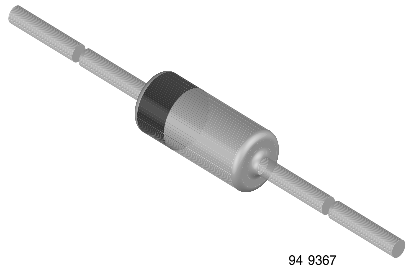
Small Signal Zener Diodes



Features
- Very sharp reverse characteristic
- Low reverse current level
- Very high stability
- Low noise
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Applications
- Voltage stabilization

Mechanical Data
Case: DO-35 Glass case
Weight: approx. 125 mg
Packaging codes/options:
TAP/10 k per Ammopack (52 mm tape), 30 k/box

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
Z-current		I_Z	P_{tot}/V_Z	mA
Junction temperature		T_j	175	°C
Storage temperature range		T_{stg}	- 65 to + 175	°C

Thermal Characteristics
T_{amb} = 25 °C, unless otherwise specified

Parameter	Test condition	Symbol	Value	Unit
Junction ambient	l = 4 mm, T_L = constant	R_{thJA}	300	K/W

Electrical Characteristics
T_{amb} = 25 °C, unless otherwise specified

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward voltage	I_F = 200 mA	V_F			1.5	V

Electrical Characteristics

Partnumber group	Partnumber	Zener Voltage		Dynamic Resistance	Test Current	Reverse Leakage Current			
		V_Z at I_Z		r_Z at I_Z	I_Z	I_R	at V_R	I_R 1)	at V_R 1)
		V	V	Ω	mA	µA	V	µA	V
		min	max	max		max		max	
TZX2V4	TZX2V4A	2.3	2.5	100	5	5	0.5	50	1
	TZX2V4B	2.4	2.6	100	5	5	0.5	50	1
TZX2V7	TZX2V7A	2.5	2.7	100	5	5	0.5	10	1
	TZX2V7B	2.6	2.8	100	5	5	0.5	10	1
	TZX2V7C	2.7	2.9	100	5	5	0.5	10	1
TZX3V0	TZX3V0A	2.8	3	100	5	5	0.5	6	1
	TZX3V0B	2.9	3.1	100	5	5	0.5	6	1
	TZX3V0C	3	3.2	100	5	5	0.5	6	1
TZX3V3	TZX3V3A	3.1	3.3	100	5	5	1	2	1
	TZX3V3B	3.2	3.4	100	5	5	1	2	1
	TZX3V3C	3.3	3.5	100	5	5	1	2	1
TZX3V6	TZX3V6A	3.4	3.6	100	5	5	1	2	1
	TZX3V6B	3.5	3.7	100	5	5	1	2	1
	TZX3V6C	3.6	3.8	100	5	5	1	2	1
TZX3V9	TZX3V9A	3.7	3.9	100	5	5	1	2	1
	TZX3V9B	3.8	4	100	5	5	1	2	1
	TZX3V9C	3.9	4.1	100	5	5	1	2	1
TZX4V3	TZX4V3A	4	4.2	100	5	5	1.5	1	1
	TZX4V3B	4.1	4.3	100	5	5	1.5	1	1
	TZX4V3C	4.2	4.4	100	5	5	1.5	1	1
	TZX4V3D	4.3	4.5	100	5	5	1.5	1	1
TZX4V7	TZX4V7A	4.4	4.6	100	5	5	2	6	2
	TZX4V7B	4.5	4.7	100	5	5	2	5	2
	TZX4V7C	4.6	4.8	100	5	5	2	4	2
	TZX4V7D	4.7	4.9	100	5	5	2	3	2
TZX5V1	TZX5V1A	4.8	5	100	5	5	2	2	2
	TZX5V1B	4.9	5.1	100	5	5	2	2	2
	TZX5V1C	5	5.2	100	5	5	2	2	2
	TZX5V1D	5.1	5.3	100	5	5	2	2	2
TZX5V6	TZX5V6A	5.2	5.5	40	5	5	2	1	2
	TZX5V6B	5.3	5.6	40	5	5	2	1	2
	TZX5V6C	5.4	5.7	40	5	5	2	1	2
	TZX5V6D	5.5	5.8	40	5	5	2	1	2
	TZX5V6E	5.6	5.9	40	5	5	2	1	2
TZX6V2	TZX6V2A	5.7	6	15	5	1	3	3	4
	TZX6V2B	5.8	6.1	15	5	1	3	3	4
	TZX6V2C	6	6.3	15	5	1	3	3	4
	TZX6V2D	6.1	6.4	15	5	1	3	3	4
	TZX6V2E	6.3	6.6	15	5	1	3	3	4
TZX6V8	TZX6V8A	6.4	6.7	15	5	1	3.5	2	4
	TZX6V8B	6.6	6.9	15	5	1	3.5	2	4
	TZX6V8C	6.7	7	15	5	1	3.5	2	4
	TZX6V8D	6.9	7.2	15	5	1	3.5	2	4

