



**THE DATASHEET OF
BZX55C13-TR**





Small Signal Zener Diodes



FEATURES

- Very sharp reverse characteristic
- Low reverse current level
- Very high stability
- Low noise
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912



RoHS COMPLIANT HALOGEN FREE

APPLICATIONS

- Voltage stabilization

LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS | | |
|------------------------------|---------------|------|
| PARAMETER | VALUE | UNIT |
| V _Z range nom. | 2.4 to 75 | V |
| Test current I _{ZT} | 2.5; 5 | mA |
| V _Z specification | Pulse current | |
| Circuit configuration | Single | |

| ORDERING INFORMATION | | | |
|----------------------|------------------|---------------------------------|------------------------|
| DEVICE NAME | ORDERING CODE | TAPED UNITS PER REEL | MINIMUM ORDER QUANTITY |
| BZX55-series | BZX55-series-TR | 10 000 per 13" reel | 30 000/box |
| BZX55-series | BZX55-series-TAP | 10 000 per ammpack (52 mm tape) | 30 000/box |

| PACKAGE | | | | |
|------------------|--------|--------------------------------------|-----------------------------------|------------------------------|
| PACKAGE NAME | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL | SOLDERING CONDITIONS |
| DO-35 (DO-204AH) | 125 mg | UL 94 V-0 | MSL level 1 (according J-STD-020) | Peak temperature max. 260 °C |

| ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified) | | | | |
|---|-------------------------------------|-------------------|----------------------------------|------|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| Power dissipation | I = 4 mm, T _L = 25 °C | P _{tot} | 500 | mW |
| Zener current | | I _Z | P _{tot} /V _Z | mA |
| Junction to ambient air | I = 4 mm, T _L = constant | R _{thJA} | 300 | K/W |
| Junction temperature | | T _j | 175 | °C |
| Storage temperature range | | T _{stg} | -65 to +175 | °C |
| Forward voltage (max.) | I _F = 200 mA | V _F | 1.5 | V |



| ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | | | | | | | |
|--|---------------------|------|------|--------------|-----------|--|-------|---|--------------------|-----------------------|-------------------------|--------|
| PART NUMBER | ZENER VOLTAGE RANGE | | | TEST CURRENT | | REVERSE LEAKAGE CURRENT | | | DYNAMIC RESISTANCE | | TEMPERATURE COEFFICIENT | |
| | V_z at I_{ZT1} | | | I_{ZT1} | I_{ZT2} | I_R at V_R | | | Z_z at I_{ZT1} | Z_{ZK} at I_{ZT2} | TK_{Vz} | |
| | V | | | mA | | $T_{amb} = 25\text{ }^{\circ}\text{C}$ | | $T_{amb} = 150\text{ }^{\circ}\text{C}$ | f = 1 kHz | | | |
| | MIN. | NOM. | MAX. | | | μA | | V | Ω | | MIN. | MAX. |
| BZX55C2V4 | 2.28 | 2.4 | 2.56 | 5 | 1 | < 50 | < 100 | 1 | < 85 | < 600 | - 0.09 | - 0.06 |
| BZX55C2V7 | 2.5 | 2.7 | 2.9 | 5 | 1 | < 10 | < 50 | 1 | < 85 | < 600 | - 0.09 | - 0.06 |
| BZX55C3V0 | 2.8 | 3.0 | 3.2 | 5 | 1 | < 4 | < 40 | 1 | < 85 | < 600 | - 0.08 | - 0.05 |
| BZX55C3V3 | 3.1 | 3.3 | 3.5 | 5 | 1 | < 2 | < 40 | 1 | < 85 | < 600 | - 0.08 | - 0.05 |
| BZX55C3V6 | 3.4 | 3.6 | 3.8 | 5 | 1 | < 2 | < 40 | 1 | < 85 | < 600 | - 0.08 | - 0.05 |
| BZX55C3V9 | 3.7 | 3.9 | 4.1 | 5 | 1 | < 2 | < 40 | 1 | < 85 | < 600 | - 0.08 | - 0.05 |
| BZX55C4V3 | 4 | 4.3 | 4.6 | 5 | 1 | < 1 | < 20 | 1 | < 75 | < 600 | - 0.06 | - 0.03 |
| BZX55C4V7 | 4.4 | 4.7 | 5 | 5 | 1 | < 0.5 | < 10 | 1 | < 60 | < 600 | - 0.05 | 0.02 |
| BZX55C5V1 | 4.8 | 5.1 | 5.4 | 5 | 1 | < 0.1 | < 2 | 1 | < 35 | < 550 | - 0.02 | 0.02 |
| BZX55C5V6 | 5.2 | 5.6 | 6 | 5 | 1 | < 0.1 | < 2 | 1 | < 25 | < 450 | - 0.05 | 0.05 |
| BZX55C6V2 | 5.8 | 6.2 | 6.6 | 5 | 1 | < 0.1 | < 2 | 2 | < 10 | < 200 | 0.03 | 0.06 |
| BZX55C6V8 | 6.4 | 6.8 | 7.2 | 5 | 1 | < 0.1 | < 2 | 3 | < 8 | < 150 | 0.03 | 0.07 |
| BZX55C7V5 | 7 | 7.5 | 7.9 | 5 | 1 | < 0.1 | < 2 | 5 | < 7 | < 50 | 0.03 | 0.07 |
| BZX55C8V2 | 7.7 | 8.2 | 8.7 | 5 | 1 | < 0.1 | < 2 | 6.2 | < 7 | < 50 | 0.03 | 0.08 |
| BZX55C9V1 | 8.5 | 9.1 | 9.6 | 5 | 1 | < 0.1 | < 2 | 6.8 | < 10 | < 50 | 0.03 | 0.09 |
| BZX55C10 | 9.4 | 10 | 10.6 | 5 | 1 | < 0.1 | < 2 | 7.5 | < 15 | < 70 | 0.03 | 0.1 |
| BZX55C11 | 10.4 | 11 | 11.6 | 5 | 1 | < 0.1 | < 2 | 8.2 | < 20 | < 70 | 0.03 | 0.11 |
| BZX55C12 | 11.4 | 12 | 12.7 | 5 | 1 | < 0.1 | < 2 | 9.1 | < 20 | < 90 | 0.03 | 0.11 |
| BZX55C13 | 12.4 | 13 | 14.1 | 5 | 1 | < 0.1 | < 2 | 10 | < 26 | < 110 | 0.03 | 0.11 |
| BZX55C15 | 13.8 | 15 | 15.6 | 5 | 1 | < 0.1 | < 2 | 11 | < 30 | < 110 | 0.03 | 0.11 |
| BZX55C16 | 15.3 | 16 | 17.1 | 5 | 1 | < 0.1 | < 2 | 12 | < 40 | < 170 | 0.03 | 0.11 |
| BZX55C18 | 16.8 | 18 | 19.1 | 5 | 1 | < 0.1 | < 2 | 13 | < 50 | < 170 | 0.03 | 0.11 |
| BZX55C20 | 18.8 | 20 | 21.2 | 5 | 1 | < 0.1 | < 2 | 15 | < 55 | < 220 | 0.03 | 0.11 |
| BZX55C22 | 20.8 | 22 | 23.3 | 5 | 1 | < 0.1 | < 2 | 16 | < 55 | < 220 | 0.04 | 0.12 |
| BZX55C24 | 22.8 | 24 | 25.6 | 5 | 1 | < 0.1 | < 2 | 18 | < 80 | < 220 | 0.04 | 0.12 |
| BZX55C27 | 25.1 | 27 | 28.9 | 5 | 1 | < 0.1 | < 2 | 20 | < 80 | < 220 | 0.04 | 0.12 |
| BZX55C30 | 28 | 30 | 32 | 5 | 1 | < 0.1 | < 2 | 22 | < 80 | < 220 | 0.04 | 0.12 |
| BZX55C33 | 31 | 33 | 35 | 5 | 1 | < 0.1 | < 2 | 24 | < 80 | < 220 | 0.04 | 0.12 |
| BZX55C36 | 34 | 36 | 38 | 5 | 1 | < 0.1 | < 2 | 27 | < 80 | < 220 | 0.04 | 0.12 |
| BZX55C39 | 37 | 39 | 41 | 2.5 | 0.5 | < 0.1 | < 5 | 30 | < 90 | < 500 | 0.04 | 0.12 |
| BZX55C43 | 40 | 43 | 46 | 2.5 | 0.5 | < 0.1 | < 5 | 33 | < 90 | < 600 | 0.04 | 0.12 |
| BZX55C47 | 44 | 47 | 50 | 2.5 | 0.5 | < 0.1 | < 5 | 36 | < 110 | < 700 | 0.04 | 0.12 |
| BZX55C51 | 48 | 51 | 54 | 2.5 | 0.5 | < 0.1 | < 10 | 39 | < 125 | < 700 | 0.04 | 0.12 |
| BZX55C56 | 52 | 56 | 60 | 2.5 | 0.5 | < 0.1 | < 10 | 43 | < 135 | < 1000 | 0.04 | 0.12 |
| BZX55C62 | 58 | 62 | 66 | 2.5 | 0.5 | < 0.1 | < 10 | 47 | < 150 | < 1000 | 0.04 | 0.12 |
| BZX55C68 | 64 | 68 | 72 | 2.5 | 0.5 | < 0.1 | < 10 | 51 | < 200 | < 1000 | 0.04 | 0.12 |
| BZX55C75 | 70 | 75 | 79 | 2.5 | 0.5 | < 0.1 | < 10 | 56 | < 250 | < 1500 | 0.04 | 0.12 |



| ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | | | | | | | |
|--|---------------------|------|-------|--------------|-----------|--|---|-----|--------------------|-----------------------|-------------------------|--------|
| PART NUMBER | ZENER VOLTAGE RANGE | | | TEST CURRENT | | REVERSE LEAKAGE CURRENT | | | DYNAMIC RESISTANCE | | TEMPERATURE COEFFICIENT | |
| | V_Z at I_{ZT1} | | | I_{ZT1} | I_{ZT2} | I_R at V_R | | | Z_Z at I_{ZT1} | Z_{ZK} at I_{ZT2} | TK _{VZ} | |
| | V | | | mA | | $T_{amb} = 25\text{ }^{\circ}\text{C}$ | $T_{amb} = 150\text{ }^{\circ}\text{C}$ | | f = 1 kHz | | | |
| | MIN. | NOM. | MAX. | | | μA | | V | Ω | | MIN. | MAX. |
| BZX55B2V4 | 2.35 | 2.4 | 2.45 | 5 | 1 | < 50 | < 100 | 1 | < 85 | < 600 | - 0.09 | - 0.06 |
| BZX55B2V7 | 2.64 | 2.7 | 2.76 | 5 | 1 | < 10 | < 50 | 1 | < 85 | < 600 | - 0.09 | - 0.06 |
| BZX55B3V0 | 2.94 | 3.0 | 3.06 | 5 | 1 | < 4 | < 40 | 1 | < 90 | < 600 | - 0.08 | - 0.05 |
| BZX55B3V3 | 3.24 | 3.3 | 3.36 | 5 | 1 | < 2 | < 40 | 1 | < 90 | < 600 | - 0.08 | - 0.05 |
| BZX55B3V6 | 3.52 | 3.6 | 3.68 | 5 | 1 | < 2 | < 40 | 1 | < 90 | < 600 | - 0.08 | - 0.05 |
| BZX55B3V9 | 3.82 | 3.9 | 3.98 | 5 | 1 | < 2 | < 40 | 1 | < 90 | < 600 | - 0.08 | - 0.05 |
| BZX55B4V3 | 4.22 | 4.3 | 4.38 | 5 | 1 | < 1 | < 20 | 1 | < 90 | < 600 | - 0.06 | - 0.03 |
| BZX55B4V7 | 4.6 | 4.7 | 4.8 | 5 | 1 | < 0.5 | < 10 | 1 | < 80 | < 600 | - 0.05 | 0.02 |
| BZX55B5V1 | 5 | 5.1 | 5.2 | 5 | 1 | < 0.1 | < 2 | 1 | < 60 | < 550 | - 0.02 | 0.02 |
| BZX55B5V6 | 5.48 | 5.6 | 5.72 | 5 | 1 | < 0.1 | < 2 | 1 | < 40 | < 450 | - 0.05 | 0.05 |
| BZX55B6V2 | 6.08 | 6.2 | 6.32 | 5 | 1 | < 0.1 | < 2 | 2 | < 10 | < 200 | 0.03 | 0.06 |
| BZX55B6V8 | 6.66 | 6.8 | 6.94 | 5 | 1 | < 0.1 | < 2 | 3 | < 8 | < 150 | 0.03 | 0.07 |
| BZX55B7V5 | 7.35 | 7.5 | 7.65 | 5 | 1 | < 0.1 | < 2 | 5 | < 7 | < 50 | 0.03 | 0.07 |
| BZX55B8V2 | 8.04 | 8.2 | 8.36 | 5 | 1 | < 0.1 | < 2 | 6.2 | < 7 | < 50 | 0.03 | 0.08 |
| BZX55B9V1 | 8.92 | 9.1 | 9.28 | 5 | 1 | < 0.1 | < 2 | 6.8 | < 10 | < 50 | 0.03 | 0.09 |
