

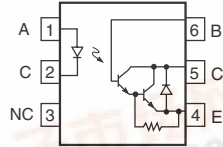
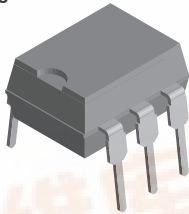


# IL66/ILD66/ILQ66

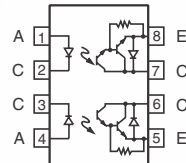
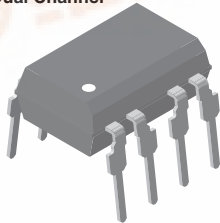
Vishay Semiconductors

## Optocoupler, Photodarlington Output, with Internal RBE (Single, Dual, Quad Channel)

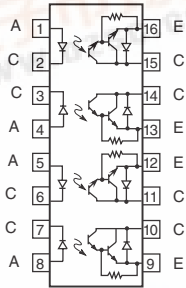
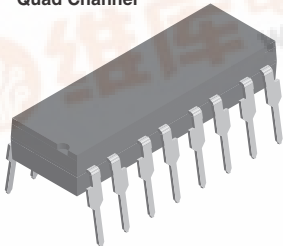
Single Channel



Dual Channel



Quad Channel



i179014

### FEATURES

- Internal RBE for high stability
- Four available CTR categories per package type
- $BV_{CEO} > 60\text{ V}$
- Standard DIP packages
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



RoHS COMPLIANT

### AGENCY APPROVALS

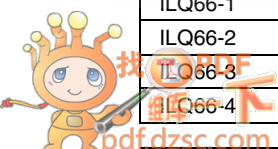
- UL1577, file no. E52744 system code H or J, double protection
- DIN EN 60747-5-2 (VDE 0884)/DIN EN 60747-5-5 pending available with option 1
- BSI IEC 60950 IEC 60065

### DESCRIPTION

IL66, ILD66, and ILQ66 are optically coupled isolators employing gallium arsenide infrared emitters and silicon photodarlington detectors. Switching can be accomplished while maintaining a high degree of isolation between driving and load circuits, with no crosstalk between channels.

### ORDER INFORMATION

PART	REMARKS
IL66-1	CTR $\geq 100\%$ , DIP-6
IL66-2	CTR $\geq 300\%$ , DIP-6
IL66-3	CTR $\geq 400\%$ , DIP-6
IL66-4	CTR $\geq 500\%$ , DIP-6
ILD66-1	CTR $\geq 100\%$ , DIP-8
ILD66-2	CTR $\geq 300\%$ , DIP-8
ILD66-3	CTR $\geq 400\%$ , DIP-8
ILD66-4	CTR $\geq 500\%$ , DIP-8
ILQ66-1	CTR $\geq 100\%$ , DIP-16
ILQ66-2	CTR $\geq 300\%$ , DIP-16
ILQ66-3	CTR $\geq 400\%$ , DIP-16
ILQ66-4	CTR $\geq 500\%$ , DIP-16



# IL66/ILD66/ILQ66



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ORDER INFORMATION	
PART	REMARKS
IL66-4X009	CTR ≥ 500 %, SMD-8 (option 9)
ILD66-2X007	CTR ≥ 300 %, SMD-8 (option 7)
ILD66-3X009	CTR ≥ 400 %, SMD-8 (option 9)
ILD66-4X009	CTR ≥ 500 %, SMD-8 (option 9)
ILQ66-4X007	CTR ≥ 500 %, SMD-16 (option 7)
ILQ66-4X009	CTR ≥ 500 %, SMD-16 (option 9)

### Note

For additional information on the available options refer to option information.

