

## Zener Diodes



SMA (DO-214AC)

### ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS      |                 |      |
|------------------------------|-----------------|------|
| PARAMETER                    | VALUE           | UNIT |
| V <sub>Z</sub> range nom.    | 3.3 to 100      | V    |
| Test current I <sub>ZT</sub> | 2.7 to 80       | mA   |
| V <sub>BR</sub>              | 5.49 to 98      | V    |
| V <sub>WM</sub>              | 4.7 to 90       | V    |
| P <sub>PPM</sub>             | 40              | W    |
| T <sub>J</sub> max.          | 150             | °C   |
| V <sub>Z</sub> specification | Pulse current   |      |
| Circuit configuration        | Single          |      |
| Polarity                     | Uni-directional |      |

### FEATURES

- High reliability
- Voltage range includes 37 breakdown voltages from 3.3 V to 100 V with ± 2 % for BZG05B-M-series
- Fits onto 5 mm SMD footpads
- Wave and reflow solderable
- AEC-Q101 qualified available
- Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade
- Base P/NHM3 - halogen-free, RoHS-compliant, and 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

| ORDERING INFORMATION |                  |                      |                        |
|----------------------|------------------|----------------------|------------------------|
| DEVICE NAME          | ORDERING CODE    | TAPED UNITS PER REEL | MINIMUM ORDER QUANTITY |
| BZG05B-M-series      | BZG05Bxxx-M3-08  | 1500 per 7" reel     | 6000/box               |
| BZG05B-M-series      | BZG05Bxxx-M3-18  | 6000 per 13" reel    | 6000/box               |
| BZG05B-M-series      | BZG05Bxxx-HM3-08 | 1500 per 7" reel     | 6000/box               |
| BZG05B-M-series      | BZG05Bxxx-HM3-18 | 6000 per 13" reel    | 6000/box               |

| PACKAGE        |        |                                      |                                   |                              |
|----------------|--------|--------------------------------------|-----------------------------------|------------------------------|
| PACKAGE NAME   | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL        | SOLDERING CONDITIONS         |
| SMA (DO-214AC) | 73 mg  | UL 94 V-0                            | MSL level 1 (according J-STD-020) | Peak temperature max. 260 °C |

| ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified) |  |                   |             |      |  |
|---|--|-------------------|-------------|------|--|
| PARAMETER   | TEST CONDITION   | SYMBOL            | VALUE       | UNIT |  |
| Power dissipation   | R <sub>thJA</sub> < 30 K/W, T <sub>amb</sub> = 60 °C                     | P <sub>tot</sub>  | 3000        | mW   |  |
|   | R <sub>thJA</sub> < 100 K/W, T <sub>amb</sub> = 25 °C                    | P <sub>tot</sub>  | 1250        | mW   |  |
| Non repetitive peak surge power dissipation                                     | t <sub>p</sub> = 100 μs sq. pulse, T <sub>j</sub> = 25 °C prior to surge | P <sub>ZSM</sub>  | 60          | W    |  |
| Junction to lead  |  | R <sub>thJL</sub> | 30          | K/W  |  |
| Junction to ambient air   | Mounted on epoxy-glass hard tissue, fig. 1a                              | R <sub>thJA</sub> | 150         | K/W  |  |
|   | Mounted on epoxy-glass hard tissue, fig. 1b                              | R <sub>thJA</sub> | 125         | K/W  |  |
|   | Mounted on Al-oxide-ceramic (Al <sub>2</sub> O <sub>3</sub> ), fig. 1b   | R <sub>thJA</sub> | 100         | K/W  |  |
| Junction temperature  |  | T <sub>j</sub>    | 150         | °C   |  |
| Storage temperature range   |  | T <sub>stg</sub>  | -65 to +150 | °C   |  |
| Operating temperature range   |  | T <sub>op</sub>   | -65 to +150 | °C   |  |
| Forward voltage (max.)  | I <sub>F</sub> = 0.2 A   | V <sub>F</sub>    | 1.2         | V    |  |



