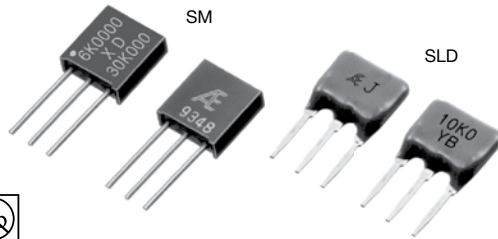


Ultra Precision Resistor 1-2-3 Network



RoHS
COMPLIANT

DSCC Specification 87026

COMPOSITION OF TYPE NUMBER

Example: $R_1 \neq R_2$

SM 1X 10K00 B A

① ② ③ ④ ⑤ ⑥

Example: $R_1 \neq R_2$

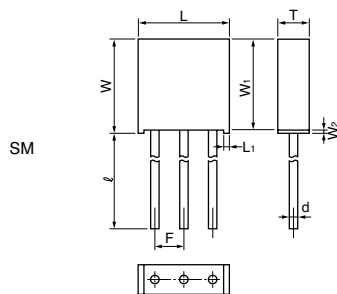
SLD 2X 1K000 / 10K00 B Q

① ② ③ ④ ⑤ ⑥

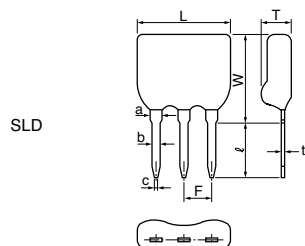
- ① Type
- ② Number of Values
- ③ TCR Absolute
- ④ Nominal Resistance Values
- ⑤ Resistance Tolerance (Absolute)
- ⑥ Resistance Tolerance (Matching)

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 ₁	1.0 max.
W	8.1±0.2
W ₁	7.8±0.2
W ₂	0.3 max.
T	2.6±0.2
F	2.54±0.25
l	10±3
d	φ0.65±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.

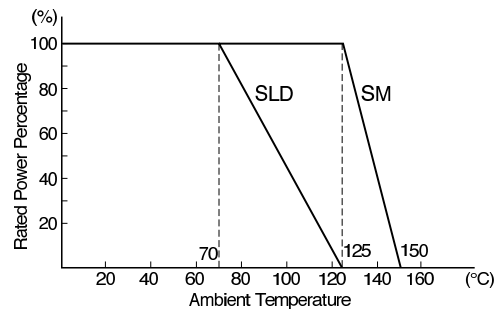
** -25°C to +125°C for SLD type.

*** Please contact us for the availability.

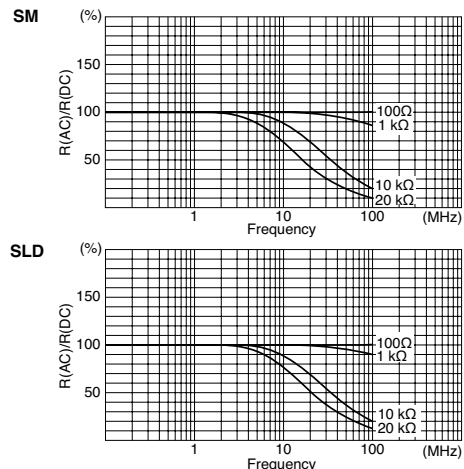
TABLE 1.
TCR TRACKING IS SUBJECT TO RESISTANCE RATIO

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

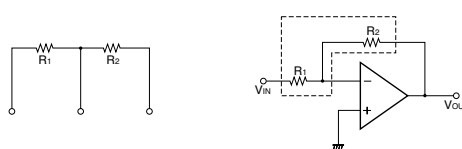


PERFORMANCE – SM					
Parameters	Test Condition	ALPHA Specification		ALPHA Typical Test Data	
		ΔR	$\Delta Ratio$	ΔR	$\Delta Ratio$
Maximum Rated Operating Temperature		125°C			
Working Temperature Range		-65°C to +150°C			
Thermal Shock Overload	-65°C/30 min. \leftrightarrow +150°C/30 min., 5 cycles Rated Voltage x 2.5, 5 sec.	$\pm 0.02\%$ $\pm 0.02\%$	$\pm 0.01\%$ $\pm 0.01\%$	$\pm 0.005\%$ $\pm 0.0025\%$	$\pm 0.0025\%$ $\pm 0.001\%$
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. \rightarrow Rated Voltage, 45 min. 0.908 kg (2 pounds), 10 sec.	$\pm 0.05\%$ $\pm 0.02\%$	$\pm 0.02\%$ $\pm 0.01\%$	$\pm 0.0025\%$ $\pm 0.0025\%$	$\pm 0.001\%$ $\pm 0.001\%$
Terminal Strength		over 10,000 M Ω		over 10,000 M Ω	
Dielectric Withstanding Voltage	Atmo. Pres.: AC 300V, 1 min. Baro. Pres. 8 mHg; AC 200V, 1 min. DC 500V, 2 min.	$\pm 0.02\%$	$\pm 0.01\%$	$\pm 0.0025\%$	$\pm 0.001\%$
Insulation Resistance		over 10,000 M Ω		over 10,000 M Ω	
Resistance to Soldering Heat	350°C, 3 sec.	$\pm 0.02\%$	$\pm 0.01\%$	$\pm 0.0025\%$	$\pm 0.001\%$
Moisture Resistance	+65°C to -10°C, 90% RH to 98% RH, Rated Voltage, 10 cycles (240 hrs.)	$\pm 0.05\%$	$\pm 0.02\%$	$\pm 0.02\%$	$\pm 0.01\%$
Shock	100G, 6 ms, Sawtooth Wave, X, Y, Z, each 10 shocks	$\pm 0.01\%$	$\pm 0.005\%$	$\pm 0.0025\%$	$\pm 0.001\%$
Vibration, High Frequency	20G, 10 Hz to 2,000 Hz to 10 Hz, 20 min., X, Y, Z, each 2.5 hrs.	$\pm 0.02\%$	$\pm 0.01\%$	$\pm 0.0025\%$	$\pm 0.001\%$
Life	125°C, Rated Power, 1.5 hr. – ON, 0.5 hr. – OFF, 2,000 hrs.	$\pm 0.05\%$	$\pm 0.02\%$	$\pm 0.015\%$	$\pm 0.005\%$
Storage Life	15°C to 35°C, 15% RH to 75% RH, No Load, 10,000 hrs.	$\pm 0.005\%$	$\pm 0.0025\%$	$\pm 0.0025\%$	$\pm 0.0015\%$
High Temperature Exposure	150°C, No Load, 2,000 hrs.	$\pm 0.05\%$	$\pm 0.02\%$	$\pm 0.015\%$	$\pm 0.005\%$
Current Noise		-32 dB		-42 dB	
Voltage Coefficient		0.0005%/V		0.00003%/V	
Thermal EMF		1.0 $\mu V/^{\circ}C$		1.0 $\mu V/^{\circ}C$	

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

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.



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