Partnumber group	Partnumber	Zener Voltage		Dynamic Resistance	Test Current	Reverse Leakage Current			
		V_Z at I_Z		r_Z at I_Z	I_Z	I_R	at V_R	I_R 1)	at V_R 1)
		V	V	Ω	mA	µA	V	µA	V
		min	max	max		max		max	
TZX7V5	TZX7V5A	7	7.3	15	5	1	5	30	6.65
	TZX7V5B	7.2	7.6	15	5	1	5	30	6.84
	TZX7V5C	7.3	7.7	15	5	1	5	30	6.94
	TZX7V5D	7.5	7.9	15	5	1	5	30	7.13
	TZX7V5X	7.07	7.45	15	5	1	5	30	6.72
TZX8V2	TZX8V2A	7.7	8.1	20	5	1	6.2	0.1	7.32
	TZX8V2B	7.9	8.3	20	5	1	6.2	0.1	7.5
	TZX8V2C	8.1	8.5	20	5	1	6.2	0.1	7.7
	TZX8V2D	8.3	8.7	20	5	1	6.2	0.1	7.98
TZX9V1	TZX9V1A	8.5	8.9	20	5	1	6.8	0.04	8.08
	TZX9V1B	8.7	9.1	20	5	1	6.8	0.04	8.27
	TZX9V1C	8.9	9.3	20	5	1	6.8	0.04	8.46
	TZX9V1D	9.1	9.5	20	5	1	6.8	0.04	8.65
	TZX9V1E	9.3	9.7	20	5	1	6.8	0.04	8.84
TZX10	TZX10A	9.5	9.9	25	5	1	7.5	0.04	9.03
	TZX10B	9.7	10.1	25	5	1	7.5	0.04	9.22
	TZX10C	9.9	10.3	25	5	1	7.5	0.04	9.41
	TZX10D	10.2	10.6	25	5	1	7.5	0.04	9.69
TZX11	TZX11A	10.4	10.8	25	5	1	8.2	0.04	9.88
	TZX11B	10.7	11.1	25	5	1	8.2	0.04	10.2
	TZX11C	10.9	11.3	25	5	1	8.2	0.04	10.4
	TZX11D	11.1	11.6	25	5	1	8.2	0.04	10.5
TZX12	TZX12A	11.4	11.9	35	5	1	9.5	0.04	10.8
	TZX12B	11.6	12.1	35	5	1	9.5	0.04	11
	TZX12C	11.9	12.4	35	5	1	9.5	0.04	11.3
	TZX12D	12.2	12.7	35	5	1	9.5	0.04	11.6
	TZX12X	11.44	12.03	35	5	1	9.5	0.04	10.9
TZX13	TZX13A	12.4	12.9	35	5	1	10	0.04	11.8
	TZX13B	12.6	13.1	35	5	1	10	0.04	12
	TZX13C	12.9	13.4	35	5	1	10	0.04	12.3
TZX14	TZX14A	13.2	13.7	35	5	1	11	0.04	12.5
	TZX14B	13.5	14	35	5	1	11	0.04	12.8
	TZX14C	13.8	14.3	35	5	1	11	0.04	13.1
TZX15	TZX15A	14.1	14.7	40	5	1	11.5	0.04	13.4
	TZX15B	14.5	15.1	40	5	1	11.5	0.04	13.8
	TZX15C	14.9	15.5	40	5	1	11.5	0.04	14.2
	TZX15X	14.35	15.09	40	5	1	11.5	0.04	13.6
TZX16	TZX16A	15.3	15.9	45	5	1	12	0.04	14.5
	TZX16B	15.7	16.5	45	5	1	12	0.04	14.9
	TZX16C	16.3	17.1	45	5	1	12	0.04	15.5
TZX18A	TZX18A	16.9	17.7	55	5	1	13	0.04	16.1
	TZX18B	17.5	18.3	55	5	1	13	0.04	16.6
	TZX18C	18.1	19	55	5	1	13	0.04	17.2
TZX20A	TZX20A	18.8	19.7	60	2	1	15	0.04	17.9
	TZX20B	19.5	20.4	60	2	1	15	0.04	18.5
	TZX20C	20.2	21.2	60	2	1	15	0.04	19.2

