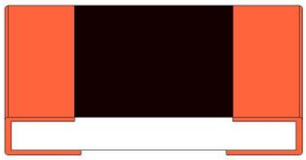
1/32W, 01005, Thick Film Embedded Resistor (Halogen Free)

Reversion History :

Date	Revision	Changes
2014.03.10	A0	New Approval
2019.09.17	A1	New Version
2020.08.06	A2	Modified title, added application description
2021.01.11	A3	Modify lead free related description

1/32W, 01005, Thick Film Embedded Resistor (Halogen Free)

Features / Applications :



- Copper electrode
- Telecommunication Equipment, Digital Cameras
  Watches, Pocket Calculators, Computers, Instruments
- Applied to embedded process
- Halogen Free Epoxy
- RoHS compliant
  - Glass/electrode of resistor with lead free meet RoHS requirements
  - Pb contained in resistive element is exempted by RoHS

Electrical Specifications :

Power Rating*	Resistance Values Series	Resistance Tolerance	Resistance Range (Ω)	Temperature Coefficient of Resistance ppm /℃ (Code)	Operating Temperature Range	Max. Operating Voltage
1/32W	E24 series E96 series	±1%(F)	10 ~ 91	± 300	-55℃ to 125℃	15V
			100 ~ 1M	± 200		
	E24 series	±2%(G) ±5%(J)	10 ~ 91	± 300		
			100 ~ 1M	± 200		
Jumper	Resistance		Rated current		Operating Temperature Range	
	Below 50mΩ		0.5A		-55℃ to 125℃	

Note: *Package Power Temperature Derating Curve

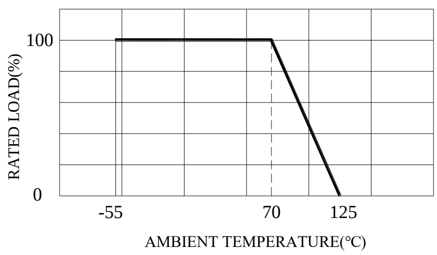


Figure 1. : Power Temperature Derating Curve

Note: **Resistors shall have a rated DC or AC(rms.) continuous operating voltage corresponding to the power rating, as calculated from the following formula

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

Where V : Rated voltage (V)

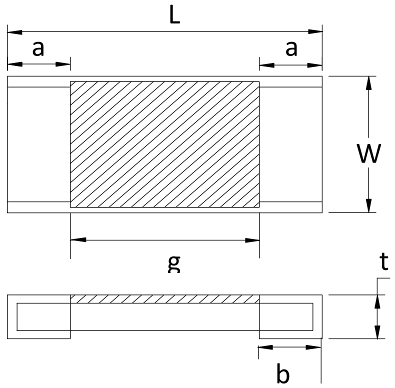
P : Rated power (W)

R : Nominal resistance (Ω)

If the voltage so obtained exceeds the maximum operating voltage, this maximum voltage shall be the rated voltage.

Outline Drawing :

Dimensions



Code Letter	Dimension
L	0.40 ± 0.02
W	0.20 ± 0.02
t	0.15 +0/-0.03
a	0.13+0.04/-0.03
b	0.13+0.04/-0.03
g	≧0.06

Unit: mm

Type Designation :

RR0204SE - XXXX - X G - NH

(1) (2) (3) (4) (5)

Note :

(1) Series No.

(2) Resistance value : 103 = 10kΩ (E24) ; 1131 =1.13kΩ (E96)

(3) Tolerance : F = ±1%, G = ±2%, J= ±5%, X= Jumper(Below 50mΩ)

(4) G=1/32W

(5) NH= Lead free / Halogen free

Characteristics :

Electrical

Item	Specification and Requirement		Test Method
	Resistor	Jumper	
Short Time Overload	△R:±(2%+ 0.1Ω) Without damage by flashover, spark, arcing, burning or breakdown	Max. 50mΩ	(1) Applied voltage: 2.5 x rated voltage or 2 x Maximum operating voltage which ever is less (2) Test time : 5 seconds
Insulation Resistance	Over 100 MΩ on Overcoat layer face up Over 1,000 MΩ on Substrate side face up		(1) Setup as figure 1 (2) Test voltage: 50 V_{DC} (3) Test time: 60 + 10 / -0 seconds
Voltage Proof	△R: ± (2%+ 0.1Ω) Without damage by flashover, spark, arcing, burning or breakdown	Max. 50mΩ	(1) Setup as figure 1 (2) Test voltage: 50 V_{AC}(rms.) (3) Test time: 60 +10 / -0 seconds

