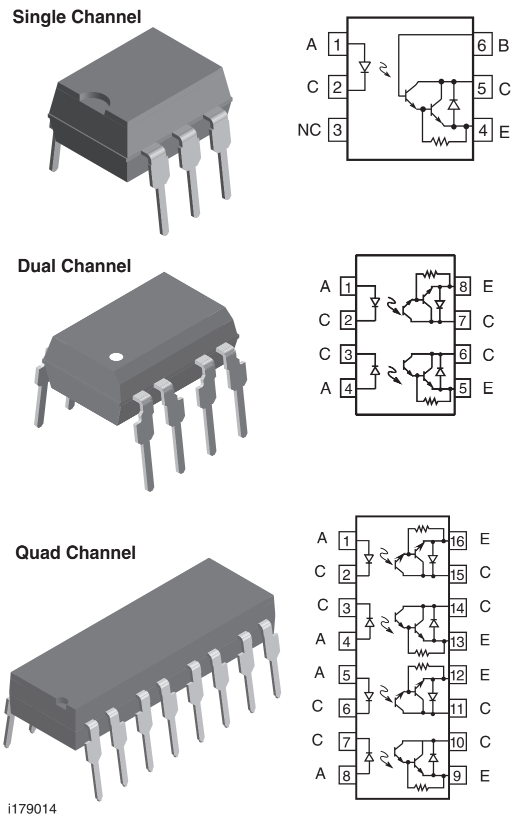
Optocoupler, Photodarlington Output, with Internal RBE (Single, Dual, Quad Channel)



FEATURES

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

Pb-free
e3
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 ≥ 100 %, DIP-6
IL66-2	CTR ≥ 300 %, DIP-6
IL66-3	CTR ≥ 400 %, DIP-6
IL66-4	CTR ≥ 500 %, DIP-6
ILD66-1	CTR ≥ 100 %, DIP-8
ILD66-2	CTR ≥ 300 %, DIP-8
ILD66-3	CTR ≥ 400 %, DIP-8
ILD66-4	CTR ≥ 500 %, DIP-8
ILQ66-1	CTR ≥ 100 %, DIP-16
ILQ66-2	CTR ≥ 300 %, DIP-16
ILQ66-3	CTR ≥ 400 %, DIP-16
ILQ66-4	CTR ≥ 500 %, DIP-16

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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
INPUT					
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
OUTPUT					
Power dissipation			P_{diss}	150	mW
Derate from 25 °C				2.0	mW/°C
COUPLER					
Isolation test voltage	t = 1.0 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 V, T_{amb} = 25 °C		R_{IO}	≥ 10^{12}	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C		R_{IO}	≥ 10^{11}	Ω
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 °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
INPUT						
Forward voltage	I_F = 20 mA	V_F		1.25	1.5	V
Reverse current	V_R = 6.0 V	I_R		0.1	10	µA
Capacitance	V_R = 0 V	C_O		25		pF

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

Note

T_{amb} = 25 °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 mA, V_{CE} = 10 V	IL(D,Q)66-1	CTR	100	400		%
		IL(D,Q)66-2	CTR	300	500		%
	I_F = 0.7 mA, V_{CE} = 10 V	IL(D,Q)66-3	CTR	400	500		%
	I_F = 2.0 mA, V_{CE} = 5.0 V	IL(D,Q)66-4	CTR	500	750		%

SWITCHING CHARACTERISTICS						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
NON SATURATED						
Rise time -1, -2, -4	V_{CC} = 10 V	t_r			200	µs
Fall time -1, -2, -4	I_F = 2.0 mA, R_L = 100 Ω	t_f			200	µs
Rise time -3	I_F = 0.7 mA	t_r			200	µs
Fall time -3	V_{CC} = 10 V, R_L = 100 Ω	t_f			200	µs

