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We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

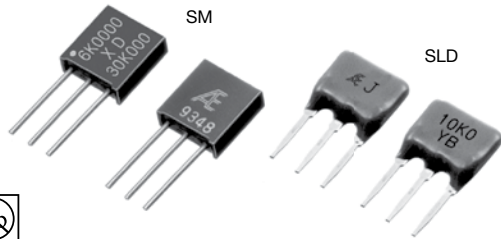
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## Ultra Precision Resistor 1-2-3 Network



RoHS  
COMPLIANT

DSCC Specification 87026

### TCR, RESISTANCE RANGE, TOLERANCE, RATED POWER

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

\* Symbols parenthesized are for type number composition.

\*\* -25°C to +125°C for SLD type.

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

### COMPOSITION OF TYPE NUMBER

Example: R<sub>1</sub>=R<sub>2</sub>

**SM 1X 10K00 B A**

① ② ③ ④ ⑤ ⑥

Example: R<sub>1</sub>≠R<sub>2</sub>

**SLD 2X 1K000 / 10K00 B Q**

① ② ③ ④ ⑤ ⑥

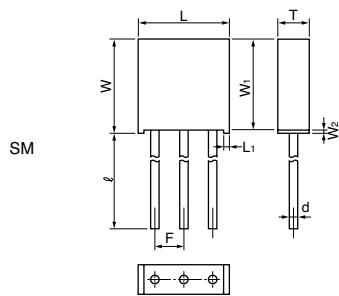
- ① Type
- ② Number of Values
- ③ TCR Absolute
- ④ Nominal Resistance Values
- ⑤ Resistance Tolerance (Absolute)
- ⑥ Resistance Tolerance (Matching)

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.

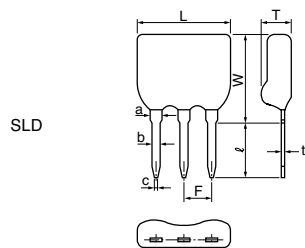
### TABLE 1. TCR TRACKING IS SUBJECT TO RESISTANCE RATIO

| 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                    |

### CONFIGURATION (DIMENSIONS IN mm)

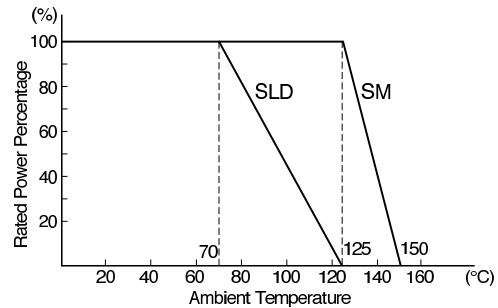


| Type           | SM         |
|----------------|------------|
| L              | 7.7±0.2    |
| L <sub>1</sub> | 1.0 max.   |
| W              | 8.1±0.2    |
| W <sub>1</sub> | 7.8±0.2    |
| W <sub>2</sub> | 0.3 max.   |
| T              | 2.6±0.2    |
| F              | 2.54±0.25  |
| l              | 10±3       |
| d              | φ0.65±0.05 |

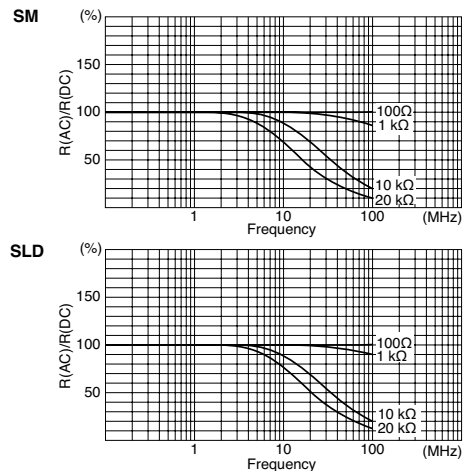


| Type | SLD       |
|------|-----------|
| L    | 7.5±0.5   |
| W    | 7.5±0.5   |
| T    | 2.2±0.5   |
| F    | 2.54±0.25 |
| l    | 5±1       |
| t    | 0.3±0.05  |
| a    | 1.0±0.05  |
| b    | 0.65±0.05 |
| c    | 0.4±0.05  |

