



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

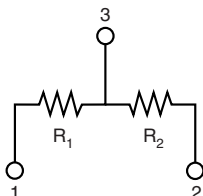


## LINKS TO ADDITIONAL RESOURCES



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. Ratios not listed but within the datasheet limits are available without NRE charge. See "Global Part Number Information" table for guidance how to create part number for ordering.

## 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
- Zero ohm jumper option available
- Standard JEDEC<sup>®</sup> TO-236 package variation AB
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS\***  
Available  
**HALOGEN  
FREE**

## Note

\* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

## TYPICAL PERFORMANCE

|      | ABSOLUTE | TRACKING |
|------|----------|----------|
| TCR  | 25       | 2        |
|      | ABSOLUTE | RATIO    |
| TOL. | 0.1      | 0.05     |

## Note

- Typical performance TCR and tolerance does not apply to zero ohm jumper

STANDARD DIVIDER RATIOS ( $R_2/R_1$ ) COMMONLY STOCKED BY DISTRIBUTORS

| RATIO | $R_2$ ( $\Omega$ ) | $R_1$ ( $\Omega$ ) | RATIO | $R_2$ ( $\Omega$ ) | $R_1$ ( $\Omega$ ) |
|-------|--------------------|--------------------|-------|--------------------|--------------------|
| 100:1 | 100K               | 1K                 | 2:1   | 10K                | 5K                 |
| 50:1  | 50K                | 1K                 | 2:1   | 2K                 | 1K                 |
| 25:1  | 25K                | 1K                 | 1:1   | 100K               | 100K               |
| 20:1  | 20K                | 1K                 | 1:1   | 50K                | 50K                |
| 10:1  | 20K                | 2K                 | 1:1   | 25K                | 25K                |
| 10:1  | 10K                | 1K                 | 1:1   | 10K                | 10K                |
| 9:1   | 9K                 | 1K                 | 1:1   | 5K                 | 5K                 |
| 9:1   | 900                | 100                | 1:1   | 2.5K               | 2.5K               |
| 6:1   | 6K                 | 1K                 | 1:1   | 2K                 | 2K                 |
| 5:1   | 10K                | 2K                 | 1:1   | 1K                 | 1K                 |
| 5:1   | 5K                 | 1K                 | 1:1   | 500                | 500                |
| 4:1   | 8K                 | 2K                 | 1:1   | 250                | 250                |
| 4:1   | 4K                 | 1K                 | 1:2   | 5K                 | 10K                |
| 3:1   | 7.5K               | 2.5K               | 1:2.5 | 10K                | 25K                |
| 2:1   | 50K                | 25K                | 1:4   | 7.5K               | 30K                |
| 2:1   | 12K                | 6K                 | 1:9   | 10K                | 90K                |

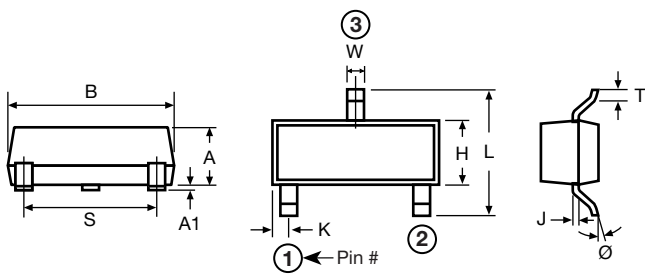
**STANDARD ELECTRICAL SPECIFICATIONS**

| TEST                           | SPECIFICATIONS                               | CONDITIONS                            |
|--------------------------------|----------------------------------------------|---------------------------------------|
| Material                       | Passivated nichrome                          | -                                     |
| Pin/Lead Number                | 3                                            | -                                     |
| Resistance Range               | 250 $\Omega$ to 100 k $\Omega$ per resistor  | -                                     |
| Resistance for Jumper          | $\leq 50$ m $\Omega$                         | -                                     |
| 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            |

**Note**

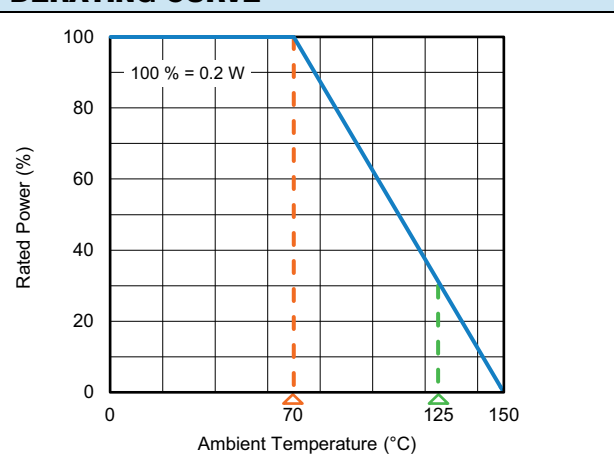
- TCR and TCR tracking are not available for parts with zero ohm jumpers

**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         |
|                                                                                     | $\emptyset$ | 0      | 8 $^{\circ}$ | 0           | 8 $^{\circ}$ |
|                                                                                     |             |        |              |             |              |
|                                                                                     |             |        |              |             |              |
|                                                                                     |             |        |              |             |              |
|                                                                                     |             |        |              |             |              |
|                                                                                     |             |        |              |             |              |

**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)**MPM**  
(Tin lead)**MPMT**  
(Lead (Pb)-free)  
(e3)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.

0000 = zero ohm jumper  
for R value

UUUU = open connection in  
place of R value

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

0000UUUU = R<sub>1</sub> = jumper,  
R<sub>2</sub> = open

UUUU0000 = R<sub>1</sub> = open,  
R<sub>2</sub> = jumper

00UUUU00 = jumper connection  
pin 1 to pin 2

0000 = R<sub>1</sub> and R<sub>2</sub> = jumpers

00001002 = R<sub>1</sub> = jumper,  
R<sub>2</sub> = 10K

50010000 = R<sub>1</sub> = 5K,  
R<sub>2</sub> = jumper

TOLERANCE AND  
RATIO TOLERANCE <sup>(1)</sup>

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 %

**Z** = 0.1 % <sup>(2)</sup>

0.025 %

**Q** = 0.05 % <sup>(2)</sup>

0.01 %

**N** = for jumpers only

## PACKAGING

**BS** = BULK 100 min., 1 mult.  
**WS** = WAFFLE 100 min., 1 mult.

TAPE AND REEL

**T0** = 100 min., 100 mult.

**T1** = 1000 min., 1000 mult. <sup>(3)</sup>

**T3** = 300 min., 300 mult.

**T5** = 500 min., 500 mult.

**TF** = full reel 4000

**TS** = 100 min., 1 mult.

## 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<br>RATIO TOLERANCE | PACKAGING |

## Notes

<sup>(1)</sup> For combinations of a resistor and a zero ohm jumper only the absolute tolerance applies to the resistor value

<sup>(2)</sup> Tolerance available 1K and up equal values only

<sup>(3)</sup> Preferred packaging code



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