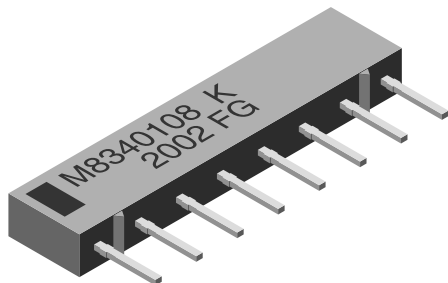


# Thick Film Resistor Networks Military, MIL-PRF-83401 Qualified, Type RZ, Single-In-Line, Molded SIP; 01, 03, 05 Schematics



## FEATURES

- MIL-PRF-83401 qualified
- 0.195" [4.95 mm] "A" and 0.350" [8.89 mm] "C" maximum seated heights
- Thick film resistive elements
- TCR available in "K" ( $\pm 100$  ppm/ $^{\circ}$ C) or "M" ( $\pm 300$  ppm/ $^{\circ}$ C) characteristic
- All device leads are hot-solder dipped
- Rugged molded case construction
- Compatible with automatic insertion equipment
- 100 % screen tested per Group A, Subgroup 1 of MIL-PRF-83401
- All devices are capable of passing the MIL-STD-202, Method 210, Condition D "Resistance to Soldering Heat" test
- Available in tube pack

## STANDARD ELECTRICAL SPECIFICATIONS

| VISHAY DALE<br>MODEL/<br>PIN NO/<br>PROFILE | SCHEMATIC | RESISTOR<br>POWER RATING<br>MAX. at 70 $^{\circ}$ C<br>W | PACKAGE<br>POWER RATING<br>MAX. at 70 $^{\circ}$ C<br>W | RESISTANCE<br>RANGE<br>$\Omega$ | STANDARD<br>TOLERANCE<br>% | TEMPERATURE<br>COEFFICIENT <sup>(2)</sup><br>(- 55 $^{\circ}$ C to + 125 $^{\circ}$ C) | WEIGHT<br>g |
|---------------------------------------------|-----------|----------------------------------------------------------|---------------------------------------------------------|---------------------------------|----------------------------|----------------------------------------------------------------------------------------|-------------|
| MSM06A                                      | 01        | 0.12                                                     | 0.60                                                    | 10 - 1M                         | $\pm 2$                    | K, M                                                                                   | 0.4         |
| MSM08A                                      | 01        | 0.12                                                     | 0.84                                                    |                                 |                            |                                                                                        | 0.5         |
| MSM10A                                      | 01        | 0.12                                                     | 1.08                                                    |                                 |                            |                                                                                        | 0.6         |
| MSM06A                                      | 03        | 0.12                                                     | 0.36                                                    | 10 - 1M                         | $\pm 2$                    | K, M                                                                                   | 0.4         |
| MSM08A                                      | 03        | 0.12                                                     | 0.48                                                    |                                 |                            |                                                                                        | 0.5         |
| MSM10A                                      | 03        | 0.12                                                     | 0.60                                                    |                                 |                            |                                                                                        | 0.6         |
| MSM06A                                      | 05        | 0.07                                                     | 0.60                                                    | Consult<br>factory              | $\pm 2$                    | K, M                                                                                   | 0.4         |
| MSM08A                                      | 05        | 0.07                                                     | 0.84                                                    |                                 |                            |                                                                                        | 0.5         |
| MSM10A                                      | 05        | 0.07                                                     | 1.08                                                    |                                 |                            |                                                                                        | 0.6         |
| MSM06C                                      | 01        | 0.20                                                     | 1.00                                                    | 10 - 1M                         | $\pm 2$                    | K, M                                                                                   | 0.7         |
| MSM08C                                      | 01        | 0.20                                                     | 1.40                                                    |                                 |                            |                                                                                        | 0.9         |
| MSM10C                                      | 01        | 0.20                                                     | 1.80                                                    |                                 |                            |                                                                                        | 1.1         |
| MSM06C                                      | 03        | 0.20                                                     | 0.60                                                    | 10 - 1M                         | $\pm 2$                    | K, M                                                                                   | 0.7         |
| MSM08C                                      | 03        | 0.20                                                     | 0.80                                                    |                                 |                            |                                                                                        | 0.9         |
| MSM10C                                      | 03        | 0.20                                                     | 1.00                                                    |                                 |                            |                                                                                        | 1.1         |
| MSM06C                                      | 05        | 0.11                                                     | 0.88                                                    | Consult<br>factory              | $\pm 2$                    | K, M                                                                                   | 0.7         |
| MSM08C                                      | 05        | 0.11                                                     | 1.32                                                    |                                 |                            |                                                                                        | 0.9         |
| MSM10C                                      | 05        | 0.11                                                     | 1.80                                                    |                                 |                            |                                                                                        | 1.1         |

