

TTI

Issue No. : 151RJM0009024

Date of Issue : November 19.2009

Classification : New Changed

PRODUCT SPECIFICATION FOR APPROVAL

Product Description : Low Resistance Value Chip Resistor(RoHS Compliance)

Product Part Number : ERJM03NF10MV

Country of Origin : JAPAN, INDONESIA

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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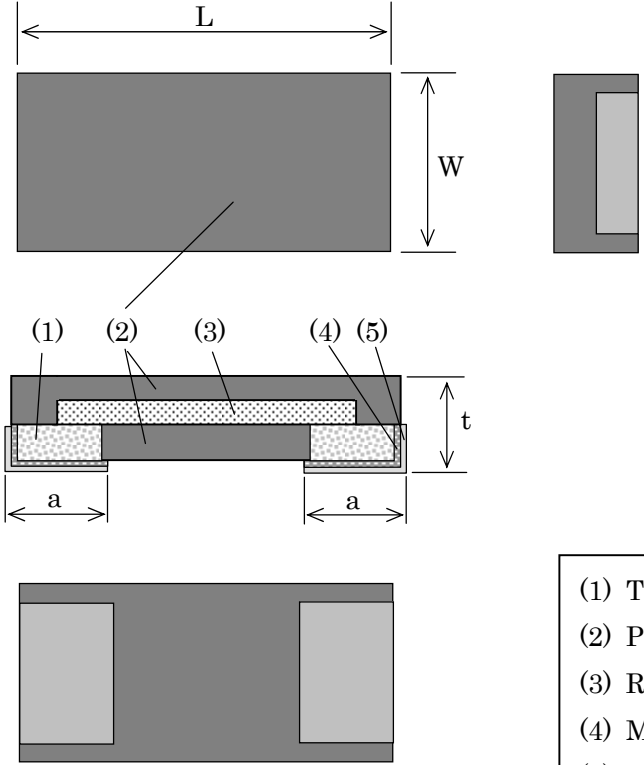
Title :

Manager of Engineering

Panasonic

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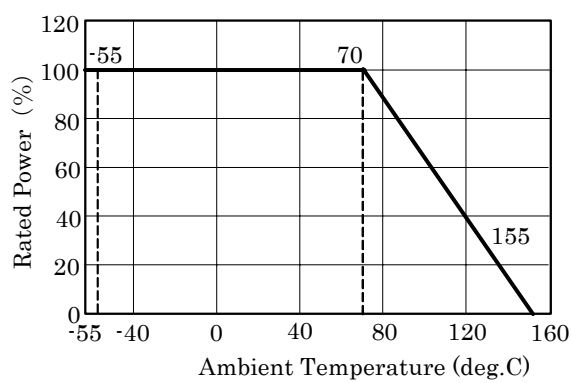
1. Dimension



- (1) Termination: Metal(Cu)
- (2) Protective Coating: Resin
- (3) Resistive Element: Alloy Metal
- (4) Middle Termination: Ni Plating
- (5) Outer Termination: Sn Plating

	L	W	t	a
Dimension (mm)	1.60±0.15	0.80±0.15	0.35±0.10	0.45±0.15

2. Power Derating Curve



Operating temperature range:
-55 to 155 deg.C

Figure 1

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3. Ratings

Item	Rated value	Explanation
Power Rating	0.25W	When you used at ambient temperature above 70 deg.C, the load power shall be reduced as shown in Figure 1.
Rated voltage & Rated Continuous Working Voltage	The rated voltage of each resistance should be calculated from the equation below. Rated voltage = (Power rating x Resistance Value) ^{1/2}	
Resistance Tolerance	F : +/- 1% J : +/- 5%	
Resistance	10 m ohm	

4. Explanation of Part Number

E	R	J	M	0	3	N	F	1	0	M	V
(1)	(2)	(3)	(4)	(5)	(6)	(7)					

(1) Product Code : Chip Resistor

(2) Structure : Metal type

(3) Size and Rated Power : 1.6 mm x 0.8 mm, 0.25 W

(4) Type : Standard

(5) Tolerance

Code	Resistance Tolerance
F	+/- 1%
J	+/- 5%

(6) Resistance Value

Code	Resistance Tolerance
10M	10 m ohm

(7) Packaging Configuration

Code	Packaging Configuration
V	Paper Taping (5000pcs/reel)

