Ver.1.00

SPECIFICATION

WOUND CHIP POWER INDUCTOR

BRL3225TR51M

TAIYO YUDEN

1. Range of application

This specification sheet applies to wound chip power inductor, BRL3225.

2. Ordering code

Example : BRL (1) 3225 (2) T (3) R51 (4) M (5)

(1) Type
(2) External dimensions
(3) Packing style (T: Taping)
(4) Inductance
(5) Inductance tolerance (M=±20 %)

3. Standard measuring method

Inductance	:	LCR meter	(HP 4285A or equivalent)
		Measuring signal level: 1V	
		Test fixture	(HP 16034E or equivalent)
		Measuring pressure : 200±20gf	
Self-resonance frequency	:	Impedance/Material Analyzer	(HP 4291A or equivalent)
DC resistance	:	DC Ohmmeter	(HIOKI 3227 or equivalent)

Standard test conditions
Unless specified, Ambient temperature is 20±15 degC and the Relative humidity is 65±20 %.
If there is any doubt about the test results, further measurement shall be had within the following limits : Ambient Temperature: 20±2degC
Relative humidity: 65±5%
Inductance value is based on our standard measurement systems.

4. Operating temperature range

-40 degC to +105 degC (Containing self temperature increase)

5. Storage temperature range

-40 degC to +85 degC （Product without taping）

6. Electrical characteristics

Refer to table 1 and 3.

7. External dimensions and structural diagram

Refer to Table 2.

8. Mechanical characteristics

Refer to Table 3.

9. Environment test performance standards

Refer to Table 3.

10. Taping method

Refer to Table 4.

11. Packing form

Refer to Table 5.

12. Reflow profile chart

Refer to Table 6.

	Table 1	
	ELECTRICAL CHARACTERISTICS	(2 / 1 1)

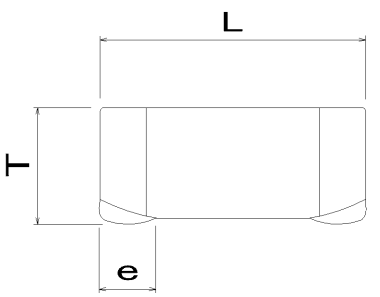
Ordering Code	Nominal Inductance [uH]	Inductance Tolerance [%]	D.C. Resistance ± 30% [Ω]	Self Resonant Frequency [MHz] min	Rated Current *) [mA] max		Measuring Frequency [MHz]
					Saturation Current Idc 1	Temperature Rise current Idc 2	
BRL3225TR51M	0.51	±20	0.029	270	3600	2550	7.96

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

*) The temperature rise current value (Idc2) is the maximum DC current value having temperature increase up to 40 degC. (at 20 degC.)

*) The rated current value is following either Idc1 or Idc2, which is the lower one.

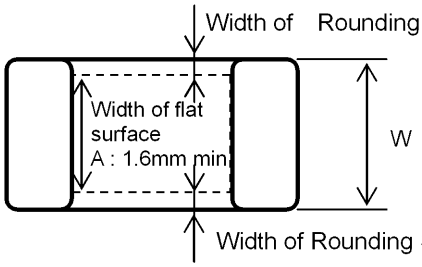
1. External dimensions



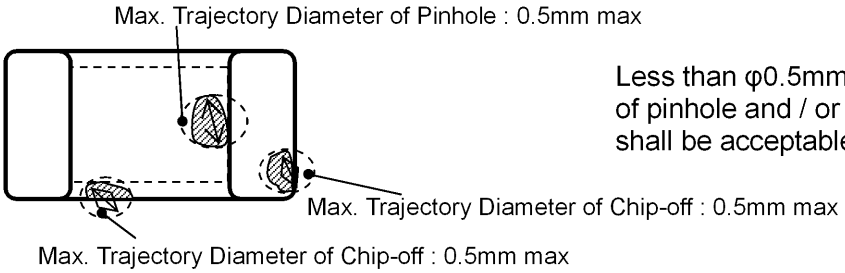
L	3.20±0.20
W	2.50±0.20
T	1.70 max
e	0.75±0.20

Unit: mm

Appearance Criteria for Chip-off Mode
(Top View)

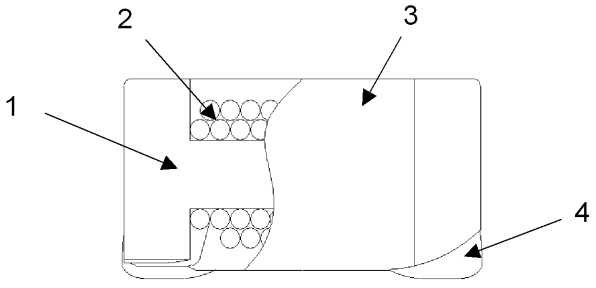


More than 1.6mm width of flat surface A shall be acceptable.
Less than 0.8mm width of rounding surface r & r' shall be acceptable.



