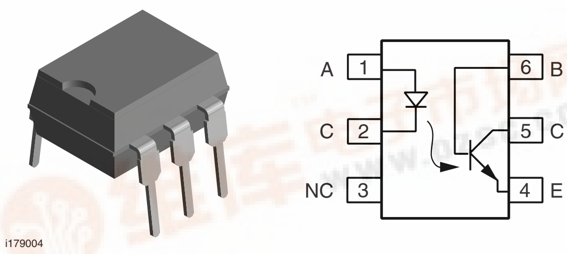
Optocoupler, Phototransistor Output, Low Input Current, Low Input Current, with Base Connection



FEATURES

- Guaranteed at I_F = 1.0 mA
- High collector emitter voltage, BV_{CEO} = 70 V
- Long term stability
- 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

AGENCY APPROVALS

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

DESCRIPTION

The IL201/IL202/IL203 are optically coupled pairs employing a gallium arsenide infrared LED and a silicon NPN phototransistor. Signal information, including a DC level, can be transmitted by the device while maintaining a high degree of electrical isolation between input and output. The IL201/IL202/IL203 can be used to replace relays and transformers in many digital interface applications, as well as analog applications such as CRT modulation.

ORDER INFORMATION

PART	REMARKS
IL201	CTR 75 to 150 %, DIP-6
IL202	CTR 125 to 250 %, DIP-6
IL203	CTR 225 to 450 %, DIP-6
IL203-X007	CTR 225 to 450 %, SMD-6 (option 7)
IL203-X009	CTR 225 to 450 %, 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				
Peak reverse voltage		V_R	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				
Collector emitter breakdown voltage		BV_{CEO}	70	V
Emitter collector breakdown voltage		BV_{ECO}	7.0	V
Collector base breakdown voltage		BV_{CBO}	70	V
Power dissipation		P_{diss}	200	mW
Derate linearly from 25 °C			2.6	mW/°C

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
COUPLER				
Isolation test voltage	t = 1.0 s	V_{ISO}	5300	V_{RMS}
Total package dissipation (LED and detector)		P_{tot}	250	mW
Derate linearly from 25 °C			3.3	mW/°C
Creepage distance			≥ 7.0	mm
Clearance distance			≥ 7.0	mm
Storage temperature		T_{stg}	- 55 to + 150	°C
Operating temperature		T_{amb}	- 55 to + 100	°C
Lead soldering time	≤ 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		1.2	1.5	V
	I_F = 1.0 mA	V_F		1.0	1.2	V
Breakdown voltage	I_R = 10 µA	V_F	6.0	20		V
Reverse current	V_R = 6.0 V	I_R		0.1	10	µA
OUTPUT						
DC forward current gain	V_{CE} = 5.0 V, I_C = 100 µA	h_{FE}	100	200		
Collector emitter breakdown voltage	I_C = 100 µA	BV_{CEO}	70			V
Emitter collector breakdown voltage	I_E = 100 µA	BV_{ECO}	7.0	10		V
Collector base breakdown voltage	I_C = 10 µA	BV_{CBO}	70	90		V
Leakage current collector emitter	V_{CE} = 10 V, T_A = 25 °C	I_{CEO}		5.0	50	nA

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 (collector to base)	I_F = 10 mA, V_{CB} = 10 V		CTR_{CB}	15			%
	I_F = 10 mA, I_C = 2.0 mA		CTR_{CB}			40	%
DC current transfer ratio	I_F = 10 mA, V_{CB} = 10 V	IL201	CTR_{DC}	75	100	150	%
		IL202	CTR_{DC}	125	200	250	%
		IL203	CTR_{DC}	225	300	450	%
	I_F = 1.0 mA, V_{CE} = 10 V	IL201	CTR_{DC}	10			%
		IL202	CTR_{DC}	30			%
		IL203	CTR_{DC}	50			%

