

Small Signal Product

## SMD Zener Diode

### FEATURES

- Wide zener voltage range selection: 2.0V to 39V
- Designed for mounting on small surface
- Extremely thin / leadless package
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21


**0603**

### MECHANICAL DATA

- Case: 0603
- Terminal: Gold plated, solderable per MIL-STD-750, method 2026
- Polarity: Indicated by cathode band
- Weight: 3 mg (approximately)

| <b>MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS</b> ( $T_A=25^\circ\text{C}$ unless otherwise noted) |                |              |                  |
|--|----------------|--------------|------------------|
| <b>PARAMETER</b>   | <b>SYMBOL</b>  | <b>VALUE</b> | <b>UNIT</b>      |
| Power Dissipation  | $P_D$          | 150          | mW               |
| Forward Voltage @ $I_F = 10\text{mA}$  | $V_F$          | 0.9          | V                |
| Forward Current, Surge Peak 8.3 ms Single Half Sine-Wave Superimposed on Rate Load                     | $I_{FSM}$      | 2            | A                |
| Junction and Storage Temperature Range   | $T_J, T_{STG}$ | -55 to +125  | $^\circ\text{C}$ |

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

| Device     | Device Marking Code | Zener Voltage |       |            | Operating Resistance |            | Rising Operating Resistance |            | Reverse Current |           |
|------------|---------------------|---------------|-------|------------|----------------------|------------|-----------------------------|------------|-----------------|-----------|
|            |                     | $V_Z$ (Volt)  |       | $I_Z$ (mA) | $Z_{ZT}$ (Ohm)       |            | $Z_{ZK}$ (Ohm)              |            | $I_R$ (uA)      |           |
|            |                     | Min           | Max   |            | Max                  | $I_Z$ (mA) | Max                         | $I_Z$ (mA) | Max             | $V_R$ (V) |
| TSZU52C2V0 | Z0                  | 1.90          | 2.10  | 5          | 100                  | 5          | 600                         | 1          | 100             | 1.0       |
| TSZU52C2V2 | Z1                  | 2.09          | 2.31  | 5          | 100                  | 5          | 600                         | 1          | 100             | 1.0       |
| TSZU52C2V4 | Z2                  | 2.28          | 2.52  | 5          | 85                   | 5          | 600                         | 1          | 100             | 1.0       |
| TSZU52C2V7 | Z3                  | 2.57          | 2.84  | 5          | 83                   | 5          | 500                         | 1          | 75              | 1.0       |
| TSZU52C3V0 | Z4                  | 2.85          | 3.15  | 5          | 95                   | 5          | 500                         | 1          | 50              | 1.0       |
| TSZU52C3V3 | Z5                  | 3.14          | 3.47  | 5          | 95                   | 5          | 500                         | 1          | 25              | 1.0       |
| TSZU52C3V6 | Z6                  | 3.42          | 3.78  | 5          | 95                   | 5          | 500                         | 1          | 15              | 1.0       |
| TSZU52C3V9 | Z7                  | 3.71          | 4.10  | 5          | 95                   | 5          | 500                         | 1          | 10              | 1.0       |
| TSZU52C4V3 | Z8                  | 4.09          | 4.52  | 5          | 95                   | 5          | 500                         | 1          | 5.0             | 1.0       |
| TSZU52C4V7 | Z9                  | 4.47          | 4.94  | 5          | 78                   | 5          | 500                         | 1          | 5.0             | 2.0       |
| TSZU52C5V1 | ZA                  | 4.85          | 5.36  | 5          | 60                   | 5          | 480                         | 1          | 0.1             | 0.8       |
