## 500mW, 5\% Tolerance SMD Zener Diodes

## FEATURES

- Wide zener voltage range selection: 2.4 V to 75 V
- $V_{z}$ tolerance selection of $\pm 5 \%$
- Surface mounting device (SMD) type
- 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

| KEY PARAMETERS |  |  |
| :---: | :---: | :---: |
| PARAMETER | VALUE | UNIT |
| $\mathrm{V}_{\mathrm{Z}}$ | $2.4-75$ | V |
| ${\text { Test current } \mathrm{I}_{\mathrm{ZT}}}^{5}$ | 5 | mA |
| $\mathrm{P}_{\mathrm{D}}$ | 500 | mW |
| $\mathrm{~V}_{\mathrm{F}}$ at $\mathrm{I}_{\mathrm{F}}=10 \mathrm{~mA}$ | 1 | V |
| $\mathrm{~T}_{\mathrm{J}}$ Max. | 150 | ${ }^{\circ} \mathrm{C}$ |
| Package | SOD-123F |  |
| Configuration | Single die |  |

## APPLICATIONS

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


## MECHANICAL DATA

- Case: SOD-123F
- 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: $8.85 \pm 0.5 \mathrm{mg}$ (approximately)


ABSOLUTE MAXIMUM RATINGS $\left(\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}\right.$ unless otherwise noted)

| PARAMETER | SYMBOL | VALUE | UNIT |
| :--- | :---: | :---: | :---: |
| Forward voltage @ $\mathrm{I}_{\mathrm{F}}=10 \mathrm{~mA}$ | $\mathrm{~V}_{\mathrm{F}}$ | 1 | V |
| Power dissipation | $\mathrm{P}_{\mathrm{D}}$ | 500 | mW |
| Junction temperature range | $\mathrm{T}_{J}$ | -65 to +150 | ${ }^{\circ} \mathrm{C}$ |
| Storage temperature range | $\mathrm{T}_{\text {STG }}$ | -65 to +150 | ${ }^{\circ} \mathrm{C}$ |

THERMAL PERFORMANCE

| PARAMETER | SYMBOL | TYP | UNIT |
| :--- | :---: | :---: | :---: |
| Junction-to-ambient thermal resistance | $R_{\ominus J A}$ | 350 | ${ }^{\circ} \mathrm{C} / \mathrm{W}$ |

TAIWAN
SEMICONDUCTOR

ELECTRICAL SPECIFICATIONS ( $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$ unless otherwise noted)

