Chip Bead Cores

Type: **EXCCL**
EXCML
EXC3B



■ Features

- Effective noise suppression for power lines and high speed signal lines
- Easy pattern layout on PC Board

Type: EXCCL, EXCML

- Low DC Resistance 3 to 8 mΩ typical: Rated current (3 and 4 Amperes) (type: EXCML)
- Low impedance

Type: EXC3B

- High impedance for high speed signal line noise
- Increased attenuation
- 60 Ω-1 A, 120 Ω-0.5 A are achieved by using 1608 size (type: EXC3BP)

■ Recommended Applications

- Digital equipment such as PCs, word processors, printers, HDD, PCC, CD-ROMs, DVD-ROMs.
- Digital audio and video equipment such as VCRs, DVC, CD Players, DVD Players.
- AC adapters, and switching power supplies.
- Electronic musical instruments, and other digital equipment.

■ Type: EXCCL

- Explanation of Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12
E	X	C	C	L	3	2	1	6	U	1	
Product Code			Type	Part kind	Size				Form	Suffix	

Product Code
Noise Filter

Type
Chip type

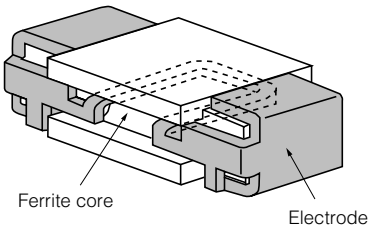
Part kind
Bead core

Code	Dimensions (mm)
4532	4.5x3.2x1.8
3225	3.2x2.5x1.6
3216	3.2x1.6x1.6

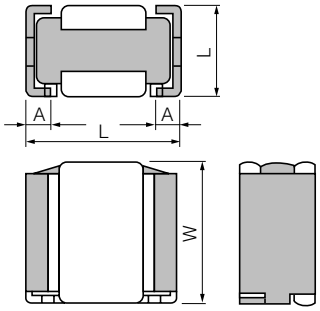
Code	Packing
U	Embossed Carrier Taping

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

■ Construction



■ Dimensions in mm (not to scale)



Type (inches)	Dimensions (mm)				Mass (Weight) [mg/pc.]
	L	W	H	A	
EXCCL4532 (1812)	4.5±0.4	3.2±0.3	1.8±0.2	0.5±0.2	125.8
EXCCL3225 (1210)	3.2±0.3	2.5±0.3	1.6±0.3	0.5±0.3	60.5
EXCCL3216 (1206)	3.2±0.3	1.6±0.3	1.6±0.3	0.5±0.3	37

■ Type: EXCML

● Explanation of Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12
E	X	C	M	L	2	0	A	3	9	0	U
Product Code			Type	Part kind	Size		Material	Nominal Impedance			Form

Product Code: Noise Filter

Type: Molded Chip type

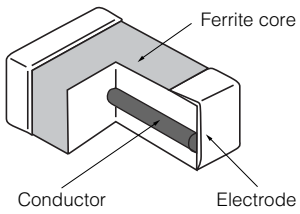
Part kind: Bead core

Code	Dimensions (mm)
45	4.5x1.6 x1.1
32	3.2x1.6 x0.9
20	2.0x1.25x0.9
16	1.6x0.8 x0.8

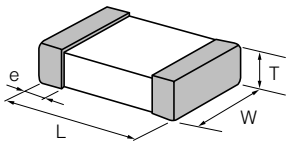
Nominal Impedance: The first two digits are significant figure of impedance value and the third one denotes the number of zeros following

Code	Packing
U	Embossed Carrier Taping (EXCML16 to 32)
H	Embossed Carrier Taping (EXCML45)

■ Construction



■ Dimensions in mm (not to scale)



Type (inches)	Dimensions (mm)				Mass (Weight) [mg/pc.]
	L	W	T	e	
EXCML16 (0603)	1.6±0.2	0.8±0.2	0.8±0.2	(0.4)	4.5
EXCML20 (0805)	2.0±0.2	1.25±0.20	0.9±0.2	(0.5)	10.5
EXCML32 (1206)	3.2±0.3	1.6±0.3	0.9±0.2	(0.6)	21.5
EXCML45 (1806)	4.5±0.3	1.6±0.3	1.1±0.2	(0.6)	36.0

