



THE DATASHEET OF TZX33A-TAP



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 36 | V |
| Test current I _{ZT} | 2; 5 | mA |
| V _Z specification | Pulse current | |
| Circuit configuration | Single | |

| ORDERING INFORMATION | | | |
|----------------------|----------------|-------------------------------------|------------------------|
| DEVICE NAME | ORDERING CODE | TAPED UNITS PER REEL | MINIMUM ORDER QUANTITY |
| TZX-series | TZX-series-TAP | 10 000 per ammpack (52 mm tape) | 30 000/box |
| TZX-series | TZX-series-TR | 10 000 per 14" reel (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 |
| Thermal resistance 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 |
|-------------|---------------------|------|--------------|-------------------------|----------------|------|-------------------------------|--------------------|
| | V_Z at I_{ZT1} | | | I_{ZT1} | I_R at V_R | | I_R at V_R ⁽¹⁾ | |
| | V | | mA | | μA | V | μA | V |
| | MIN. | MAX. | | MAX. | MAX. | MAX. | MAX. | MAX. |
| TZX2V4A | 2.3 | 2.5 | 5 | 5 | 0.5 | 50 | 1 | 100 |
| TZX2V4B | 2.4 | 2.6 | 5 | 5 | 0.5 | 50 | 1 | 100 |
| TZX2V7A | 2.5 | 2.7 | 5 | 5 | 0.5 | 10 | 1 | 100 |
| TZX2V7B | 2.6 | 2.8 | 5 | 5 | 0.5 | 10 | 1 | 100 |
| TZX2V7C | 2.7 | 2.9 | 5 | 5 | 0.5 | 10 | 1 | 100 |
| TZX3V0A | 2.8 | 3 | 5 | 5 | 0.5 | 6 | 1 | 100 |
| TZX3V0B | 2.9 | 3.1 | 5 | 5 | 0.5 | 6 | 1 | 100 |
| TZX3V0C | 3 | 3.2 | 5 | 5 | 0.5 | 6 | 1 | 100 |
| TZX3V3A | 3.1 | 3.3 | 5 | 5 | 1 | 2 | 1 | 100 |
| TZX3V3B | 3.2 | 3.4 | 5 | 5 | 1 | 2 | 1 | 100 |
| TZX3V3C | 3.3 | 3.5 | 5 | 5 | 1 | 2 | 1 | 100 |
| TZX3V6A | 3.4 | 3.6 | 5 | 5 | 1 | 2 | 1 | 100 |
| TZX3V6B | 3.5 | 3.7 | 5 | 5 | 1 | 2 | 1 | 100 |
| TZX3V6C | 3.6 | 3.8 | 5 | 5 | 1 | 2 | 1 | 100 |
| TZX3V9A | 3.7 | 3.9 | 5 | 5 | 1 | 2 | 1 | 100 |
| TZX3V9B | 3.8 | 4 | 5 | 5 | 1 | 2 | 1 | 100 |
| TZX3V9C | 3.9 | 4.1 | 5 | 5 | 1 | 2 | 1 | 100 |
| TZX4V3A | 4 | 4.2 | 5 | 5 | 1.5 | 1 | 1 | 100 |
| TZX4V3B | 4.1 | 4.3 | 5 | 5 | 1.5 | 1 | 1 | 100 |
| TZX4V3C | 4.2 | 4.4 | 5 | 5 | 1.5 | 1 | 1 | 100 |
| TZX4V3D | 4.3 | 4.5 | 5 | 5 | 1.5 | 1 | 1 | 100 |
| TZX4V7A | 4.4 | 4.6 | 5 | 5 | 2 | 6 | 2 | 100 |
| TZX4V7B | 4.5 | 4.7 | 5 | 5 | 2 | 5 | 2 | 100 |
| TZX4V7C | 4.6 | 4.8 | 5 | 5 | 2 | 4 | 2 | 100 |
| TZX4V7D | 4.7 | 4.9 | 5 | 5 | 2 | 3 | 2 | 100 |
| TZX5V1A | 4.8 | 5 | 5 | 5 | 2 | 2 | 2 | 100 |
| TZX5V1B | 4.9 | 5.1 | 5 | 5 | 2 | 2 | 2 | 100 |
| TZX5V1C | 5 | 5.2 | 5 | 5 | 2 | 2 | 2 | 100 |
| TZX5V1D | 5.1 | 5.3 | 5 | 5 | 2 | 2 | 2 | 100 |
| TZX5V6A | 5.2 | 5.5 | 5 | 5 | 2 | 1 | 2 | 40 |
| TZX5V6B | 5.3 | 5.6 | 5 | 5 | 2 | 1 | 2 | 40 |
| TZX5V6C | 5.4 | 5.7 | 5 | 5 | 2 | 1 | 2 | 40 |
| TZX5V6D | 5.5 | 5.8 | 5 | 5 | 2 | 1 | 2 | 40 |
| TZX5V6E | 5.6 | 5.9 | 5 | 5 | 2 | 1 | 2 | 40 |
| TZX6V2A | 5.7 | 6 | 5 | 1 | 3 | 3 | 4 | 15 |
| TZX6V2B | 5.8 | 6.1 | 5 | 1 | 3 | 3 | 4 | 15 |
| TZX6V2C | 6 | 6.3 | 5 | 1 | 3 | 3 | 4 | 15 |
| TZX6V2D | 6.1 | 6.4 | 5 | 1 | 3 | 3 | 4 | 15 |
| TZX6V2E | 6.3 | 6.6 | 5 | 1 | 3 | 3 | 4 | 15 |
| TZX6V8A | 6.4 | 6.7 | 5 | 1 | 3.5 | 2 | 4 | 15 |
| TZX6V8B | 6.6 | 6.9 | 5 | 1 | 3.5 | 2 | 4 | 15 |
| TZX6V8C | 6.7 | 7 | 5 | 1 | 3.5 | 2 | 4 | 15 |
| TZX6V8D | 6.9 | 7.2 | 5 | 1 | 3.5 | 2 | 4 | 15 |

