

Notice for TAIYO YUDEN products

Please read this notice before using the TAIYO YUDEN products.

REMINDERS

- Product information in this catalog is as of October 2009. All of the contents specified herein are subject to change without notice due to technical improvements, etc. Therefore, please check for the latest information carefully before practical application or usage of the Products.

Please note that Taiyo Yuden Co., Ltd. shall not be responsible for any defects in products or equipment incorporating such products, which are caused under the conditions other than those specified in this catalog or individual specification.

- Please contact Taiyo Yuden Co., Ltd. for further details of product specifications as the individual specification is available.
- Please conduct validation and verification of products in actual condition of mounting and operating environment before commercial shipment of the equipment.

- All electronic components or functional modules listed in this catalog are developed, designed and intended for use in general electronics equipment.(for AV, office automation, household, office supply, information service, telecommunications, (such as mobile phone or PC) etc.). Before incorporating the components or devices into any equipment in the field such as transportation,(automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network (telephone exchange, base station) etc. which may have direct influence to harm or injure a human body, please contact Taiyo Yuden Co., Ltd. for more detail in advance. Do not incorporate the products into any equipment in fields such as aerospace, aviation, nuclear control, submarine system, military, etc. where higher safety and reliability are especially required.

In addition, even electronic components or functional modules that are used for the general electronic equipment, if the equipment or the electric circuit require high safety or reliability function or performances, a sufficient reliability evaluation check for safety shall be performed before commercial shipment and moreover, due consideration to install a protective circuit is strongly recommended at customer's design stage.

- The contents of this catalog are applicable to the products which are purchased from our sales offices or distributors (so called "TAIYO YUDEN' s official sales channel"). It is only applicable to the products purchased from any of TAIYO YUDEN' s official sales channel.

- Please note that Taiyo Yuden Co., Ltd. shall have no responsibility for any controversies or disputes that may occur in connection with a third party's intellectual property rights and other related rights arising from your usage of products in this catalog. Taiyo Yuden Co., Ltd. grants no license for such rights.

- Caution for export

Certain items in this catalog may require specific procedures for export according to "Foreign Exchange and Foreign Trade Control Law" of Japan, "U.S. Export Administration Regulations", and other applicable regulations. Should you have any question or inquiry on this matter, please contact our sales staff.
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WOUND CHIP POWER INDUCTORS (CB SERIES)



REFLOW

FEATURES

- This series corresponds to high electric current compared with LB/LBC series.
Wound Chip Inductors that can be used for small DC/DC converters and are suitable for choke uses.
- CBMF 1608 Series**
The best efficiency design is achieved by adopting bottom-surface electrode structure.
Wound Chip Inductors that are suitable for module design which needs high electric current like DC/DC converters.

APPLICATIONS

- DSC/DVC/HDD, LCD, portable telephones, game equipment.
Various audio-visual equipment, various communication equipment, etc.

ORDERING CODE

Ordering Code: C B △ 2 0 1 2 T 1 0 0 △ △ △ △ △

1 Type	CB Wound chip power inductor
2 Characteristic Spec	△ Low Rdc C High current L Low profile MF Bottom-surface electrode
3 External Dimensions (mm)	1608 (0603) 1.6×0.8 2012 (0805) 2.0×1.25 2016 (0806) 2.0×1.6 2518 (1007) 2.5×1.8 3225 (1210) 3.2×2.5
4 Packaging	T Tape & Reel
5 Nominal Inductance (μH)	example 1R0 1 100 10 101 100 ※R=decimal point
6 Inductance Tolerances (%)	K ±10 M ±20
7 Special code	△ Standard products R Low Rdc type
8 Internal code	△△△ Standard Products △=Blank space

EXTERNAL DIMENSIONS/STANDARD QUANTITY

Type	L	W	T	e	Standard Quantity [pcs]	
					Paper Tape	Embossed Tape
CBC3225	3.2±0.2 (0.126±0.008)	2.5±0.2 (0.098±0.008)	2.5±0.2 (0.098±0.008)	0.6±0.3 (0.024±0.012)	—	1000
CB2518 CBC2518	2.5±0.2 (0.098±0.008)	1.8±0.2 (0.071±0.008)	1.8±0.2 (0.071±0.008)	0.5±0.2 (0.020±0.008)	—	2000
CB2016 CBC2016	2.0±0.2 (0.079±0.008)	1.6±0.2 (0.063±0.008)	1.6±0.2 (0.063±0.008)	0.5±0.2 (0.020±0.008)	—	2000
CB2012 CBC2012	2.0±0.2 (0.079±0.008)	1.25±0.2 (0.049±0.008)	1.25±0.2 (0.049±0.008)	0.5±0.2 (0.020±0.008)	—	2000
CBL2012	2.0±0.2 (0.079±0.008)	1.25±0.2 (0.049±0.008)	0.9±0.1 (0.035±0.004)	0.5±0.2 (0.020±0.008)	4000	—
CBMF1608	1.6±0.2 (0.063±0.2)	0.8±0.2 (0.031±0.008)	0.8±0.2 (0.031±0.008)	0.45±0.15 (0.016±0.006)	—	3000

Unit : mm

Recommended Land Patterns

Surface Mounting
 • Mounting and soldering conditions should be checked beforehand.
 • Applicable soldering process to those products is reflow soldering only.
 • Recommended Land Patterns

Unit : mm (inch)

AVAILABLE CAPACITANCE RANGE

Inductance [μH]	Type		CB2518	CB2016	CB2012	CBC3225	CBC2518	CBC2016	CBC2012	CBC2012	CBMF1608
	Range	Type									
1	1200	1μH	1200	600	500	1440	1000	1100	700	620	350
22	510	0.09	510	510	410	1130	890	750	530	530	230
10	250	2.40	250	250	200	900	480	380	240	440	115
47	110	0.95	110	110	90	390	240	150	120	100	50
100	60	2.1	70	70	60	270	160	110	47μH	47μH	47μH
1000	25	24	1000μH	100μH	100μH	100μH	65	100μH	—	—	—

