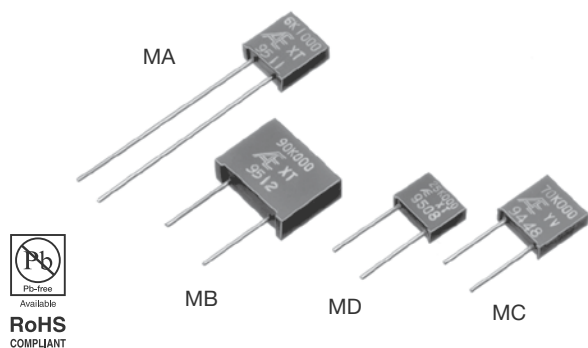


# Ultra Precision Resistor (Transfer Molded)



## COMPOSITION OF TYPE NUMBER

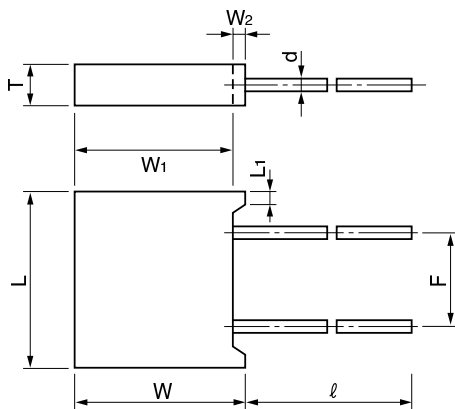
Example:

**MA Y 10K000 A**

Tolerance  
Resistance Value  
TCR  
Type

Resistance value, in ohm, is expressed by a series of six characters, five of which represent significant digits. 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 | MA             | MC        | MB       | MD        |
|------|----------------|-----------|----------|-----------|
| L    | 7.9±0.2        |           | 13.0±0.3 | 7.4±0.2   |
| L1   | 1.0 max.       |           | 1.5 max. | 0.8 max.  |
| W    | 8.3±0.2        |           | 10.0±0.3 | 6.0±0.2   |
| W1   | 8.0±0.2        |           | 9.5±0.3  | 5.7±0.2   |
| W2   | 0.3 max.       |           | 0.5 max. | 0.4 max.  |
| T    | 2.8±0.2        | 2.3±0.2   | 4.0±0.3  | 2.3±0.2   |
| F    | 3.81±0.25      | 5.08±0.25 | 7.5±0.5  | 5.08±0.25 |
| ℓ    | 25±10          |           | 10±3     |           |
| d    | Dia. 0.65±0.05 |           |          |           |

## TCR, RESISTANCE RANGE, TOLERANCE, RATED POWER

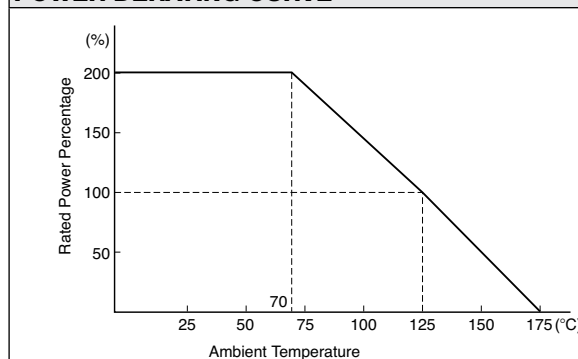
| Type     | TCR (ppm/°C)<br>-55°C to +125°C*  | Resistance Range (Ω) | Resistance Tolerance (%)†                                               | Rated Power (W)<br>at 125°C     |
|----------|-----------------------------------|----------------------|-------------------------------------------------------------------------|---------------------------------|
| MA<br>MC | 0±15 (W)                          | 1 to 5               | ±0.5 (D) ±1 (F)                                                         | 0.3<br>(0.2 at 150 kΩ or above) |
|          | 0±5 (X)                           | 5 to 30              | ±0.1 (B) ±0.5 (D) ±1 (F)                                                |                                 |
|          | 0±5 (X)<br>0±2.5 (Y)<br>0±1 (Z)** | 30 to 200k           | ±0.005 (V) ±0.01 (T)<br>±0.02 (Q) ±0.05 (A)<br>±0.1 (B) ±0.5 (D) ±1 (F) |                                 |
| MB       | 0±5 (X)                           | 5 to 30              | ±0.1 (B) ±0.5 (D) ±1 (F)                                                | 0.5<br>(0.3 at 200 kΩ or above) |
|          | 0±5 (X)<br>0±2.5 (Y)<br>0±1 (Z)** | 30 to 400k           | ±0.005 (V) ±0.01 (T)<br>±0.02 (Q) ±0.05 (A)<br>±0.1 (B) ±0.5 (D) ±1 (F) |                                 |
| MD       | 0±5 (X)                           | 5 to 30              | ±0.1 (B) ±0.5 (D) ±1 (F)                                                | 0.125                           |
|          | 0±5 (X)<br>0±2.5 (Y)              | 30 to 100            | ±0.05 (A) ±0.1 (B)<br>±0.5 (D) ±1 (F)                                   |                                 |
|          | 0±5 (X)<br>0±2.5 (Y)<br>0±1 (Z)** | 100 to 80k           | ±0.01 (T) ±0.02 (Q)<br>±0.05 (A) ±0.1 (B)<br>±0.5 (D) ±1 (F)            |                                 |

\* Symbols in parentheses are for type number composition.

