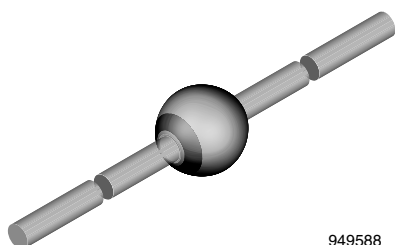


# Zener Diodes with Surge Current Specification



949588

## FEATURES

- Glass passivated junction
- Hermetically sealed package
- Clamping time in picoseconds
- 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 regulators and transient suppression
- Circuits

## PRIMARY CHARACTERISTICS

| PARAMETER                    | VALUE         | UNIT |
|------------------------------|---------------|------|
| V <sub>Z</sub> range nom.    | 6.8 to 270    | V    |
| Test current I <sub>ZT</sub> | 5 to 175      | mA   |
| V <sub>Z</sub> specification | Pulse current |      |
| Int. construction            | Single        |      |

## ORDERING INFORMATION (Example)

| DEVICE NAME | ORDERING CODE | TAPED UNITS                | MINIMUM ORDER QUANTITY |
|-------------|---------------|----------------------------|------------------------|
| BZW03C6V8   | BZW03C6V8-TR  | 2500 per 10" tape and reel | 12 500                 |
| BZW03C6V8   | BZW03C6V8-TAP | 2500 per ammpack           | 12 500                 |

## PACKAGE

| PACKAGE NAME | WEIGHT | MOLDING COMPOUND<br>FLAMMABILITY RATING | MOISTURE SENSITIVITY<br>LEVEL        | SOLDERING<br>CONDITIONS  |
|--------------|--------|-----------------------------------------|--------------------------------------|--------------------------|
| SOD-64       | 858 mg | UL 94 V-0                               | MSL level 1<br>(according J-STD-020) | 260 °C/10 s at terminals |

## ABSOLUTE MAXIMUM RATINGS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

| PARAMETER                                   | TEST CONDITION                                  | SYMBOL            | VALUE         | UNIT |
|---------------------------------------------|-------------------------------------------------|-------------------|---------------|------|
| Power dissipation                           | I = 10 mm, T <sub>L</sub> = 25 °C               | P <sub>tot</sub>  | 6000          | mW   |
|                                             | T <sub>amb</sub> = 45 °C                        | P <sub>tot</sub>  | 1850          |      |
| Repetitive peak reverse power dissipation   |                                                 | P <sub>ZRM</sub>  | 20            | W    |
| Non repetitive peak surge power dissipation | t <sub>p</sub> = 100 μs, T <sub>j</sub> = 25 °C | P <sub>ZSM</sub>  | 1000          | W    |
| Junction to ambient air                     | I = 25 mm, T <sub>L</sub> = constant            | R <sub>thJA</sub> | 30            | K/W  |
|                                             | On PC board with spacing 37.5 mm                | R <sub>thJA</sub> | 70            |      |
| 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> = 1 A                            | V <sub>F</sub>    | 1.2           | V    |

