

150mW, 2V - 39V Zener Diode

FEATURES

- Wide zener voltage range selection: 2.0V to 39V
- Designed for mounting on small surface
- Extremely thin / leadless package
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

APPLICATIONS

- General regulation functions

MECHANICAL DATA

- Case: 0603
- Terminal: Gold plated, solderable per MIL-STD-750, method 2026
- Polarity: Indicated by cathode band
- Weight: 3.00mg (approximately)

| KEY PARAMETERS | | |
|----------------|------------|------|
| PARAMETER | VALUE | UNIT |
| P_D | 150 | mW |
| V_Z | 2.0 - 39 | V |
| $T_{J\ MAX}$ | 125 | °C |
| Package | 0603 | |
| Configuration | Single die | |


0603


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

| PARAMETER | SYMBOL | VALUE | UNIT |
|---|-----------|-------------|------|
| Power dissipation | P_D | 150 | mW |
| Forward Voltage @ $I_F = 10\text{mA}$ | V_F | 0.9 | V |
| Surge peak forward current, 8.3ms single half sine-wave superimposed on rated | I_{FSM} | 2 | A |
| Junction temperature range | T_J | -55 to +125 | °C |
| Storage temperature range | T_{STG} | -55 to +125 | °C |

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

| PART NUMBER | MARKING CODE | ZENER VOLTAGE | | TEST CURRENT | Operating Resistance | | Rising Operating Resistance | | LEAKAGE CURRENT | |
|-------------|--------------|---------------|-------|--------------|----------------------|----------|-----------------------------|----------|-----------------|-------|
| | | $V_Z @ I_Z$ | | I_Z | $Z_{ZT} @ I_{ZT}$ | I_{ZT} | $Z_{ZT} @ I_{ZK}$ | I_{ZK} | $I_R @ V_R$ | V_R |
| | | Min | Max | mA | Ω | mA | Ω | mA | μA | 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 |

ORDERING INFORMATION

| ORDERING CODE ⁽¹⁾ | PACKAGE | PACKING |
|------------------------------|---------|--------------|
| TSZU52Cx RGG | 0603 | 4K / 7" Reel |

Notes:

- "x" defines voltage from 2.0V(TSZU52C2V0) to 39V(TSZU52C39)

