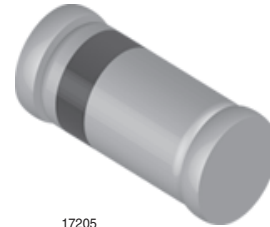


## Silicon Epitaxial Planar Zener - Diodes

### Features

- Very sharp reverse characteristic
- Low reverse current level
- Very high stability
- Low noise
- High reliability



17205

### Applications

Voltage stabilization

### Mechanical Data

**Case:** MiniMELF Glass Case (SOD-80)

**Weight:** approx. 50 mg

### Packaging codes/ options:

GS18/ 10 k per 13" reel (8 mm tape), 10 k/box

GS08/ 2.5 k per 7" reel (8 mm tape), 12.5 k/box

### Absolute Maximum Ratings

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

Parameter	Test condition	Symbol	Value	Unit
Power dissipation	$R_{thJA} \leq 300\text{ K/W}$	$P_{tot}$	500	mW
Z-current		$I_Z$	$P_{tot}/V_Z$	mA
Junction temperature		$T_j$	175	$^{\circ}\text{C}$
Storage temperature range		$T_{stg}$	- 65... + 175	$^{\circ}\text{C}$

### Thermal Characteristics

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

Parameter	Test condition	Symbol	Value	Unit
Junction ambient	on PC board 50 mm x 50 mm x 1.6 mm	$R_{thJA}$	500	K/W

### Electrical Characteristics

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

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward voltage	$I_F = 200\text{ mA}$	$V_F$			1.5	V

### Electrical Characteristics

Partnumber	Marking Code	Zener Voltage		Dynamic Resistance		Test Current		Reverse Leakage Current	
		$V_Z @ I_{ZT}$		$Z_Z @ I_{ZT}$	$Z_{ZK} @ I_{ZK}$	$I_{ZT}$	$I_{ZK}$	$I_R$	@ $V_R$
		V	V	$\Omega$	$\Omega$	mA	mA	$\mu A$	V
		min	max	max	max			max	
TLZ2V4	2V4	2.33	2.63						
TLZ2V4A	2A4	2.33	2.52	100	2000	20	1	70	1
TLZ2V4B	2B4	2.43	2.63	100	2000	20	1	70	1
TLZ2V7	2V7	2.54	2.91						
TLZ2V7A	2A7	2.54	2.75	100	1000	20	1	50	1
TLZ2V7B	2B7	2.69	2.91	100	1000	20	1	50	1
TLZ3V0	3V0	2.85	3.22						
TLZ3V0A	3A0	2.85	3.07	80	1000	20	1	50	1
TLZ3V0B	3B0	3.01	3.22	80	1000	20	1	10	1
TLZ3V3	3V3	3.16	3.53						
TLZ3V3A	3A3	3.16	3.38	70	1000	20	1	10	1
TLZ3V3B	3B3	3.32	3.53	70	1000	20	1	10	1
TLZ3V6	3V6	3.455	3.845						
TLZ3V6A	3A6	3.455	3.695	60	1000	20	1	5	1
TLZ3V6B	3B6	3.6	3.845	60	1000	20	1	5	1
TLZ3V9	3V9	3.74	4.16						
TLZ3V9A	3A9	3.74	4.01	50	1000	20	1	3	1
TLZ3V9B	3B9	3.89	4.16	50	1000	20	1	3	1
TLZ4V3	4V3	4.04	4.57						
TLZ4V3A	4A3	4.04	4.29	40	1000	20	1	3	1
TLZ4V3B	4B3	4.17	4.43	40	1000	20	1	3	1
TLZ4V3C	4C3	4.3	4.57	40	1000	20	1	3	1
TLZ4V7	4V7	4.44	4.93						
TLZ4V7A	4A7	4.44	4.68	25	900	20	1	10	2
TLZ4V7B	4B7	4.55	4.8	25	900	20	1	6	2
TLZ4V7C	4C7	4.68	4.93	25	900	20	1	3	2
TLZ5V1	5V1	4.81	5.37						
TLZ5V1A	5A1	4.81	5.07	20	800	20	1	2	2
TLZ5V1B	5B1	4.94	5.2	20	800	20	1	2	2
TLZ5V1C	5C1	5.09	5.37	20	800	20	1	2	2
TLZ5V6	5V6	5.28	5.91						
TLZ5V6A	5A6	5.28	5.55	13	500	20	1	1	2
TLZ5V6B	5B6	5.45	5.73	13	500	20	1	1	2
TLZ5V6C	5C6	5.61	5.91	13	500	20	1	1	2
TLZ6V2	6V2	5.78	6.44						
TLZ6V2A	6A2	5.78	6.09	10	300	20	1	3	4
TLZ6V2B	6B2	5.96	6.27	10	300	20	1	3	4
TLZ6V2C	6C2	6.12	6.44	10	300	20	1	3	4
TLZ6V8	6V8	6.29	7.01						
TLZ6V8A	6A8	6.29	6.63	8	150	20	0.5	2	4
TLZ6V8B	6B8	6.49	6.83	8	150	20	0.5	2	4
TLZ6V8C	6C8	6.66	7.01	8	150	20	0.5	2	4
TLZ7V5	7V5	6.85	7.67						
TLZ7V5A	7A5	6.85	7.22	8	120	20	0.5	3	6.5



