



RSV Series Thick Film Chip Resistors Product Specification

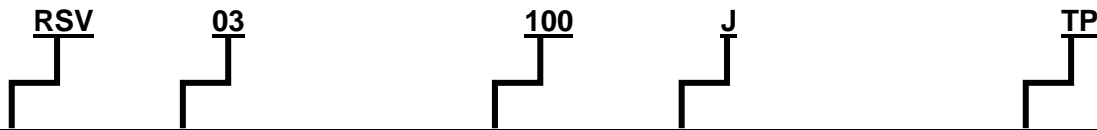
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1 Scope:

- 1.1 This specification is applicable to lead free and halogen free of RoHS directive for RSV series Anti-Sulfurated High Voltage thick film chip resistors.
- 1.2 Superior Sulfur resistant capability (Refer to ASTM-B-809-95&EIA977sulfurvapor test).
- 1.3 This product is for general purpose.

2 Explanation Of Part Numbers:

(EX)



Type	Size	Nominal Resistance		Resistance Tolerance	Packaging(Refer to IE-SP-055)
Anti-Sulfurated High Voltage Thick Film Chip Resistors	03(0603) 05(0805) 06(1206) 12(1210) 20(2010) 25(2512)	5% (3-Digit)	EX. 10Ω=100 4.7Ω=4R7	D=± 0.5% F=± 1% J=± 5%	TP : 4 mm Pitch Carrier Tape 5000 pcs P2 : 4 mm Pitch Carrier Tape 10000 pcs P3 : 4 mm Pitch Carrier Tape 15000 pcs P4 : 4 mm Pitch Carrier Tape 20000 pcs TE : 4 mm Pitch Carrier Tape 4000 pcs
	0.5% 1% (4-Digit)	EX. 10.2Ω=10R2 10KΩ=1002			

3 General Specifications:

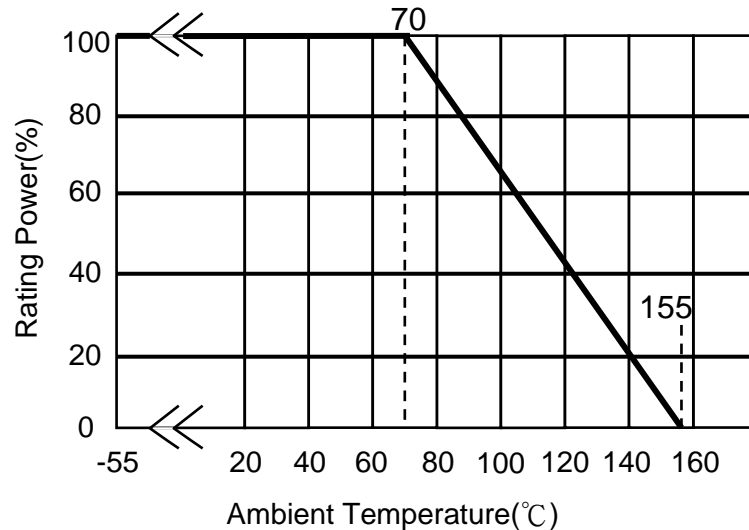
Type	Rated Power at 70°C	Max. Working Voltage	Max. Overload Voltage	T.C.R (ppm/°C)	Resistance Range		
					D(±0.5%) E-96	F(±1%) E-96	J(±5%) E-24
RSV03 (0603)	1/10 W	350V	500V	±100	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 1MΩ
				±200	1Ω ≤ R < 10Ω 1MΩ < R ≤ 10MΩ	1Ω ≤ R < 10Ω 1MΩ < R ≤ 10MΩ	1Ω ≤ R < 10Ω 1MΩ < R ≤ 10MΩ
RSV05 (0805)	1/8 W	400V	800V	±100	100Ω ≤ R ≤ 1MΩ	100Ω ≤ R ≤ 1MΩ	100Ω ≤ R ≤ 1MΩ
				±200	1MΩ < R ≤ 10MΩ	1MΩ < R ≤ 10MΩ	1MΩ < R ≤ 10MΩ
RSV06 (1206)	1/4 W	500V	1000V	±100	100Ω ≤ R ≤ 1MΩ	100Ω ≤ R ≤ 1MΩ	100Ω ≤ R ≤ 1MΩ
				±200	1MΩ < R ≤ 10MΩ	1MΩ < R ≤ 10MΩ	1MΩ < R ≤ 10MΩ
RSV12 (1210)	1/2 W	500V	1000V	±100	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 1MΩ
				±200	1Ω ≤ R < 10Ω 1MΩ < R ≤ 10MΩ	1Ω ≤ R < 10Ω 1MΩ < R ≤ 10MΩ	1Ω ≤ R < 10Ω 1MΩ < R ≤ 10MΩ
RSV20 (2010)	3/4 W	500V	1000V	±100	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 1MΩ
				±200	-----	-----	1Ω ≤ R < 10Ω 1MΩ < R ≤ 10MΩ
RSV25 (2512)	1W	500V	1000V	±100	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 1MΩ
				±200	-----	-----	1Ω ≤ R < 10Ω 1MΩ < R ≤ 10MΩ
Operating Temperature Range				-55°C ~ +155°C			