### Notes

<sup>(1)</sup>  $\pm 1$  % and  $\pm 5$  % available

<sup>(2)</sup> K =  $\pm 100$  ppm/ $^{\circ}$ C; M =  $\pm 300$  ppm/ $^{\circ}$ C

## GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: M8340107K1003GCD03 (preferred part numbering format)

|                        |                                                                                                                                                                                |   |   |   |   |                                              |   |                                                                                                                                                        |   |   |                                                              |   |                                         |   |                                                                                    |   |   |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|----------------------------------------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|--------------------------------------------------------------|---|-----------------------------------------|---|------------------------------------------------------------------------------------|---|---|
| M                      | 8                                                                                                                                                                              | 3 | 4 | 0 | 1 | 0                                            | 7 | K                                                                                                                                                      | 1 | 0 | 0                                                            | 3 | G                                       | C | D                                                                                  | 0 | 3 |
| MIL<br>STYLE<br>M83401 | SPEC SHEET<br>04 = 6 Pin, "C" Profile<br>05 = 8 Pin, "C" Profile<br>06 = 10 Pin, "C" Profile<br>07 = 6 Pin, "A" Profile<br>08 = 8 Pin, "A" Profile<br>09 = 10 Pin, "A" Profile |   |   |   |   | CHARACTERISTIC<br>K = 100 ppm<br>M = 300 ppm |   | RESISTANCE<br>VALUE<br>3 digit significant<br>figure, followed by<br>a multiplier<br>10R0 = 10 $\Omega$<br>3302 = 33 k $\Omega$<br>1004 = 1 M $\Omega$ |   |   | TOLERANCE<br>F = $\pm 1$ %<br>G = $\pm 2$ %<br>J = $\pm 5$ % |   | SCHEMATIC<br>C = Bussed<br>G = Isolated |   | PACKAGING<br>D03 = Tin/Lead, Tube<br>DSL = Tin/Lead, Tube,<br>Single Lot Date Code |   |   |

Historical Part Number example: M8340107K1003GC (will continue to be accepted)

|           |            |                |                  |           |           |           |
|-----------|------------|----------------|------------------|-----------|-----------|-----------|
| M83401    | 07         | K              | 1003             | G         | C         | D03       |
| MIL STYLE | SPEC SHEET | CHARACTERISTIC | RESISTANCE VALUE | TOLERANCE | SCHEMATIC | PACKAGING |

