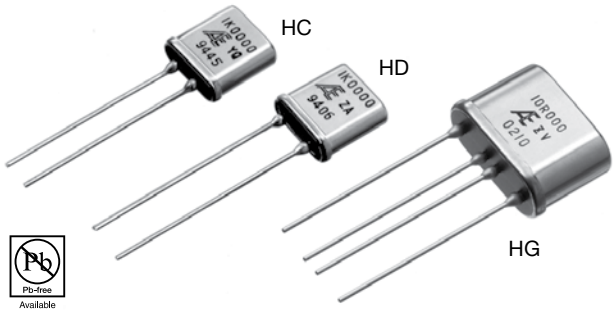
Ultra Precision Resistor (Hermetically Sealed)



Pb-free Available

RoHS COMPLIANT

COMPOSITION OF TYPE NUMBER

Example:

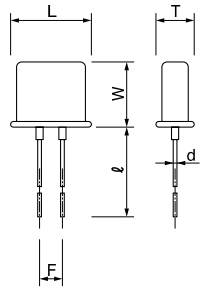
HC Y 30K000 T

- T — Tolerance
- 30K000 — Resistance Value
- Y — TCR
- HC — Type

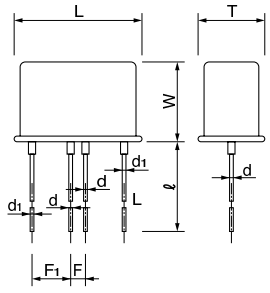
Resistance value, in ohm, is expressed by a series of six characters, five of which represent significant digits. The sixth R or K is a dual-purpose letter that designates both the value range (R for ohmic; K for kilo-ohm) and the location of decimal point.

CONFIGURATION (DIMENSIONS IN mm)

HC, HD Type



HG Type



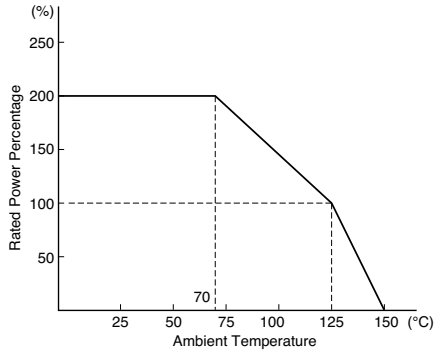
Type	HC	HD	HG
L	10.7±0.3		19.0±0.3
W	10.7±0.3		12.8±0.3
T	4.3±03		8.8±0.3
F	3.81±0.25	5.08±0.25	2.54±0.25
F1	–		5.08±0.25
ℓ	30±10		
d	Dia. 0.65±0.05		
d1	Dia. 0.8±0.05		

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) 0±2.5 (Y) 0±1 (Z)**	30 to 120k	±0.005 (V) ±0.01 (T) ±0.02 (Q) ±0.05 (A) ±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)	
		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±3.2 mm away from the base for type HC and HD, 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.

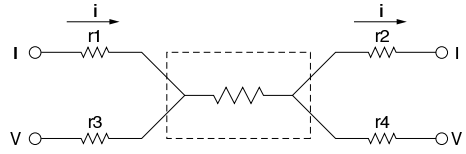
POWER DERATING CURVE



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.

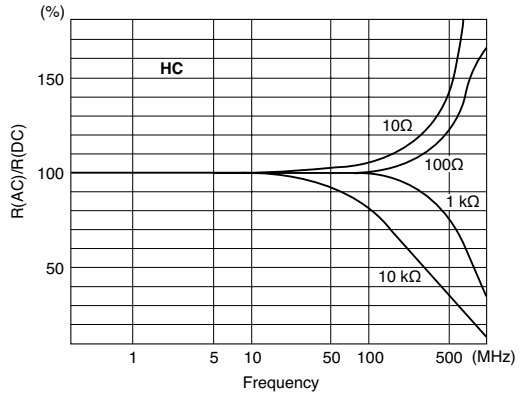
Four-Terminal Resistor



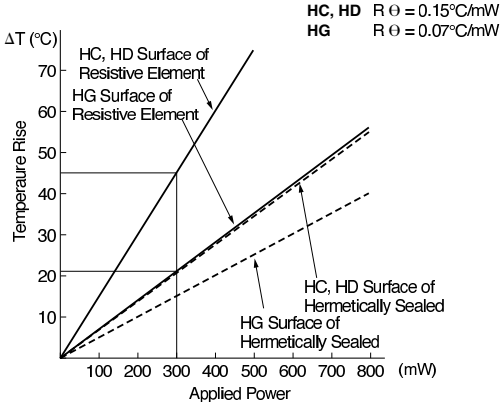
PERFORMANCE

Parameters	Test Condition	MIL-PRF-55182/9 Specification	ALPHA Typical Test Data
Maximum Rated Operating Temperature		125°C	
Working Temperature Range		–65°C to +150°C	
Maximum Working Voltage		300V	
Power Conditioning	125°C, Rated Power, 100 hrs.	±(0.20% +0.01Ω)	±0.0025%
Thermal Shock	–65°C/30 min. ↔ +150°C/30 min., 5 cycles	±0.05%	±0.0025%
Overload	Rated Voltage x 6.25, 5 sec.	±0.05%	±0.0025%
Solderability	Steam Aging 8 hrs., 245°C, 5 sec.	over 95% coverage	
Resistance to Solvents	❶ Isopropyl Alcohol + Mineral Spirits ❷ Water + Butyl Cellosolve + Monoethanolamine	no damage	
Low Temperature Storage	–65°C, 24 hrs.	±0.05%	±0.0025%
Low Temperature Operation	–65°C Rated Voltage, 45 min.	±0.05%	±0.0025%
Terminal Strength	0.908 kg (2 pounds), 10 sec.	±0.02%	±0.001%
Dielectric Withstanding Voltage	Atom. Pres.: 300V rms. Baro. Pres. 8 mHg: 200V rms.	±0.02%	±0.0025%
Insulation Resistance	DC 100V, 2 min.	over 10,000 MΩ	over 10,000 MΩ
Resistance to Soldering Heat	260°C, 10 sec. ±2 sec.	±0.02%	±0.0025%
Moisture Resistance	+65°C to –10°C, 90% RH to 98% RH, Rated Voltage, 10 cycles (240 hrs.)	±0.05%	±0.0025%
Shock (Specified Pulse)	100G, 6 ms, Sawtooth Wave, X, Y, Z, each 10 shocks	±0.01%	±0.0025%
Vibration, High Frequency	20G, 10 Hz to 2,000 Hz to 10 Hz, 20 min., X, Y, each 4 hrs.	±0.02%	±0.0025%
Life	125°C, Rated Power, 1.5 hr. – 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	175°C, No Load, 2,000 hrs.	±0.5%	±0.01%
Current Noise		–32 dB	–42 dB
Voltage Coefficient		0.0001%/V	0.00003%/V
Thermal EMF		1.0 µV/°C	0.1 µV/°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 10 mm away from the board surface by using an insulating tube.

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