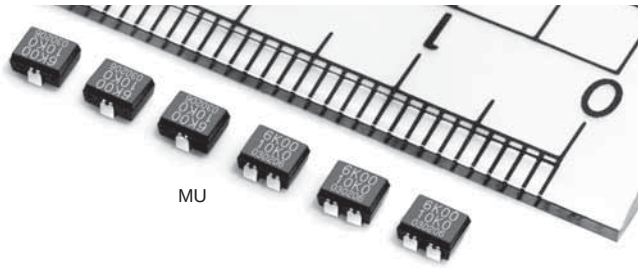
Ultra-Precision SMT Resistor 1-2-3 Network (Molded, J-Lead Terminal)



Patent Pending

Composition of Type Number

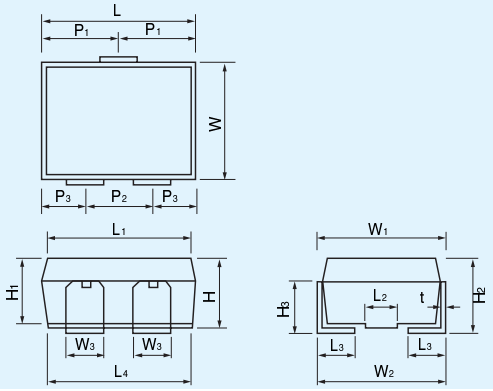
Example:

MU 1K000/ 10K00 B Q L

① ② ③ ④ ⑤ ⑥

① Type
② Nominal Resistance Values (R1)
③ Nominal Resistance Values (R2)
④ Tolerance (Absolute)
⑤ Tolerance (Matching)
⑥ Tape & Reel Package Being Required

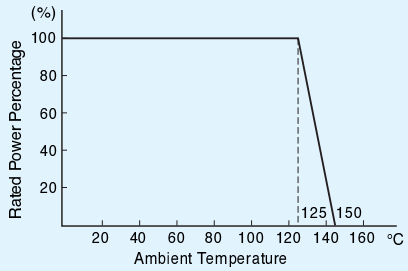
Configuration



L	W	H	H1	H2	H3	P1	P2	P3
3.2 ±0.2	2.5 ±0.2	1.5 ±0.2	1.4 ±0.2	1.6 ±0.2	1.1 ±0.2	1.6 ±0.1	1.4 ±0.1	0.9 ±0.1
W1	W2	W3	L1	L2	L3	L4	t	
2.7 ±0.2	2.7 ±0.2	0.8 ±0.1	3.0 ±0.2	0.7 ±0.2	0.8 ±0.1	3.0 ±0.2	0.1 ±0.05	

Dimensions in mm

Power Derating Curve



Resistance Range, Tolerance, Rated Power

Type	Resistance Range Element	Resistance Tolerance		Rated Power Element (W) at 125°C
		Absolute	Matching	
MU	10Ω≦R<100Ω	±0.1% (B) ±0.5% (D)	±0.05% (A) ±0.1% (B) ±0.5% (D)	0.05
	100Ω≦R<1kΩ	±0.05% (A) ±0.1% (B) ±0.5% (D)	±0.02% (Q) ±0.05% (A) ±0.1% (B) ±0.5% (D)	
	1kΩ≦R<20kΩ	±0.02% (Q) ±0.05% (A) ±0.1% (B) ±0.5% (D)	±0.01% (T) ±0.02% (Q) ±0.05% (A) ±0.1% (B) ±0.5% (D)	

Symbols in parentheses are for type number composition.
Please contact us for the availibility combination of resistance values.

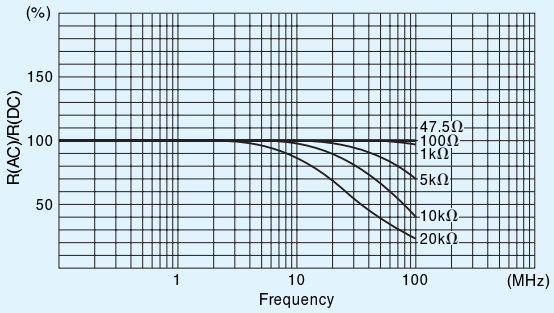
Absolute TCR

Resistance Range (Ω)	Absolute TCR (ppm/°C) -55C to +125°C
10Ω≦R<30Ω	±15
30Ω≦R<100Ω	±10
100Ω≦R<20kΩ	±5

TCR Tracking

Resistance Ratio	TCR Tracking (ppm/°C) -55°C to +125°C
Ratio=1	±1
1<Ratio≦10	±2
10<Ratio≦100	±3
100<Ratio	±5

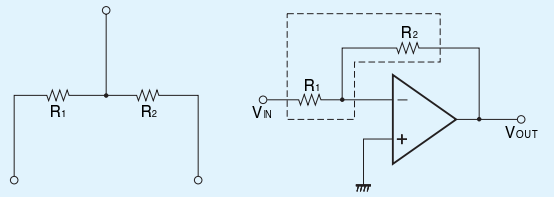
Frequency Characteristics



Example of Applications

An Application of Type MU (input/feedback resistors for amplifiers)

Because the input and the feedback resistors are incorporated into one single element, amplification is not affected by temperature change.

