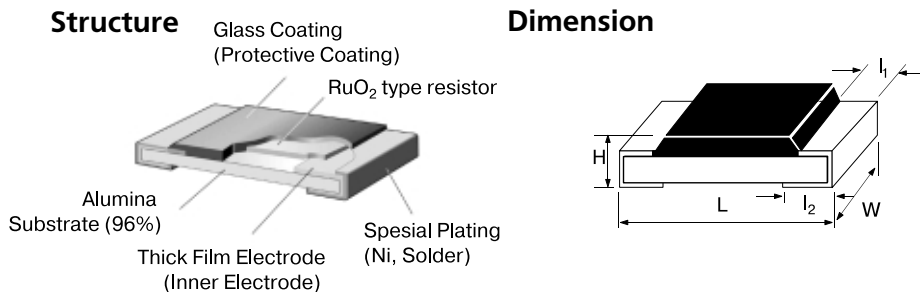


Thick Film Chip Resistors Rectangular type - General purpose

Structure and Dimensions

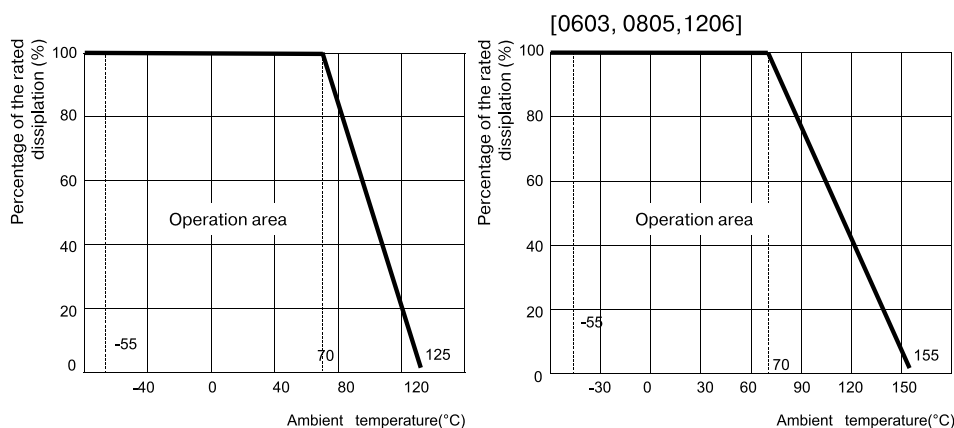


(Unit: mm)

inch	Power (W)	L	W	H	l ₁	l ₂	Unit Weight
0201	1/20	0.60±0.03	0.30±0.03	0.23±0.5	0.15±0.05	0.15±0.05	0.16mg
0402	1/16	1.00±0.05	0.50±0.05	0.35±0.5	0.20±0.10	0.25±0.10	0.6mg
0603	1/10	1.60±0.10	0.80±0.15	0.45±0.10	0.30±0.20	0.35±0.20	2.1mg
0805	1/8	2.00±0.20	1.25±0.15	0.50±0.10	0.40±0.20	0.35±0.20	4.9mg
1206	1/4	3.20±0.20	0.60±0.15	0.55±0.10	0.45±0.20	0.40±0.20	9.5mg
1210	1/4	3.20±0.20	2.55±0.20	0.55±0.10	0.45±0.20	0.40±0.20	16mg
2010	1/2	5.00±0.15	2.50±0.15	0.55±0.15	0.60±0.20	0.60±0.20	26mg
2512	1	6.30±0.15	3.20±0.15	0.55±0.15	0.60±0.20	0.60±0.20	41mg

Power Derating Curve

The rated power 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. (The load current shall be derated according to Derating curve in case of the 'Jumper')



Marking

* 3 digits indication (E-24, E-12 series)

- Left 2 digits represent significant figures.
- Last 1 digit represent exponential number of 10.
- Example: 103
Left 2 digits: 10
Last 1 digit: 3
 $103 = 10 \times 10^3 \Omega = 10000\Omega = 10k\Omega$



