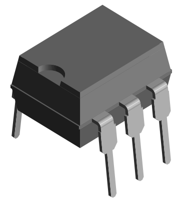
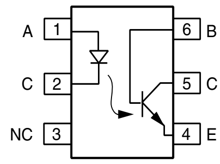
Optocoupler, Phototransistor Output, Low Input Current, With Base Connection

Features

- Guaranteed at I_F = 1.0 mA
- High Collector-emitter Voltage, BV_{CEO} = 70 V
- Long Term Stability
- Industry Standard DIP Package
- Lead-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC





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Agency Approvals

- UL1577, File No. E52744 System Code H or J, Double Protection
- DIN EN 60747-5-2 (VDE0884)
  DIN EN 60747-5-5 pending
  Available with Option 1

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 - 150 %, DIP-6
IL202	CTR 125 - 250 %, DIP-6
IL203	CTR 225 - 450 %, DIP-6
IL203-X007	CTR 225 - 450 %, SMD-6 (option 7)
IL203-X009	CTR 225 - 450 %, SMD-6 (option 9)

For additional information on the available options refer to Option Information.

Absolute Maximum Ratings

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 Rating for extended periods of the time can adversely affect reliability.

Input

Parameter	Test condition	Symbol	Value	Unit
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

Parameter	Test condition	Symbol	Value	Unit
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

Coupler

Parameter	Test condition	Symbol	Value	Unit
Isolation test voltage	t = 1.0 sec.	V_{ISO}	5300	V_{RMS}
Total package dissipation (LED + detector)		P_{tot}	250	mW
Derate linearly from 25 °C			3.3	mW/°C
Creepage			≥ 7.0	min.
Clearance			≥ 7.0	min.
Storage temperature		T_{stg}	- 55 to + 150	°C
Operating temperature		T_{amb}	- 55 to + 100	°C
Lead soldering time	≤ 260 °C		10	sec.

Electrical Characteristics

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.

Input

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
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

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
DC forward current gain	V_{CE} = 5.0 V, I_C = 100 μA	HFE	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

Current Transfer Ratio

Parameter	Test condition	Part	Symbol	Min	Typ.	Max	Unit
Current Transfer Ratio (collector-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 (Tamb = 25 °C unless otherwise specified)

