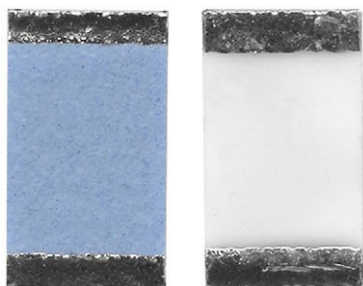


# High Precision Wraparound - Wide Ohmic Value Range Thin Film Chip Resistors, Sulfur Resistant



## LINKS TO ADDITIONAL RESOURCES



For low noise and precision applications, superior stability, low temperature coefficient of resistance, and low voltage coefficient, Vishay Sfernice's proven precision thin film wraparound resistors exceed requirements of MIL-PRF-55342G characteristics Y  $\pm 10$  ppm/ $^{\circ}$ C (-55  $^{\circ}$ C; +155  $^{\circ}$ C) down to  $\pm 5$  ppm/ $^{\circ}$ C (-55  $^{\circ}$ C; +155  $^{\circ}$ C).

## FEATURES

- Load life stability 0.02 % typical at 8000 h at 70  $^{\circ}$ C under Pd (0.033 % maximum)
- Low temperature coefficient down to **5 ppm/ $^{\circ}$ C** (-55  $^{\circ}$ C; +155  $^{\circ}$ C)
- Very low noise < -35 dB and voltage coefficient < 0.01 ppm/V
- Wide resistance range: 10  $\Omega$  to 86 M $\Omega$  depending on size
- Tolerances to  **$\pm 0.01$  %**
- In lot tracking  $\leq 5$  ppm/ $^{\circ}$ C
- Termination: thin film technology
- Short circuits (jumpers)  $r < 50$  mR,  $I < 2$  A, see PZR datasheet ([www.vishay.com/doc?53053](http://www.vishay.com/doc?53053))
- Withstand moisture resistance test of AEC-Q200
- Sulfur resistant (per ASTM B809-95 humid vapor test)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS\***  
Available

**HALOGEN**  
**FREE**  
Available

**GREEN**  
(5-2008)  
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

| MODEL                | SIZE | RESISTANCE RANGE <sup>(2)</sup><br>( $\Omega$ ) | RATED POWER<br>W<br>Pn <sup>(1)</sup> | RATED POWER<br>W<br>Pd <sup>(1)</sup> | LIMITING ELEMENT VOLTAGE<br>V | TOLERANCE<br>$\pm$ %                      | TEMPERATURE COEFFICIENT<br>$\pm$ ppm/ $^{\circ}$ C |
|----------------------|------|-------------------------------------------------|---------------------------------------|---------------------------------------|-------------------------------|-------------------------------------------|----------------------------------------------------|
| P0302                | 0302 | 10 to 420K                                      | 0.040                                 | 0.030                                 | 25                            | 0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5 | 5, 10, 25, 50, 100                                 |
| P0402                | 0402 | 10 to 1M                                        | 0.063                                 | 0.040                                 | 50                            | 0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5 | 5, 10, 25, 50, 100                                 |
| P0505                | 0505 | 10 to 4M                                        | 0.125                                 | 0.050                                 | 50                            | 0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5 | 5, 10, 25, 50, 100                                 |
| P0603                | 0603 | 10 to 3.2M                                      | 0.125                                 | 0.100                                 | 75                            | 0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5 | 5, 10, 25, 50, 100                                 |
| P0805 <sup>(3)</sup> | 0805 | 10 to 8M                                        | 0.200                                 | 0.125                                 | 150                           | 0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5 | 5, 10, 25, 50, 100                                 |
| P1005                | 1005 | 10 to 7.5M                                      | 0.250                                 | 0.125                                 | 75                            | 0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5 | 5, 10, 25, 50, 100                                 |
| P1206                | 1206 | 10 to 22M                                       | 0.330                                 | 0.250                                 | 200                           | 0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5 | 5, 10, 25, 50, 100                                 |
| P1505                | 1505 | 10 to 13.8M                                     | 0.350                                 | 0.175                                 | 200                           | 0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5 | 5, 10, 25, 50, 100                                 |
| P2010                | 2010 | 10 to 62M                                       | 1 <sup>(4)</sup>                      | 0.500                                 | 300                           | 0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5 | 5, 10, 25, 50, 100                                 |
| P2512                | 2512 | 10 to 86M                                       | 2 <sup>(4)</sup>                      | 1                                     | 300                           | 0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1, 2, 5 | 5, 10, 25, 50, 100                                 |

## Notes

- (1) Pn = nominal power: Pd = derated power intended to improve stability
- (2) **For ohmic range versus tolerance and TCR see detailed table on next page**
- (3) Model P0805 having the same size than P0705 and the same performances, only codification of P0805 remains
- (4) With special assembly care

## CLIMATIC SPECIFICATIONS

|                             |                                     |
|-----------------------------|-------------------------------------|
| Operating temperature range | -55 $^{\circ}$ C; +155 $^{\circ}$ C |
|-----------------------------|-------------------------------------|

