

Zener Diodes



DESIGN SUPPORT TOOLS AVAILABLE



3D Models

FEATURES

- Silicon planar 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. Replace suffix “C” with “B” for $\pm 2\%$ tolerance
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Voltage stabilization

PRIMARY CHARACTERISTICS

| PARAMETER | VALUE | UNIT |
|-----------------------|---------------|------|
| V_Z range nom. | 2.7 to 100 | V |
| Test current I_{ZT} | 2.7 to 80 | mA |
| V_Z specification | Pulse current | |
| Circuit configuration | Single | |

ORDERING INFORMATION

| DEVICE NAME | ORDERING CODE | TAPED UNITS PER REEL | MINIMUM ORDER QUANTITY |
|--------------|------------------|-------------------------------|------------------------|
| BZX85-series | BZX85-series-TR | 5000 (52 mm tape on 13" reel) | 25 000/box |
| BZX85-series | BZX85-series-TAP | 5000 per ammpack (52 mm tape) | 25 000/box |

PACKAGE

| PACKAGE NAME | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL | SOLDERING CONDITIONS |
|------------------|--------|--------------------------------------|-----------------------------------|------------------------------|
| DO-41 (DO-204AL) | 310 mg | UL 94 V-0 | MSL level 1 (according J-STD-020) | Peak temperature max. 260 °C |

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ °C}$, unless otherwise specified)

| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
|---------------------------|---|------------|-------------|------|
| Power dissipation | Valid provided that leads at a distance of 4 mm from case are kept at ambient temperature | P_{tot} | 1300 | mW |
| Zener current | See Table “Electrical characteristics” | | | |
| Junction to ambient air | Valid provided that leads at a distance of 4 mm from case are kept at ambient temperature | R_{thJA} | 110 | K/W |
| Junction temperature | | T_j | 175 | °C |
| Storage temperature range | | T_{stg} | -55 to +175 | °C |



| ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | | | | | | | |
|--|------------------------------------|------|------|--------------|-----------|-------------------------|-----|-----------------------------------|-----------------------|--|--------|---|
| PART NUMBER | ZENER VOLTAGE RANGE ⁽¹⁾ | | | TEST CURRENT | | REVERSE LAEKAGE CURRENT | | DYNAMIC RESISTANCE ⁽³⁾ | | TEMPERATURE COEFFICIENT OF ZENER VOLTAGE | | ADMISSIBLE ZENER CURRENT ⁽²⁾ |
| | V_Z at I_{ZT1} | | | I_{ZT1} | I_{ZT2} | I_R at V_R | | Z_Z at I_{ZT1} | Z_{ZK} at I_{ZT2} | ΔV_Z at I_{ZT1} | | I_Z |
| | V | | | mA | | μA | V | Ω | | %/°C | | mA |
| | MIN. | NOM. | MAX. | | | | | MAX. | MAX. | MIN. | MAX. | |
| BZX85C2V7 | 2.5 | 2.7 | 2.9 | 80 | 1 | < 150 | 1 | < 20 | < 400 | - 0.08 | - 0.05 | 360 |
| BZX85C3V0 | 2.8 | 3.0 | 3.2 | 80 | 1 | < 100 | 1 | < 20 | < 400 | - 0.08 | - 0.05 | 330 |
| BZX85C3V3 | 3.1 | 3.3 | 3.5 | 80 | 1 | < 40 | 1 | < 20 | < 400 | - 0.08 | - 0.05 | 300 |
| BZX85C3V6 | 3.4 | 3.6 | 3.8 | 60 | 1 | < 20 | 1 | < 20 | < 500 | - 0.08 | - 0.05 | 290 |
| BZX85C3V9 | 3.7 | 3.9 | 4.1 | 60 | 1 | < 10 | 1 | < 15 | < 500 | - 0.07 | - 0.02 | 280 |
| BZX85C4V3 | 4 | 4.3 | 4.6 | 50 | 1 | < 3 | 1 | < 13 | < 500 | - 0.05 | 0.01 | 250 |
| BZX85C4V7 | 4.4 | 4.7 | 5 | 45 | 1 | < 3 | 1 | < 13 | < 600 | - 0.03 | 0.04 | 215 |
| BZX85C5V1 | 4.8 | 5.1 | 5.4 | 45 | 1 | < 1 | 1.5 | < 10 | < 500 | - 0.01 | 0.04 | 200 |
| BZX85C5V6 | 5.2 | 5.6 | 6 | 45 | 1 | < 1 | 2 | < 7 | < 400 | 0 | 0.045 | 190 |
| BZX85C6V2 | 5.8 | 6.2 | 6.6 | 35 | 1 | < 1 | 3 | < 4 | < 300 | 0.01 | 0.055 | 170 |
| BZX85C6V8 | 6.4 | 6.8 | 7.2 | 35 | 1 | < 1 | 4 | < 3.5 | < 300 | 0.015 | 0.06 | 155 |
| BZX85C7V5 | 7 | 7.5 | 7.9 | 35 | 0.5 | < 1 | 4.5 | < 3 | < 200 | 0.02 | 0.065 | 140 |
| BZX85C8V2 | 7.7 | 8.2 | 8.7 | 25 | 0.5 | < 1 | 6.2 | < 5 | < 200 | 0.03 | 0.07 | 130 |
| BZX85C9V1 | 8.5 | 9.1 | 9.6 | 25 | 0.5 | < 1 | 6.8 | < 5 | < 200 | 0.035 | 0.075 | 120 |
| BZX85C10 | 9.4 | 10 | 10.6 | 25 | 0.5 | < 0.5 | 7.5 | < 7 | < 200 | 0.04 | 0.08 | 105 |
| BZX85C11 | 10.4 | 11 | 11.6 | 20 | 0.5 | < 0.5 | 8.2 | < 8 | < 300 | 0.045 | 0.08 | 97 |
| BZX85C12 | 11.4 | 12 | 12.7 | 20 | 0.5 | < 0.5 | 9.1 | < 9 | < 350 | 0.045 | 0.085 | 88 |
| BZX85C13 | 12.4 | 13 | 14.1 | 20 | 0.5 | < 0.5 | 10 | < 10 | < 400 | 0.05 | 0.085 | 79 |
| BZX85C15 | 13.8 | 15 | 15.6 | 15 | 0.5 | < 0.5 | 11 | < 15 | < 500 | 0.055 | 0.09 | 71 |
| BZX85C16 | 15.3 | 16 | 17.1 | 15 | 0.5 | < 0.5 | 12 | < 15 | < 500 | 0.055 | 0.09 | 66 |
| BZX85C18 | 16.8 | 18 | 19.1 | 15 | 0.5 | < 0.5 | 13 | < 20 | < 500 | 0.06 | 0.09 | 62 |
| BZX85C20 | 18.8 | 20 | 21.2 | 10 | 0.5 | < 0.5 | 15 | < 24 | < 600 | 0.06 | 0.09 | 56 |
| BZX85C22 | 20.8 | 22 | 23.3 | 10 | 0.5 | < 0.5 | 16 | < 25 | < 600 | 0.06 | 0.095 | 52 |
| BZX85C24 | 22.8 | 24 | 25.6 | 10 | 0.5 | < 0.5 | 18 | < 25 | < 600 | 0.06 | 0.095 | 47 |
| BZX85C27 | 25.1 | 27 | 28.9 | 8 | 0.25 | < 0.5 | 20 | < 30 | < 750 | 0.06 | 0.095 | 41 |
| BZX85C30 | 28 | 30 | 32 | 8 | 0.25 | < 0.5 | 22 | < 30 | < 1000 | 0.06 | 0.095 | 36 |
| BZX85C33 | 31 | 33 | 35 | 8 | 0.25 | < 0.5 | 24 | < 35 | < 1000 | 0.06 | 0.095 | 33 |
| BZX85C36 | 34 | 36 | 38 | 8 | 0.25 | < 0.5 | 27 | < 40 | < 1000 | 0.06 | 0.095 | 30 |
| BZX85C39 | 37 | 39 | 41 | 6 | 0.25 | < 0.5 | 30 | < 50 | < 1000 | 0.06 | 0.095 | 28 |
| BZX85C43 | 40 | 43 | 46 | 6 | 0.25 | < 0.5 | 33 | < 50 | < 1000 | 0.06 | 0.095 | 26 |
| BZX85C47 | 44 | 47 | 50 | 4 | 0.25 | < 0.5 | 36 | < 90 | < 1500 | 0.06 | 0.095 | 23 |
| BZX85C51 | 48 | 51 | 54 | 4 | 0.25 | < 0.5 | 39 | < 115 | < 1500 | 0.06 | 0.095 | 21 |
| BZX85C56 | 52 | 56 | 60 | 4 | 0.25 | < 0.5 | 43 | < 120 | < 2000 | 0.06 | 0.095 | 19 |
| BZX85C62 | 58 | 62 | 66 | 4 | 0.25 | < 0.5 | 47 | < 125 | < 2000 | 0.06 | 0.095 | 16 |
| BZX85C68 | 64 | 68 | 72 | 4 | 0.25 | < 0.5 | 51 | < 130 | < 2000 | 0.055 | 0.095 | 15 |
| BZX85C75 | 70 | 75 | 80 | 4 | 0.25 | < 0.5 | 56 | < 135 | < 2000 | 0.055 | 0.095 | 14 |
| BZX85C82 | 77 | 82 | 87 | 2.7 | 0.25 | < 0.5 | 62 | < 200 | < 3000 | 0.055 | 0.095 | 12 |
| BZX85C91 | 85 | 91 | 96 | 2.7 | 0.25 | < 0.5 | 68 | < 250 | < 3000 | 0.055 | 0.095 | 10 |
| BZX85C100 | 96 | 100 | 106 | 2.7 | 0.25 | < 0.5 | 75 | < 350 | < 3000 | 0.055 | 0.095 | 9.4 |

