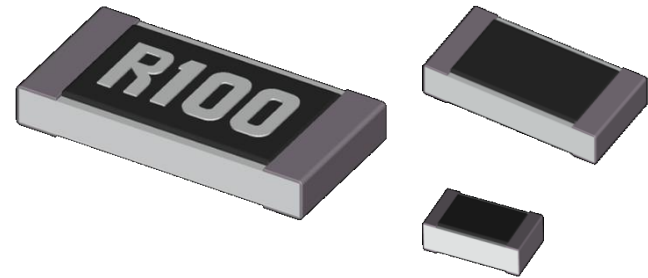


Thick Film Type Current Sensing Resistor (RUT Series)

■ Features

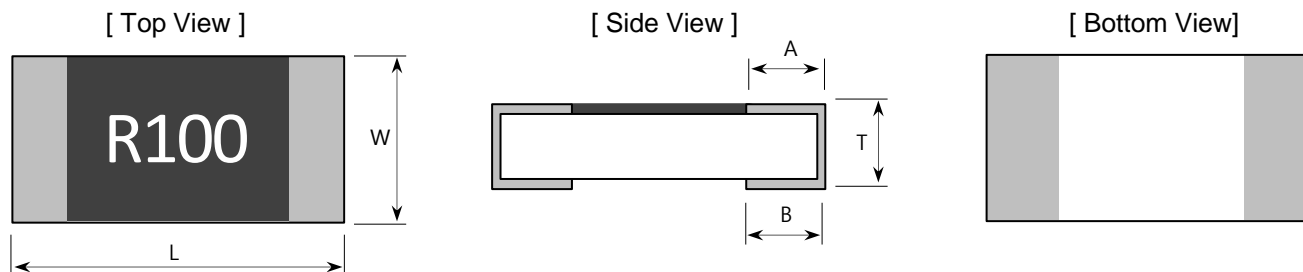
- Current Sensing Resistor
- Very low resistance with high precision reliability.
- Low T. C. R, High power.
- Stable in Sulfur Atmosphere. (Sulfur Resistant)
- 100% Lead Free Component.
- EU RoHS Compliant.



■ Part Number System

RUT		3216		F		R499		CS	
Type (Series)		Size : mm (inch)		Tolerance		Resistance Value		Packing Type	
RUT	Thick film low ohm chip resistor	1005	1.0×0.5mm (0402)	F	±1%	- 4-digit code System (E-24 series) - 4-digit code System (E-96 series) - R499 : 0.499Ω = 499mΩ		CS	7" reel
		1608	1.6×0.8mm (0603)	J	±5%			ES	10" reel
		2012	2.0×1.2mm (0805)					AS	13" reel
		3216	3.2×1.6mm (1206)						
		3225	3.2×2.5mm (1210)						
		5025	5.0×2.5mm (2010)						
		6432	6.4×3.2mm (2512)						

■ Structure and Dimensions



[Unit : mm]

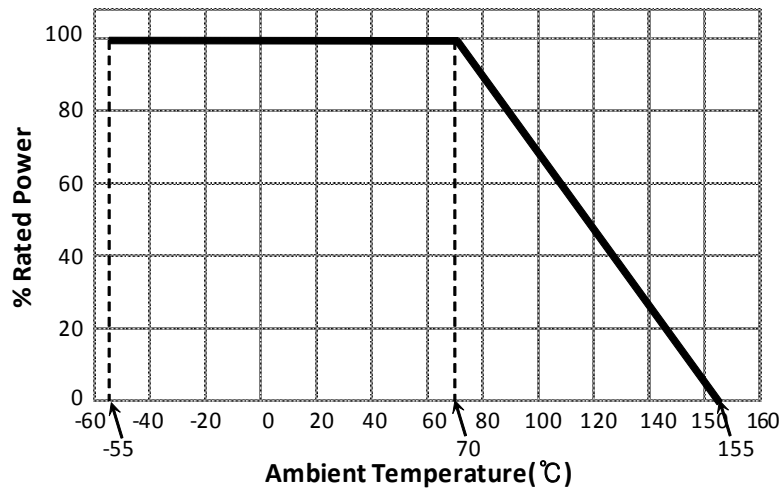
Size (mil)	L	W	T	A	B	Unit Weight
RUT1005 (0402)	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10	0.6mg
RUT1608 (0603)	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.35±0.10	2.1mg
RUT2012 (0805)	2.00±0.20	1.25±0.15	0.55±0.10	0.40±0.20	0.35±0.20	4,9mg
RUT3216 (1206)	3.20±0.20	1.60±0.15	0.55±0.10	0.45±0.20	0.40±0.20	9.5mg
RUT3225 (1210)	3.20±0.20	2.55±0.20	0.55±0.10	0.45±0.20	0.40±0.20	16mg
RUT5025 (2010)	5.00±0.20	2.50±0.20	0.55±0.10	0.60±0.20	0.60±0.20	26mg
RUT6432 (2512)	6.30±0.20	3.20±0.20	0.55±0.10	0.60±0.20	0.60±0.20	41mg

