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 October 2021. 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.

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.

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

*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 3 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.

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.

Automotive Application Guide

We classify automotive electronic equipment into the following four application categories and set usable application categories for each of our products. Therefore, we have the corresponding product series (the part number code of 2nd digit from the left side is “A” or “C”). When using our products for automotive electronic equipment, please be sure to check such application categories and use the corresponding product series accordingly. Should you have any questions on this matter, please contact us.

Product Series (Part Number Code of 2nd digit from the Left Side)	Category	Automotive Electronic Equipment (Typical Example)
A	POWERTRAIN	• Engine ECU (Electronically Controlled Fuel Injector) • Cruise Control Unit • 4WS (4 Wheel Steering) • Transmission • Power Steering • HEV/PHV/EV Core Control (Battery, Inverter, DC-DC) • Automotive Locator (Car location information providing device), etc.
	SAFETY	• ABS (Anti-Lock Brake System) • ESC (Electronic Stability Control) • Airbag • ADAS (Equipment that directly controls running, turning and stopping), etc.
C	BODY & CHASSIS	• Wiper • Automatic Door • Power Window • Keyless Entry System • Electric Door Mirror • Automobile Digital Mirror • Interior Lighting • Automobile Air Conditioning System • TPMS (Tire Pressure Monitoring System) • Anti-Theft Device (Immobilizer), etc.
	INFOTAINMENT	• Car Infotainment System • ITS/Telematics System • Instrument Cluster • ADAS (Sensor, Equipment that is not interlocked with safety equipment or powertrain) • Dashcam (genuine products for automotive manufacturer), etc.

Wire-wound Ferrite Power Inductors LCXN/LCXP series for Automotive Body & Chassis and Infotainment

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

AEC-Q200 Grade 3 (we conduct the evaluation at the test condition of Grade 3.)
*Operating environment Temp:-40～85℃

REFLOW
AEC-Q200

■PART NUMBER　　*Operating Temp. :　-40～125℃(Including self-generated heat)

L	C	X	N	D	4	0	4	0	T	K	L	1	0	0	M	D	G
①				②	③				④		⑤	⑥			⑦	⑧	

①Series

Code (1)(2)(3)(4)	
LCXN	Wire-wound Ferrite Power Inductor for Automotive Body & Chassis and Infotainment
LCXP	Wire-wound Ferrite Power Inductor for Automotive Body & Chassis and Infotainment

(1) Product Group

Code	
L	Inductors

(2) Category

Code	Recommended equipment	Quality Grade
C	Automotive Electronic Equipment (Body & Chassis, Infotainment)	2

(3) Type

Code	
X	Ferrite Wire-wound (Drum type)

(4) Features, Characteristics

Code	
N	Standard Power choke
P	High current power choke

②Features

Code	Feature
D	Bottom electrode (Ag × solder)
E	Bottom electrode (Cu × solder)
H	Bottom electrode (Frame type)

③Dimensions (L × W)

Code	Dimensions (L × W) [mm]
2020	2.0 × 2.0
2424	2.4 × 2.4
3030	3.0 × 3.0
4040	4.0 × 4.0
5050	5.0 × 5.0
6060	6.0 × 6.0
8080	8.0 × 8.0

④Dimensions (H)

Code	Dimensions (H) [mm]
KK	1.0
MK	1.2
PK	1.4
QK	1.5
TK	1.8
WK	2.0
WD	2.4
WE	2.5
WH	2.8
XK	3.0
XA	3.1
YK	4.0
YA	4.1
YB	4.2
YE	4.5

⑤Packaging

Code	Packaging
T	Taping
L	Taping

⑥Nominal inductance

Code (example)	Nominal inductance [μH]
2R2	2.2
100	10
101	100

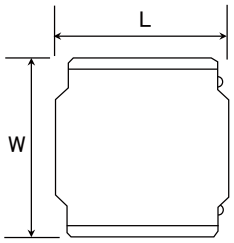
※R=Decimal point

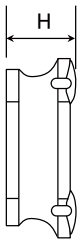
⑦Inductance tolerance

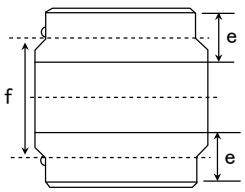
Code	Inductance tolerance
M	±20%
N	±30%

⑧Internal code

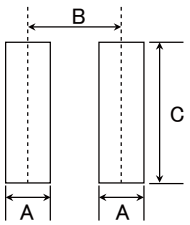
■STANDARD EXTERNAL DIMENSIONS / STANDARD QUANTITY







Recommended Land Patterns

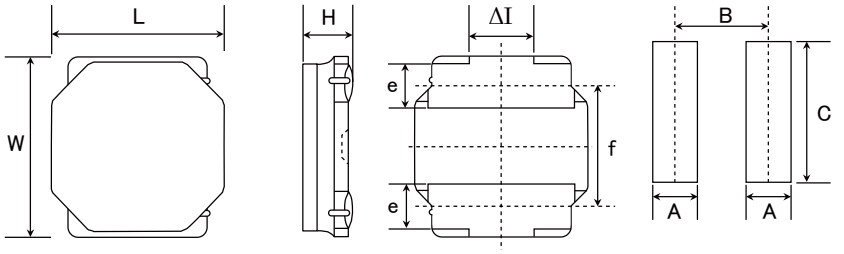


Type	A	B	C
2020	0.65	1.35	2.0
2424	0.7	1.45	2.0
3030	0.8	2.2	2.7
4040	1.2	2.8	3.7
8080	1.8	5.6	7.5

Unit : mm

Type	L	W	H	e	f	Standard quantity [pcs] Taping
2020KK	2.0±0.1 (0.079±0.004)	2.0±0.1 (0.079±0.004)	1.0 max (0.039 max)	0.5±0.2 (0.020±0.008)	1.25±0.2 (0.050±0.008)	2500
2020MK	2.0±0.1 (0.079±0.004)	2.0±0.1 (0.079±0.004)	1.2 max (0.047 max)	0.5±0.2 (0.020±0.008)	1.25±0.2 (0.050±0.008)	2500
2424KK	2.4±0.1 (0.095±0.004)	2.4±0.1 (0.095±0.004)	1.0 max (0.039 max)	0.6±0.2 (0.024±0.008)	1.45±0.2 (0.057±0.008)	2500
2424MK	2.4±0.1 (0.095±0.004)	2.4±0.1 (0.095±0.004)	1.2 max (0.047 max)	0.6±0.2 (0.024±0.008)	1.45±0.2 (0.057±0.008)	2500
3030KK	3.0±0.1 (0.118±0.004)	3.0±0.1 (0.118±0.004)	1.0 max (0.039 max)	0.9±0.2 (0.035±0.008)	1.9±0.2 (0.075±0.008)	2000
3030MK	3.0±0.1 (0.118±0.004)	3.0±0.1 (0.118±0.004)	1.2 max (0.047 max)	0.9±0.2 (0.035±0.008)	1.9±0.2 (0.075±0.008)	2000
3030QK	3.0±0.1 (0.118±0.004)	3.0±0.1 (0.118±0.004)	1.5 max (0.059 max)	0.9±0.2 (0.035±0.008)	1.9±0.2 (0.075±0.008)	2000
4040KK	4.0±0.2 (0.158±0.008)	4.0±0.2 (0.158±0.008)	1.0 max (0.039 max)	1.1±0.2 (0.043±0.008)	2.5±0.2 (0.098±0.008)	5000
4040MK	4.0±0.2 (0.158±0.008)	4.0±0.2 (0.158±0.008)	1.2 max (0.047 max)	1.1±0.2 (0.043±0.008)	2.5±0.2 (0.098±0.008)	4500
4040TK	4.0±0.2 (0.158±0.008)	4.0±0.2 (0.158±0.008)	1.8 max (0.071 max)	1.1±0.2 (0.043±0.008)	2.5±0.2 (0.098±0.008)	3500
8080XK	8.0±0.2 (0.315±0.008)	8.0±0.2 (0.315±0.008)	3.0 max (0.118 max)	1.60±0.3 (0.063±0.012)	5.6±0.3 (0.22±0.012)	1000
8080YK	8.0±0.2 (0.315±0.008)	8.0±0.2 (0.315±0.008)	4.0 max (0.158 max)	1.60±0.3 (0.063±0.012)	5.6±0.3 (0.22±0.012)	1000
8040YB	8.0±0.2 (0.315±0.008)	8.0±0.2 (0.315±0.008)	4.2 max (0.165 max)	1.60±0.3 (0.063±0.012)	5.6±0.3 (0.22±0.012)	1000

Unit : mm (inch)



Recommended Land Patterns

Type	A	B	C
5050	1.5	3.6	4.0
6060	1.6	4.7	5.7

Unit : mm

Type	L	W	H	e	f	ΔI	Standard quantity [pcs] Taping
5050KK	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	1.0 max (0.039 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	1000
5050MK	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	1.2 max (0.047 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	1000
5050PK	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	1.4 max (0.055 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	1000
5050WK	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	2.0 max (0.079 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	800
5050WD	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	2.4max (0.095 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	2500
5050WE	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	2.5 max (0.098 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	2500
5050XK	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	3.0 max (0.118 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	500
5050XA	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	3.1 max (0.122 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	500
5050YK	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	4.0 max (0.158 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	1500
5050YA	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	4.1 max (0.161 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	1500
6060KK	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	1.0 max (0.039 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.158±0.008)	2.3typ (0.091typ)	1000
6060MK	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	1.2 max (0.047 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.158±0.008)	2.3typ (0.091typ)	1000
6060PK	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	1.4 max (0.055 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.158±0.008)	2.3typ (0.091typ)	1000
6060WK	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	2.0 max (0.079 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.158±0.008)	2.3typ (0.091typ)	2500
6060WH	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	2.8 max (0.110 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.158±0.008)	2.3typ (0.091typ)	2000
6060YE	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	4.5 max (0.177 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.158±0.008)	2.3typ (0.091typ)	1500

Unit : mm (inch)

■PART NUMBER

・All the Wire-wound Ferrite Power Inductors of the catalog lineup are RoHS compliant.

Notes)

・The exchange of individual specifications is necessary depending on your application and/or circuit condition. Please contact TAIYO YUDEN's official sales channel.

・For Automotive (AEC-Q200 Qualified) products for BODY & CHASSIS, and INFOTAINMENT. Please check "Automotive Application Guide" for further details before using the products.

＜ AEC-Q200 ：AEC-Q200 qualified＞

All the Wire-wound Ferrite Power Inductors for Automotive products are tested based on the test conditions and methods defined in AEC-Q200 by family item.
Please consult with TAIYO YUDEN's official sales channel for the details of the product specifications and AEC-Q200 test results, etc.,
and please review and approve the product specifications before ordering.

●2020KK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXPD2020KKTR47N0G	NRV2010T R47N GFV	0.47	±30%	–	0.052	2,100	2,000	100
LCXPD2020KKTR68N0G	NRV2010T R68N GFV	0.68	±30%	–	0.060	1,850	1,850	100
LCXPD2020KKT1R0N0G	NRV2010T 1R0N GFV	1.0	±30%	–	0.080	1,550	1,600	100
LCXPD2020KKT1R5M0G	NRV2010T 1R5M GFV	1.5	±20%	–	0.100	1,350	1,450	100
LCXPD2020KKT2R2M0G	NRV2010T 2R2M GFV	2.2	±20%	–	0.175	1,100	1,100	100
LCXPD2020KKT3R3M0G	NRV2010T 3R3M GFV	3.3	±20%	–	0.250	880	1,000	100
LCXPD2020KKT4R7M0G	NRV2010T 4R7M GFV	4.7	±20%	–	0.320	760	820	100

●2020MK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXPD2020MKT1R0N0G	NRV2012T 1R0N GFV	1.0	±30%	–	0.073	2,200	1,650	100
LCXPD2020MKT1R5N0G	NRV2012T 1R5N GFV	1.5	±30%	–	0.100	1,800	1,400	100
LCXPD2020MKT2R2M0G	NRV2012T 2R2M GFV	2.2	±20%	–	0.129	1,600	1,200	100
LCXPD2020MKT3R3M0G	NRV2012T 3R3M GFV	3.3	±20%	–	0.227	1,250	900	100
LCXPD2020MKT4R7M0G	NRV2012T 4R7M GFV	4.7	±20%	–	0.325	1,100	750	100

●2020MK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND2020MKT1R0N0G	NRS2012T 1R0N GJV	1.0	±30%	–	0.070	1,900	1,700	100
LCXND2020MKT1R5N0G	NRS2012T 1R5N GJV	1.5	±30%	–	0.090	1,650	1,500	100
LCXND2020MKT2R2M0G	NRS2012T 2R2M GJV	2.2	±20%	–	0.107	1,350	1,370	100
LCXND2020MKT3R3M0G	NRS2012T 3R3M GJV	3.3	±20%	–	0.190	1,000	1,020	100
LCXND2020MKT4R7M0G	NRS2012T 4R7M GJV	4.7	±20%	–	0.241	900	910	100

●2424KK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXNE2424KKTR68NN	NRH2410T R68NN 4V	0.68	±30%	120	0.060	2,200	1,570	100
LCXNE2424KKT1R0NN	NRH2410T 1R0NN 4V	1.0	±30%	106	0.070	1,800	1,410	100
LCXNE2424KKT1R5MN	NRH2410T 1R5MN V	1.5	±20%	94	0.110	1,550	1,160	100
LCXNE2424KKT2R2MN	NRH2410T 2R2MN V	2.2	±20%	77	0.150	1,290	970	100
LCXNE2424KKT3R3MN	NRH2410T 3R3MN V	3.3	±20%	56	0.220	1,000	770	100
LCXNE2424KKT4R7MN	NRH2410T 4R7MN V	4.7	±20%	50	0.290	880	670	100
LCXNE2424KKT6R8MN	NRH2410T 6R8MN V	6.8	±20%	43	0.410	750	570	100
LCXNE2424KKT100MN	NRH2410T 100MN V	10	±20%	32	0.690	550	450	100
LCXNE2424KKT150MN	NRH2410T 150MN V	15	±20%	27	1.02	470	370	100
LCXNE2424KKT220MN	NRH2410T 220MN V	22	±20%	22	1.47	390	300	100

●2424MK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXNE2424MKTR47NNG	NRH2412T R47NNGJV	0.47	±30%	180	0.050	2,900	2,100	100
LCXNE2424MKT1R0NNG	NRH2412T 1R0NNGHV	1.0	±30%	101	0.077	2,350	1,300	100
LCXNE2424MKT1R5NNG	NRH2412T 1R5NNGHV	1.5	±30%	89	0.100	2,100	1,150	100
LCXNE2424MKT2R2MNG	NRH2412T 2R2MNGHV	2.2	±20%	72	0.140	1,700	1,000	100
LCXNE2424MKT3R3MNG	NRH2412T 3R3MNGHV	3.3	±20%	56	0.225	1,400	750	100
LCXNE2424MKT4R7MNG	NRH2412T 4R7MNGHV	4.7	±20%	45	0.300	1,150	650	100
LCXNE2424MKT6R8MNG	NRH2412T 6R8MNGHV	6.8	±20%	34	0.420	950	550	100
LCXNE2424MKT100MNG	NRH2412T 100MNGHV	10	±20%	29	0.600	810	450	100

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

■PART NUMBER

●3030KK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXNE3030KKT1R2NN	NRH3010T 1R2NN V	1.2	±30%	120	0.065	1,700	1,480	100
LCXNE3030KKT1R5NN	NRH3010T 1R5NN V	1.5	±30%	99	0.075	1,440	1,370	100
LCXNE3030KKT2R2MN	NRH3010T 2R2MN V	2.2	±20%	86	0.083	1,300	1,300	100
LCXNE3030KKT3R3MN	NRH3010T 3R3MN V	3.3	±20%	64	0.130	1,000	1,030	100
LCXNE3030KKT4R7MN	NRH3010T 4R7MN V	4.7	±20%	50	0.170	850	900	100
LCXNE3030KKT6R8MN	NRH3010T 6R8MN V	6.8	±20%	44	0.250	700	745	100
LCXNE3030KKT100MN	NRH3010T 100MN V	10	±20%	34	0.350	600	620	100
LCXNE3030KKT150MN	NRH3010T 150MN V	15	±20%	25	0.550	450	480	100
LCXNE3030KKT220MN	NRH3010T 220MN V	22	±20%	22	0.770	380	410	100
LCXNE3030KKT470MN	NRH3010T 470MN V	47	±20%	17	2.05	250	285	100

●3030MK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXNE3030MKTR47NN	NRH3012T R47NN V	0.47	±30%	160	0.033	2,600	1,900	100
LCXNE3030MKT1R0NN	NRH3012T 1R0NN V	1.0	±30%	111	0.048	2,200	1,710	100
LCXNE3030MKT1R5NN	NRH3012T 1R5NN V	1.5	±30%	95	0.055	1,700	1,600	100
LCXNE3030MKT2R2MN	NRH3012T 2R2MN V	2.2	±20%	78	0.075	1,500	1,370	100
LCXNE3030MKT3R3MN	NRH3012T 3R3MN V	3.3	±20%	61	0.100	1,200	1,210	100
LCXNE3030MKT4R7MN	NRH3012T 4R7MN V	4.7	±20%	50	0.130	1,000	1,060	100
LCXNE3030MKT6R8MN	NRH3012T 6R8MN V	6.8	±20%	43	0.190	850	890	100
LCXNE3030MKT100MN	NRH3012T 100MN V	10	±20%	32	0.270	730	720	100
LCXNE3030MKT150MN	NRH3012T 150MN V	15	±20%	26	0.450	530	570	100
LCXNE3030MKT220MN	NRH3012T 220MN V	22	±20%	22	0.630	500	500	100

●3030MK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXPD3030MKT1R0N	NRV3012T 1R0N V	1.0	±30%	110	0.065	2,500	1,600	100
LCXPD3030MKT1R5N	NRV3012T 1R5N V	1.5	±30%	92	0.075	2,100	1,400	100
LCXPD3030MKT2R2M	NRV3012T 2R2M V	2.2	±20%	70	0.120	1,800	1,100	100
LCXPD3030MKT3R3M	NRV3012T 3R3M V	3.3	±20%	55	0.150	1,600	1,000	100
LCXPD3030MKT4R7M	NRV3012T 4R7M V	4.7	±20%	48	0.190	1,250	850	100
LCXPD3030MKT6R8M	NRV3012T 6R8M V	6.8	±20%	40	0.300	950	650	100
LCXPD3030MKT100M	NRV3012T 100M V	10	±20%	32	0.470	800	550	100

●3030QK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND3030QKT1R0NNG	NRS3015T 1R0NNGHV	1.0	±30%	100	0.030	2,100	2,100	100
LCXND3030QKT1R5NNG	NRS3015T 1R5NNGHV	1.5	±30%	87	0.038	1,800	1,820	100
LCXND3030QKT2R2MNG	NRS3015T 2R2MNGHV	2.2	±20%	64	0.058	1,480	1,500	100
LCXND3030QKT3R3MNG	NRS3015T 3R3MNGHV	3.3	±20%	49	0.078	1,210	1,230	100
LCXND3030QKT4R7MNG	NRS3015T 4R7MNGHV	4.7	±20%	40	0.120	1,020	1,040	100
LCXND3030QKT6R8MNG	NRS3015T 6R8MNGHV	6.8	±20%	36	0.160	870	880	100
LCXND3030QKT100MNG	NRS3015T 100MNGHV	10	±20%	28	0.220	700	710	100
LCXND3030QKT220MNG	NRS3015T 220MNGHV	22	±20%	20	0.520	470	470	100
LCXND3030QKT330MNG	NRS3015T 330MNGHV	33	±20%	18	0.780	400	440	100

●4040KK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND4040KKL1R0NDG	NRS4010T 1R0NDGGV	1.0	±30%	116	0.056	2,000	1,900	100
LCXND4040KKL2R2MDG	NRS4010T 2R2MDGGV	2.2	±20%	73	0.085	1,200	1,500	100
LCXND4040KKL3R3MDG	NRS4010T 3R3MDGGV	3.3	±20%	58	0.100	1,100	1,400	100
LCXND4040KKL4R7MDG	NRS4010T 4R7MDGGV	4.7	±20%	47	0.140	950	1,200	100
LCXND4040KKL6R8MDG	NRS4010T 6R8MDGGV	6.8	±20%	38	0.200	800	1,000	100
LCXND4040KKL100MDG	NRS4010T 100MDGGV	10	±20%	31	0.300	620	750	100
LCXND4040KKL150MDG	NRS4010T 150MDGGV	15	±20%	24	0.430	540	600	100
LCXND4040KKL220MDG	NRS4010T 220MDGGV	22	±20%	19	0.570	450	500	100

●4040MK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND4040MKL1R0NDG	NRS4012T 1R0NDGGV	1.0	±30%	100	0.042	2,800	2,200	100
LCXND4040MKL2R2MDG	NRS4012T 2R2MDGJV	2.2	±20%	70	0.060	1,650	1,900	100
LCXND4040MKL3R3MDG	NRS4012T 3R3MDGJV	3.3	±20%	60	0.070	1,400	1,700	100
LCXND4040MKL4R7MDG	NRS4012T 4R7MDGJV	4.7	±20%	45	0.095	1,200	1,500	100
LCXND4040MKL6R8MDG	NRS4012T 6R8MDGJV	6.8	±20%	35	0.125	900	1,300	100
LCXND4040MKL100MDG	NRS4012T 100MDGJV	10	±20%	30	0.170	800	1,100	100
LCXND4040MKL150MDG	NRS4012T 150MDGJV	15	±20%	24	0.260	650	750	100
LCXND4040MKL220MDG	NRS4012T 220MDGJV	22	±20%	18	0.400	500	620	100

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

■PART NUMBER

●4040TK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND4040TKL1R0NDG	NRS4018T 1R0NDGJV	1.0	±30%	90	0.027	4,000	3,200	100
LCXND4040TKL1R5NDG	NRS4018T 1R5NDGJV	1.5	±30%	75	0.037	3,300	2,400	100
LCXND4040TKL2R2MDG	NRS4018T 2R2MDGJV	2.2	±20%	60	0.042	3,000	2,200	100
LCXND4040TKL3R3MDG	NRS4018T 3R3MDGJV	3.3	±20%	45	0.055	2,300	2,000	100
LCXND4040TKL4R7MDG	NRS4018T 4R7MDGJV	4.7	±20%	35	0.070	2,000	1,700	100
LCXND4040TKL6R8MDG	NRS4018T 6R8MDGJV	6.8	±20%	30	0.098	1,600	1,450	100
LCXND4040TKL100MDG	NRS4018T 100MDGJV	10	±20%	25	0.150	1,300	1,200	100
LCXND4040TKL150MDG	NRS4018T 150MDGJV	15	±20%	18	0.210	1,100	850	100
LCXND4040TKL220MDG	NRS4018T 220MDGJV	22	±20%	15	0.290	900	720	100
LCXND4040TKL330MDG	NRS4018T 330MDGJV	33	±20%	12	0.460	700	550	100
LCXND4040TKL470MDG	NRS4018T 470MDGJV	47	±20%	10	0.650	600	440	100
LCXND4040TKL680MDG	NRS4018T 680MDGJV	68	±20%	8.3	1.00	520	320	100
LCXND4040TKL101MDG	NRS4018T 101MDGJV	100	±20%	6.5	1.45	420	280	100
LCXND4040TKL151MDG	NRS4018T 151MDGJV	150	±20%	5.5	2.30	340	220	100
LCXND4040TKL221MDG	NRS4018T 221MDGJV	220	±20%	4.0	3.80	275	170	100

●5050KK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND5050KKT1R0NMG	NRS5010T 1R0NMGFV	1.0	±30%	95	0.070	2,350	1,750	100
LCXND5050KKT2R2NMG	NRS5010T 2R2NMGFV	2.2	±30%	65	0.105	1,500	1,400	100
LCXND5050KKT3R3MMG	NRS5010T 3R3MMGFV	3.3	±20%	42	0.125	1,400	1,250	100
LCXND5050KKT4R7MMG	NRS5010T 4R7MMGFV	4.7	±20%	37	0.145	1,200	1,150	100
LCXND5050KKT6R8MMG	NRS5010T 6R8MMGFV	6.8	±20%	33	0.185	1,000	1,000	100
LCXND5050KKT100MMG	NRS5010T 100MMGFV	10	±20%	23	0.250	850	900	100
LCXND5050KKT150MMG	NRS5010T 150MMGFV	15	±20%	19	0.400	680	650	100
LCXND5050KKT220MMG	NRS5010T 220MMGFV	22	±20%	15	0.600	550	450	100