Notes

- (1) Measured with pulses $t_p = 5\text{ ms}$
- (2) Valid provided that leads are kept at ambient temperature at a distance of 10 mm from case
- (3) Measured with $f = 1\text{ kHz}$



| ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | | | | | | | |
|--|------------------------------------|------|------|--------------|-----------|-------------------------|-----|-----------------------------------|-----------------------|--|--------|---|
| PART NUMBER | ZENER VOLTAGE RANGE ⁽¹⁾ | | | TEST CURRENT | | REVERSE LAEKAGE CURRENT | | DYNAMIC RESISTANCE ⁽³⁾ | | TEMPERATURE COEFFICIENT OF ZENER VOLTAGE | | ADMISSIBLE ZENER CURRENT ⁽²⁾ |
| | V_Z at I_{ZT1} | | | I_{ZT1} | I_{ZT2} | I_R at V_R | | Z_Z at I_{ZT1} | Z_{ZK} at I_{ZT2} | ΔV_Z at I_{ZT1} | | I_Z |
| | V | | | mA | | μA | V | Ω | | %/°C | | mA |
| | MIN. | NOM. | MAX. | | | | | MAX. | MAX. | MIN. | MAX. | |
| BZX85B2V7 | 2.64 | 2.7 | 2.76 | 80 | 1 | < 150 | 1 | < 20 | < 400 | - 0.08 | - 0.05 | 360 |
| BZX85B3V0 | 2.94 | 3 | 3.06 | 80 | 1 | < 100 | 1 | < 20 | < 400 | - 0.08 | - 0.05 | 330 |
| BZX85B3V3 | 2.24 | 3.3 | 3.36 | 80 | 1 | < 40 | 1 | < 20 | < 400 | - 0.08 | - 0.05 | 300 |
| BZX85B3V6 | 3.53 | 3.6 | 3.67 | 60 | 1 | < 20 | 1 | < 20 | < 500 | - 0.08 | - 0.05 | 290 |
| BZX85B3V9 | 3.82 | 3.9 | 3.98 | 60 | 1 | < 10 | 1 | < 15 | < 500 | - 0.07 | - 0.02 | 280 |
| BZX85B4V3 | 4.21 | 4.3 | 4.39 | 50 | 1 | < 3 | 1 | < 13 | < 500 | - 0.05 | 0.01 | 250 |
| BZX85B4V7 | 4.61 | 4.7 | 4.79 | 45 | 1 | < 3 | 1 | < 13 | < 600 | - 0.03 | 0.04 | 215 |
| BZX85B5V1 | 5 | 5.1 | 5.2 | 45 | 1 | < 1 | 1.5 | < 10 | < 500 | - 0.01 | 0.04 | 200 |
| BZX85B5V6 | 5.49 | 5.6 | 5.71 | 45 | 1 | < 1 | 2 | < 7 | < 400 | 0 | 0.045 | 190 |
| BZX85B6V2 | 6.08 | 6.2 | 6.32 | 35 | 1 | < 1 | 3 | < 4 | < 300 | 0.01 | 0.055 | 170 |
| BZX85B6V8 | 6.66 | 6.8 | 6.94 | 35 | 1 | < 1 | 4 | < 3.5 | < 300 | 0.015 | 0.06 | 155 |
| BZX85B7V5 | 7.35 | 7.5 | 7.65 | 35 | 0.5 | < 1 | 4.5 | < 3 | < 200 | 0.02 | 0.065 | 140 |
| BZX85B8V2 | 8.04 | 8.2 | 8.36 | 25 | 0.5 | < 1 | 6.2 | < 5 | < 200 | 0.03 | 0.07 | 130 |
| BZX85B9V1 | 8.92 | 9.1 | 9.28 | 25 | 0.5 | < 1 | 6.8 | < 5 | < 200 | 0.035 | 0.075 | 120 |
| BZX85B10 | 9.8 | 10 | 10.2 | 25 | 0.5 | < 0.5 | 7.5 | < 7 | < 200 | 0.04 | 0.08 | 105 |