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5. Appearance & Construction

Item	Specification and Explanation
Appearance & Construction	<ol style="list-style-type: none"> 1. The resistive element should be covered with protective coating that don't fade easily. The surface of coating should avoid unevenness, flaw, pinhole and discoloration. 2. The electrode should be printed uniformly, as shown in the dimensions. The plating should not fade easily, and should avoid unevenness, flaw, pinhole, projection and discoloration. 3. The electrode should be connected electrically, mechanically to resistive element. 4. Dimensions of the substrate should be as in the list and it should not have chipping, flaw, flash and crack. Details of appearance criteria shall be as described in attached sheet.

As far as there shall not designation especially, the following tests and measurement shall be operated under the following conditions.

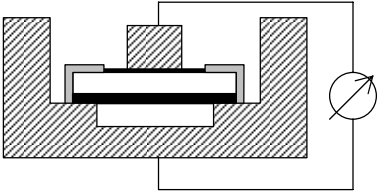
Normal temperature : 5 deg.C to 35 deg.C

Normal humidity : 45 % to 85 %

Normal atmospheric pressure : 86 k Pa to 106 k Pa

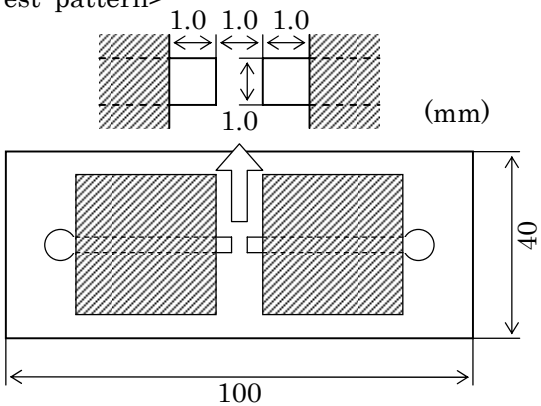
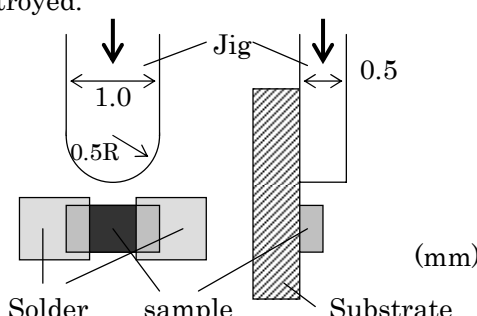
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6. Electrical Performance Specification

Item	Specification	Test Method (JIS-C5201-1)
DC resistance	DC resistance value shall be within the specified tolerance.	At 20 deg.C, 65%RH
Temperature coefficient of resistance (TCR)	+/- 100 x 10 ⁻⁶ /deg.C	Natural resistance change per temperature degree centigrade. $TCR = (R_2 - R_1) \times 10^6 / R_1 (t_2 - t_1)$ (x10 ⁻⁶ /deg.C) R ₁ : Resistance value at reference temperature (t ₁) R ₂ : Resistance value at test temperature (t ₂) t ₁ : 25 deg.C , t ₂ : 125 deg.C
Short time overload	ΔR : +/- (2%+0.1 m ohm)	Resistors shall be applied 4 times the rated power for 5 seconds.
Intermittent overload	ΔR : +/- (4%+0.1 m ohm)	Resistors shall be subjected to 10000 cycles of 4 times the rated power applied for 1 second with pause of 25 seconds between tests.
Dielectric Withstanding	No evidence of flashover, mechanical damage, arcing or insulation breakdown	AC 200V between substrate and termination for 1 minute.
Insulation resistance	Min. 1000 M ohm	 <p>AC power supply or Insulation resistance meter</p>
		Resistors shall be facing down. After applying AC 200V to the resistor, insulation resistance shall be measured.