Partnumber	Marking Code	Zener Voltage		Dynamic Resistance		Test Current		Reverse Leakage Current	
		$V_Z @ I_{ZT}$		$Z_Z @ I_{ZT}$	$Z_{ZK} @ I_{ZK}$	$I_{ZT}$	$I_{ZK}$	$I_R$	@ $V_R$
		V	V	$\Omega$	$\Omega$	mA	mA	$\mu A$	V
		min	max	max	max			max	
TLZ7V5B	7B5	7.07	7.45	8	120	20	0.5	3	6.73
TLZ7V5C	7C5	7.29	7.67	8	120	20	0.5	3	6.93
TLZ8V2	8V2	7.53	8.45						
TLZ8V2A	8A2	7.53	7.92	8	120	20	0.5	7.5	7.15
TLZ8V2B	8B2	7.78	8.19	8	120	20	0.5	7.5	7.39
TLZ8V2C	8C2	8.03	8.45	8	120	20	0.5	7.5	7.63
TLZ9V1	9V1	8.29	9.3						
TLZ9V1A	9A1	8.29	8.73	8	120	20	0.5	0.04	7.88
TLZ9V1B	9B1	8.57	9.01	8	120	20	0.5	0.04	8.14
TLZ9V1C	9C1	8.83	9.3	8	120	20	0.5	0.04	8.39
TLZ10	10	9.12	10.44						
TLZ10A	10A	9.12	9.59	8	120	20	0.5	0.04	8.66
TLZ10B	10B	9.41	9.9	8	120	20	0.5	0.04	8.94
TLZ10C	10C	9.7	10.2	8	120	20	0.5	0.04	9.22
TLZ10D	10D	9.94	10.44	8	120	20	0.5	0.04	9.44
TLZ11	11	10.18	11.38						
TLZ11A	11A	10.18	10.71	10	120	10	0.5	0.04	9.67
TLZ11B	11B	10.5	11.05	10	120	10	0.5	0.04	9.98
TLZ11C	11C	10.82	11.38	10	120	10	0.5	0.04	10.28
TLZ12	12	11.13	12.35						
TLZ12A	12A	11.13	11.71	12	110	10	0.5	0.04	10.6
TLZ12B	12B	11.44	12.03	12	110	10	0.5	0.04	10.9
TLZ12C	12C	11.74	12.35	12	110	10	0.5	0.04	11.2
TLZ13	13	12.11	13.66						
TLZ13A	13A	12.11	12.75	14	110	10	0.5	0.04	11.5
TLZ13B	13B	12.55	13.21	14	110	10	0.5	0.04	11.9
TLZ13C	13C	12.99	13.66	14	110	10	0.5	0.04	12.3
TLZ15	15	13.44	15.09						
TLZ15A	15A	13.44	14.13	16	110	10	0.5	0.04	12.8
TLZ15B	15B	13.89	14.62	16	110	10	0.5	0.04	13.2
TLZ15C	15C	14.35	15.09	16	110	10	0.5	0.04	13.6
TLZ16	16	14.8	16.51						
TLZ16A	16A	14.8	15.57	18	150	10	0.5	0.04	14.1
TLZ16B	16B	15.25	16.04	18	150	10	0.5	0.04	14.5
TLZ16C	16C	15.69	16.51	18	150	10	0.5	0.04	14.9
TLZ18	18	16.22	18.33						
TLZ18A	18A	16.22	17.06	23	150	10	0.5	0.04	15.4
TLZ18B	18B	16.82	17.7	23	150	10	0.5	0.04	16
TLZ18C	18C	17.42	18.33	23	150	10	0.5	0.04	16.5
TLZ20	20	18.02	20.72						
TLZ20A	20A	18.02	18.96	28	200	10	0.5	0.04	17.1
TLZ20B	20B	18.63	19.59	28	200	10	0.5	0.04	17.7
TLZ20C	20C	19.23	20.22	28	200	10	0.5	0.04	18.3
TLZ20D	20D	19.72	20.72	28	200	10	0.5	0.04	18.7
TLZ22	22	20.15	22.63						
TLZ22A	22A	20.15	21.2	30	200	5	0.5	0.04	19.1
TLZ22B	22B	20.64	21.71	30	200	5	0.5	0.04	19.6
TLZ22C	22C	21.08	22.17	30	200	5	0.5	0.04	20