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■ Type: EXC3B

● Explanation of Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12
E	X	C	3	B	B	2	2	1	H		
Product Code			Size	Type	Characteristics	Nominal Impedance			Form	Suffix	

- Product Code: Noise Filter
- Size:

Code	Dimensions (mm)
3	1.6x0.8x0.8

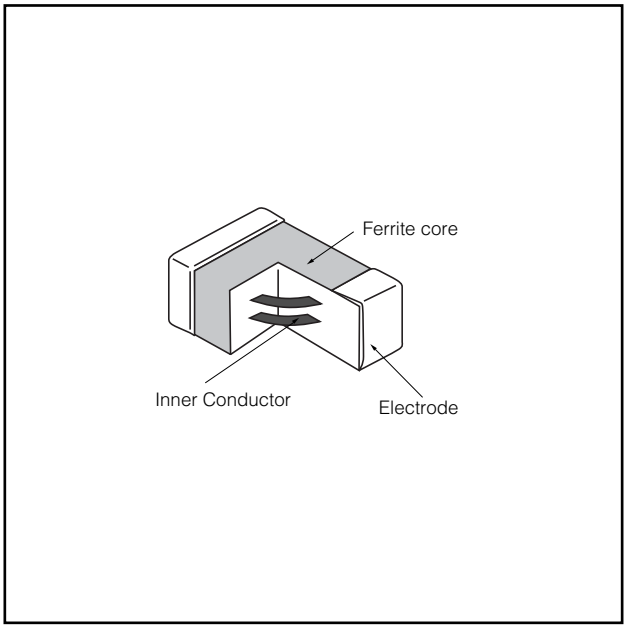
- Type: Multilayer Chip type Bead Core
- Characteristics:

B	High frequency High attenuation for signal Lines
P	High frequency High attenuation for Power Lines

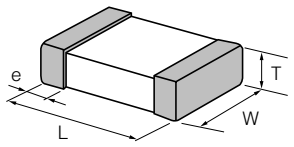
- Nominal Impedance: The first two digits are significant figure of impedance value and the third one denotes the number of zeros following
- Form / Suffix:

Code	Packing
H	Embossed Carrier Taping

■ Construction



■ Dimensions in mm (not to scale)



Type (inches)	Dimensions (mm)				Mass (Weight) [mg/pc.]
	L	W	T	e	
EXC3BB (0603)	1.6±0.2	0.8±0.2	0.8±0.2	0.30±0.15	4.5
EXC3BP (0603)	1.6±0.2	0.8±0.2	0.8±0.2	0.30±0.15	4.5

■ Ratings

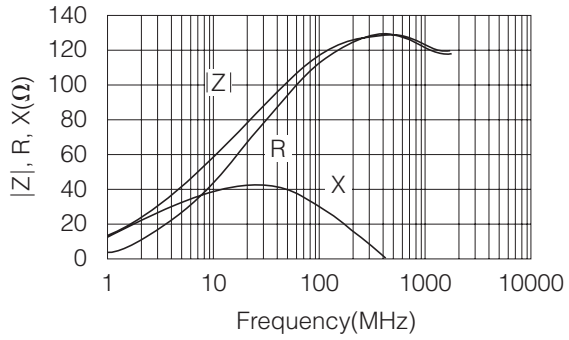
Type	Part Number	Impedance		Rated Current (mA DC)	DC Resistance (Ω) max.
		(Ω) at 100 MHz	tol.(%)		
4532	EXCCL4532U1	115	±25	2000	0.1
3225	EXCCL3225U1	45		2000	0.05
3216	EXCCL3216U1	25		2000	0.05
4516	EXCML45A910H	91		3000	0.016
3216	EXCML32A680U	68		3000	0.012
2012	EXCML20A390U	39		4000	0.008
1608	EXCML16A270U	27		4000	0.006
1608	EXC3BP600H	60		1000	0.07
	EXC3BP121H	120		500	0.1
	EXC3BB221H	220		200	0.3
	EXC3BB601H	600		100	0.8
	EXC3BB102H	1000		50	1