| TSZU52C5V6 | ZB                  | 5.32          | 5.88  | 5          | 40                   | 5          | 400                         | 1          | 0.1             | 1.0       |
| TSZU52C6V2 | ZC                  | 5.89          | 6.51  | 5          | 10                   | 5          | 200                         | 1          | 0.1             | 2.0       |
| TSZU52C6V8 | ZE                  | 6.46          | 7.14  | 5          | 8                    | 5          | 150                         | 1          | 0.1             | 3.0       |
| TSZU52C7V5 | ZF                  | 7.13          | 7.88  | 5          | 7                    | 5          | 50                          | 1          | 0.1             | 5.0       |
| TSZU52C8V2 | ZG                  | 7.79          | 8.61  | 5          | 7                    | 5          | 50                          | 1          | 0.1             | 6.0       |
| TSZU52C9V1 | ZH                  | 8.65          | 9.56  | 5          | 10                   | 5          | 50                          | 1          | 0.1             | 7.0       |
| TSZU52C10  | ZJ                  | 9.50          | 10.50 | 5          | 15                   | 5          | 70                          | 1          | 0.1             | 7.5       |
| TSZU52C11  | ZK                  | 10.45         | 11.55 | 5          | 20                   | 5          | 70                          | 1          | 0.1             | 8.5       |
| TSZU52C12  | ZM                  | 11.40         | 12.60 | 5          | 20                   | 5          | 90                          | 1          | 0.1             | 9.0       |
| TSZU52C13  | ZN                  | 12.35         | 13.65 | 5          | 25                   | 5          | 110                         | 1          | 0.1             | 10        |
| TSZU52C15  | ZP                  | 14.25         | 15.75 | 5          | 30                   | 5          | 110                         | 1          | 0.1             | 11        |
| TSZU52C16  | ZQ                  | 15.20         | 16.80 | 5          | 40                   | 5          | 170                         | 1          | 0.1             | 12        |
| TSZU52C18  | ZR                  | 17.10         | 18.90 | 5          | 50                   | 5          | 170                         | 1          | 0.1             | 14        |
| TSZU52C20  | ZS                  | 19.00         | 21.00 | 5          | 50                   | 5          | 220                         | 1          | 0.1             | 15        |
| TSZU52C22  | ZT                  | 20.90         | 23.10 | 5          | 55                   | 5          | 220                         | 1          | 0.1             | 17        |
| TSZU52C24  | ZU                  | 22.80         | 25.20 | 5          | 80                   | 5          | 220                         | 1          | 0.1             | 18        |
| TSZU52C27  | ZV                  | 25.65         | 28.35 | 5          | 80                   | 5          | 250                         | 1          | 0.1             | 20        |
| TSZU52C30  | ZW                  | 28.50         | 31.50 | 5          | 80                   | 5          | 250                         | 1          | 0.1             | 23        |
| TSZU52C33  | ZX                  | 31.35         | 34.65 | 5          | 80                   | 5          | 250                         | 1          | 0.1             | 25        |
| TSZU52C36  | ZY                  | 34.20         | 37.80 | 5          | 90                   | 5          | 250                         | 1          | 0.1             | 27        |
| TSZU52C39  | ZZ                  | 37.05         | 40.95 | 5          | 90                   | 5          | 300                         | 1          | 0.1             | 29        |

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**RATINGS AND CHARACTERISTICS CURVES**

