

## Zener Diodes



### FEATURES

- Silicon planar power Zener diodes
- For use in stabilizing and clipping circuits with high power rating
- The Zener voltages are graded according to the international E 24 standard. Replace suffix "C" with "B" for  $\pm 2\%$  tolerance
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### APPLICATIONS

- Voltage stabilization

### PRIMARY CHARACTERISTICS

| PARAMETER             | VALUE         | UNIT |
|-----------------------|---------------|------|
| $V_Z$ range nom.      | 2.7 to 100    | V    |
| Test current $I_{ZT}$ | 2.7 to 80     | mA   |
| $V_Z$ specification   | Pulse current |      |
| Int. construction     | Single        |      |

### ORDERING INFORMATION

| DEVICE NAME  | ORDERING CODE    | TAPED UNITS PER REEL          | MINIMUM ORDER QUANTITY |
|--------------|------------------|-------------------------------|------------------------|
| BZX85-series | BZX85-series-TR  | 5000 (52 mm tape on 13" reel) | 25 000/box             |
| BZX85-series | BZX85-series-TAP | 5000 per ammpack (52 mm tape) | 25 000/box             |

### PACKAGE

| PACKAGE NAME | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL        | SOLDERING CONDITIONS     |
|--------------|--------|--------------------------------------|-----------------------------------|--------------------------|
| DO-41        | 310 mg | UL 94 V-0                            | MSL level 1 (according J-STD-020) | 260 °C/10 s at terminals |

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25\text{ °C}$ , unless otherwise specified)

| PARAMETER                 | TEST CONDITION                                                                            | SYMBOL     | VALUE       | UNIT |
|---------------------------|-------------------------------------------------------------------------------------------|------------|-------------|------|
| Power dissipation         | Valid provided that leads at a distance of 4 mm from case are kept at ambient temperature | $P_{tot}$  | 1300        | mW   |
| Zener current             | See Table "Electrical characteristics"                                                    |            |             |      |
| Junction to ambient air   | Valid provided that leads at a distance of 4 mm from case are kept at ambient temperature | $R_{thJA}$ | 110         | K/W  |
| Junction temperature      |                                                                                           | $T_j$      | 175         | °C   |
| Storage temperature range |                                                                                           | $T_{stg}$  | -55 to +175 | °C   |

**ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| PART NUMBER | ZENER VOLTAGE RANGE <sup>(1)</sup> |      |      | TEST CURRENT |           | REVERSE LAEKAGE CURRENT |     | DYNAMIC RESISTANCE <sup>(3)</sup> |                       | TEMPERATURE COEFFICIENT OF ZENER VOLTAGE |        | ADMISSIBLE ZENER CURRENT <sup>(2)</sup> |
|-------------|------------------------------------|------|------|--------------|-----------|-------------------------|-----|-----------------------------------|-----------------------|------------------------------------------|--------|-----------------------------------------|
|             | $V_Z$ at $I_{ZT1}$                 |      |      | $I_{ZT1}$    | $I_{ZT2}$ | $I_R$ at $V_R$          |     | $Z_Z$ at $I_{ZT1}$                | $Z_{ZK}$ at $I_{ZT2}$ | $\alpha_{VZ}$ at $I_{ZT1}$               |        | $I_Z$                                   |
|             | V                                  |      |      | mA           |           | $\mu\text{A}$           | V   | $\Omega$                          |                       | %/°C                                     |        | mA                                      |
|             | MIN.                               | NOM. | MAX. |              |           |                         |     | MAX.                              | MAX.                  | MIN.                                     | MAX.   |                                         |
| BZX85C2V7   | 2.5                                | 2.7  | 2.9  | 80           | 1         | < 150                   | 1   | < 20                              | < 400                 | - 0.08                                   | - 0.05 | 360                                     |
| BZX85C3V0   | 2.8                                | 3.0  | 3.2  | 80           | 1         | < 100                   | 1   | < 20                              | < 400                 | - 0.08                                   | - 0.05 | 330                                     |
| BZX85C3V3   | 3.1                                | 3.3  | 3.5  | 80           | 1         | < 40                    | 1   | < 20                              | < 400                 | - 0.08                                   | - 0.05 | 300                                     |
| BZX85C3V6   | 3.4                                | 3.6  | 3.8  | 60           | 1         | < 20                    | 1   | < 20                              | < 500                 | - 0.08                                   | - 0.05 | 290                                     |
| BZX85C3V9   | 3.7                                | 3.9  | 4.1  | 60           | 1         | < 10                    | 1   | < 15                              | < 500                 | - 0.07                                   | - 0.02 | 280                                     |
| BZX85C4V3   | 4                                  | 4.3  | 4.6  | 50           | 1         | < 3                     | 1   | < 13                              | < 500                 | - 0.05                                   | 0.01   | 250                                     |
| BZX85C4V7   | 4.4                                | 4.7  | 5    | 45           | 1         | < 3                     | 1   | < 13                              | < 600                 | - 0.03                                   | 0.04   | 215                                     |
| BZX85C5V1   | 4.8                                | 5.1  | 5.4  | 45           | 1         | < 1                     | 1.5 | < 10                              | < 500                 | - 0.01                                   | 0.04   | 200                                     |
| BZX85C5V6   | 5.2                                | 5.6  | 6    | 45           | 1         | < 1                     | 2   | < 7                               | < 400                 | 0                                        | 0.045  | 190                                     |
| BZX85C6V2   | 5.8                                | 6.2  | 6.6  | 35           | 1         | < 1                     | 3   | < 4                               | < 300                 | 0.01                                     | 0.055  | 170                                     |
| BZX85C6V8   | 6.4                                | 6.8  | 7.2  | 35           | 1         | < 1                     | 4   | < 3.5                             | < 300                 | 0.015                                    | 0.06   | 155                                     |
| BZX85C7V5   | 7                                  | 7.5  | 7.9  | 35           | 0.5       | < 1                     | 4.5 | < 3                               | < 200                 | 0.02                                     | 0.065  | 140                                     |
| BZX85C8V2   | 7.7                                | 8.2  | 8.7  | 25           | 0.5       | < 1                     | 6.2 | < 5                               | < 200                 | 0.03                                     | 0.07   | 130                                     |
| BZX85C9V1   | 8.5                                | 9.1  | 9.6  | 25           | 0.5       | < 1                     | 6.8 | < 5                               | < 200                 | 0.035                                    | 0.075  | 120                                     |
| BZX85C10    | 9.4                                | 10   | 10.6 | 25           | 0.5       | < 0.5                   | 7.5 | < 7                               | < 200                 | 0.04                                     | 0.08   | 105                                     |
| BZX85C11    | 10.4                               | 11   | 11.6 | 20           | 0.5       | < 0.5                   | 8.2 | < 8                               | < 300                 | 0.045                                    | 0.08   | 97                                      |
| BZX85C12    | 11.4                               | 12   | 12.7 | 20           | 0.5       | < 0.5                   | 9.1 | < 9                               | < 350                 | 0.045                                    | 0.085  | 88                                      |
