ref	"Z" Dia ref
CMT3-1	0.58	0.83
CMT3-2	0.64	0.90
CMT3-3	0.71	0.97
CMT3-4	0.80	1.06
CMT3-5	0.89	1.15
CMT3-6	0.99	1.25

CMT4 Series

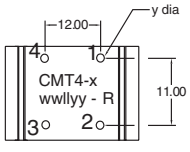
FRONT VIEW



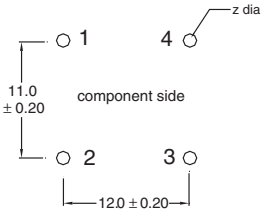
SIDE VIEW



BOTTOM VIEW



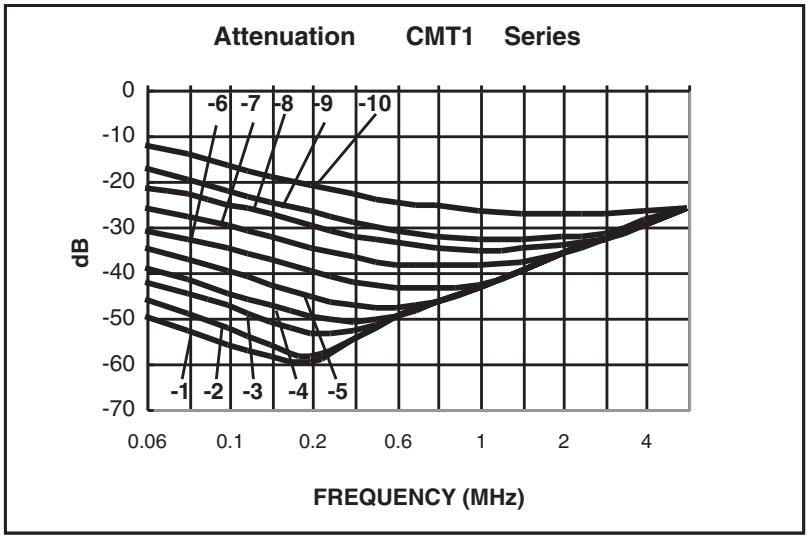
RECOMMENDED PCB LAYOUT

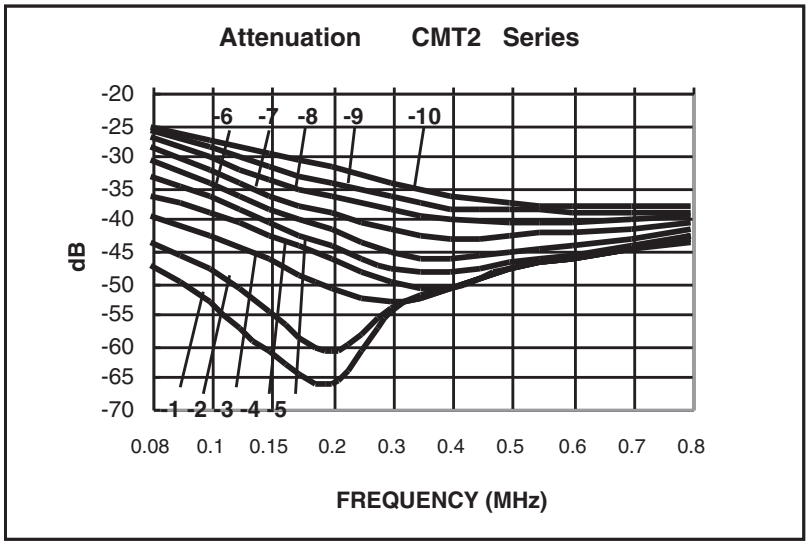


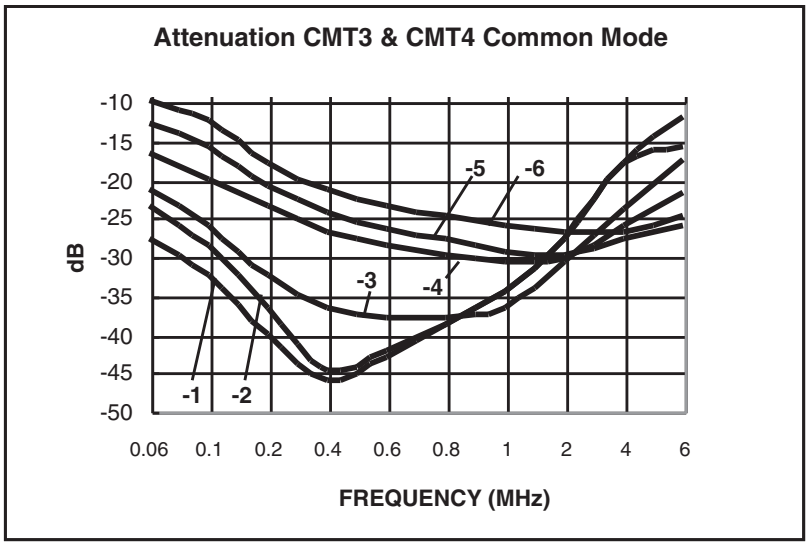
	"Y" Dia ref	"Z" Dia ref
CMT4-1	0.58	0.83
CMT4-2	0.64	0.90
CMT4-3	0.71	0.97
CMT4-4	0.80	1.06
CMT4-5	0.89	1.15
CMT4-6	0.99	1.25

(1) All Dimensions are in millimeters unless otherwise specified
(2) Tolerances are +/- 0.20mm unless stated otherwise.
(3) wwllyy = (Date Code) R = (Revision Level)
Schematic is the same for all the series

Attenuation Curves

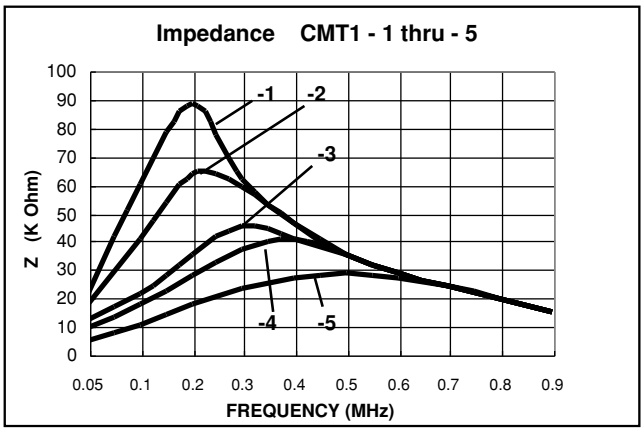


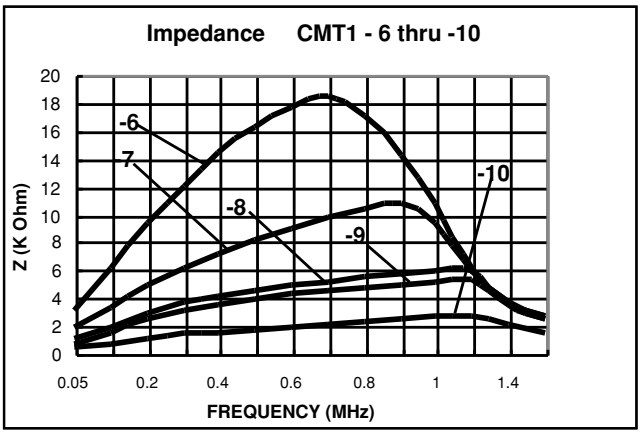


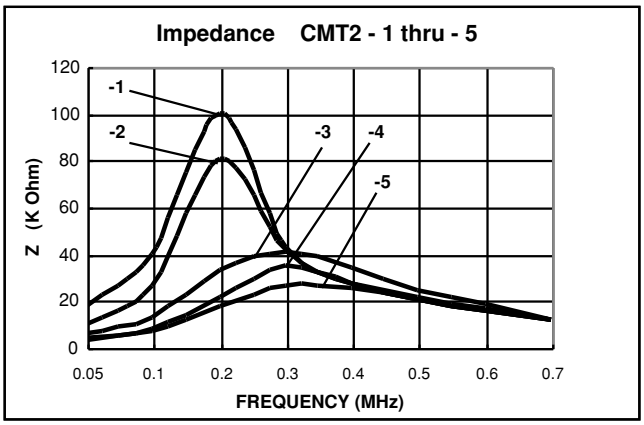


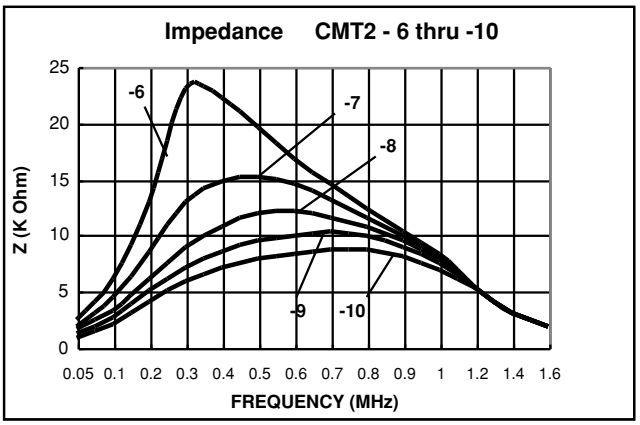
COOPER Bussmann

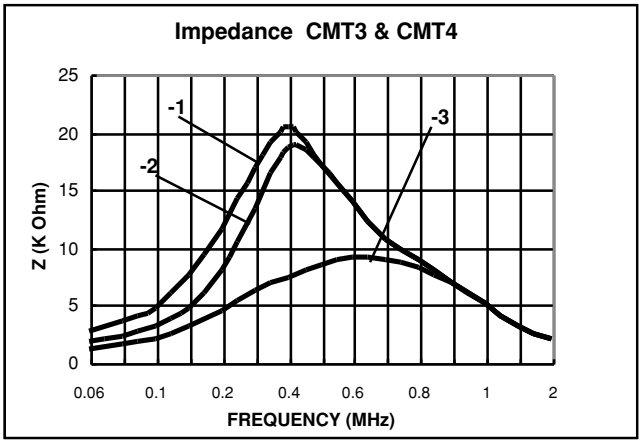
Impedance Curves

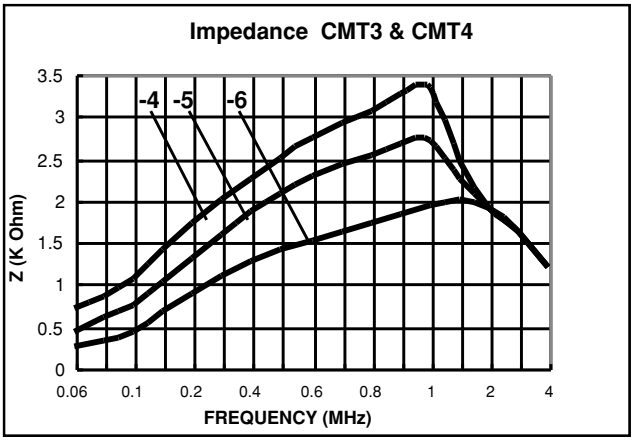












COOPER Bussmann

COILTRONICS

CS Series
Current Sense
Current Sense Inductors

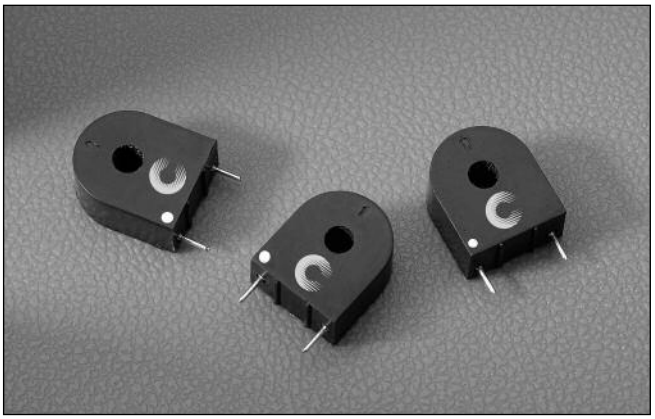
Description

RoHS 2002/95/EC

- Encapsulated Through Hole Design
- Isolation between Pri and Sec of 3750 Volts
- Materials meet UL Class B