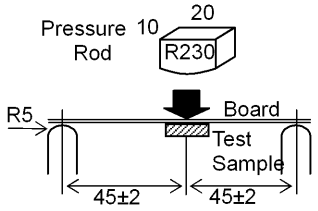
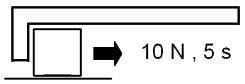
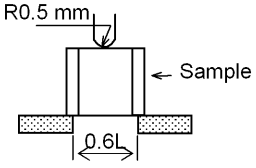
Less than φ0.5mm max. trajectory diameter of pinhole and / or chip-off of whole surface shall be acceptable.

2 Structural diagram



1.	Ferrite core	Ni-Zn ferrite
2.	Coil material	Polyurethane-copper wire
3.	Over-coating resin	Epoxy resin, containing ferrite powder
4.	Electrode	Base material : Ag Foundation plating : Ni Surface plating : Sn

	Table 3	
	STANDARDS	(4 / 11)

	Item	Standard	Test method
ELECTRICAL CHARACTERISTICS	Inductance	Refer to Table 1	LCR meter (HP 4285A or equivalent) Measuring signal level: 1V Test fixture (HP16034E or equivalent) Measuring pressure : 200±20gf
	Self resonant frequency	Refer to Table 1	Impedance/material analyzer (HP 4291A or equivalent)
	DC resistance	Refer to Table 1	DC ohm meter (HIOKI 3227 or equivalent)
	Rated current	Refer to Table 1	The maximum DC value having inductance decrease within 30 % and temperature increase within 40 degC by the application of DC bias.
	Over current test	No smoke and no fire.	1.5 times the rated current shall be applied for a period of 5 minutes.
MECHANICAL CHARACTERISTICS	Resistance to flexure substrate	No damage.	The test samples shall be soldered to the testing board and by reflow soldering conditions as show in table 6. Apply pressure in the direction of the arrow until bent width reaches 2 mm.  Unit : mm Substrate size : 100×40×1.0 Substrate material : glass epoxy-resin Solder cream thickness : 0.12 (Land size refer to recommended Land Pattern Dimensions of "Precaution")
	Adhesion of terminal electrode	No abnormality.	The test samples shall be soldered to the testing board and by reflow soldering conditions as shown table 6.  Applied force : 10 N to X and Y directions. Duration : 5 s. Solder cream thickness : 0.12 mm (Land size refer to recommended Land Pattern Dimensions of "Precaution")
	Body strength	No damage.	Applied force : 10 N Duration : 10 s 

<table>
<tr><th></th><th>Item</th><th>Standard</th><th>Test method</th></tr>
<tr><td rowspan="5">ENVIRONMENT TESTS</td><td>Resistance to vibration</td><td>Inductance change: Within ±10 %
No abnormality observed in appearance.</td><td>The test samples shall be soldered to testing jig as shown in under table.<table><tr><td>Frequency range</td><td>10~55 Hz</td></tr><tr><td>Overall Amplitude</td><td>1.5 mm（Shall not exceed acceleration 196 m/S^2）</td></tr><tr><td>Sweeping Method</td><td>10 to 55 to 10 Hz for 1 min.</td></tr><tr><td>Time</td><td>2 hours each in X, Y, and Z Direction.</td></tr></table></td></tr>
<tr><td>Resistance to soldering</td><td>Inductance change: Within ±10 %
No abnormality observed in appearance.</td><td>3 times of reflow oven at 230 degC min for 40 sec max, with peak temperature at 260+0/-5 degC for 5 sec max.