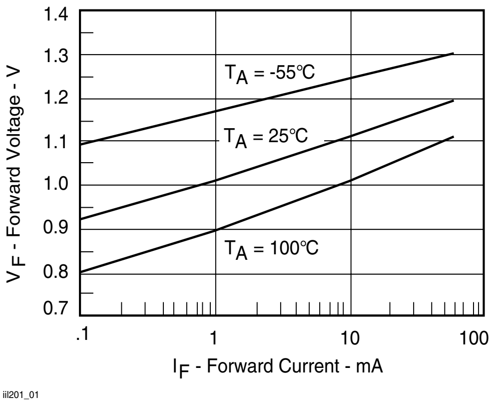


Figure 1. Forward Voltage vs. Forward Current

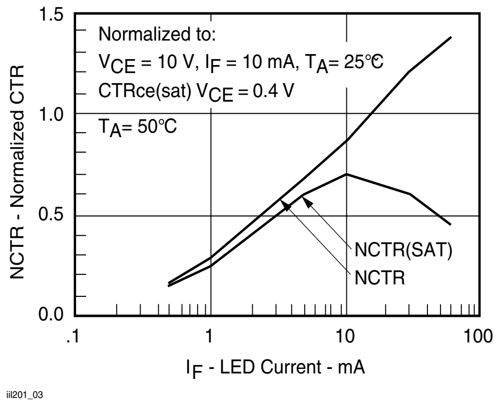


Figure 3. Normalized Non-Saturated and Saturated CTR vs. LED Current

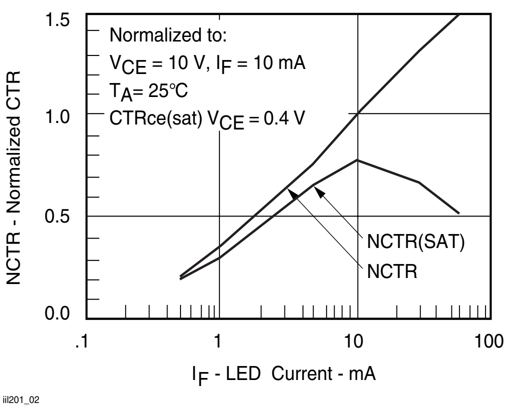


Figure 2. Normalized Non-Saturated and Saturated CTR vs. LED Current

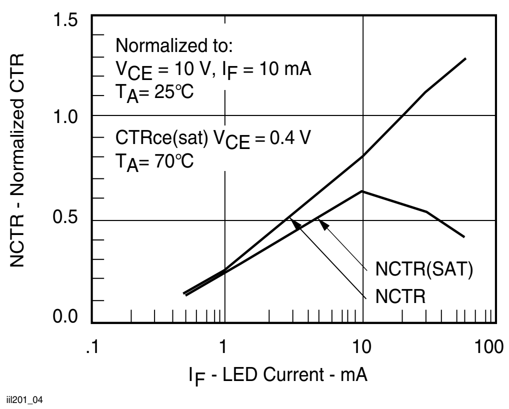


Figure 4. Normalized Non-Saturated and Saturated CTR vs. LED Current

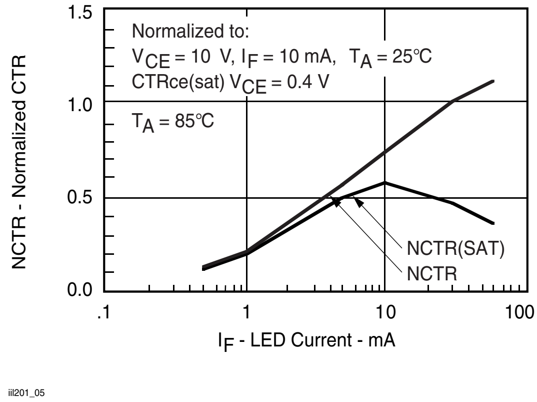


Figure 5. Normalized Non-Saturated and Saturated CTR vs. LED Current

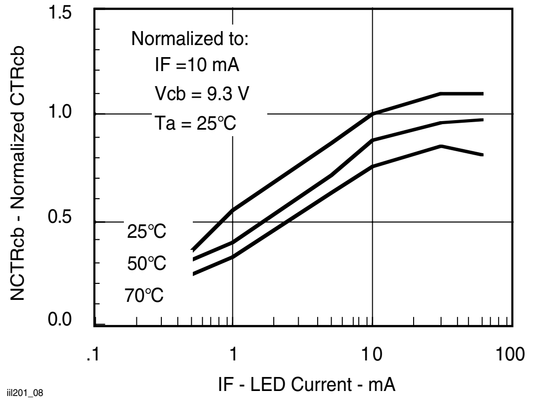


Figure 8. Normalized CTR_{cb} vs. LED Current and Temperature

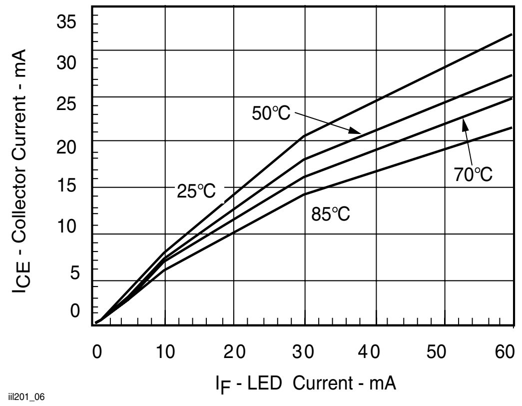


Figure 6. Collector-Emitter Current vs. Temperature and LED Current

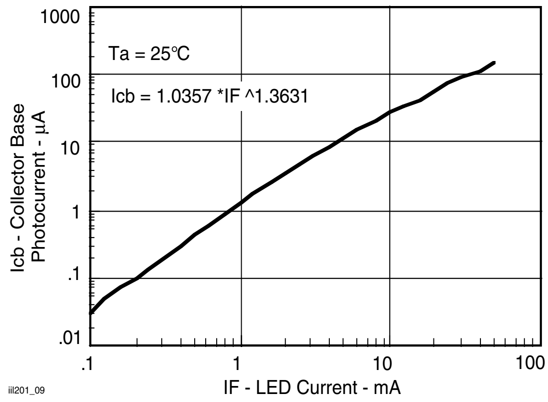


Figure 9. Collector Base Photocurrent vs. LED Current

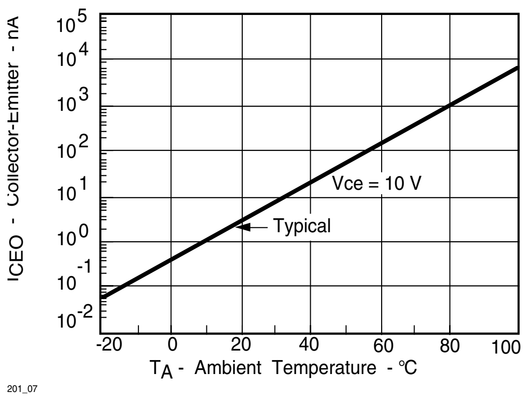


Figure 7. Collector-Emitter Leakage Current vs.Temp.

