



## ■ 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 <sup>*3</sup>
	Equipment <sup>*1</sup>	Category (Part Number Code <sup>*2</sup> )	
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 <sup>\*1</sup>
- (3) Medical devices classified as GHTF Class D (Japan Class IV), implantable medical devices <sup>\*2</sup>
- (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	<ul style="list-style-type: none"> <li>• Engine ECU (Electronically Controlled Fuel Injector)</li> <li>• Cruise Control Unit</li> <li>• 4WS (4 Wheel Steering)</li> <li>• Transmission</li> <li>• Power Steering</li> <li>• HEV/PHV/EV Core Control (Battery, Inverter, DC-DC)</li> <li>• Automotive Locator (Car location information providing device), etc.</li> </ul>
	SAFETY	<ul style="list-style-type: none"> <li>• ABS (Anti-Lock Brake System)</li> <li>• ESC (Electronic Stability Control)</li> <li>• Airbag</li> <li>• ADAS (Equipment that directly controls running, turning and stopping), etc.</li> </ul>
C	BODY & CHASSIS	<ul style="list-style-type: none"> <li>• Wiper</li> <li>• Automatic Door</li> <li>• Power Window</li> <li>• Keyless Entry System</li> <li>• Electric Door Mirror</li> <li>• Automobile Digital Mirror</li> <li>• Interior Lighting</li> <li>• Automobile Air Conditioning System</li> <li>• TPMS (Tire Pressure Monitoring System)</li> <li>• Anti-Theft Device (Immobilizer), etc.</li> </ul>
	INFOTAINMENT	<ul style="list-style-type: none"> <li>• Car Infotainment System</li> <li>• ITS/Telematics System</li> <li>• Instrument Cluster</li> <li>• ADAS (Sensor, Equipment that is not interlocked with safety equipment or powertrain)</li> <li>• Dashcam (genuine products for automotive manufacturer), etc.</li> </ul>

# Wire-wound Ferrite Inductors for Class D Amplifier LCXA 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.

LCXA

AEC-Q200 Grade 3 (we conduct the evaluation at the test condition of Grade 3.)

\*Operating environment Temp: -40~85°C

REFLOW

AEC-Q200

## ■ PART NUMBER

\*Operating Temp. : -40~125°C(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

### ① Series

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

### ② Features

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

### ③ Dimensions (L x W)

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

### ④ Dimensions (H)

Code	Dimensions (H) [mm]
YE	4.5

### (3) Type

Code	
X	Ferrite Wire-wound (Drum type)

### (4) Features, Characteristics

Code	
A	For audio filters

### ⑤ Packaging

Code	Packaging
L	Taping

### ⑥ Nominal inductance

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

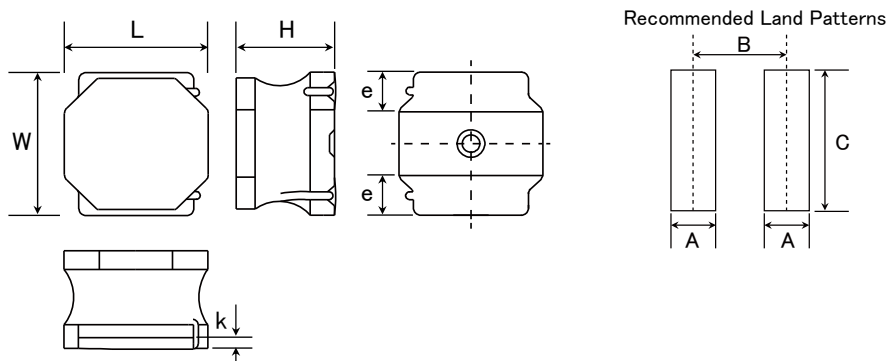
※R=Decimal point

### ⑦ Inductance tolerance

Code	Inductance tolerance
M	±20%

### ⑧ Internal code

## ■ STANDARD EXTERNAL DIMENSIONS / STANDARD QUANTITY



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 [ $\mu$ H]	Inductance tolerance	DC Resistance [m $\Omega$ ] Max (Typ)	Rated current ※) [A]		Measuring frequency [MHz]
					Saturation current Idc1 Max (Typ)	Temperature rise current Idc2 Max (Typ)	
LCXAF6060YEL3R3MMR	NRC6045T 3R3MMRUV	3.3	$\pm$ 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°C)

