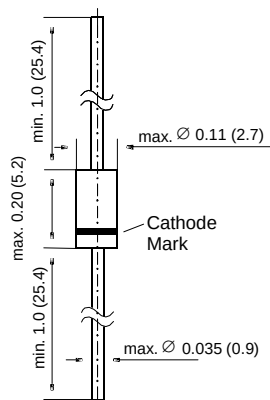


# ZY1, ZY11 THRU ZY200

## ZENER DIODES

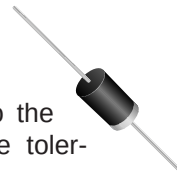
### DO-41 Plastic



Dimensions are in inches and (millimeters)

### FEATURES

- ♦ Silicon Power Zener Diodes
- ♦ For use in stabilizing and clipping circuits with high power rating
- ♦ The Zener voltages are graded according to the international E 24 standard. Smaller voltage tolerances are available upon request.



### MECHANICAL DATA

**Case:** DO-41 Plastic Case

**Weight:** approx. 0.34 g

### MAXIMUM RATINGS

Ratings at 25°C ambient temperature unless otherwise specified.

|                                             | SYMBOL           | VALUE             | UNIT  |
|---------------------------------------------|------------------|-------------------|-------|
| Zener Current (see Table "Characteristics") |                  |                   |       |
| Power Dissipation at Tamb = 25°C            | P <sub>tot</sub> | 2.0 <sup>1)</sup> | Watts |
| Junction Temperature                        | T <sub>j</sub>   | 150               | °C    |
| Storage Temperature Range                   | T <sub>s</sub>   | - 55 to +150      | °C    |

|                                               | SYMBOL            | MIN. | TYP. | MAX.             | UNIT |
|-----------------------------------------------|-------------------|------|------|------------------|------|
| Thermal Resistance<br>Junction to Ambient Air | R <sub>thJA</sub> | —    | —    | 60 <sup>1)</sup> | °C/W |

#### NOTES:

(1) Valid provided that leads are kept at ambient temperature at a distance of 10 mm from case.