CHARACTERISTICS CURVES

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

Fig.1 Temperature Coefficients

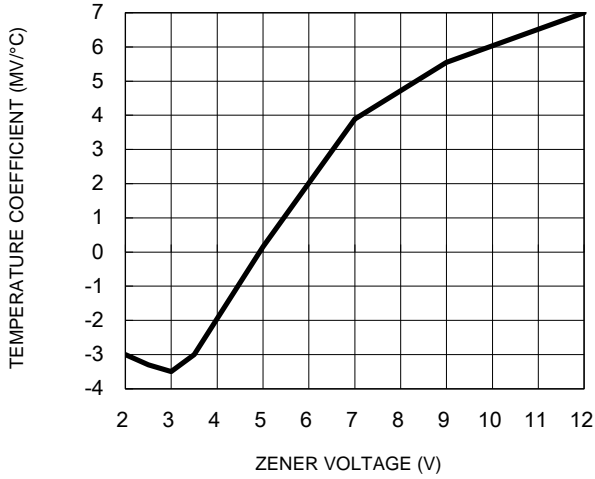


Fig.2 Temperature Coefficients

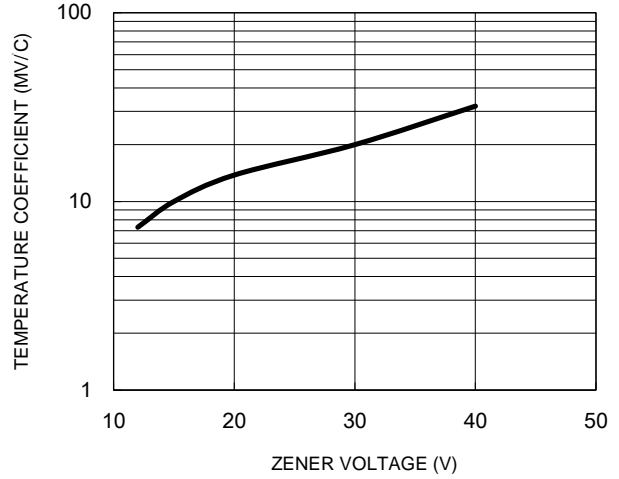


Fig.3 Effect of Zener Voltage on Zener Impedance

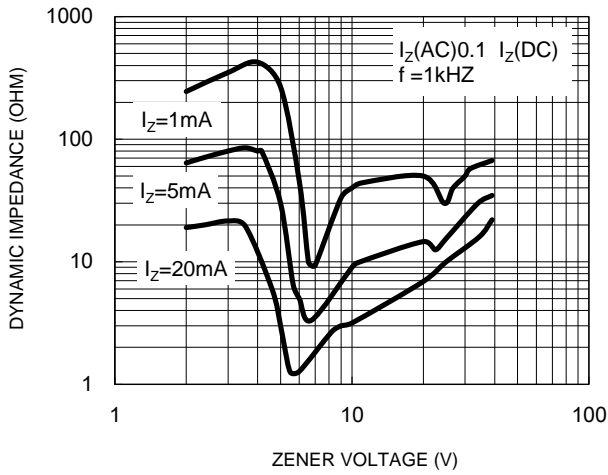


Fig.4 Typical Forward Voltage

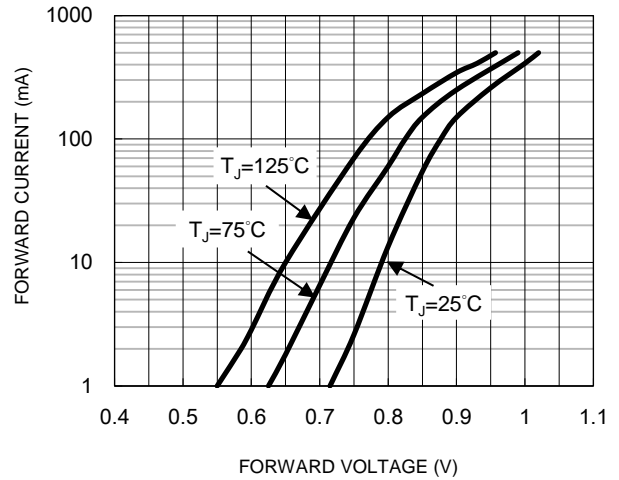


Fig.5 Typical Leakage Current

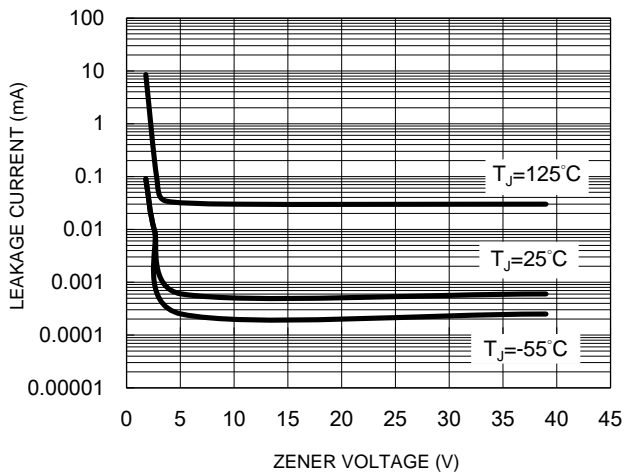
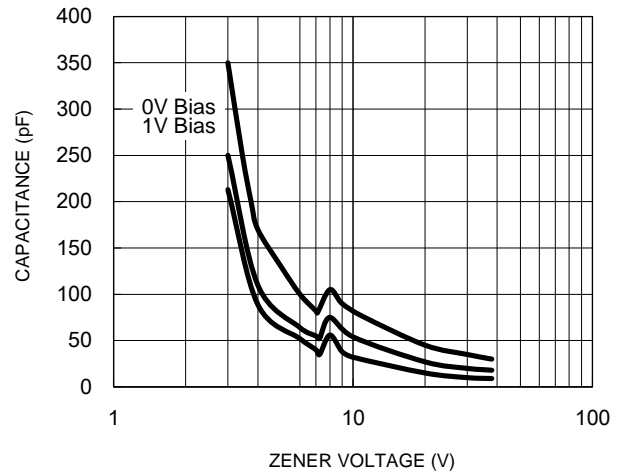