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                     |      |        |              |           |                         |     |                    |                       |                         |       |
|--|---------------------|------|--------|--------------|-----------|-------------------------|-----|--------------------|-----------------------|-------------------------|-------|
| PART NUMBER  | ZENER VOLTAGE RANGE |      |        | TEST CURRENT |           | REVERSE LEAKAGE CURRENT |     | DYNAMIC RESISTANCE |                       | TEMPERATURE COEFFICIENT |       |
|  | $V_Z$ at $I_{ZT1}$  |      |        | $I_{ZT1}$    | $I_{ZT2}$ | $I_R$ at $V_R$          |     | $Z_Z$ at $I_{ZT1}$ | $Z_{ZK}$ at $I_{ZT2}$ | $TC_{VZ}$ at $I_{ZT1}$  |       |
|  | V                   |      |        | mA           | mA        | $\mu\text{A}$           | V   | $\Omega$           |                       | %K                      |       |
|  | MIN.                | NOM. | MAX.   |              |           | MAX.                    |     | MAX.               | MAX.                  | MIN.                    | MAX.  |
| BZG05B3V3-M  | 3.23                | 3.3  | 3.37   | 80           | 1         | 40                      | 1   | 20                 | 400                   | -0.08                   | -0.05 |
| BZG05B3V6-M  | 3.53                | 3.6  | 3.67   | 60           | 1         | 20                      | 1   | 20                 | 500                   | -0.08                   | -0.05 |
| BZG05B3V9-M  | 3.82                | 3.9  | 3.98   | 60           | 1         | 10                      | 1   | 15                 | 500                   | -0.07                   | -0.02 |
| BZG05B4V3-M  | 4.21                | 4.3  | 4.39   | 50           | 1         | 3                       | 1   | 13                 | 500                   | -0.07                   | -0.01 |
| BZG05B4V7-M  | 4.61                | 4.7  | 4.79   | 45           | 1         | 3                       | 1   | 13                 | 600                   | -0.03                   | 0.04  |
| BZG05B5V1-M  | 5.00                | 5.1  | 5.20   | 45           | 1         | 1                       | 1.5 | 10                 | 500                   | -0.01                   | 0.04  |
| BZG05B5V6-M  | 5.49                | 5.6  | 5.71   | 45           | 1         | 1                       | 2   | 7                  | 400                   | 0                       | 0.045 |
| BZG05B6V2-M  | 6.08                | 6.2  | 6.32   | 35           | 1         | 1                       | 3   | 4                  | 300                   | 0.01                    | 0.055 |
| BZG05B6V8-M  | 6.66                | 6.8  | 6.94   | 35           | 1         | 1                       | 4   | 3.5                | 300                   | 0.015                   | 0.06  |
| BZG05B7V5-M  | 7.35                | 7.5  | 7.65   | 35           | 0.5       | 1                       | 4.5 | 3                  | 200                   | 0.02                    | 0.065 |
| BZG05B8V2-M  | 8.04                | 8.2  | 8.36   | 25           | 0.5       | 1                       | 6.2 | 5                  | 200                   | 0.03                    | 0.07  |
| BZG05B9V1-M  | 8.92                | 9.1  | 9.28   | 25           | 0.5       | 1                       | 6.8 | 5                  | 200                   | 0.035                   | 0.075 |
| BZG05B10-M   | 9.80                | 10   | 10.20  | 25           | 0.5       | 0.5                     | 7   | 7                  | 200                   | 0.04                    | 0.08  |
| BZG05B11-M   | 10.78               | 11   | 11.22  | 20           | 0.5       | 0.5                     | 8.2 | 8                  | 300                   | 0.045                   | 0.08  |
| BZG05B12-M   | 11.76               | 12   | 12.24  | 20           | 0.5       | 0.5                     | 9.1 | 9                  | 350                   | 0.045                   | 0.085 |
| BZG05B13-M   | 12.74               | 13   | 13.26  | 20           | 0.5       | 0.5                     | 10  | 10                 | 400                   | 0.05                    | 0.085 |