Applications

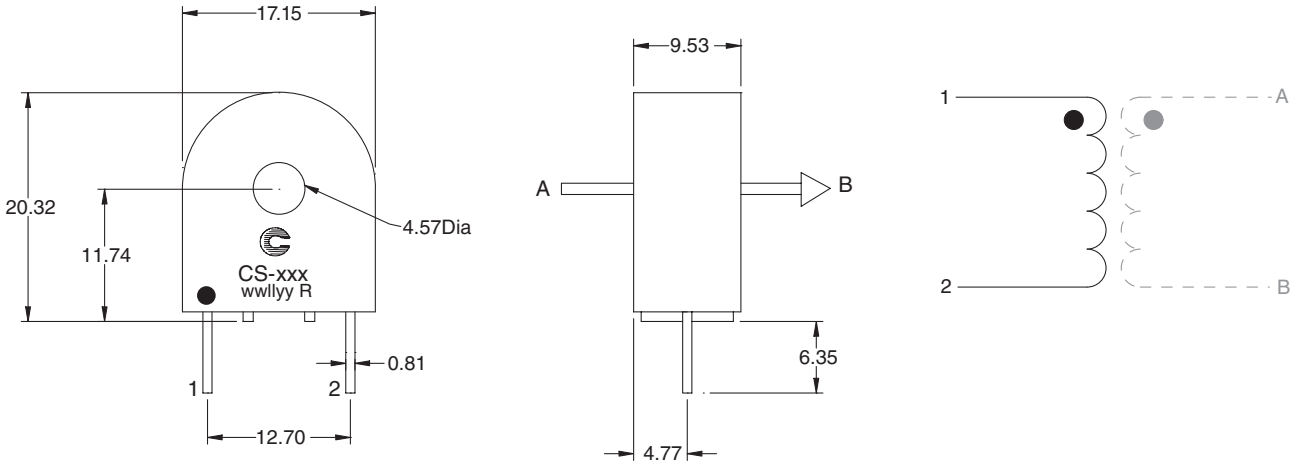
- Feedback elements linking the output and pulse control circuitry
- Switch Mode Power Supplies: PFC, Half-bridge, Full-bridge, Forward
- Off-Line
- Telecom



Part Number	Inductance (mH)	Turns +/-1%	Current Range AMPS	DCR (Ω) +/-15% @ 20°C	Recommended Terminating Resistor	Frequency Range
CS-1050-R	5.6	50	1-10	0.60	50 ohms	20k-200kHz
CS-1100-R	22.4	100	2-20	1.3	100 ohms	20k-200kHz
CS-1200-R	89.7	200	4-40	3.3	200 ohms	20k-100kHz

1) Test Parameters: 10kHz, 0.25 Vrms
2) Dimensions in Millimeters
3) Output Voltage is 1v/A with the terminating resistor and is linear over the specified range
4) Hipot is 3750 Volts from winding to test wire A-B
5) Materials meet UL Class B
6) Polarity Indicator Dot: (This lead is in phase with lead A of conductor A-B)

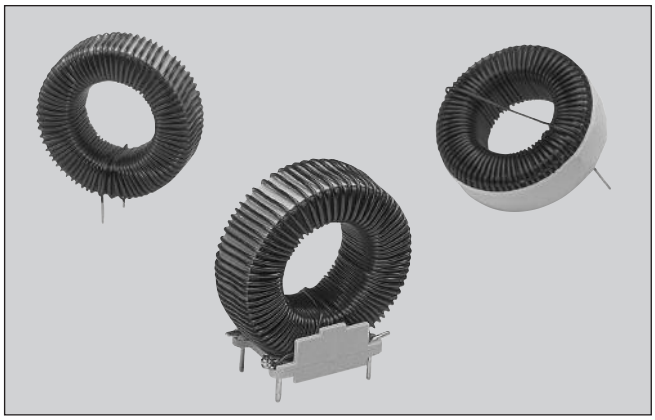
Mechanical Diagrams



xxx = Inductance value
wwllyy = Date code R = Revision level

LOW COST POWER INDUCTORS
Toroidal Inductors

RoHS 2002/95/EC



Description

- Low loss, powdered iron cores with stable electrical operating characteristics maximize inductor efficiency by minimizing copper losses
- Available in vertical and horizontal self leaded and header mounted configurations
- Inductance values range from 10uH to 1000uH
- Current values range from 1.5 to 29.5 Amps
- Meets UL 94V-0 flammability standard
- Powder Iron core material

Applications

- Filters
- Buck and boost switches
- Chokes

Environmental Data

- Storage temperature range: -40°C to +105°C
- Operating ambient temperature range: -40°C to +75°C (range is application specific)

Packaging

- Supplied in bulk packaging

Family Table

Vertical Part Number	Horizontal Part Number	Header Mounted Part Number	Inductance µH (rated)	OCL(1) µH +/- 20%	I DC(2) Amperes	I SAT(3) Amperes	Volt-µSec(4) VµS	Energy(5) µJ	DCR (Ω)(6) max
CTX10-1-52-R	CTX10-1-52LP-R	CTX10-1-52M-R	10	10.14	2.4	2.1	5.4	15	0.0481
CTX20-1-52-R	CTX20-1-52LP-R	CTX20-1-52M-R	20	20.22	1.8	2.2	7.8	36	0.0829
CTX50-1-52-R	CTX50-1-52LP-R	CTX50-1-52M-R	50	50.29	2.6	2.7	16.3	130	0.0715
CTX100-1-52-R	CTX100-1-52LP-R	CTX100-1-52M-R	100	100.40	2.5	2.4	27.5	197	0.1060
CTX150-1-52-R	CTX150-1-52LP-R	CTX150-1-52M-R	150	151.70	2.1	2.3	35.7	283	0.1620
CTX250-1-52-R	CTX250-1-52LP-R	CTX250-1-52M-R	250	250.90	1.9	2.2	47.8	421	0.2210
CTX500-1-52-R	CTX500-1-52LP-R	CTX500-1-52M-R	500	505.00	1.7	1.9	77.9	645	0.3610
CTX750-1-52-R	CTX750-1-52LP-R	CTX750-1-52M-R	750	754.40	1.8	2.4	114.3	1530	0.4340
CTX1000-1-52-R	CTX1000-1-52LPR	CTX1000-1-52M-R	1000	1004.00	1.5	2.1	131.9	1530	0.6380
CTX10-2-52-R	CTX10-2-52LP-R	CTX10-2-52M-R	10	9.60	4.7	4.5	6.6	68	0.0183
CTX20-2-52-R	CTX20-2-52LP-R	CTX20-2-52M-R	20	19.60	3.2	3.2	9.4	69	0.0392
CTX50-2-52-R	CTX50-2-52LP-R	CTX50-2-52M-R	50	50.00	4.9	4.9	21.3	420	0.0326
CTX100-2-52-R	CTX100-2-52LP-R	CTX100-2-52M-R	100	101.70	4.4	4.3	35.0	643	0.0534
CTX150-2-52-R	CTX150-2-52LP-R	CTX150-2-52M-R	150	148.00	4.3	4.0	47.6	829	0.0719
CTX250-2-52-R	CTX250-2-52LP-R	CTX250-2-52M-R	250	251.10	4.2	4.2	66.0	1540	0.0833
CTX500-2-52-R	CTX500-2-52LP-R	CTX500-2-52M-R	500	499.40	3.1	3.3	104.0	1890	0.1830
CTX750-2-52-R	CTX750-2-52LP-R	CTX750-2-52M-R	750	749.30	3.4	3.4	147.3	2960	0.2080
CTX10-5-52-R	CTX10-5-52LP-R	CTX10-5-52M-R	10	9.68	8.7	11.1	9.4	417	0.0104
CTX20-5-52-R	CTX20-5-52LP-R	CTX20-5-52M-R	20	21.25	7.8	9.3	16.0	643	0.0260
CTX50-5-52-R	CTX50-5-52LP-R	CTX50-5-52M-R	50	49.60	7.6	9.4	29.3	1530	0.0248
CTX100-5-52-R	CTX100-5-52LP-R	CTX100-5-52M-R	100	97.20	8.2	7.5	45.7	1890	0.0267
CTX150-5-52-R	CTX150-5-52LP-R	CTX150-5-52M-R	150	150.60	7.7	7.5	66.0	2960	0.0401
CTX250-5-52-R	CTX250-5-52LP-R		250	254.40	9.2	8.1	102.4	5860	0.0400
CTX10-7-52-R	CTX10-7-52LP-R	CTX10-7-52M-R	10	10.04	11.4	13.5	11.0	640	0.0080
CTX20-7-52-R	CTX20-7-52LP-R	CTX20-7-52M-R	20	20.96	11.4	14.5	19.1	1540	0.0110
CTX50-7-52-R	CTX50-7-52LP-R	CTX50-7-52M-R	50	52.27	10.5	10.2	33.5	1900	0.0163
CTX100-7-52-R	CTX100-7-52LP-R		100	101.40	12.0	9.1	54.2	2960	0.0167
CTX150-7-52-R	CTX150-7-52LP-R		150	152.80	12.8	10.5	79.3	5900	0.0204
CTX10-10-52-R	CTX10-10-52LP-R		10	10.04	16.9	20.9	13.2	1530	0.0051
CTX20-10-52-R	CTX20-10-52LP-R		20	21.17	16.0	16.0	21.3	1900	0.0070
CTX50-10-52-R	CTX50-10-52LP-R		50	52.37	13.9	12.7	38.9	2960	0.0124
CTX100-10-52-R	CTX100-10-52LPR		100	99.38	17.6	13.0	64.0	5880	0.0109
CTX10-16-52-R	CTX10-16-52LP-R		10	9.90	27.3	29.3	16.9	2970	0.0032
CTX20-16-52-R	CTX20-16-52LP-R		20	19.24	31.5	29.5	28.1	5860	0.0034

Notes:
(1) Open circuit inductance test parameters: 100kHz, 0.250Vrms, 0 Adc.
(2) DC current for an approximate ΔT of 30°C at 75°C Ambient with no core loss. See Chart 2 for derating of IDC with core loss.
(3) Peak current for an approximate 30% roll-off in OCL. For other current levels see Chart 1.
(4) Applied Volt-Time product (VµS) across the inductor. This value represents the VµS at 100kHz necessary to generate a core loss equal to 10% of the total losses for 30°C rise. For other frequencies and operating levels see Chart 2. (Note: skin effect losses not included.)
(5) Energy storage (µJ) at ISAT. For other current levels see Chart 1.
(6) Maximum D.C. resistance at 20°C.