New Global Part Numbering: M8340104KA001GHD03 (preferred part numbering format)

|                        |                                                                                                                                                                                |   |   |   |   |                                              |   |                                                                             |   |   |                                                              |   |                                     |   |                                                                                    |   |   |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|----------------------------------------------|---|-----------------------------------------------------------------------------|---|---|--------------------------------------------------------------|---|-------------------------------------|---|------------------------------------------------------------------------------------|---|---|
| M                      | 8                                                                                                                                                                              | 3 | 4 | 0 | 1 | 0                                            | 4 | K                                                                           | A | 0 | 0                                                            | 1 | G                                   | H | D                                                                                  | 0 | 3 |
| MIL<br>STYLE<br>M83401 | SPEC SHEET<br>04 = 6 Pin, "C" Profile<br>05 = 8 Pin, "C" Profile<br>06 = 10 Pin, "C" Profile<br>07 = 6 Pin, "A" Profile<br>08 = 8 Pin, "A" Profile<br>09 = 10 Pin, "A" Profile |   |   |   |   | CHARACTERISTIC<br>K = 100 ppm<br>M = 300 ppm |   | RESISTANCE<br>VALUE<br>Per std. Mil. Spec<br>(see Impedance<br>Codes table) |   |   | TOLERANCE<br>F = $\pm 1$ %<br>G = $\pm 2$ %<br>J = $\pm 5$ % |   | SCHEMATIC<br>H = Dual<br>Terminator |   | PACKAGING<br>D03 = Tin/Lead, Tube<br>DSL = Tin/Lead, Tube,<br>Single Lot Date Code |   |   |

Historical Part Number example: M8340104KA001GH (will continue to be accepted)

|           |            |                |                  |           |           |           |
|-----------|------------|----------------|------------------|-----------|-----------|-----------|
| M83401    | 04         | K              | A001             | G         | H         | D03       |
| MIL STYLE | SPEC SHEET | CHARACTERISTIC | RESISTANCE VALUE | TOLERANCE | SCHEMATIC | PACKAGING |

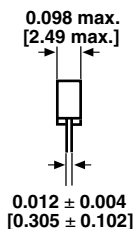
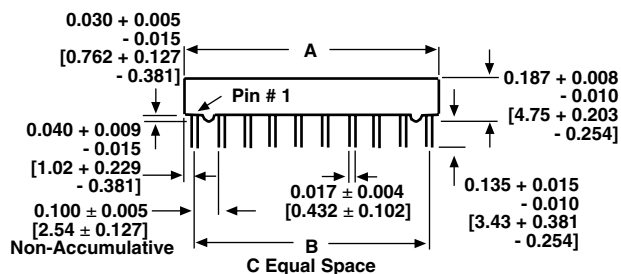


# MSM (Military M83401)

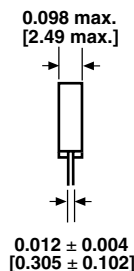
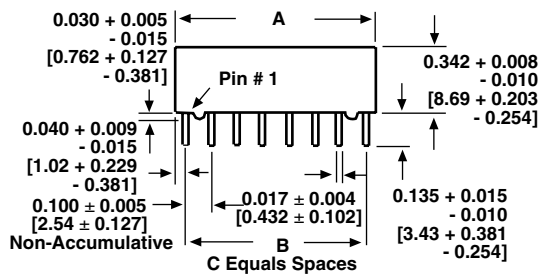
Thick Film Resistor Networks Military, MIL-PRF-83401 Qualified, Vishay Dale  
Type RZ, Single-In-Line, Molded SIP; 01, 03, 05 Schematics

## DIMENSIONS in inches [millimeters]

### "A" Profile



### "C" Profile



| VISHAY DALE MODEL | A                                | B                | C |
|-------------------|----------------------------------|------------------|---|
| MSM06             | 0.583 ± 0.015<br>[14.81 ± 0.381] | 0.500<br>[12.70] | 5 |
| MSM08             | 0.783 ± 0.015<br>[19.89 ± 0.381] | 0.700<br>[17.78] | 7 |
| MSM10             | 0.983 ± 0.015<br>[24.97 ± 0.381] | 0.900<br>[22.86] | 9 |

