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Notice for TAIYO YUDEN products

Please read this notice before using the TAIYO YUDEN products.

⚠ REMINDERS

- Product information in this catalog is as of October 2011. All of the contents specified herein are subject to change without notice due to technical improvements, etc. Therefore, please check for the latest information carefully before practical application or usage of the Products.

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

- Please contact Taiyo Yuden Co., Ltd. for further details of product specifications as the individual specification is available.

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

- All electronic components or functional modules listed in this catalog are developed, designed and intended for use in general electronics equipment.(for AV, office automation, household, office supply, information service, telecommunications, (such as mobile phone or PC) etc.). Before incorporating the components or devices into any equipment in the field such as transportation,(automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network (telephone exchange, base station) etc. which may have direct influence to harm or injure a human body, please contact Taiyo Yuden Co., Ltd. for more detail in advance.
  Do not incorporate the products into any equipment in fields such as aerospace, aviation, nuclear control, submarine system, military, etc. where higher safety and reliability are especially required.

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- The contents of this catalog are applicable to the products which are purchased from our sales offices or distributors (so called "TAIYO YUDEN's official sales channel").
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- Caution for export
  Certain items in this catalog may require specific procedures for export according to "Foreign Exchange and Foreign Trade Control Law" of Japan, "U.S. Export Administration Regulations", and other applicable regulations. Should you have any question or inquiry on this matter, please contact our sales staff.

SMD COMMON MODE FILTERS FOR HIGH-SPEED DIFFERENTIAL SIGNAL LINES

REFLOW

FEATURES

- CM01 Series is Wire-wound Structured Type Commom Mode Choke Coil which provides highly effective noise suppression characteristics without distorting the wave pattern of High-speed Differential Signal interface.
- Developed 1210 case-size by utilizing our wire-wound technologies. This small and wire-wound structured product has little transmission loss and keeps high common impedance up to GHz range.
- CM01S600, CM01S900 : Suitable characteristics for super high speed differential signal such as USB3.0 and so on. Cutoff frequency is 8～10GHz.
- CM01H900 : Suitable characteristics for high speed differential signal such as HDMI, DVI, Displayport and so on. Cut-off frequency is 8GHz.
- CM01U900 : Suitable characteristics for differential signal such as USB2.0, LVDS, LAN and so on. Cut-off frequency is 3GHz. High rated current of this product makes it possible to replace 2012 size product for this product.
- CM01U161 : Suitable characteristics for differential signal such as USB2.0, LVDS, LAN and so on. Cut-off frequency is 3GHz. High common impedance of this product works effectively on noise suppression.

APPLICATIONS

- Radiated noise suppression in the High-speed Diffrential Signal interfaces [HDMI, Serial-ATA, IEEE1394, LVDS, and USB2.0] of LCD-TV, Blu-ray players, and PCs.
- Countermeasure for degradation of receiver sensitivity caused by high frequency noise from high-speed differential signal of Cellular phones, Data Cards and Smartphones.
- Common mode noise suppression raised from the power line and audio signal in a small device.

OPERATING TEMP.

- −40～125℃ (Including self-generated heat)

ORDERING CODE

C M 0 1 H 9 0 0 T

❶Type	
CM	Common mode choke coil

❷External Dimensions (L×W)	
01	1.2×1.0mm

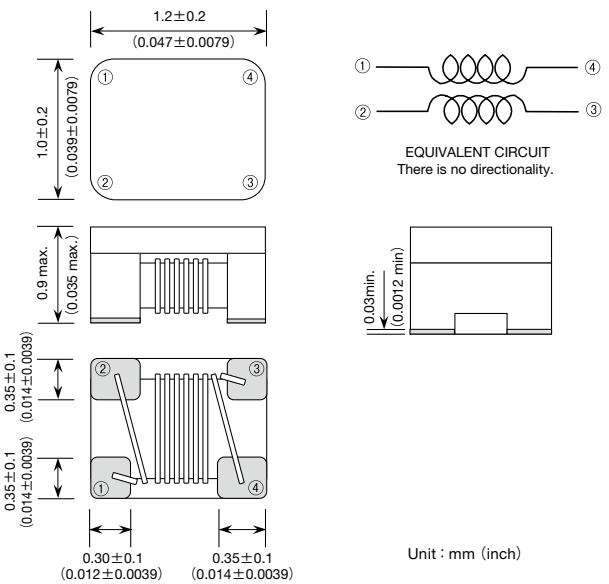
❸Product classification code	
S	USB3.0 correspondence
H	HDMI/Displayport correspondence
U	USB2.0/LAN correspondence

❹Impedance	
600	60Ω typical at 100MHz
900	90Ω typical at 100MHz
161	160Ω typical at 100MHz

❺Packaging	
T	Taping

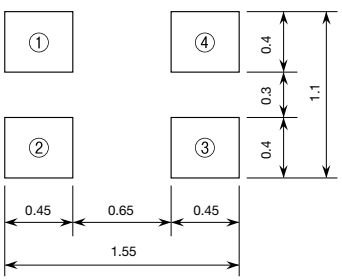
EXTERNAL DIMENSIONS/MINIMUM QUANTITY / LAND PATTERN DESIGN

●CM01TYPE



Type	Minimum Quantity (pcs.)
	Embossed tape
CM01[2 Lines] type	3000

●LAND PATTERN DESIGN



PART NUMBERS

●CM01 TYPE

Ordering	EHS	No. of Lines	Common Impedance [Ω] (at 100MHz)	DC resistance [Ω]	Rated current [mA]	Rated voltage [V] (D.C.)	Insulation resistance [MΩ]	Cut off frequency [GHz]	Characteristic impedance [Ω]
CM01S600T	RoHS	2	60typ. 43min.	0.4max.	300max.	20max.	100min.	10.0typ.	90typ.
CM01S900T	RoHS	2	90typ. 65min.	0.5max.	280max.	20max.	100min.	8.0typ.	90typ.
CM01H900T	RoHS	2	90typ. 65min.	0.5max.	280max.	20max.	100min.	8.0typ.	100typ.
CM01U900T	RoHS	2	90typ. 65min.	0.3max.	400max.	20max.	100min.	3.0typ.	—
CM01U161T	RoHS	2	160typ. 120min.	0.6max.	260max.	20max.	100min.	3.0typ.	—

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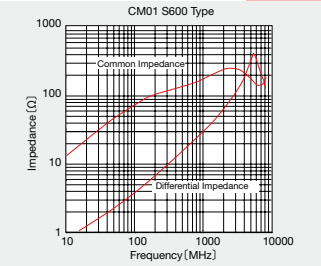
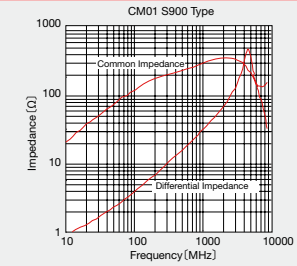
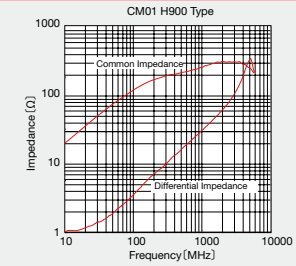
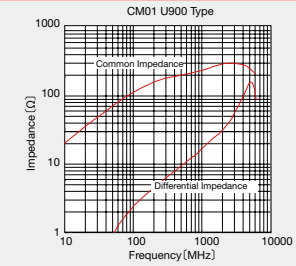
ELECTRICAL CHARACTERISTICS

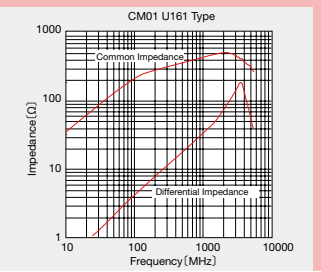
Impedance characteristics



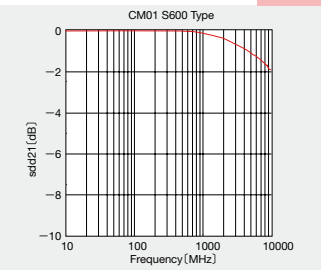


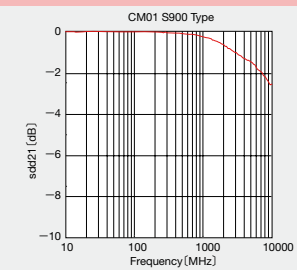


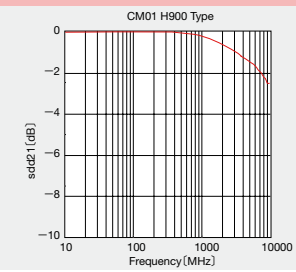


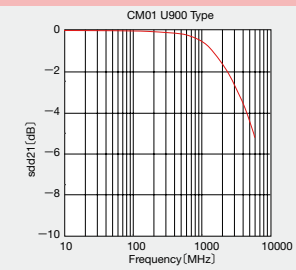


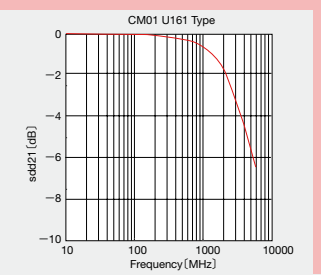
Transmission characteristic











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SMD COMMON MODE FILTERS FOR DC AND SIGNAL LINES

REFLOW

FEATURES

- Available in embossed tape and reel.
- Highly coupled coil construction ideal for common mode noise attenuation.