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7. Mechanical Performance Specification

Item	Specifications	Test Method (JIS-C5201-1)
Bending strength	No mechanical damage.	Substrate : Glass epoxy (t=1.6 mm) Span : 90mm Bending distance : 3mm (10 seconds) <Test pattern> 
	$\Delta R : \pm(3\%+0.1 \text{ m ohm})$	
Terminal strength	Min. 2.5 N	Resistors shall be added load from a side of body for 10 seconds. And measure the terminal strength when the terminal is destroyed. 
Solderability	Termination should be covered uniformly with solder (Min. 95% coverage)	Resistors shall be dipped in the melted solder bath at 230 deg.C +/- 5 deg.C for 3 seconds +/- 0.5 second. Flux shall be removed from the surface of termination with clean organic solvent.
Resistance to Soldering Heat	$\Delta R : \pm(2\% +0.1 \text{ m ohm})$	Resistors shall be dipped in the melted solder bath at 270 deg.C +/- 3 deg.C for 10 seconds +/- 1 second.

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8. Environmental Characteristic

Item	Specification	Test Method (JIS-C5201-1)									
High temperature exposure	$\Delta R : +/- (2\% + 0.1 \text{ m ohm})$	Resistors shall be exposed at 155 deg.C +/- 3 deg.C with no load for 1000 hours +48/-0 hours.									
Temperature cycling	$\Delta R : +/- (2\% + 0.1 \text{ m ohm})$	Resistors shall be tested for 5 cycles continuously in accordance with the following duty cycle. However, this examination standard is the guarantee of only chip resistor. <table border="1" data-bbox="842 815 1434 945"> <thead> <tr> <th>Step</th> <th>Temperature (deg.C)</th> <th>Time (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55 +/-3</td> <td>30</td> </tr> <tr> <td>2</td> <td>+125 +/-3</td> <td>30</td> </tr> </tbody> </table>	Step	Temperature (deg.C)	Time (min.)	1	-55 +/-3	30	2	+125 +/-3	30
Step	Temperature (deg.C)	Time (min.)									
1	-55 +/-3	30									
2	+125 +/-3	30									
Humidity (Steady state)	$\Delta R : +/- (2\% + 0.1 \text{ m ohm})$	Resistors shall be exposed at 60 deg.C +/- 2 deg.C and 90% to 95% relative humidity in a humidity test chamber for 1000 hours +48/-0 hours.									
Load life	$\Delta R : +/- (3\% + 0.1 \text{ m ohm})$	Resistors shall be operated at DC rated voltage (1.5 hours "ON", 0.5 hours "OFF") for 1000 hours +48/-0 hours in a test chamber controlled at 70 deg.C +/-2 deg.C.									
Load life in humidity	$\Delta R : +/- (3\% + 0.1 \text{ m ohm})$	Resistors shall be operated at DC rated voltage (1.5 hours "ON", 0.5 hours "OFF") for 1000 hours +48/-0 hours in a test chamber controlled at 60 deg.C +/- 2 deg.C and at 90% to 95% in relative humidity.									

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9. Common precautions in handling resistors

⚠ Notice for use

- (1) This specification shows the quality and performance of a unit component. Before adoption, be sure to evaluate and verify the product mounting it in your product.
- (2) We take no responsibility for troubles caused by the product usage that is not specified in this catalog. Be sure to exchange the delivery specification with us.
- (3) Use fail-safe design and ensure safety by carrying out the following items in cases where it is forecast that the failure of the product gives serious damage to something important like human life, for instant in traffic transportation equipment (trains, cars, traffic signal equipment, etc.), medical equipment, aerospace equipment, electric heating appliances, combustion and gas equipment, rotating equipment, disaster and crime preventive equipment.
 - *Ensure safety as the system by setting protective circuits and protective equipment.
 - *Ensure safety as the system by setting such redundant circuits as do not cause danger by a single failure.
- (4) When a dogma shall be occurred about safety for this product, be sure to inform us rapidly, operate your technical examination.
- (5) The product is designed to use in general standard applications of general electric equipment (AV products, household electric appliances, office equipment, information and communication equipment, etc.); hence, it do not take the use under the following special environments into consideration.

Accordingly, the use in the following special environments, and such environmental conditions may affect the performance of the product; prior to use, verify the performance, reliability, etc. thoroughly.

