

## 200mW, 2% Tolerance SMD Zener Diodes

### FEATURES

- Wide zener voltage range selection: 2.4V to 75V
- $V_Z$  tolerance selection of  $\pm 2\%$
- Moisture sensitivity level: level 1, per J-STD-020
- Compliant to RoHS directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

### APPLICATIONS

- Low voltage stabilizers or voltage references
- Adapters
- On-board DC/DC converter

| KEY PARAMETERS             |            |                    |
|----------------------------|------------|--------------------|
| PARAMETER                  | VALUE      | UNIT               |
| $V_Z$                      | 2.4-75     | V                  |
| $P_D$                      | 200        | mW                 |
| $V_F$ at $I_F=10\text{mA}$ | 1          | V                  |
| $T_J$ Max.                 | 150        | $^{\circ}\text{C}$ |
| Package                    | SOD-323F   |                    |
| Configuration              | Single die |                    |



### MECHANICAL DATA

- Case: SOD-323F
- Molding compound meets UL 94 V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Polarity: Indicated by cathode band
- Weight:  $4.02 \pm 0.5\text{mg}$  (approximately)



### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^{\circ}\text{C}$ unless otherwise noted)

| PARAMETER                           | SYMBOL    | VALUE       | UNIT               |
|-------------------------------------|-----------|-------------|--------------------|
| Forward voltage @ $I_F=10\text{mA}$ | $V_F$     | 1           | V                  |
| Power dissipation                   | $P_D$     | 200         | mW                 |
| Junction temperature range          | $T_J$     | -65 to +150 | $^{\circ}\text{C}$ |
| Storage temperature range           | $T_{STG}$ | -65 to +150 | $^{\circ}\text{C}$ |

### THERMAL PERFORMANCE

| PARAMETER                              | SYMBOL          | TYP | UNIT                 |
|--|-----------------|-----|----------------------|
| Junction-to-ambient thermal resistance | $R_{\theta JA}$ | 625 | $^{\circ}\text{C/W}$ |

