Notice for TAIYO YUDEN Products

Please read this notice before using the TAIYO YUDEN products.

⚠ REMINDERS

Product Information in this Catalog

Product information in this catalog is as of March 2023. All of the contents specified herein and production status of the products listed in this catalog are subject to change without notice due to technical improvement of our products, etc. Therefore, please check for the latest information carefully before practical application or use of our products.

Please note that TAIYO YUDEN shall not be in any way responsible for any damages and defects in products or equipment incorporating our products, which are caused under the conditions other than those specified in this catalog or individual product specification sheets.

Approval of Product Specifications

Please contact TAIYO YUDEN for further details of product specifications as the individual product specification sheets are available. When using our products, please be sure to approve our product specifications or make a written agreement on the product specification with TAIYO YUDEN in advance.

Pre-Evaluation in the Actual Equipment and Conditions

Please conduct validation and verification of our products in actual conditions of mounting and operating environment before using our products.

Limited Application

1. Equipment Intended for Use

The products listed in this catalog are intended for general-purpose and standard use in general electronic equipment for consumer (e.g., AV equipment, OA equipment, home electric appliances, office equipment, information and communication equipment including, without limitation, mobile phone, and PC) and other equipment specified in this catalog or the individual product specification sheets, or the equipment approved separately by TAIYO YUDEN.
TAIYO YUDEN has the product series intended for use in the following equipment. Therefore, when using our products for these equipment, please check available applications specified in this catalog or the individual product specification sheets and use the corresponding products.

Application	Product Series		Quality Grade *3
	Equipment *1	Category (Part Number Code *2)	
Automotive	Automotive Electronic Equipment (POWERTRAIN, SAFETY)	A	1
	Automotive Electronic Equipment (BODY & CHASSIS, INFOTAINMENT)	C	2
Industrial	Telecommunications Infrastructure and Industrial Equipment	B	2
Medical	Medical Devices classified as GHTF Class C (Japan Class III)	M	2
	Medical Devices classified as GHTF Classes A or B (Japan Classes I or II)	L	3
Consumer	General Electronic Equipment	S	3
	Only for Mobile Devices *4	E	4

*Notes: 1. Based on the general specifications required for electronic components for such equipment, which are recognized by TAIYO YUDEN, the use of each product series for the equipment is recommended. Please be sure to contact TAIYO YUDEN before using our products for equipment other than those covered by the product series.
2. On each of our part number, the 2nd code from the left is a code indicating the “Category” as shown in the above table. For details, please check the explanatory materials regarding the part numbering system of each of our products.
3. Each product series is assigned a “Quality Grade” from 1 to 4 in order of higher quality. Please do not incorporate a product into any equipment with a higher Quality Grade than the Quality Grade of such product without the prior written consent of TAIYO YUDEN.
4. The applications covered by this product series are limited to mobile devices (smartphone, tablet PC, smartwatch, handheld game console, etc.) among general electronic equipment for consumer. The design, specifications and operating environment, etc. differ from those of the product series for "General Electronic Equipment" (Category: S), so please check the individual product specification sheets for details. The product series for "General Electronic Equipment" (Category: S) can also be used for mobile devices.

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

2. Equipment Requiring Inquiry

Please be sure to contact TAIYO YUDEN for further information before using the products listed in this catalog for the following equipment (excluding intended equipment as specified in this catalog or the individual product specification sheets) which may cause loss of human life, bodily injury, serious property damage and/or serious public impact due to a failure or defect of the products and/or malfunction attributed thereto.

(1) Transportation equipment (automotive powertrain control system, train control system, and ship control system, etc.)
(2) Traffic signal equipment
(3) Disaster prevention equipment, crime prevention equipment
(4) Medical devices classified as GHTF Class C (Japan Class III)
(5) Highly public information network equipment, data-processing equipment (telephone exchange, and base station, etc.)
(6) Any other equipment requiring high levels of quality and/or reliability equal to the equipment listed above

3. Equipment Prohibited for Use

Please do not incorporate our products into the following equipment requiring extremely high levels of safety and/or reliability.