APPLICATIONS

- Immunity against undesirable external line radiation fields and broadcast waves generated by multifunction telephone sets, PBXs, and facsimile machines.
- Preventive measure against DC line noise in electronic equipment.
- Suppresses radiated emissions from secondary power supplies and signal lines on AC adapters, battery chargers, and digital equipment.
- Excellent for reducing radiated noise in DVC (digital video cameras) and DSC (digital still cameras)
- Offers high speed differential mode noise attenuation in USB and IEEE1394 connectors in personal computers, printers, scanners and other computer peripherals.

OPERATING TEMP.

- −25℃～105℃ (Including self-generated heat)

ORDERING CODE

C M 0 4 R C △ 0 1 △ T ○

❶Type	
CM	Common mode choke coils
BU	

❷Dimensions of Core (mm)	
04	3.5
05	5.0

❸Shape	
RC	Surface mount type
MC	

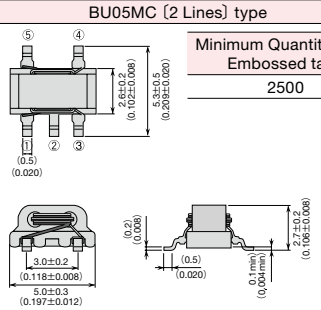
❹Product classification code
△01～△10
△=Blank space

❺Packaging	
△T	Taped products
△=Blank space	

❻Internal code	
△	Standard Products
△=Blank space	

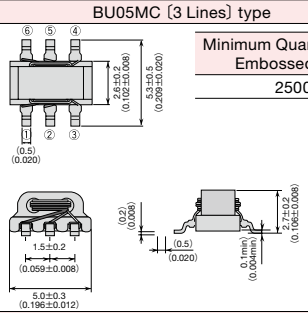
EXTERNAL DIMENSIONS/MINIMUM QUANTITY

BU05MC (2 Lines) type



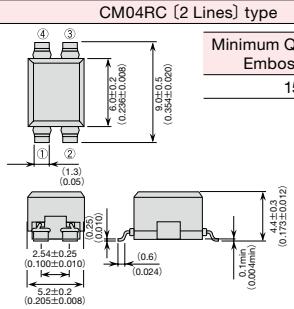
Minimum Quantity (pcs.) Embossed tape
2500

BU05MC (3 Lines) type



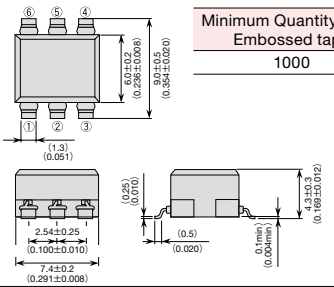
Minimum Quantity (pcs.) Embossed tape
2500

CM04RC (2 Lines) type



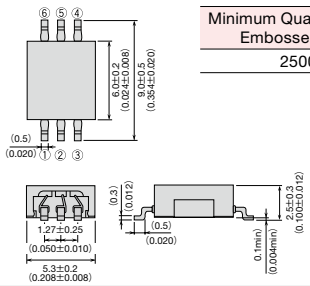
Minimum Quantity (pcs.) Embossed tape
1500

CM04RC 02T



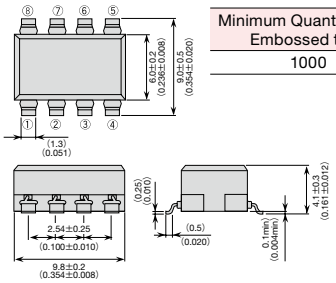
Minimum Quantity (pcs.) Embossed tape
1000

CM04RC 08T



Minimum Quantity (pcs.) Embossed tape
2500

CM04RC (4 Lines) type



Minimum Quantity (pcs.) Embossed tape
1000

The values without tolerance are for reference only.

Unit : mm (inch)

PART NUMBERS

CM04RC Type

Ordering code	EHS (Environmental Hazardous Substances)	No. of Lines	Impedance [Ω] (typical)	DC resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V] (D.C.)	Insulation resistance [MΩ] (min.)
CM04RC01T	RoHS	2	800 (at 100MHz)	0.06	1.5	50	100
CM04RC04T	RoHS		900 (at 20MHz)	0.1	1.3		
CM04RC07T	RoHS		500 (at 160MHz)	0.06	2.5		
CM04RC09T	RoHS		270 (at 200MHz)	0.03	3.0		
CM04RC10T	RoHS		100 (at 200MHz)	0.02	4.0		
CM04RC02T	RoHS	3	1000 (at 100MHz)	0.18	0.5		
CM04RC08T	RoHS		1000 (at 200MHz)	0.2	0.5		
CM04RC05T	RoHS	4	800 (at 100MHz)	0.2	0.5		

BU05MC Type

Ordering code	EHS (Environmental Hazardous Substances)	No. of Lines	Impedance [Ω] (typical)	DC resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V] (D.C.)	Insulation resistance [MΩ] (min.)
BU05MC01T	RoHS	2	1000 (at 60MHz)	0.12	1	50	100
BU05MC08T	RoHS	3	700 (at 60MHz)	0.11	0.5		

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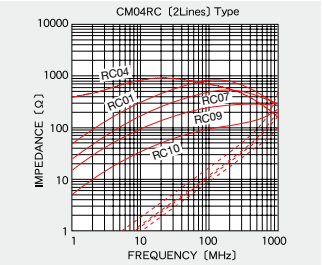
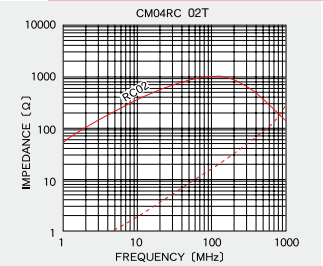
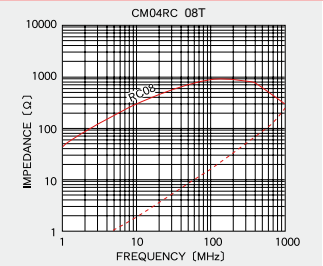
ELECTRICAL CHARACTERISTICS

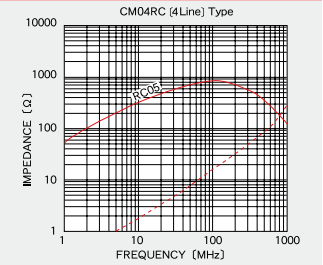
Impedance -vs- Frequency characteristics

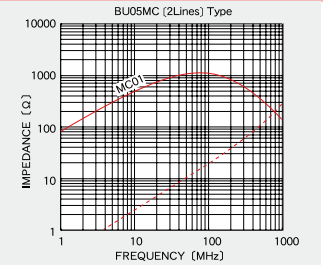
(Measured by HP4291A)

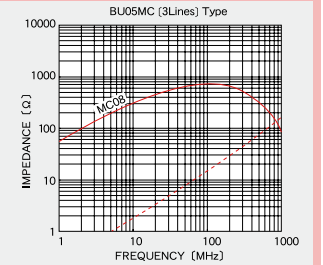












Common mode

Normal mode

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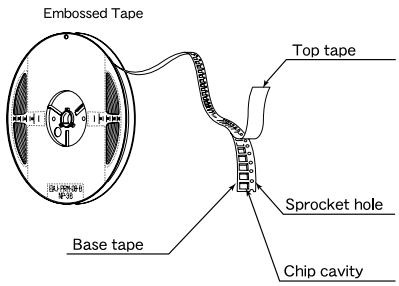
PACKAGING

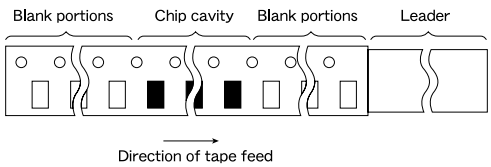
①Minimum Quantity

Type	Minimum Quantity (pcs.) Embossed tape
CM01 [2 Lines] type	3000
CM04RC [2 Lines] type	1500
CM04RC 02T	1000
CM04RC 08T	2500
CM04RC [4 Lines] type	1000
BU05MC [2 Lines] type	2500
BU05MC [3 Lines] type	2500

