

Version:
July 16, 2018



(HI80M) Tubular High Voltage Precision Divider Resistors

Token Electronics Industry Co., Ltd.

Taiwan: No.137, Sec. 1, Zhongxing Rd., Wugu District,
New Taipei City, Taiwan, R.O.C. 24872
Tel: +886 2981 0109 **Fax:** +886 2988 7487

China: 12F, Zhong Xing Industry Bld., Chuang Ye Road,
Nan Shan District, Shen Zhen City,
Guang Dong, China 518054
Tel: +86 755 26055363; **Fax:** +86 755 26055365

Web: www.token.com.tw

mailto: rfq@token.com.tw



▶ Product Introduction

Cylindrical Thick Film High-Voltage Resistor Dividers Provide Accuracy And Stability.

Features :

- High precision, Non-Inductance design.
- High voltage, Wide range of resistance.
- Custom design services. RoHS compliant.

Applications :

- Pulse Modulator, Radar Pulse Forming Network, Impulse Voltage Generator.
- X-ray/Imaging Equipment, and EMI lightning suppression, Electric Arc Furnace Damping.
- Capacitor Arc Suppression Circuit, Energy Research, High Voltage Buffer Circuit.

Token Electronics is further expanding its solutions for challenging applications and introducing thick-film precision resistor dividers for high-voltage measurement circuits. The new (HI80M) was introduced to meet the growing demand in the medical, energy, industrial and instrumentation markets.

Thick film technology allows high resistance values to be printed on flat or cylindrical substrates. Not only can high resistance be obtained, but a high voltage can be applied to the thick film product with almost no change in resistance value. Many thick film resistors are printed using a serpentine pattern. This pattern helps reduce inductance and is the first choice for stable frequency applications.

As new industries expand, so does the demand for such components. Applications such as portable defibrillators, high-voltage PSUs, on-board instruments, TWT power supplies, radar systems, X-ray systems, analytical equipment, and high resolution CRT displays require components with tight tolerances, leading temperature coefficient (TCR), load life stability and extremely high impedance values to provide optimum space, weight and cost combinations. Package.

The Cylindrical (HI80M) of high quality, high voltage, versatile, non-inductive, thick film precision dividers available from Token Electronics. The (HI80M) divider features with voltage handling capability of up to 80 KVdc and has an operating temperature range of -55°C to $+125^{\circ}\text{C}$, wide resistance range $2\text{M}\Omega$ to $1\text{G}\Omega$ with Resistive Ratio $R_2/(R_1+R_2)$ 1:1000 to 1:20000, and power up to 41W.

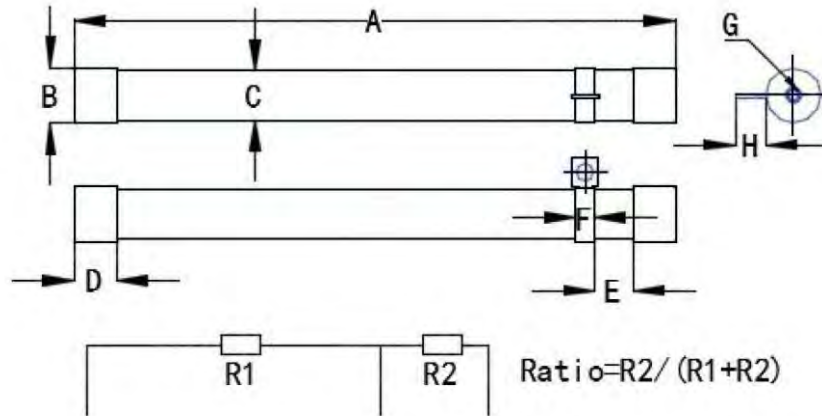
The (HI80M) conforms to the RoHS directives and Lead-free. To assist with your specifying high voltage divider application, please contact Token Electronics. We can offer high voltage divider combinations and solutions based on high voltage resistor sector in the catalog, or use our sophisticated features to provide higher accuracy in matching resistor sets. Customized design, and tighter tolerances are available on request. Or link to Token official website "[High Voltage Resistors](http://www.token.com.tw)" to get more information.



