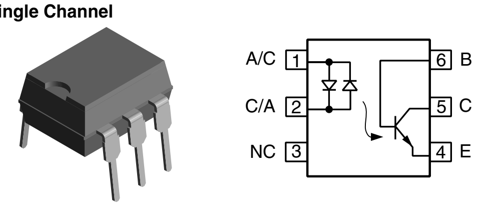
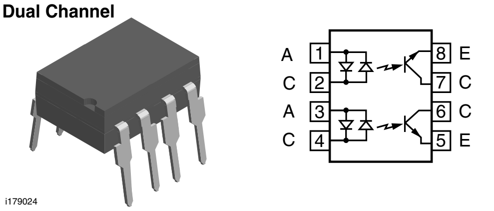
Optocoupler, Phototransistor Output, AC Input, with Base Connection

Single Channel



Dual Channel



FEATURES

- AC or polarity insensitive input
- Built-in reverse polarity input protection
- Improved CTR symmetry
- Industry standard DIP package
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

APPLICATIONS

- Ideal for AC signal detection and monitoring

AGENCY APPROVALS

- UL1577, file no. E52744 system code H or J, double protection
- CSA 93751
- BSI IEC 60950; IEC 60065
- DIN EN 60747-5-5 (VDE 0884) available with option 1

DESCRIPTION

The IL250, IL251, IL252, ILD250, ILD251, ILD252 are bidirectional input optically coupled isolators consisting of two gallium arsenide infrared LEDs coupled to a silicon NPN phototransistor per channel.

The IL250/ILD250 has a minimum CTR of 50 %, the IL251, ILD251 has a minimum CTR of 20 %, and the IL252, ILD252 has a minimum CTR of 100 %.

The IL250, IL251, IL252 are single channel optocouplers. The ILD250, LD251, ILD252 has two isolated channels in a single DIP package.

ORDER INFORMATION

PART	REMARKS
IL250	CTR > 50 %, single channel DIP-6
IL251	CTR > 20 %, single channel DIP-6
IL252	CTR > 100 %, single channel DIP-6
ILD250	CTR > 50 %, dual channel DIP-8
ILD251	CTR > 20 %, dual channel DIP-8
ILD252	CTR > 100 %, dual channel DIP-8
IL250-X007	CTR > 50 %, single channel SMD-6 (option 7)
IL250-X009	CTR > 50 %, single channel SMD-6 (option 9)
IL251-X009	CTR > 20 %, single channel SMD-6 (option 9)
IL252-X007	CTR > 100 %, single channel SMD-6 (option 7)
IL252-X009	CTR > 100 %, single channel SMD-6 (option 9)
ILD250-X009	CTR > 50 %, dual channel SMD-6 (option 9)
ILD251-X006	CTR > 20 %, dual channel DIP-8 400 mil (option 6)
ILD251-X007	CTR > 20 %, dual channel SMD-6 (option 7)
ILD251-X009	CTR > 20 %, dual channel SMD-6 (option 9)
ILD252-X009	CTR > 100 %, dual channel SMD-6 (option 9)

Note

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

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Forward continuous current		I_F	60	mA
Power dissipation		P_{diss}	100	mW
Derate linearly from 25 °C			1.33	mW/°C
OUTPUT				
Collector emitter breakdown voltage		BV_{CEO}	30	V
Emitter base breakdown voltage		BV_{EBO}	5	V
Collector base breakdown voltage		BV_{CBO}	70	V
Power dissipation single channel		P_{diss}	200	mW
Power dissipation dual channel		P_{diss}	150	mW
Derate linearly from 25 °C single channel			2.6	mW/°C
Derate linearly from 25 °C dual channel			2	mW/°C
COUPLER				
Isolation test voltage between emitter and detector		V_{ISO}	5300	V_{RMS}
Creepage distance			≥ 7	mm
Clearance distance			≥ 7	mm
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
Total dissipation single channel		P_{tot}	250	mW
Total dissipation dual channel		P_{tot}	400	mW
Derate linearly from 25 °C single channel			3.3	mW/°C
Derate linearly from 25 °C dual channel			5.3	mW/°C
Storage temperature		T_{stg}	- 55 to + 150	°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	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT							
Forward voltage	I_F = ± 10 mA		V_F		1.2	1.5	V
OUTPUT							
Collector emitter breakdown voltage	I_C = 1 mA		BV_{CEO}	30	50		V
Emitter base breakdown voltage	I_E = 100 µA		BV_{EBO}	7	10		V
Collector base breakdown voltage	I_C = 10 µA		BV_{CBO}	70	90		V
Collector emitter leakage current	V_{CE} = 10 V		I_{CEO}		5	50	nA
COUPLER							
Collector emitter saturation voltage	I_F = ± 16 mA, I_C = 2 mA		V_{CEsat}			0.4	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**
DC current transfer ratio	I_F = ± 10 mA, V_{CE} = 10 V	IL250/ILD250	CTR_{DC}	50			%
		IL251/ILD251	CTR_{DC}	20			%
		IL251/ILD251	CTR_{DC}	100			%
Symmetry (CTR at + 10 mA)/ (CTR at -10 mA)				0.50	1	2	

