

Small Signal Zener Diodes



FEATURES

- Zener voltage specified at 50 μ A
- Maximum delta V_Z given from 10 μ A to 100 μ A
- Very high stability
- Low noise
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

DESIGN SUPPORT TOOLS

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3D
Models
Available

APPLICATIONS

- Voltage stabilization

PRIMARY CHARACTERISTICS

| PARAMETER | VALUE | UNIT |
|-----------------------|---------------|------|
| V_Z range nom. | 1.8 to 43 | V |
| Test current I_{ZT} | 0.05 | mA |
| V_Z specification | Pulse current | |
| Circuit configuration | Single | |

ORDERING INFORMATION

| DEVICE NAME | ORDERING CODE | TAPED UNITS PER REEL | MINIMUM ORDER QUANTITY |
|--------------------|------------------------------|----------------------|------------------------|
| TZS4678 to TZS4717 | TZS4678-GS08 to TZS4717-GS08 | 2500 (per 7" reel) | 12 500/box |

PACKAGE

| PACKAGE NAME | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL | SOLDERING CONDITIONS |
|---------------------|--------|-----------------------------------------|--------------------------------------|--------------------------|
| QuadroMELF (SOD-80) | 34 mg | UL 94 V-0 | MSL level 1 (according J-STD-020) | 260 °C/10 s at terminals |

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

| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
|---------------------------|------------------------------------|------------|---------------|------|
| Power dissipation | $R_{thJA} \leq 300\text{ K/W}$ | P_{tot} | 500 | mW |
| Zener current | | I_Z | P_{tot}/V_Z | mA |
| Junction to ambient air | On PC board 50 mm x 50 mm x 1.6 mm | R_{thJA} | 500 | K/W |
| Junction temperature | | T_j | 175 | °C |
| Storage temperature range | | T_{stg} | -65 to +175 | °C |
| Forward voltage (max.) | $I_F = 100\text{ mA}$ | 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 CURRENT ⁽³⁾ | | VOLTAGE CHANGE ⁽⁴⁾ |
| | V_Z at I_{ZT1} | | | I_{ZT1} | I_{ZT2} ⁽²⁾ | I_R at V_R | | ΔV_Z |
| | V | | | mA | | μA | V | V |
| | MIN. | NOM. ⁽¹⁾ | MAX. | | | MAX. | | MAX. |
| TZS4678 | 1.71 | 1.8 | 1.89 | 0.05 | 120 | 7.5 | 1 | 0.7 |
| TZS4679 | 1.9 | 2 | 2.1 | 0.05 | 110 | 5 | 1 | 0.7 |
| TZS4680 | 2.09 | 2.2 | 2.31 | 0.05 | 100 | 4 | 1 | 0.75 |
| TZS4681 | 2.28 | 2.4 | 2.52 | 0.05 | 95 | 2 | 1 | 0.8 |
| TZS4682 | 2.565 | 2.7 | 2.835 | 0.05 | 90 | 1 | 1 | 0.85 |
| TZS4683 | 2.85 | 3 | 3.15 | 0.05 | 85 | 0.8 | 1 | 0.9 |
| TZS4684 | 3.135 | 3.3 | 3.465 | 0.05 | 80 | 7.5 | 1.5 | 0.95 |
| TZS4685 | 3.42 | 3.6 | 3.78 | 0.05 | 75 | 7.5 | 2 | 0.95 |
| TZS4686 | 3.705 | 3.9 | 4.095 | 0.05 | 70 | 5 | 2 | 0.97 |
| TZS4687 | 4.085 | 4.3 | 4.515 | 0.05 | 65 | 4 | 2 | 0.99 |
| TZS4688 | 4.465 | 4.7 | 4.935 | 0.05 | 60 | 10 | 3 | 0.99 |
| TZS4689 | 4.845 | 5.1 | 5.355 | 0.05 | 55 | 10 | 3 | 0.97 |
| TZS4690 | 5.32 | 5.6 | 5.88 | 0.05 | 50 | 10 | 4 | 0.96 |
| TZS4691 | 5.89 | 6.2 | 6.51 | 0.05 | 45 | 10 | 5 | 0.95 |
| TZS4692 | 6.46 | 6.8 | 7.14 | 0.05 | 35 | 10 | 5.1 | 0.9 |
| TZS4693 | 7.125 | 7.5 | 7.875 | 0.05 | 31.8 | 10 | 5.7 | 0.75 |
| TZS4694 | 7.79 | 8.2 | 8.61 | 0.05 | 29 | 1 | 6.2 | 0.5 |
| TZS4695 | 8.265 | 8.7 | 9.135 | 0.05 | 27.4 | 1 | 6.6 | 0.1 |
| TZS4696 | 8.645 | 9.1 | 9.555 | 0.05 | 26.2 | 1 | 6.9 | 0.08 |
| TZS4697 | 9.5 | 10 | 10.5 | 0.05 | 24.8 | 1 | 7.6 | 0.1 |
| TZS4698 | 10.45 | 11 | 11.55 | 0.05 | 21.6 | 0.05 | 8.4 | 0.11 |
| TZS4699 | 11.4 | 12 | 12.6 | 0.05 | 20.4 | 0.05 | 9.1 | 0.12 |
| TZS4700 | 12.35 | 13 | 13.65 | 0.05 | 19 | 0.05 | 9.8 | 0.13 |
| TZS4701 | 13.3 | 14 | 14.7 | 0.05 | 17.5 | 0.05 | 10.6 | 0.14 |
| TZS4702 | 14.25 | 15 | 15.75 | 0.05 | 16.3 | 0.05 | 11.4 | 0.15 |
| TZS4703 | 15.2 | 16 | 16.8 | 0.05 | 15.4 | 0.05 | 12.1 | 0.16 |
| TZS4704 | 16.15 | 17 | 17.85 | 0.05 | 14.5 | 0.05 | 12.9 | 0.17 |
| TZS4705 | 17.1 | 18 | 18.9 | 0.05 | 13.2 | 0.05 | 13.6 | 0.18 |
| TZS4706 | 18.05 | 19 | 19.95 | 0.05 | 12.5 | 0.05 | 14.4 | 0.19 |
| TZS4707 | 19 | 20 | 21 | 0.05 | 11.9 | 0.01 | 15.2 | 0.2 |
| TZS4708 | 20.9 | 22 | 23.1 | 0.05 | 10.8 | 0.01 | 16.7 | 0.22 |
| TZS4709 | 22.8 | 24 | 25.2 | 0.05 | 9.9 | 0.01 | 18.2 | 0.24 |
| TZS4710 | 23.75 | 25 | 26.25 | 0.05 | 9.5 | 0.01 | 19 | 0.25 |
| TZS4711 | 25.65 | 27 | 28.35 | 0.05 | 8.8 | 0.01 | 20.4 | 0.27 |
| TZS4712 | 26.6 | 28 | 29.4 | 0.05 | 8.5 | 0.01 | 21.2 | 0.28 |
| TZS4713 | 28.5 | 30 | 31.5 | 0.05 | 7.9 | 0.01 | 22.8 | 0.3 |
| TZS4714 | 31.35 | 33 | 34.65 | 0.05 | 7.2 | 0.01 | 25 | 0.33 |
| TZS4715 | 34.2 | 36 | 37.8 | 0.05 | 6.6 | 0.01 | 27.3 | 0.36 |
| TZS4716 | 37.05 | 39 | 40.95 | 0.05 | 6.1 | 0.01 | 29.6 | 0.39 |
| TZS4717 | 40.85 | 43 | 45.15 | 0.05 | 5.5 | 0.01 | 32.6 | 0.43 |

