

Digi Key

Issue No. : 151RB00006019

Date of Issue : March 06.2006

Classification : New Changed

PRODUCT SPECIFICATION FOR APPROVAL

Product Description : Micro Chip Fuse
Product Part Number : E R B S E * R * * U

Country of Origin : JAPAN
Applications : Standard electronic equipment

*If you approve this specification, please fill in and sign the below and return 1 copy to us.

Approval No	:	
Approval Date	:	
Executed by	:	

		(signature)
Title	:	
Dept.	:	

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Manager of Engineering

Panasonic

Classification	Specification		Spec No. 151-ERB-S031E																																
Product Name	Micro Chip Fuse / Circuit Protector ERBSE□R□□U		10-1																																
<p>1. Scope This specification shall apply to the Circuit Protector (ERBSE type).</p> <p>2. Explanation of Part Number</p> <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;">E</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">R</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">B</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">S</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">E</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">1</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">R</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">5</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">0</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">U</td> </tr> <tr> <td colspan="3" style="text-align: center;">(1)</td> <td style="text-align: center;">(2)</td> <td style="text-align: center;">(3)</td> <td colspan="4" style="text-align: center;">(4)</td> <td style="text-align: center;">(5)</td> </tr> </table> <p>(1): Product Code</p> <p>(2): Fusing Characteristics</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <th style="width: 15%;">Code</th> <th>Fusing Characteristics</th> </tr> <tr> <td style="text-align: center;">S</td> <td>Fast-acting (Inrush withstand)</td> </tr> </table> <p>(3): Product Shape</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <th style="width: 15%;">Code</th> <th>Product Shape</th> </tr> <tr> <td style="text-align: center;">E</td> <td>1608 size (1.6mm×0.8mm)</td> </tr> </table> <p>(4): Ampere Rating</p> <p>(Ex.) 1R50 → 1.5A 2R00 → 2.0A</p> <p>(5): Package Type</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <th style="width: 15%;">Code</th> <th>Package Type</th> </tr> <tr> <td style="text-align: center;">U</td> <td>Punched Carrier Taping</td> </tr> </table> <p>3. Product Specification</p> <p>3.1. Measurement condition</p> <p>Unless otherwise specified, standard ambient environment conditions for testing the product characteristics shall be the following:</p> <ul style="list-style-type: none"> •Ambient temperature: 25°C±2°C •Relative humidity: 45%RH to 75%RH •Atmospheric pressure: 0.86×10⁵Pa to 1.06×10⁵Pa <p>Unless otherwise specified, it shall be tested after the soldering on the evaluation board as following:</p> <p>Board material: Single-side printed circuit glass epoxy board (FR4)</p> <p>Board dimension(LxWxt): 130mm x 30mm x 1.0mm</p>				E	R	B	S	E	1	R	5	0	U	(1)			(2)	(3)	(4)				(5)	Code	Fusing Characteristics	S	Fast-acting (Inrush withstand)	Code	Product Shape	E	1608 size (1.6mm×0.8mm)	Code	Package Type	U	Punched Carrier Taping
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Enactment April, 1, 2005	Panasonic Electronic Devices Co.,Ltd. Circuit Components Business Unit																																		

Classification	Specification	Spec No. 151-ERB-S031E
Product Name	Micro Chip Fuse / Circuit Protector ERBSE□ R□□ U	10-2

3.2. Ratings

Part Number	Rated Current	Rated Voltage (DC)	Interrupting Rating	Resistance#
ERBSE0R50	0.5A	32V	50A at Rated Voltage	370 m ohm max.
ERBSE0R75	0.75A	32V	50A at Rated Voltage	245 m ohm max.
ERBSE1R00	1.0A	32V	50A at Rated Voltage	155 m ohm max.
ERBSE1R25	1.25A	32V	50A at Rated Voltage	120 m ohm max.
ERBSE1R50	1.5A	32V	50A at Rated Voltage	90 m ohm max.
ERBSE2R00	2.0A	32V	50A at Rated Voltage	60 m ohm max.
ERBSE2R50	2.5A	32V	50A at Rated Voltage	48 m ohm max.
ERBSE3R00	3.0A	32V	50A at Rated Voltage	36 m ohm max.
ERBSE4R00	4.0A	32V	35A at Rated Voltage	28 m ohm max.
ERBSE5R00	5.0A	32V	35A at Rated Voltage	20 m ohm max.