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

Fig. 1 Temperature Coefficients

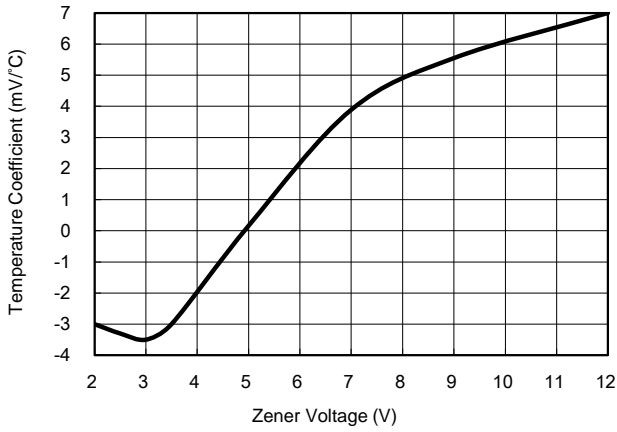


Fig. 2 Temperature Coefficients

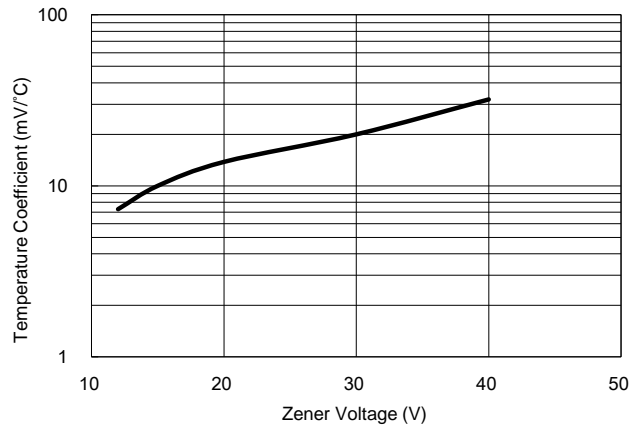


Fig. 3 Effect of Zener Voltage on Zener Impedance



Fig. 4 Typical Forward Voltage

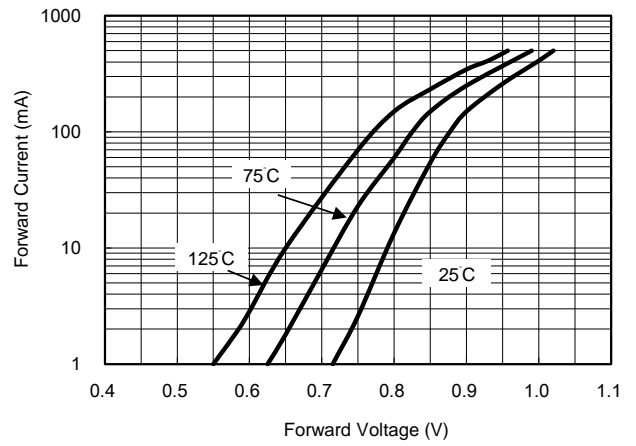
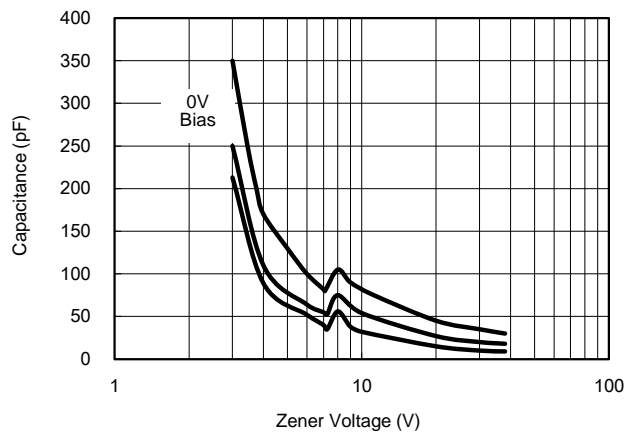


Fig. 5 Typical Leakage Current



Fig. 6 Typical Capacitance



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Fig. 7 Zener Voltage VS. Zener Current