Fig.6 Typical Capacitance



CHARACTERISTICS CURVES

($T_A = 25^\circ\text{C}$ unless otherwise not)

Fig.7 Steady State Power Derating

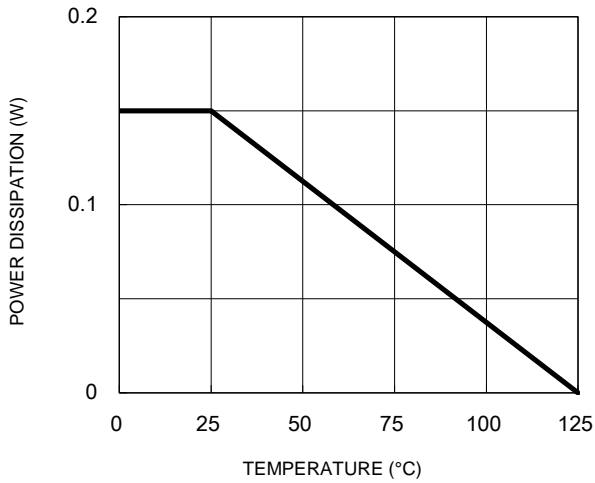


Fig.8 Zener Breakdown Characteristics

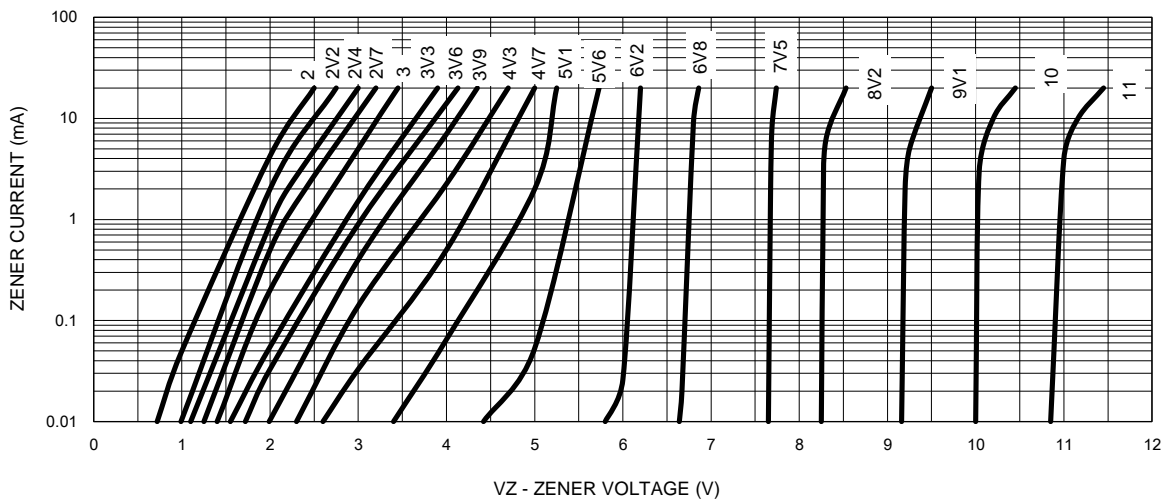
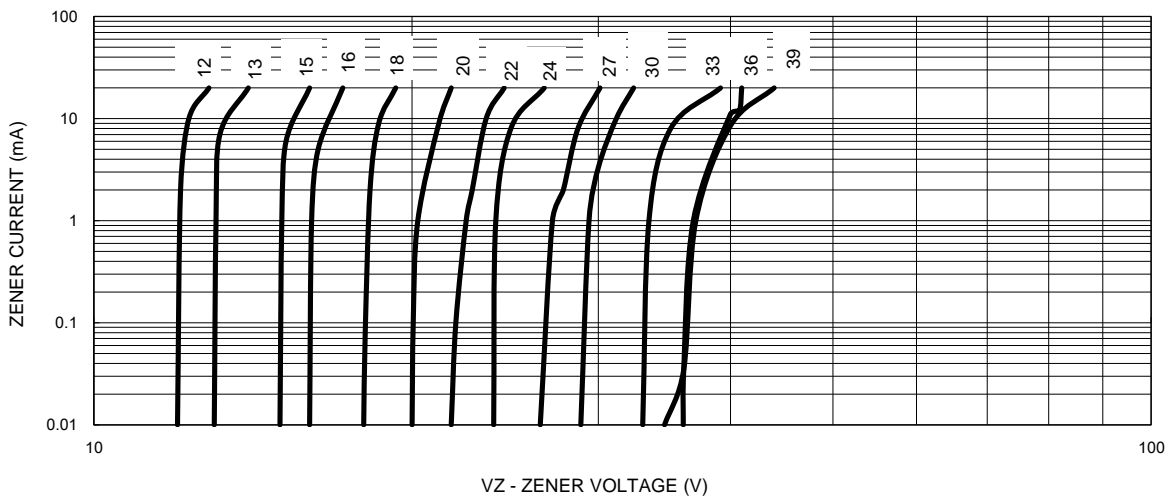
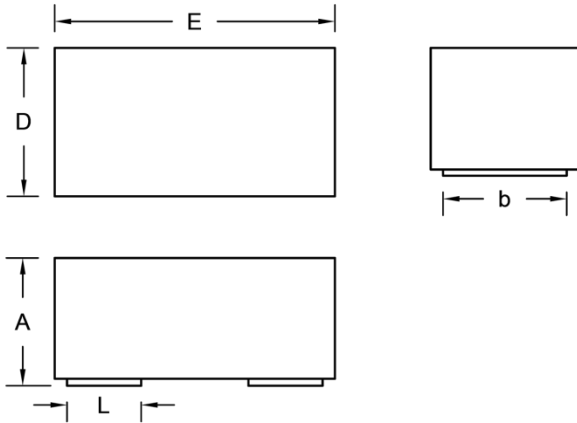


Fig.9 Zener Breakdown Characteristics



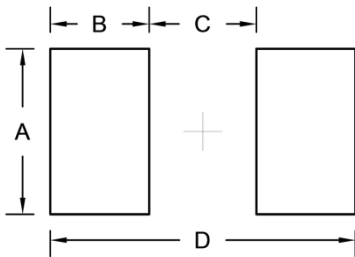
PACKAGE OUTLINE DIMENSION

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| DIM. | Unit (mm) | | Unit (inch) | |
|------|-------------|------|--------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.70 | 0.85 | 0.028 | 0.033 |
| b | 0.70 (TYP.) | | 0.028 (TYP.) | |
| D | 0.80 | 1.00 | 0.031 | 0.039 |
| E | 1.60 | 1.80 | 0.063 | 0.071 |
| L | 0.45 (TYP.) | | 0.018 (TYP.) | |

SUGGESTED PAD LAYOUT



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A | 1.00 | 0.024 |
| B | 0.60 | 0.039 |
| C | 0.65 | 0.026 |
| D | 1.85 | 0.073 |

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