► Dimensions

Cylindrical High Voltage Precision Divider Resistors (HI80M) Dimensions

Type	A±2	B±0.2	C±0.5	D±2	E±1	F±0.5	G	H±2
HI80M-156	156	14.5	13.5	10	8.5	5	M4	10
HI80M-310	310	33	32	14	40	7	M6	



Dimensions (Unit: mm)

Electrical Characteristics

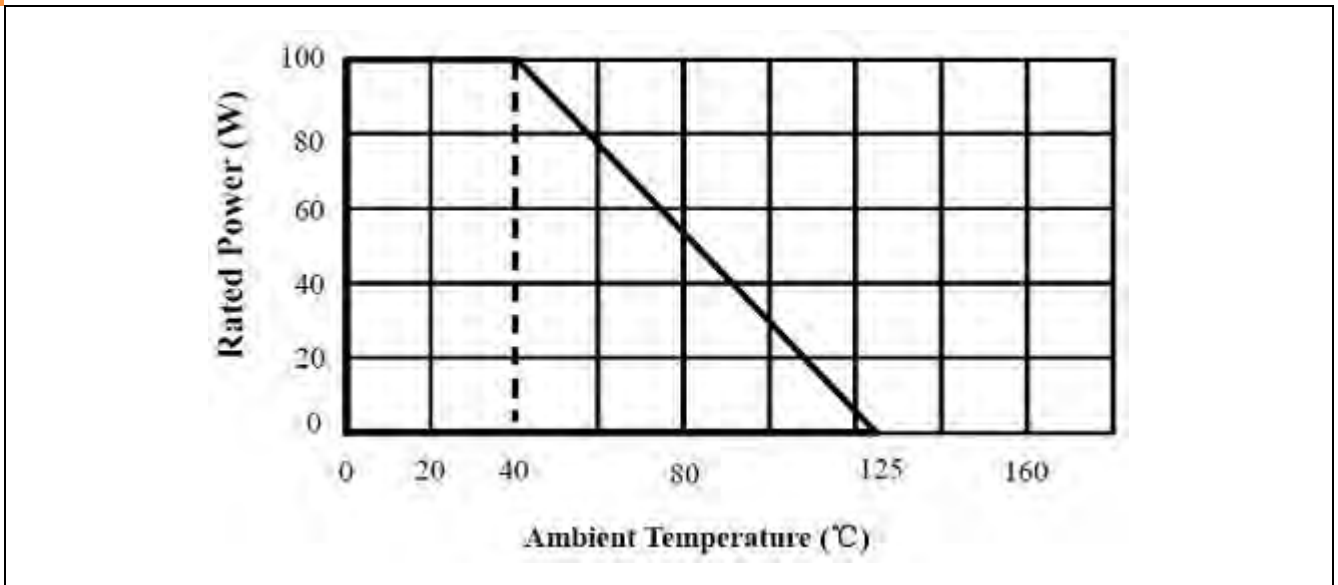
Electrical Characteristics - (HI80M)

Item	Specifications					
Part Number	HI80M-156			HI80M-310		
Power (W)(40°C)	12W			41W		
U Max Working Voltage (V)	40KVDC			80KVDC		
Resistance Range (R) (R1+R2)	2M~1G			5M~1G		
Absolute TCR (ppm/°C) (25°C ~ 85°C)	±50ppm/ ±100ppm	±25ppm	±15ppm	±50ppm/ ±100ppm	±25ppm	±15ppm
Relative TCR (ppm/°C) (25°C ~ 85°C)	±25ppm	±15ppm	±10ppm	±25ppm	±15ppm	±10ppm
Absolute Resistance Tolerance (%)	±0.25%~±5%	±0.25%~±5%	±0.25%~±5%	±0.25%~±5%	±0.25%~±5%	±0.25%~±5%
Relative Resistance Tolerance (%)	±0.25%~±0.5%	±0.1%~±0.5%	±0.1%~±0.5%	±0.25%~±0.5%	±0.1%~±0.5%	±0.1%~±0.5%
Insulation Voltage (V)	>1000VDC					
Resistive Ratio: R2/(R1+R2)	1:1000 to 1:20000					
Operating Temperature Range (°C)	-55°C ~ +125°C					
Coated	Silicone					
Terminal	Nickel plated copper cap					
Overload	5 times of Rated Power do not exceed 1.5UMax 5s, $R \leq \pm(0.2\%+0.05\Omega)$					
Load Life	1000Hrs. at Rated Power , $\Delta R \leq \pm(0.5\%+0.05\Omega)$					
Steady heat	40°C , RH≥95%, 240Hrs , $\Delta R \leq \pm(0.4\%+0.05\Omega)$					
Rapid Change of Temperature	-55~155°C at 5 cycles , $\Delta R \leq \pm(0.2\%+0.05\Omega)$					