TYPICAL CHARACTERISTICS

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

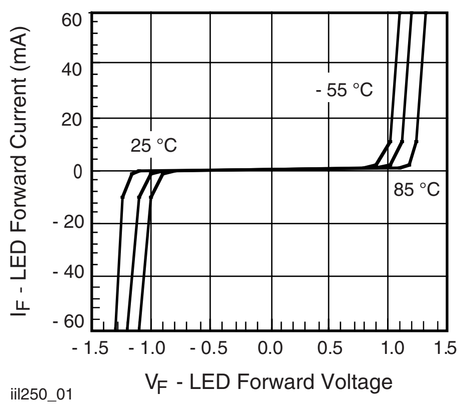


Fig. 1 - LED Forward Current vs.Forward Voltage

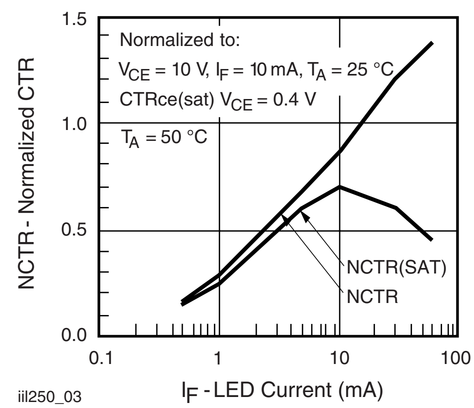


Fig. 3 - Normalized Non-Saturated and Saturated CTR vs. LED Current

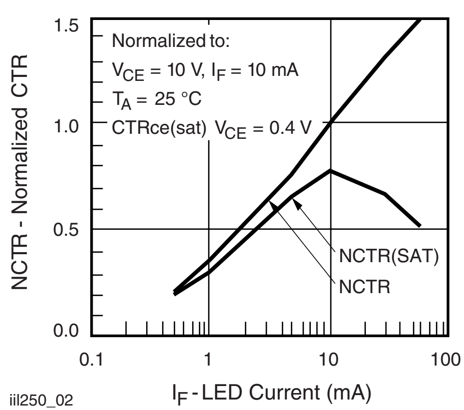


Fig. 2 - Normalized Non-Saturated and Saturated CTR vs. LED Current

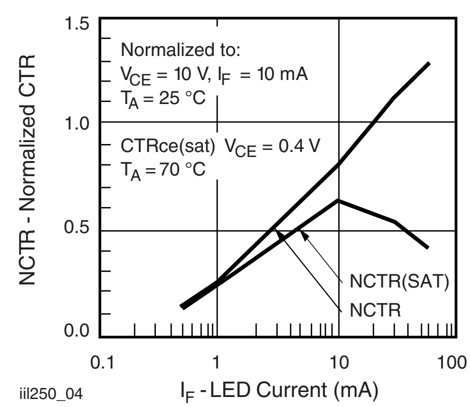


Fig. 4 - Normalized Non-Saturated and Saturated CTR vs. LED Current

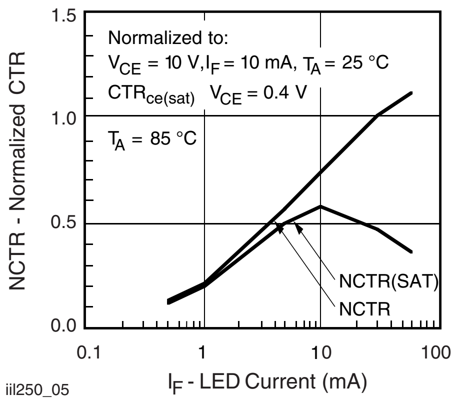


Fig. 5 - Normalized Non-Saturated and Saturated CTR vs. LED Current

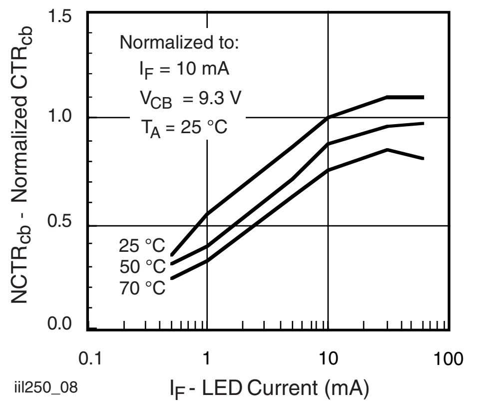