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

| PART NUMBER | ZENER VOLTAGE RANGE | | TEST CURRENT | REVERSE LEAKAGE CURRENT | | | | DYNAMIC RESISTANCE |
|-------------|---------------------|-------|--------------|-------------------------|------|-------------------------------|------|--------------------|
| | V_Z at I_{ZT1} | | | I_R at V_R | | I_R at V_R ⁽¹⁾ | | |
| | V | | mA | μA | V | μA | V | Ω |
| | MIN. | MAX. | | MAX. | | MAX. | | MAX. |
| TZX7V5A | 7 | 7.3 | 5 | 1 | 5 | 30 | 6.65 | 15 |
| TZX7V5B | 7.2 | 7.6 | 5 | 1 | 5 | 30 | 6.84 | 15 |
| TZX7V5C | 7.3 | 7.7 | 5 | 1 | 5 | 30 | 6.94 | 15 |
| TZX7V5D | 7.5 | 7.9 | 5 | 1 | 5 | 30 | 7.13 | 15 |
| TZX7V5X | 7.07 | 7.45 | 5 | 1 | 5 | 30 | 6.72 | 15 |
| TZX8V2A | 7.7 | 8.1 | 5 | 1 | 6.2 | 0.1 | 7.32 | 20 |
| TZX8V2B | 7.9 | 8.3 | 5 | 1 | 6.2 | 0.1 | 7.5 | 20 |
| TZX8V2C | 8.1 | 8.5 | 5 | 1 | 6.2 | 0.1 | 7.7 | 20 |
| TZX8V2D | 8.3 | 8.7 | 5 | 1 | 6.2 | 0.1 | 7.98 | 20 |
| TZX9V1A | 8.5 | 8.9 | 5 | 1 | 6.8 | 0.04 | 8.08 | 20 |
| TZX9V1B | 8.7 | 9.1 | 5 | 1 | 6.8 | 0.04 | 8.27 | 20 |
| TZX9V1C | 8.9 | 9.3 | 5 | 1 | 6.8 | 0.04 | 8.46 | 20 |
| TZX9V1D | 9.1 | 9.5 | 5 | 1 | 6.8 | 0.04 | 8.65 | 20 |
| TZX9V1E | 9.3 | 9.7 | 5 | 1 | 6.8 | 0.04 | 8.84 | 20 |
| TZX10A | 9.5 | 9.9 | 5 | 1 | 7.5 | 0.04 | 9.03 | 25 |
| TZX10B | 9.7 | 10.1 | 5 | 1 | 7.5 | 0.04 | 9.22 | 25 |
| TZX10C | 9.9 | 10.3 | 5 | 1 | 7.5 | 0.04 | 9.41 | 25 |
| TZX10D | 10.2 | 10.6 | 5 | 1 | 7.5 | 0.04 | 9.69 | 25 |
| TZX11A | 10.4 | 10.8 | 5 | 1 | 8.2 | 0.04 | 9.88 | 25 |
| TZX11B | 10.7 | 11.1 | 5 | 1 | 8.2 | 0.04 | 10.2 | 25 |
