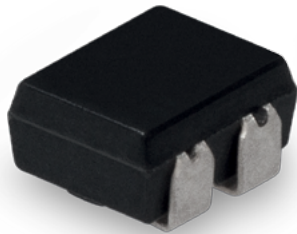


# Data Sheet for Precision Resistor

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 °C up to +125°C (-65..+150°C)	

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

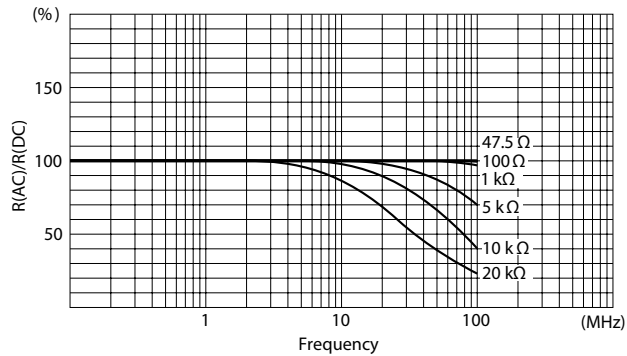
Parameters	Test Conditions	Specification	
		ΔR	Δ Ratio
Short time overload	2.5 x rated voltage, 5 sec.	±0.01%	±0.005%
Life span (biased)	125°C, rated power, 90 min. on 30 min off, 2000 h	±0.03%	±0.015%
High temperature / humidity	+65°C..-10°C, 90..98% RH rated power, 10 cycles, 240h	±0.03%	±0.01%
Temperature 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

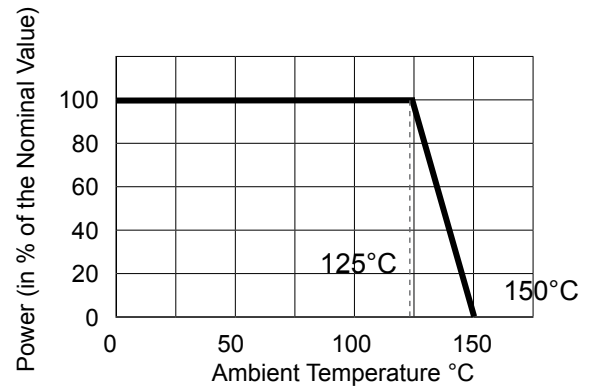
SMD Resistor as Voltage Divider (metal foil)

Series MMU

## Frequency Characteristics

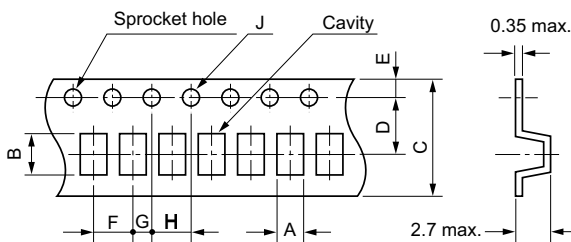


## Power Derating Curve



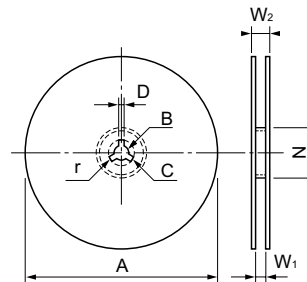
## Dimensions Tape and Reel

Tape Dimensions in mm



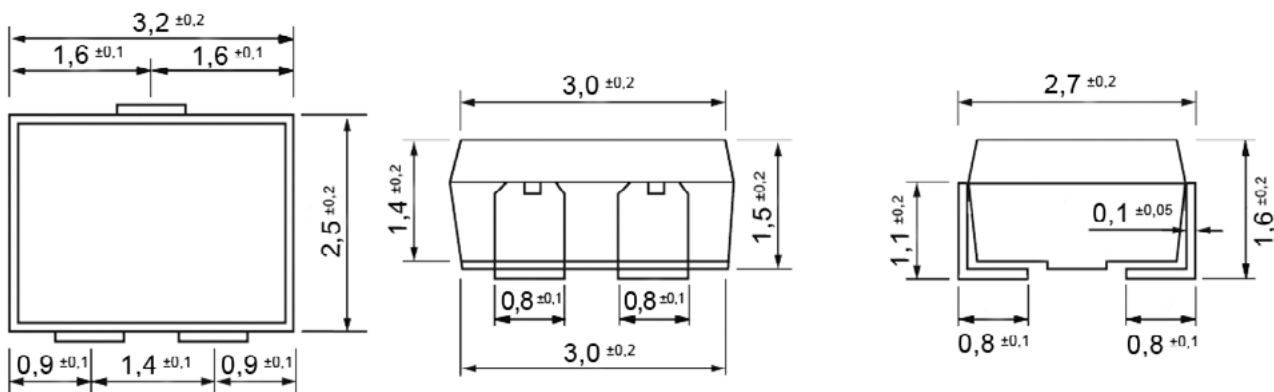
A	B	C	D	E	F	G	H	J
3.6 ±0.2	3.1 ±0.2	12.0 ±0.3	5.5 ±0.05	1.75 ±0.1	8.0 ±0.1	2.0 ±0.05	4.0 ±0.1	Dia. 1.5 +0.1-0

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

## Drawing



# Data Sheet for Precision Resistor

SMD Resistor as Voltage Divider (metal foil)

Series MMU

Order code						
Description		Selection: <b>standard=black/bold</b> , possible <i>options=grey/italic</i>				
Series:	MMU					
Resistance tolerance absolute: ±0,5% @ R = 10Ω..20kΩ ±0,1% @ R = 10Ω..20kΩ ±0,05% @ R = 100Ω..20kΩ ±0,02% @ R = 1kΩ..20kΩ		WA0,5% WA0,1% WA0,05% WA0,02%				
Resistance tolerance matching: ±0,5% @ R = 10Ω..20kΩ ±0,1% @ R = 10Ω..20kΩ ±0,05% @ R = 10Ω..20kΩ ±0,02% @ R = 100Ω..20kΩ ±0,01% @ R = 1kΩ..20kΩ			WM0,5% WM0,1% WM0,05% WM0,02% WM0,01%			
Temperature coefficient absolute: ±15ppm/°C @ 10Ω ≤ R < 30Ω ±10ppm/°C @ 30Ω ≤ R < 100Ω ±5ppm/°C @ 100Ω ≤ R ≤ 20kΩ				TK15 TK10 TK5		
Resistance value 1 - please choose: From 10Ω to ≤ 20kΩ (aggregate value max. 20kΩ)					xxkxxx	
Resistance value 2 - please choose: From 10Ω to ≤ 20kΩ (aggregate value max. 20kΩ)						/xxkxxx

Order Example	Series	Resistance tolerance absolute	Resistance tolerance matching	Temperature coefficient absolute	Resistance value 1	Resistance value 2
Choice	MMU	±0.1%	±0.1%	5ppm/°C	10,1kΩ	5kΩ
Code	MMU	WA0.1%	WM0.1%	TK5	10k100	/5k000