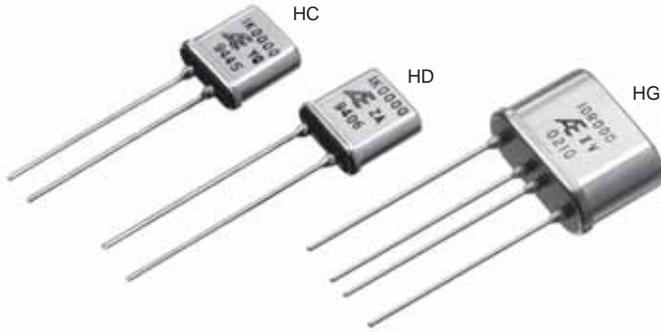


Ultra-Precision Resistor (Hermetically Sealed)



Composition of Type Number

Example:

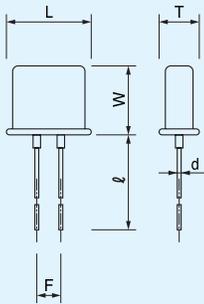
HC Y 30K000 T



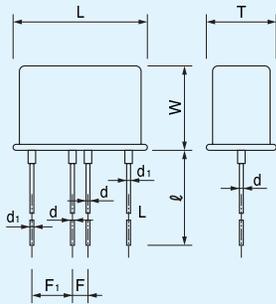
Resistance value, in ohm, is expressed by a series of six characters, five of which represent significant digits. The sixth R or K is a dual-purpose letter that designates both the value range (R for ohmic; K for kilo-ohm) and the location of decimal point.

Configuration

HC, HD Type



HG Type



| Type | HC | HD | HG |
|----------------|-----------|------------|-----------|
| L | | 10.7±0.3 | 19.0±0.3 |
| W | | 10.7±0.3 | 12.8±0.3 |
| T | | 4.3±0.3 | 8.8±0.3 |
| F | 3.81±0.25 | 5.08±0.25 | 2.54±0.25 |
| F ₁ | | 5.08±0.25 | 5.08±0.25 |
| l | | 30±10 | |
| d | | φ0.65±0.05 | |
| d ₁ | | φ0.8±0.05 | |

Dimensions in mm

TCR, Resistance Range, Tolerance, Rated Power

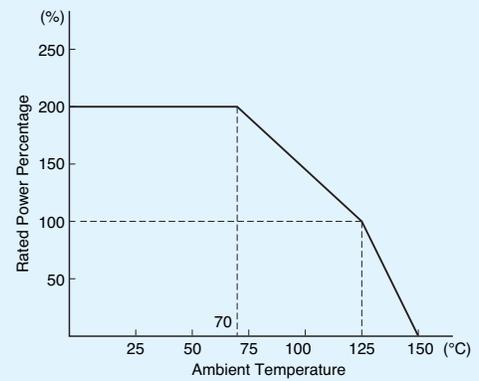
| Type | TCR (ppm/°C) -55°C to +125°C | Resistance Range(Ω) | Resistance Tolerance (%)* | Rated Power (W) at 125°C |
|-----------|---------------------------------|--------------------------|---|-----------------------------|
| HC HD | 0±15 (W) | 1 to 5 | ±0.5 (D) ±1 (F) | 0.3 |
| | 0±5 (X) | 5 to 30 | ±0.1 (B) ±0.5 (D) ±1 (F) | |
| | 0±5 (X) | 30 to 120k | ±0.005 (V) ±0.01 (T) | |
| | 0±2.5 (Y) | | ±0.02 (Q) ±0.05 (A) | |
| 0±1 (Z)** | | ±0.1 (B) ±0.5 (D) ±1 (F) | | |
| HG | 0±2.5 (Y) 0±1 (Z)** | 1 to 10 | ±0.01 (T) ±0.02 (Q) ±0.05 (A) ±0.1 (B) ±0.5 (D) ±1 (F) | 0.3 |
| | | 10 to 10k | ±0.005 (V) ±0.01 (T) ±0.02 (Q) ±0.05 (A) ±0.1 (B) ±0.5 (D) ±1 (F) | |

Symbols in parentheses are for type number composition.

*Resistance figures are obtained by measuring the leads at point 12.7±3.2mm away from the base for type HC and HD, but, in case of resistance below 10 ohm, the value at 1.6±0.6mm away from the base for all types.

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

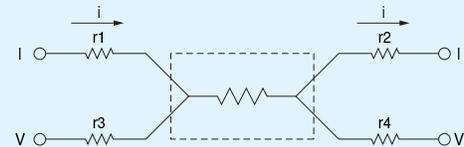
Power Derating Curve



Four-Terminal (Kelvin) Connection

For low ohmic resistor (less than 10 ohm), the resistance value and TCR of the copper lead increases overall resistance value. Four-terminal (Kelvin) connection is recommended per the following figure. Loading current at voltage and current terminals (V, I) causes measurement error.