②Tape Material



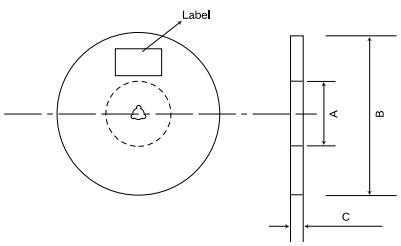
③Leader and Blank Portion



Type	Leader	Blank portions (Leader side)	Blank portions (Chip cavity side)
CM01	200～400 (7.87～15.75)	160～200 (6.30～7.87)	160 (6.30) or more
CM04RC	150 (5.89)	80 (3.14)	80 (3.14)
BU05MC	150 (5.89)	80 (3.14)	80 (3.14)

Unit : mm (inch)

④Reel size

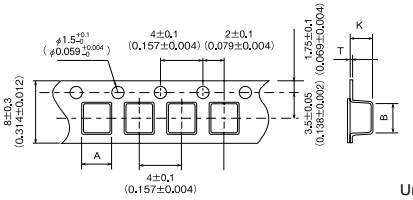


Type	A	B	C
CM01	φ60+1/−0 (φ2.36+0.039/−0)	φ180+0/−3 (φ7.09+0/−0.118)	10.0±1.5 (0.394±0.059)
CM04RC	φ100±1 (φ3.94±0.039)	φ330±2 (φ12.99±0.079)	18±1.5 (0.709±0.059)
BU05MC	φ80±1 (φ3.15±0.039)	φ330±2 (φ12.99±0.079)	13.5±1 (0.53±0.039)

Unit : mm (inch)

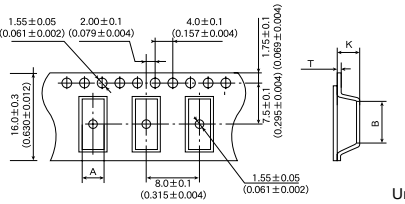
⑤Taping dimensions

● Embossed tape (CM01 type)



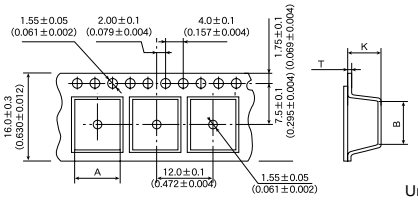
Unit: mm (inch)

● Embossed tape (CM04RC type) 8mm pitch (0.31 inches pitch)



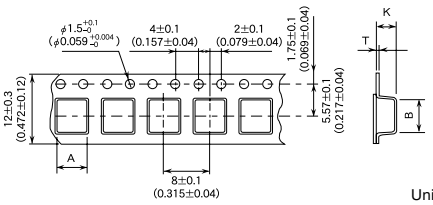
Unit: mm (inch)

● Embossed tape (CM04RC type) 12mm pitch (0.472 inches pitch)



Unit: mm (inch)

● Embossed tape (BU05MC type)

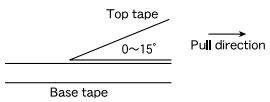


Unit: mm (inch)

Type	Lines	Insertion pitch	Chip cavity		tape thickness	
			A	B	K	T
CM01	2	4.0±0.1	1.16±0.1	1.41±0.1	0.98±0.1	0.3max.
CM04RC	2	8.0±0.1	5.7±0.1	9.65±0.1	5.2max	0.4±0.05
	3(02T)	12.0±0.1	9.8±0.1	7.7±0.1	5.0max	0.38±0.05
	3(08T)	8.0±0.1	5.7±0.1	9.8±0.1	3.1max	0.4±0.05
	4	12.0±0.1	10.3±0.1	10.3±0.1	5.0max	0.3±0.05
BU05MC	2	8.0±0.1	5.35±1.5	5.7±0.2	3.2±0.1	0.4±0.05
	3					

Unit : mm (inch)

⑥Top Tape Strength



● CM01
The top tape requires a peel-off force of 0.1 to 1.0N in the direction of the arrow as illutrated above.

● CM04RC, BU05MC
The top tape requires a peel-off force of 0.1 to 0.7N in the direction of the arrow as illutrated above.

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RELIABILITY DATA

1. Operating Temperature Range	
CM01	−40℃～+125℃
CM04RC	−25℃～+105℃
BU05MC	

【Test Method and Remarks】
Including self-generated heat

2. Storage Temperature Range	
CM01	−40℃～+85℃
CM04RC	
BU05MC	

【Test Method and Remarks】
−5 to +40℃ in taped packaging

3. Rated current	
CM01	Within the specified tolerance.
CM04RC	
BU05MC	

【Test Method and Remarks】
The maximum value of DC current within a specified rise of temperature individually.

4. Impedance	
CM01	Within the specified tolerance.
CM04RC	
BU05MC	

【Test Method and Remarks】
Measuring equipment : HP 4291A or its equivalent
Measuring frequency : Specified frequency

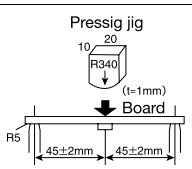
5. DC Resisitance	
CM01	Within the specified tolerance.
CM04RC	
BU05MC	

【Test Method and Remarks】
SMD transformer・Commom mode choke coil :
Measuring equipment : DC ohm meter

6. Resistance to flexure of substrate	
CM01	Within the specified tolerance.
CM04RC	Refer to the individual specification.
BU05MC	

【Test Method and Remarks】
According to JIS C 0051

	CM01	CM04RC・BU05MC
Warp	2mm	3mm
Pressing speed	0.5mm/sec.	
Duration	5±1sec.	



7. Dielectric resistance : between wires	
CM01	100MΩ min.
CM04RC	
BU05MC	

【Test Method and Remarks】
Applied voltage : Rated voltage
Duration : 60 sec.

8. Rated voltage	
CM01	Within the specification.
CM04RC	
BU05MC	

9. Withstanding voltage : between wires	
CM01	No abnormality.
CM04RC	
BU05MC	

【Test Method and Remarks】
Applied voltage : Regulation voltage, DC250V(CM04RC), DC125V(BU05MC)
Duration : 60 sec.

10. Resistance to vibration	
CM01	No abnormality observed in appearance
CM04RC	Refer to the individual specification.
BU05MC	

【Test Method and Remarks】
According to JIS C 0040
Directions : 2 hrs each in X, Y, and Z directions. Total : 6 hrs
Frequency range : 10 to 55 to 10 Hz (1 min.)
Amplitude : 1.5mm (Shall not exceed acceleration 196m/s^2)
Mounting method : soldering onto printed board
Recovery : At least 2 hrs of recovery under the standard condition after the test,followed by the measurement within 48 hrs.

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RELIABILITY DATA

11. Solderability	
CM01	At least 90% of terminal electrode is covered by new solder.
CM04RC BU05MC	At least 75% of terminal electrode is covered by new solder.

【Test Method and Remarks】

	CM01	CM04RC・BU05MC
Solder temperature	245±5℃	235±5℃
Duration	3±1sec.	2±0.5sec.
Immersion depth	—	Up to 0.5mm from terminal root

12. Resistance to solder Heat	
CM01	Within the specified tolerance.
CM04RC BU05MC	Refer to the individual specification.

【Test Method and Remarks】

	CM01	CM04RC・BU05MC
Reflow soldering	Preheating : 150 to 180℃ 1 to 2min Peak : 255±5℃ 5sec. 230±5℃ 30～40sec. Number of reflow : Within 2 times	Preheating : 100 to 150℃ 1 to 2min Peak : 230 to 240℃ within 5sec. More than 200℃ within 40sec. Number of reflow : Within 2 times
Manual soldering	—	Solder temperature : 350±5℃ Duration : 3±1sec. Recovery : 1 to 2hrs of recovery under the standard condition after the test.

13. Thermal shock	
CM01	Within the specified tolerance.
CM04RC BU05MC	Refer to the individual specification.

【Test Method and Remarks】
Accoding to JIS C 0025
Conditions of 1 cycle

Step	Temperature (℃)		Time (min)	
	CM01	CM04RC・BU05MC	CM01	CM04RC・BU05MC
1	−40±3℃	−25±3℃	30±3	
2	Room Temp.	Room Temp.	3	
3	85±2℃	85±3℃	30±3	
4	Room Temp.	Room Temp.	3	

Number of cycle : CM01 : 100 cycle
CM04RC・BU05MC : 10 cycle
Recovery : Recovery under the standard condition after removal from test chamber.
CM01 : Should be measured within 2 to 48hours.
CM04RC・BU05MC : Leave within 1 to 2 hours.

14. Loading under damp heat	
CM01	Within the specified tolerance.
CM04RC BU05MC	Refer to the individual specification.

【Test Method and Remarks】

	CM01	CM04RC・BU05MC
Temperature	60±2℃	40±3℃
Humidity	90～95%RH	
Applied current	Rated current	
Duration	1000±24hrs	

Recovery : Recovery under the standard condition after removal from test chamber.
CM01 : Should be measured within 2 to 48hours.
CM04RC・BU05MC : Leave within 1 to 2 hours.

15. High temperature life test	
CM01	—
CM04RC BU05MC	Refer to the individual specification.

【Test Method and Remarks】

	CM04RC・BU05MC
Temperature	85±3℃
Duration	1000±24hrs

Recovery : Recovery under the standard condition after removal from test chamber.
CM01 : Should be measured within 2 to 48hours.
CM04RC・BU05MC : Leave within 1 to 2 hours.

