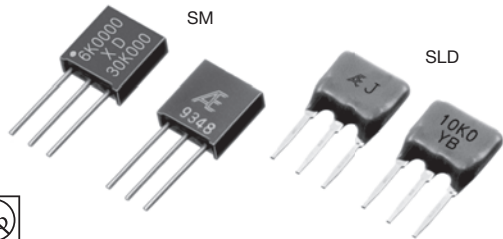


Ultra Precision Resistor 1-2-3 Network



RoHS  
COMPLIANT

DSCC Specification 87026

COMPOSITION OF TYPE NUMBER

Example: R<sub>1</sub>≠R<sub>2</sub>

SM 1X 10K00 B A

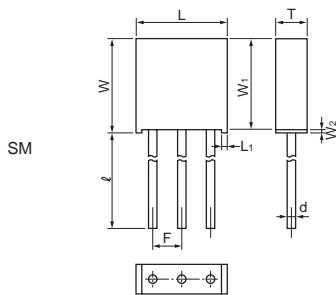
Example: R<sub>1</sub>≠R<sub>2</sub>

SLD 2X 1K000 / 10K00 B Q

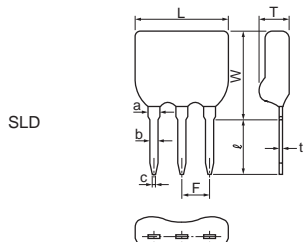
- ① Type
- ② Number of Values
- ③ TCR Absolute
- ④ Nominal Resistance Values
- ⑤ Resistance Tolerance (Absolute)
- ⑥ Resistance Tolerance (Matching)

Resistance value, in ohm, is expressed by a series of five characters, four of which represent significant digits. The fifth R or K is a dual-purpose letter that designates both the value range (R for ohmic; K for kilo-ohm) and the location of decimal point.

CONFIGURATION (DIMENSIONS IN mm)



Type	SM
L	7.7±0.2
L <sub>1</sub>	1.0 max.
W	8.1±0.2
W <sub>1</sub>	7.8±0.2
W <sub>2</sub>	0.3 max.
T	2.6±0.2
F	2.54±0.25
l	10±3
d	φ 0.65±0.05



Type	SLD
L	7.5±0.5
W	7.5±0.5
T	2.2±0.5
F	2.54±0.25
l	5±1
t	0.3±0.05
a	1.0±0.05
b	0.65±0.05
c	0.4±0.05

TCR, RESISTANCE RANGE, TOLERANCE, RATED POWER

Type	TCR (ppm/°C) -55°C to +125°C**		Resistance Range/ Element (Ω)***	Resistance Tolerance (%)		Rated Power/ Package (W)
	Absolute*	Tracking		Absolute*	Matching*	
SM	0±5 (X) 0±2.5 (Y)	See Table 1	50 to 30k	±0.02 (Q) ±0.05 (A) ±0.1 (B)	±0.01 (T) ±0.02 (Q) ±0.05 (A) ±0.1 (B)	0.3 at 125°C
SLD	0±5 (X) 0±2.5 (Y)	See Table 1	50 to 100	±0.1 (B) ±0.5 (D)	±0.05 (A) ±0.1 (B)	0.25 at 70°C
			100 to 30k	±0.05 (A) ±0.1 (B)	±0.02 (Q) ±0.05 (A) ±0.1 (B)	

\* Symbols parenthesized are for type number composition.

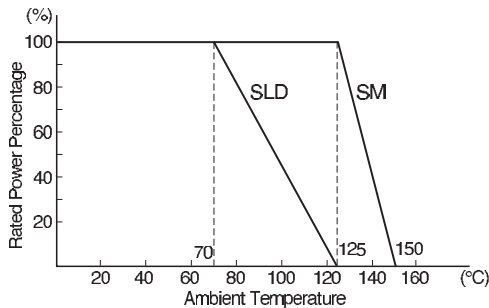
\*\* -25°C to +125°C for SLD type.

\*\*\* Please contact us for the availability.

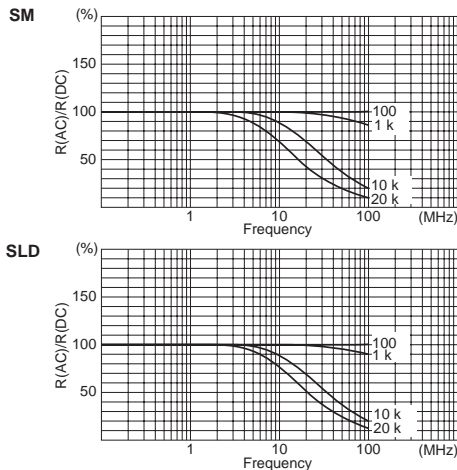
TABLE 1.  
TCR TRACKING IS SUBJECT TO RESISTANCE RATIO

Resistance Ratio	TCR Tracking (ppm/°C)
Resistance Ratio = 1	±0.5
1 < Resistance Ratio ≤ 10	±1
10 < Resistance Ratio ≤ 100	±2
100 < Resistance Ratio	±3