## TECHNICAL SPECIFICATIONS

| PARAMETER                         | UNIT             | MSM SERIES    |
|-----------------------------------|------------------|---------------|
| Maximum Operating Voltage         | V <sub>DC</sub>  | 50            |
| Voltage Coefficient of Resistance | V <sub>eff</sub> | < 50 ppm      |
| Dielectric Strength               | V <sub>AC</sub>  | 200 min.      |
| Insulation Resistance             | Ω                | 10 000 M      |
| Operating Temperature Range       | °C               | - 55 to + 125 |
| Storage Temperature Range         | °C               | - 55 to + 150 |

## MECHANICAL SPECIFICATIONS

|                |                                 |
|----------------|---------------------------------|
| Body:          | Molded epoxy                    |
| Terminals:     | Copper alloy, hot-solder dipped |
| Solderability: | Per MIL-PRF-83401               |

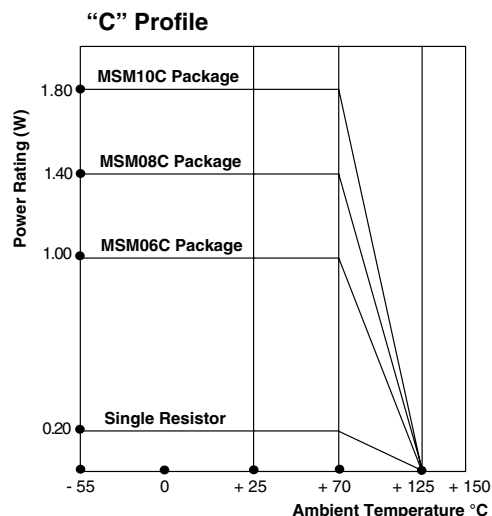
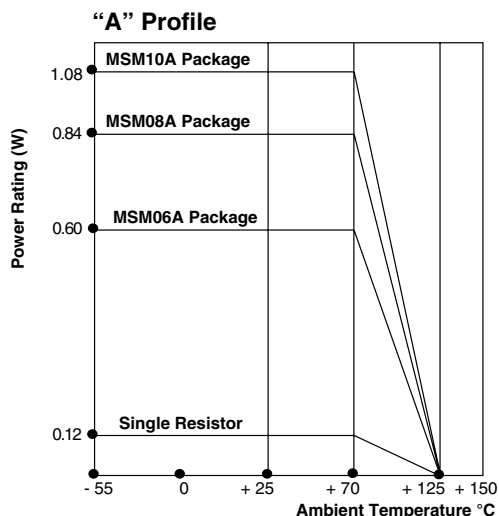
**CAGE CODE: 91637 and SH903**

## MILITARY IMPEDANCE CODES

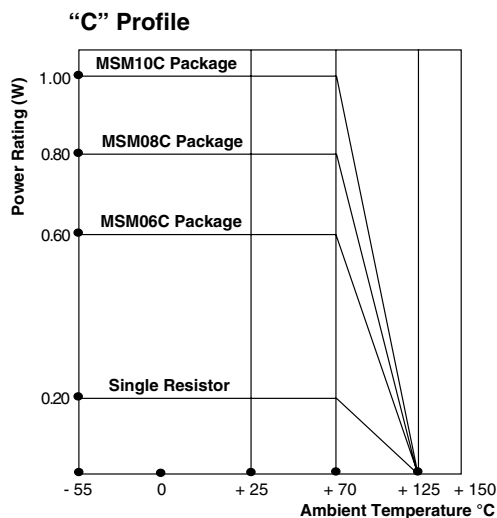
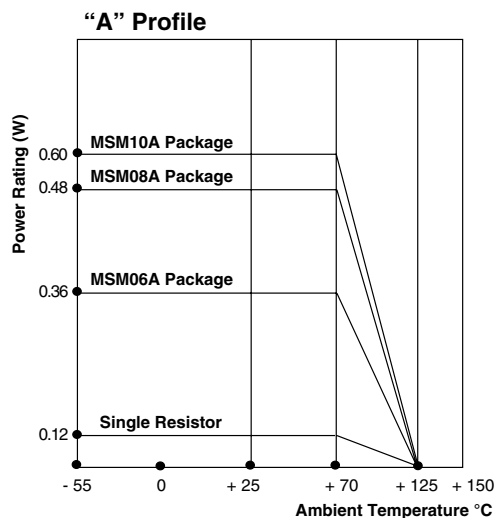
| CODE | R <sub>1</sub> (Ω) | R <sub>2</sub> (Ω) | CODE | R <sub>1</sub> (Ω) | R <sub>2</sub> (Ω) |
|------|--------------------|--------------------|------|--------------------|--------------------|
| A001 | 82                 | 130                | A010 | 330                | 470                |
| A002 | 120                | 200                | A011 | 330                | 680                |
| A003 | 130                | 210                | A012 | 1.5K               | 3.3K               |
| A004 | 160                | 260                | A013 | 3K                 | 6.2K               |
| A005 | 180                | 240                | A014 | 180                | 270                |
| A006 | 180                | 390                | A015 | 270                | 270                |
| A007 | 220                | 270                | A016 | 560                | 560                |
| A008 | 220                | 330                | A017 | 560                | 1.2K               |
| A009 | 330                | 390                | A018 | 620                | 2.7K               |