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	TEST CONDITION	PART	SYMBOL	VALUE	UNIT
<b>INPUT</b>					
Peak reverse voltage			$V_{RM}$	6.0	V
Forward continuous current			$I_F$	60	mA
Power dissipation			$P_{diss}$	100	mW
Derate linearly from 25 °C				1.33	mW/°C
<b>OUTPUT</b>					
Power dissipation			$P_{diss}$	150	mW
Derate from 25 °C				2.0	mW/°C
<b>COUPLER</b>					
Isolation test voltage	$t = 1.0 \text{ s}$		$V_{ISO}$	5300	$V_{RMS}$
Total package power dissipation		IL66	$P_{tot}$	250	mW
		ILD66	$P_{tot}$	400	mW
		ILQ66	$P_{tot}$	500	mW
Derate linearly from 25 °C		IL66		3.3	mW/°C
		ILD66		5.33	mW/°C
		ILQ66		6.67	mW/°C
Creepage distance				≥ 7.0	mm
Clearance distance				≥ 7.0	mm
Comparative tracking index			CTI	175	
Isolation resistance	$V_{IO} = 500 \text{ V}, T_{amb} = 25 \text{ °C}$		$R_{IO}$	≥ $10^{12}$	$\Omega$
	$V_{IO} = 500 \text{ V}, T_{amb} = 100 \text{ °C}$		$R_{IO}$	≥ $10^{11}$	$\Omega$
Storage temperature			$T_{stg}$	- 55 to + 125	°C
Operating temperature			$T_{amb}$	- 55 to + 100	°C
Lead soldering time at 260 °C				10	s

### Note

$T_{amb} = 25 \text{ °C}$ , unless otherwise specified.

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

ELECTRICAL CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>						
Forward voltage	$I_F = 20 \text{ mA}$	$V_F$		1.25	1.5	V
Reverse current	$V_R = 6.0 \text{ V}$	$I_R$		0.1	10	$\mu\text{A}$
Capacitance	$V_R = 0 \text{ V}$	$C_O$		25		pF



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ELECTRICAL CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>OUTPUT</b>						
Collector emitter breakdown voltage	$I_C = 1.0 \text{ mA}, I_F = 0 \text{ A}$	$BV_{CEO}$	60			V
Collector base breakdown voltage (IL66)	$I_C = 10 \text{ } \mu\text{A}$	$BV_{CBO}$	60			V
Collector emitter leakage current	$V_{CE} = 50 \text{ V}, I_F = 0 \text{ A}$	$I_{CEO}$		1.0	100	nA
Capacitance collector emitter	$V_{CE} = 10 \text{ V}$			3.4		pF
<b>COUPLER</b>						
Saturation voltage, collector emitter	$I_C = 10 \text{ mA}, I_F = 10 \text{ mA}$	$V_{CEsat}$		0.9	1.0	V

**Note**

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

Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

CURRENT TRANSFER RATIO							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Current transfer ratio	$I_F = 2.0 \text{ mA}, V_{CE} = 10 \text{ V}$	IL(D,Q)66-1	CTR	100	400		%
		IL(D,Q)66-2	CTR	300	500		%
	$I_F = 0.7 \text{ mA}, V_{CE} = 10 \text{ V}$	IL(D,Q)66-3	CTR	400	500		%
	$I_F = 2.0 \text{ mA}, V_{CE} = 5.0 \text{ V}$	IL(D,Q)66-4	CTR	500	750		%

SWITCHING CHARACTERISTICS							
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT	
<b>NON SATURATED</b>							
Rise time -1, -2, -4	$V_{CC} = 10 \text{ V}$	$t_r$			200	$\mu\text{s}$	
Fall time -1, -2, -4	$I_F = 2.0 \text{ mA}, R_L = 100 \text{ } \Omega$	$t_f$			200	$\mu\text{s}$	
Rise time -3	$I_F = 0.7 \text{ mA}$	$t_r$			200	$\mu\text{s}$	
Fall time -3	$V_{CC} = 10 \text{ V}, R_L = 100 \text{ } \Omega$	$t_f$			200	$\mu\text{s}$	

