

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 2010. 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.

WOUND CHIP INDUCTORS FOR SIGNAL LINE (LB/LE SERIES M TYPE)



LB: REFLOW LE: WAVE REFLOW

FEATURES

- **LBM2016 Series**
LBM2016-Series which are the wound chip inductors for signal line propose Down sizing with High Q and narrow tolerance.
- **LEM2520 Series**
A high-quality inductor that is simple to mass-produce and conforms to the same production process and basic construction as an axial lead type inductor.

APPLICATIONS

- LBM series are suitable for the analog signal line of DSC, DVC, HDD, LCD-TV, game equipments, STB, various audio-visual equipments, various communication equipments and etc..

OPERATING TEMP.

- LBM2016 Series
- 40 ~ 105°C (Including-self-generated heat)

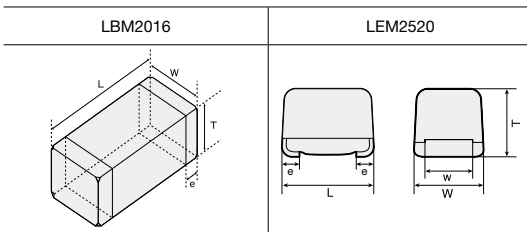
ORDERING CODE

L B M | 2 0 1 6 | T 1 0 0 | J \triangle

1 Type		2 External Dimensions (mm)		3 Packaging		4 Nominal Inductance (μ H)		5 Inductance Tolerances		6 Internal code	
LBM	Wound chip inductor for signal line	2016	2.0×1.6	T	Tape & Reel	example		J	±5%	\triangle	Standard Products
LEM	Wound chip inductor for signal line	2520	2.5×2.0			R12	0.12	K	±10%		\triangle =Blank space
						1R0	1.00				
						100	10.0				

※R=decimal point

EXTERNAL DIMENSIONS/STANDARD QUANTITY



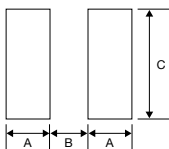
Type	L	W	T	e	W	Standard Quantity [pcs]	
						Paper Tape	Embossed Tape
LBM2016	2.0±0.2 (0.08±0.008)	1.6±0.2 (0.063±0.008)	1.6±0.2 (0.063±0.008)	0.5±0.2 (0.02±0.008)		-	2000
LEM2520	2.5±0.2 (0.098±0.008)	2.0±0.2 (0.079±0.008)	1.8±0.2 (0.071±0.008)	0.45 (0.018)	1.4±0.1 (0.055±0.004)		

Unit : mm (inch)

Recommended Land Patterns

Surface Mounting

- Mounting and soldering conditions should be checked beforehand.
- Applicable soldering process to those products is reflow soldering only. (LB only)
- Recommended Land Patterns



Unit : mm

TYPE	A	B	C
LBM2016	0.6	1.0	1.8
LEM2520	0.9	1.5	1.5

AVAILABLE INDUCTANCE RANGE

Range	Type		Type	
	LBM2016	LEM2520	LBM2016	LEM2520
Ordinary type Inductance [μ H]	I_{dc} [mA]	R_{dc} ±30% [Ω]	I_{dc} [mA]	R_{dc} max [Ω]
	0.12	610 0.13	520 0.37	
	1.0	385 0.38	245 1.10	
	10	215 1.20	155 3.50	
100	80 8.00	60 21.00		
	100 μ H		100 μ H	

