



### Small Signal Zener Diodes



#### FEATURES

- Very sharp reverse characteristic
- Low reverse current level
- Very high stability
- Low noise
- 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

#### DESIGN SUPPORT TOOLS AVAILABLE



#### APPLICATIONS

- Voltage stabilization

| PRIMARY CHARACTERISTICS      |               |      |
|------------------------------|---------------|------|
| PARAMETER                    | VALUE         | UNIT |
| V <sub>Z</sub> range nom.    | 2.4 to 75     | V    |
| Test current I <sub>ZT</sub> | 2.5; 5        | mA   |
| V <sub>Z</sub> specification | Pulse current |      |
| Circuit configuration        | Single        |      |

| ORDERING INFORMATION |                  |                                 |                        |
|----------------------|------------------|---------------------------------|------------------------|
| DEVICE NAME          | ORDERING CODE    | TAPED UNITS PER REEL            | MINIMUM ORDER QUANTITY |
| BZX55-series         | BZX55-series-TR  | 10 000 per 13" reel             | 30 000/box             |
| BZX55-series         | BZX55-series-TAP | 10 000 per ammpack (52 mm tape) | 30 000/box             |

| PACKAGE          |        |                                      |                                   |                              |
|------------------|--------|--------------------------------------|-----------------------------------|------------------------------|
| PACKAGE NAME     | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL        | SOLDERING CONDITIONS         |
| DO-35 (DO-204AH) | 125 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   | I = 4 mm, T <sub>L</sub> = 25 °C    | P <sub>tot</sub>  | 500                              | mW   |
| Zener current   |                                     | I <sub>Z</sub>    | P <sub>tot</sub> /V <sub>Z</sub> | mA   |
| Junction to ambient air   | I = 4 mm, T <sub>L</sub> = constant | R <sub>thJA</sub> | 300                              | K/W  |
| Junction temperature  |                                     | T <sub>j</sub>    | 175                              | °C   |
| Storage temperature range   |                                     | T <sub>stg</sub>  | -65 to +175                      | °C   |
| Forward voltage (max.)  | I <sub>F</sub> = 200 mA             | V <sub>F</sub>    | 1.5                              | V    |