Fig. 8 - Normalized CTR_{CB} vs. LED Current and Temperature

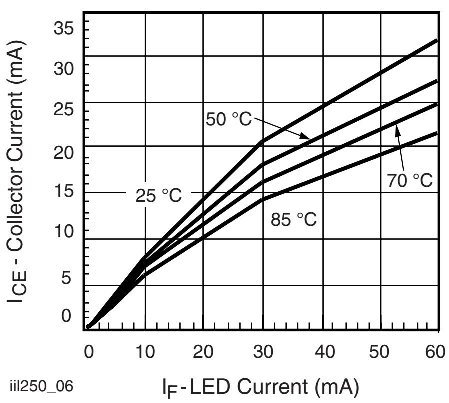


Fig. 6 - Collector Emitter Current vs. Temperature and LED Current

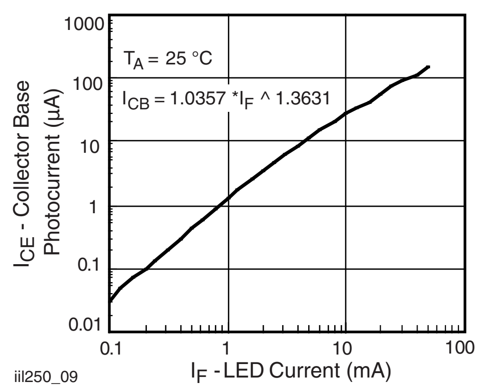


Fig. 9 - Collector Base Photocurrent vs. LED Current

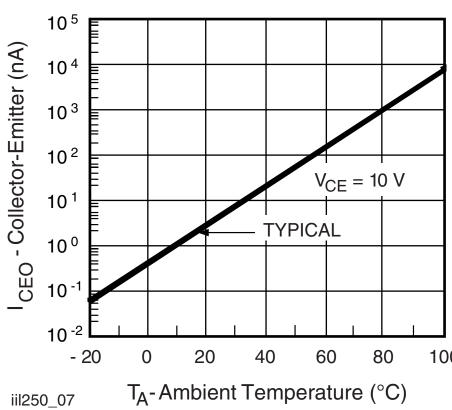


Fig. 7 - Collector Emitter Leakage Current vs.Temperature

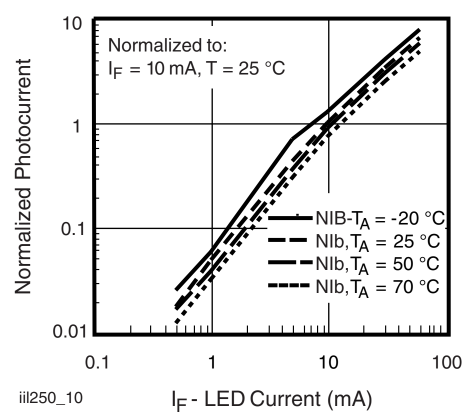


Fig. 10 - Normalized Photocurrent vs. I_F and Temperature

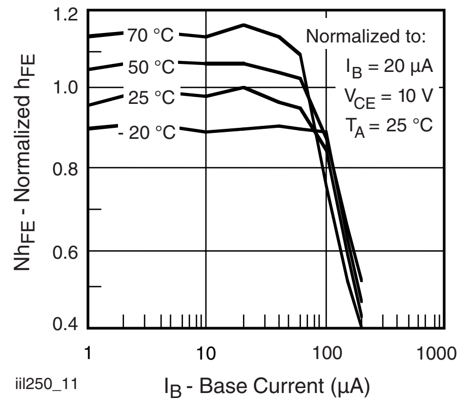


Fig. 11 - Normalized Non Saturated h_{FE} vs. Base Current and Temperature

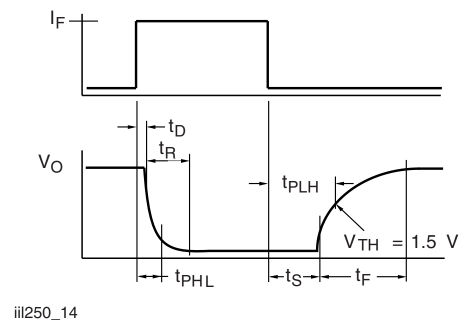