| BZX85C13    | 12.4                               | 13   | 14.1 | 20           | 0.5       | < 0.5                   | 10  | < 10                              | < 400                 | 0.05                                     | 0.085  | 79                                      |
| BZX85C15    | 13.8                               | 15   | 15.6 | 15           | 0.5       | < 0.5                   | 11  | < 15                              | < 500                 | 0.055                                    | 0.09   | 71                                      |
| BZX85C16    | 15.3                               | 16   | 17.1 | 15           | 0.5       | < 0.5                   | 12  | < 15                              | < 500                 | 0.055                                    | 0.09   | 66                                      |
| BZX85C18    | 16.8                               | 18   | 19.1 | 15           | 0.5       | < 0.5                   | 13  | < 20                              | < 500                 | 0.06                                     | 0.09   | 62                                      |
| BZX85C20    | 18.8                               | 20   | 21.2 | 10           | 0.5       | < 0.5                   | 15  | < 24                              | < 600                 | 0.06                                     | 0.09   | 56                                      |
| BZX85C22    | 20.8                               | 22   | 23.3 | 10           | 0.5       | < 0.5                   | 16  | < 25                              | < 600                 | 0.06                                     | 0.095  | 52                                      |
| BZX85C24    | 22.8                               | 24   | 25.6 | 10           | 0.5       | < 0.5                   | 18  | < 25                              | < 600                 | 0.06                                     | 0.095  | 47                                      |
| BZX85C27    | 25.1                               | 27   | 28.9 | 8            | 0.25      | < 0.5                   | 20  | < 30                              | < 750                 | 0.06                                     | 0.095  | 41                                      |
| BZX85C30    | 28                                 | 30   | 32   | 8            | 0.25      | < 0.5                   | 22  | < 30                              | < 1000                | 0.06                                     | 0.095  | 36                                      |
| BZX85C33    | 31                                 | 33   | 35   | 8            | 0.25      | < 0.5                   | 24  | < 35                              | < 1000                | 0.06                                     | 0.095  | 33                                      |
| BZX85C36    | 34                                 | 36   | 38   | 8            | 0.25      | < 0.5                   | 27  | < 40                              | < 1000                | 0.06                                     | 0.095  | 30                                      |
| BZX85C39    | 37                                 | 39   | 41   | 6            | 0.25      | < 0.5                   | 30  | < 50                              | < 1000                | 0.06                                     | 0.095  | 28                                      |
| BZX85C43    | 40                                 | 43   | 46   | 6            | 0.25      | < 0.5                   | 33  | < 50                              | < 1000                | 0.06                                     | 0.095  | 26                                      |
| BZX85C47    | 44                                 | 47   | 50   | 4            | 0.25      | < 0.5                   | 36  | < 90                              | < 1500                | 0.06                                     | 0.095  | 23                                      |
| BZX85C51    | 48                                 | 51   | 54   | 4            | 0.25      | < 0.5                   | 39  | < 115                             | < 1500                | 0.06                                     | 0.095  | 21                                      |
| BZX85C56    | 52                                 | 56   | 60   | 4            | 0.25      | < 0.5                   | 43  | < 120                             | < 2000                | 0.06                                     | 0.095  | 19                                      |
| BZX85C62    | 58                                 | 62   | 66   | 4            | 0.25      | < 0.5                   | 47  | < 125                             | < 2000                | 0.06                                     | 0.095  | 16                                      |
| BZX85C68    | 64                                 | 68   | 72   | 4            | 0.25      | < 0.5                   | 51  | < 130                             | < 2000                | 0.055                                    | 0.095  | 15                                      |
| BZX85C75    | 70                                 | 75   | 80   | 4            | 0.25      | < 0.5                   | 56  | < 135                             | < 2000                | 0.055                                    | 0.095  | 14                                      |
| BZX85C82    | 77                                 | 82   | 87   | 2.7          | 0.25      | < 0.5                   | 62  | < 200                             | < 3000                | 0.055                                    | 0.095  | 12                                      |
| BZX85C91    | 85                                 | 91   | 96   | 2.7          | 0.25      | < 0.5                   | 68  | < 250                             | < 3000                | 0.055                                    | 0.095  | 10                                      |
| BZX85C100   | 96                                 | 100  | 106  | 2.7          | 0.25      | < 0.5                   | 75  | < 350                             | < 3000                | 0.055                                    | 0.095  | 9.4                                     |