| ELECTRICAL CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified) |                                    |      |      |                  |                  |                                  |       |     |                                    |                                     |                         |        |
|---|------------------------------------|------|------|------------------|------------------|----------------------------------|-------|-----|------------------------------------|-------------------------------------|-------------------------|--------|
| PART NUMBER   | ZENER VOLTAGE RANGE                |      |      | TEST CURRENT     |                  | REVERSE LEAKAGE CURRENT          |       |     | DYNAMIC RESISTANCE                 |                                     | TEMPERATURE COEFFICIENT |        |
|   | V <sub>Z</sub> at I <sub>ZT1</sub> |      |      | I <sub>ZT1</sub> | I <sub>ZT2</sub> | I <sub>R</sub> at V <sub>R</sub> |       |     | Z <sub>Z</sub> at I <sub>ZT1</sub> | Z <sub>ZK</sub> at I <sub>ZT2</sub> | TK <sub>VZ</sub>        |        |
|   | V                                  |      |      | mA               |                  | μA                               |       | V   | Ω                                  |                                     | % / K                   |        |
|   | MIN.                               | NOM. | MAX. |                  |                  |                                  |       |     | MAX.                               | MAX.                                | MIN.                    | MAX.   |
| BZX55C2V4   | 2.28                               | 2.4  | 2.56 | 5                | 1                | < 50                             | < 100 | 1   | < 85                               | < 600                               | - 0.09                  | - 0.06 |
| BZX55C2V7   | 2.5                                | 2.7  | 2.9  | 5                | 1                | < 10                             | < 50  | 1   | < 85                               | < 600                               | - 0.09                  | - 0.06 |
| BZX55C3V0   | 2.8                                | 3.0  | 3.2  | 5                | 1                | < 4                              | < 40  | 1   | < 85                               | < 600                               | - 0.08                  | - 0.05 |
| BZX55C3V3   | 3.1                                | 3.3  | 3.5  | 5                | 1                | < 2                              | < 40  | 1   | < 85                               | < 600                               | - 0.08                  | - 0.05 |
| BZX55C3V6   | 3.4                                | 3.6  | 3.8  | 5                | 1                | < 2                              | < 40  | 1   | < 85                               | < 600                               | - 0.08                  | - 0.05 |
| BZX55C3V9   | 3.7                                | 3.9  | 4.1  | 5                | 1                | < 2                              | < 40  | 1   | < 85                               | < 600                               | - 0.08                  | - 0.05 |
| BZX55C4V3   | 4                                  | 4.3  | 4.6  | 5                | 1                | < 1                              | < 20  | 1   | < 75                               | < 600                               | - 0.06                  | - 0.03 |
| BZX55C4V7   | 4.4                                | 4.7  | 5    | 5                | 1                | < 0.5                            | < 10  | 1   | < 60                               | < 600                               | - 0.05                  | 0.02   |
| BZX55C5V1   | 4.8                                | 5.1  | 5.4  | 5                | 1                | < 0.1                            | < 2   | 1   | < 35                               | < 550                               | - 0.02                  | 0.02   |
| BZX55C5V6   | 5.2                                | 5.6  | 6    | 5                | 1                | < 0.1                            | < 2   | 1   | < 25                               | < 450                               | - 0.05                  | 0.05   |
| BZX55C6V2   | 5.8                                | 6.2  | 6.6  | 5                | 1                | < 0.1                            | < 2   | 2   | < 10                               | < 200                               | 0.03                    | 0.06   |
| BZX55C6V8   | 6.4                                | 6.8  | 7.2  | 5                | 1                | < 0.1                            | < 2   | 3   | < 8                                | < 150                               | 0.03                    | 0.07   |
| BZX55C7V5   | 7                                  | 7.5  | 7.9  | 5                | 1                | < 0.1                            | < 2   | 5   | < 7                                | < 50                                | 0.03                    | 0.07   |
| BZX55C8V2   | 7.7                                | 8.2  | 8.7  | 5                | 1                | < 0.1                            | < 2   | 6.2 | < 7                                | < 50                                | 0.03                    | 0.08   |
| BZX55C9V1   | 8.5                                | 9.1  | 9.6  | 5                | 1                | < 0.1                            | < 2   | 6.8 | < 10                               | < 50                                | 0.03                    | 0.09   |