### POWER DERATING CURVE



### FREQUENCY CHARACTERISTICS



| PERFORMANCE – SM  |   |                                       |                |  |                |
|---|---|---------------------------------------|----------------|--|----------------|
| Parameters  | Test Condition  | ALPHA Specification                   |                | ALPHA Typical Test Data                |                |
|   |   | $\Delta R$                            | $\Delta Ratio$ | $\Delta R$                             | $\Delta Ratio$ |
| Maximum Rated Operating Temperature<br>Working Temperature Range  |   | 125°C<br>-65°C to +150°C              |                |  |                |
| Thermal Shock<br>Overload   | -65°C/30 min. ↔ +150°C/30 min., 5 cycles<br>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<br>② Water + Butyl Cellosolve + Monoethanolamine  | no damage                             |                | no damage                              |                |
| Low Temperature Storage and<br>Operation<br>Terminal Strength   | -65°C, No Load, 24 hrs. → Rated Voltage, 45 min.<br>0.908 kg (2 pounds), 10 sec.  | ±0.05%                                | ±0.02%         | ±0.0025%                               | ±0.001%        |
| Dielectric Withstanding Voltage<br>Insulation Resistance<br>Resistance to Soldering Heat<br>Moisture Resistance | Atmo. Pres.: AC 300V, 1 min. Baro. Pres. 8 mHg; AC 200V, 1min.<br>DC 500V, 2 min.<br>350°C, 3 sec.<br>+65°C to -10°C, 90% RH to 98% RH, Rated Voltage, 10 cycles (240 hrs.) | ±0.02%                                | ±0.01%         | ±0.0025%                               | ±0.001%        |
|   |   | over 10,000 M $\Omega$                |                | over 10,000 M $\Omega$                 |                |
|   |   | ±0.02%                                | ±0.01%         | ±0.0025%                               | ±0.001%        |
| Shock<br>Vibration, High Frequency  | 100G, 6 ms, Sawtooth Wave, X, Y, Z, each 10 shocks<br>20G, 10 Hz to 2,000 Hz to 10 Hz, 20 min., X, Y, Z, each 2.5 hrs.  | ±0.01%                                | ±0.005%        | ±0.0025%                               | ±0.001%        |
|   |   | ±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<br>Voltage Coefficient<br>Thermal EMF   |   | -32 dB<br>0.0005%/V<br>1.0 $\mu$ V/°C |                | -42 dB<br>0.00003%/V<br>1.0 $\mu$ V/°C |                |

| PERFORMANCE – SLD   |   |                         |                |                         |                |
|---|---|-------------------------|----------------|-------------------------|----------------|
| Parameters  | Test Condition  | ALPHA Specification     |                | ALPHA Typical Test Data |                |
|   |   | $\Delta R$              | $\Delta Ratio$ | $\Delta R$              | $\Delta Ratio$ |
| Maximum Rated Operating Temperature<br>Working Temperature Range  |   | 70°C<br>-25°C to +125°C |                |                         |                |
| Thermal Cycling<br>Overload   | -25°C/30 min., Room Temperature/5 min., 125°C/30 min., 5 cycles<br>Rated Voltage x 2.5, 5 sec.  | ±0.05%                  | ±0.01%         | ±0.01%                  | ±0.005%        |
| Solderability   | 235°C, 2 sec.   | over 75% coverage       |                | over 75% coverage       |                |
| Resistance to Solvents  | Isopropyl Alcohol   | no damage               |                | no damage               |                |
| Low Temperature Operation<br>Terminal Strength  | -25°C, No Load, 2 hrs.<br>0.908 kg (2 pounds), 10 sec.  | ±0.05%                  | ±0.01%         | ±0.0025%                | ±0.001%        |
| Dielectric Withstanding Voltage<br>Insulation Resistance<br>Resistance to Soldering Heat<br>Moisture Resistance | Atmo. Pres.: AC 300V, 1 min.<br>DC 100V, 1 min.<br>350°C, 3 sec.<br>+65°C to -10°C, 90% RH to 98% RH, Rated Voltage, 10 cycles (240 hrs.) | ±0.03%                  | ±0.01%         | ±0.0025%                | ±0.001%        |
|   |   | over 10,000 M $\Omega$  |                | over 10,000 M $\Omega$  |                |
|   |   | ±0.03%                  | ±0.01%         | ±0.0025%                | ±0.001%        |
| Shock<br>Vibration  | 50G, 11 ms, Half-Sine Wave, X, Y, Z, each 3 shocks<br>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%        |
|   |   | ±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<br>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.