| TZX11C | 10.9 | 11.3 | 5 | 1 | 8.2 | 0.04 | 10.4 | 25 |
| TZX11D | 11.1 | 11.6 | 5 | 1 | 8.2 | 0.04 | 10.5 | 25 |
| TZX12A | 11.4 | 11.9 | 5 | 1 | 9.5 | 0.04 | 10.8 | 35 |
| TZX12B | 11.6 | 12.1 | 5 | 1 | 9.5 | 0.04 | 11 | 35 |
| TZX12C | 11.9 | 12.4 | 5 | 1 | 9.5 | 0.04 | 11.3 | 35 |
| TZX12D | 12.2 | 12.7 | 5 | 1 | 9.5 | 0.04 | 11.6 | 35 |
| TZX12X | 11.44 | 12.03 | 5 | 1 | 9.5 | 0.04 | 10.9 | 35 |
| TZX13A | 12.4 | 12.9 | 5 | 1 | 10 | 0.04 | 11.8 | 35 |
| TZX13B | 12.6 | 13.1 | 5 | 1 | 10 | 0.04 | 12 | 35 |
| TZX13C | 12.9 | 13.4 | 5 | 1 | 10 | 0.04 | 12.3 | 35 |
| TZX14A | 13.2 | 13.7 | 5 | 1 | 11 | 0.04 | 12.5 | 35 |
| TZX14B | 13.5 | 14 | 5 | 1 | 11 | 0.04 | 12.8 | 35 |
| TZX14C | 13.8 | 14.3 | 5 | 1 | 11 | 0.04 | 13.1 | 35 |
| TZX15A | 14.1 | 14.7 | 5 | 1 | 11.5 | 0.04 | 13.4 | 40 |
| TZX15B | 14.5 | 15.1 | 5 | 1 | 11.5 | 0.04 | 13.8 | 40 |
| TZX15C | 14.9 | 15.5 | 5 | 1 | 11.5 | 0.04 | 14.2 | 40 |
| TZX15X | 14.35 | 15.09 | 5 | 1 | 11.5 | 0.04 | 13.6 | 40 |
| TZX16A | 15.3 | 15.9 | 5 | 1 | 12 | 0.04 | 14.5 | 45 |
| TZX16B | 15.7 | 16.5 | 5 | 1 | 12 | 0.04 | 14.9 | 45 |
| TZX16C | 16.3 | 17.1 | 5 | 1 | 12 | 0.04 | 15.5 | 45 |
| TZX18A | 16.9 | 17.7 | 5 | 1 | 13 | 0.04 | 16.1 | 55 |
| TZX18B | 17.5 | 18.3 | 5 | 1 | 13 | 0.04 | 16.6 | 55 |
| TZX18C | 18.1 | 19 | 5 | 1 | 13 | 0.04 | 17.2 | 55 |
| TZX20A | 18.8 | 19.7 | 2 | 1 | 15 | 0.04 | 17.9 | 60 |
| TZX20B | 19.5 | 20.4 | 2 | 1 | 15 | 0.04 | 18.5 | 60 |
| TZX20C | 20.2 | 21.2 | 2 | 1 | 15 | 0.04 | 19.2 | 60 |
| TZX22A | 20.9 | 21.9 | 2 | 1 | 17 | 0.04 | 19.9 | 65 |