POWER DERATING CURVE



FREQUENCY CHARACTERISTICS



PERFORMANCE – SM					
Parameters	Test Condition	ALPHA Specification		ALPHA Typical Test Data	
		$\Delta R$	$\Delta \text{Ratio}$	$\Delta R$	$\Delta \text{Ratio}$
Maximum Rated Operating Temperature		125°C			
Working Temperature Range		–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.	±0.02%	±0.01%	±0.005%	±0.0025%
Solderability	245°C, 5 sec.	over 95% coverage		over 95% coverage	
Resistance to Solvents	① Isopropyl Alcohol + Mineral Spirits ② Water + Butyl Cellosolve + Monoethanolamine	no damage		no damage	
Low Temperature Storage and Operation	–65°C, No Load, 24 hrs. → Rated Voltage, 45 min.	±0.05%	±0.02%	±0.0025%	±0.001%
Terminal Strength	0.908 kg (2 pounds), 10 sec.	±0.02%	±0.01%	±0.0025%	±0.001%
Dielectric Withstanding Voltage	Atmo. Pres.: AC 300V, 1 min. Baro. Pres.: 1066 Pa; AC 200V, 1 min.	±0.02%	±0.01%	±0.0025%	±0.001%
Insulation Resistance	DC 500V, 2 min.	over 10,000 MΩ		over 10,000 MΩ	
Resistance to Soldering Heat	350°C, 3 sec.	±0.02%	±0.01%	±0.0025%	±0.001%
Moisture Resistance	+65°C to –10°C, 90% RH to 98% RH, Rated Voltage, 10 cycles (240 hrs.)	±0.05%	±0.02%	±0.02%	±0.01%
Shock	100G, 6 ms, Sawtooth Wave, X, Y, Z, each 10 shocks	±0.01%	±0.005%	±0.0025%	±0.001%
Vibration, High Frequency	20G, 10 Hz to 2,000 Hz to 10 Hz, 20 min., X, Y, Z, each 2.5 hrs.	±0.02%	±0.01%	±0.0025%	±0.001%
Life	125°C, Rated Power, 1.5 hr. – ON, 0.5 hr. – OFF, 2,000 hrs.	±0.05%	±0.02%	±0.015%	±0.005%
Storage Life	15°C to 35°C, 15% RH 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%	±0.015%	±0.005%
Current Noise		–32 dB		–42 dB	
Voltage Coefficient		0.0005%/V		0.00003%/V	
Thermal EMF		1.0 $\mu\text{V}/^\circ\text{C}$		1.0 $\mu\text{V}/^\circ\text{C}$	

PERFORMANCE – SLD					
Parameters	Test Condition	ALPHA Specification		ALPHA Typical Test Data	
		$\Delta R$	$\Delta \text{Ratio}$	$\Delta R$	$\Delta \text{Ratio}$
Maximum Rated Operating Temperature		70°C			
Working Temperature Range		–25°C to +125°C			
Temperature Cycling	–25°C/30 min., Room Temperature/5 min., 125°C/30 min., 5 cycles	±0.05%	±0.01%	±0.01%	±0.005%
Overload	Rated Voltage x 2.5, 5 sec.	±0.05%	±0.01%	±0.0025%	±0.001%
Solderability	235°C, 2 sec.	over 75% coverage		over 75% coverage	
Resistance to Solvents	Isopropyl Alcohol	no damage		no damage	
Low Temperature Operation	–25°C, No Load, 2 hrs.	±0.05%	±0.01%	±0.0025%	±0.001%
Terminal Strength	0.908 kg (2 pounds), 10 sec.	±0.05%	±0.01%	±0.0025%	±0.001%
Dielectric Withstanding Voltage	Atmo. Pres.: AC 300V, 1 min.	±0.03%	±0.01%	±0.0025%	±0.001%
Insulation Resistance	DC 100V, 1 min.	over 10,000 MΩ		over 10,000 MΩ	
Resistance to Soldering Heat	350°C, 3 sec.	±0.03%	±0.01%	±0.0025%	±0.001%
Moisture Resistance	+65°C to –10°C, 90% RH to 98% RH, Rated Voltage, 10 cycles (240 hrs.)	±0.1%	±0.05%	±0.03%	±0.01%
Shock	50G, 11 ms, Half-Sine Wave, X, Y, Z, each 3 shocks	±0.03%	±0.01%	±0.005%	±0.001%
Vibration	20G, 10 Hz to 55 Hz to 10 Hz, 1 min., X, Y, Z, each 2 hrs.	±0.03%	±0.01%	±0.005%	±0.001%
Life (Rated Load)	70°C, Rated Power, 1.5 hr. – ON, 0.5 hr. – OFF, 1,000 hrs.	±0.1%	±0.05%	±0.01%	±0.005%
Life (Moisture Load)	40°C 90% RH to 95% RH, Rated Power 1.5 hrs – ON, 0.5 hr. – OFF, 1,000 hrs.	±0.05%	±0.01%	±0.01%	±0.005%
Storage Life	15°C to 35°C, 15% RH to 75% RH, No Load, 10,000 hrs	±0.02%	±0.01%	±0.005%	±0.0025%
High Temperature Exposure	125°C, No Load, 1,000 hrs.	±0.05%	±0.01%	±0.01%	±0.005%

### EXAMPLE OF APPLICATION

An application of type SM/SLD (input/feedback resistors for amplifiers) Because the input and the feedback resistors are incorporated into one single element, amplification is not affected by temperature range.