●5050MK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND5050MKT1R0NMG	NRS5012T 1R0NMGFV	1.0	±30%	100	0.053	4,500	2,300	100
LCXND5050MKT1R5NMG	NRS5012T 1R5NMGFV	1.5	±30%	86	0.070	3,800	2,200	100
LCXND5050MKT2R2MMG	NRS5012T 2R2MMGFV	2.2	±20%	70	0.085	3,100	2,000	100
LCXND5050MKT3R3MMG	NRS5012T 3R3MMGFV	3.3	±20%	48	0.160	2,400	1,450	100
LCXND5050MKT4R7MMG	NRS5012T 4R7MMGFV	4.7	±20%	40	0.180	2,200	1,400	100
LCXND5050MKT6R8MMG	NRS5012T 6R8MMGFV	6.8	±20%	36	0.260	1,700	1,100	100
LCXND5050MKT100MMG	NRS5012T 100MMGFV	10	±20%	26	0.420	1,400	850	100
LCXND5050MKT150MMG	NRS5012T 150MMGFV	15	±20%	22	0.670	1,200	640	100

●5050PK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND5050PKTR47NMG	NRS5014T R47NMGGV	0.47	±30%	185	0.025	5,800	3,300	100
LCXND5050PKT1R2NMG	NRS5014T 1R2NMGGV	1.2	±30%	86	0.045	3,800	2,400	100
LCXND5050PKT2R2NMG	NRS5014T 2R2NMGGV	2.2	±30%	56	0.065	2,800	2,000	100
LCXND5050PKT3R3NMG	NRS5014T 3R3NMGGV	3.3	±30%	48	0.080	2,350	1,700	100
LCXND5050PKT4R7NMG	NRS5014T 4R7NMGGV	4.7	±30%	41	0.100	2,050	1,400	100
LCXND5050PKT6R8MMG	NRS5014T 6R8MMGGV	6.8	±20%	33	0.150	1,600	1,200	100
LCXND5050PKT100MMG	NRS5014T 100MMGGV	10	±20%	27	0.200	1,400	1,050	100
LCXND5050PKT150MMG	NRS5014T 150MMGGV	15	±20%	20	0.320	1,100	650	100
LCXND5050PKT220MMG	NRS5014T 220MMGGV	22	±20%	16	0.450	900	550	100

●5020WK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND5050WKTR47NMG	NRS5020T R47NMGJV	0.47	±30%	230	0.012	6,100	5,000	100
LCXND5050WKT1R0NMG	NRS5020T 1R0NMGJV	1.0	±30%	81	0.021	4,000	3,600	100
LCXND5050WKT1R5NMG	NRS5020T 1R5NMGJV	1.5	±30%	68	0.026	3,350	3,200	100
LCXND5050WKT2R2NMG	NRS5020T 2R2NMGJV	2.2	±30%	57	0.035	2,900	2,900	100
LCXND5050WKT3R3NMG	NRS5020T 3R3NMGJV	3.3	±30%	46	0.048	2,400	2,400	100
LCXND5050WKT4R7MMG	NRS5020T 4R7MMGJV	4.7	±20%	37	0.060	2,000	2,000	100
LCXND5050WKT6R8MMG	NRS5020T 6R8MMGJV	6.8	±20%	30	0.090	1,600	1,650	100
LCXND5050WKT100MMG	NRS5020T 100MMGJV	10	±20%	24	0.120	1,300	1,450	100
LCXND5050WKT150MMG	NRS5020T 150MMGJV	15	±20%	20	0.165	1,100	1,200	100
LCXND5050WKT220MMG	NRS5020T 220MMGJV	22	±20%	17	0.260	900	1,000	100
LCXND5050WKT470MMG	NRS5020T 470MMGJV	47	±20%	12	0.435	630	560	100
LCXND5050WKT101MMG	NRS5020T 101MMGJV	100	±20%	7	0.850	420	400	100

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

■PART NUMBER

●5050WE/5050WD type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND5050WEL1R0NMG	NRS5024T 1R0NMGJV	1.0	±30%	85	0.016	5,800	4,400	100
LCXND5050WEL1R5NMG	NRS5024T 1R5NMGJV	1.5	±30%	67	0.022	5,200	3,600	100
LCXND5050WDL2R2NMG	NRS5024T 2R2NMGJV	2.2	±30%	51	0.029	4,100	3,100	100
LCXND5050WDL3R3NMG	NRS5024T 3R3NMGJV	3.3	±30%	41	0.043	3,100	2,400	100
LCXND5050WDL4R7MMG	NRS5024T 4R7MMGJV	4.7	±20%	37	0.055	2,700	2,000	100
LCXND5050WDL6R8MMG	NRS5024T 6R8MMGJV	6.8	±20%	28	0.080	2,200	1,600	100
LCXND5050WDL100MMG	NRS5024T 100MMGJV	10	±20%	21	0.125	1,700	1,200	100
LCXND5050WDL150MMG	NRS5024T 150MMGJV	15	±20%	18	0.170	1,400	1,000	100
LCXND5050WDL220MMG	NRS5024T 220MMGJV	22	±20%	15	0.230	1,200	820	100
LCXND5050WDL330MMG	NRS5024T 330MMGJV	33	±20%	11	0.370	1,000	630	100

●5050XA/5050XK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND5050XATR47NMG	NRS5030T R47NMGJV	0.47	±30%	185	0.010	9,000	5,000	100
LCXND5050XAT1R0NMG	NRS5030T 1R0NMGJV	1.0	±30%	110	0.015	6,600	4,000	100
LCXND5050XAT2R2NMG	NRS5030T 2R2NMGJV	2.2	±30%	46	0.023	4,200	3,500	100
LCXND5050XAT3R3MMG	NRS5030T 3R3MMGJV	3.3	±20%	36	0.030	3,600	3,000	100
LCXND5050XAT4R7MMG	NRS5030T 4R7MMGJV	4.7	±20%	31	0.035	3,100	2,600	100
LCXND5050XAT6R8MMG	NRS5030T 6R8MMGJV	6.8	±20%	22	0.052	2,500	2,300	100
LCXND5050XAT100MMG	NRS5030T 100MMGJV	10	±20%	20	0.070	2,100	1,700	100
LCXND5050XKT150MMG	NRS5030T 150MMGJV	15	±20%	14	0.125	1,600	1,400	100
LCXND5050XKT220MMG	NRS5030T 220MMGJV	22	±20%	13	0.180	1,400	1,050	100
LCXND5050XKT330MMG	NRS5030T 330MMGJV	33	±20%	10	0.225	1,150	800	100
LCXND5050XKT470MMG	NRS5030T 470MMGJV	47	±20%	9	0.325	950	700	100

●5050YA/5050YK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND5050YAL1R5NMG	NRS5040T 1R5NMGJV	1.5	±30%	60	0.017	6,400	4,500	100
LCXND5050YAL2R2NMG	NRS5040T 2R2NMGJV	2.2	±30%	42	0.022	5,000	3,700	100
LCXND5050YAL3R3NMG	NRS5040T 3R3NMGJV	3.3	±30%	32	0.027	4,000	3,300	100
LCXND5050YAL4R7NMG	NRS5040T 4R7NMGKV	4.7	±30%	28	0.029	3,300	3,100	100
LCXND5050YAL6R8MMG	NRS5040T 6R8MMGJV	6.8	±20%	21	0.049	2,800	2,400	100
LCXND5050YAL100MMG	NRS5040T 100MMGJV	10	±20%	18	0.056	2,300	2,100	100
LCXND5050YKL150MMG	NRS5040T 150MMGJV	15	±20%	13	0.080	2,000	1,800	100
LCXND5050YKL220MMG	NRS5040T 220MMGKV	22	±20%	9	0.126	1,500	1,400	100
LCXND5050YKL330MMG	NRS5040T 330MMGJV	33	±20%	7	0.180	1,300	1,200	100
LCXND5050YKL470MMG	NRS5040T 470MMGJV	47	±20%	6	0.310	1,100	900	100

●6060KK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND6060KKT1R5MMG	NRS6010T 1R5MMGFV	1.5	±20%	77	0.090	2,400	1,900	100
LCXND6060KKT2R2MMG	NRS6010T 2R2MMGFV	2.2	±20%	56	0.110	1,900	1,700	100
LCXND6060KKT3R3MMG	NRS6010T 3R3MMGFV	3.3	±20%	42	0.135	1,600	1,500	100
LCXND6060KKT4R7MMG	NRS6010T 4R7MMGFV	4.7	±20%	36	0.165	1,300	1,400	100
LCXND6060KKT6R8MMG	NRS6010T 6R8MMGFV	6.8	±20%	30	0.220	1,200	1,200	100
LCXND6060KKT100MMG	NRS6010T 100MMGFV	10	±20%	25	0.270	1,000	1,100	100
LCXND6060KKT220MMG	NRS6010T 220MMGFV	22	±20%	12	0.580	650	700	100

●6060MK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND6060MKT1R0NMG	NRS6012T 1R0NMGJV	1.0	±30%	95	0.050	3,000	2,400	100
LCXND6060MKT1R5NMG	NRS6012T 1R5NMGGV	1.5	±30%	69	0.067	2,600	2,100	100
LCXND6060MKT2R5NMG	NRS6012T 2R5NMGGV	2.5	±30%	45	0.090	2,100	1,800	100
LCXND6060MKT3R3NMG	NRS6012T 3R3NMGGV	3.3	±30%	42	0.105	1,800	1,700	100
LCXND6060MKT4R7MMG	NRS6012T 4R7MMGGV	4.7	±20%	36	0.125	1,600	1,550	100
LCXND6060MKT5R3MMG	NRS6012T 5R3MMGJV	5.3	±20%	34	0.125	1,500	1,550	100
LCXND6060MKT6R8MMG	NRS6012T 6R8MMGJV	6.8	±20%	30	0.165	1,300	1,350	100
LCXND6060MKT100MMG	NRS6012T 100MMGJV	10	±20%	22	0.200	1,000	1,200	100
LCXND6060MKT150MMG	NRS6012T 150MMGJV	15	±20%	18	0.295	800	800	100
LCXND6060MKT220MMG	NRS6012T 220MMGJV	22	±20%	12	0.465	760	650	100
LCXND6060MKT330MMG	NRS6012T 330MMGJV	33	±20%	8	0.580	590	550	100
LCXND6060MKT470MMG	NRS6012T 470MMGJV	47	±20%	6	0.965	520	460	100
LCXND6060MKT680MMG	NRS6012T 680MMGJV	68	±20%	3	1.16	440	410	100
LCXND6060MKT101MMG	NRS6012T 101MMGJV	100	±20%	1	1.67	350	320	100

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

■PART NUMBER

●6060PK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND6060PKT1R2NMG	NRS6014T 1R2NMGGV	1.2	±30%	77	0.042	4,000	2,750	100
LCXND6060PKT2R2NMG	NRS6014T 2R2NMGGV	2.2	±30%	61	0.055	3,000	2,300	100
LCXND6060PKT3R3NMG	NRS6014T 3R3NMGGV	3.3	±30%	41	0.075	2,500	2,000	100
LCXND6060PKT4R7MMG	NRS6014T 4R7MMGGV	4.7	±20%	36	0.090	2,000	1,900	100
LCXND6060PKT6R8MMG	NRS6014T 6R8MMGGV	6.8	±20%	30	0.115	1,700	1,650	100
LCXND6060PKT100MMG	NRS6014T 100MMGGV	10	±20%	24	0.140	1,400	1,400	100
LCXND6060PKT150MMG	NRS6014T 150MMGGV	15	±20%	20	0.210	1,150	1,200	100
LCXND6060PKT220MMG	NRS6014T 220MMGGV	22	±20%	16	0.300	950	1,000	100

●6060WK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND6060WKL0R8NMG	NRS6020T 0R8NMGGV	0.8	±30%	110	0.020	6,400	4,100	100
LCXND6060WKL1R5NMG	NRS6020T 1R5NMGJV	1.5	±30%	93	0.026	4,300	3,600	100
LCXND6060WKL2R2NMG	NRS6020T 2R2NMGJV	2.2	±30%	73	0.034	3,200	2,900	100
LCXND6060WKL3R3NMG	NRS6020T 3R3NMGJV	3.3	±30%	55	0.040	2,800	2,750	100
LCXND6060WKL4R7NMG	NRS6020T 4R7NMGJV	4.7	±30%	43	0.058	2,400	2,150	100
LCXND6060WKL6R8NMG	NRS6020T 6R8NMGJV	6.8	±30%	30	0.085	2,000	1,800	100
LCXND6060WKL100MMG	NRS6020T 100MMGGV	10	±20%	18	0.125	1,900	1,500	100
LCXND6060WKL220MMG	NRS6020T 220MMGGV	22	±20%	11	0.290	1,250	950	100

●6060WH type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND6060WHL0R9NMG	NRS6028T 0R9NMGJV	0.9	±30%	90	0.013	6,700	4,600	100
LCXND6060WHL1R5NMG	NRS6028T 1R5NMGJV	1.5	±30%	78	0.016	5,100	4,200	100
LCXND6060WHL2R2NMG	NRS6028T 2R2NMGJV	2.2	±30%	68	0.020	4,200	3,700	100
LCXND6060WHL3R0NMG	NRS6028T 3R0NMGJV	3.0	±30%	55	0.023	3,600	3,400	100
LCXND6060WHL4R7MMG	NRS6028T 4R7MMGKV	4.7	±20%	39	0.031	2,700	3,000	100
LCXND6060WHL6R8MMG	NRS6028T 6R8MMGJV	6.8	±20%	25	0.043	2,600	2,500	100
LCXND6060WHL100MMG	NRS6028T 100MMGKV	10	±20%	20	0.065	1,900	1,900	100
LCXND6060WHL150MMG	NRS6028T 150MMGJV	15	±20%	17	0.095	1,600	1,800	100
LCXND6060WHL220MMG	NRS6028T 220MMGJV	22	±20%	12	0.135	1,300	1,400	100
LCXND6060WHL330MMG	NRS6028T 330MMGJV	33	±20%	10	0.220	1,100	1,100	100
LCXND6060WHL470MMG	NRS6028T 470MMGJV	47	±20%	8	0.300	1,000	920	100
LCXND6060WHL680MMG	NRS6028T 680MMGJV	68	±20%	5	0.420	800	770	100
LCXND6060WHL101MMG	NRS6028T 101MMGJV	100	±20%	3	0.600	650	660	100

●6060YE type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND6060YEL1R0NMG	NRS6045T 1R0NMGKV	1.0	±30%	110	0.014	9,800	4,500	100
LCXND6060YEL1R3NMG	NRS6045T 1R3NMGKV	1.3	±30%	95	0.016	8,200	4,200	100
LCXND6060YEL1R8NMG	NRS6045T 1R8NMGKV	1.8	±30%	80	0.019	7,200	3,900	100
LCXND6060YEL2R3NMG	NRS6045T 2R3NMGKV	2.3	±30%	60	0.022	6,400	3,600	100
LCXND6060YEL3R0NMG	NRS6045T 3R0NMGKV	3.0	±30%	45	0.024	5,600	3,300	100
LCXND6060YEL4R5MMG	NRS6045T 4R5MMGKV	4.5	±20%	25	0.030	4,400	3,100	100
LCXND6060YEL6R3MMG	NRS6045T 6R3MMGKV	6.3	±20%	15	0.036	3,600	3,000	100
LCXND6060YEL100MMG	NRS6045T 100MMGKV	10	±20%	12	0.046	3,100	2,400	100
LCXND6060YEL150MMG	NRS6045T 150MMGKV	15	±20%	10	0.070	2,500	1,900	100
LCXND6060YEL220MMG	NRS6045T 220MMGKV	22	±20%	7	0.107	2,000	1,600	100
LCXND6060YEL330MMG	NRS6045T 330MMGKV	33	±20%	6	0.141	1,650	1,400	100
LCXND6060YEL470MMG	NRS6045T 470MMGKV	47	±20%	5	0.211	1,400	1,150	100
LCXND6060YEL680MMG	NRS6045T 680MMGKV	68	±20%	4	0.304	1,100	950	100
LCXND6060YEL101MMG	NRS6045T 101MMGKV	100	±20%	3	0.466	900	750	100

●8080XK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXNH8080XKL1R0NJG	NRS8030T 1R0NJGJV	1.0	±30%	120	0.009	7,800	6,200	100
LCXNH8080XKL1R5NJG	NRS8030T 1R5NJGJV	1.5	±30%	80	0.012	6,200	5,300	100
LCXNH8080XKL2R2NJG	NRS8030T 2R2NJGJV	2.2	±30%	60	0.015	4,900	4,800	100
LCXNH8080XKL3R3MJG	NRS8030T 3R3MJGJV	3.3	±20%	50	0.019	4,200	4,300	100
LCXNH8080XKL4R7MJG	NRS8030T 4R7MJGJV	4.7	±20%	40	0.022	3,600	4,000	100
LCXNH8080XKL6R8MJG	NRS8030T 6R8MJGJV	6.8	±20%	32	0.029	3,000	3,400	100
LCXNH8080XKL100MJG	NRS8030T 100MJGJV	10	±20%	27	0.033	2,400	3,000	100
LCXNH8080XKL150MJG	NRS8030T 150MJGJV	15	±20%	20	0.060	2,000	2,200	100
LCXNH8080XKL220MJG	NRS8030T 220MJGJV	22	±20%	16	0.070	1,750	1,900	100
LCXNH8080XKL330MJG	NRS8030T 330MJGJV	33	±20%	13	0.120	1,300	1,500	100
LCXNH8080XKL470MJG	NRS8030T 470MJGJV	47	±20%	11	0.170	1,100	1,300	100

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

■PART NUMBER

●8080YB/8080YK type

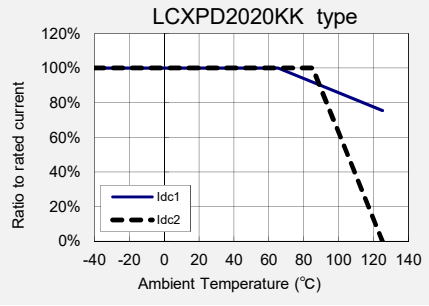
New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXNH8080YBL0R9NJG	NRS8040T 0R9NJGJV	0.9	±30%	85	0.006	13,000	7,800	100
LCXNH8080YBL1R4NJG	NRS8040T 1R4NJGJV	1.4	±30%	63	0.007	10,000	7,000	100
LCXNH8080YBL2R0NJG	NRS8040T 2R0NJGJV	2.0	±30%	50	0.009	8,100	6,300	100
LCXNH8080YBL3R6NJG	NRS8040T 3R6NJGJV	3.6	±30%	34	0.015	6,400	4,900	100
LCXNH8080YBL4R7NJG	NRS8040T 4R7NJGJV	4.7	±30%	30	0.018	5,400	4,100	100
LCXNH8080YBL6R8NJG	NRS8040T 6R8NJGJV	6.8	±30%	24	0.025	4,400	3,700	100
LCXNH8080YKL100MJG	NRS8040T 100MJGJV	10	±20%	22	0.034	3,800	3,100	100
LCXNH8080YKL150MJG	NRS8040T 150MJGJV	15	±20%	16	0.050	2,900	2,400	100
LCXNH8080YKL220MJG	NRS8040T 220MJGJV	22	±20%	13	0.066	2,400	2,200	100
LCXNH8080YKL330MJG	NRS8040T 330MJGKV	33	±20%	12	0.100	2,000	1,700	100
LCXNH8080YKL470MJG	NRS8040T 470MJGKV	47	±20%	8	0.140	1,500	1,500	100
LCXNH8080YKL680MJG	NRS8040T 680MJGKV	68	±20%	7	0.210	1,300	1,200	100
LCXNH8080YKL101MJG	NRS8040T 101MJGKV	100	±20%	6	0.280	1,100	1,000	100

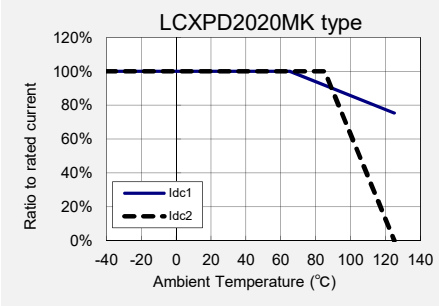
※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20℃)
※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40℃. (at 20℃)
※) The rated current is the DC current value that satisfies both of current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

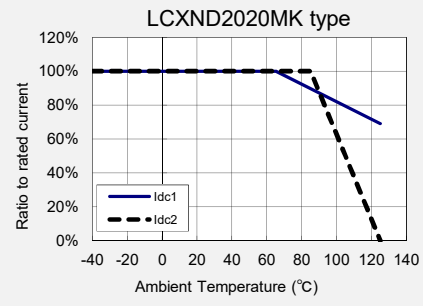
Derating of Rated Current

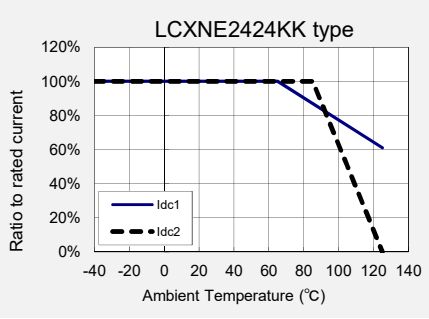
LCXN/LCXP series

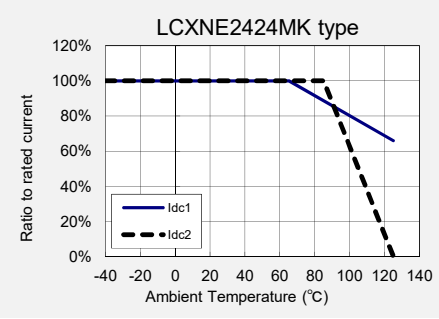
Derating of current is necessary for LCXN/LCXP series depending on ambient temperature.
Please refer to the chart shown below for appropriate derating of current.