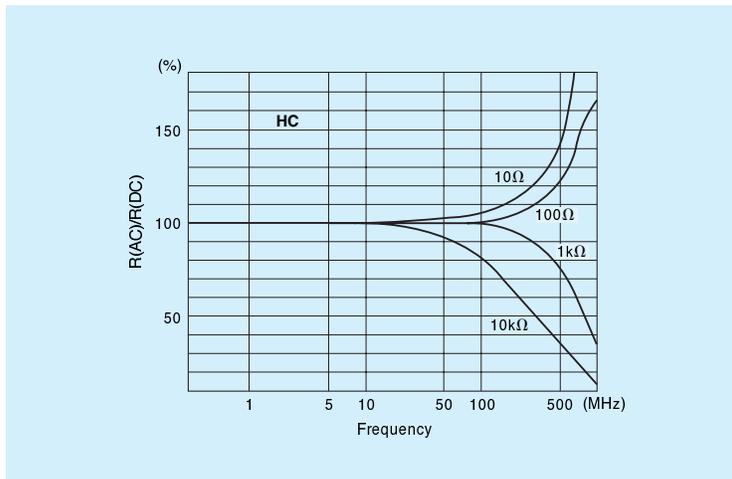
Four-Terminal Resistor



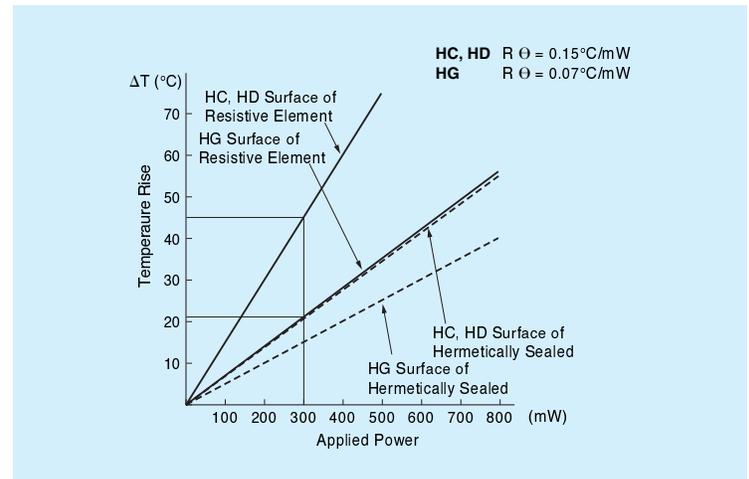
Performance

| Parameters | Test Condition | MIL-PRF-55182/9 Specification | ALPHA Typical Test Data |
|---|---|---|---|
| Maximum Rated Operating Temperature Working Temperature Range Maximum Working Voltage | | | 125°C -65°C to +150°C 300V |
| Power Conditioning Thermal Shock Overload | 125°C, Rated Power, 100 hrs. -65°C/30 min. ↔ +150°C/30 min., 5 cycles Rated Power x 6.25, 5 sec. | ±(0.20%+0.01Ω) ±0.05% ±0.05% | ±0.0025% ±0.0025% ±0.0025% |
| Solderability | Steam Aging 8 hrs., 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 Low Temperature Operation Terminal Strength | -65°C, 24 hrs. -65°C, Rated Voltage, 45 min. 0.908kg (2 pounds), 10 sec. | ±0.05% ±0.05% ±0.02% | ±0.0025% ±0.0025% ±0.001% |
| Dielectric Withstanding Voltage Insulation Resistance Resistance to Soldering Heat Moisture Resistance | Atmospheric: 300V rms. Barometric: 200V rms. DC 100V, 2 min. +260°C, 10 sec. ±2 sec. +65°C to -10°C, 90% RH to 98% RH, Rated Voltage, 10 cycles (240 hrs.) | ±0.02% over 10,000MΩ ±0.02% ±0.05% | ±0.0025% over 10,000MΩ ±0.0025% ±0.0025% |
| Shock (Specified Pulse) Vibration, High Frequency | 100G, 6ms., Sawtooth Wave, X, Y, each 10 shocks 20G, 10Hz to 2,000Hz to 10Hz, 20 min., X, Y, each 4 hrs. | ±0.01% ±0.02% | ±0.0025% ±0.0025% |
| Life | 125°C, Rated Voltage, 1.5 hrs. – ON, 0.5 hr. – OFF, 2,000 hrs. | ±0.05% | ±0.01% |
| 70°C Power Rating | 70°C, Rated Voltage x 2, 1.5 hrs. – ON, 0.5 hr. – OFF, 2,000 hrs. | ±0.05% | ±0.01% |
| Storage Life | 15°C to 35°C, 15% RH to 75% RH, No Load, 10,000 hrs. | ±0.005 % | ±0.0005 % |
| High Temperature Exposure | 150°C, No Load, 2,000 hrs. | ±0.5 % | ±0.01 % |
| Current Noise Voltage Coefficient Thermal EMF | | -32dB 0.0001%/V 1.0μV/°C | -42dB 0.00003%/V 0.1μV/°C |

Frequency Characteristics



Temperature of Resistor Surface



Precaution in Using HC, HD or HG Resistors

When soldering to mount HC, HD or HG on a board, keep the resistor over 10mm away from the board surface by using an insulating tube.