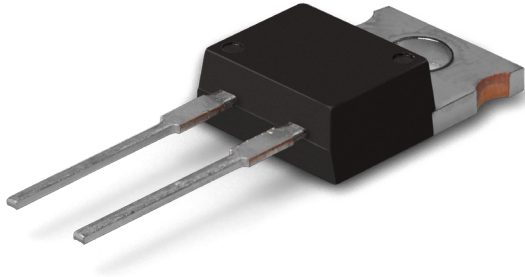


# Data Sheet for Precision Resistors

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

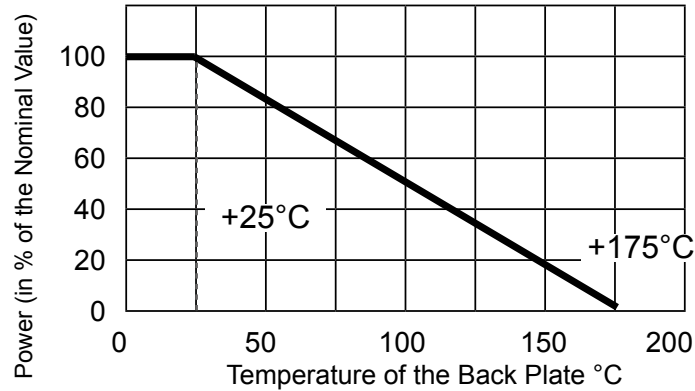
Parameters	Test Conditions	Specification $\Delta R$
Load life	90 min on, 30 min off, 1000h @25°C	±1%
Moisture resistance	90..95% RH, 0,1W, 1000h @ 40°C	±1%
Thermal shock	-55°C 30 min., +155°C 30min. 1000h	±0,25%
Resistance to soldering heat	350°C, 3 sec.	±0,1%
Vibration	IEC60068-2-6	±0,25%
Dielectric 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

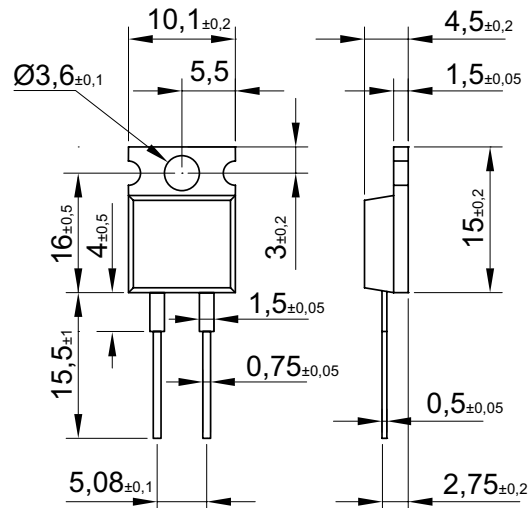
Power Resistor (thin film)

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.

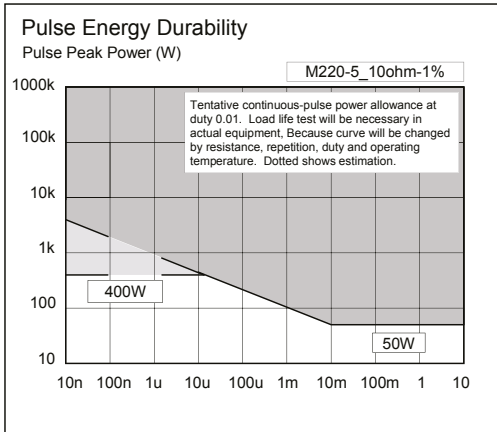
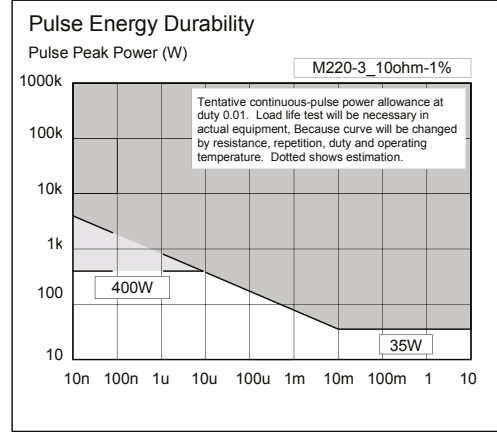
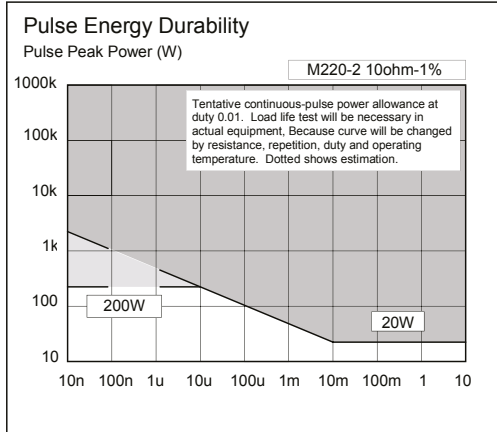
# Data Sheet for Precision Resistors



Power Resistor (thin film)

Series M220

## Pulse Energy Durability



## Order code

### Description

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

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

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