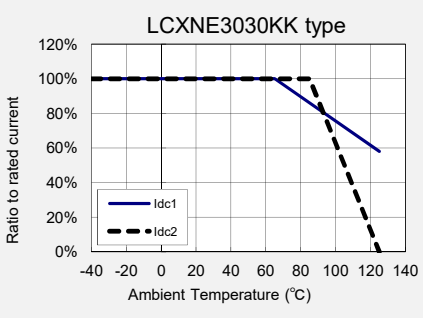


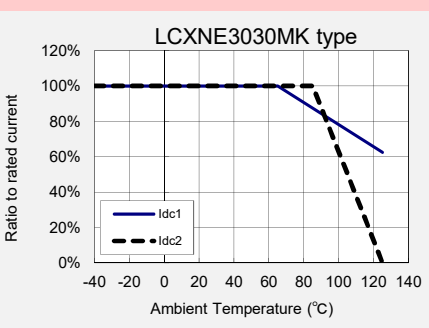


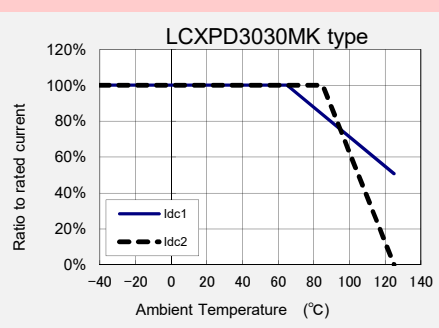


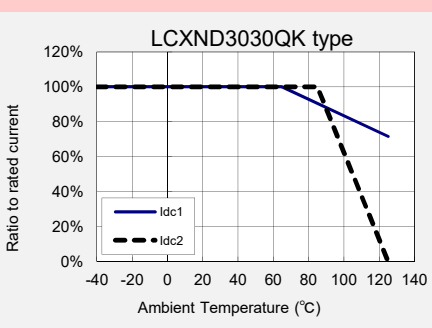


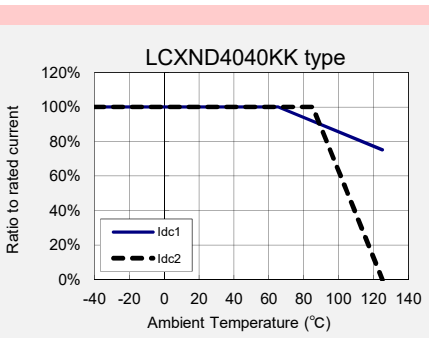


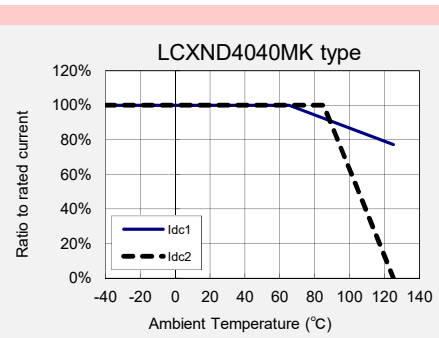


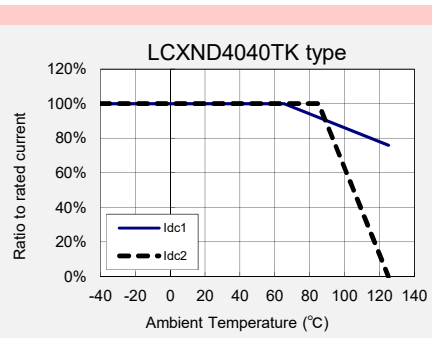


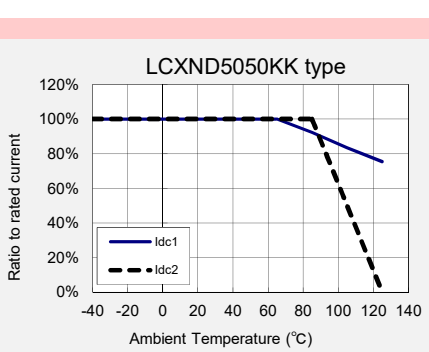


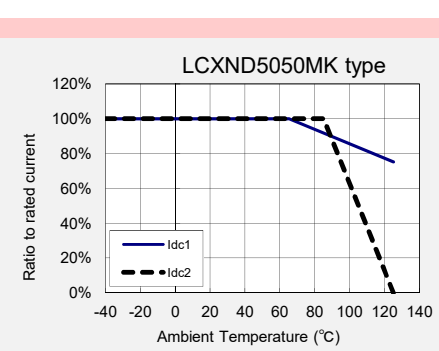


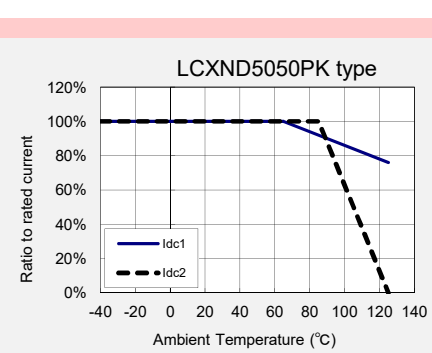








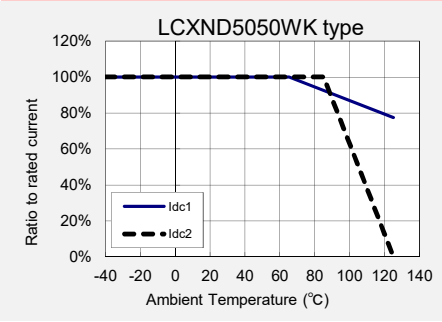


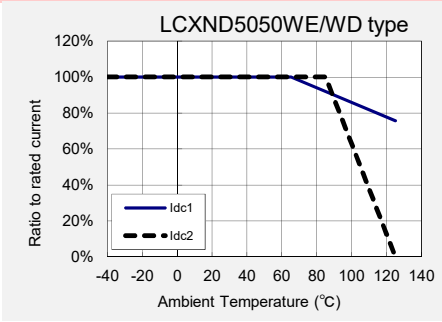


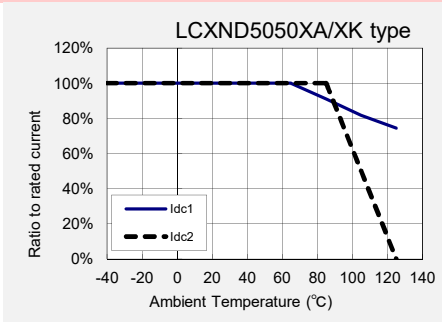
Derating of Rated Current

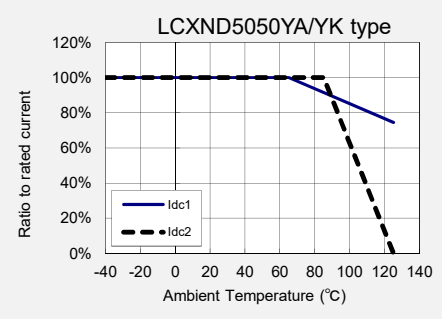
LCXN/LCXP series

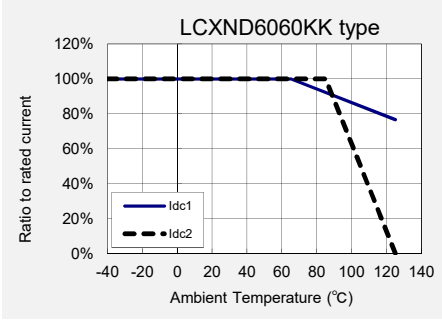
Derating of current is necessary for LCXN/LCXP series depending on ambient temperature.
Please refer to the chart shown below for appropriate derating of current.

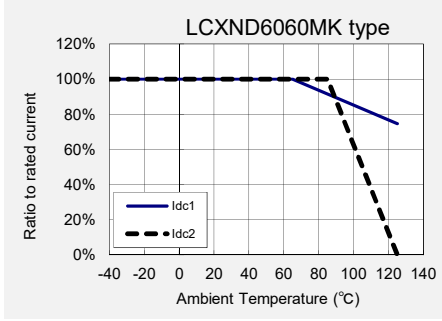


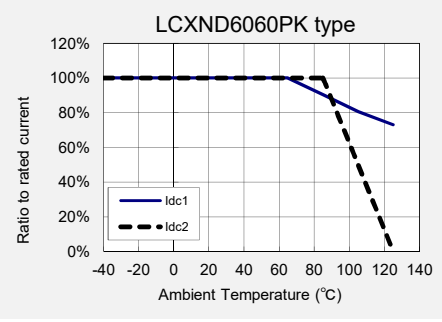


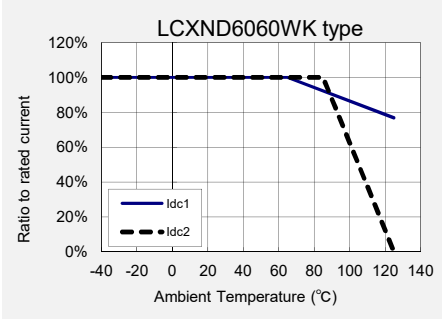


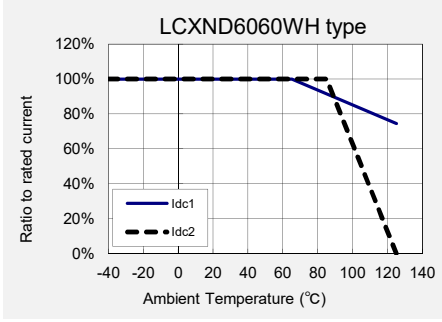


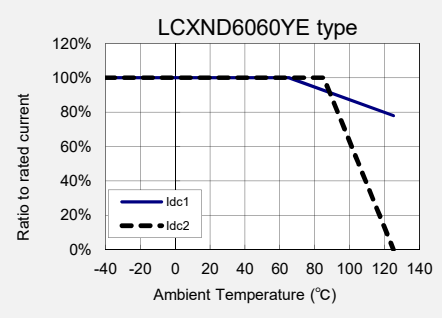


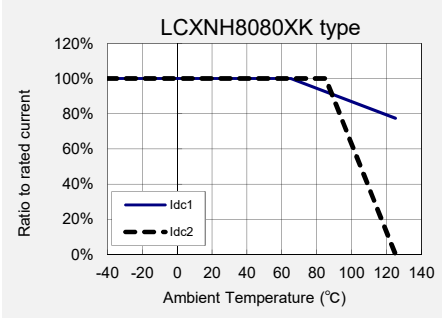


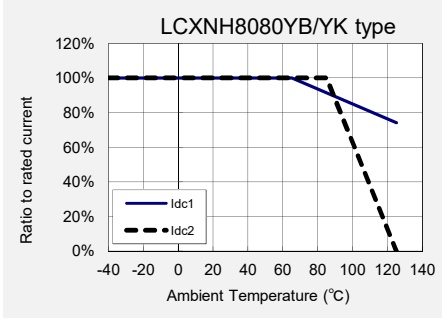












Wire-wound Ferrite Power Inductors LSXB/LSXN/LSXP/LCXN/LCXP/LBXN/LBXP/ LLXB/LLXN/LLXP/LMXN/LMXP series
Wire-wound Ferrite Power Inductors LCXH/LBXH/LMXH series
Wire-wound Ferrite Inductors for Class D Amplifier LCXA

■PACKAGING

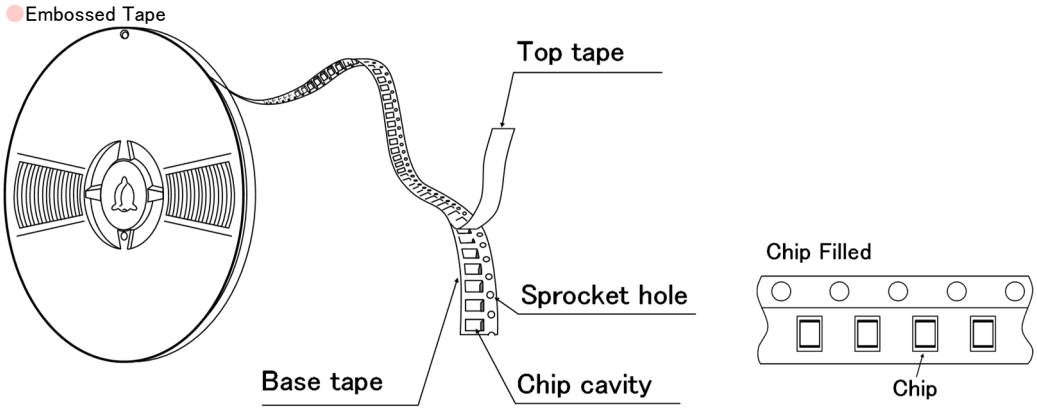
①Minimum Quantity

Type	Standard Quantity [pcs]
	Tape & Reel
2020KK	2500
2020MK	2500
2424KK	2500
2424MK	2500
3030KK	2000
3030MK	2000
3030QK	2000
4040KK	5000
4040MK	4500
4040TK	3500
4040WK	700

Type	Standard Quantity [pcs]
	Tape & Reel
5050KK	1000
5050MK	1000
5050PK	1000
5050WB	800
5050WK	800
5050WD 5050WE	2500
5050XK 5050XA	500
5050YA 5050YK	1500
6060KK	1000
6060MK	1000
6060PK	1000
6060WK	2500
6060WH	2000
6060YE	1500
8080XK	1000
8080YK 8080YB	1000

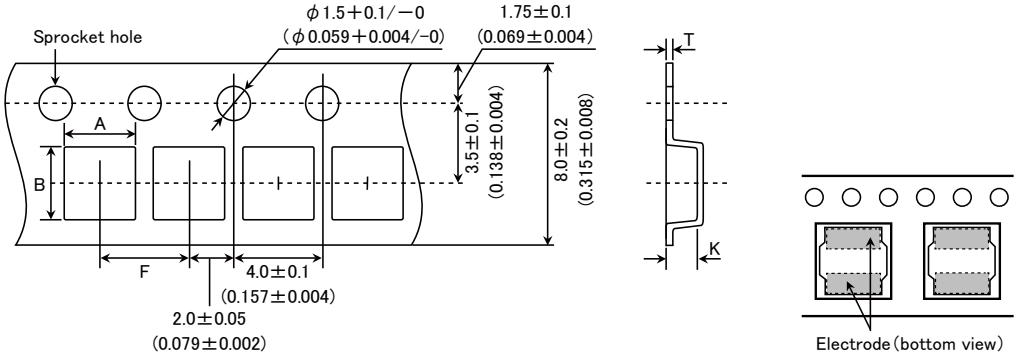
②Tape Material

●Embossed Tape



③Taping dimensions

●Embossed tape 8mm wide (0.315 inches wide)

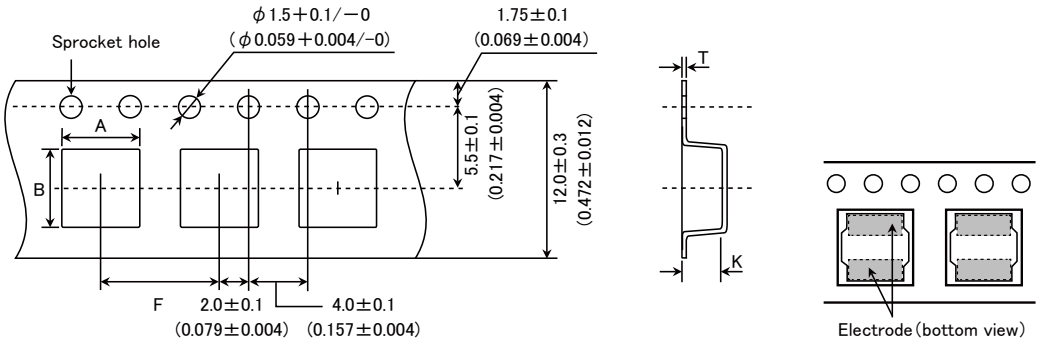


▸ This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification.
For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (http://www.ty-top.com/)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

Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
2020KK 2020MK	2.2±0.1 (0.102±0.004)	2.2±0.1 (0.102±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.009±0.002)	1.3±0.1 (0.051±0.004)
2424KK 2424MK	2.6±0.1 (0.087±0.004)	2.6±0.1 (0.102±0.004)		0.25±0.05 (0.009±0.002)	1.3±0.1 (0.051±0.004)
3030KK	3.2±0.1 (0.126±0.004)	3.2±0.1 (0.126±0.004)		0.3±0.05 (0.012±0.002)	1.4±0.1 (0.055±0.004)
3030MK					1.6±0.1 (0.063±0.004)
3030QK					1.9±0.1 (0.075±0.004)

Unit : mm (inch)

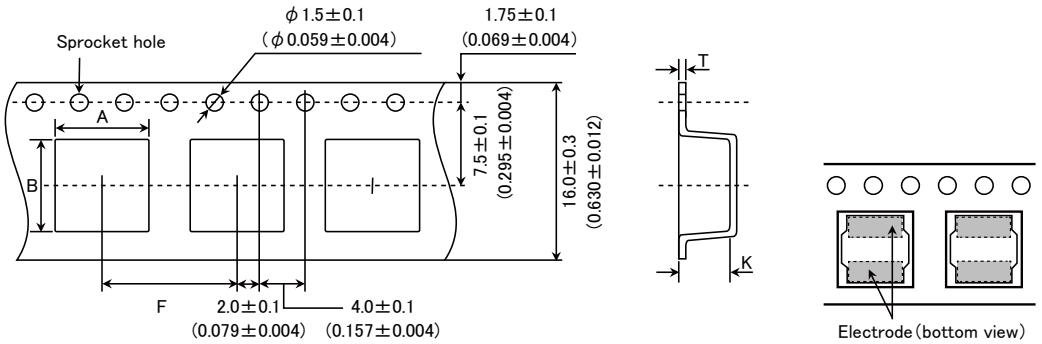
Embossed tape 12mm wide (0.47 inches wide)



Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
4040KK	4.3±0.1 (0.169±0.004)	4.3±0.1 (0.169±0.004)	8.0±0.1 (0.315±0.004)	0.3±0.1 (0.012±0.004)	1.4±0.1 (0.055±0.004)
4040MK					1.6±0.1 (0.063±0.004)
4040TK 4040WK					2.1±0.1 (0.083±0.004)
5050KK	5.25±0.1 (0.207±0.004)	5.25±0.1 (0.207±0.004)			1.4±0.1 (0.055±0.004)
5050MK					1.4±0.1 (0.055±0.004)
5050PK					1.6±0.1 (0.063±0.004)
5050WB 5050WK					2.3±0.1 (0.091±0.004)
5050WD 5050WE					2.7±0.1 (0.106±0.004)
5050XK 5050XA	5.15±0.1 (0.203±0.004)	5.15±0.1 (0.203±0.004)		0.4±0.1 (0.016±0.004)	3.2±0.1 (0.126±0.004)
5050YK 5050YA	5.15±0.1 (0.203±0.004)	5.15±0.1 (0.203±0.004)			4.2±0.1 (0.165±0.004)
6060KK	6.3±0.1 (0.248±0.004)	6.3±0.1 (0.248±0.004)			1.4±0.1 (0.055±0.004)
6060MK					1.6±0.1 (0.063±0.004)
6060PK					1.6±0.1 (0.063±0.004)
6060WK					2.3±0.1 (0.090±0.004)
6060WH					3.1±0.1 (0.122±0.004)
6060YE					4.7±0.1 (0.185±0.004)

Unit : mm (inch)

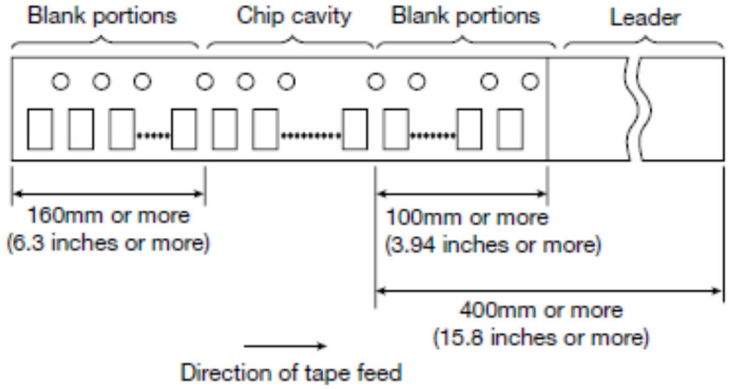
Embossed tape 16mm wide (0.63 inches wide)



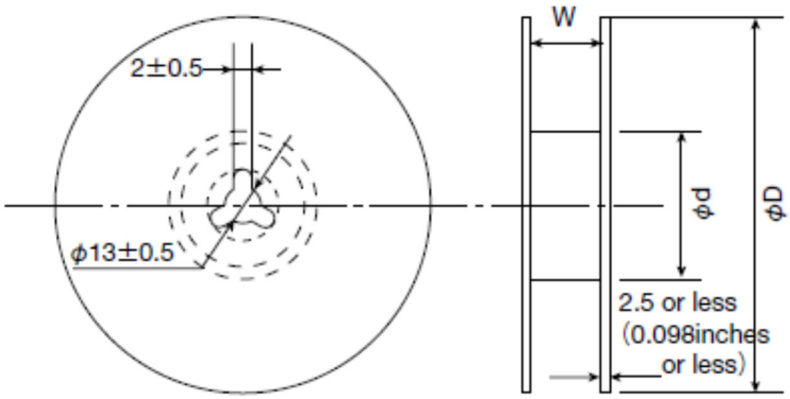
Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
8080XK	8.3±0.1 (0.327±0.004)	8.3±0.1 (0.327±0.004)	12.0±0.1 (0.472±0.004)	0.5±0.1 (0.020±0.004)	3.4±0.1 (0.134±0.004)
8080YK 8080YB					4.5±0.1 (0.177±0.004)

Unit : mm (inch)

④Leader and Blank portion

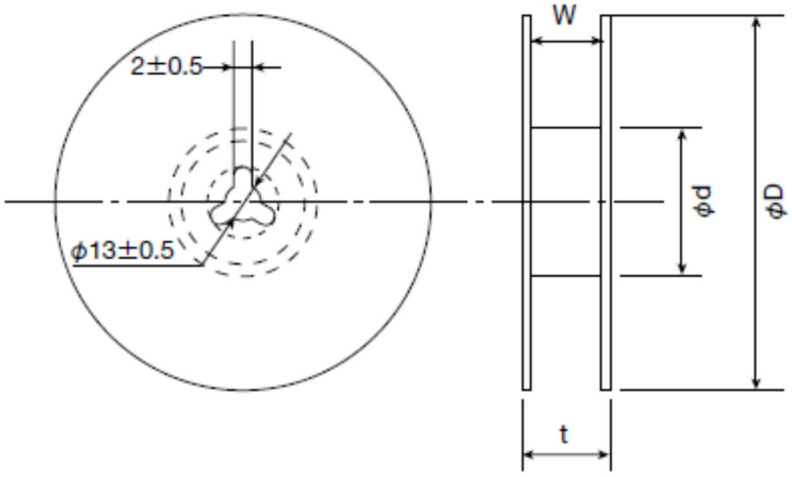


⑤Reel size



Type	Reel size (Reference values)		
	ϕD	ϕd	W
2020KK	180±0.5 (7.087±0.019)	60±1.0 (2.36±0.04)	10.0±1.5 (0.394±0.059)
2020MK			
2424KK			
2424MK			
3030KK			
3030MK			
3030QK			
4040WK	180±3.0 (7.087±0.118)	60±2.0 (2.36±0.08)	14.0±1.5 (0.551±0.059)
5050KK			
5050MK			
5050PK			
5050WB			
5050WK			
5050XK			
5050XA			
6060KK			
6060MK			
6060PK			

Unit : mm (inch)

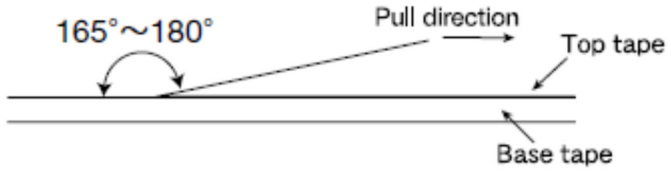


Type	Reel size (Reference values)			
	ϕD	ϕd	t (max.)	W
4040KK	330±3.0 (12.99±0.118)	80±2.0 (3.15±0.078)	18.5 (0.72)	13.5±1.0 (0.531±0.04)
4040MK				
4040TK				
5050WD				
5050WE				
5050YA				
5050YK				
6060WK				
6060WH				
6060YE				
8080XK			22.5 (0.89)	17.5±1.0 (0.689±0.04)
8080YK				
8080YB				

Unit : mm (inch)

⑥Top Tape Strength

The top tape requires a peel-off force of 0.1 to 1.3N in the direction of the arrow as illustrated below.