Partnumber group	Partnumber	Zener Voltage		Dynamic Resistance	Test Current	Reverse Leakage Current			
		V_Z at I_Z		r_Z at I_Z	I_Z	I_R	at V_R	I_R 1)	at V_R 1)
		V	V	Ω	mA	µA	V	µA	V
		min	max	max		max		max	
TZX22	TZX22A	20.9	21.9	65	2	1	17	0.04	19.9
	TZX22B	21.6	22.6	65	2	1	17	0.04	20.5
	TZX22C	22.3	23.3	65	2	1	17	0.04	21.2
TZX24	TZX24A	22.9	24	70	2	1	19	0.04	21.8
	TZX24B	23.6	24.7	70	2	1	19	0.04	22.4
	TZX24C	24.3	25.5	70	2	1	19	0.04	23.1
	TZX24X	22.61	23.77	70	2	1	19	0.04	21.5
TZX27	TZX27A	25.2	26.6	80	2	1	21	0.04	23.9
	TZX27B	26.2	27.6	80	2	1	21	0.04	24.9
	TZX27C	27.2	28.6	80	2	1	21	0.04	25.8
	TZX27X	26.99	28.39	80	2	1	21	0.04	25.6
TZX30	TZX30A	28.2	29.6	100	2	1	23	0.04	26.8
	TZX30B	29.2	30.6	100	2	1	23	0.04	27.7
	TZX30C	30.2	31.6	100	2	1	23	0.04	28.7
	TZX30X	29.02	30.51	100	2	1	23	0.04	27.6
TZX33	TZX33A	31.2	32.6	120	2	1	25	0.04	29.6
	TZX33B	32.2	33.6	120	2	1	25	0.04	30.6
	TZX33C	33.2	34.5	120	2	1	25	0.04	31.5
TZX36	TZX36A	34.2	35.7	140	2	1	27	0.04	32.5
	TZX36B	35.3	36.8	140	2	1	27	0.04	33.5
	TZX36C	36.4	38	140	2	1	27	0.04	34.6
	TZX36X	35.36	37.19	140	2	1	27	0.04	33.6

1) Additional measurement

NOTE: Additional measurement of voltage group TZM9V1 to TZX36, I_R at 95 % V_{Zmin} ≤ 40 nA at T_j = 25 °C