Notes

- (1) Tolerancing and voltage designation (V_Z). The type numbers shown have a standard tolerance of $\pm 5\%$ on the nominal zener voltage.
- (2) Maximum Zener current ratings (I_{ZM}). Maximum Zener current ratings are based on maximum Zener voltage of the individual units
- (3) Reverse leakage current (I_R). Reverse leakage currents are guaranteed and measured at V_R as shown on the table.
- (4) Maximum voltage change (ΔV_Z). Voltage change is equal to the difference between V_Z at 100 μA and V_Z at 10 μA .



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

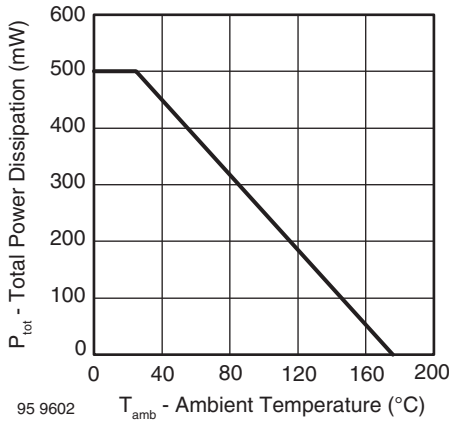


Fig. 1 - Total Power Dissipation vs. Ambient Temperature

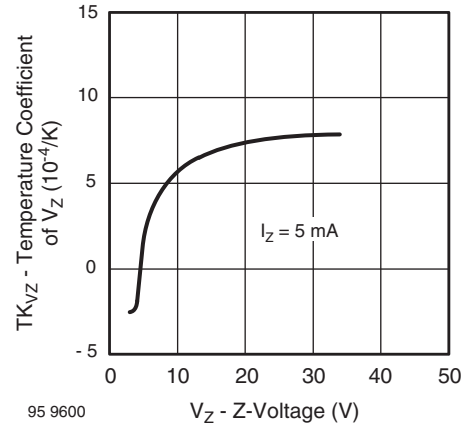


Fig. 4 - Temperature Coefficient of V_Z vs. Z-Voltage

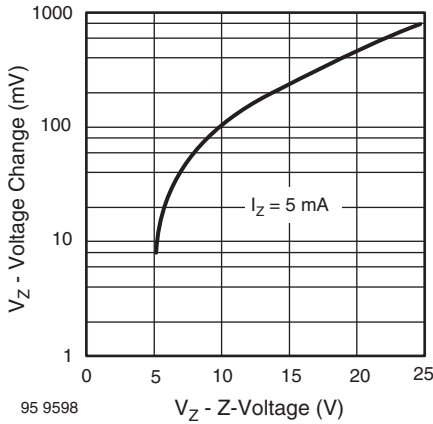


Fig. 2 - Typical Change of Working Voltage under Operating Conditions at $T_{amb} = 25\text{ }^{\circ}\text{C}$