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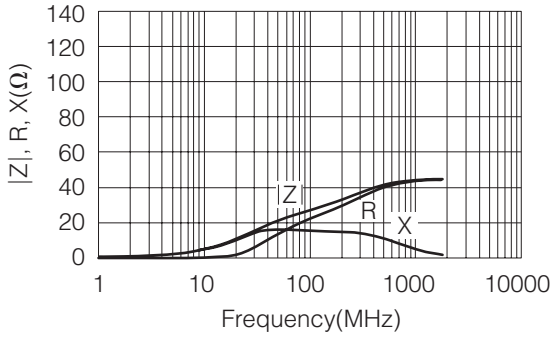
■ Impedance Characteristics (Reference Data) Measured by HP4291A

|Z| : Impedance R : Resistance X : Reactance

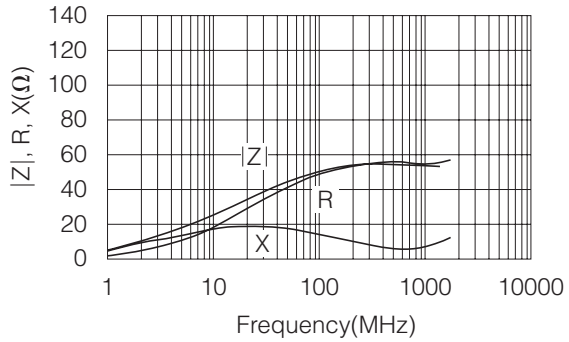
●EXCCL4532U1 (4532)



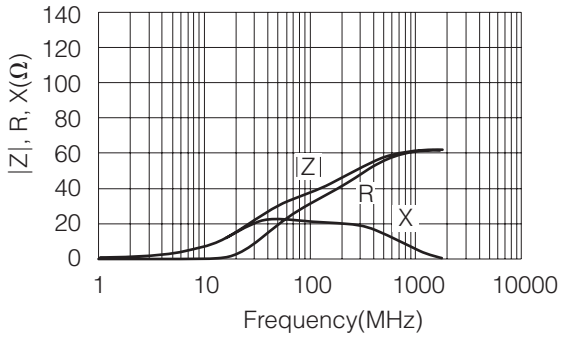
●EXCML16A270U (1608)



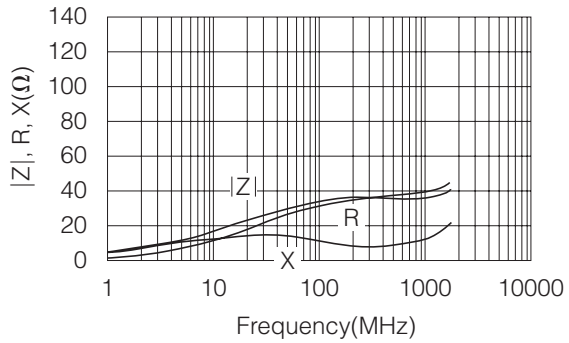
●EXCCL3225U1 (3225)



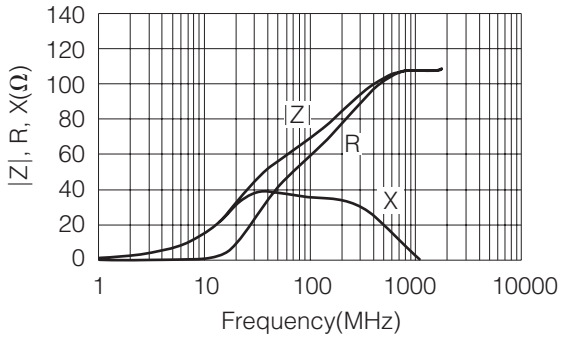
●EXCML20A390U (2012)