# ZY1, ZY11 THRU ZY200

## ELECTRICAL CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified.

| Type               | Zener voltage <sup>(2)</sup><br>at I <sub>ZT</sub><br>V <sub>Z</sub> (V) | Dynamic resistance<br>at I <sub>ZT</sub><br>f = 1 kHz<br>max<br>r <sub>zj</sub> (Ω) | Temp. coeff.<br>of Zener volt.<br>at I <sub>ZT</sub><br>α <sub>VZ</sub> (10 <sup>-4</sup> / K) | Test current<br>I <sub>ZT</sub> (mA) | Reverse voltage<br>at I <sub>R</sub> = 0.5μA<br>V <sub>R</sub> (V) | Admissible Zener current <sup>(1)</sup><br>at T <sub>amb</sub> = 25°C<br>I <sub>Z</sub> (mA) |
|--------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| ZY1 <sup>(3)</sup> | 0.71 ... 0.82                                                            | 0.5 (< 1)                                                                           | -26 ... -16                                                                                    | 100                                  | —                                                                  | 1000                                                                                         |
| ZY11               | 10.4 ... 11.6                                                            | 4 (< 7)                                                                             | +5 ... +10                                                                                     | 50                                   | > 9.2                                                              | 135                                                                                          |
| ZY12               | 11.4 ... 12.7                                                            | 4 (< 7)                                                                             | +5 ... +10                                                                                     | 50                                   | > 10                                                               | 120                                                                                          |
| ZY13               | 12.4 ... 14.1                                                            | 5 (< 10)                                                                            | +5 ... +10                                                                                     | 50                                   | > 10.7                                                             | 110                                                                                          |
| ZY15               | 13.8 ... 15.8                                                            | 5 (< 10)                                                                            | +5 ... +10                                                                                     | 50                                   | > 12                                                               | 98                                                                                           |
| ZY16               | 15.3 ... 17.1                                                            | 6 (< 15)                                                                            | +6 ... +11                                                                                     | 25                                   | > 13.3                                                             | 90                                                                                           |
| ZY18               | 16.8 ... 19.1                                                            | 6 (< 15)                                                                            | +6 ... +11                                                                                     | 25                                   | > 14.7                                                             | 80                                                                                           |
| ZY20               | 18.8 ... 21.2                                                            | 6 (< 15)                                                                            | +6 ... +11                                                                                     | 25                                   | > 16.5                                                             | 72                                                                                           |
| ZY22               | 20.8 ... 23.3                                                            | 6 (< 15)                                                                            | +6 ... +11                                                                                     | 25                                   | > 18.3                                                             | 66                                                                                           |
| ZY24               | 22.8 ... 25.6                                                            | 7 (< 15)                                                                            | +6 ... +11                                                                                     | 25                                   | > 20.1                                                             | 60                                                                                           |
| ZY27               | 25.1 ... 28.9                                                            | 7 (< 15)                                                                            | +6 ... +11                                                                                     | 25                                   | > 22.5                                                             | 53                                                                                           |
| ZY30               | 28 ... 32                                                                | 8 (< 15)                                                                            | +6 ... +11                                                                                     | 25                                   | > 25.1                                                             | 48                                                                                           |
| ZY33               | 31 ... 35                                                                | 8 (< 15)                                                                            | +6 ... +11                                                                                     | 25                                   | > 27.8                                                             | 44                                                                                           |
| ZY36               | 34 ... 38                                                                | 21 (< 40)                                                                           | +6 ... +11                                                                                     | 10                                   | > 30.2                                                             | 40                                                                                           |
| ZY39               | 37 ... 41                                                                | 21 (< 40)                                                                           | +6 ... +11                                                                                     | 10                                   | > 32.9                                                             | 37                                                                                           |
| ZY43               | 40 ... 46                                                                | 24 (< 45)                                                                           | +7 ... +12                                                                                     | 10                                   | > 35.6                                                             | 33                                                                                           |
| ZY47               | 44 ... 50                                                                | 24 (< 45)                                                                           | +7 ... +12                                                                                     | 10                                   | > 39.2                                                             | 30                                                                                           |
| ZY51               | 48 ... 54                                                                | 25 (< 60)                                                                           | +7 ... +12                                                                                     | 10                                   | > 42.8                                                             | 27                                                                                           |
| ZY56               | 52 ... 60                                                                | 25 (< 60)                                                                           | +7 ... +12                                                                                     | 10                                   | > 47.3                                                             | 25                                                                                           |
| ZY62               | 58 ... 66                                                                | 25 (< 80)                                                                           | +8 ... +13                                                                                     | 10                                   | > 51.7                                                             | 21                                                                                           |
| ZY68               | 64 ... 72                                                                | 25 (< 80)                                                                           | +8 ... +13                                                                                     | 10                                   | > 57.1                                                             | 20                                                                                           |
| ZY75               | 70 ... 79                                                                | 30 (< 100)                                                                          | +8 ... +13                                                                                     | 10                                   | > 63.2                                                             | 18                                                                                           |
| ZY82               | 77 ... 88                                                                | 30 (< 100)                                                                          | +8 ... +13                                                                                     | 10                                   | > 68.6                                                             | 16                                                                                           |
| ZY91               | 85 ... 96                                                                | 60 (< 200)                                                                          | +9 ... +13                                                                                     | 5                                    | > 75.7                                                             | 15                                                                                           |
| ZY100              | 94 ... 106                                                               | 60 (< 200)                                                                          | +9 ... +13                                                                                     | 5                                    | > 83.7                                                             | 13                                                                                           |
| ZY110              | 104 ... 116                                                              | 80 (< 250)                                                                          | +9 ... +13                                                                                     | 5                                    | > 92.6                                                             | 12                                                                                           |
| ZY120              | 114 ... 127                                                              | 80 (< 250)                                                                          | +9 ... +13                                                                                     | 5                                    | > 101.6                                                            | 11                                                                                           |
| ZY130              | 124 ... 141                                                              | 110 (< 300)                                                                         | +9 ... +13                                                                                     | 5                                    | > 110.5                                                            | 10                                                                                           |
| ZY150              | 138 ... 156                                                              | 110 (< 300)                                                                         | +9 ... +13                                                                                     | 5                                    | > 123                                                              | 9                                                                                            |
| ZY160              | 153 ... 171                                                              | 150 (< 350)                                                                         | +9 ... +13                                                                                     | 5                                    | > 136                                                              | 8.5                                                                                          |
| ZY180              | 168 ... 191                                                              | 150 (< 350)                                                                         | +9 ... +13                                                                                     | 5                                    | > 149                                                              | 8                                                                                            |
| ZY200              | 188 ... 212                                                              | 150 (< 350)                                                                         | +9 ... +13                                                                                     | 5                                    | > 167                                                              | 7.5                                                                                          |