TYPICAL CHARACTERISTICS

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

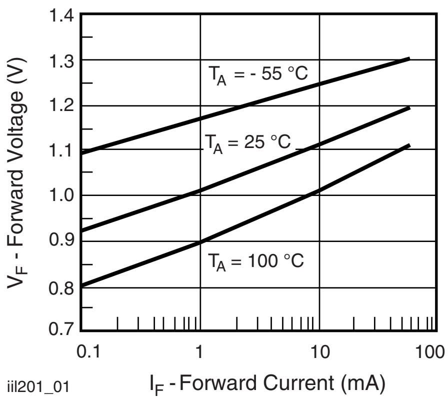


Fig. 1 - Forward Voltage vs. Forward Current

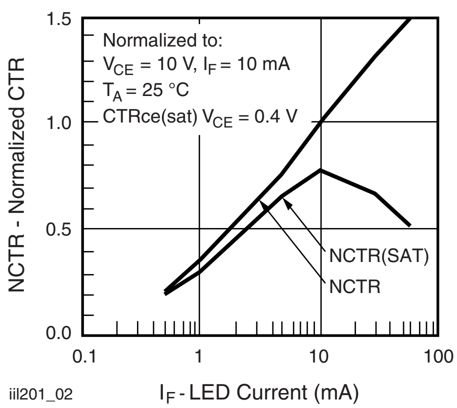


Fig. 2 - Normalized Non-Saturated and Saturated CTR vs. LED Current

0 V

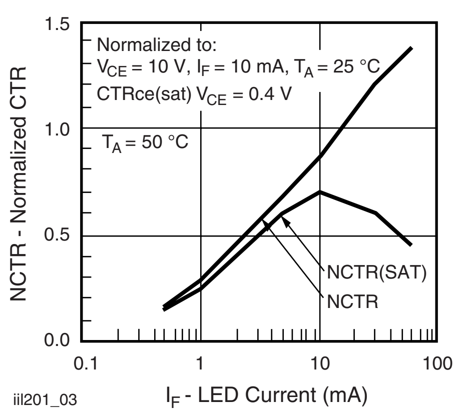


Fig. 3 - Normalized Non-Saturated and Saturated CTR vs. LED Current

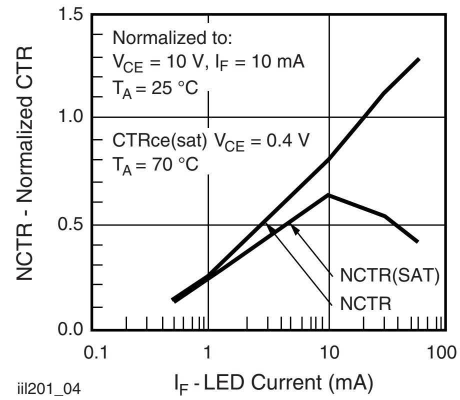


Fig. 4 - Normalized Non-Saturated and Saturated CTR vs. LED Current

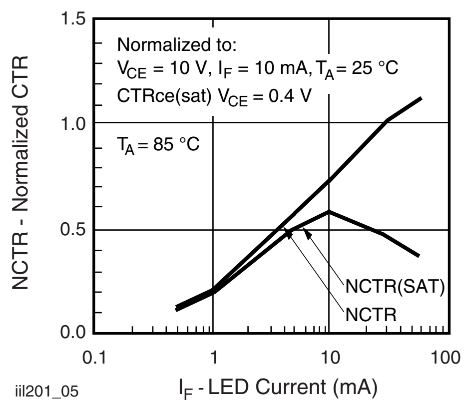


Fig. 5 - Normalized Non-Saturated and Saturated CTR vs. LED Current