**Notes**(1) Measured with pulses  $t_p = 5\text{ ms}$ 

(2) Valid provided that leads are kept at ambient temperature at a distance of 10 mm from case

(3) Measured with  $f = 1\text{ kHz}$

**ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| PART NUMBER | ZENER VOLTAGE RANGE <sup>(1)</sup> |      |      | TEST CURRENT |           | REVERSE LAEKAGE CURRENT |     | DYNAMIC RESISTANCE <sup>(3)</sup> |                       | TEMPERATURE COEFFICIENT OF ZENER VOLTAGE |        | ADMISSIBLE ZENER CURRENT <sup>(2)</sup> |
|-------------|------------------------------------|------|------|--------------|-----------|-------------------------|-----|-----------------------------------|-----------------------|------------------------------------------|--------|-----------------------------------------|
|             | $V_Z$ at $I_{ZT1}$                 |      |      | $I_{ZT1}$    | $I_{ZT2}$ | $I_R$ at $V_R$          |     | $Z_Z$ at $I_{ZT1}$                | $Z_{ZK}$ at $I_{ZT2}$ | $\alpha_{VZ}$ at $I_{ZT1}$               |        | $I_Z$                                   |
|             | V                                  |      |      | mA           |           | $\mu\text{A}$           | V   | $\Omega$                          |                       | %/ $^{\circ}\text{C}$                    |        | mA                                      |
|             | MIN.                               | NOM. | MAX. |              |           |                         |     | MAX.                              | MAX.                  | MIN.                                     | MAX.   |                                         |
| BZX85B2V7   | 2.64                               | 2.7  | 2.76 | 80           | 1         | < 150                   | 1   | < 20                              | < 400                 | - 0.08                                   | - 0.05 | 360                                     |
| BZX85B3V0   | 2.94                               | 3    | 3.06 | 80           | 1         | < 100                   | 1   | < 20                              | < 400                 | - 0.08                                   | - 0.05 | 330                                     |
| BZX85B3V3   | 2.24                               | 3.3  | 3.36 | 80           | 1         | < 40                    | 1   | < 20                              | < 400                 | - 0.08                                   | - 0.05 | 300                                     |
| BZX85B3V6   | 3.53                               | 3.6  | 3.67 | 60           | 1         | < 20                    | 1   | < 20                              | < 500                 | - 0.08                                   | - 0.05 | 290                                     |
| BZX85B3V9   | 3.82                               | 3.9  | 3.98 | 60           | 1         | < 10                    | 1   | < 15                              | < 500                 | - 0.07                                   | - 0.02 | 280                                     |
| BZX85B4V3   | 4.21                               | 4.3  | 4.39 | 50           | 1         | < 3                     | 1   | < 13                              | < 500                 | - 0.05                                   | 0.01   | 250                                     |
| BZX85B4V7   | 4.61                               | 4.7  | 4.79 | 45           | 1         | < 3                     | 1   | < 13                              | < 600                 | - 0.03                                   | 0.04   | 215                                     |
| BZX85B5V1   | 5                                  | 5.1  | 5.2  | 45           | 1         | < 1                     | 1.5 | < 10                              | < 500                 | - 0.01                                   | 0.04   | 200                                     |
| BZX85B5V6   | 5.49                               | 5.6  | 5.71 | 45           | 1         | < 1                     | 2   | < 7                               | < 400                 | 0                                        | 0.045  | 190                                     |
| BZX85B6V2   | 6.08                               | 6.2  | 6.32 | 35           | 1         | < 1                     | 3   | < 4                               | < 300                 | 0.01                                     | 0.055  | 170                                     |
| BZX85B6V8   | 6.66                               | 6.8  | 6.94 | 35           | 1         | < 1                     | 4   | < 3.5                             | < 300                 | 0.015                                    | 0.06   | 155                                     |
| BZX85B7V5   | 7.35                               | 7.5  | 7.65 | 35           | 0.5       | < 1                     | 4.5 | < 3                               | < 200                 | 0.02                                     | 0.065  | 140                                     |
| BZX85B8V2   | 8.04                               | 8.2  | 8.36 | 25           | 0.5       | < 1                     | 6.2 | < 5                               | < 200                 | 0.03                                     | 0.07   | 130                                     |
| BZX85B9V1   | 8.92                               | 9.1  | 9.28 | 25           | 0.5       | < 1                     | 6.8 | < 5                               | < 200                 | 0.035                                    | 0.075  | 120                                     |
| BZX85B10    | 9.8                                | 10   | 10.2 | 25           | 0.5       | < 0.5                   | 7.5 | < 7                               | < 200                 | 0.04                                     | 0.08   | 105                                     |
| BZX85B11    | 10.8                               | 11   | 11.2 | 20           | 0.5       | < 0.5                   | 8.2 | < 8                               | < 300                 | 0.045                                    | 0.08   | 97                                      |
| BZX85B12    | 11.8                               | 12   | 12.2 | 20           | 0.5       | < 0.5                   | 9.1 | < 9                               | < 350                 | 0.045                                    | 0.085  | 88                                      |
