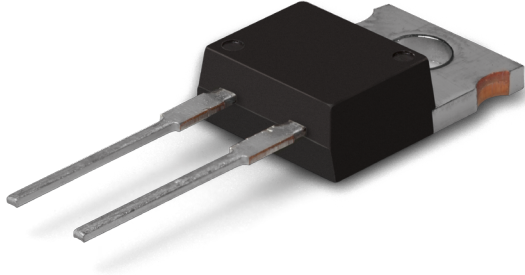


Data Sheet for Precision Resistors

Power Resistor (thin film)

Series M220



- Power rating up to 50 Watt (with heat-sink)
- Resistance range from 0,01Ω..51kΩ
- Resistance tolerance ±1%
- TCR up to ±50ppm/°C
- TO-220 housing
- Low inductance (<10nH)

Electrical Specification	M220-2	M220-3	M220-5
Resistance range	0,02Ω..51kΩ	0,01Ω..51kΩ	0,02Ω..51kΩ
Resistance tolerance		±1%..±5%	
Power rating @ 25°C (0W @ +175°C)	20 W with heat-sink 1 W without heat-sink	35 W with heat-sink 1 W without heat-sink	50 W with heat-sink 1 W without heat-sink
Max. working voltage		500V or $\sqrt{P \cdot R}$	
TCR-rate		±50ppm/°C @ $R \geq 10\Omega$ ±100ppm/°C @ $0,1\Omega \leq R < 10\Omega$ ±250ppm/°C @ $R < 0,1\Omega$	
Working temperature range (max.)		-55..+175°C	

Mechanical Specification	
Resistance technology / material	Thin film
Housing material	Epoxy moulded
Design	TO-220
Connections	Radial cooper tinned

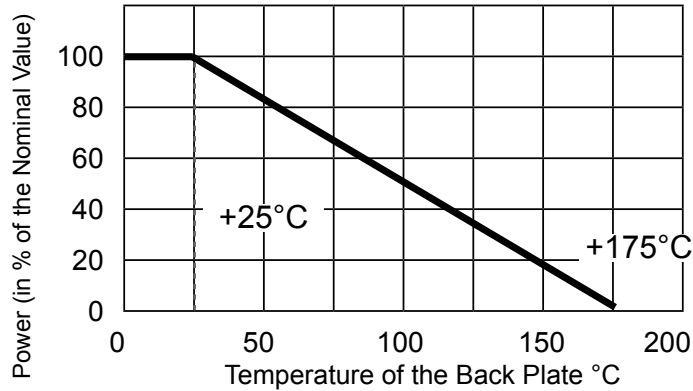
Parameters	Test Conditions	Specification ΔR
Load life	90 min on, 30 min off, 1000h @25°C	±1%
Moisture resistance	90..95% RH, 0,1W, 1000h @ 40°C	±1%
Thermal shock	-55°C 30 min., +155°C 30min. 1000h	±0,25%
Resistance to soldering heat	350°C, 3 sec.	±0,1%
Vibration	IEC60068-2-6	±0,25%
Dielectric strength: 2000 VAC		
Inductance: 8,38 nH (M220-2 / M220-3) / 9,65 nH (M220-5)		
Isolation resistance: >1 GΩ		
Thermal resistance: 4,9°C/W (M220-2) / 3,3°C/W (M220-3) / 2,3°C/W (M220-5)		

Data Sheet for Precision Resistors

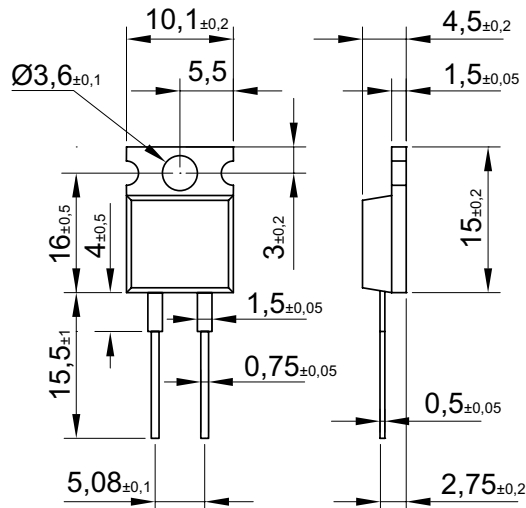
Power Resistor (thin film)

Series M220

Power Derating Curve



Technical Drawing



Power Rating Notes:

The M220 series resistors have to be combined with a correctly dimensioned heat-sink. The internal temperature of the resistor should not exceed 175°C.