## Note

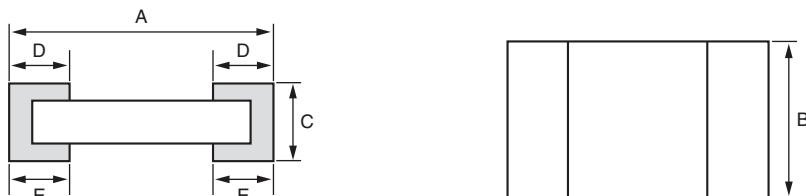
- For temperature up to 230  $^{\circ}$ C, see PHT datasheet ([www.vishay.com/doc?53050](http://www.vishay.com/doc?53050))

## PERFORMANCE VS. HUMID SULFUR VAPOR

|                 |                                                                                |
|-----------------|--------------------------------------------------------------------------------|
| Test conditions | 50 $^{\circ}$ C $\pm 2$ $^{\circ}$ C, 85 % $\pm 4$ % RH, exposure time 500 h   |
| Test results    | Resistance drift < (0.05 % R + 0.05 $\Omega$ ), no corrosion products observed |

## MECHANICAL SPECIFICATIONS

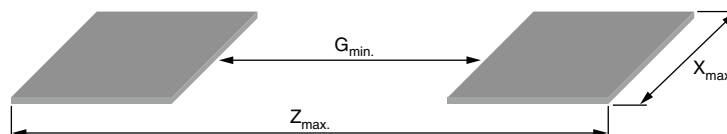
|              |                                                                                                                                                                        |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Substrate    | Alumina                                                                                                                                                                |
| Technology   | Thin film                                                                                                                                                              |
| Film         | <b>Nickel chromium</b> with mineral passivation or <b>CrSi</b>                                                                                                         |
| Protection   | Epoxy + silicone                                                                                                                                                       |
| Terminations | <b>B type:</b> SnPb over nickel barrier for solder reflow<br><b>N type:</b> SnAg over nickel barrier<br><b>G type:</b> gold over nickel barrier for other applications |

**DIMENSIONS** in millimeters (inches)


| CASE SIZE | A                                                            | B                                                            | C                             | D/E          |              |  |
|-----------|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------|--------------|--------------|--|
|           | MAX. TOL.<br>+0.152 (+0.006)<br>MIN. TOL.<br>-0.152 (-0.006) | MAX. TOL.<br>+0.127 (+0.005)<br>MIN. TOL.<br>-0.127 (-0.005) |                               |              |              |  |
|           | NOMINAL                                                      | NOMINAL                                                      |                               | NOMINAL      | TOLERANCE    |  |
| 0302      | 0.75 (0.029)                                                 | 0.60 (0.024)                                                 | 0.5 (0.02)<br>± 0.127 (0.005) | 0.15 (0.006) | 0.08 (0.003) |  |
| 0402      | 1.00 (0.039)                                                 | 0.60 (0.024)                                                 |                               | 0.25 (0.010) | 0.1 (0.004)  |  |
| 0505      | 1.27 (0.005)                                                 | 1.27 (0.050)                                                 |                               | 0.38 (0.015) | 0.13 (0.005) |  |
| 0603      | 1.52 (0.060)                                                 | 0.85 (0.033)                                                 |                               |              |              |  |
| 0805      | 1.91 (0.075)                                                 | 1.27 (0.050)                                                 |                               |              |              |  |
| 1005      | 2.54 (0.100)                                                 | 1.27 (0.050)                                                 |                               |              |              |  |
| 1206      | 3.06 (0.120)                                                 | 1.60 (0.063)                                                 |                               | 0.40 (0.016) |              |  |
| 1505      | 3.81 (0.150)                                                 | 1.32 (0.052)                                                 |                               | 0.48 (0.019) |              |  |
| 2010      | 5.08 (0.200)                                                 | 2.54 (0.100)                                                 |                               | 0.48 (0.019) |              |  |
| 2512      | 6.30 (0.248)                                                 | 3.30 (0.130)                                                 |                               |              |              |  |

**Note**

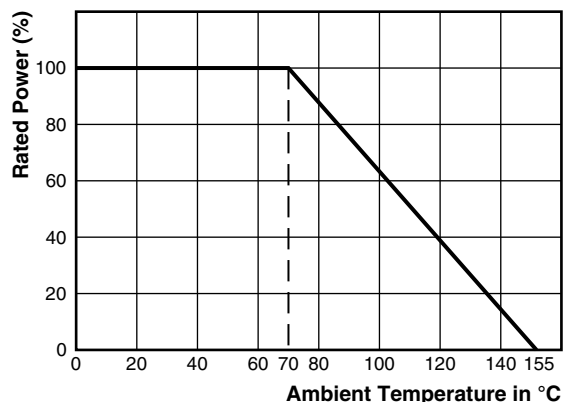
- Model P0805 having the same size than P0705 and the same performances, only codification of P0805 remains

