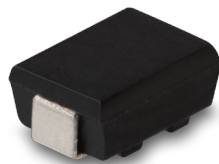


# Data Sheet for Precision Resistors

SMD Resistor (metal foil)

Series MMP/MMQ



MMQ



MMP

- SMD - Resistor
- Resistance value from 30Ω..60kΩ
- Resistance Tolerance up to ±0,05%
- Standard TCR up to ±5ppm/°C (≥ ±1ppm/°C on request)
- Temperature Range -65°C..+175°C
- Tape on Reel Packaging or Bulk

Electrical Specification	MMP	MMQ
Resistance range	30Ω..30kΩ	30Ω..60kΩ
Resistance tolerance	±0,05%, ±0,1% (optional ±0,02%, ±0,01%)	
Power rating @ 125°C (0W @ +175°C)	0,1W	0,125W
Max. working voltage	50V	100V
Max. working current	350 mA	
TCR-rate	±5ppm/°C@ R =100Ω..30kΩ, ±10ppm/°C R =30..100Ω (±1ppm/°C on request)	±5ppm/°C@ R =100Ω..60kΩ, ±10ppm/°C R =30..100Ω (±1ppm/°C on request)
Working temperature range (max.)	-55..+125°C (-65..+175°C)	

Mechanical Specification	
Resistance technology / material	Metal foil
Housing material	Epoxy moulded
Connections	Radial brass silver plated

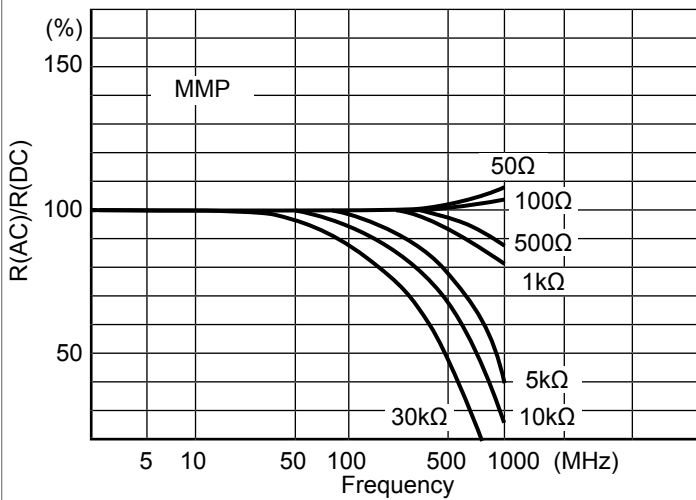
Parameters	Test Conditions	Specification
Short time overload	2,5 x rated voltage, 5 sec.	ΔR ±0,01%
Life span (biased)	125°C, rated power, 90 min. on 30 min. off, 2000 h	ΔR ±0,03%
High temperature / humidity	+65° ..-10°C, 90..98% RH rated voltage, 10 cycles, 240h	ΔR ±0,03%
Temperature shock	-65°C (30 min.)..+175°C (30 min.), 5 cycles	ΔR ±0,01%
High temperature exposure	+175°C, no load 2000 h	ΔR ±0,03%
Resistance to soldering heat	260°C, 10 sec.	ΔR ±0,01%
Isolation resistance	100 VDC, 1 min.	>10000MΩ
Dielectric strength	200 VAC, 1 min.	ΔR ±0,005%
Low temperature operation	-65°C, 45 min. rated voltage	ΔR ±0,01%
Shock	100G, 6 ms, halfsine, X, Y, Z each 10 shocks	ΔR ±0,01%
High frequency vibration	20G, 10Hz to 2kHz to 10Hz, 20 min. X, Y, Z each 2,5 h	ΔR ±0,01%

# Data Sheet for Precision Resistors

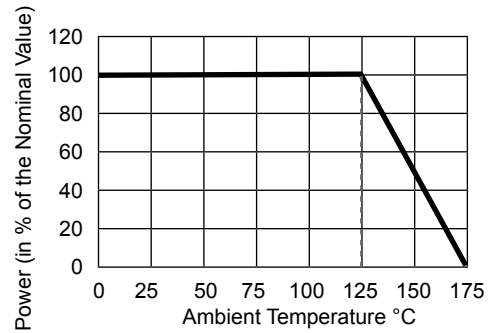
SMD Resistor (metal foil)

