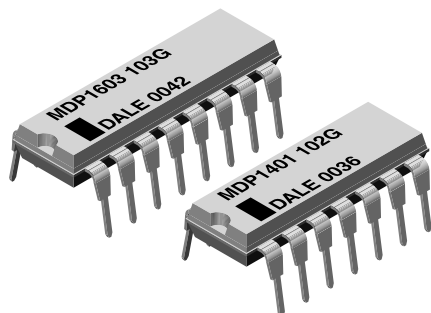


# Thick Film Resistor Networks, Dual-In-Line, Molded DIP



## 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 <sup>(1)</sup> P <sub>70 °C</sub> W	RESISTANCE RANGE Ω	TOLERANCE <sup>(3)</sup> ± %	TEMPERATURE COEFFICIENT (-55 °C to +125 °C) ± ppm/°C	TCR TRACKING <sup>(2)</sup> (-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 16 = 16 pin		01 = Bussed 03 = Isolated 00 = Special		R = Ω K = kΩ M = MΩ 10R0 = 10 Ω 680K = 680 kΩ 1M00 = 1.0 MΩ 0000 = 0 Ω Jumper				F = ± 1 % G = ± 2 % J = ± 5 % S = Special Z = 0 Ω Jumper		E04 = Lead (Pb)-free, tube 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)

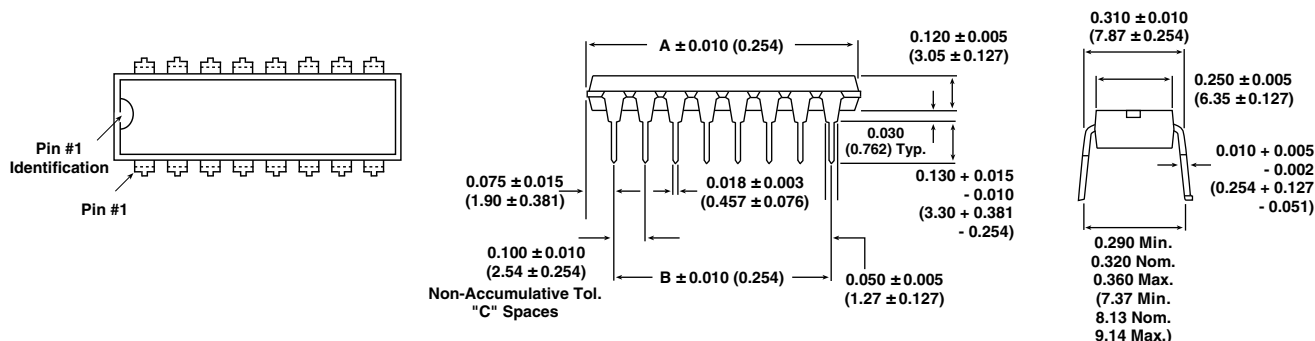
M	D	P	1	4	0	5	1	2	1	C	G	D	0	4			
GLOBAL MODEL	PIN COUNT		SCHEMATIC		RESISTANCE VALUE				TOLERANCE CODE		PACKAGING			SPECIAL			
MDP	14 = 14 pin 16 = 16 pin		05 = Dual terminator		3 digit impedance code, followed by alpha modifier (see Impedance Codes table)				F = ± 1 % G = ± 2 % J = ± 5 %		E04 = Lead (Pb)-free, tube 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](http://www.vishay.com/doc?31542)).

**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**

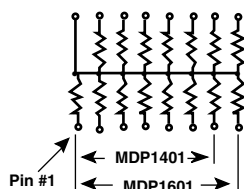
CODE	$R_1 (\Omega)$	$R_2 (\Omega)$	CODE	$R_1 (\Omega)$	$R_2 (\Omega)$
500B	82	130	141A	270	270
750B	120	200	181A	330	390
800C	130	210	191A	330	470
990A	160	260	221B	330	680
101C	180	240	281B	560	560
111C	180	270	381B	560	1.2K
121B	180	390	501C	620	2.7K
121C	220	270	102A	1.5K	3.3K
131A	220	330	202B	3K	6.2K

**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

### 01 Schematic

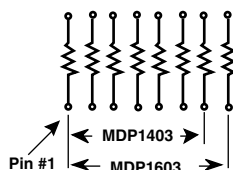


13 and 15 resistors with one pin common

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

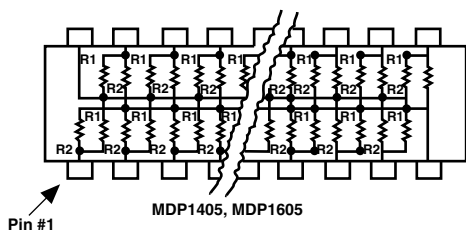


7 or 8 isolated resistors

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



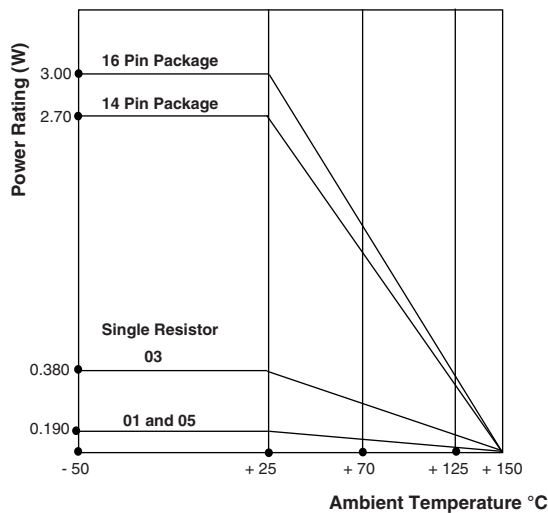
TTL dual-line terminator; pulse squaring

The MDPXX05 circuit contains 12 and 14 series pair of resistors. Each series pair is connected between ground and a common pair. 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





PERFORMANCE		
TEST	CONDITIONS	MAX. $\Delta R$ (TYPICAL TEST LOTS)
Power Conditioning	1.5 rated power, applied 1.5 h "ON" and 0.5 h "OFF" for 100 h $\pm 4$ 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)	-



## 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.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. 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.