(1) Aerospace equipment (artificial satellite, rocket, etc.)
(2) Aviation equipment *1
(3) Medical devices classified as GHTF Class D (Japan Class IV), implantable medical devices *2
(4) Power generation control equipment (nuclear power, hydroelectric power, thermal power plant control system, etc.)
(5) Undersea equipment (submarine repeating equipment, etc.)
(6) Military equipment
(7) Any other equipment requiring extremely high levels of safety and/or reliability equal to the equipment listed above

*Notes: 1. There is a possibility that our products can be used only for aviation equipment that does not directly affect the safe operation of aircraft (e.g., in-flight entertainment, cabin light, electric seat, cooking equipment) if such use meets requirements specified separately by TAIYO YUDEN. Please be sure to contact TAIYO YUDEN for further information before using our products for such aviation equipment.

2. Implantable medical devices contain not only internal unit which is implanted in a body, but also external unit which is connected to the internal unit.

4. Limitation of Liability

Please note that unless you obtain prior written consent of TAIYO YUDEN, TAIYO YUDEN shall not be in any way responsible for any damages incurred by you or third parties arising from use of the products listed in this catalog for any equipment that is not intended for use by TAIYO YUDEN, or any equipment requiring inquiry to TAIYO YUDEN or prohibited for use by TAIYO YUDEN as described above.

Safety Design

When using our products for high safety and/or reliability-required equipment or circuits, please fully perform safety and/or reliability evaluation. In addition, please install (i) systems equipped with a protection circuit and a protection device and/or (ii) systems equipped with a redundant circuit or other system to prevent an unsafe status in the event of a single fault for a failsafe design to ensure safety.

Intellectual Property Rights

Information contained in this catalog is intended to convey examples of typical performances and/or applications of our products and is not intended to make any warranty with respect to the intellectual property rights or any other related rights of TAIYO YUDEN or any third parties nor grant any license under such rights.

Limited Warranty

Please note that the scope of warranty for our products is limited to the delivered our products themselves conforming to the product specifications specified in the individual product specification sheets, and TAIYO YUDEN shall not be in any way responsible for any damages resulting from a failure or defect in our products. Notwithstanding the foregoing, if there is a written agreement (e.g., supply and purchase agreement, quality assurance agreement) signed by TAIYO YUDEN and your company, TAIYO YUDEN will warrant our products in accordance with such agreement, provided, however, that our products shall be used for general-purpose and standard use in the equipment specified in this catalog or the individual product specification sheets.

TAIYO YUDEN's Official Sales Channel

The contents of this catalog are applicable to our products which are purchased from our sales offices or authorized distributors (hereinafter "TAIYO YUDEN's official sales channel"). Please note that the contents of this catalog are not applicable to our products purchased from any seller other than TAIYO YUDEN's official sales channel.

Caution for Export

Some of our products listed in this catalog may require specific procedures for export according to "U.S. Export Administration Regulations", "Foreign Exchange and Foreign Trade Control Law" of Japan, and other applicable regulations. Should you have any questions on this matter, please contact our sales staff.

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Wire-wound Ferrite Inductors for Signal Lines LSQM series for General Electronic Equipment for Consumer

Code in front of Series have been extracted from Part number, which describes the segment of products, such as kinds and characteristics.

REFLOW

■PART NUMBER

＊ Operating Temp.: −40〜+105℃ (Including self-generated heat)

L S Q M	B	2 0 1 6	1 6	T	1 0 0	J	
①	②	③	④	⑤	⑥	⑦	⑧

①Series

Code (1)(2)(3)(4)	
LSQM	Wire-wound Ferrite Inductor for General Electronic Equipment for Consumer

(1) Product Group

Code	
L	Inductors

(3) Type

Code	
Q	Ferrite Wire-wound (Horizontal type)

(2) Category

Code	Recommended equipment	Quality Grade
S	General Electronic Equipment for Consumer	3

(4) Features, Characteristics

Code	
M	Signal line

②Features

Code	Feature
B	L-shape electrode (Ag-resin × Sn-plate)

⑤Packaging

Code	Packaging
T	Taping

③Dimensions (L × W)