| BZX85B13    | 12.7                               | 13   | 13.3 | 20           | 0.5       | < 0.5                   | 10  | < 10                              | < 400                 | 0.05                                     | 0.085  | 79                                      |
| BZX85B15    | 14.7                               | 15   | 15.3 | 15           | 0.5       | < 0.5                   | 11  | < 15                              | < 500                 | 0.055                                    | 0.09   | 71                                      |
| BZX85B16    | 15.7                               | 16   | 16.3 | 15           | 0.5       | < 0.5                   | 12  | < 15                              | < 500                 | 0.055                                    | 0.09   | 66                                      |
| BZX85B18    | 17.6                               | 18   | 18.4 | 15           | 0.5       | < 0.5                   | 13  | < 20                              | < 500                 | 0.06                                     | 0.09   | 62                                      |
| BZX85B20    | 19.6                               | 20   | 20.4 | 10           | 0.5       | < 0.5                   | 15  | < 24                              | < 600                 | 0.06                                     | 0.09   | 56                                      |
| BZX85B22    | 21.6                               | 22   | 22.4 | 10           | 0.5       | < 0.5                   | 16  | < 25                              | < 600                 | 0.06                                     | 0.095  | 52                                      |
| BZX85B24    | 23.5                               | 24   | 24.5 | 10           | 0.5       | < 0.5                   | 18  | < 25                              | < 600                 | 0.06                                     | 0.095  | 47                                      |
| BZX85B27    | 26.5                               | 27   | 27.5 | 8            | 0.25      | < 0.5                   | 20  | < 30                              | < 750                 | 0.06                                     | 0.095  | 41                                      |
| BZX85B30    | 29.4                               | 30   | 30.6 | 8            | 0.25      | < 0.5                   | 22  | < 30                              | < 1000                | 0.06                                     | 0.095  | 36                                      |
| BZX85B33    | 32.3                               | 33   | 33.7 | 8            | 0.25      | < 0.5                   | 24  | < 35                              | < 1000                | 0.06                                     | 0.095  | 33                                      |
| BZX85B36    | 35.3                               | 36   | 36.7 | 8            | 0.25      | < 0.5                   | 27  | < 40                              | < 1000                | 0.06                                     | 0.095  | 30                                      |
| BZX85B39    | 38.2                               | 39   | 39.8 | 6            | 0.25      | < 0.5                   | 30  | < 50                              | < 1000                | 0.06                                     | 0.095  | 28                                      |
| BZX85B43    | 42.1                               | 43   | 43.9 | 6            | 0.25      | < 0.5                   | 33  | < 50                              | < 1000                | 0.06                                     | 0.095  | 26                                      |
| BZX85B47    | 46.1                               | 47   | 47.9 | 4            | 0.25      | < 0.5                   | 36  | < 90                              | < 1500                | 0.06                                     | 0.095  | 23                                      |
| BZX85B51    | 50                                 | 51   | 52   | 4            | 0.25      | < 0.5                   | 39  | < 115                             | < 1500                | 0.06                                     | 0.095  | 21                                      |
| BZX85B56    | 54.9                               | 56   | 57.1 | 4            | 0.25      | < 0.5                   | 43  | < 120                             | < 2000                | 0.06                                     | 0.095  | 19                                      |
| BZX85B62    | 60.8                               | 62   | 63.2 | 4            | 0.25      | < 0.5                   | 47  | < 125                             | < 2000                | 0.06                                     | 0.095  | 16                                      |
| BZX85B68    | 66.6                               | 68   | 69.4 | 4            | 0.25      | < 0.5                   | 51  | < 130                             | < 2000                | 0.055                                    | 0.095  | 15                                      |
| BZX85B75    | 73.5                               | 75   | 76.5 | 4            | 0.25      | < 0.5                   | 56  | < 135                             | < 2000                | 0.055                                    | 0.095  | 14                                      |
| BZX85B82    | 80.4                               | 82   | 83.6 | 2.7          | 0.25      | < 0.5                   | 62  | < 200                             | < 3000                | 0.055                                    | 0.095  | 12                                      |
| BZX85B91    | 89.2                               | 91   | 92.8 | 2.7          | 0.25      | < 0.5                   | 68  | < 250                             | < 3000                | 0.055                                    | 0.095  | 10                                      |
| BZX85B100   | 98                                 | 100  | 102  | 2.7          | 0.25      | < 0.5                   | 75  | < 350                             | < 3000                | 0.055                                    | 0.095  | 9.4                                     |