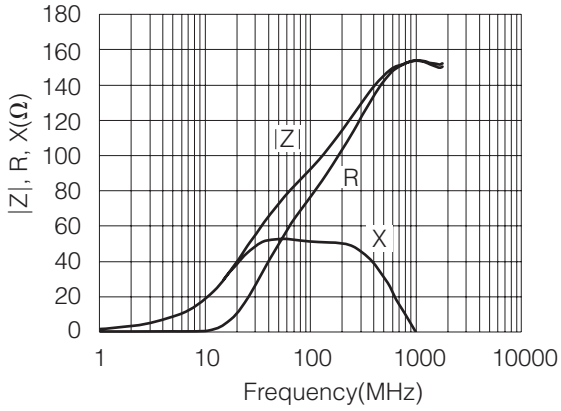
●EXCCL3216U1 (3216)



●EXCML32A680U (3216)



●EXCML45A910H (4516)

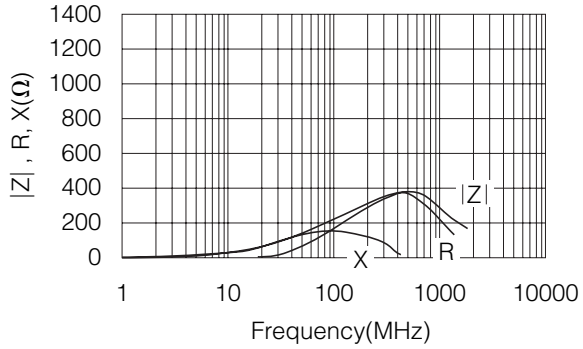


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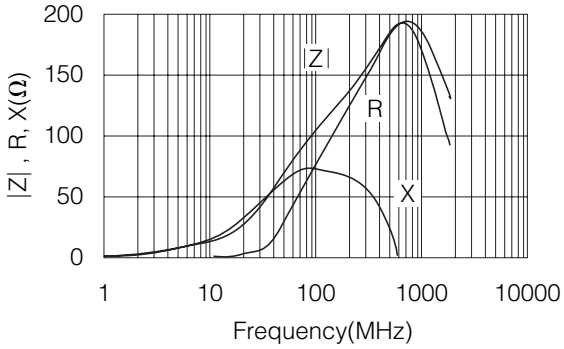
■ Impedance Characteristics (Reference Data) Measured by HP4291A

|Z| : Impedance R : Resistance X : Reactance

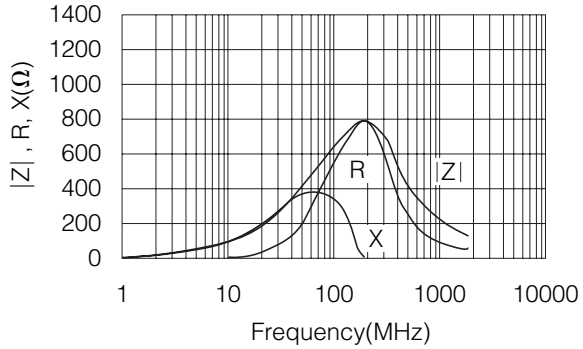
●EXC3BB221H (1608)



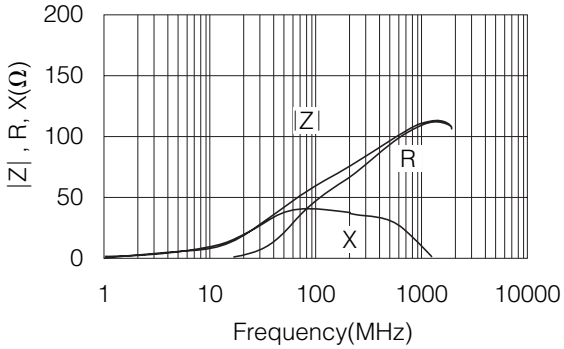
●EXC3BP121H (1608)



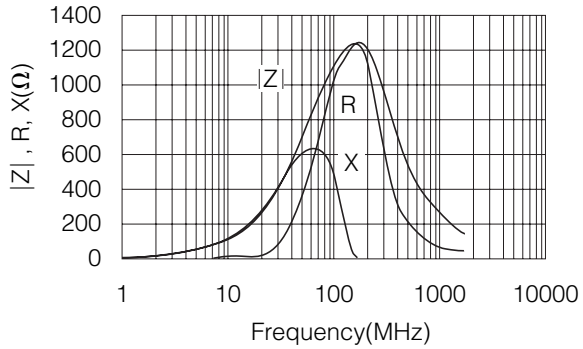
●EXC3BB601H (1608)