16. Low Temperature life Test	
CM01	Within the specified tolerance.
CM04RC BU05MC	Refer to the individual specification.

【Test Method and Remarks】

	CM01	CM04RC・BU05MC
Temperature	−40±2℃	−40±3℃
Applied current	1000±24hrs	

Recovery : Recovery under the standard condition after removal from test chamber.
CM01 : Should be measured within 2 to 48hours.
CM04RC・BU05MC : Leave within 1 to 2 hours.

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17. Loading at high temperature life test	
CM01	Within the specified tolerance.
CM04RC	—
BU05MC	

【Test Method and Remarks】

	CM01
Temperature	105±2℃
Applied current	Rated current
Duration	1000±24hrs

Recovery : Recovery under the standard condition after removal from test chamber.
CM01 : Should be measured within 2 to 48hours.
CM04RC・BU05MC : Leave within 1 to 2 hours.

Note on standard condition :
"standard condition" referred to herein is defined as follows:
5 to 35℃ of temperature, 45 to 85% relative humidity and 86 to 106kPa of air pressure.
When there are questions concerning measurement results:
In order to provide correlation data, the test shall be conducted under condition of 20±2℃ of temperature, 45 to 85% relative humidity and 86 to 106kPa of air pressure.
Unless otherwise specified, all the tests are conducted under the "standard condition."

PRECAUTIONS

CM04RC, BU05MC, CM01

1. Circuit Design

Precautions

◆Operating environment

1. The products described in this specification are intended for use in general electronic equipment, (office supply equipment, telecommunications systems, measuring equipment, and household equipment). They are not intended for use in mission-critical equipment or systems requiring special quality and high reliability (traffic systems, safety equipment, aerospace systems, nuclear control systems and medical equipment including life-support systems,) where product failure might result in loss of life, injury or damage. For such uses, contact TAIYO YUDEN Sales Department in advance.

2. PCB Design

Precautions

◆Land pattern design

1. Please contact any of our offices for a land pattern, and refer to a recommended land pattern of specifications.

Technical consider-ations

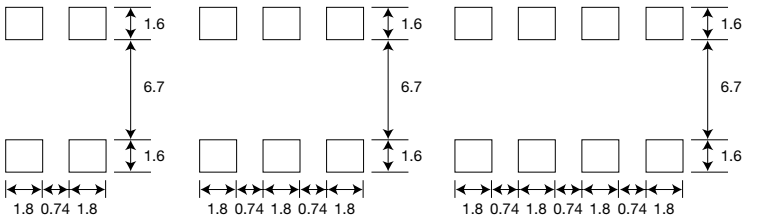
◆Land pattern design

Surface Mounting

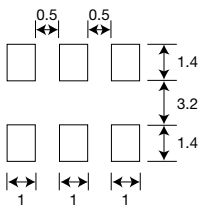
- Mounting and soldering conditions should be checked beforehand.
- Applicable soldering process to these products is reflow soldering only.
- Recommended Land Patterns

【CM04RC】

(2 Lines) (3 Lines) (4 Lines)

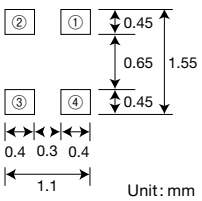


【BU05MC】



【CM01】

Refer to the external dimension drawing for the pin location.



Unit: mm

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 consider-ations

◆Adjustment of mounting machine

1. When installing products, care should be taken not to apply distortion stress as it may deform the products.

4. Soldering

Precautions

◆Reflow soldering

1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified.
2. This product can 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

【CM04RC, BU05MC】

- 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.

【CM01】

- Please do not conduct an adjustment with a soldering iron because the wire would be broken due to its thinness.

Technical consider-ations

◆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.

5. Cleaning

Precautions

◆Cleaning conditions

1. Please contact any of our offices for a cleaning.

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 onto an exposed part of ferrite cores.

◆Packing

1. Please avoid accumulation of a packing box as much as possible.

Technical consider-ations

◆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 considereed 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. An excessive shock or stress may cause a damage to the product or a detrioration of a characteristic.

◆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 : 0～40℃, Humidity : Below 70% RH

The ambient temperature must be kept below 30℃. Even under ideal storage conditions, the solderability of electrodes may decrease gradually. For this reason, the products should be used within one year from the time of delivery. In case of storage over 6 months, solderability shall be checked before actual usage.

Technical consider-ations

◆Storage

1. Under a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration oftaping/packaging materials may take place.

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LEADED COMMON MODE FILTERS FOR DC AND SIGNAL LINES

WAVE

FEATURES

- Highly reliable, compact and lightweight
- Easily inserted into the PCB

APPLICATIONS

- TLF Type :
  Countermeasure for noise in the low-frequency (AM) broad-casting band. Shields against radiated emissions in the broadcasting frequency for multi-functional telephone sets. PBXs, faxes, etc.
- CM/BU Type :
  Countermeasure for noise in the high-frequency (MHz) band

OPERATING TEMP.

TLF Type	−25℃～+105℃
CM Type	−25℃～+105℃

(Including self-generated heat)

ORDERING CODE

【TLF Type】

T L F △ 9 U B H 3 0 2 W K 1

❶Type	
TLF	Line filter

❷Dimensions of core	
△9	9mm

△=Blank space

❸Shape	
UB△	U core, vertically split wound
UBH	U core, horizontally split wound

△=Blank space

❹Nominal inductance (μH)	
example	
302	3000
203	20000

❺Inductance tolerance (%)	
W	+100 −10

❻Internal code	
K1	Adhesive fixation

【CM-BU Type】

C M 0 5 R A △ 0 6 ◯

❶Type	
CM	Common mode choke coile
BU	

❷Core dimensions (mm)	
05	4.8
08	8.0
12	12.0

❸Shape	
RA	Double-wire lead
RB	Pin type with base

❹Product classification code
△01～△20

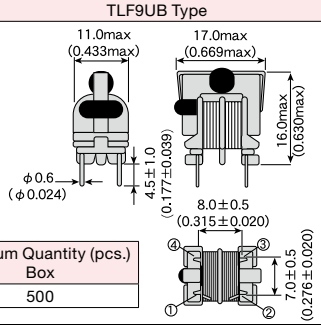
△=Blank space

❺Internal code	
△	Standard product

△=Blank space

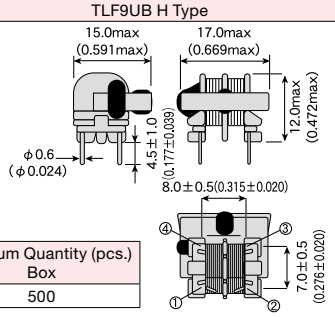
EXTERNAL DIMENSIONS/MINIMUM QUANTITY

TLF9UB Type



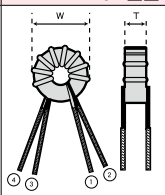
Minimum Quantity (pcs.) Box
500

TLF9UB H Type



Minimum Quantity (pcs.) Box
500

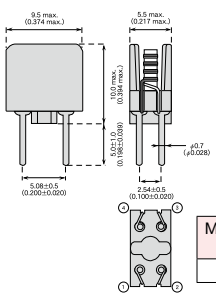
CM□□RA Type / BU08RA Type



Type	Minimum Quantity (pcs.)	
	Box	Bulk
CM05RA06	—	500
CM08RA□□	—	250
CM12RA02	—	100
BU08RA□□	—	200

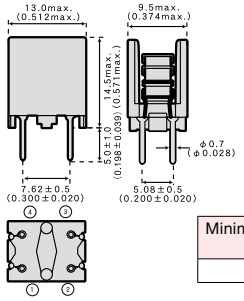
Type	W (max.)	T (max.)
CM05	6.5 (0.256)	3.0 (0.118)
CM08,BU08	11.0 (0.433)	6.0, 7.0 (0.024, 0.276)
CM12	15.5 (0.610)	7.0 (0.276)

CM05RB (2Lines Type)



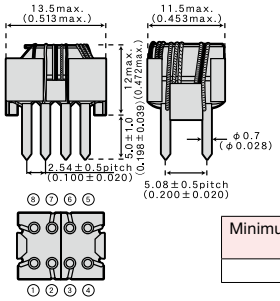
Minimum Quantity (pcs.) Box
1000

CM08RB (2Lines Type)



Minimum Quantity (pcs.) Box
500

CM08RB (4Lines) Type



Minimum Quantity (pcs.) Box
500

Unit : mm (inch)