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

| PART<br>NUMBER | ZENER VOLTAGE<br>RANGE |      |      | TEST<br>CURRENT | REVERSE<br>LEAKAGE<br>CURRENT |     | DYNAMIC<br>RESISTANCE |      | TEMPERATURE<br>COEFFICIENT |      | CLAMPING <sup>(1)</sup>  |      | STAND<br>OFF <sup>(2)</sup> |     |
|----------------|------------------------|------|------|-----------------|-------------------------------|-----|-----------------------|------|----------------------------|------|--------------------------|------|-----------------------------|-----|
|                | $V_Z$ at $I_{ZT1}$     |      |      | $I_{ZT1}$       | $I_R$ at $V_R$                |     | $Z_Z$ at $I_{ZT1}$    |      | $TC_{VZ}$ at $I_{ZT1}$     |      | $V_{(CL)R}$ at $I_{RMS}$ |      | $I_R$ at $V_R$              |     |
|                | V                      |      |      | mA              | $\mu\text{A}$                 | V   | $\Omega$              |      | % / K                      |      | V                        | A    | $\mu\text{A}$               | V   |
|                | MIN.                   | NOM. | MAX. |                 | MAX.                          |     | TYP.                  | MAX. | MIN.                       | MAX. | MAX.                     |      | MAX.                        |     |
| BZW03C6V8      | 6.4                    | 6.8  | 7.2  | 175             | 2000                          | 5.1 | 0.7                   | 1.5  | 0                          | 0.07 | 10.3                     | 48.5 | 4000                        | 5.6 |
| BZW03C7V5      | 7                      | 7.5  | 7.9  | 175             | 1500                          | 5.6 | 0.7                   | 1.5  | 0                          | 0.07 | 11.3                     | 44.2 | 3000                        | 6.2 |
| BZW03C8V2      | 7.7                    | 8.2  | 8.7  | 150             | 1200                          | 6.2 | 0.8                   | 1.5  | 0.03                       | 0.08 | 12.3                     | 40.6 | 2400                        | 6.8 |
| BZW03C9V1      | 8.5                    | 9.1  | 9.6  | 150             | 40                            | 6.8 | 0.9                   | 2    | 0.03                       | 0.08 | 13.3                     | 37.6 | 100                         | 7.5 |
| BZW03C10       | 9.4                    | 10   | 10.6 | 125             | 20                            | 7.5 | 1                     | 2    | 0.05                       | 0.09 | 14.8                     | 34   | 40                          | 8.2 |
| BZW03C11       | 10.4                   | 11   | 11.6 | 125             | 15                            | 8.2 | 1.1                   | 2.5  | 0.05                       | 0.1  | 15.7                     | 31.8 | 30                          | 9.1 |
| BZW03C12       | 11.4                   | 12   | 12.7 | 100             | 10                            | 9.1 | 1.1                   | 2.5  | 0.05                       | 0.1  | 17                       | 29.4 | 20                          | 10  |
| BZW03C13       | 12.4                   | 14   | 14.1 | 100             | 4                             | 10  | 1.2                   | 2.5  | 0.05                       | 0.1  | 18.9                     | 26.4 | 10                          | 11  |
| BZW03C15       | 13.8                   | 15   | 15.6 | 75              | 2                             | 11  | 1.2                   | 2.5  | 0.05                       | 0.1  | 20.9                     | 23.9 | 10                          | 12  |
| BZW03C16       | 15.3                   | 16   | 17.1 | 75              | 2                             | 12  | 1.3                   | 2.5  | 0.06                       | 0.11 | 22.9                     | 21.8 | 10                          | 13  |
| BZW03C18       | 16.8                   | 18   | 19.1 | 65              | 2                             | 13  | 1.3                   | 2.5  | 0.06                       | 0.11 | 25.6                     | 19.5 | 10                          | 15  |
| BZW03C20       | 18.8                   | 20   | 21.2 | 65              | 2                             | 15  | 1.5                   | 3    | 0.06                       | 0.11 | 28.4                     | 17.6 | 10                          | 16  |
| BZW03C22       | 20.8                   | 22   | 23.3 | 50              | 2                             | 16  | 1.6                   | 3.5  | 0.06                       | 0.11 | 31                       | 16.1 | 10                          | 18  |
| BZW03C24       | 22.8                   | 24   | 25.6 | 50              | 2                             | 18  | 1.8                   | 3.5  | 0.06                       | 0.11 | 33.8                     | 14.8 | 10                          | 20  |
| BZW03C27       | 25.1                   | 27   | 28.9 | 50              | 2                             | 20  | 2.5                   | 5    | 0.06                       | 0.11 | 38.1                     | 13.1 | 10                          | 22  |
| BZW03C30       | 28                     | 30   | 32   | 40              | 2                             | 22  | 4                     | 8    | 0.06                       | 0.11 | 42.2                     | 11.8 | 10                          | 24  |
| BZW03C33       | 31                     | 33   | 35   | 40              | 2                             | 24  | 5                     | 10   | 0.06                       | 0.11 | 46.2                     | 10.8 | 10                          | 27  |