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PART NUMBERS

LBM2016 TYPE

Ordering code	EHS (Environmental Hazardous Substances)	Inductance (μH)	Inductance Tolerance	Q (min.)	Self-resonant frequency (MHz) min.	Resistance DC (Ω) (±30%)	Rated current (mA) (max.)	Measuring frequency (MHz)	
LB M2016TR12J	RoHS	0.12	±5%	30	600	0.13	610	25.2	
LB M2016TR15J	RoHS	0.15			550	0.15	570		
LB M2016TR18J	RoHS	0.18			500	0.15	560		
LB M2016TR22J	RoHS	0.22			450	0.20	520		
LB M2016TR27J	RoHS	0.27			425	0.21	510		
LB M2016TR33J	RoHS	0.33			400	0.21	490		
LB M2016TR39J	RoHS	0.39			375	0.26	440		
LB M2016TR47J	RoHS	0.47			350	0.26	430		
LB M2016TR56J	RoHS	0.56			300	0.29	410		
LB M2016TR68J	RoHS	0.68			270	0.32	400		
LB M2016TR82J	RoHS	0.82			250	0.34	390		
LB M2016T1R0J	RoHS	1.0			220	0.38	385		7.96
LB M2016T1R2J	RoHS	1.2			180	0.41	370		
LB M2016T1R5J	RoHS	1.5			135	0.47	350		
LB M2016T1R8J	RoHS	1.8			100	0.48	345		
LB M2016T2R2J	RoHS	2.2		75	0.54	340			
LB M2016T2R7J	RoHS	2.7		55	0.59	310			
LB M2016T3R3J	RoHS	3.3		48	0.68	290			
LB M2016T3R9J	RoHS	3.9		43	0.74	275			
LB M2016T4R7J	RoHS	4.7		40	0.78	270			
LB M2016T5R6J	RoHS	5.6		36	0.88	255			
LB M2016T6R8J	RoHS	6.8		33	0.97	240			
LB M2016T8R2J	RoHS	8.2		30	1.10	225	2.52		
LB M2016T100J	RoHS	10		27	1.20	215			
LB M2016T120J	RoHS	12		23	1.4	200			
LB M2016T150J	RoHS	15		20	1.5	190			
LB M2016T180J	RoHS	18		18	2.5	150			
LB M2016T220J	RoHS	22		17	2.8	140			
LB M2016T270J	RoHS	27		16	3.2	130			
LB M2016T330J	RoHS	33		15	3.6	125			
LB M2016T390J	RoHS	39	14	3.9	120				
LB M2016T470J	RoHS	47	13	4.1	115				
LB M2016T560J	RoHS	56	12	5.9	95				
LB M2016T680J	RoHS	68	11	7.0	90				
LB M2016T820J	RoHS	82	10	7.7	85				
LB M2016T101J	RoHS	100	9	9.0	80	0.796			

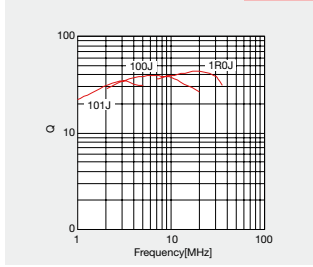
LEM2520 TYPE

Ordering code	EHS (Environmental Hazardous Substances)	Inductance (μH)	Inductance Tolerance	Q (min.)	Self-resonant frequency (MHz) min.	Resistance DC (Ω) (max.)	Rated current (mA) (max.)	Measuring frequency (MHz)	
LEM 2520 TR12K	RoHS	0.12	±10%	30	600	0.37	520	25.2	
LEM 2520 TR15K	RoHS	0.15			550	0.42	480		
LEM 2520 TR18K	RoHS	0.18			500	0.46	460		
LEM 2520 TR22K	RoHS	0.22			450	0.52	430		
LEM 2520 TR27K	RoHS	0.27			425	0.56	420		
LEM 2520 TR33K	RoHS	0.33			400	0.60	400		
LEM 2520 TR39K	RoHS	0.39			375	0.65	375		
LEM 2520 TR47K	RoHS	0.47			350	0.68	350		
LEM 2520 TR56K	RoHS	0.56			300	0.75	325		
LEM 2520 TR68K	RoHS	0.68			270	0.85	300		
LEM 2520 TR82K	RoHS	0.82			250	1.00	260		
LEM 2520 T1R0J	RoHS	1.0			220	1.10	245		7.96
LEM 2520 T1R2J	RoHS	1.2			180	1.20	230		
LEM 2520 T1R5J	RoHS	1.5			135	1.30	220		
LEM 2520 T1R8J	RoHS	1.8			100	1.45	210		
LEM 2520 T2R2J	RoHS	2.2	75	1.55	200				
LEM 2520 T2R7J	RoHS	2.7	55	1.70	195				
LEM 2520 T3R3J	RoHS	3.3	48	1.90	185				
LEM 2520 T3R9J	RoHS	3.9	43	2.10	180				
LEM 2520 T4R7J	RoHS	4.7	40	2.30	175				
LEM 2520 T5R6J	RoHS	5.6	36	2.50	170				
LEM 2520 T6R8J	RoHS	6.8	33	2.70	165				
LEM 2520 T8R2J	RoHS	8.2	30	3.05	160	2.52			
LEM 2520 T100J	RoHS	10	27	3.50	155				
LEM 2520 T120J	RoHS	12	23	3.80	150				
LEM 2520 T150J	RoHS	15	20	4.40	140				
LEM 2520 T180J	RoHS	18	18	4.80	130				
LEM 2520 T220J	RoHS	22	17	5.50	125				
LEM 2520 T270J	RoHS	27	16	6.30	115				
LEM 2520 T330J	RoHS	33	15	7.10	110				
LEM 2520 T390J	RoHS	39	14	9.50	90				
LEM 2520 T470J	RoHS	47	13	11.10	80				
LEM 2520 T560J	RoHS	56	12	12.10	75				
LEM 2520 T680J	RoHS	68	11	16.60	70				
LEM 2520 T820J	RoHS	82	10	19.00	65				
LEM 2520 T101J	RoHS	100	9	21.00	60		0.796		