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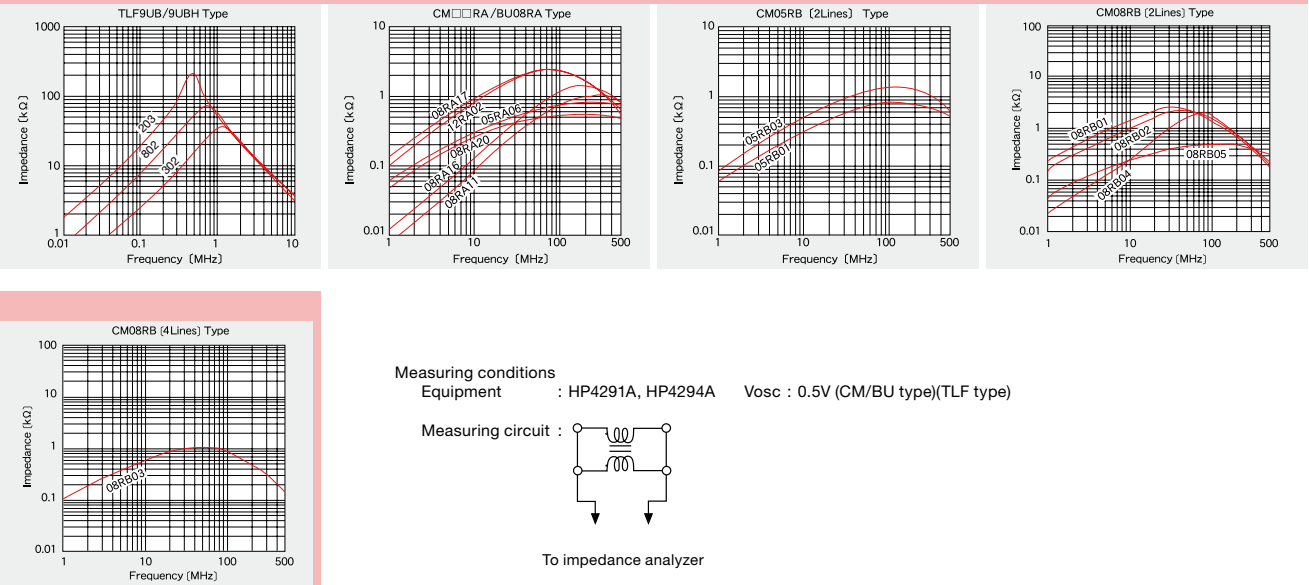
PART NUMBERS

Ordering code		EHS (Environmental Hazardous Substances)	No. of lines	Inductance [μH] [$^{+100}_{-10}$ %]	DC resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V] D.C.	Insulation resistance [MΩ] (min.)	Impedance [KΩ] (Reference values)
TLF9UBH 302WK1		RoHS	2	3000	1.5	0.4	50	100	≧20 (at 1MHz)
TLF9UB 302WK1		RoHS							
TLF9UBH 802WK1		RoHS		8000	3.0	0.3			≧40 (at 700kHz)
TLF9UB 802WK1		RoHS							
TLF9UBH 203WK1		RoHS		20000	6.5	0.18			≧150 (at 500kHz)
TLF9UB 203WK1		RoHS							

Ordering code			EHS (Environmental Hazardous Substances)	No.of lines	Inductance [μH] [at 1kHz]	Impedance [Ω] (typical)	DC resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V] D.C.	Insulation resistance [MΩ] (min.)
CM05RA	06		RoHS	2	0.7 min.	700 (at 200MHz)	0.050	1.5	50	100
BU08RA	11		RoHS		0.7～1.3	1000 (at 250MHz)	0.013	4.0		
	16		RoHS		1.19～2.21	1200 (at 200MHz)	0.011	3.0		
CM08RA	17		RoHS		15.0 min.	2000 (at 80MHz)	0.040	2.4		
	20		RoHS		6.0 min.	500 (at 200MHz)	0.020	5.5		
CM12RA	02		RoHS		10.0 min.	2000 (at 80MHz)	0.040	3.0		
CM05RB	01		RoHS		7.0 min.	700 (at 70MHz)	0.050	2.0		
	03		RoHS		15.0 min.	1400 (at 100MHz)	0.060	1.5		
CM08RB	01		RoHS		40.0 min.	2500 (at 30MHz)	0.040	2.0		
	02		RoHS		15.0 min.	2000 (at 50MHz)	0.040	2.4		
	04		RoHS		110.0 min.	2000 (at 70MHz)	0.040	3.0		
	05		RoHS		6.0 min.	450 (at 100MHz)	0.020	4.0		
	03		RoHS	4	15.0 min.	1000 (at 50MHz)	0.050	2.0		

ELECTRICAL CHARACTERISTICS



Measuring conditions
Equipment : HP4291A, HP4294A Vosc : 0.5V (CM/BU type)(TLF type)

Measuring circuit :

To impedance analyzer

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LEADED COMMON MODE CHOKE COILS FOR AC LINES

WAVE

FEATURES

- TLH10UAH TYPE : Thin configuration (Hybrid choke、Height 10mmMAX)
- TLH10UA(B)TYPE : Ordinary configuration (Hybrid choke)
- TLF10UAH TYPE : Thin configuration (Height 10mmMAX)
- TLF9UA(H)K1 TYPE : Small-sized configuration
- TLF14CB(H)K1 TYPE : Ordinary configuration
- TLF24HB(H)K1TYPE : Large current capacity for power supply line use

APPLICATIONS

- As a preventive measure against noise terminal voltage or power supply noise in TV's SW power supplies, NC machines, computer systems, peripheral units, measuring instruments, and controllers.

OPERATING TEMP.

−25℃～+105℃ (Including self-generated heat)

ORDERING CODE

T L F 1 4 C B △ 1 0 3 △ 0 R 7 K 1

❶ ❷ ❸ ❹ ❺ ❻ ❼

❶Type	
TLF	Common mode choke
TLH	Hybrid choke

❷Core dimensions (mm)	
△9	9
10	10
14	14
24	24

△=Blank space

❸Shape	
UA△	U core, vertical type
UAH	U core, horizontal type
UB△	U core,vertically split wound
CB△	Square type core vertically split wound
CBH	Square type core horizontally split wound
HB△	Double-square type core vertically split wound
HBH	Double-square type core horizontally split wound

△=Blank space

❹Nominal Inductance (μH)	
example	
102	1000
103	10000

❺Inductance tolerance (%)	
△	Nominal Values or higher
W	+100/−10

△=Blank space

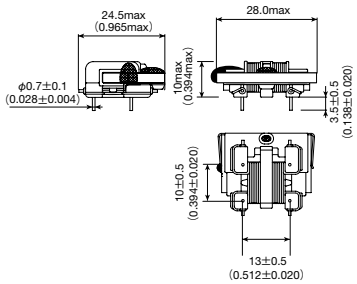
❻Rated current (A)	
R54	0.54
0R8	0.8

※R=decimal point

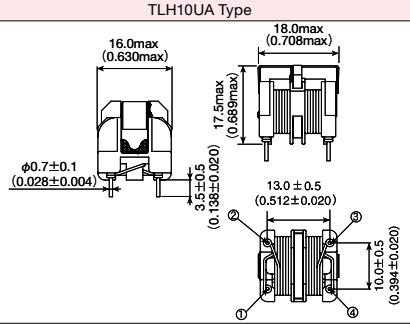
❼Internal code	
K1	Adhesive fixation

EXTERNAL DIMENSIONS/MINIMUM QUANTITY

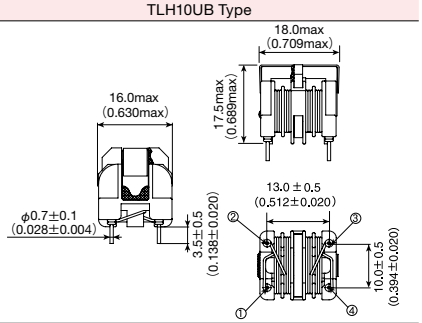
TLH10UAH Type



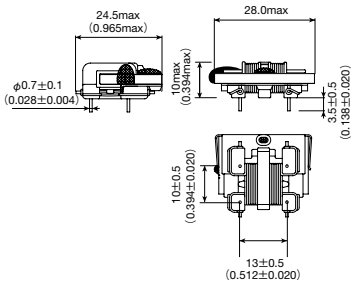
TLH10UA Type



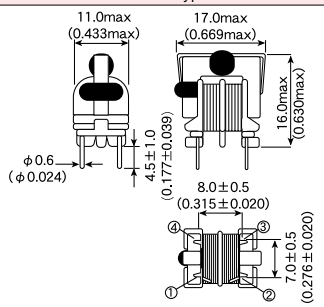
TLH10UB Type



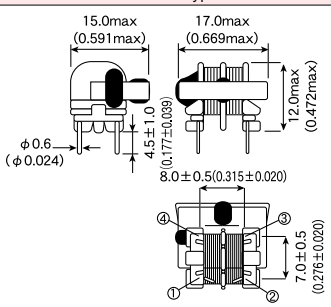
TLF10UAH Type



TLF 9UA Type



TLF 9UAH Type



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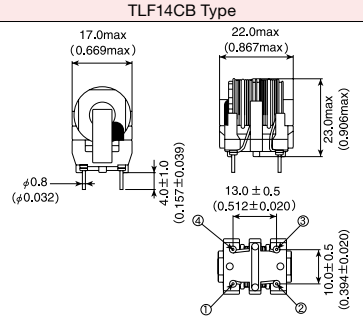
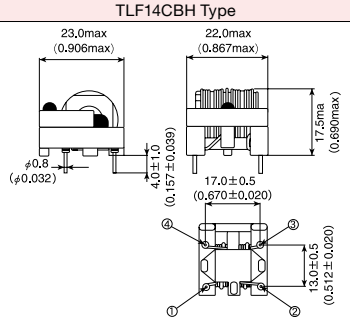
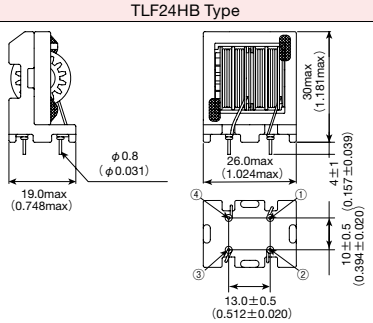