Wire-wound Ferrite Power Inductors LCXN/LCXP series
for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Power Inductors LBXN/LBXP series
for Telecommunications Infrastructure and Industrial Equipment
Wire-wound Ferrite Power Inductors LMXN/LMXP series
for Medical Devices classified as GHTF Class C (Japan Class III)

■RELIABILITY DATA

1. Operating Temperature Range	
Specified Value	−40～＋125℃(Including self-generated heat)
Test Methods and Remarks	Including self-generated heat

2. Storage Temperature Range	
Specified Value	−40～＋85℃
Test Methods and Remarks	−5 to 40℃ for the product with taping.

3. Rated current	
Specified Value	Within the specified tolerance

4. Inductance	
Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : LCR Meter (HP 4285A or equivalent) Measuring frequency : 100kHz, 1V

5. DC Resistance	
Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : DC ohmmeter (HIOKI 3227 or equivalent)

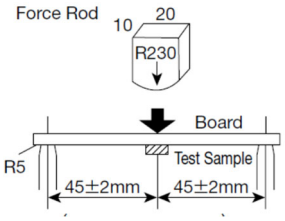
6. Self resonance frequency	
Specified Value	Within the specified tolerance(2020 type:−)
Test Methods and Remarks	Measuring equipment : Impedance analyzer/material analyzer(HP4291A or equivalent HP4191A, 4192A or equivalent)

7. Temperature characteristic	
Specified Value	Inductance change : Within ±20%
Test Methods and Remarks	Measurement of inductance shall be taken at temperature range within −40℃～＋85℃. With reference to inductance value at ＋20℃., change rate shall be calculated. Change of maximum inductance deviation in step 1 to 5

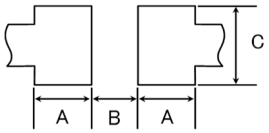
Step	Temperature(℃)
1	20
2	Minimum operating temperature
3	20 (Standard temperature)
4	Maximum operating temperature
5	20

8. Resistance to flexure of substrate

Specified Value	No damage
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. As illustrated below, apply force in the direction of the arrow indicating until deflection of the test board reaches to 2 mm. Test board size : 100×40×1.6 mm Test board material : glass epoxy-resin Solder cream thickness : 0.10mm (2020～3030 type) : 0.15mm (4040～8080 type)



Land dimension



Type	A	B	C
2020	0.65	0.7	2.0
2424	0.7	0.75	2.0
3030	0.8	1.4	2.7
4040	1.2	1.6	3.7
5050	1.5	2.1	4.0
6060	1.6	3.1	5.7
8080	1.8	3.8	7.5

9. Insulation resistance : between wires

Specified Value	—

10. Insulation resistance : between wire and core

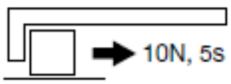
Specified Value	—

11. Withstanding voltage : between wire and core

Specified Value	—

12. Adhesion of terminal electrode

Specified Value	Shall not come off PC board
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. Applied force : 10N to X and Y directions. Duration : 5s. Solder cream thickness : 0.10mm(2020～3030 type) : 0.15mm(4040～8080 type)



13. Resistance to vibration

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

Test Methods and Remarks

The test samples shall be soldered to the test board by the reflow.
Then it shall be submitted to below test conditions.

Frequency Range	10～55Hz	
Total Amplitude	1.5mm (May not exceed acceleration 196m/s^2)	
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 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

14. Solderability

Specified Value	At least 90% of surface of terminal electrode is covered by new solder.
Test Methods and Remarks	The test samples shall be dipped in flux, and then immersed in molten solder as shown in below table. Flux : Ethanol solution containing rosin 25%. Solder Temperature: 245±5℃ Time: 5±1.0 sec. ※Immersion depth : All sides of mounting terminal shall be immersed.

15. Resistance to soldering heat

Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	The test sample shall be exposed to reflow oven at 230±5℃ for 40 seconds, with peak temperature at 260±5℃ for 5 seconds, 2 times. Test board material : glass epoxy-resin Test board thickness : 1.0mm

16. Thermal shock

Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. The test samples shall be placed at specified temperature for specified time by step 1 to step 4 as shown in below table in sequence. The temperature cycle shall be repeated 1000 cycles.

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

17. Damp heat

Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. The test samples shall be placed in thermostatic oven set at specified temperature and humidity as shown in below table. Temperature: 60±2℃ Humidity: 90～95%RH Time: 1000+24/−0 hour

18. Loading under damp heat

Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. The test samples shall be placed in thermostatic oven set at specified temperature and humidity and applied the rated current continuously as shown in below table. Temperature: 60±2℃ Humidity: 90～95%RH Applied current: Rated current Time: 1000+24/−0 hour

19. Low temperature life test

Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. After that, the test samples shall be placed at test conditions as shown in below table. Temperature: −40±2℃ Time: 1000+24/−0 hour

20. High temperature life test

Specified Value	—

21. Loading at high temperature life test	
Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow soldering. Temperature: 85±2℃ Applied current: Rated current Time: 1000+24/−0 hour

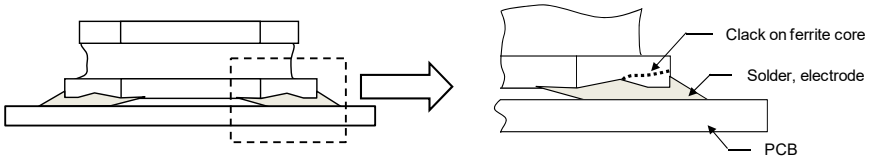
22. Standard condition	
Specified Value	Standard test condition : Unless otherwise specified, temperature is 20±15℃ and 65±20%of relative humidity. When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of 20±2℃ of temperature, 65±5% relative humidity. Inductance is in accordance with our measured value.

Wire-wound Ferrite Power Inductors LAYP series for Automotive Powertrain and safety
Wire-wound Ferrite Power Inductors LCXN/LCXP series for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Power Inductors LCXH series for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Inductors for Class D Amplifier LCXA for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Power Inductors LCRN series for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Power Inductors LBXN/LBXP series for Telecommunications Infrastructure and Industrial Equipment
Wire-wound Ferrite Power Inductors LBXH series for Telecommunications Infrastructure and Industrial Equipment
Wire-wound Ferrite Power Inductors LBRN series for Telecommunications Infrastructure and Industrial Equipment
Wire-wound Ferrite Power Inductors LMXN/LMXP series for Medical Devices classified as GHTF Class C (Japan Class III)
Wire-wound Ferrite Power Inductors LMXH series for Medical Devices classified as GHTF Class C (Japan Class III)
Wire-wound Ferrite Power Inductors LMRN series for Medical Devices classified as GHTF Class C (Japan Class III)

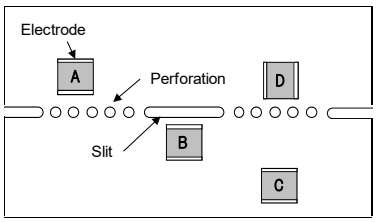
■PRECAUTIONS

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 refer to a recommended land pattern. 2. There is stress, which has been caused by distortion of a PCB, to the inductor. (LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) 3. Please consider the arrangement of parts on a PCB. (LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)
Technical considerations	◆Land pattern design Surface Mounting 1. Mounting and soldering conditions should be checked beforehand. 2. Applicable soldering process to this products is reflow soldering only. 3. Please use the recommended land pattern shown as below. Electrical characteristics and the mounting ability of the product are being considered in the recommended land pattern. If a PCB is designed with other dimensions, defective soldering and stress to a product may occur due to misalignment. The performance of the product may not be brought out. If an adopted land pattern is different from the recommended land pattern, stress to the product will increase. It may cause cracks or defective electrical characteristics of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) 4. As coefficients of thermal expansion between an inductor and a PCB differs, cracks may occur on a ferrite core when thermal stress is applied to them after mounting an inductor. (Please refer to the drawings below.) Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)



5. SMD inductors should be located to minimize any possible mechanical stresses from board warp or deflection. When splitting the PC board after mounting inductors and other components, care is required so as not to give any stresses of deflection or twisting to the board.
(LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)



A product tends to undergo stress in order "A>C>B≡D".
Please consider the layouts of a product to minimize any stresses.

3. Considerations for automatic placement

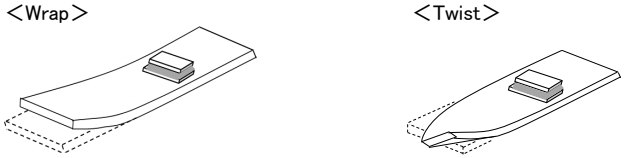
Precautions

◆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

◆Adjustment of mounting machine
1. When installing products, care should be taken not to apply distortion stress as it may deform the products.
2. Stress may be applied to a product with a warp or a twist in handling of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility.
(LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)

＜Wrap＞ ＜Twist＞



4. Soldering

Precautions

◆Reflow soldering
1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified.
2. The product shall be used reflow soldering only.
3. Please do not add any stress to a product until it returns in normal temperature after reflow soldering.

◆Lead free soldering
1. When using products with lead free soldering, we request to use them after confirming adhesion, temperature of resistance to soldering heat, soldering etc sufficiently.

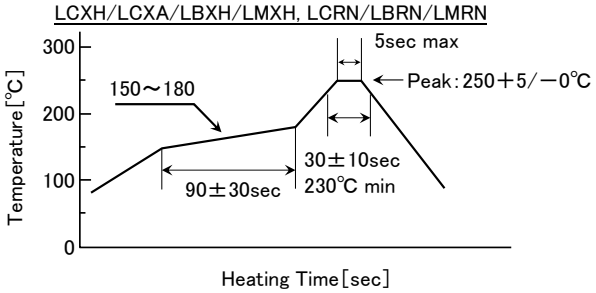
◆Recommended conditions for using a soldering iron
- Put the soldering iron on the land-pattern.
- Soldering iron's temperature – Below 350℃
- Duration – 3 seconds or less
- The soldering iron should not directly touch the inductor.

Technical considerations

◆Reflow soldering
1. If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products.

Recommended reflow condition (Pb free solder)

LCXN/LCXP/LBXN/LBXP/LMXN/LMXP,
LCXH/LCXA/LBXH/LMXH, LCRN/LBRN/LMRN



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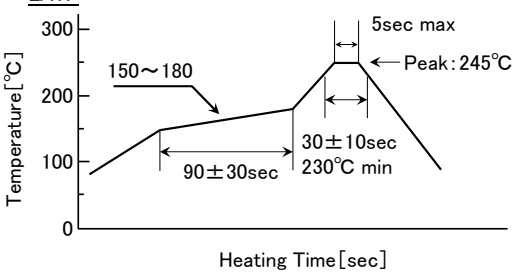


5. Cleaning	
Precautions	◆Cleaning conditions 1. Washing by supersonic waves shall be avoided.
Technical considerations	◆Cleaning conditions 1. If washed by supersonic waves, the products might be broken.

6. Handling	
Precautions	◆Handling 1. Keep the product away from all magnets and magnetic objects. ◆Breakaway PC boards (splitting along perforations) 1. When splitting the PC board after mounting product, 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 product any excessive mechanical shocks. 2. Please do not add any shock and power to a product in transportation. ◆Pick-up pressure 1. Please do not push to add any pressure to a winding part. Please do not give any shock and push into a ferrite core exposure part. ◆Packing 1. Please avoid accumulation of a packing box as much as possible.
Technical considerations	◆Handling 1. There is a case that a characteristic varies with magnetic influence. ◆Breakaway PC boards (splitting along perforations) 1. The position of the product on PCBs shall be carefully considered to minimize the stress caused from splitting of the PCBs. ◆Mechanical considerations 1. There is a case to be damaged by a mechanical shock. 2. There is a case to be broken by the handling in transportation. ◆Pick-up pressure 1. Damage and a characteristic can vary with an excessive shock or stress. ◆Packing 1. If packing boxes are accumulated, that could cause a deformation on packing tapes or a damage on the products.

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. ・ Recommended conditions Ambient temperature : －5～40℃ Humidity : Below 70% RH ・ The ambient temperature must be kept 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.

Wire-wound Ferrite Power Inductors LCXH series for Automotive Body & Chassis and Infotainment

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

LCXH
AEC-Q200 Grade 2 (we conduct the evaluation at the test condition of Grade 2.)
*Operating environment Temp:-40～105℃

REFLOW
AEC-Q200

■PART NUMBER　　*Operating Temp. :　-40～125℃(Including self-generated heat)

L	C	X	H	F	6	0	6	0	Y	E	L	1	0	0	M	M	R
①				②	③				④		⑤	⑥			⑦	⑧	

①Series

Code (1)(2)(3)(4)	
LCXH	Wire-wound Ferrite Power Inductor for Automotive Body & Chassis and Infotainment

(1) Product Group

Code	
L	Inductors

(2) Category

Code	Recommended equipment	Quality Grade
C	Automotive Electronic Equipment (Body & Chassis, Infotainment)	2

(3) Type

Code	
X	Ferrite Wire-wound (Drum type)

(4) Features, Characteristics

Code	
H	Hybrid power choke

②Features

Code	Feature
F	Bottom electrode (Ag×solder) for fillet

③Dimensions(L×W)

Code	Dimensions(L×W)[mm]
3030	3.0×3.0
4040	4.0×4.0
5050	5.0×5.0
6060	6.0×6.0

④Dimensions(H)

Code	Dimensions(H)[mm]
QK	1.5
WK	2.0
WB	2.2
XA	3.1
YE	4.5

⑤Packaging

Code	Packaging
T	Taping
L	Taping

⑥Nominal inductance

Code (example)	Nominal inductance[μH]
2R2	2.2
100	10
101	100

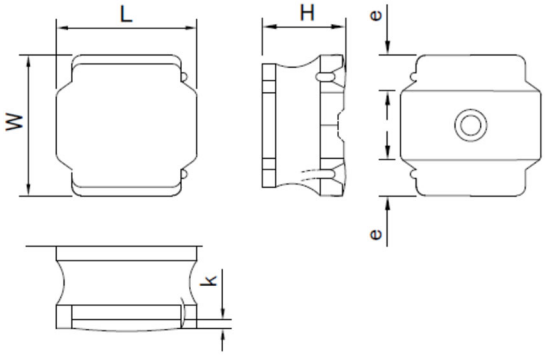
※R=Decimal point

⑦Inductance tolerance

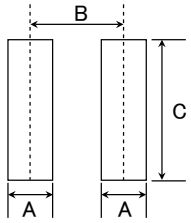
Code	Inductance tolerance
M	±20%
N	±30%

⑧Internal code

■STANDARD EXTERNAL DIMENSIONS / STANDARD QUANTITY



Recommended Land Patterns

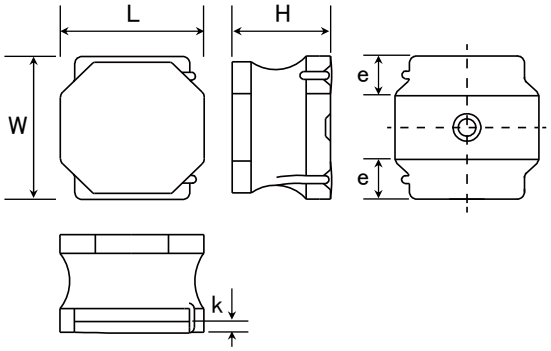


Type	A	B	C
3030	1.3	2.3	2.7
4040	1.5	3.3	3.5
5050	1.9	4.2	3.8

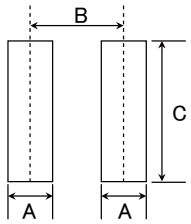
Unit : mm

Type	L	W	H	e	k(ref)	Standard quantity [pcs] Taping
3030QK	3.0±0.2 (0.118±0.008)	3.0±0.2 (0.118±0.008)	1.5 max (0.059 max)	0.8±0.3 (0.031±0.012)	0.1 min (0.004 min)	2000
4040WK	4.0±0.2 (0.158±0.008)	4.0±0.2 (0.158±0.008)	2.0 max (0.079 max)	1.0±0.3 (0.039±0.012)	0.1 min (0.004 min)	700
5050WB	5.0±0.2 (0.197±0.008)	5.0±0.2 (0.197±0.008)	2.2 max (0.088 max)	1.3±0.3 (0.051±0.012)	0.2 min (0.008 min)	800
5050XA	5.0±0.2 (0.197±0.008)	5.0±0.2 (0.197±0.008)	3.1 max (0.122 max)	1.3±0.3 (0.051±0.012)	0.2 min (0.008 min)	500

Unit : mm(inch)



Recommended Land Patterns



Type	A	B	C
6060	2.4	5.0	4.8

Unit : mm

Type	L	W	H	e	k(ref)	Standard quantity [pcs] Taping
6060YE	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	4.5 max (0.177 max)	1.65±0.3 (0.053±0.012)	0.3 min (0.012 min)	1500

Unit : mm(inch)

■PART NUMBER

・All the Wire-wound Ferrite Power Inductors of the catalog lineup are RoHS compliant.

Notes)

・The exchange of individual specifications is necessary depending on your application and/or circuit condition. Please contact TAIYO YUDEN's official sales channel.

・For Automotive (AEC-Q200 Qualified) products for BODY & CHASSIS, and INFOTAINMENT. Please check "Automotive Application Guide" for further details before using the products.

＜ AEC-Q200 ：AEC-Q200 qualified＞

All the Wire-wound Ferrite Power Inductors for Automotive products are tested based on the test conditions and methods defined in AEC-Q200 by family item.
Please consult with TAIYO YUDEN's official sales channel for the details of the product specifications and AEC-Q200 test results, etc.,
and please review and approve the product specifications before ordering.

●3030QK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	DC Resistance [mΩ] Max (Typ)	Rated current ※) [A]			Measuring frequency [MHz]
					Saturation current Idc1 Max (Typ)	Temperature rise current① Idc2 Max (Typ)	Temperature rise current② Idc2 Max (Typ)	
LCXHF3030QKTR47MNR	NRM3015T R47MNRSV	0.47	±20%	23 (18)	3.10 (4.50)	2.20 (2.60)	4.00 (4.55)	0.1
LCXHF3030QKT1R0MNR	NRM3015T 1R0MNRSV	1	±20%	33 (28)	2.30 (3.20)	1.70 (2.10)	3.20 (3.60)	0.1
LCXHF3030QKT1R5MNR	NRM3015T 1R5MNRSV	1.5	±20%	46 (38)	1.80 (2.25)	1.60 (2.00)	2.60 (2.95)	0.1
LCXHF3030QKT2R2MNR	NRM3015T 2R2MNRSV	2.2	±20%	72 (60)	1.50 (1.90)	1.40 (1.80)	2.30 (2.60)	0.1
LCXHF3030QKT3R3MNR	NRM3015T 3R3MNRSV	3.3	±20%	96 (80)	1.20 (1.63)	1.20 (1.60)	1.90 (2.20)	0.1
LCXHF3030QKT4R7MNR	NRM3015T 4R7MNRSV	4.7	±20%	120 (100)	1.00 (1.40)	1.00 (1.40)	1.70 (1.90)	0.1
LCXHF3030QKT6R8MNR	NRM3015T 6R8MNRSV	6.8	±20%	168 (140)	0.90 (1.15)	0.85 (1.20)	1.40 (1.60)	0.1
LCXHF3030QKT100MNR	NRM3015T 100MNRSV	10	±20%	228 (190)	0.76 (0.91)	0.75 (1.00)	1.24 (1.40)	0.1
LCXHF3030QKT220MNR	NRM3015T 220MNRSV	22	±20%	504 (420)	0.51 (0.66)	0.53 (0.70)	0.85 (0.95)	0.1
LCXHF3030QKT470MNR	NRM3015T 470MNRSV	47	±20%	980 (820)	0.29 (0.39)	0.38 (0.50)	0.60 (0.65)	0.1
LCXHF3030QKT101MNR	NRM3015T 101MNRSV	100	±20%	2028 (1690)	0.21 (0.27)	0.24 (0.33)	0.40 (0.45)	0.1

●4040WK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	DC Resistance [mΩ] Max (Typ)	Rated current ※) [A]			Measuring frequency [MHz]
					Saturation current Idc1 Max (Typ)	Temperature rise current① Idc2 Max (Typ)	Temperature rise current② Idc2 Max (Typ)	
LCXHF4040WKT1R0MNR	NRM4020T 1R0MNRRV	1	±20%	31 (26)	4.60 (5.30)	2.43 (3.36)	3.66 (4.15)	0.1
LCXHF4040WKT2R2MNR	NRM4020T 2R2MNRRV	2.2	±20%	52 (43)	3.00 (3.40)	1.91 (2.65)	3.00 (3.37)	0.1
LCXHF4040WKT4R7MNR	NRM4020T 4R7MNRRV	4.7	±20%	84 (70)	2.00 (2.40)	1.50 (2.08)	2.27 (2.60)	0.1
LCXHF4040WKT100MNR	NRM4020T 100MNRRV	10	±20%	156 (130)	1.50 (1.70)	1.05 (1.45)	1.63 (1.85)	0.1
LCXHF4040WKT220MNR	NRM4020T 220MNRRV	22	±20%	360 (300)	1.00 (1.20)	0.71 (0.99)	1.09 (1.25)	0.1
LCXHF4040WKT470MNR	NRM4020T 470MNRRV	47	±20%	660 (550)	0.70 (0.80)	0.53 (0.73)	0.80 (0.85)	0.1
LCXHF4040WKT101MNR	NRM4020T 101MNRRV	100	±20%	1512 (1260)	0.46 (0.57)	0.34 (0.48)	0.53 (0.56)	0.1
LCXHF4040WKT221MNR	NRM4020T 221MNRRV	220	±20%	3360 (2800)	0.33 (0.37)	0.23 (0.32)	0.36 (0.375)	0.1

●5050WB type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	DC Resistance [mΩ] Max (Typ)	Rated current ※) [A]			Measuring frequency [MHz]
					Saturation current Idc1 Max (Typ)	Temperature rise current① Idc2 Max (Typ)	Temperature rise current② Idc2 Max (Typ)	
LCXHF5050WBTR47NMR	NRM5020T R47NMRRV	0.47	±30%	14.4 (12)	6.60 (7.40)	3.60 (5.00)	6.00 (6.80)	0.1
LCXHF5050WBT1R0NMR	NRM5020T 1R0NMRPV	1	±30%	24 (20)	5.00 (5.50)	2.60 (3.60)	4.40 (4.90)	0.1
LCXHF5050WBT2R2NMR	NRM5020T 2R2NMRPV	2.2	±30%	36 (30)	3.20 (3.60)	2.10 (2.90)	3.50 (4.00)	0.1
LCXHF5050WBT4R7MMR	NRM5020T 4R7MMRRV	4.7	±20%	69.6 (58)	2.10 (2.40)	1.50 (2.10)	2.60 (2.90)	0.1
LCXHF5050WBT100MMR	NRM5020T 100MMRRV	10	±20%	127.2 (106)	1.50 (1.70)	1.10 (1.50)	1.80 (2.00)	0.1
LCXHF5050WBT220MMR	NRM5020T 220MMRRV	22	±20%	280 (230)	1.10 (1.20)	0.80 (1.10)	1.30 (1.50)	0.1
LCXHF5050WBT470MMR	NRM5020T 470MMRRV	47	±20%	520 (435)	0.73 (0.81)	0.58 (0.80)	0.97 (1.00)	0.1
LCXHF5050WBT101MMR	NRM5020T 101MMRRV	100	±20%	1020 (850)	0.50 (0.56)	042 (0.58)	0.69 (0.78)	0.1

●5050XA type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	DC Resistance [mΩ] Max (Typ)	Rated current ※) [A]			Measuring frequency [MHz]
					Saturation current Idc1 Max (Typ)	Temperature rise current① Idc2 Max (Typ)	Temperature rise current② Idc2 Max (Typ)	
LCXHF5050XATR47NMR	NRM5030T R47NMRPV	0.47	±30%	13 (10)	11.00 (12.00)	4.10 (5.50)	6.80 (7.70)	0.1
LCXHF5050XAT1R0NMR	NRM5030T 1R0NMRPV	1	±30%	18.5 (14)	7.50 (8.00)	3.10 (4.30)	5.10 (5.80)	0.1
LCXHF5050XAT1R5NMR	NRM5030T 1R5NMRPV	1.5	±30%	21.6 (18)	6.30 (6.80)	2.80 (3.70)	4.50 (5.10)	0.1
LCXHF5050XAT2R2NMR	NRM5030T 2R2NMRPV	2.2	±30%	29 (24)	5.10 (5.60)	2.50 (3.40)	4.00 (4.60)	0.1
LCXHF5050XAT3R3NMR	NRM5030T 3R3NMRPV	3.3	±30%	37 (32)	4.30 (4.80)	2.10 (2.90)	3.50 (3.90)	0.1
LCXHF5050XAT4R7MMR	NRM5030T 4R7MMRPV	4.7	±20%	52 (43)	3.50 (3.90)	1.90 (2.50)	3.00 (3.40)	0.1
LCXHF5050XAT6R8MMR	NRM5030T 6R8MMRPV	6.8	±20%	78 (65)	3.00 (3.40)	1.35 (1.95)	2.25 (2.50)	0.1
LCXHF5050XAT100MMR	NRM5030T 100MMRPV	10	±20%	115 (96)	2.50 (2.75)	1.10 (1.60)	1.90 (2.10)	0.1
LCXHF5050XAT220MMR	NRM5030T 220MMRPV	22	±20%	228 (190)	1.70 (1.90)	0.80 (1.10)	1.30 (1.50)	0.1
LCXHF5050XAT470MMR	NRM5030T 470MMRPV	47	±20%	360 (300)	0.85 (1.00)	0.60 (0.85)	1.00 (1.20)	0.1
LCXHF5050XAT101MMR	NRM5030T 101MMRQV	100	±20%	733 (611)	0.55 (0.60)	0.45 (0.60)	0.70 (0.80)	0.1
LCXHF5050XAT221MMR	NRM5030T 221MMRQV	220	±20%	1692 (1412)	0.38 (0.41)	0.28 (0.38)	0.46 (0.53)	0.1
LCXHF5050XAT471MMR	NRM5030T 471MMRQV	470	±20%	3672 (3060)	0.25 (0.28)	0.17 (0.24)	0.30 (0.35)	0.1

