

## Subminiature Transmissive Optical Sensor with Phototransistor Output

### Description

This device has a compact construction where the emitting light source and the detector is located face to face on the same optical axes. The operating wavelength is 950 nm.



### Features

- Gap 2 mm
- Package height: 4 mm
- Parts shipped taped and reeled  
2000 pcs/ reel
- Soldering method according to  
CECC00802 table 1, class B or C
- Surface Mountable Technology (SMD)
- Option X01:  
High rel. device advanced applications

### Application

- Accurate position sensor for steering wheel
- Detection for motion direction
- Detection of motor speed and direction where high reliability performance is required

### Pin Connection

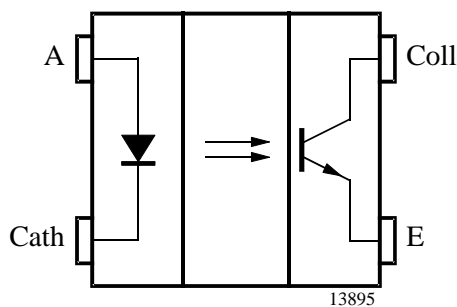


Figure 1.

## Absolute Maximum Ratings

### Input (Emitter)

Parameters	Test Conditions	Symbol	Value	Unit
Reverse voltage		$V_R$	5	V
Forward current		$I_F$	25	mA
Pulse forward current	$t_p = 0.1 \text{ ms}; t_p / T = 0.01$	$I_{FP}$	100	mA
Power dissipation	$T_{amb} \leq 25^\circ\text{C}$	$P_v$	75	mW

### Output (Detector)

Parameters	Test Conditions	Symbol	Value	Unit
Collector emitter voltage		$V_{CE0}$	70	V
Emitter collector voltage		$V_{EC0}$	7	V
Collector current		$I_C$	20	mA
Power dissipation	$T_{amb} \leq 25^\circ\text{C}$	$P_v$	75	mW

### Coupler

Parameters	Test Conditions	Symbol	Value	Unit
Total power dissipation	$T_{amb} \leq 25^\circ\text{C}$	$P_{tot}$	150	mW
Ambient temperature range		$T_{amb}$	- 40 to + 85	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	- 40 to + 100	$^\circ\text{C}$
Soldering temperature	$t \leq 5 \text{ s}$	$T_{sd}$	230	$^\circ\text{C}$

**Electrical Characteristics**

$T_{amb} = 25^{\circ}\text{C}$

**Input (Emitter)**

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Forward voltage	$I_F = 15 \text{ mA}$	$V_F$		1.2	1.5	V
Reverse current	$V_R = 5 \text{ V}$	$I_R$			10	$\mu\text{A}$
Junction capacitance	$V_R = 0 \text{ V}, f = 1 \text{ MHz}$	$C_j$		50		pF

**Output (Detector)**

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector emitter voltage	$I_C = 1 \text{ mA}$	$V_{CE0}$	70			V
Emitter collector voltage	$I_E = 100 \mu\text{A}$	$V_{EC0}$	7			V
Collector emitter cut-off current	$V_{CE} = 25 \text{ V}, I_F = 0, E = 0$	$I_{CE0}$		10	100	nA

**Coupler**

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector current	$V_{CE} = 5 \text{ V}, I_F = 15 \text{ mA}$	$I_C$	300	500		$\mu\text{A}$
Collector/emitter saturation voltage	$I_F = 15 \text{ mA}, I_C = 0.05 \text{ mA}$	$V_{CEsat}$			0.4	V

**Derating Diagram**

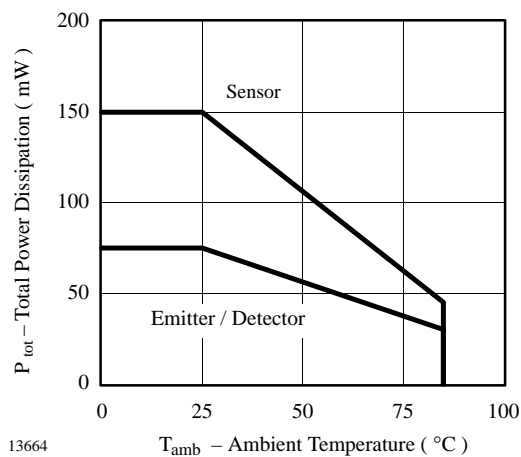


Figure 2.

