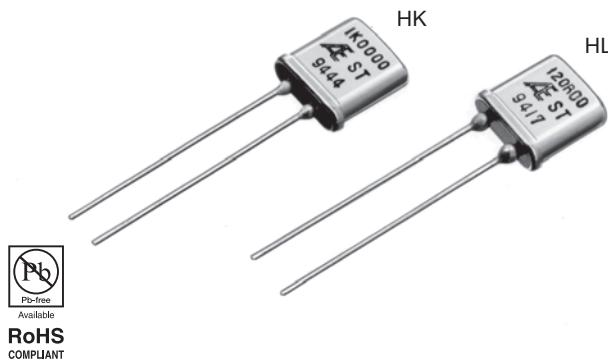


Zero-TCR Ultra Precision Resistor (Hermetically Sealed)



TCR, RESISTANCE RANGE, TOLERANCE, RATED POWER

Type	TCR	Resistance Range (Ω)	Resistance Tolerance (%)*†	Rated Power (W) at 70°C
HK HL	Char. S	100 to 100k	±0.005 (V) ±0.01 (T) ±0.02 (Q) ±0.05 (A) ±0.1 (B) ±0.5 (D) ±1 (F)	0.3

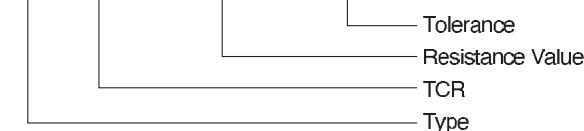
* Symbols parenthesized are for type number composition.

† Resistance figures are obtained by measuring the leads at point 12.7±3.2 mm away from the root.

COMPOSITION OF TYPE NUMBER

Example:

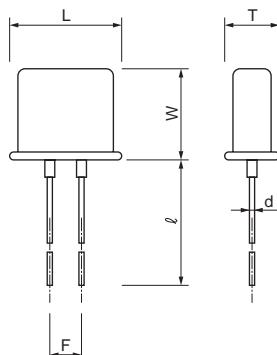
HK S 10K000 T



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.

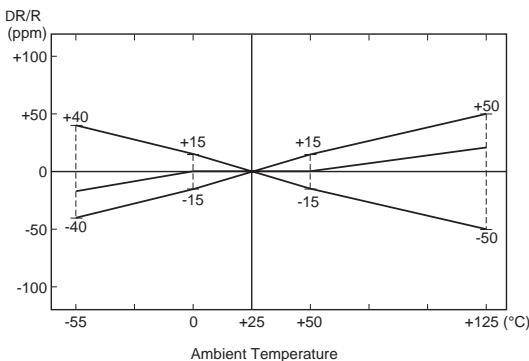
CONFIGURATION (DIMENSIONS IN mm)

HK, HL



Type	HK	HL
L	10.7±0.3	
W	10.7±0.3	
T	4.3±0.3	
F	3.81±0.25	5.08±0.25
l	30±10	
d	φ0.65±0.05	