Code	Type (inch)	Dimensions (L × W) [mm]
2016	2016 (0806)	2.0 × 1.6

⑥Nominal inductance

Code (example)	Nominal inductance [μH]
R12	0.12
1R0	1.0
100	10
101	100

※R=Decimal point

④Dimensions (T)

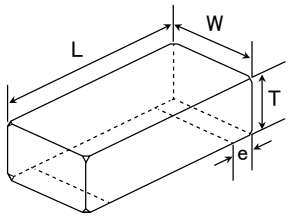
Code	Dimensions (T) [mm]
16	1.6

⑦Inductance tolerance

Code	Inductance tolerance
J	±5%

⑧Internal code

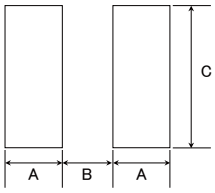
■STANDARD EXTERNAL DIMENSIONS / STANDARD QUANTITY



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

Type	A	B	C
B2016	0.6	1.0	1.8

Unit : mm



Type	L	W	T	e	Standard quantity [pcs]	
					Paper tape	Embossed tape
B201616	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

Unit : mm (inch)

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For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (http://www.ty-top.com/) .

■PART NUMBER

●2016(0806) type

New part number	Old part number (for reference)	EHS	Nominal inductance [μH]	Inductance tolerance	Q (min.)	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current [mA] (max.)	Measuring frequency [MHz]
LSQMB201616TR12J	LBM 2016TR12J	RoHS	0.12	±5%	30	600	0.13	610	25.2
LSQMB201616TR15J	LBM 2016TR15J	RoHS	0.15	±5%	30	550	0.15	570	25.2
LSQMB201616TR18J	LBM 2016TR18J	RoHS	0.18	±5%	30	500	0.15	560	25.2
LSQMB201616TR22J	LBM 2016TR22J	RoHS	0.22	±5%	30	450	0.20	520	25.2
LSQMB201616TR27J	LBM 2016TR27J	RoHS	0.27	±5%	30	425	0.21	510	25.2
LSQMB201616TR33J	LBM 2016TR33J	RoHS	0.33	±5%	30	400	0.21	490	25.2
LSQMB201616TR39J	LBM 2016TR39J	RoHS	0.39	±5%	30	375	0.26	440	25.2
LSQMB201616TR47J	LBM 2016TR47J	RoHS	0.47	±5%	30	350	0.26	430	25.2
LSQMB201616TR56J	LBM 2016TR56J	RoHS	0.56	±5%	30	300	0.29	410	25.2
LSQMB201616TR68J	LBM 2016TR68J	RoHS	0.68	±5%	30	270	0.32	400	25.2
LSQMB201616TR82J	LBM 2016TR82J	RoHS	0.82	±5%	30	250	0.34	390	25.2
