

# Surface Mount Zener Diode

## BZT52C Series

• **Electrical Characteristics @ T<sub>A</sub>=25** unless otherwise specified

500mW, SOD-123

| Type Number | Marking Code | Zener Voltage Range (Note 2) |     |      |                  | Maximum Zener Impedance (Note 3) |                                  |     | Maximum Reverse Current (Note 2) |                | Temperature Coefficient of Zener Voltage @ I <sub>ZT</sub> = 5 mA mV / |      |
|-------------|--------------|------------------------------|-----|------|------------------|----------------------------------|----------------------------------|-----|----------------------------------|----------------|--|------|
|             |              | V <sub>Z</sub>               |     |      | @I <sub>ZT</sub> | Z <sub>ZT</sub> @I <sub>ZT</sub> | Z <sub>ZK</sub> @I <sub>ZK</sub> |     | I <sub>R</sub>                   | V <sub>R</sub> | Min  | Max  |
|             |              | Min                          | Nom | Max  |                  |                                  | Ω                                | Ω   |                                  |                |  |      |
| V           | V            | V                            | mA  | Ω    | Ω                | mA                               | μA                               | V   | Min                              | Max            |  |      |
| BZT52C2V4   | WX           | 2.2                          | 2.4 | 2.6  | 5                | 100                              | 600                              | 1.0 | 50                               | 1.0            | -3.5   | 0    |
| BZT52C2V7   | W1           | 2.5                          | 2.7 | 2.9  | 5                | 100                              | 600                              | 1.0 | 20                               | 1.0            | -3.5   | 0    |
| BZT52C3V0   | W2           | 2.8                          | 3.0 | 3.2  | 5                | 95                               | 600                              | 1.0 | 10                               | 1.0            | -3.5   | 0    |
| BZT52C3V3   | W3           | 3.1                          | 3.3 | 3.5  | 5                | 95                               | 600                              | 1.0 | 5                                | 1.0            | -3.5   | 0    |
| BZT52C3V6   | W4           | 3.4                          | 3.6 | 3.8  | 5                | 90                               | 600                              | 1.0 | 5                                | 1.0            | -3.5   | 0    |
| BZT52C3V9   | W5           | 3.7                          | 3.9 | 4.1  | 5                | 90                               | 600                              | 1.0 | 3                                | 1.0            | -3.5   | 0    |
| BZT52C4V3   | W6           | 4.0                          | 4.3 | 4.6  | 5                | 90                               | 600                              | 1.0 | 3                                | 1.0            | -3.5   | 0    |
| BZT52C4V7   | W7           | 4.4                          | 4.7 | 5.0  | 5                | 80                               | 500                              | 1.0 | 3                                | 2.0            | -3.5   | 0.2  |
| BZT52C5V1   | W8           | 4.8                          | 5.1 | 5.4  | 5                | 60                               | 480                              | 1.0 | 2                                | 2.0            | -2.7   | 1.2  |
| BZT52C5V6   | W9           | 5.2                          | 5.6 | 6.0  | 5                | 40                               | 400                              | 1.0 | 1                                | 2.0            | -2.0   | 2.5  |
| BZT52C6V2   | WA           | 5.8                          | 6.2 | 6.6  | 5                | 10                               | 150                              | 1.0 | 3                                | 4.0            | 0.4  | 3.7  |
| BZT52C6V8   | WB           | 6.4                          | 6.8 | 7.2  | 5                | 15                               | 80                               | 1.0 | 2                                | 4.0            | 1.2  | 4.5  |
| BZT52C7V5   | WC           | 7.0                          | 7.5 | 7.9  | 5                | 15                               | 80                               | 1.0 | 1                                | 5.0            | 2.5  | 5.3  |
| BZT52C8V2   | WD           | 7.7                          | 8.2 | 8.7  | 5                | 15                               | 80                               | 1.0 | 0.7                              | 5.0            | 3.2  | 6.2  |