Mechanical Diagrams

Vertical and Horizontal Self Leaded Mounting Options

Vertical P/N See Figure 1	Horizontal P/N See Figure 2	OD (max)	ID (typ)	Ht (max)	X (typ)	Y (typ)	T (typ)	H (typ)
CTX10-1-52-R	CTX10-1-52LP-R	8.6	0.0	4.7	3.8	7.3	0.42	0.67
CTX20-1-52-R	CTX20-1-52LP-R	9.1	0.0	6.7	5.6	7.4	0.37	0.62
CTX50-1-52-R	CTX50-1-52LP-R	16.2	4.2	9.0	7.5	13.7	0.58	0.83
CTX100-1-52-R	CTX100-1-52LP-R	15.5	4.2	12.4	10.7	13.7	0.58	0.83
CTX150-1-52-R	CTX150-1-52LP-R	20.7	6.6	9.4	7.8	18.8	0.52	0.77
CTX250-1-52-R	CTX250-1-52LP-R	20.9	6.0	13.0	11.0	18.8	0.52	0.77
CTX500-1-52-R	CTX500-1-52LP-R	24.0	9.0	15.3	14.0	21.2	0.52	0.77
CTX750-1-52-R	CTX750-1-52LP-R	29.8	11.7	17.4	15.6	28.2	0.52	0.77
CTX1000-1-52-R	CTX1000-1-52LP-R	29.8	11.7	17.1	15.5	28.0	0.46	0.71
CTX10-2-52-R	CTX10-2-52LP-R	12.7	0.0	7.8	6.3	11.0	0.71	0.96
CTX20-2-52-R	CTX20-2-52LP-R	12.5	0.0	7.5	6.3	11.0	0.58	0.83
CTX50-2-52-R	CTX50-2-52LP-R	21.6	6.1	13.6	11.0	19.5	0.89	1.14
CTX100-2-52-R	CTX100-2-52LP-R	24.0	8.8	16.6	13.9	21.8	0.89	1.14
CTX150-2-52-R	CTX150-2-52LP-R	30.6	11.2	11.4	9.3	28.5	0.80	1.05
CTX250-2-52-R	CTX250-2-52LP-R	31.2	9.1	19.0	15.7	28.5	0.89	1.14
CTX500-2-52-R	CTX500-2-52LP-R	36.7	11.7	14.8	12.5	34.5	0.71	0.96
CTX750-2-52-R	CTX750-2-52LP-R	43.3	19.9	18.2	15.8	41.5	0.80	1.05
CTX10-5-52-R	CTX10-5-52LP-R	22.2	5.4	13.9	11.5	19.9	1.11	1.36
CTX20-5-52-R	CTX20-5-52LP-R	24.5	8.8	16.6	14.5	22.0	0.89	1.14
CTX50-5-52-R	CTX50-5-52LP-R	32.3	10.1	18.9	16.5	28.8	1.11	1.36
CTX100-5-52-R	CTX100-5-52LP-R	37.8	11.2	16.8	13.6	35.5	1.24	1.49
CTX150-5-52-R	CTX150-5-52LP-R	46.4	18.8	19.8	16.8	43.4	1.24	1.49
CTX250-5-52-R	CTX250-5-52LP-R	53.7	18.8	24.3	20.1	49.4	1.38	1.63
CTX10-7-52-R	CTX10-7-52LP-R	25.7	6.5	18.0	16.0	22.4	1.38	1.63
CTX20-7-52-R	CTX20-7-52LP-R	32.4	8.5	19.8	16.8	29.2	1.38	1.63
CTX50-7-52-R	CTX50-7-52LP-R	39.0	10.8	16.8	13.9	35.7	1.38	1.63
CTX100-7-52-R	CTX100-7-52LP-R	48.5	17.1	21.8	17.2	43.4	1.73	1.98
CTX150-7-52-R	CTX150-7-52LP-R	54.5	17.1	25.4	21.2	50.9	1.73	1.98
CTX10-10-52-R	CTX10-10-52LP-R	34.0	7.0	21.4	17.0	29.6	1.73	1.98
CTX20-10-52-R	CTX20-10-52LP-R	40.5	9.0	18.0	14.3	35.2	1.73	1.98
CTX50-10-52-R	CTX50-10-52LP-R	47.5	17.1	21.3	17.5	42.8	1.73	1.98
CTX100-10-52-R	CTX100-10-52LP-R	57.0	15.0	27.5	21.3	50.6	2.15	2.45
CTX10-16-52-R	CTX10-16-52LP-R	50.3	13.0	24.0	18.6	43.0	2.41	2.70
CTX20-16-52-R	CTX20-16-52LP-R	59.0	13.0	28.0	23.0	50.7	2.69	2.99

Note: All dimensions are in millimeters.

VERTICAL SELF LEADED MOUNT

HORIZONTAL SELF LEADED MOUNT

FIGURE 1

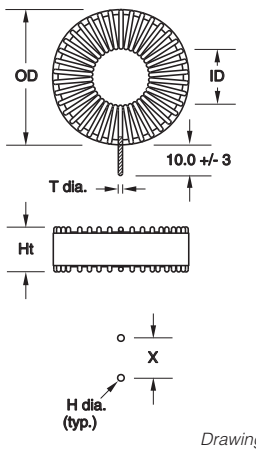
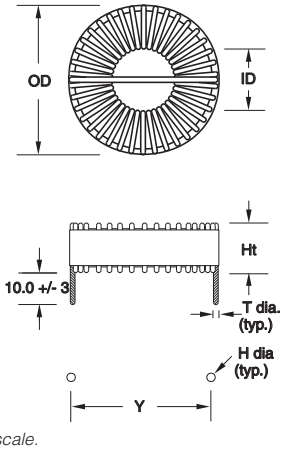


FIGURE 2



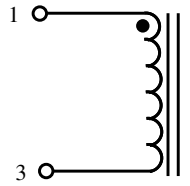
Drawings are not to scale.

Header Mounted Option

Header Mounted Part Number	See Figure #	OD (max)	A (max)	B (max)	C (max)	X (typ)	Y (typ)	T (typ)	H (typ)
CTX10-1-52M-R	3	8.6	9.4	9.4	6.9	6.5	6.5	—	—
CTX20-1-52M-R	3	9.1	9.4	9.4	9.0	6.5	6.5	—	—
CTX50-1-52M-R	4	16.2	19.6	16.1	20.0	15.3	6.4	—	—
CTX100-1-52M-R	4	15.5	19.6	16.1	19.7	15.3	6.4	—	—
CTX150-1-52M-R	4	20.7	19.6	16.1	24.2	15.3	6.4	—	—
CTX250-1-52M-R	5	20.9	31.0	16.0	22.5	20.3	10.2	1.20	1.45
CTX500-1-52M-R	5	24.0	35.4	21.7	25.0	23.0	15.4	1.20	1.45
CTX750-1-52M-R	5	29.8	35.4	21.7	31.6	23.0	15.4	1.20	1.45
CTX1000-1-52M-R	5	29.8	35.4	21.7	31.2	23.0	15.4	1.20	1.45
CTX10-2-52M-R	3	12.7	13.6	11.4	11.7	10.8	7.5	—	—
CTX20-2-52M-R	3	12.5	13.6	11.4	11.4	10.8	7.5	—	—
CTX50-2-52M-R	5	21.6	31.0	16.0	23.5	20.3	10.2	1.20	1.45
CTX100-2-52M-R	5	24.0	35.4	21.7	26.0	23.0	15.4	1.20	1.45
CTX150-2-52M-R	5	30.6	31.0	16.0	32.5	20.3	10.2	1.20	1.45
CTX250-2-52M-R	5	31.2	35.4	21.7	33.4	23.0	15.4	1.20	1.45
CTX500-2-52M-R	5	36.7	31.0	16.0	38.4	20.3	10.2	1.20	1.45
CTX750-2-52M-R	5	43.3	35.4	21.7	45.4	23.0	15.4	1.20	1.45
CTX10-5-52M-R	5	22.2	31.0	16.0	22.7	20.3	10.2	1.20	1.45
CTX20-5-52M-R	5	24.5	35.4	21.7	25.5	23.0	15.4	1.20	1.45
CTX50-5-52M-R	5	32.3	35.4	21.7	33.7	23.0	15.4	1.11	1.36
CTX100-5-52M-R	5	37.8	35.4	21.7	40.2	23.0	15.4	1.24	1.49
CTX150-5-52M-R	5	46.4	35.4	21.7	47.0	23.0	15.4	1.24	1.49
CTX10-7-52M-R	5	25.7	35.4	21.7	26.7	23.0	15.4	1.38	1.63
CTX20-7-52M-R	5	32.4	35.4	21.7	34.2	23.0	15.4	1.38	1.63
CTX50-7-52M-R	5	39.0	35.4	21.7	40.3	23.0	15.4	1.38	1.63

Note: All dimensions are in millimeters.

CONNECTION DIAGRAM



HEADER MOUNT

FIGURE 3

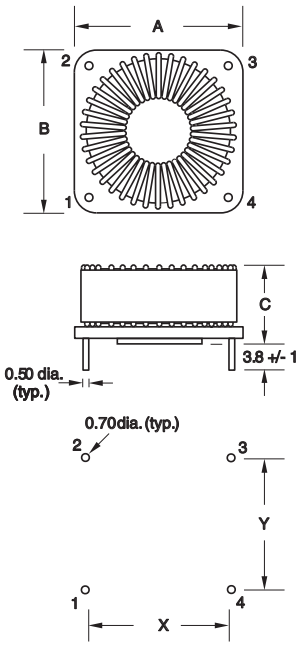


FIGURE 4

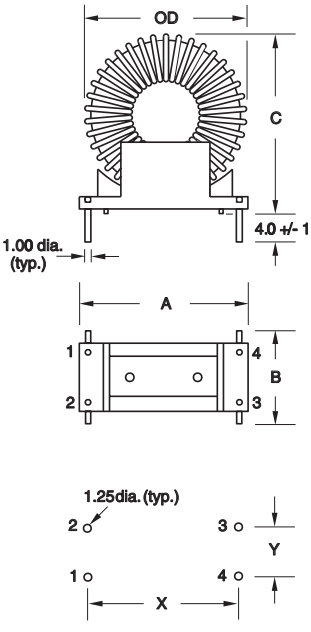
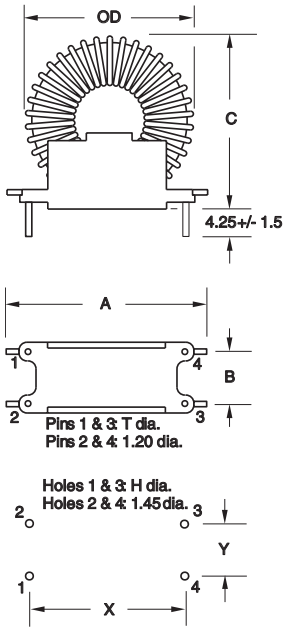
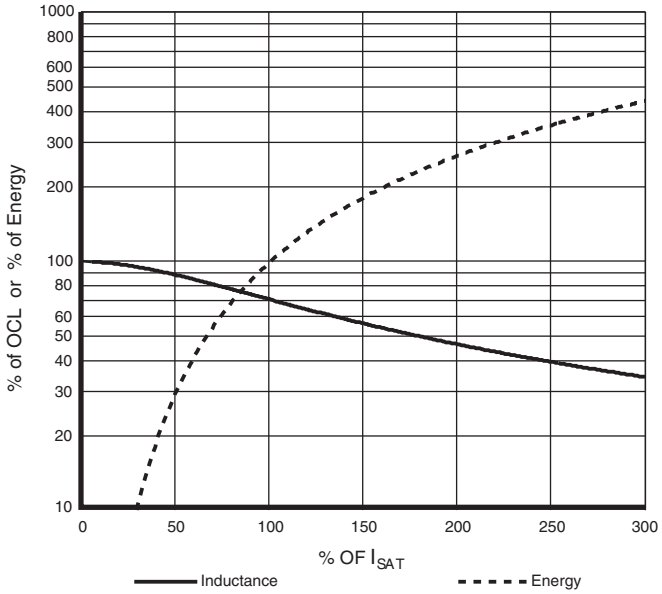


FIGURE 5

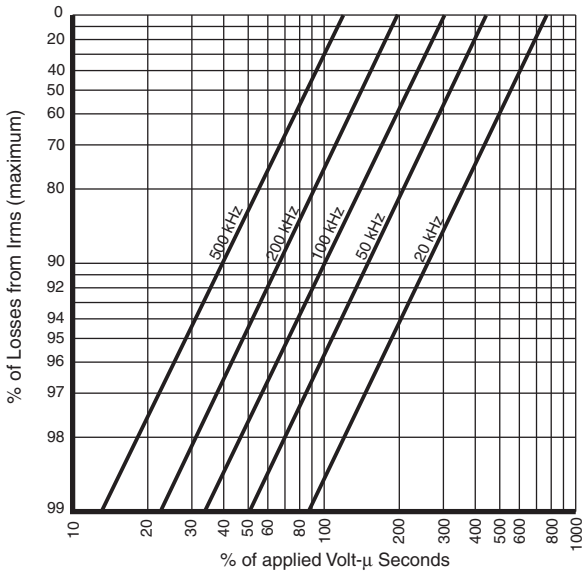


Drawings are not to scale.