### NOTES:

(1) Valid provided that leads are kept at ambient temperature at a distance of 10 mm from case

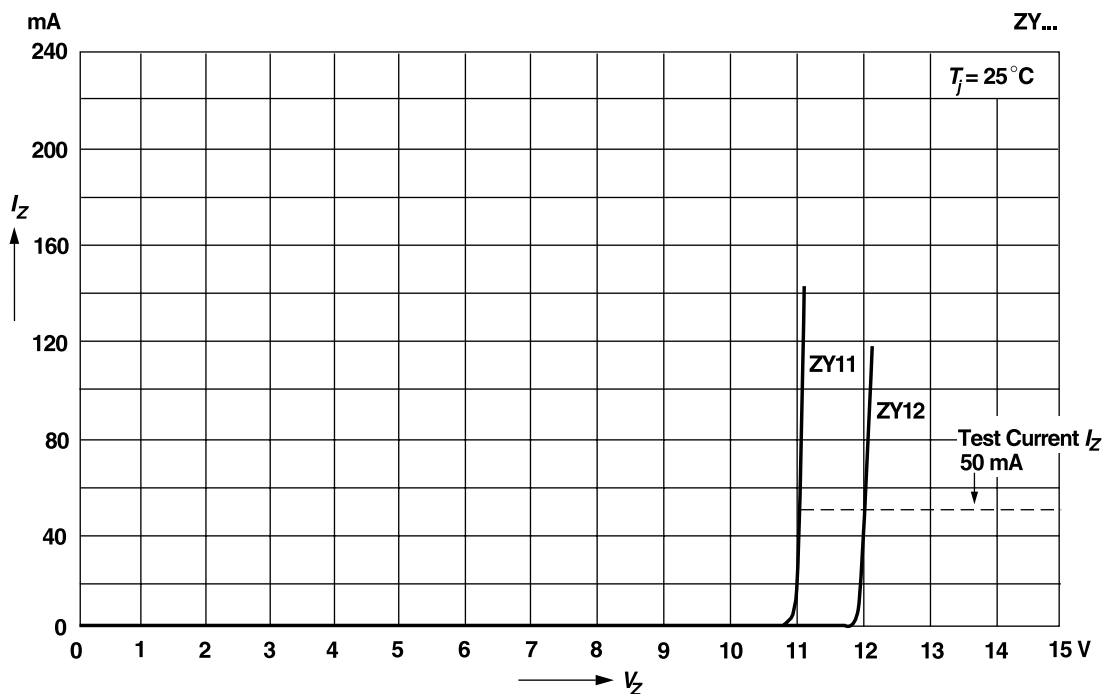
(2) Tested with pulses t<sub>p</sub> = 5 ms

(3) The ZY1 is a silicon diode operated in forward direction. Hence, the index of all parameters ratings should be "F" instead of "Z". Connect the cathode lead to the negative pole

