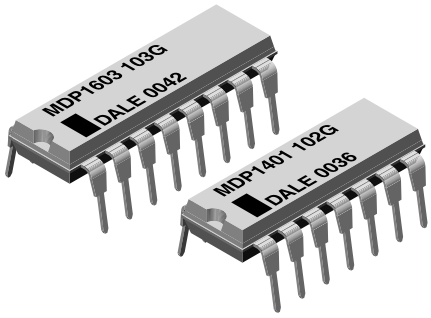
# Thick Film Resistor Networks, Dual-In-Line, Molded DIP




## 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

Pb Available

e1 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) $P_{70\,°C}$ W | RESISTANCE RANGE Ω | TOLERANCE (3) ± % | TEMPERATURE COEFFICIENT (-55 °C to +125 °C) ± ppm/°C | TCR TRACKING (2) (-55 °C to +125 °C) ± ppm/°C | WEIGHT 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

**New Global Part Numbering: MDP1403100RGD04 (preferred part numbering format)**

| M | D | P | 1 | 4 | 0 | 3 | 1 | 0 | 0 | R | G | D | 0 | 4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| GLOBAL MODEL | PIN COUNT | SCHEMATIC | RESISTANCE VALUE | TOLERANCE CODE | PACKAGING | SPECIAL |
|---|---|---|---|---|---|---|
| **MDP** | **14** = 14 pin<br>**16** = 16 pin | **01** = Bussed<br>**03** = Isolated<br>**00** = Special | **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 | **F** = ± 1 %<br>**G** = ± 2 %<br>**J** = ± 5 %<br>**S** = Special<br>**Z** = 0 Ω Jumper | **E04** = Lead (Pb)-free, tube<br>**D04** = Tin/lead, tube | Blank = Standard (Dash Number) (up to 3 digits) From **1 to 999** as applicable |

**Historical Part Number Example: MDP1403101G (will continue to be accepted)**

| MDP | 14 | 03 | 101 | G | D04 |
|---|---|---|---|---|---|
| HISTORICAL MODEL | PIN COUNT | SCHEMATIC | RESISTANCE VALUE | TOLERANCE CODE | PACKAGING |

**New Global Part Numbering: MDP1405121CGD04 (preferred part numbering format)**

| M | D | P | 1 | 4 | 0 | 5 | 1 | 2 | 1 | C | G | D | 0 | 4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| GLOBAL MODEL | PIN COUNT | SCHEMATIC | RESISTANCE VALUE | TOLERANCE CODE | PACKAGING | SPECIAL |
|---|---|---|---|---|---|---|
| **MDP** | **14** = 14 pin<br>**16** = 16 pin | **05** = Dual terminator | 3 digit impedance code, followed by alpha modifier (see Impedance Codes table) | **F** = ± 1 %<br>**G** = ± 2 %<br>**J** = ± 5 % | **E04** = Lead (Pb)-free, tube<br>**D04** = Tin/lead, tube | Blank = Standard (Dash Number) (up to 3 digits) From **1 to 999** as applicable |

**Historical Part Number Example: MDP1405221271G (will continue to be accepted)**

| MDP | 14 | 05 | 221 | 271 | G | D04 |
|---|---|---|---|---|---|---|
| HISTORICAL MODEL | PIN COUNT | SCHEMATIC | RESISTANCE VALUE 1 | RESISTANCE VALUE 2 | TOLERANCE CODE | PACKAGING |