| BZX55B10 | 9.8 | 10 | 10.2 | 5 | 1 | < 0.1 | < 2 | 7.5 | < 15 | < 70 | 0.03 | 0.1 |
| BZX55B11 | 10.78 | 11 | 11.22 | 5 | 1 | < 0.1 | < 2 | 8.2 | < 20 | < 70 | 0.03 | 0.11 |
| BZX55B12 | 11.76 | 12 | 12.24 | 5 | 1 | < 0.1 | < 2 | 9.1 | < 20 | < 90 | 0.03 | 0.11 |
| BZX55B13 | 12.74 | 13 | 13.26 | 5 | 1 | < 0.1 | < 2 | 10 | < 26 | < 110 | 0.03 | 0.11 |
| BZX55B15 | 14.7 | 15 | 15.3 | 5 | 1 | < 0.1 | < 2 | 11 | < 30 | < 110 | 0.03 | 0.11 |
| BZX55B16 | 15.7 | 16 | 16.3 | 5 | 1 | < 0.1 | < 2 | 12 | < 40 | < 170 | 0.03 | 0.11 |
| BZX55B18 | 17.64 | 18 | 18.36 | 5 | 1 | < 0.1 | < 2 | 13 | < 50 | < 170 | 0.03 | 0.11 |
| BZX55B20 | 19.6 | 20 | 20.4 | 5 | 1 | < 0.1 | < 2 | 15 | < 55 | < 220 | 0.03 | 0.11 |
| BZX55B22 | 21.55 | 22 | 22.45 | 5 | 1 | < 0.1 | < 2 | 16 | < 55 | < 220 | 0.04 | 0.12 |
| BZX55B24 | 23.5 | 24 | 24.5 | 5 | 1 | < 0.1 | < 2 | 18 | < 80 | < 220 | 0.04 | 0.12 |
| BZX55B27 | 26.4 | 27 | 27.6 | 5 | 1 | < 0.1 | < 2 | 20 | < 80 | < 220 | 0.04 | 0.12 |
| BZX55B30 | 29.4 | 30 | 30.6 | 5 | 1 | < 0.1 | < 2 | 22 | < 80 | < 220 | 0.04 | 0.12 |
| BZX55B33 | 32.4 | 33 | 33.6 | 5 | 1 | < 0.1 | < 2 | 24 | < 80 | < 220 | 0.04 | 0.12 |
| BZX55B36 | 35.3 | 36 | 36.7 | 5 | 1 | < 0.1 | < 2 | 27 | < 80 | < 220 | 0.04 | 0.12 |
| BZX55B39 | 38.2 | 39 | 39.8 | 2.5 | 0.5 | < 0.1 | < 5 | 30 | < 90 | < 500 | 0.04 | 0.12 |
| BZX55B43 | 42.1 | 43 | 43.9 | 2.5 | 0.5 | < 0.1 | < 5 | 33 | < 90 | < 600 | 0.04 | 0.12 |
| BZX55B47 | 46.1 | 47 | 47.9 | 2.5 | 0.5 | < 0.1 | < 5 | 36 | < 110 | < 700 | 0.04 | 0.12 |
| BZX55B51 | 50 | 51 | 52 | 2.5 | 0.5 | < 0.1 | < 10 | 39 | < 125 | < 700 | 0.04 | 0.12 |
| BZX55B56 | 54.9 | 56 | 57.1 | 2.5 | 0.5 | < 0.1 | < 10 | 43 | < 135 | < 1000 | 0.04 | 0.12 |
| BZX55B62 | 60.8 | 62 | 63.2 | 2.5 | 0.5 | < 0.1 | < 10 | 47 | < 150 | < 1000 | 0.04 | 0.12 |
| BZX55B68 | 66.6 | 68 | 69.4 | 2.5 | 0.5 | < 0.1 | < 10 | 51 | < 200 | < 1000 | 0.04 | 0.12 |
| BZX55B75 | 73 | 75 | 76.5 | 2.5 | 0.5 | < 0.1 | < 10 | 56 | < 250 | < 1500 | 0.04 | 0.12 |

BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)



Fig. 1 - Thermal Resistance vs. Lead Length

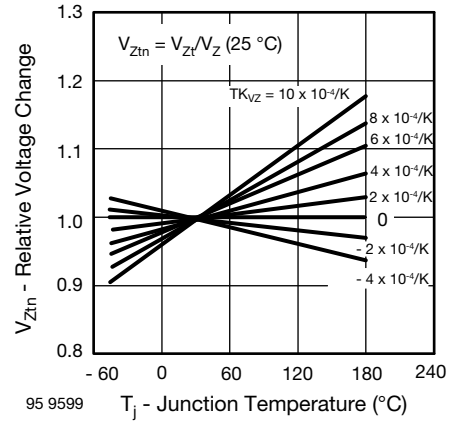


Fig. 4 - Typical Change of Working Voltage vs. Junction Temperature

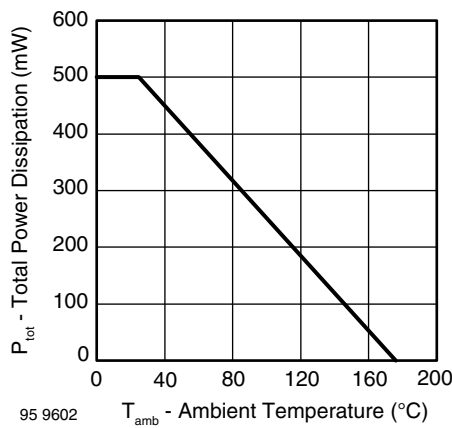


Fig. 2 - Total Power Dissipation vs. Ambient Temperature

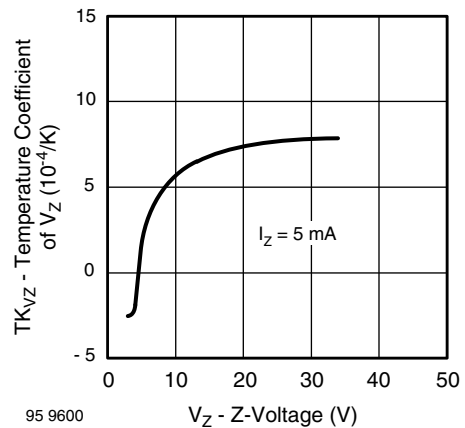


Fig. 5 - Temperature Coefficient of V_Z vs. Z-Voltage

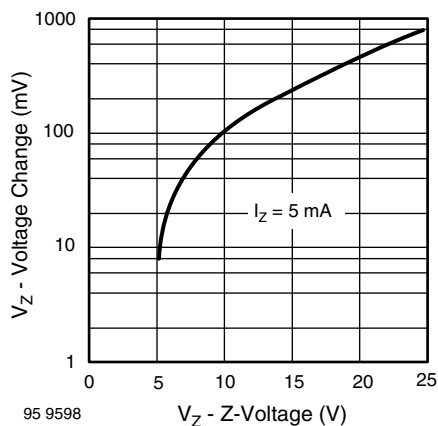


Fig. 3 - Typical Change of Working Voltage under Operating Conditions at $T_{amb} = 25\text{ }^{\circ}\text{C}$