LSQMB201616T1R0J	LBM 2016T1R0J	RoHS	1.0	±5%	30	220	0.38	385	7.96
LSQMB201616T1R2J	LBM 2016T1R2J	RoHS	1.2	±5%	30	180	0.41	370	7.96
LSQMB201616T1R5J	LBM 2016T1R5J	RoHS	1.5	±5%	30	135	0.47	350	7.96
LSQMB201616T1R8J	LBM 2016T1R8J	RoHS	1.8	±5%	30	100	0.48	345	7.96
LSQMB201616T2R2J	LBM 2016T2R2J	RoHS	2.2	±5%	30	75	0.54	340	7.96
LSQMB201616T2R7J	LBM 2016T2R7J	RoHS	2.7	±5%	30	55	0.59	310	7.96
LSQMB201616T3R3J	LBM 2016T3R3J	RoHS	3.3	±5%	30	48	0.68	290	7.96
LSQMB201616T3R9J	LBM 2016T3R9J	RoHS	3.9	±5%	30	43	0.74	275	7.96
LSQMB201616T4R7J	LBM 2016T4R7J	RoHS	4.7	±5%	30	40	0.78	270	7.96
LSQMB201616T5R6J	LBM 2016T5R6J	RoHS	5.6	±5%	25	36	0.88	255	7.96
LSQMB201616T6R8J	LBM 2016T6R8J	RoHS	6.8	±5%	25	33	0.97	240	7.96
LSQMB201616T8R2J	LBM 2016T8R2J	RoHS	8.2	±5%	25	30	1.1	225	7.96
LSQMB201616T100J	LBM 2016T100J	RoHS	10	±5%	25	27	1.2	215	2.52
LSQMB201616T120J	LBM 2016T120J	RoHS	12	±5%	25	23	1.4	200	2.52
LSQMB201616T150J	LBM 2016T150J	RoHS	15	±5%	25	20	1.5	190	2.52
LSQMB201616T180J	LBM 2016T180J	RoHS	18	±5%	25	18	2.5	150	2.52
LSQMB201616T220J	LBM 2016T220J	RoHS	22	±5%	25	17	2.8	140	2.52
LSQMB201616T270J	LBM 2016T270J	RoHS	27	±5%	25	16	3.2	130	2.52
LSQMB201616T330J	LBM 2016T330J	RoHS	33	±5%	25	15	3.6	125	2.52
LSQMB201616T390J	LBM 2016T390J	RoHS	39	±5%	20	14	3.9	120	2.52
LSQMB201616T470J	LBM 2016T470J	RoHS	47	±5%	20	13	4.1	115	2.52
LSQMB201616T560J	LBM 2016T560J	RoHS	56	±5%	20	12	5.9	95	2.52
LSQMB201616T680J	LBM 2016T680J	RoHS	68	±5%	20	11	7.0	90	2.52
LSQMB201616T820J	LBM 2016T820J	RoHS	82	±5%	20	10	7.7	85	2.52
LSQMB201616T101J	LBM 2016T101J	RoHS	100	±5%	15	9.0	8.0	80	0.796
LSQMB201616T151J	LBM 2016T151J	RoHS	150	±5%	15	6.5	13.5	69	0.796
LSQMB201616T181J	LBM 2016T181J	RoHS	180	±5%	15	6.0	15	67	0.796
LSQMB201616T221J	LBM 2016T221J	RoHS	220	±5%	15	5.5	18	65	0.796

