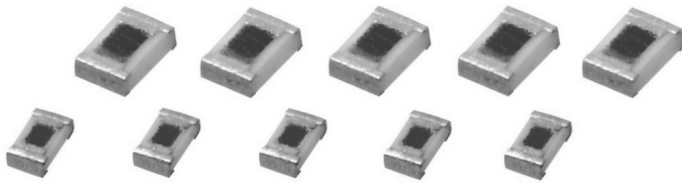




ELECTRO-MECHANICS

Thick Film Chip Resistors.

Rectangular type – Trimmable chip



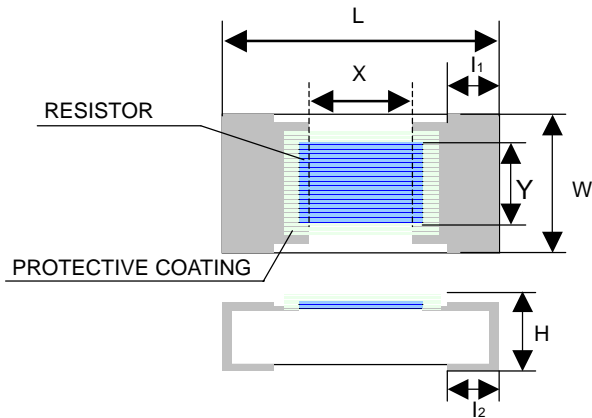
FEATURES

- Can be trimmed after SMD.
- Protective coating for resistor and YAG laser trimming.
- Both flow and reflow soldering are applicable.

APPLICATION

- Precision circuit where reliable tolerance in module by trimming.
- Available for User's exact resistance.

STRUCTURE AND DIMENSIONS



(UNIT : mm)

TYPE	inch	Power (W)	L	W	H	I ₁	I ₂	X	Y
RT1608	0603	1/10	1.60±0.10	0.80±0.15	0.45±0.10	0.30±0.20	0.35±0.20	0.50±0.10	0.40±0.10
RT2012	0805	1/8	2.00±0.20	1.25±0.15	0.50±0.10	0.40±0.20	0.35±0.20	0.70±0.10	0.62±0.10
RT3216	1206	1/4	3.20±0.20	1.60±0.15	0.55±0.10	0.45±0.20	0.40±0.20	1.30±0.10	1.00±0.10
RT3225	1210	1/4	3.20±0.20	2.55±0.20	0.55±0.10	0.45±0.20	0.40±0.20	1.40±0.10	2.00±0.10
RT5025	2010	1/2	5.00±0.15	2.50±0.15	0.55±0.15	0.60±0.20	0.60±0.20	2.40±0.10	1.70±0.10
RT6432	2512	1	6.30±0.15	3.20±0.15	0.55±0.15	0.60±0.20	0.60±0.20	3.30±0.10	2.30±0.10

PARTS NUMBERING SYSTEM

- The part number system shall be in the following format

RT	2012	M	100	CS
Code Designation	Dimension & Size Code	Tolerance	Resistance Value	Packaging Code
RT : Trimmable Chip	1608 : 1.6×0.8(mm)——0603(inch) 2012 : 2.0×1.2(mm)——0805(inch) 3216 : 3.2×1.6(mm)——1206(inch) 3225 : 3.2×2.5(mm)——1210(inch) 5025 : 5.0×2.5(mm)——2010(inch) 6432 : 6.4×3.2(mm)——2512(inch)	K : ± 10% L : ± 15% M : ± 20%	3 digits coding system (IEC coding system) (E-24 series)	GS: Bulk Packaging CS: Tape Packaging 7" ES: Tape Packaging 10" FS: Tape Packaging 13" AS: Tape Packaging 13"

■ SPECIFICATION

TYPE	Power Rating(W)	Working Voltage(MAX)	Overload Voltage(MAX)	TCR (ppm/°C)	Resistance Range (Ω)			Rated Ambient Temperature	Rated Working Temperature
					K(±10%) E-12	L(±15%) E-9	M(±20%) E-6		
RT1608	1/10	50(V)	100(V)	0 ≤ R ≤ 10Ω	1Ω-10MΩ	1Ω-10MΩ	1Ω-10MΩ	70°C	-55°C ~ +125°C
RT2012	1/8	150(V)	300(V)	±300ppm	1Ω-10MΩ	1Ω-10MΩ	1Ω-10MΩ		
RT3216	1/4	200(V)	400(V)	10Ω ≤ R ≤ 1MΩ	1Ω-10MΩ	1Ω-10MΩ	1Ω-10MΩ		
RT3225	1/4			±200ppm	1Ω-10MΩ	1Ω-10MΩ	1Ω-10MΩ		
RT5025	1/2			1MΩ ≤ R ≤ 10MΩ	1Ω-10MΩ	1Ω-10MΩ	1Ω-10MΩ		
RT6432	1			±300ppm	1Ω-10MΩ	1Ω-10MΩ	1Ω-10MΩ		

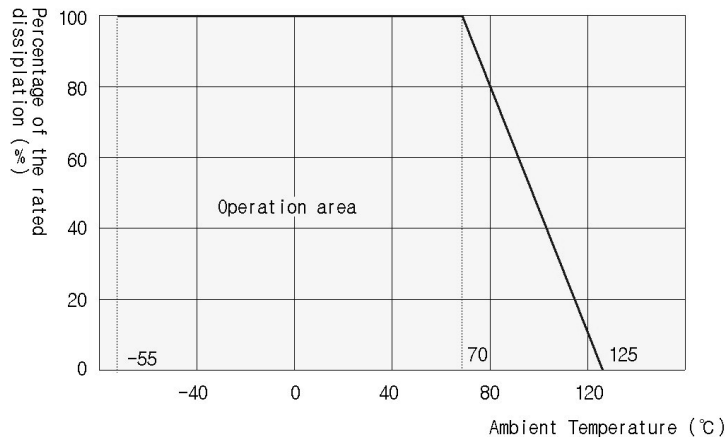
• Rated voltage (V) = $\sqrt{\text{Rated power (W)} \times \text{Normal resistance value (R)}}$

Rated voltage should be lower than (MAX) working voltage.