## Application Example

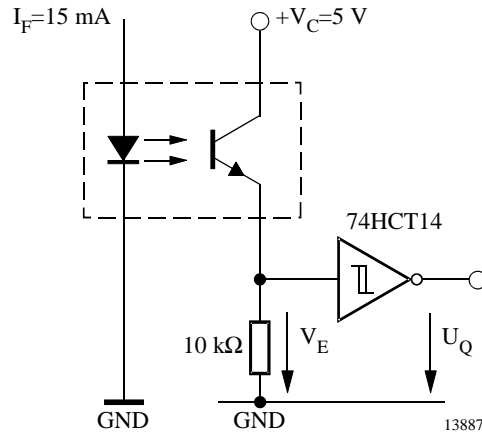


Figure 3.

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

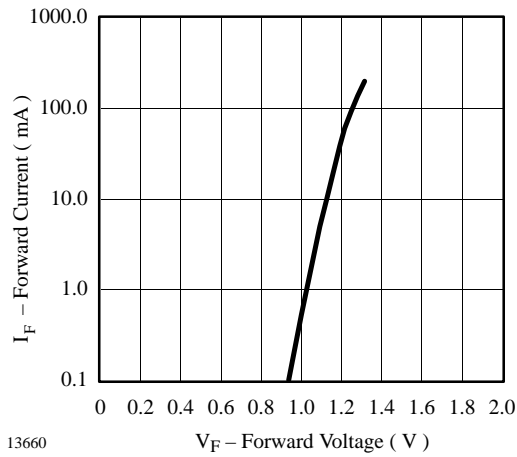


Figure 4. Forward Current vs. Forward Voltage

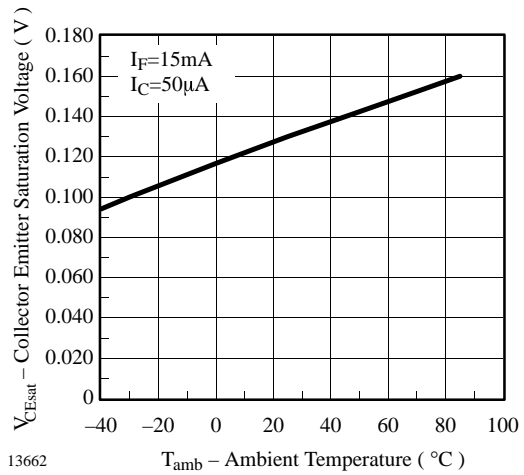
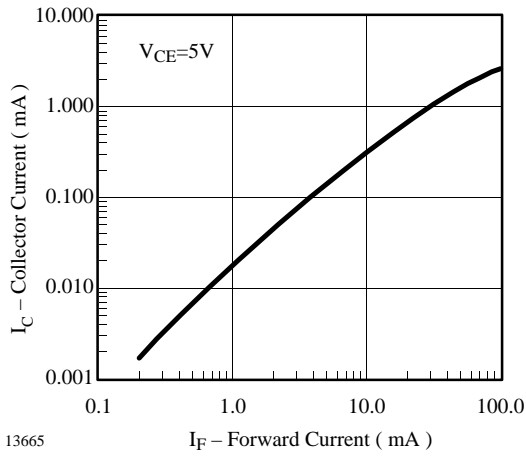