Inductance Characteristics



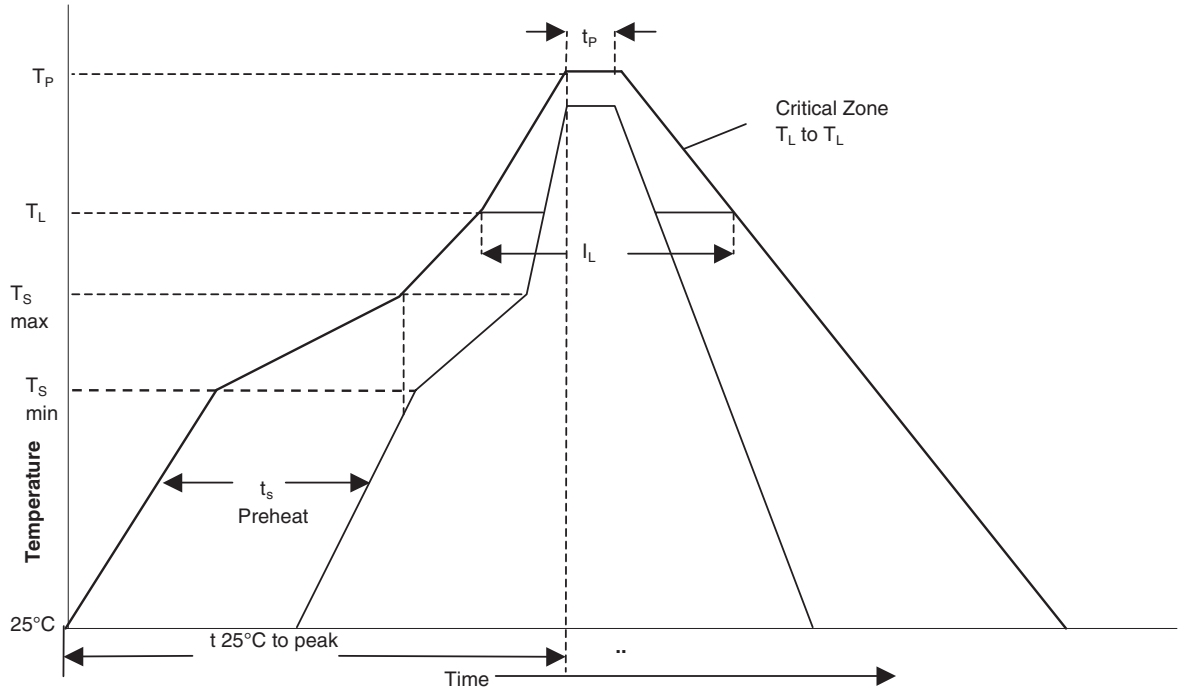
Core Loss



Recommended Solder Reflow Profiles

Profile Feature	Standard SnPb Solder	Lead (Pb) Free Solder
Average Ramp-Up Rate (T_L to T_P)	3°C/Second Max.	3°C/Second Max.
Preheat Temperature Min. (T_{Smin}) Temperature Max. (T_{Smax}) Time (Min to Max) (ts)	 100°C 150°C 60-120seconds	 150°C 200°C 60-120seconds
T_{smax} to T_L Ramp-Up Rate		 3°C/Second Max.
Time Maintained Above: Temperature (T_L) Time (t_L)	 183°C 60-150 Seconds	 217°C 60-150 Seconds
Peak Temperature (T_P)	235°C +/-5°C	255°C +/-5°C
Time Within 5°C of Actual Peak Temperature (t_P)	30 Seconds Max	10 Seconds Max
Ramp Down Rate	6°C/ Second Max.	6°C/ Second Max.
Time 25°C to Peak Temperature	6 Minutes Max	8 Minutes Max

All temperatures refer to the topside of the package, measured on the package body surface
Reference JEDEC J-STD-020B



Using the Versa-Pac as a Flyback Transformer

The Versa-Pac range of transformers is one of the many products manufactured under the Cooper Coiltronics® brand of power magnetics from Cooper Bussmann. Versa-Pac is available in five sizes and is suitable for flyback circuits with power levels up to 35W and a maximum switching frequencies of 500kHz. The VP series was designed, primarily, for low voltage applications typically 3.3V, 5V and 12V. With the addition of the VPH products to the range the Versa-Pac can now be used for 24V, 48V and, at higher frequencies, even 120V applications. Each transformer has six identical windings that can be configured in series and parallel to produce the required transformer design, the isolation between these windings is 500Vdc. Full product data is available on our website: www.cooperbussmann.com

Design Procedure

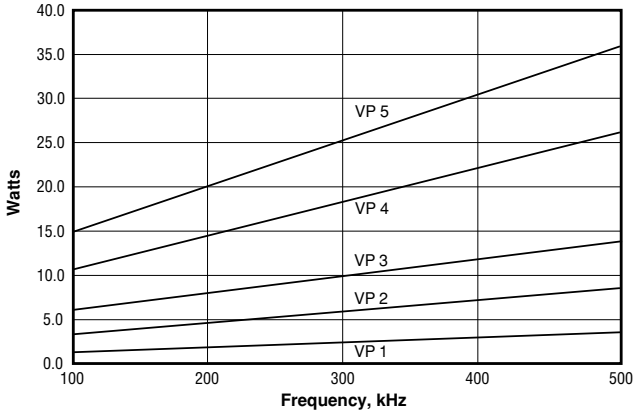
In order to design a flyback transformer using the Versa-Pac the following information is required: nominal, minimum and maximum input voltages (Vin(nom), Vin(min) & Vin(max)), output voltage (Vo), output current (Io) and switching frequency (Fs).

For the purpose of our example let's take the following values:

Vo = 5V, Io = 1A, Vin(min) = 40V, Vin(nom)=48V , Vin(max) = 56V and Fs = 200kHz

Using the graph for Unipolar (Flyback) Power v Frequency from the data sheet select the required Versa-Pac size by reading off your required output power and operating frequency.

Unipolar (Flyback) Power vs Frequency



At 200kHz and 5W this gives a VP3 size.

If the output power requirement can't be met then the Versa-Pac is unable to offer a flyback transformer solution. It may be worth considering a Push-Pull topology, as this will give better transformer utilization allowing high output power levels for the same transformer size.

Calculate the turns ratio for a duty cycle (D) of 0.5 using the equation;

Vo/Vin(nom) = Nsec/Npri x (D/1-D) (1)

Where Nsec is the number of secondary windings and Npri is the number of primary windings, Npri/Nsec is the turns ratio which must be rounded to the nearest achievable value (i.e. 0.5, 0.667, 1, 1.5, 2, 3 etc).

5/48 = Nsec/Npri x 0.5/(1-0.5)
Npri/Nsec = (48x1)/5 = 9.6
Rounding down, Npri/Nsec = 5 (max ratio)

Vin(nom) and 0.5 duty cycle are used only as a starting point, it is possible that using Vin(min) with lower or high duty cycles you may achieve a more suitable turns ratio.

Calculate the actual duty cycle for Vin(max) using equation 1 and the calculated turns ratio rounded up or down to the nearest achievable value.

5/56 = (1/5) x D/(1-D)
0.446-0.446D = D
D = 0.446/1.446 = 0.309

Calculate the primary volt-seconds product using the following equation:

Primary Vs = D x Ts x Vin(max)
Where Ts = 1/Fs (2)

This value should be less than the rated primary Volt-µsec, if the primary uses one winding the rated Volt-µsec is the same as Volt-µsec(Base). If the primary is two windings in series then the rating is then 2 x Volt-µsec(Base) and for 3 series windings 3 x Volt-µsec(Base) etc. If the Volt-µsec rating can not be achieved using the selected Versa-Pac size then you will need to select a larger size or increase the switching frequency.

Primary Vs = 0.309 x 1/200x10^3 x 56 = 86.52Vµsec

The VP3 has a Volt-µsec(Base) of 27.7Vµsec, multiplying this by 5 gives a rating of 138.5Vµsec. So the VP3 size meets the volt-seconds requirements.

If the required volt-seconds rating can't be achieved you can reduce the required rating by increasing the switching frequency. Alternatively you can recalculate the turns ratio using Vin(min) as this may increase the number of series primary windings.

Starting with the highest inductance value for the selected VP size, calculate the output current at which current conduction is at the boundary between continuous and discontinuous.

Io (boundary) = Ts x Vo x (1-D(max))^2/(2 x Ls) (3)

Where Ls is the secondary inductance and Dmax is the duty cycle at Vin(min).

Selecting the VP3-0780:
D(max) = 0.625/1.625 = 0.385
Ls = 63.2µH
Io (boundary) = 5x10^{-6} x 5 x (1-0.385)^2/
(2 x 63.2x10^{-6}) = 0.075A

As the boundary current is less than the maximum output current the transformer is operating in continuous mode.

Calculating the peak and rms primary currents we can determine if the selected Versa-Pac meets the specified requirements.

For Continuous mode conduction:

Peak Primary Current:

Ipri(peak) = Nsec/Npri x (1/1-D(max))
x Io + (Vin(min) x Ts x D(max))/2 x Lpri (4)

Where Lpri is the primary inductance.

In order to calculate the rms primary current you first need to calculate the primary current delta and average peak.

∆Ipri = (Vin(min) x D(max) x Ts)/Lpri (5)

Ipri(avg-pk) = (Ipri(peak) + (Ipri(peak) - ∆Ipri))/2 (6)

Ipri(rms) = (D(max) x (Ipri(avg-pk))^2)$^{0.5}$ (7)

Ipri(peak) = 0.2 x 1/(1-0.385) + (40 x 5x10^{-6} x 0.385)/
(2 x 5^2 x 63.2x10^{-6}) = 0.35A

Peak current is higher than the Isat rating for the VP3-0780, which is equal to 6/5 x Isat(base). So moving up to the VP3-0138, we once again find that conduction is mainly continuous mode and so peak primary current:

Ipri(peak) = 0.2 x 1/(1-0.385) + (40 x 5x10^{-6} x 0.385)/
(2 x 5^2 x 11.2x10^{-6}) = 0.462A

∆Ipri = (40 x 0.385 x 5x10^{-6})/(5^2 x 11.2x10^{-6}) = 0.275A
Ipri(avg-pk) = (0.462 + (0.462 – 0.275))/2 = 0.325A
Ipri(rms) = (0.385 x 0.325^2)$^{0.5}$ = 0.202A

For the VP3-0138 the Irms rating is 1.47A and the Isat(base) is 0.59A both of which are sufficiently high to meet the primary current requirements.