| BZW03C36       | 34                     | 36   | 38   | 30              | 2                             | 27  | 6                     | 11   | 0.06                       | 0.11 | 50.1                     | 10   | 10                          | 30  |
| BZW03C39       | 37                     | 39   | 41   | 30              | 2                             | 30  | 7                     | 14   | 0.06                       | 0.11 | 54.1                     | 9.2  | 10                          | 33  |
| BZW03C43       | 40                     | 43   | 46   | 30              | 2                             | 33  | 10                    | 20   | 0.07                       | 0.12 | 60.7                     | 8.2  | 10                          | 36  |
| BZW03C47       | 44                     | 47   | 50   | 25              | 2                             | 36  | 12                    | 25   | 0.07                       | 0.12 | 65.5                     | 7.6  | 10                          | 39  |
| BZW03C51       | 48                     | 51   | 54   | 25              | 2                             | 39  | 14                    | 27   | 0.07                       | 0.12 | 70.8                     | 7    | 10                          | 43  |
| BZW03C56       | 52                     | 56   | 60   | 20              | 2                             | 43  | 18                    | 35   | 0.07                       | 0.12 | 78.6                     | 6.3  | 10                          | 47  |
| BZW03C62       | 58                     | 62   | 66   | 20              | 2                             | 47  | 20                    | 42   | 0.08                       | 0.13 | 86.5                     | 5.8  | 10                          | 51  |
| BZW03C68       | 64                     | 68   | 72   | 20              | 2                             | 51  | 22                    | 44   | 0.08                       | 0.13 | 94.4                     | 5.3  | 10                          | 56  |
| BZW03C75       | 70                     | 75   | 79   | 20              | 2                             | 56  | 25                    | 45   | 0.08                       | 0.13 | 103.5                    | 4.8  | 10                          | 62  |
| BZW03C82       | 77                     | 82   | 87   | 15              | 2                             | 62  | 30                    | 65   | 0.08                       | 0.13 | 114                      | 4.3  | 10                          | 68  |
| BZW03C91       | 85                     | 91   | 96   | 15              | 2                             | 68  | 40                    | 75   | 0.09                       | 0.13 | 126                      | 3.9  | 10                          | 75  |
| BZW03C100      | 94                     | 100  | 106  | 12              | 2                             | 75  | 45                    | 90   | 0.09                       | 0.13 | 139                      | 3.6  | 10                          | 82  |
| BZW03C110      | 104                    | 110  | 116  | 12              | 2                             | 82  | 65                    | 125  | 0.09                       | 0.13 | 152                      | 3.3  | 10                          | 91  |
| BZW03C120      | 114                    | 120  | 127  | 10              | 2                             | 91  | 90                    | 170  | 0.09                       | 0.13 | 167                      | 3    | 10                          | 100 |
| BZW03C130      | 124                    | 130  | 141  | 10              | 2                             | 100 | 100                   | 190  | 0.09                       | 0.13 | 185                      | 2.7  | 10                          | 110 |
| BZW03C150      | 138                    | 150  | 156  | 8               | 2                             | 110 | 150                   | 330  | 0.09                       | 0.13 | 204                      | 2.4  | 10                          | 120 |
| BZW03C160      | 153                    | 160  | 171  | 8               | 2                             | 120 | 180                   | 350  | 0.09                       | 0.13 | 224                      | 2.2  | 10                          | 130 |
| BZW03C180      | 168                    | 180  | 191  | 5               | 2                             | 130 | 210                   | 430  | 0.09                       | 0.13 | 249                      | 2    | 10                          | 150 |
| BZW03C200      | 188                    | 200  | 212  | 5               | 2                             | 150 | 250                   | 500  | 0.09                       | 0.13 | 276                      | 1.8  | 10                          | 160 |
| BZW03C220      | 208                    | 220  | 233  | 5               | 2                             | 160 | 350                   | 700  | 0.09                       | 0.13 | 305                      | 1.6  | 10                          | 180 |
| BZW03C240      | 228                    | 240  | 256  | 5               | 2                             | 180 | 450                   | 900  | 0.09                       | 0.13 | 336                      | 1.5  | 10                          | 200 |
| BZW03C270      | 251                    | 270  | 289  | 5               | 2                             | 200 | 600                   | 1200 | 0.09                       | 0.13 | 380                      | 1.3  | 10                          | 220 |

