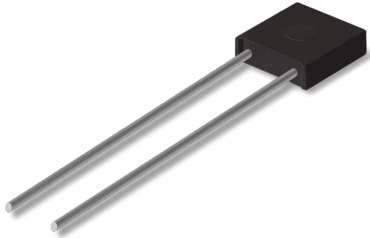


# Data Sheet for Precision Resistors

Metal Foil Resistor

Series MR



- Very good Long Term Stability
- Any Resistance from 1Ω..400kΩ
- Best Resistance Tolerance ±0,005%
- Temperature Coefficient up to ±1ppm/°C
- Low Current Noise
- Rugged Epoxy Housing

Electrical Specification	MR 9101	MR 9102	MR 9103
Resistance range	1Ω..200kΩ		5Ω..400kΩ
Resistance tolerance	±0,005%..±1%		
Power rating @ 125°C (0W @ +175°C)	0,3W (≥150kΩ = 0,2W)		0,5W (≥200kΩ = 0,3W)
Max. working voltage	300V		350V
TCR-rate	±1ppm/°C**, ±2,5ppm/°C @ R = 30..200kΩ ±5ppm/°C @ R = 5..200kΩ ±15ppm/°C @ R = 1..5Ω		±1ppm/°C**, ±2,5ppm/°C @ R = 30..400kΩ ±5ppm/°C @ R = 5..400kΩ
Working temperature range (max.)	-55..+125°C (-65..+175°C)		

\*\*limited max. working temperature range 0..+60°C

Mechanical Specification	
Resistance technology / material	Metal foil
Housing material	Epoxy moulded
Connections	Radial cooper tinned

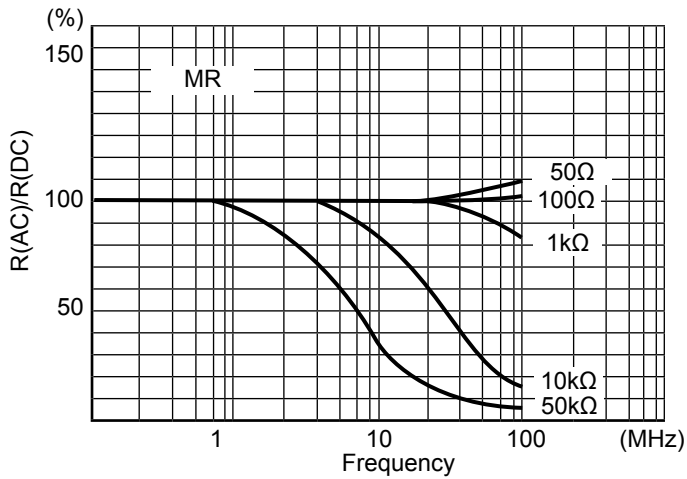
Parameters	Test Conditions (MIL-PRF-55182/9)	Specification
Power Conditioning	125°C, rated power, 100 h	ΔR ±0,005%
Short time overload	6,25 x rated power, 5 sec.	ΔR ±0,005%
Life span (biased)	125°C, rated voltage, 90 min. on 30 min off, 2000 h	ΔR ±0,015%
High temperature / humidity	+65°..-10°C, 90..98% RH rated voltage, 10 cycles, 240h	ΔR ±0,01%
Temperature shock	-65°C (30 min)..+150°C (30 min), 5 cycles	ΔR ±0,005%
High temperature exposure	+175°C, no load 2000 h	ΔR ±0,015%
Solderability	245°C, 5 sec.	Coverage >95%
Resistance to soldering heat	260°C, 10 sec.	ΔR ±0,0025%
Isolation resistance	100 VDC, 2 min.	>10000MΩ
Dielectric strength	Atmo. Pres.: 300 Vrms.	ΔR ±0,0025%
Low temperature operation	-65°C, 45 min. rated voltage	ΔR ±0,0025%
Shock	100G, 6 ms, halfsine, X, Y each 10 shocks	ΔR ±0,0025%
High frequency vibration	20G, 10Hz to 2kHz to 10Hz, 20 min. X, Y each 4 h	ΔR ±0,0025%
Current noise		-42 dB
Voltage coefficient		0,00003%/V
Thermal EMF		1,0 μV/°C