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

| PART NUMBER | ZENER VOLTAGE RANGE | | TEST CURRENT | REVERSE LEAKAGE CURRENT | | | | DYNAMIC RESISTANCE |
|-------------|---------------------|-------|--------------|-------------------------|----|-------------------------------|------|--------------------|
| | V_Z at I_{ZT1} | | | I_R at V_R | | I_R at V_R ⁽¹⁾ | | |
| | V | | mA | μA | V | μA | V | Ω |
| | MIN. | MAX. | | | | | | |
| TZX22B | 21.6 | 22.6 | 2 | 1 | 17 | 0.04 | 20.5 | 65 |
| TZX22C | 22.3 | 23.3 | 2 | 1 | 17 | 0.04 | 21.2 | 65 |
| TZX24A | 22.9 | 24 | 2 | 1 | 19 | 0.04 | 21.8 | 70 |
| TZX24B | 23.6 | 24.7 | 2 | 1 | 19 | 0.04 | 22.4 | 70 |
| TZX24C | 24.3 | 25.5 | 2 | 1 | 19 | 0.04 | 23.1 | 70 |
| TZX24X | 22.61 | 23.77 | 2 | 1 | 19 | 0.04 | 21.5 | 70 |
| TZX27A | 25.2 | 26.6 | 2 | 1 | 21 | 0.04 | 23.9 | 80 |
| TZX27B | 26.2 | 27.6 | 2 | 1 | 21 | 0.04 | 24.9 | 80 |
| TZX27C | 27.2 | 28.6 | 2 | 1 | 21 | 0.04 | 25.8 | 80 |
| TZX27X | 26.99 | 28.39 | 2 | 1 | 21 | 0.04 | 25.6 | 80 |
| TZX30A | 28.2 | 29.6 | 2 | 1 | 23 | 0.04 | 26.8 | 100 |
| TZX30B | 29.2 | 30.6 | 2 | 1 | 23 | 0.04 | 27.7 | 100 |
| TZX30C | 30.2 | 31.6 | 2 | 1 | 23 | 0.04 | 28.7 | 100 |
| TZX30X | 29.02 | 30.51 | 2 | 1 | 23 | 0.04 | 27.6 | 100 |
| TZX33A | 31.2 | 32.6 | 2 | 1 | 25 | 0.04 | 29.6 | 120 |
| TZX33B | 32.2 | 33.6 | 2 | 1 | 25 | 0.04 | 30.6 | 120 |
| TZX33C | 33.2 | 34.5 | 2 | 1 | 25 | 0.04 | 31.5 | 120 |
| TZX36A | 34.2 | 35.7 | 2 | 1 | 27 | 0.04 | 32.5 | 140 |
| TZX36B | 35.3 | 36.8 | 2 | 1 | 27 | 0.04 | 33.5 | 140 |
| TZX36C | 36.4 | 38 | 2 | 1 | 27 | 0.04 | 34.6 | 140 |
| TZX36X | 35.36 | 37.19 | 2 | 1 | 27 | 0.04 | 33.6 | 140 |

Notes

- Additional measurement of voltage group TZX9V1 to TZX36, I_R at 95 % V_{Zmin} , $\leq 40\text{ nA}$ at $T_j = 25\text{ }^{\circ}\text{C}$
- (1) Additional measurement

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


Fig. 1 - Thermal Resistance vs. Lead Length



Fig. 2 - Total Power Dissipation vs. Ambient Temperature



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



Fig. 7 - Forward Current vs. Forward Voltage



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



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

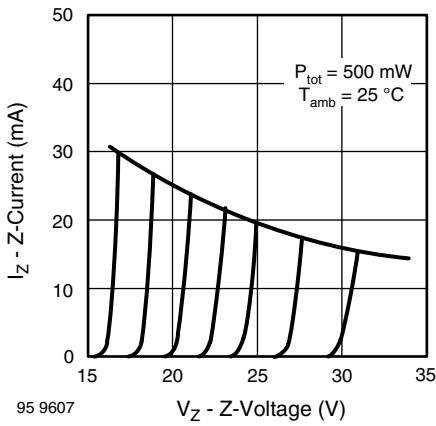


Fig. 9 - Z-Current vs. Z-Voltage

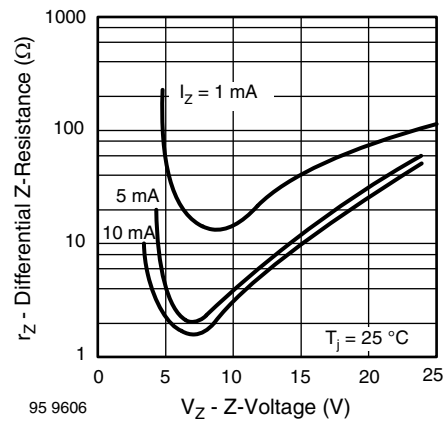


Fig. 10 - Differential Z-Resistance vs. Z-Voltage



Fig. 11 - Thermal Response

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



Rev. 6 - Date: 19. December 2011
 Document no.: SB-V-3906.04-031(4)
 94 9366



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.



Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

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.

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

-  [View TZX33A-TAP on WIN SOURCE](#)
-  [Vishay Information](#)

Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management