† Resistance figures are the values obtained by measuring the leads at point 12.7±3.2 mm away from the base for Type MA and at point 5.0±1.0 mm for Types MC, MB and MD, but, in case of resistance below 10 ohm, the value at 1.6±0.6 mm away from the base for all types.

\*\*Temperature characteristic Z is applicable for temperature range between 0°C and 60°C.

## POWER DERATING CURVE



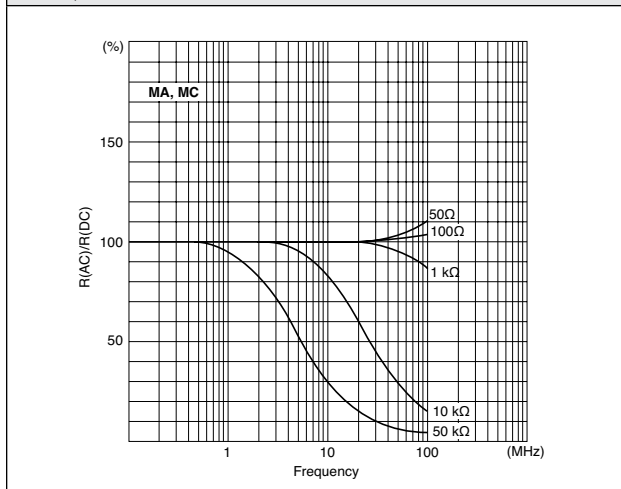
## DSCC SPECIFICATIONS

97009  
97010  
97011

| PERFORMANCE                                                                                                     |                                                                                                                                                                   |                                                           |                                                  |
|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------|
| Parameters                                                                                                      | Test Condition                                                                                                                                                    | MIL-PRF-55182/9 Specification                             | ALPHA Typical Test Data                          |
| Maximum Rated Operating Temperature<br>Working Temperature Range<br>Maximum Working Voltage                     |                                                                                                                                                                   | 125°C<br>-65°C to +175°C<br>MA, MC=300V, MB=350V, MD=250V |                                                  |
| Power Conditioning<br>Thermal Shock<br>Overload                                                                 | 125°C, Rated Power, 100 hrs.<br>-65°C/30 min. ↔ +150°C/30 min., 5 cycles<br>Rated Power x 6.25, 5 sec.                                                            | ±(0.20%+0.01Ω)<br>±0.05%<br>±0.05%                        | ±0.005%<br>±0.005%<br>±0.005%                    |
| Solderability<br>Resistance to Solvents                                                                         | Steam Aging 8 hrs., 245°C, 5 sec.<br>① Isopropyl Alcohol + Mineral Spirits<br>② Water + Butyl Cellosolve + Monoethanolamine                                       | over 95% coverage<br>no damage                            | over 95% coverage<br>no damage                   |
| Low Temperature Storage<br>Low Temperature Operation<br>Terminal Strength                                       | -65°C, 24 hrs.<br>-65°C, Rated Voltage, 45 min.<br>0.908 kg (2 pounds), 10 sec                                                                                    | ±0.05%<br>±0.05%<br>±0.02%                                | ±0.0025%<br>±0.0025%<br>±0.0025%                 |
| Dielectric Withstanding Voltage<br>Insulation Resistance<br>Resistance to Soldering Heat<br>Moisture Resistance | Atmo.Pres.: 300V rms. Baro. Pres. 8 mHg: 200V rms.<br>DC 100V, 2 min.<br>+260°C, 10 sec.<br>+65°C to -10°C, 90% RH to 98% RH, Rated Voltage, 10 cycles (240 hrs.) | ±0.02%<br>over 10,000 MΩ<br>±0.02%<br>±0.05%              | ±0.0025%<br>over 10,000 MΩ<br>±0.0025%<br>±0.01% |
| Shock (Specified Pulse)<br>Vibration, High Frequency                                                            | 100G, 6 ms, Sawtooth Wave, X, Y, each 10 shocks<br>20G, 10 Hz to 2,000 Hz to 10 Hz, 20min., X, Y, each 4 hrs.                                                     | ±0.01%<br>±0.02%                                          | ±0.0025%<br>±0.0025%                             |
| Life                                                                                                            | 125°C, Rated Voltage, 1.5 hr. – ON, 0.5 hr. – OFF, 2,000 hrs.                                                                                                     | ±0.05%                                                    | ±0.015%                                          |
| Life 70°C Power Rating                                                                                          | 70°C, Rated Voltage x 2, 1.5 hr. – ON, 0.5 hr. – OFF, 2,000 hrs.                                                                                                  | ±0.05%                                                    | ±0.015%                                          |
| Storage Life                                                                                                    | 15°C to 35°C, 15% RH to 75% RH, No Load, 10,000 hrs.                                                                                                              | ±0.005%                                                   | ±0.0025%                                         |
| High Temperature Exposure                                                                                       | 175°C, No Load, 2,000 hrs.                                                                                                                                        | ±0.5%                                                     | ±0.015%                                          |
| Current Noise<br>Voltage Coefficient<br>Thermal EMF                                                             |                                                                                                                                                                   | -32 dB<br>0,0005%/V<br>1.0 μV/°C                          | -42 dB<br>0,00003%/V<br>1.0 μV/°C                |

Type MA meets requirements of MIL-PRF-55182/9.

## FREQUENCY CHARACTERISTICS



## TEMPERATURE OF RESISTOR SURFACE