| BZX55C10  | 9.4                                | 10   | 10.6 | 5                | 1                | < 0.1                            | < 2   | 7.5 | < 15                               | < 70                                | 0.03                    | 0.1    |
| BZX55C11  | 10.4                               | 11   | 11.6 | 5                | 1                | < 0.1                            | < 2   | 8.2 | < 20                               | < 70                                | 0.03                    | 0.11   |
| BZX55C12  | 11.4                               | 12   | 12.7 | 5                | 1                | < 0.1                            | < 2   | 9.1 | < 20                               | < 90                                | 0.03                    | 0.11   |
| BZX55C13  | 12.4                               | 13   | 14.1 | 5                | 1                | < 0.1                            | < 2   | 10  | < 26                               | < 110                               | 0.03                    | 0.11   |
| BZX55C15  | 13.8                               | 15   | 15.6 | 5                | 1                | < 0.1                            | < 2   | 11  | < 30                               | < 110                               | 0.03                    | 0.11   |
| BZX55C16  | 15.3                               | 16   | 17.1 | 5                | 1                | < 0.1                            | < 2   | 12  | < 40                               | < 170                               | 0.03                    | 0.11   |
| BZX55C18  | 16.8                               | 18   | 19.1 | 5                | 1                | < 0.1                            | < 2   | 13  | < 50                               | < 170                               | 0.03                    | 0.11   |
| BZX55C20  | 18.8                               | 20   | 21.2 | 5                | 1                | < 0.1                            | < 2   | 15  | < 55                               | < 220                               | 0.03                    | 0.11   |
| BZX55C22  | 20.8                               | 22   | 23.3 | 5                | 1                | < 0.1                            | < 2   | 16  | < 55                               | < 220                               | 0.04                    | 0.12   |
| BZX55C24  | 22.8                               | 24   | 25.6 | 5                | 1                | < 0.1                            | < 2   | 18  | < 80                               | < 220                               | 0.04                    | 0.12   |
| BZX55C27  | 25.1                               | 27   | 28.9 | 5                | 1                | < 0.1                            | < 2   | 20  | < 80                               | < 220                               | 0.04                    | 0.12   |
| BZX55C30  | 28                                 | 30   | 32   | 5                | 1                | < 0.1                            | < 2   | 22  | < 80                               | < 220                               | 0.04                    | 0.12   |
| BZX55C33  | 31                                 | 33   | 35   | 5                | 1                | < 0.1                            | < 2   | 24  | < 80                               | < 220                               | 0.04                    | 0.12   |
| BZX55C36  | 34                                 | 36   | 38   | 5                | 1                | < 0.1                            | < 2   | 27  | < 80                               | < 220                               | 0.04                    | 0.12   |
| BZX55C39  | 37                                 | 39   | 41   | 2.5              | 0.5              | < 0.1                            | < 5   | 30  | < 90                               | < 500                               | 0.04                    | 0.12   |
| BZX55C43  | 40                                 | 43   | 46   | 2.5              | 0.5              | < 0.1                            | < 5   | 33  | < 90                               | < 600                               | 0.04                    | 0.12   |
| BZX55C47  | 44                                 | 47   | 50   | 2.5              | 0.5              | < 0.1                            | < 5   | 36  | < 110                              | < 700                               | 0.04                    | 0.12   |
| BZX55C51  | 48                                 | 51   | 54   | 2.5              | 0.5              | < 0.1                            | < 10  | 39  | < 125                              | < 700                               | 0.04                    | 0.12   |
| BZX55C56  | 52                                 | 56   | 60   | 2.5              | 0.5              | < 0.1                            | < 10  | 43  | < 135                              | < 1000                              | 0.04                    | 0.12   |
| BZX55C62  | 58                                 | 62   | 66   | 2.5              | 0.5              | < 0.1                            | < 10  | 47  | < 150                              | < 1000                              | 0.04                    | 0.12   |
| BZX55C68  | 64                                 | 68   | 72   | 2.5              | 0.5              | < 0.1                            | < 10  | 51  | < 200                              | < 1000                              | 0.04                    | 0.12   |
| BZX55C75  | 70                                 | 75   | 79   | 2.5              | 0.5              | < 0.1                            | < 10  | 56  | < 250                              | < 1500                              | 0.04                    | 0.12   |



