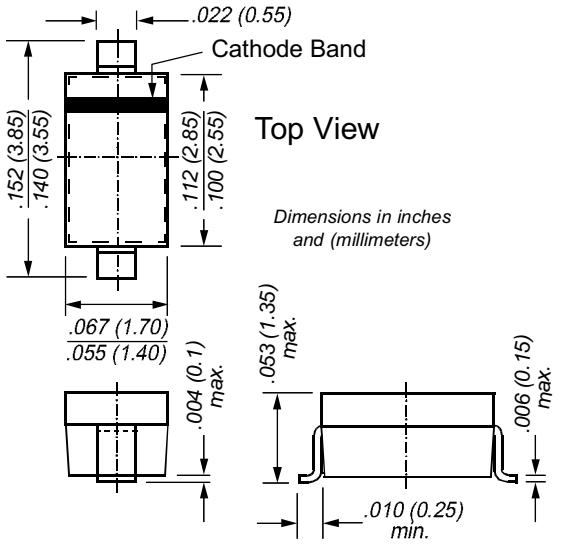
Vishay Semiconductors
formerly General Semiconductor

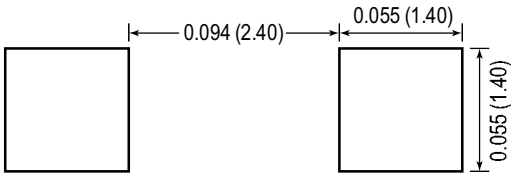
# Zener Diodes

**VZ Range** 2.4 to 75
**Power Dissipation** 410mW

**SOD-123**




**Mounting Pad Layout**




## Features

- Silicon Planar Power Zener Diodes
- The Zener voltages are graded according to the international E 24 standard. Standard Zener voltage tolerance is ±5%. Replace suffix “C” with “B” for ±2% tolerance. Other tolerances and other Zener voltages are available upon request.
- These diodes are also available in other case styles and other configurations including: the SOT-23 case with type designation BZX84 series, the dual zener diode common anode configuration in the SOT-23 case with type designation AZ23 series and the dual zener diode common cathode configuration in the SOT-23 case with type designation DZ23 series.

## Mechanical Data

**Case:** SOD-123 Plastic Case
**Weight:** approx. 0.01g
**Packaging Codes/Options:**
D3 / 10K per 13” reel (8mm tape)
D4 / 3K per 7” reel (8mm tape)

## Maximum Ratings and Thermal Characteristics (TA = 25°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Zener Current (see Table “Characteristics”) | | | |
| Power Dissipation at Tamb = 25°C | $P_{tot}$ | 410(1) | mW |
| Thermal Resistance Junction to Ambient Air | $R_{\Theta JA}$ | 300(2) | °C/W |
| Junction Temperature | $T_j$ | 150 | °C |
| Storage Temperature Range | $T_S$ | –65 to +150 | °C |

**Notes:**
(1) Diode on Ceramic Substrate 0.7mm; 2.5mm$^2$ area
(2) Valid provided that electrodes are kept at ambient temperature