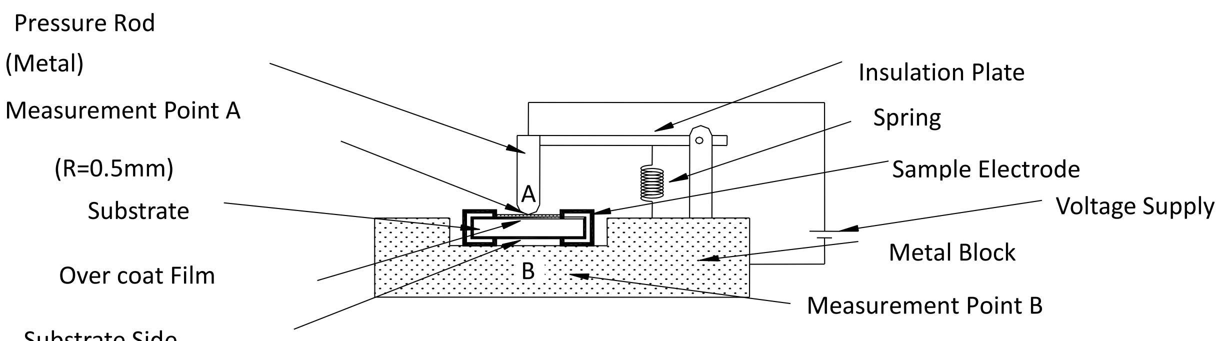


Figure 1 : Measurement Setup

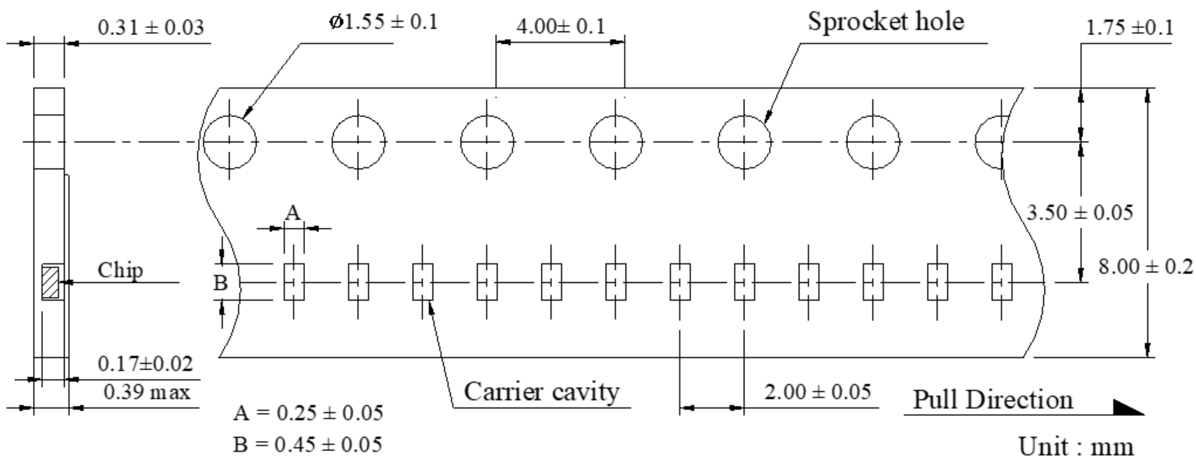
Mechanical

Item	Specification and Requirement		Test Method
	Resistor	Jumper	
Bending Test	△R: ±(1.0%+ 0.05Ω) Without mechanical damage such as break		Bending value: 2 mm for 30 ± 1 seconds
Solvent Resistance	Without mechanical and distinct damage in appearance	Max. 50mΩ	(1) Solvent: Trichloroethane or Isopropyl alcohol (2) Immersed in solvent at room temperature for 90 seconds