Series MMP/MMQ

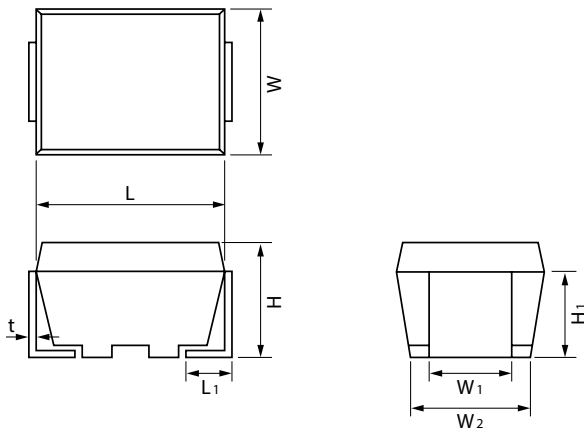
## Frequency Characteristics



## Power Derating Curve



## Technical Drawing



Type	MMP	MMQ
L	3.2±0.2	4.5±0.2
W	2.5±0.2	3.2±0.2
H	2.0±0.2	
L <sub>1</sub>	0.6±0.2	0.8±0.2
W <sub>1</sub>	1.4±0.3	
W <sub>2</sub>	2.3±0.2	3.0±0.2
H <sub>1</sub>	1.5±0.3	
t	0.15±0.05	

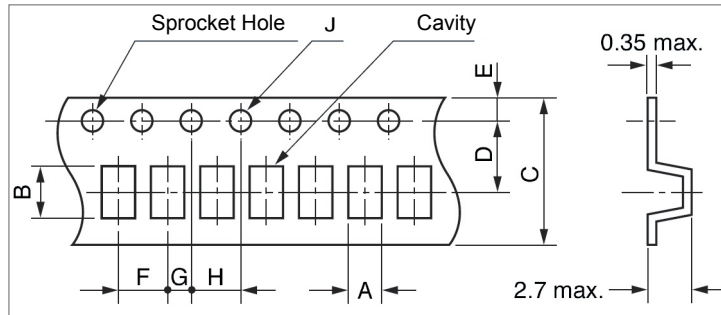
Dimensions in mm

# Data Sheet for Precision Resistors

SMD Resistor (metal foil)

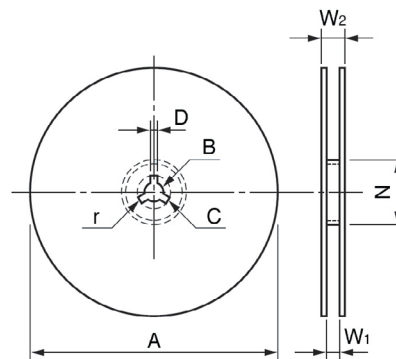
Series MMP/MMQ

## Tape Dimensions



Dimensions in mm	A	B	C	D	E	F	G	H	J
MMP	2,8 ±0,2	3,9 ±0,2	12 ±0,3	5,5 ±0,05	1,75 ±0,1	4 ±0,1	2 ±0,05	4 ±0,1	Ø1,5 ±0,1
MMQ	3,6 ±0,2	5,2 ±0,2	12 ±0,3	5,5 ±0,05	1,75 ±0,1	8 ±0,1	2 ±0,05	4 ±0,1	Ø1,5 ±0,1

## Reel Dimensions



Dimensions in mm	A	N	B	C	D	W <sub>1</sub>	W <sub>2</sub>	r
	Ø178 ±0,2	Ø60 min	Ø13 ±0,5	Ø21 ±0,8	2 ±0,5	12,4 +2	18,4 max.	1 ±0,5

Packaging	MMP	MMQ
Reel Capacity	1200	800

## Processing and storage instructions

- Do not store in high temperatures (>40°C) high humidity (>70% RH).
- Hand Soldering: soldering temperature 240°C..265°C with soldering tip ≤ 3 mm
- Soldering furnace: max. temperature 250°C+0/-5°C, holding time max. 10sec.
- Dip Soldering: max. temperature of the soldering bath 260°C
- After the different soldering methods an even cooling down has to be ensured. Avoid parts from any mech. stress.

# Data Sheet for Precision Resistors

SMD Resistor (metal foil)

Series MMP/MMQ

Order code				
Description		Selection: standard=black/bold, possible options=grey/cursive		
<b>Series:</b> <b>MMP (max. 30kΩ)</b> <b>MMQ (max. 60kΩ)</b>	<b>MMP</b> <b>MMQ</b>			
<b>Resistance tolerance:</b> <b>±0,05% @ R ≤100Ω</b> <b>±0,1% @ R &gt;100Ω</b> <i>Option ±0,02 @ R &gt;100Ω</i> <i>Option ±0,01 @ R &gt;1kΩ</i>		<b>W0,05%</b> <b>W0,1%</b> <i>W0,02%</i> <i>W0,01%</i>		
<b>Temperature coefficient:</b> <b>±10ppm/°C @ R ≤100Ω</b> <b>±5ppm/°C @ R &gt;100Ω</b> <i>Option ±5ppm/°C &gt; TKx,x &gt; ±1ppm/°C</i> <i>Option ±1ppm/°C @ R ≥0,1..40kΩ for MMQ</i> <i>Option ±1ppm/°C @ R ≥1..20kΩ for MMP</i>			<b>TK10</b> <b>TK5</b> <i>TKx,x</i> <i>TK1</i> <i>TK1</i>	
<b>Resistance value - please choose:</b> <b>From 30Ω to ≤ see series</b>				<b>xxkxxx</b>

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