| <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 $I_{ZT2}$ | $TK_{Vz}$               |        |
|  | V                   |      |       | mA           |           | $\mu\text{A}$           |       | V   | $\Omega$           |                       |                         |        |
|  | MIN.                | NOM. | MAX.  |              |           |                         |       |     | MAX.               | MAX.                  | MIN.                    | MAX.   |
| BZX55B2V4  | 2.35                | 2.4  | 2.45  | 5            | 1         | < 50                    | < 100 | 1   | < 85               | < 600                 | - 0.09                  | - 0.06 |
| BZX55B2V7  | 2.64                | 2.7  | 2.76  | 5            | 1         | < 10                    | < 50  | 1   | < 85               | < 600                 | - 0.09                  | - 0.06 |
| BZX55B3V0  | 2.94                | 3.0  | 3.06  | 5            | 1         | < 4                     | < 40  | 1   | < 90               | < 600                 | - 0.08                  | - 0.05 |
| BZX55B3V3  | 3.24                | 3.3  | 3.36  | 5            | 1         | < 2                     | < 40  | 1   | < 90               | < 600                 | - 0.08                  | - 0.05 |
| BZX55B3V6  | 3.52                | 3.6  | 3.68  | 5            | 1         | < 2                     | < 40  | 1   | < 90               | < 600                 | - 0.08                  | - 0.05 |
| BZX55B3V9  | 3.82                | 3.9  | 3.98  | 5            | 1         | < 2                     | < 40  | 1   | < 90               | < 600                 | - 0.08                  | - 0.05 |
| BZX55B4V3  | 4.22                | 4.3  | 4.38  | 5            | 1         | < 1                     | < 20  | 1   | < 90               | < 600                 | - 0.06                  | - 0.03 |
| BZX55B4V7  | 4.6                 | 4.7  | 4.8   | 5            | 1         | < 0.5                   | < 10  | 1   | < 80               | < 600                 | - 0.05                  | 0.02   |
| BZX55B5V1  | 5                   | 5.1  | 5.2   | 5            | 1         | < 0.1                   | < 2   | 1   | < 60               | < 550                 | - 0.02                  | 0.02   |
| BZX55B5V6  | 5.48                | 5.6  | 5.72  | 5            | 1         | < 0.1                   | < 2   | 1   | < 40               | < 450                 | - 0.05                  | 0.05   |
| BZX55B6V2  | 6.08                | 6.2  | 6.32  | 5            | 1         | < 0.1                   | < 2   | 2   | < 10               | < 200                 | 0.03                    | 0.06   |
| BZX55B6V8  | 6.66                | 6.8  | 6.94  | 5            | 1         | < 0.1                   | < 2   | 3   | < 8                | < 150                 | 0.03                    | 0.07   |
| BZX55B7V5  | 7.35                | 7.5  | 7.65  | 5            | 1         | < 0.1                   | < 2   | 5   | < 7                | < 50                  | 0.03                    | 0.07   |
| BZX55B8V2  | 8.04                | 8.2  | 8.36  | 5            | 1         | < 0.1                   | < 2   | 6.2 | < 7                | < 50                  | 0.03                    | 0.08   |
| BZX55B9V1  | 8.92                | 9.1  | 9.28  | 5            | 1         | < 0.1                   | < 2   | 6.8 | < 10               | < 50                  | 0.03                    | 0.09   |
| BZX55B10   | 9.8                 | 10   | 10.2  | 5            | 1         | < 0.1                   | < 2   | 7.5 | < 15               | < 70                  | 0.03                    | 0.1    |
| BZX55B11   | 10.78               | 11   | 11.22 | 5            | 1         | < 0.1                   | < 2   | 8.2 | < 20               | < 70                  | 0.03                    | 0.11   |