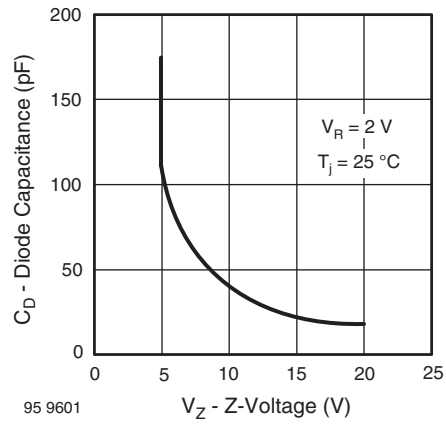


Fig. 5 - Diode Capacitance vs. Z-Voltage

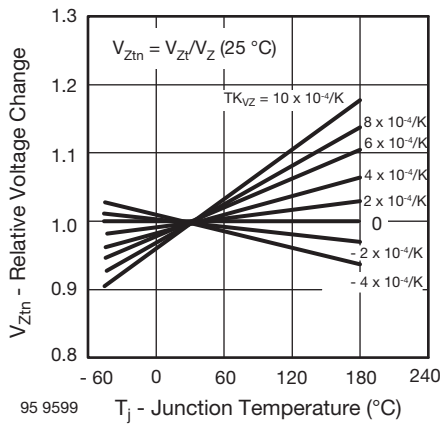


Fig. 3 - Typical Change of Working Voltage vs. Junction Temperature

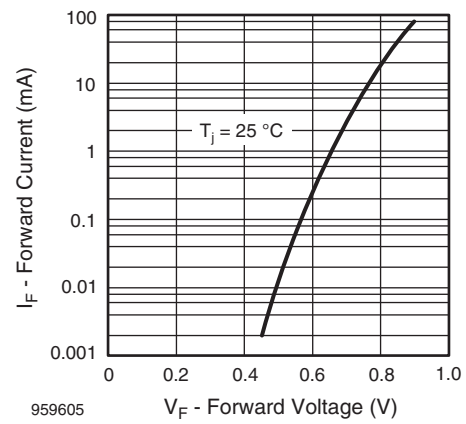


Fig. 6 - Forward Current vs. Forward Voltage

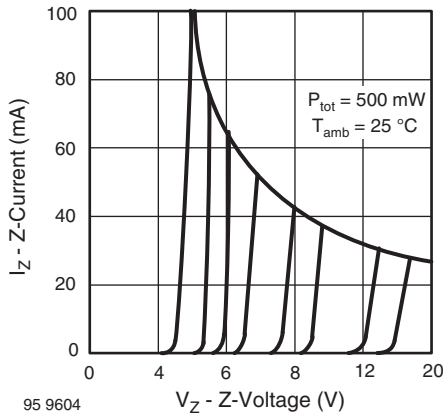


Fig. 7 - Z-Current vs. Z-Voltage

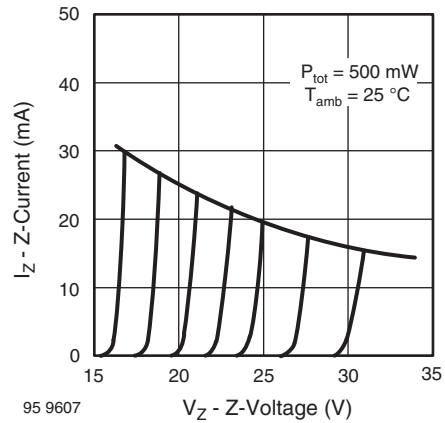


Fig. 8 - Z-Current vs. Z-Voltage