●EXC3BP600H (1608)



●EXC3BB102H (1608)



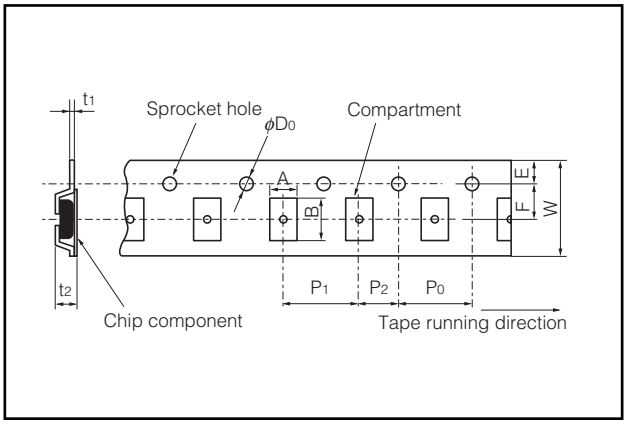
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■ Packaging Methods (Taping)

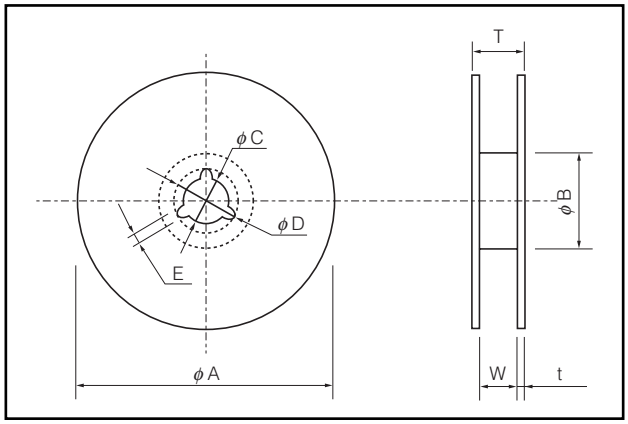
● Standard Quantity

Part Number	Kind of Taping	Pitch (P_1)	Quantity
EXCCL4532U1	Embossed Carrier Taping	8 mm	1000 pcs./reel
EXCCL3225U1		4 mm	2000 pcs./reel
EXCCL3216U1			
EXCML45A910H			3000 pcs./reel
EXCML32A680U			
EXCML20A390U			4000 pcs./reel
EXCML16A270U			
EXC3B□□□□H			

● Embossed Carrier Taping



● Taping Reel



Embossed Carrier Dimensions (mm)

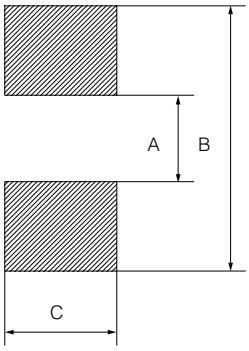
Part Number	A	B	W	F	E	P_1	P_2	P_0	ϕD_0	t_1	t_2
EXCCL4532U1	3.6±0.2	4.9±0.2	12.0±0.2	5.5±0.1	1.75±0.10	8.0±0.1	2.0±0.1	4.0±0.1	1.5±0.1	0.20±0.05	2.4 max.
EXCCL3225U1	2.9±0.2	3.6±0.2	8.0±0.2	3.5±0.1		4.0±0.1					2.1 max.
EXCCL3216U1	2.0±0.2	3.6±0.2									
EXCML45A910H	1.9±0.2	4.8±0.2	12.0±0.2	5.5±0.1							1.8 max.
EXCML32A680U	1.9±0.2	3.5±0.2	8.0±0.2	3.5±0.1							1.6 max.
EXCML20A390U	1.5±0.2	2.3±0.2									
EXCML16A270U	1.1±0.2	2.1±0.2									
EXC3B□□□□H	1.0±0.1	1.8±0.1								0.25±0.05	