※)Rated Current : The maximum DC value having inductance decrease within 10 % and temperature increase within 20 degC by the application of DC bias.

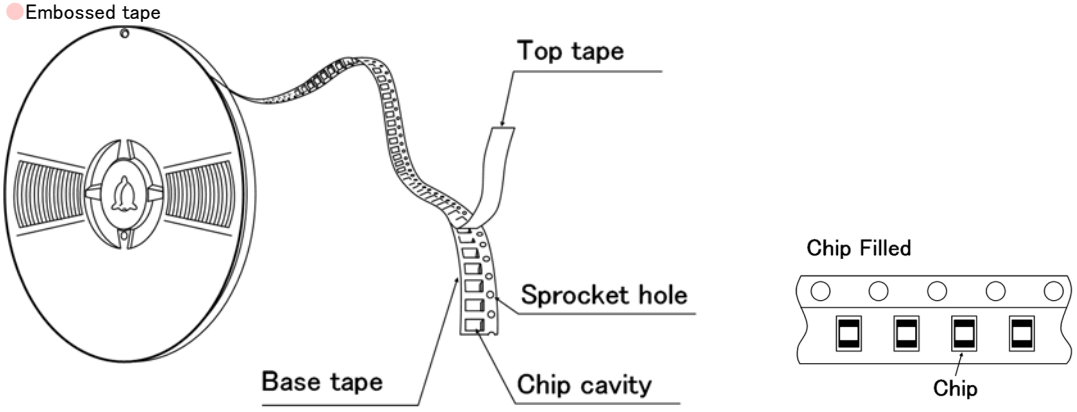
■PACKAGING

①Minimum Quantity

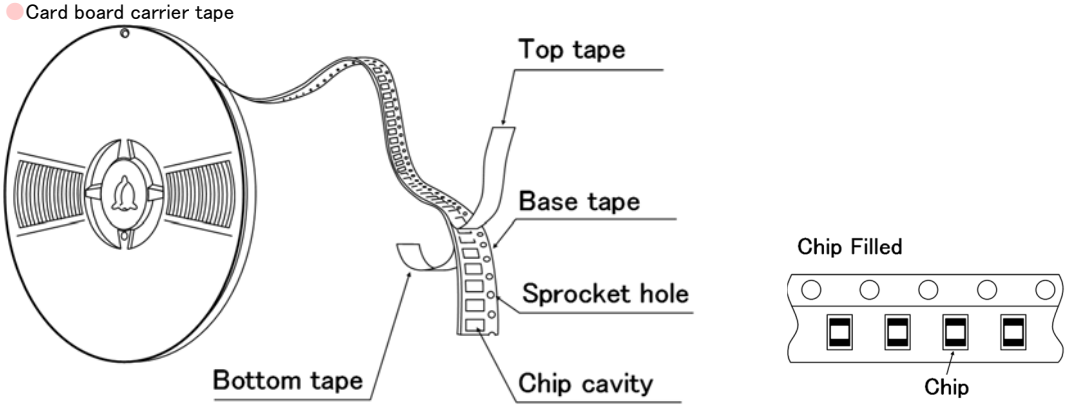
Type	Standard Quantity [pcs]	
	Paper Tape	Embossed Tape
A322525	—	1000
A321818	—	2000
A251818	—	2000
B201616 A201616	—	2000
A201212	—	3000
A201209	4000	—
A160808	4000	—
B160808	—	3000

②Tape material

●Embossed tape

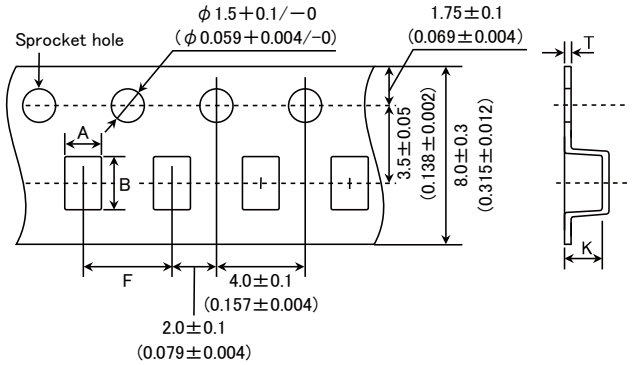


●Card board carrier tape



③Taping Dimensions

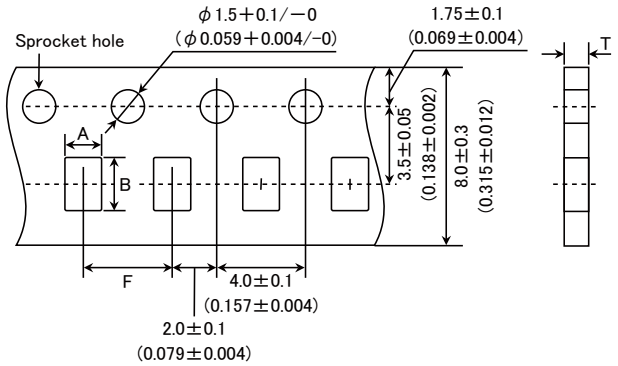
Embossed Tape (0.315 inches wide)



Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
B201616	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. (0.075max.)
A322525	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. (0.157max.)
A321818	2.1±0.1 (0.083±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)	2.2max. (0.087max.)
A251818	2.15±0.1 (0.085±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)	2.2max. (0.087max.)
A201616	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. (0.075max.)
A201212	1.45±0.1 (0.057±0.004)	2.25±0.1 (0.089±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.010±0.002)	1.45max. (0.057max.)
B160808	1.1±0.1 (0.043±0.004)	1.9±0.1 (0.075±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.010±0.002)	1.2max. (0.047max.)

