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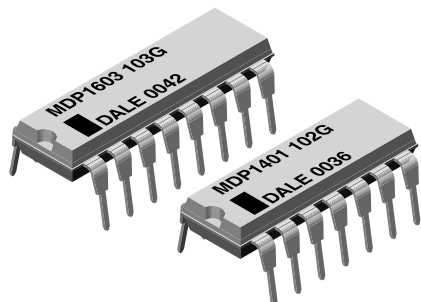


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MDP 01, 03, 05

Vishay Dale

## Thick Film Resistor Networks, Dual-In-Line, Molded DIP



### FEATURES

- Isolated, bussed, and dual terminator schematics available
- 0.160" (4.06 mm) maximum seated height and rugged, molded case construction
- Thick film resistive elements
- Low temperature coefficient (-55 °C to +125 °C) ± 100 ppm/°C
- Reduces total assembly costs
- Compatible with automatic inserting equipment
- Wide resistance range (10 Ω to 2.2 MΩ)
- Uniform performance characteristics
- Available in tube pack
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS\* Available

### 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.

| STANDARD ELECTRICAL SPECIFICATIONS |           |  |                       |                      |  |   |             |
|------------------------------------|-----------|--|-----------------------|----------------------|--|---|-------------|
| GLOBAL MODEL/ NO. OF PINS          | SCHEMATIC | POWER RATING ELEMENT (1)<br>P <sub>70°C</sub><br>W | RESISTANCE RANGE<br>Ω | TOLERANCE (3)<br>± % | TEMPERATURE COEFFICIENT<br>(-55 °C to +125 °C)<br>± ppm/°C | TCR TRACKING (2)<br>(-55 °C to +125 °C)<br>± ppm/°C | WEIGHT<br>g |
| MDP 14                             | 01        | 0.125  | 10 to 2.2M            | 1, 2, 5              | 100  | 50  | 1.3         |
|                                    | 03        | 0.250  | 10 to 2.2M            |                      |  | 50  |             |
|                                    | 05        | 0.125  | Consult factory       |                      |  | 100   |             |
| MDP 16                             | 01        | 0.125  | 10 to 2.2M            | 1, 2, 5              | 100  | 50  | 1.5         |
|                                    | 03        | 0.250  | 10 to 2.2M            |                      |  | 50  |             |
|                                    | 05        | 0.125  | Consult factory       |                      |  | 100   |             |