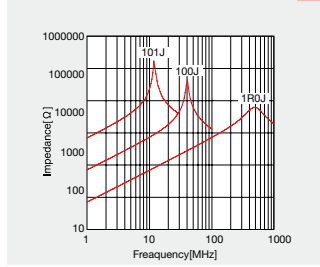
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● LBM2016

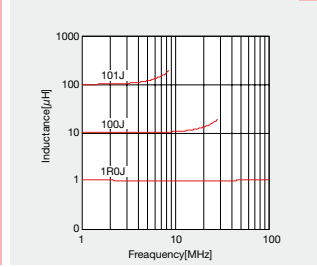
■ Q-vs-Frequency characteristics



■ Impedance-vs-Frequency characteristics

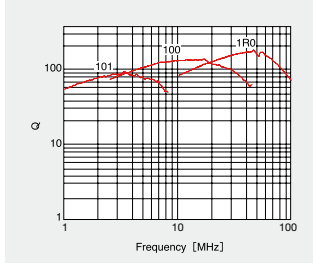


■ Inductance-vs-Frequency characteristics

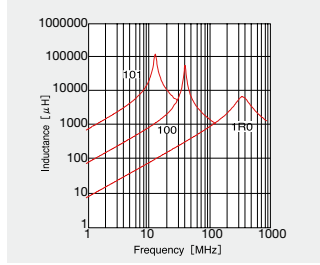


● LEM2520

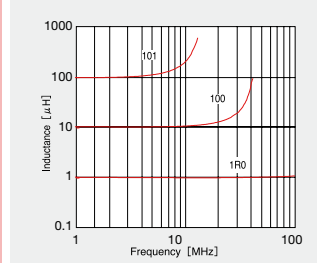
■ Q-vs-Frequency characteristics



■ Impedance-vs-Frequency characteristics



■ Inductance-vs-Frequency characteristics



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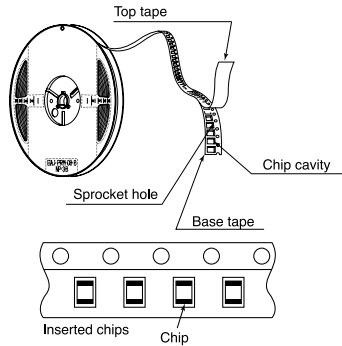
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① Minimum Quantity

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

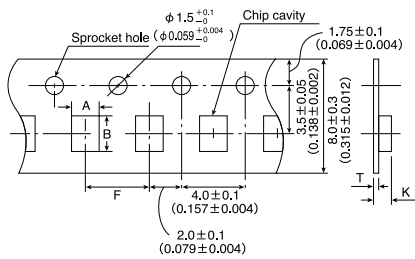
② Tape material

- Embossed tape



③ Taping Dimensions

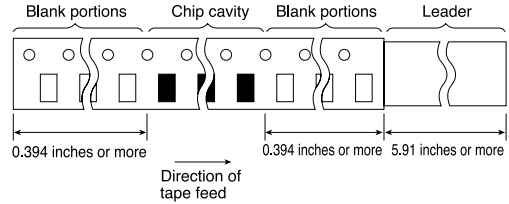
- Embossed Tape (0.315 inches wide)
- Card board carrier tape (0.315 inches wide)



