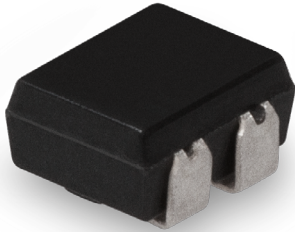


# Data Sheet for Precision Resistor

SMD Resistor as Voltage Divider (metal foil)

Series MMU



- SMD Resistor as Voltage Divider
- Resistance range from 10Ω..20kΩ
- TCR up to ±5ppm/°C absolute, matching ±1ppm/°C
- Resistance tolerances absolute from ±0,02%, matching from ±0,01%
- Low current noise with excellent load life ratio stability

Electrical Specification	Absolute	Matching
Resistance range	10Ω..20kΩ (max. aggregate value 20kΩ)	
Resistance tolerance	±0,02%..±0,5%	±0,01%..±0,5%
Power rating @ 125°C (0W @ +150°C)	0,05W (each single element)	
TCR-rate	±5ppm/°C..±15ppm/°C	Tracking
		Ratio
		Value
		R1 / R2 = 1 1 < R1 / R2 ≤ 10 10 < R1 / R2 ≤ 100 R1 / R2 > 100
Working temperature range (max.)	-55..+125°C (-65..+150°C)	

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

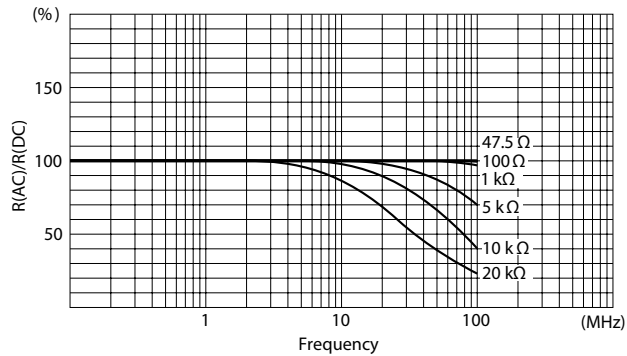
Parameters	Test Conditions	Specification	
		ΔR	Δ Ratio
Short time overload	2,5 x rated voltage, 5 sec.	±0,01%	±0,005%
Life span (biased)	125°C, rated power, 90 min. on 30 min off, 2000 h	±0,03%	±0,015%
High temperature / humidity	+65°C..-10°C, 90..98% RH rated power, 10 cycles, 240h	±0,03%	±0,01%
Temperature shock	-65°C (30 min.), +150°C (30 min), 5 cycles	±0,01%	±0,005%
High temperature exposure	+150°C, no load 2000 h	±0,02%	±0,01%
Resistance to soldering heat	260°C, 10 sec.	±0,01%	±0,005%
Isolation resistance	100 VDC, 1 min.	>10.000MΩ	
Dielectric strength	Atmo. Pres.: 200 VAC, 1 min.	±0,005%	±0,0025%
Shock	100G, 6 ms, halfsine, X, Y, Z each 10 shocks	±0,01%	±0,005%
Vibration high frequency	20G, 10Hz zu 2kHz zu 10Hz, 20 min. X, Y, Z each 2,5h	±0,01%	±0,005%

# Data Sheet for Precision Resistor

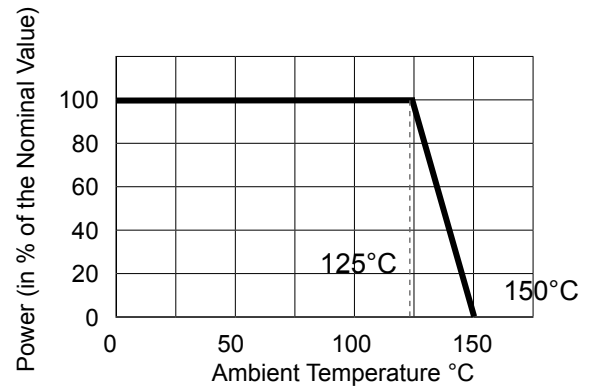
SMD Resistor as Voltage Divider (metal foil)