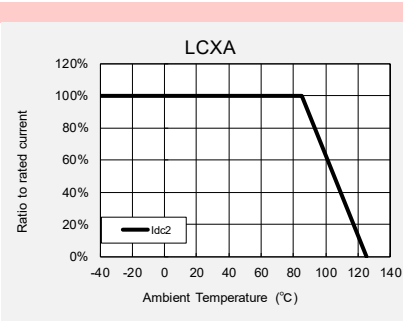
※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) 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 series

Derating of current is necessary for LCXA 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 series

■ PACKAGING

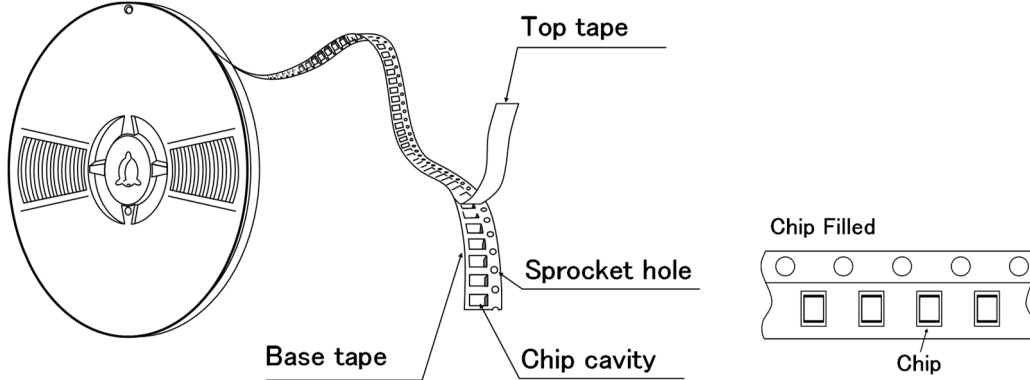
① Minimum Quantity

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	2500
5050WE	2500
5050XK	500
5050XA	500
5050YA	1500
5050YK	1500
6060KK	1000
6060MK	1000
6060PK	1000
6060WK	2500
6060WH	2000
6060YE	1500
8080XK	1000
8080YK	1000
8080YB	1000

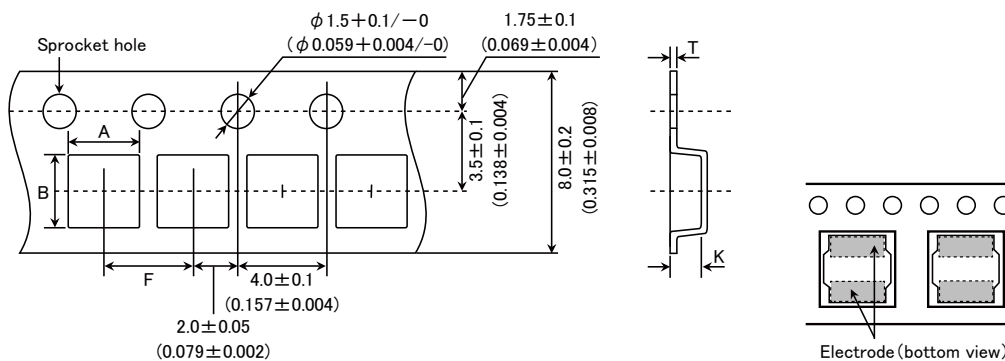
② Tape Material

● Embossed Tape



③ Taping dimensions

● Embossed tape 8mm wide (0.315 inches wide)

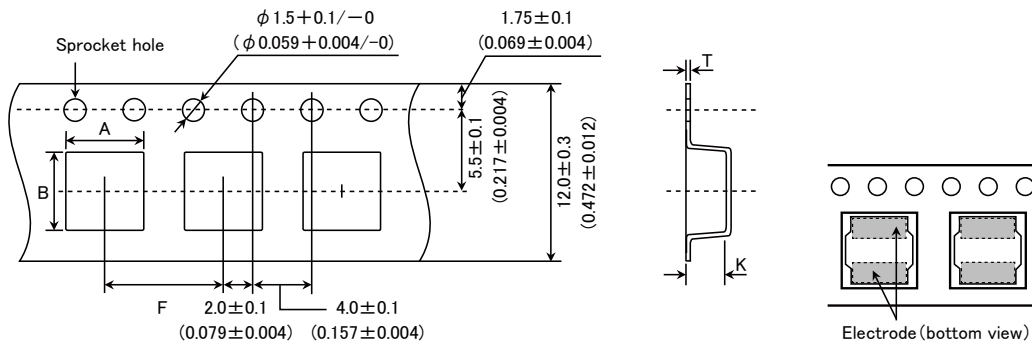


▶ This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification. For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (<http://www.ty-top.com/>).