**SUGGESTED LAND PATTERN** (to IPC-7351A)


| CHIP SIZE | DIMENSIONS in millimeters (inches) |                   |                   |
|-----------|------------------------------------|-------------------|-------------------|
|           | Z <sub>max.</sub>                  | G <sub>min.</sub> | X <sub>max.</sub> |
| 0302      | 1.30 (0.051)                       | 0.15 (0.006)      | 0.73 (0.029)      |
| 0402      | 1.55 (0.061)                       | 0.15 (0.006)      | 0.73 (0.029)      |
| 0505      | 1.82 (0.072)                       | 0.10 (0.004)      | 1.40 (0.055)      |
| 0603      | 2.37 (0.093)                       | 0.35 (0.014)      | 0.98 (0.039)      |
| 0805      | 2.76 (0.109)                       | 0.74 (0.029)      | 1.40 (0.055)      |
| 1005      | 3.39 (0.133)                       | 1.37 (0.054)      | 1.40 (0.055)      |
| 1206      | 3.91 (0.154)                       | 1.85 (0.073)      | 1.73 (0.068)      |
| 1505      | 4.66 (0.183)                       | 2.44 (0.096)      | 1.45 (0.057)      |
| 2010      | 5.93 (0.233)                       | 3.71 (0.146)      | 2.67 (0.105)      |
| 2512      | 7.15 (0.281)                       | 4.93 (0.194)      | 3.43 (0.135)      |

**TEMPERATURE COEFFICIENT**

| TCR                                  | CODE                                              | FILM         |
|--------------------------------------|---------------------------------------------------|--------------|
| $\pm 5 \text{ ppm/}^\circ\text{C}$   | C (-55 $^\circ\text{C}$ ; +155 $^\circ\text{C}$ ) | NiCr         |
| $\pm 5 \text{ ppm/}^\circ\text{C}$   | Z (0 $^\circ\text{C}$ ; +70 $^\circ\text{C}$ )    | NiCr         |
| $\pm 10 \text{ ppm/}^\circ\text{C}$  | Y                                                 | NiCr         |
| $\pm 25 \text{ ppm/}^\circ\text{C}$  | E                                                 | NiCr         |
| $\pm 50 \text{ ppm/}^\circ\text{C}$  | H                                                 | NiCr or CrSi |
| $\pm 100 \text{ ppm/}^\circ\text{C}$ | K                                                 | NiCr or CrSi |

**POWER DERATING CURVE****BEST TOLERANCE AND TCR VS. OHMIC VALUE**

| STYLE | RANGE ( $\Omega$ ) | TOLERANCE ( $\pm$ %)                      | TCR CODE         |
|-------|--------------------|-------------------------------------------|------------------|
| 0302  | 10 to < 50         | 0.1; 0.25; 0.5; 1; 2; 5                   | C; Z; Y; E; H; K |
|       | 50 to < 100        | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | C; Z; Y; E; H; K |
|       | 100 to < 250       | 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5       | C; Z; Y; E; H; K |
|       | 250 to 30K         | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | C; Z; Y; E; H; K |
|       | > 30K to 40K       | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | Z; Y; E; H; K    |
|       | > 40K to 65K       | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | E; H; K          |
|       | > 65K to 420K      | 0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>    | H; K             |
| 0402  | 10 to < 50         | 0.1; 0.25; 0.5; 1; 2; 5                   | C; Z; Y; E; H; K |
|       | 50 to < 100        | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | C; Z; Y; E; H; K |
|       | 100 to < 250       | 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5       | C; Z; Y; E; H; K |
|       | 250 to 67K         | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | C; Z; Y; E; H; K |
|       | > 67K to 200K      | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | Z; Y; E; H; K    |
|       | > 200K to 341K     | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | E; H; K          |
|       | > 341K to 1M       | 0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>    | H; K             |
| 0505  | 10 to < 50         | 0.1; 0.25; 0.5; 1; 2; 5                   | C; Z; Y; E; H; K |
|       | 50 to < 100        | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | C; Z; Y; E; H; K |
|       | 100 to < 250       | 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5       | C; Z; Y; E; H; K |
|       | 250 to 187K        | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | C; Z; Y; E; H; K |
|       | > 187K to 260K     | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | Z; Y; E; H; K    |
|       | > 260K to 400K     | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | E; H; K          |
|       | > 400K to 4M       | 0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>    | H; K             |
| 0603  | 10 to < 50         | 0.1; 0.25; 0.5; 1; 2; 5                   | C; Z; Y; E; H; K |
|       | 50 to < 100        | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | C; Z; Y; E; H; K |
|       | 100 to < 250       | 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5       | C; Z; Y; E; H; K |
|       | 250 to 160K        | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | C; Z; Y; E; H; K |
|       | > 160K to 332K     | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | Z; Y; E; H; K    |
|       | > 332K to 500K     | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | E; H; K          |
|       | > 500K to 3M2      | 0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>    | H; K             |