# RATINGS AND CHARACTERISTIC CURVES ZY1, ZY11 THRU ZY200

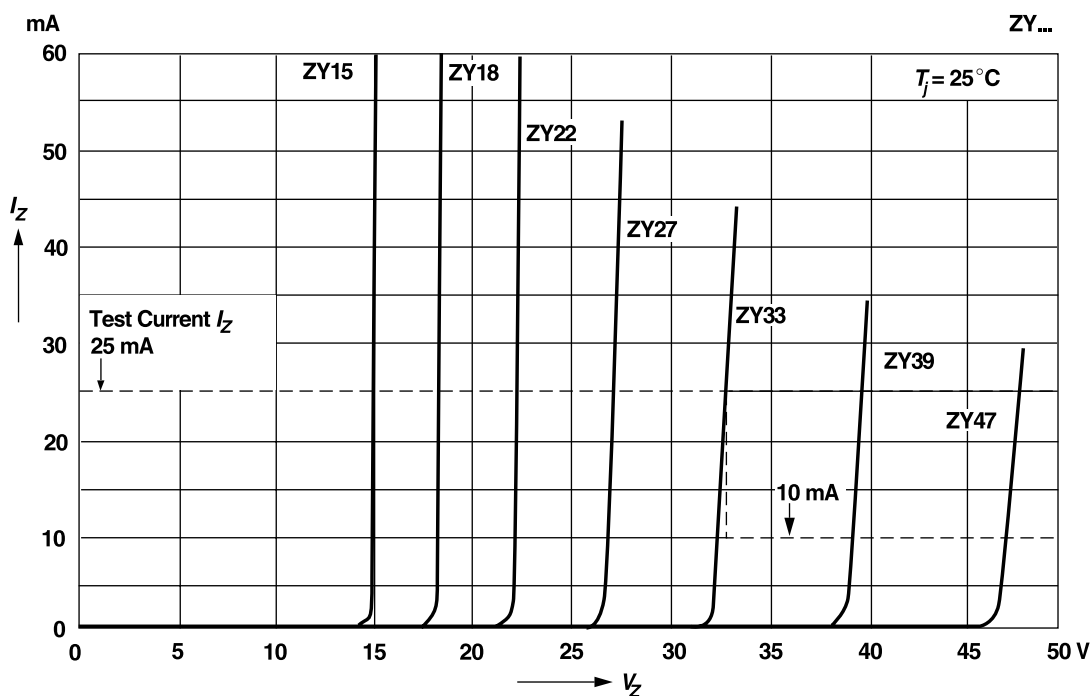
## Breakdown characteristics

$T_j = \text{constant (pulsed)}$



## Breakdown characteristics

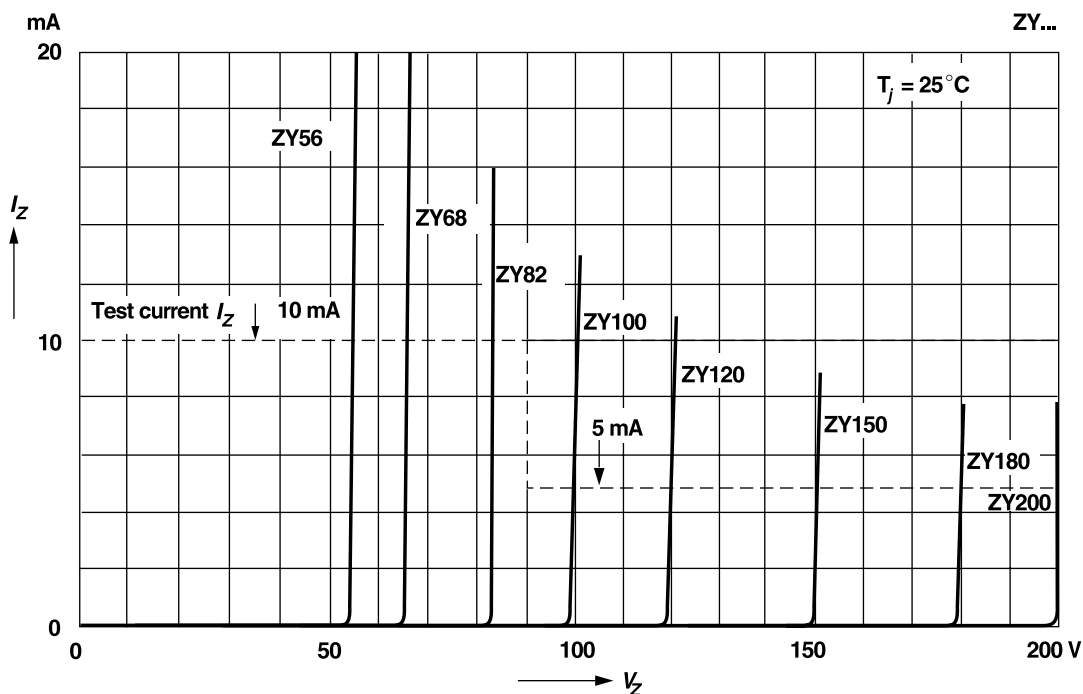
$T_j = \text{constant (pulsed)}$