Unit : mm (inch)

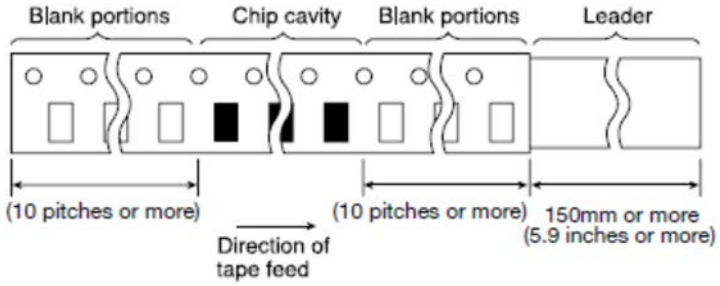
Card board carrier tape (0.315 inches wide)



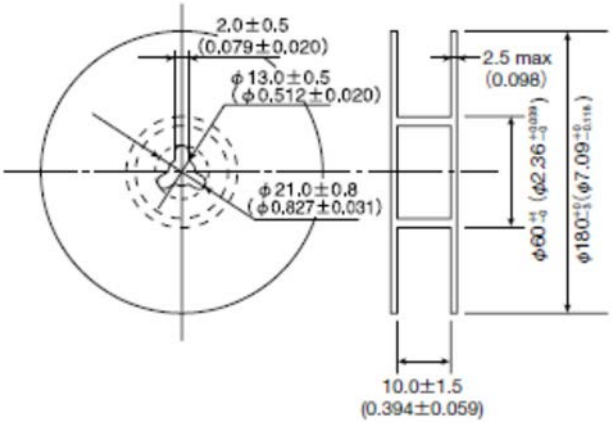
Type	Chip cavity		Insertion pitch	Tape thickness
	A	B	F	T
A201209	1.55±0.1 (0.061±0.004)	2.3±0.1 (0.091±0.004)	4.0±0.1 (0.157±0.004)	1.1max. (0.043max.)
A160808	1.0±0.1 (0.039±0.004)	1.8±0.1 (0.071±0.004)	4.0±0.1 (0.157±0.004)	1.1max. (0.043max.)

Unit : mm (inch)

④Leader and Blank Portion

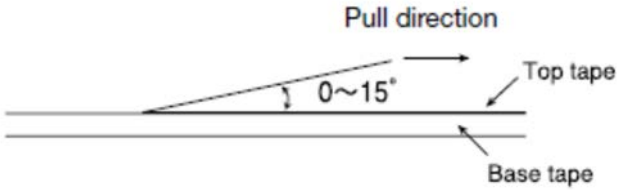


⑤Reel Size



⑥Top Tape Strength

The top tape requires a peel-off force 0.1 to 1.0N in the direction of the arrow as illustrated below.



Wire-wound Ferrite Inductors LSQB/LSQC/LSQE series
for General Electronic Equipment for Consumer
Wire-wound Ferrite Power Inductors LSQN/LSQPA series
for General Electronic Equipment for Consumer
Wire-wound Ferrite Inductors for Signal Lines LSQM series
for General Electronic Equipment for Consumer
Wire-wound Ferrite Inductors LLQB/LLQC/LLQE series
for Medical Devices classified as GHTF Classes A or B (Japan Classes I or II)
Wire-wound Ferrite Power Inductors LLQN/LLQPA series
for Medical Devices classified as GHTF Classes A or B (Japan Classes I or II)
Wire-wound Ferrite Inductors for Signal Lines LLQM series
for Medical Devices classified as GHTF Classes A or B (Japan Classes I or II)

■RELIABILITY DATA

1.Operating temperature Range	
Specified Value	−40～＋105℃(Including self-generated heat)

2. Storage Temperature Range(after soldering)	
Specified Value	−40～＋85℃
Test Methods and Remarks	Wire-wound Ferrite Inductors, Wire-wound Ferrite Power Inductors Please refer the term of ″7. storage conditions″ in precautions.