**BEST TOLERANCE AND TCR VS. OHMIC VALUE**

| STYLE | RANGE<br>( $\Omega$ ) | TOLERANCE<br>( $\pm$ %)                   | TCR CODE         |
|-------|-----------------------|-------------------------------------------|------------------|
| 0805  | 10 to < 50            | 0.1; 0.25; 0.5; 1; 2; 5                   | C; Z; Y; E; H; K |
|       | 50 to < 100           | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | C; Z; Y; E; H; K |
|       | 100 to < 250          | 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5       | C; Z; Y; E; H; K |
|       | 250 to 360K           | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | C; Z; Y; E; H; K |
|       | > 360K to 511K        | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | Z; Y; E; H; K    |
|       | > 511K to 750K        | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | E; H; K          |
|       | > 750K to 8M          | 0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>    | H; K             |
| 1005  | 10 to < 50            | 0.1; 0.25; 0.5; 1; 2; 5                   | C; Z; Y; E; H; K |
|       | 50 to < 100           | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | C; Z; Y; E; H; K |
|       | 100 to < 250          | 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5       | C; Z; Y; E; H; K |
|       | 250 to 400K           | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | C; Z; Y; E; H; K |
|       | > 400K to 550K        | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | Z; Y; E; H; K    |
|       | > 550K to 810K        | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | E; H; K          |
|       | > 810K to 7M5         | 0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>    | H; K             |
| 1206  | 10 to < 50            | 0.1; 0.25; 0.5; 1; 2; 5                   | C; Z; Y; E; H; K |
|       | 50 to < 100           | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | C; Z; Y; E; H; K |
|       | 100 to < 250          | 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5       | C; Z; Y; E; H; K |
|       | 250 to 1M3            | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | C; Z; Y; E; H; K |
|       | > 1M3 to 2M           | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | Z; Y; E; H; K    |
|       | > 2M to 3M5           | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | E; H; K          |
|       | > 3M5 to 22M          | 0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>    | H; K             |
| 1505  | 10 to < 50            | 0.1; 0.25; 0.5; 1; 2; 5                   | C; Z; Y; E; H; K |
|       | 50 to < 100           | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | C; Z; Y; E; H; K |
|       | 100 to < 250          | 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5       | C; Z; Y; E; H; K |
|       | 250 to 720K           | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | C; Z; Y; E; H; K |
|       | > 720K to 1M          | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | Z; Y; E; H; K    |
|       | > 1M to 1M5           | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | E; H; K          |
|       | > 1M5 to 13M8         | 0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>    | H; K             |
| 2010  | 10 to < 50            | 0.1; 0.25; 0.5; 1; 2; 5                   | C; Z; Y; E; H; K |
|       | 50 to < 100           | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | C; Z; Y; E; H; K |
|       | 100 to < 250          | 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5       | C; Z; Y; E; H; K |
|       | 250 to 3M8            | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | C; Z; Y; E; H; K |
|       | > 3M8 to 5M           | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | Z; Y; E; H; K    |
|       | > 5M to 7M5           | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | E; H; K          |
|       | > 7M5 to 62M          | 0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>    | H; K             |
| 2512  | 10 to < 50            | 0.1; 0.25; 0.5; 1; 2; 5                   | C; Z; Y; E; H; K |
|       | 50 to < 100           | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | C; Z; Y; E; H; K |
|       | 100 to < 250          | 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5       | C; Z; Y; E; H; K |
|       | 250 to 6M4            | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | C; Z; Y; E; H; K |
|       | > 6M4 to 8M6          | 0.01; 0.02; 0.05; 0.1; 0.25; 0.5; 1; 2; 5 | Z; Y; E; H; K    |
|       | > 8M6 to 12M9         | 0.05; 0.1; 0.25; 0.5; 1; 2; 5             | E; H; K          |
|       | > 12M9 to 86M         | 0.1; 0.25; 0.5; 1; 2; 5 <sup>(1)</sup>    | H; K             |

**Note**<sup>(1)</sup> Tolerance 0.05 % on request

## POPULAR OPTIONS

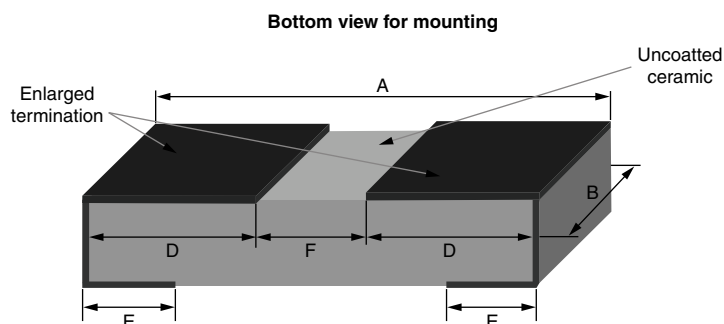
For any option it is recommended to consult Vishay Sfernice for availability first.

### Option: Enlarged Terminations

For stringent and special power dissipation requirements, the thermal resistance between the resistive layer and the solder joint can be reduced using enlarged terminations chip resistors which are soldered on large and thick copper pads acting as heatsink (see application note: 53048 Power Dissipation in High Precision Vishay Sfernice Chip Resistors and Arrays (P Thin Film, PRA Arrays, CHP Thick Film) [www.vishay.com/doc?53048](http://www.vishay.com/doc?53048).