| BZG05B15-M   | 14.70               | 15   | 15.30  | 15           | 0.5       | 0.5                     | 11  | 15                 | 500                   | 0.055                   | 0.09  |
| BZG05B16-M   | 15.68               | 16   | 16.32  | 15           | 0.5       | 0.5                     | 12  | 15                 | 500                   | 0.055                   | 0.09  |
| BZG05B18-M   | 17.64               | 18   | 18.36  | 15           | 0.5       | 0.5                     | 13  | 20                 | 500                   | 0.06                    | 0.09  |
| BZG05B20-M   | 19.60               | 20   | 20.40  | 10           | 0.5       | 0.5                     | 15  | 24                 | 600                   | 0.06                    | 0.09  |
| BZG05B22-M   | 21.56               | 22   | 22.44  | 10           | 0.5       | 0.5                     | 16  | 25                 | 600                   | 0.06                    | 0.095 |
| BZG05B24-M   | 23.52               | 24   | 24.48  | 10           | 0.5       | 0.5                     | 18  | 25                 | 600                   | 0.06                    | 0.095 |
| BZG05B27-M   | 26.46               | 27   | 27.54  | 8            | 0.25      | 0.5                     | 20  | 30                 | 750                   | 0.06                    | 0.095 |
| BZG05B30-M   | 29.40               | 30   | 30.60  | 8            | 0.25      | 0.5                     | 22  | 30                 | 1000                  | 0.06                    | 0.095 |
| BZG05B33-M   | 32.34               | 33   | 33.66  | 8            | 0.25      | 0.5                     | 24  | 35                 | 1000                  | 0.06                    | 0.095 |
| BZG05B36-M   | 35.28               | 36   | 36.72  | 8            | 0.25      | 0.5                     | 27  | 40                 | 1000                  | 0.07                    | 0.11  |
| BZG05B39-M   | 38.22               | 39   | 39.78  | 6            | 0.25      | 0.5                     | 30  | 50                 | 1000                  | 0.07                    | 0.11  |
| BZG05B43-M   | 42.14               | 43   | 43.86  | 6            | 0.25      | 0.5                     | 33  | 50                 | 1000                  | 0.07                    | 0.11  |
| BZG05B47-M   | 46.06               | 47   | 47.94  | 4            | 0.25      | 0.5                     | 36  | 90                 | 1500                  | 0.07                    | 0.11  |
| BZG05B51-M   | 49.98               | 51   | 52.02  | 4            | 0.25      | 0.5                     | 39  | 115                | 1500                  | 0.08                    | 0.12  |
| BZG05B56-M   | 54.88               | 56   | 57.12  | 4            | 0.25      | 0.5                     | 43  | 120                | 2000                  | 0.08                    | 0.12  |
| BZG05B62-M   | 60.76               | 62   | 63.24  | 4            | 0.25      | 0.5                     | 47  | 125                | 2000                  | 0.08                    | 0.12  |
| BZG05B68-M   | 66.64               | 68   | 69.36  | 4            | 0.25      | 0.5                     | 51  | 130                | 2000                  | 0.08                    | 0.12  |
| BZG05B75-M   | 73.50               | 75   | 76.50  | 4            | 0.25      | 0.5                     | 56  | 135                | 2000                  | 0.08                    | 0.12  |
| BZG05B82-M   | 80.36               | 82   | 83.64  | 2.7          | 0.25      | 0.5                     | 62  | 200                | 3000                  | 0.08                    | 0.12  |
| BZG05B91-M   | 89.18               | 91   | 92.82  | 2.7          | 0.25      | 0.5                     | 68  | 250                | 3000                  | 0.08                    | 0.12  |
| BZG05B100-M  | 98.00               | 100  | 102.00 | 2.7          | 0.25      | 0.5                     | 75  | 350                | 3000                  | 0.08                    | 0.12  |