The test condition for resistance value shall be the following:

- Test current: Less than 20% of the rated current

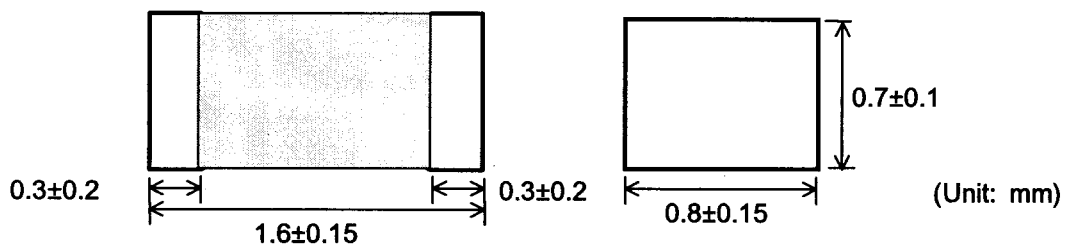
3.3. Approved Safety Standards

UL248-14: File No.E194052

c-UL(CSA)C22.2 No.248-14: File No.E194052

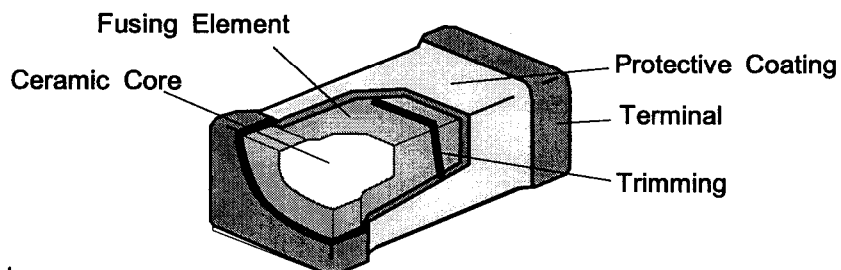
3.4. Shape, Dimensions and Appearance

3.4.1. Shape and Dimensions



3.4.2. Construction and Material of Product

1) Construction



2) Material of Product

Item	Material
Ceramic Core	Alumina Ceramic
Fusing Element	Metal Plating
Terminal	Under layer: Ni / Top layer: Sn
Enclosure	Under layer: Silicone Resin / Top layer: Epoxy Resin

Note

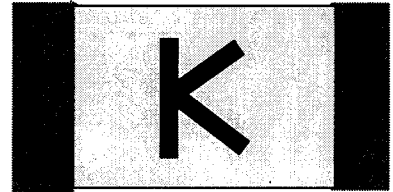
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Classification	Specification	Spec No. 151-ERB-S031E
Product Name	Micro Chip Fuse / Circuit Protector ERBSE□R□□U	10-3

3.4.3. Marking

The product is displayed by the alphabet(1 character) which corresponded by the rated current.

