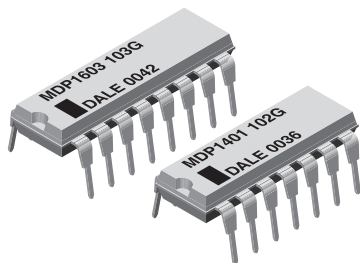


# Thick Film Resistor Networks, Dual-In-Line, Molded DIP



## 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)  $\pm 100$  ppm/°C
- Reduces total assembly costs
- Compatible with automatic inserting equipment
- Wide resistance range (10  $\Omega$  to 2.2 M $\Omega$ )
- Uniform performance characteristics
- Available in tube pack
- Compliant to RoHS directive 2002/95/EC


**RoHS\***  
COMPLIANT

## STANDARD ELECTRICAL SPECIFICATIONS

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

### Notes

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

(2) Tighter tracking available

(3)  $\pm 2$  % standard,  $\pm 1$  % and  $\pm 5$  % 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 = $\Omega$<br>K = k $\Omega$<br>M = M $\Omega$<br>10R0 = 10 $\Omega$<br>680K = 680 k $\Omega$<br>1M00 = 1.0 M $\Omega$ |   |   | F = $\pm 1\%$<br>G = $\pm 2\%$<br>J = $\pm 5\%$<br>S = Special |   |   | E04 = Lead (Pb)-free, tube<br>D04 = Tin/lead, tube |   |   | Blank = Standard (Dash Number)<br>(Up to 3 digits)<br>From 1 to 999 as applicable |   |   |  |  |  |

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

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

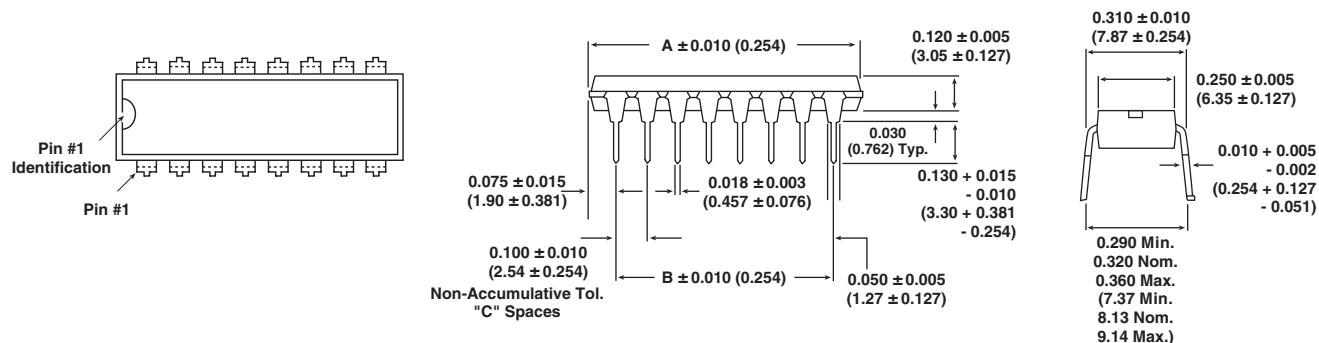
**New Global Part Numbering: MDP1405121CGD04 (preferred part numbering format)**

|              |  |                            |  |   |  |                      |  |   |  |                                                                                |  |   |  |                                     |  |   |  |                                                    |  |   |  |                                                                             |  |   |  |   |  |   |  |  |  |  |  |  |  |
|--------------|--|----------------------------|--|---|--|----------------------|--|---|--|--------------------------------------------------------------------------------|--|---|--|-------------------------------------|--|---|--|----------------------------------------------------|--|---|--|-----------------------------------------------------------------------------|--|---|--|---|--|---|--|--|--|--|--|--|--|
| 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)**

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

\* Pb containing terminations are not RoHS compliant, exemptions may apply

**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**

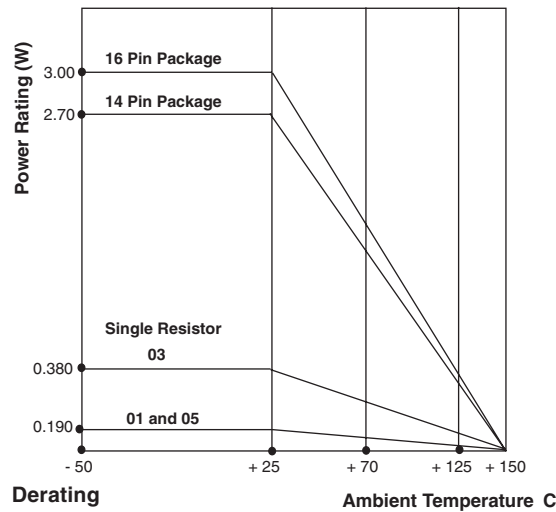
| PARAMETER                                 | UNIT      | MDP14             | MDP16 |
|-------------------------------------------|-----------|-------------------|-------|
| Package Power Rating (Maximum at + 70 °C) | W         | 1.73              | 1.92  |
| Voltage Coefficient of Resistance         | $V_{eff}$ | < 50 ppm typical  |       |
| Dielectric Strength                       | $V_{AC}$  | 200               |       |
| Insulation Resistance                     | $\Omega$  | > 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                 |

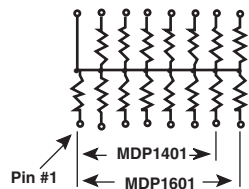
**IMPEDANCE CODES**

| CODE | R1 ( $\Omega$ ) | R2 ( $\Omega$ ) | CODE | R1 ( $\Omega$ ) | R2 ( $\Omega$ ) |
|------|-----------------|-----------------|------|-----------------|-----------------|
| 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            |



## CIRCUIT APPLICATIONS

### 01 SCHEMATIC

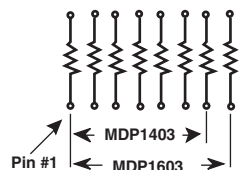


13 and 15 resistors with one pin common

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

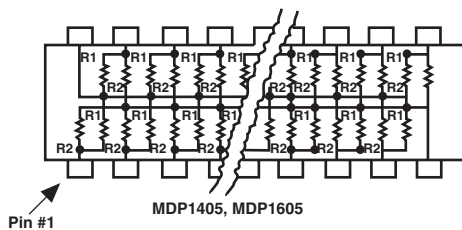


7 and 8 isolated resistors

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.

| <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, 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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