# RATINGS AND CHARACTERISTIC CURVES ZY1, ZY11 THRU ZY200

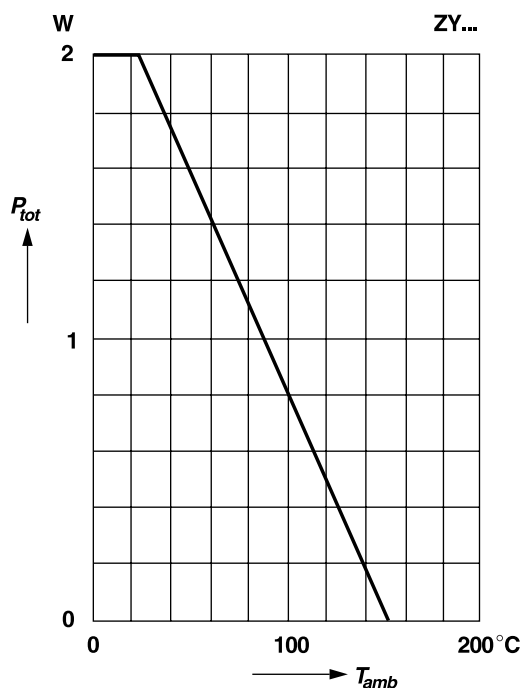
## Breakdown characteristics

$T_j = \text{constant (pulsed)}$

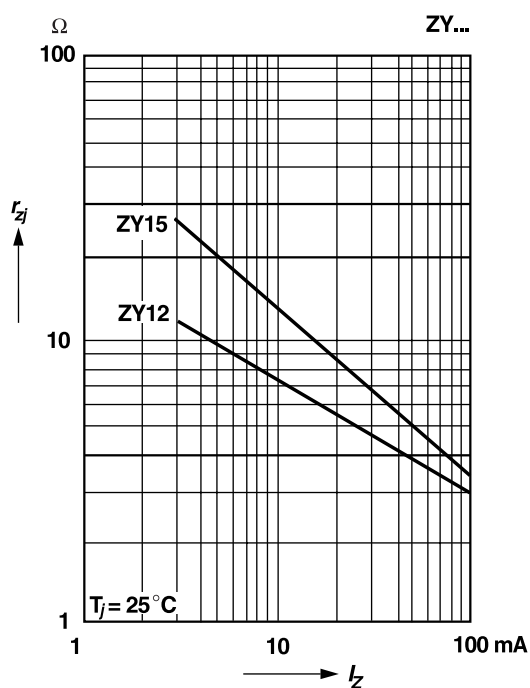


## Admissible power dissipation versus ambient temperature

Valid provided that leads are kept at ambient temperature at a distance of 10 mm from case