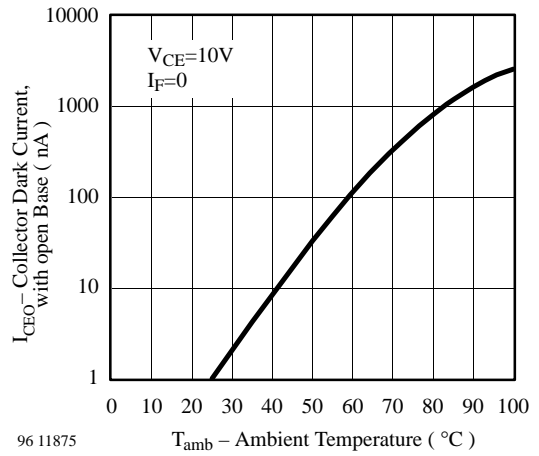
Figure 5. Collector Em. Sat. Voltage vs. Ambient Temperature

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



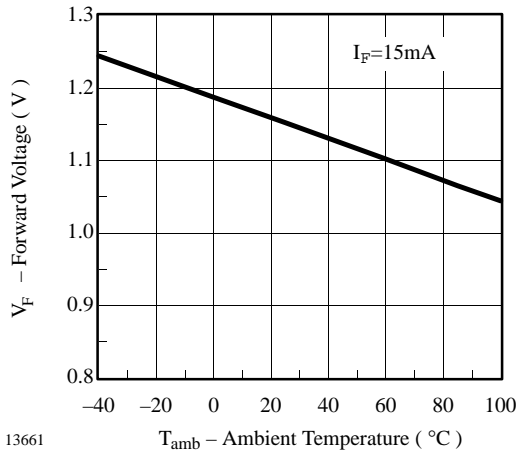
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Figure 6. Collector Current vs. Forward Current



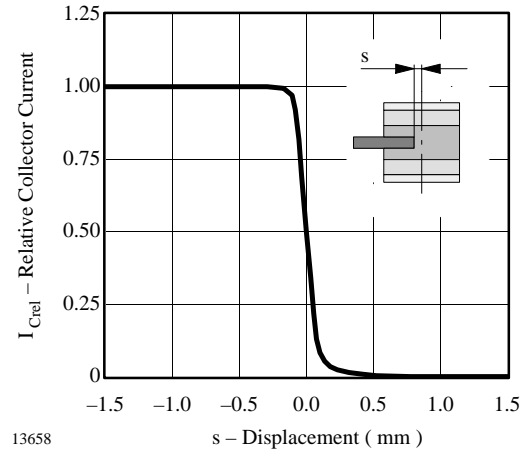
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Figure 9. Collector Dark Current vs. Ambient Temperature



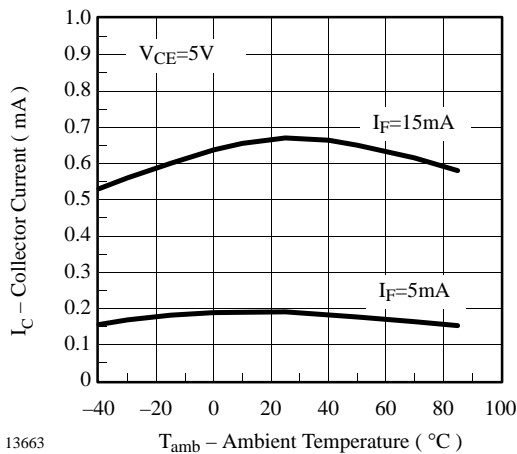
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Figure 7. Forward Voltage vs. Ambient Temperature



