

## 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
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### APPLICATIONS

- Voltage stabilization

### LINKS TO ADDITIONAL RESOURCES



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 <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)

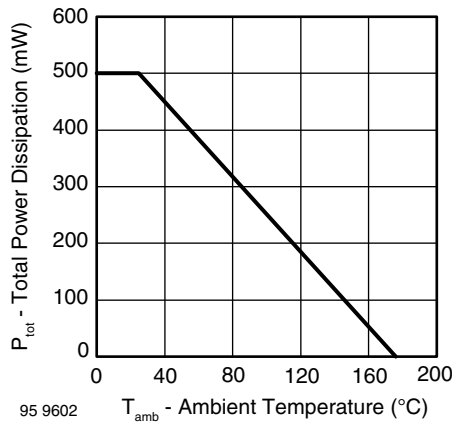


Fig. 1 - Total Power Dissipation vs. Ambient Temperature

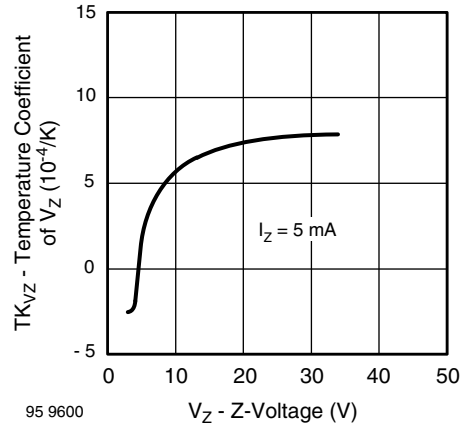


Fig. 4 - Temperature Coefficient of  $V_Z$  vs. Z-Voltage

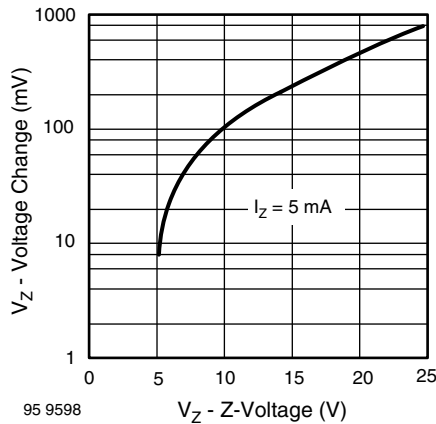


Fig. 2 - Typical Change of Working Voltage under Operating Conditions at  $T_{amb} = 25\text{ }^{\circ}\text{C}$