Type	Chip cavity		Insertion pitch F	Tape thickness	
	A	B		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)

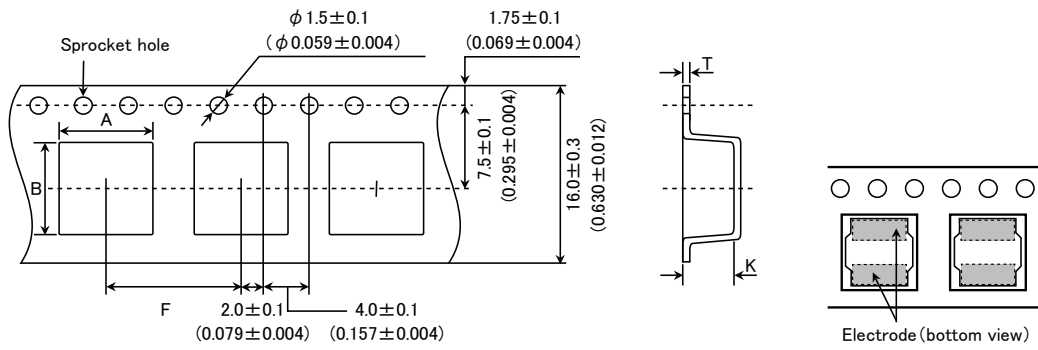


Type	Chip cavity		Insertion pitch F	Tape thickness		
	A	B		T	K	
4040KK	4.3±0.1 (0.169±0.004)	4.3±0.1 (0.169±0.004)	8.0±0.1 (0.315±0.004)	0.3±0.1 (0.012±0.004)	1.4±0.1 (0.055±0.004)	
4040MK					1.6±0.1 (0.063±0.004)	
4040TK 4040WK					2.1±0.1 (0.083±0.004)	
5050KK	5.25±0.1 (0.207±0.004)	5.25±0.1 (0.207±0.004)			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)
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)		0.4±0.1 (0.016±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)

► 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/>).

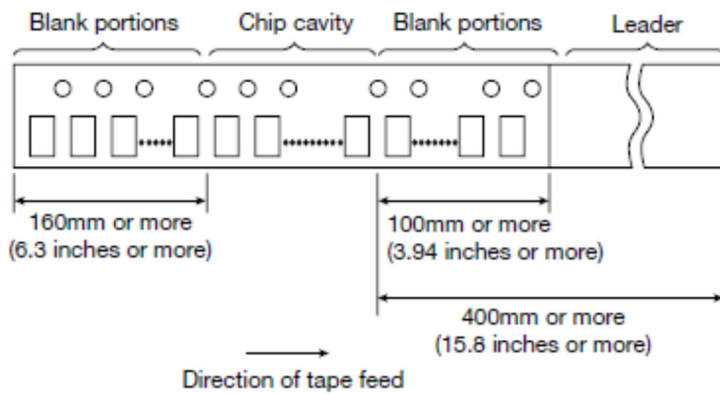
● Embossed tape 16mm wide (0.63 inches wide)



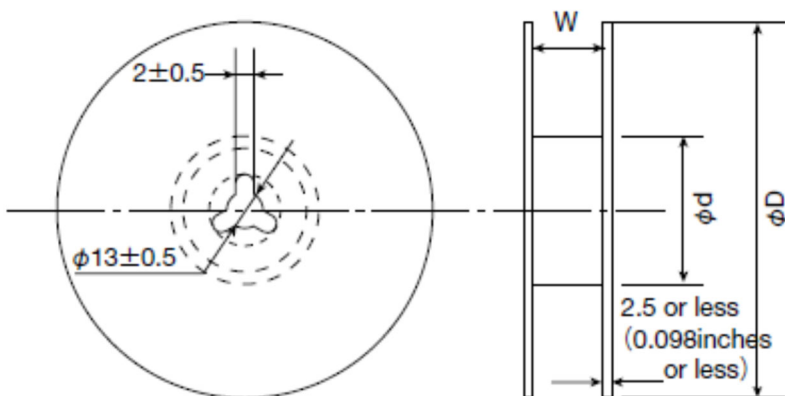
Type	Chip cavity		Insertion pitch F	Tape thickness	
	A	B		T	K
8080XK	8.3±0.1 (0.327±0.004)	8.3±0.1 (0.327±0.004)	12.0±0.1 (0.472±0.004)	0.5±0.1 (0.020±0.004)	3.4±0.1 (0.134±0.004)
8080YK					4.5±0.1 (0.177±0.004)
8080YB					4.5±0.1 (0.177±0.004)