**Notes**<sup>(1)</sup> Exp. falling pulse,  $t_p = 500\text{ }\mu\text{s}$  down to 37 %<sup>(2)</sup> Stand-off reverse voltage = recommended supply voltage

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

| PART<br>NUMBER | ZENER VOLTAGE<br>RANGE |      |      | TEST<br>CURRENT | REVERSE<br>LEAKAGE<br>CURRENT |      | DYNAMIC<br>RESISTANCE |      | TEMPERATURE<br>COEFFICIENT |      | CLAMPING <sup>(1)</sup>  |      | STAND<br>OFF <sup>(2)</sup> |      |
|----------------|------------------------|------|------|-----------------|-------------------------------|------|-----------------------|------|----------------------------|------|--------------------------|------|-----------------------------|------|
|                | $V_Z$ at $I_{ZT1}$     |      |      | $I_{ZT1}$       | $I_R$ at $V_R$                |      | $Z_Z$ at $I_{ZT1}$    |      | $TC_{VZ}$ at $I_{ZT1}$     |      | $V_{(CL)R}$ at $I_{RMS}$ |      | $I_R$ at $V_R$              |      |
|                | V                      |      |      | mA              | $\mu\text{A}$                 | V    | $\Omega$              |      | % / K                      |      | V                        | A    | $\mu\text{A}$               | V    |
|                | MIN.                   | NOM. | MAX. |                 | MAX.                          |      | TYP.                  | MAX. | MIN.                       | MAX. | MAX.                     |      | MAX.                        |      |
| BZW03D6V8      | 6.1                    | 6.8  | 7.5  | 175             | 2000                          | 4.8  | 0.7                   | 1.5  | 0                          | 0.07 | 10.6                     | 48.5 | 4000                        | 5.3  |
| BZW03D7V5      | 6.75                   | 7.5  | 8.25 | 175             | 1500                          | 5.3  | 0.7                   | 1.5  | 0                          | 0.07 | 11.7                     | 44.2 | 3000                        | 5.8  |
| BZW03D8V2      | 7.4                    | 8.2  | 9    | 150             | 1200                          | 5.8  | 0.8                   | 1.5  | 0.03                       | 0.08 | 12.6                     | 40.6 | 2400                        | 6.5  |
| BZW03D9V1      | 8.2                    | 9.1  | 10   | 150             | 40                            | 6.5  | 0.9                   | 2    | 0.03                       | 0.08 | 13.6                     | 37.6 | 100                         | 7.1  |
| BZW03D10       | 9                      | 10   | 11   | 125             | 20                            | 7.1  | 1                     | 2    | 0.05                       | 0.09 | 15.2                     | 34   | 40                          | 7.9  |
| BZW03D11       | 9.9                    | 11   | 12.1 | 125             | 15                            | 7.9  | 1.1                   | 2.5  | 0.05                       | 0.1  | 16.2                     | 31.8 | 30                          | 8.6  |
| BZW03D12       | 10.8                   | 12   | 13.2 | 100             | 10                            | 8.6  | 1.1                   | 2.5  | 0.05                       | 0.1  | 17.5                     | 29.4 | 20                          | 9.3  |
| BZW03D13       | 11.7                   | 13   | 14.3 | 100             | 4                             | 9.3  | 1.2                   | 2.5  | 0.05                       | 0.1  | 19.1                     | 26.4 | 10                          | 10.6 |
| BZW03D15       | 13.5                   | 15   | 16.5 | 75              | 2                             | 10.6 | 1.2                   | 2.5  | 0.05                       | 0.1  | 21.8                     | 23.9 | 10                          | 11.6 |
| BZW03D16       | 14.4                   | 16   | 17.6 | 75              | 2                             | 11.6 | 1.3                   | 2.5  | 0.06                       | 0.11 | 23.4                     | 21.8 | 10                          | 12.6 |
| BZW03D18       | 16.2                   | 18   | 19.8 | 65              | 2                             | 12.6 | 1.3                   | 2.5  | 0.06                       | 0.11 | 26.3                     | 19.5 | 10                          | 14.4 |
| BZW03D20       | 18                     | 20   | 22   | 65              | 2                             | 14.4 | 1.5                   | 3    | 0.06                       | 0.11 | 29.2                     | 17.6 | 10                          | 15.8 |
| BZW03D22       | 20.8                   | 22   | 24.2 | 50              | 2                             | 15.8 | 1.6                   | 3.5  | 0.06                       | 0.11 | 32                       | 16.1 | 10                          | 17.2 |
| BZW03D24       | 21.6                   | 24   | 26.4 | 50              | 2                             | 17.2 | 1.8                   | 3.5  | 0.06                       | 0.11 | 34.6                     | 14.8 | 10                          | 19.4 |
| BZW03D27       | 24.3                   | 27   | 29.7 | 50              | 2                             | 19.4 | 2.5                   | 5    | 0.06                       | 0.11 | 39                       | 13.1 | 10                          | 21.5 |
| BZW03D30       | 27                     | 30   | 33   | 40              | 2                             | 21.5 | 4                     | 8    | 0.06                       | 0.11 | 43.2                     | 11.8 | 10                          | 23.5 |
| BZW03D33       | 29.7                   | 33   | 36.3 | 40              | 2                             | 23.5 | 5                     | 10   | 0.06                       | 0.11 | 47                       | 10.8 | 10                          | 25.8 |