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20℃)
※) The temperature rise current value (Idc2)① is the DC current value having temperature increase up to 20℃. (at 20℃)
※) The temperature rise current value (Idc2)② is the DC current value having temperature increase up to 40℃. (at 20℃)
※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

■PART NUMBER

●6060YE type

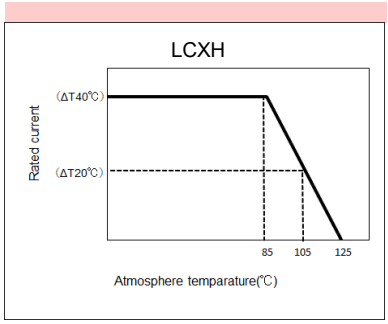
New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	DC Resistance [mΩ] Max (Typ)	Rated current ※) [A]			Measuring frequency [MHz]
					Saturation current Idc1 Max (Typ)	Temperature rise current① Idc2 Max (Typ)	Temperature rise current② Idc2 Max (Typ)	
LCXHF6060YEL1R0NMR	NRM6045T 1R0NMRRV	1	±30%	13 (10)	13.50 (14.50)	4.00 (6.00)	6.20 (7.00)	0.1
LCXHF6060YEL1R5NMR	NRM6045T 1R5NMRRV	1.5	±30%	19 (14)	10.00 (11.00)	3.40 (4.70)	5.50 (6.40)	0.1
LCXHF6060YEL2R2NMR	NRM6045T 2R2NMRRV	2.2	±30%	23 (18)	8.50 (9.50)	3.00 (4.00)	4.40 (5.10)	0.1
LCXHF6060YEL3R3MMR	NRM6045T 3R3MMRSV	3.3	±20%	27.6(23)	7.00 (7.50)	2.50 (3.50)	4.00 (4.50)	0.1
LCXHF6060YEL4R7MMR	NRM6045T 4R7MMRRV	4.7	±20%	36 (30)	6.00 (6.50)	2.20 (3.00)	3.60 (3.90)	0.1
LCXHF6060YEL6R8MMR	NRM6045T 6R8MMRRV	6.8	±20%	52 (43)	5.10 (5.60)	1.90 (2.60)	3.10 (3.50)	0.1
LCXHF6060YEL100MMR	NRM6045T 100MMRSV	10	±20%	60 (50)	4.00 (4.40)	1.80 (2.40)	2.60 (3.20)	0.1
LCXHF6060YEL150MMR	NRM6045T 150MMRRV	15	±20%	105 (87)	3.10 (3.50)	1.40 (1.80)	2.15 (2.45)	0.1
LCXHF6060YEL220MMR	NRM6045T 220MMRRV	22	±20%	132 (110)	2.50 (3.00)	1.20 (1.60)	1.80 (2.00)	0.1
LCXHF6060YEL330MMR	NRM6045T 330MMRRV	33	±20%	216 (180)	1.75 (1.95)	0.75 (0.95)	1.25 (1.35)	0.1
LCXHF6060YEL470MMR	NRM6045T 470MMRRV	47	±20%	272 (227)	1.55 (1.70)	0.70 (0.90)	1.20 (1.30)	0.1
LCXHF6060YEL680MMR	NRM6045T 680MMRRV	68	±20%	385 (320)	1.20 (1.30)	0.65 (0.85)	1.05 (1.20)	0.1
LCXHF6060YEL101MMR	NRM6045T 101MMRRV	100	±20%	600 (475)	1.05 (1.15)	0.55 (0.70)	0.85 (0.95)	0.1
LCXHF6060YEL151MMR	NRM6045T 151MMRRV	150	±20%	816 (680)	0.83 (0.90)	0.48 (0.65)	0.76 (0.85)	0.1
LCXHF6060YEL221MMR	NRM6045T 221MMRRV	220	±20%	1320 (1100)	0.70 (0.75)	0.35 (0.50)	0.57 (0.65)	0.1
LCXHF6060YEL331MMR	NRM6045T 331MMRRV	330	±20%	1872 (1580)	0.55 (0.60)	0.29 (0.39)	0.45 (0.54)	0.1
LCXHF6060YEL471MMR	NRM6045T 471MMRRV	470	±20%	2760 (2300)	0.45 (0.50)	0.22 (0.30)	0.38 (0.45)	0.1

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20℃)
※) The temperature rise current value (Idc2)① is the DC current value having temperature increase up to 20℃. (at 20℃)
※) The temperature rise current value (Idc2)② is the DC current value having temperature increase up to 40℃. (at 20℃)
※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

■Derating of Rated Current

●LCXH series

Derating of current is necessary for LCXH series depending on ambient temperature.
Please refer to the chart shown below for appropriate derating of current.



Wire-wound Ferrite Power Inductors LSXB/LSXN/LSXP/LCXN/LCXP/LBXN/LBXP/ LLXB/LLXN/LLXP/LMXN/LMXP series
Wire-wound Ferrite Power Inductors LCXH/LBXH/LMXH series
Wire-wound Ferrite Inductors for Class D Amplifier LCXA

■PACKAGING

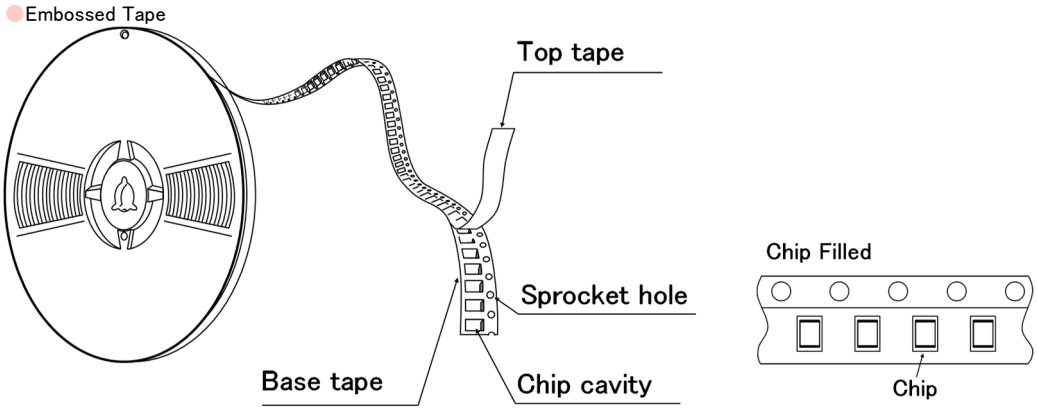
①Minimum Quantity

Type	Standard Quantity [pcs]
	Tape & Reel
2020KK	2500
2020MK	2500
2424KK	2500
2424MK	2500
3030KK	2000
3030MK	2000
3030QK	2000
4040KK	5000
4040MK	4500
4040TK	3500
4040WK	700

Type	Standard Quantity [pcs]
	Tape & Reel
5050KK	1000
5050MK	1000
5050PK	1000
5050WB	800
5050WK	800
5050WD 5050WE	2500
5050XK 5050XA	500
5050YA 5050YK	1500
6060KK	1000
6060MK	1000
6060PK	1000
6060WK	2500
6060WH	2000
6060YE	1500
8080XK	1000
8080YK 8080YB	1000

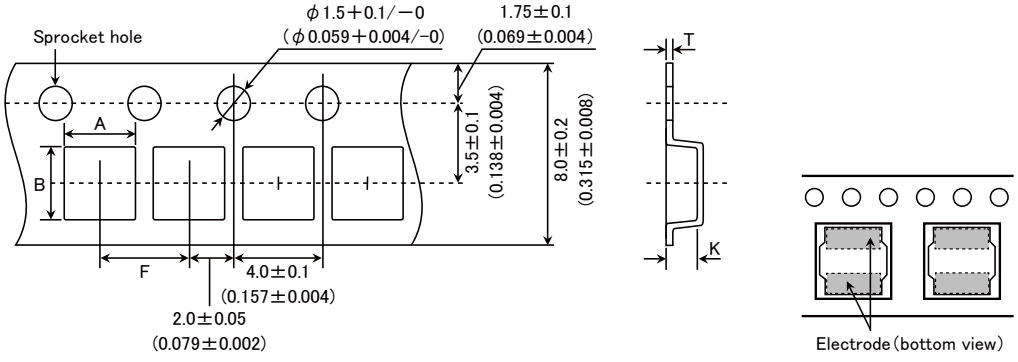
②Tape Material

●Embossed Tape



③Taping dimensions

●Embossed tape 8mm wide (0.315 inches wide)

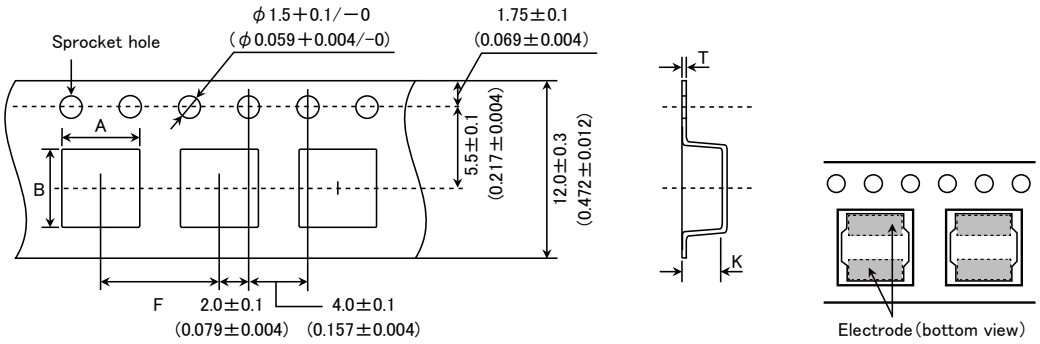


▸ This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification.
For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (http://www.ty-top.com/)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

Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
2020KK 2020MK	2.2±0.1 (0.102±0.004)	2.2±0.1 (0.102±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.009±0.002)	1.3±0.1 (0.051±0.004)
2424KK 2424MK	2.6±0.1 (0.087±0.004)	2.6±0.1 (0.102±0.004)		0.25±0.05 (0.009±0.002)	1.3±0.1 (0.051±0.004)
3030KK	3.2±0.1 (0.126±0.004)	3.2±0.1 (0.126±0.004)		0.3±0.05 (0.012±0.002)	1.4±0.1 (0.055±0.004)
3030MK					1.6±0.1 (0.063±0.004)
3030QK					1.9±0.1 (0.075±0.004)

Unit : mm (inch)

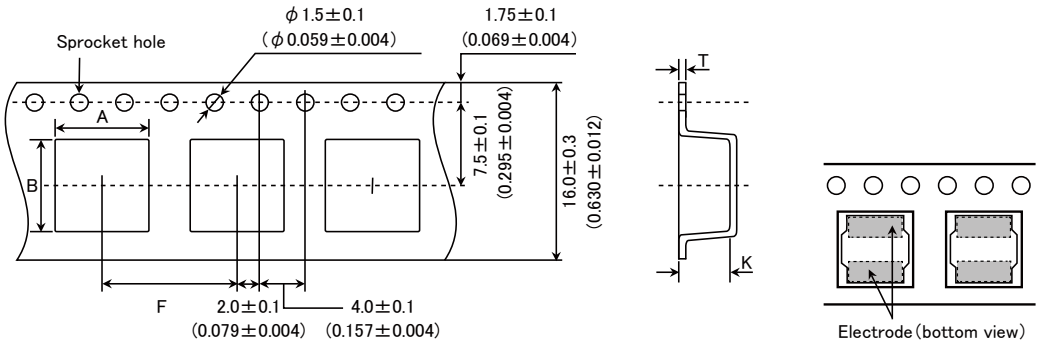
Embossed tape 12mm wide (0.47 inches wide)



Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
4040KK	4.3±0.1 (0.169±0.004)	4.3±0.1 (0.169±0.004)	8.0±0.1 (0.315±0.004)	0.3±0.1 (0.012±0.004)	1.4±0.1 (0.055±0.004)
4040MK					1.6±0.1 (0.063±0.004)
4040TK 4040WK					2.1±0.1 (0.083±0.004)
5050KK	5.25±0.1 (0.207±0.004)	5.25±0.1 (0.207±0.004)			1.4±0.1 (0.055±0.004)
5050MK					1.4±0.1 (0.055±0.004)
5050PK					1.6±0.1 (0.063±0.004)
5050WB 5050WK					2.3±0.1 (0.091±0.004)
5050WD 5050WE					2.7±0.1 (0.106±0.004)
5050XK 5050XA	5.15±0.1 (0.203±0.004)	5.15±0.1 (0.203±0.004)		0.4±0.1 (0.016±0.004)	3.2±0.1 (0.126±0.004)
5050YK 5050YA	5.15±0.1 (0.203±0.004)	5.15±0.1 (0.203±0.004)			4.2±0.1 (0.165±0.004)
6060KK	6.3±0.1 (0.248±0.004)	6.3±0.1 (0.248±0.004)			1.4±0.1 (0.055±0.004)
6060MK					1.6±0.1 (0.063±0.004)
6060PK					1.6±0.1 (0.063±0.004)
6060WK					2.3±0.1 (0.090±0.004)
6060WH					3.1±0.1 (0.122±0.004)
6060YE					4.7±0.1 (0.185±0.004)

Unit : mm (inch)

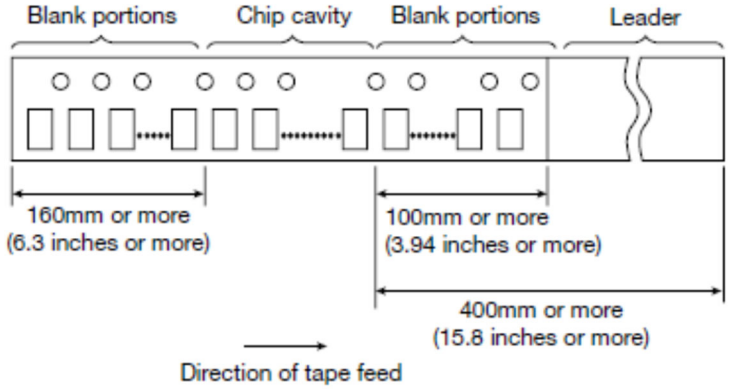
Embossed tape 16mm wide (0.63 inches wide)



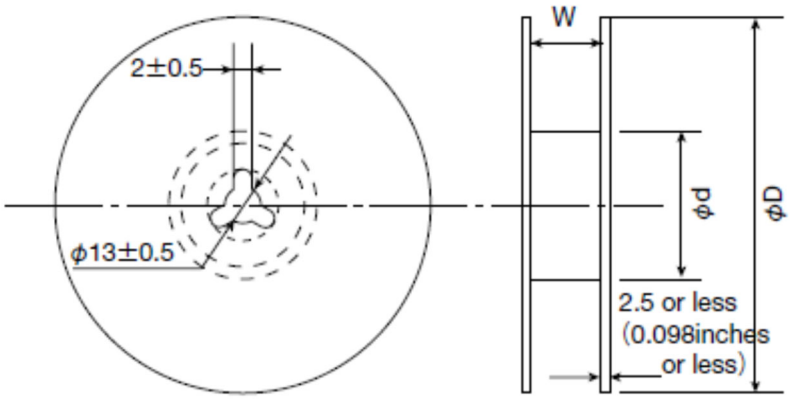
Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
8080XK	8.3±0.1 (0.327±0.004)	8.3±0.1 (0.327±0.004)	12.0±0.1 (0.472±0.004)	0.5±0.1 (0.020±0.004)	3.4±0.1 (0.134±0.004)
8080YK 8080YB					4.5±0.1 (0.177±0.004)

Unit : mm (inch)

④Leader and Blank portion

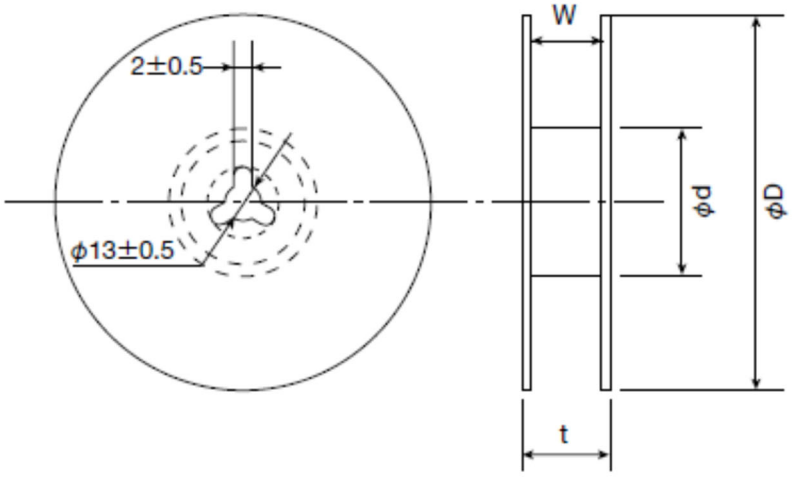


⑤Reel size



Type	Reel size (Reference values)		
	ϕD	ϕd	W
2020KK	180±0.5 (7.087±0.019)	60±1.0 (2.36±0.04)	10.0±1.5 (0.394±0.059)
2020MK			
2424KK			
2424MK			
3030KK			
3030MK			
3030QK			
4040WK	180±3.0 (7.087±0.118)	60±2.0 (2.36±0.08)	14.0±1.5 (0.551±0.059)
5050KK			
5050MK			
5050PK			
5050WB			
5050WK			
5050XK			
5050XA			
6060KK			
6060MK			
6060PK			

Unit : mm (inch)

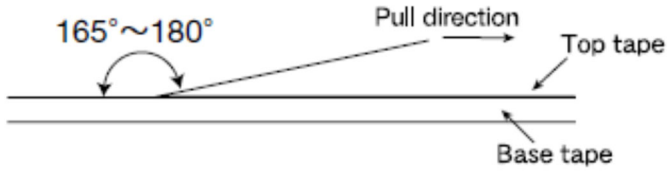


Type	Reel size (Reference values)			
	ϕD	ϕd	t (max.)	W
4040KK	330±3.0 (12.99±0.118)	80±2.0 (3.15±0.078)	18.5 (0.72)	13.5±1.0 (0.531±0.04)
4040MK				
4040TK				
5050WD				
5050WE				
5050YA				
5050YK				
6060WK				
6060WH				
6060YE				
8080XK			22.5 (0.89)	17.5±1.0 (0.689±0.04)
8080YK				
8080YB				

Unit : mm (inch)

⑥Top Tape Strength

The top tape requires a peel-off force of 0.1 to 1.3N in the direction of the arrow as illustrated below.



Wire-wound Ferrite Power Inductors LCXH series
for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Inductors for Class D Amplifier LCXA
for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Power Inductors LBXH series
for Telecommunications Infrastructure and Industrial Equipment
Wire-wound Ferrite Power Inductors LMXH series
for Medical Devices classified as GHTF Class C (Japan Class III)

■RELIABILITY DATA

1. Operating Temperature Range	
Specified Value	−40～＋125℃(Including self-generated heat)
Test Methods and Remarks	Including self-generated heat

2. Storage Temperature Range	
Specified Value	−40～＋125℃
Test Methods and Remarks	−5 to 40℃ for the product with taping.

3. Rated current	
Specified Value	Within the specified tolerance

4. Inductance	
Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : LCR Meter (HP 4285A or equivalent) Measuring frequency : 100kHz, 1V

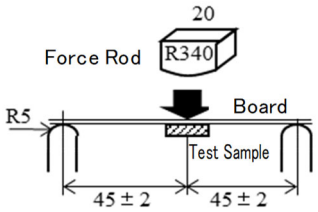
5. DC Resistance	
Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : DC ohmmeter (HIOKI 3227 or equivalent)

6. Temperature characteristic	
Specified Value	Inductance change : Within ±20%
Test Methods and Remarks	Measurement of inductance shall be taken at temperature range within −40℃～＋125℃. With reference to inductance value at ＋20℃., change rate shall be calculated. Change of maximum inductance deviation in step 1 to 5

Step	Temperature(℃)
1	20
2	Minimum operating temperature
3	20 (Standard temperature)
4	Maximum operating temperature
5	20

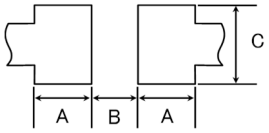
7. Resistance to flexure of substrate

Specified Value	No damage
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. As illustrated below, apply force in the direction of the arrow indicating until deflection of the test board reaches to 2 mm. Test board size : 100×40×1.6 mm Test board material : glass epoxy-resin Solder cream thickness : 0.10mm (3030～4040 type) : 0.15mm (5050～6060 type)



Unit : mm

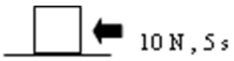
Land dimension



Type	A	B	C
3030	1.3	1.0	2.7
4040	1.5	1.8	3.5
5050	1.9	2.3	3.8
6060	2.4	2.6	4.8

8. Adhesion of terminal electrode

Specified Value	Shall not come off PC board
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. Applied force : 10N Duration : 5s. Solder cream thickness : 0.10mm(3030～4040 type) : 0.15mm(5050～6060 type)



9. Resistance to vibration

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

Test Methods and Remarks

The test samples shall be soldered to the test board by the reflow.
Then it shall be submitted to below test conditions.

Frequency Range	10～55Hz	
Total Amplitude	1.5mm (May not exceed acceleration 196m/s^2)	
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 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

10. Solderability

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

Test Methods and Remarks

The test samples shall be dipped in flux, and then immersed in molten solder as shown in below table.
Flux : Ethanol solution containing rosin 25%.

Solder Temperature	245±5℃
Time	5±1.0 sec.

※Immersion depth : All sides of mounting terminal shall be immersed.

11. Resistance to soldering heat

Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	The test sample shall be exposed to reflow oven at 230±5℃ for 40 seconds, with peak temperature at 260±5℃ for 5 seconds, 2 times. Test board material : glass epoxy-resin Test board thickness : 1.0mm

12. Thermal shock

Specified Value

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

Test Methods and Remarks

The test samples shall be soldered to the test board by the reflow. The test samples shall be placed at specified temperature for specified time by step 1 to step 4 as shown in below table in sequence. The temperature cycle shall be repeated 1000 cycles.

LCXH/LBXH/LMXH

Conditions of 1 cycle		
段階	Temperature (℃)	Duration (min)
1	−40±3	30±3
2	Room temperature	Within 3
3	+105±3	30±3
4	Room temperature	Within 3

LCXA

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

13. Damp heat

Specified Value

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

Test Methods and Remarks

The test samples shall be soldered to the test board by the reflow.
The test samples shall be placed in thermostatic oven set at specified temperature and humidity as shown in below table.

Temperature	85±2℃
Humidity	85%RH
Time	1000+24/−0 hour

14. Low temperature life test

Specified Value

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

Test Methods and Remarks

The test samples shall be soldered to the test board by the reflow. After that, the test samples shall be placed at test conditions as shown in below table.

Temperature	−40±2℃
Time	1000+24/−0 hour

15. High temperature life test

Specified Value

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

Test Methods and Remarks

The test samples shall be soldered to the test board by the reflow. After that, the test samples shall be placed at test conditions as shown in below table.

Temperature	125±3℃
Time	1000 hour

16. Loading at high temperature life test

Specified Value

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

Test Methods and Remarks

The test samples shall be soldered to the test board by the reflow soldering.

LCXH/LBXH/LMXH

Temperature	1) 85±2℃ 2) 105±3℃
Applied current	1) Rated current (+40℃) 2) Rated current (+20℃)
Time	1000+24/−0 hour

LCXA

Temperature	85±2℃
Applied current	Rated current
Time	1000+24/−0 hour

17. Standard condition

Specified Value

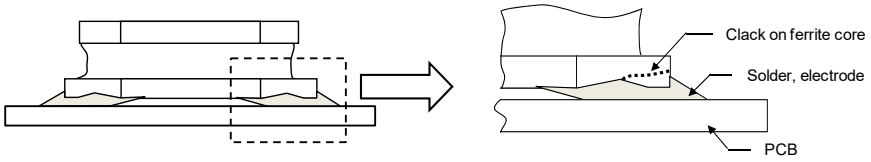
Standard test condition :
Unless otherwise specified, temperature is 20±15℃ and 65±20%of relative humidity.
When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of 20±2℃ of temperature, 65±5% relative humidity.
Inductance is in accordance with our measured value.