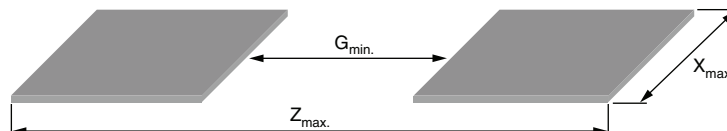
Option to order 0063: (applies to size 1206 / 1505 / 2010 / 2512).

### DIMENSIONS (Option 0063) in millimeters



| CASE SIZE | A                                          | B                                          | E                                        | D                                        | F       |      |      |
|-----------|--------------------------------------------|--------------------------------------------|------------------------------------------|------------------------------------------|---------|------|------|
|           | MAX. TOL.<br>+0.152<br>MIN. TOL.<br>-0.152 | MAX. TOL.<br>+0.127<br>MIN. TOL.<br>-0.127 | MAX. TOL.<br>+0.13<br>MIN. TOL.<br>-0.13 | MAX. TOL.<br>+0.13<br>MIN. TOL.<br>-0.13 |         |      |      |
|           | NOMINAL                                    | NOMINAL                                    | NOMINAL                                  | NOMINAL                                  | NOMINAL | MIN. | MAX. |
| 1206      | 3.06                                       | 1.60                                       | 0.40                                     | 1.215                                    | 0.63    | 0.50 | 0.76 |
| 1505      | 3.81                                       | 1.32                                       | 0.48                                     | 1.59                                     |         |      |      |
| 2010      | 5.08                                       | 2.54                                       |                                          | 2.215                                    |         |      |      |
| 2512      | 6.30                                       | 3.30                                       |                                          | 2.835                                    |         |      |      |

### SUGGESTED LAND PATTERN (Option 0063)



| CHIP SIZE | DIMENSIONS (IN MILLIMETER) |                   |                   |
|-----------|----------------------------|-------------------|-------------------|
|           | Z <sub>max.</sub>          | G <sub>min.</sub> | X <sub>max.</sub> |
| 1206      | 3.91                       | 0.50              | 1.73              |
| 1505      | 4.66                       |                   | 1.45              |
| 2010      | 5.93                       |                   | 2.67              |
| 2512      | 7.15                       |                   | 3.43              |

**Option: Marking**Option to order 0013:

Marking of ohmic value and tolerance:

Sizes: 0805 to 1005: 3 digits marking (according to EIA-96)

Sizes: 1206 to 2512: 4 digits marking (same codification than in the ordering procedure)

Tolerance indicated by a color dot.

Option to order 0014:

Marking of ohmic value:

Sizes: 0805 to 1005: 3 digits marking (according to EIA-96)

Sizes: 1206 to 2512: 4 digits marking (same codification than in the ordering procedure)

No standard marking available for smaller sizes.

A price adder will apply to the unit price of the parts for options 0013 and 0014.

**Option: AEC-Q200**

For moisture resistance test only.

Option to Order 0058:

Specific production process to withstand 85 °C/85 % at Pn/10

**PACKAGING**

ESD packaging available: waffle-pack and plastic tape and reel (low conductivity). Paper tape available upon request (for sizes 0402, 0603, 0805 and 1206).

| SIZE | MOQ | NUMBER OF PIECES PER PACKAGE |               |      | TAPE WIDTH |
|------|-----|------------------------------|---------------|------|------------|
|      |     | WAFFLE PACK<br>2" x 2"       | TAPE AND REEL |      |            |
|      |     |                              | MIN.          | MAX. |            |
| 0302 | 250 | 340                          | 100           | 5000 | 8 mm       |
| 0402 | 100 |                              |               | 100  |            |
| 0505 |     | 5000                         |               |      |            |
| 0603 |     | 5000                         |               |      |            |
| 0805 |     | 4000                         |               |      |            |
| 1005 |     |                              |               |      |            |
| 1206 |     |                              |               |      |            |
| 1505 |     |                              |               |      |            |
| 2010 |     | 1000                         |               |      |            |
| 2512 |     | 2000                         |               |      | 12 mm      |

**PACKAGING RULES****Waffle Pack**

Can be filled up to maximum quantity indicated in the table here above, taking into account the minimum order quantity. When quantity ordered exceeds maximum quantity of a single waffle pack, the waffle packs are stacked up on the top of each other and closed by one single cover.