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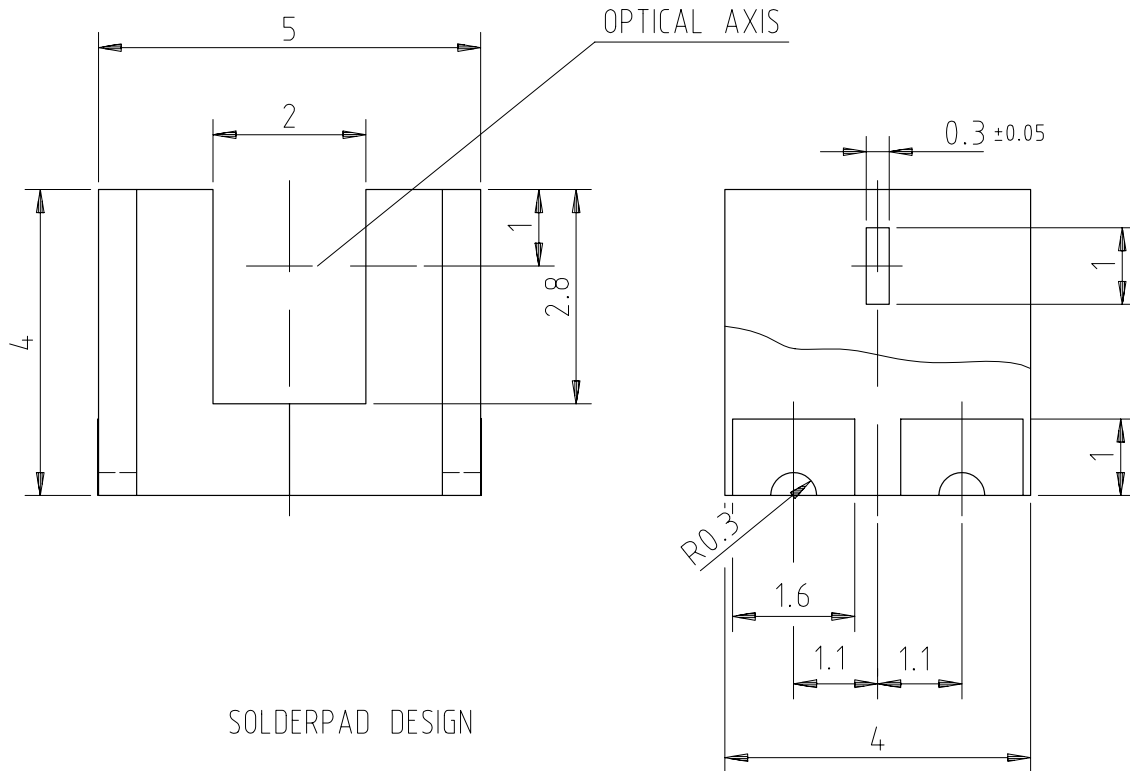
Figure 10. Rel. Collector Current vs. Distance



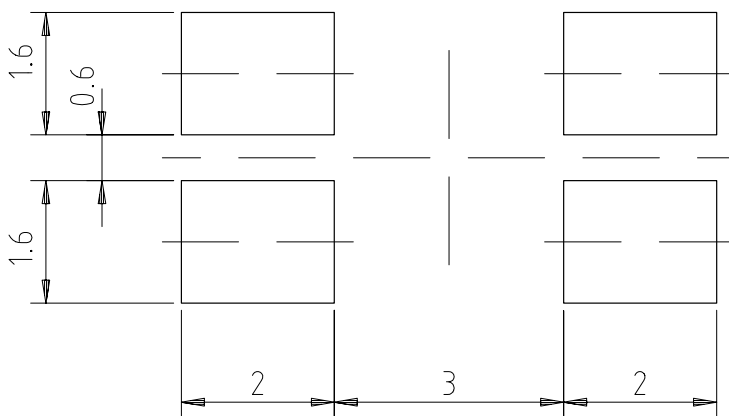
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Figure 8. Collector Current vs. Ambient Temperature