Fig. 14 - Switching Timing

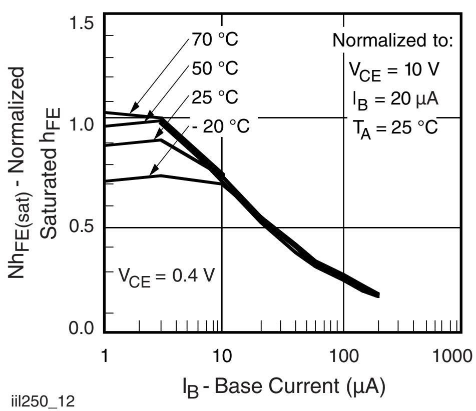


Fig. 12 - Normalized Saturated h_{FE} vs. Base Current and Temperature

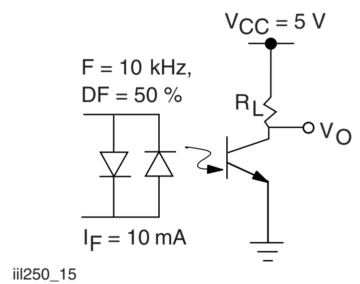


Fig. 15 - Switching Schematic

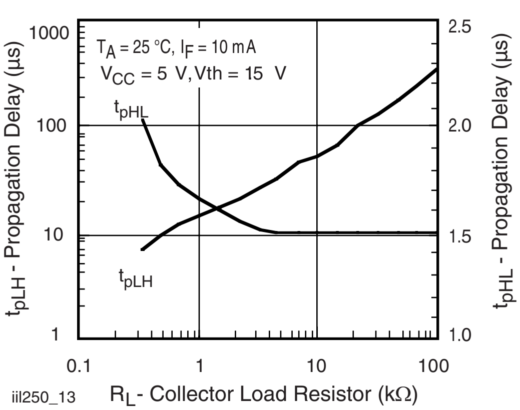
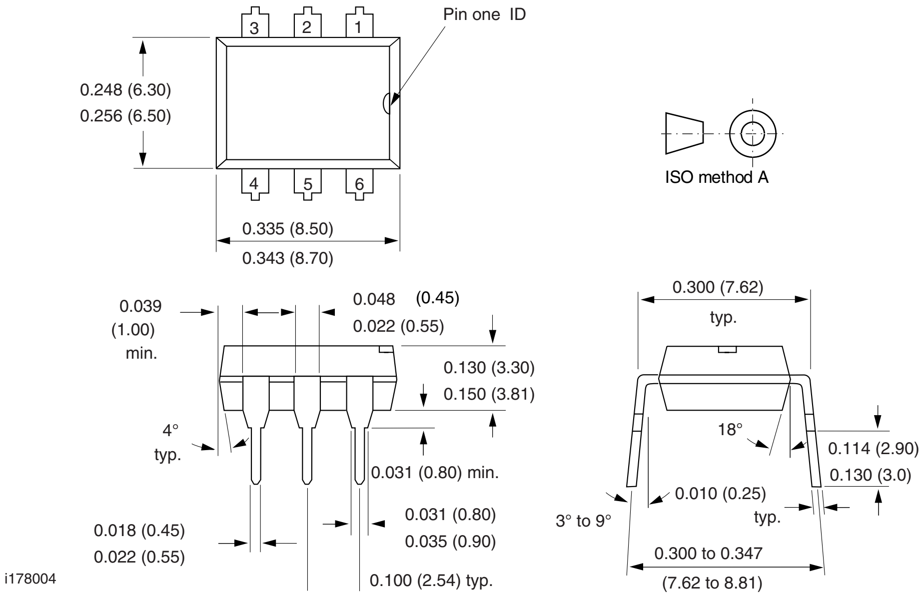
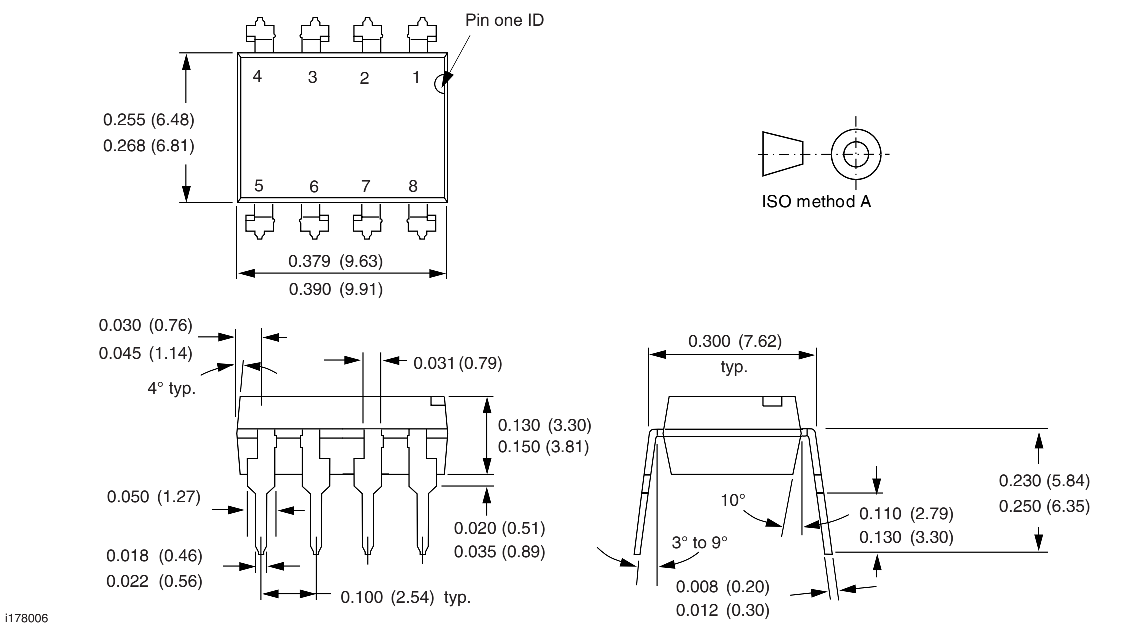
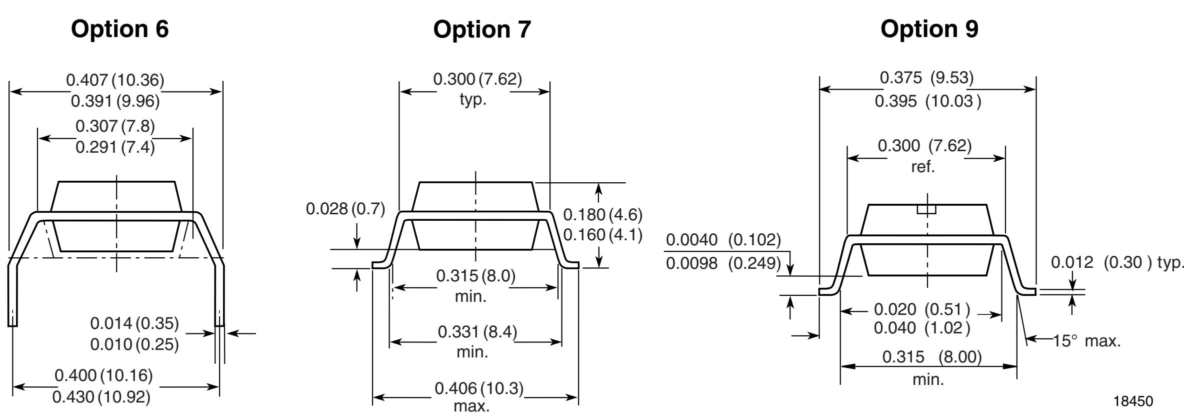


Fig. 13 - Propagation Delay vs. Collector Load Resistor

PACKAGE DIMENSIONS in inches (millimeters)







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.

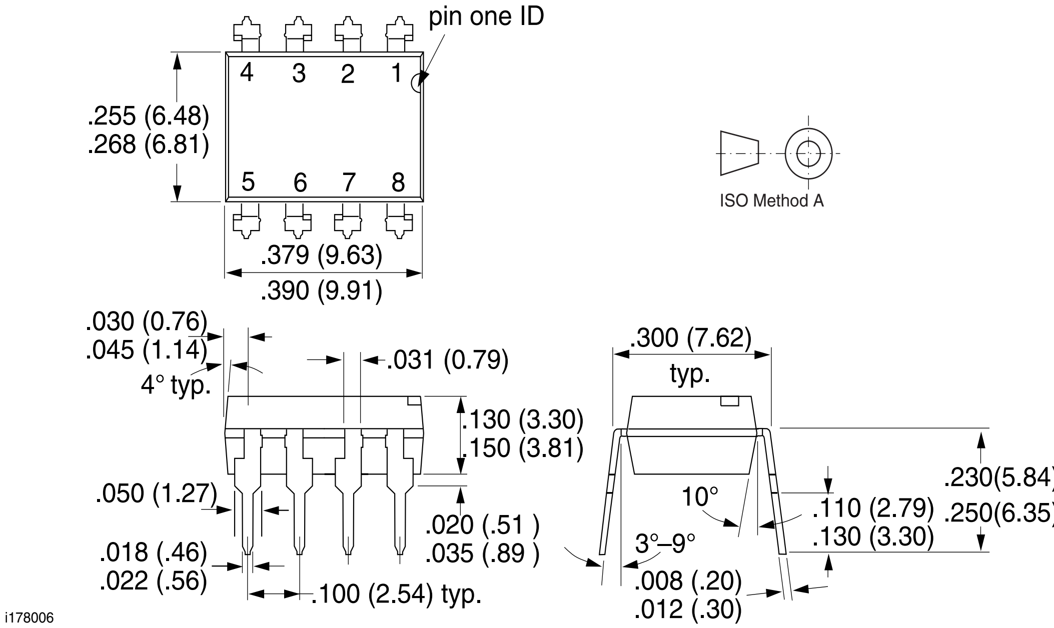
Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