Rated Current(A)	Marking
0.5	F
0.75	G
1.0	H
1.25	J
1.5	K
2.0	N
2.5	O
3.0	P
4.0	S
5.0	T



3.5. Characteristics

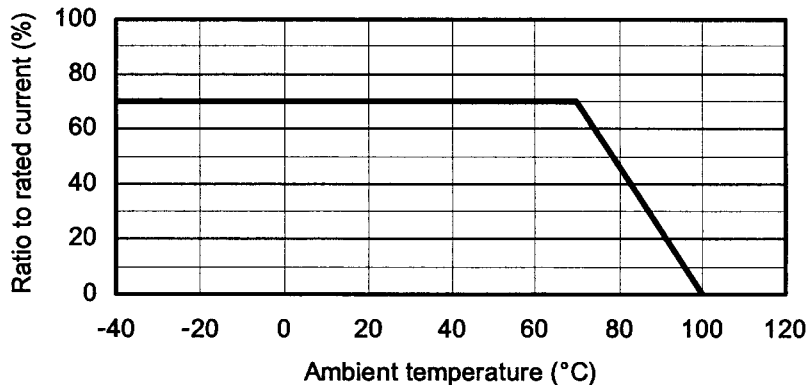
3.5.1. Electrical Characteristics

Item	Test Condition	Performance
Fusing Time (at 25°C)	Fusing Current: Rated Current×100%	4 hours min.
	: Rated Current×200%	5 second max.
	: Rated Current×300%	0.2 second max.
Residual Resistance after Fusing	Fusing Condition: Rated Voltage, Rated Current×200% Test Voltage: Rated Voltage	Over 10 kohm
Category Temperature Range	-40°C to +100°C	

#1. For Circuit Protector operated at continuous current, rated current shall be reduced by the derating curve of Fig.1.

#2. This current derating curve is not for fusing characteristics.

Fig.1. Current Derating Curve



Note

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Product Name	Micro Chip Fuse / Circuit Protector ERBSE□ R□□ U	10-4

3.5.2. Environmental Characteristics

Item	Test Condition	Performance
Resistance to Soldering Heat	+260°C±5°C×10 seconds	ΔR: within ±10% Meet the fusing characteristics
Temperature Cycle	-40°C±2°C to +100°C±2°C 30 minutes /5cycles	ΔR: within ±10% Meet the fusing characteristics
Vibration	Vibration Frequency: 10Hz→55Hz→10Hz /1minutes Amplitude: 1.5mm 2 hours in each of 3 directions; X,Y,Z (total 6 hours)	ΔR: within ±10% Meet the fusing characteristics
Endurance (Under Load and Heat)	+70°C±2°C Load Current: Rated Current ×70% 1.5hours ON,0.5hours OFF/ 1000hours	ΔR: within ±10% Meet the fusing characteristics
Endurance (Under Load and Damp)	+60°C±2°C/ 90%RH to 95%RH Load Current: Rated Current ×70% 1.5hours ON,0.5hours OFF/ 1000hours	ΔR: within ±10% Meet the fusing characteristics
Resistance to Damp	+60°C±2°C/ 90%RH to 95%RH 1000hours	ΔR: within ±10% Meet the fusing characteristics
Resistance to Solvent	Solvent: 2-propanol(IPA)/ 10 minutes	No abnormality on appearance

3.5.3. Physical Characteristics

Item	Test Condition	Performance
Solderability	Flux: +25%-rosin Solder: Sn-3.0Ag-0.5Cu Temperature: +245°C±3°C Immersion time: 5 seconds	Covered with new solder by 95% at least