**ELECTRICAL SPECIFICATIONS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| PART<br>NUMBER | MARKING<br>CODE | ZENER VOLTAGE  |       |       | TEST<br>CURRENT | REGULAR<br>IMPEDANCE |                   | TEST<br>CURRENT | LEAKAGE<br>CURRENT |      |
|----------------|-----------------|----------------|-------|-------|-----------------|----------------------|-------------------|-----------------|--------------------|------|
|                |                 | $V_Z @ I_{ZT}$ |       |       | $I_{ZT}$        | $Z_{ZT} @ I_{ZT}$    | $Z_{ZK} @ I_{ZK}$ | $I_{ZK}$        | $I_R @ V_R$        |      |
|                |                 | V              |       |       | mA              | $\Omega$             | $\Omega$          | mA              | $\mu\text{A}$      | V    |
|                |                 | Min.           | Nom.  | Max.  |                 | Max.                 | Max.              |                 | Max.               |      |
| BZT52B2V4S     | OZ              | 2.35           | 2.40  | 2.45  | 5               | 100                  | 564               | 1               | 45                 | 1    |
| BZT52B2V7S     | 1Z              | 2.65           | 2.70  | 2.75  | 5               | 100                  | 564               | 1               | 18                 | 1    |
| BZT52B3V0S     | 2Z              | 2.94           | 3.00  | 3.06  | 5               | 100                  | 564               | 1               | 9                  | 1    |
| BZT52B3V3S     | 3Z              | 3.23           | 3.30  | 3.37  | 5               | 95                   | 564               | 1               | 4.5                | 1    |
| BZT52B3V6S     | 4Z              | 3.53           | 3.60  | 3.67  | 5               | 90                   | 564               | 1               | 4.5                | 1    |
| BZT52B3V9S     | 5Z              | 3.82           | 3.90  | 3.98  | 5               | 90                   | 564               | 1               | 2.7                | 1    |
| BZT52B4V3S     | 6Z              | 4.21           | 4.30  | 4.39  | 5               | 90                   | 564               | 1               | 2.7                | 1    |
| BZT52B4V7S     | 7Z              | 4.61           | 4.70  | 4.79  | 5               | 80                   | 470               | 1               | 2.7                | 2.0  |
| BZT52B5V1S     | 8Z              | 5.00           | 5.10  | 5.20  | 5               | 60                   | 451               | 1               | 1.8                | 2.0  |
| BZT52B5V6S     | 9Z              | 5.49           | 5.60  | 5.71  | 5               | 40                   | 376               | 1               | 0.9                | 2.0  |
| BZT52B6V2S     | AZ              | 6.08           | 6.20  | 6.32  | 5               | 10                   | 141               | 1               | 2.7                | 4.0  |
| BZT52B6V8S     | BZ              | 6.66           | 6.80  | 6.94  | 5               | 15                   | 75                | 1               | 1.8                | 4.0  |
| BZT52B7V5S     | CZ              | 7.35           | 7.50  | 7.65  | 5               | 15                   | 75                | 1               | 0.9                | 5.0  |
| BZT52B8V2S     | DZ              | 8.04           | 8.20  | 8.36  | 5               | 15                   | 75                | 1               | 0.63               | 5.0  |
| BZT52B9V1S     | EZ              | 8.92           | 9.10  | 9.28  | 5               | 15                   | 94                | 1               | 0.45               | 6.0  |
| BZT52B10S      | FZ              | 9.80           | 10.00 | 10.20 | 5               | 20                   | 141               | 1               | 0.18               | 7.0  |
| BZT52B11S      | GZ              | 10.78          | 11.00 | 11.22 | 5               | 20                   | 141               | 1               | 0.09               | 8.0  |
| BZT52B12S      | HZ              | 11.76          | 12.00 | 12.24 | 5               | 25                   | 141               | 1               | 0.09               | 8.0  |
| BZT52B13S      | JZ              | 12.74          | 13.00 | 13.26 | 5               | 30                   | 160               | 1               | 0.09               | 8.0  |
| BZT52B15S      | KZ              | 14.70          | 15.00 | 15.30 | 5               | 30                   | 188               | 1               | 0.045              | 10.5 |
| BZT52B16S      | LZ              | 15.68          | 16.00 | 16.32 | 5               | 40                   | 188               | 1               | 0.045              | 11.2 |
| BZT52B18S      | MZ              | 17.64          | 18.00 | 18.36 | 5               | 45                   | 212               | 1               | 0.045              | 12.6 |
| BZT52B20S      | NZ              | 19.60          | 20.00 | 20.40 | 5               | 55                   | 212               | 1               | 0.045              | 14.0 |
| BZT52B22S      | PZ              | 21.56          | 22.00 | 22.44 | 5               | 55                   | 235               | 1               | 0.045              | 15.4 |
| BZT52B24S      | RZ              | 23.52          | 24.00 | 24.48 | 5               | 70                   | 235               | 1               | 0.045              | 16.8 |
| BZT52B27S      | SZ              | 26.46          | 27.00 | 27.54 | 2               | 80                   | 282               | 0.5             | 0.045              | 18.9 |
| BZT52B30S      | TZ              | 29.40          | 30.00 | 30.60 | 2               | 80                   | 282               | 0.5             | 0.045              | 21.0 |
| BZT52B33S      | UZ              | 32.34          | 33.00 | 33.66 | 2               | 80                   | 306               | 0.5             | 0.045              | 23.0 |
| BZT52B36S      | VZ              | 35.28          | 36.00 | 36.72 | 2               | 90                   | 329               | 0.5             | 0.045              | 25.2 |
| BZT52B39S      | WZ              | 38.22          | 39.00 | 39.78 | 2               | 130                  | 329               | 0.5             | 0.045              | 27.3 |
| BZT52B43S      | XZ              | 42.14          | 43.00 | 43.86 | 2               | 150                  | 353               | 0.5             | 0.045              | 30.1 |
| BZT52B47S      | YZ              | 46.06          | 47.00 | 47.94 | 2               | 170                  | 353               | 0.5             | 0.045              | 33.0 |
| BZT52B51S      | -Z              | 49.98          | 51.00 | 52.02 | 2               | 180                  | 376               | 0.5             | 0.045              | 35.7 |
| BZT52B56S      | =Z              | 54.88          | 56.00 | 57.12 | 2               | 200                  | 400               | 0.5             | 0.045              | 39.2 |
| BZT52B62S      | ≡Z              | 60.76          | 62.00 | 63.24 | 2               | 215                  | 423               | 0.5             | 0.045              | 43.4 |
| BZT52B68S      | >Z              | 66.64          | 68.00 | 69.36 | 2               | 240                  | 447               | 0.5             | 0.045              | 47.6 |
| BZT52B75S      | <Z              | 73.50          | 75.00 | 76.50 | 2               | 255                  | 470               | 0.5             | 0.045              | 52.5 |