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PART NUMBERS

●CB2012 TYPE

Ordering code	EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] min.	Resistance DC [Ω] (±30%)	Rated current [mA]		Measuring frequency [MHz]
						Saturation current Idc1	Temperature rise current Idc2	
CB 2012T1R0M	RoHS	1.0	±20%	100	0.15	500	900	7.96
CB 2012T2R2M	RoHS	2.2		80	0.23	410	770	
CB 2012T3R3M	RoHS	3.3		55	0.30	330	650	
CB 2012T4R7M	RoHS	4.7		45	0.40	300	580	
CB 2012T6R8M	RoHS	6.8		38	0.47	250	540	
CB 2012T100□	RoHS	10	±10% ±20%	32	0.70	190	440	2.52
CB 2012T100□R	RoHS	10		32	0.50	200	520	
CB 2012T150□	RoHS	15		28	1.3	170	320	
CB 2012T220□	RoHS	22		16	1.7	135	280	
CB 2012T470□	RoHS	47		11	3.7	90	190	
CB 2012T680□	RoHS	68		10	6.0	70	140	
CB 2012T101□	RoHS	100		8	7.0	60	130	

●CB2016 TYPE

Ordering code	EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] min.	Resistance DC [Ω] (±30%)	Rated current [mA]		Measuring frequency [MHz]
						Saturation current Idc1	Temperature rise current Idc2	
CB 2016T1R0M	RoHS	1.0	±20%	100	0.09	600	1100	7.96
CB 2016T1R5M	RoHS	1.5		80	0.11	550	1000	
CB 2016T2R2M	RoHS	2.2		70	0.13	510	1000	
CB 2016T3R3M	RoHS	3.3		55	0.20	400	800	
CB 2016T4R7M	RoHS	4.7		45	0.25	340	740	
CB 2016T6R8M	RoHS	6.8	38	0.35	300	600	2.52	
CB 2016T100□	RoHS	10	32	0.50	250	520		
CB 2016T150□	RoHS	15	28	0.70	210	440		
CB 2016T220□	RoHS	22	16	1.0	165	370		
CB 2016T330□	RoHS	33	14	1.7	130	270		
CB 2016T470□	RoHS	47	11	2.4	110	240		
CB 2016T680□	RoHS	68	10	3.0	90	210		
CB 2016T101□	RoHS	100	8	4.5	70	170		
								0.796

●CB2518 TYPE

Ordering code	EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] min.	Resistance DC [Ω] (±30%)	Rated current [mA]		Measuring frequency [MHz]
						Saturation current Idc1	Temperature rise current Idc2	
CB 2518T1R0M	RoHS	1.0	±20%	100	0.06	1200	1500	7.96
CB 2518T1R5M	RoHS	1.5		80	0.07	650	1400	
CB 2518T2R2M	RoHS	2.2		68	0.09	510	1300	
CB 2518T3R3M	RoHS	3.3		54	0.11	440	1200	
CB 2518T4R7MR	RoHS	4.7		46	0.10	310	1200	
CB 2518T4R7M	RoHS	4.7	46	0.13	340	1100	2.52	
CB 2518T6R8M	RoHS	6.8	38	0.15	270	930		
CB 2518T100□	RoHS	10	30	0.25	250	820		
CB 2518T150□	RoHS	15	23	0.32	180	650		
CB 2518T220□	RoHS	22	19	0.50	165	580		
CB 2518T330□	RoHS	33	15	0.70	130	460		
CB 2518T470□	RoHS	47	12	0.95	110	420		
CB 2518T680□	RoHS	68	9.5	1.5	70	310		
CB 2518T101□	RoHS	100	9.0	2.1	60	260	0.796	
CB 2518T151□	RoHS	150	7.0	3.2	55	210		
CB 2518T221□	RoHS	220	5.5	4.5	50	180		
CB 2518T331□	RoHS	330	4.5	7.0	40	140		
CB 2518T471□	RoHS	470	3.5	10	35	120		
CB 2518T681□	RoHS	680	3.0	17	30	90		
CB 2518T102□	RoHS	1000	2.4	24	25	75		

●CBC2012 TYPE

Ordering code	EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] min.	Resistance DC [Ω] (±30%)	Rated current [mA]		Measuring frequency [MHz]
						Saturation current Idc1	Temperature rise current Idc2	
CB C2012T1R0M	RoHS	1.0	±20%	100	0.19	700	840	7.96
CB C2012T2R2M	RoHS	2.2		70	0.33	530	640	
CB C2012T4R7M	RoHS	4.7		45	0.50	360	520	
CB C2012T100□	RoHS	10	±10% ±20%	40	1.2	240	340	2.52
CB C2012T220□	RoHS	22		16	3.7	170	190	
CB C2012T470□	RoHS	47		11	5.8	120	150	

□Please specify the Inductance tolerance code(Kor M)

- ※) The saturation current value(Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)
- ※) The temperature rise current value(Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)
- ※) The maximum rated current is the DC current value that satisfies both of DC saturation current value and temperature rise current value.

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PART NUMBERS

●CBC2016 TYPE

Ordering code	EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] min.	Resistance DC [Ω] (±30%)	Rated current [mA]		Measuring frequency [MHz]
						Saturation current I _{dc1}	Temperature rise current I _{dc2}	
CB C2016T1R0M	RoHS	1.0	±20%	100	0.10	1100	1100	7.96
CB C2016T1R5M	RoHS	1.5		80	0.15	1000	1000	
CB C2016T2R2M	RoHS	2.2		70	0.20	750	720	
CB C2016T3R3M	RoHS	3.3		55	0.27	600	610	
CB C2016T4R7M	RoHS	4.7		45	0.37	550	530	
CB C2016T6R8M	RoHS	6.8	±10% ±20%	38	0.59	450	450	2.52
CB C2016T100□	RoHS	10		32	0.82	380	350	
CB C2016T150□	RoHS	15		28	1.2	300	300	
CB C2016T220□	RoHS	22		16	1.8	250	240	
CB C2016T330□	RoHS	33		14	2.8	220	220	
CB C2016T470□	RoHS	47		11	4.3	150	150	
CB C2016T680□	RoHS	68		10	7.0	130	130	
CB C2016T101□	RoHS	100		8	8.0	110	110	