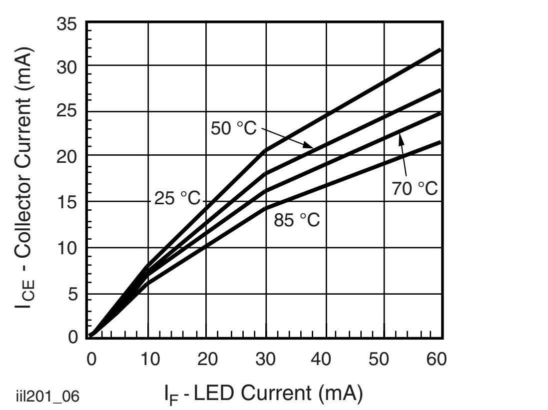


Fig. 6 - Collector Emitter Current vs. Temperature and LED Current

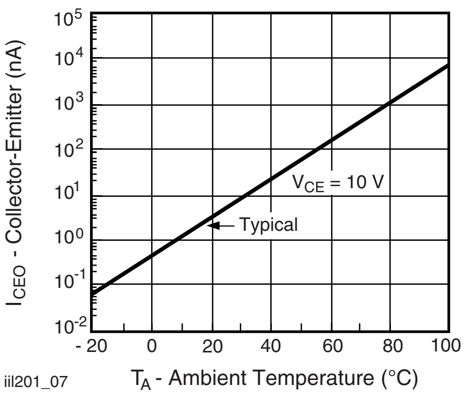


Fig. 7 - Collector Emitter Leakage Current vs.Temperature

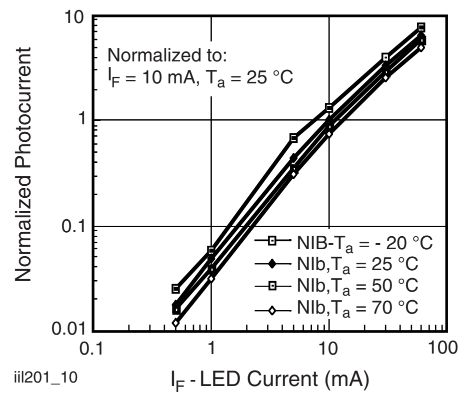


Fig. 10 - Normalized Photocurrent vs. I_F and Temperature

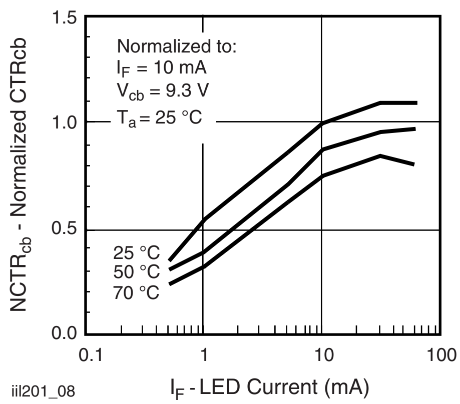


Fig. 8 - Normalized CTR_{cb} vs. LED Current and Temperature

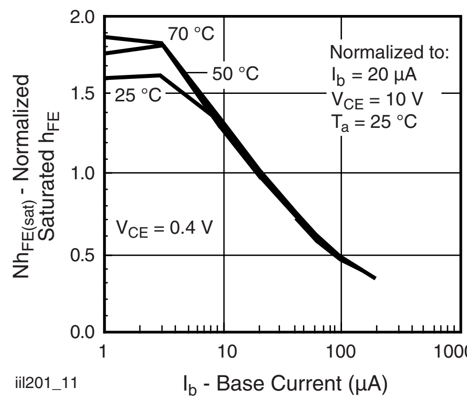


Fig. 11 - Normalized Saturated h_{FE} vs. Base Current and Temperature

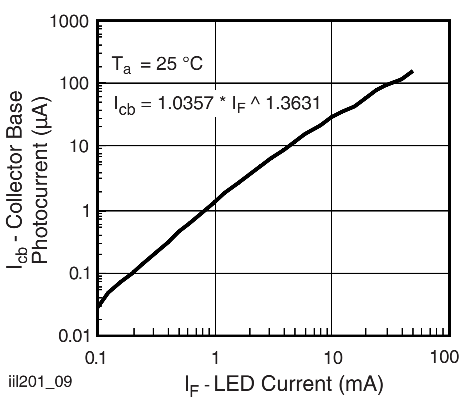


Fig. 9 - Collector Base Photocurrent vs. LED Current

