MPMA (Divider)



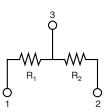
Vishay Dale Thin Film

Matched Pair, Molded, Automotive, Thin Film, SOT-23, Resistor, Surface Mount Network, AEC-Q200 Qualified



Vishay Thin Film MPMA Series dividers provide $\pm 2 \text{ ppm/}^{\circ}\text{C}$ tracking and a ratio tolerance as tight as ± 0.05 %, small size, and exceptional stability for all surface mount applications. The standard SOT-23 package format with unity and common standard resistance divider ratios provide easy selection for most applications requiring matched pair resistor elements. MPMA is AEC-Q200 qualified and ideal for high precision automotive applications. The ratios listed are available for off the shelf delivery. If you require a non-standard ratio, consult the applications engineering group as we may be able to meet your requirements.

SCHEMATIC



FEATURES

- AEC-Q200 qualified
- Resistance range 250 Ω to 50 k Ω
- Excellent long term ratio stability \pm 0.03 % over 1000 h, 125 °C
- Ratio tolerances to ± 0.05 %
- Tracking as low as ± 2 ppm/°C
- Very low noise and voltage coefficient (< -30 dB, 0.1 ppm/V)
- Standard JEDEC[®] TO-236 package variation AB
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

STANDARD DIVIDER RATIO (R ₂ /R ₁)				
RATIO	R₂ (Ω)	R ₁ (Ω)	TCR TRACKING	
50:1	50K	1K	10 ppm/°C	
25:1	25K	1K	E nom/00	
20:1	20K	1K	5 ppm/°C	
10:1	10K	1K		
9:1	9K	1K		
6:1	6K	1K		
5:1	10K	2K	3 ppm/°C	
5:1	5K	1K		
4:1	8K	2K		
4:1	4K	1K		
2:1	10K	5K		
2:1	2K	1K		
1:1	50K	50K		
1:1	25K	25K		
1:1	10K	10K	2 ppm/°C	
1:1	5K	5K		
1:1	2.5K	2.5K		
1:1	1K	1K		
1:1	500	500		
1:1	250	250		

STANDARD ELECTRICAL SPECIFICATIONS				
TEST	SPECIFICATIONS	CONDITIONS		
Material	Ta2N	-		
Pin/Lead Number	3	-		
Resistance Range	250 Ω to 50 kΩ per resistor	-		
TCR: Absolute	± 25 ppm/°C	-55 °C to +125 °C		
TCR: Tracking	Down to ± 2 ppm/°C	-55 °C to +125 °C		
Tolerance: Absolute	± 0.1 % to ± 1.0 %	+25 °C		
Tolerance: Ratio	± 0.05 % to 0.5 %	+25 °C		
Power Rating: Resistor	100 mW	Maximum at +70 °C		
Power Rating: Package	200 mW	Maximum at +70 °C		
Stability: Absolute	< 1 kΩ: ± 0.35 %; > 1 kΩ: ± 0.04 %	1000 h at +125 °C		
Stability: Ratio	< 1 kΩ: ± 0.35 %; > 1 kΩ: ± 0.03 %	1000 h at +125 °C		
Voltage Coefficient	0.1 ppm/V	-		
Working Voltage	100 V max. not to exceed $\sqrt{P \times R}$	-		
Operating Temperature Range	-55 °C to +155 °C	-		
Storage Temperature Range	-55 °C to +155 °C	-		
Noise	< - 30 dB	-		
Thermal EMF	0.2 μV/°C	-		
Shelf Life Stability: Absolute	$\Delta R/R \pm 0.01 \%$	1 year at +25 °C		
Shelf Life Stability: Ratio	$\Delta R/R \pm 0.002 \%$	1 year at +25 °C		

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1 For technical questions, contact: <u>thinfilm@vishav.com</u> Document Number: 60113

Pb-free



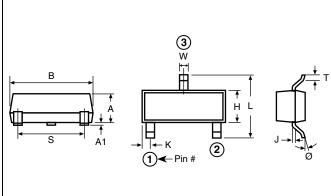
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DIMENSIONS AND IMPRINTING in inches and millimeters