IE			QA		Remark IT'S NOT UNDER CONTROL FOR PDF FILE PLS NOTE THE VERSION STATED.. Do not copy without permission	Issue Dep. DATA Center. Series No. 60
Written 王荷花	Checked 	Approved 李昌旺	Signing 许国敏			

3.1 Power Derating Curve:

Operating Temperature Range : - 55~155 °C

For resistors operated in ambient temperatures above 70°C, power rating shall be derated in accordance with figure below .



3.2 Voltage Rating:

Rated Voltage: The resistor shall have a DC continuous working voltage or a rms. AC continuous working voltage at commercial-line frequency and wave form corresponding to the power rating, as determined from the following:

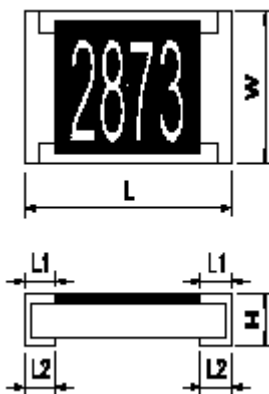
$$E = \sqrt{R \times P}$$

E= Rated voltage (v)

P= Power rating (w)

R= Nominal resistance(Ω)

4 Dimensions:



Dimension		Unit:mm				
Type	Size Code	L	W	H	L1	L2
RSV03	0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.15	0.30±0.15
RSV05	0805	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20	0.35±0.15
RSV06	1206	3.05±0.10	1.55±0.10	0.50±0.10	0.45±0.20	0.35±0.15
RSV12	1210	3.05±0.10	2.55±0.10	0.55±0.10	0.50±0.20	0.50±0.20
RSV20	2010	5.00±0.20	2.50±0.20	0.55±0.10	0.60±0.20	0.60±0.20
RSV25	2512	6.30±0.20	3.20±0.20	0.55±0.10	0.60±0.20	0.60±0.20

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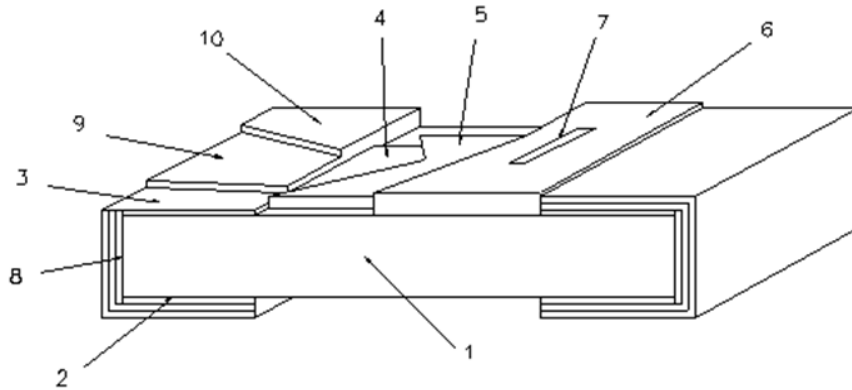
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5 Structure Graph:



1	Ceramic substrate	6	2nd Protective coating
2	Bottom inner electrode	7	Marking
3	Top inner electrode	8	Terminal inner electrode
4	Resistive layer	9	Ni plating
5	1st Protective coating	10	Sn plating

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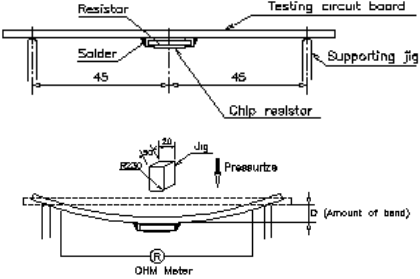
6 Reliability Test:

6.1 Electrical Performance Test

Item	Conditions	Specifications
		Resistors
Temperature Coefficient of Resistance	$TCR \text{ (ppm/}^\circ\text{C)} = \frac{(R2 - R1)}{R1 (T2 - T1)} \times 10^6$ R1: Resistance at room temperature R2: Resistance at -55°C or +125°C T1: Room temperature T2: Temperature -55°C or +125°C Refer to JIS-C5201-1 4.8	Refer to item 3. general specifications
Short Time Overload	Applied 2.5 times rated voltage for 5 seconds and release the load for about 30 minutes, then measure its resistance variance rate. (Rated voltage refer to item 3. general specifications) Refer to JIS-C5201-1 4.13	0.5%、1%: $\Delta R\% = \pm 1.0\%$ 5%: $\Delta R\% = \pm 2.0\%$
Insulation Resistance	Put the resistor in the fixture, add 100 VDC in +, - terminal for 60 sec then measured the insulation resistance between electrodes and insulating enclosure or between electrodes and base material. Refer to JIS-C5201-1 4.6 	$\geq 10^9 \Omega$
Dielectric Withstand Voltage	Put the resistor in the fixture, add VAC (see spec. below) in +, - terminal for. RSV05、06、20、25 apply 500 VAC 1 minute. RSV03 apply 300 VAC 1 minute. Refer to JIS-C5201-1 4.7	No short or burned on the appearance.

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6.2 Mechanical Performance Test

Item	Conditions	Specifications
		Resistors
Terminal Strength	Test1: The resistor mounted on the board applied 5N pushing force on the sample rear for 10 sec. Test2: The resistor mounted on the board slowly add force on the sample rear until the sample termination is breakdown. Refer to JIS-C5201-1 4.16	Test 1: No evidence of mechanical damage. Test 2: $\geq 5N$
Resistance to Solvent	The tested resistor be immersed into isopropyl alcohol of 20~25°C for 5 minutes, then the resistor is left in the room for 48 hrs., and measured its resistance variance rate. Refer to JIS-C5201-1 4.29	$\Delta R\% = \pm 0.5\%$
Solderability	Preconditioning: Put the tested resistor in the apparatus of PCT, at a temperature of 105°C, humidity of 100% RH, and pressure of 1.22×10^5 Pa for a duration of 4 hours. Then after left the tested resistor in room temperature for 2 hours or more. Test method: The resistor be immersed into solder pot in temperature $235 \pm 5^\circ C$ for 2 sec, then the resistor is left as placed under microscope to observed its solder area. Refer to JIS-C5201-1 4.17	Solder coverage over 95%
Resistance to Soldering Heat	◎ Test method 1 (solder pot test): The tested resistor be immersed into molten solder of $260 + 5 / - 0^\circ C$ for 10 seconds. Then the resistor is left in the room for 1 hour. ◎ Test method 2 (solder pot test): The tested resistor be immersed into molten solder of $260 + 5 / - 0^\circ C$ for 30 seconds. Then the resistor is left as placed under microscope to observe its solder area. ◎ Test method 3 (Electric iron test): Preheating temperature : $350 \pm 10^\circ C$ Electric iron preheating time : $3 + 1 / - 0$ sec Preheating the electric iron on electrode termination, as after that step placed the iron over 60 min. and measured its resistance variance rate. Refer to JIS-C5201-1 4.18	Test item 1: (1). Variance rate on resistance $\Delta R\% = \pm 1.0\%$ Test item 2: (1). Solder coverage over 95%. (2). The underlying material (such as ceramic) shall not be visible at the crest corner area of the electrode. Test item 3: (1). Variance rate on resistance $\Delta R\% = \pm 1.0\%$
Joint Strength of Solder	◎ Bending Strength Solder tested resistor on to PC board. Add force in the middle down, and under load measured its resistance variance rate. D: RSV03、05=5mm RSV06、12=3mm RSV20、25=2mm  Refer to JIS-C5201-1 4.33	(1). Variance rate on resistance $\Delta R\% = \pm 1.0\%$ (2). No evidence of mechanical damage. No terminal peeling off and core body cracked.