Partnumber	Marking Code	Zener Voltage		Dynamic Resistance		Test Current		Reverse Leakage Current	
				$Z_Z @ I_{ZT}$	$Z_{ZK} @ I_{ZK}$	$I_{ZT}$	$I_{ZK}$	$I_R$	@ $V_R$
		V	V	$\Omega$	$\Omega$	mA	mA	$\mu A$	V
		min	max	max	max			max	
TLZ22D	22D	21.52	22.63	30	200	5	0.5	0.04	20.4
TLZ24	24	22.05	24.85						
TLZ24A	24A	22.05	23.18	35	200	5	0.5	0.04	20.9
TLZ24B	24B	22.61	23.77	35	200	5	0.5	0.04	21.5
TLZ24C	24C	23.12	24.31	35	200	5	0.5	0.04	22
TLZ24D	24D	23.63	24.85	35	200	5	0.5	0.04	22.4
TLZ27	27	24.26	27.64						
TLZ27A	27A	24.26	25.52	45	250	5	0.5	0.04	23
TLZ27B	27B	24.97	26.26	45	250	5	0.5	0.04	23.7
TLZ27C	27C	25.63	26.95	45	250	5	0.5	0.04	24.3
TLZ27D	27D	26.29	27.64	45	250	5	0.5	0.04	25
TLZ30	30	26.99	30.51						
TLZ30A	30A	26.99	28.39	55	250	5	0.5	0.04	25.6
TLZ30B	30B	27.7	29.13	55	250	5	0.5	0.04	26.3
TLZ30C	30C	28.36	29.82	55	250	5	0.5	0.04	26.9
TLZ30D	30D	29.02	30.51	55	250	5	0.5	0.04	27.6
TLZ33	33	29.68	33.11						
TLZ33A	33A	29.68	31.22	65	250	5	0.5	0.04	28.2
TLZ33B	33B	30.32	31.88	65	250	5	0.5	0.04	28.8
TLZ33C	33C	30.9	32.5	65	250	5	0.5	0.04	29.4
TLZ33D	33D	31.49	33.11	65	250	5	0.5	0.04	29.9
TLZ36	36	32.14	35.77						
TLZ36A	36A	32.14	33.79	75	250	5	0.5	0.04	30.5
TLZ36B	36B	32.79	34.49	75	250	5	0.5	0.04	31.2
TLZ36C	36C	33.4	35.13	75	250	5	0.5	0.04	31.7
TLZ36D	36D	34.01	35.77	75	250	5	0.5	0.04	32.3
TLZ39	39	34.68	40.8						
TLZ39A	39A	34.68	36.47	85	250	5	0.5	0.04	32.9
TLZ39B	39B	35.36	37.19	85	250	5	0.5	0.04	33.6
TLZ39C	39C	36	37.85	85	250	5	0.5	0.04	34.2
TLZ39D	39D	36.63	38.52	85	250	5	0.5	0.04	34.8
TLZ39E	39E	37.36	39.29	85	250	5	0.5	0.04	35.5
TLZ39F	39F	38.14	40.11	85	250	5	0.5	0.04	36.2
TLZ39G	39G	38.94	40.8	85	250	5	0.5	0.04	37
TLZ43	43	40	45	90	-	5	-	0.04	38
TLZ47	47	44	49	90	-	5	-	0.04	41.8
TLZ51	51	48	54	100	-	5	-	0.04	45.6
TLZ56	56	53	60	100	-	5	-	0.04	50.4