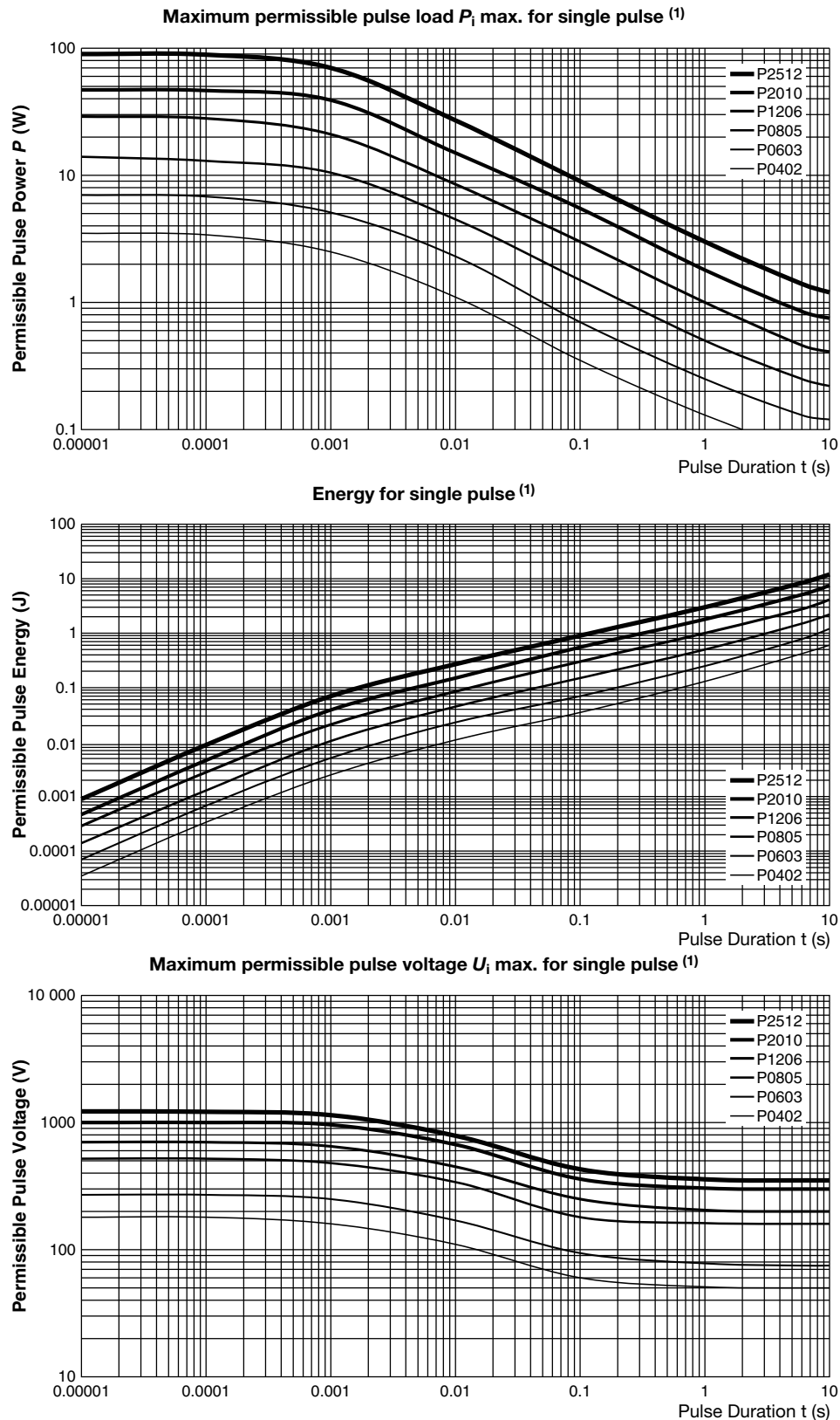
**To get "not stacked up" waffle pack in case of ordered quantity > maximum number of pieces per package: Please consult Vishay Sfernice for specific ordering code.**