# Data Sheet for Precision Resistors

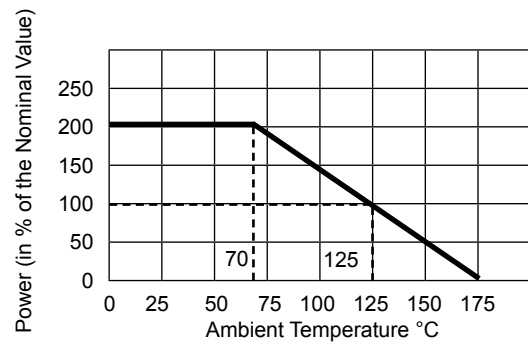
Metal Foil Resistor

Series MR

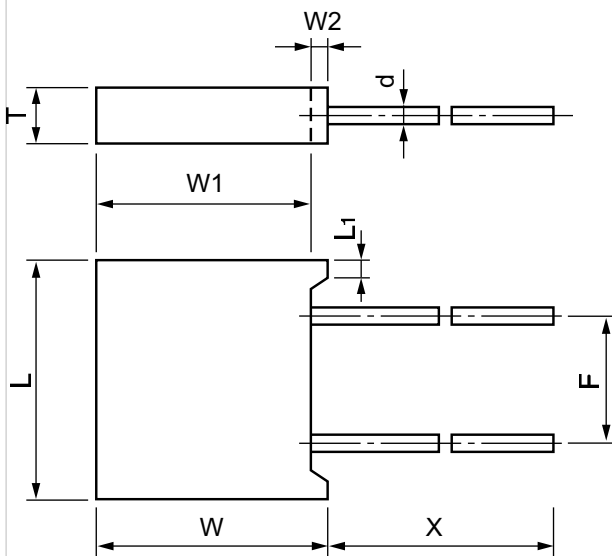
## Frequency Characteristics



## Power Derating Curve



## Technical Drawing



	MR 9101	MR 9102	MR 9103
L	7,9 ±0,2 mm		13 ±0,3 mm
L1	max. 1 mm		max. 1,5 mm
W	8,3 ±0,2 mm		10 ±0,3 mm
W1	8,0 ±0,2 mm		9,5 ±0,3 mm
W2	max. 0,3 mm		max. 0,5 mm
T	2,8 ±0,2 mm	2,3 ±0,2 mm	4,0 ±0,3 mm
F	3,81 ±0,25 mm	5,08 ±0,25 mm	7,5 ±0,5 mm
X	25 ±10 mm	10 ±3 mm	
d	Ø0,65 ±0,05 mm		

# Data Sheet for Precision Resistors

Metal Foil Resistor

Series MR

Order code					
Description		Selection: standard=black/bold, possible options=grey/cursive			
<b>Series:</b>	<b>MR</b>				
<b>Type / size:</b> 9101 (1Ω..200kΩ) 9102 (1Ω..200kΩ) 9103 (5Ω..400kΩ)		<b>9101</b> <b>9102</b> <b>9103</b>			
<b>Resistance tolerance for 9101 and 9102:</b> ±1% @ R >1Ω ±0,5% @ R >1Ω ±0,1% @ R >5Ω ±0,05% @ R >30Ω ±0,02% @ R >30Ω ±0,01% @ R >30Ω ±0,005% @ R >30Ω			<b>W1%</b> <b>W0,5%</b> <b>W0,1%</b> <b>W0,05%</b> <b>W0,02%</b> <b>W0,01%</b> <b>W0,005%</b>		
<b>Resistance tolerance for 9103:</b> ±1% @ R >5Ω ±0,5% @ R >5Ω ±0,1% @ R >5Ω ±0,05% @ R >30Ω ±0,02% @ R >30Ω ±0,01% @ R >30Ω ±0,005% @ R >30Ω			<b>W1%</b> <b>W0,5%</b> <b>W0,1%</b> <b>W0,05%</b> <b>W0,02%</b> <b>W0,01%</b> <b>W0,005%</b>		
<b>Temperature coefficient for 9101 and 9102:</b> ±15ppm/°C @ R ≤5Ω ±5ppm/°C @ R >5Ω ±2,5ppm/°C @ R ≥30Ω <i>Option ±1ppm/°C @ R ≥30Ω</i>				<b>TK15</b> <b>TK5</b> <b>TK2,5</b> <i>TK1</i>	
<b>Temperature coefficient for 9103:</b> ±5ppm/°C @ R >5Ω ±2,5ppm/°C @ R ≥30Ω <i>Option ±1ppm/°C @ R ≥30Ω</i>				<b>TK5</b> <b>TK2,5</b> <i>TK1</i>	
<b>Resistance value - please choose:</b> From 0,01Ω to ≤ see type					<b>xxxxxxx</b>

Order Example	Series	Type	Resistance tolerance	Temperature coefficient	Resistance value
Choice	MR	9102	±0,1%	5ppm/°C	10,1kΩ
Code	MR	9102	W0,1%	TK5	10k100