| BZX55B12   | 11.76               | 12   | 12.24 | 5            | 1         | < 0.1                   | < 2   | 9.1 | < 20               | < 90                  | 0.03                    | 0.11   |
| BZX55B13   | 12.74               | 13   | 13.26 | 5            | 1         | < 0.1                   | < 2   | 10  | < 26               | < 110                 | 0.03                    | 0.11   |
| BZX55B15   | 14.7                | 15   | 15.3  | 5            | 1         | < 0.1                   | < 2   | 11  | < 30               | < 110                 | 0.03                    | 0.11   |
| BZX55B16   | 15.7                | 16   | 16.3  | 5            | 1         | < 0.1                   | < 2   | 12  | < 40               | < 170                 | 0.03                    | 0.11   |
| BZX55B18   | 17.64               | 18   | 18.36 | 5            | 1         | < 0.1                   | < 2   | 13  | < 50               | < 170                 | 0.03                    | 0.11   |
| BZX55B20   | 19.6                | 20   | 20.4  | 5            | 1         | < 0.1                   | < 2   | 15  | < 55               | < 220                 | 0.03                    | 0.11   |
| BZX55B22   | 21.55               | 22   | 22.45 | 5            | 1         | < 0.1                   | < 2   | 16  | < 55               | < 220                 | 0.04                    | 0.12   |
| BZX55B24   | 23.5                | 24   | 24.5  | 5            | 1         | < 0.1                   | < 2   | 18  | < 80               | < 220                 | 0.04                    | 0.12   |
| BZX55B27   | 26.4                | 27   | 27.6  | 5            | 1         | < 0.1                   | < 2   | 20  | < 80               | < 220                 | 0.04                    | 0.12   |
| BZX55B30   | 29.4                | 30   | 30.6  | 5            | 1         | < 0.1                   | < 2   | 22  | < 80               | < 220                 | 0.04                    | 0.12   |
| BZX55B33   | 32.4                | 33   | 33.6  | 5            | 1         | < 0.1                   | < 2   | 24  | < 80               | < 220                 | 0.04                    | 0.12   |
| BZX55B36   | 35.3                | 36   | 36.7  | 5            | 1         | < 0.1                   | < 2   | 27  | < 80               | < 220                 | 0.04                    | 0.12   |
| BZX55B39   | 38.2                | 39   | 39.8  | 2.5          | 0.5       | < 0.1                   | < 5   | 30  | < 90               | < 500                 | 0.04                    | 0.12   |
| BZX55B43   | 42.1                | 43   | 43.9  | 2.5          | 0.5       | < 0.1                   | < 5   | 33  | < 90               | < 600                 | 0.04                    | 0.12   |
| BZX55B47   | 46.1                | 47   | 47.9  | 2.5          | 0.5       | < 0.1                   | < 5   | 36  | < 110              | < 700                 | 0.04                    | 0.12   |
| BZX55B51   | 50                  | 51   | 52    | 2.5          | 0.5       | < 0.1                   | < 10  | 39  | < 125              | < 700                 | 0.04                    | 0.12   |
| BZX55B56   | 54.9                | 56   | 57.1  | 2.5          | 0.5       | < 0.1                   | < 10  | 43  | < 135              | < 1000                | 0.04                    | 0.12   |
| BZX55B62   | 60.8                | 62   | 63.2  | 2.5          | 0.5       | < 0.1                   | < 10  | 47  | < 150              | < 1000                | 0.04                    | 0.12   |
| BZX55B68   | 66.6                | 68   | 69.4  | 2.5          | 0.5       | < 0.1                   | < 10  | 51  | < 200              | < 1000                | 0.04                    | 0.12   |
| BZX55B75   | 73                  | 75   | 76.5  | 2.5          | 0.5       | < 0.1                   | < 10  | 56  | < 250              | < 1500                | 0.04                    | 0.12   |