※ 1608 and smaller sizes don't have marking on the top of the chips

Application Characteristics

Type mm(mil)	Power Rating [W]	Tolerance [%]	Resistance Range [Ω]	T.C.R * [ppm/°C]	Working Temp. [°C]
RUT1005 (0402)	1/10(0.10)	F : ±1 J : ±5	0.100~0.976	±150	-55°C~ +155°C
RUT1608 (0603)	1/8(0.125)				
RUT2012 (0805)	1/4(0.25)				
RUT3216 (1206)	1/3(0.33)				
RUT3225 (1210)	1/2(0.50)				
RUT5025 (2010)	2/3(0.66)				
RUT6432 (2512)	1(1.0)				

Power Derating Curve



Jumper Ratings

Type	Rated Current [A]	Resistance [Ω]
1005	3A	0.010 Max
1608	4A	
2012	5A	
3216	6A	
6432	10A	

Rated Voltage

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

E : Rated Voltage (V)
 P : Rated Power (W)
 R : Resistance Value (Ω)

■ Rated Voltage

1. The rated voltage for resistor can be a DC continuous working voltage or AC(rms) voltage in commercial line frequency wave form at rated power. It can be expressed as below.

$$E = \sqrt{P \times R} \quad E : \text{Rated Voltage(V)} \quad P : \text{Rated Power(W)} \quad R : \text{Nominal Resistance(\Omega)}$$

If the value calculated by the equation exceeds Max working Voltage, the rated voltage is limited to max working voltage. In other words, the lower value is the rated voltage.

ex) For RC1608 Series [P=0.1(W), Max working voltage = 50(V)]

1) The rated voltage, when R=1K Ω

$$E = \sqrt{0.1 \times 1000} = 10(V)$$

Value is lower than Max working voltage,
therefore $E = 10(V)$

2) The rated voltage, when R=100K Ω

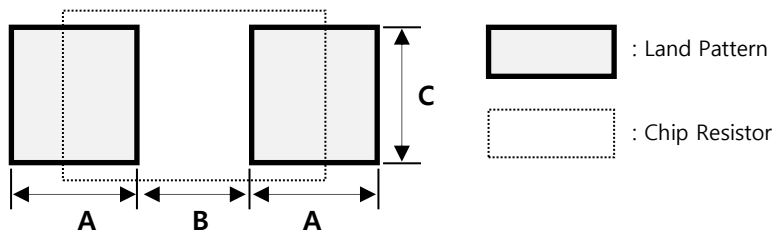
$$E = \sqrt{0.1 \times 100000} = 100(V)$$

Value is higher than Max working voltage,
therefore $E = 50(V)$

2. When the rated voltage is applied to the resistor, check the ambient temperature and decrease the lower according to the power derating curve.
3. If higher voltage than rated voltage, the reliability condition and performance cannot be guaranteed.

* If pulse wave is applied, the maximum pulse power should be below the rated voltage.

Standard Soldering Pad Dimensions



* PCB : FR4 (1.6t)

[Unit : mm]

Size (mil)	Reflow Soldering			
	A	B	2A + B	C
RUT1005 (0402)	0.60	0.50	1.70	0.50
RUT1608 (0603)	0.80	0.80	2.40	0.80
RUT2012 (0805)	0.90	1.40	3.20	1.20
RUT3216 (1206)	1.30	1.80	4.40	1.50
RUT3225 (1210)	1.30	1.80	4.40	2.40
RUT5025 (2010)	1.40	3.30	6.10	2.40
RUT6432 (2512)	1.40	4.60	7.40	3.00

■ Performance Characteristics

ITEM	Requirements Specification	Test Conditions (JIS C 5201-1)
	Resistors	
Resistance	Within the specified tolerance	JIS C 5201-1 4.5
Temperature Characteristic	$\Delta R \leq \pm 150\text{ppm}$	JIS C 5201-1 4.8 +20°C → -55°C / +20°C → +125°C
Short time Overload	$\Delta R < \pm 2\% + 0.0005\Omega$	JIS C 5201-1 4.13 Rated Voltage × 2.5, 5sec
Solderability	Immersed over 95%	JIS C 5201-1 4.17 Rosin Ethanol (25%WT) 245±5/-0°C, 2±0.5 sec
Resistance to Solder Heat	$\Delta R < \pm 1\% + 0.0005\Omega$	JIS C 5201-1 4.18 260±5°C, 10±1 sec
Temperature Cycle	$\Delta R < \pm 1\% + 0.0005\Omega$	JIS C 5201-1 4.19 -55°C ↔ +155°C, 100 cycle
Moisture Resistance	$\Delta R < \pm 2\% + 0.0005\Omega$	JIS C 5201-1 4.24 40±2°C, 90~95%RH, 1000 ⁺⁴⁸ hours
Load Life	$\Delta R < \pm 3\% + 0.0005\Omega$	JIS C 5201-1 4.25 Rated Voltage, 70±2°C, 1000 ⁺⁴⁸ hours 90mins ON, 30mins OFF
High Temp. Exposure	$\Delta R < \pm 3\% + 0.0005\Omega$	JIS C 5201-1 4.23 155±2°C, 1000 ⁺⁴⁸ hours
Flower of Sulfur (FOS)	$\Delta R < \pm 1\% + 0.0005\Omega$	105°C, FoS, 720 ⁺² hours

※ The reliability test condition can be replaced by the corresponding accelerated test condition.

 Product specifications included in the specifications are effective as of January 04, 2019.

Please be advised that they are standard product specifications for reference only.

We may change, modify or discontinue the product specifications without notice at any time.

So, you need to approve the product specifications before placing an order.

Should you have any question regarding the product specifications,

please contact our sales personnel or application engineers.