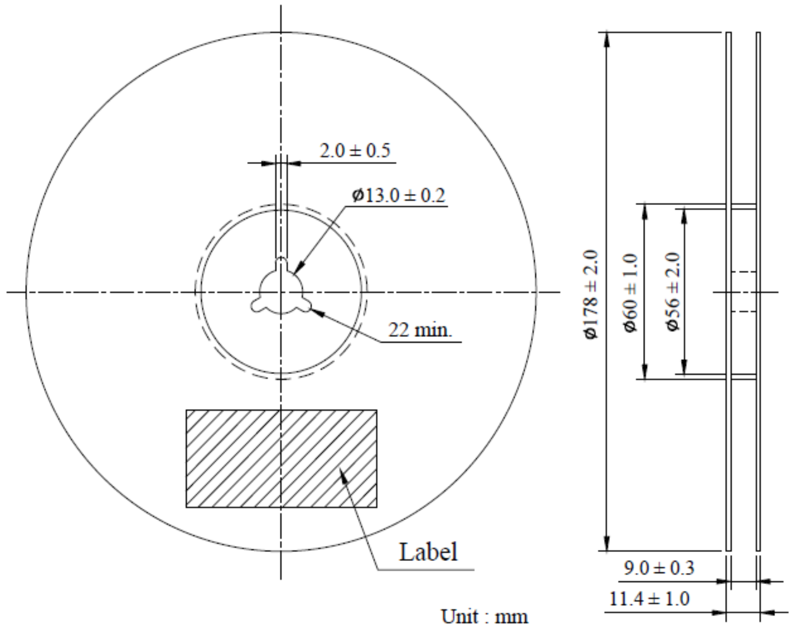
Endurance

Item	Specification and Requirement		Test Method
	Jumper	Jumper	
Rapid change of Temperature	△R: ±(1.0%+ 0.05Ω) Without distinct damage in appearance	Max. 50mΩ	(1) Repeat 5 cycle as follow: (-55 ± 3℃,30minutes) →(Room temperature, 2~3 minutes) → (+125 ± 2℃,30minutes) →(Room temperature, 2~3 minutes) (2) Measuring resistance 1 hour after test
Moisture with Load	△R: ±(5.0%+ 0.1Ω) Without distinct damage in appearance Marking should be legible	Max. 50mΩ	(1) Environment condition: 40 ± 2℃,90~95% RH (2) Applied Voltage: rated voltage (3) Test period: (1.5 hour ON) →(0.5 hour OFF) cycled for total 1,000 + 48 / - 0 hours (4) Measuring resistance 1 hour after test
Load Life	△R: ±(5.0%+ 0.1Ω) Without distinct damage in appearance	Max. 100mΩ	(1) Test temperature: 70 ± 2℃ (2) Applied Voltage: rated Voltage (3) Test period: (1.5 hour ON) →(0.5 hour OFF) cycled for total 1,000 + 48 / - 0 hours (4) Measuring resistance 1 hour after test
Low Temperature Store	△R: ±(5.0%+ 0.1Ω) Without distinct damage in appearance	Max. 100mΩ	(1) Store temperature: -55 ± 3℃ for total 1,000 + 48 / - 0 hours (2) Measuring resistance 1 hour after test
High Temperature Store	△R: ±(5.0%+ 0.1Ω) Without distinct damage in appearance	Max. 100mΩ	(1) Store temperature: +125 ± 2℃ for total 1,000 + 48 / - 0 hours (2) Measuring resistance 1 hour after test

TAPE PACKAGING DIMENSIONS:



REEL DIMENSIONS:



Numbers of Taping: 20,000 pieces/reel

The following items shall be marked on the reel.

(1) Type designation.

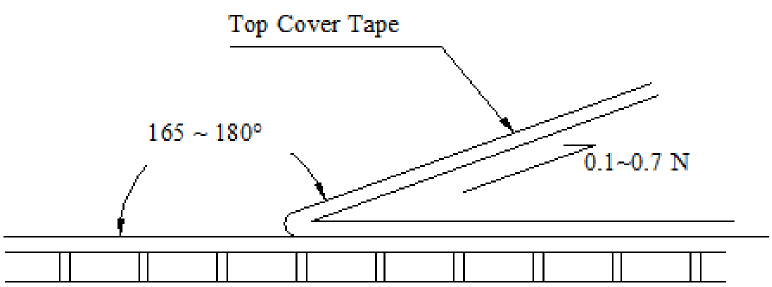
(2) Quantity

(3) Manufacturing date code

(4) Manufacturer’s name

Peel force of top cover tape

The peel speed shall be about 300 mm/min. The peel force of top cover tape shall be between 0.1 to 0.7 N.



Care Note :

Care note for storage

(1) Chip resistor shall be stored in a room where temperature and humidity must be controlled.
(temperature 5 to 35℃, humidity 45 to 85% RH) However, a humidity keep it low, as it is possible.

(2) Chip resistor shall be stored as direct sunshine doesn’t hit on it.

(3) Chip resistor shall be stored with no moisture, dust, a material that will make solder ability inferior, and a harmful gas (Hydrogen chloride, sulfurous acid gas, and Hydrogen sulfide)

Care note for operating and handling

(1) It is necessary to protect the edge and protection coat of resistors from mechanical stress.

(2) Handle with care when printing circuit board (PCB) is divided or fixed on support body, because bending of printing circuit board (PCB) mounting will make mechanical stress for resistors.

(3) Resistors shall be used with in rated range shown in specification. Especially, if voltage more than specified value will be loaded to resistor, there is a case it will make damage for machine because of temperature rise depending on generating of heat, and increase resistance value or breaks.

(4) In case that resistor is loaded a rated voltage, it is necessary to confirms temperature of a resistor and to reduce a load power according to load reduction curve, because a temperature rise of a resistor depends on influence of heat from mounting density and neighboring element.

(5) Observe Limiting element voltage and maximum overload voltage specified in each specification.

(6) If there is possibility that a large voltage (pulse voltage, shock voltage) charge to resistor, it is necessary that operating condition shall be set up before use.