Wire-wound Ferrite Power Inductors LAYP series for Automotive Powertrain and safety
Wire-wound Ferrite Power Inductors LCXN/LCXP series for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Power Inductors LCXH series for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Inductors for Class D Amplifier LCXA for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Power Inductors LCRN series for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Power Inductors LBXN/LBXP series for Telecommunications Infrastructure and Industrial Equipment
Wire-wound Ferrite Power Inductors LBXH series for Telecommunications Infrastructure and Industrial Equipment
Wire-wound Ferrite Power Inductors LBRN series for Telecommunications Infrastructure and Industrial Equipment
Wire-wound Ferrite Power Inductors LMXN/LMXP series for Medical Devices classified as GHTF Class C (Japan Class III)
Wire-wound Ferrite Power Inductors LMXH series for Medical Devices classified as GHTF Class C (Japan Class III)
Wire-wound Ferrite Power Inductors LMRN series for Medical Devices classified as GHTF Class C (Japan Class III)

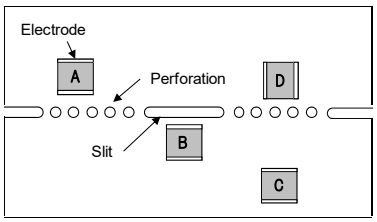
■PRECAUTIONS

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 refer to a recommended land pattern. 2. There is stress, which has been caused by distortion of a PCB, to the inductor. (LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) 3. Please consider the arrangement of parts on a PCB. (LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)
Technical considerations	◆Land pattern design Surface Mounting 1. Mounting and soldering conditions should be checked beforehand. 2. Applicable soldering process to this products is reflow soldering only. 3. Please use the recommended land pattern shown as below. Electrical characteristics and the mounting ability of the product are being considered in the recommended land pattern. If a PCB is designed with other dimensions, defective soldering and stress to a product may occur due to misalignment. The performance of the product may not be brought out. If an adopted land pattern is different from the recommended land pattern, stress to the product will increase. It may cause cracks or defective electrical characteristics of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) 4. As coefficients of thermal expansion between an inductor and a PCB differs, cracks may occur on a ferrite core when thermal stress is applied to them after mounting an inductor. (Please refer to the drawings below.) Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)



5. SMD inductors should be located to minimize any possible mechanical stresses from board warp or deflection. When splitting the PC board after mounting inductors and other components, care is required so as not to give any stresses of deflection or twisting to the board.
(LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)



A product tends to undergo stress in order "A>C>B≡D".
Please consider the layouts of a product to minimize any stresses.

3. Considerations for automatic placement

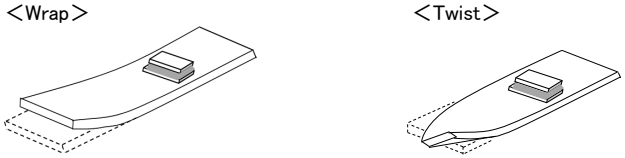
Precautions

◆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

◆Adjustment of mounting machine
1. When installing products, care should be taken not to apply distortion stress as it may deform the products.
2. Stress may be applied to a product with a warp or a twist in handling of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility.
(LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)

＜Wrap＞ ＜Twist＞



4. Soldering

Precautions

◆Reflow soldering
1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified.
2. The product shall be used reflow soldering only.
3. Please do not add any stress to a product until it returns in normal temperature after reflow soldering.

◆Lead free soldering
1. When using products with lead free soldering, we request to use them after confirming adhesion, temperature of resistance to soldering heat, soldering etc sufficiently.

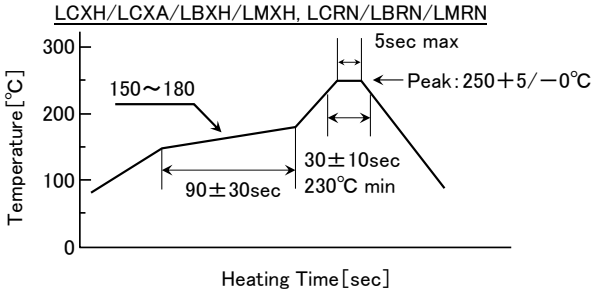
◆Recommended conditions for using a soldering iron
- Put the soldering iron on the land-pattern.
- Soldering iron's temperature – Below 350℃
- Duration – 3 seconds or less
- The soldering iron should not directly touch the inductor.

Technical considerations

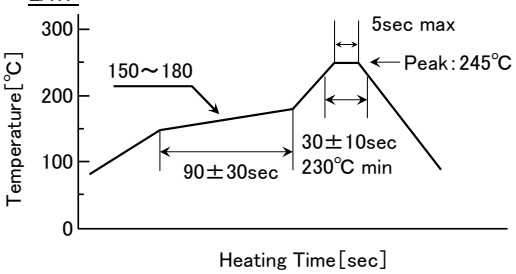
◆Reflow soldering
1. If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products.

Recommended reflow condition (Pb free solder)

LCXN/LCXP/LBXN/LBXP/LMXN/LMXP,
LCXH/LCXA/LBXH/LMXH, LCRN/LBRN/LMRN



LAYP



5. Cleaning	
Precautions	◆Cleaning conditions 1. Washing by supersonic waves shall be avoided.
Technical considerations	◆Cleaning conditions 1. If washed by supersonic waves, the products might be broken.

6. Handling	
Precautions	◆Handling 1. Keep the product away from all magnets and magnetic objects. ◆Breakaway PC boards (splitting along perforations) 1. When splitting the PC board after mounting product, 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 product any excessive mechanical shocks. 2. Please do not add any shock and power to a product in transportation. ◆Pick-up pressure 1. Please do not push to add any pressure to a winding part. Please do not give any shock and push into a ferrite core exposure part. ◆Packing 1. Please avoid accumulation of a packing box as much as possible.
Technical considerations	◆Handling 1. There is a case that a characteristic varies with magnetic influence. ◆Breakaway PC boards (splitting along perforations) 1. The position of the product on PCBs shall be carefully considered to minimize the stress caused from splitting of the PCBs. ◆Mechanical considerations 1. There is a case to be damaged by a mechanical shock. 2. There is a case to be broken by the handling in transportation. ◆Pick-up pressure 1. Damage and a characteristic can vary with an excessive shock or stress. ◆Packing 1. If packing boxes are accumulated, that could cause a deformation on packing tapes or a damage on the products.

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. ・ Recommended conditions Ambient temperature : －5～40℃ Humidity : Below 70% RH ・ The ambient temperature must be kept 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.

Wire-wound Ferrite Inductors for Class D Amplifier LCXA for Automotive Body & Chassis and Infotainment

LCXA
AEC-Q200 Grade 3 (we conduct the evaluation at the test condition of Grade 3.)
*Operating environment Temp:-40～85℃

REFLOW
AEC-Q200

■PART NUMBER

*Operating Temp. : -40～125℃(Including self-generated heat)

L	C	X	A	F	6	0	6	0	Y	E	L	3	R	3	M	M	R
①				②	③				④		⑤	⑥			⑦	⑧	

①Series

Code (1)(2)(3)(4)	
LCXA	Wire-wound Ferrite Inductors for Class D Amplifiers for Automotive Body & Chassis and Infotainment

(1) Product Group

Code	
L	Inductors

(2) Category

Code	Recommended equipment	Quality Grade
C	Automotive Electronic Equipment (Body & Chassis, Infotainment)	2

(3) Type

Code	
X	Ferrite Wire-wound (Drum type)

(4) Features, Characteristics

Code	
A	For audio filters

②Features

Code	Feature
F	Bottom electrode (Ag × solder) for fillet

③Dimensions (L × W)

Code	Dimensions (L × W) [mm]
6060	6.0 × 6.0

④Dimensions (H)

Code	Dimensions (H) [mm]
YE	4.5

⑤Packaging

Code	Packaging
L	Taping

⑥Nominal inductance

Code (example)	Nominal inductance [μH]
3R3	3.3

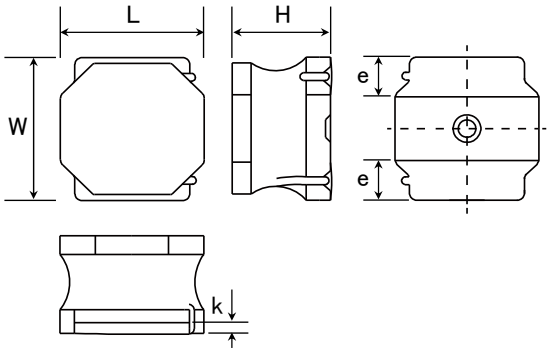
※R=Decimal point

⑦Inductance tolerance

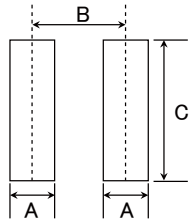
Code	Inductance tolerance
M	±20%

⑧Internal code

■STANDARD EXTERNAL DIMENSIONS / STANDARD QUANTITY



Recommended Land Patterns



Type	A	B	C
6060	2.4	5.0	4.8

Unit : mm

Type	L	W	H	e	k(ref)	Standard quantity [pcs] Taping
6060YE	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	4.5 max (0.177 max)	1.65±0.3 (0.053±0.012)	0.3 min (0.012 min)	1500

Unit : mm(inch)

■PART NUMBER

・All the Wire-wound Ferrite Inductors for Class D Amplifier of the catalog lineup are RoHS compliant.

Notes)

・The exchange of individual specifications is necessary depending on your application and/or circuit condition. Please contact TAIYO YUDEN's official sales channel.

・For Automotive (AEC-Q200 Qualified) products for BODY & CHASSIS, and INFOTAINMENT. Please check "Automotive Application Guide" for further details before using the products.

＜ AEC-Q200 ：AEC-Q200 qualified＞

All the Wire-wound Ferrite Inductors for Class D Amplifier for Automotive products are tested based on the test conditions and methods defined in AEC-Q200 by family item.
Please consult with TAIYO YUDEN's official sales channel for the details of the product specifications and AEC-Q200 test results, etc.,
and please review and approve the product specifications before ordering.

●Inductors for Class D Amplifier LCXAF6060YE type

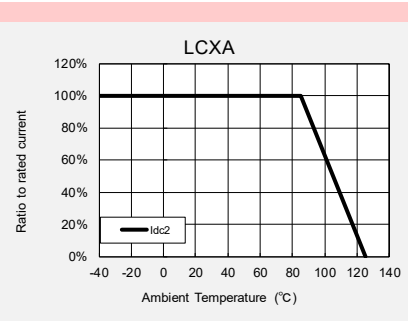
New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	DC Resistance [mΩ] Max (Typ)	Rated current ※) [A]		Measuring frequency[MHz]
					Saturation current Idc1 Max (Typ)	Temperature rise current Idc2 Max (Typ)	
LCXAF6060YEL3R3MMR	NRC6045T 3R3MMRUV	3.3	±20%	32 (26)	9.00 (9.60)	3.80 (4.30)	0.1

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20℃)
※) The temperature rise current value (Idc2)② is the DC current value having temperature increase up to 40℃. (at 20℃)
※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

■Derating of Rated Current

●LCXA

Derating of current is necessary for LCXA depending on ambient temperature.
Please refer to the chart shown below for appropriate derating of current.



Wire-wound Ferrite Power Inductors LSXB/LSXN/LSXP/LCXN/LCXP/LBXN/LBXP/ LLXB/LLXN/LLXP/LMXN/LMXP series
Wire-wound Ferrite Power Inductors LCXH/LBXH/LMXH series
Wire-wound Ferrite Inductors for Class D Amplifier LCXA

■PACKAGING

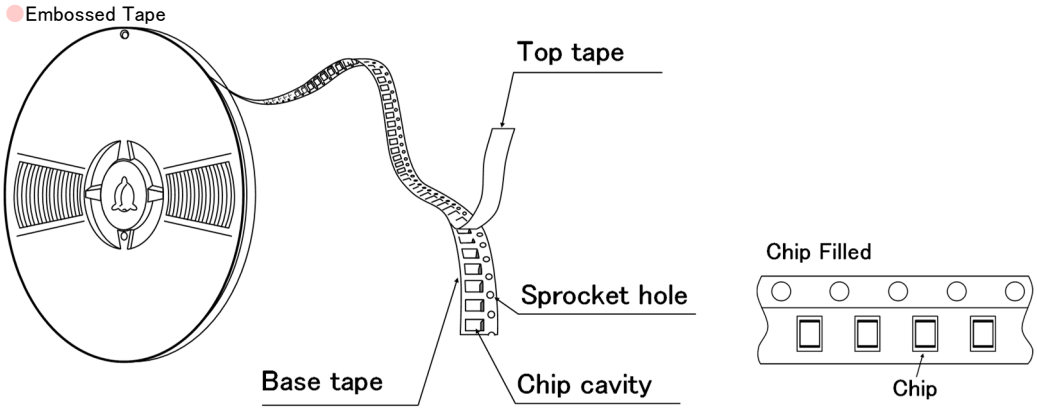
①Minimum Quantity

Type	Standard Quantity [pcs]
	Tape & Reel
2020KK	2500
2020MK	2500
2424KK	2500
2424MK	2500
3030KK	2000
3030MK	2000
3030QK	2000
4040KK	5000
4040MK	4500
4040TK	3500
4040WK	700

Type	Standard Quantity [pcs]
	Tape & Reel
5050KK	1000
5050MK	1000
5050PK	1000
5050WB	800
5050WK	800
5050WD 5050WE	2500
5050XK 5050XA	500
5050YA 5050YK	1500
6060KK	1000
6060MK	1000
6060PK	1000
6060WK	2500
6060WH	2000
6060YE	1500
8080XK	1000
8080YK 8080YB	1000

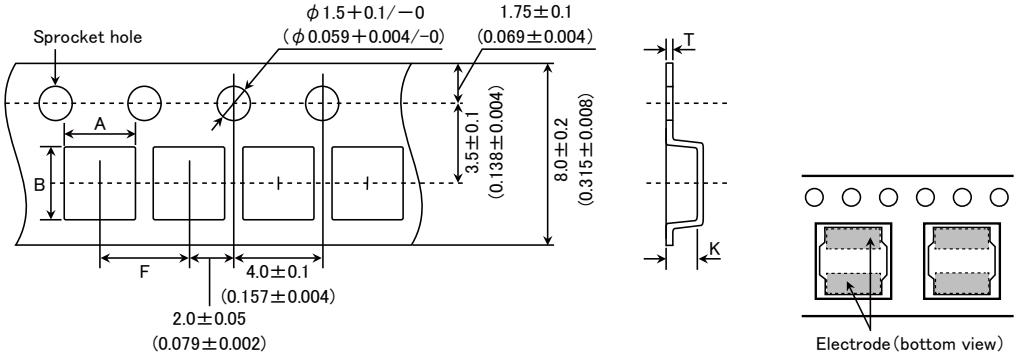
②Tape Material

●Embossed Tape



③Taping dimensions

●Embossed tape 8mm wide (0.315 inches wide)

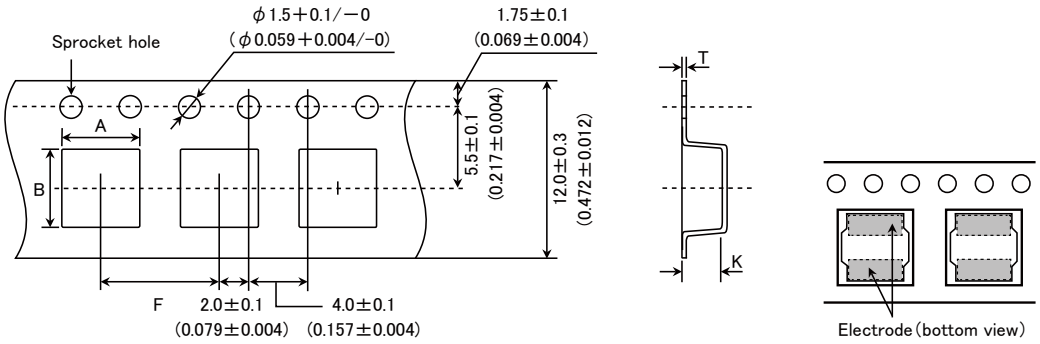


▸ This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification.
For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (http://www.ty-top.com/)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

Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
2020KK 2020MK	2.2±0.1 (0.102±0.004)	2.2±0.1 (0.102±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.009±0.002)	1.3±0.1 (0.051±0.004)
2424KK 2424MK	2.6±0.1 (0.087±0.004)	2.6±0.1 (0.102±0.004)		0.25±0.05 (0.009±0.002)	1.3±0.1 (0.051±0.004)
3030KK	3.2±0.1 (0.126±0.004)	3.2±0.1 (0.126±0.004)		0.3±0.05 (0.012±0.002)	1.4±0.1 (0.055±0.004)
3030MK					1.6±0.1 (0.063±0.004)
3030QK					1.9±0.1 (0.075±0.004)

Unit : mm (inch)

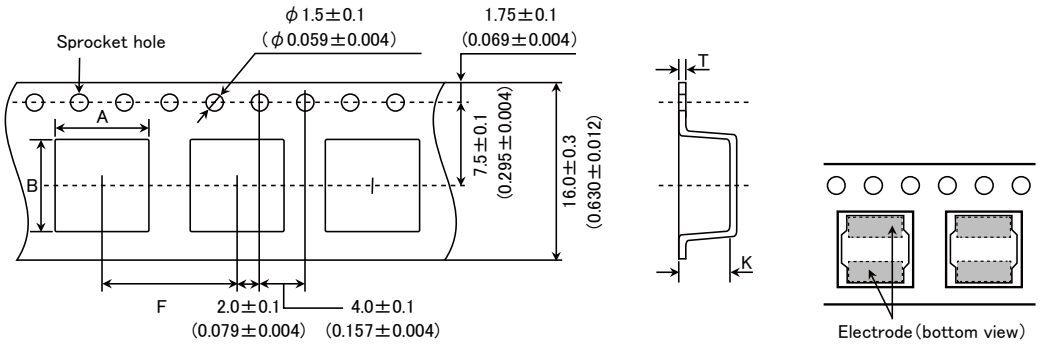
Embossed tape 12mm wide (0.47 inches wide)



Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
4040KK	4.3±0.1 (0.169±0.004)	4.3±0.1 (0.169±0.004)	8.0±0.1 (0.315±0.004)	0.3±0.1 (0.012±0.004)	1.4±0.1 (0.055±0.004)
4040MK					1.6±0.1 (0.063±0.004)
4040TK 4040WK					2.1±0.1 (0.083±0.004)
5050KK	5.25±0.1 (0.207±0.004)	5.25±0.1 (0.207±0.004)			1.4±0.1 (0.055±0.004)
5050MK					1.4±0.1 (0.055±0.004)
5050PK					1.6±0.1 (0.063±0.004)
5050WB 5050WK					2.3±0.1 (0.091±0.004)
5050WD 5050WE					2.7±0.1 (0.106±0.004)
5050XK 5050XA	5.15±0.1 (0.203±0.004)	5.15±0.1 (0.203±0.004)		0.4±0.1 (0.016±0.004)	3.2±0.1 (0.126±0.004)
5050YK 5050YA	5.15±0.1 (0.203±0.004)	5.15±0.1 (0.203±0.004)			4.2±0.1 (0.165±0.004)
6060KK	6.3±0.1 (0.248±0.004)	6.3±0.1 (0.248±0.004)			1.4±0.1 (0.055±0.004)
6060MK					1.6±0.1 (0.063±0.004)
6060PK					1.6±0.1 (0.063±0.004)
6060WK					2.3±0.1 (0.090±0.004)
6060WH					3.1±0.1 (0.122±0.004)
6060YE					4.7±0.1 (0.185±0.004)

Unit : mm (inch)

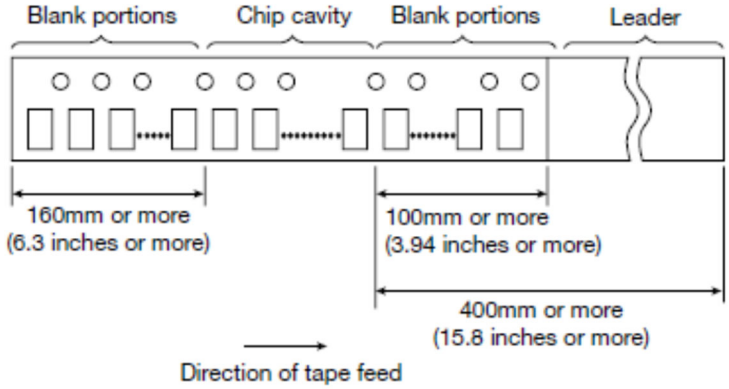
Embossed tape 16mm wide (0.63 inches wide)



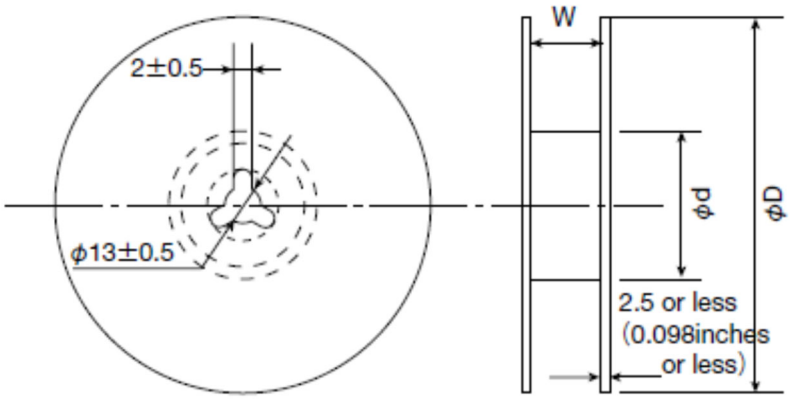
Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
8080XK	8.3±0.1 (0.327±0.004)	8.3±0.1 (0.327±0.004)	12.0±0.1 (0.472±0.004)	0.5±0.1 (0.020±0.004)	3.4±0.1 (0.134±0.004)
8080YK 8080YB					4.5±0.1 (0.177±0.004)

Unit : mm (inch)

④Leader and Blank portion

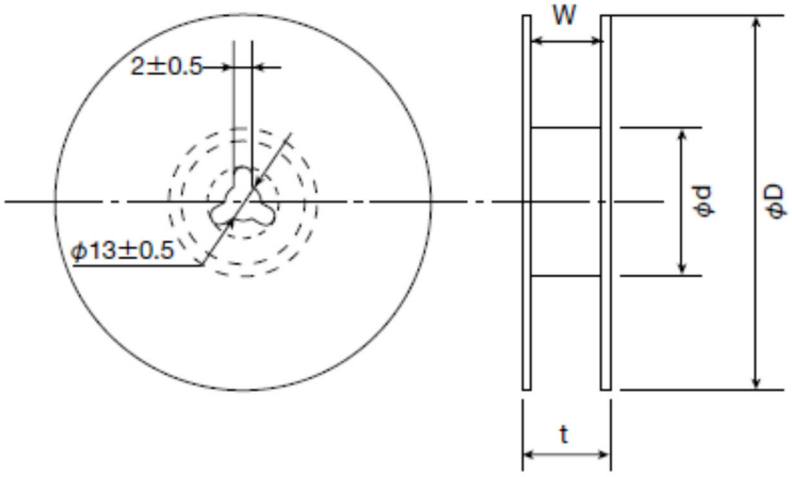


⑤Reel size



Type	Reel size (Reference values)		
	ϕD	ϕd	W
2020KK	180±0.5 (7.087±0.019)	60±1.0 (2.36±0.04)	10.0±1.5 (0.394±0.059)
2020MK			
2424KK			
2424MK			
3030KK			
3030MK			
3030QK			
4040WK	180±3.0 (7.087±0.118)	60±2.0 (2.36±0.08)	14.0±1.5 (0.551±0.059)
5050KK			
5050MK			
5050PK			
5050WB			
5050WK			
5050XK			
5050XA			
6060KK			
6060MK			
6060PK			

Unit : mm (inch)

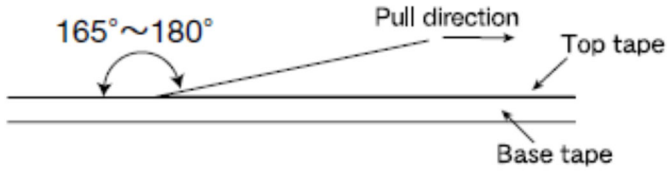


Type	Reel size (Reference values)			
	ϕD	ϕd	t (max.)	W
4040KK	330±3.0 (12.99±0.118)	80±2.0 (3.15±0.078)	18.5 (0.72)	13.5±1.0 (0.531±0.04)
4040MK				
4040TK				
5050WD				
5050WE				
5050YA				
5050YK				
6060WK				
6060WH				
6060YE				
8080XK			22.5 (0.89)	17.5±1.0 (0.689±0.04)
8080YK				
8080YB				

Unit : mm (inch)

⑥Top Tape Strength

The top tape requires a peel-off force of 0.1 to 1.3N in the direction of the arrow as illustrated below.



