Type MM and ML Precision Film Resistors

High Temperature Resistors for Geophysical, Industrial, and Military Requirements

Type MM and ML resistors have a proven performance history in industrial and military applications. Utilizing our proven Micronox® resistance films, these resistors are available with power ratings up to 1 Watt and resistance values to 10 Megohms. These resistors are ideal for applications requiring tolerances as close as 0.1% and extended life stability of 0.1% per 1,000 hours.

Some models of Type MM and ML resistors are manufactured with Caddock's Non-Inductive Design that provides for neighboring lines to carry current in opposite directions. This efficient non-inductive construction is accomplished without derating of any performance advantages.

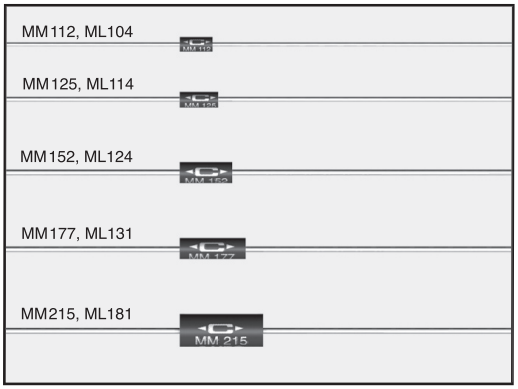


Type MM features:

- Max. Operating Temperature to +275°C.
- High Power Rating at +125°C.
- TC of 50 ppm/°C from -15°C to +105°C.
- Non-Inductive Performance Available.

Type ML features:

- TC of 50 ppm/°C from -15°C to +105°C.
- Non-Inductive Performance Available.



Model No.	Watt-age	Max. Voltage	Oper. Temp. (Max.)	Dielect. Strength	Resistance		Dimensions in inches and (millimeters)		
					Min.	Max.	A	B	C
MM112	0.12	200	275°C	400	45 Ω	500 K	.160 ±.010 (4.06 ±.26)	.065 ±.010 (1.65 ±.26)	.018 ±.004 (.48 ±.10)
MM125	0.25	200	275°C	500	30 Ω	1 Meg	.188 ±.020 (4.78 ±.51)	.070 ±.015 (1.78 ±.38)	.020 ±.002 (.51 ±.05)
MM152	0.4	300	275°C	750	30 Ω	2 Meg	.250 ±.020 (6.35 ±.51)	.094 ±.006 (2.39 ±.15)	.025 ±.002 (.64 ±.05)
MM177	0.6	500	275°C	750	45 Ω	5 Meg	.313 ±.020 (7.95 ±.51)	.094 ±.006 (2.39 ±.15)	.025 ±.002 (.64 ±.05)
MM215	1.0	800	275°C	1,000	45 Ω	10 Meg	.400 ±.020 (10.16 ±.51)	.150 ±.010 (3.81 ±.26)	.025 ±.002 (.64 ±.05)
ML104	0.08	200	175°C	400	50 Ω	300 K	.160 ±.010 (4.06 ±.26)	.065 ±.010 (1.65 ±.26)	.018 ±.004 (.48 ±.10)
ML114	0.15	200	175°C	500	50 Ω	500 K	.188 ±.020 (4.78 ±.51)	.070 ±.015 (1.78 ±.38)	.020 ±.002 (.51 ±.05)
ML124	0.25	300	175°C	750	50 Ω	600 K	.250 ±.020 (6.35 ±.51)	.094 ±.006 (2.39 ±.15)	.025 ±.002 (.64 ±.05)
ML131	0.4	500	175°C	750	50 Ω	1 Meg	.313 ±.020 (7.95 ±.51)	.094 ±.006 (2.39 ±.15)	.025 ±.002 (.64 ±.05)
ML181	0.6	600	175°C	750	50 Ω	5 Meg	.400 ±.020 (10.16 ±.51)	.150 ±.010 (3.81 ±.26)	.025 ±.002 (.64 ±.05)

Models with low inductance construction are in shaded areas.
Models with Caddock's Non-Inductive Resistance Pattern are in non-shaded areas.

Replacement Notes:

Model MM216 replaced by MS221
Model MM217 replaced by MS223
Model MM224 replaced by MS244
Model MM225 replaced by MS245
Model MM236 replaced by MS260

Model ML212 replaced by MS221
Model ML213 replaced by MS223
Model ML218 replaced by MS244
Model ML219 replaced by MS245
Model ML226 replaced by MS260

Ordering Information:

ML124 - 20.0K - 1%

Model Number: ML124
Resistor Value: 20.0K
Tolerance: 1%

Note: The MM and ML resistors are intended for high performance electronics applications that are outside the scope of the RoHS directive. Contact Caddock Applications Engineering for an RoHS compliant alternative.

Specifications:

Resistance Tolerance: ±1% (tolerances to 0.1% on special order).

Temperature Coefficient: 50 ppm/°C referenced to +25°C, ΔR taken at -15°C and +105°C.

Insulation Resistance: 10,000 Megohms, min.

Overload/Overvoltage: 5 times rated power with applied voltage not to exceed 1.5 times maximum continuous operating voltage for 5 seconds, ΔR 0.5% max. or 0.5 ohm max., whichever is greater.

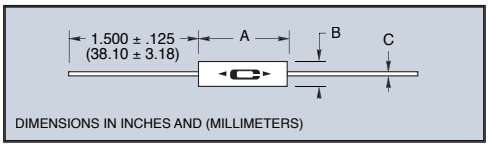
Thermal Shock: Mil-Std-202, Method 107, Cond. F, ΔR 0.2% max. or 0.5 ohm max., whichever is greater.

Moisture Resistance: Mil-Std-202, Method 106, ΔR 0.5% max. or 0.5 ohm max., whichever is greater.

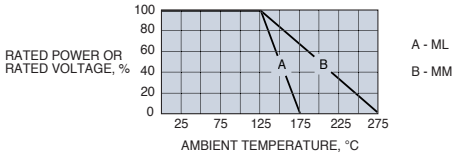
Loadlife: 1,000 hours at +125°C at rated power, not to exceed rated voltage, ΔR 0.5% max. or 0.5 ohm max., whichever is greater.

Solderable leads

Encapsulation: Transfer Molded.



Derating Curve:



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Roseburg, Oregon 97470-9422
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