



# THE DATASHEET OF BZG05C20TR

## Zener Diodes



### FEATURES

- High reliability
- Voltage range 3.3 V to 100 V
- Fits onto 5 mm SMD footpads
- Wave and reflow solderable
- AEC-Q101 qualified available
- Base P/N-E3 - RoHS-compliant, commercial grade
- Base P/NHE3 - RoHS-compliant, AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### APPLICATIONS

- Voltage stabilization

### 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>              | 5.2 to 95       | 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   |      |
| Int. construction            | Single          |      |
| Polarity                     | Uni-directional |      |

### ORDERING INFORMATION

| DEVICE NAME   | ORDERING CODE         | TAPED UNITS PER REEL | MINIMUM ORDER QUANTITY |
|---------------|-----------------------|----------------------|------------------------|
| BZG05C-series | BZG05C-series-E3-TR   | 1500 per 7" reel     | 6000/box               |
| BZG05C-series | BZG05C-series-E3-TR3  | 6000 per 13" reel    | 6000/box               |
| BZG05C-series | BZG05C-series-HE3-TR  | 1500 per 7" reel     | 6000/box               |
| BZG05C-series | BZG05C-series-HE3-TR3 | 6000 per 13" reel    | 6000/box               |

### PACKAGE

| PACKAGE NAME | WEIGHT | MOLDING COMPOUND<br>FLAMMABILITY RATING | MOISTURE SENSITIVITY<br>LEVEL        | SOLDERING CONDITIONS     |
|--------------|--------|-----------------------------------------|--------------------------------------|--------------------------|
| DO-214AC     | 77 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                           | 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-oxid-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   |
| Forward voltage (max.)                      | I <sub>F</sub> = 0.2 A                                                   | V <sub>F</sub>    | 1.2         | V    |

**ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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 $I_{ZT1}$ | $Z_Z K$ at $I_{ZT2}$ | $TC_{VZ}$ at $I_{ZT1}$  |       |
|             | V                   |      |      | mA           | mA        | $\mu A$                 | V   | $\Omega$           |                      | % / K                   |       |
|             | MIN.                | NOM. | MAX. |              |           | MAX.                    |     | MAX.               | MAX.                 | MIN.                    | MAX.  |
| BZG05C3V3   | 3.1                 | 3.3  | 3.5  | 80           | 1         | 40                      | 1   | 20                 | 400                  | -0.08                   | -0.05 |
| BZG05C3V6   | 3.4                 | 3.6  | 3.8  | 60           | 1         | 20                      | 1   | 20                 | 500                  | -0.08                   | -0.05 |
| BZG05C3V9   | 3.7                 | 3.9  | 4.1  | 60           | 1         | 10                      | 1   | 15                 | 500                  | -0.07                   | -0.02 |
| BZG05C4V3   | 4                   | 4.3  | 4.6  | 50           | 1         | 3                       | 1   | 13                 | 500                  | -0.07                   | -0.01 |
| BZG05C4V7   | 4.4                 | 4.7  | 5    | 45           | 1         | 3                       | 1   | 13                 | 600                  | -0.03                   | 0.04  |
| BZG05C5V1   | 4.8                 | 5.1  | 5.4  | 45           | 1         | 1                       | 1.5 | 10                 | 500                  | -0.01                   | 0.04  |
| BZG05C5V6   | 5.2                 | 5.6  | 6    | 45           | 1         | 1                       | 2   | 7                  | 400                  | 0                       | 0.045 |
| BZG05C6V2   | 5.8                 | 6.2  | 6.6  | 35           | 1         | 1                       | 3   | 4                  | 300                  | 0.01                    | 0.055 |
| BZG05C6V8   | 6.4                 | 6.8  | 7.2  | 35           | 1         | 1                       | 4   | 3.5                | 300                  | 0.015                   | 0.06  |
| BZG05C7V5   | 7                   | 7.5  | 7.9  | 35           | 0.5       | 1                       | 4.5 | 3                  | 200                  | 0.02                    | 0.065 |
| BZG05C8V2   | 7.7                 | 8.2  | 8.7  | 25           | 0.5       | 1                       | 6.2 | 5                  | 200                  | 0.03                    | 0.07  |
| BZG05C9V1   | 8.5                 | 9.1  | 9.6  | 25           | 0.5       | 1                       | 6.8 | 5                  | 200                  | 0.035                   | 0.075 |
| BZG05C10    | 9.4                 | 10   | 10.6 | 25           | 0.5       | 0.5                     | 7   | 7                  | 200                  | 0.04                    | 0.08  |
| BZG05C11    | 10.4                | 11   | 11.6 | 20           | 0.5       | 0.5                     | 8.2 | 8                  | 300                  | 0.045                   | 0.08  |
| BZG05C12    | 11.4                | 12   | 12.7 | 20           | 0.5       | 0.5                     | 9.1 | 9                  | 350                  | 0.045                   | 0.085 |
| BZG05C13    | 12.4                | 13   | 14.1 | 20           | 0.5       | 0.5                     | 10  | 10                 | 400                  | 0.05                    | 0.085 |
| BZG05C15    | 13.8                | 15   | 15.6 | 15           | 0.5       | 0.5                     | 11  | 15                 | 500                  | 0.055                   | 0.09  |
| BZG05C16    | 15.3                | 16   | 17.1 | 15           | 0.5       | 0.5                     | 12  | 15                 | 500                  | 0.055                   | 0.09  |
| BZG05C18    | 16.8                | 18   | 19.1 | 15           | 0.5       | 0.5                     | 13  | 20                 | 500                  | 0.06                    | 0.09  |
| BZG05C20    | 18.8                | 20   | 21.2 | 10           | 0.5       | 0.5                     | 15  | 24                 | 600                  | 0.06                    | 0.09  |
| BZG05C22    | 20.8                | 22   | 23.3 | 10           | 0.5       | 0.5                     | 16  | 25                 | 600                  | 0.06                    | 0.095 |
| BZG05C24    | 22.8                | 24   | 25.6 | 10           | 0.5       | 0.5                     | 18  | 25                 | 600                  | 0.06                    | 0.095 |
| BZG05C27    | 25.1                | 27   | 28.9 | 8            | 0.25      | 0.5                     | 20  | 30                 | 750                  | 0.06                    | 0.095 |
| BZG05C30    | 28                  | 30   | 32   | 8            | 0.25      | 0.5                     | 22  | 30                 | 1000                 | 0.06                    | 0.095 |
| BZG05C33    | 31                  | 33   | 35   | 8            | 0.25      | 0.5                     | 24  | 35                 | 1000                 | 0.06                    | 0.095 |
| BZG05C36    | 34                  | 36   | 38   | 8            | 0.25      | 0.5                     | 27  | 40                 | 1000                 | 0.07                    | 0.11  |
| BZG05C39    | 37                  | 39   | 41   | 6            | 0.25      | 0.5                     | 30  | 50                 | 1000                 | 0.07                    | 0.11  |
| BZG05C43    | 40                  | 43   | 46   | 6            | 0.25      | 0.5                     | 33  | 50                 | 1000                 | 0.07                    | 0.11  |
| BZG05C47    | 44                  | 47   | 50   | 4            | 0.25      | 0.5                     | 36  | 90                 | 1500                 | 0.07                    | 0.11  |
| BZG05C51    | 48                  | 51   | 54   | 4            | 0.25      | 0.5                     | 39  | 115                | 1500                 | 0.08                    | 0.12  |
| BZG05C56    | 52                  | 56   | 60   | 4            | 0.25      | 0.5                     | 43  | 120                | 2000                 | 0.08                    | 0.12  |
| BZG05C62    | 58                  | 62   | 66   | 4            | 0.25      | 0.5                     | 47  | 125                | 2000                 | 0.08                    | 0.12  |
| BZG05C68    | 64                  | 68   | 72   | 4            | 0.25      | 0.5                     | 51  | 130                | 2000                 | 0.08                    | 0.12  |
| BZG05C75    | 70                  | 75   | 79   | 4            | 0.25      | 0.5                     | 56  | 135                | 2000                 | 0.08                    | 0.12  |
| BZG05C82    | 77                  | 82   | 87   | 2.7          | 0.25      | 0.5                     | 62  | 200                | 3000                 | 0.08                    | 0.12  |
| BZG05C91    | 85                  | 91   | 96   | 2.7          | 0.25      | 0.5                     | 68  | 250                | 3000                 | 0.08                    | 0.12  |
| BZG05C100   | 95                  | 100  | 106  | 2.7          | 0.25      | 0.5                     | 75  | 350                | 3000                 | 0.08                    | 0.12  |