●CBC2518 TYPE

Ordering code	EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] min.	Resistance DC [Ω] (±30%)	Rated current [mA]		Measuring frequency [MHz]
						Saturation current I _{dc1}	Temperature rise current I _{dc2}	
CB C2518T1R0M	RoHS	1.0	±20%	100	0.08	1000	1200	7.96
CB C2518T1R5M	RoHS	1.5		80	0.11	950	1190	
CB C2518T2R2M	RoHS	2.2		68	0.13	890	1100	
CB C2518T3R3M	RoHS	3.3		54	0.16	730	1020	
CB C2518T4R7M	RoHS	4.7		41	0.20	680	920	
CB C2518T6R8M	RoHS	6.8	±10% ±20%	38	0.30	550	740	2.52
CB C2518T100□	RoHS	10		30	0.36	480	680	
CB C2518T150□	RoHS	15		23	0.65	350	500	
CB C2518T220□	RoHS	22		19	0.77	320	460	
CB C2518T330□	RoHS	33		15	1.5	270	320	
CB C2518T470□	RoHS	47		12	1.9	240	290	
CB C2518T680□	RoHS	68		9.5	2.8	200	200	
CB C2518T101□	RoHS	100		9.0	3.7	160	170	
CB C2518T151□	RoHS	150	7.0	6.1	140	130	0.796	
CB C2518T221□	RoHS	220	5.5	8.4	115	110		
CB C2518T331□	RoHS	330	4.5	12.3	100	90		
CB C2518T471□	RoHS	470	3.5	22	80	70		
CB C2518T681□	RoHS	680		3.0	28	65	60	

●CBC3225 TYPE

Ordering code	EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] min.	Resistance DC [Ω] (±30%)	Rated current [mA]		Measuring frequency [MHz]
						Saturation current I _{dc1}	Temperature rise current I _{dc2}	
CB C3225T1R0MR	RoHS	1.0	±20%	250	0.055	2000	1440	0.1
CB C3225T1R5MR	RoHS	1.5		220	0.06	2000	1310	
CB C3225T2R2MR	RoHS	2.2		190	0.08	2000	1130	
CB C3225T3R3MR	RoHS	3.3		160	0.095	2000	1040	
CB C3225T4R7MR	RoHS	4.7		70	0.10	1250	1010	
CB C3225T6R8MR	RoHS	6.8	±10% ±20%	50	0.12	950	940	
CB C3225T100□R	RoHS	10		23	0.133	900	900	
CB C3225T150□R	RoHS	15		20	0.195	730	850	
CB C3225T220□R	RoHS	22		17	0.27	620	780	
CB C3225T330□R	RoHS	33		13	0.41	500	570	
CB C3225T470□R	RoHS	47		10	0.67	390	480	
CB C3225T680□R	RoHS	68		8	1.0	320	410	
CB C3225T101□R	RoHS	100		6	1.4	270	340	

●CBL2012 TYPE

Ordering code	EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] min.	Resistance DC [Ω] (±30%)	Rated current [mA]		Measuring frequency [MHz]
						Saturation current I _{dc1}	Temperature rise current I _{dc2}	
CB L2012T1R0M	RoHS	1.0	±20%	100	0.15	620	950	0.1
CB L2012T2R2M	RoHS	2.2		80	0.39	440	590	
CB L2012T4R7M	RoHS	4.7		45	0.66	275	490	
CB L2012T100M	RoHS	10		32	1.0	205	370	
CB L2012T220M	RoHS	22		23	2.1	150	250	
CB L2012T470M	RoHS	47		11	4.2	100	140	

□ Please specify the Inductance tolerance code (K or M)

※) The saturation current value (I_{dc1}) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (I_{dc2}) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The maximum rated current is the DC current value that satisfies both of DC saturation current value and temperature rise current value.

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■ PART NUMBERS

● CBMF1608 TYPE

Ordering code	EHS (Environmental Hazardous Substances)	Inductance (μ H)	Inductance Tolerance	Self-resonant frequency (MHz) min.	Resistance DC [Ω] (\pm 30%)	Rated current (mA)		Measuring frequency [MHz]
						Saturation current Idc1	Temperature rise current Idc2	
CBMF1608T1R0M	RoHS	1.0	\pm 20%	100	0.09	290	770	7.96
CBMF1608T2R2M	RoHS	2.2		80	0.17	190	560	
CBMF1608T3R3M	RoHS	3.3		60	0.22	170	500	
CBMF1608T4R7M	RoHS	4.7		45	0.24	145	470	
CBMF1608T100□	RoHS	10.0	\pm 10% \pm 20%	32	0.36	115	380	2.52
CBMF1608T220□	RoHS	22		16	1.0	70	230	
CBMF1608T470□	RoHS	47		11	2.5	50	140	

□ Please specify the Inductance tolerance code (K or M)

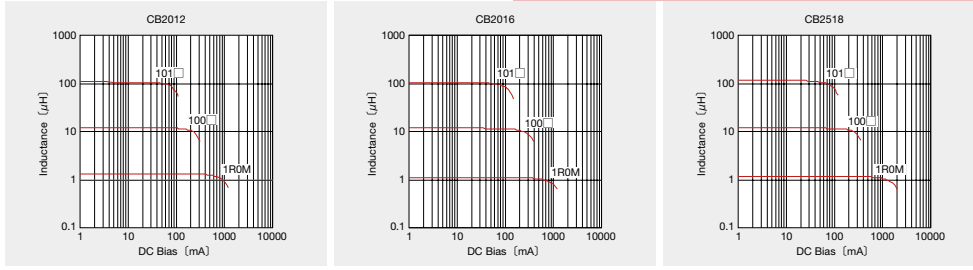
- ※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)
- ※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)
- ※) The maximum rated current is the DC current value that satisfies both of DC saturation current value and temperature rise current value.

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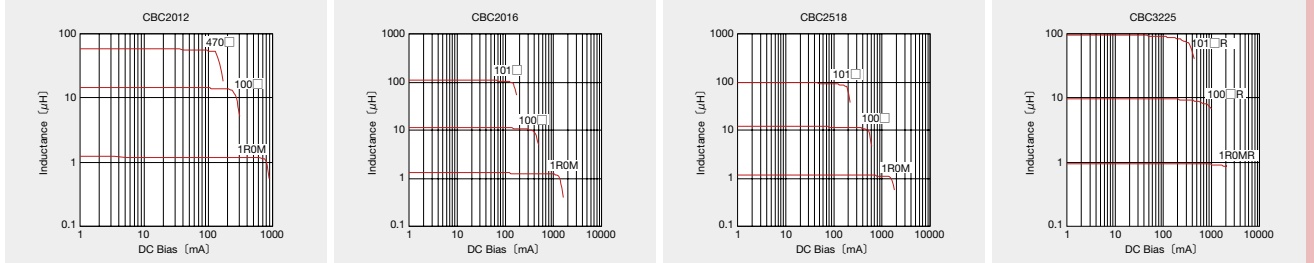
ELECTRICAL CHARACTERISTICS

