Small Signal Zener Diodes

FEATURES

- Very sharp reverse characteristic
- Low reverse current level
- Very high stability
- Low noise
- 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.	2.4 to 36	V
Test current I_{ZT}	2; 5	mA
V_Z specification	Pulse current	
Int. construction	Single	

ORDERING INFORMATION			
DEVICE NAME	ORDERING CODE	TAPED UNITS PER REEL	MINIMUM ORDER QUANTITY
TZX-series	TZX-series-TAP	10 000 per ammopack (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	125 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Power dissipation	l = 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	l = 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 °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)		Z_Z at I_{ZT1}
	V		mA	µA	V	µA	V	Ω
	MIN.	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 °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)		Z_Z at I_{ZT1}
	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 °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)		Z_Z at I_{ZT1}
	V		mA	µA	V	µA	V	Ω
	MIN.	MAX.		MAX.		MAX.		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 TZM9V1 to TZX36, I_R at 95 % $V_{Zmin.} \leq$ 40 nA at T_j = 25 °C

(1) Additional measurement

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

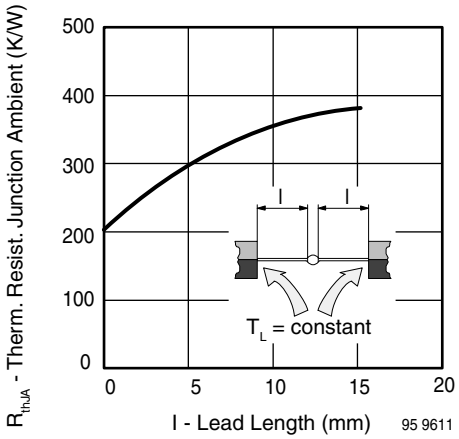


Fig. 1 - Thermal Resistance vs. Lead Length

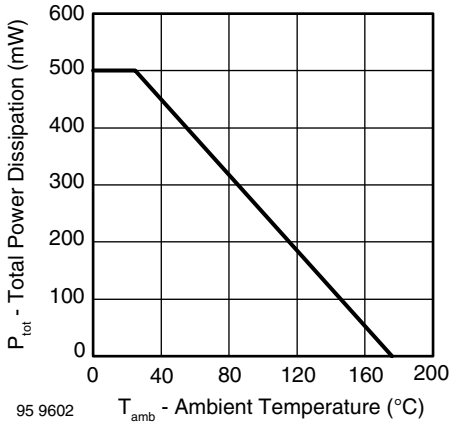


Fig. 2 - Total Power Dissipation vs. Ambient Temperature

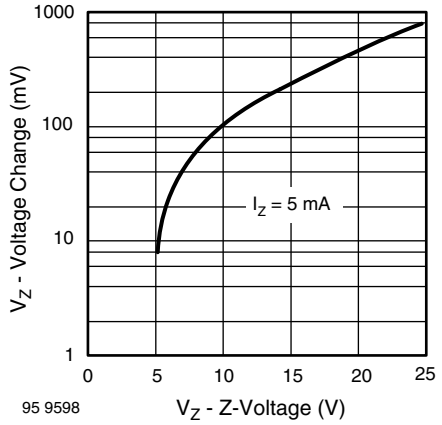


Fig. 3 - Typical Change of Working Voltage under Operating Conditions at T_{amb} = 25 °C