■ POWER DERATING CURVE

The rated power is the maximum continuous loading power at 70°C ambient temperature.

For ambient temperature above 70°C, the loading power follows the below power derating curve.



■ TRIMMING APPLICATIONS

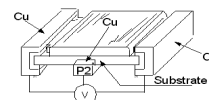
- Laser M/C should be required for trimming after mounted trimmable chip resistor on top of P. C. B. to use of proper resistance.
- Please be consider more carefully for cutting shape that has various resistance rates when trimming.

Single Cut	L-Cut	Double Plunge Cut	Serpentine Cut
<p>W : Width of resistor</p>			
<ul style="list-style-type: none"> - Basic trimming - High speed 	<ul style="list-style-type: none"> - More accuracy - Even power dissipation 	<ul style="list-style-type: none"> - High trim resolution - Cut 1 is longer than cut 2 	<ul style="list-style-type: none"> - Capable of a wide range - Many hot spot cause poor power handling.

■ CHARACTERISTICS PERFORMANCE

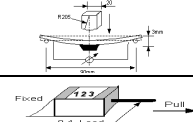
• Electrical Characteristic

Item		Requirements Specification	Test Methods
Direct Current Resistance		Within the regulated resistance tolerance.	JIS C 5202 (5.1) Voltage apply within 5 sec.
Temperature Characteristic		$1\Omega \leq R < 10\Omega$: +300 ppm/°C -200 ppm/°C $10\Omega \leq R < 1M\Omega$: ±200 ppm/°C $1M\Omega \leq R < 10M\Omega$: ±300 ppm/°C	Test Temperature(°C) 20 → -55 → 20 → 125 → 20 $T.C.R(ppm/°C) = (R - R_{20} / R_{20}) \times 1 / (T / T_{20}) \times 10^6$ * T=Test Temperature, T ₂₀ =20°C R=Resistance at T, R ₂₀ =Resistance at T ₂₀
Short-time Overload	ΔR	Less than ±(1%+0.1Ω)of the initial value.	Apply 2.5 times rated voltage for 5 sec. Wait 30 minutes at room temperature. Measure the resistance value.
	Visual	No evidence of mechanical damage.	
Intermittent Overload	ΔR	Less than ±(3%+0.1Ω)of the initial value.	2.5 times of rated voltage. 1 second ON, 25 second OFF. 10000cycles.
	Visual	No evidence of mechanical damage.	
Dielectric Withstanding Voltage		No evidence of mechanical damage.	Apply voltage for 1 minute.
Insulation Resistance		Over 1,000MΩ	1608 : 100V Others : 500V



• Mechanical Characteristic

Item		Requirements Specification	Test Methods
Solderability		Coverage : ≥95% each termination.	Rosin Flux : Rosin 25%, Methanol 75% Solder Temp. : 235± 5°C Dipping time : 2± 0.5sec.
Bending Test	ΔR	Less than ±(0.5%+0.05Ω)of the initial value.	After soldering resistor on the PCB, 3mm of bending shall be applied for 10 sec.
	Visual	No evidence of mechanical damage.	
Terminal Strength		1608 : Over 0.3kg Others : Over 0.5kg	Pull direction fixed 0.4 lead.
Resis. to Soldering H.	ΔR	Less than ±(1%+0.05Ω)of the initial value.	Immerse in molten solder at 260°C for 10±1sec. Preheat and soldering Procedure.
	Visual	No evidence of mechanical damage.	
Anti-Vibration Test	ΔR	Less than ±(1%+0.1Ω)of the initial value.	2 hours each in X,Y, and Z axis(total 6 hours) 10 to 55 Hz sweep in 1 minute at 1.5mm amplitude.
	Visual	No evidence of mechanical damage.	



• Environmental Characteristic

Item		Requirements Specification	Test Methods
Temperature Cycle	ΔR	Less than ±(1%+0.1Ω)of the initial value.	Test Temperature(°C) : -55 → 20 → 125 → 20 Test Time (minute) : 30 → 15 → 30 → 15
	Visual	No evidence of mechanical damage.	
Load Life	ΔR	Less than ±(3%+0.1Ω)of the initial value.	Test Voltage : rated voltage Temp : 70 ± 3°C Time : 1,000 ⁺⁴⁸ hours (90min ; ON, 30min ; OFF)
	Visual	No evidence of mechanical damage.	
Low Temp. Exposure	ΔR	Less than ±(3%+0.1Ω)of the initial value.	Dwell in -55°C chamber without loading for 1,000 ⁺⁴⁸ hours. Stabilize for 60 minute at room temperature. Measure value.
	Visual	No evidence of mechanical damage.	
High Temp. Exposure	ΔR	Less than ±(3%+0.1Ω)of the initial value.	Dwell in 125°C chamber without loading for 1,000 ⁺⁴⁸ hours. Stabilize for 60 minute at room temperature. Measure value.
	Visual	No evidence of mechanical damage.	
Moisture Resistance	ΔR	Less than ±(3%+0.1Ω)of the initial value.	Test voltage : rated voltage Test Temp. : 40±2°C Time : 1,000 ⁺⁴⁸ hours (90min:ON,30min:OFF) Humidity : 90~95% RH Stabilize for 1hrs & Measure.
	Visual	No evidence of mechanical damage.	