| PART NUMBER | MARKING CODE | ZENER VOLTAGE |  |  | TEST CURRENT | REGULAR IMPEDANCE |  | TESTCURRENT $\|$$\mathrm{I}_{\mathrm{ZK}}$ <br> mA | LEAKAGE CURRENT <br> $I_{R} @ V_{R}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | $\mathrm{V}_{\mathrm{z}}$ @ $\mathrm{I}_{\mathrm{zT}}$ |  |  | $\mathrm{I}_{\mathrm{ZT}}$ | $\mathrm{Z}_{\mathrm{ZT}} @ \mathrm{I}_{\mathrm{ZT}}$ | $\mathrm{Z}_{\mathrm{zk}} @ \mathrm{I}_{\mathrm{zk}}$ |  |  |  |
|  |  | V |  |  | mA | $\Omega$ | $\Omega$ |  | $\mu \mathrm{A}$ | V |
|  |  | Min. | Nom. | Max. |  | Max. | Max. |  | Max. |  |
| BZT52C2V4 | 2V4Z | 2.28 | 2.40 | 2.52 | 5 | 100 | 564 | 1 | 45 | 1.0 |
| BZT52C2V7 | 2V7Z | 2.57 | 2.70 | 2.84 | 5 | 100 | 564 | 1 | 18 | 1.0 |
| BZT52C3V0 | 3 VOZ | 2.85 | 3.00 | 3.15 | 5 | 100 | 564 | 1 | 9 | 1.0 |
| BZT52C3V3 | 3V3Z | 3.14 | 3.30 | 3.47 | 5 | 95 | 564 | 1 | 4.5 | 1.0 |
| BZT52C3V6 | 3V6Z | 3.42 | 3.60 | 3.78 | 5 | 90 | 564 | 1 | 4.5 | 1.0 |
| BZT52C3V9 | 3V9Z | 3.71 | 3.90 | 4.10 | 5 | 90 | 564 | 1 | 2.7 | 1.0 |
| BZT52C4V3 | 4V3Z | 4.09 | 4.30 | 4.52 | 5 | 90 | 564 | 1 | 2.7 | 1.0 |
| BZT52C4V7 | 4V7Z | 4.47 | 4.70 | 4.94 | 5 | 80 | 470 | 1 | 2.7 | 2.0 |
| BZT52C5V1 | 5V1Z | 4.85 | 5.10 | 5.36 | 5 | 60 | 451 | 1 | 1.8 | 2.0 |
| BZT52C5V6 | 5V6Z | 5.32 | 5.60 | 5.88 | 5 | 40 | 376 | 1 | 0.9 | 2.0 |
| BZT52C6V2 | 6V2Z | 5.89 | 6.20 | 6.51 | 5 | 10 | 141 | 1 | 2.7 | 4.0 |
| BZT52C6V8 | 6V8Z | 6.46 | 6.80 | 7.14 | 5 | 15 | 75 | 1 | 1.8 | 4.0 |
| BZT52C7V5 | 7V5Z | 7.11 | 7.50 | 7.86 | 5 | 15 | 75 | 1 | 0.9 | 5.0 |
| BZT52C8V2 | 8V2Z | 7.79 | 8.20 | 8.61 | 5 | 15 | 75 | 1 | 0.63 | 5.0 |
| BZT52C9V1 | 9V1Z | 8.65 | 9.10 | 9.56 | 5 | 15 | 94 | 1 | 0.45 | 6.0 |
| BZT52C10 | 10VZ | 9.50 | 10.00 | 10.50 | 5 | 20 | 141 | 1 | 0.18 | 7.0 |
| BZT52C11 | 11 VZ | 10.45 | 11.00 | 11.55 | 5 | 20 | 141 | 1 | 0.09 | 8.0 |
| BZT52C12 | 12VZ | 11.40 | 12.00 | 12.60 | 5 | 25 | 141 | 1 | 0.09 | 8.0 |
| BZT52C13 | 13VZ | 12.35 | 13.00 | 13.65 | 5 | 30 | 160 | 1 | 0.09 | 8.0 |
| BZT52C15 | 15VZ | 14.25 | 15.00 | 15.75 | 5 | 30 | 188 | 1 | 0.045 | 10.5 |
| BZT52C16 | 16VZ | 15.20 | 16.00 | 16.80 | 5 | 40 | 188 | 1 | 0.045 | 11.2 |
| BZT52C18 | 18VZ | 17.10 | 18.00 | 18.90 | 5 | 45 | 212 | 1 | 0.045 | 12.6 |
| BZT52C20 | 20VZ | 19.00 | 20.00 | 21.00 | 5 | 55 | 212 | 1 | 0.045 | 14.0 |
| BZT52C22 | 22VZ | 20.90 | 22.00 | 23.10 | 5 | 55 | 235 | 1 | 0.045 | 15.4 |
| BZT52C24 | 24VZ | 22.80 | 24.00 | 25.20 | 5 | 70 | 235 | 1 | 0.045 | 16.8 |
| BZT52C27 | 27VZ | 25.65 | 27.00 | 28.35 | 2 | 80 | 282 | 0.5 | 0.045 | 18.9 |
| BZT52C30 | 30VZ | 28.50 | 30.00 | 31.50 | 2 | 80 | 282 | 0.5 | 0.045 | 21.0 |
| BZT52C33 | 33 VZ | 31.35 | 33.00 | 34.65 | 2 | 80 | 306 | 0.5 | 0.045 | 23.0 |
| BZT52C36 | 36 VZ | 34.20 | 36.00 | 37.80 | 2 | 90 | 329 | 0.5 | 0.045 | 25.2 |
| BZT52C39 | 39 VZ | 37.05 | 39.00 | 40.95 | 2 | 130 | 329 | 0.5 | 0.045 | 27.3 |
| BZT52C43 | 43VZ | 40.85 | 43.00 | 45.15 | 2 | 150 | 353 | 0.5 | 0.045 | 30.1 |
| BZT52C47 | 47VZ | 44.65 | 47.00 | 49.35 | 2 | 170 | 353 | 0.5 | 0.045 | 33.0 |
| BZT52C51 | 51VZ | 48.45 | 51.00 | 53.55 | 2 | 180 | 376 | 0.5 | 0.045 | 35.7 |
| BZT52C56 | 56VZ | 53.20 | 56.00 | 58.80 | 2 | 200 | 400 | 0.5 | 0.045 | 39.2 |
| BZT52C62 | 62 VZ | 58.90 | 62.00 | 65.10 | 2 | 215 | 423 | 0.5 | 0.045 | 43.4 |
| BZT52C68 | 68 VZ | 64.60 | 68.00 | 71.40 | 2 | 240 | 447 | 0.5 | 0.045 | 47.6 |
| BZT52C75 | 75VZ | 71.25 | 75.00 | 78.75 | 2 | 255 | 470 | 0.5 | 0.045 | 52.5 |

