

# 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                |

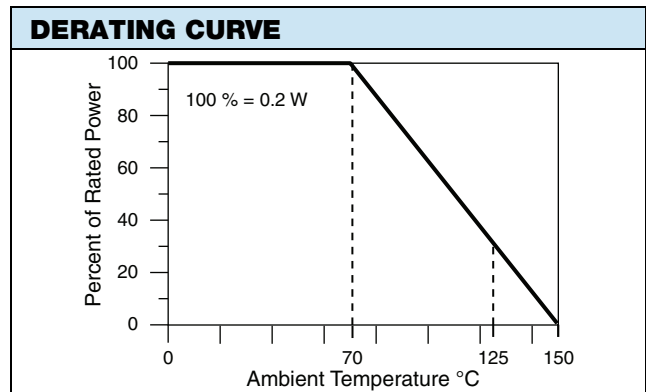
## STANDARD ELECTRICAL SPECIFICATIONS

| 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



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.