

## Small Signal Zener Diodes



### FEATURES

- Zener voltage specified at 50  $\mu$ A
- Maximum delta  $V_Z$  given from 10  $\mu$ A to 100  $\mu$ A
- Very high stability
- Low noise
- AEC-Q101 qualified
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC


**RoHS**  
COMPLIANT

### 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 |      |
| Int. construction     | Single        |      |

### ORDERING INFORMATION

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

### PACKAGE

| PACKAGE NAME      | WEIGHT | MOLDING COMPOUND<br>FLAMMABILITY RATING | MOISTURE SENSITIVITY<br>LEVEL        | SOLDERING<br>CONDITIONS  |
|-------------------|--------|---|--------------------------------------|--------------------------|
| QuadroMELF SOD-80 | 34 mg  | UL 94 V-0                               | MSL level 1<br>(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 <sup>(3)</sup> |      | VOLTAGE CHANGE <sup>(4)</sup> |
|   | $V_Z$ at $I_{ZT1}$  |                     |       | $I_{ZT1}$    | $I_{ZT2}$ <sup>(2)</sup> | $I_R$ at $V_R$                 |      | $\Delta V_Z$                  |
|   | V                   |                     |       | mA           |                          | $\mu\text{A}$                  | V    | V                             |
|   | MIN.                | NOM. <sup>(1)</sup> | 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 ( $\Delta V_Z$ ). Voltage change is equal to the difference between  $V_Z$  at 100  $\mu\text{A}$  and  $V_Z$  at 10  $\mu\text{A}$ .

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

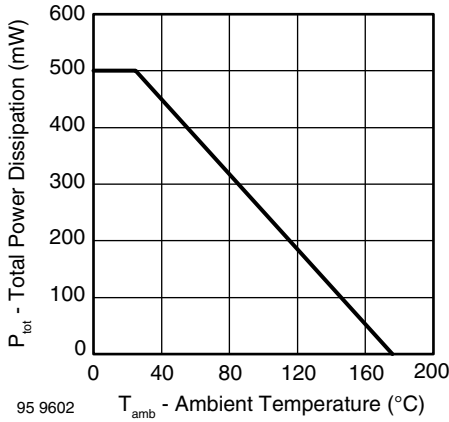


Fig. 1 - Total Power Dissipation vs. Ambient Temperature

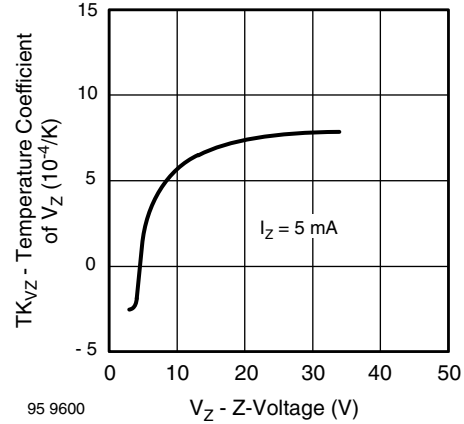


Fig. 4 - Temperature Coefficient of  $V_Z$  vs. Z-Voltage

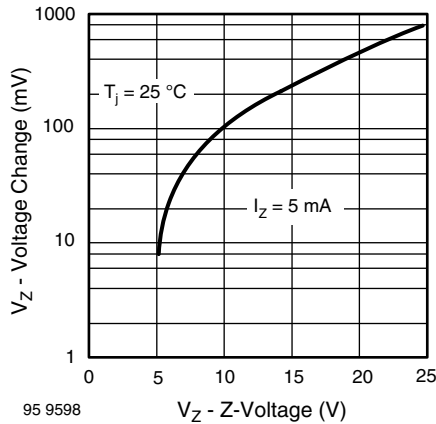


Fig. 2 - Typical Change of Working Voltage under Operating Conditions at  $T_{amb} = 25\text{ }^{\circ}\text{C}$