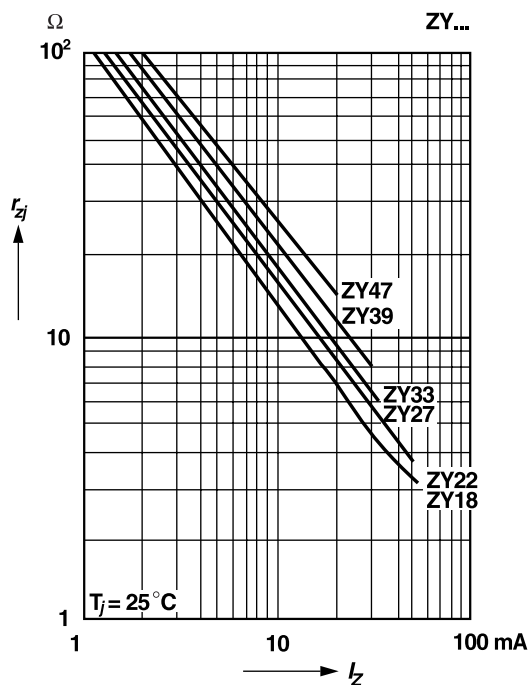


## Dynamic resistance versus Zener current



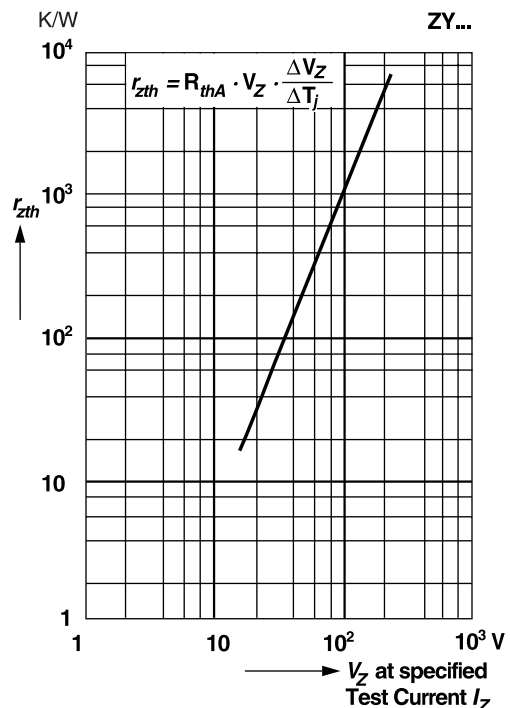
# RATINGS AND CHARACTERISTIC CURVES ZY1, ZY11 THRU ZY200

Dynamic resistance  
versus Zener current

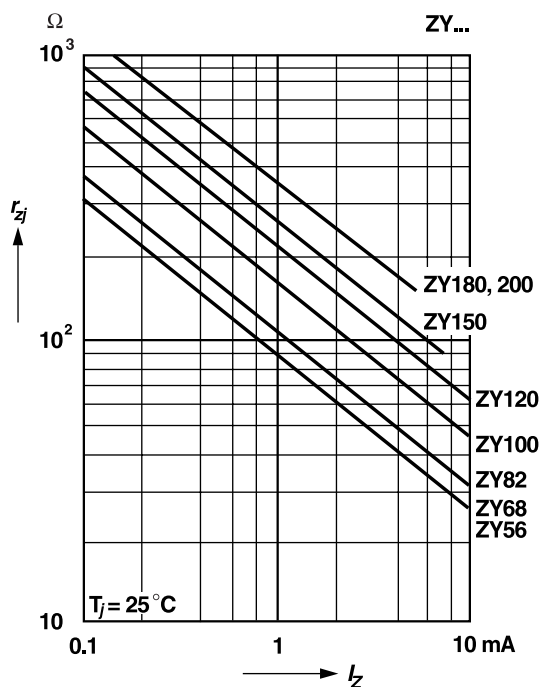


Thermal differential resistance  
versus Zener voltage

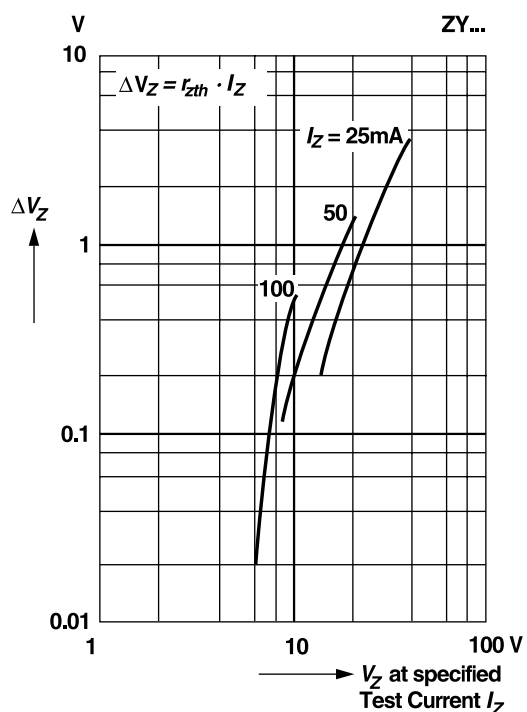
Valid provided that leads are kept at ambient temperature  
at a distance of 10 mm from case