## DERATING

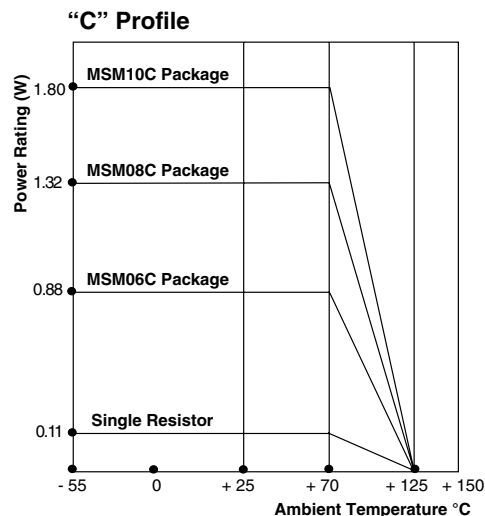
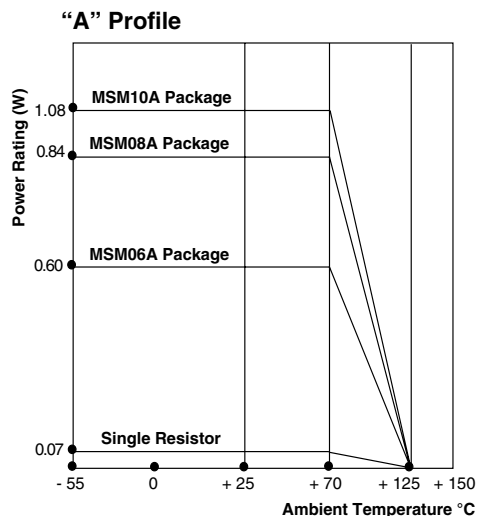
### 01 Schematic



### 03 Schematic



### 05 Schematic



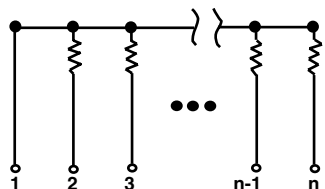


# MSM (Military M83401)

Thick Film Resistor Networks Military, MIL-PRF-83401 Qualified, Vishay Dale  
Type RZ, Single-In-Line, Molded SIP; 01, 03, 05 Schematics

## CIRCUIT APPLICATIONS

### 01 Schematic



5, 7 or 9 resistors with one pin common

#### "A" Profile

MSM06A01 (M8340107xxxxxC)

MSM08A01 (M8340108xxxxxC)

MSM10A01 (M8340109xxxxxC)

#### "C" Profile

MSM06C01 (M8340104xxxxxC)

MSM08C01 (M8340105xxxxxC)

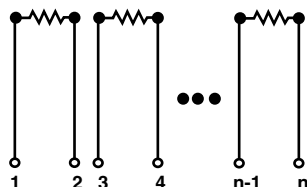
MSM10C01 (M8340106xxxxxC)

The MSM06A01, MSM08A01, MSM10A01, MSM06C01, MSM08C01 and MSM10C01 molded single-in-line resistor networks provide the user with a choice of 5, 7 or 9 nominally equal resistors, each connected to a common pin (Pin No. 1).