Unit : mm (inch)

#### ④ Leader and Blank portion



#### ⑤ Reel size

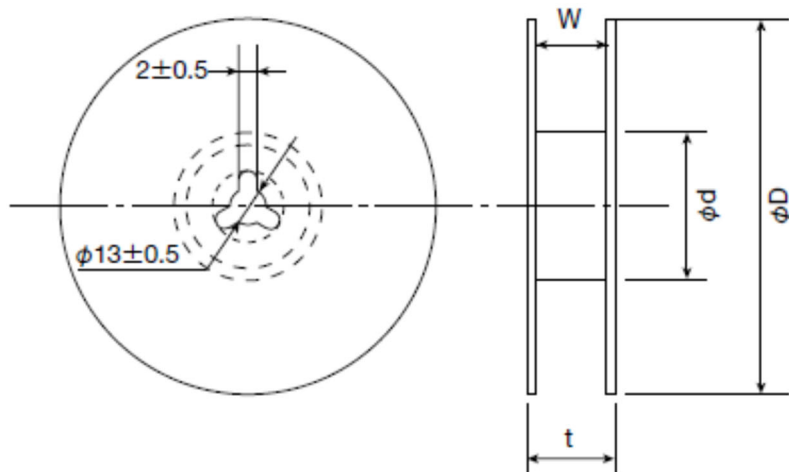


► This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification. For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (<http://www.ty-top.com/>).



Type	Reel size (Reference values)		
	$\phi D$	$\phi d$	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)

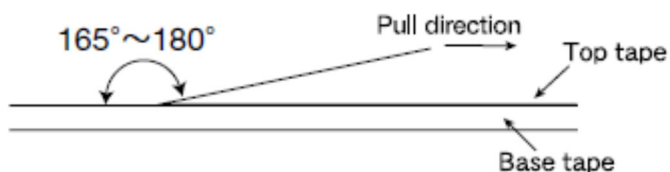


Type	Reel size (Reference values)			
	$\phi D$	$\phi d$	t (max.)	W
4040KK	330±3.0 (12.99±0.118)	80±2.0 (3.15±0.078)	18.5 (0.72)	13.5±1.0 (0.531±0.04)
4040MK				
4040TK				
5050WD				
5050WE				
5050YA				
5050YK			22.5 (0.89)	17.5±1.0 (0.689±0.04)
6060WK				
6060WH				
6060YE				
8080XK	22.5 (0.89)	17.5±1.0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

Unit: mm (inch)

### ⑥ Top 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 series  
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       $-40 \sim +125^{\circ}\text{C}$  (Including self-generated heat)

Test Methods and Remarks      Including self-generated heat

2. Storage Temperature Range

Specified Value       $-40 \sim +125^{\circ}\text{C}$

Test Methods and Remarks       $-5$  to  $40^{\circ}\text{C}$  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

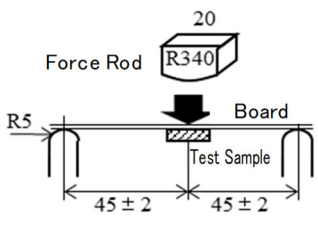
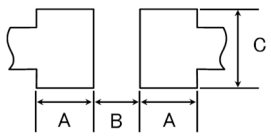
Specified Value      Inductance change : Within  $\pm 20\%$

Test Methods and Remarks      Measurement of inductance shall be taken at temperature range within  $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$ .  
With reference to inductance value at  $+20^{\circ}\text{C}$ ., change rate shall be calculated.