## Notes:

1. The zener voltage $\left(V_{z}\right)$ is tested under pulse condition of 30 ms .
2. The device numbers listed have a standard tolerance on the normal zener voltage of $\pm 5 \%$.
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 a rms value equal to $10 \%$ of the DC zener current $\left(I_{Z T}\right.$ or $\left.I_{Z K}\right)$ is superimposed to $I_{Z T}$ or $I_{Z K}$.

| ORDERING INFORMATION |  |  |
| :---: | :---: | :---: |
| PART NO. <br> (Note 1) | PACKAGE | PACKING |
| BZT52Cxxx RHG | SOD-123F | $3 \mathrm{~K} / 7^{\prime \prime}$ Reel |
| BZT52Cxxx RH | SOD-123F | $3 \mathrm{~K} / 7^{\prime \prime}$ Reel |

## Note:

1. "xxx" defines voltage from 2.4 V (BZT52C2V4) to 75 V (BZT52C75)

## CHARACTERISTICS CURVES

( $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$ unless otherwise noted)

Fig. 1 Typical Forward Characteristics


Fig. 3 Zener Breakdown Characteristics


Fig. 2 Zener Breakdown Characteristics


Fig. 4 Power Dissipation Curve


## CHARACTERISTICS CURVES

( $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$ unless otherwise noted)

Fig. 5 Typical Capacitance


Fig. 6 Effect of Zener Voltage on Impedence


## PACKAGE OUTLINE DIMENSION

SOD-123F


| DIM. | Unit (mm) |  | Unit (inch) |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Min | Max | Min | Max |
| A | 1.50 | 1.70 | 0.059 | 0.067 |
| B | 3.30 | 3.90 | 0.130 | 0.154 |
| C | 0.50 | 0.70 | 0.020 | 0.028 |
| D | 2.50 | 2.70 | 0.098 | 0.106 |
| E | 0.80 | 1.15 | 0.031 | 0.045 |
| F | 0.05 | 0.20 | 0.002 | 0.008 |

## SUGGEST PAD LAYOUT



| DIM. | Unit (mm) | Unit (inch) |
| :---: | :---: | :---: |
|  | Min | Min |
| C | 2.86 | 0.113 |
| G | 1.52 | 0.060 |
| X | 1.34 | 0.053 |
| X1 | 4.20 | 0.165 |
| Y | 1.80 | 0.071 |

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