Note

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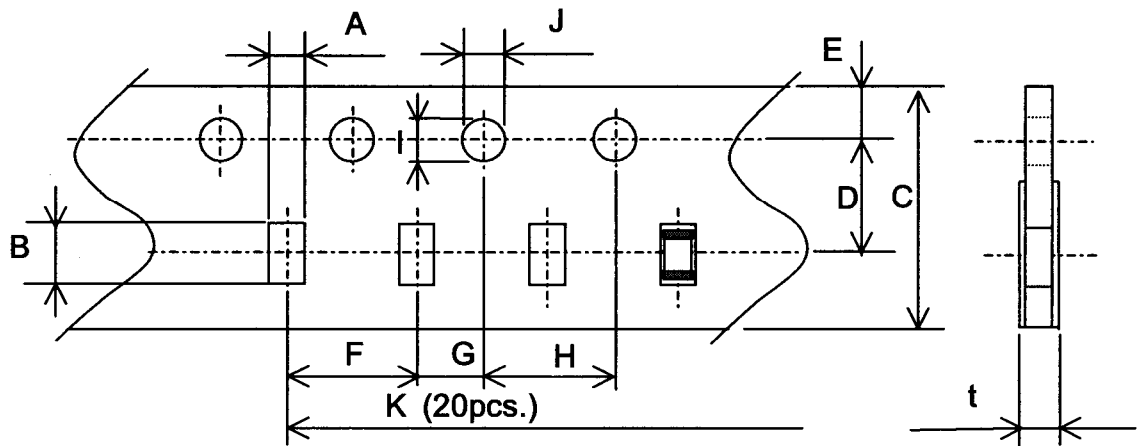
Classification	Specification	Spec No. 151-ERB-S031E
Product Name	Micro Chip Fuse / Circuit Protector ERBSE□R□□U	10-5

4. Packaging

4.1. Taping Style

4.1.1. Taping Construction

The Circuit Protectors ERBSE type shall be put into chip holes of carrier tape (Material: paper) of the following. The carrier tape holding the products shall be covered by cover tape in hotmelt method and reeled.



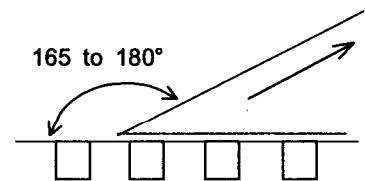
Symbol	A	B	C	D	E	F	G	H
Dimensions	1.0 ±0.10	1.8 ±0.2	8.0 ±0.2	3.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	4.0 ±0.1

Symbol	I	J	K	t
Dimensions	1.5 ^{+0.1} ₋₀	1.5 ^{+0.1} ₋₀	80 ±0.1	0.85 ±0.07

(Unit: mm)

4.1.2. Adhesive Strength of Cover Tape

Adhesive strength shall be 0.10N to 1.0N
(Covered tape shall be pulled by tension gauge as right figure. Pulling speed be 300mm/min.)



Note

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Classification	Specification	Spec No. 151-ERB-S031E
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4.1.3. Packing Method of Taping

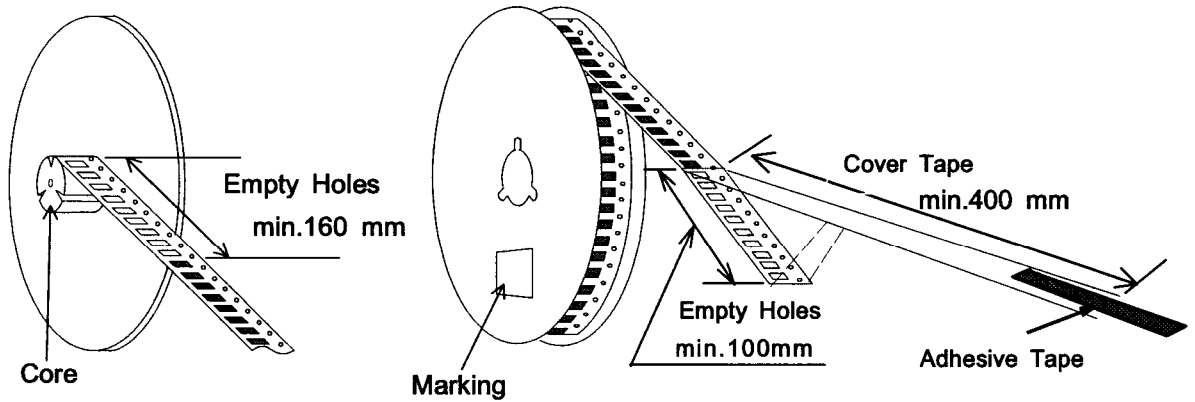
1) Beginning and End of Rolling

Beginning of Rolling:

There shall be more than 40 pieces of vacant holes in the beginning.