**Tape and Reel**

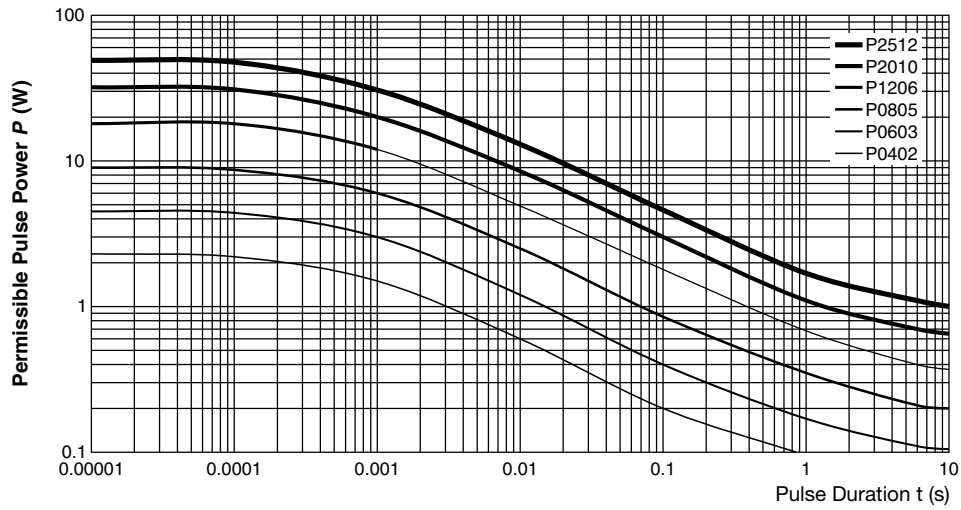
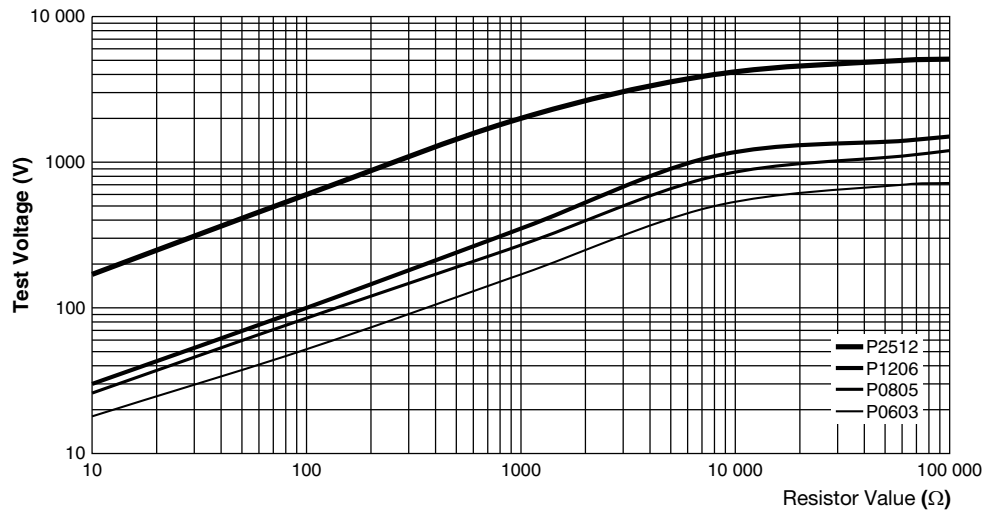
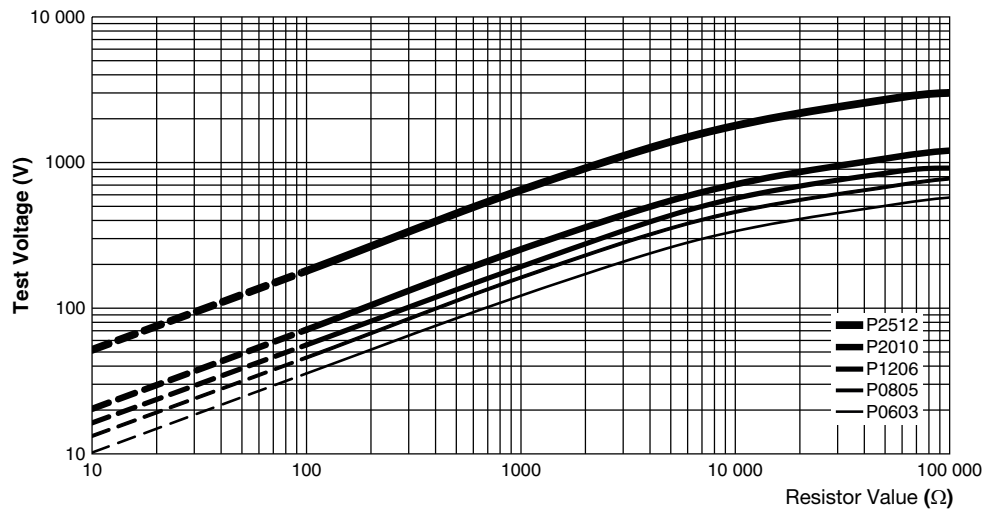
See Part Numbering information to get the quantity desired by tape.

| PERFORMANCE               |                                                                     |                          |                        |
|---------------------------|---------------------------------------------------------------------|--------------------------|------------------------|
| TESTS                     | CONDITIONS                                                          | MIL OR CECC REQUIREMENTS | TYPICAL PERFORMANCES   |
| Thermal shock             | MIL-PRF-55342G<br>MIL-STD-202 F-Method 107 F                        | ± 0.05 %                 | ± 0.02 %               |
| Short time overload       | MIL-PRF-55342G<br>PARA 3.10.4.7.5                                   | ± 0.05 %                 | ± 0.01 %               |
| Low temperature operation | MIL-PRF-55342G<br>PARA 3.9 and 4.7.4                                | ± 0.05 %                 | ± 0.01 %               |
| Resistance to solder heat | MIL-PRF-55342G<br>PARA 3.12, 4.7.7, 4.7.1.2                         | ± 0.05 %                 | ± 0.03 %               |
| Moisture resistance       | MIL-PRF-55342G<br>PARA 3.13 and 4.7.8<br>MIL-STD-202 F-Method 106 E | ± 0.10 %                 | ± 0.01 %               |
|                           | CECC 56 days/40 °C/93 % RH                                          | ± 0.10 %                 | ± 0.01 %               |
|                           | AEC-Q200 <sup>(1)</sup><br>85 °C/85 % RH/Pn/10, 1000 h              | ± 0.5 % + 0.05 Ω         | Max. < 0.3 % + 0.05 Ω  |
| High temperature          | MIL-PRF-55342G<br>PARA 3.11 and 4.7.6                               | ± 0.05 %                 | ± 0.05 %               |
| Load life                 | MIL-PRF-55342G<br>8000 h Pn at 70 °C<br>MIL-STD-202 F-Method 108 A  | ± 0.5 %                  | ± 0.1 % <sup>(2)</sup> |

**Notes**<sup>(1)</sup> Option to order 0058<sup>(2)</sup> Typical drift ± 0.02 % at Pd


**Note**

<sup>(1)</sup> One should apply the data mentioned on the 3 curves together to get the right performances

Maximum permissible pulse load  $P_i$  max.

