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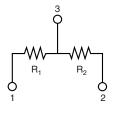
Vishay Dale Thin Film

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



Vishay Thin Film MPMA Series dividers provide  $\pm 2$  ppm/°C tracking and a ratio tolerance as tight as  $\pm 0.05$  %, 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  $\Omega$  to 50 k $\Omega$
- Excellent long term ratio stability ± 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)</li>
- Standard JEDEC® TO-236 package variation AB
- Material categorization: for definitions of compliance please see <a href="https://www.vishay.com/doc?99912"><u>www.vishay.com/doc?99912</u></a>

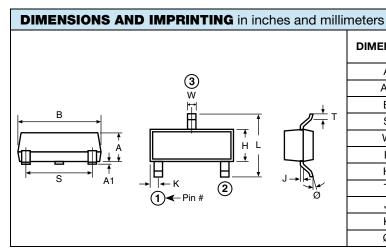
STANDARD DIVIDER RATIO (R <sub>2</sub> /R <sub>1</sub> )				
RATIO	$R_2(\Omega)$	R <sub>1</sub> (Ω)	TCR TRACKING	
50:1	50K	1K	10 ppm/°C	
25:1	25K	1K	5 nnm/°C	
20:1	20K	1K	5 ppm/°C	
10:1	10K	1K		
9:1	9K	1K		
6:1	6K	1K		
5:1	10K	2K	3 ppm/°C	
5:1	5K	1K		
4:1	8K	2K		
4:1	4K	1K		
2:1	10K	5K		
2:1	2K	1K		
1:1	50K	50K		
1:1	25K	25K		
1:1	10K	10K	0.555	
1:1	5K	5K	2 ppm/°C	
1:1	2.5K	2.5K	1	
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 $\Omega$ to 50 k $\Omega$ 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 √P x 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	ΔR/R ± 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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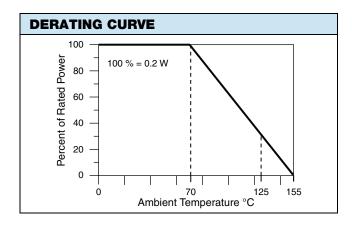


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DIMENSION	INCHES		MILLIMETERS	
DIMENSION	MIN.	MAX.	MIN.	MAX.
Α	0.031	0.040	0.79	1.02
A1	0.001	0.004	0.02	0.10
В	0.105	0.120	2.67	3.05
S	0.071	0.079	1.80	2.00
W	0.015	0.021	0.38	0.54
L	0.083	0.098	2.10	2.50
Н	0.047	0.055	1.20	1.40
Т	0.005	0.010	0.13	0.25
J	0.0035	0.0059	0.089	0.15
K	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	



ENVIRONMENTAL TESTS				
ENVIRONMENTAL TEST	CONDITIONS	SUGGESTED PRODUCT LIMITS ABS/RATIO	MAX. VALUES ABS/RATIO	
High Tagana and an European	< 1 kΩ: MIL-STD-202, 108, 1000 h at 125 °C	$\pm$ 0.5 %/± 0.5 %	± 0.35 %/± 0.35 %	
High Temperature Exposure	> 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 %	
Life	> 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 %	
Electrostatic Dischause	< 1 kΩ: 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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GLOBAL PART NUMBER INFORMATION				
New Global Part Number	ering: MPMA1003AWS			
M P M	A 1 0	0 3	A T 1	
M P M	A 1 0 0	1 5 0 0	1 A T 1	
GLOBAL MODEL (3 or 4 digits)  MPMA Ni/Pd/Au = e4 termination	RESISTANCE (4 or 8 digits)  First 3 digits are significant figures and the last digit specifies the number of zeros to follow. When like values are required use total resistance. When dual values are required list both values.  Example: (List R <sub>1</sub> first in part number with dual values) 1002 = 10K (5K/5K) 1003 = 100K (50K/50K) 10011002 = 1K/10K divider	TOLERANCE AND RATIO TOLERANCE  Abs. Tol. Ratio  A = 0.1 % 0.05 % B = 0.1 % 0.1 % C = 0.25 % 0.1 % D = 0.5 % 0.1 % F = 1 % 0.5 %	PACKAGING  TAPE AND REEL T1 = 1000 min., 1000 mult (1) T5 = 500 min., 500 mult TF = Full reel 4000 TP = 100 min., 1 mult (package unit single lot date code) TS = 100 min., 1 mult	

#### Note

<sup>(1)</sup> Preferred packaging code



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