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

DIP-8

Package Dimensions in Inches (mm)



Ozone Depleting Substances Policy Statement

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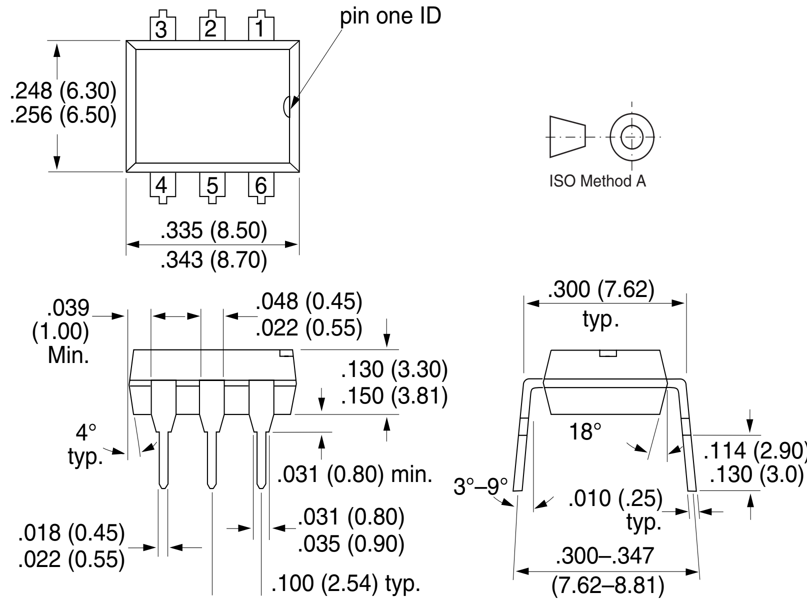
Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany
Telephone: 49 (0)7131 67 2831, Fax number: 49 (0)7131 67 2423

DIP-6A

Package Dimensions in Inches (mm)



i178004

Ozone Depleting Substances Policy Statement

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Telephone: 49 (0)7131 67 2831, Fax number: 49 (0)7131 67 2423