**Notes:**

1. The zener voltage ( $V_Z$ ) is tested under pulse condition of 30ms.
2. The device numbers listed have a standard tolerance on the normal zener voltage of  $\pm 2\%$ .
3. For detailed information on price, availability and delivery of normal zener voltages between the voltages shown and tighter voltage tolerances, contact your nearest Taiwan Semiconductor representative.
4. The Zener impedance is derived from the 60-cycle ac voltage, which results when an ac current having an RMS value equal to 10% of the DC zener current ( $I_{ZT}$  or  $I_{ZK}$ ) is superimposed to  $I_{ZT}$  or  $I_{ZK}$ .

| <b>ORDERING INFORMATION</b> |                |                |
|-----------------------------|----------------|----------------|
| <b>PART NO.</b><br>(Note 1) | <b>PACKAGE</b> | <b>PACKING</b> |
| BZT52BxxxS RRG              | SOD-323F       | 3K / 7" Reel   |
| BZT52BxxxS RR               | SOD-323F       | 3K / 7" Reel   |
| BZT52BxxxS R9G              | SOD-323F       | 10K / 13" Reel |
| BZT52BxxxS R9               | SOD-323F       | 10K / 13" Reel |

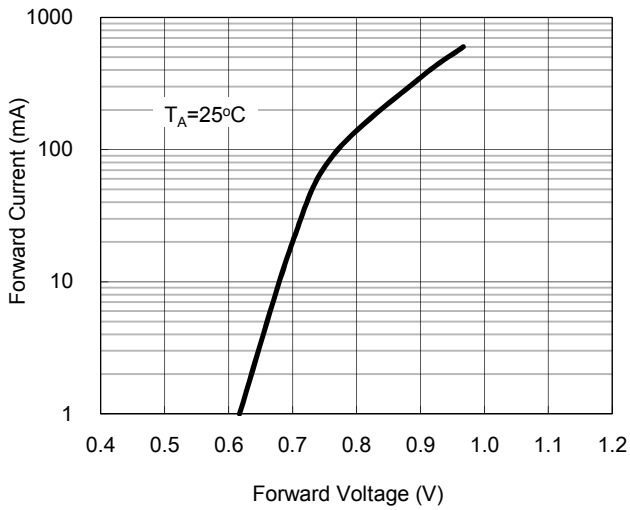
**Note:**

1. "xxx" defines voltage from 2.4V (BZT52B2V4S) to 75V (BZT52B75S)