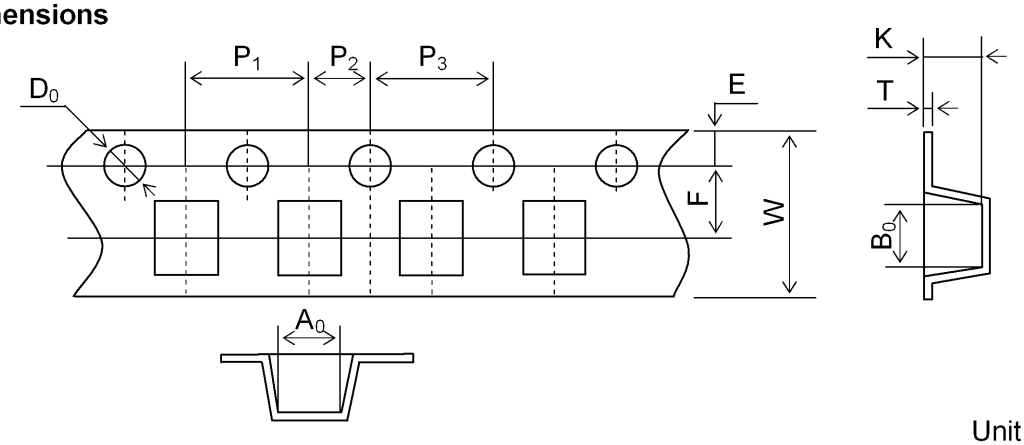
Substrate thickness : 1.0 mm
Substrate material : glass epoxy-resin</td></tr>
<tr><td>Solderability</td><td>At least 90 % of terminal electrode is covered by new solder.</td><td>The test samples shall be submerged molten solder as shown in under table.
Flux : methanol solution with 25 % of rosin or equivalent.
Pb free solder : Sn-3Ag-0.5Cu<table><tr><td>Solder Temperature</td><td>245±5 degC</td></tr><tr><td>Time</td><td>5±0.5 s</td></tr><tr><td>Immersing Speed</td><td>25 mm/s</td></tr></table>Eutectic solder<table><tr><td>Solder Temperature</td><td>230±5 degC</td></tr><tr><td>Time</td><td>5±0.5 s</td></tr><tr><td>Immersing Speed</td><td>25 mm/s</td></tr></table></td></tr>
<tr><td>Temperature characteristics</td><td>Inductance change: Within ±15 %
No abnormality observed in appearance.</td><td>Measurement shall be taken in a temperature range of -40 degC to +85 degC and the value at +20 degC shall be used as the standard value.</td></tr>
<tr><td>Thermal shock</td><td>Inductance change: Within ±10 %
No abnormality observed in appearance.</td><td>The test samples shall be soldered to the testing jig and by reflow soldering conditions as shown in table 6.
The test samples shall be left for the specified time at each of temperature in steps from 1 to 4, as shown in under table in sequence.
The temperature cycles shall be repeated 100 cycles in the Method.
Conditions for 1 cycle.<table><tr><th>Step</th><th>Temperature</th><th>Time (min)</th></tr><tr><td>1</td><td>-40±3 degC</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>within 3</td></tr><tr><td>3</td><td>85±2 degC</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp</td><td>within 3</td></tr></table></td></tr>
</table>

	Item	Standard	Test method
ENVIRONMENT TESTS	Low temperature life test	Inductance change: Within ±10 % No abnormality observed in appearance.	The test samples shall be soldered to the testing jig and by reflow soldering conditions as shown in table 6. And after that proceed the test as shown condition under table. Temperature: -40±2 degC Time: 1 000+24 h
	High temperature life test	Inductance change: Within ±10 % No abnormality observed in appearance.	The test samples shall be soldered to the testing jig and by reflow soldering conditions as shown in table 6. And after that proceed the test as shown condition under table. Temperature: 85±2 degC Time: 1 000+24 h
	Damp heat life test	Inductance change: Within ±10 % No abnormality observed in appearance.	The test samples shall be soldered to the testing jig and by reflow soldering conditions as shown in table 6. The test samples shall be put in thermostatic oven set at temperature with humidity, as shown in under table. Temperature: 60±2 degC Humidity: 90~95 %RH Time: 1 000+24 h
	Loading under damp heat life test	Inductance change: Within ±10 % No abnormality observed in appearance.	The test samples shall be soldered to the testing jig and by reflow soldering conditions as shown in table 6. The test samples shall be put in thermostatic oven set at temperature with humidity, as shown in under table, and with the rated current continuously applied. Temperature: 60±2 degC Humidity: 90~95 %RH Current: Refer to Table 1 Time: 1 000+24 h

Standard measuring condition	Unless otherwise specified, at least 2 hrs of recovery under the room temperature and normal humidity after the test, followed by the measurement within 48 hrs.