TYPICAL CHARACTERISTICS

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

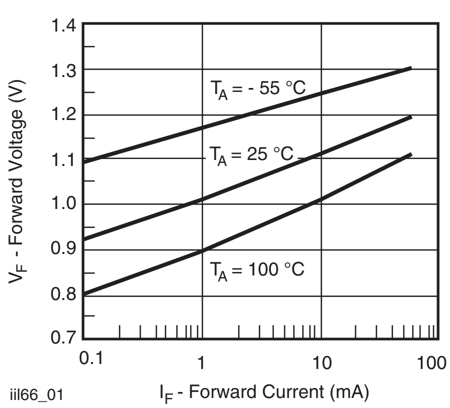


Fig. 1 - Forward Voltage vs. Forward Current

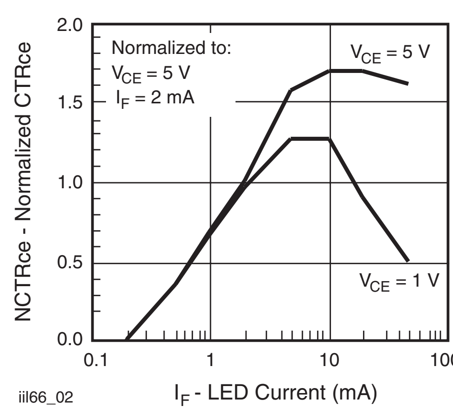


Fig. 2 - Normalized Non-Saturated and Saturated CTR_{CE} vs. LED Current

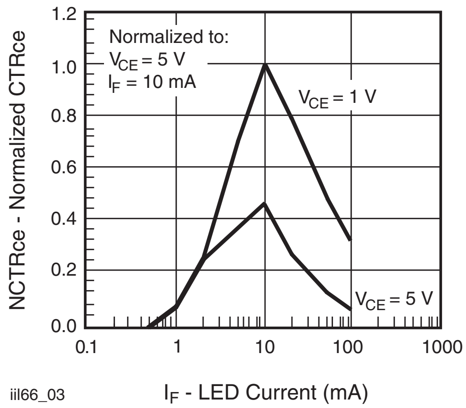


Fig. 3 - Normalized Non-Saturated and Saturated CTR_{CE} vs. LED Current

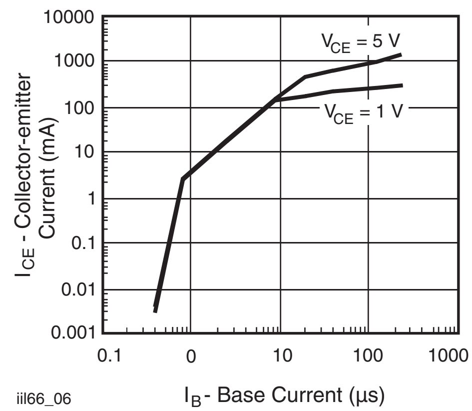


Fig. 6 - Collector Emitter Current vs. LED Current

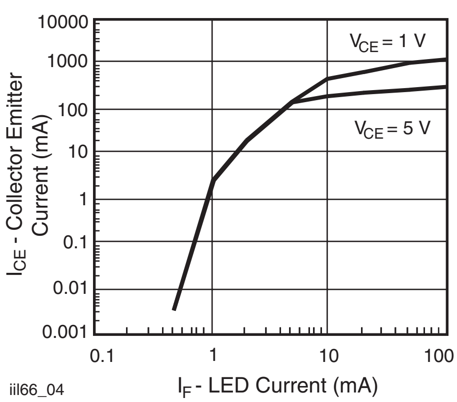


Fig. 4 - Non-Saturated and Saturated Collector Emitter Current vs. LED Current

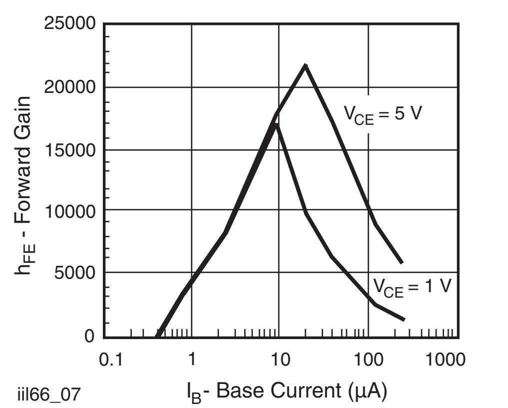


Fig. 7 - Non-Saturated and Saturated h_{FE} vs. LED Current

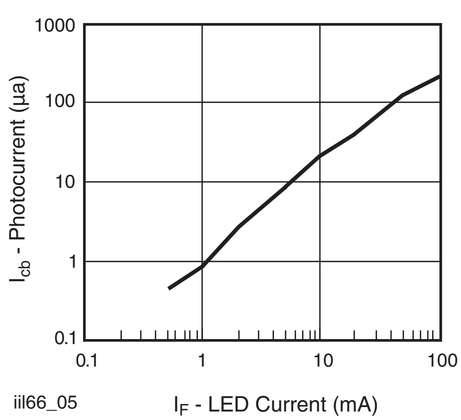


Fig. 5 - Collector Base Photocurrent vs. LED Current

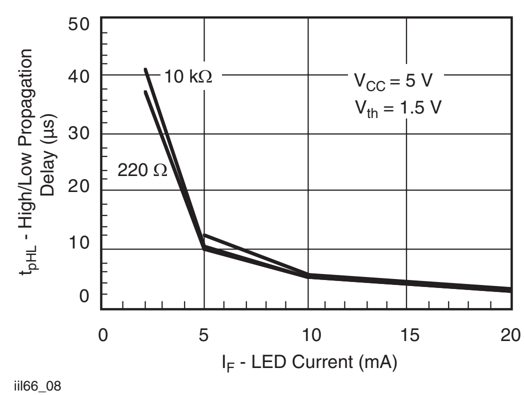


Fig. 8 - High to Low Propagation Delay vs. Collector Load Resistance and LED Current

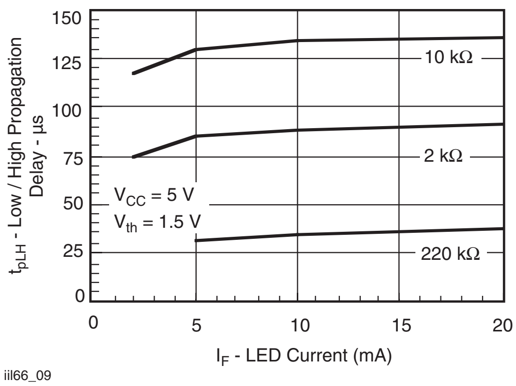


Fig. 9 - Low to High Propagation Delay vs. Collector Load Resistance and LED Current