DC Bias characteristics Measured by HP4285A+42841A

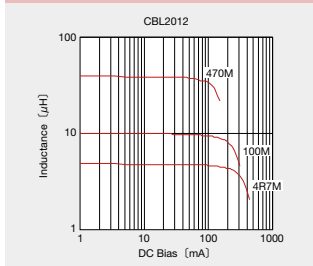
Low Rdc Type



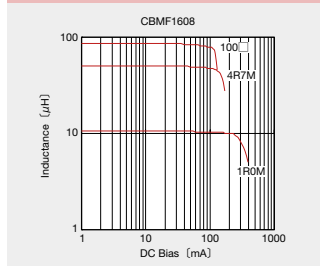
High Current Type



Low Profile Type

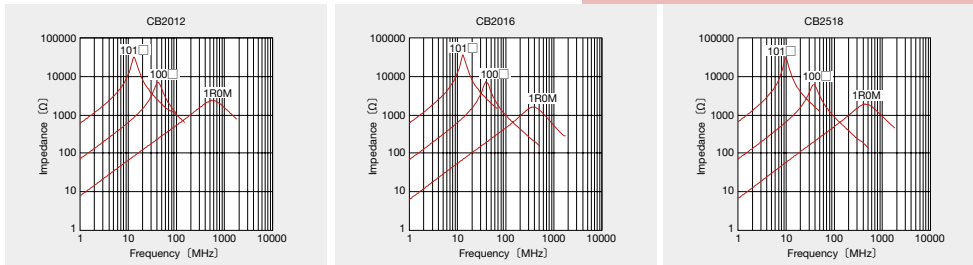


Bottom-surface electrode Type

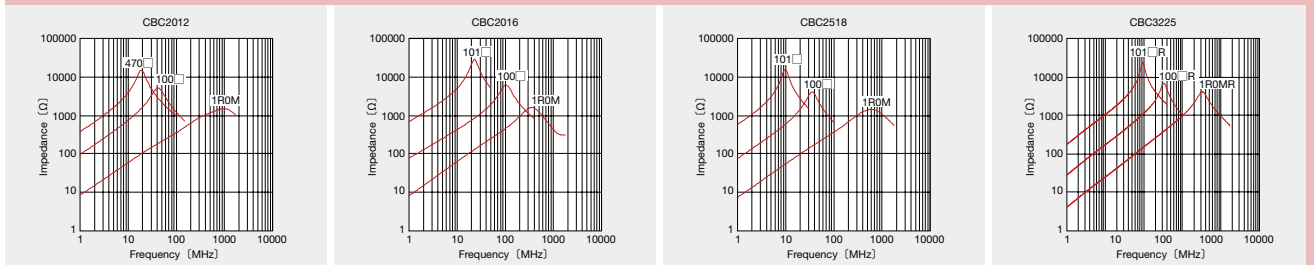


Impedance-vs-Frequency characteristics Measured by HP4291A

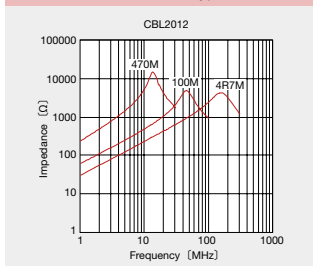
Low Rdc Type



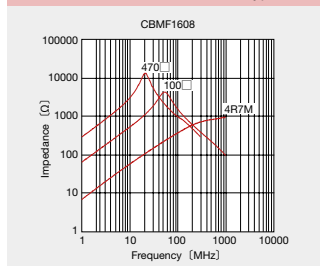
High Current Type



Low Profile Type



Bottom-surface electrode Type



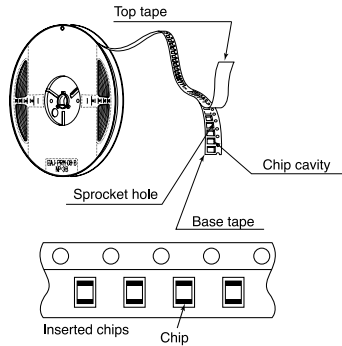
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① Minimum Quantity

Type	Standard Quantity [pcs]	
	Papar Tape	Embossed Tape
LBC3225/CBC3225	—	1000
LB3218	—	2000
LBR2518/LBC2518/LB251/CB2518/CBC2518/LEM2520	—	2000
LBM2016/LBC2016/LB2016/CB2016/CBC2016	—	2000
LB2012/LBC2012/LBR202/CB2012/CBC2012	—	3000
CBL2012	4000	—
LB1608	4000	—
LBMF1608/CBMF1608	—	3000

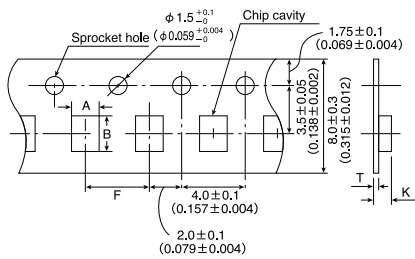
② Tape material

- Embossed tape



③ Taping Dimensions

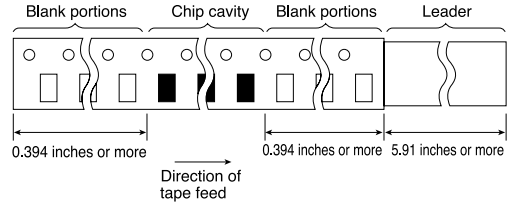
- Embossed Tape (0.315 inches wide)
- Card board carrier tape (0.315 inches wide)