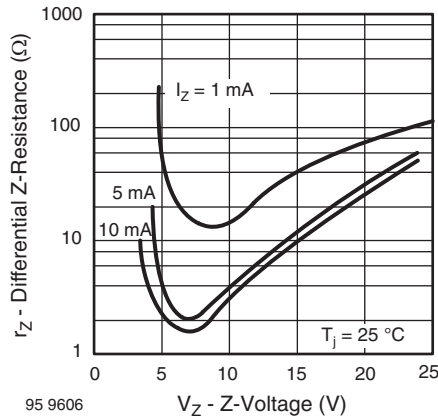


Fig. 9 - Differential Z-Resistance vs. Z-Voltage

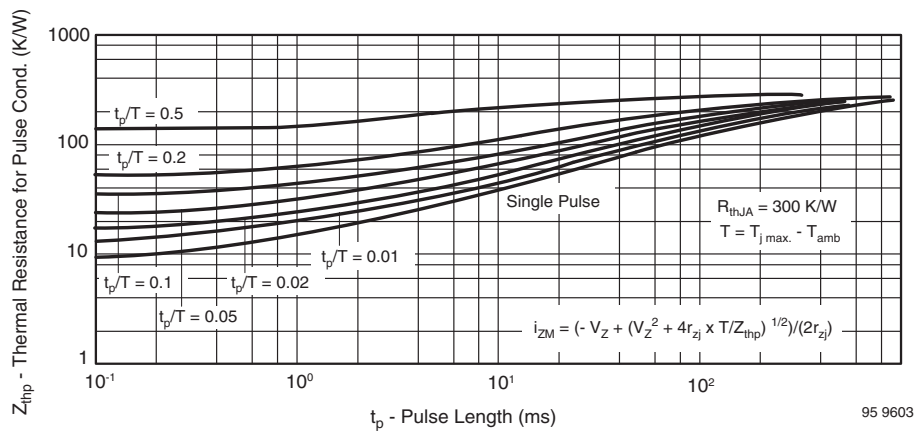
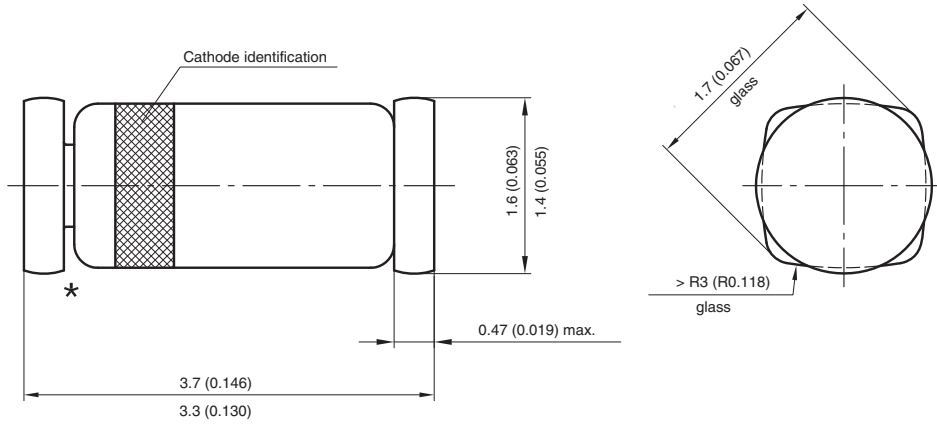


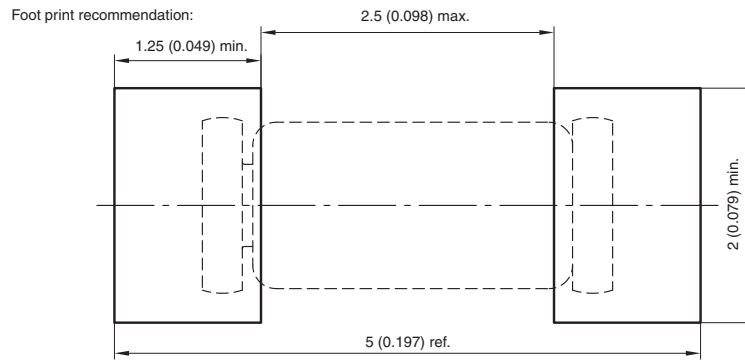
Fig. 10 - Thermal Response



PACKAGE DIMENSIONS in millimeters (inches): **QuadroMELF SOD-80**



* The gap between plug and glass can be either on cathode or anode side



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