	Table 4	
	TAPING DIMENSIONS	(7 / 11)

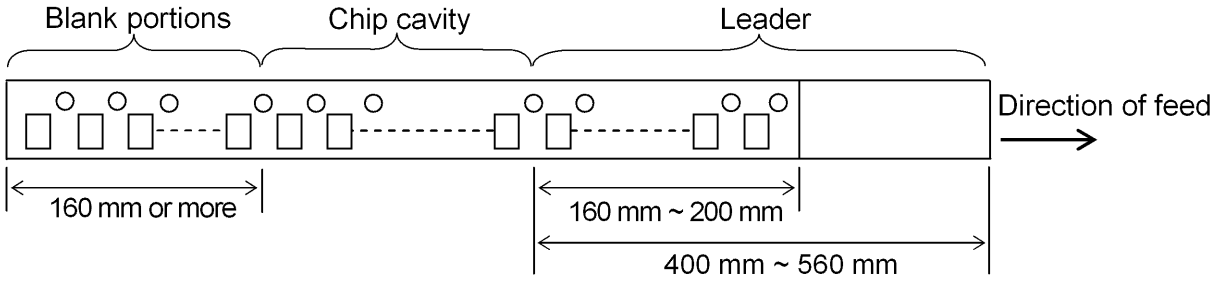
1. Dimensions



Unit : mm

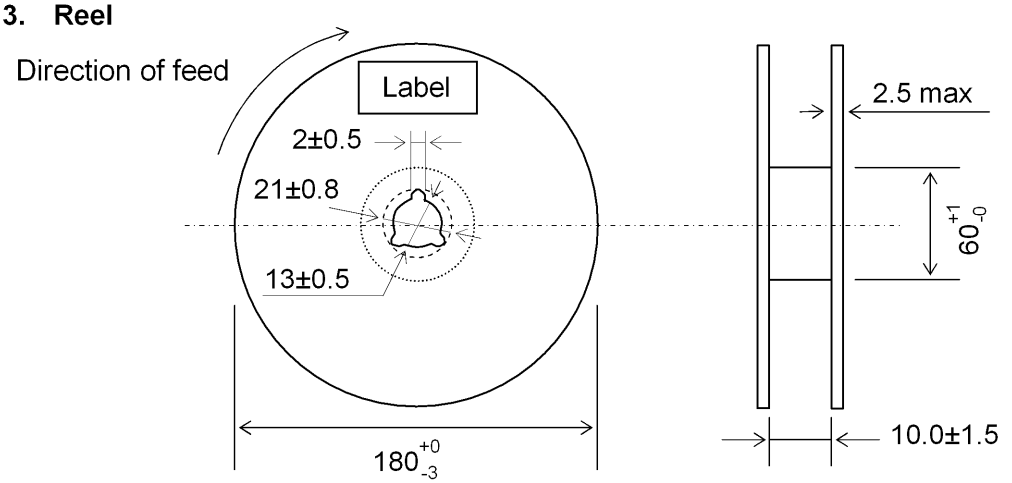
A_0	B_0	W	F	E	P_1	P_2	P_3	D_0	T	K
2.80 ±0.10	3.50 ±0.10	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	φ1.50 +0.10 −0	0.25 ±0.05	1.90 max

2. Direction of rolling



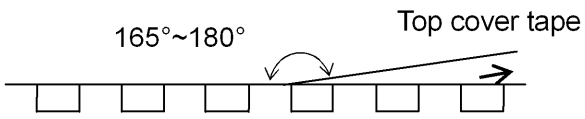
3. Reel

Unit : mm



Label position : the opposite side of pilot holes

4. Top tape strength



Peel-off strength : 0.2 N～0.7 N
Peel-off angle : 165°~180°
Peel-off speed : 300 mm/min

1. The number of components

Each reel shall accommodate 2000 inductors whether there are empty compartments or not.

2. Packing in tape

Emboss carrier tapes of 8 mm width, 4 mm pitch and φ180 mm-reels shall be used.