**Notes**(1) Measured with pulses  $t_p = 5\text{ ms}$ 

(2) Valid provided that leads are kept at ambient temperature at a distance of 10 mm from case

(3) Measured with  $f = 1\text{ kHz}$

### BASIC CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)



Fig. 1 - Pulse Thermal Resistance vs. Pulse Duration

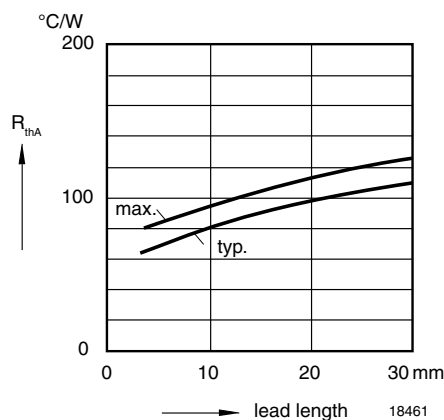


Fig. 4 - Thermal Resistance vs. Lead Length



Fig. 2 - Dynamic Resistance vs. Zener Current

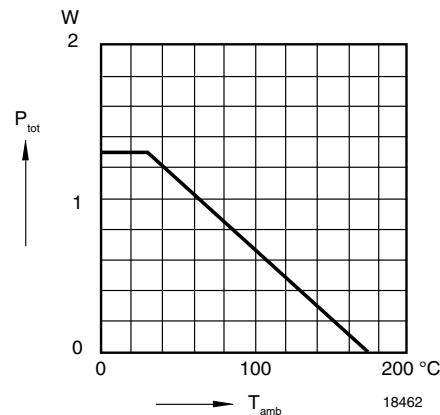


Fig. 5 - Admissible Power Dissipation vs. Ambient Temperature



Fig. 3 - Dynamic Resistance vs. Zener Current



Fig. 6 - Dynamic Resistance vs. Zener Current



Fig. 7 - Breakdown Characteristics

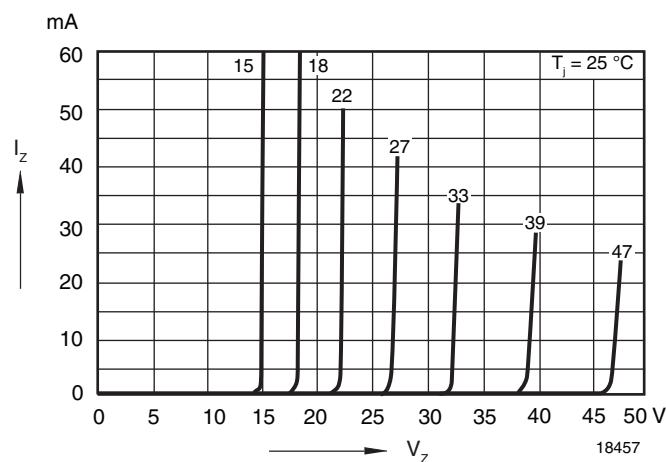


Fig. 8 - Breakdown Characteristics

### PACKAGE DIMENSIONS in millimeters (inches): DO-41



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## Disclaimer

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## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**