Dynamic resistance  
versus Zener current

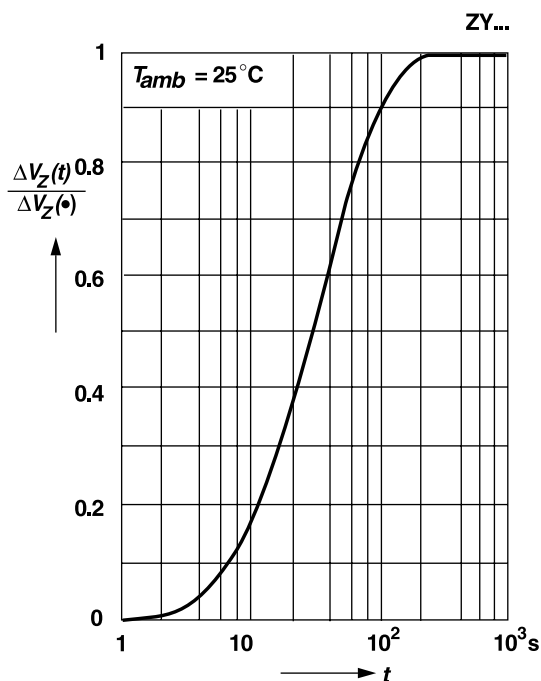


Change of Zener voltage from turn-on  
up to the point of thermal equilibrium  
versus Zener Voltage