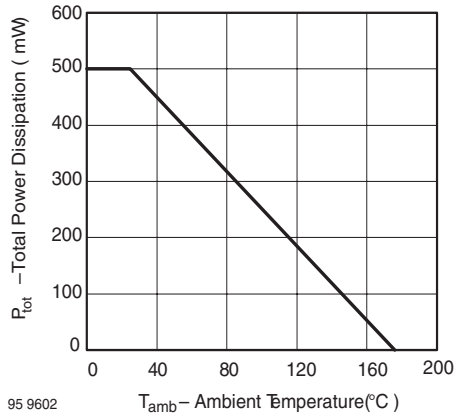
**Typical Characteristics** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified)


Figure 1. Total Power Dissipation vs. Ambient Temperature

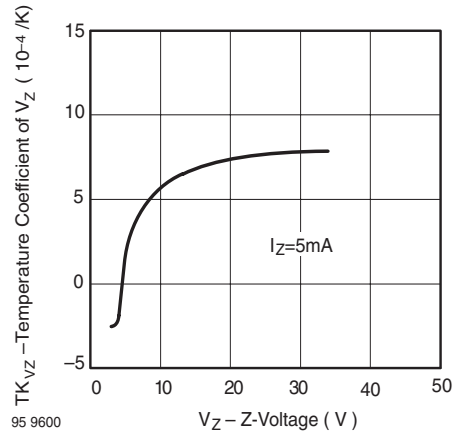


Figure 4. Temperature Coefficient of Vz vs. Z-Voltage

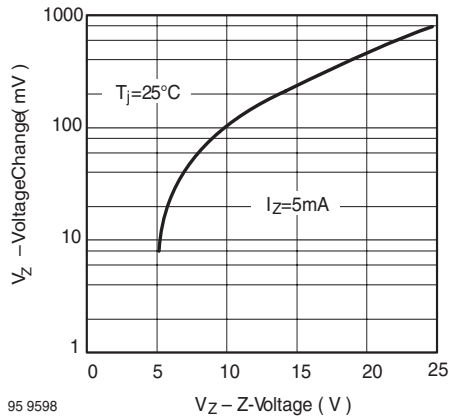
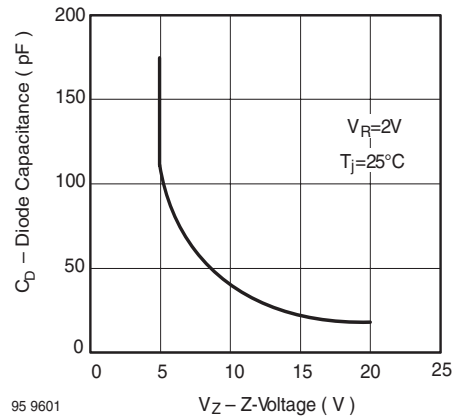

 Figure 2. Typical Change of Working Voltage under Operating Conditions at  $T_{amb}=25\text{ }^{\circ}\text{C}$ 