End of Rolling (Leader Part):

There shall be min.400mm cover tape as leader, and more than 25 vacant holes.



2) Dimension of Reel

(Unit: mm)

Symbol	A	B	C	D	E	W	T
Dimensions	178 ±2.0	50 min.	13.0 ±0.5	21.0 ±0.5	2.0 ±0.5	9.0 ±1.0	11.4 ±2.0

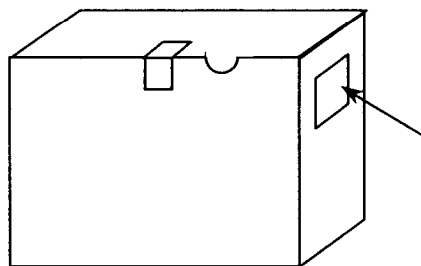
3) Quantity

5000pcs. /reel

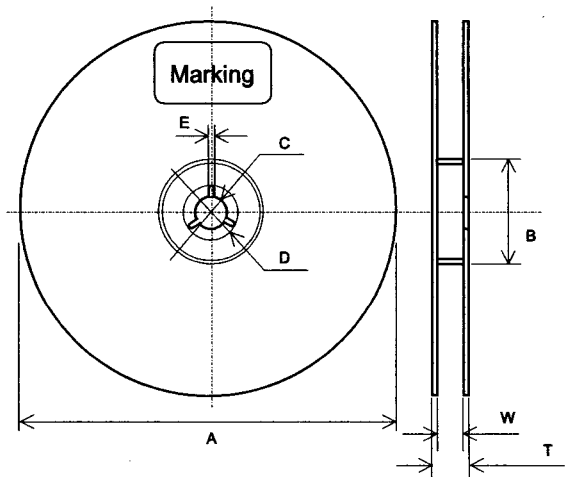
4.2. Inner Box(Packing of Reel)

5 reel shall be packed in one packing case.

Size of the packing case: 188mm×188mm×65mm



Marking



Note

Enactment

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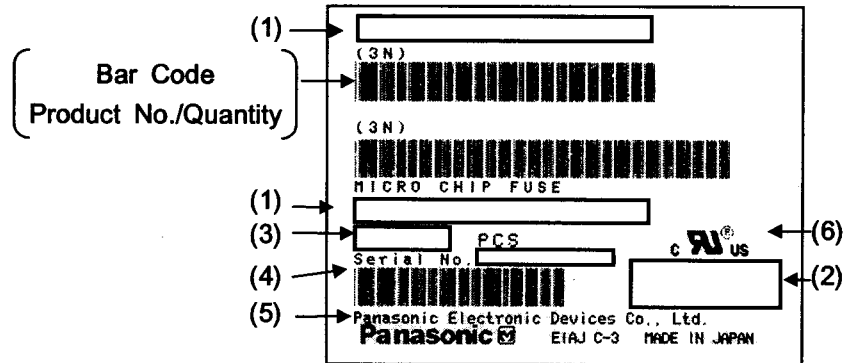
Classification	Specification	Spec No. 151-ERB-S031E
Product Name	Micro Chip Fuse / Circuit Protector ERBSE□R□□U	10-7

4.3. Marking

4.3.1. Marking of Reel

- (1) Part Number
- (2) Ratings
- (3) Quantity
- (4) Serial No.
- (5) Manufacture Name
- (6) Recognized Mark

(Ex.)



4.3.2. Marking of Inner Box

- Part Number
- Quantity
- Manufacture Name

5. Manufacture Factory

Country : Japan
Plant : Panasonic Communications Miyazaki Co.,Ltd.