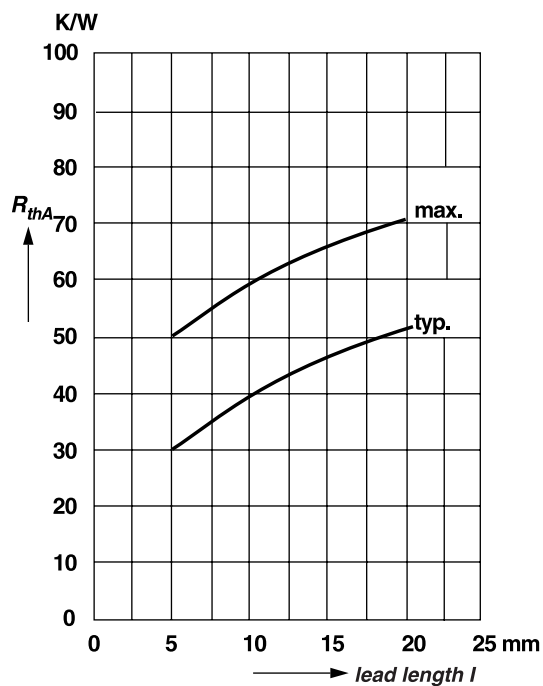


# RATINGS AND CHARACTERISTIC CURVES ZY1, ZY11 THRU ZY200

Relative change of Zener voltage  
versus turn-on time

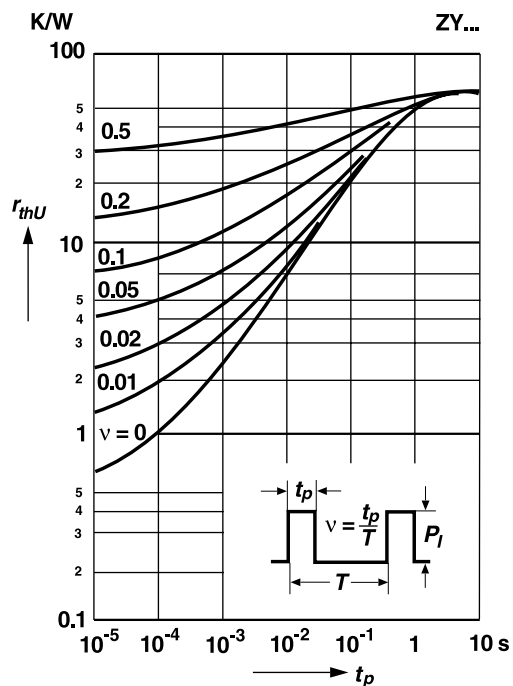


Thermal resistance  
versus lead length



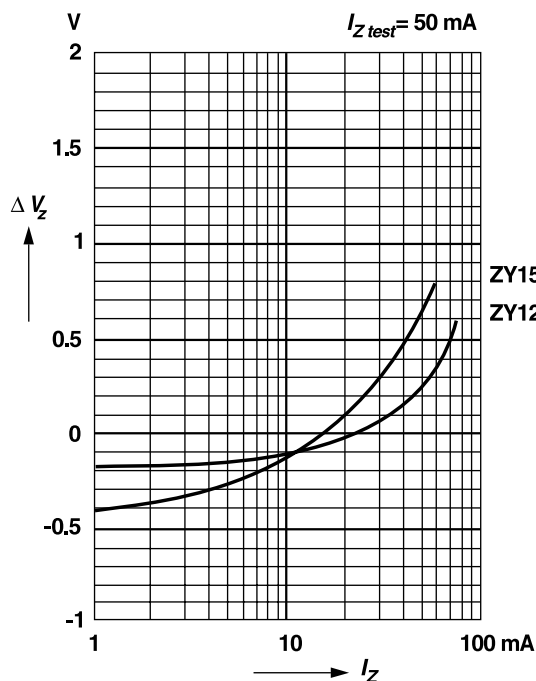
Pulse thermal resistance  
versus pulse duration

Valid provided that leads are kept at ambient temperature  
at a distance of 10 mm from case

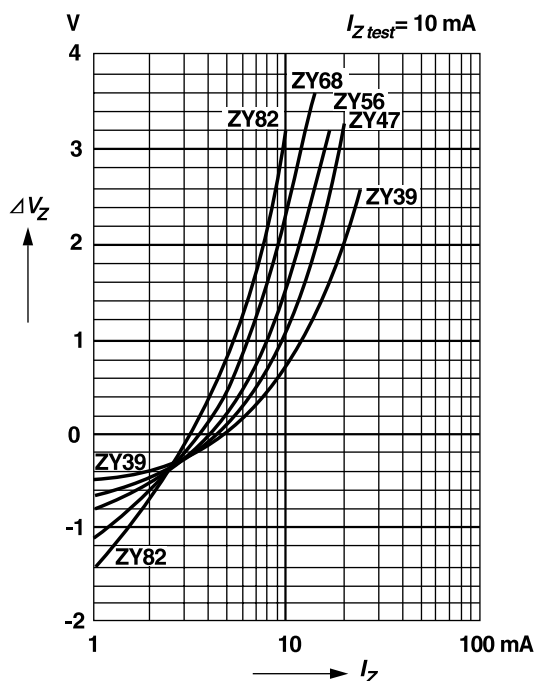


# RATINGS AND CHARACTERISTIC CURVES ZY1, ZY11 THRU ZY200

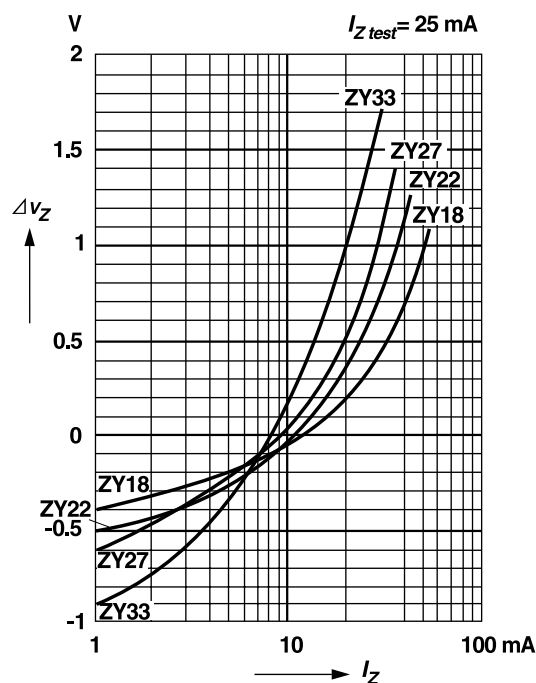
Difference between Zener voltage at test current pulses less than 1 s duration and Zener voltage at the point of thermal equilibrium versus Zener current



Difference between Zener voltage at test current pulses less than 1 s duration and Zener voltage at the point of thermal equilibrium versus Zener current



Difference between Zener voltage at test current pulses less than 1 s duration and Zener voltage at the point of thermal equilibrium versus Zener current



Difference between Zener voltage at test current pulses less than 1 s duration and Zener voltage at the point of thermal equilibrium versus Zener current