 - 1) Use in liquids such as water, oil, chemical, and organic solvent.
 - 2) Use under direct sunlight, in outdoor or in dusty atmospheres.
 - 3) Use in places full of corrosive gases such as sea breeze, Cl₂, H₂S, NH₃, SO₂, and NO_x.
 - 4) Use in environment with large static electricity or strong electromagnetic waves.
 - 5) Where the product is close to a heating component, and where an inflammable such as a polyvinyl chloride wire is arranged close to the product.
 - 6) Where the resistor is sealed or coated with resin, etc.
 - 7) Where water or a water-soluble detergent is used in cleaning free soldering and in flux cleaning after soldering (Pay particular attention to soluble flux.)
 - 8) Use in such a place where the product is wetted due to dew condensation.

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⚠ Notice for use

- (6) If transient load (heavy load in a short time) like pulse is expected to be applied, carry out evaluation and confirmation test with resistors actually mounted on your own board. When the load of more than rated power is applied under the load condition at steady state, it may impair performance and/or reliability of resistor. Never exceed the rated power. When the product shall be used under special condition, be sure to ask us in advance.
- (7) Halogen type (Chlorine type, Bromine type, etc.) or other high-activity flux is not recommended as the residue may affect performance or reliability of resistors.
- (8) When soldering with soldering iron, never touch the body of the chip resistor with a tip of the soldering iron. When using a soldering iron with a tip at high temperature, solder for a time as short as possible. (three seconds or less up to 350 deg.C)
- (9) Avoid physical shock to the resistor and nipping of the resistor with hard tool (a pair of pliers or tweezers) as it may damage protective film or the body of resistor and may affect resistor's performance.
- (10) Avoid immersion of chip resistor in solvent for long time. Use solvent after the effect of immersion is confirmed.

10. Storage Method

If the product is stored in the following environments and conditions, the performance and solderability may be badly affected, avoid the storage in the following environments.

- (1) Storage in places full of corrosive gases such as sea breeze, Cl₂, H₂S, NH₃, SO₂, and NO_x.
- (2) Storage in places exposed to direct sunlight.
- (3) Storage in places outside the temperature range of 5 deg.C to 35 deg.C and humidity range of 45 %RH to 85 %RH.
- (4) Storage over a year after our delivery (This item also applies to the case where the storage method specified in item (1) to (3) has been followed.).

11. Laws and Regulations

- (1) This product has not been manufactured with any ozone-depleting chemical controlled under the Montreal Protocol.
- (2) This product complies with the RoHS Directive (Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (DIRECTIVE 2002/95/EC)).
- (3) All materials used in this part are registered material under the Law Concerning the Examination and Regulation of Manufacturers, etc. of Chemical substances.

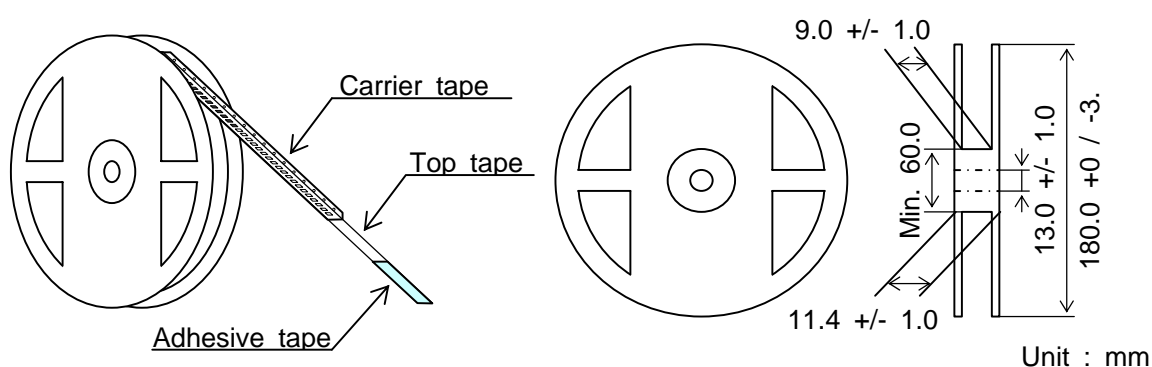
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- (4) All the materials used in this part contain no brominated materials of PBBOs or PBBs as the flame-retardant.
- (5) If you need the notice by letter of “A preliminary judgement on the Laws of Japan foreign exchange and Foreign Trade control”, be sure to let us know.