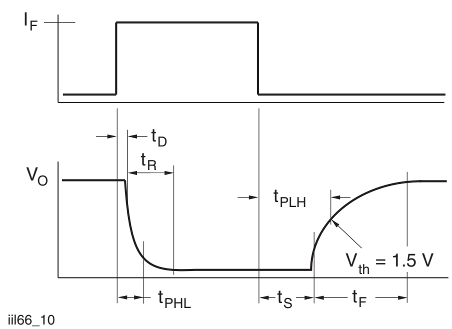


Fig. 10 - Switching Waveform

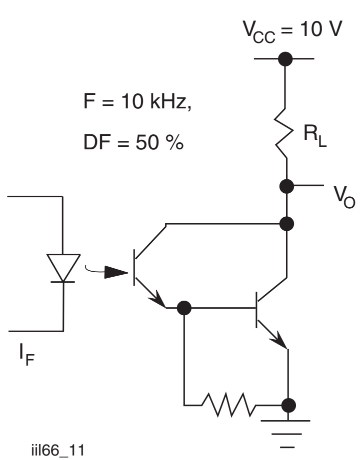
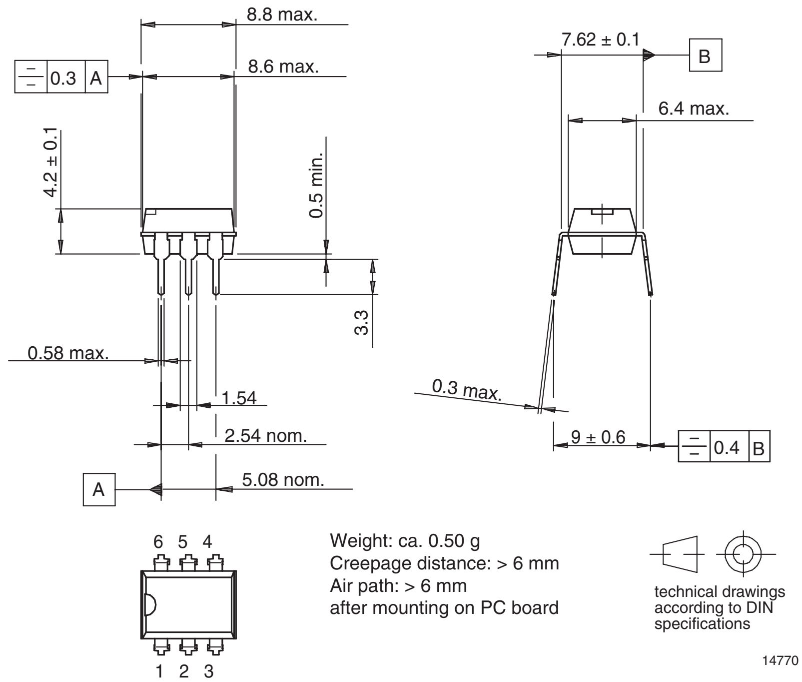
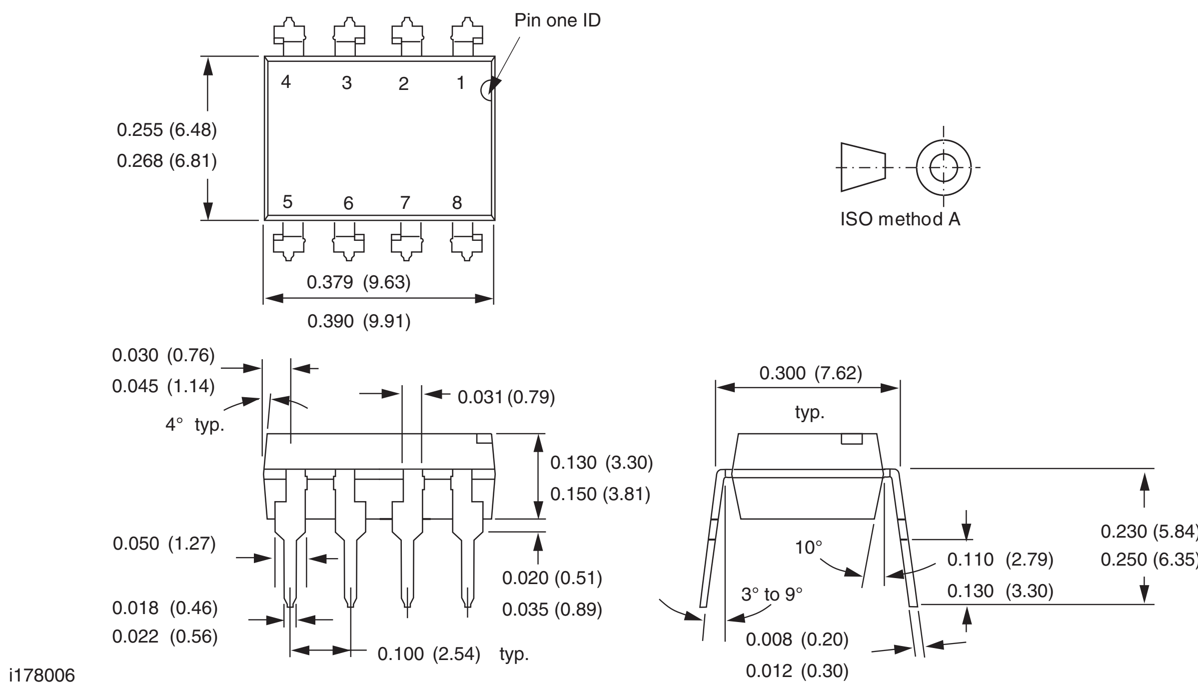
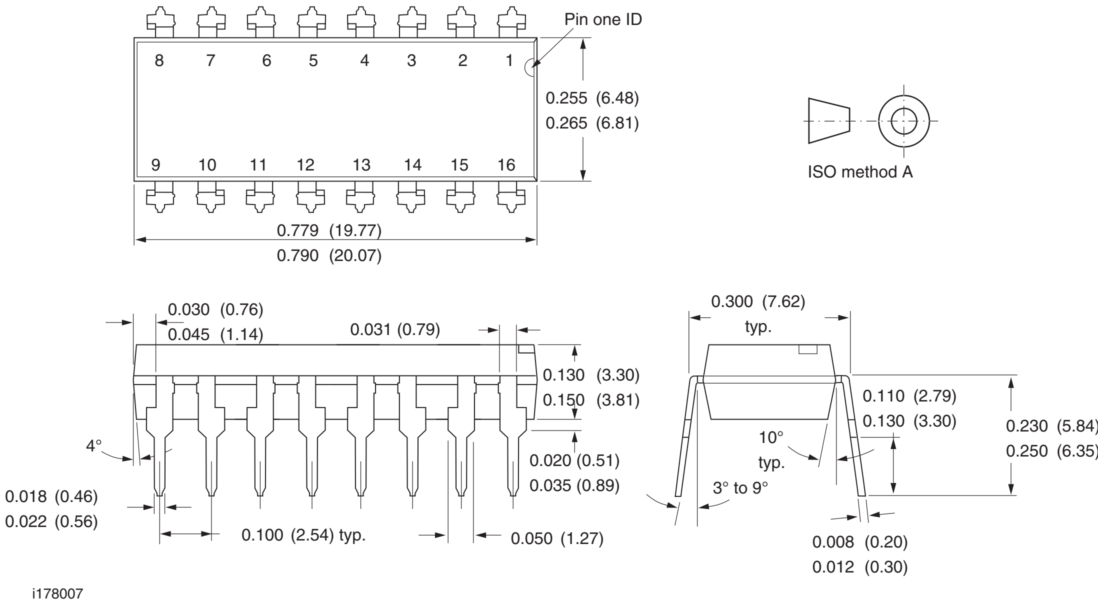