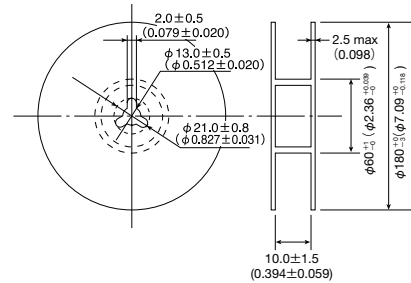
Type	Chip cavity		Insertion pitch F	Tape thickness	
	A	B		T	K
LBM 2016	1.75 ± 0.1 (0.069 ± 0.004)	2.1 ± 0.1 (0.083 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	0.3 ± 0.05 (0.012 ± 0.002)	1.9max. (0.074)
LEM 2520	2.3 ± 0.1 (0.091 ± 0.004)	2.7 ± 0.1 (0.106 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	0.3 ± 0.05 (0.012 ± 0.002)	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

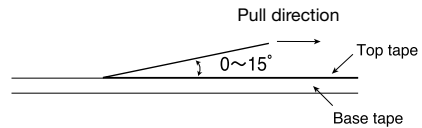


⑤ Reel Size



⑥ Top Tape Strength

The top tape requires a peel-off force 0.2 to 0.7N in the direction of the arrow as illustrated below.



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RELIABILITY DATA

1. Operating temperature Range	
LB, LBC, LBR, LBMF Series	-40~+105°C (Including self-generated heat)
CB, CBC, CBL, CBMF Series	
LBM Series	
LEM Series	-40~+85°C

2. Storage	
LB, LBC, LBR, LBMF Series	-40~+85°C
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	
【Test Methods and Remarks】 Please refer the term of "7. storage conditions" in precautions.	

3. Rated Current	
LB, LBC, LBR, LBMF Series	Within the specified tolerance
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	
【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	
LB, LBC, LBR, LBMF Series	Within the specified tolerance
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	
【Test Methods and Remarks】 LEM Series 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	
LB, LBC, LBR, LBMF Series	Within the specified tolerance
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	
【Test Methods and Remarks】 LEM Series 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 Resisitance	
LB, LBC, LBR, LBMF Series	Within the specified tolerance
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	
【Test Methods and Remarks】 Measuring equipment : DC Ohmmeter (HIOKI 3227 or its equivalent)	

7. Self-Resonant Frequency	
LB, LBC, LBR, LBMF Series	Within the specified tolerance
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	
【Test Methods and Remarks】 Measuring equipment : Impedance analyzer (HP4291A or its equivalent)	

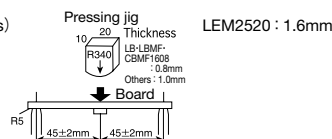
8. Temperature Characteristic						
LBM2016	LEM2520					Inductance change: Within ±5%
LB1608	LB2012	LBR2012	CB2012	CBL2012	LB2016	Inductance change: Within ±20%
CB2016	LB2518	LBR2518	CB2518	LBC3225	CBC3225	
LBMF1608	CBMF1608	LBC2016	CBC2016	LBC2518		Inductance change: Within ±25%
CBC2518	LB3218					
LBC2012	CBC2012					Inductance change: Within ±35%

【Test Methods and Remarks】
 Change of maximum inductance deviation in step 1-5

Step	1	2	3	4	5
Temperature (°C)	20	-40	20 (Reference temperature)	+85 (Maximum operating temperature)	20

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

9. Resistance to Flexure of Substrate	
LB, LBC, LBR, LBMF Series	No damage.
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	
【Test Methods and Remarks】 Warp : 2mm (LB·LBC·LBR·CB·CBC·CBL·LBM·LBMF·CBMF Series) 3mm (LEM2520) Test substrate: Board according to JIS C0051	



