

# 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              |


**GLOBAL PART NUMBER INFORMATION**

 New Global Part Numbering: **MPM1003AWS**


| GLOBAL MODEL (3 or 4 digits)  | RESISTANCE (4 or 8 digits)  | TOLERANCE AND RATIO TOLERANCE  | PACKAGING |       |                  |        |                  |       |                   |       |                  |       |                |       |                                 |         |                                  |        |   |
|---|---|--|-----------|-------|------------------|--------|------------------|-------|-------------------|-------|------------------|-------|----------------|-------|---------------------------------|---------|----------------------------------|--------|---|
| <b>MPM</b><br>(Tin lead)<br><br><b>MPMT</b><br>(Lead (Pb)-free)<br>(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.<br><br>Example:<br>(List R <sub>1</sub> first in part number with dual values)<br>1002 = 10K (5K/5K)<br>1003 = 100K (50K/50K)<br>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<br><b>WS</b> = WAFFLE 100 min., 1 mult<br><br><b>TAPE AND REEL</b><br><b>T0</b> = 100 min., 100 mult<br><b>T1</b> = 1000 min., 1000 mult <sup>(2)</sup><br><b>T3</b> = 300 min., 300 mult<br><b>T5</b> = 500 min., 500 mult<br><b>TF</b> = Full reel 4000<br><b>TS</b> = 100 min., 1 mult |
| 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 %  |  |           |       |                  |        |                  |       |                   |       |                  |       |                |       |                                 |         |                                  |        |   |

 Historical Part Number example: **MPM1002BW** (for reference purposes only)

**Notes**

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



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- Техническая поддержка проекта;
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