TLF14CBH Type



TLF24HB Type



Unit : mm (inch)

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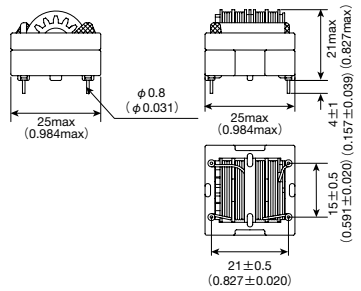
TLF24 HBH Type



Unit : mm (inch)

Type	Minimum Quantity (pcs.) Box
TLH Type	500
TLF Type	

PART NUMBERS

●TLH10UAH Type (Hybrid choke)

Ordering code	EHS	Common Mode Inductance [mH]	Inductance Tolerance	Normal Mode Inductance [mH] (Typ.)	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V] (max.)	Applicable frequency [MHz] Reference
TLH10UAH872 0R7	RoHS	8.7	min.	0.70	1.00	0.7	AC250	0.1～10
TLH10UAH992 0R6	RoHS	9.9		0.85	1.35	0.6		
TLH10UAH123 0R5	RoHS	12.0		1.06	1.60	0.5		

●TLH10UA Type (Hybrid choke)

Ordering code	EHS	Common Mode Inductance [mH]	Inductance Tolerance	Normal Mode Inductance [mH] (Typ.)	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V] (max.)	Applicable frequency [MHz] Reference
TLH10UA 901 2R0	RoHS	0.9	min.	0.067	0.089	2.0	AC250	0.1～10
TLH10UA 112 1R8	RoHS	1.1		0.087	0.126	1.8		
TLH10UA 152 1R6	RoHS	1.5		0.126	0.171	1.6		
TLH10UA 212 1R4	RoHS	2.1		0.160	0.222	1.4		
TLH10UA 282 1R2	RoHS	2.8		0.215	0.272	1.2		
TLH10UA 432 1R0	RoHS	4.3		0.330	0.398	1.0		
TLH10UA 622 0R8	RoHS	6.2		0.430	0.578	0.8		
TLH10UA 872 0R7	RoHS	8.7		0.644	0.878	0.7		
TLH10UA 992 0R6	RoHS	9.9		0.836	1.138	0.6		
TLH10UA 143 0R5	RoHS	14.0		1.256	1.567	0.5		

●TLH10UB Type (Hybrid choke)

Ordering code	EHS	Common Mode Inductance [mH]	Inductance Tolerance	Normal Mode Inductance [mH] (Typ.)	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V] (max.)	Applicable frequency [MHz] Reference
TLH10UB 701 2R0	RoHS	0.7	min.	0.056	0.097	2.0	AC250	0.1～10
TLH10UB 112 1R7	RoHS	1.1		0.068	0.133	1.7		
TLH10UB 142 1R4	RoHS	1.4		0.113	0.214	1.4		
TLH10UB 232 1R2	RoHS	2.3		0.150	0.274	1.2		
TLH10UB 352 1R0	RoHS	3.5		0.232	0.422	1.0		
TLH10UB 442 0R8	RoHS	4.4		0.328	0.624	0.8		
TLH10UB 872 0R7	RoHS	8.7		0.580	0.982	0.7		
TLH10UB 972 0R6	RoHS	9.7		0.735	1.314	0.6		
TLH10UB 113 0R5	RoHS	11.0		0.877	1.577	0.5		

●TLF10UAH Type

Ordering code	EHS	Common Mode Inductance [mH]	Inductance Tolerance	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V] (max.)	Applicable frequency [MHz] Reference
TLF10UAH872 0R7	RoHS	8.7	min.	1.00	0.7	AC250	0.1～10
TLF10UAH992 0R6	RoHS	9.9		1.35	0.6		
TLF10UAH123 0R5	RoHS	12.0		1.60	0.5		

●TLF 9UA Type

Ordering code	EHS	Common Mode Inductance [mH]	Inductance Tolerance	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V] (max.)	Applicable frequency [MHz] Reference
TLF 9UA 102W0R8K1	RoHS	1.0	+100%/−10%	0.5	0.80	AC250	0.1～10
TLF 9UA 202WR54K1	RoHS	2.0		1.0	0.54		
TLF 9UA 302WR42K1	RoHS	3.0		1.5	0.42		
TLF 9UA 502WR32K1	RoHS	5.0		2.5	0.32		
TLF 9UA 802WR25K1	RoHS	8.0		4.0	0.25		
TLF 9UA 103WR23K1	RoHS	10.0		4.5	0.23		

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PART NUMBERS

TLF 9UAH Type

Ordering code	EHS	Common Mode Inductance [mH]	Inductance Tolerance	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V] (max.)	Applicable frequency [MHz] Reference
TLF 9UAH102W0R8K1	RoHS	1.0	+100%/−10%	0.5	0.80	AC250	0.1〜10
TLF 9UAH202WR54K1	RoHS	2.0		1.0	0.54		
TLF 9UAH302WR42K1	RoHS	3.0		1.5	0.42		
TLF 9UAH502WR32K1	RoHS	5.0		2.5	0.32		
TLF 9UAH802WR25K1	RoHS	8.0		4.0	0.25		
TLF 9UAH103WR23K1	RoHS	10.0		4.5	0.23		

TLF14CB Type

Ordering code	EHS	Common Mode Inductance [mH]	Inductance Tolerance	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V] (max.)	Applicable frequency [MHz] Reference
TLF14CB 102 1R5K1	RoHS	1.0	min.	0.10	1.5	AC250	0.1〜10
TLF14CB 222 1R2K1	RoHS	2.2		0.18	1.2		
TLF14CB 332 1R0K1	RoHS	3.3		0.32	1.0		
TLF14CB 472 1R0K1	RoHS	4.7		0.38	1.0		
TLF14CB 562 0R8K1	RoHS	5.6		0.42	0.8		
TLF14CB 682 0R8K1	RoHS	6.8		0.60	0.8		
TLF14CB 103 0R7K1	RoHS	10.0		0.85	0.7		
TLF14CB 223 0R4K1	RoHS	22.0		1.7	0.4		
TLF14CB 333 0R3K1	RoHS	33.0		2.7	0.3		
TLF14CB 473 0R2K1	RoHS	47.0		3.6	0.2		
TLF14CB 563 0R2K1	RoHS	56.0		5.0	0.2		
TLF14CB 683 0R2K1	RoHS	68.0		6.5	0.2		

TLF14CBH Type

Ordering code	EHS	Common Mode Inductance [mH]	Inductance Tolerance	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V] (max.)	Applicable frequency [MHz] Reference
TLF14CBH102 1R5K1	RoHS	1.0	min.	0.10	1.5	AC250	0.1〜10
TLF14CBH222 1R2K1	RoHS	2.2		0.18	1.2		
TLF14CBH332 1R0K1	RoHS	3.3		0.32	1.0		
TLF14CBH472 1R0K1	RoHS	4.7		0.38	1.0		
TLF14CBH562 0R8K1	RoHS	5.6		0.42	0.8		
TLF14CBH682 0R8K1	RoHS	6.8		0.60	0.8		
TLF14CBH103 0R7K1	RoHS	10.0		0.85	0.7		
TLF14CBH223 0R4K1	RoHS	22.0		1.7	0.4		
TLF14CBH333 0R3K1	RoHS	33.0		2.7	0.3		
TLF14CBH473 0R2K1	RoHS	47.0		3.6	0.2		
TLF14CBH563 0R2K1	RoHS	56.0		5.0	0.2		
TLF14CBH683 0R2K1	RoHS	68.0		6.5	0.2		