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6.3 Environmental Test

Item	Conditions	Specifications								
		Resistors								
Resistance to Dry Heat	Put tested resistor in chamber under temperature $155\pm 5^{\circ}\text{C}$ for 1000 +48/-0 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.25	0.5%.1%: $\Delta R\%=\pm 1.0\%$ 5%: $\Delta R\%=\pm 2.0\%$								
Thermal Shock	Put the tested resistor in the chamber under the Thermal Shock which shown in the following table shall be repeated 300 times consecutively. Then leaving the tested resistor in the room temperature for 1 hours, and measure its resistance variance rate. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="2">Testing Condition</th> </tr> </thead> <tbody> <tr> <td>Lowest Temperature</td> <td>$-55\pm 5^{\circ}\text{C}$</td> </tr> <tr> <td>Highest Temperature</td> <td>$125\pm 5^{\circ}\text{C}$</td> </tr> <tr> <td>Temperature-retaining time</td> <td>15 minutes each</td> </tr> </tbody> </table> Refer to MIL-STD 202 Method 107	Testing Condition		Lowest Temperature	$-55\pm 5^{\circ}\text{C}$	Highest Temperature	$125\pm 5^{\circ}\text{C}$	Temperature-retaining time	15 minutes each	0.5%、1%: $\Delta R\%=\pm 0.5\%$ 5%: $\Delta R\%=\pm 1.0\%$
Testing Condition										
Lowest Temperature	$-55\pm 5^{\circ}\text{C}$									
Highest Temperature	$125\pm 5^{\circ}\text{C}$									
Temperature-retaining time	15 minutes each									
Loading Life in Moisture	Put the tested resistor in the chamber under temperature $40\pm 2^{\circ}\text{C}$, relative humidity 90~95% and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.24	0.5%、1%: $\Delta R\%=\pm 2.0\%$ 5%: $\Delta R\%=\pm 3.0\%$								
Load Life	Put the tested resistor in chamber under temperature $70\pm 2^{\circ}\text{C}$ and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.25	0.5%.1%: $\Delta R\%=\pm 2.0\%$ 5%: $\Delta R\%=\pm 3.0\%$								
Sulfuration Test	Put the tested resistor in sulfur vapor, at a temperature of $105\pm 2^{\circ}\text{C}$ for 750hrs. Refer to ASTM-B-809-95&EIA977	$\Delta R\%=\pm 4.0\%$								

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7 Plating Thickness:

- 7.1 Ni: $\geq 2 \mu\text{m}$
- 7.2 Sn(Tin): $\geq 3 \mu\text{m}$
- 7.3 Sn(Tin): Mate Sn

8 Measurement Point:

Bottom electrode		Unit : mm	
TYPE	DIM	A	B
		RSV03	1.35±0.05
RSV05	1.80±0.05	0.35±0.05	
RSV06	2.90±0.05	0.35±0.05	
RSV12	2.90±0.05	0.35±0.05	
RSV20	4.50±0.05	1.15±0.05	
RSV25	5.90±0.05	1.60±0.05	

⊙ **Current Terminal**
 ⊖ **Voltage Terminal**

9 Rule of package empty quantity:

- 9.1 Empty quantity for each reels not allowed to exceed 0.1% of the whole quantity, and continuous 2pcs (included) empty are also unallowed.

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