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

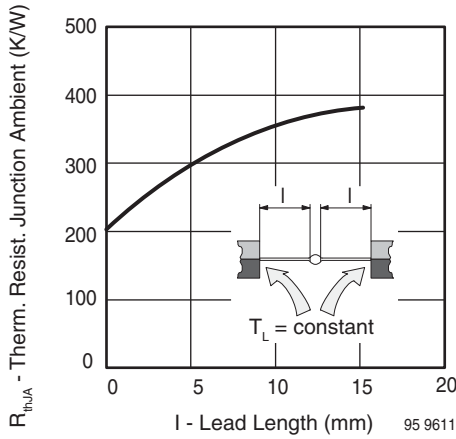


Fig. 1 - Thermal Resistance vs. Lead Length

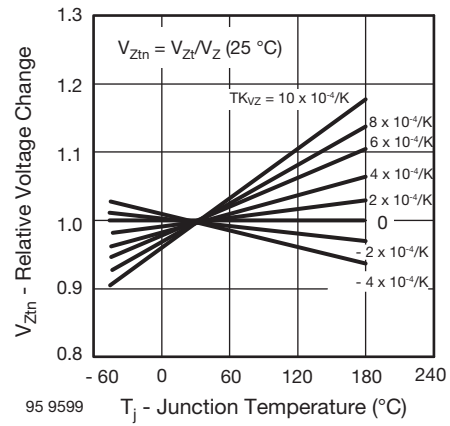


Fig. 4 - Typical Change of Working Voltage vs. Junction Temperature

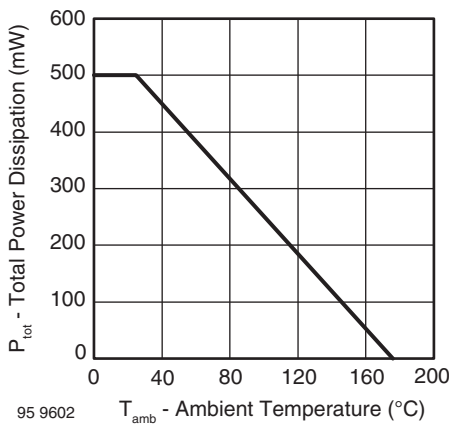


Fig. 2 - Total Power Dissipation vs. Ambient Temperature

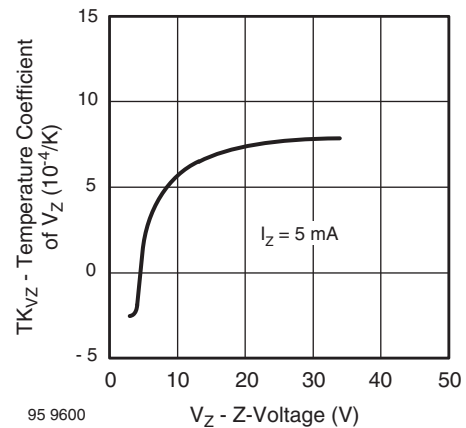


Fig. 5 - Temperature Coefficient of  $V_Z$  vs. Z-Voltage

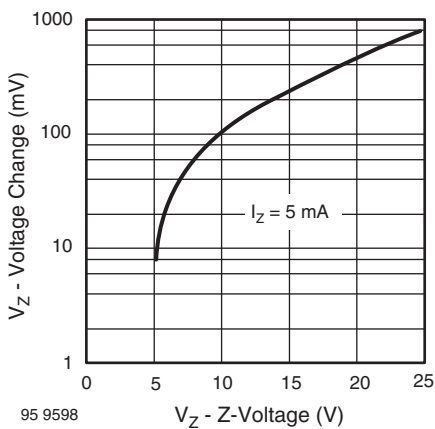


Fig. 3 - Typical Change of Working Voltage under Operating Conditions at  $T_{amb} = 25\text{ }^{\circ}\text{C}$