3.Rated Current	
Specified Value	Within the specified tolerance

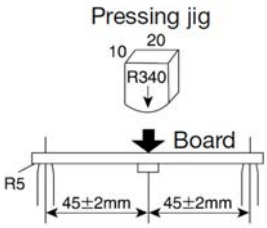
4.Inductance	
Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : LCR Mater(HP4285A or its equivalent) Measuring frequency : Specified frequency

5.Q	
Specified Value	Wire-wound Ferrite Inductors for Signal Lines: Within the specified tolerance
Test Methods and Remarks	Wire-wound Ferrite Inductors for Signal Lines: Measuring equipment : LCR Mater(HP4285A or its equivalent) Measuring frequency : Specified frequency

6.DC Resisitance	
Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : DC Ohmmeter (HIOKI 3227 or its equivalent)

7.Self-Resonant Frequency	
Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : Impedance analyzer (HP4291A or its equivalent)

8.Temperature Characteristic					
Specified Value	LSQMB2016				Inductance change : Within±5%
	LLQMB2016				
	LSQBA1608	LSQBA2012	LSQEA2012	LSQNA2012	Inductance change : Within±20%
	LSQNA2012	LSQBA2016	LSQNA2016	LSQBA2518	
	LSQEA2518	LSQNA2518	LSQCA3225	LSQPA3225	
	LLQBA2016	LLQBA2012	LLQEA2012	LLQNA2012	
	LLQNA2012	LLQBA2016	LLQNA2016	LLQBA2518	
	LLQEA2518	LLQNA2518	LLQCA3225	LLQPA3225	
	LSQBB1608	LSQNB1608	LSQCA2016	LSQPA2016	Inductance change : Within±25%
	LSQCA2518	LSQPA2518	LSQBA3218		
	LLQBB1608	LLQNB1608	LLQCA2016	LLQPA2016	
	LLQCA2518	LLQPA2518	LLQBA3218		
	LSQCA2012	LSQPA2012			Inductance change : Within±35%
	LLQCA2012	LLQPA2012			
Test Methods and Remarks	Based on the inductance at 20℃ and Measured at the ambient of －40℃～＋85℃.				

9.Rasistance to Flexure of Substrate	
Specified Value	No damage.
Test Methods and Remarks	Warp : 2mm Test substrate : Glass epoxy-resin substrate Thickness : 1.0mm （1608 type：0.8mm） 

10.Body Strength	
Specified Value	No damage.
Test Methods and Remarks	Applied force : 10N（1608 type：5N） Duration : 10sec.

11.Adhesion of terminal electrode		
Specified Value	LB, LBC, LBR, LBMF Series	No abnormality.
	CB, CBC, CBL, CBMF Series	
	LBM Series	
Test Methods and Remarks	Applied force : 10N to X and Y directions（1608 type：5N to X and Y directions） Duration : 5 sec. Test substrate : Printed board	

12.Resistance to vibration

Specified Value

Wire-wound Ferrite Inductors, Wire-wound Ferrite Power Inductors
Inductance change : Within±10%
No significant abnormality in appearance.
Wire-wound Ferrite Inductors for Signal Lines
Inductance change :Within±5%
No significant abnormality in appearance.

Test Methods and Remarks

The given sample is soldered to the board and then it is tested depending on the conditions of the following table.

Vibration Frequency	10～55Hz	
Total Amplitude	1.5mm (May not exceed acceleration 196m/s2)	
Sweeping Method	10Hz to 55Hz to 10Hz for 1min.	
Time	X	For 2 hours on each X, Y, and Z axis.
	Y	
	Z	

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

13.Drop test

Specified Value —

14.Solderability

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

Test Methods and Remarks

Solder temperature : 245±5℃
Duration : 5±0.5sec
Flux : Ethanol solution with 25% of colophony

15.Resistance to soldering

Specified Value

Wire-wound Ferrite Inductors, Wire-wound Ferrite Power Inductors
Inductance change : Within±10%
Wire-wound Ferrite Inductors for Signal Lines
Inductance change :Within±5%

Test Methods and Remarks

3 times of reflow oven at 230℃ MIN for 40sec. with peak temperature at 260 ℃ for 5sec.
Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.

16.Resisitance to solvent

Specified Value —

Test Methods and Remarks

Solvent temperature : Room temperature
Type of solvent : Isopropyl alcohol
Cleaning conditions : 90s. Immersion and cleaning.

17.Thermal shock

Specified Value

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

Test Methods and Remarks

The given sample is soldered to the board and then its Inductance is measured after 100cycles of the following conditions.

Conditions of 1 cycle		
Step	Temperature (℃)	Duration (min)
1	−40±3	30±3
2	Room temperature	Within 3
3	+85±2	30±3
4	Room temperature	Within 3

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

Specified Value

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

Test Methods and Remarks

Temperature : 60±2℃
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.