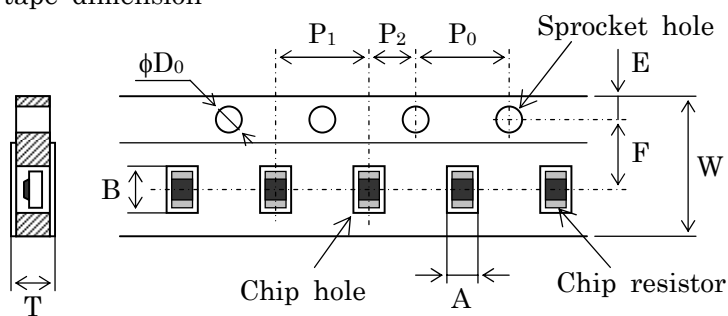
12. Taped and Reel Package

12-1. Physical Dimensions

Structure and reel dimensions shall be as shown in the figure below.



12-2 Carrier tape dimension



	A	B	W	F	E
Dimension (mm)	1.10+/-0.10	1.90+/-0.10	8.00+/-0.20	3.50+/-0.05	1.75+/-0.10

	P ₁	P ₂	P ₀	φD ₀	T
Dimension (mm)	4.00+/-0.10	2.00+/-0.05	4.00+/-0.10	1.50+0.10/-0	0.70+/-0.05

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12-3 Specifications

12-3-1 Taping

(1) Minimum Bending Radius

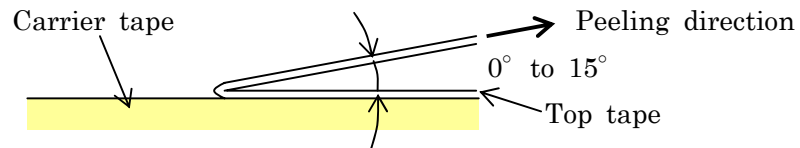
When Carrier tape shall be bent by Minimum Bending Radius (15mm), no deflection of chip and no break of carrier tape. However minimum bending radius shall be tested for 1 time.

(2) Resistance to climate of top tape

When it shall be exposed at 60 deg.C, 90 %RH to 95 %RH for 120 hours, no exfoliation of top tape.

(3) When the test shall be operated with the below conditions, peel strength should be 0.03 N to 1.00 N, should not have flash and tear after peeling.

(Test Method)



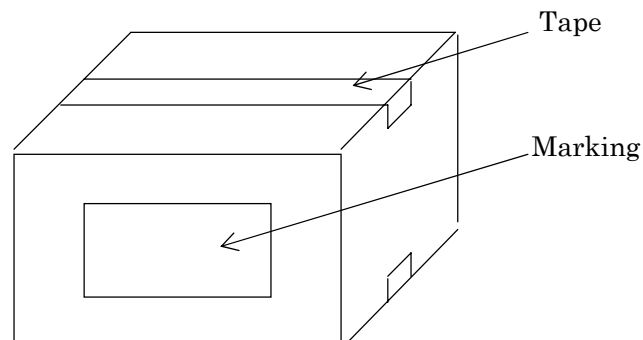
12-3-2 Quantity in Taping : 5000 pcs./reel

12-3-3 Tape packaging

- (1) Resistance side shall be facing upward.
- (2) Chip resistor shall not be sticking to top tape and bottom tape.
- (3) Chip resistor shall be easy to take out from carrier tape and chip hole or sprocket hole shall not have flash and break.

12-4 Outer Packaging

Quantity : 20 reels (Max. 100,000pcs.)



* When taping shall not reach Max. or quantity, the remaining empty space shall be buried with buffer material.

* When the quantity shall be few, alternative packaging methods may be used. No problem must occur during the exportation of the product.

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12-5 Marking(Label)

Items listed below shall be displayed.

(1) Side of reel (Marking shall be on one side)

1)Part name, 2)Part number, 3)Quantity, 4)Lot number, 5)Maker name

6) Production country

(2)Packaging box

1)Customer name, 2)Part name, 3)Part number, 4)Customer part number, 5)Quantity.

6)Maker name, 7)Production country