## Electrical Characteristics ($T_A$ = 25°C unless otherwise noted)

| y = C for ± 5%<br>y = B for ± 2%<br>Type | Marking Code | Dynamic Resistance at $I_Z$ = 5mA f = 1 kHz $r_{Zj}$ (Ω) | Dynamic Resistance at $I_Z$ = 1mA f = 1kHz $r_{Zj}$ (Ω) | Temp. Coeff. of Zener Voltage at $I_Z$ = 5mA $\alpha_{VZ}$ ($10^{-4}$/°C) | Reverse Voltage at $I_R$ = 100nA $V_R$ (V) | Admissible Zener current(4) at $T_{amb}$ = 45°C $I_Z$ (mA) | Admissible Zener current(4) at $T_{amb}$ = 25°C $I_Z$ (mA) |
|---|---|---|---|---|---|---|---|
| BZT52-y2V4 | W1 | 85 | 600 | – 9 … – 4 | – | – | – |
| BZT52-y2V7 | W2 | 75 (< 83) | < 500 | – 9 … – 4 | – | 113 | 134 |
| BZT52-y3 | W3 | 80 (< 95) | < 500 | – 9 … – 3 | – | 98 | 118 |
| BZT52-y3V3 | W4 | 80 (< 95) | < 500 | – 8 … – 3 | – | 92 | 109W5 |
| BZT52-y3V6 | W5 | 80 (< 95) | < 500 | – 8 … – 3 | – | 85 | 100 |
| BZT52-y3V9 | W6 | 80 (< 95) | < 500 | – 7 … – 3 | – | 77 | 92 |
| BZT52-y4V3 | W7 | 80 (< 95) | < 500 | – 6 … – 1 | – | 71 | 84 |
| BZT52-y4V7 | W8 | 70 (< 78) | < 500 | – 5 … +2 | – | 64 | 76 |
| BZT52-y5V1 | W9 | 30 (< 60) | < 480 | – 3 … +4 | > 0.8 | 56 | 67 |
| BZT52-y5V6 | WA | 10 (< 40) | < 400 | – 2 … +6 | > 1 | 50 | 59 |
| BZT52-y6V2 | WB | 4.8 (< 10) | < 200 | – 1 … +7 | > 2 | 45 | 54 |
| BZT52-y6V8 | WC | 4.5 (< 8) | < 150 | +2 … +7 | > 3 | 41 | 49 |
| BZT52-y7V5 | WD | 4 (< 7) | < 50 | +3 … +7 | > 5 | 37 | 44 |
| BZT52-y8V2 | WE | 4.5 (< 7) | < 50 | +4 … +7 | > 6 | 34 | 40 |
| BZT52-y9V1 | WF | 4.8 (< 10) | < 50 | +5 … +8 | > 7 | 30 | 36 |
| BZT52-y10 | WG | 5.2 (< 15) | < 70 | +5 … +8 | > 7.5 | 28 | 33 |
| BZT52-y11 | WH | 6 (< 20) | < 70 | +5 … +9 | > 8.5 | 25 | 30 |
| BZT52-y12 | WI | 7 (< 20) | < 90 | +6 … +9 | > 9 | 23 | 28 |
| BZT52-y13 | WK | 9 (< 25) | < 110 | +7 … +9 | > 10 | 21 | 25 |
| BZT52-y15 | WL | 11 (< 30) | < 110 | +7 … +9 | > 11 | 19 | 23 |
| BZT52-y16 | WM | 13 (< 40) | < 170 | +8 … +9.5 | > 12 | 17 | 20 |
| BZT52-y18 | WN | 18 (< 50) | < 170 | +8 … +9.5 | > 14 | 15 | 18 |
| BZT52-y20 | WO | 20 (< 50) | < 220 | +8 … +10 | > 15 | 14 | 17 |
| BZT52-y22 | WP | 25 (< 55) | < 220 | +8 … +10 | > 17 | 13 | 16 |
| BZT52-y24 | WR | 28 (< 80) | < 220 | +8 … +10 | > 18 | 11 | 13 |
| BZT52-y27 | WS | 30 (< 80) | < 250 | +8 … +10 | > 20 | 10 | 12 |
| BZT52-y30 | WT | 35 (< 80) | < 250 | +8 … +10 | > 22.5 | 9 | 10 |
| BZT52-y33 | WU | 40 (< 80) | < 250 | +8 … +10 | > 25 | 8 | 9 |
| BZT52-y36 | WW | 40 (< 90) | < 250 | +8 … +10 | > 27 | 8 | 9 |
| BZT52-y39 | WX | 50 (< 90) | < 300 | +10 … +12 | > 29 | 7 | 8 |
| BZT52-y43 | WY | 60 (< 100) | < 700 | +10 … +12 | > 32 | 6 | 7 |
| BZT52-y47 | WZ | 70 (< 100) | < 750 | +10 … +12 | > 35 | 5 | 6 |
| BZT52-y51 | X1 | 70 (< 100) | < 750 | +10 … +12 | > 38 | 5 | 6 |
| BZT52-y56 | X2 | < 135(2) | < 1000(3) | typ. +10(2) | – | – | – |
| BZT52-y62 | X3 | < 150(2) | < 1000(3) | typ. +10(2) | – | – | – |
| BZT52-y68 | X4 | < 200(2) | < 1000(3) | typ. +10(2) | – | – | – |
| BZT52-y75 | X5 | < 250(2) | < 1500(3) | typ. +10(2) | – | – | – |

**Notes:** (1) Tested with pulses $t_p$ = 5 ms
(2) at $I_Z$ = 2.5 mA
(3) at $I_Z$ = 0.5 mA
(4) Valid provided that electrodes are kept at ambient temperature