Formula for the calculation of an appropriate heat-sink:

$$R_{\theta H} = \frac{T_{\max} - (P \times R_{\theta R}) - T_U}{P}$$

$R_{\theta H}$	Thermal Resistance of the Heat-Sink (°C/W)
$R_{\theta R}$	Thermal Resistance of the Resistor (°C/W)
T_{\max}	Maximum Temperature of the Resistor
T_U	Ambient Temperature of the Heat-Sink (°C)
P	Power applied to the Resistor (W)

Mounting Notes:

The resistor must be attached to a suitable heat-sink. Mount resistor using thermal grease to a clean, flat surface. Use a compression washer to provide 665 to 1330N of mounting force. Torque mounting screw to 0,9 Nm. Back plate is isolated from both pins.

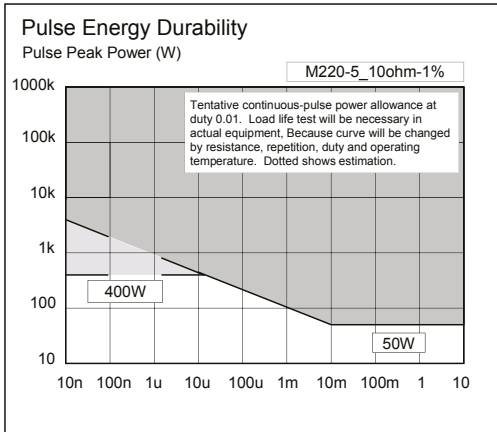
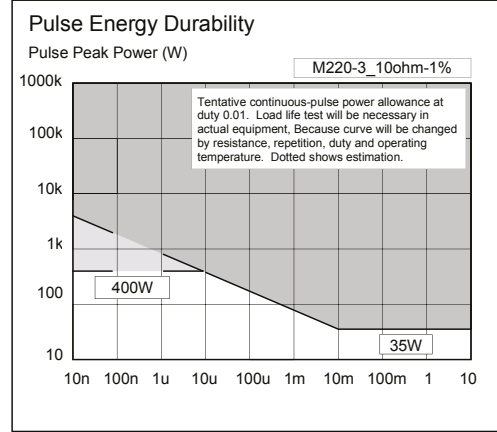
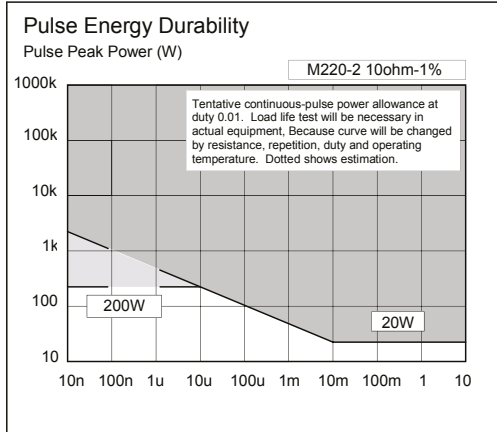
Data Sheet for Precision Resistors



Power Resistor (thin film)

Series M220

Pulse Energy Durability



Order code

Description

Selection: standard=black/bold, possible options=grey/cursive

Series:	M2220			
Resistance tolerance: ±1% @R ≥ 0,1 Ω ±5		W1% W5%		
Temperature coefficient: ±50ppm/°C @ R ≥ 10Ω ±100ppm/°C @ 0,1Ω ≤ R <10Ω ±250ppm/°C @ R < 0,1Ω			TK50 TK100 TK250	
Resistance value - please choose: From 0,01Ω to ≤ 51kΩ			xxxkxxx	
Power rating: Type 2 @ 20W Type 3 @ 35W Type 5 @ 50W				2 3 5

Order Example	Series	Resistance tolerance	Temperature coefficient	Resistance value	Power Rating
Choice	M220	±1%	50ppm/°C	10,1kΩ	20W
Code	M220	W1%	TK50	10k100	2