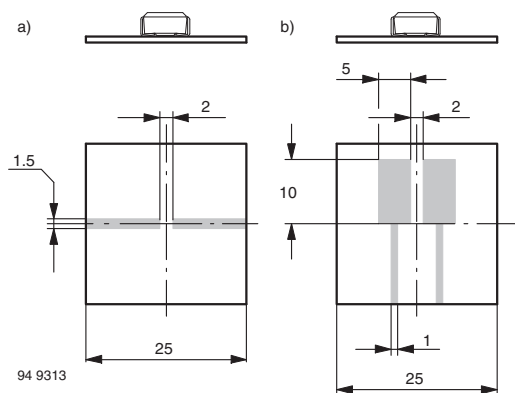
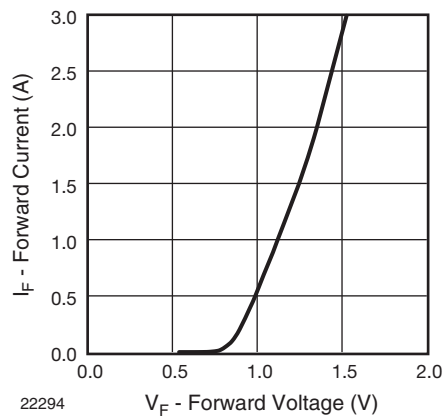
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