TLF24HB Type

Ordering code	EHS	Common Mode Inductance [mH]	Inductance Tolerance	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V] (max.)	Applicable frequency [MHz] Reference
TLF24HB 122 3R0K1	RoHS	1.2	min.	0.045	3.0	AC250	0.1〜10
TLF24HB 222 2R2K1	RoHS	2.2		0.080	2.2		
TLF24HB 272 2R0K1	RoHS	2.7		0.090	2.0		
TLF24HB 332 1R8K1	RoHS	3.3		0.120	1.8		
TLF24HB 392 1R5K1	RoHS	3.9		0.130	1.5		
TLF24HB 562 1R4K1	RoHS	5.6		0.187	1.4		
TLF24HB 682 1R2K1	RoHS	6.8		0.254	1.2		
TLF24HB 822 1R0K1	RoHS	8.2		0.275	1.0		
TLF24HB 103 1R0K1	RoHS	10.0		0.345	1.0		
TLF24HB 123 0R9K1	RoHS	12.0		0.350	0.9		
TLF24HB 183 0R8K1	RoHS	18.0		0.550	0.8		
TLF24HB 273 0R6K1	RoHS	27.0		0.880	0.6		
TLF24HB 333 0R5K1	RoHS	33.0		1.150	0.5		

TLF24HBH Type

Ordering code	EHS	Common Mode Inductance [mH]	Inductance Tolerance	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V] (max.)	Applicable frequency [MHz] Reference
TLF24HBH122 3R0K1	RoHS	1.2	min.	0.045	3.0	AC250	0.1〜10
TLF24HBH222 2R2K1	RoHS	2.2		0.080	2.2		
TLF24HBH272 2R0K1	RoHS	2.7		0.090	2.0		
TLF24HBH332 1R8K1	RoHS	3.3		0.120	1.8		
TLF24HBH392 1R5K1	RoHS	3.9		0.130	1.5		
TLF24HBH562 1R4K1	RoHS	5.6		0.187	1.4		
TLF24HBH682 1R2K1	RoHS	6.8		0.254	1.2		
TLF24HBH822 1R0K1	RoHS	8.2		0.275	1.0		
TLF24HBH103 1R0K1	RoHS	10.0		0.345	1.0		
TLF24HBH123 0R9K1	RoHS	12.0		0.350	0.9		
TLF24HBH183 0R8K1	RoHS	18.0		0.550	0.8		
TLF24HBH273 0R6K1	RoHS	27.0		0.880	0.6		
TLF24HBH333 0R5K1	RoHS	33.0		1.150	0.5		

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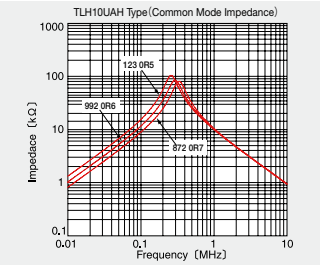
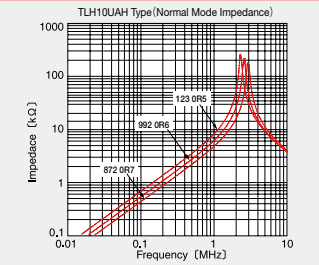
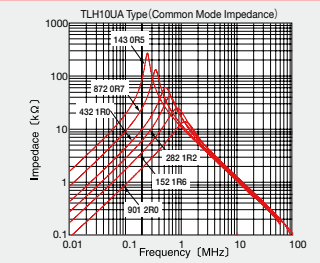
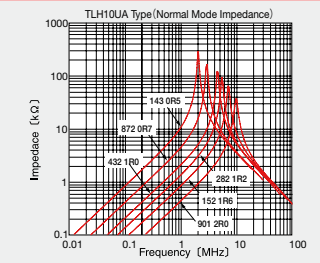
ELECTRICAL CHARACTERISTICS

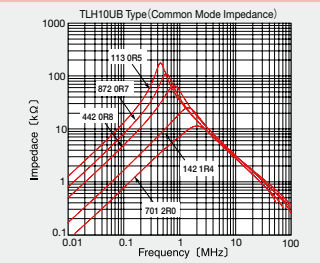
Impedance-Frequency characteristic

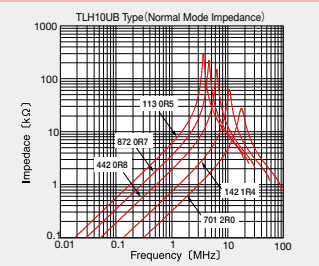


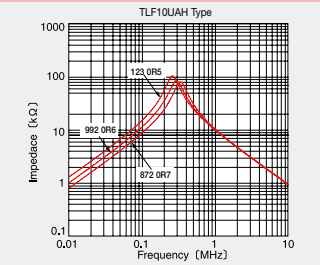


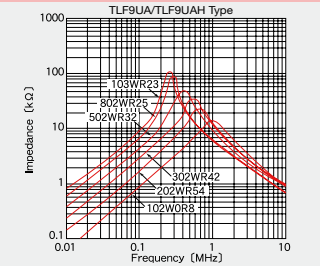


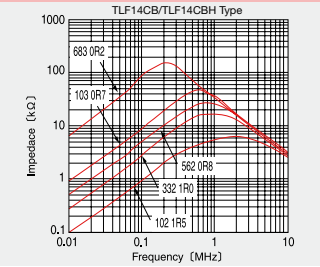


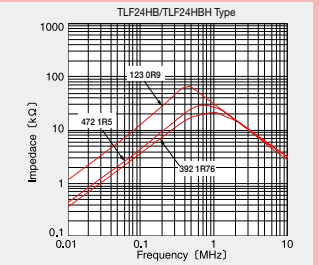








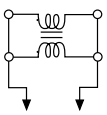




Test conditions

Equipment : HP-4294A

Test circuit :



To impedance analyzer

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PACKAGING

Minimum Quantity

● CM/BU Type

Type	Minimum Quantity (pcs.)	
	Box	Bulk
CM05RA06	—	500
CM05RB□□	1000	—
CM08RA□□	—	250
CM08RB□□	500	—
CM12RA02	—	100
BU08RA□□	—	200

● TL Type

Type	Minimum Quantity (pcs.) Box
TLH10UA□	500
TLH10UB	
TLF10UAH	
TLF9UA□	
TLF9UB□	
TLF14CB□	
TLF24HB□	

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RELIABILITY DATA

1. Operating Temperature Range	
CM-RA/BU-RA Type	−25～+105℃
CM-RB Type	
TLH, TLF Type	

【Test method and remarks】
Including temperature rise due to self-generated heat.

2. Storage temperature range	
CM-RA/BU-RA Type	−40～+85℃
CM-RB Type	
TLH, TLF Type	

3. Rated current	
CM-RA/BU-RA Type	Within the specified range
CM-RB Type	
TLH, TLF Type	

【Test method and remarks】
CM:The maximum value of DC current within a specified rise of temperature individually.
TLH10U, TLF10UAH: The maximum value of AC current within the temperature rise of 60℃
TLF9UA, 14CB: The maximum value of AC current within the temperature rise of 45℃
TLF9UB: The maximum value of DC current within the temperature rise of 45℃

4. Inductance	
CM-RA/BU-RA Type	Within the specified tolerance
CM-RB Type	
TLH, TLF Type	

【Test method and remarks】
CM :
Measuring equipment : 4263A (HP) or its equivalent
Measuring frequency : 1kHz

TLF9U :
Measuring equipment : Impedance analyzer (HP4192A) or its equivalent
Measuring frequency : 1kHz
Measuring voltage : 0.35Vosc

TLH, TLF (except TLF9U) :
Measuring equipment : LCR meter 4284A or its equivalent
Measuring frequency : 1kHz
Measuring voltage : 1.0V

5. DC resistance	
CM-RA/BU-RA Type	Within the specified tolerance
CM-RB Type	
TLH, TLF Type	

【Test method and remarks】
CM, TLH, TLF : Measuring equipment : DC ohmmeter

6. Terminal strength tensile force	
CM-RA/BU-RA Type	No abnormality
CM-RB Type	
TLH, TLF Type	

【Test method and remarks】
CM : Fix the component in the direction to draw terminal and gradually apply tensile force as detailed in indiviual specifications.

TLF9U : Apply the stated tensile force gradually in the direction to draw terminal.

Nominal wire diameter tensile φd [mm]	force [N]	duration [s]
φ0.6	5	30±5

TLH, TLF (except TLF9U): Apply the stated tensile force gradually in the direction to draw terminal.

Nominal wire diameter tensile φd [mm]	force [N]	duration [s]
φ0.8	10	30±5

7. Insulation resistance between wires	
CM-RA/BU-RA Type	100MΩ min.
CM-RB Type	
TLH, TLF Type	

【Test method and remarks】
CM, TLH, TLF : Applied voltage : Rated voltage (CM-RA/BU-RA, CM-RB)
: 500VDC (TLH, TLF (except TLF9UB))
: 250VDC (TLF9UB)
Duration : 60sec.

8. Insulation resistance between wire and core	
CM-RA/BU-RA Type	
CM-RB Type	
TLH, TLF Type	100MΩ min.(except TLH, TLF10UAH Type)

【Test method and remarks】
TLF : Applied voltage : 500VDC (TLF (except TLF9UB))
: 250VDC (TLF9UB)
Duration : 60 sec.