**Note**

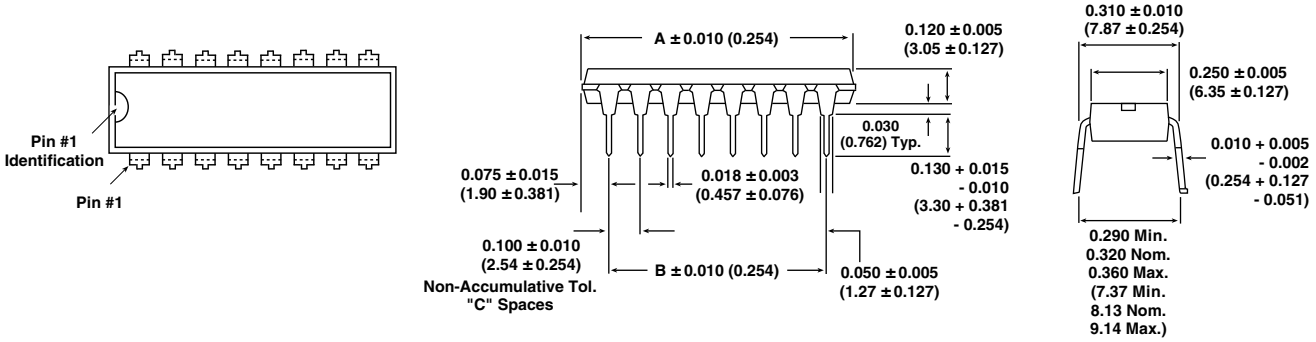
- For additional information on packaging, refer to the Through-Hole Network Packaging document (www.vishay.com/doc?31542).



For technical questions, contact: ff2aresistors@vishay.com

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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 | $V_{eff}$ | < 50 ppm typical | |
| Dielectric Strength | $V_{AC}$ | 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 | $R_1$ (Ω) | $R_2$ (Ω) | CODE | $R_1$ (Ω) | $R_2$ (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).

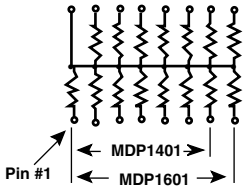


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## CIRCUIT APPLICATIONS

**01 Schematic**

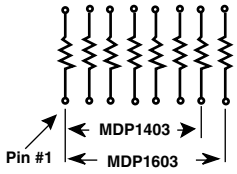



13 and 15 resistors with one pin common

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:

- MOS/ROM Pull-up/Pull-down
- Open Collector Pull-up
- "Wired OR" Pull-up
- Power Driven Pull-up
- TTL Input Pull-down
- Digital Pulse Squaring
- TTL Unused Gate Pull-up
- High Speed Parallel Pull-up

**03 Schematic**

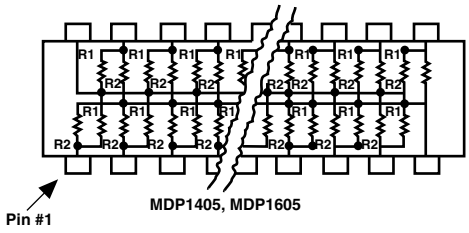



7 or 8 isolated resistors

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:

- "Wired OR" Pull-up
- Power Driven Pull-up
- Powergate Pull-up
- Line Termination
- Long-line Impedance Balancing
- LED Current Limiting
- ECL Output Pull-down
- TTL Input Pull-down

**05 Schematic**



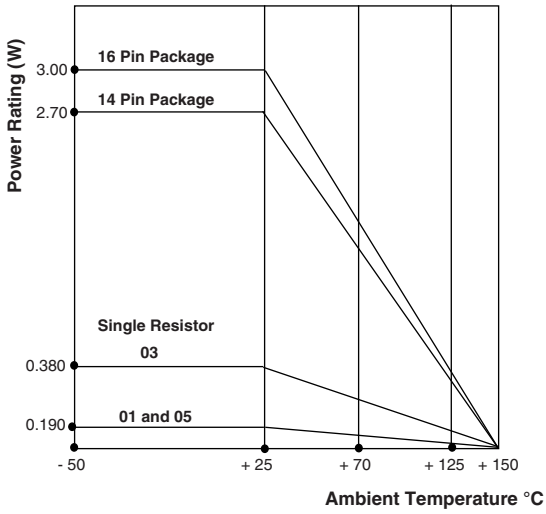

TTL dual-line terminator; pulse squaring

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.

**Note**

- Standard E24 resistance values stocked. Consult factory.

## DERATING






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


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