Footprints

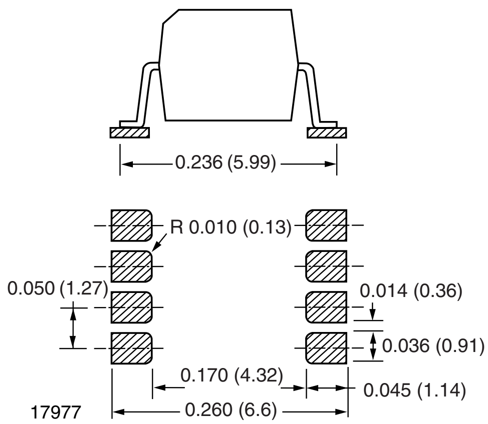

Fig. 1 - SO8A and DSO8A SMD

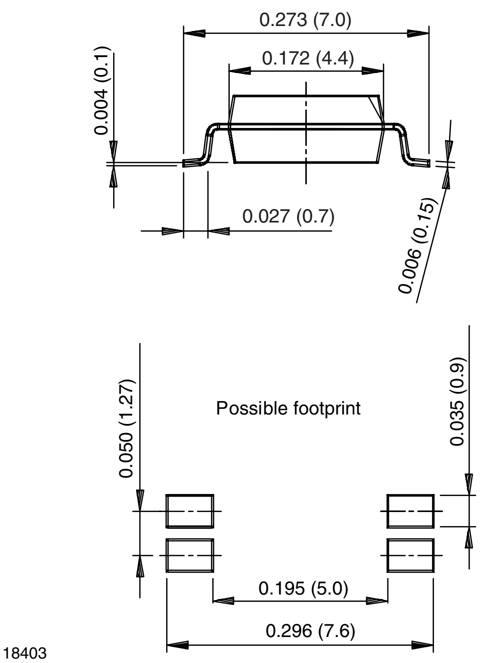

Fig. 2 - SOP-4, Miniflat

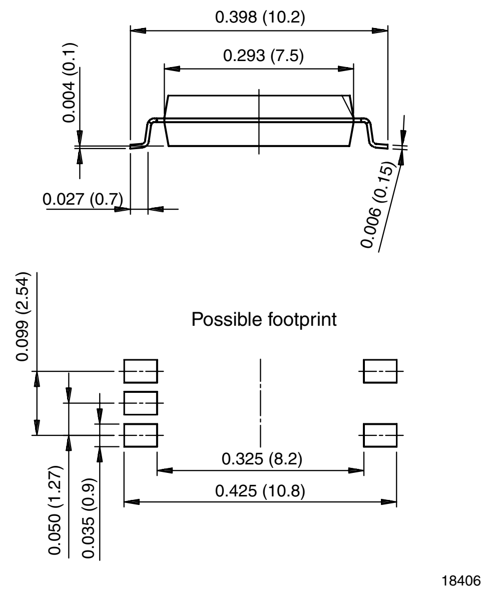

Fig. 3 - SOP-6, 5 Pin Wide Body

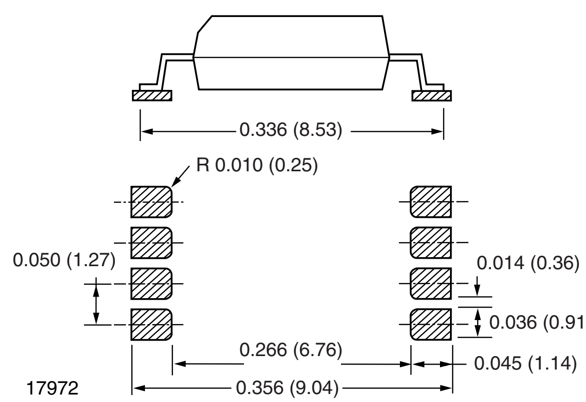

Fig. 4 - 8 Pin PCMCIA

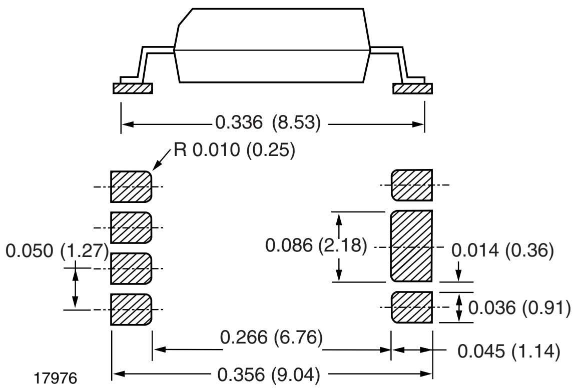

Fig. 5 - 8 Pin PCMCIA, Heat Sink

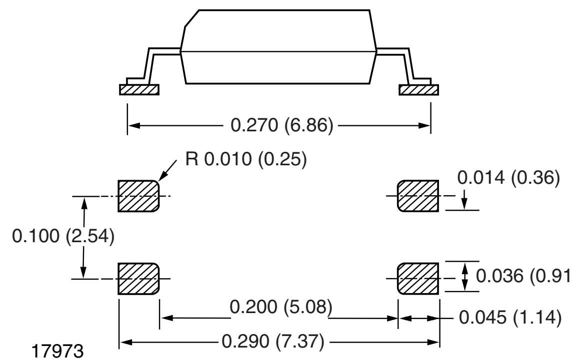

Fig. 8 - 4 Pin Mini-Flat

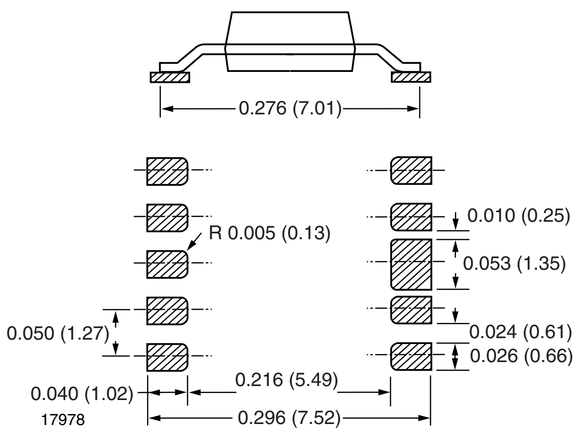

Fig. 6 - Mini Coupler