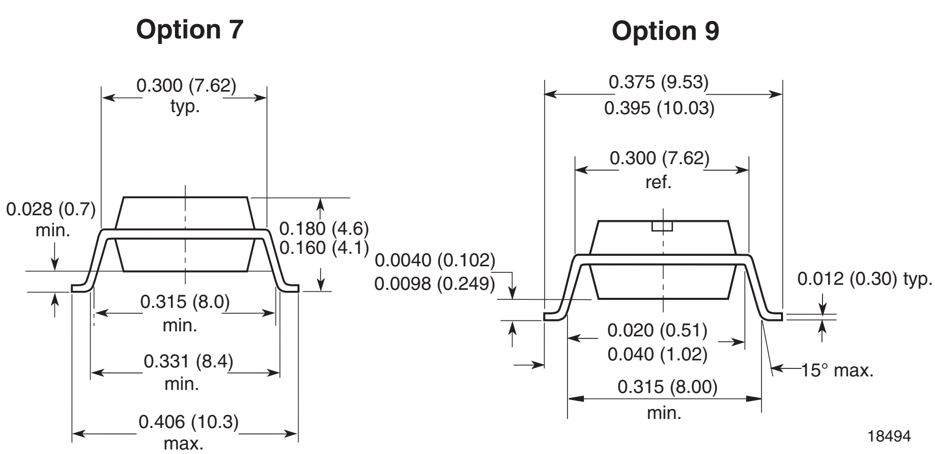
Fig. 11 - Switching Schematic

PACKAGE DIMENSIONS in millimeters






Pin one ID
8 7 6 5 4 3 2 1
9 10 11 12 13 14 15 16
0.255 (6.48)
0.265 (6.81)
ISO method A
0.779 (19.77)
0.790 (20.07)
0.030 (0.76)
0.045 (1.14)
0.031 (0.79)
0.130 (3.30)
0.150 (3.81)
4°
0.020 (0.51)
0.035 (0.89)
0.018 (0.46)
0.022 (0.56)
0.100 (2.54) typ.
0.050 (1.27)
0.300 (7.62)
typ.
0.110 (2.79)
0.130 (3.30)
0.230 (5.84)
0.250 (6.35)
10°
typ.
3° to 9°
0.008 (0.20)
0.012 (0.30)
i178007


Option 7
0.300 (7.62)
typ.
0.028 (0.7)
min.
0.180 (4.6)
0.160 (4.1)
0.315 (8.0)
min.
0.331 (8.4)
min.
0.406 (10.3)
max.
Option 9
0.375 (9.53)
0.395 (10.03)
0.300 (7.62)
ref.
0.0040 (0.102)
0.0098 (0.249)
0.012 (0.30) typ.
0.020 (0.51)
0.040 (1.02)
15° max.
0.315 (8.00)
min.
18494

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

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