| BZT52C9V1   | WE           | 8.5                          | 9.1 | 9.6  | 5                | 15                               | 100                              | 1.0 | 0.5                              | 6.0            | 3.8  | 7.0  |
| BZT52C10    | WF           | 9.4                          | 10  | 10.6 | 5                | 20                               | 150                              | 1.0 | 0.2                              | 7.0            | 4.5  | 8.0  |
| BZT52C11    | WG           | 10.4                         | 11  | 11.6 | 5                | 20                               | 150                              | 1.0 | 0.1                              | 8.0            | 5.4  | 9.0  |
| BZT52C12    | WH           | 11.4                         | 12  | 12.7 | 5                | 25                               | 150                              | 1.0 | 0.1                              | 8.0            | 6.0  | 10.0 |
| BZT52C13    | WI           | 12.4                         | 13  | 14.1 | 5                | 30                               | 170                              | 1.0 | 0.1                              | 8.0            | 7.0  | 11.0 |
| BZT52C15    | WJ           | 13.8                         | 15  | 15.6 | 5                | 30                               | 200                              | 1.0 | 0.1                              | 10.5           | 9.2  | 13.0 |
| BZT52C16    | WK           | 15.3                         | 16  | 17.1 | 5                | 40                               | 200                              | 1.0 | 0.1                              | 11.2           | 10.4   | 14.0 |
| BZT52C18    | WL           | 16.8                         | 18  | 19.1 | 5                | 45                               | 225                              | 1.0 | 0.1                              | 12.6           | 12.4   | 16.0 |
| BZT52C20    | WM           | 18.8                         | 20  | 21.2 | 5                | 55                               | 225                              | 1.0 | 0.1                              | 14.0           | 14.4   | 18.0 |
| BZT52C22    | WN           | 20.8                         | 22  | 23.3 | 5                | 55                               | 250                              | 1.0 | 0.1                              | 15.4           | 16.4   | 20.0 |
| BZT52C24    | WO           | 22.8                         | 24  | 25.6 | 5                | 70                               | 250                              | 1.0 | 0.1                              | 16.8           | 18.4   | 22.0 |
| BZT52C27    | WP           | 25.1                         | 27  | 28.9 | 2                | 80                               | 300                              | 0.5 | 0.1                              | 18.9           | 21.4   | 25.3 |
| BZT52C30    | WQ           | 28.0                         | 30  | 32.0 | 2                | 80                               | 300                              | 0.5 | 0.1                              | 21.0           | 24.4   | 29.4 |
| BZT52C33    | WR           | 31.0                         | 33  | 35.0 | 2                | 80                               | 325                              | 0.5 | 0.1                              | 23.1           | 27.4   | 33.4 |
| BZT52C36    | WS           | 34.0                         | 36  | 38.0 | 2                | 90                               | 350                              | 0.5 | 0.1                              | 25.2           | 30.4   | 37.4 |
| BZT52C39    | WT           | 37.0                         | 39  | 41.0 | 2                | 130                              | 350                              | 0.5 | 0.1                              | 27.3           | 33.4   | 41.2 |
| BZT52C43    | WU           | 40.0                         | 43  | 46.0 | 5                | 100                              | 700                              | 1.0 | 0.1                              | 32.0           | 10.0   | 12.0 |
| BZT52C47    | WV           | 44.0                         | 47  | 50.0 | 5                | 100                              | 750                              | 1.0 | 0.1                              | 35.0           | 10.0   | 12.0 |
| BZT52C51    | WW           | 48.0                         | 51  | 54.0 | 5                | 100                              | 750                              | 1.0 | 0.1                              | 38.0           | 10.0   | 12.0 |