Wire-wound Ferrite Power Inductors LCXH series
for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Inductors for Class D Amplifier LCXA
for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Power Inductors LBXH series
for Telecommunications Infrastructure and Industrial Equipment
Wire-wound Ferrite Power Inductors LMXH series
for Medical Devices classified as GHTF Class C (Japan Class III)

■RELIABILITY DATA

1. Operating Temperature Range	
Specified Value	−40～＋125℃(Including self-generated heat)
Test Methods and Remarks	Including self-generated heat

2. Storage Temperature Range	
Specified Value	−40～＋125℃
Test Methods and Remarks	−5 to 40℃ for the product with taping.

3. Rated current	
Specified Value	Within the specified tolerance

4. Inductance	
Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : LCR Meter (HP 4285A or equivalent) Measuring frequency : 100kHz, 1V

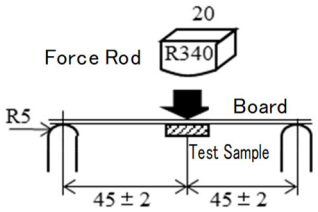
5. DC Resistance	
Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : DC ohmmeter (HIOKI 3227 or equivalent)

6. Temperature characteristic	
Specified Value	Inductance change : Within ±20%
Test Methods and Remarks	Measurement of inductance shall be taken at temperature range within −40℃～＋125℃. With reference to inductance value at ＋20℃., change rate shall be calculated. Change of maximum inductance deviation in step 1 to 5

Step	Temperature(℃)
1	20
2	Minimum operating temperature
3	20 (Standard temperature)
4	Maximum operating temperature
5	20

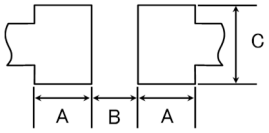
7. Resistance to flexure of substrate

Specified Value	No damage
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. As illustrated below, apply force in the direction of the arrow indicating until deflection of the test board reaches to 2 mm. Test board size : 100×40×1.6 mm Test board material : glass epoxy-resin Solder cream thickness : 0.10mm (3030～4040 type) : 0.15mm (5050～6060 type)



Unit : mm

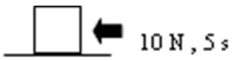
Land dimension



Type	A	B	C
3030	1.3	1.0	2.7
4040	1.5	1.8	3.5
5050	1.9	2.3	3.8
6060	2.4	2.6	4.8

8. Adhesion of terminal electrode

Specified Value	Shall not come off PC board
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. Applied force : 10N Duration : 5s. Solder cream thickness : 0.10mm(3030～4040 type) : 0.15mm(5050～6060 type)



9. Resistance to vibration

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

Test Methods and Remarks

The test samples shall be soldered to the test board by the reflow.
Then it shall be submitted to below test conditions.

Frequency Range	10～55Hz	
Total Amplitude	1.5mm (May not exceed acceleration 196m/s^2)	
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 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

10. Solderability

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

Test Methods and Remarks

The test samples shall be dipped in flux, and then immersed in molten solder as shown in below table.
Flux : Ethanol solution containing rosin 25%.

Solder Temperature	245±5℃
Time	5±1.0 sec.

※Immersion depth : All sides of mounting terminal shall be immersed.

11. Resistance to soldering heat

Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	The test sample shall be exposed to reflow oven at 230±5℃ for 40 seconds, with peak temperature at 260±5℃ for 5 seconds, 2 times. Test board material : glass epoxy-resin Test board thickness : 1.0mm

12. Thermal shock

Specified Value

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

Test Methods and Remarks

The test samples shall be soldered to the test board by the reflow. The test samples shall be placed at specified temperature for specified time by step 1 to step 4 as shown in below table in sequence. The temperature cycle shall be repeated 1000 cycles.

LCXH/LBXH/LMXH

Conditions of 1 cycle		
段階	Temperature (℃)	Duration (min)
1	−40±3	30±3
2	Room temperature	Within 3
3	+105±3	30±3
4	Room temperature	Within 3

LCXA

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

13. Damp heat

Specified Value

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

Test Methods and Remarks

The test samples shall be soldered to the test board by the reflow.
The test samples shall be placed in thermostatic oven set at specified temperature and humidity as shown in below table.

Temperature	85±2℃
Humidity	85%RH
Time	1000+24/−0 hour

14. Low temperature life test

Specified Value

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

Test Methods and Remarks

The test samples shall be soldered to the test board by the reflow. After that, the test samples shall be placed at test conditions as shown in below table.

Temperature	−40±2℃
Time	1000+24/−0 hour

15. High temperature life test

Specified Value

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

Test Methods and Remarks

The test samples shall be soldered to the test board by the reflow. After that, the test samples shall be placed at test conditions as shown in below table.

Temperature	125±3℃
Time	1000 hour

16. Loading at high temperature life test

Specified Value

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

Test Methods and Remarks

The test samples shall be soldered to the test board by the reflow soldering.

LCXH/LBXH/LMXH

Temperature	1) 85±2℃ 2) 105±3℃
Applied current	1) Rated current (+40℃) 2) Rated current (+20℃)
Time	1000+24/−0 hour

LCXA

Temperature	85±2℃
Applied current	Rated current
Time	1000+24/−0 hour

17. Standard condition

Specified Value

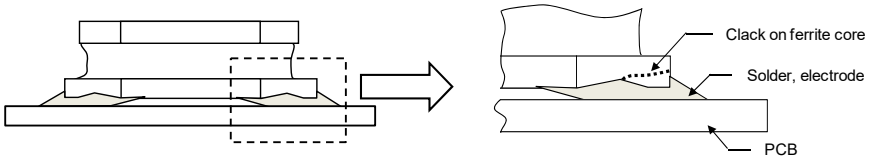
Standard test condition :
Unless otherwise specified, temperature is 20±15℃ and 65±20%of relative humidity.
When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of 20±2℃ of temperature, 65±5% relative humidity.
Inductance is in accordance with our measured value.

Wire-wound Ferrite Power Inductors LAYP series for Automotive Powertrain and safety
Wire-wound Ferrite Power Inductors LCXN/LCXP series for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Power Inductors LCXH series for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Inductors for Class D Amplifier LCXA for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Power Inductors LCRN series for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Power Inductors LBXN/LBXP series for Telecommunications Infrastructure and Industrial Equipment
Wire-wound Ferrite Power Inductors LBXH series for Telecommunications Infrastructure and Industrial Equipment
Wire-wound Ferrite Power Inductors LBRN series for Telecommunications Infrastructure and Industrial Equipment
Wire-wound Ferrite Power Inductors LMXN/LMXP series for Medical Devices classified as GHTF Class C (Japan Class III)
Wire-wound Ferrite Power Inductors LMXH series for Medical Devices classified as GHTF Class C (Japan Class III)
Wire-wound Ferrite Power Inductors LMRN series for Medical Devices classified as GHTF Class C (Japan Class III)

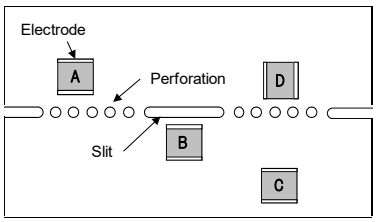
■PRECAUTIONS

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 refer to a recommended land pattern. 2. There is stress, which has been caused by distortion of a PCB, to the inductor. (LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) 3. Please consider the arrangement of parts on a PCB. (LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)
Technical considerations	◆Land pattern design Surface Mounting 1. Mounting and soldering conditions should be checked beforehand. 2. Applicable soldering process to this products is reflow soldering only. 3. Please use the recommended land pattern shown as below. Electrical characteristics and the mounting ability of the product are being considered in the recommended land pattern. If a PCB is designed with other dimensions, defective soldering and stress to a product may occur due to misalignment. The performance of the product may not be brought out. If an adopted land pattern is different from the recommended land pattern, stress to the product will increase. It may cause cracks or defective electrical characteristics of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) 4. As coefficients of thermal expansion between an inductor and a PCB differs, cracks may occur on a ferrite core when thermal stress is applied to them after mounting an inductor. (Please refer to the drawings below.) Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)



5. SMD inductors should be located to minimize any possible mechanical stresses from board warp or deflection. When splitting the PC board after mounting inductors and other components, care is required so as not to give any stresses of deflection or twisting to the board.
(LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)



A product tends to undergo stress in order "A>C>B≡D".
Please consider the layouts of a product to minimize any stresses.

3. Considerations for automatic placement

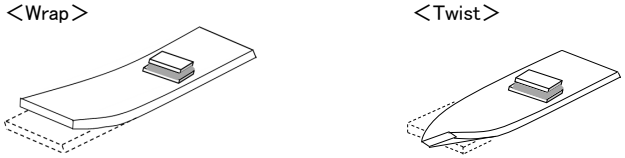
Precautions

◆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

◆Adjustment of mounting machine
1. When installing products, care should be taken not to apply distortion stress as it may deform the products.
2. Stress may be applied to a product with a warp or a twist in handling of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility.
(LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)

＜Wrap＞ ＜Twist＞



4. Soldering

Precautions

◆Reflow soldering
1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified.
2. The product shall be used reflow soldering only.
3. Please do not add any stress to a product until it returns in normal temperature after reflow soldering.

◆Lead free soldering
1. When using products with lead free soldering, we request to use them after confirming adhesion, temperature of resistance to soldering heat, soldering etc sufficiently.

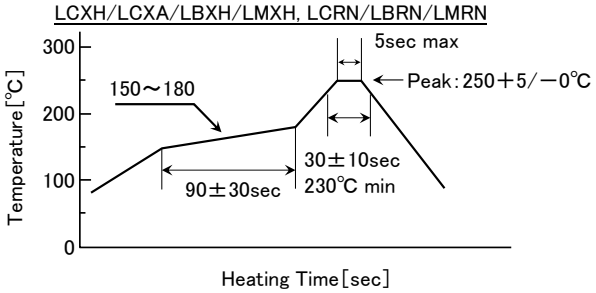
◆Recommended conditions for using a soldering iron
- Put the soldering iron on the land-pattern.
- Soldering iron's temperature – Below 350℃
- Duration – 3 seconds or less
- The soldering iron should not directly touch the inductor.

Technical considerations

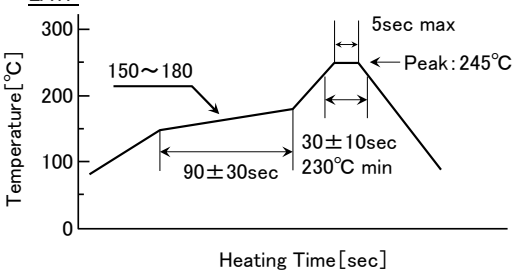
◆Reflow soldering
1. If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products.

Recommended reflow condition (Pb free solder)

LCXN/LCXP/LBXN/LBXP/LMXN/LMXP,
LCXH/LCXA/LBXH/LMXH, LCRN/LBRN/LMRN



LAYP



5. Cleaning	
Precautions	◆Cleaning conditions 1. Washing by supersonic waves shall be avoided.
Technical considerations	◆Cleaning conditions 1. If washed by supersonic waves, the products might be broken.

6. Handling	
Precautions	◆Handling 1. Keep the product away from all magnets and magnetic objects. ◆Breakaway PC boards (splitting along perforations) 1. When splitting the PC board after mounting product, 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 product any excessive mechanical shocks. 2. Please do not add any shock and power to a product in transportation. ◆Pick-up pressure 1. Please do not push to add any pressure to a winding part. Please do not give any shock and push into a ferrite core exposure part. ◆Packing 1. Please avoid accumulation of a packing box as much as possible.
Technical considerations	◆Handling 1. There is a case that a characteristic varies with magnetic influence. ◆Breakaway PC boards (splitting along perforations) 1. The position of the product on PCBs shall be carefully considered to minimize the stress caused from splitting of the PCBs. ◆Mechanical considerations 1. There is a case to be damaged by a mechanical shock. 2. There is a case to be broken by the handling in transportation. ◆Pick-up pressure 1. Damage and a characteristic can vary with an excessive shock or stress. ◆Packing 1. If packing boxes are accumulated, that could cause a deformation on packing tapes or a damage on the products.

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. ・ Recommended conditions Ambient temperature : －5～40℃ Humidity : Below 70% RH ・ The ambient temperature must be kept 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.

Wire-wound Ferrite Power Inductors LCRN series for Automotive Body & Chassis and Infotainment

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

AEC-Q200 Grade 3 (we conduct the evaluation at the test condition of Grade 3.)
*Operating environment Temp:-40～85℃

REFLOW
AEC-Q200

■PART NUMBER　　*Operating Temp. :　-40～125℃(Including self-generated heat)

L	C	R	N	J	1	0	1	4	5	G	L	1	0	0	M	N
①				②	③			④		⑤	⑥	⑦			⑧	⑨

①Series

Code (1)(2)(3)(4)	
LCRN	Wire-wound Ferrite Power Inductor for Automotive Body & Chassis and Infotainment

(1) Product Group

Code	
L	Inductors

(2) Category

Code	Recommended equipment	Quality Grade
C	Automotive Electronic Equipment (Body & Chassis, Infotainment)	2

(3) Type

Code	
R	Ferrite Wire-wound (Drum-sleeve, pedestal type)

(4) Features, Characteristics

Code	
N	Standard Power choke

②Features

Code	Feature
J	Bottom electrode (Pedestal type)

③Dimensions(L×W)

Code	Dimensions(L×W)[mm]
101	10.1×10.1
125	12.5×12.5

④Dimensions(H)

Code	Dimensions(H)[mm]
45	4.5
55	5.5
65	6.5
75	7.5

⑤Operating temperature

Code	Operating temperature[℃]
G	-40～+125

⑥Packaging

Code	Packaging
L	Taping

⑦Nominal inductance

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

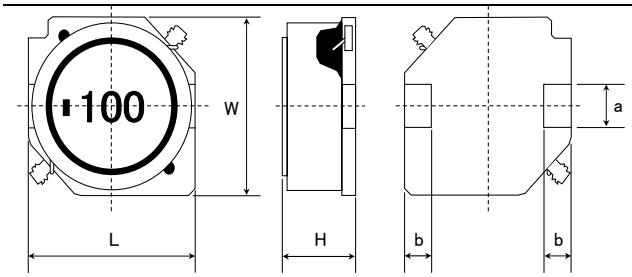
※R=Decimal point

⑧Inductance tolerance

Code	Inductance tolerance
M	±20%
N	±30%

⑨Internal code

■STANDARD EXTERNAL DIMENSIONS / MINIMUM QUANTITY



Type	L	W	H	a	b	Minimum quantity [pcs]
10145	10.1±0.3 (0.398±0.012)	10.1±0.3 (0.398±0.012)	4.5±0.35 (0.177±0.014)	2.8±0.1 (0.110±0.004)	2.0±0.15 (0.079±0.006)	2000
10155	10.1±0.3 (0.398±0.012)	10.1±0.3 (0.398±0.012)	5.5±0.35 (0.217±0.014)	2.8±0.1 (0.110±0.004)	2.0±0.15 (0.079±0.006)	2000
10165	10.1±0.3 (0.398±0.012)	10.1±0.3 (0.398±0.012)	6.5±0.35 (0.256±0.014)	2.8±0.1 (0.110±0.004)	2.0±0.15 (0.079±0.006)	2000
12555	12.5±0.3 (0.492±0.012)	12.5±0.3 (0.492±0.012)	5.5±0.35 (0.217±0.014)	3.0±0.1 (0.118±0.004)	2.0±0.15 (0.079±0.006)	2000
12565	12.5±0.3 (0.492±0.012)	12.5±0.3 (0.492±0.012)	6.5±0.35 (0.256±0.014)	3.0±0.1 (0.118±0.004)	2.0±0.15 (0.079±0.006)	2000
12575	12.5±0.3 (0.492±0.012)	12.5±0.3 (0.492±0.012)	7.5±0.35 (0.295±0.014)	3.0±0.1 (0.118±0.004)	2.0±0.15 (0.079±0.006)	2000

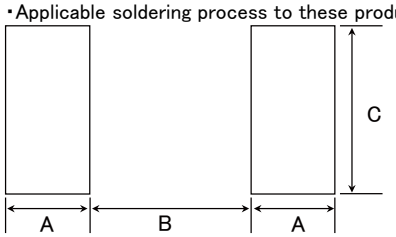
Unit : mm (inch)

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
10145	2.5	5.6	3.2
10155	2.5	5.6	3.2
10165	2.5	5.6	3.2
12555	2.5	8.6	3.2
12565	2.5	8.6	3.2
12575	2.5	8.6	3.2

Unit : mm

■PART NUMBER

・All the Wire-wound Ferrite Power Inductors of the catalog lineup are RoHS compliant.

Notes)

・The exchange of individual specifications is necessary depending on your application and/or circuit condition. Please contact TAIYO YUDEN's official sales channel.

・For Automotive (AEC-Q200 Qualified) products for BODY & CHASSIS, and INFOTAINMENT. Please check "Automotive Application Guide" for further details before using the products.

＜ AEC-Q200 ：AEC-Q200 qualified＞

All the Wire-wound Ferrite Power Inductors for Automotive products are tested based on the test conditions and methods defined in AEC-Q200 by family item.

Please consult with TAIYO YUDEN's official sales channel for the details of the product specifications and AEC-Q200 test results, etc.,

and please review and approve the product specifications before ordering.

●10145 type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	DC Resistance [Ω] (±20%)	Rated current ※) [A]		Measuring frequency [kHz]
					Saturation current Idc1	Temperature rise current Idc2	
LCRNJ10145GL1R0NN	NS 10145T 1R0NNVV	1.0	±30%	0.0049	12.54	8.90	100
LCRNJ10145GL1R5NN	NS 10145T 1R5NNVV	1.5	±30%	0.0060	10.34	7.99	100
LCRNJ10145GL2R2NN	NS 10145T 2R2NNVV	2.2	±30%	0.0085	8.91	6.64	100
LCRNJ10145GL3R3NN	NS 10145T 3R3NNVV	3.3	±30%	0.0100	7.33	6.10	100
LCRNJ10145GL4R7NN	NS 10145T 4R7NNVV	4.7	±30%	0.0144	6.69	5.03	100
LCRNJ10145GL5R6NN	NS 10145T 5R6NNVV	5.6	±30%	0.0181	5.85	4.45	100
LCRNJ10145GL6R8NN	NS 10145T 6R8NNVV	6.8	±30%	0.0230	5.05	4.22	100
LCRNJ10145GL100MN	NS 10145T 100MNVV	10	±20%	0.0270	4.22	3.10	100
LCRNJ10145GL150MN	NS 10145T 150MNVV	15	±20%	0.0381	3.44	3.00	100
LCRNJ10145GL220MN	NS 10145T 220MNVV	22	±20%	0.0570	2.87	2.30	100
LCRNJ10145GL330MN	NS 10145T 330MNVV	33	±20%	0.0880	2.36	1.90	100
LCRNJ10145GL470MN	NS 10145T 470MNVV	47	±20%	0.130	2.00	1.50	100
LCRNJ10145GL680MN	NS 10145T 680MNVV	68	±20%	0.150	1.66	1.45	100
LCRNJ10145GL101MN	NS 10145T 101MNVV	100	±20%	0.230	1.40	1.10	100
LCRNJ10145GL151MN	NS 10145T 151MNVV	150	±20%	0.350	1.11	0.86	100
LCRNJ10145GL221MN	NS 10145T 221MNVV	220	±20%	0.510	0.91	0.78	100
LCRNJ10145GL331MN	NS 10145T 331MNVV	330	±20%	0.700	0.71	0.64	100
LCRNJ10145GL471MN	NS 10145T 471MNVV	470	±20%	1.03	0.61	0.52	100
LCRNJ10145GL681MN	NS 10145T 681MNVV	680	±20%	1.57	0.50	0.42	100
LCRNJ10145GL102MN	NS 10145T 102MNVV	1000	±20%	2.58	0.41	0.32	100
LCRNJ10145GL152MN	NS 10145T 152MNVV	1500	±20%	3.70	0.36	0.27	100

●10155 type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	DC Resistance [Ω] (±20%)	Rated current ※) [A]		Measuring frequency [kHz]
					Saturation current Idc1	Temperature rise current Idc2	
LCRNJ10155GL1R5NN	NS 10155T 1R5NNVV	1.5	±30%	0.0060	11.90	8.39	100
LCRNJ10155GL2R2NN	NS 10155T 2R2NNVV	2.2	±30%	0.0072	10.00	7.61	100
LCRNJ10155GL3R3NN	NS 10155T 3R3NNVV	3.3	±30%	0.0097	8.50	6.49	100
LCRNJ10155GL4R7NN	NS 10155T 4R7NNVV	4.7	±30%	0.0112	7.40	6.01	100
LCRNJ10155GL6R8NN	NS 10155T 6R8NNVV	6.8	±30%	0.0159	6.00	4.98	100
LCRNJ10155GL100MN	NS 10155T 100MNVV	10	±20%	0.0200	4.49	4.40	100
LCRNJ10155GL150MN	NS 10155T 150MNVV	15	±20%	0.0310	4.03	3.40	100
LCRNJ10155GL220MN	NS 10155T 220MNVV	22	±20%	0.0430	3.37	2.80	100

●10165 type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	DC Resistance [Ω] (±20%)	Rated current ※) [A]		Measuring frequency [kHz]
					Saturation current Idc1	Temperature rise current Idc2	
LCRNJ10165GL1R5NN	NS 10165T 1R5NNVV	1.5	±30%	0.0062	13.60	8.04	100
LCRNJ10165GL2R2NN	NS 10165T 2R2NNVV	2.2	±30%	0.0074	10.80	7.32	100
LCRNJ10165GL3R3NN	NS 10165T 3R3NNVV	3.3	±30%	0.0086	9.30	6.76	100
LCRNJ10165GL4R7NN	NS 10165T 4R7NNVV	4.7	±30%	0.0112	7.70	5.88	100
LCRNJ10165GL6R8NN	NS 10165T 6R8NNVV	6.8	±30%	0.0140	6.00	5.22	100
LCRNJ10165GL100MN	NS 10165T 100MNVV	10	±20%	0.0174	5.20	4.66	100
LCRNJ10165GL150MN	NS 10165T 150MNVV	15	±20%	0.0280	3.60	3.84	100
LCRNJ10165GL220MN	NS 10165T 220MNVV	22	±20%	0.0350	3.10	3.41	100

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20℃)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40℃. (at 20℃)