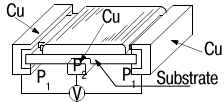
* 4 digits indication (E-48 series)

- Left 3 digits represent significant figures.
- Last 1 digit represent exponential number of 10.
- Example: 1002
Left 3 digits: 100
Last 1 digit: 2
 $1002 = 100 \times 10^2 \Omega = 10000\Omega = 10k\Omega$

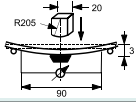
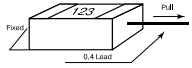


Characteristics Performance

Electrical Characteristics

Item	Requirements Specification		Test Methods		
	Resistor	Jumper	Resistor	Jumper	
Direct Current Resistance	Within the regulated resistance tolerance		JIS C 5202 (5.1) Voltage apply within 5 sec.		
Temperature Characteristic	$1\Omega \leq R < 10\Omega$: +300ppm/°C -200 ppm/°C $10\Omega \leq R < 1M\Omega$: ±200 ppm/°C $1M\Omega \leq R < 10M\Omega$: ±300ppm/°C		Test Temperature (°C) 20 → -55 → 20 → 125 → 20 T.C.R(ppm/°C)=(R-R ₂₀ /R ₂₀)x1/(T/T ₂₀)x10 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.	50mΩ max.	Apply 2.5 times rated voltage for 5 sec. Wait 30 minutes at room temperature. Measure the resistance value.	2A for 5 sec. Wait 30 min. Measure.
	Visual	No evidence of mechanical damage.			
Intermittent Overload	ΔR	Less than ±(3%+0.1Ω) of the initial value.	50mΩ max.	2.5 times of rated voltage.1 second ON, 25 second OFF.10,000 cycles.	Applying 2A
	Visual	No evidence of mechanical damage.			
Dielectric Withstanding Voltage	No evidence of mechanical damage.		Apply voltage for 1 minute. 0603, 1005, 1608: 100V Others: 500V		
Insulation Resistance	Over 1,000 MΩ				

Mechanical Characteristics

Item	Requirements Specification		Test Methods		
	Resistor	Jumper	Resistor	Jumper	
Solderability	Coverage: ≥95% each termination		Rosin Flux: Rosin 25%, Methanol 75 % Solder Temp.: 235±5°C Dipping time 2±0.5 sec.		
Bending Test	ΔR	Less than ±(0.5%+0.05Ω) of initial value.	50mΩ max.	After Soldering resistor on the PCB, 3 mm of bending shall be applied for 10 sec.	
	Visual	No evidence of mechanical damage.			
Terminal Strength	0603, 1005, 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 initial value.	50mΩ max.	Immerse in molten solder at 260°C for 10±1 sec. Preheat and soldering Procedure.	
	Visual	No evidence of mechanical damage.			
Anti-Vibration Test	ΔR	Less than ±(1%+0.1Ω) of initial value.	50mΩ max.	2 hours each in X, Y, and Z axis (total 6 hours) 10 to 55 Hz sweep in 1 minute at 1.5 mm amplitude.	
	Visual	No evidence of mechanical damage.			

Environmental Characteristics

Item	Requirements Specification		Test Methods		
	Resistor	Jumper	Resistor	Jumper	
Temperature Cycle	ΔR	Less than ±(1%+0.1Ω) of initial value.	50mΩ max.	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 initial value.	50mΩ max.	Test Voltage: rated voltage Temp: 70±3°C Time: 1,000 ⁺⁴⁸ hours (90 min: ON, 30 min: OFF)	
	Visual	No evidence of mechanical damage.			
Low Temp. Exposure	ΔR	Less than ±(3%+0.1Ω) of initial value.	50mΩ max.	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 initial value.	50mΩ max.	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 initial value.	50mΩ max.	Test Voltage: rated voltage Test Temp: 40±2°C Time: 1,000 ⁺⁴⁸ hours (90 min: ON, 30 min: OFF) Humidity: 90-95% RH Stabilize for 1 hrs & Measure.	
	Visual	No evidence of mechanical damage.			