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

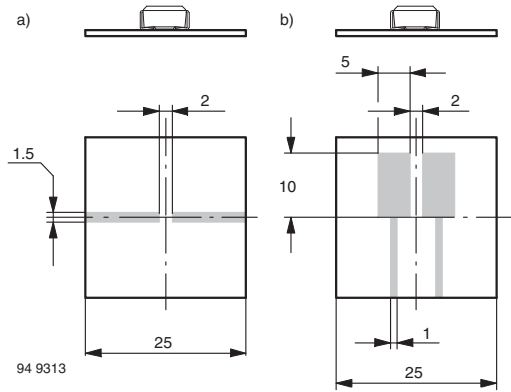


Fig. 1 - Boards for  $R_{thJA}$  Definition (Copper Overlay 35  $\mu$ )

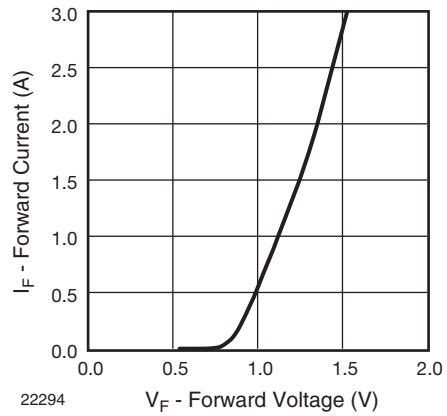


Fig. 3 - Forward Current vs. Forward Voltage

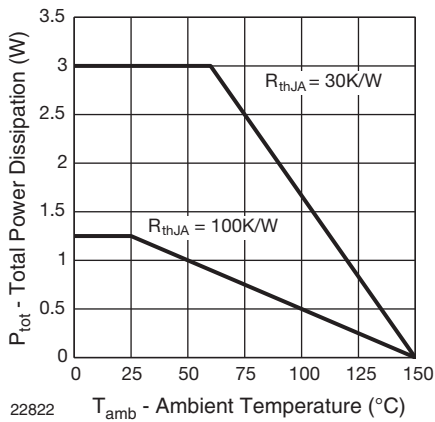


Fig. 2 - Typ. Total Power Dissipation vs. Ambient Temperature