| BZX85B11 | 10.8 | 11 | 11.2 | 20 | 0.5 | < 0.5 | 8.2 | < 8 | < 300 | 0.045 | 0.08 | 97 |
| BZX85B12 | 11.8 | 12 | 12.2 | 20 | 0.5 | < 0.5 | 9.1 | < 9 | < 350 | 0.045 | 0.085 | 88 |
| BZX85B13 | 12.7 | 13 | 13.3 | 20 | 0.5 | < 0.5 | 10 | < 10 | < 400 | 0.05 | 0.085 | 79 |
| BZX85B15 | 14.7 | 15 | 15.3 | 15 | 0.5 | < 0.5 | 11 | < 15 | < 500 | 0.055 | 0.09 | 71 |
| BZX85B16 | 15.7 | 16 | 16.3 | 15 | 0.5 | < 0.5 | 12 | < 15 | < 500 | 0.055 | 0.09 | 66 |
| BZX85B18 | 17.6 | 18 | 18.4 | 15 | 0.5 | < 0.5 | 13 | < 20 | < 500 | 0.06 | 0.09 | 62 |
| BZX85B20 | 19.6 | 20 | 20.4 | 10 | 0.5 | < 0.5 | 15 | < 24 | < 600 | 0.06 | 0.09 | 56 |
| BZX85B22 | 21.6 | 22 | 22.4 | 10 | 0.5 | < 0.5 | 16 | < 25 | < 600 | 0.06 | 0.095 | 52 |
| BZX85B24 | 23.5 | 24 | 24.5 | 10 | 0.5 | < 0.5 | 18 | < 25 | < 600 | 0.06 | 0.095 | 47 |
| BZX85B27 | 26.5 | 27 | 27.5 | 8 | 0.25 | < 0.5 | 20 | < 30 | < 750 | 0.06 | 0.095 | 41 |
| BZX85B30 | 29.4 | 30 | 30.6 | 8 | 0.25 | < 0.5 | 22 | < 30 | < 1000 | 0.06 | 0.095 | 36 |
| BZX85B33 | 32.3 | 33 | 33.7 | 8 | 0.25 | < 0.5 | 24 | < 35 | < 1000 | 0.06 | 0.095 | 33 |
| BZX85B36 | 35.3 | 36 | 36.7 | 8 | 0.25 | < 0.5 | 27 | < 40 | < 1000 | 0.06 | 0.095 | 30 |
| BZX85B39 | 38.2 | 39 | 39.8 | 6 | 0.25 | < 0.5 | 30 | < 50 | < 1000 | 0.06 | 0.095 | 28 |
| BZX85B43 | 42.1 | 43 | 43.9 | 6 | 0.25 | < 0.5 | 33 | < 50 | < 1000 | 0.06 | 0.095 | 26 |
| BZX85B47 | 46.1 | 47 | 47.9 | 4 | 0.25 | < 0.5 | 36 | < 90 | < 1500 | 0.06 | 0.095 | 23 |
| BZX85B51 | 50 | 51 | 52 | 4 | 0.25 | < 0.5 | 39 | < 115 | < 1500 | 0.06 | 0.095 | 21 |
| BZX85B56 | 54.9 | 56 | 57.1 | 4 | 0.25 | < 0.5 | 43 | < 120 | < 2000 | 0.06 | 0.095 | 19 |
| BZX85B62 | 60.8 | 62 | 63.2 | 4 | 0.25 | < 0.5 | 47 | < 125 | < 2000 | 0.06 | 0.095 | 16 |
| BZX85B68 | 66.6 | 68 | 69.4 | 4 | 0.25 | < 0.5 | 51 | < 130 | < 2000 | 0.055 | 0.095 | 15 |
| BZX85B75 | 73.5 | 75 | 76.5 | 4 | 0.25 | < 0.5 | 56 | < 135 | < 2000 | 0.055 | 0.095 | 14 |
| BZX85B82 | 80.4 | 82 | 83.6 | 2.7 | 0.25 | < 0.5 | 62 | < 200 | < 3000 | 0.055 | 0.095 | 12 |
| BZX85B91 | 89.2 | 91 | 92.8 | 2.7 | 0.25 | < 0.5 | 68 | < 250 | < 3000 | 0.055 | 0.095 | 10 |
| BZX85B100 | 98 | 100 | 102 | 2.7 | 0.25 | < 0.5 | 75 | < 350 | < 3000 | 0.055 | 0.095 | 9.4 |