Fig. 8 Zener Voltage vs. Zener Current

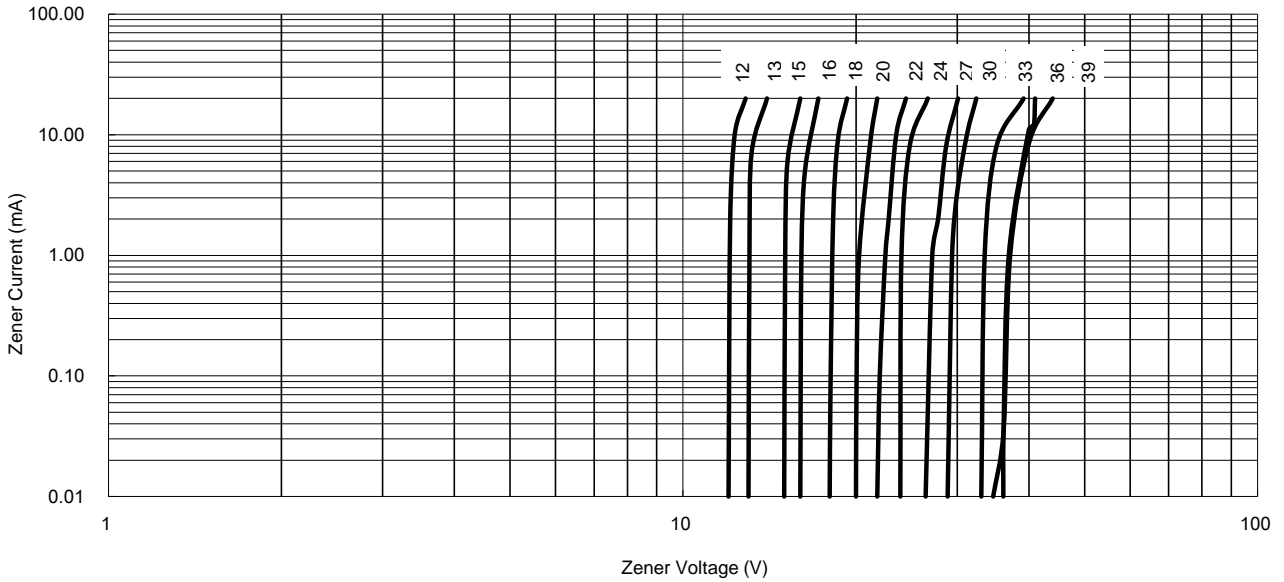
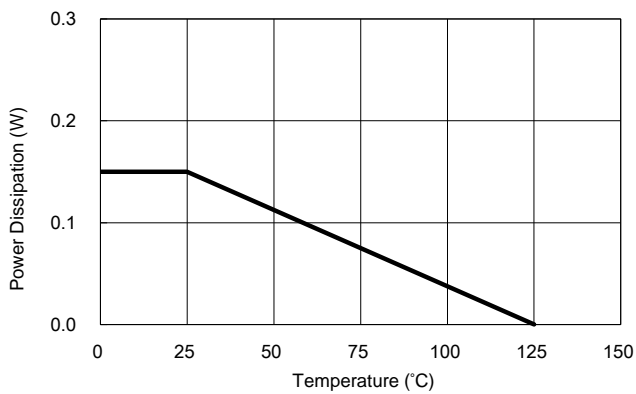


Fig. 9 Steady State Power Derating



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**ORDERING INFORMATION**

| PART NO.                 | PACKING CODE | PACKING CODE SUFFIX | PACKAGE | PACKING      |
|--------------------------|--------------|---------------------|---------|--------------|
| TSZU52Cxxx<br>(Note1, 2) | RG           | G                   | 0603    | 4K / 7" Reel |

Note 1: "xxx" defines voltage from 2.0V (TSZU52C2V0) to 39V (TSZU52C39)

Note 2: Whole series with green compound

**EXAMPLE**

| EXAMPLE P/N   | PART NO.  | PACKING CODE | PACKING CODE SUFFIX | DESCRIPTION    |
|---------------|-----------|--------------|---------------------|----------------|
| TSZU52C39 RGG | TSZU52C39 | RG           | G                   | Green compound |

**PACKAGE OUTLINE DIMENSION**
**0603**


| DIM. | Unit (mm) |      |      | Unit (inch) |       |       |
|------|-----------|------|------|-------------|-------|-------|
|      | Min       | Typ. | Max  | Min         | Typ.  | Max   |
| L    | 1.60      | -    | 1.80 | 0.063       | -     | 0.071 |
| W    | 0.80      | -    | 1.00 | 0.031       | -     | 0.039 |
| T    | 0.70      | -    | 0.85 | 0.028       | -     | 0.033 |
| C    | -         | 0.45 | -    | -           | 0.018 | -     |
| D    | -         | 0.70 | -    | -           | 0.028 | -     |

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