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RELIABILITY DATA

10.Body Strength	
LB, LBC, LBR, LBMF Series	No damage.
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	
[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.Adhesion of terminal electrode	
LB, LBC, LBR, LBMF Series	No abnormality.
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	
[Test Methods and Remarks]	
LB·LBC·LBR·CB·CBC·CBL·LBM·LBMF·CBMF·LEM2520	Applied force : 10N to X and Y directions Duration : 5 sec. Test substrate : Printed board
LB1608·CBMF1608·LBMF1608	Applied force : 5N to X and Y directions Duration : 5 sec. Test substrate : Printed board
12.Resistance to vibration	
LB, LBC, LBR, LBMF Series	Inductance change:Within±10% No significant abnormality in appearance.
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	Inductance change:Within±5% No significant abnormality in appearance.
[Test Methods and Remarks]	
LEM·LB·LBC·LBR·CB·CBC·CBL·LBM·LBMF·CBMF : 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.	
13.Drop test	
LB, LBC, LBR, LBMF Series	Inductance change:Within±5% No significant abnormality in appearance.
CB, CBC, CBL, CBMF Series	
LBM Series	
LEM Series	
[Test Methods and Remarks]	
LEM :	
Acceleration : 980m/sec ²	
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.	
14.Solderability	
LB, LBC, LBR, LBMF Series	At least 90% of surface of terminal electrode is covered by new
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	
[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·CBMF :	Solder temperature : 245±5°C
	Duration : 5±0.5sec
	Flux : Methanol solution with 25% of colophony

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RELIABILITY DATA

15. Resistance to soldering	
LB, LBC, LBR, LBMF Series	Inductance change: Within $\pm 10\%$
CB, CBC, CBL, CBMF Series	
LEM Series	Inductance change: Within $\pm 5\%$
LEM2520	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.)

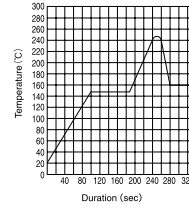
Flow condition

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.



16. Resistance to solvent	
LB, LBC, LBR, LBMF Series	No significant abnormality in appearance
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	

[Test Methods and Remarks]

Solvent temperature : Room temperature

Type of solvent : Isopropyl alcohol

Cleaning conditions : 90s. Immersion and cleaning.

17. Thermal shock	
LB, LBC, LBR, LBMF Series	Inductance change: Within $\pm 10\%$ No significant abnormality in appearance.
CB, CBC, CBL, CBMF Series	
LBM Series	Inductance change : Within $\pm 10\%$ Q → R12~4R7 : 30 min. 5R6~330 : 25 min. 390~820 : 20 min. 101 : 15 min.
LEM Series	

[Test Methods and Remarks]

LEM : Conditions for 1 cycle

Step	Temperature ($^\circ\text{C}$)	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.

18. Damp heat life test	
LB, LBC, LBR, LBMF Series	Inductance change: Within $\pm 10\%$ No significant abnormality in appearance.
CB, CBC, CBL, CBMF Series	
LBM Series	Inductance change : Within $\pm 10\%$ Q → R12~4R7 : 30 min. 5R6~330 : 25 min. 390~820 : 20 min. 101 : 15 min.
LEM Series	

[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.

19. Loading under damp heat life test	
LB, LBC, LBR, LBMF Series	Inductance change: Within $\pm 10\%$ No significant abnormality in appearance.
CB, CBC, CBL, CBMF Series	
LBM Series	Inductance change : Within $\pm 10\%$ Q → R12~4R7 : 30 min. 5R6~330 : 25 min. 390~820 : 20 min. 101 : 15 min.
LEM Series	

[Test Methods and Remarks]

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

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.

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RELIABILITY DATA

20.High temperature life test	
LB, LBC, LBR, LBMF Series	Inductance change:Within±10% No significant abnormality in appearance.
CB, CBC, CBL, CBMF Series	
LBM Series	
LEM Series	Inductance change :Within±10% Q→ R12~4R7 : 30 min. 5R6~330 : 25 min. 390~820 : 20 min. 101 : 15 min.
[Test Methods and Remarks] 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.	
21.Loading at high temperature life test	
LB, LBC, LBR, LBMF Series	Inductance change:Within±10% No significant abnormality in appearance.
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	
[Test Methods and Remarks] 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.	
22.Low temperature life test	
LB, LBC, LBR, LBMF Series	Inductance change:Within±10% No significant abnormality in appearance.
CB, CBC, CBL, CBMF Series	
LBM Series	
LEM Series	Inductance change :Within±10% Q→ R12~4R7 : 30 min. 5R6~330 : 25 min. 390~820 : 20 min. 101 : 15 min.
[Test Methods and Remarks] Temperature : -40±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.	
23.Standard condition	
LB, LBC, LBR, LBMF Series	Standard test conditions Unless specified, Ambient temperature is 20±15°C 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°C Relative humidity: 65±5% Inductance value is based on our standard measurement systems.
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	