Notes

- (1) Measured with pulses $t_p = 5\text{ ms}$
- (2) Valid provided that leads are kept at ambient temperature at a distance of 10 mm from case
- (3) Measured with $f = 1\text{ kHz}$

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

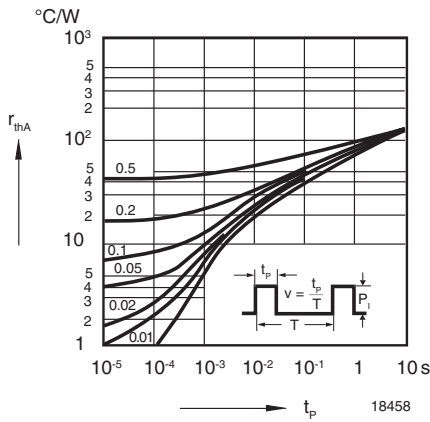


Fig. 1 - Pulse Thermal Resistance vs. Pulse Duration

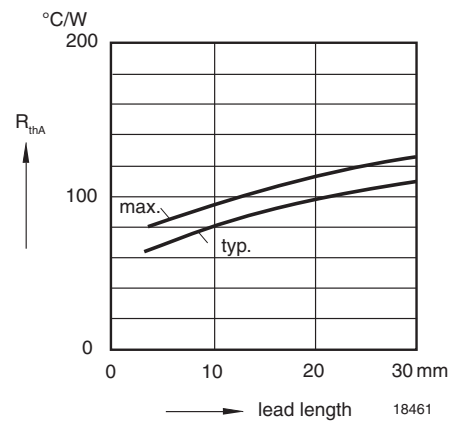


Fig. 4 - Thermal Resistance vs. Lead Length

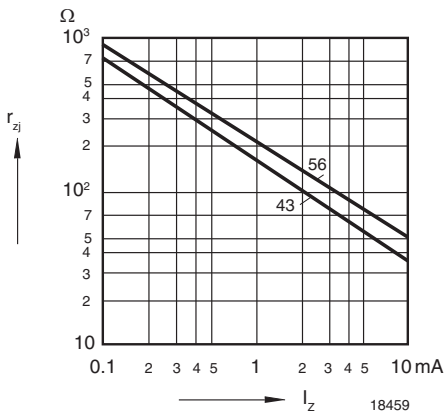


Fig. 2 - Dynamic Resistance vs. Zener Current

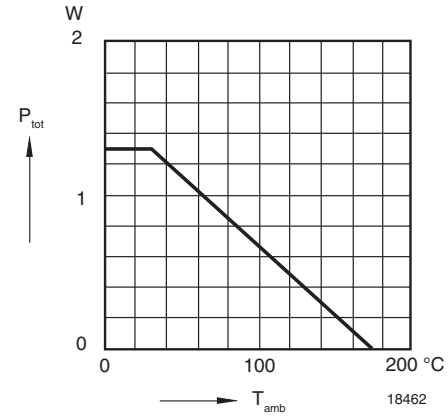


Fig. 5 - Admissible Power Dissipation vs. Ambient Temperature