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

■PART NUMBER

●12555 type ●NS 12555 type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	DC Resistance [Ω] (±20%)	Rated current ※) [A]		Measuring frequency [kHz]
					Saturation current Idc1	Temperature rise current Idc2	
LCRNJ12555GL6R0NN	NS 12555T 6R0NN V	6.0	±30%	0.0140	5.01	5.60	100
LCRNJ12555GL100MN	NS 12555T 100MN V	10	±20%	0.0175	4.73	5.04	100
LCRNJ12555GL150MN	NS 12555T 150MN V	15	±20%	0.0233	3.89	4.18	100
LCRNJ12555GL220MN	NS 12555T 220MN V	22	±20%	0.0297	3.20	3.81	100
LCRNJ12555GL330MN	NS 12555T 330MN V	33	±20%	0.0415	2.64	3.16	100
LCRNJ12555GL470MN	NS 12555T 470MN V	47	±20%	0.0618	2.23	2.70	100
LCRNJ12555GL680MN	NS 12555T 680MN V	68	±20%	0.0832	1.81	2.14	100
LCRNJ12555GL101MN	NS 12555T 101MN V	100	±20%	0.117	1.53	1.86	100
LCRNJ12555GL151MN	NS 12555T 151MN V	150	±20%	0.215	1.10	1.30	100
LCRNJ12555GL221MN	NS 12555T 221MN V	220	±20%	0.270	1.00	1.18	100
LCRNJ12555GL331MN	NS 12555T 331MN V	330	±20%	0.410	0.82	0.96	100
LCRNJ12555GL471MN	NS 12555T 471MN V	470	±20%	0.520	0.68	0.80	100
LCRNJ12555GL681MN	NS 12555T 681MN V	680	±20%	0.870	0.48	0.61	100
LCRNJ12555GL102MN	NS 12555T 102MN V	1000	±20%	1.44	0.41	0.46	100
LCRNJ12555GL152MN	NS 12555T 152MN V	1500	±20%	1.73	0.40	0.44	100

●12565 type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	DC Resistance [Ω] (±20%)	Rated current ※) [A]		Measuring frequency [kHz]
					Saturation current Idc1	Temperature rise current Idc2	
LCRNJ12565GL2R0NN	NS 12565T 2R0NN V	2.0	±30%	0.0080	13.91	7.60	100
LCRNJ12565GL4R2NN	NS 12565T 4R2NN V	4.2	±30%	0.0126	9.40	5.91	100
LCRNJ12565GL7R0NN	NS 12565T 7R0NN V	7.0	±30%	0.0162	7.80	5.21	100
LCRNJ12565GL100MN	NS 12565T 100MN V	10	±20%	0.0199	6.00	4.75	100
LCRNJ12565GL150MN	NS 12565T 150MN V	15	±20%	0.0237	5.60	4.33	100
LCRNJ12565GL220MN	NS 12565T 220MN V	22	±20%	0.0310	4.20	3.91	100
LCRNJ12565GL330MN	NS 12565T 330MN V	33	±20%	0.0390	3.80	3.22	100
LCRNJ12565GL470MN	NS 12565T 470MN V	47	±20%	0.0575	3.34	2.78	100
LCRNJ12565GL680MN	NS 12565T 680MN V	68	±20%	0.0775	2.70	2.30	100
LCRNJ12565GL101MN	NS 12565T 101MN V	100	±20%	0.123	2.23	1.81	100
LCRNJ12565GL151MN	NS 12565T 151MN V	150	±20%	0.173	1.80	1.54	100
LCRNJ12565GL221MN	NS 12565T 221MN V	220	±20%	0.273	1.39	1.18	100

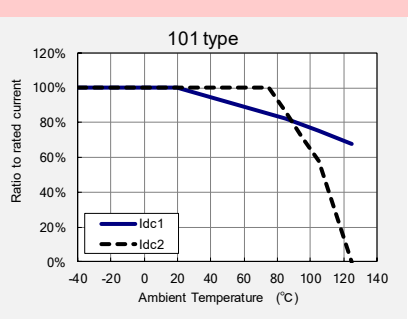
●12575 type

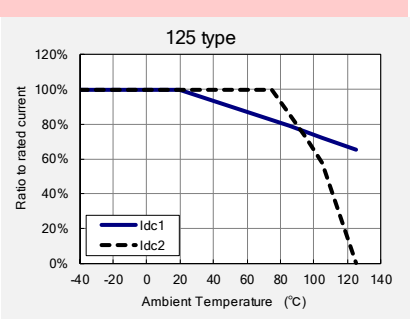
New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	DC Resistance [Ω] (±20%)	Rated current ※) [A]		Measuring frequency [kHz]
					Saturation current Idc1	Temperature rise current Idc2	
LCRNJ12575GL1R2NN	NS 12575T 1R2NN V	1.2	±30%	0.0058	18.08	9.15	100
LCRNJ12575GL2R7NN	NS 12575T 2R7NN V	2.7	±30%	0.0085	13.91	7.69	100
LCRNJ12575GL3R9NN	NS 12575T 3R9NN V	3.9	±30%	0.0099	12.10	7.38	100
LCRNJ12575GL5R6NN	NS 12575T 5R6NN V	5.6	±30%	0.0116	10.20	6.36	100
LCRNJ12575GL6R8NN	NS 12575T 6R8NN V	6.8	±30%	0.0131	9.50	5.84	100
LCRNJ12575GL100MN	NS 12575T 100MN V	10	±20%	0.0156	7.65	5.55	100
LCRNJ12575GL150MN	NS 12575T 150MN V	15	±20%	0.0184	6.30	5.22	100
LCRNJ12575GL220MN	NS 12575T 220MN V	22	±20%	0.0260	5.50	4.05	100
LCRNJ12575GL330MN	NS 12575T 330MN V	33	±20%	0.0390	4.30	3.48	100
LCRNJ12575GL470MN	NS 12575T 470MN V	47	±20%	0.0515	3.60	2.95	100
LCRNJ12575GL680MN	NS 12575T 680MN V	68	±20%	0.0900	2.78	2.10	100
LCRNJ12575GL101MN	NS 12575T 101MN V	100	±20%	0.110	2.50	2.01	100
LCRNJ12575GL151MN	NS 12575T 151MN V	150	±20%	0.161	1.90	1.51	100
LCRNJ12575GL221MN	NS 12575T 221MN V	220	±20%	0.300	1.60	1.10	100
LCRNJ12575GL102MN	NS 12575T 102MN V	1000	±20%	1.170	0.72	0.53	100

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

■定格電流のディレーティ. ■Derating of Rated Current

●LCRN series
Derating of current is necessary for LCRN series depending on ambient temperature.
Please refer to the chart shown below for appropriate derating of current.





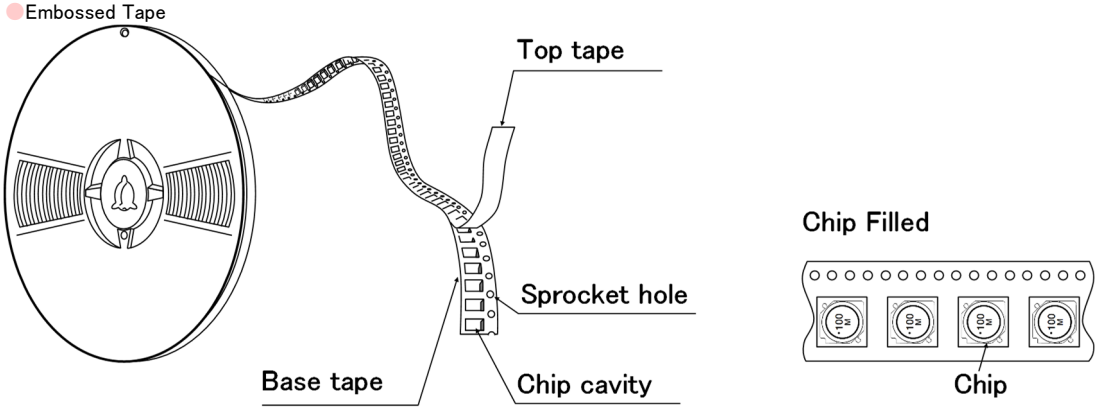
■PACKAGING

①Packing Quantity

Type	Standard Quantity (1reel) [pcs]	Minimum Quantity [pcs]
	Embossed Tape	Embossed Tape
10145	500	2000
10155	500	2000
10165	500	2000
12555	500	2000
12565	500	2000
12575	500	2000

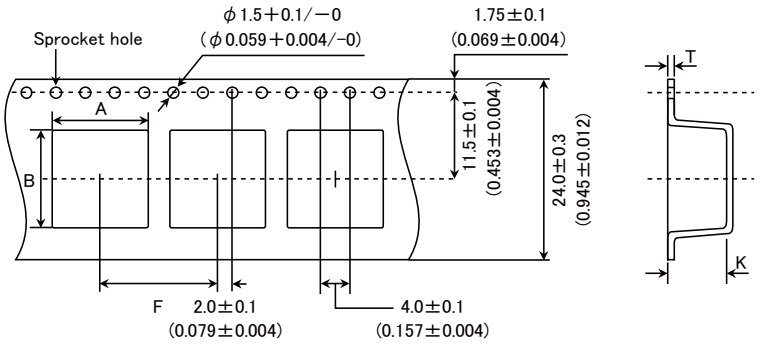
②Tape Material

●Embossed Tape



③Taping dimensions

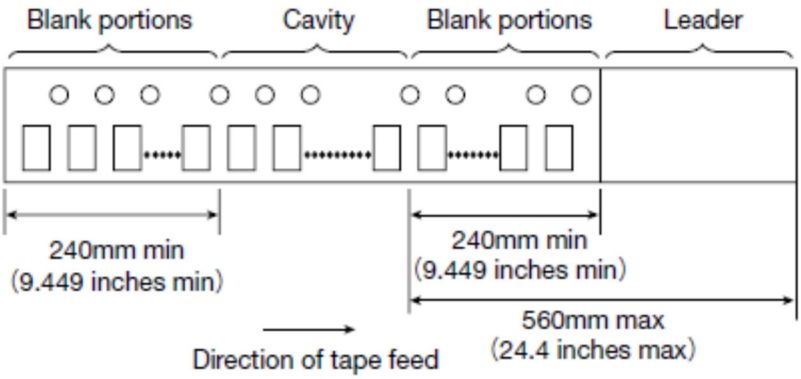
●Embossed tape 24mm wide (0.945 inches wide)



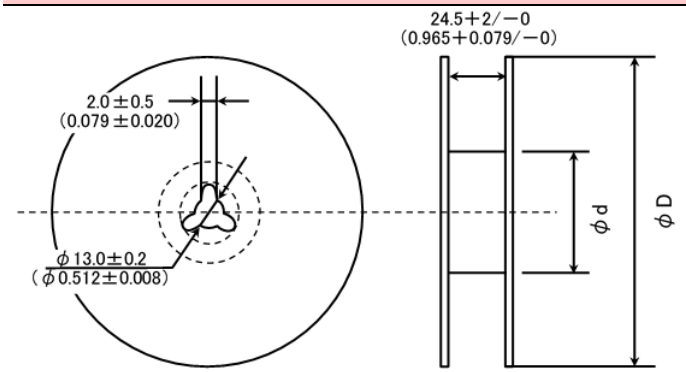
Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
10145	10.5±0.1 (0.413±0.004)	10.5±0.1 (0.413±0.004)	16.0±0.1 (0.630±0.004)	0.4±0.1 (0.016±0.004)	5.0±0.1 (0.197±0.004)
10155	10.5±0.1 (0.413±0.004)	10.5±0.1 (0.413±0.004)	16.0±0.1 (0.630±0.004)	0.4±0.1 (0.016±0.004)	6.0±0.1 (0.236±0.004)
10165	10.5±0.1 (0.413±0.004)	10.5±0.1 (0.413±0.004)	16.0±0.1 (0.630±0.004)	0.4±0.1 (0.016±0.004)	7.0±0.1 (0.276±0.004)
12555	13.0±0.1 (0.512±0.004)	13.0±0.1 (0.512±0.004)	16.0±0.1 (0.630±0.004)	0.4±0.1 (0.016±0.004)	6.1±0.1 (0.240±0.004)
12565	13.0±0.1 (0.512±0.004)	13.0±0.1 (0.512±0.004)	16.0±0.1 (0.630±0.004)	0.4±0.1 (0.016±0.004)	7.1±0.1 (0.280±0.004)
12575	13.0±0.1 (0.512±0.004)	13.0±0.1 (0.512±0.004)	16.0±0.1 (0.630±0.004)	0.4±0.1 (0.016±0.004)	8.0±0.1 (0.315±0.004)

Unit : mm (inch)

④Leader and Blank portion



⑤Reel size

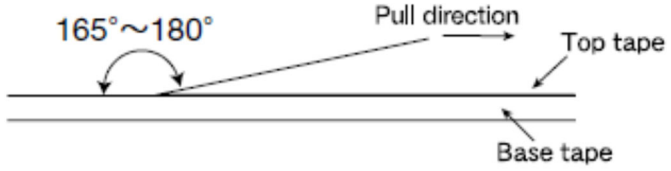


Type	Reel size (Reference values)	
	φD	φd
10145	330±2 (12.99±0.079)	100±1 (3.937±0.039)
10155		
10165		
12555		
12565		
12575		

Unit : mm (inch)

⑥Top Tape Strength

The top tape requires a peel-off force of 0.1 to 1.3N in the direction of the arrow as illustrated below.



Wire-wound Ferrite Power Inductors LCRN series for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Power Inductors LBRN series for Telecommunications Infrastructure and Industrial Equipment
Wire-wound Ferrite Power Inductors LMRN series for Medical Devices classified as GHTF Class C (Japan Class III)

■RELIABILITY DATA

1. Operating Temperature Range	
Specified Value	−40～＋125℃(Including self-generated heat)
Test Methods and Remarks	Including self-generated heat

2. Storage Temperature Range	
Specified Value	−40～＋85℃
Test Methods and Remarks	−5 to 40℃ for the product with taping.

3. Rated current	
Specified Value	Within the specified tolerance

4. Inductance	
Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : LCR Meter (HP 4285A or equivalent) Measuring frequency : 100kHz, 1V

5. DC Resistance	
Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : DC ohmmeter (HIOKI 3227 or equivalent)

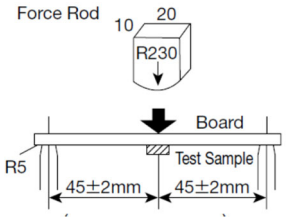
6. Self resonance frequency	
Specified Value	−

7. Temperature characteristic	
Specified Value	Inductance change : Within ±15%
Test Methods and Remarks	Measurement of inductance shall be taken at temperature range within −40℃～＋125℃. With reference to inductance value at ＋20℃., change rate shall be calculated. Change of maximum inductance deviation in step 1 to 5

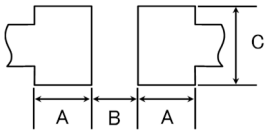
Step	Temperature(℃)
1	20
2	Minimum operating temperature
3	20 (Standard temperature)
4	Maximum operating temperature
5	20

8. Resistance to flexure of substrate

Specified Value	No damage
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. As illustrated below, apply force in the direction of the arrow indicating until deflection of the test board reaches to 2 mm. Test board size : 100 × 40 × 1.0 Test board material : glass epoxy-resin Solder cream thickness : 0.15 mm



Land dimension



Type	A	B	C
101	2.5	5.6	3.2
125	2.5	8.6	3.2

9. Insulation resistance : between wires

Specified Value	—

10. Insulation resistance : between wire and core

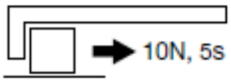
Specified Value	—

11. Withstanding voltage : between wire and core

Specified Value	—

12. Adhesion of terminal electrode

Specified Value	Shall not come off PC board
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. Applied force : 10N to X and Y directions. Duration : 5s. Solder cream thickness : 0.15mm



13. Resistance to vibration

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

Test Methods and Remarks

The test samples shall be soldered to the test board by the reflow.
Then it shall be submitted to below test conditions.

Frequency Range	10～55Hz	
Total Amplitude	1.5mm (May not exceed acceleration 196m/s^2)	
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 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

14. Solderability

Specified Value	At least 90% of surface of terminal electrode is covered by new solder.
Test Methods and Remarks	The test samples shall be dipped in flux, and then immersed in molten solder as shown in below table. Flux : Ethanol solution containing rosin 25%. Solder Temperature: 245±5℃ Time: 5±1.0 sec. ※Immersion depth : All sides of mounting terminal shall be immersed.

15. Resistance to soldering heat

Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	The test sample shall be exposed to reflow oven at 230±5℃ for 40 seconds, with peak temperature at 260±5℃ for 5 seconds, 2 times. Test board material : glass epoxy-resin Test board thickness : 1.0mm Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

16. Thermal shock

Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. The test samples shall be placed at specified temperature for specified time by step 1 to step 4 as shown in below table in sequence. The temperature cycle shall be repeated 100 cycles.

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

17. Damp heat

Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. The test samples shall be placed in thermostatic oven set at specified temperature and humidity as shown in below table. Temperature: 60±2℃ Humidity: 90～95%RH Time: 500+24/−0 hour Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

18. Loading under damp heat

Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. The test samples shall be placed in thermostatic oven set at specified temperature and humidity and applied the rated current continuously as shown in below table. Temperature: 60±2℃ Humidity: 90～95%RH Applied current: Rated current Time: 500+24/−0 hour Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

19. Low temperature life test	
Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. After that, the test samples shall be placed at test conditions as shown in below table. Temperature: −40±2℃ Time: 500+24/−0 hour Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

20. High temperature life test	
Specified Value	—

21. Loading at high temperature life test	
Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow soldering. Temperature: 85±2℃ Applied current: Rated current Time: 500+24/−0 hour Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

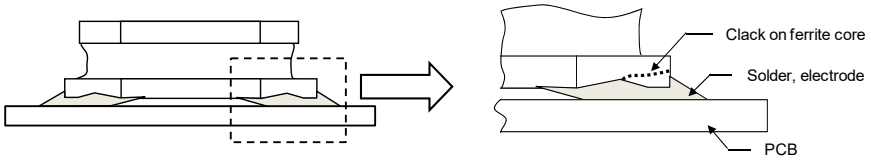
22. Standard condition	
Specified Value	Standard test condition : Unless otherwise specified, temperature is 20±15℃ and 65±20%of relative humidity. When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of 20±2℃ of temperature, 65±5% relative humidity. Inductance is in accordance with our measured value.

Wire-wound Ferrite Power Inductors LAYP series for Automotive Powertrain and safety
Wire-wound Ferrite Power Inductors LCXN/LCXP series for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Power Inductors LCXH series for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Inductors for Class D Amplifier LCXA for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Power Inductors LCRN series for Automotive Body & Chassis and Infotainment
Wire-wound Ferrite Power Inductors LBXN/LBXP series for Telecommunications Infrastructure and Industrial Equipment
Wire-wound Ferrite Power Inductors LBXH series for Telecommunications Infrastructure and Industrial Equipment
Wire-wound Ferrite Power Inductors LBRN series for Telecommunications Infrastructure and Industrial Equipment
Wire-wound Ferrite Power Inductors LMXN/LMXP series for Medical Devices classified as GHTF Class C (Japan Class III)
Wire-wound Ferrite Power Inductors LMXH series for Medical Devices classified as GHTF Class C (Japan Class III)
Wire-wound Ferrite Power Inductors LMRN series for Medical Devices classified as GHTF Class C (Japan Class III)

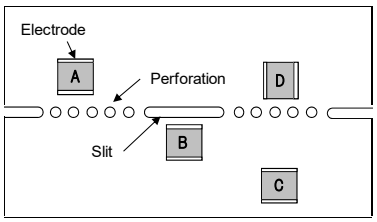
■PRECAUTIONS

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 refer to a recommended land pattern. 2. There is stress, which has been caused by distortion of a PCB, to the inductor. (LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) 3. Please consider the arrangement of parts on a PCB. (LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)
Technical considerations	◆Land pattern design Surface Mounting 1. Mounting and soldering conditions should be checked beforehand. 2. Applicable soldering process to this products is reflow soldering only. 3. Please use the recommended land pattern shown as below. Electrical characteristics and the mounting ability of the product are being considered in the recommended land pattern. If a PCB is designed with other dimensions, defective soldering and stress to a product may occur due to misalignment. The performance of the product may not be brought out. If an adopted land pattern is different from the recommended land pattern, stress to the product will increase. It may cause cracks or defective electrical characteristics of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) 4. As coefficients of thermal expansion between an inductor and a PCB differs, cracks may occur on a ferrite core when thermal stress is applied to them after mounting an inductor. (Please refer to the drawings below.) Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)



5. SMD inductors should be located to minimize any possible mechanical stresses from board warp or deflection. When splitting the PC board after mounting inductors and other components, care is required so as not to give any stresses of deflection or twisting to the board.
(LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)



A product tends to undergo stress in order "A>C>B≡D".
Please consider the layouts of a product to minimize any stresses.

3. Considerations for automatic placement

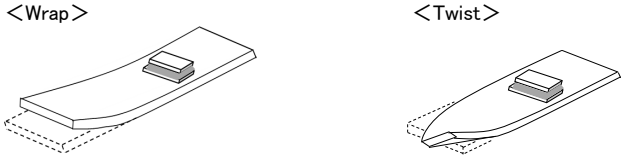
Precautions

◆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

◆Adjustment of mounting machine
1. When installing products, care should be taken not to apply distortion stress as it may deform the products.
2. Stress may be applied to a product with a warp or a twist in handling of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility.
(LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)

＜Wrap＞ ＜Twist＞



4. Soldering

Precautions

◆Reflow soldering
1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified.
2. The product shall be used reflow soldering only.
3. Please do not add any stress to a product until it returns in normal temperature after reflow soldering.

◆Lead free soldering
1. When using products with lead free soldering, we request to use them after confirming adhesion, temperature of resistance to soldering heat, soldering etc sufficiently.

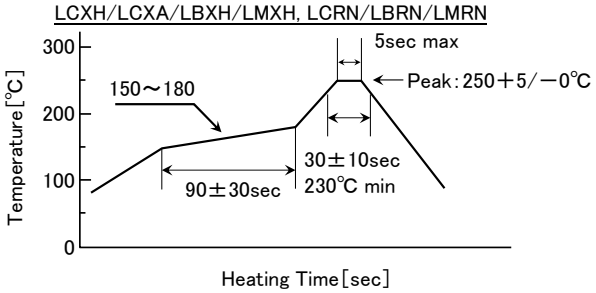
◆Recommended conditions for using a soldering iron
- Put the soldering iron on the land-pattern.
- Soldering iron's temperature – Below 350℃
- Duration – 3 seconds or less
- The soldering iron should not directly touch the inductor.

Technical considerations

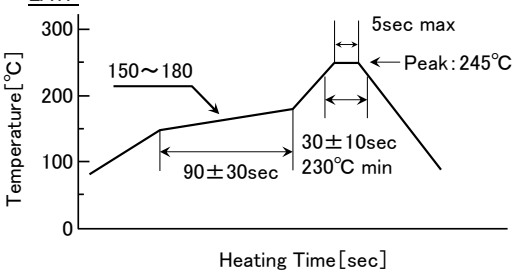
◆Reflow soldering
1. If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products.

Recommended reflow condition (Pb free solder)

LCXN/LCXP/LBXN/LBXP/LMXN/LMXP,
LCXH/LCXA/LBXH/LMXH, LCRN/LBRN/LMRN



LAYP



5. Cleaning	
Precautions	◆Cleaning conditions 1. Washing by supersonic waves shall be avoided.
Technical considerations	◆Cleaning conditions 1. If washed by supersonic waves, the products might be broken.

6. Handling	
Precautions	◆Handling 1. Keep the product away from all magnets and magnetic objects. ◆Breakaway PC boards (splitting along perforations) 1. When splitting the PC board after mounting product, 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 product any excessive mechanical shocks. 2. Please do not add any shock and power to a product in transportation. ◆Pick-up pressure 1. Please do not push to add any pressure to a winding part. Please do not give any shock and push into a ferrite core exposure part. ◆Packing 1. Please avoid accumulation of a packing box as much as possible.
Technical considerations	◆Handling 1. There is a case that a characteristic varies with magnetic influence. ◆Breakaway PC boards (splitting along perforations) 1. The position of the product on PCBs shall be carefully considered to minimize the stress caused from splitting of the PCBs. ◆Mechanical considerations 1. There is a case to be damaged by a mechanical shock. 2. There is a case to be broken by the handling in transportation. ◆Pick-up pressure 1. Damage and a characteristic can vary with an excessive shock or stress. ◆Packing 1. If packing boxes are accumulated, that could cause a deformation on packing tapes or a damage on the products.

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. ・ Recommended conditions Ambient temperature : －5～40℃ Humidity : Below 70% RH ・ The ambient temperature must be kept 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.

单击下面可查看定价，库存，交付和生命周期等信息

>>Taiyo Yuden(太阳诱电)