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# **DIRECT**

## **Electronics Tech.**

# **(RMG50) TO-220 Low-Profile Power Resistors**

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**▶ Product Introduction**

**Direct's low profile TO-220 heat sinkable resistor keeps its cool.**

**Features :**

- Electrically Isolated Case.
- TO-220 Style Power Package.
- Low ohm value, non-inductance design
- Molded Case for Protection and Easy to Mount.
- 50 Watt at 25°C Case Temperature Heat Sink Mounted.

**Applications :**

- UPS.
- Voltage Regulation.
- Pulsing applications.
- Switching Power Supplies.
- Non-inductive design for high frequency.

Providing design engineers with an open screened substrate device for applications requiring superior thermal performance, Direct Electronics has developed a non-moulded power resistor rated up to 50W.

Designated the RMG50 Series, the resistor is housed in a TO-220 opened screened substrate package, and features an insulated tapered venturi bonded to the substrate for maximum heat dissipation. The design of the RMG50 Series resistor allows for three methods of heat dissipation, resulting in exceptional power handling characteristics.



The chimney-shaped tapered venturi is attached to the ceramic substrate and convection forces hot air up the 'neck' of the chimney and away from the resistor face of the component.

The power resistor utilizes all three methods of heat dissipation, including conduction through the heat-sink tab, radiation from the resistor surface, and convection through the venturi element. Typical applications for the RMG50 resistor include higher wattage switch-mode power supply circuits, motor control and drive circuits, inverters and industrial power equipment.

Resistance ranges from 0.05Ω to 10KΩ, with tolerances of ±0.50% and ±10% and operating temperature range is -65°C to +150°C. The RMG50 Series TO-220 provides customers requiring more wattage in a smaller package with an excellent alternative.

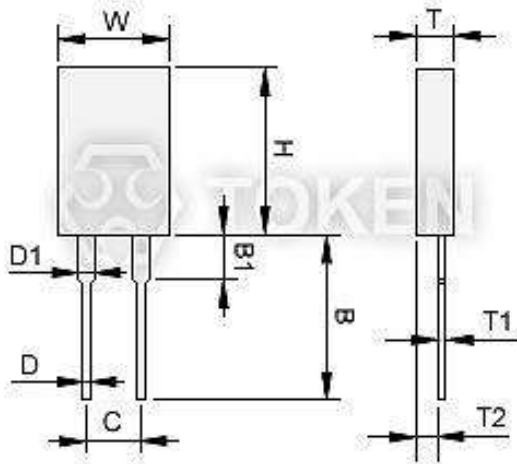
Direct Electronics will also produce devices outside these specifications to meet customer requirements, with comprehensive application engineering and design support available for customers worldwide. Contact us with your specific needs. Please link to Direct official website "[Power Resistors](http://www.direct-token.com)" for more information.



**Dimensions**

**Dimensions (Unit: mm) (RMG50) TO220**

Type	W	H	T	T1	T2	B	B1	C	D	D1
RMG50	10.15	16.00	2.92	0.40	1.52	11.43	2.54	4.82	0.66	1.14
	~ 10.67	~ 16.52	~ 3.44	~ 0.60	~ 2.04	~ 13.97	~ 4.06	~ 5.34	~ 0.86	~ 1.40



**TO220 Heat Sinkable Resistors (RMG50)  
Dimensions (Unit: mm)**

**Specifications**

**Electrical Characteristics Specifications (RMG50) TO220**

Resistance Range	Resistance Tolerance	TCR(PPM/°C)
0.05Ω~1Ω	±5.00% ±10.0%	-
2Ω~5Ω	±1.00% ±5.00% ±10.0%	±200
5Ω~10Ω	±1.00% ±5.00% ±10.0%	±100 ±200
11Ω~10KΩ	±0.50% ±1.00% ±5.00% ±10.0%	±50 ±100 ±200

- Operating Voltage: 350V Max. Dielectric Strength: 1800VAC. Insulation Resistance: 10GΩmin.
- Working Temperature Range: -65°C to +150°C. Resistance Value < 1Ω is Available



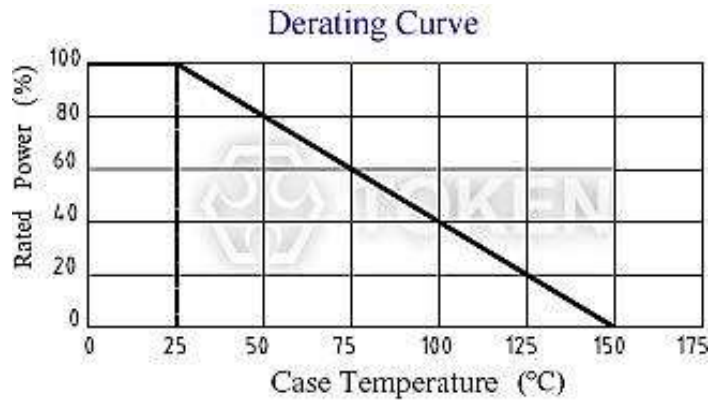
► **Characteristics**

**Environmental Characteristics (RMG50) TO220**

Test Item	Specification	Test Method
Temperature Coefficient of Resistance	10Ω and above, ±50ppm/°C 1Ω and 10Ω, (±100ppm)/°C	Referenced to 25°C, ΔR taken at +105°C
Short Time Overload	Δ R±0.3%	2 times rated power with applied voltage not to exceed 1.5 times maximum continuous operating voltage for 5 seconds.
Load Life	Δ R±1.0%	MIL-R-39009, 2,000 hours at rated power.
Humidity (Steady State)	Δ R±0.5%	MIL-STD-202F, Method 103B 40°C, 90~95%RH, RCWV 1.5hours ON, 0.5hours OFF. Total 1000~1048 hours.
Thermal Shock	Δ R±0.3%	MIL-STD-202, Method 107G. -65°C~150°C, 100 cycle
Terminal Strength	Δ R±0.2%	MIL-STD-202, Method 211, Cond.A(Pull Test) 2.4N.
Vibration, High Frequency	Δ R±0.2%	MIL-STD-202, Method 204, Cond.D.

- **Lead Material: Tinned Copper. Maximum Torque: 0.9 Nm.**
- **Without a Heat Sink, When in Free Air at 25°C, the RMG50 is rated for 3W.**
- **The Case Temperature is to be used for the Definition of the Applied Power Limit.**
- **The Case Temperature Measurement Must be Made with a Thermocouple Contacting the Center of the Component Mounted on the Designed Heat Sink.**
- **Thermal Grease Should be Applied Properly.**

► **Derating Curve**



(RMG50) Power Derating Curve



## ▶ Order Codes

### Order Codes (RMG50) TO220

RMG	50	J	P	D	10R
Part Number	Power Rating (W)	Resistance Tolerance (%)	Package	TCR (PPM/°C)	Resistance (Ω)
		D ±0.5%	T Tube	D ±50PPM/°C	0R1 0.1Ω
		F ±1%	P Bulk	E ±100PPM/°C	10R 10Ω
		G ±2%		F ±200PPM/°C	1K 1KΩ
		J ±5%		- No specified	10K 10KΩ
		K ±10%			

## ▶ General Information

### Compact TO-Style Resistors are Low Cost

Direct Electronics TO-Style power film heat sink mountable resistors, TO-220 and TO-247 Style Packages, are designed for intermediate power applications and combines performance with an economical price.

TO-220 Power Resistors, TO-247 Power Resistors RMG series are ultra-precision and high power resistors encapsulated in the TO-220, TO-247 style power package. Power resistors are manufactured in 20W, 30W, 35W, 50W and 100W. Resistance element is electrically insulated from metal heat sink mounting tab. When properly mounted Direct's RMG\*\* TO220/TO247 packaged power resistors provide up to 50/100 watts of steady state power. These very low inductance resistors are ideal for many industrial applications: power supplies, power controls and inrush/bleeder resistors.

### Non-Inductive Design for High Frequency Applications

Direct's TO-Style Series satisfy demanding applications for accurate and stable power resistors housed in the convenient TO-Style case. The resistance element is isolated from the mounting tab by an alumina ceramic layer, providing very low thermal resistance and ensuring high insulation resistance between terminals and tab.

These isolated resistor element are constructed and packaged in a high temperature plastic case with a single screw metal tab for easy mounting to the heat sink. The non-inductive design makes these products especially useful in high frequency and high speed pulse applications.

### Pulse-Loading Applications as Snubber or Bleeder Resistors

Direct's TO-Style resistors are designed for use in pulse-loading applications, as bleeder or snubber resistors in switching power supplies, industrial power drives, medical, test equipment, high power equipment such as uninterruptible power supplies (UPS), and other power distribution and power conversion applications.

The Power Film Resistors use an optimized process of Direct's thick film technology on an alumina substrate to achieve tolerances as low as  $\pm 0.5\%$ , and up to  $\pm 10\%$ . The Non-Inductive design and resistance values as low as 0.05 ohms are also ideal for current sensing applications.