**TYPICAL CHARACTERISTICS**

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

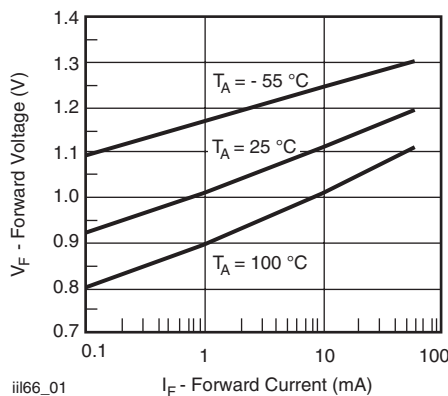


Fig. 1 - Forward Voltage vs. Forward Current

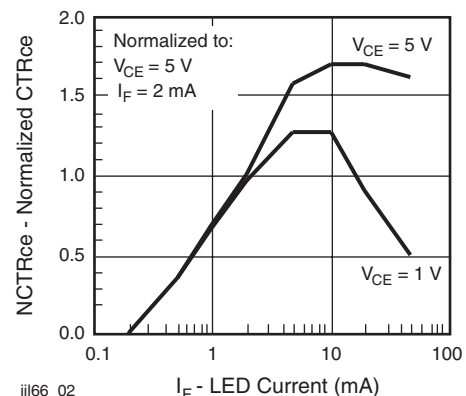


Fig. 2 - Normalized Non-Saturated and Saturated  $CTR_{CE}$  vs. LED Current

# IL66/ILD66/ILQ66



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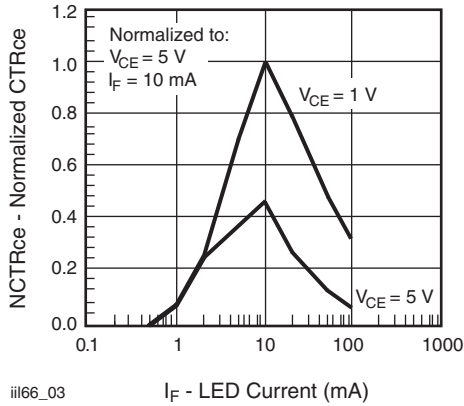