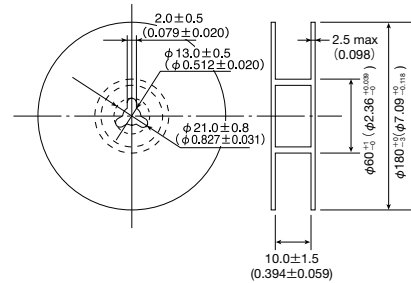
Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B		T	K
LBM 2016	1.75 ± 0.1 (0.069 ± 0.004)	2.1 ± 0.1 (0.083 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	0.3 ± 0.05 (0.012 ± 0.002)	1.9max. (0.074)
LEM 2520	2.3 ± 0.1 (0.091 ± 0.004)	2.7 ± 0.1 (0.106 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	0.3 ± 0.05 (0.012 ± 0.002)	2.1 ± 0.1 (0.083 ± 0.004)
LBC3225/ CBC3225	2.8 ± 0.1 (0.110 ± 0.004)	3.5 ± 0.1 (0.138 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	0.3 ± 0.05 (0.012 ± 0.002)	4.0max. (0.157)
LB3218	2.1 ± 0.1 (0.084 ± 0.004)	3.5 ± 0.1 (0.014 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	0.3 ± 0.05 (0.012 ± 0.002)	2.2max. (0.086)
LB2518 / CB2518 LBC2518 / CBC2518 LBR2518	2.15 ± 0.1 (0.085 ± 0.004)	2.7 ± 0.1 (0.107 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	0.3 ± 0.05 (0.012 ± 0.002)	2.2max. (0.086)
LB2016/ CB2016 LBC2016 / CBC2016	1.75 ± 0.1 (0.069 ± 0.004)	2.1 ± 0.1 (0.083 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	0.3 ± 0.05 (0.012 ± 0.002)	1.9max. (0.074)
LB2012 / CB2012 LBC2012 / CBC2012 LBR2012	1.45 ± 0.1 (0.058 ± 0.004)	2.25 ± 0.1 (0.09 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	0.25 ± 0.05 (0.010 ± 0.002)	1.45max. (0.057)
CBL2012	1.55 ± 0.1 (0.061 ± 0.004)	2.3 ± 0.1 (0.091 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	1.1max. (0.044)	1.1max. (0.044)
LB1608	1.0 ± 0.1 (0.059 ± 0.004)	1.8 ± 0.1 (0.072 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	1.1max. (0.044)	1.1max. (0.044)
LBMF1608 / CBMF1608	1.1 ± 0.1 (0.04 ± 0.004)	1.9 ± 0.1 (0.076 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	0.25 ± 0.05 (0.010 ± 0.002)	1.2max. (0.047)

Unit : mm (inch)

④ Leader and Blank Portion

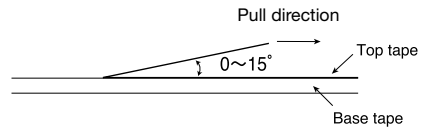


⑤ Reel Size



⑥ Top Tape Strength

The top tape requires a peel-off force 0.1 to 0.7N in the direction of the arrow as illustrated below.



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RELIABILITY DATA

1. Operating temperature Range						
LEM2520						-40~+85°C
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608	-25~+105°C (Including self-generated heat)
LBC3225	LBC2518	LBC2016	LBC2012			
LBR2518	LBR2012					
CB2518	CB2016	CB2012				
CBC3225	CBC2518	CBC2016	CBC2012			
CBL2012						
CBMF1608						
LBM2016						

2. Storage						
LEM2520						-40~+85°C
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608	
LBC3225	LBC2518	LBC2016	LBC2012			
LBR2518	LBR2012					
CB2518	CB2016	CB2012				
CBC3225	CBC2518	CBC2016	CBC2012			
CBL2012						
CBMF1608						
LBM2016						

3. Rated Current						
LEM2520						Within the specified tolerance
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608	
LBC3225	LBC2518	LBC2016	LBC2012			
LBR2518	LBR2012					
CB2518	CB2016	CB2012				
CBC3225	CBC2518	CBC2016	CBC2012			
CBL2012						
CBMF1608						
LBM2016						

【Test Methods and Remarks】

LEM Series The maximum DC value having inductance decrease within 10% and temperature increase within 20°C by the application of DC bias.

4. Inductance						
LEM2520						Within the specified tolerance
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608	
LBC3225	LBC2518	LBC2016	LBC2012			
LBR2518	LBR2012					
CB2518	CB2016	CB2012				
CBC3225	CBC2518	CBC2016	CBC2012			
CBL2012						
CBMF1608						
LBM2016						

【Test Methods and Remarks】

LEM Series R12~101

Measuring equipment : LCR Meter (HP4285A+42851A or its equivalent)

Measuring frequency : Specified frequency

LB · LBC · LBR · CB · CBC · CBL · LBMF · CBMF · LBM Series

Measuring equipment : LCR Meter (HP4285A or its equivalent)

5. Q						
LEM2520						Within the specified tolerance
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608	Within the specified tolerance
LBC3225	LBC2518	LBC2016	LBC2012			
LBR2518	LBR2012					
CB2518	CB2016	CB2012				
CBC3225	CBC2518	CBC2016	CBC2012			
CBL2012						
CBMF1608						
LBM2016						

【Test Methods and Remarks】

LEM Series R12~101 Measuring equipment : LCR Meter (HP4285A+42851A or its equivalent)

Measuring frequency : Specified frequency

LBM Series Measuring equipment : LCR Meter (HP4285A or its equivalent)

6. DC Resistance						
LEM2520						Within the specified tolerance
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608	
LBC3225	LBC2518	LBC2016	LBC2012			
LBR2518	LBR2012					
CB2518	CB2016	CB2012				
CBC3225	CBC2518	CBC2016	CBC2012			
CBL2012						
CBMF1608						
LBM2016						

【Test Methods and Remarks】

LEM · LB · LBC · LBR · CB · CBC · CBL · LBM · LBMF · CBMF Series Measuring equipment : DC Ohmmeter (HIOKI 3227 or its equivalent)

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RELIABILITY DATA

7. Self-Resonant Frequency

LEM2520						Within the specified tolerance
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608	
LBC3225	LBC2518	LBC2016	LBC2012			
LBR2518	LBR2012					
CB2518	CB2016	CB2012				
CBC3225	CBC2518	CBC2016	CBC2012			
CBL2012						
CBMF1608						
LBM2016						

[Test Methods and Remarks]

LEM2520 Measuring equipment : Impedance analyzer (HP4291A or its equivalent)
 LB · LBC · LBR · CB · CBC · CBL · LBMF · CBMF Series Measuring equipment : Impedance analyzer (HP4291A or its equivalent)
 LBM Series Measuring equipment : Network analyzer (HP8720B or its equivalent)

8. Temperature Characteristic

LEM2520						Inductance change: Within ±5%
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608	Inductance change: Within ±15% LBMF1608 · LB3218 Inductance change: Within ±20%
LBC3225	LBC2518	LBC2016	LBC2012			LBC3225 · LBC2518 · LBC2016 Inductance change: Within ±20% LBC2012 Inductance change: Within ±30%
LBR2518	LBR2012					Inductance change: Within ±15%
CB2518	CB2016	CB2012				Inductance change: Within ±15%
CBC3225	CBC2518	CBC2016	CBC2012			CBC3225 · CBC2518 · CBC2016 Inductance change: Within ±20% CBC2012 Inductance change: Within ±30%
CBL2012						Inductance change: Within ±15%
CBMF1608						Inductance change: Within ±20%
LBM2016						Inductance change: Within ±5%