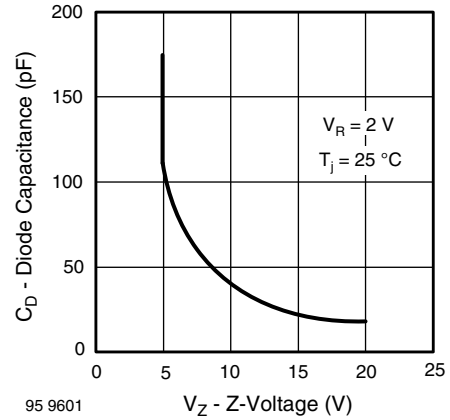


Fig. 5 - Diode Capacitance vs. Z-Voltage

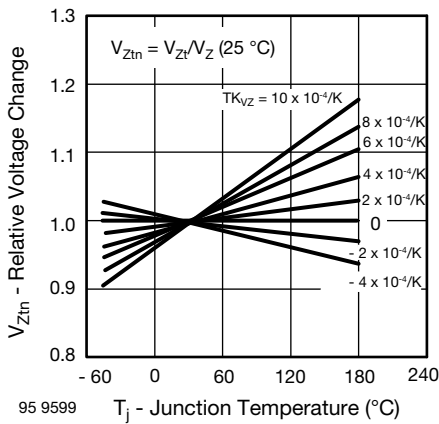


Fig. 3 - Typical Change of Working Voltage vs. Junction Temperature

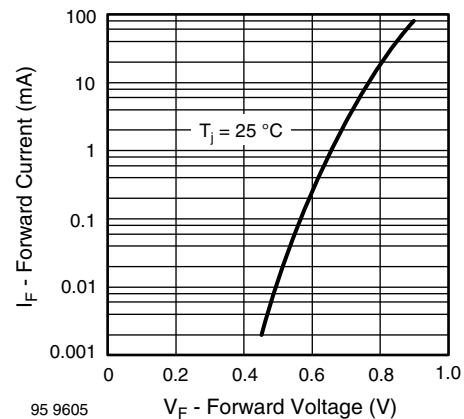


Fig. 6 - Forward Current vs. Forward Voltage



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



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

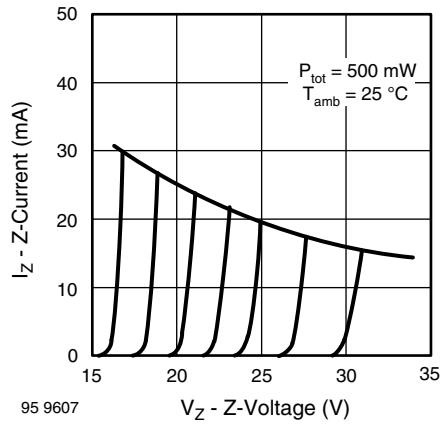


Fig. 8 - Z-Current vs. Z-Voltage

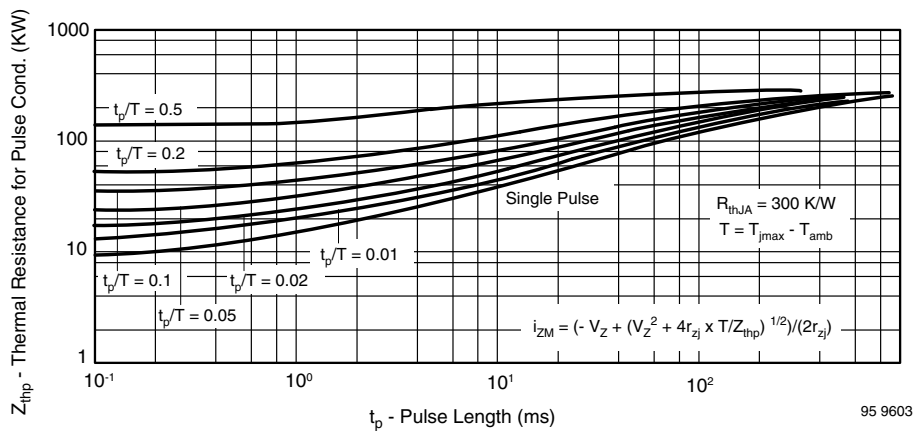
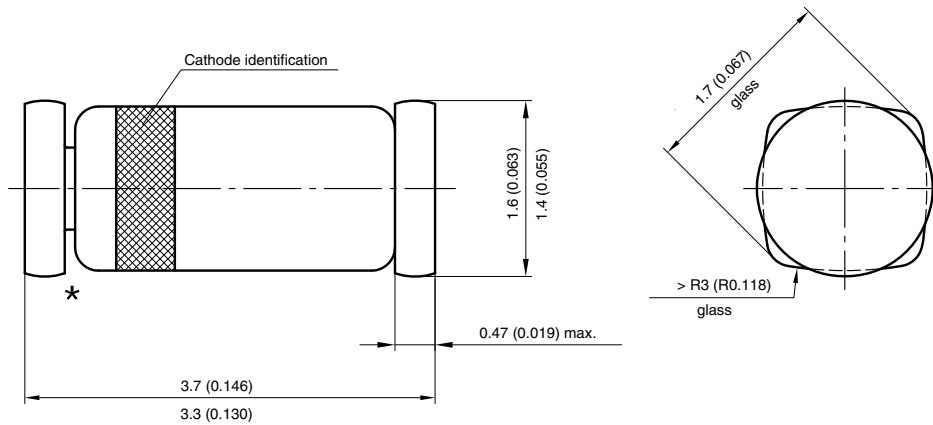


Fig. 10 - Thermal Response

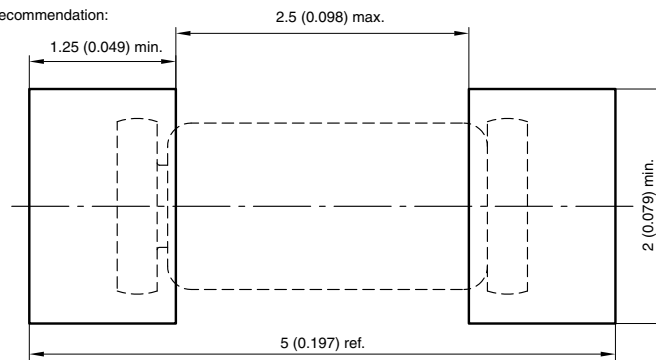


### PACKAGE DIMENSIONS in millimeters (inches): **QuadroMELF SOD-80**



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

Foot print recommendation:



Created - Date: 03.November.2003  
 Rev. 11 - Date: 07.June 2006  
 Document no.:6.560-5006.01-4  
 96 12071



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