## Electrical Characteristics (TA = 25°C unless otherwise noted)

| Type ± 5% Tol. | Zener Voltage range(1) at $I_{ZT1}$ $V_Z$ (V) min. | max. | Test Current $I_{ZT1}$ (mA) |
|---|---|---|---|
| BZT52-C2V4 | 2.20 | 2.60 | 5 |
| BZT52-C2V7 | 2.50 | 2.90 | 5 |
| BZT52-C3 | 2.80 | 3.20 | 5 |
| BZT52-C3V3 | 3.10 | 3.50 | 5 |
| BZT52-C3V6 | 3.40 | 3.80 | 5 |
| BZT52-C3V9 | 3.70 | 4.10 | 5 |
| BZT52-C4V3 | 4.00 | 4.60 | 5 |
| BZT52-C4V7 | 4.40 | 5.00 | 5 |
| BZT52-C5V1 | 4.80 | 5.40 | 5 |
| BZT52-C5V6 | 5.20 | 6.00 | 5 |
| BZT52-C6V2 | 5.80 | 6.60 | 5 |
| BZT52-C6V8 | 6.40 | 7.20 | 5 |
| BZT52-C7V5 | 7.00 | 7.90 | 5 |
| BZT52-C8V2 | 7.70 | 8.70 | 5 |
| BZT52-C9V1 | 8.50 | 9.60 | 5 |
| BZT52-C10 | 9.4 | 10.6 | 5 |
| BZT52-C11 | 10.4 | 11.6 | 5 |
| BZT52-C12 | 11.4 | 12.7 | 5 |
| BZT52-C13 | 12.4 | 14.1 | 5 |
| BZT52-C15 | 13.8 | 15.6 | 5 |
| BZT52-C16 | 15.3 | 17.1 | 5 |
| BZT52-C18 | 16.8 | 19.1 | 5 |
| BZT52-C20 | 18.8 | 21.2 | 5 |
| BZT52-C22 | 20.8 | 23.3 | 5 |
| BZT52-C24 | 22.8 | 25.6 | 5 |
| BZT52-C27 | 25.1 | 28.9 | 5 |
| BZT52-C30 | 28.0 | 32.0 | 5 |
| BZT52-C33 | 31.0 | 35.0 | 5 |
| BZT52-C36 | 34.0 | 38.0 | 5 |
| BZT52-C39 | 37.0 | 41.0 | 5 |
| BZT52-C43 | 40.0 | 46.0 | 5 |
| BZT52-C47 | 44.0 | 50.0 | 5 |
| BZT52-C51 | 48.0 | 54.0 | 5 |
| BZT52-C56 | 52.0 | 60.0 | 2.5 |
| BZT52-C62 | 58.0 | 66.0 | 2.5 |
| BZT52-C68 | 64.0 | 72.0 | 2.5 |
| BZT52-C75 | 70.0 | 79.0 | 2.5 |

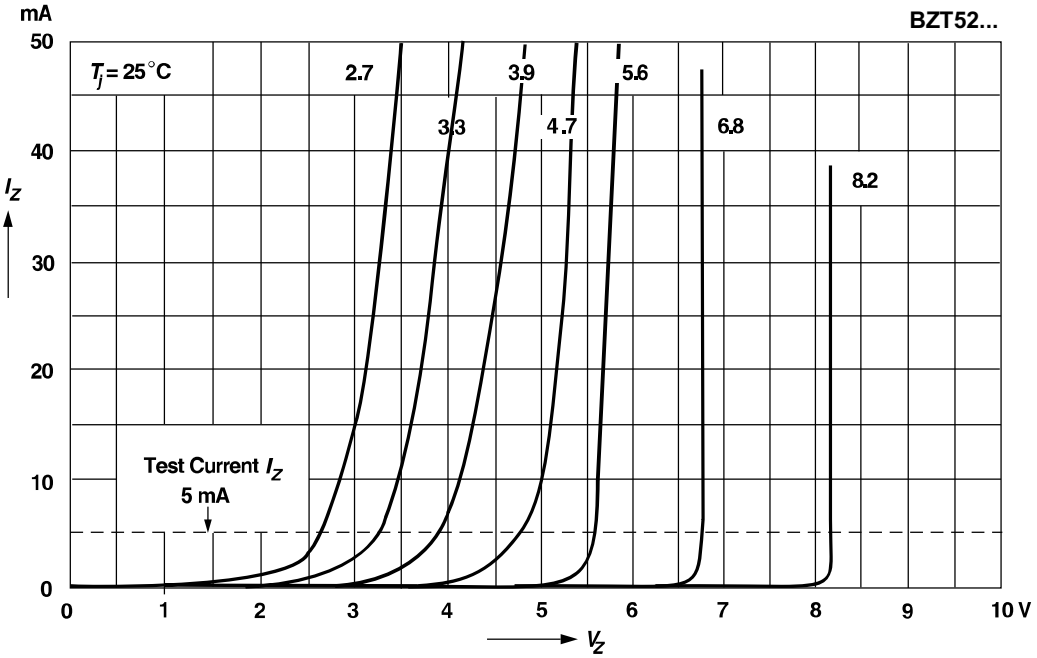
| Type ± 2% Tol. | Zener Voltage range(1) at $I_{ZT1}$ $V_Z$ (V) min. | max. | Test Current $I_{ZT1}$ (mA) |
|---|---|---|---|
| BZT52-B2V4 | 2.35 | 2.45 | 5 |
| BZT52-B2V7 | 2.65 | 2.75 | 5 |
| BZT52-B3 | 2.94 | 3.06 | 5 |
| BZT52-B3V3 | 3.23 | 3.37 | 5 |
| BZT52-B3V6 | 3.53 | 3.67 | 5 |
| BZT52-B3V9 | 3.82 | 3.98 | 5 |
| BZT52-B4V3 | 4.21 | 4.39 | 5 |
| BZT52-B4V7 | 4.61 | 4.79 | 5 |
| BZT52-B5V1 | 5.00 | 5.20 | 5 |
| BZT52-B5V6 | 5.49 | 5.71 | 5 |
| BZT52-B6V2 | 6.08 | 6.32 | 5 |
| BZT52-B6V8 | 6.66 | 6.94 | 5 |
| BZT52-B7V5 | 7.35 | 7.65 | 5 |
| BZT52-B8V2 | 8.04 | 8.36 | 5 |
| BZT52-B9V1 | 8.92 | 9.28 | 5 |
| BZT52-B10 | 9.80 | 10.2 | 5 |
| BZT52-B11 | 10.8 | 11.2 | 5 |
| BZT52-B12 | 11.8 | 12.2 | 5 |
| BZT52-B13 | 12.7 | 13.3 | 5 |
| BZT52-B15 | 14.7 | 15.3 | 5 |
| BZT52-B16 | 15.7 | 16.3 | 5 |
| BZT52-B18 | 17.6 | 18.4 | 5 |
| BZT52-B20 | 19.6 | 20.4 | 5 |
| BZT52-B22 | 21.6 | 22.4 | 5 |
| BZT52-B24 | 23.5 | 24.5 | 5 |
| BZT52-B27 | 26.5 | 27.5 | 5 |
| BZT52-B30 | 29.4 | 30.6 | 5 |
| BZT52-B33 | 32.3 | 33.7 | 5 |
| BZT52-B36 | 35.3 | 36.7 | 5 |
| BZT52-B39 | 38.2 | 39.8 | 5 |
| BZT52-B43 | 42.1 | 43.9 | 5 |
| BZT52-B47 | 46.1 | 47.9 | 5 |
| BZT52-B51 | 50.0 | 52.0 | 5 |
| BZT52-B56 | 54.9 | 57.1 | 2.5 |
| BZT52-B62 | 60.8 | 63.2 | 2.5 |
| BZT52-B68 | 66.6 | 69.4 | 2.5 |
| BZT52-B75 | 73.5 | 76.5 | 2.5 |