19.Loading under damp heat life test	
Specified Value	Inductance change : Within±10% No significant abnormality in appearance.
Test Methods and Remarks	Temperature : 60±2℃ 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.

20.High temperature life test	
Specified Value	Wire-wound Ferrite Power Inductors, Wire-wound Ferrite Inductors for Signal Lines : Inductance change : Within±10% No significant abnormality in appearance.
Test Methods and Remarks	Temperature : 85±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.

21.Loading at high temperature life test	
Specified Value	Wire-wound Ferrite Inductors: Inductance change : Within±10% (3225 type:Within±20%) No significant abnormality in appearance.
Test Methods and Remarks	Temperature : 85±2℃ 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	
Specified Value	Inductance change : Within±10% No significant abnormality in appearance.
Test Methods and Remarks	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.

23.Standard condition	
Specified Value	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.

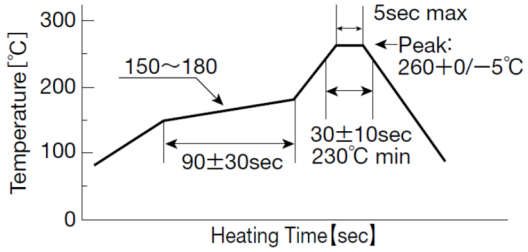
Wire-wound Ferrite Inductors LSQB/LSQC/LSQE/LLQB/LLQC/LLQE/LMQB/LMQC/LMQE/ LBQB/LBQC/LBQE series
Wire-wound Ferrite Power Inductors LSQN/LSQPA/LLQN/LLQPA/LMQN/LMQPA/ LBQN/LBQPA series
Wire-wound Ferrite Inductors for Signal Lines LSQM/LLQM/LMQM/LBQM series

■PRECAUTIONS

1. Circuit Design	
Precautions	◆Verification of operating environment, electrical rating and performance 1. A malfunction in medical equipment, spacecraft, nuclear reactors, etc. may cause serious harm to human life or have severe social ramifications. As such, any inductors to be used in such equipment may require higher safety and/or reliability considerations and should be clearly differentiated from components used in general purpose applications. 2. When inductors are used in places where dew condensation develops and/or where corrosive gas such as hydrogen sulfide, sulfurous acid, or chlorine exists in the air, characteristic deterioration may occur. Please do not use inductors under such environmental conditions. ◆Operating Current (Verification of Rated current) 1. The operating current including inrush current for inductors must always be lower than their rated values. 2. Do not apply current in excess of the rated value because the inductance may be reduced due to the magnetic saturation effect. ◆Temperature rise Temperature rise of power choke coil depends on the installation condition in end products. Make sure that temperature rise of power choke coils in actual end products is within the specified temperature range.

2. PCB Design	
Precautions	◆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	PRECAUTIONS 【Recommended Land Patterns】 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	◆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	1. When installing products, care should be taken not to apply distortion stress as it may deform the products.

4. Soldering	
Precautions	◆Reflow soldering (Wire-wound Ferrite Inductors, Wire-wound Ferrite Power Inductors) 1. For reflow soldering with either leaded or lead-free solder, the profile specified in "point for controlling" is recommended. ◆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	◆Reflow soldering (Wire-wound Ferrite Inductors, Wire-wound Ferrite Power Inductors) 1. Reflow profile  ◆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	◆Cleaning conditions Washing by supersonic waves shall be avoided.
Technical considerations	◆Cleaning conditions If washed by supersonic waves, the products might be broken.

6. Handling	
Precautions	◆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.
Technical considerations	◆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.

7. Storage conditions	
Precautions	◆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. ・ Storage conditions Ambient temperature : 0～40℃ Humidity : Below 70% RH ・ The recommended ambient temperature is below 30℃. Even under ideal storage conditions, solderability of products electrodes may decrease as time passes. For this reason, product should be used within 6 months from the time of delivery. In case of storage over 6 months, solderability shall be checked before actual usage.
Technical considerations	◆Storage 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.