Fig. 3 - Normalized Non-Saturated and Saturated  $CTR_{CE}$  vs. LED Current

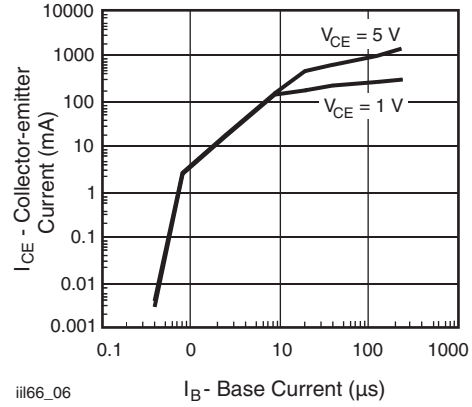


Fig. 6 - Collector Emitter Current vs. LED Current

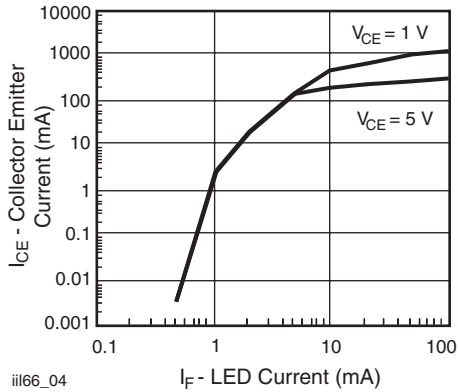


Fig. 4 - Non-Saturated and Saturated Collector Emitter Current vs. LED Current

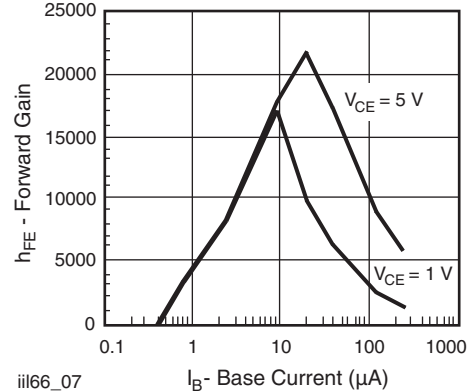


Fig. 7 - Non-Saturated and Saturated  $h_{FE}$  vs. LED Current

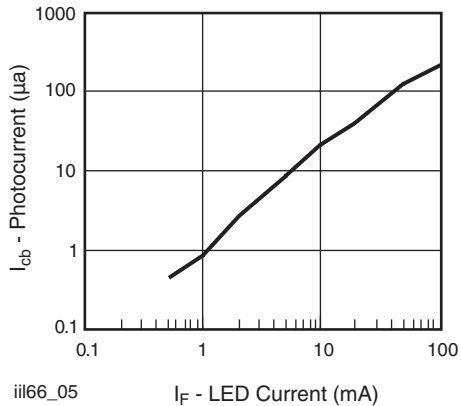


Fig. 5 - Collector Base Photocurrent vs. LED Current

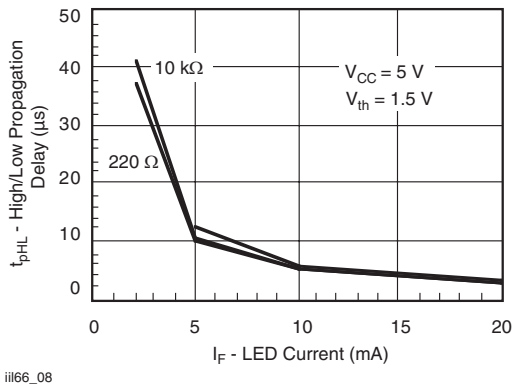
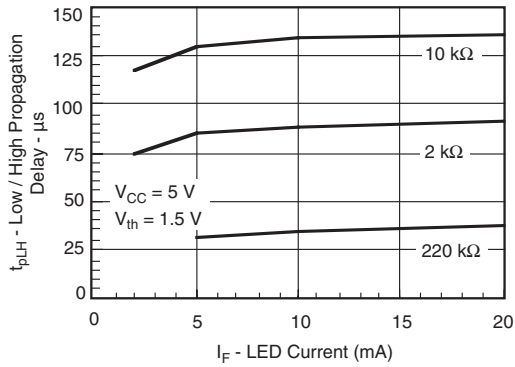
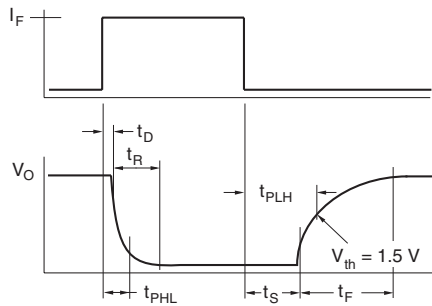


Fig. 8 - High to Low Propagation Delay vs. Collector Load Resistance and LED Current



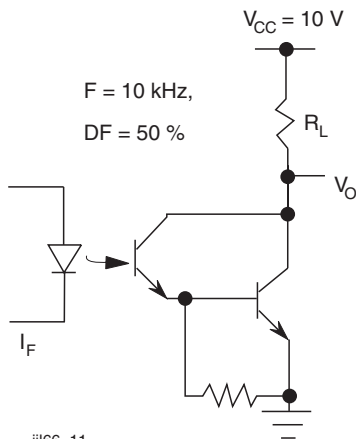
iii66\_09

Fig. 9 - Low to High Propagation Delay vs. Collector Load Resistance and LED Current