For discontinuous mode conduction:

First we need to calculate the average primary current:

Ipri(avg)= (Vo x Io)/(Vin(min) x Efficiency) (8)

Ipri(peak) = (2 x Ipri(avg))/D(max) (9)

Ipri(rms) = ((Ipri(peak)^2 x D(max))/3)$^{0.5}$ (10)

You can now check these results against the Isat and Irms ratings, bearing in mine that the actual Isat rating:

= (6 x Isat(base))/Number of windings driven (11)

The number of windings driven for a flyback transformer is the number of series windings used to make up the primary. So for two series primary windings the rated Isat is actually 3 times Isat(base).

Finally, calculate the maximum rms secondary current,

For continuous mode:

Isec(rms) = ((1-D(max)) x (Io/(1-D(max)))^2)$^{0.5}$ (12)

For discontinuous mode:

$Isec(rms) = ((1-D(max))/3 \times (Isec(peak))^2)^{0.5}$ (13)

Where, referring to equation 9:

$Isec(peak) = Ipri(peak) \times Npri/Nsec$ (14)

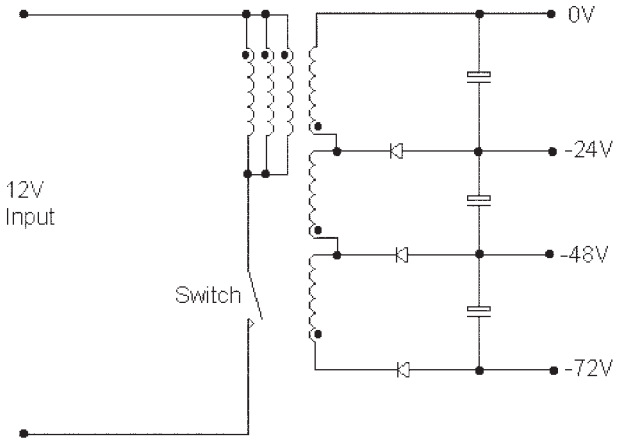
$Isec(rms) = ((1-0.385) \times (1/(1-0.385))^2)^{0.5} = 1.275A$

The VP3-0138 has an Irms(base) rating of 1.47A

Examples:

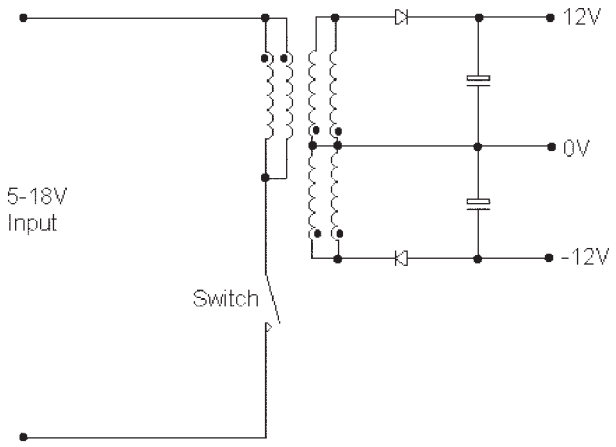
SLIC Power Supply

By connecting three secondary windings in series much higher output voltages can be achieve, in this example each secondary winding has a -24V output therefore providing the -48V and -72V supplies required in SLIC applications.



Split +/-12V Supply

Using a secondary center tap allows the winding to be configured for positive and negative outputs. Extra windings are paralleled with the primary and secondary windings in order handle more current and reduce losses.



Using the Versa-Pac as a Forward Converter Transformer

The Versa-Pac range of transformers is one of the many products manufactured under the Cooper Coiltronics® brand of power magnetics from Cooper Bussmann. Versa-Pac is available in five sizes and is suitable for a maximum switching frequency of 500kHz and power levels up to 30W, for single ended topologies, or 60W for bipolar applications. The VP series was designed, primarily, for low voltage applications typically 3.3V, 5V and 12V. With the addition of the VPH products to the range the Versa-Pac can now be used for 24V, 48V and, at higher frequencies, even 120V applications. Each transformer has six identical windings that can be configured in series and parallel to produce the required transformer design, the isolation between these windings is 500Vdc. Full product data is available on our website: www.cooperbussmann.com

Single Ended Forward Converter Design Procedure

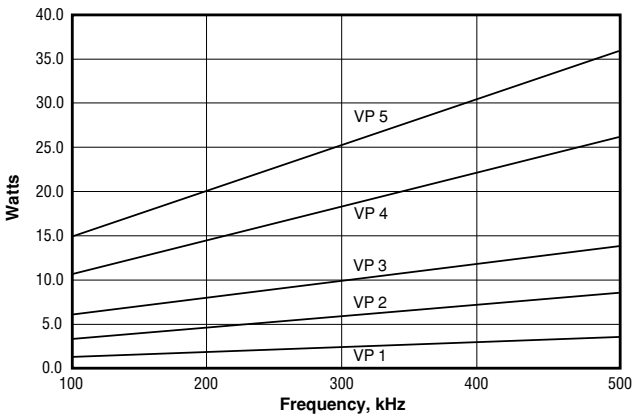
In order to design a forward converter transformer using the Versa-Pac the following information is required: nominal, minimum and maximum input voltages (Vin(nom), Vin(min) & Vin(max)), output voltage (Vo), output current (Io) and switching frequency (Fs).

For the purpose of our example let's take the following values:

Vo = 3.3V, Io = 5A, Vin(min) = 40V, Vin(nom)=48V , Vin(max) = 56V and Fs = 250kHz

Using the graph for unipolar (Flyback) Power v Frequency from the data sheet select the required Versa-Pac size by reading off your required output power and operating frequency.

Unipolar (Flyback) Power vs Frequency



At 250kHz and 16.5W this gives a VP5 size.

Although the data used in the Power v. Frequency curve was derived using a flyback topology, as a guide to Versa-Pac size requirements, it still holds true for unipolar forward converters.

Calculate the turns ratio for a duty cycle (D) of 0.25 using the equation;

$$Vo/Vin(nom) = D \times Nsec/Npri \quad (1)$$

Where Nsec is the number of secondary windings and Npri is the number of primary windings, Npri/Nsec is the turns ratio which must be rounded to the nearest achievable value (i.e. 0.5, 0.667, 1, 1.5, 2, 3 etc).

3.3/48 = Nsec/Npri x (0.25)
Npri/Nsec = (48x0.25)/3.3 = 3.6
Rounding down, Npri/Nsec = 3

Vin(nom) and 0.25 duty cycle are used only as a starting point, it is possible that using Vin(min) with lower or high duty cycles you may achieve a more suitable turns ratio. Note: Maximum duty cycle for most unipolar forward converters is 0.5.

Calculate the maximum duty cycle for Vin(min) using equation 1 and the calculated turns ratio rounded up or down to the nearest achievable value.

3.3/40 = 1/3 x (D)
(3.3 x 3)/40 = D
D(max) = 0.2475

Calculate the primary volt-seconds product using the following equation:

Primary Vs = D(max) x Ts x Vin(min)
Where Ts = 1/Fs (2)

This value should be less than the rated primary Volt-µsec, if the primary uses one winding the rated Volt-µsec is the same as Volt-µsec(Base). If the primary is two windings in series then the rating is then 2 x Volt-µsec(Base) and for 3 series windings 3 x Volt-µsec(Base) etc. If the Volt-µsec rating can not be achieved using the selected Versa-Pac size then you will need to select a larger size or increase the switching frequency.

Primary Vs = 0.2475 x 1/250x10³ x 40 = 39.6Vµsec

APPLICATION NOTES

The VP5 has a Volt-µsec(Base) of 65.6Vµsec, multiplying this by 3 gives a rating of 196.8Vµsec. So the VP5 easily meets the volt-seconds requirements.

If the required volt-seconds rating can't be achieved you can reduce the required rating by increasing the switching frequency. Alternatively you can recalculate the turns ratio using Vin(max) or a high duty cycle as this may increase the number of series primary windings.

Starting with the highest inductance value for the selected VP, calculating the rms primary currents we can determine if the selected Versa-Pac meets the specified requirements.

In order to calculate the rms primary current you first need to calculate the peak current.

$$Ipri(peak) = Nsec/Npri \times (Io + \Delta Io/2) + Imag(peak) \quad (3)$$

Where:

$$Imag(peak) = (Vin(min) \times Ts \times D(max))/Lpri \quad (4)$$

Primary rms current:

$$Ipri(rms) = (D(max) \times (Ipri(avg\text{-}pk))^2)^{0.5} \quad (5)$$

Where:

$$Ipri(avg\text{-}pk) = (Ipri(peak) + (Ipri(peak) - Imag(peak)))/2 \quad (6)$$

Assuming ΔIo is set to 10% of Io max, which is achieved by selection of the correct output inductor value (see application note EUA001). Using a VP5-1200, the L(base) is 76.8µH therefore:

$Imag(peak) = (40 \times 1/250x10^3 \times 0.248)/3^2 \times 76.8 \times 10^{-6} = 0.0574A$
$Ipri(peak) = 1/3 \times (5 + (0.5/2) + 0.0574 = 1.81A$
$Ipri(avg\text{-}pk) = (1.81 + (1.81 - 0.0574))/2 = 1.78A$
$Ipri(rms) = (0.248 \times 1.78^2)^{0.5} = 0.89A$

The rms current rating, Irms(base), for the VP5-1200 is 2.08A

Finally, calculate the maximum rms secondary current,

$$Isec(rms) = (D(max) \times (Io + Isec(peak)/2)^2)^{0.5} \quad (7)$$

Where, referring to equation 3:

$$Isec(peak) = Ipri(peak) \times Npri/Nsec \quad (8)$$

$Isec(peak) = 1.81 \times 3 = 5.43A$
$Isec(rms) = (0.248 \times ((5 + 5.43)/2)^2)^{0.5} = 2.6A$

The rms current rating, Irms(base), for the VP5-1200 is 2.08A. In order to achieve the required rms current rating at least two parallel windings must be used to make up the secondary. For improved efficiency it would be normal practice to use both the spare windings and have a secondary made up of three parallel windings.

Transformer Reset

In a practical single ended forward converter design you need to consider how transformer reset is going to be achieved. During the switch 'ON' period current proportional to the output current plus the magnetizing current flow in the primary winding, the magnetizing current must be reset to zero during the switch 'OFF' period in order to prevent converter failure. This can be achieved in a number of ways, figure 1 shows a method that uses an auxiliary primary winding connected in anti-phase to the main primary. This additional winding acts in flyback mode during the switch 'OFF' period recovering the magnetizing energy in to the supply rail.

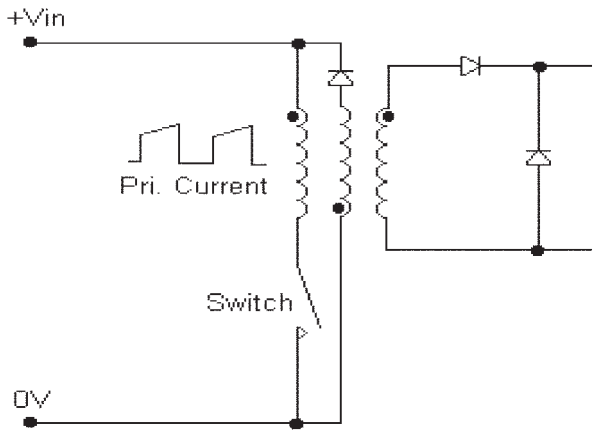


Figure 1

For Versa-Pac designs this method limits the converter maximum duty cycle to 50% and also reduces the number of possible configurations, as only 5 windings will be available. Figure 2 shows a simple way of resetting the transformer using an resistor-capacitor-diode (RCD) network which allows all 6 windings to be used when configuring the transformer.