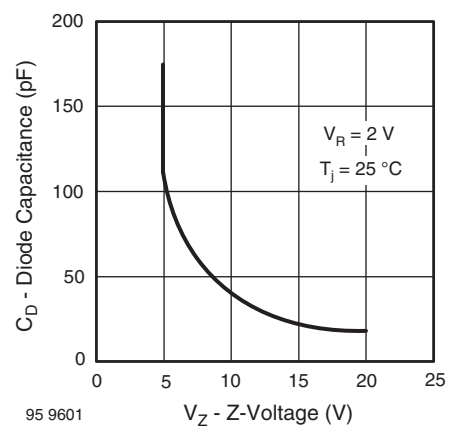


Fig. 6 - Diode Capacitance vs. Z-Voltage

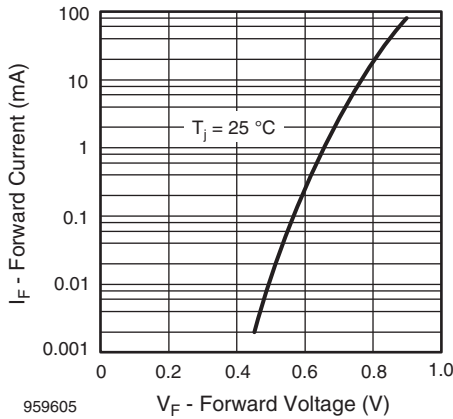


Fig. 7 - Forward Current vs. Forward Voltage

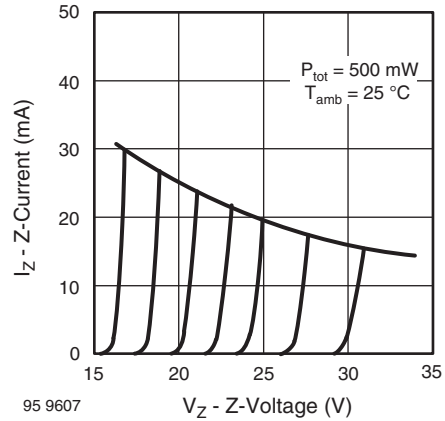


Fig. 9 - Z-Current vs. Z-Voltage

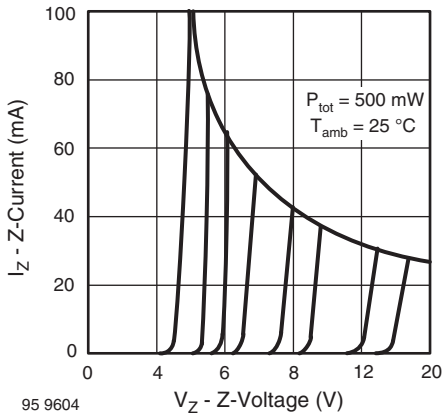


Fig. 8 - Z-Current vs. Z-Voltage

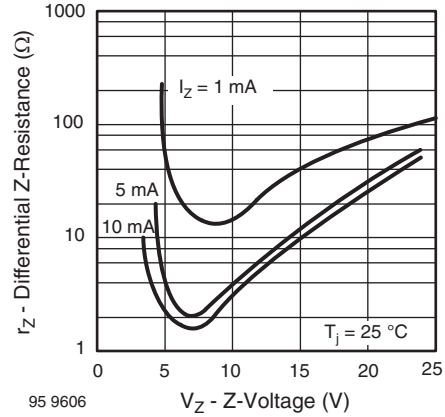


Fig. 10 - Differential Z-Resistance vs. Z-Voltage

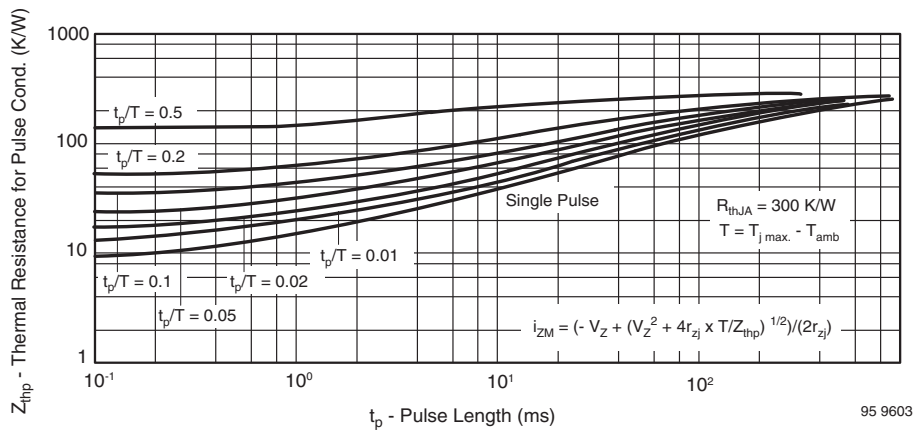
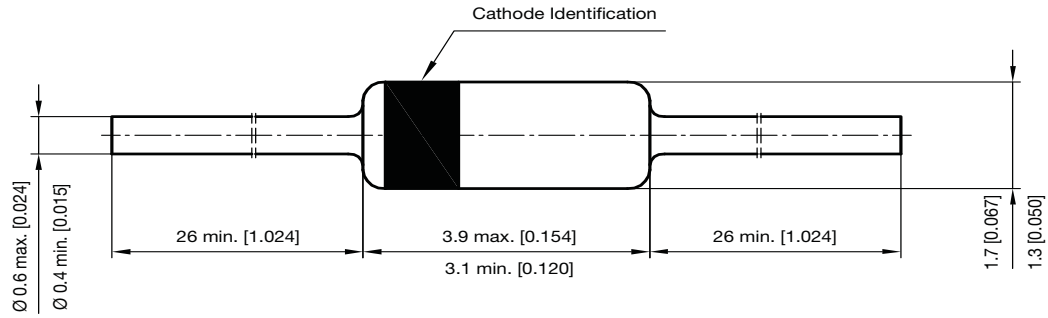


Fig. 11 - Thermal Response



**PACKAGE DIMENSIONS** in millimeters (inches): **DO-35 (DO-204AH)**



Rev. 6 - Date: 19. December 2011  
Document no.: SB-V-3906.04-031(4)  
94 9366



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