iii66\_10

Fig. 10 - Switching Waveform



iii66\_11

Fig. 11 - Switching Schematic

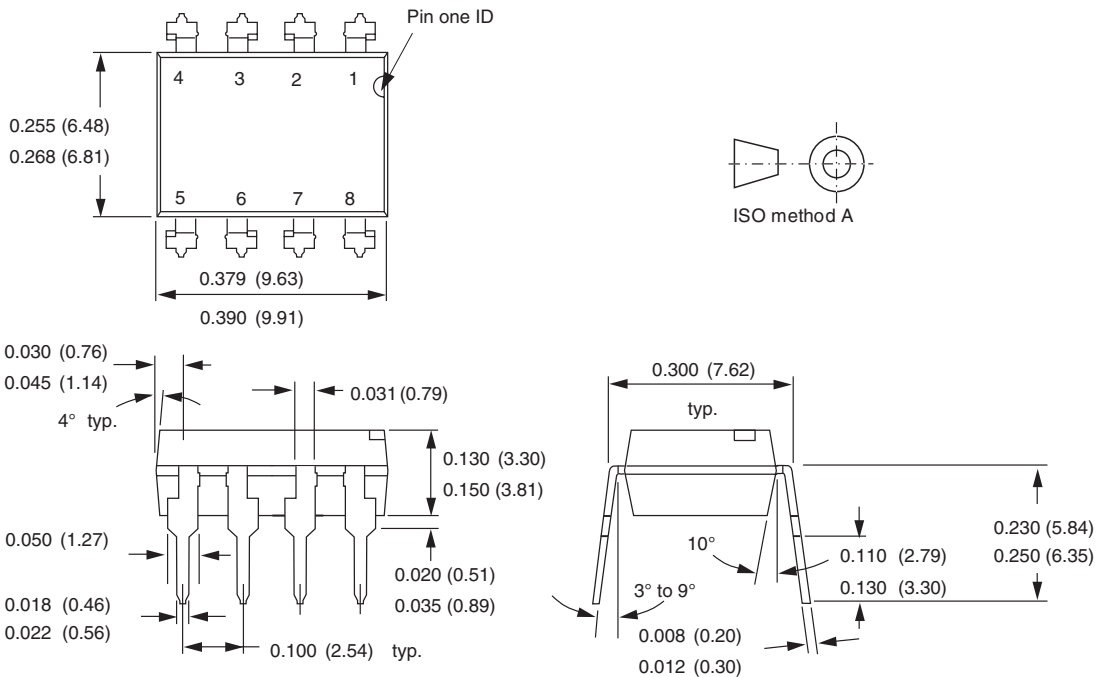
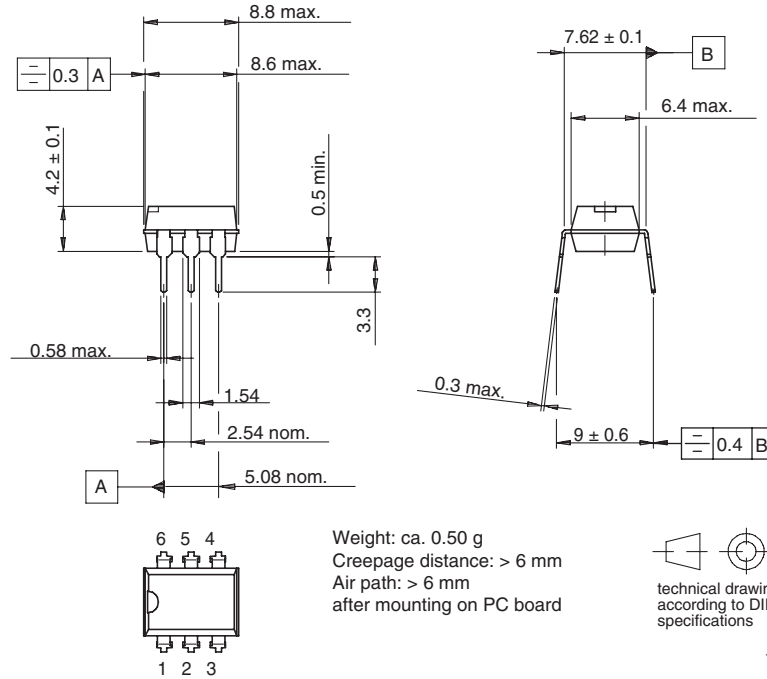
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## PACKAGE DIMENSIONS in millimeters