1.2/50  $\mu$ s lightning surge

10/700  $\mu$ s lightning surge




**GLOBAL PART NUMBER INFORMATION**

New Global Part Numbering: P0505Y1003BBT999

| GLOBAL MODEL | SIZE                                                                         | TCR                                                                                                                                                                                                                                                          | VALUE                                                                                                                                                                                                          | TOLERANCE                                                                                                                                                             | TERMINATION                                                                                                                                                      | PACKAGING                                                  | OPTION                                       |
|--------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------|
| P            | 0302<br>0402<br>0505<br>0603<br>0805<br>1005<br>1206<br>1505<br>2010<br>2512 | K = $\pm 100$ ppm/ $^{\circ}$ C<br>H = $\pm 50$ ppm/ $^{\circ}$ C<br>E = $\pm 25$ ppm/ $^{\circ}$ C<br>Y = $\pm 10$ ppm/ $^{\circ}$ C<br>Z = $\pm 5$ ppm<br>(0 $^{\circ}$ C; +70 $^{\circ}$ C)<br>C = $\pm 5$ ppm<br>(- 55 $^{\circ}$ C; + 155 $^{\circ}$ C) | The first three digits are significant figures and the last digit specifies the number of zeros to follow, R designates decimal point<br><br>10R0 = 10 $\Omega$<br>3901 = 3900 $\Omega$<br>1004 = 1 M $\Omega$ | L = $\pm 0.01$ %<br>P = $\pm 0.02$ %<br>W = $\pm 0.05$ %<br>B = $\pm 0.1$ %<br>C = $\pm 0.25$ %<br>D = $\pm 0.5$ %<br>F = $\pm 1$ %<br>G = $\pm 2$ %<br>J = $\pm 5$ % | B: SnPb over nickel barrier<br>N: SnAg over nickel barrier<br>G: gold over nickel barrier<br><br>B: lead bearing version<br>N and G: lead (Pb)-free/RoHS version | For more information see "Codification of packaging" table | From 1 to 3 digits, leave blank if no option |

**Historical Part Number Examples:**

P1206Y1001LNT100 (tapes of 100 pieces)  
P1206H7151FBT250 (tapes of 250 pieces)  
P1206Y1503WNT1K032 (tapes of 1000 pieces and option 32)  
P1206Y2372BG (waffle pack)

Historical part numbers are not recommended, but can still be used for ordering.

**CODIFICATION OF PACKAGING**

| CODE 18                                                                                                      | PACKAGING                                         |
|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| <b>WAFFLE PACK</b>                                                                                           |                                                   |
| W                                                                                                            | 100 min., 1 mult.                                 |
| WA                                                                                                           | 100 min., 100 mult. (available only in size 1206) |
| <b>PLASTIC TAPE (in standard for all sizes)</b>                                                              |                                                   |
| T                                                                                                            | 100 min., 1 mult.                                 |
| TA                                                                                                           | 100 min., 100 mult.                               |
| TB                                                                                                           | 250 min., 250 mult.                               |
| TC                                                                                                           | 500 min., 500 mult.                               |
| TD                                                                                                           | 1000 min., 1000 mult.                             |
| TE                                                                                                           | 2500 min., 2500 mult.                             |
| TF                                                                                                           | Full tape (quantity depending on size of chips)   |
| <b>PAPER TAPE (available for 0402, 0603, 0805, and 1206. Please consult Vishay Sfernice for other sizes)</b> |                                                   |
| PT                                                                                                           | 100 min., 1 mult.                                 |
| PA                                                                                                           | 100 min., 100 mult.                               |
| PB                                                                                                           | 250 min., 250 mult.                               |
| PC                                                                                                           | 500 min., 500 mult.                               |
| PD (not available for size 0402)                                                                             | 1000 min., 1000 mult.                             |
| PE (not available for size 0402)                                                                             | 2500 min., 2500 mult.                             |
| PF (not available for size 0402)                                                                             | Full tape (quantity depending on size of chips)   |

**Notes**

- For CECC qualified, see RV datasheet ([www.vishay.com/doc?60022](http://www.vishay.com/doc?60022))
- For ESCC qualified, see PHR datasheet ([www.vishay.com/doc?53037](http://www.vishay.com/doc?53037)) or PFRR datasheet ([www.vishay.com/doc?53046](http://www.vishay.com/doc?53046))
- For high temperature (230  $^{\circ}$ C), see PHT datasheet ([www.vishay.com/doc?53050](http://www.vishay.com/doc?53050))
- For very high temperature (270  $^{\circ}$ C), see PVHT datasheet ([www.vishay.com/doc?53060](http://www.vishay.com/doc?53060))
- For strap (0  $\Omega$ ), see PZR datasheet ([www.vishay.com/doc?53053](http://www.vishay.com/doc?53053))



## 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.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. 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.