

Version:
February 28, 2017

DIRECT

Electronics Tech.

(RI85)

High Voltage Power Resistors

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▶ Product Introduction**Direct High Voltage Resistors (RI85)
Break Through 800 Wattage in High Power Applications.****Features :**

- Max Working Voltage from 50KV to 100KV.
- Temperature Coefficient ≤ 100 ppm/°C.
- Resistance Range from 100K Ω to 1Tera Ω .
- Resistance Tolerance K($\pm 10\%$), M($\pm 20\%$).
- Rated Wattage from 200W to 800W.

Applications :

- X-ray/imaging equipment,
- EMI/lightning suppression, Energy research,
- Pulse modulators, Radar Pulse-forming networks,
- Impulse voltage generators, Arc furnace damping,
- Capacitor crowbar circuits, High voltage snubber circuits.

Direct Electronics RI85 series has been developed to provide design engineers with high quality, high power, and high voltage dividers for use in sophisticated system.

The RI85 resistors use Direct's proprietary thick film metal glaze resistive element and Serpentine Pattern Design which provides ideal cost efficient, stability, high power and high voltage characteristics for a wide range of measurement, voltage divider circuits, and control functions in high voltage power electronics applications.

Direct RI85 Voltage Power Resistors are able to absorb large amounts of energy at high voltage while remaining non-inductive and heavy load characteristics. RI85 Resistors conform to the RoHS directives and Lead-free. Customized design, low TCR, resistance values, and tighter tolerances are available on request.

The RI85 non-inductive metal glazed resistors are manufactured on proceeding of tube designed with tab terminal, thick-film printing, firing and laser trimming.

By utilizing specific ceramic core materials with optimum processing, Direct are able to control, very tightly in manufacturing, the important ultra-stable performance parameters TCR less than 100 ppm/°C. Voltage handles up to 100 KV and Wattage available 200W to 800W. This unique process is also offered in specific resistance values in a wide variety of sizes and terminations. The extraordinary operating stability of the Type RI85 resistors will improve the performance of your high voltage system.

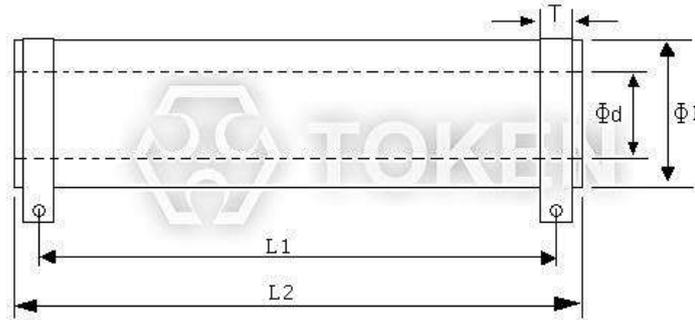
The RI85 Power Voltage Series is RoHS compliant and lead free. For customized designs, tighter tolerances, non-standard technical requirements, or custom special applications, please contact us, or link to Direct official website "[High Voltage Resistors](#)" to get more information.



► **Dimensions & Specification**

Dimensions & Specification (RI85) (Unit: mm)

| Type | Power Rating | Resistance Value (Ω) | Resistance Tolerance | Temperature Coefficient (PPM/°C) | Dimensions (Unit: mm) | | | | | Max working voltage |
|------|--------------|----------------------|----------------------|----------------------------------|-----------------------|------|------|------|------|---------------------|
| | | | | | ΦD±2 | Φd±2 | L1±5 | L2±5 | T±1 | |
| RI85 | 200W | 100K~100G | 10% (K) 20% (M) | ≤100 | 28 | 15 | 185 | 200 | 10.5 | 50KV |
| RI85 | 500W | 100K~500G | | ≤100 | 34 | 20 | 205 | 220 | 15 | 50KV |
| RI85 | 800W | 100K~1T | | ≤100 | 55 | 40 | 205 | 220 | 15 | 100KV |

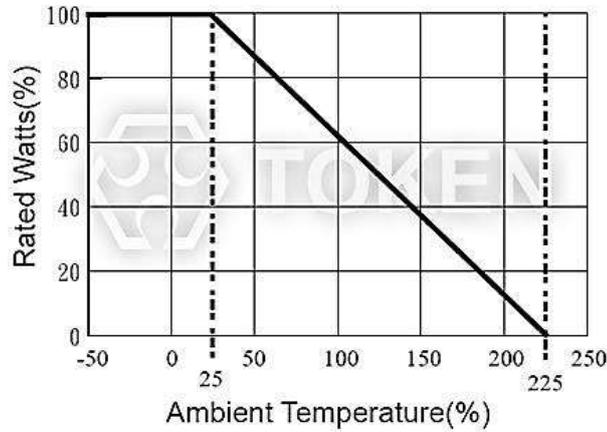


Tubular High Voltage Ceramic Resistors (RI85) Dimensions

- **Remark: Rated Continuous Working Voltage (RCWV) shall be determined from RCWV = square root (power rating × resistance value) or Max Working Voltage listed above, whichever less.**

▶ **Derating Curve**

Power Derating Curve (RI85)



(RI85) Power Derating Curve

▶ **Performance Specifications**

Performance Specifications (RI85)

| Test Item | Test Methods | Characteristics |
|-----------------------|---|--|
| Moisture resistance | MIL Std. 202, method 106 (IEC68-2-3) | $\Delta R/R \leq \pm 0.1\%$ typ., 0.25% Max. |
| Insulation resistance | 500V 25°C 75% relative humidity | 10GΩ Min. |
| Dielectric strength | 25°C 75% relative humidity | 1000V Min. |
| Overload | 1.5×Pnom. 5 sec (do not exceed max. voltage) | $\Delta R/R \leq \pm 0.1\%$ typ., 0.25% Max. |
| Thermal shock | MIL Std. 202, method 107 Cond. C (IEC68-2-14) | $\Delta R/R \leq \pm 0.1\%$ typ., 0.2% Max. |
| Load life | 1000h at rated power (IEC115-1) | $\Delta R/R \leq \pm 0.1\%$ typ., 0.25% Max. |

▶ Advance Technique**The Advantages of Non-Inductance & Serpentine Pattern - (RI85)****Non-Inductive Performance:**

- RI85 Non-Inductive Design which uses a serpentine resistive pattern that offers for zigzagging lines to carry current in opposite directions, thereby achieving maximum neutralization of flux fields over the entire length of the resistor.
- This efficient non-inductive construction without derating of any performance advantages is ideal for applications where high frequency is required.

**Serpentine Pattern Screen Printing Design:**

- The RI85 High Voltage Power Resistor combines Direct's Non-Inductive serpentine pattern, high thru-put screen printed silicone coating.
- The alignment of the gap in the serpentine resistor pattern with the gap in the coating pattern provides a complete encapsulation of the resistor element.
- The cap and lead assemblies are pressed onto the resistor core, finishing the resistor and providing rugged terminal attachment.

▶ Order Codes**High Voltage Resistors (RI85)**

| | | | |
|---------------|-----------------|--------------------------------|-----------------------|
| RI85 | 200W | 1M | K |
| Product Type. | Rated Power.(W) | Resistance Value. (Ω) | Resistance Tolerance. |



► General Information

Cost Effective Complete Selection of High Voltage Components

Direct 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 Direct 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

Direct 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.