[Test Methods and Remarks]

Change of maximum inductance deviation in step 1-5

Step	1	2	3	4	5
Temperature (°C)	20	-25	20 (Reference temperature)	+85 (Maximum operating temperature)	20

9. Resistance to Flexure of Substrate

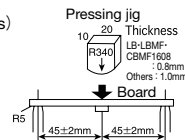
LEM2520						No damage.
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608	
LBC3225	LBC2518	LBC2016	LBC2012			
LBR2518	LBR2012					
CB2518	CB2016	CB2012				
CBC3225	CBC2518	CBC2016	CBC2012			
CBL2012						
CBMF1608						
LBM2016						

[Test Methods and Remarks]

Warp : 2mm (LB · LBC · LBR · CB · CBC · CBL · LBM · LBMF · CBMF Series)
 3mm (LEM2520)

Test substrate: Printed board

According to JIS C0051



10. Body Strength

LEM2520						No damage.
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608	
LBC3225	LBC2518	LBC2016	LBC2012			
LBR2518	LBR2012					
CB2518	CB2016	CB2012				
CBC3225	CBC2518	CBC2016	CBC2012			
CBL2012						
CBMF1608						
LBM2016						

[Test Methods and Remarks]

LB · LBC · LBR · CB · CBC · CBL · LBM · LEM2520 Applied force : 10N

Duration : 10sec.

LB1608 · LBMF1608 · CBMF1608 Applied force : 5N

Duration : 10sec.

11. Self Resonant Frequency

LEM2520						Inductance change : Within—10%
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608	
LBC3225	LBC2518	LBC2016	LBC2012			
LBR2518	LBR2012					
CB2518	CB2016	CB2012				
CBC3225	CBC2518	CBC2016	CBC2012			
CBL2012						
CBMF1608						
LBM2016						

[Test Methods and Remarks]

Measure inductance with application of rated current using LCR metre to compare it with the initial value.

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RELIABILITY DATA

12. Adhesion of terminal electrode					
LEM2520					
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608
LBC3225	LBC2518	LBC2016	LBC2012		
LBR2518	LBR2012				
CB2518	CB2016	CB2012			
CBC3225	CBC2518	CBC2016	CBC2012		
CBL2012					
CBMF1608					
LBM2016					

No abnormality.

[Test Methods and Remarks]

LB · LBC · LBR · CB · CBC · CBL · LBM · LBMF · CBF · LEM2520 Applied force : 10N to X and Y directions
 Duration : 5 sec.
 Test substrate : Printed board

LB1608 · CBF1608 · LBMF1608 Applied force : 5N to X and Y directions
 Duration : 5 sec.
 Test substrate : Printed board

13. Resistance to vibration					
LEM2520					
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608
LBC3225	LBC2518	LBC2016	LBC2012		
LBR2518	LBR2012				
CB2518	CB2016	CB2012			
CBC3225	CBC2518	CBC2016	CBC2012		
CBL2012					
CBMF1608					
LBM2016					

Inductance change: Within ±5% No significant abnormality in appearance.

Inductance change: Within ±10% No significant abnormality in appearance.

Inductance change: Within ±5% No significant abnormality in appearance.

[Test Methods and Remarks]

LEM · LB · LBC · LBR · CB · CBC · CBL · LBM · LBMF · CBF : According to JIS C5102 clause 8.2.
 Vibration type : A
 Directions : 2 hrs each in X, Y and Z directions. Total : 6 hrs
 Frequency range : 10 to 55 to 10 Hz (1min.)
 Amplitude : 1.5mm
 Mounting method : Soldering onto printed board
 Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.
 LEM : Recovery
 At least 1 hr of recovery under the standard condition after the test, followed by the measurement within 2 hrs.

14. Drop test					
LEM2520					
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608
LBC3225	LBC2518	LBC2016	LBC2012		
LBR2518	LBR2012				
CB2518	CB2016	CB2012			
CBC3225	CBC2518	CBC2016	CBC2012		
CBL2012					
CBMF1608					
LBM2016					

Inductance change: Within ±5% No significant abnormality in appearance.

[Test Methods and Remarks]

LEM :
 Acceleration : 980m/sec²
 Duration : 6msec
 Number of times : 6 sides × 3 times
 Mounting method : Soldering onto printed board
 Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.
 LEM : Recovery
 At least 1 hr of recovery under the standard condition after the test, followed by the measurement within 2 hrs.

15. Solderability					
LEM2520					
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608
LBC3225	LBC2518	LBC2016	LBC2012		
LBR2518	LBR2012				
CB2518	CB2016	CB2012			
CBC3225	CBC2518	CBC2016	CBC2012		
CBL2012					
CBMF1608					
LBM2016					

At least 90% of surface of terminal electrode is covered by new

[Test Methods and Remarks]

LEM :
 Solder temperature : 230±5°C
 Duration : 5±0.5sec.
 Flux : Methanol solution with 25% of colophony

LB · LBC · LBR · CB · CBC · CBL · LBM · LBMF · CBF :
 Solder temperature : 245±5°C
 Duration : 5±0.5sec
 Flux : Methanol solution with 25% of colophony

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RELIABILITY DATA

16. Resistance to soldering heat							
LEM2520							No significant abnormality in appearance.
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608		LB3218, LB2518, LB2016, LB2012, LB1608 Inductance change: Within $\pm 10\%$ No significant abnormality in appearance. LBMF1608 Inductance change: Within $\pm 20\%$ No significant abnormality in appearance.
LBC3225	LBC2518	LBC2016	LBC2012				Inductance change: Within $\pm 10\%$ No significant abnormality in appearance.
LBR2518	LBR2012						
CB2518	CB2016	CB2012					
CBC3225	CBC2518	CBC2016	CBC2012				
CBL2012							
CBMF1608							Inductance change: Within $\pm 20\%$ No significant abnormality in appearance.
LBM2016							Inductance change: Within $\pm 5\%$ No significant abnormality in appearance.

[Test Methods and Remarks]

LEM :

Reflow condition 3 times of reflow over at $220 \pm 5^\circ\text{C}$ for 40sec. MAX, With Peak temperature at $240 \pm 5^\circ\text{C}$ for 5 sec. MAX. (Refer to a Profile of chart below.)

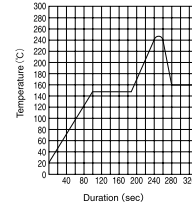
Flow condition

Solder temperature : $260 \pm 5^\circ\text{C}$

Duration : 10 ± 1 sec. Once

LB · LBC · LBR · CB · CBC · CBL · LBM · LBMF · CBMF :

3 times of reflow oven at 230°C MIN for 40sec. with peak temperature at 260°C for 5sec.



