

# Molded, SOT-23 Thin Film Resistor, Surface Mount Network



Vishay Dale Thin Film MPM Series Dividers provide  $\pm 2$  ppm/ $^{\circ}$ C tracking and a ratio tolerance as tight as 0.01 %, 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. 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

- Excellent long term ratio stability ( $\Delta R \pm 0.015$  %, 2000 h, + 70  $^{\circ}$ C)
- Ratio tolerances to  $\pm 0.01$  %
- Low TCR tracking  $\pm 2$  ppm
- Standard JEDEC TO-236 package variation AB
- Compliant to RoHS Directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition



**RoHS\***  
COMPLIANT  
HALOGEN  
**FREE**

## Note

\* Pb containing terminations are not RoHS compliant, exemptions may apply

## TYPICAL PERFORMANCE

	ABSOLUTE	TRACKING
TCR	25	2
	ABSOLUTE	RATIO
TOL.	0.1	0.05

## STANDARD DIVIDER RATIO ( $R_2/R_1$ )

RATIO	$R_2$ ( $\Omega$ )	$R_1$ ( $\Omega$ )
100:1	100K	1K
50:1	50K	1K
25:1	25K	1K
20:1	20K	1K
10:1	10K	1K
9:1	9K	1K
6:1	6K	1K
5:1	10K	2K
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
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	Passivated nichrome	-
Pin/Lead Number	3	-
Resistance Range	250 $\Omega$ to 100 k $\Omega$ per resistor	-
TCR: Absolute	$\pm 25$ ppm/ $^{\circ}$ C	- 55 $^{\circ}$ C to + 125 $^{\circ}$ C
TCR: Tracking	$\pm 2$ ppm/ $^{\circ}$ C (typical)	- 55 $^{\circ}$ C to + 125 $^{\circ}$ C
Tolerance: Absolute	$\pm 0.05$ % to $\pm 1.0$ %	+ 25 $^{\circ}$ C
Tolerance: Ratio	$\pm 0.01$ % to 0.5 %	+ 25 $^{\circ}$ C
Power Rating: Resistor	100 mW	Maximum at + 70 $^{\circ}$ C
Power Rating: Package	200 mW	Maximum at + 70 $^{\circ}$ C
Stability: Absolute	$\Delta R \pm 0.05$ %	2000 h at + 70 $^{\circ}$ C
Stability: Ratio	$\Delta R \pm 0.015$ %	2000 h at + 70 $^{\circ}$ C
Voltage Coefficient	0.1 ppm/V	-
Working Voltage	100 V max. not to exceed $\sqrt{P \times R}$	-
Operating Temperature Range	- 55 $^{\circ}$ C to + 125 $^{\circ}$ C	-
Storage Temperature Range	- 55 $^{\circ}$ C to + 150 $^{\circ}$ C	-
Noise	< - 30 dB	-
Thermal EMF	0.2 $\mu$ V/ $^{\circ}$ C	-
Shelf Life Stability: Absolute	$\Delta R \pm 0.01$ %	1 year at + 25 $^{\circ}$ C
Shelf Life Stability: Ratio	$\Delta R \pm 0.002$ %	1 year at + 25 $^{\circ}$ C

**DIMENSIONS AND IMPRINTING** in inches and millimeters

DIMENSION	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.031	0.040	0.79	1.02
A1	0.001	0.004	0.02	0.10
B	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
H	0.047	0.055	1.20	1.40
T	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	Passivated nichrome
Substrate Material	Silicon
Body	Molded epoxy
Terminals	Copper alloy
Lead (Pb)-free Option	100 % matte tin
Tin Lead Option	Sn85
Tin Lead and Lead (Pb)-free Finish	Plated

**DERATING CURVE**

**GLOBAL PART NUMBER INFORMATION**

 New Global Part Numbering: **MPM1003AWS**

M	P	M	1	0	0	3	A	W	S					
M	P	M	T	1	0	0	1	5	0	0	1	A	T	1

GLOBAL MODEL (3 or 4 digits)	RESISTANCE (4 or 8 digits)	TOLERANCE AND RATIO TOLERANCE	PACKAGING																
<b>MPM</b> (Tin lead)  <b>MPMT</b> (Lead (Pb)-free) (e3)	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	<table border="1"> <thead> <tr> <th>Abs. Tol.</th> <th>Ratio</th> </tr> </thead> <tbody> <tr> <td><b>A</b> = 0.1 %</td> <td>0.05 %</td> </tr> <tr> <td><b>B</b> = 0.1 %</td> <td>0.1 %</td> </tr> <tr> <td><b>C</b> = 0.25 %</td> <td>0.1 %</td> </tr> <tr> <td><b>D</b> = 0.5 %</td> <td>0.1 %</td> </tr> <tr> <td><b>F</b> = 1 %</td> <td>0.5 %</td> </tr> <tr> <td><b>Z</b> = 0.1 % <sup>(1)</sup></td> <td>0.025 %</td> </tr> <tr> <td><b>Q</b> = 0.05 % <sup>(1)</sup></td> <td>0.01 %</td> </tr> </tbody> </table>	Abs. Tol.	Ratio	<b>A</b> = 0.1 %	0.05 %	<b>B</b> = 0.1 %	0.1 %	<b>C</b> = 0.25 %	0.1 %	<b>D</b> = 0.5 %	0.1 %	<b>F</b> = 1 %	0.5 %	<b>Z</b> = 0.1 % <sup>(1)</sup>	0.025 %	<b>Q</b> = 0.05 % <sup>(1)</sup>	0.01 %	<b>BS</b> = BULK 100 min., 1 mult <b>WS</b> = WAFFLE 100 min., 1 mult  <b>TAPE AND REEL</b> <b>T0</b> = 100 min., 100 mult <b>T1</b> = 1000 min., 1000 mult <sup>(2)</sup> <b>T3</b> = 300 min., 300 mult <b>T5</b> = 500 min., 500 mult <b>TF</b> = Full reel 4000 <b>TS</b> = 100 min., 1 mult
Abs. Tol.	Ratio																		
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 Historical Part Number example: **MPM1002BW** (for reference purposes only)

<b>MPM</b>	<b>1002</b>	<b>B</b>	<b>W</b>
SERIES	RESISTANCE	TOLERANCE AND RATIO TOLERANCE	PACKAGING

**Notes**

- (1) Tol. available 1K and up equal values only  
 (2) Preferred packaging code



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