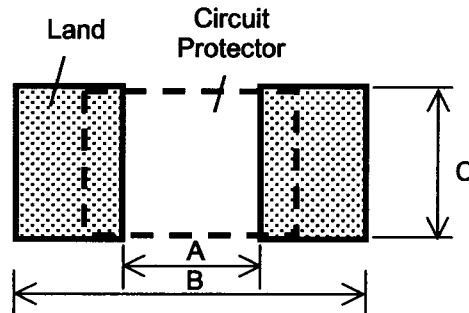
Note

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Classification	Specification	Spec No. 151-ERB-S031E
Product Name	Micro Chip Fuse / Circuit Protector ERBSE□R□□U	10-8

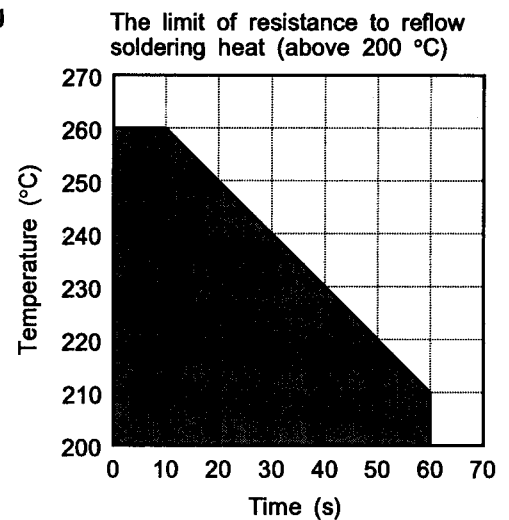
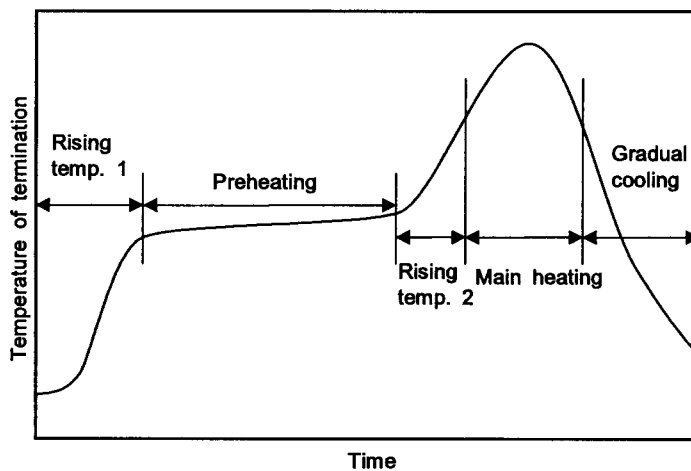
6. Consideration for Placement

6.1. Recommended Land Pattern



Code	Dimensions (mm)
A	0.9
B	2.1 to 2.3
C	0.8

6.2. Recommended Temperature Profile in Reflow Soldering



Solder	Rising temp. 1	Preheating	Rising temp. 2	Main heating	Gradual cooling
For solder (Sn-37Pb)	The normal to Preheating temp.	140 to 160 °C	Preheating to 200 °C	235±10 °C	200 to 100 °C
	30 to 60 s	60 to 120 s	20 to 40 s	Peak	1 to 4 °C/s
For lead-free Solder (Sn-3Ag-0.5Cu)	The normal to Preheating temp.	150 to 170 °C	Preheating to 210 °C	250 ⁺¹⁰ ₋₅ °C	210 to 100 °C
	30 to 60 s	60 to 120 s	20 to 40 s	Peak	1 to 4 °C/s

6.3. Precaution for Soldering

- 1) The product is designed for reflow soldering.
- 2) Reflow soldering shall be within two times.
- 3) When correcting the soldered product with a soldering iron, use the following cautions
 - After adequately preheating the product with hot air, etc., carry out correction with the iron tip temperature not exceeding 350°C, and within 3 seconds per terminal.
 - Do not allow the iron to touch the product directly, but carry out soldering by melting solder on the land pattern.
- 4) Mount the product marking surface up.