**Notes:** (1) Measured with pulses $t_p$ = 5 ms

## Ratings and Characteristic Curves (TA = 25°C unless otherwise noted)

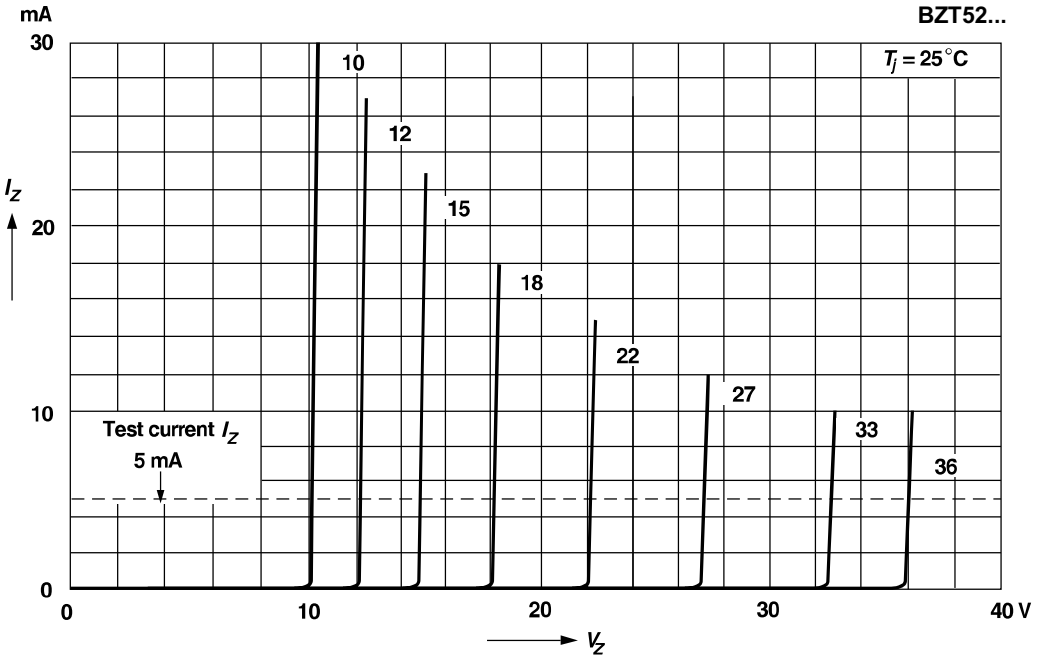
**Breakdown characteristics**

$T_j$ = constant (pulsed)




**Breakdown characteristics**

$T_j$ = constant (pulsed)