Standard Reel Dimensions (mm)

Part Number	ϕA	ϕB	ϕC	ϕD	E	W	T	t
EXCCL4532U1	$180.0^{0}_{-3.0}$	60.0±1.0	13.0±0.5	21.0±0.8	2.0±0.5	$13.0^{+0.5}_{-1.0}$	16.5 max.	1.2±0.5
EXCCL3225U1						$9.5^{+0.5}_{-1.0}$	13 max.	
EXCCL3216U1								
EXCML45A910H						$13.0^{+0.5}_{-1.0}$	16.5 max.	
EXCML32A680U						$9.5^{+0.5}_{-1.0}$	13 max.	
EXCML20A390U								
EXCML16A270U								
EXC3B□□□□H								

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■ Recommended Land Pattern Dimensions in mm (not to scale)



(mm)

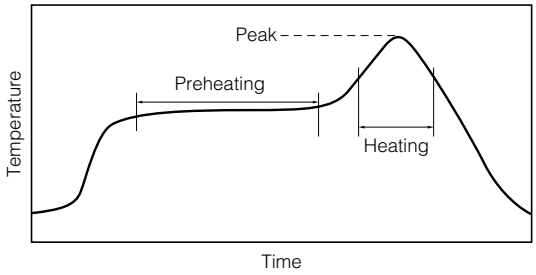
Part Number	A	B	C
EXCCL4532U1	3	5.4	2.8
EXCCL3225U1	1.7	4.1	2.1
EXCCL3216U1	1.7	4.1	1.2
EXCML45A910H	2.6 to 3	5.5 to 6.5	1.2 to 1.6
EXCML32A680U	1.6 to 2	4 to 5	1.2 to 1.6
EXCML20A390U	0.8 to 1.2	3 to 4	1 to 1.2
EXCML16A270U	0.6 to 1	2 to 3	0.8 to 1
EXC3B□□□□H	0.8 to 1	2 to 2.6	0.8 to 1

■ Recommended Soldering Conditions

Recommendations and precautions are described below.

● Recommended soldering conditions for reflow

· Reflow soldering shall be performed a maximum of two times.
· Please contact us for additional information when used in conditions other than those specified.
· Please measure the temperature of the terminals and study every kind of solder and printed circuit board for solderability before actual use.



For soldering (Example : Sn-37Pb)

	Temperature	Time
Preheating	140 °C to 160 °C	60 s to 120 s
Main heating	Above 200 °C	30 s to 40 s
Peak	235 ± 10 °C	max. 10 s

For lead-free soldering (Example : Sn/3Ag/0.5Cu)

	Temperature	Time
Preheating	150 °C to 170 °C	60 s to 120 s
Main heating	Above 230 °C	30 s to 40 s
Peak	max. 260 °C	max. 10 s

<Repair with hand soldering>

● Preheat with a blast of hot air or similar method. Use a soldering iron with a tip temperature of 350 °C or less. Solder each electrode for 3 seconds or less.
● Never touch this product with the tip of a soldering iron.

⚠ Safety Precautions

The following are precautions for individual products. Please also refer to the precautions common to EMI Filters, ESD Suppressors, Fuses, and MR Sensors shown on page EL113 of this catalog.

1. Flow soldering may cause this product to come off because the adhesiveness of the product element is low. Please consult our sales representative in advance about flow soldering.
2. Use rosin-based flux or halogen-free flux.
3. For cleaning, use an alcohol-based cleaning agent. Before using any other type, consult with our sales person in advance.
4. Do not apply shock to Chip Bead Cores (hereafter called the bead cores) or pinch them with a hard tool (e.g. pliers and tweezers). Otherwise, their bodies may be chipped, affecting their performance.
   Excessive mechanical stress may damage the bead cores. Handle with care.
5. Store the bead cores in a location with a temperature ranging from -5 °C to +40 °C and a relative humidity of 40 % to 60 %, where there are no rapid changes in temperature or humidity.
6. Use the bead cores within a year (EXC3B Type: within half a year) after the date of the outgoing inspection indicated on the packages.