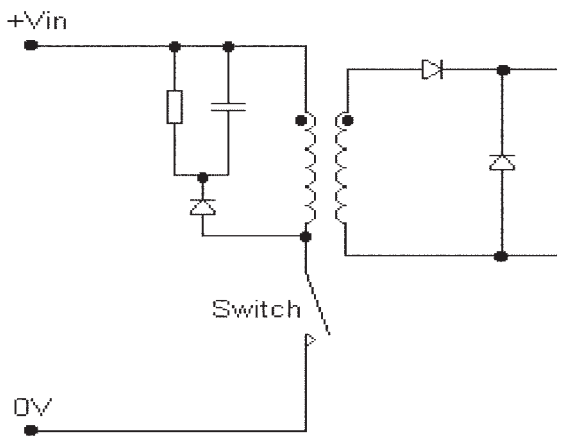


Figure 2

Using an RCD reset network has a number of advantages, it reduces the voltage stress on the switch, it limits turn off voltage spike and permits operation at greater than 50% duty cycle. Figure 3 shows a reset method for a dual switch topology, this method allows the primary winding to operate in flyback mode with the current flowing through the two recovery diodes. This technique is similar to that shown in figure 1, the advantages of this topology include reduced voltage rating requirement for the switches and no requirement for an auxiliary primary winding.

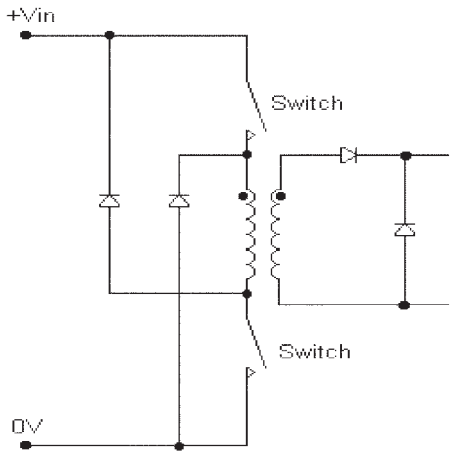
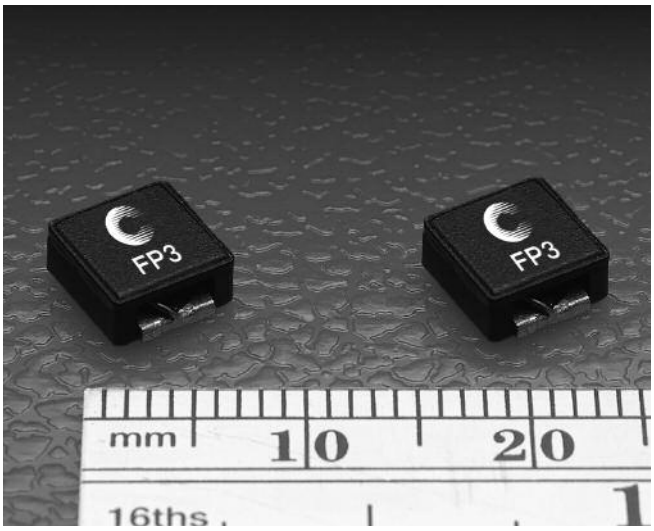
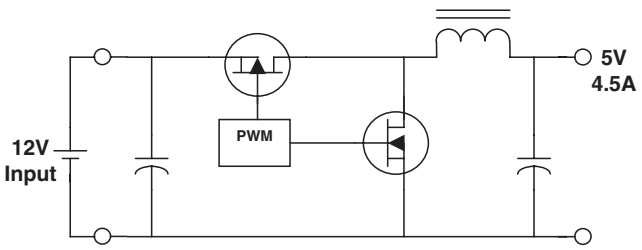


Figure 3

Power Inductors Improve Reliability in High Temperature Designs



The Cooper Coiltronics® brand of High Current FP3™ power inductors from Cooper Bussmann is designed for high density, medium current applications using a high temperature iron powder core material. These inductors do not exhibit the thermal aging issue frequently associated with iron powder core inductors. In fact the FP3 core is rated for 200°C without thermal degradation. The FP3 family is rated for 155°C operation. The calculations below will allow users to take advantage of this high temperature capability.



In this example, a buck regulator will be used to convert a 12V input to a 5V output with a load current of 4.5A. The operating frequency was chosen to be 600 kHz to reduce the size of the filter components, while still maintaining good efficiency. The converter is designed to have 20% ripple current, so a relatively low ESR output filter capacitor will be used, as is typical in switching power supplies.

First calculate the needed inductance value:
V = L * dI/dt where:
V = Vin - Vout (voltage across the inductor)
dT = On time of drive = Vout/Vin/frequency
∆I = Chosen above to be 20%

Calculate the required inductance:
L = V * dt / ∆I = (12-5)*(12/5/600k)/(0.2*4.5)
L= 4.8 µH
Choose 4.7 µH, the nearest standard value
Recalculate ripple current at 23% using 4.7 µH

Second determine peak to peak flux density, Bp-p:
Bp-p = K * L * ∆I where:

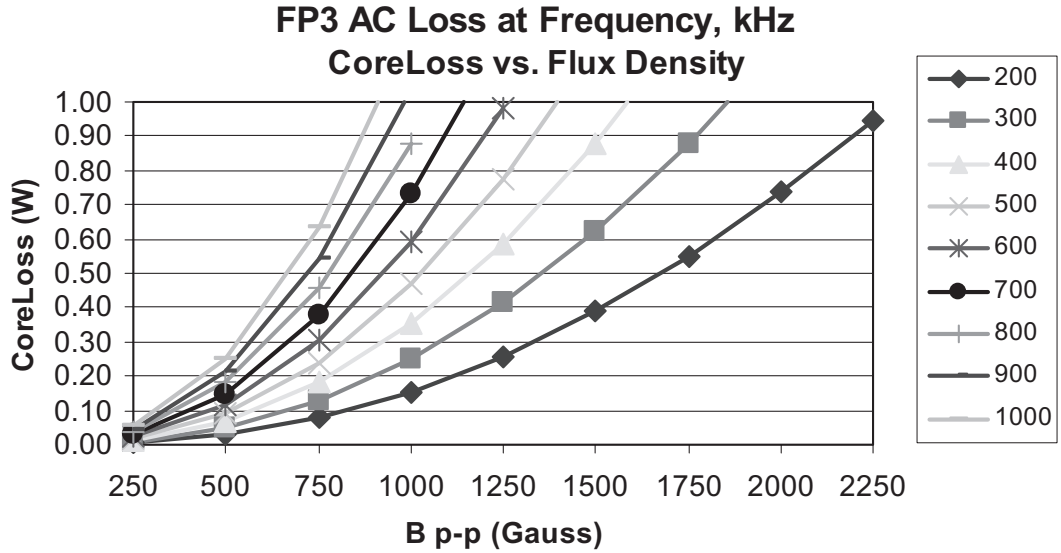
K: K-factor from the adjacent table
L: Inductance µH
∆I: Peak to peak ripple current (Amps)
Bp-p = 105*4.7*0.23*4.5 = 510 Gauss

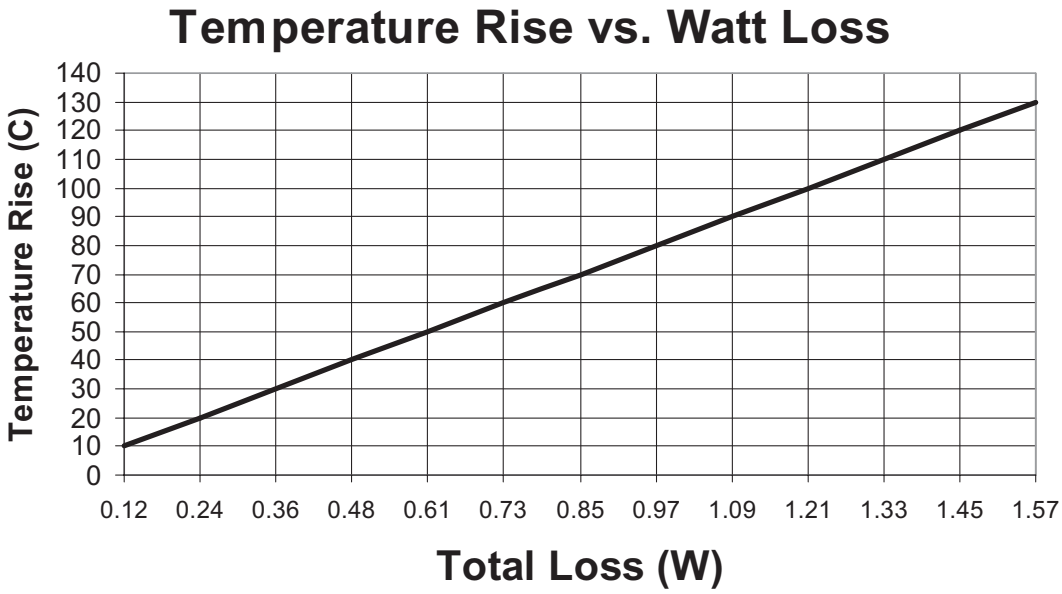
Part Number	K-factor
FP3-R10	803
FP3-R20	482
FP3-R47	344
FP3-R68	268
FP3-1R0	219
FP3-1R5	185
FP3-2R0	161
FP3-3R3	127
FP3-4R7	105
FP3-8R2	78
FP3-150	59

Next determine the total losses in the inductor:
Total losses = DC loss + AC loss
DC loss = I^2 *DCR = 4.5^2 * 0.040 = 0.81 W
(DCR from FP3 datasheet)
AC loss from table at Bp-p of 510 = 0.15 W
Total Loss = DC loss + AC loss = 0.96W

Finally determine the temperature rise.
Total loss = 0.96W, using the table,
Temperature rise is 80°C
Assuming an ambient temperature of 70°C,
The temperature of the inductor is
T = 70 +75 = 150°C

Note the data assumes no cooling airflow. Cooling will reduce the temperature of the inductor.
The FP3 is rated for 155°C operation.





Switching Regulator Inductor Design

In switching regulator applications the inductor is used as an energy storage device, when the semiconductor switch is on the current in the inductor ramps up and energy is stored. When the switch turns off this energy is released into the load, the amount of energy stored is given by;

$$\text{Energy} = 1/2L.I^2 \quad \text{(Joules)} \qquad (1)$$

Where L is the inductance in Henrys and I is the peak value of inductor current.

The amount by which the current changes during a switching cycle is known as the ripple current and is defined by the equation;

$$V_1 = L.di/dt \qquad (2)$$

Where V_1 is the voltage across the inductor, di is the ripple current and dt is the duration for which the voltage is applied. From this we can see that the value of ripple current is dependent upon the value of inductance.

Choosing the correct value of inductance is important in order to obtain acceptable inductor and output capacitor sizes and sufficiently low output voltage ripple.

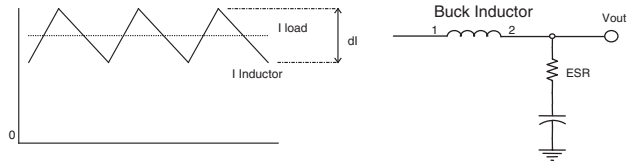


Figure 1

As can be seen from figure 1 inductor current is made up of AC and DC components, because the AC component is high frequency it will flow through the output capacitor as it has a low HF impedance. This will produce a ripple voltage due to the capacitor 'equivalent series resistance' (ESR) that will appear at the output of the switching regulator. This ripple voltage needs to be sufficiently low as not to effect the operation of the circuit the regulator is supplying, normally in the order of 10-500mVpk-pk.