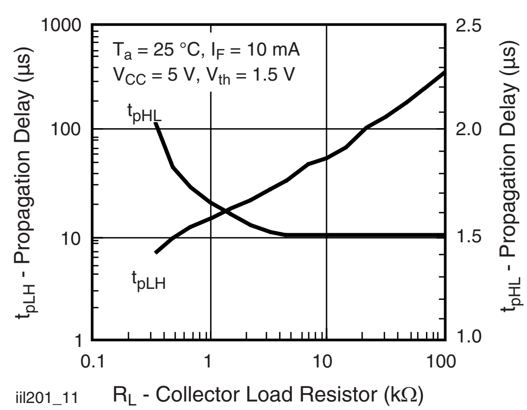


Fig. 12 - Propagation Delay vs. Collector Load Resistor

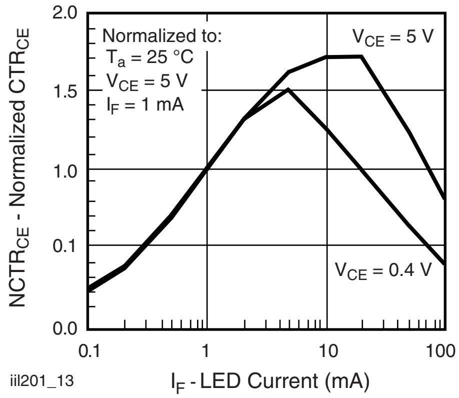


Fig. 13 - Normalized Non-Saturated and Saturated CTR_{CE} vs. LED Current

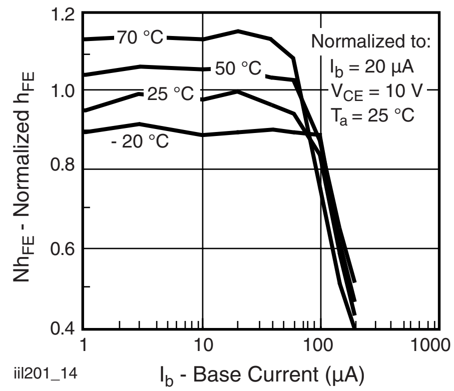
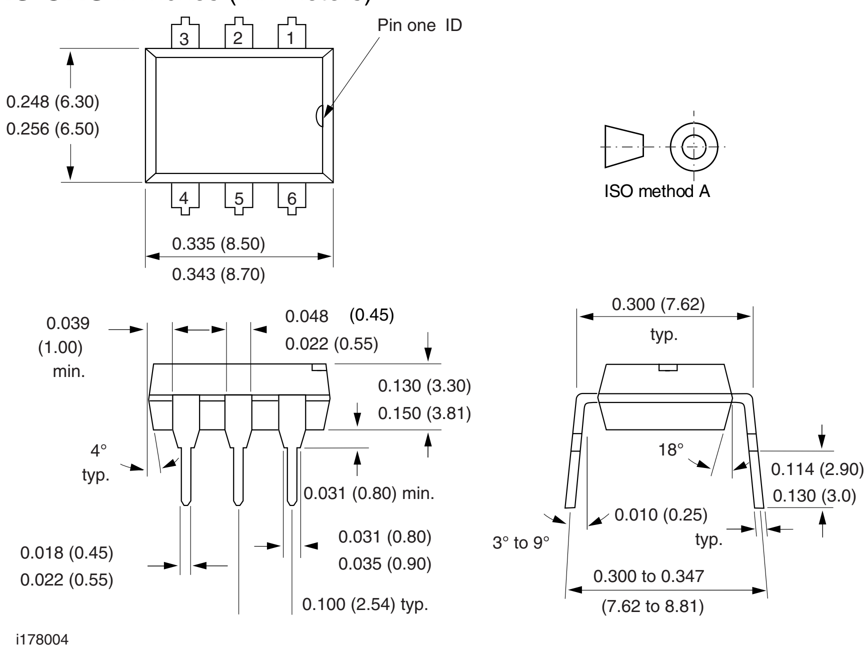
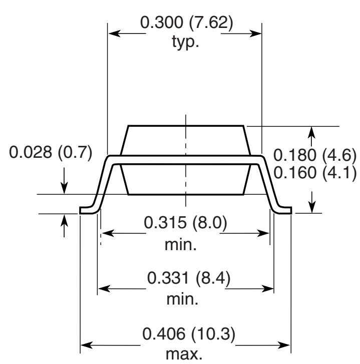


Fig. 14 - Normalized Non-Saturated h_{FE} vs. Base Current and Temperature

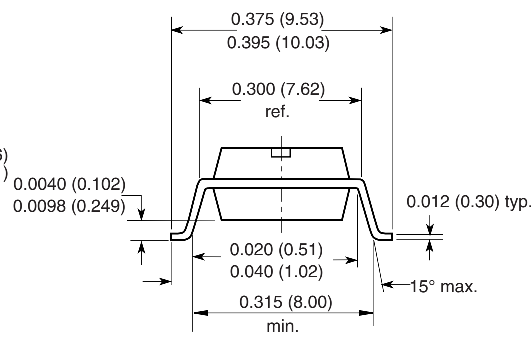
PACKAGE DIMENSIONS in inches (millimeters)



Option 7



Option 9



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.

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