Notes:

- Valid provided that device terminals are keep at ambient temperature
- Test with pulses. period = 5 ms, pulse width = 300 μA
- f = 1 K Hz

• **Maximum Ratings @ T<sub>A</sub>=25** unless otherwise specified

| Characteristic                                       | Symbol                            | Value      | Unit |
|--|-----------------------------------|------------|------|
| Power Dissipation (Note 1), Derate above 25          | P <sub>d</sub>                    | 500        | mW   |
| Forward Voltage (Note 2) @ I <sub>F</sub> = 10 mA    | V <sub>F</sub>                    | 0.9        | V    |
| Thermal Resistance, Junction to Ambient Air (Note 1) | R <sub>θJA</sub>                  | 305        | / W  |
| Operating and Storage Temperature Range              | T <sub>J</sub> , T <sub>STG</sub> | -65 ~ +150 |      |

Notes:

- Device mounted on ceramic PCB; 7.6mm×9.4mm×0.87mm with pad areas 25mm<sup>2</sup>.
- Short duration test pulse used in minimize self-heating effect.
- f = 1 K Hz

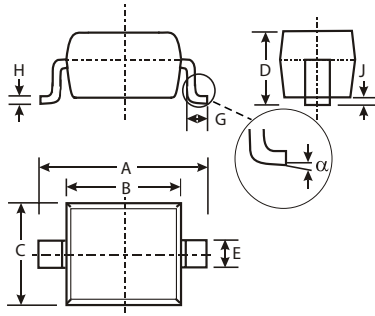
● **Features**

- . RoHS Compliant
- . Standard Zener Breakdown Voltage Range: 2.4V to 51V
- . Steady State Power Rating of 500 mW
- . Small Body Outline Dimensions: 2.70 mm x 1.60 mm
- . Low Body Height: 1.05 mm
- . Package Weight: 10.00 mg / unit
- . ESD Rating of Class 3 ( > 16 KV ) per Human Body Model

● **Mechanical Data**

- . Case: SOD-123, Void-Free, Transfer-Molded Plastic
- . Finish: All External Surfaces are Corrosion Resistant
- . Maximum Case Temperature for Soldering Purpose: 260 for 10 Seconds
- . Polarity: Cathode Indicated by Polarity Band
- . Flammability Rating: UL94V-0
- . Mounting Position: Any

● **Outline**



| SOD-123              |              |      |
|----------------------|--------------|------|
| Dim                  | Min          | Max  |
| A                    | 3.60         | 3.80 |
| B                    | 2.60         | 2.80 |
| C                    | 1.55         | 1.65 |
| D                    | 1.05 Typical |      |
| E                    | 0.50         | 0.60 |
| G                    | 0.25         | 0.45 |
| H                    | 0.10         | 0.15 |
| J                    | 0.05 Typical |      |
| α                    | 0°           | 8°   |
| All Dimensions in mm |              |      |

• Electrical Characteristic Curves @  $T_A=25$

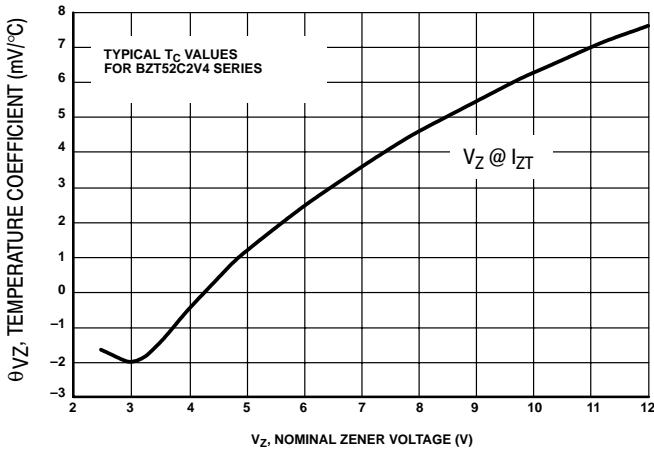


Figure 1. Temperature Coefficients (Temperature Range  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$ )

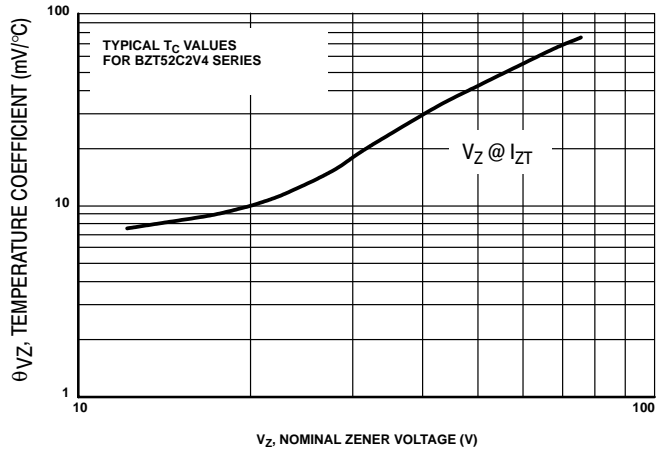


Figure 2. Temperature Coefficients (Temperature Range  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$ )