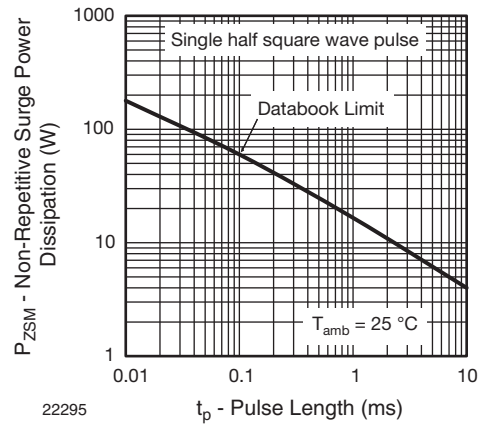


Fig. 4 - Non Repetitive Surge Power Dissipation vs. Pulse Length

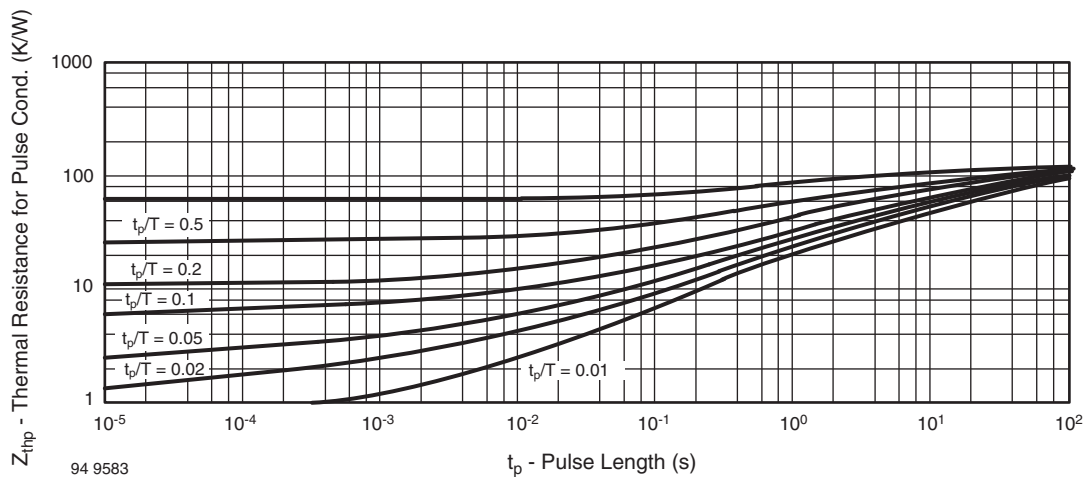
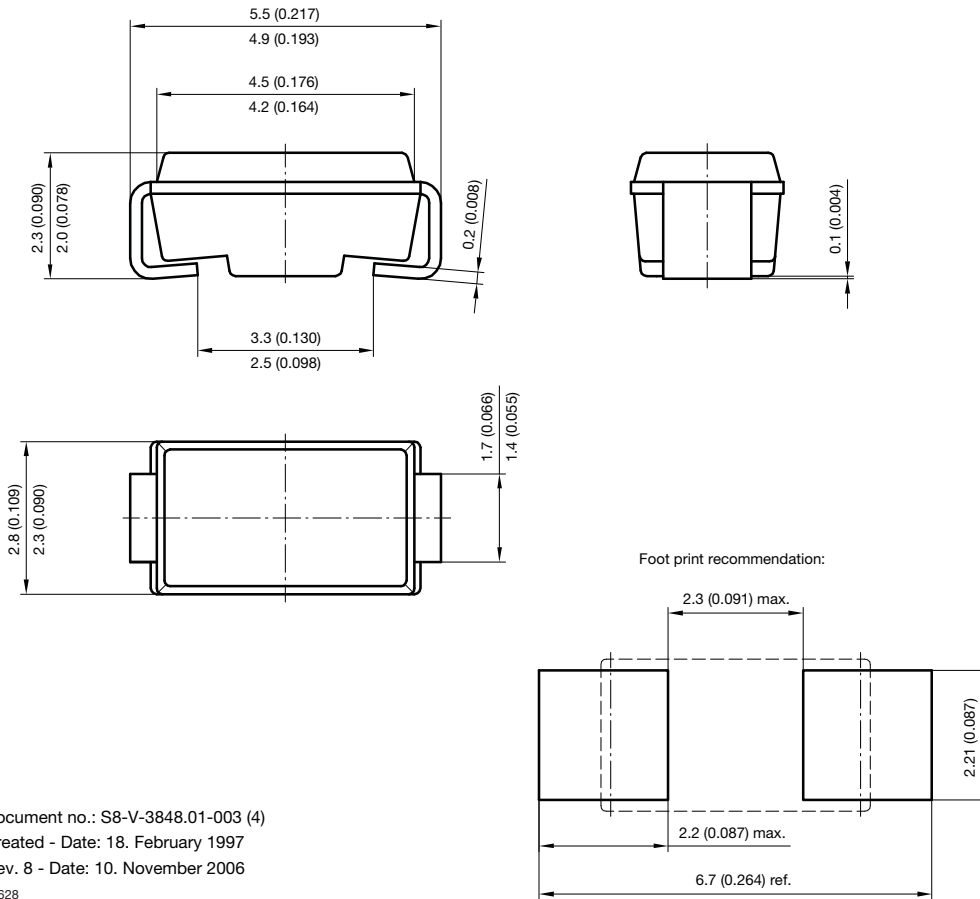


Fig. 5 - Thermal Response



**PACKAGE DIMENSIONS** in millimeters (inches): **SMA (DO-214AC)**



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