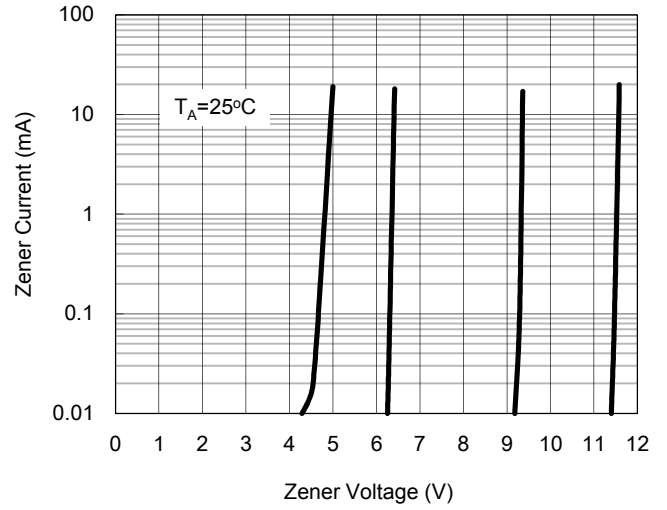
**CHARACTERISTICS CURVES**

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

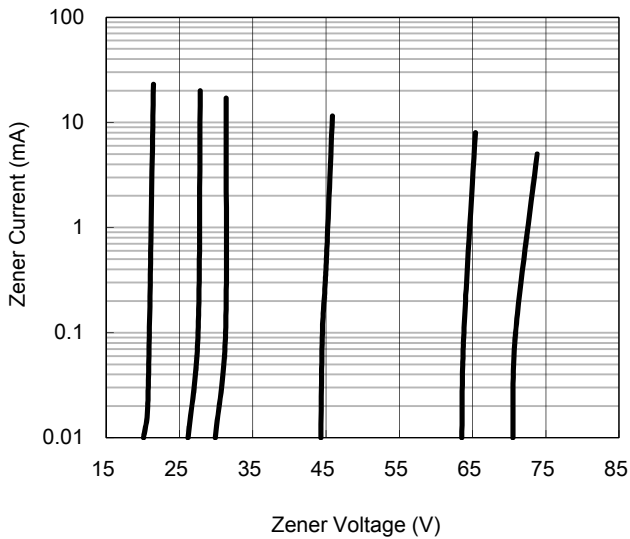
**Fig.1 Typical Forward Characteristics**



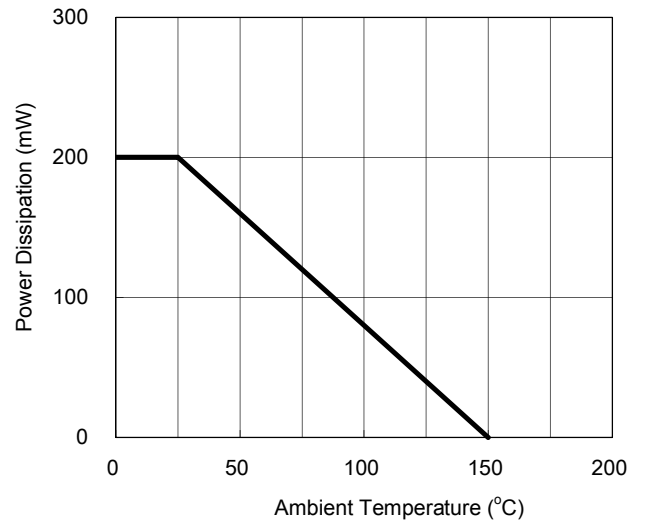
**Fig. 2 Zener Breakdown Characteristics**