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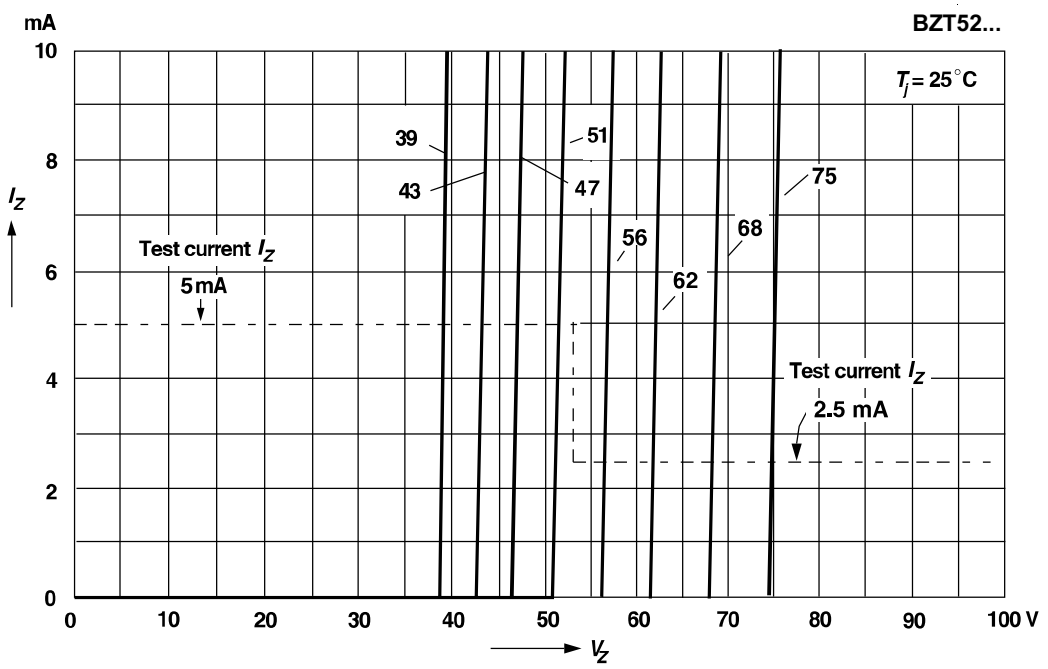
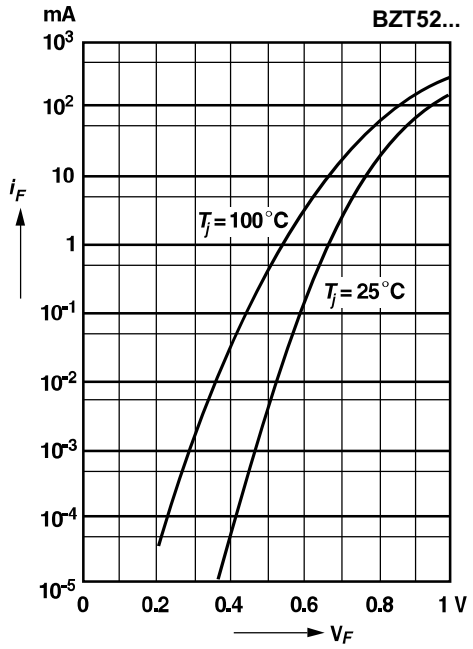
**Breakdown characteristics**

$T_j$ = constant (pulsed)



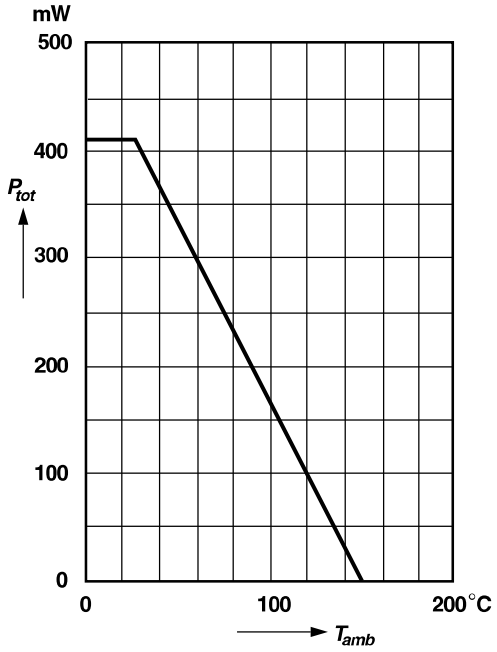

**Forward characteristics**




**Admissible power dissipation versus ambient temperature**

For conditions, see footnote in table "Absolute Maximum Ratings"