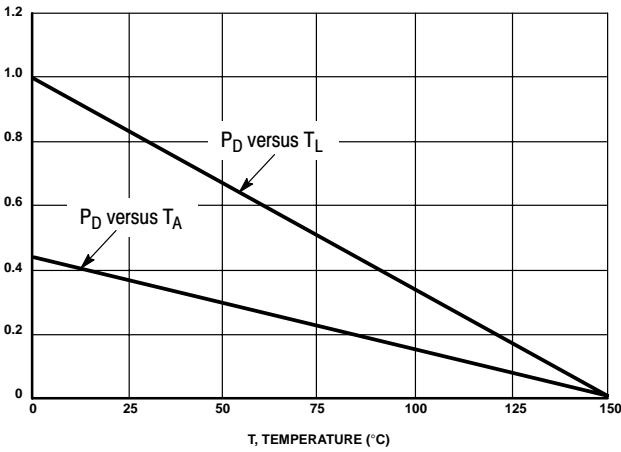


Figure 3. Steady State Power Derating

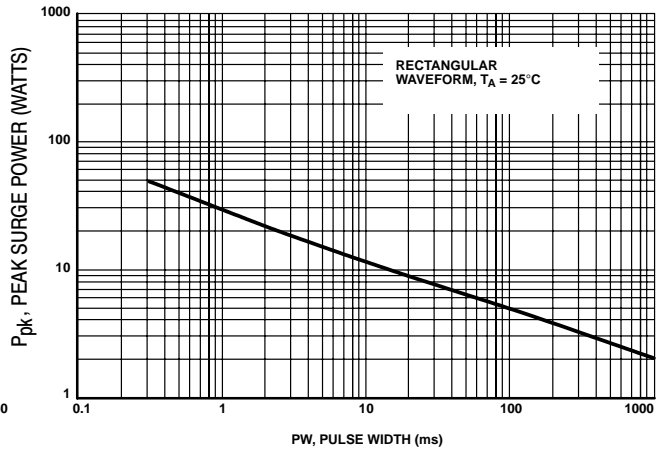


Figure 4. Maximum Nonrepetitive Surge Power

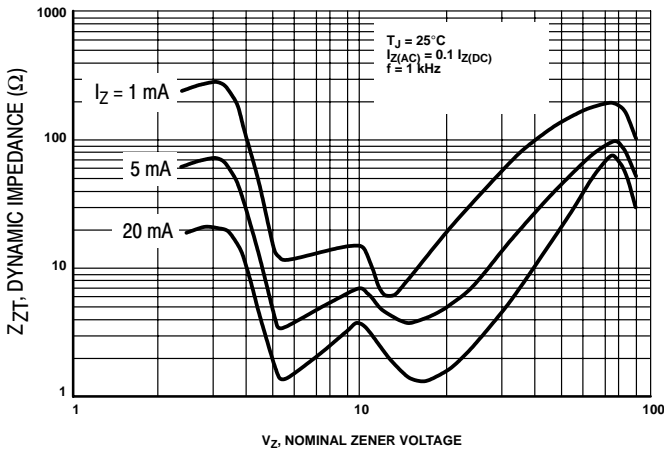


Figure 5. Effect of Zener Voltage on Zener Impedance

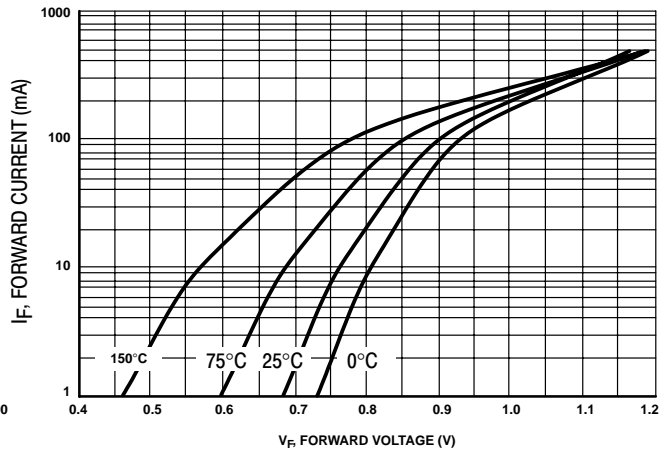


Figure 6. Typical Forward Voltage