3. The allowable number of empty components

The number of empty compartments in a reel, which shall not appear continuously, must be limited to 2.

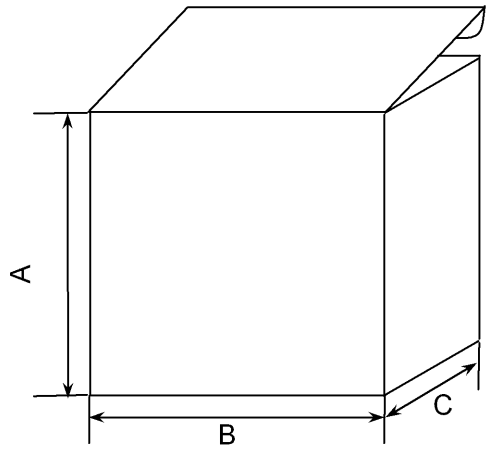
4. Marking

The following items shall be marked legibly each unit pack.

(1) Customer part No.
(2) Our part No.
(3) Manufacture's name (TAIYO YUDEN CO., LTD.)
(4) Control No.
(5) Date (stamp)
(6) Quantity
(7) Country of the origin

5. Dimensions of packing box

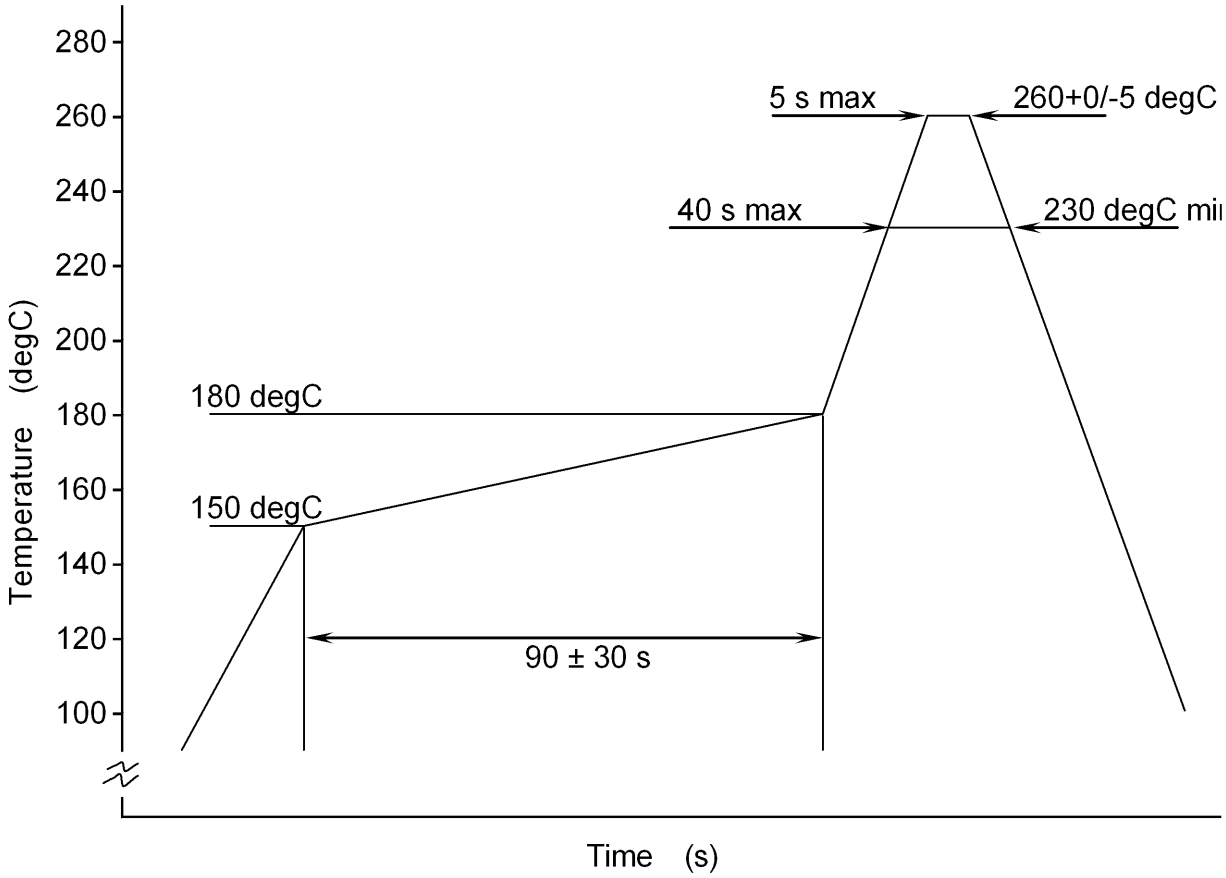
* Reference



Code	A	B	C	Standard Quantity
Size	190	185	75	10, 000 pcs. max
			140	20, 000 pcs. max