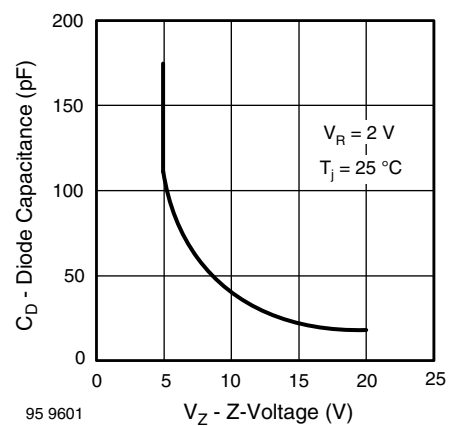


Fig. 6 - Diode Capacitance vs. Z-Voltage



Fig. 7 - Forward Current vs. Forward Voltage



Fig. 9 - Z-Current vs. Z-Voltage



Fig. 8 - Z-Current vs. Z-Voltage



Fig. 10 - Differential Z-Resistance vs. Z-Voltage

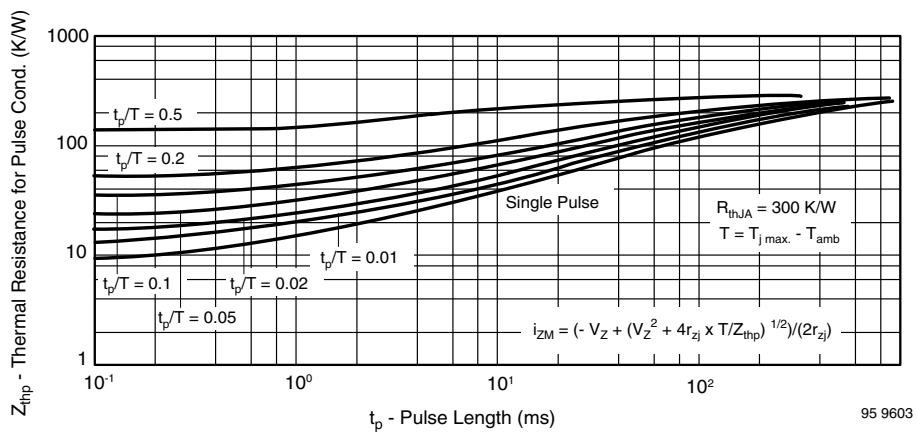
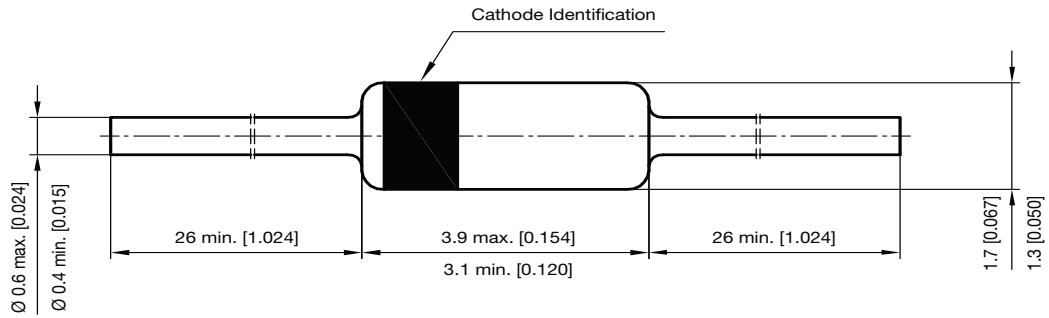


Fig. 11 - Thermal Response



PACKAGE DIMENSIONS in millimeters (inches): **DO-35 (DO-204AH)**



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94 9366



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