Typical Characteristics

T_{amb} = 25 °C, unless otherwise specified

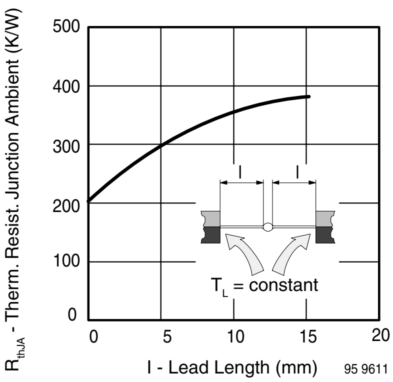


Figure 1. Thermal Resistance vs. Lead Length

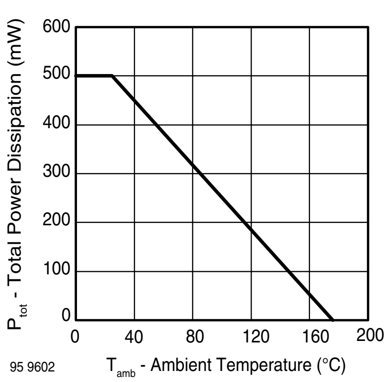


Figure 2. Total Power Dissipation vs. Ambient Temperature

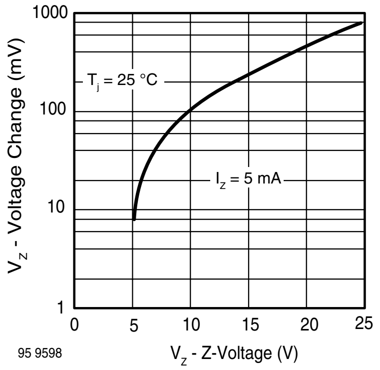


Figure 3. Typical Change of Working Voltage under Operating Conditions at T_{amb} = 25 °C