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PRECAUTIONS

LEM Type, LB Type, CB Type

1. Circuit Design

Precautions	<ul style="list-style-type: none"> ◆Operating environment 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.
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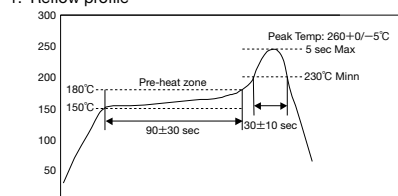
2. PCB Design

Precautions	<ul style="list-style-type: none"> ◆Land pattern design 1. Please contact any of our offices for a land pattern, and refer to a recommended land pattern of a right figure or specifications.
Technical considerations	<p>PRECAUTIONS [Recommended Land Patterns]</p> <ul style="list-style-type: none"> · Surface Mounting · Mounting and soldering conditions should be checked beforehand. · Applicable soldering process to those products is reflow soldering only.

3. Considerations for automatic placement

Precautions	<ul style="list-style-type: none"> ◆Adjustment of mounting machine 1. Excessive impact load should not be imposed on the products when mounting onto the PC boards. 2. Mounting and soldering conditions should be checked beforehand.
Technical considerations	<ul style="list-style-type: none"> 1. When installing products, care should be taken not to apply distortion stress as it may deform the products.

4. Soldering

Precautions	<ul style="list-style-type: none"> ◆Wave soldering (LEM Type only) 1. For wave soldering, please apply conditions meeting the range of the specified conditions in our catalog or the relevant specifications. ◆Reflow soldering (LB and CB Types) 1. For reflow soldering with either leaded or lead-free solder, the profile specified in "point for controlling" is recommended. ◆Reflow soldering (LEM) 1. For reflow soldering, please apply conditions meeting the range of the specified conditions in our catalog or the relevant specifications. ◆Recommended conditions for using a soldering iron 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.
Technical considerations	<ul style="list-style-type: none"> ◆Wave soldering (LEM Type only) 1. Components can be damaged by excessive heat where soldering conditions exceed the specified range. ◆Reflow soldering (LB and CB Types) 1. Reflow profile  <ul style="list-style-type: none"> ◆Recommended conditions for using a soldering iron 1. Components can be damaged by excessive heat where soldering conditions exceed the specified range.

5. Cleaning

Precautions	<ul style="list-style-type: none"> ◆Cleaning conditions Washing by supersonic waves shall be avoided.
Technical considerations	<ul style="list-style-type: none"> ◆Cleaning conditions If washed by supersonic waves, the products might be broken.

6. Handling

Precautions	<ul style="list-style-type: none"> ◆Handling 1. There is a case that a characteristic varies with magnetic influence. ◆Breakaway PC boards (splitting along perforations) 1. Planning pattern configurations and the position of products should be carefully performed to minimize stress. ◆Mechanical considerations 1. There is a case to be damaged by a mechanical shock.
Technical considerations	<ul style="list-style-type: none"> ◆Handling 1. Keep the inductors away from all magnets and magnetic objects. ◆Breakaway PC boards (splitting along perforations) 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. 2. Board separation should not be done manually, but by using the appropriate devices. ◆Mechanical considerations 1. Please do not give the inductors any excessive mechanical shocks.

7. Storage conditions

Precautions	<ul style="list-style-type: none"> ◆Storage 1. Under a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/package materials may take place.
Technical considerations	<ul style="list-style-type: none"> ◆Storage 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. · Recommended conditions · Ambient temperature : 0~40°C / Humidity : Below 70% RH 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. LB type : Should be used within 6 months from the time of delivery. LE type : In case of storage over 6 months, solderability shall be checked before actual usage.

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