- Working Voltage = $\sqrt{(P * R)}$ or Max. Working Voltage listed in above table whichever is lower.
- Overloading Voltage = $\sqrt{(5P * R)}$ or 1.5 * Max. Working Voltage listed in above table whichever is lower.

▶ Derating Curve (HI80M)

Derating Curve



▶ Order Codes

High Voltage Precision Divider Resistors - Order Codes (HI80M)

HI80M	156	C2C3	20M	5K	JD	
Part Number	Rated Power (W)		R1 + R2 (Ω)		Resistance Tolerance (%)	
HI80M	156	12W	20M	19.5MΩ + 5KΩ	5K	5KΩ
	310	41W	30M	29.5MΩ + 5KΩ	1M	1MΩ
			150M	148.5MΩ + 1.5MΩ	1M5	1.5MΩ
		TCR (ppm/°C)				
		C1C2			JF	±5% absolute and ±1% relative
		C1C3			JD	±5% absolute and ±0.5% relative
		C2C3			FC	±1% absolute and ±0.25% relative

► General Information

Cost Effective Complete Selection of High Voltage Components

Token high voltage series can be specified for use in industrial and general purpose high voltage systems, as well as a complete selection of high resistance, Hi-Meg, high-voltage, high frequency, and bulk ceramic resistors for higher average power dissipation. These High Resistance, High Frequency, High Resistance resistors combine the proven performance of Token resistance system with new cost efficient design elements and high voltage applications.

Detailed specifications, both mechanical and electrical, please contact our sales representative for more information.

High Voltage Applications

Resistors produced from Serpentine Pattern Screen Printing Design or bulk ceramic materials have displayed several key advantages in demanding high-voltage situations, including both continuous-wave and pulse applications. These include radar and broadcast transmitters, x-ray systems, defibrillators, lasers, and high-voltage semiconductor process equipment applications, where resistors must handle peak voltage anywhere from 8KV to 75KV.

Typical applications include current limit in capacitor charge/discharge, crowbar, and tube-arc circuits. In these uses, bulk ceramic resistors provide low inductance, high average power per unit size, stability at high voltage, and durability at extreme peak-power levels. Film resistors typically cannot withstand high-voltage pulse applications.

RF/Digital Loads and High-Frequency Applications

Token Non-Inductive Voltage Resistors are used extensively for high-frequency RF loads in broadcast and communication equipment because of their non-inductive characteristics. They provide excellent non-inductive power-handling capacity at frequencies up to the gigahertz range, with no sacrifice in power dissipation.

Film resistors may provide the needed non-inductive characteristics required by such RF applications, but they have size limitations and present reliability problems due to potential film burnout. This is especially true in advanced digital applications such as digital radio and TV transmitters involving pulses at high frequencies.

Application Notes

- Due to the high voltage which can appear between the end cap and any adjacent metal part, resistors should be mounted at an adequate distance from other conductors.
- An appropriate number of resistors may be screwed together as a stick to provide an assembly which will be capable to withstanding any desired voltage, providing no individual resistor is subject to a greater stress or power dissipation than is recommended in its data sheet, and that appropriate anticorona devices are fitted.
- The axial termination should not be bent closer than twice the diameter of the terminal wire from the body of the resistor.

When resistors are required to be potted, the preferred encapsulant is a silicone compound.

Oil Immersion

For some high voltage applications it is required to immerse the components in oil or gas to reduce the effects of corona and surface tracking. A special lacquer protected version of the resistor is available, suitable for immersion in transformer oil or SF6.