Commonly used in the following applications:

- "Wired OR" Pull-up
- Power Gate Pull-up
- MOS/ROM Pull-up/Pull-down
- Open Collector Pull-up
- TTL Input Pull-down
- TTL Unused Gate Pull-up

### 03 Schematic



3, 4 or 5 isolated resistors

#### "A" Profile

MSM06A03 (M8340107xxxxxG)

MSM08A03 (M8340108xxxxxG)

MSM10A03 (M8340109xxxxxG)

#### "C" Profile

MSM06C03 (M8340104xxxxxG)

MSM08C03 (M8340105xxxxxG)

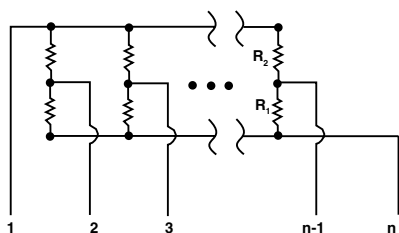
MSM10C03 (M8340106xxxxxG)

The MSM06A03, MSM08A03, MSM10A03, MSM06C03, MSM08C03 and MSM10C03 molded single-in-line resistor networks provide the user with a choice of 3, 4 or 5 nominally equal resistors. Each resistor is isolated from all others.

Commonly used in the following applications:

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

### 05 Schematic



4, 6 or 8 isolated resistors

#### "A" Profile

MSM06A05 (M8340107xxxxxH)

MSM08A05 (M8340108xxxxxH)

MSM10A05 (M8340109xxxxxH)

#### "C" Profile

MSM06C05 (M8340104xxxxxH)

MSM08C05 (M8340105xxxxxH)

MSM10C05 (M8340106xxxxxH)

The MSM06A05, MSM08A05, MSM10A05, MSM06C05, MSM08C05 and MSM10C05 molded single-in-line resistor networks provide the user with a choice of 4, 6 or 8 pair of R1/R2 resistor values for pulse squaring and TTL dual-line terminating requirements.

## PERFORMANCE

| TEST                         | CONDITIONS                                                                                               | MAX. $\Delta R$ (Typical Test Lots)                                                      |
|------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Power Conditioning           | 1.5 x 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 for 5 s                                                                      | $\pm$ 0.25 % $\Delta R$ (Characteristic K)<br>$\pm$ 0.50 % $\Delta R$ (Characteristic M) |
| Low Temperature Operation    | 45 min at full rated working voltage at - 65 °C                                                          | $\pm$ 0.25 % $\Delta R$ (Characteristic K)<br>$\pm$ 0.50 % $\Delta R$ (Characteristic M) |
| 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 + 260 °C solder to within 1/16" of body for 10 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 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                    | $\pm$ 0.50 % $\Delta R$ (Characteristic K)<br>$\pm$ 2.00 % $\Delta R$ (Characteristic M) |
| Terminal Strength            | 4 1/2 pound pull for 30 s                                                                                | $\pm$ 0.25 % $\Delta R$                                                                  |
| Insulation Resistance        | 10 000 M $\Omega$ (minimum)                                                                              | -                                                                                        |
| Dielectric Withstanding      | No evidence of arcing or damage (200 V <sub>RMS</sub> for 1 min)                                         | -                                                                                        |



### Disclaimer

All product specifications and data are subject to change without notice.

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 herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

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.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.