### Notes

(1) For resistor power ratings at +25 °C see derating curves

(2) Tighter tracking available

(3) ± 2 % standard, ± 1 %, and ± 5 % available

| GLOBAL PART NUMBER INFORMATION   |   |   |   |                    |  |           |   |   |  |   |   |   |   |   |  |  |  |
|--|---|---|---|--------------------|--|-----------|---|---|--|---|---|---|---|---|--|--|--|
| <b>New Global Part Numbering: MDP1403100RGD04 (preferred part numbering format)</b>  |   |   |   |                    |  |           |   |   |  |   |   |   |   |   |  |  |  |
| M  | D                                       | P   | 1   | 4                  | 0  | 3         | 1   | 0 | 0  | R | G | D | 0 | 4 |  |  |  |
| GLOBAL MODEL<br>MDP  | PIN COUNT<br>14 = 14 pin<br>16 = 16 pin | SCHEMATIC<br>01 = Bussed<br>03 = Isolated<br>00 = Special | RESISTANCE VALUE<br>R = Ω<br>K = kΩ<br>M = MΩ<br>10R0 = 10 Ω<br>680K = 680 kΩ<br>1M00 = 1.0 MΩ<br>0000 = 0 Ω Jumper |                    | TOLERANCE CODE<br>F = ± 1 %<br>G = ± 2 %<br>J = ± 5 %<br>S = Special<br>Z = 0 Ω Jumper |           | PACKAGING<br>E04 = Lead (Pb)-free, tube<br>D04 = Tin/lead, tube |   | SPECIAL<br>Blank = Standard (Dash Number) (up to 3 digits) From 1 to 999 as applicable |   |   |   |   |   |  |  |  |
| <b>Historical Part Number Example: MDP1403101G (will continue to be accepted)</b>    |   |   |   |                    |  |           |   |   |  |   |   |   |   |   |  |  |  |
| MDP  | 14                                      | 03  | 101   |                    | G  | D04       |   |   |  |   |   |   |   |   |  |  |  |
| HISTORICAL MODEL   | PIN COUNT                               | SCHEMATIC   | RESISTANCE VALUE  |                    | TOLERANCE CODE   | PACKAGING |   |   |  |   |   |   |   |   |  |  |  |
| <b>New Global Part Numbering: MDP1405121CGD04 (preferred part numbering format)</b>  |   |   |   |                    |  |           |   |   |  |   |   |   |   |   |  |  |  |
| M  | D                                       | P   | 1   | 4                  | 0  | 5         | 1   | 2 | 1  | C | G | D | 0 | 4 |  |  |  |
| GLOBAL MODEL<br>MDP  | PIN COUNT<br>14 = 14 pin<br>16 = 16 pin | SCHEMATIC<br>05 = Dual terminator                         | RESISTANCE VALUE<br>3 digit impedance code, followed by alpha modifier (see Impedance Codes table)                  |                    | TOLERANCE CODE<br>F = ± 1 %<br>G = ± 2 %<br>J = ± 5 %                                  |           | PACKAGING<br>E04 = Lead (Pb)-free, tube<br>D04 = Tin/lead, tube |   | SPECIAL<br>Blank = Standard (Dash Number) (up to 3 digits) From 1 to 999 as applicable |   |   |   |   |   |  |  |  |
| <b>Historical Part Number Example: MDP1405221271G (will continue to be accepted)</b> |   |   |   |                    |  |           |   |   |  |   |   |   |   |   |  |  |  |
| MDP  | 14                                      | 05  | 221   |                    | 271  | G         | D04   |   |  |   |   |   |   |   |  |  |  |
| HISTORICAL MODEL   | PIN COUNT                               | SCHEMATIC   | RESISTANCE VALUE 1  | RESISTANCE VALUE 2 | TOLERANCE CODE   | PACKAGING |   |   |  |   |   |   |   |   |  |  |  |

### Note

- For additional information on packaging, refer to the Through-Hole Network Packaging document ([www.vishay.com/doc?231542](http://www.vishay.com/doc?231542)).

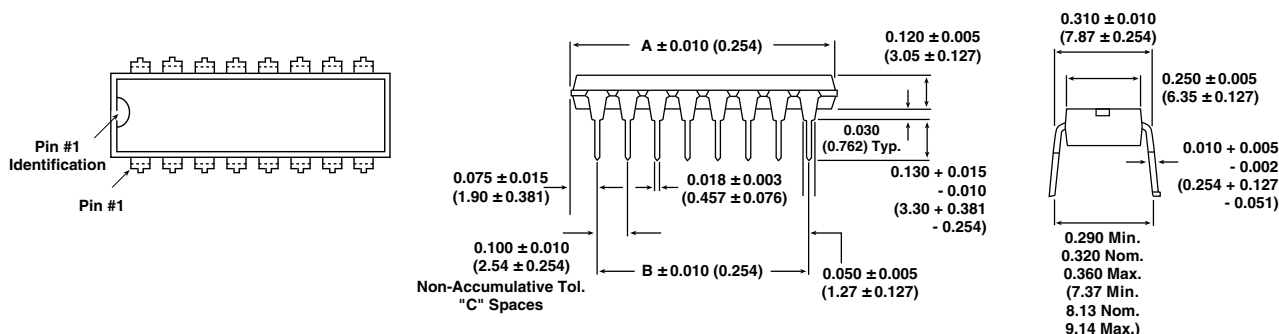


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**DIMENSIONS** in inches (millimeters)