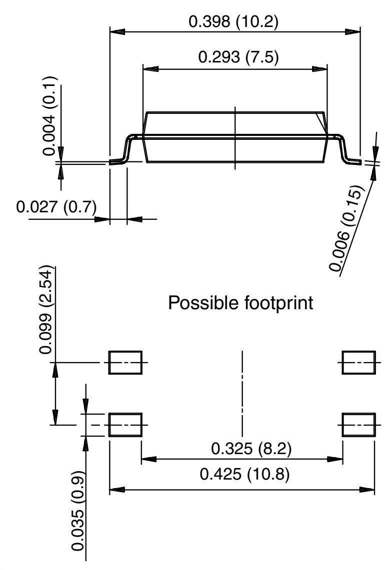

Fig. 9 - SOP-6, 4 Pin Wide Body

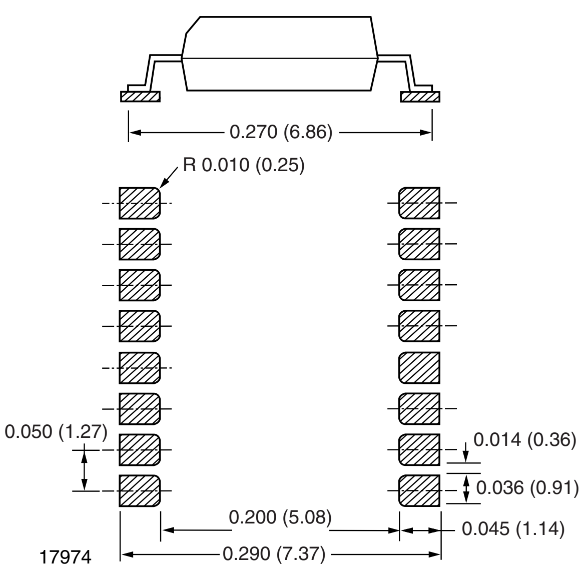

Fig. 7 - SOP-16

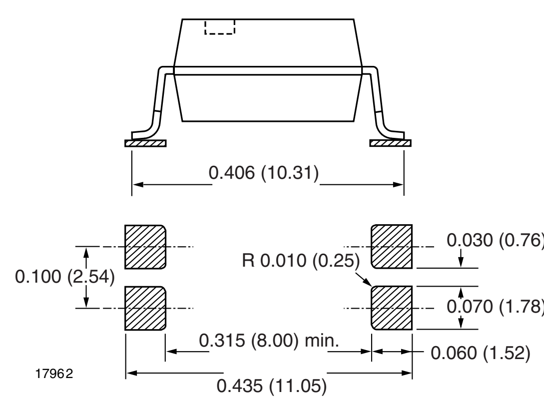

Fig. 10 - 4 Pin SMD Option 7

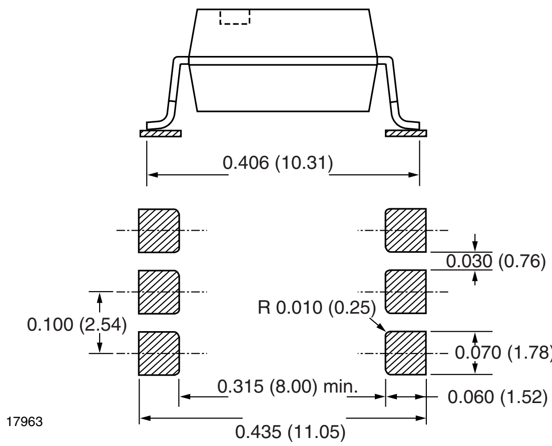

Fig. 11 - 6 Pin SMD Option 7

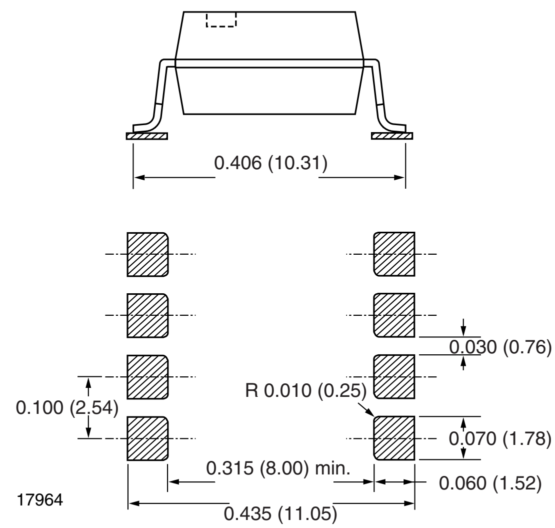

Fig. 12 - 8 Pin SMD Option 7

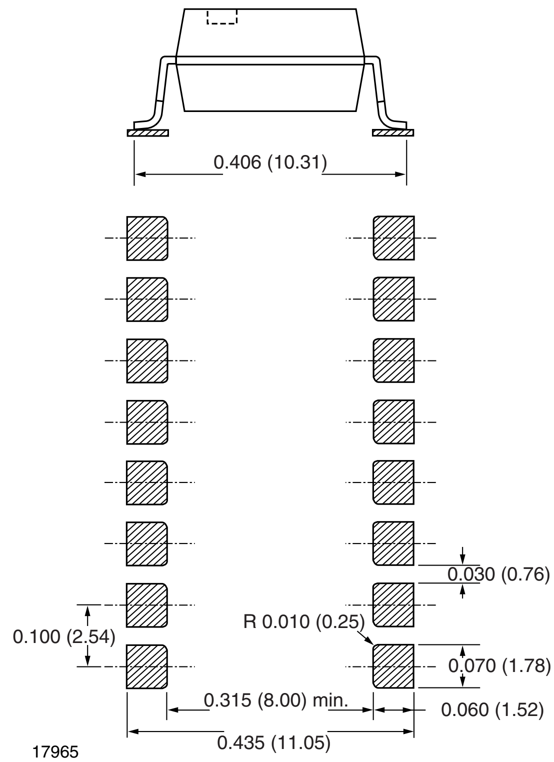

Fig. 13 - 16 Pin SMD Option 7

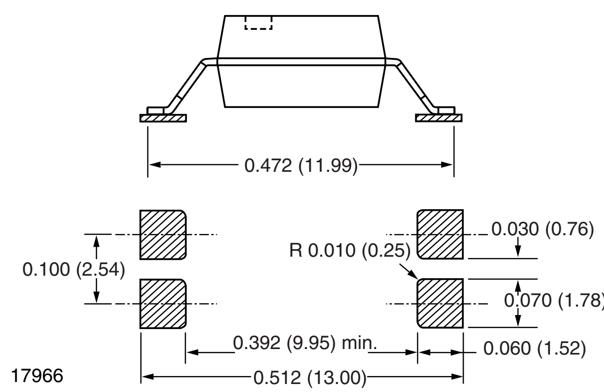

Fig. 14 - 4 Pin SMD Option 8