| BZW03D36       | 32.4                   | 36   | 39.6 | 30              | 2                             | 25.8 | 6                     | 11   | 0.06                       | 0.11 | 51.7                     | 10   | 10                          | 28   |
| BZW03D39       | 25.1                   | 39   | 42.9 | 30              | 2                             | 28   | 7                     | 14   | 0.06                       | 0.11 | 56                       | 9.2  | 10                          | 31   |
| BZW03D43       | 38.7                   | 43   | 47.3 | 30              | 2                             | 31   | 10                    | 20   | 0.07                       | 0.12 | 62                       | 8.2  | 10                          | 33.5 |
| BZW03D47       | 42.3                   | 47   | 51.7 | 25              | 2                             | 33.5 | 12                    | 25   | 0.07                       | 0.12 | 66.7                     | 7.6  | 10                          | 36.5 |
| BZW03D51       | 45.9                   | 51   | 56.1 | 25              | 2                             | 36.5 | 14                    | 27   | 0.07                       | 0.12 | 73                       | 7    | 10                          | 40   |
| BZW03D56       | 50.4                   | 56   | 61.6 | 20              | 2                             | 40   | 18                    | 35   | 0.07                       | 0.12 | 80.2                     | 6.3  | 10                          | 44.5 |
| BZW03D62       | 55.8                   | 62   | 68.2 | 20              | 2                             | 44.5 | 20                    | 42   | 0.08                       | 0.13 | 88.7                     | 5.8  | 10                          | 49   |
| BZW03D68       | 61.2                   | 68   | 74.8 | 20              | 2                             | 49   | 22                    | 44   | 0.08                       | 0.13 | 97.2                     | 5.3  | 10                          | 54   |
| BZW03D75       | 67.5                   | 75   | 82.5 | 20              | 2                             | 54   | 25                    | 45   | 0.08                       | 0.13 | 107                      | 4.8  | 10                          | 59   |
| BZW03D82       | 73.8                   | 82   | 90.2 | 15              | 2                             | 59   | 30                    | 65   | 0.08                       | 0.13 | 117                      | 4.3  | 10                          | 65   |
| BZW03D91       | 81.9                   | 91   | 100  | 15              | 2                             | 65   | 40                    | 75   | 0.09                       | 0.13 | 130                      | 3.9  | 10                          | 71   |
| BZW03D100      | 90                     | 100  | 110  | 12              | 2                             | 71   | 45                    | 90   | 0.09                       | 0.13 | 143                      | 3.6  | 10                          | 79   |
| BZW03D110      | 99                     | 110  | 121  | 12              | 2                             | 79   | 65                    | 125  | 0.09                       | 0.13 | 157                      | 3.3  | 10                          | 86   |
| BZW03D120      | 108                    | 120  | 132  | 10              | 2                             | 86   | 90                    | 170  | 0.09                       | 0.13 | 172                      | 3    | 10                          | 93   |
| BZW03D130      | 117                    | 130  | 143  | 10              | 2                             | 93   | 100                   | 190  | 0.09                       | 0.13 | 187                      | 2.7  | 10                          | 106  |
| BZW03D150      | 135                    | 150  | 165  | 8               | 2                             | 106  | 150                   | 330  | 0.09                       | 0.13 | 213                      | 2.4  | 10                          | 116  |
| BZW03D160      | 144                    | 160  | 176  | 8               | 2                             | 116  | 180                   | 350  | 0.09                       | 0.13 | 229                      | 2.2  | 10                          | 126  |
| BZW03D180      | 162                    | 180  | 198  | 5               | 2                             | 126  | 210                   | 430  | 0.09                       | 0.13 | 256                      | 2    | 10                          | 144  |
| BZW03D200      | 180                    | 200  | 220  | 5               | 2                             | 144  | 250                   | 500  | 0.09                       | 0.13 | 284                      | 1.8  | 10                          | 158  |
| BZW03D220      | 198                    | 220  | 242  | 5               | 2                             | 158  | 350                   | 700  | 0.09                       | 0.13 | 314                      | 1.6  | 10                          | 172  |
| BZW03D240      | 216                    | 240  | 264  | 5               | 2                             | 172  | 450                   | 900  | 0.09                       | 0.13 | 344                      | 1.5  | 10                          | 194  |
| BZW03D270      | 243                    | 270  | 297  | 5               | 2                             | 194  | 600                   | 1200 | 0.09                       | 0.13 | 388                      | 1.3  | 10                          | 215  |