| GLOBAL MODEL | A             | B             | C |
|--------------|---------------|---------------|---|
| MDP 14       | 0.750 (19.05) | 0.600 (15.24) | 6 |
| MDP 16       | 0.850 (21.59) | 0.700 (17.78) | 7 |

| TECHNICAL SPECIFICATIONS                 |                  |                   |       |
|--|------------------|-------------------|-------|
| PARAMETER                                | UNIT             | MDP14             | MDP16 |
| Package Power Rating (Maximum at +70 °C) | W                | 1.73              | 1.92  |
| Voltage Coefficient of Resistance        | V <sub>eff</sub> | < 50 ppm typical  |       |
| Dielectric Strength                      | V <sub>AC</sub>  | 200               |       |
| Insulation Resistance                    | Ω                | > 10 000M minimum |       |
| Operating Temperature Range              | °C               | -55 to +125       |       |
| Storage Temperature Range                | °C               | -55 to +150       |       |

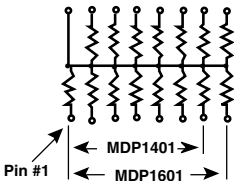
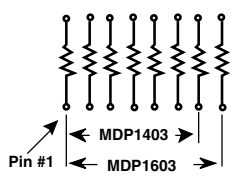
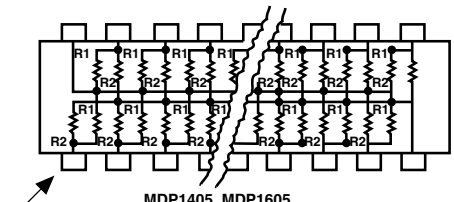
| MECHANICAL SPECIFICATIONS      |  |
|--------------------------------|--|
| Marking Resistance to Solvents | Permanency testing per MIL-STD-202, method 215 |
| Solderability                  | Per MIL-STD-202, method 208E                   |
| Body                           | Molded epoxy                                   |
| Terminals                      | Solder plated leads                            |
| Weight                         | 14 pin = 1.3 g; 16 pin = 1.5 g                 |

| IMPEDANCE CODES |                    |                    |      |                    |                    |
|-----------------|--------------------|--------------------|------|--------------------|--------------------|
| CODE            | R <sub>1</sub> (Ω) | R <sub>2</sub> (Ω) | CODE | R <sub>1</sub> (Ω) | R <sub>2</sub> (Ω) |
| 500B            | 82                 | 130                | 141A | 270                | 270                |
| 750B            | 120                | 200                | 181A | 330                | 390                |
| 800C            | 130                | 210                | 191A | 330                | 470                |
| 990A            | 160                | 260                | 221B | 330                | 680                |
| 101C            | 180                | 240                | 281B | 560                | 560                |
| 111C            | 180                | 270                | 381B | 560                | 1.2K               |
| 121B            | 180                | 390                | 501C | 620                | 2.7K               |
| 121C            | 220                | 270                | 102A | 1.5K               | 3.3K               |
| 131A            | 220                | 330                | 202B | 3K                 | 6.2K               |

**Note**

- For additional impedance codes, refer to the Dual Terminator Impedance Code Table document ([www.vishay.com/doc?31530](http://www.vishay.com/doc?31530)).