17. Resistance to solvent							
LEM2520							No significant abnormality in appearance
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608		
LBC3225	LBC2518	LBC2016	LBC2012				
LBR2518	LBR2012						
CB2518	CB2016	CB2012					
CBC3225	CBC2518	CBC2016	CBC2012				
CBL2012							
CBMF1608							
LBM2016							

[Test Methods and Remarks]

Solvent temperature : Room temperature

Type of solvent : Isopropyl alcohol

(LEM2520 · LB · LBC · LBR · CB · CBC · CBL · LBM · LBMF · CBMF)

Cleaning conditions : 90s. Immersion and cleaning.

(LEM2520 · LB · LBC · LBR · CB · CBC · CBL · LBM · LBMF · CBMF)

18. Thermal shock							
LEM2520							Inductance change : Within $\pm 10\%$ Q → R12~4R7 : 30 min. 5R6~330 : 25 min. 390~820 : 20 min. 101 : 15 min.
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608		Inductance change: Within $\pm 10\%$ No significant abnormality in appearance.
LBC3225	LBC2518	LBC2016	LBC2012				
LBR2518	LBR2012						
CB2518	CB2016	CB2012					
CBC3225	CBC2518	CBC2016	CBC2012				
CBL2012							
CBMF1608							
LBM2016							

[Test Methods and Remarks]

LEM : Conditions for 1cycle

Step	Temperature (°C)	Duration (min)
1	-40	30
2	+85	30

Number of cycle : 100 cycle

Recovery : At least 1 hr of recovery under the standard condition after the test, followed by the measurement within 2 hrs.

LB · LBC · LBR · CB · CBC · CBL · LBM · LBMF · CBMF : $-40 \sim +85^\circ\text{C}$, maintain times 30min., 100 cycle

Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.

19. Damp heat							
LEM2520							Inductance change : Within $\pm 10\%$ Q → R12~4R7 : 30 min. 5R6~330 : 25 min. 390~820 : 20 min. 101 : 15 min.
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608		Inductance change: Within $\pm 10\%$ No significant abnormality in appearance.
LBC3225	LBC2518	LBC2016	LBC2012				
LBR2518	LBR2012						
CB2518	CB2016	CB2012					
CBC3225	CBC2518	CBC2016	CBC2012				
CBL2012							
CBMF1608							
LBM2016							

[Test Methods and Remarks]

Temperature : $60 \pm 2^\circ\text{C}$

Humidity : 90~95%RH

Duration : 1000 hrs

Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.

LEM : Recovery

At least 1 hr of recovery under the standard condition after the test, followed by the measurement within 2 hrs.

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RELIABILITY DATA

20.Loading under damp heat

LEM2520						Inductance change :Within±10% Q→ R12~4R7 : 30 min. 5R6~330 : 25 min. 390~820 : 20 min. 101 : 15 min.	
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608	Inductance change:Within±10% No significant abnormality in appearance.	
LBC3225	LBC2518	LBC2016	LBC2012				
LBR2518	LBR2012						
CB2518	CB2016	CB2012					
CBC3225	CBC2518	CBC2016	CBC2012				
CBL2012							
CBMF1608							
LBM2016							
[Test Methods and Remarks] LEM·LB·LBC·LBR·CB·CBC·CBL·LBM·LBMF·CBMF : Temperature : 60±2°C Humidity : 90~95%RH Duration : 1000 hrs Applied current : Rated current Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs. LEM : Recovery At least 1 hr of recovery under the standard condition after the test, followed by the measurement within 2 hrs.							

21.High temperature life test

LEM2520						Inductance change :Within±10% Q→ R12~4R7 : 30 min. 5R6~330 : 25 min. 390~820 : 20 min. 101 : 15 min.	
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608	Inductance change:Within±10% No significant abnormality in appearance.	
LBC3225	LBC2518	LBC2016	LBC2012				
LBR2518	LBR2012						
CB2518	CB2016	CB2012					
CBC3225	CBC2518	CBC2016	CBC2012				
CBL2012							
CBMF1608							
LBM2016							
[Test Methods and Remarks] LEM·CB·CBC·CBL·LBM·CBMF : Temperature : 85±2°C Duration : 1000 hrs Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs. LEM : Recovery At least 1 hr of recovery under the standard condition after the test, followed by the measurement within 2 hrs.							

22.Loading at high temperature

LEM2520							
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608	Inductance change:Within±10% No significant abnormality in appearance.	
LBC3225	LBC2518	LBC2016	LBC2012				
LBR2518	LBR2012						
CB2518	CB2016	CB2012					
CBC3225	CBC2518	CBC2016	CBC2012				
CBL2012							
CBMF1608							
LBM2016							
[Test Methods and Remarks] LB·LBC·LBR·LBMF : Temperature : 85±2°C Duration : 1000 hrs Applied current : Rated current Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.							

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RELIABILITY DATA

23. Low temperature life test

LEM2520						Inductance change :Within±10% Q→ R12~4R7 : 30 min. 5R6~330 : 25 min. 390~820 : 20 min. 101 : 15 min.
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608	Inductance change:Within±10% No significant abnormality in appearance.
LBC3225	LBC2518	LBC2016	LBC2012			
LBR2518	LBR2012					
CB2518	CB2016	CB2012				
CBC3225	CBC2518	CBC2016	CBC2012			
CBL2012						
CBMF1608						
LBM2016						

[Test Methods and Remarks]

LEM · LB · LBC · LBR · CB · CBC · CBL · LBM · LBMF · CBF

Temperature : -40±2℃

Duration : 1000 hrs

Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.

LEM : Recovery

At least 1 hr of recovery under the standard condition after the test, followed by the measurement within 2 hrs.