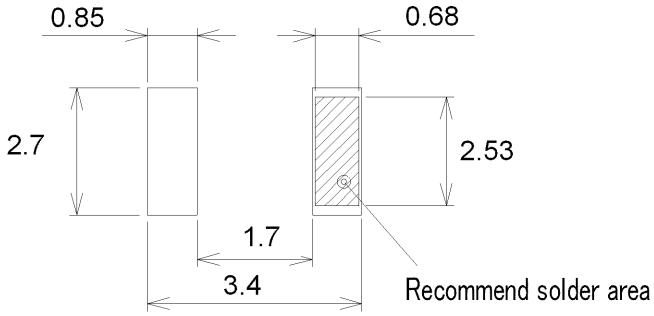
[Unit : mm]

	Table 6	
	REFLOW PROFILE CHART (REFERENCE)	(9 / 1 1)



1. Surface Mounting

-Mounting and soldering conditions should be checked beforehand.
-This inductors only using reflow soldering.
-Recommended Land-Pattern and Metal Mask-Pattern (t = 0.10~0.12 mm) :



Unit : mm

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

2. Handling

-Please keep the inductors away from all magnets and magnetic objects.
-When splitting the PC boards after mounting inductors, care should be taken not to give any stresses of deflection or twisting to the board.
-Board separation should not be done manually, but by using the appropriate devices.
-Please do not give the inductors any excessive mechanical shocks.
-Please avoid operation, which apply excessive stress and/or temperature to the products, such as resin molding.
-Washing by supersonic waves shall be avoided.

3. Storage

To maintain the solderability of terminal electrodes and to keep the packing material in good condition, temperature and humidity in the storage area should be controlled.
Recommended conditions.
Ambient temperature 0 ~ 40 degC
Humidity Below 70 % RH
The ambient temperature must be kept below 30 degC. Even under ideal storage conditions, solderability of products electrodes may decrease as time passes, so inductors should be used within 6 months from the time of delivery.

4. Regulations

-No ozone-depleting substances, which are defined as Class-1 and Class-2 in the US Federal Clean Air Act, are used in the production processes, nor contained in the product.
-The product and the specifications described above are not included in the list of export regulations in Japan and USA.
-The product and the specifications described above are conformable to “RoHS compliance”. “RoHS compliance” means that the product does not contain lead, cadmium, mercury, hexavalent chromium, PBBs or PBDEs referring to EU Directive 2002/95/EC, except other non-restricted substances or impurities which could not be technically removed at the refining process.

5. Production Sites

-TAIYO YUDEN CO., LTD. (JAPAN)
-CHUKI SEIKI CO., LTD. (JAPAN)
-Tsukiyono Denshi Co., Ltd. (JAPAN)

6. Guarantee

The operating conditions for the guarantee of this product are as shown in the drawing for specification.
Please note that Taiyo Yuden Co., Ltd. shall not be responsible for a failure and or abnormality which is caused by use under the conditions other than the aforesaid operating conditions.

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

■Please conduct validation and verification of products in actual condition of mounting and operating environment before commercial shipment of the equipment.

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Before incorporating the components or devices into any equipment in the field such as transportation,(automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network (telephone exchange, base station) etc. which may have direct influence to harm or injure a human body, please contact Taiyo Yuden Co., Ltd. for more detail in advance.
Do not incorporate the products into any equipment in fields such as aerospace, aviation, nuclear control, submarine system, military, etc. where higher safety and reliability are especially required.
In addition, even electronic components or functional modules that are used for the general electronic equipment, if the equipment or the electric circuit require high safety or reliability function or performances, a sufficient reliability evaluation check for safety shall be performed before commercial shipment and moreover, due consideration to install a protective circuit is strongly recommended at customer's design stage.

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It is only applicable to the products purchased from any of TAIYO YUDEN’s official sales channel.

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