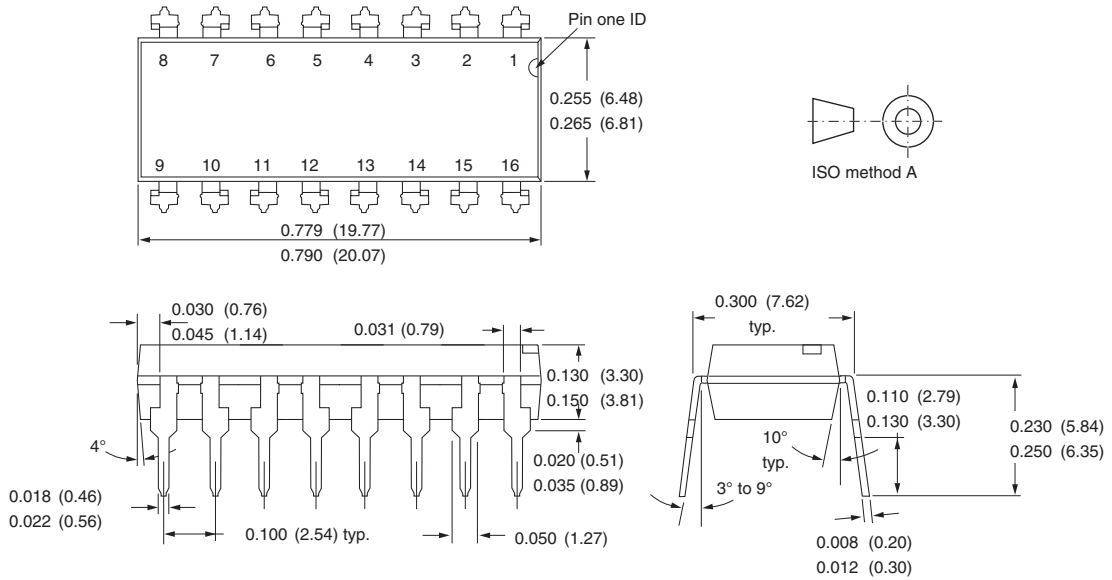


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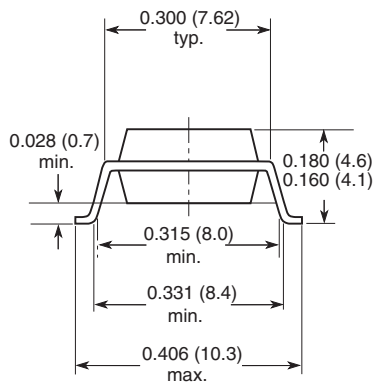
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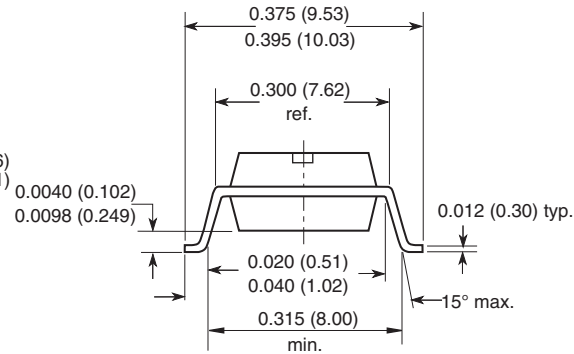


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Option 7



Option 9



18494



Vishay Semiconductors      Optocoupler, Photodarlington Output,  
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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 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.

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





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