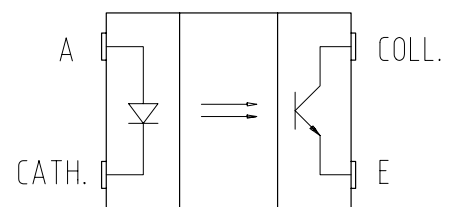
## Dimensions in mm



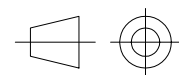
### SOLDERPAD DESIGN



### PIN CONNECTION TOP VIEW



All dimensions in mm  
Not indicated tolerances  $\pm 0.15$



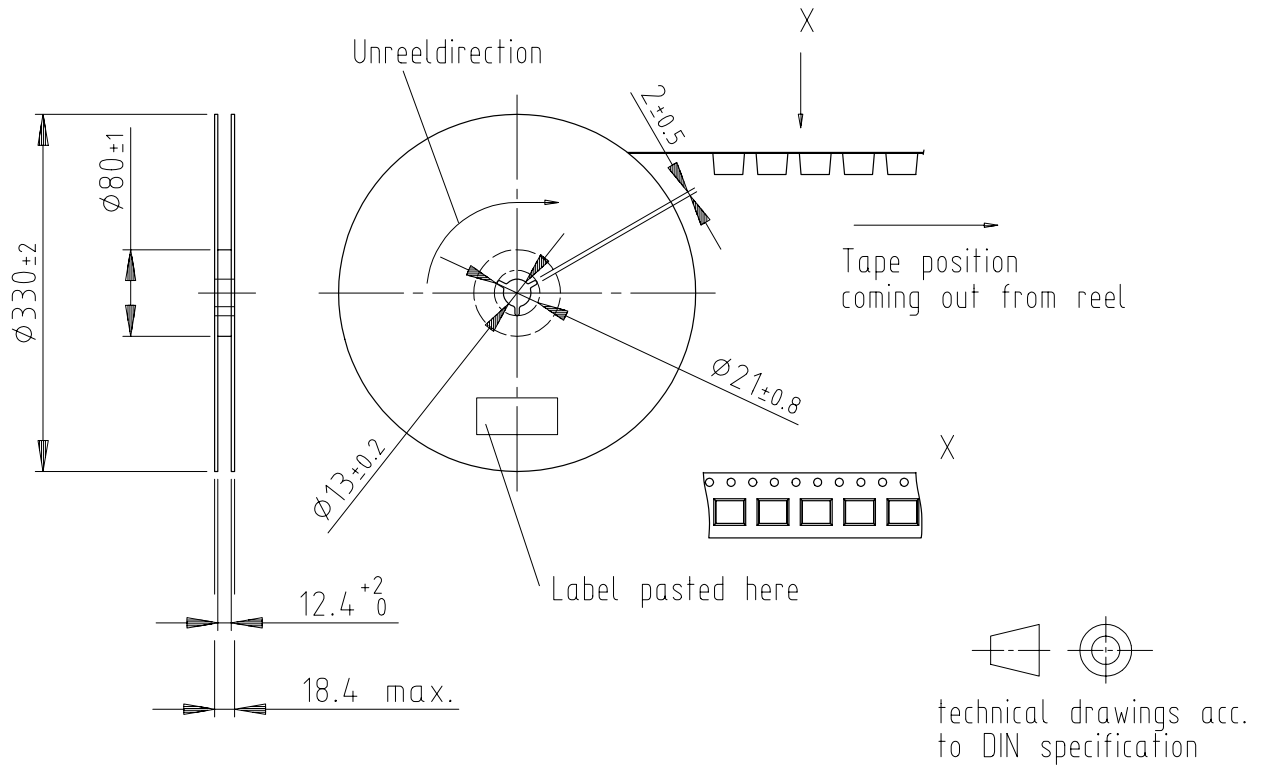
technical drawings  
according to DIN  
specifications

12899

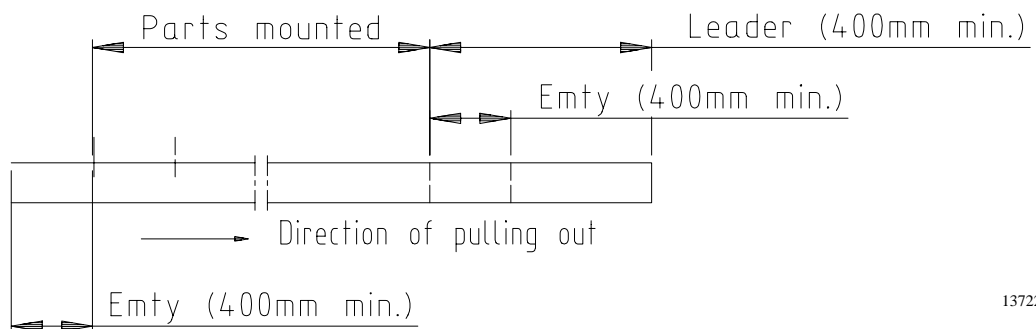
weight: ca. 0.15 g

**Reel Dimensions**

Reel-dimension and shape:

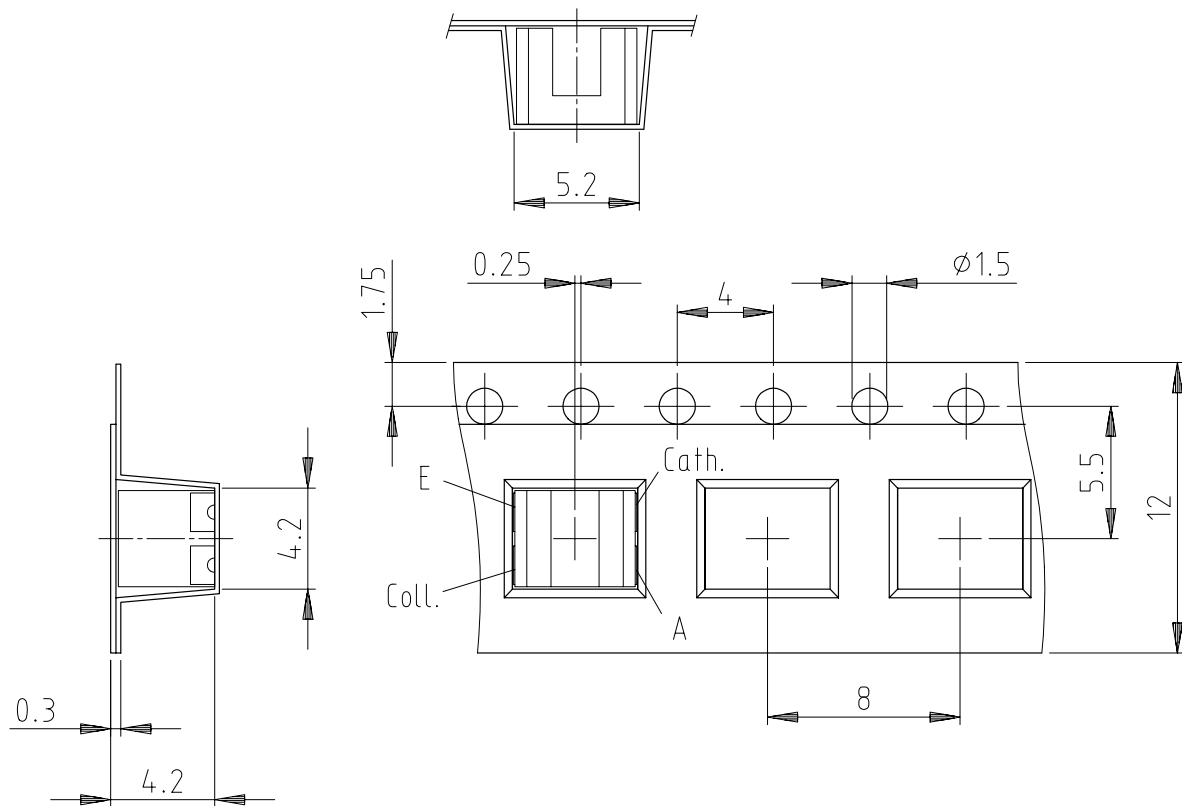


Leader and trailer tape:

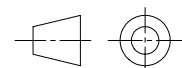


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## Tape Dimensions



Quantity per reel: 2000 pcs.



technical drawings acc.  
to DIN specification

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## 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 Telefunken products for any unintended or unauthorized application, the buyer shall indemnify Vishay Telefunken 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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