TEMPERATURE CHARACTERISTICS OF RESISTANCE

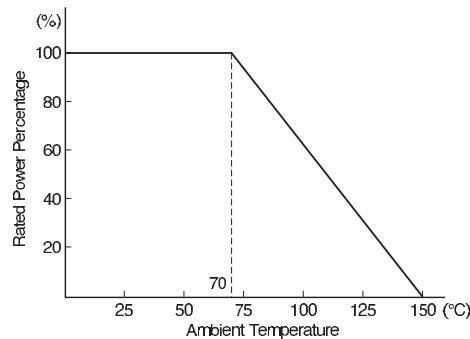


Ambient Temperature

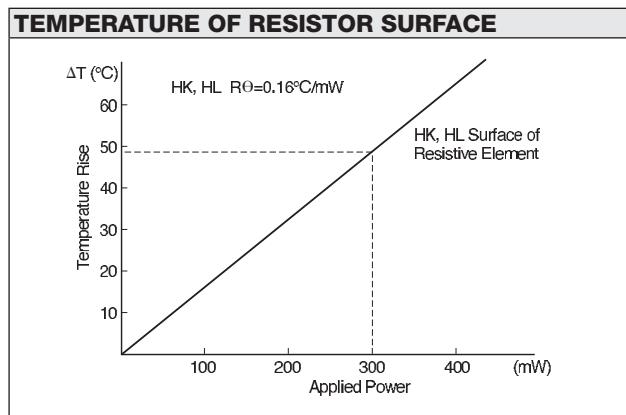
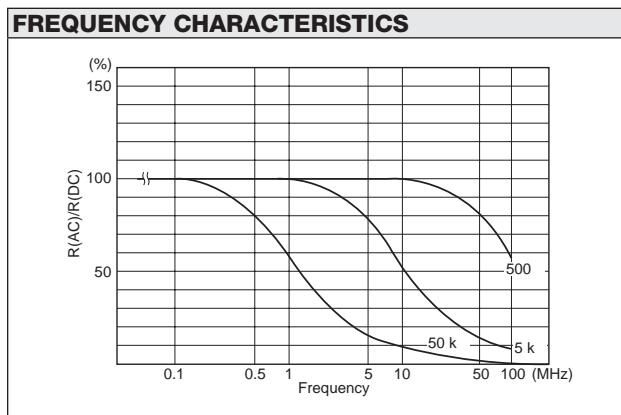
Temperature (°C)	ΔR/R (ppm)
-55	0±40
0	0±15
+50	0±15
+125	0±50

Reference Temperature +25°C

POWER DERATING CURVE



PERFORMANCE		ALPHA Specification	ALPHA Typical Test Data
Parameters	Test Condition		
Maximum Rated Operating Temperature		70°C	
Working Temperature Range		-65°C to +150°C	
Maximum Working Voltage		300V	
Power Conditioning Thermal Shock Overload	25°C, Rated Voltage, 96 hrs. -65°C/30 min. \leftrightarrow +150°C/30 min., 5 cycles Rated Voltage x 2.5, 5 sec.	$\pm 0.05\%$	$\pm 0.0025\%$
Solderability	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 Terminal Strength	-65°C, No Load, 24 hrs. \rightarrow Rated Voltage, 45 min. 0.908 kg (2 pounds), 10 sec.	$\pm 0.05\%$ $\pm 0.02\%$	$\pm 0.0025\%$ $\pm 0.001\%$
Dielectric Withstanding Voltage Insulation Resistance Resistance to Soldering Heat Moisture Resistance	Atmo. Pres.: AC 300V, 1 min. Baro. Pres. 8 mHg: AC200V, 1min. DC 500V, 2 min. 350°C, 3 sec. +65°C to -10°C, 90% RH to 98% RH, Rated Voltage, 10 cycles (240 hrs.)	$\pm 0.02\%$ over 10,000 M Ω $\pm 0.05\%$ $\pm 0.05\%$	$\pm 0.0025\%$ over 10,000 M Ω $\pm 0.0025\%$ $\pm 0.0025\%$
Shock Vibration, High Frequency	100G, 6 ms, Sawtooth Wave, X, Y, Z, each 10 shocks 20G, 10 Hz to 2,000 Hz to 10 Hz, 20 min., X, Y, Z, each 2.5 hrs.	$\pm 0.01\%$ $\pm 0.02\%$	$\pm 0.0025\%$ $\pm 0.0025\%$
Life	70°C, Rated Power, 1.5 hr. - 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.	$\pm 0.0025\%$	$\pm 0.0005\%$
High Temperature Exposure	150°C, No Load, 2,000 hrs.	$\pm 0.05\%$	$\pm 0.01\%$
Current Noise Voltage Coefficient Thermal EMF		-32 dB 0.00005%/V 1.0 μ V/°C	-42 dB 0.00003%/V 0.1 μ V/°C



PRECAUTION IN USING HK OR HL RESISTORS

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