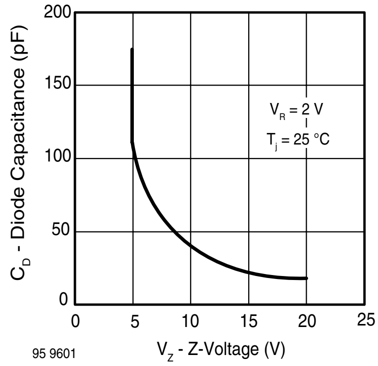


Figure 6. Diode Capacitance vs. Z-Voltage

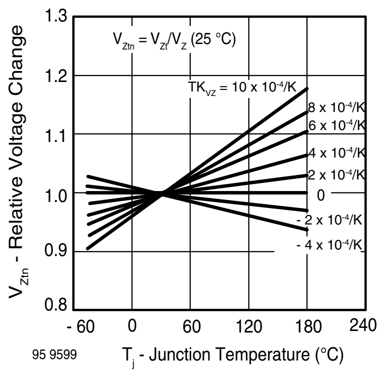


Figure 4. Typical Change of Working Voltage vs. Junction Temperature

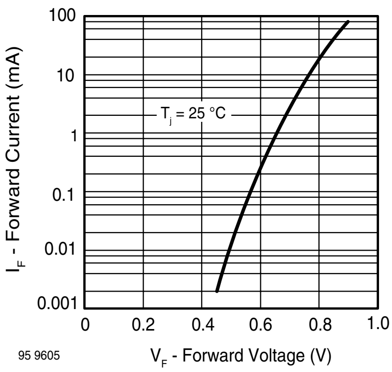


Figure 7. Forward Current vs. Forward Voltage

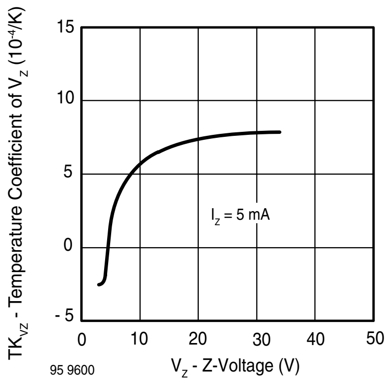


Figure 5. Temperature Coefficient of Vz vs. Z-Voltage

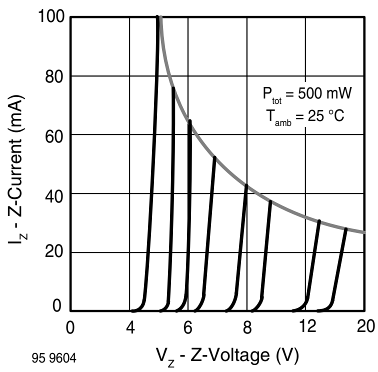


Figure 8. Z-Current vs. Z-Voltage

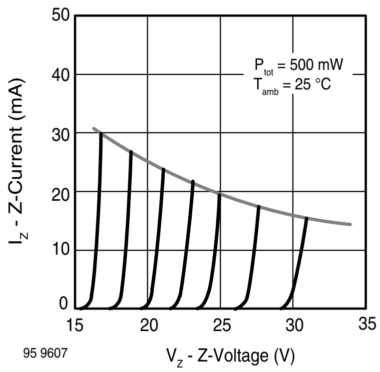


Figure 9. Z-Current vs. Z-Voltage

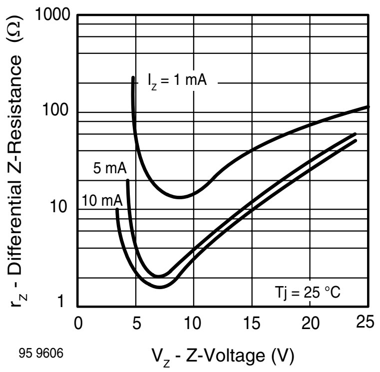


Figure 10. Differential Z-Resistance vs. Z-Voltage

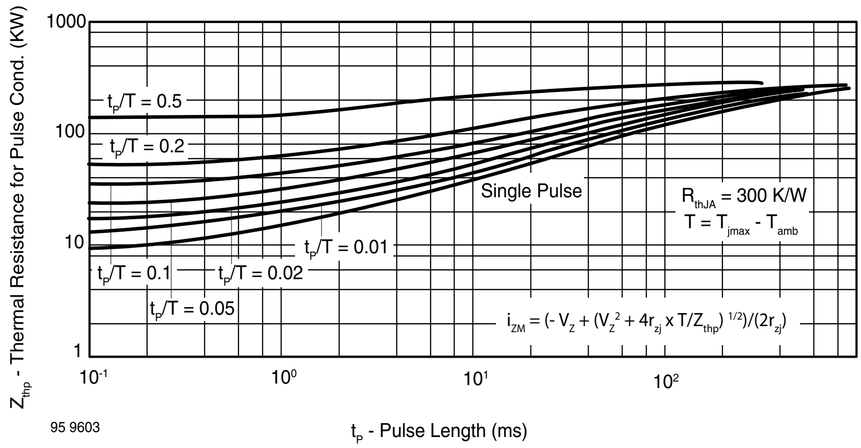
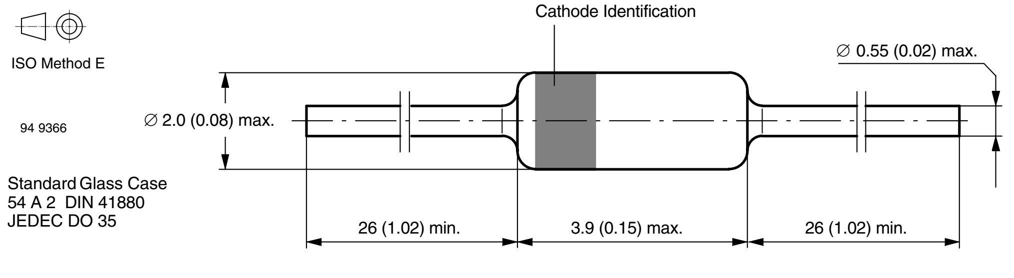


Figure 11. Thermal Response

Package Dimensions in mm (Inches)



Ozone Depleting Substances Policy Statement

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

Notice

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.