

**Thick Film Chip Resistor - Metal Strip
Type MSR Series**

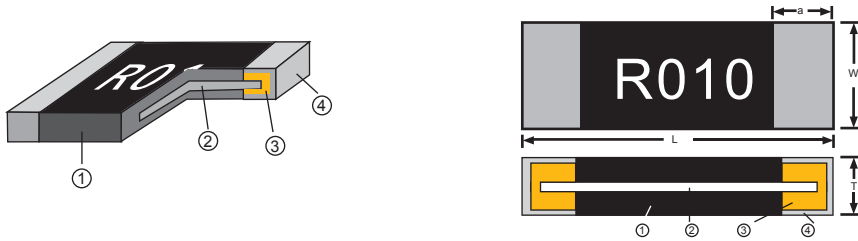
Δ Features

- High power rating and low TCR.
- Inductance less than 1.0nH.
- Low resistance and high precision (1%).
- Excellent reliability and reasonable cost.
- Suitable for lead free soldering.

Δ Applications

- Switching Power Supply
- Power Amplifier
- Medical Equipment
- Telecom Equipment
- Consumer Electronics

Δ Dimension and Construction

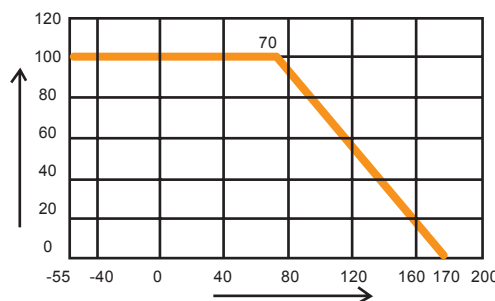


Type	1. Protective Coating	2. Resistive Element	3. Terminal	4. Outer Terminal
	Resin	Alloy Metal	Copper	Tin Plating

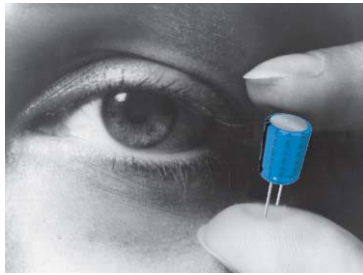
Type	L	W	T	a
1m,2m	6.20+/-0.25	3.20+/-0.25	0.70+/-0.20	2.0+/-0.30
3m~25m	6.20+/-0.20	3.20+/-0.20	0.60+/-0.20	0.80+/-0.20

Δ Power Derating Curve

Operating Temperature Range: -55 to +170 deg.C



Ambient Temperature (deg.C)



Thick Film Chip Resistor - Metal Strip
Type MSR Series

Δ Rating

Type	Power Rating at 70 °C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient (TCR; ppm/°C)	Resistance Range (mΩ)
FMF25	1W	158mV	316mV	± 1%(F)	± 100	1,2,3,4,5
				± 5%(J)	± 70	7,10,12,15,18,20,25
	2W	224mV	418mV	± 1%(F)	± 100	1,2,3,4,5
				± 5%(J)	± 70	7,10,12,15,18,20,25

Δ How to Order

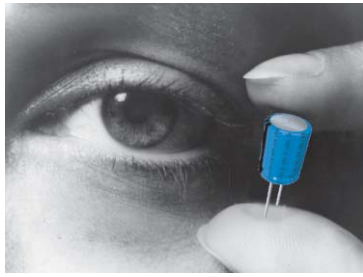
Part Number

example	MSR	2512	T	J	D001	H	LF
	Type	Size	Packing	Tolerance	Resistance Value	Wattage	
	MSR	2512	T: Tape	F: ±1% J: ±5%	506 = 50x10 ⁶ = 50M Ω	H: 1W J: 2W	LF = Lead Free

Δ Resistance Marking



R001 = 1mΩ
R020 = 20mΩ



Thick Film Chip Resistor - Metal Strip
Type MSR Series

Δ Rating

ITEM	SPECIFICATION	TEST METHOD
DC Resistance	F± 1% , J :± 5%	IEC 60115-1 4.5 / JIS C 5202 5.1 Measure the resistance value.
Short time Overload	□ R□±(1%+0.5mΩ)	IEC 60115-1 4.13 / JIS C 5202 5.5 5 X Rated voltage for 5 sec. measure resistance after 30 minutes
Solderability	Over 95% of termination must be covered with solder	IEC 60115-1 4.17 / JIS C 5202 6.5 After immersing flux, dip in the 245 ± 2 °C molten solder bath for 3 ± 0.5 sec.
Resistance to Solder Heat	□ R□± (1% + 0.5mΩ) No mechanical damage	IEC 60115-1 4.18 / JIS C 5202 6.4 With 260 ± 5 °C for 10 ± 1 sec.
Temperature Coefficient of Resistance (TCR)	1mΩ~ 5mΩ : ±100 ppm/°C 7mΩ~2.5mΩ : ±70 ppm/°C	IEC 60115-1 4.8.4.2 / JIS C 5202 5.2 Test temperature : 25 °C(T1)→ -55°C(T2) 25°C(T1)→ 125°C(T2) $TCR (ppm/^{\circ}C) = \frac{R2-R1}{R1} \times \frac{1}{T2-T1} \times 10^6$ T1: 25°C T2: Test temperature R1: Resistance at reference temperature (T1) R2: Resistance at test temperature (T2)
Load Life Humidity	□ R□±(1 %+0.5mΩ)	IEC 60115-1 4.24.2 / JIS C 5202 7.9 Maintain the temperature of the resistor at 40 ± 2 °C and 90~95% R.H. with the rated voltage applied. Cycle ON for 1.5 hours and OFF for 0.5 hour for 1000+48/-0 hours. After 1~4 hour, measure the resistance value.
Load Life	□ R□±(1 %+0.5mΩ)	IEC 60115-1 4.25.1 / JIS C 5202 7.10 Permanent resistance change after 1000+48/-0 hours (1.5 hours ON , 0.5 hour OFF) at RCWV or Max. Keep the resistor at 70 ± 2 °C ambient
Temperature Cycle	□ R□± (1% + 0.5mΩ) No mechanical damage	IEC 60115-1 4.19 / JIS C 5202 7.4 Repeat 5 cycles as follows -55°C(30 min.) ~ +25 °C(2~3 min.) +125°C(30 min.) ~ +25 °C(2~3 min.)
Insulation Resistance	Between termination and coating must be over 1000M Ω	IEC 60115-1 4.6.1.1 / JIS C 5202 5.6 Test voltage: 100 ± 15V
Bending Strength	□ R□± (1% + 0.5mΩ) No mechanical damage	IEC 60115-1 4.33 Resistance change after bended on the 90mm PCB. Bend: 2mm

Surface Mount Resistors