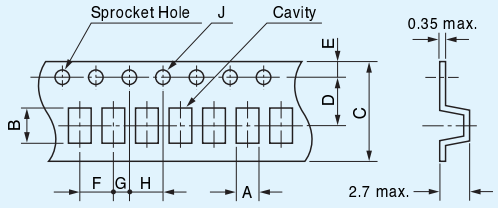


Performance

Parameters	Test Condition	ALPHA Specification		ALPHA Typical Test Data	
		ΔR	ΔRatio	ΔR	ΔRatio
Maximum Rated Operating Temperature Working Temperature Range		125°C -65°C to +150°C			
Thermal Shock Overload	-65°C/30 min.⇔ +150°C/30 min., 5 cycles Rated Voltage x 2.5, 5 sec.	±0.05% ±0.05%	±0.02% ±0.02%	±0.01% ±0.01%	±0.005% ±0.005%
Low Temperature Storage and Operation Substrate Bending Test	-65°C, No Load, 24 hrs.→ Rated Voltage, 45 min. 3mm Bend 60 sec.	±0.05% ±0.05%	±0.02% ±0.02%	±0.01% ±0.01%	±0.005% ±0.005%
Dielectric Withstanding Voltage Insulation Resistance Resistance to Soldering Heat Moisture Resistance	Atmospheric: AC 200V, 1 min. DC 100V, 1 min. 260°C, 10 sec. +65°C to -10°C, 90% to 98% RH, Rated Power, 10 cycles (240 hrs.)	±0.01% over 10,000MΩ ±0.05% ±0.05%	±0.01% ±0.02% ±0.02%	±0.005% over 10,000MΩ ±0.01% ±0.03%	±0.0025% ±0.005% ±0.01%
Shock Vibration, High Frequency	100G, 6ms, Sawtooth Wave, X, Y, Z, each 10 shocks 20G, 10Hz to 2,000Hz to 10Hz, 20 min., X, Y, Z, each 2.5 hrs.	±0.02% ±0.02%	±0.01% ±0.01%	±0.01% ±0.01%	±0.005% ±0.005%
Life	125°C, Rated Power, 1.5 hrs. – ON, 0.5 hrs. – OFF, 2,000 hrs.	±0.05%	±0.02%	±0.03%	±0.015%
Storage Life	15°C to 35°C, 15% to 75% RH, No Load, 10,000 hrs.	±0.005%	±0.0025%	±0.0025%	±0.0015%
High Temperature Exposure	150°C, No Load, 2,000 hrs.	±0.05%	±0.02%	±0.02%	±0.01%

Tape and Reel Package (based on EIA-481-1)

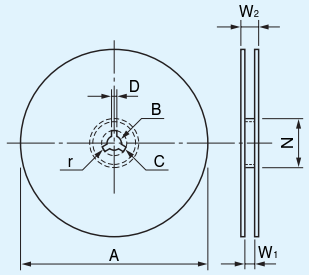
Tape Dimensions



Type	A	B	C	D	E	F	G	H	J
MU	3.6 ±0.2	3.1 ±0.2	12.0 ±0.3	5.5 ±0.05	1.75 ±0.1	8.0 ±0.1	2.0 ±0.05	4.0 ±0.1	ϕ1.5 +0.1-0

Dimensions in mm

Reel Dimensions



A	N	B	C	D	W1	W2	r
ϕ178 ±2	ϕ60 min.	ϕ13 ±0.5	ϕ21 ±0.8	2 ±0.5	12.4 +2.0-0	18.4 max.	1.0 ±0.5

Reel Capacity: 800 pieces/reel

Dimensions in mm

Precaution in Using Face-Bonded Chip Resistor

1. Storage

Storage condition or environment may adversely affect solderability of the exterior terminals. Do not store in high temperature and humidity. The recommended storage environment is lower than 40°C, has less than 70% RH humidity and free is from harmful gases such as sulphur and chlorine.

2. Caution in Soldering

❶ Hand Soldering

Hand soldering is applicable as shown at right.

Recommended
- Temp. of Iron Tip: 300°C max.
- Power of Iron: 20W or less
- Diameter of Tip: dia. 3mm max.

❷ Solder Reflow in Furnace

Recommended
- Peak Temperature: 245°C
- Holding time: 220°C (40sec.max.)
- To cool gradually at room temperature

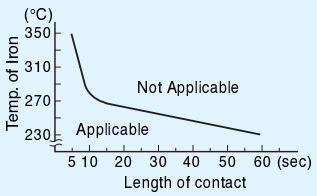
❸ Dipping in Solder (Wave or Still)

Recommended
- Temp. of Solder: 240°C to 250°C
- Length of Dipping: 3 to 4 seconds
- To cool gradually at room temperature

❹ Other

Corrosion-free flux, such as rosin, is recommended.

Do not apply pressure to the molded housing immediately after soldering.

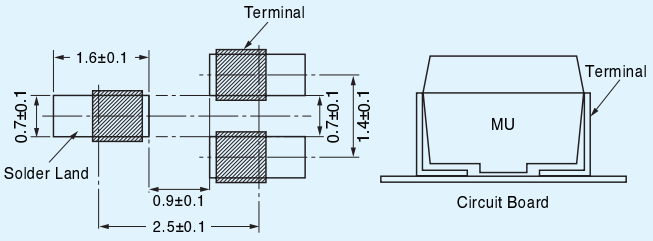


3. Cleaning

Use volatile cleaner such as methylalcohol or propylalcohol.

4. Circuit Board Design

The dimensions of solder land must be determined in conformity with the size of resistors and with the soldering method. They are also subject to the mounting machine and the material of the substrate. See example below.



Dimensions in mm

When parts are mounted on a board in high density, solder can possibly attach to the resistors in an excessive amount to affect peformance or reliability of the resistors. To prevent this effect, the use of solder resist is recommended to isolate solder lands.