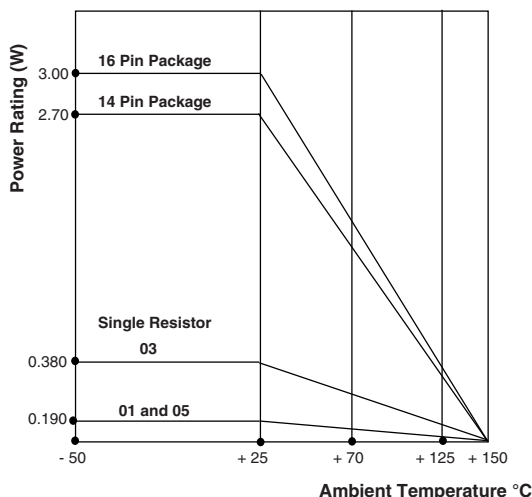


| CIRCUIT APPLICATIONS  |  |
|---|--|
| <p><b>01 Schematic</b></p>   | <p>13 and 15 resistors with one pin common</p> <p>The MDPXX01 circuit provides a choice of 13 and 15 nominally equal resistors, each connected between a common pin (14 and 16) and a discrete PC board pin. Commonly used in the following applications:</p> <ul style="list-style-type: none"> <li>• MOS/ROM Pull-up/Pull-down</li> <li>• Open Collector Pull-up</li> <li>• "Wired OR" Pull-up</li> <li>• Power Driven Pull-up</li> <li>• TTL Input Pull-down</li> <li>• Digital Pulse Squaring</li> <li>• TTL Unused Gate Pull-up</li> <li>• High Speed Parallel Pull-up</li> </ul> |
| <p><b>03 Schematic</b></p>   | <p>7 or 8 isolated resistors</p> <p>The MDPXX03 provides a choice of 7 and 8 nominally equal resistors, each resistor isolated from all others and wired directly across. Commonly used in the following applications:</p> <ul style="list-style-type: none"> <li>• "Wired OR" Pull-up</li> <li>• Power Driven Pull-up</li> <li>• Powergate Pull-up</li> <li>• Line Termination</li> <li>• Long-line Impedance Balancing</li> <li>• LED Current Limiting</li> <li>• ECL Output Pull-down</li> <li>• TTL Input Pull-down</li> </ul>   |
| <p><b>05 Schematic</b></p>  | <p>TTL dual-line terminator; pulse squaring</p> <p>The MDPXX05 circuit contains 12 and 14 series pair of resistors. Each series pair is connected between ground and a common line. The junction of these resistor pairs is connected to the input terminals. The 05 circuits are designed for TTL dual-line termination and pulse squaring.</p>   |

**Note**

- Standard E24 resistance values stocked. Consult factory.

**DERATING**





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| <b>PERFORMANCE</b>              |  |   |
|---------------------------------|--|---|
| <b>TEST</b>                     | <b>CONDITIONS</b>  | <b>MAX. <math>\Delta R</math><br/>(TYPICAL TEST LOTS)</b> |
| Power Conditioning              | 1.5 rated power, applied 1.5 h "ON" and 0.5 h "OFF" for 100 h<br>$\pm 4$ h at +25 °C ambient temperature                 | $\pm 0.50$ % $\Delta R$                                   |
| Thermal Shock                   | 5 cycles between -65 °C and +125 °C  | $\pm 0.50$ % $\Delta R$                                   |
| Short Time Overload             | 2.5 x rated working voltage 5 s  | $\pm 0.25$ % $\Delta R$                                   |
| Low Temperature Operation       | 45 min at full rated working voltage at -65 °C   | $\pm 0.25$ % $\Delta R$                                   |
| Moisture Resistance             | 240 h with humidity ranging from 80 % RH to 98 % RH  | $\pm 0.50$ % $\Delta R$                                   |
| Resistance to Soldering Heat    | Leads immersed in +350 °C solder to within 1/16" of device body for 3 s  | $\pm 0.25$ % $\Delta R$                                   |
| Shock                           | Total of 18 shocks at 100 g's  | $\pm 0.25$ % $\Delta R$                                   |
| Vibration                       | 12 h at maximum of 20 g's between 10 Hz and 2000 Hz  | $\pm 0.25$ % $\Delta R$                                   |
| Load Life                       | 1000 h at +70 °C, rated power applied 1.5 h "ON",<br>0.5 h "OFF" for full 1000 h period. Derated according to the curve. | $\pm 1.00$ % $\Delta R$                                   |
| Terminal Strength               | 4.5 pound pull for 30 s  | $\pm 0.25$ % $\Delta R$                                   |
| Insulation Resistance           | 10 000 M $\Omega$ (minimum)  | -   |
| Dielectric Withstanding Voltage | No evidence of arcing or damage (200 V <sub>RMS</sub> for 1 min)   | -   |



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