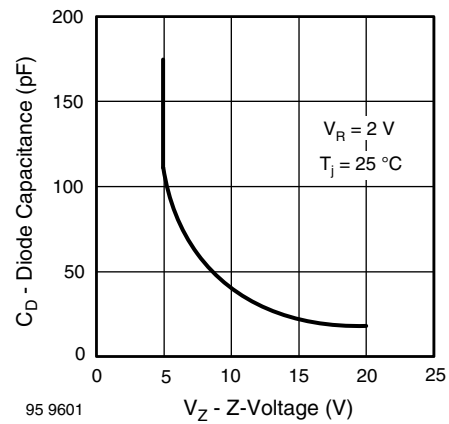


Fig. 5 - Diode Capacitance vs. Z-Voltage

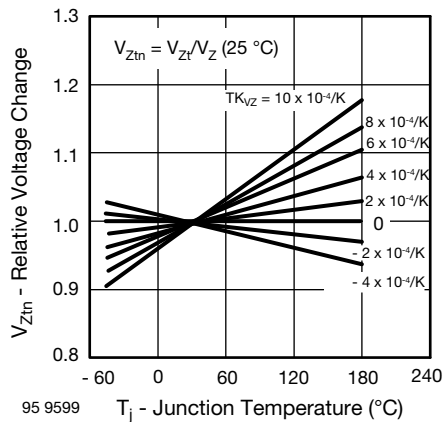


Fig. 3 - Typical Change of Working Voltage vs. Junction Temperature

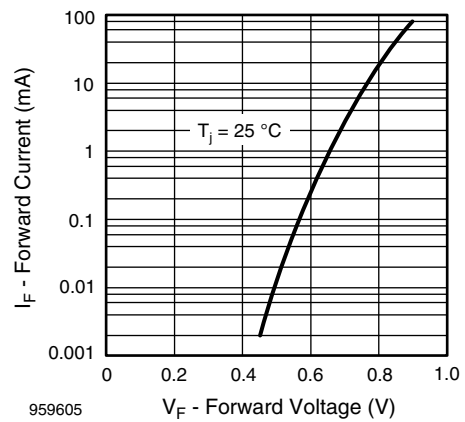


Fig. 6 - Forward Current vs. Forward Voltage

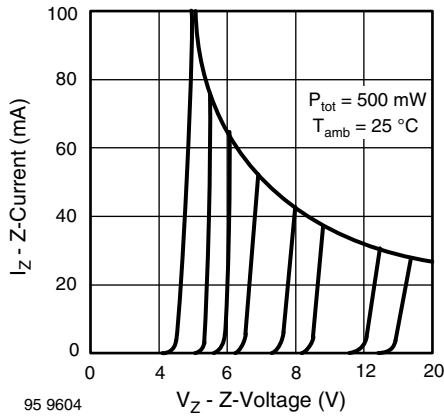


Fig. 7 - Z-Current vs. Z-Voltage

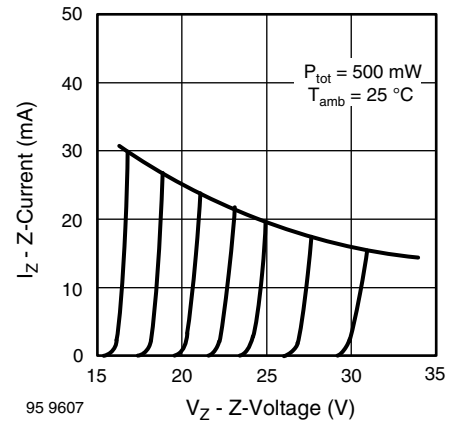


Fig. 8 - Z-Current vs. Z-Voltage

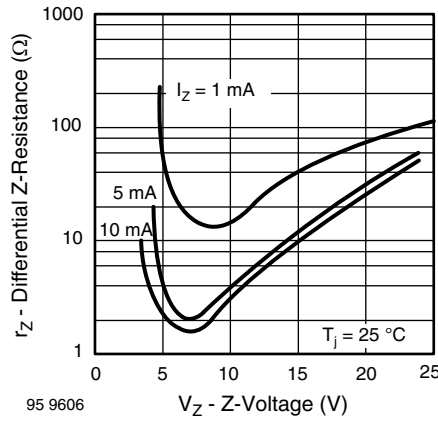


Fig. 9 - Differential Z-Resistance vs. Z-Voltage

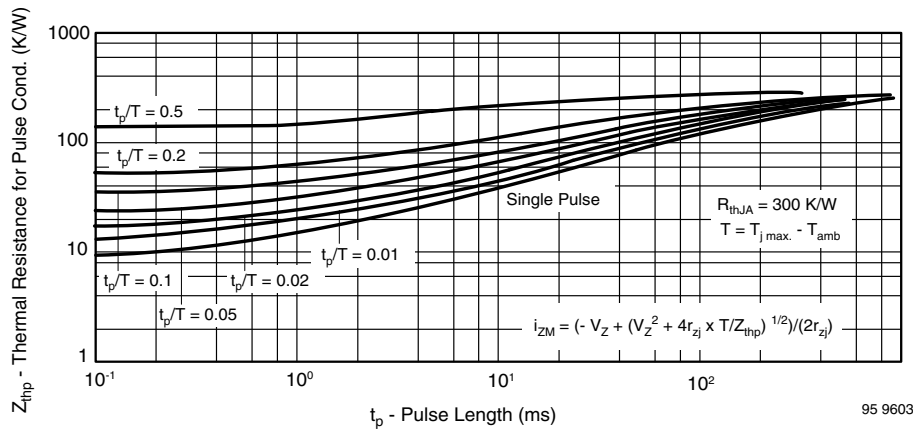
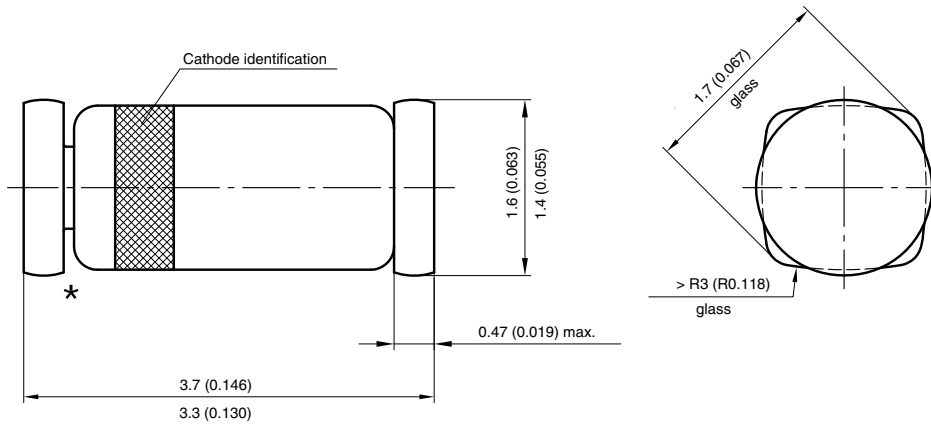


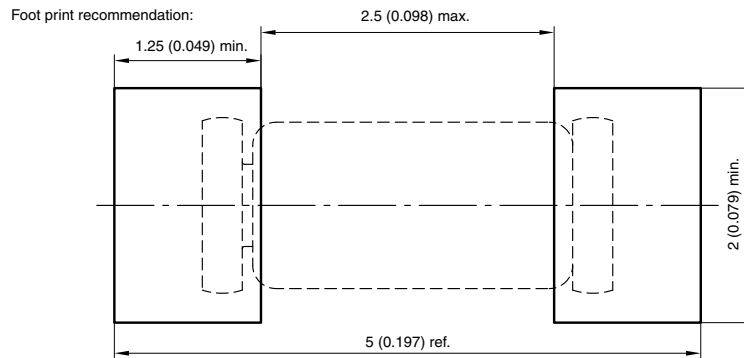
Fig. 10 - Thermal Response



### 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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