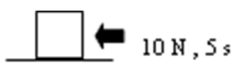
Change of maximum inductance deviation in step 1 to 5

Step	Temperature ( $^{\circ}\text{C}$ )
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	<p>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.</p> <p>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)</p> <div style="text-align: right;">  <p style="text-align: right;">Unit: mm</p> </div> <p>Land dimension</p> <table border="1" style="display: inline-table; margin-left: 20px;"> <thead> <tr> <th>Type</th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>3030</td> <td>1.3</td> <td>1.0</td> <td>2.7</td> </tr> <tr> <td>4040</td> <td>1.5</td> <td>1.8</td> <td>3.5</td> </tr> <tr> <td>5050</td> <td>1.9</td> <td>2.3</td> <td>3.8</td> </tr> <tr> <td>6060</td> <td>2.4</td> <td>2.6</td> <td>4.8</td> </tr> </tbody> </table> 	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
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	<p>The test samples shall be soldered to the test board by the reflow.</p> <p>Applied force : 10N          Duration : 5s.          Solder cream thickness : 0.10mm (3030~4040 type)          : 0.15mm (5050~6060 type)</p> 

### 9. Resistance to vibration

Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.										
Test Methods and Remarks	<p>The test samples shall be soldered to the test board by the reflow. Then it shall be submitted to below test conditions.</p> <table border="1" style="width: 100%;"> <tr> <td>Frequency Range</td> <td>10~55Hz</td> </tr> <tr> <td>Total Amplitude</td> <td>1.5mm (May not exceed acceleration 196m/s<sup>2</sup>)</td> </tr> <tr> <td>Sweeping Method</td> <td>10Hz to 55Hz to 10Hz for 1min.</td> </tr> <tr> <td rowspan="3">Time</td> <td>X</td> </tr> <tr> <td>Y</td> </tr> <tr> <td>Z</td> </tr> </table> <p style="text-align: center;">For 2 hours on each X, Y, and Z axis.</p> <p>Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.</p>	Frequency Range	10~55Hz	Total Amplitude	1.5mm (May not exceed acceleration 196m/s <sup>2</sup> )	Sweeping Method	10Hz to 55Hz to 10Hz for 1min.	Time	X	Y	Z
Frequency Range	10~55Hz										
Total Amplitude	1.5mm (May not exceed acceleration 196m/s <sup>2</sup> )										
Sweeping Method	10Hz to 55Hz to 10Hz for 1min.										
Time	X										
	Y										
	Z										

### 10. Solderability

Specified Value	At least 90% of surface of terminal electrode is covered by new solder.				
Test Methods and Remarks	<p>The test samples shall be dipped in flux, and then immersed in molten solder as shown in below table.</p> <p>Flux : Ethanol solution containing rosin 25%.</p> <table border="1" style="width: 100%;"> <tr> <td>Solder Temperature</td> <td>245 ± 5°C</td> </tr> <tr> <td>Time</td> <td>5 ± 1.0 sec.</td> </tr> </table> <p>※Immersion depth : All sides of mounting terminal shall be immersed.</p>	Solder Temperature	245 ± 5°C	Time	5 ± 1.0 sec.
Solder Temperature	245 ± 5°C				
Time	5 ± 1.0 sec.				

### 11. Resistance to soldering heat

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

▶ 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/>).

## 12. Thermal shock

Specified Value	Inductance change : Within $\pm 10\%$ 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	LCXA																																			
	<table border="1"> <thead> <tr> <th colspan="3">Conditions of 1 cycle</th> </tr> <tr> <th>段階</th> <th>Temperature (<math>^{\circ}\text{C}</math>)</th> <th>Duration (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><math>-40\pm 3</math></td> <td><math>30\pm 3</math></td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>Within 3</td> </tr> <tr> <td>3</td> <td><math>+105\pm 3</math></td> <td><math>30\pm 3</math></td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>Within 3</td> </tr> </tbody> </table>	Conditions of 1 cycle			段階	Temperature ( $^{\circ}\text{C}$ )	Duration (min)	1	$-40\pm 3$	$30\pm 3$	2	Room temperature	Within 3	3	$+105\pm 3$	$30\pm 3$	4	Room temperature	Within 3	<table border="1"> <thead> <tr> <th colspan="3">Conditions of 1 cycle</th> </tr> <tr> <th>Step</th> <th>Temperature (<math>^{\circ}\text{C}</math>)</th> <th>Duration (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><math>-40\pm 3</math></td> <td><math>30\pm 3</math></td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>Within 3</td> </tr> <tr> <td>3</td> <td><math>+85\pm 3</math></td> <td><math>30\pm 3</math></td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>Within 3</td> </tr> </tbody> </table>	Conditions of 1 cycle			Step	Temperature ( $^{\circ}\text{C}$ )	Duration (min)	1	$-40\pm 3$	$30\pm 3$	2	Room temperature	Within 3	3	$+85\pm 3$	$30\pm 3$	4	Room temperature
Conditions of 1 cycle																																					
段階	Temperature ( $^{\circ}\text{C}$ )	Duration (min)																																			
1	$-40\pm 3$	$30\pm 3$																																			
2	Room temperature	Within 3																																			
3	$+105\pm 3$	$30\pm 3$																																			
4	Room temperature	Within 3																																			
Conditions of 1 cycle																																					
Step	Temperature ( $^{\circ}\text{C}$ )	Duration (min)																																			
1	$-40\pm 3$	$30\pm 3$																																			
2	Room temperature	Within 3																																			
3	$+85\pm 3$	$30\pm 3$																																			
4	Room temperature	Within 3																																			