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


Fig. 3 - Forward Current vs. Forward Voltage

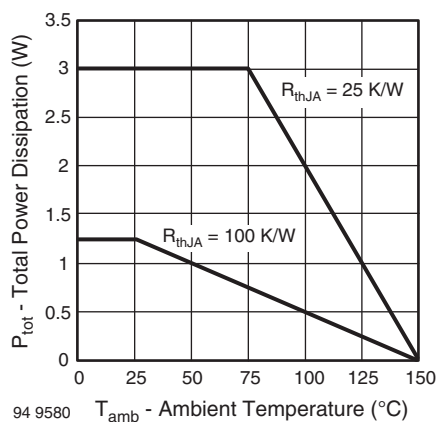


Fig. 2 - Typ. Total Power Dissipation vs. Ambient Temperature

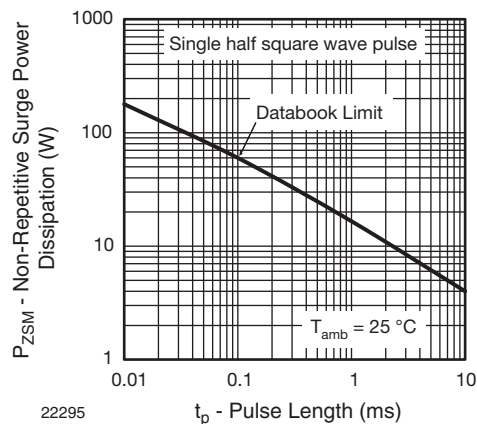


Fig. 4 - Non Repetitive Surge Power Dissipation vs. Pulse Length

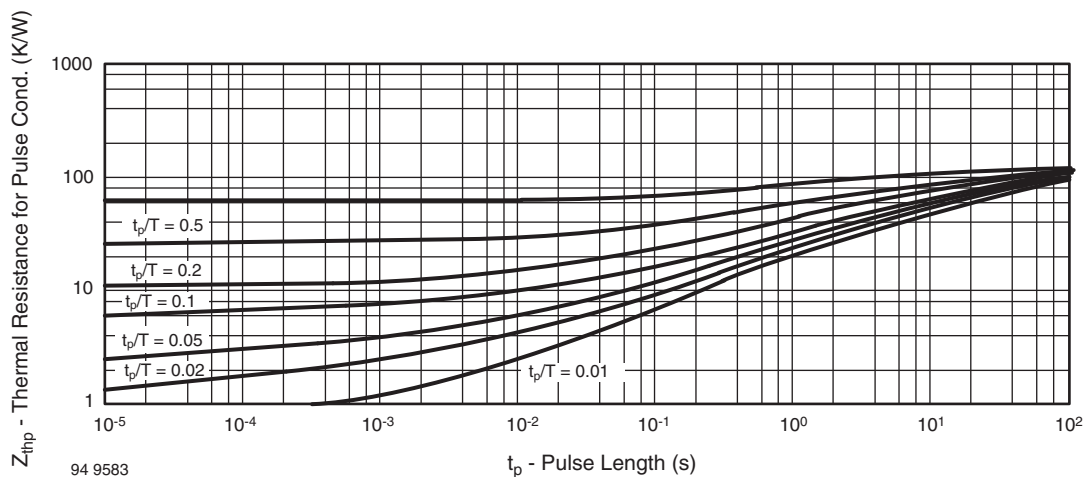
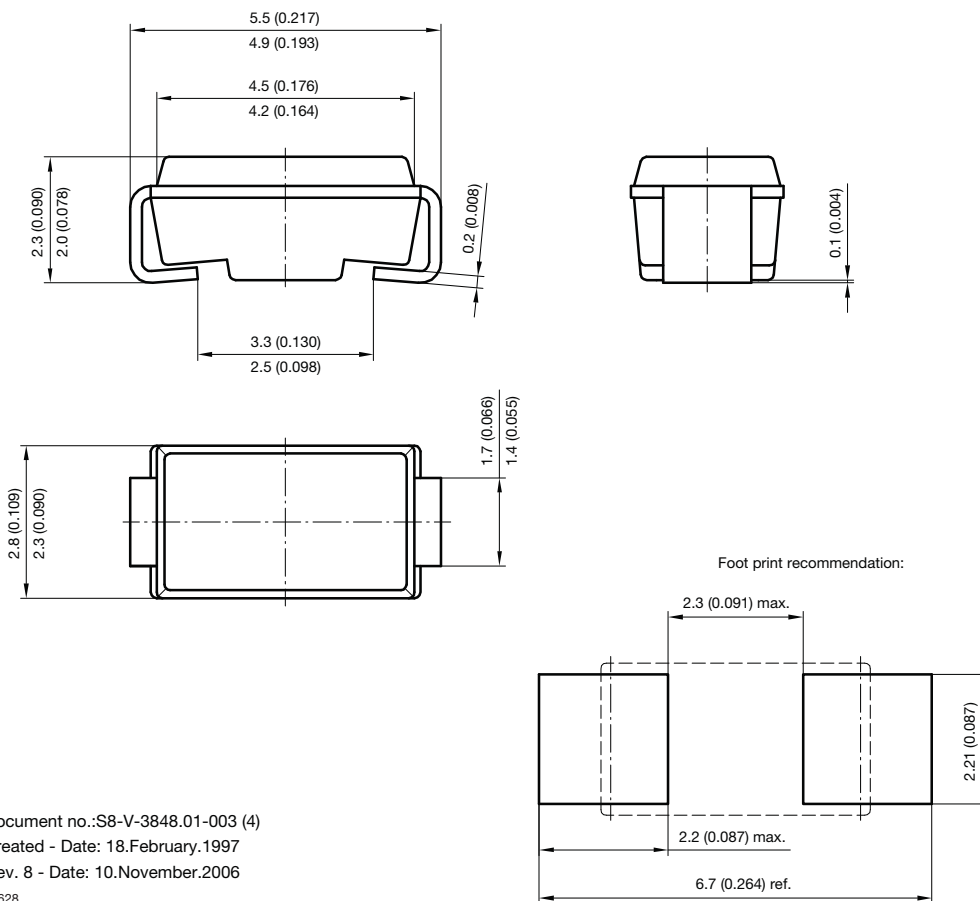


Fig. 5 - Thermal Response



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



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