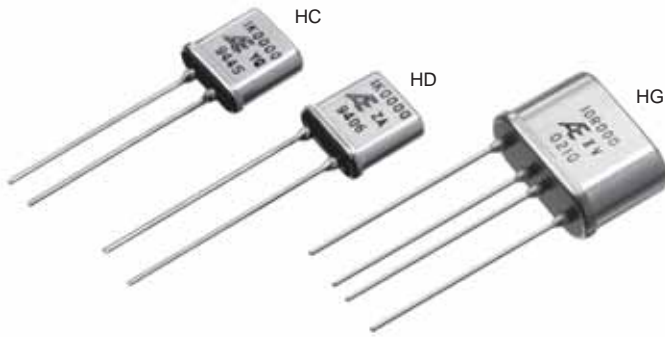


Ultra-Precision Resistor (Hermetically Sealed)



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.

Composition of Type Number

Example:

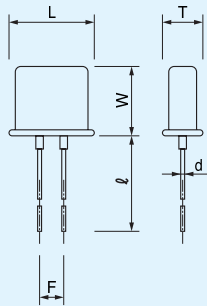
HC Y 30K000 T

Tolerance
Resistance Value
TCR
Type

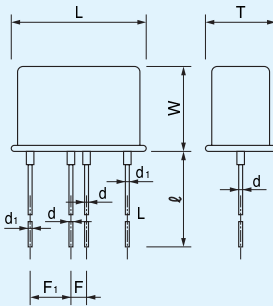
Resistance value, in ohm, is expressed by a series of six characters, five of which represent significant digits. The sixth R or K is a dual-purpose letter that designates both the value range (R for ohmic; K for kilo-ohm) and the location of decimal point.

Configuration

HC, HD Type



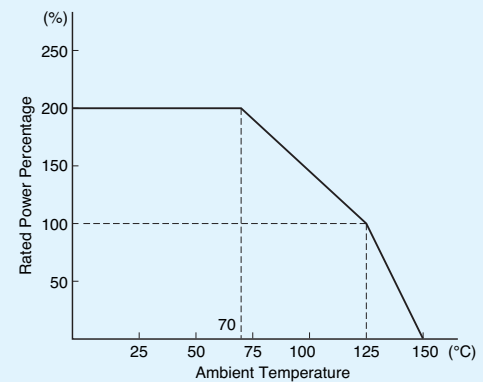
HG Type



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
F1		5.08±0.25	
l		30±10	
d		φ0.65±0.05	
d1		φ0.8±0.05	

Dimensions in mm

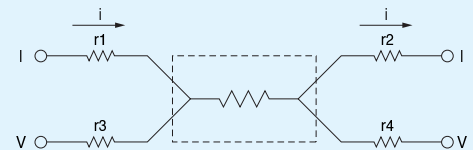
Power Derating Curve



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

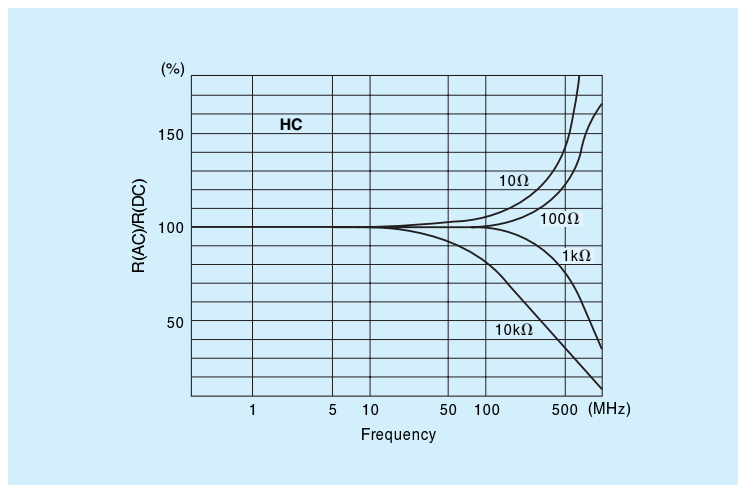




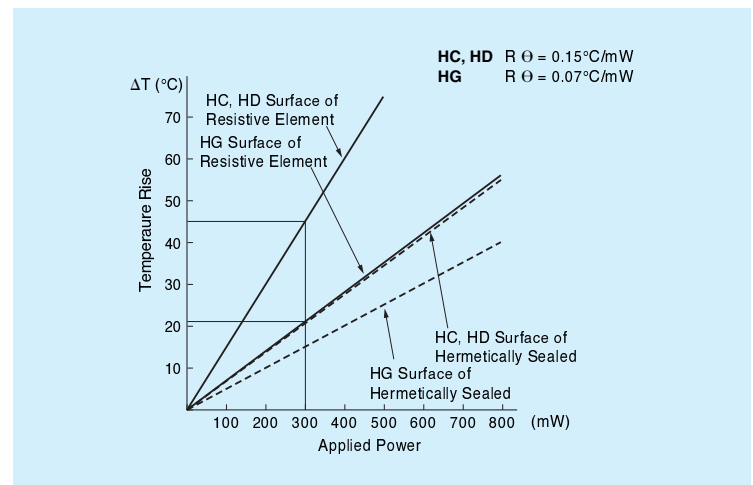
Performance

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. \leftrightarrow +150°C/30 min., 5 cycles Rated Power x 6.25, 5 sec.	$\pm(0.20\%+0.01\Omega)$ $\pm 0.05\%$ $\pm 0.05\%$	$\pm 0.0025\%$ $\pm 0.0025\%$ $\pm 0.0025\%$
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.	$\pm 0.05\%$ $\pm 0.05\%$ $\pm 0.02\%$	$\pm 0.0025\%$ $\pm 0.0025\%$ $\pm 0.001\%$
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.)	$\pm 0.02\%$ over 10,000M Ω $\pm 0.02\%$ $\pm 0.05\%$	$\pm 0.0025\%$ over 10,000M Ω $\pm 0.0025\%$ $\pm 0.0025\%$
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.	$\pm 0.01\%$ $\pm 0.02\%$	$\pm 0.0025\%$ $\pm 0.0025\%$
Life	125°C, Rated Voltage, 1.5 hrs. – ON, 0.5 hr. – OFF, 2,000 hrs.	$\pm 0.05\%$	$\pm 0.01\%$
70°C Power Rating	70°C, Rated Voltage x 2, 1.5 hrs. – ON, 0.5 hr. – OFF, 2,000 hrs.	$\pm 0.05\%$	$\pm 0.01\%$
Storage Life	15°C to 35°C, 15% RH to 75% RH, No Load, 10,000 hrs.	$\pm 0.005\%$	$\pm 0.0005\%$
High Temperature Exposure	150°C, No Load, 2,000 hrs.	$\pm 0.5\%$	$\pm 0.01\%$
Current Noise Voltage Coefficient Thermal EMF		-32dB 0.0001%/V 1.0 μ V/°C	-42dB 0.00003%/V 0.1 μ V/°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.