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Should a safety concern arise regarding this product, please be sure to contact us immediately.

⚠Safety Precautions (Common precautions for EMI Filters, ESD Suppressors, Fuses, and MR Sensors)

- When using our products, no matter what sort of equipment they might be used for, be sure to make a written agreement on the specifications with us in advance. The design and specifications in this catalog are subject to change without prior notice.
- Do not use the products beyond the specifications described in this catalog.
- This catalog explains the quality and performance of the products as individual components. Before use, check and evaluate their operations when installed in your products.
- Install the following systems for a failsafe design to ensure safety if these products are to be used in equipment where a defect in these products may cause the loss of human life or other significant damage, such as damage to vehicles (automobile, train, vessel), traffic lights, medical equipment, aerospace equipment, electric heating appliances, combustion/gas equipment, rotating equipment, and disaster/crime prevention equipment.

✻ Systems equipped with a protection circuit and a protection device
✻ Systems equipped with a redundant circuit or other system to prevent an unsafe status in the event of a single fault

(1) Precautions for use

- These products are designed and manufactured for general and standard use in general electronic equipment (e.g. AV equipment, home electric appliances, office equipment, information and communication equipment)
- These products are not intended for use in the following special conditions. Before using the products, carefully check the effects on their quality and performance, and determine whether or not they can be used.
  1. In liquid, such as water, oil, chemicals, or organic solvent
  2. In direct sunlight, outdoors, or in dust
  3. In salty air or air with a high concentration of corrosive gas, such as Cl_2, H_2S, NH_3, SO_2, or NO_2
  4. Electric Static Discharge (ESD) Environment (except ESD Suppressors)
     These components are sensitive to static electricity and can be damaged under static shock (ESD).
     Please take measures to avoid any of these environments.
     Smaller components are more sensitive to ESD environment.
  5. Electromagnetic Environment
     Avoid any environment where strong electromagnetic waves exist.
  6. In an environment where these products cause dew condensation
  7. Sealing or coating of these products or a printed circuit board on which these products are mounted, with resin or other materials
- These products generate Joule heat when energized. Carefully position these products so that their heat will not affect the other components.
- Carefully position these products so that their temperatures will not exceed the category temperature range due to the effects of neighboring heat-generating components. Do not mount or place heat-generating components or inflammables, such as vinyl-coated wires, near these products (except Thermal Cutoffs).
- Note that non-cleaning solder, halogen-based highly active flux, or water-soluble flux may deteriorate the performance or reliability of the products.
- Carefully select a flux cleaning agent for use after soldering. An unsuitable agent may deteriorate the performance or reliability. In particular, when using water or a water-soluble cleaning agent, be careful not to leave water residues. Otherwise, the insulation performance may be deteriorated.

(2) Precautions for storage

The performance of these products, including the solderability, is guaranteed for a year from the date of arrival at your company, provided that they remain packed as they were when delivered and stored at a temperature of 5 °C to 35 °C and a relative humidity of 45 % to 85 %. (Micro Chip Fuses: Guaranteed for 6 months from the date of arrival at your company)
The performance of EMI Filters is guaranteed for 6 months or a year from the outgoing inspection date indicated on the packages, provided that they are stored at a temperature of -5 °C to +40 °C and a relative humidity of 40 % to 60 %. Check the guarantee period in the specifications. The performance of Thermal Cutoffs is guaranteed for a year from the outgoing inspection date indicated on the packages, provided that they are stored at a temperature of -10 °C to +40 °C and a relative humidity of 30 % to 75 %.

Even within the above guarantee periods, do not store these products in the following conditions. Otherwise, their electrical performance and/or solderability may be deteriorated, and the packaging materials (e.g. taping materials) may be deformed or deteriorated, resulting in mounting failures.

1. In salty air or in air with a high concentration of corrosive gas, such as Cl_2, H_2S, NH_3, SO_2, or NO_2
2. In direct sunlight

<Package markings>
Package markings include the product number, quantity, and country of origin.
In principle, the country of origin should be indicated in English.