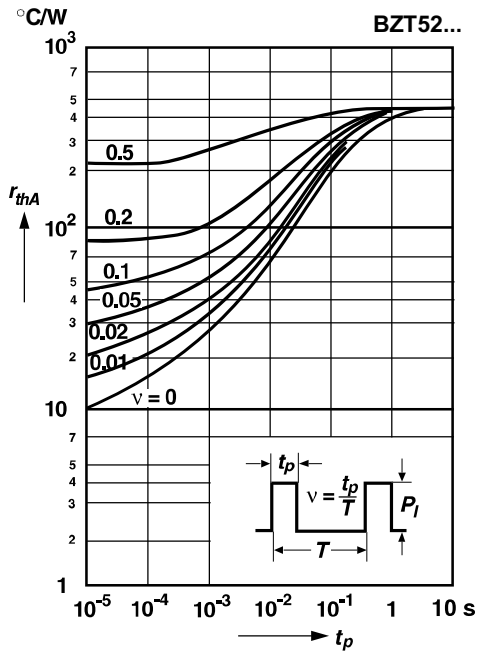
BZT52...



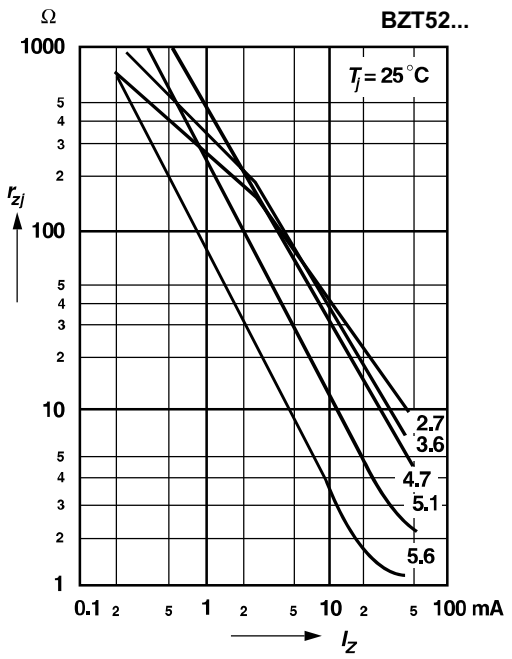
## Ratings and Characteristic Curves (TA = 25°C unless otherwise noted)

**Pulse thermal resistance versus pulse duration**

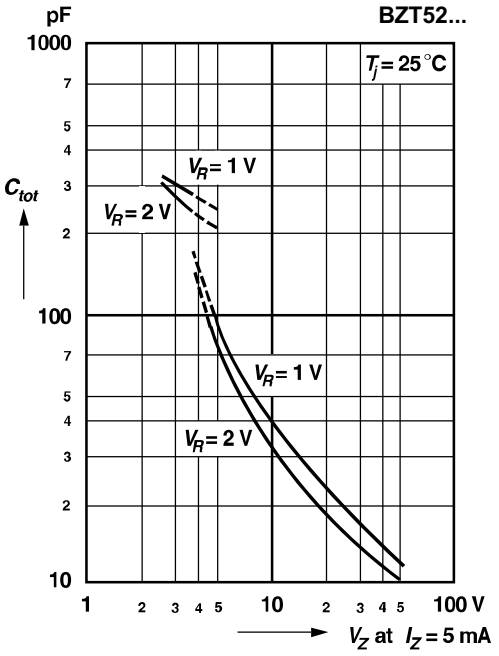
For conditions, see footnote in table "Absolute Maximum Ratings"