Figure 5. Diode Capacitance vs. Z-Voltage

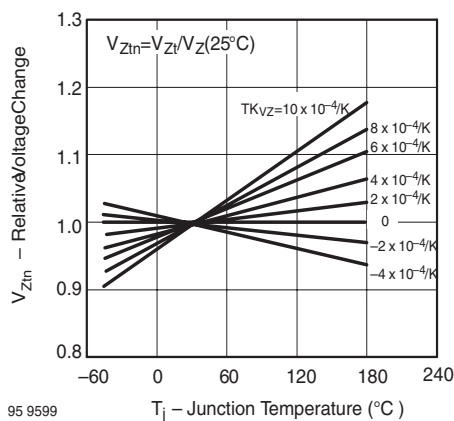


Figure 3. Typical Change of Working Voltage vs. Junction Temperature

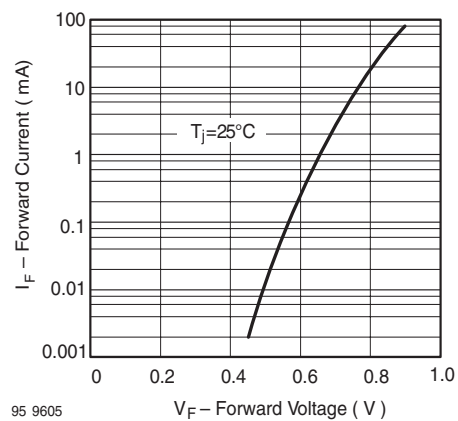


Figure 6. Forward Current vs. Forward Voltage

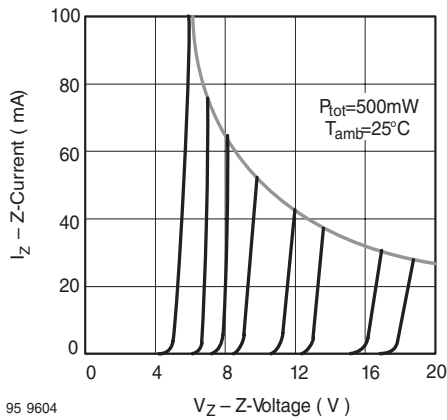


Figure 7. Z-Current vs. Z-Voltage

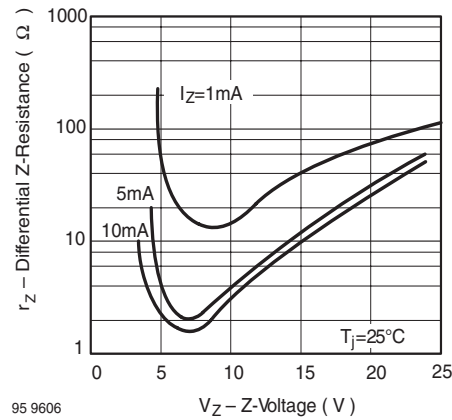


Figure 9. Differential Z-Resistance vs. Z-Voltage

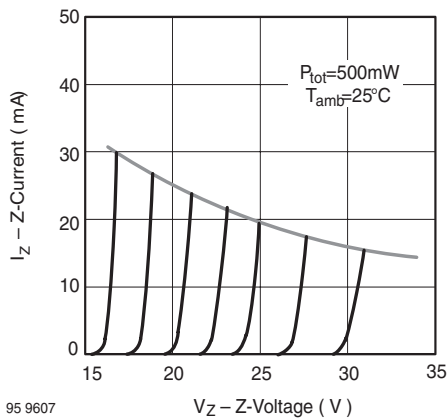


Figure 8. Z-Current vs. Z-Voltage

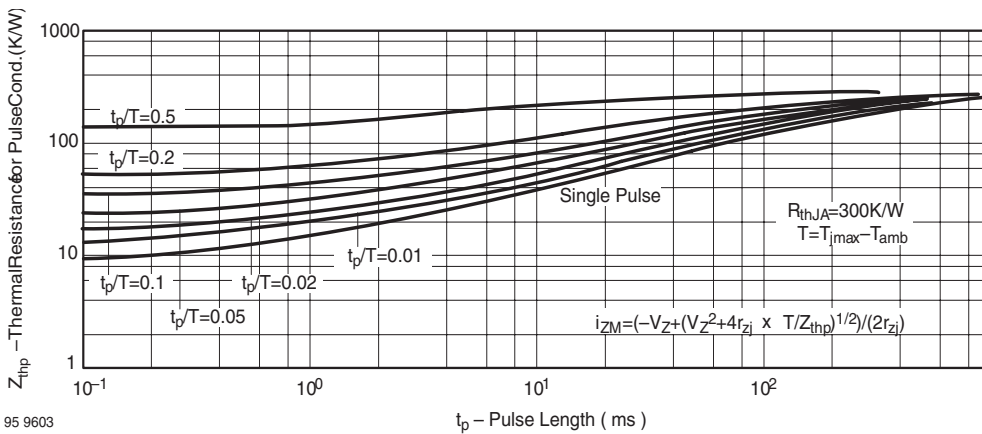
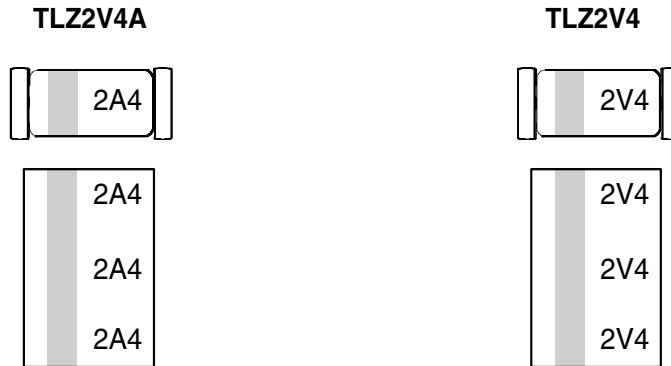


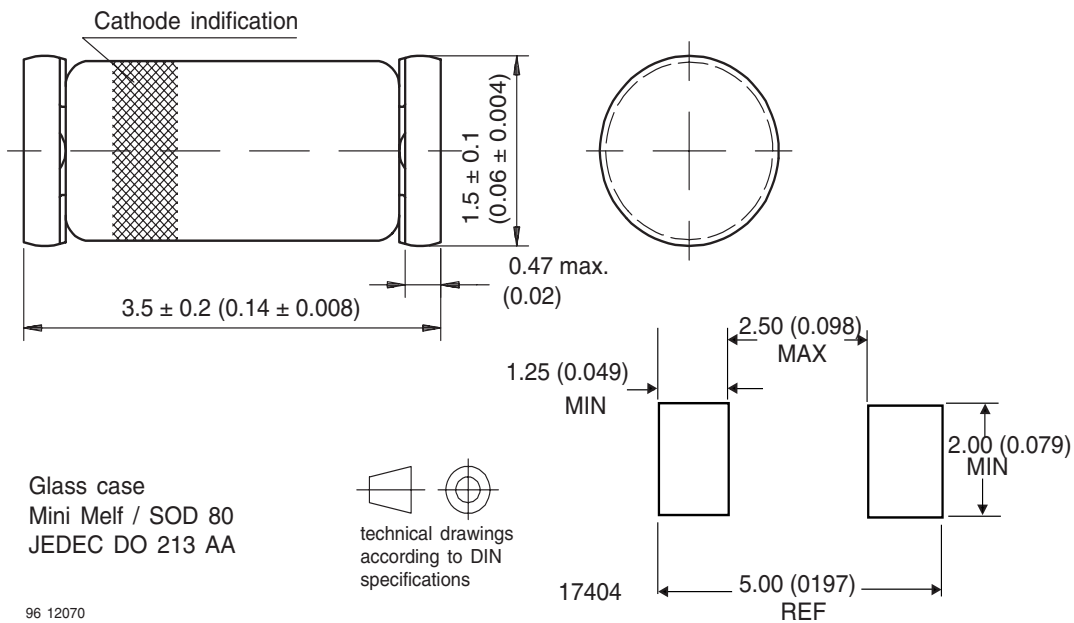
Figure 10. Thermal Response

**Marking Voltage Group**


18660

**Remark:**

The Zener voltage TLZ2V4 or Zener voltage group TLZ2V4A is printed with max 3 digits 3 times on the surface. The marking should be readable at minimum 2 times. The third print is allowed to be incomplete due to tolerances in Diameter of the glassbody.

**Package Dimensions in mm (Inches)**


96 12070

## Vishay Semiconductors

### 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.

**We reserve the right to make changes to improve technical design  
and may do so without further notice.**

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

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