## 13. Damp heat

Specified Value	Inductance change : Within $\pm 10\%$ 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.						
	<table border="1"> <tr> <td>Temperature</td> <td><math>85\pm 2^{\circ}\text{C}</math></td> </tr> <tr> <td>Humidity</td> <td>85%RH</td> </tr> <tr> <td>Time</td> <td>1000+24/-0 hour</td> </tr> </table>	Temperature	$85\pm 2^{\circ}\text{C}$	Humidity	85%RH	Time	1000+24/-0 hour
Temperature	$85\pm 2^{\circ}\text{C}$						
Humidity	85%RH						
Time	1000+24/-0 hour						

## 14. Low temperature life test

Specified Value	Inductance change : Within $\pm 10\%$ 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.					
	<table border="1"> <tr> <td>Temperature</td> <td><math>-40\pm 2^{\circ}\text{C}</math></td> </tr> <tr> <td>Time</td> <td>1000+24/-0 hour</td> </tr> </table>	Temperature	$-40\pm 2^{\circ}\text{C}$	Time	1000+24/-0 hour	
	Temperature	$-40\pm 2^{\circ}\text{C}$				
Time	1000+24/-0 hour					

## 15. High temperature life test

Specified Value	Inductance change : Within $\pm 10\%$ 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.					
	<table border="1"> <tr> <td>Temperature</td> <td><math>125\pm 3^{\circ}\text{C}</math></td> </tr> <tr> <td>Time</td> <td>1000 hour</td> </tr> </table>	Temperature	$125\pm 3^{\circ}\text{C}$	Time	1000 hour	
	Temperature	$125\pm 3^{\circ}\text{C}$				
Time	1000 hour					

## 16. Loading at high temperature life test

Specified Value	Inductance change : Within $\pm 10\%$ 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	LCXA												
	<table border="1"> <tr> <td>Temperature</td> <td>1) <math>85\pm 2^{\circ}\text{C}</math> 2) <math>105\pm 3^{\circ}\text{C}</math></td> </tr> <tr> <td>Applied current</td> <td>1) Rated current (<math>+40^{\circ}\text{C}</math>) 2) Rated current (<math>+20^{\circ}\text{C}</math>)</td> </tr> <tr> <td>Time</td> <td>1000+24/-0 hour</td> </tr> </table>	Temperature	1) $85\pm 2^{\circ}\text{C}$ 2) $105\pm 3^{\circ}\text{C}$	Applied current	1) Rated current ( $+40^{\circ}\text{C}$ ) 2) Rated current ( $+20^{\circ}\text{C}$ )	Time	1000+24/-0 hour	<table border="1"> <tr> <td>Temperature</td> <td><math>85\pm 2^{\circ}\text{C}</math></td> </tr> <tr> <td>Applied current</td> <td>Rated current</td> </tr> <tr> <td>Time</td> <td>1000+24/-0 hour</td> </tr> </table>	Temperature	$85\pm 2^{\circ}\text{C}$	Applied current	Rated current	Time	1000+24/-0 hour
	Temperature	1) $85\pm 2^{\circ}\text{C}$ 2) $105\pm 3^{\circ}\text{C}$												
Applied current	1) Rated current ( $+40^{\circ}\text{C}$ ) 2) Rated current ( $+20^{\circ}\text{C}$ )													
Time	1000+24/-0 hour													
Temperature	$85\pm 2^{\circ}\text{C}$													
Applied current	Rated current													
Time	1000+24/-0 hour													

## 17. Standard condition

Specified Value	Standard test condition : Unless otherwise specified, temperature is $20\pm 15^{\circ}\text{C}$ and $65\pm 20\%$ of relative humidity. When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of $20\pm 2^{\circ}\text{C}$ of temperature, $65\pm 5\%$ relative humidity. Inductance is in accordance with our measured value.
-----------------	--