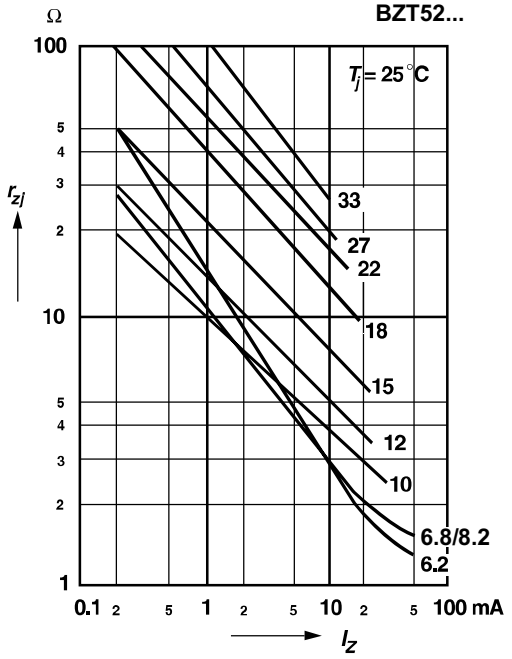

**Dynamic resistance versus Zener current**




**Capacitance versus Zener voltage**

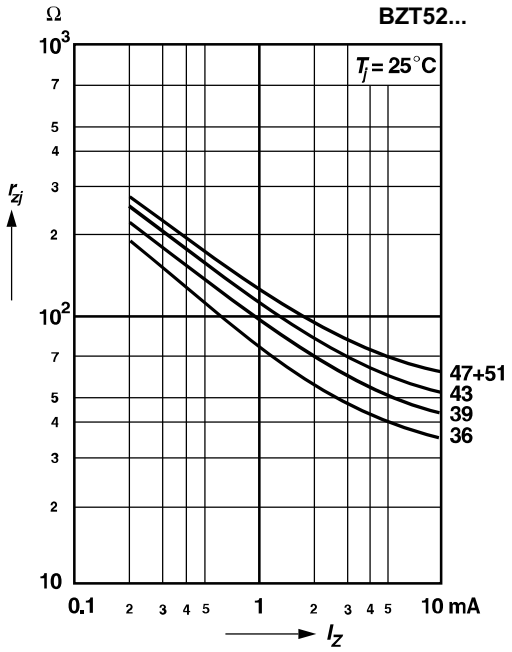



**Dynamic resistance versus Zener current**



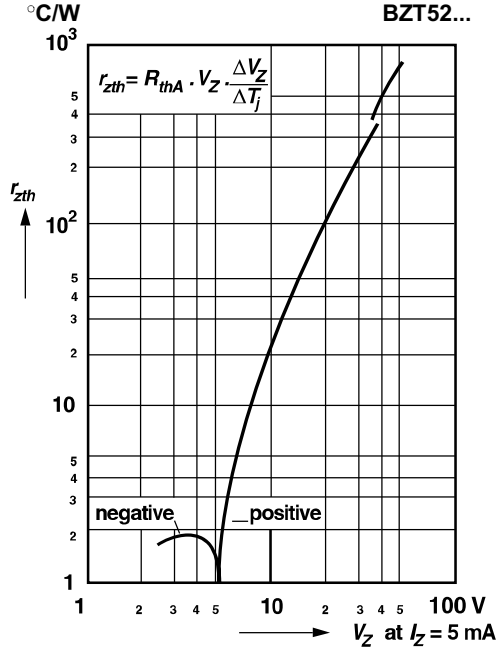
## Ratings and Characteristic Curves (TA = 25°C unless otherwise noted)

**Dynamic resistance versus Zener current**

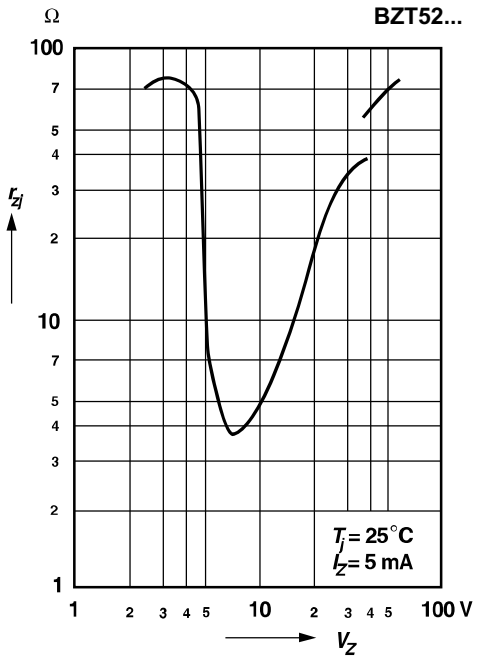



**Thermal differential resistance versus Zener voltage**

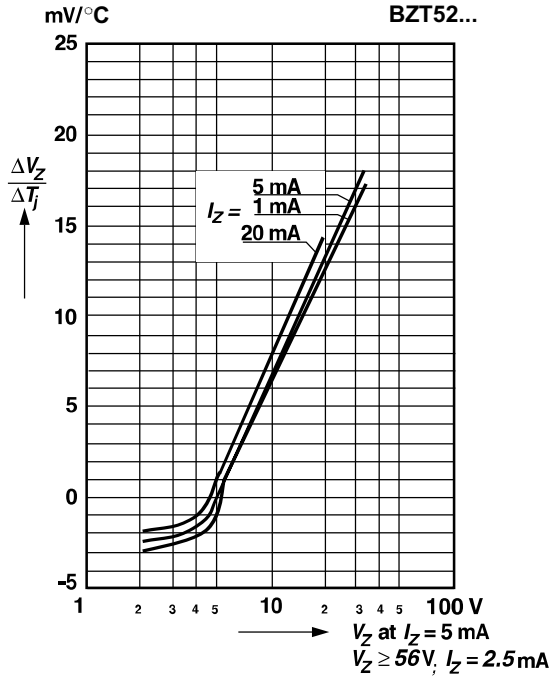
For conditions, see footnote in table "Absolute Maximum Ratings"