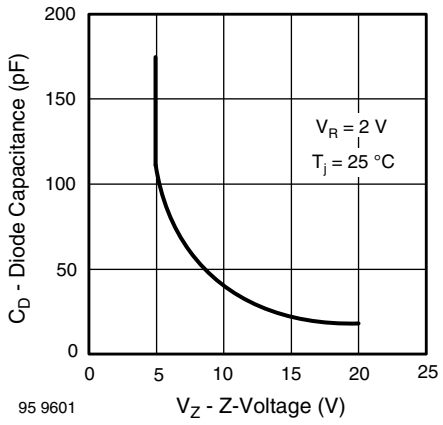


Fig. 6 - Diode Capacitance vs. Z-Voltage

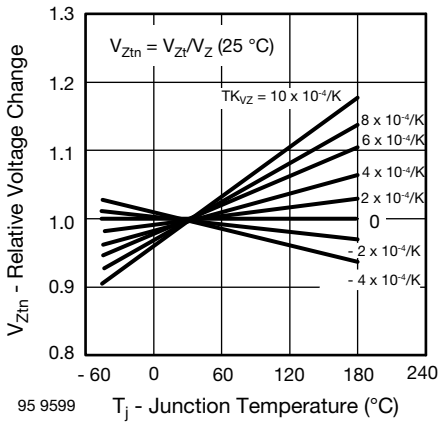


Fig. 4 - Typical Change of Working Voltage vs. Junction Temperature

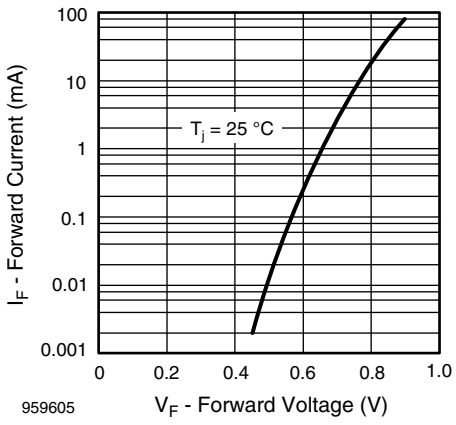


Fig. 7 - Forward Current vs. Forward Voltage

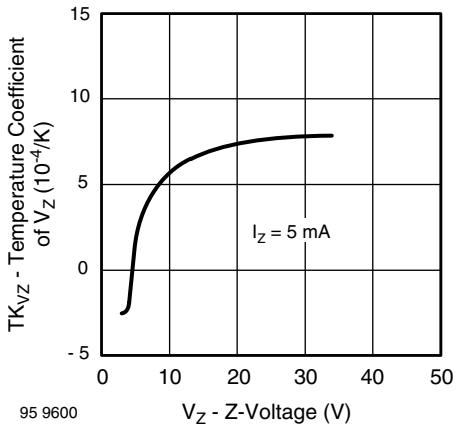


Fig. 5 - Temperature Coefficient of Vz vs. Z-Voltage

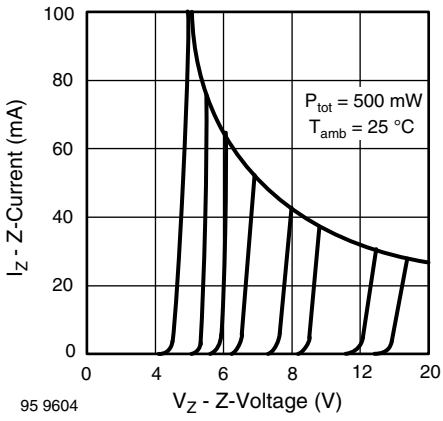


Fig. 8 - Z-Current vs. Z-Voltage

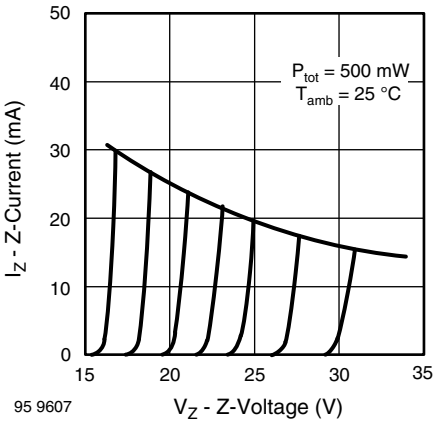


Fig. 9 - Z-Current vs. Z-Voltage

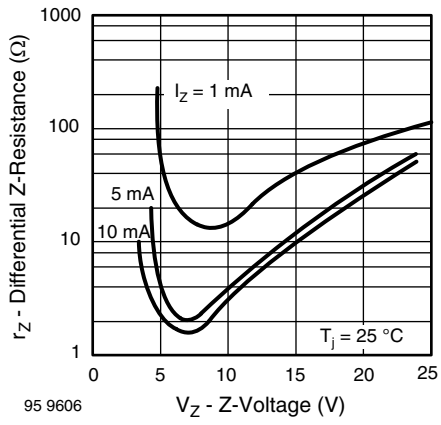


Fig. 10 - Differential Z-Resistance vs. Z-Voltage

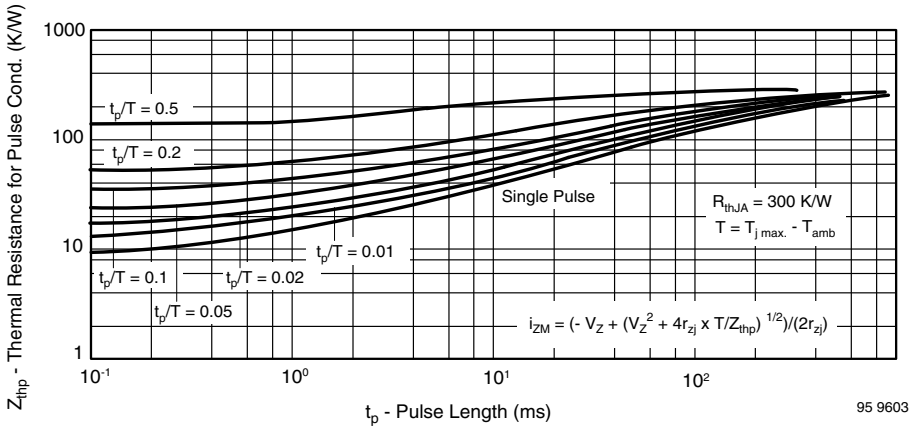
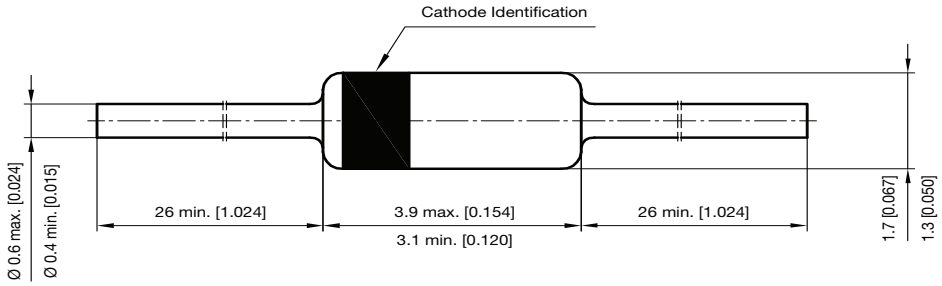


Fig. 11 - Thermal Response

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



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Document no.: SB-V-3906.04-031(4)
94 9366

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Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
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