Selecting the correct ripple current also impacts on the size of inductor and output capacitor, the capacitor will need to have a sufficiently high ripple current rating or it will overheat and dry out. In order to get a good compromise between inductor and capacitor size a ripple current value of 10-30% of maximum inductor current should be chosen. This also means that the current in the inductor will be continuous for output currents greater that 5-15% of full load.

Inductor Selection for Buck Converters

When selecting an inductor for a Buck converter, as with all switching regulators, you will need to define or calculate the following parameters:

- Maximum input voltage
- Output voltage
- Switching frequency
- Maximum ripple current
- Duty cycle

For the example shown in figure 2 lets assume a switching frequency of 250kHz, input voltage range of 12V±10% and a max ripple current of 220mA.

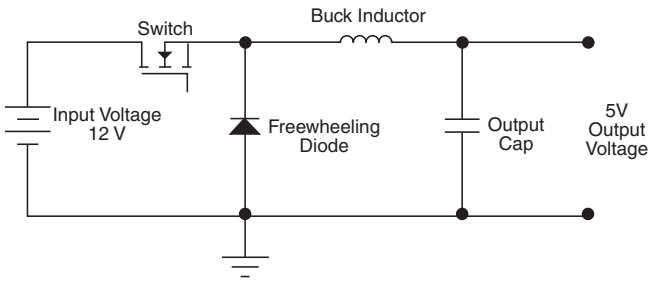


Figure 2

For an input voltage of 13.2V the duty cycle will be:

$$D = V_o/V_i = 5/13.2 = 0.379 \qquad (3)$$

Where V_o is the output voltage and V_i is the input voltage.

Voltage across the inductance:

$$V_1 = V_i - V_o = 8.2V \quad \text{when the switch is on} \qquad (4)$$
$$V_1 = -V_o = -5V \quad \text{when the switch is off} \qquad (5)$$

Require inductance:

$$L = V_1.dt/di = (8.2 \times 0.379/250 \times 10^3)/0.22 \qquad (6)$$
$$L = 56.5\mu H$$

Inductor Selection for Boost Converters

In order to calculate the require value of inductance for a Boost converter we follow the same procedure as described for the Buck converter, the difference being that the equations for duty cycle and inductor voltage change.

Taking maximum input voltage as 5.5V, switching frequency as 100kHz and maximum ripple current as 0.1A.

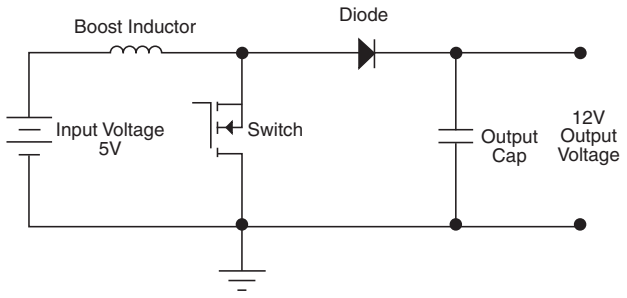


Figure 3

Duty cycle:

$$D = 1 - (V_i/V_o) = 1 - (5.5/12) = 0.542 \quad (7)$$

Inductor Voltage:

$$V_1 = V_i = 5.5V \quad \text{when the switch is on} \quad (8)$$

$$V_1 = V_o - V_i = 6.5V \quad \text{when the switch is off} \quad (9)$$

Using equation 6, inductance:

$$L = (5.5 \times 0.542/100 \times 10^3)/0.1$$

$$L = 298\mu H$$

One thing to note about the Boost converter topology is that, unlike the Buck converter, inductor current does not continuously flow to the load. During the switch 'on' period the inductor current flows to ground and the load current is supplied from the output capacitor. This means that the output capacitor must have sufficient energy storage capability and ripple current rating in order to supply the load current during this period.

Inductor Selection for Buck-Boost Converters (including Cuk & SEPIC)

The procedure shown here is for the Cuk converter but it applies equally well to the SEPIC and the single inductor Buck-Boost topologies. Initially we will consider the circuit utilizing two separate inductors of equal value and then look at some of the advantages of using coupled inductors.

For this example we shall use a switching frequency of 200kHz and a maximum ripple current of 200mA.

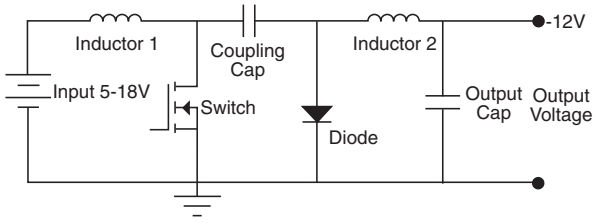


Figure 4

Duty cycle:

$$D = V_o/(V_o + V_i) = 12/(12+18) = 0.4 \quad (10)$$

Inductor voltages:

$$V_1 = V_i = 18V \quad \text{when the switch is on} \quad (11)$$

$$V_1 = V_o = 12V \quad \text{when the switch is off} \quad (12)$$

Using equation 6, inductance:

$$L = (18 \times 0.4/200 \times 10^3)/0.2$$

$$L = 180\mu H$$

Both the SEPIC and Cuk topologies offer advantages over the single inductor Buck-Boost design. Input current is continuous resulting in lower peak values, drive circuit requirements are simple due to switch location and the use of a coupled inductor reduces the cost and PCB space penalties of these topologies.

One thing to note when using coupled inductors, for the total ripple current and total inductive energy stored to remain the same the inductance of each winding should be halved (for our example Lcouple = 90µH).

Inductor Selection for SEPIC Designs

The SEPIC (single-ended primary inductance converter) in an increasingly popular topology, particularly in battery powered applications, as the input voltage can be higher or lower than the output voltage. This presents obvious design advantages but for many engineers the circuit operation and component selection is a mystery, for those that understand the basics the addition of a coupled inductor is an added complication. This article looks at the operation of the SEPIC and compares the design procedure for two single winding inductors with a coupled inductor approach.

Basic Operation

Figure 1 shows the simple circuit diagram for a SEPIC, during the switch (SW) ON time the voltage across both inductors is equal to Vin. This is obvious for L1, however it is not so clear for L2. In order to understand this we first need to look at the voltage across Cp, neglecting ripple voltage, this voltage is constantly at the value of Vin. The simplest way to see this is when the circuit is at equilibrium, under these conditions there is no DC voltage across L1 or L2, so one side of the capacitor is at Vin and the other at zero volts.

When the switch is ON capacitor Cp is connected in parallel with L2, hence the voltage across L2 is the same as the capacitor voltage, -Vin. This in turn means that diode D1 is reverse bias and the load current is being supplied by capacitor Cout. During this period energy is being stored in L1 from the input and in L2 from Cp.

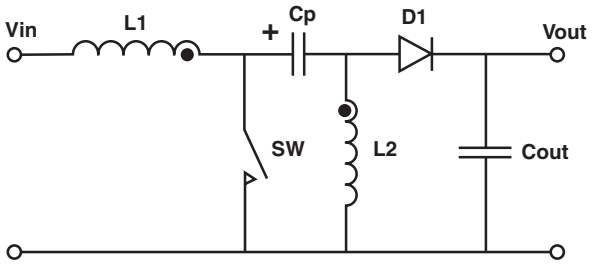


Figure 1 - Simple SEPIC Circuit

When the switch turns off the current in L1 continues to flow through Cp, D1 and into Cout and the load recharging Cp ready for the next cycle. The current in L2 also flows into Cout and the load, ensuring that Cout is recharged ready for the next cycle.

During this period the voltage across both L1 and L2 is equal to Vout, once again this is fairly clear for L2 but no so for L1. However we already know that the voltage across Cp is equal to Vin and that the voltage on L2 is equal to Vout, in order for this to be true the voltage at the node of Cp and L1 must be Vin + Vout. This in turn means that the voltage across L1 is (Vin+Vout) – Vin = Vout.

Inductor Selection

First, let us look at the selection of two separate inductors for L1 and L2 in the following example:

Input voltage (Vin) – 2.8V – 4.5V
Output (Vout & Iout) – 3.3V, 1A
Switching Frequency (Fs) – 250kHz
Efficiency - 90%

First we need to calculate the duty cycle;

$D = Vout/(Vout + Vin)$

The worst case condition for inductor ripple current is at maximum input voltage so;

$D = 3.3/(3.3 + 4.5) = 0.423$

Normally, the output inductor is sized to ensure that the inductor current is continuous at minimum load and that the output voltage ripple does not affect the circuit that the converter is powering. In this case we will assume a 20% minimum load thus allowing a 40% peak to peak ripple current in the output inductor L2.

Calculating the value of L2;

$V = L\ di/dt$

Where V is the voltage applied to the inductor, L in the inductance, di is the inductor peak to peak ripple current and dt is the duration the voltage is applied for. Hence;

$L = V.dt/di$

$dt = 1/Fs \times D$
$dt = 1/(250 \times 10^3) \times 0.423 = 1.69\ \mu s$

V = Vin during the switch ON time so;

$L2 = 4.5 \times (1.69 \times 10^{-6}/0.4)$
$L2 = 19\ \mu H$

Using the nearest preferred value would lead to the selection of a 22 µH inductor. It is common practice to select the same value for both input and output inductors

in SEPIC designs although when two separate parts are being used it is not essential.

Having selected the inductance value we now need to calculate the required RMS and peak current ratings for both inductors.

For input inductor L1;

Irms = (Vout x Iout)/(Vin (min) * efficiency)
Irms = (3.3 x 1)/(2.8 x 0.9) = 1.31A

Ipeak = Irms + (0.5 x Iripple)

Although worst case ripple current is at maximum input voltage the peak current is normally highest at the minimum input voltage.

Iripple = (V.dt)/L
Iripple = (2.8 x 2.2 x 10^{-6})/22 x 10 -6 = 0.28A

Ipeak = 1.31 + 0.14 =1.45A

So a 22µH, 1.31Arms & 1.45Apk rated inductor is required. For example the DR73-220 from Cooper Coiltronics®, this part is 7.5mm square and 3.5mm high with 1.62Arms and 1.67Apk current ratings.

For the output inductor L2

Irms = Iout = 1A

Iripple = (4.5 x 1.69 x 10^{-6})/22 x 10^{-6} = 0.346A

Ipeak = 1 + 0.173 = 1.173A

So a 22µH, 1Arms & 1.173Apk rated inductor is required, which for simplicity could be the same DR73-220 inductor used for L1.

Coupled Inductor Selection
When calculating the value for a coupled inductor you need to bear in mind that all the current is effectively flowing in one inductor and that if the two windings are closely coupled the ripple current will be split equally between them. So calculating the inductance value;

L = V.dt/di

From our earlier example the output ripple current needs to be 0.4Apk-pk, so now we calculate for 0.8A as the ripple current is split between the two windings

L = 4.5 x (1.69 x 10^{-6}/0.8) = 9.5µH

From this it can be seen that by using a coupled inductor the required inductance is halved. It is also important to note that because the two winding are on the same core they must be the same value. If they are not the voltage across each winding will not be equal and Cp will act as a short circuit to the difference.