24. Standard condition

LEM2520						Standard test conditions Unless specified, Ambient temperature is 20±15℃ and the Relative humidity is 65±20%. If there is any doubt about the test results, further measurement shall be had within the following limits: Ambient Temperature: 20±2℃ Relative humidity: 65±5% Inductance value is based on our standard measurement systems.
LB3218	LB2518	LB2016	LB2012	LB1608	LBMF1608	
LBC3225	LBC2518	LBC2016	LBC2012			
LBR2518	LBR2012					
CB2518	CB2016	CB2012				
CBC3225	CBC2518	CBC2016	CBC2012			
CBL2012						
CBMF1608						
LBM2016						

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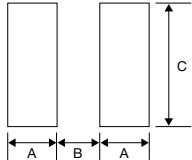
PRECAUTIONS

LEM Type, LB Type, CB Type

1. Circuit Design

Precautions	<p>◆Operating environment</p> <p>1. The products described in this specification are intended for use in general electronic equipment,(office supply equipment, telecommunications systems, measuring equipment, and household equipment). They are not intended for use in mission-critical equipment or systems requiring special quality and high reliability (traffic systems, safety equipment, aerospace systems, nuclear control systems and medical equipment including life-support systems,) where product failure might result in loss of life, injury or damage. For such uses, contact TAIYO YUDEN Sales Department in advance.</p>
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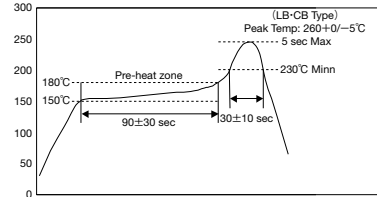
2. PCB Design

Precautions	<p>◆Land pattern design</p> <p>1. Please contact any of our offices for a land pattern, and refer to a recommended land pattern of a right figure or specifications.</p>																																								
Technical considerations	<p>PRECAUTIONS [Recommended Land Patterns] Surface Mounting</p> <ul style="list-style-type: none"> Mounting and soldering conditions should be checked beforehand. Applicable soldering process to those products is reflow soldering only. Recommended Land Patterns  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="4">Unit : mm</th> </tr> <tr> <th>TYPE</th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>1608</td> <td>0.55</td> <td>0.7</td> <td>1.0</td> </tr> <tr> <td>MF1608</td> <td>0.55</td> <td>0.8</td> <td>0.9</td> </tr> <tr> <td>2012</td> <td>0.7</td> <td>0.8</td> <td>1.45</td> </tr> <tr> <td>2016</td> <td>0.7</td> <td>0.8</td> <td>1.8</td> </tr> <tr> <td>2518</td> <td>0.8</td> <td>1.2</td> <td>2.0</td> </tr> <tr> <td>LEM2520</td> <td>0.9</td> <td>1.5</td> <td>1.5</td> </tr> <tr> <td>3218</td> <td>1.0</td> <td>1.6</td> <td>2.0</td> </tr> <tr> <td>3225</td> <td>1.0</td> <td>1.6</td> <td>2.7</td> </tr> </tbody> </table>	Unit : mm				TYPE	A	B	C	1608	0.55	0.7	1.0	MF1608	0.55	0.8	0.9	2012	0.7	0.8	1.45	2016	0.7	0.8	1.8	2518	0.8	1.2	2.0	LEM2520	0.9	1.5	1.5	3218	1.0	1.6	2.0	3225	1.0	1.6	2.7
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3. Considerations for automatic placement

Precautions	<p>◆Adjustment of mounting machine</p> <p>1. Excessive impact load should not be imposed on the products when mounting onto the PC boards.</p> <p>2. Mounting and soldering conditions should be checked beforehand.</p>
Technical considerations	<p>1. When installing products, care should be taken not to apply distortion stress as it may deform the products.</p>

4. Soldering

Precautions	<p>◆Wave soldering (LEM Type only)</p> <p>1. For wave soldering, please apply conditions meeting the range of the specified conditions in our catalog or the relevant specifications.</p> <p>◆Reflow soldering (LB and CB Types)</p> <p>1. For reflow soldering with either leaded or lead-free solder, the profile specified in "point for controlling" is recommended.</p> <p>◆Reflow soldering (LEM)</p> <p>1. For reflow soldering, please apply conditions meeting the range of the specified conditions in our catalog or the relevant specifications.</p> <p>◆Recommended conditions for using a soldering iron</p> <p>1. Put the soldering iron on the land-pattern. Soldering iron's temperature-Below 350°C Duration-3 seconds or less. The soldering iron should not come in contact with inductor directly.</p>
Technical considerations	<p>◆Wave soldering (LEM Type only)</p> <p>1. Components can be damaged by excessive heat where soldering conditions exceed the specified range.</p> <p>◆Reflow soldering (LB and CB Types)</p> <p>1. Reflow profile</p>  <p>◆Recommended conditions for using a soldering iron</p> <p>1. Components can be damaged by excessive heat where soldering conditions exceed the specified range.</p>

5. Cleaning

Precautions	<p>◆Cleaning conditions</p> <p>1. LEM Type, LB Type, CB Type Washing by supersonic waves shall be avoided.</p>
Technical considerations	<p>◆Cleaning conditions</p> <p>1. LEM Type, LB Type, CB Type If washing by supersonic waves, supersonic waves may cause broken products.</p>

6. Handling

Precautions	<p>◆Handling</p> <p>1. Keep the inductors away from all magnets and magnetic objects.</p> <p>◆Breakaway PC boards (splitting along perforations)</p> <p>1. When splitting the PC board after mounting inductors, care should be taken not to give any stresses of deflection or twisting to the board.</p> <p>2. Board separation should not be done manually, but by using the appropriate devices.</p> <p>◆Mechanical considerations</p> <p>1. Please do not give the inductors any excessive mechanical shocks.</p>
Technical considerations	<p>◆Handling</p> <p>1. There is a case that a characteristic varies with magnetic influence.</p> <p>◆Breakaway PC boards (splitting along perforations)</p> <p>1. Planning pattern configurations and the position of products should be carefully performed to minimize stress.</p> <p>◆Mechanical considerations</p> <p>1. There is a case to be damaged by a mechanical shock.</p>

7. Storage conditions

Precautions	<p>◆Storage</p> <p>1. To maintain the solderability of terminal electrodes and to keep the packing material in good condition, temperature and humidity in the storage area should be controlled.</p> <ul style="list-style-type: none"> Recommended conditions Ambient temperature : 0~40°C / Humidity : Below 70% RH <p>The ambient temperature must be kept below 30°C Even under ideal storage conditions, solderability of products electrodes may decrease as time passes. For this reason, LE type inductors should be used within one year from the time of delivery.</p> <p>LB type : Should be used within 6 months from the time of delivery.</p> <p>LE type : In case of storage over 6 months, solderability shall be checked before actual usage.</p>
Technical considerations	<p>◆Storage</p> <p>1. Under a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/packaging materials may take place.</p>

* This catalog contains the typical specification only due to the limitation of space. When you consider purchase of our products, please check our specification. For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (<http://www.ty-top.com/>) or CD catalogs.