9. Withstanding : between wires	
CM-RA/BU-RA Type	No abnormality
CM-RB Type	
TLH, TLF Type	

【Test method and remarks】
CM, TLH, TLF : Applied voltage : 250VDC (CM-RA/BU-RA, CM-RB)
: 2000VAC (TLH, TLF (except TLF9UB))
: 500VDC (TLF9UB)
Duration : 60sec.

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RELIABILITY DATA

10. Withstanding : between wires and core	
CM-RA/BU-RA Type	
CM-RB Type	
TLH, TLF Type	No abnormality (except TLH, TLF10UAH Type)

【Test method and remarks】
TLF : Applied voltage : 2000VAC (TLF (except TLF9UB))
: 500VDC (TLF9UB)
Duration : 60sec.

11. Rated voltage	
CM-RA/BU-RA Type	Within the specified range
CM-RB Type	
TLH, TLF Type	

【Test method and remarks】
TLH, TLF (except TLF9UB) : 250VAC
TLF9UB : 50VDC

12. Resistance to vibration		
CM-RA/BU-RA Type		
CM-RB Type	Appearance : No abnormality	Inductance change : Within ±15%
TLH, TLF Type	TLF9U : Inductance change : Within ±5%	TLH, TLF (except TLF9U) : Within the specified range

【Test method and remarks】
CM, TLH, TLF : According to JIS C 0040
Direction : 2hrs each in X, Y and Z direction Total : 6hrs
Frequency range : 10 to 55 to 10Hz (1 min.)
Amplitude : 1.5mm (shall not exceed acceleration 196m/s^2)
Mounting method : soldering onto PC board
Recovery : 2 to 24 hrs of recovery under the standard condition after the test. (CM-RB)
: At least 1hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2hrs. (TLH, TLF)

13. Solderability	
CM-RA/BU-RA Type	At least 75% of terminal electrode is covered by new solder.
CM-RB Type	
TLH, TLF Type	Solder shall be uniformly adhered onto immersed surfaces.

【Test method and remarks】
CM : Solder temperature : 235±5℃
Duration : 2±0.5sec.
Immersion depth : According to detailed specification.

TLH, TLF : Solder temperature : 245±5℃
Duration : 4±1sec.
Immersion depth : Up to 1.0 to 1.5mm from PBC mounted level.

14. Resistance to soldering heat		
CM-RA/BU-RA Type	Appearance : No abnormality	Inductance change : Refer to individual specification
CM-RB Type		
TLH, TLF Type	TLF9UA : Inductance change : Within ±5%	TLF14CB : Within the specified range

【Test method and remarks】
CM : Solder temperature : 260±5℃
Duration : 5±0.5sec.
Immersion depth : Up to 2～2.5mm from terminal root.
Recovery : 1 to 2 hrs of recovery under the standard condition after the test.

TLH, TLF : Solder temperature : 260±5℃
Duration : 10±1sec.
Immersion depth : Up to 1.0 to 1.5mm from PBC mounted level.
Recovery : At least 1hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2hrs.

15. Thermnal shock			
CM-RA/BU-RA Type	Appearance : No abnormality	Inductance change : Refer to individual specification	
CM-RB Type			
TLH, TLF Type	TLF9UA	: Inductance change	: Within ±15%
	TLH, TLF (except TLF9UA)	: Withstanding voltage : No abnormality	Insulation resistance : No abnormality

【Test method and remarks】
CM, TLH, TLF :
According to JIS C 0025
Conditions for 1 cycle

Step	Temperature〔℃〕	Durration〔min〕
1	−25±3	30±3
2	Room Temperature	Within 3
3	+85±2	30±3
4	Room Temperature	Within 3

Number of cycles : 10
Recovery : At least 1hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2 hrs.

16. Damp heat			
CM-RA/BU-RA Type			
CM-RB Type			
TLH, TLF Type	TLF9UA	: Inductance change	: Within ±15%
	TLH, TLF (except TLF9UA)	: Withstanding voltage : No abnormality	Insulation resistance : No abnormality

【Test method and remarks】
TLH, TLF : Temperature : 60±2℃
40±2℃ (※TLF14CB)
Humidity : 90～95%RH
Duration : 500 hrs
Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs.

* 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/) or CD catalogs.

17. Loading under damp heat		
CM-RA/BU-RA Type CM-RB Type	Appearance : No abnormality	Inductance change : Refer to individual specification
TLH, TLF Type	Withstanding voltage : No abnormality	Insulation resistance : No abnormality

【Test method and remarks】

CM : Temperature : 40±2℃
Humidity : 90～95%RH
Duration : 500 (+12, −0) hrs
Applied current : Rated current
Recovery : 1 to 2hrs of recovery under the standard condition after the removal from test chamber.

TLH, TLF : Temperature : 60±2℃
40±2℃ (※TLF14CB)
Humidity : 90～95%RH
Duration : 100 hrs
500 hrs Apply rated current across windings (※TLF14CB)
Applied voltage : Apply the following specified voltage between windings.

TLF9UA	250VAC
TLF9UB	50VDC

Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs.

18. Low temperature life test		
CM-RA/BU-RA Type CM-RB Type	Appearance : No abnormality	Inductance change : Refer to individual specification
TLH, TLF Type	TLF9U : Inductance change : Within ±15% TLH, TLF (except TLF9U) : Withstanding voltage : No abnormality	Insulation resistance : No abnormality

【Test method and remarks】

CM : Temperature : −40±3℃
Duration : 500 (+12, −0) hrs
Recovery : 1 to 2hrs of recovery under the standard condition after the removal from test chamber.

TLH, TLF : Temperature : −25±2℃
: −40±2℃ (※TLF14CB)
Duration : 500 hrs
Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs.

19. High Temperature life test		
CM-RA/BU-RA Type CM-RB Type	Appearance : No abnormality	Inductance change : Refer to individual specification
TLH, TLF Type	TLF9U : Inductance change : Within ±15% TLH, TLF (except TLF9U) : Withstanding voltage : No abnormality	Insulation resistance : No abnormality

【Test method and remarks】

CM : Temperature : 85±2℃
Duration : 500 (+12, −0) hrs
Recovery : 1 to 2hrs of recovery under the standard condition after the removal from test chamber.

TLH, TLF : Temperature : 85±2℃
: 105±3℃ (※TLF14CB)
Duration : 500 hrs
Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs.

PRECAUTIONS

CM-RA Type, CM-RB Type, TLH, TLF Type

1. Circuit Design	
Precautions	◆Operating environment 1. The products described in this specification are intended for use in general electronic equipment, (office supply equipment, telecommunications systems, measuring equipment, and household equipment). They are not intended for use in mission-critical equipment or systems requiring special quality and high reliability (traffic systems, safety equipment, aerospace systems, nuclear control systems and medical equipment including life-support systems) where product failure might result in loss of life, injury or damage. For such uses, contact TAIYO YUDEN Sales Department in advance.

2. PCB Design	
Precautions	◆Design 1. Please design insertion pitches as matching to that of leads of the component on PCBs.
Technical consider-ations	◆Design 1. When Inductors are mounted onto a PC board, hole dimensions on the board should match the lead pitch of the component, if not, it will cause breakage of the terminals or cracking of terminal roots covered with resin as excess stress travels through the terminal legs.

3. Soldering	
Precautions	◆Wave soldering 1. Please refer to the specifications in the catalog for a wave soldering. 2. Do not immerse the entire inductor in the flux during the soldering operation. ◆Lead free soldering 1. When using products with lead free soldering, we request to use them after confirming of adhesion, temperature of resistance to soldering heat, 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 product.
Technical consider-ations	◆Lead free 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.

4. Cleaning	
Precautions	◆Cleaning conditions 1. TLF type Please contact any of our offices for about a cleaning.

5. Handling	
Precautions	◆Handling 1. Keep the product away from all magnets and magnetic objects. ◆Mechanical considerations 1. Please do not give the product any excessive mechanical shocks. 2. TLF type Please do not add any shock or power to a product in transportation. ◆Packing 1. Please do not give the product any excessive mechanical shocks. In loading, please pay attention to handling indication mentioned in a packing box (a loading direction / number of maximum loading / fragile item).
Technical consider-ations	◆Handling 1. There is a case that a characteristic varies with magnetic influence. ◆Mechanical considerations 1. There is a case to be damaged by a mechanical shock. 2. TLF type There is a case to be broken by a fall. ◆Packing 1. There is a case that a lead route turns at by a fall or an excessive shock.

6. 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 : 0~40℃ Humidity : Below 70% RH The ambient temperature must be kept below 30℃. Even under ideal storage conditions, the solderbility of electrodes decreases gradually, so the products should be mounted within one year from the time of delivery. In case of storage over 6 months, solderability shall be checked before actual usage.
Technical consider-ations	◆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.

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