III	limeters				
	DIMENSION	INCHES		MILLIMETERS	
	DIVIENSION	MIN.	MAX.	MIN.	MAX.
	А	0.031	0.040	0.79	1.02
	A1	0.001	0.004	0.02	0.10
	В	0.105	0.120	2.67	3.05
	S	0.071	0.079	1.80	2.00
	W	0.015	0.021	0.38	0.54
	L	0.083	0.098	2.10	2.50
	Н	0.047	0.055	1.20	1.40
	Т	0.005	0.010	0.13	0.25
	J	0.0035	0.0059	0.089	0.15
	К	0.017	0.022	0.44	0.55
	Ø	0	8°	0	8°

MECHANICAL SPECIFICATIONS		
Resistive Element	Tantalum nitride	
Substrate Material	Ceramic	
Body	Molded epoxy	
Terminals	Copper alloy	
Lead (Pb)-free Option	Solder free leads, Ni/Pd/Au plated	

DERATING CURVE

ENVIRONMENTAL TESTS				
ENVIRONMENTAL TEST	CONDITIONS	SUGGESTED PRODUCT LIMITS ABS/RATIO	MAX. VALUES ABS/RATIO	
High Temperature Exposure	< 1 kΩ: MIL-STD-202, 108, 1000 h at 125 °C	± 0.5 %/± 0.5 %	± 0.35 %/± 0.35 %	
	> 1 kΩ: MIL-STD-202, 108, 1000 h at 125 °C	± 0.25 %/± 0.1 %	± 0.02 %/± 0.008 %	
Temperature Cycling	JESD22, JA-104, 1000 cycles at -55 °C to +125 °C	± 0.25 %/± 0.1 %	± 0.1%/± 0.027 %	
Moisture Resistance	MIL-STD-202, 106	± 0.25 %/± 0.1 %	± 0.03%/± 0.012 %	
Biased Humidity	MIL-STD-202, 103, 1000 h at 85 °C, 85 % RH, 10 % P	± 1.0 %/± 0.5 %	± 0.4 %/± 0.34 %	
Life	< 1 kΩ: MIL-STD-202, 108 at 125 °C, 1000 h	± 0.5 %/± 0.5 %	± 0.35 %/± 0.35 %	
Liie	> 1 kΩ: MIL-STD-202, 108 at 125 °C, 1000 h	± 0.5 %/± 0.1 %	± 0.04 %/± 0.03 %	
Mechanical Shock	MIL-STD-202, 213, condition C	± 0.25 %/± 0.1 %	± 0.03 %/± 0.018 %	
Vibration	MIL-STD-204, 10 Hz to 2 kHz	± 0.25 %/± 0.1 %	± 0.02 %/± 0.047 %	
Resistance to Soldering Heat	MIL-STD-202, 210, condition B	± 0.25 %/± 0.1 %	± 0.13 %/± 0.024 %	
	$<$ 1 k Ω : AEC-Q200-002 at 500 V human body	± 0.5 %	± 0.50 %	
Electrostatic Discharge	> 1 kΩ: AEC-Q200-002 at 1000 V human body	± 0.5 %	± 0.25 %	
Solderability	J-STD-002 method B and B1	Visual	Visual	
Terminal Strength	AEC-Q200-006 at 1 kg for 60 s	± 0.25 %/± 0.1 %	± 0.02 %/± 0.018 %	
Flame Retardance	AEC-Q200-001 para 4.0	Visual	Visual	

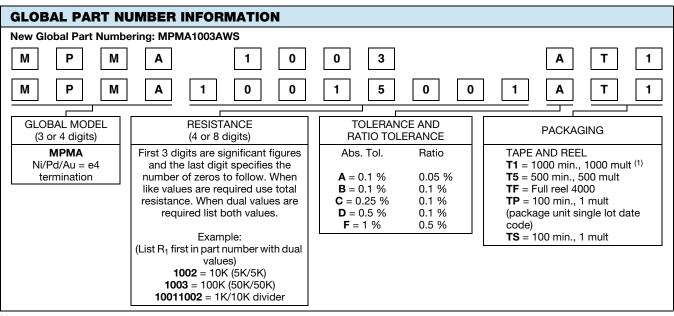
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Note

⁽¹⁾ Preferred packaging code



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