Series MMU

## Frequency Characteristics

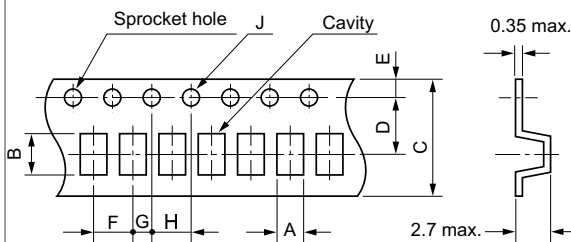


## Power Derating Curve



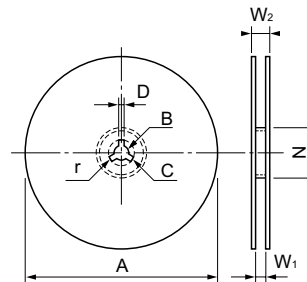
## Dimensions Tape and Reel

Tape Dimensions in mm



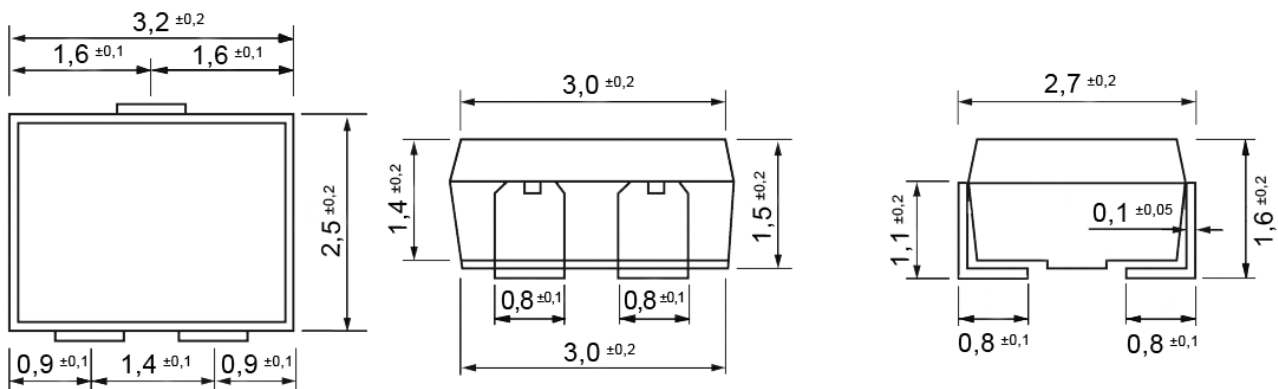
A	B	C	D	E	F	G	H	J
3.6 ±0.2	3.1 ±0.2	12.0 ±0.3	5.5 ±0.05	1.75 ±0.1	8.0 ±0.1	2.0 ±0.05	4.0 ±0.1	Dia. 1.5 +0.1-0

Reel Dimensions in mm (Reel capacity: 800 pieces/reel)



A	N	B	C	D	W <sub>1</sub>	W <sub>2</sub>	r
Dia. 178 ±2	Dia. 60 min.	Dia. 13 ±0.5	Dia. 21 ±0.8	2 ±0.5	12.4 +2.0-0	18.4 max.	1.0 ±0.5

## Technical Drawing



# Data Sheet for Precision Resistor

SMD Resistor as Voltage Divider (metal foil)

Series MMU

Order code						
Description	Selection: standard=black/bold, possible options=grey/cursive					
Series:	<b>MMU</b>					
Resistance tolerance absolute: $\pm 0,5\%$ @ R = 10 $\Omega$ ..20k $\Omega$ $\pm 0,1\%$ @ R = 10 $\Omega$ ..20k $\Omega$ $\pm 0,05\%$ @ R = 100 $\Omega$ ..20k $\Omega$ $\pm 0,02\%$ @ R = 1k $\Omega$ ..20k $\Omega$		<b>WA0,5%</b> <b>WA0,1%</b> <b>WA0,05%</b> <b>WA0,02%</b>				
Resistance tolerance matching: $\pm 0,5\%$ @ R = 10 $\Omega$ ..20k $\Omega$ $\pm 0,1\%$ @ R = 10 $\Omega$ ..20k $\Omega$ $\pm 0,05\%$ @ R = 10 $\Omega$ ..20k $\Omega$ $\pm 0,02\%$ @ R = 100 $\Omega$ ..20k $\Omega$ $\pm 0,01\%$ @ R = 1k $\Omega$ ..20k $\Omega$			<b>WM0,5%</b> <b>WM0,1%</b> <b>WM0,05%</b> <b>WM0,02%</b> <b>WM0,01%</b>			
Temperature coefficient absolute: $\pm 15\text{ppm}/^\circ\text{C}$ @ 10 $\Omega$ $\leq$ R < 30 $\Omega$ $\pm 10\text{ppm}/^\circ\text{C}$ @ 30 $\Omega$ $\leq$ R < 100 $\Omega$ $\pm 5\text{ppm}/^\circ\text{C}$ @ 100 $\Omega$ $\leq$ R $\leq$ 20k $\Omega$				<b>TK15</b> <b>TK10</b> <b>TK5</b>		
Resistance value 1 - please choose: From 10 $\Omega$ to $\leq$ 20k $\Omega$ (aggregate value max. 20k $\Omega$ )					<b>xxkxxx</b>	
Resistance value 2 - please choose: From 10 $\Omega$ to $\leq$ 20k $\Omega$ (aggregate value max. 20k $\Omega$ )						<b>/xxkxxx</b>

Order Example	Series	Resistance tolerance absolut	Resistance tolerance matching	Temperature coefficient absolut	Resistance value 1	Resistance value 2
Choice	MMU	$\pm 0,1\%$	$\pm 0,1\%$	5ppm/ $^\circ\text{C}$	10,1k $\Omega$	5k $\Omega$
Code	MMU	WA0,1%	WM0,1%	TK5	10k100	/5k000