Note

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Classification	Specification		Spec No. 151-ERB-S031E
Product Name	Micro Chip Fuse / Circuit Protector ERBSE□ R□□ U		10-9
7. Precautions for use			
<p>1) This specification shows the quality and performance of the products as individual components. Before use, check and evaluate their operations when installed in your products.</p> <p>2) The products are designed and manufactured for general purpose and standard use in general electronic equipment(e.g. AV equipment, home electric appliances, office equipment, information and communication equipment)</p> <p>3) 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.</p> <ul style="list-style-type: none"> • 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 <p>4) The 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.</p> <p>(1) In liquid, such as water, oil, chemicals, or organic solvent.</p> <p>(2) In direct sunlight, outdoors, or in dust</p> <p>(3) In salty air or air with a high concentration of corrosive gas, such as Cl₂, H₂S, NH₃, SO₂, or NO₂</p> <p>(4) In an environment where strong static electricity or electromagnetic waves exist</p> <p>(5) In an environment where the products cause dew condensation</p> <p>(6) Sealing or coating of these products or a printed circuit board on which these products are mounted, with resin or other materials</p> <p>5) The products generate Joule heat when energized. Carefully position these products so that their heat will not affect the other components.</p> <p>6) Carefully position the 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.</p> <p>7) Note that non-cleaning solder, halogen-based highly active flux, or water-soluble flux may deteriorate the performance or reliability of the products.</p> <p>8) 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.</p>			
<u>Cautions for the rating of the products</u>			
<p>9) Set the rated current so that the current passing through the products under normal conditions is within 70% of the rated current.</p> <p>10) Do not continuously pass a current exceeding the rated current through the products.</p> <p>11) If a pulse exceeding the rated current is applied, such as a rush current or surge current at power-on, take care not to cause unwanted fusing. Calculate the I²t value of the pulse and check the tolerance to the number of pulses according to the I²t-t characteristic curve before deciding to use the products. Before checking the tolerance, consult our sales staff in advance.</p>			
Note			
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Classification	Specification		Spec No.
Product Name			151-ERB-S031E
Micro Chip Fuse / Circuit Protector ERBSE□ R□□ U			10-10
<p>12) The products are designed to be blown out by a current that is double or greater than the rated current. Ensure that the abnormal current generated when a circuit abnormality occurs in your product is at least double or greater than the rated current of the products. In addition, ensure that the abnormal current of your product does not exceed the maximum interrupting current of the products.</p> <p>13) The products are designed to be used on the secondary side of a power supply. Do not use them on the primary side.</p> <p>14) Ensure that the voltage applied to the products is within their rated voltage.</p> <p>15) The fusing characteristics of the products are affected by the ambient temperature. Before use, mount the products on your PWB and carefully check and evaluate their operating temperature range.</p> <p>16) In case that there are any doubt about safety problems, please inform us immediately.</p>			
<p>8. Precautions for storage</p>			
<p>The performance of the products, including the solderability, is guaranteed for 6 months 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%.</p>			
<p>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.</p>			
<p>(1) In salty air or in air with a high concentration of corrosive gas, such as Cl₂, H₂S, NH₃, SO₂, or NO₂</p> <p>(2) In direct sunlight</p>			
<p>9. Laws and Regulations</p>			
<p>1) No ODCs or other ozone-depleting substances which are subject to regulation under the Montreal Protocol are used in our manufacturing processes, including in the manufacture of this product.</p> <p>2) All materials used in this product are existing chemical substances recognized under "laws on examination of chemical substances and regulations of manufacturing and others."</p> <p>3) None of the materials used in this product contain the designated incombustible bromic substances, PBBOs and PBBs.</p> <p>4) Please contact us to obtain a notice as to whether this product has passed inspection under review criteria primarily based on Foreign Exchange and Foreign Trade Control law, and appended table in the Export Control law.</p>			
<p>10. Design Change and Specification Change</p>			
<p>Customers notified of any changes in product design and specifications, and any such changes shall be discussed by both parties and agreed.</p>			
<p>Note</p>			
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