**Dynamic resistance versus Zener voltage**

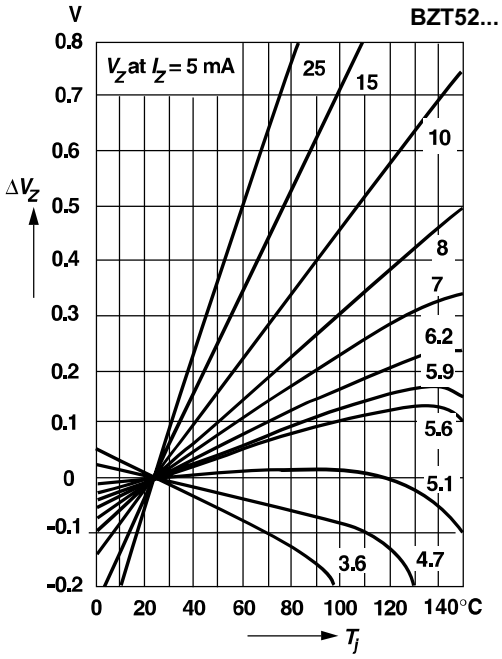



**Temperature dependence of Zener voltage versus Zener voltage**

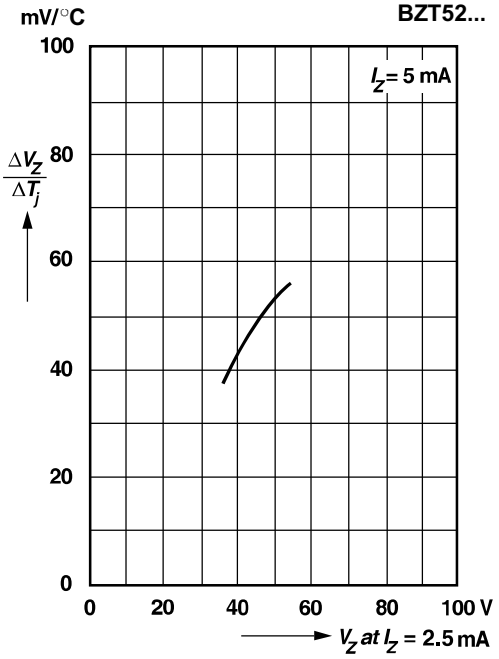


## Ratings and Characteristic Curves (TA = 25°C unless otherwise noted)

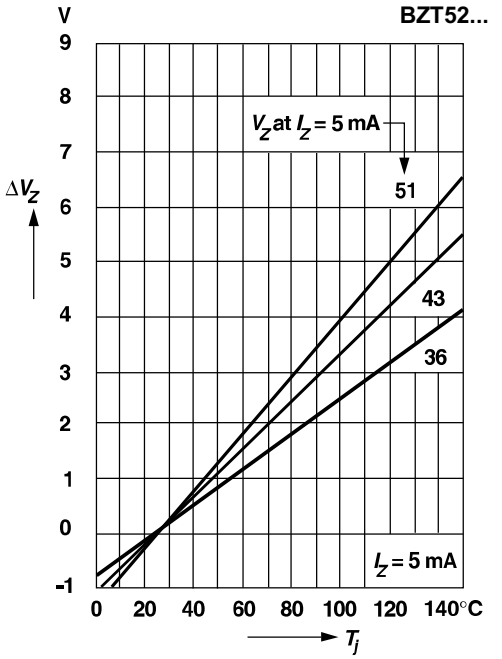
**Change of Zener voltage versus junction temperature**



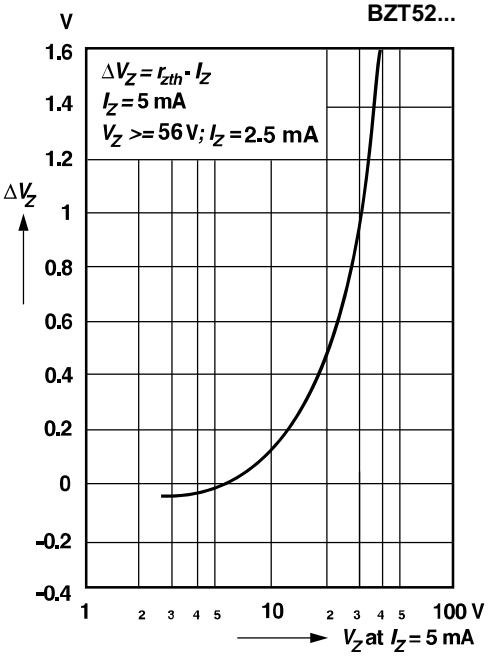

**Temperature dependence of Zener voltage versus Zener voltage**




**Change of Zener voltage versus junction temperature**




**Change of Zener voltage from turn-on up to the point of thermal equilibrium versus Zener voltage**



## Ratings and Characteristic Curves (TA = 25°C unless otherwise noted)

**Change of Zener voltage from turn-on up to the point of thermal equilibrium versus Zener voltage**