**Notes**(1) Exp. falling pulse,  $t_p = 500\text{ }\mu\text{s}$  down to 37 %

(2) Stand-off reverse voltage = recommended supply voltage

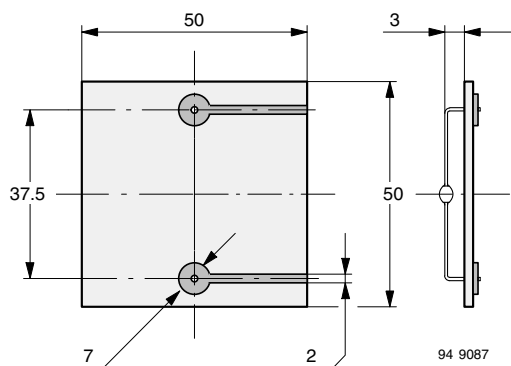
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Epoxy Glass Hard Tissue, Board Thickness 1.5 mm,  
 $R_{thJA} \leq 70\text{ K/W}$

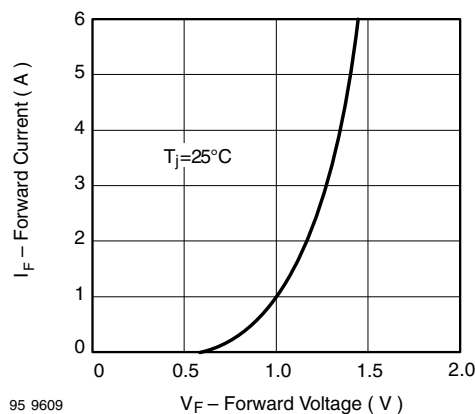


Fig. 3 - Forward Current vs. Forward Voltage

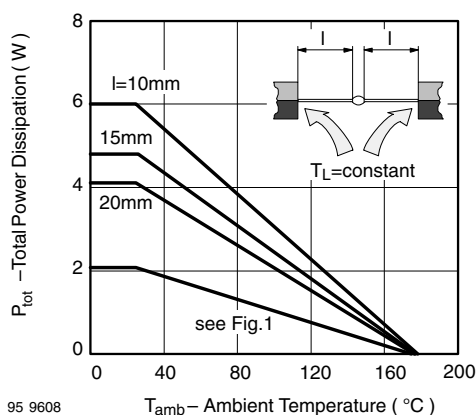


Fig. 2 - Total Power Dissipation vs. Ambient Temperature

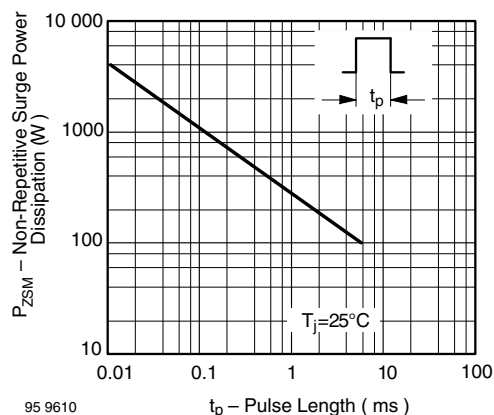
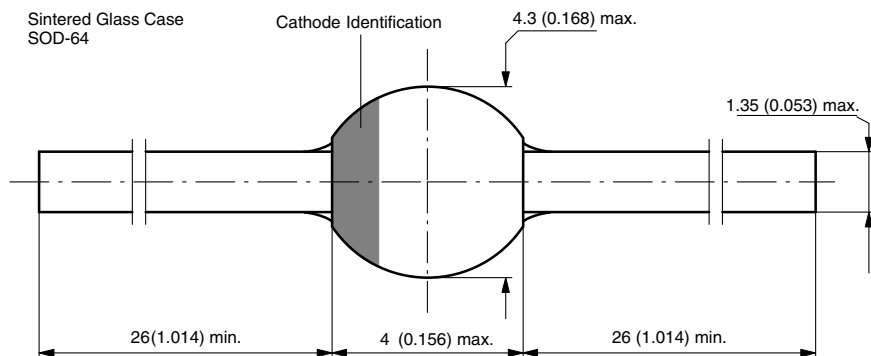


Fig. 4 - Non Repetitive Surge Power Dissipation vs.  
Pulse Length

**PACKAGE DIMENSIONS** in millimeters (inches): **SOD-64**


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94 9587



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