**Fig. 3 Zener Breakdown Characteristics**



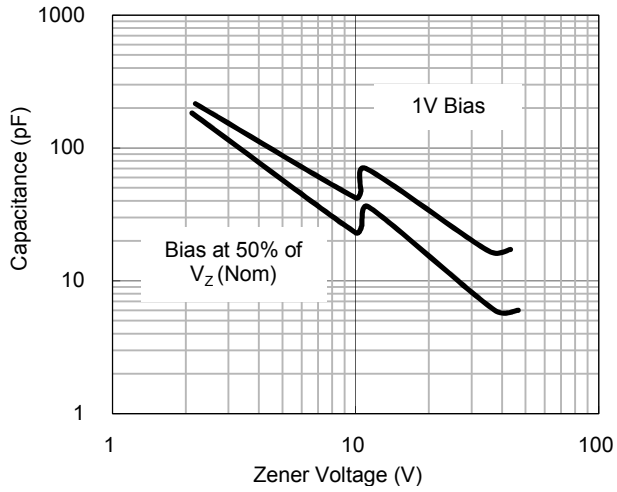
**Fig.4 Power Dissipation Curve**



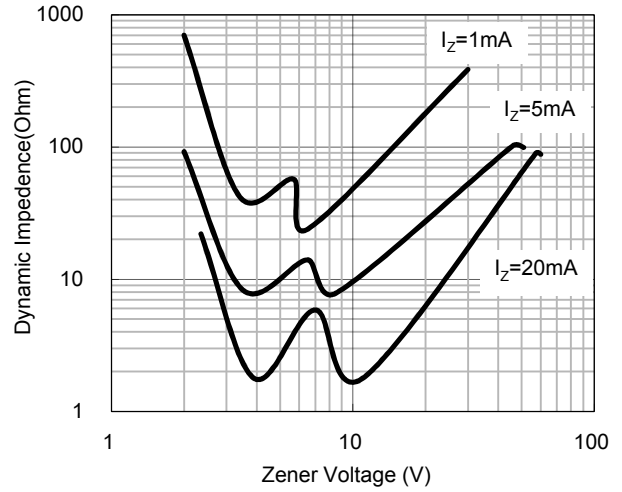
**CHARACTERISTICS CURVES**

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

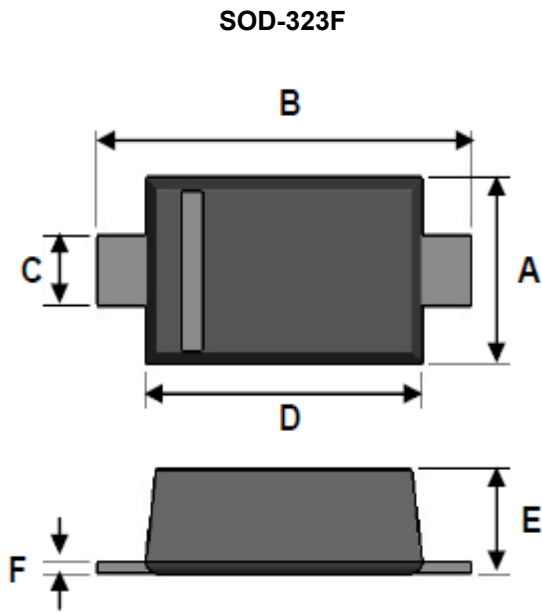
**Fig.5 Typical Capacitance**



**Fig.6 Effect of Zener Voltage on Impedance**

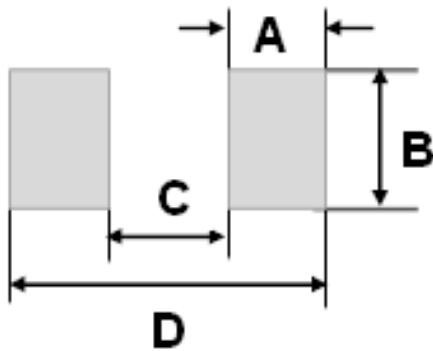


**PACKAGE OUTLINE DIMENSION**



| DIM. | Unit (mm) |      | Unit (inch) |       |
|------|-----------|------|-------------|-------|
|      | Min       | Max  | Min         | Max   |
| A    | 1.15      | 1.35 | 0.045       | 0.053 |
| B    | 2.30      | 2.80 | 0.091       | 0.110 |
| C    | 0.25      | 0.40 | 0.010       | 0.016 |
| D    | 1.60      | 1.80 | 0.063       | 0.071 |
| E    | 0.80      | 1.10 | 0.031       | 0.043 |
| F    | 0.05      | 0.25 | 0.002       | 0.010 |

**SUGGEST PAD LAYOUT**



| DIM. | Unit (mm) | Unit (inch) |
|------|-----------|-------------|
|      | Typ.      | Typ.        |
| A    | 0.63      | 0.025       |
| B    | 0.83      | 0.033       |
| C    | 1.60      | 0.063       |
| D    | 2.86      | 0.113       |

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