Continuing with the example using an inductance value of 10µH we now need to calculate the worst case peak current requirement. We already know the RMS current in each winding,

Input inductor RMS current = 1.31A
Output inductor RMS current = 1A

Ipeak = Iin + Iout + (0.5 x Iripple)

Iripple = (2.8 x 2.2 x 10^{-6})/10 x 10^{-6} = 0.62A

Ipeak = 1.31 + 1 + 0.31 = 2.62A @ minimum input voltage

So a 10µH coupled inductor with 2.31Arms and 2.62Apk current ratings is required, for example DRQ74-100. This part has the same 7.5mm square footprint as the DR73-220 that was selected in the example using separate inductors but is 4.35mm high.

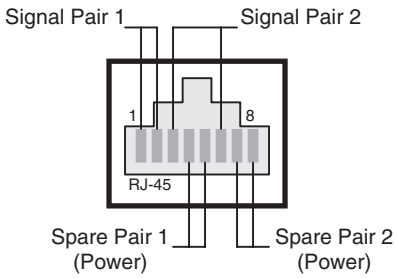
Using a coupled inductor takes up less space on the PCB and tends to be lower cost than two separate inductors. It also offers the option to have most of the inductor ripple current flow in either the input or the output. This is achieved by using a winding construction that positions most of the leakage inductance in one winding, this will cause most of the ripple current to appear in the opposite winding. By doing this the need for input filtering can be minimized or the output ripple voltage can be reduced to very low levels when supplying sensitive circuits.

Cooper Bussmann offers a number of coupled inductor options from the Cooper Coiltronics® range, including the SDQ and DRQ series of shielded drum inductors and the Econo-Pac and Octa-Pac range of toroid inductors. With inductance values from 0.33µH to 1mH and sizes from 5.2mm 2 x 1.2mm high up to 12.5mm 2 x 8mm high Cooper Coiltronics® offers one of the broadest ranges of coupled inductor solutions.

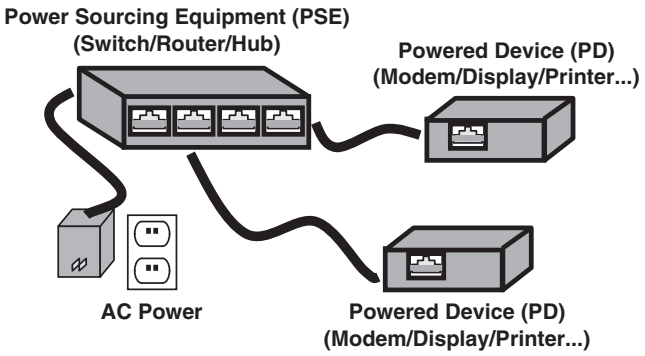
PoE Power Magnetics - Options and Trends

What is Power over Ethernet technology?
Ethernet enabled devices require both data connectivity and a power supply. Power over Ethernet (PoE) technology allows Ethernet devices to receive power as well as data over standard category 5 Ethernet cable. PoE is governed by the standard defined in IEEE802.3af. Specific details of the 802.3af standard are available from the Institute of Electrical and Electronic Engineers at www.ieee.org. This article highlights an easy to use, low cost Cooper Coiltronics® PoE power magnetic selection. In short, the PoE port allows a powered device (PD) to draw up to 12.95W from the power-sourcing equipment (PSE). PSE controls the PoE port and it identifies PDs via detection and classification before powering the port. The big advantage of PoE is the elimination of the nuisance "wall wart" power converters. In this case, the need to install additional AC power outlets and connect electrical wires to each terminal is eliminated. Only one cable is needed for your appliance. PoE promises to create a new world of network appliances by saving space, lower cost, easier maintenance and flexible installation.

What is Power over Ethernet application?
PoE is gaining in popularity and manufacturers already have products on the market such as VoIP (Voice over Internet Protocol) telephones, UPS, Wireless LAN access points, Bluetooth access points, Network cameras, Building access systems, Time and attendance systems, Retail point-of-information systems, Battery chargers for mobile phones and PDAs, Vending machines and Gaming machines.



Cooper Coiltronics Power Over Ethernet Transformer and characteristics
In order to comply with IEEE802.3af PoE standard, Powered Device (PD) must meet the isolation requirement. Dc-Dc converters solve the isolation problem. Forward and Flyback switcher topologies can use Cooper Coiltronics PoE transformers to isolate the PD's PoE interface from the rest of its circuitry while stepping down the PoE input voltage to power the PD circuitry.



Cooper Coiltronics PoE transformers support 1500VAC isolation in the power converter with feedback voltage of 11V at 0.1A. Available in 4W, 7W and 13W, the transformers accept input voltage range from 29.5V to 60V using a nominal 250KHz switching frequency. An EFD15 core is used in 4W and 7W transformers while an EFD17 core is used in the 13W transformers. The EFD17 is a core developed by Cooper Bussmann to fit in between the EFD15 and EFD20 core sizes, and allows a smaller solution than most competitive devices for the same output power. These components operate in ambient temperatures between -40 and +85 degrees Celsius. Due to the size, Cooper Coiltronics PoE transformers can handle DC current of PoE and are rated for operating temperatures up to 125 degrees Celsius.

Cooper Coiltronics PoE transformers feature split primary and secondary windings to minimize leakage inductance – minimizing the result of imperfect magnetic linking of one winding to another. These components allow multiple output variations. 3.3V and 5V PoE transformers support three outputs while 12V transformers support two outputs. Each of them has same output current and voltage. Alternately, the isolated windings can be combined in series to produce additional voltage combinations.

PoE13W3VERS has three different outputs, 7V, 3.3V and 1.8V respectively. These outputs can be connected in series to produce a converter with 1.8V, 5.1V and 12.1V from the same transformer. The series configuration produces optimal cross regulation between outputs. PoE13W2VERS has two different outputs, 5V and 3.3V. VERS refers to the Cooper Coiltronics Versa-Pac® prod-

uct lines that offer more than 500 usable inductor or transformer configurations. The same concept has been used in the PoE transformer family. Connecting the windings in parallel will increase the current carrying capability while connecting in series will increase the output voltage. These components provide flexibility in the design to connect the winding in series or parallel, and thereby achieving higher voltage or current.

Future trend- High Power over Ethernet (HPoE)
The current IEEE802.3af standard is restricted to low power devices but the demand to standardize high power PoE is increasing. A standard capable with double the power limit of 13W on a 48V input was proposed. High Power over Ethernet needs same level of safety, reliability and should be backwards compatibility with the IEEE 802.3af standard. Cooper Coiltronics is also introducing 26W HPoE transformers. Due to power and efficiency requirements, Forward converters with synchronous rectification are used. A gate drive winding will be provided on the secondary side. The operating frequency is 300KHz - available in 3.3V and 5V outputs. The new standard delivers power to laptops, advanced network cameras, videophone, flat screen monitor and other high power consumption Ethernet devices.

Conclusion
With the introduction of the IEEE Power over Ethernet standard, the advantages of easy installation and robustness of a powered network has quickly lead to the introduction of many new network appliances. Higher power devices demand the same advantage, since reducing cost is always a driver for implementing new technology. As a key player manufacturing power magnetics, Cooper Coiltronics offers a series of standard PoE products suitable to use in Dc-Dc converters. Samples are available upon request and the datasheet is available in the website: www.cooperbussmann.com.

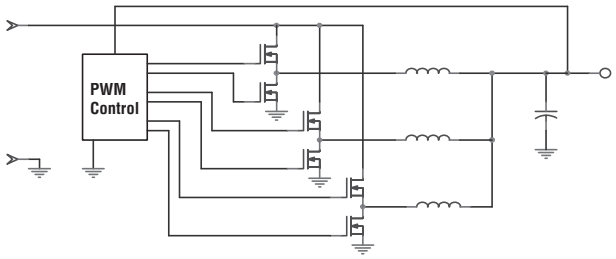
High Current Inductors for DC-DC Converters

State-of-the-art power supply design of DC-DC converters requires maximum thermal efficiency, low switching losses and platform scalability. Overall systems efficiency can be improved by the advancements in strategic power components. When striving for maximum efficiency, low switching components losses and parasitic inductance losses are critical. This is driven by increasing performance requirements of new microprocessors ranging from 10A to120A and starting 50nH.

High current inductors can be found in many DC-DC converter applications such as:

- VRM (Multi-phase for Servers / Desktop / Notebook computers)
- DDR Memory Power Supply(Synchronous Buck and Multi-phase Converters)
- GPU Graphics cards (Buck and Multi-phase Converters)

Voltage Regulators



Multi-phase VRMs for High-End Desktops, Servers, and Notebook Computers

The evolution of today's microprocessors requires high frequency synchronous buck converters to provide highly efficient power to high current low voltage processors with fast transient response. High frequency switching translates back to increased FET losses as the major contributor to switching loss. The combined DC and AC loss in inductors is the next highest contributor of power loss. A roadmap of modern CPU's shows that processor current will keep increasing up to 200Amps by 2006 (5 phases, 40A/phase). High current inductors can positively impact the overall system's efficiency by up to 2%. A well packaged high current inductor: provides higher energy density and low loss (Core and Copper loss) and can be available in both THT and SMT which brings flexibility to chipset developers.

Cooper Coiltronics®

Cooper Coiltronics brand magnetics from Cooper Bussmann offer a wide variety of standard and customized solutions. We specialized in inductors and transformers for DC-DC power conversion and switch-mode applications requiring high frequency magnetics. Our products are used in many standard topologies including:

- EMI/ Noise Filter: Common Mode and Series Mode
- Averaging Choke: Buck and Boost
- Coupled Inductors: Coupled Choke, Flyback, Sepic

The Cooper Coiltronics High Current and Flat-Pac inductor product lines provide an optimal mix of innovative packaging, high efficiency and unbeatable reliability. We invest in new technologies that deliver superior performance by providing high power density and reduced inductor size when compared to conventional solutions. Core and conductor losses become more critical as higher switching frequencies are used. Our designs utilize low loss core materials, new and custom core shapes in combination with innovative construction and packaging to provide power supply designers with the highest performance parts available in the market.

Summary

Cooper Coiltronics magnetic component solutions deliver high performance, innovative packaging, scalability and unbeatable reliability. Our wide variety of High Current and Flat-Pac inductors are specifically developed for today and tomorrow's DC-DC converters. For all your high current inductor and transformer needs, Cooper Coiltronics is your best power magnetics solution partner.

Magnetics Design Specification Form

Company:		Application:	
Contact:		Sales Contact:	Date:
Address:		Sample Quantity:	☐ Quote Only
Phone:		Target Cost:	
Fax:	Email:	Estimated Annual Quantity:	

Standard Geometry	☐ ER 11/5-SG1	☐ ER 14.5/6-SG2	☐ EFD 15-SG3	☐ EFD 17-SG4	☐ EFD 20-SG5
	☐ EE 8.3-SG6	☐ EF 12.6-SG7	☐ EE 13-SG8	☐ SEE 16-SG9	

Topology	☐ Buck	☐ Boost	☐ Flyback	☐ Coupled inductor
	☐ Forward	☐ Gate Drive	☐ SEPIC	☐ Common Mode

Frequency Range: Duty cycle: ☐ Continuous ☐ Discontinuous

Input Voltage:

Power:

Output Voltage (s) @ Continuous Current:

DESIGN PRIORITY	
Cost	☐
Size	☐
Efficiency	☐

Inductance:

Input Switch Current (Ipk):

Max Ambient Temp:

DC Resistance (DCR):

Dielectric Withstanding Voltage (Hypot):

Mounting: ☐ Surface Mount ☐ Thru-Hole Specify mounting pad or hole dimensions below.

Max Dimensions Length: Width: Height:

Agency Approvals? ☐ Yes Agency and Document Number:

Schematic, Notes & Sketch: