MP820 / MP821 Non-Inductive Power Film Resistors

Product overview

A resistance film fired onto a flat ceramic substrate is thermally bonded to a copper heatsink tab. High-temperature molding completes the metal-tab TO-220 package.



Features

- Non-inductive geometry for fast switching, snubbers and RF applications.
- Resistive element electrically isolated from the mounting surface.
- Power capability depends on case temperature; design cooling with the derating curve.
- Standard resistance and tolerance choices; custom requirements by agreement.

Electrical specifications

Parameter	MP820	MP821
Package	TO-220	TO-220
Resistance range	10 Ω–10 kΩ	0.020–9.99 Ω
Power at Tc =25°C	20 W	20 W
Maximum operating voltage	300 V	Power limited
Thermal resistance RθJC	7.50 °C/W	7.50 °C/W
Maximum temperature Tmax	175°C	175°C
Free-air power at 25°C	2.25 W	2.25 W
Operating temperature	-55°C to model-specific Tmax	
Dielectric withstand	1500 Vrms AC	
Insulation resistance	≥10,000 MΩ	
Typical series inductance	10 nH	
Terminal material	Solderable	

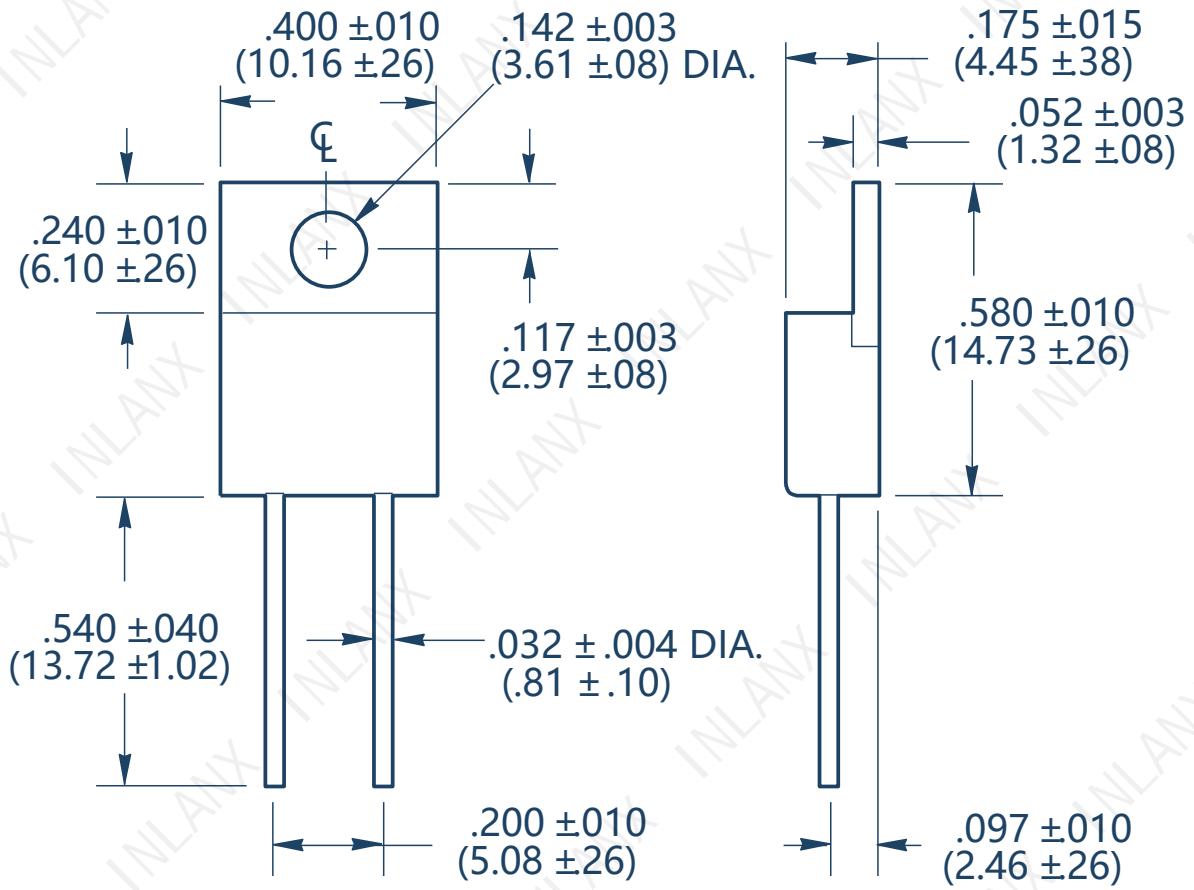
Power and overload capability are derated by case temperature. “Power limited” means voltage must be determined from resistance and allowable power.

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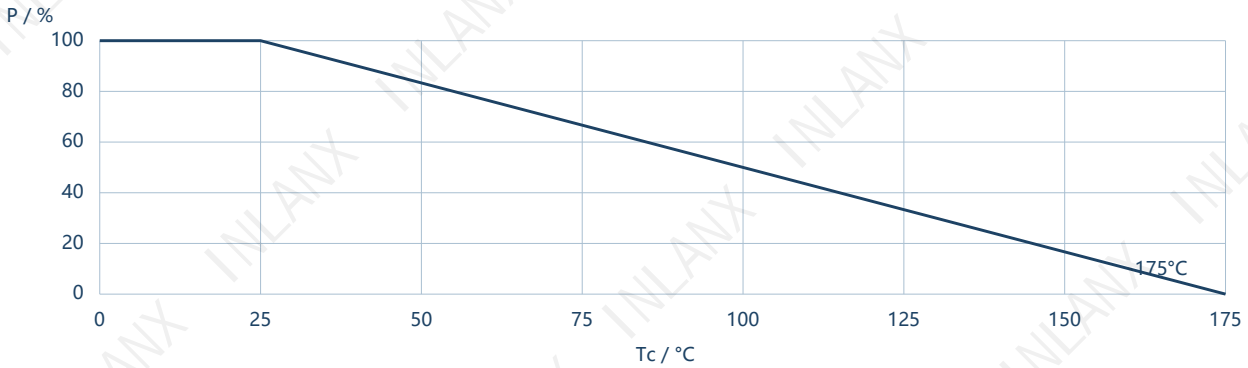
Dimensions and construction

Dimensions follow the source: inches with millimeters in parentheses. Structures, holes and terminal shapes follow the original drawing.

MP820 / MP821 • TO-220



Power derating curve



Rated power is 100% at Tc =25°C and falls linearly to zero at each model’ s Tmax. Measure Tc at the mounting-face center with the part correctly mounted and loaded.

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Temperature coefficient

Resistance interval	TCR / ppm/°C
R ≥5 Ω	-20...+50
0.50–4.99 Ω	-20...+80
0.050–0.49 Ω	0...+200
0.020–0.049 Ω	0...+300

TCR is referenced to 25°C, with ΔR measured at Tmax.

Performance and tests

Test	Conditions	Resistance change limit
Load stability	2000 h at rated power; derated by case temperature	±(1.0%R + 0.001 Ω)
Momentary overload	5 s; voltage ≤1.5× maximum continuous operating voltage	±(0.3%R + 0.001 Ω)
Moisture resistance	MIL-STD-202, Method 106	±(0.5%R + 0.001 Ω)
Thermal shock	MIL-STD-202, Method 107, Condition F	±(0.3%R + 0.001 Ω)
Mechanical shock	100 G; MIL-STD-202, Method 213, Condition I	±(0.2%R + 0.001 Ω)
High-frequency vibration	MIL-STD-202, Method 204, Condition D	±(0.2%R + 0.001 Ω)
Terminal strength	MIL-STD-202, Method 211, Condition A; 5 lb pull	±(0.2%R + 0.001 Ω)

R is nominal resistance. Momentary overload: 2× rated power for MP820, MP821 and MP850; 1.5× for MP825 and the MP900/MP9100 models.

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Standard resistance values and tolerance

MP820

10.0 Ω	12.0 Ω	15.0 Ω	20.0 Ω	25.0 Ω	27.0 Ω	30.0 Ω	33.0 Ω
40.0 Ω	47.0 Ω	50.0 Ω	56.0 Ω	75.0 Ω	100 Ω	120 Ω	150 Ω
200 Ω	250 Ω	300 Ω	330 Ω	400 Ω	470 Ω	500 Ω	560 Ω
750 Ω	1.00 kΩ	1.50 kΩ	2.00 kΩ	2.50 kΩ	3.00 kΩ	3.30 kΩ	4.00 kΩ
5.00 kΩ	7.50 kΩ	10.0 kΩ					

Standard ±1%; ±0.5%, ±5% and ±20% available for most values.

MP821

0.020 Ω	0.025 Ω	0.030 Ω	0.033 Ω	0.040 Ω	0.050 Ω	0.075 Ω	0.10 Ω
0.15 Ω	0.20 Ω	0.25 Ω	0.30 Ω	0.33 Ω	0.40 Ω	0.50 Ω	0.75 Ω
1.00 Ω	1.50 Ω	2.00 Ω	2.50 Ω	3.00 Ω	3.30 Ω	4.00 Ω	5.00 Ω
7.50 Ω	8.00 Ω						

Standard ±1%; ±0.5%, ±5% and ±20% available for most values.

Mounting and selection

• Use a smooth, flat, clean heatsink and a thermal interface such as grease. The entire exposed heat-dissipating rear surface must contact the heatsink.

• For screw mounting, use a compression washer providing 150–300 lb (665–1330 N). The mounting torque limit to avoid package damage is 8 in·lbf (0.90 N·m).

• A spring clip should apply 8–30 lb (35–130 N) at the package center. Use a rounded or smooth contact area to avoid point loading. A pressure bar with a larger contact area is another option.

• Across the full application temperature range, satisfy $T_c + R\theta JC \times P \le T_{max}$. Measure case temperature at the mounting-surface center with the part properly mounted and electrically loaded.

• Measure resistance and inductance 0.2 in (5.08 mm) from the resistor body. For dielectric tests, short the terminals and test against the mounting metal surface or a metal clip contacting the package top.

Ordering example: MP820 - 50.0 - 1% (model - resistance - tolerance). Packaging: 50 pieces per tube. Custom resistance and tolerance by agreement.