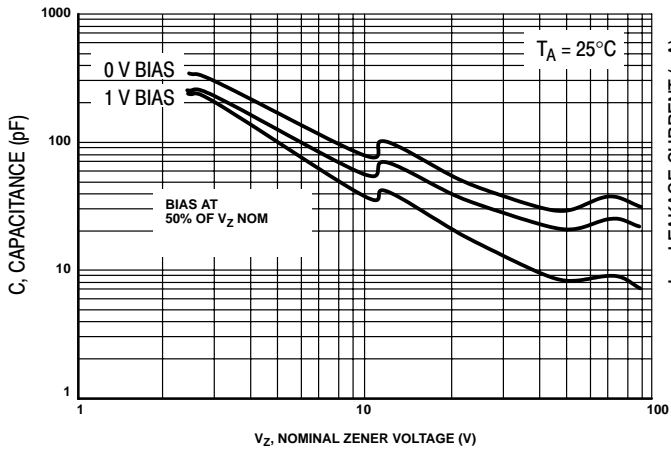


Figure 7. Typical Capacitance

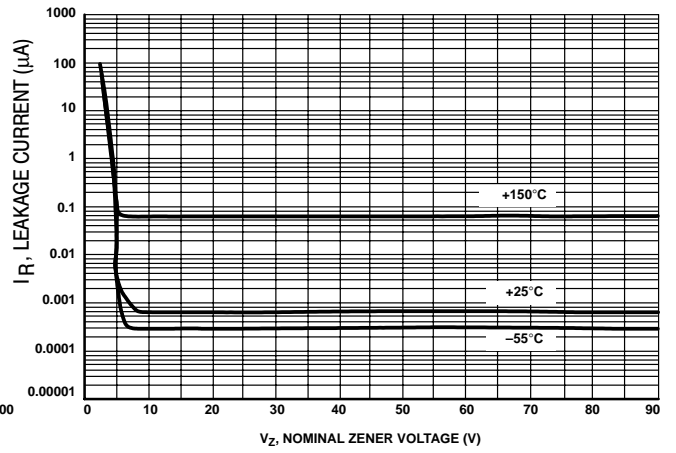


Figure 8. Typical Leakage Current

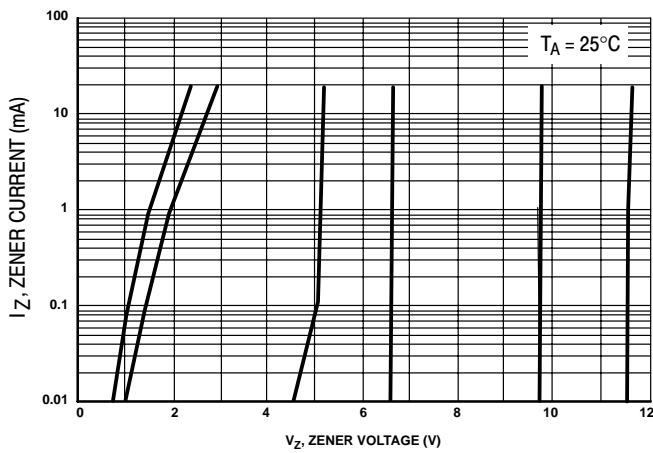


Figure 9. Zener Voltage versus Zener Current ( $V_Z$  Up to 12 V)

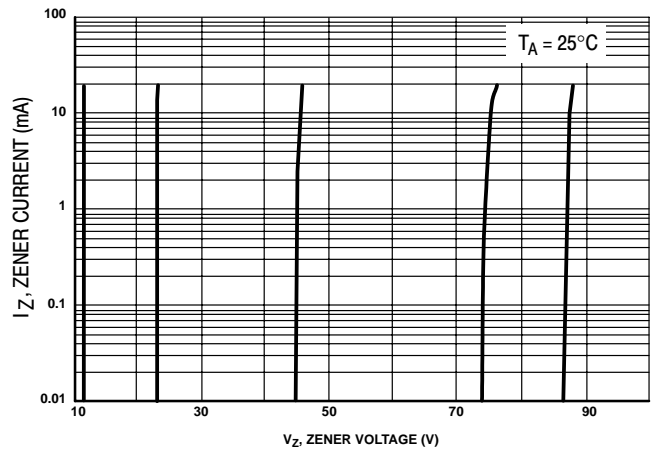


Figure 10. Zener Voltage versus Zener Current (12 V to 91 V)