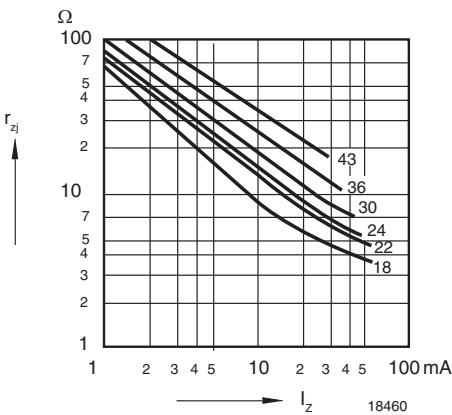


Fig. 3 - Dynamic Resistance vs. Zener Current

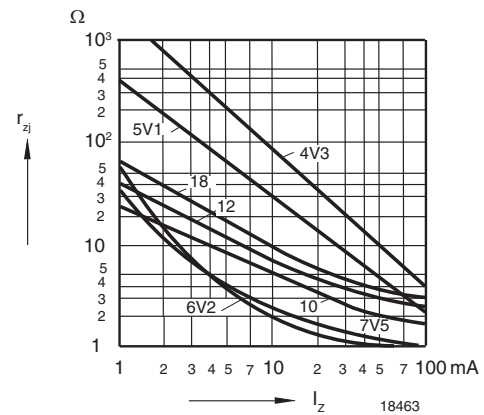


Fig. 6 - Dynamic Resistance vs. Zener Current

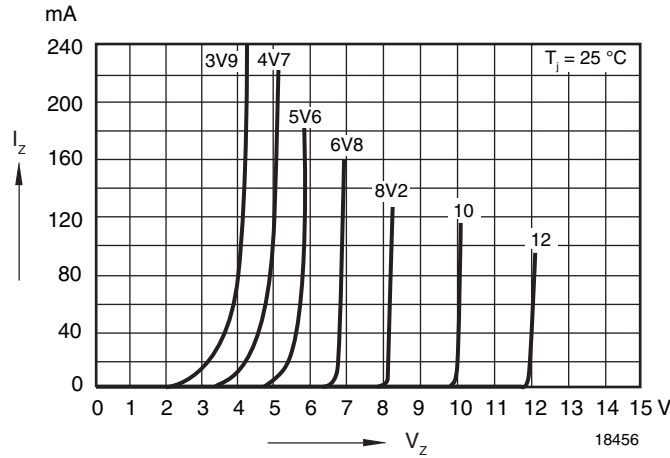


Fig. 7 - Breakdown Characteristics

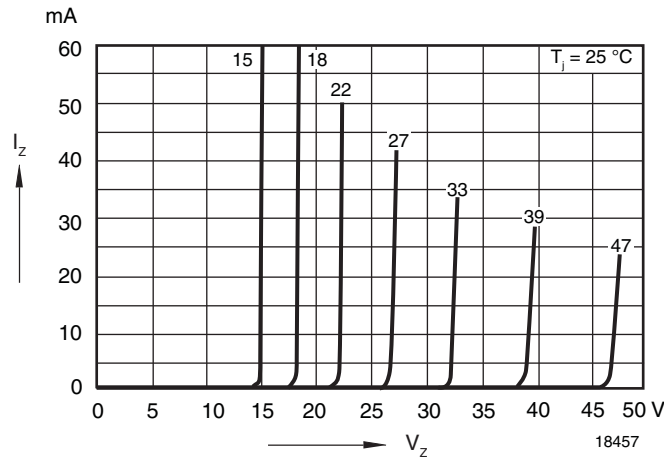
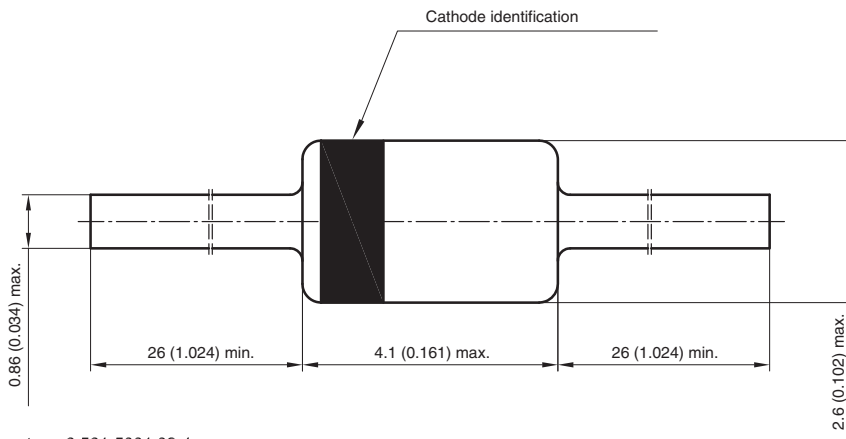


Fig. 8 - Breakdown Characteristics

PACKAGE DIMENSIONS in millimeters (inches): **DO-41 (DO-204AL)**



Document no.: 6.561-5001.02-4
 Rev. 3 - Date: 09 February 2005
 94 9368



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.