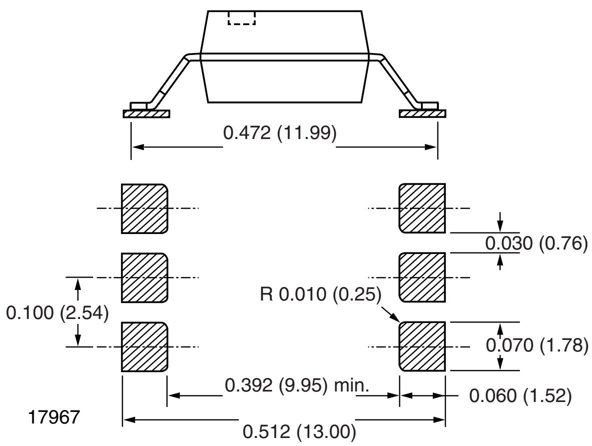

Fig. 15 - 6 Pin SMD Option 8

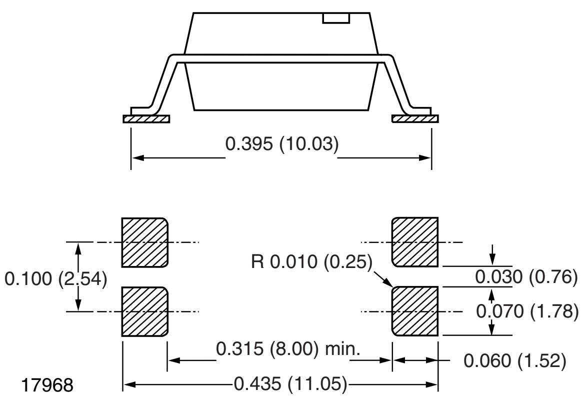

Fig. 16 - 4 Pin SMD Option 9

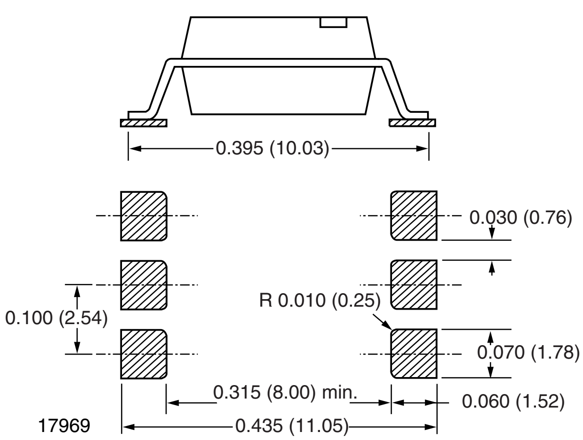

Fig. 17 - 6 Pin SMD Option 9

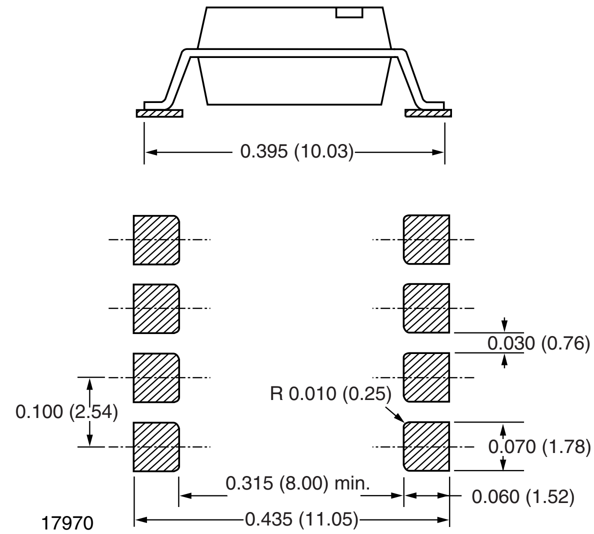

Fig. 18 - 8 Pin SMD Option 9

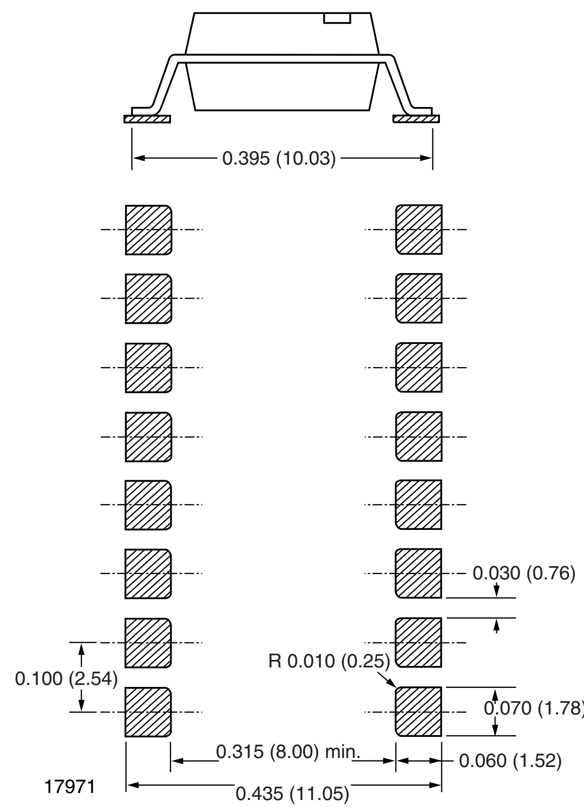

Fig. 19 - 16 Pin SMD Option 9

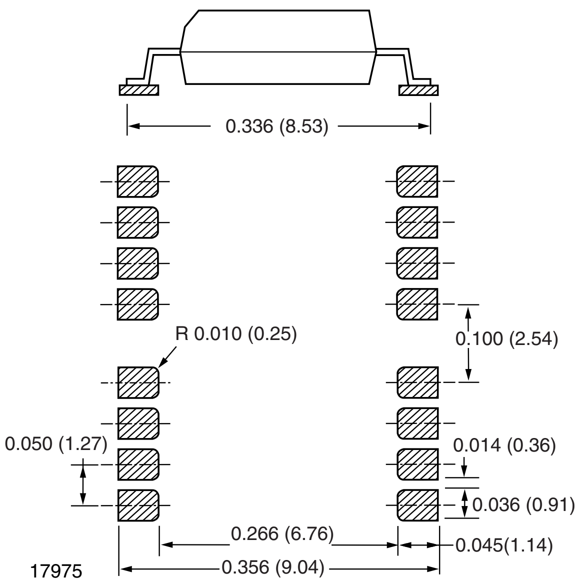

Fig. 20 - 16 Pin PCMCIA

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