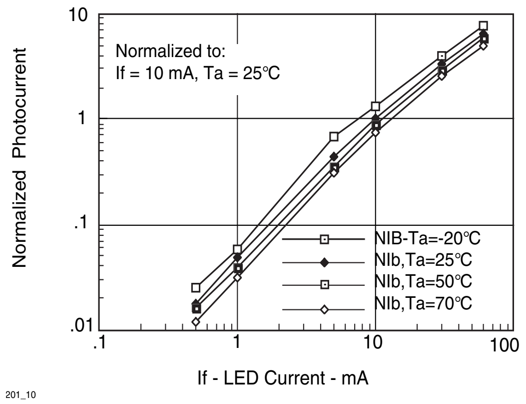


Figure 10. Normalized Photocurrent vs. I_F and Temp.

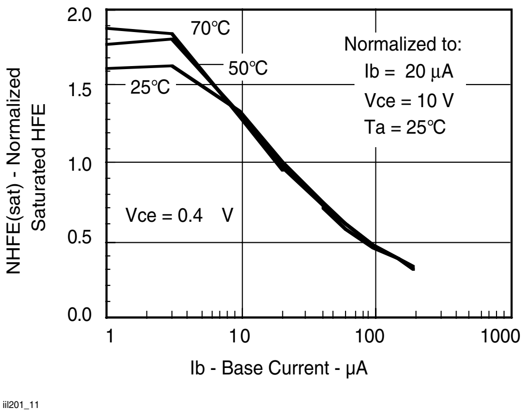


Figure 11. Normalized Saturated HFE vs. Base Current and Temperature

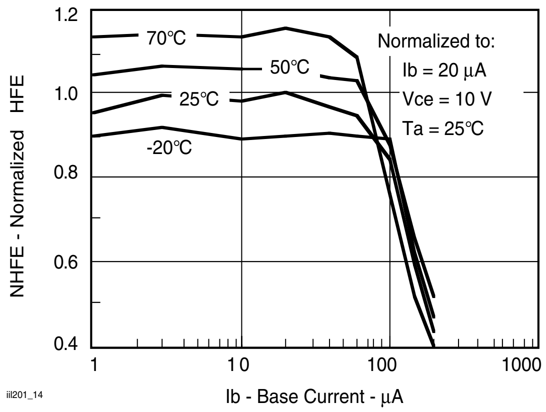


Figure 14. Normalized Non-saturated HFE vs. Base Current and Temperature

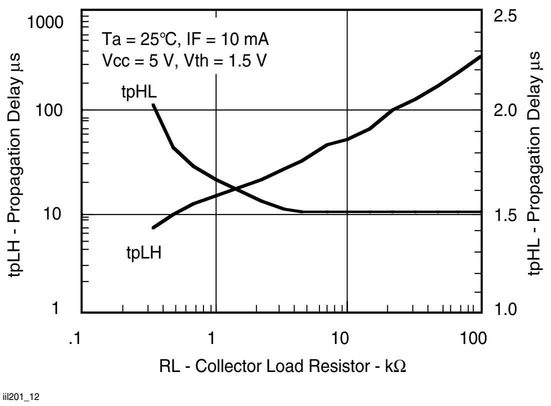


Figure 12. Propagation Delay vs. Collector Load Resistor

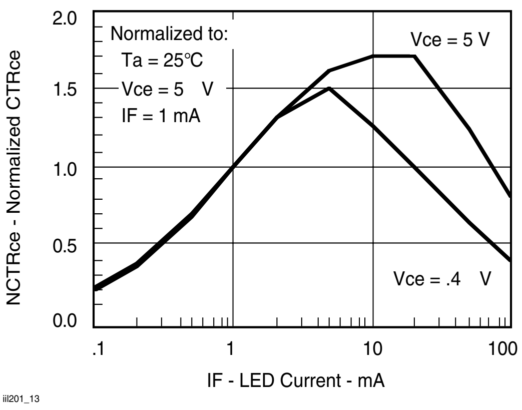
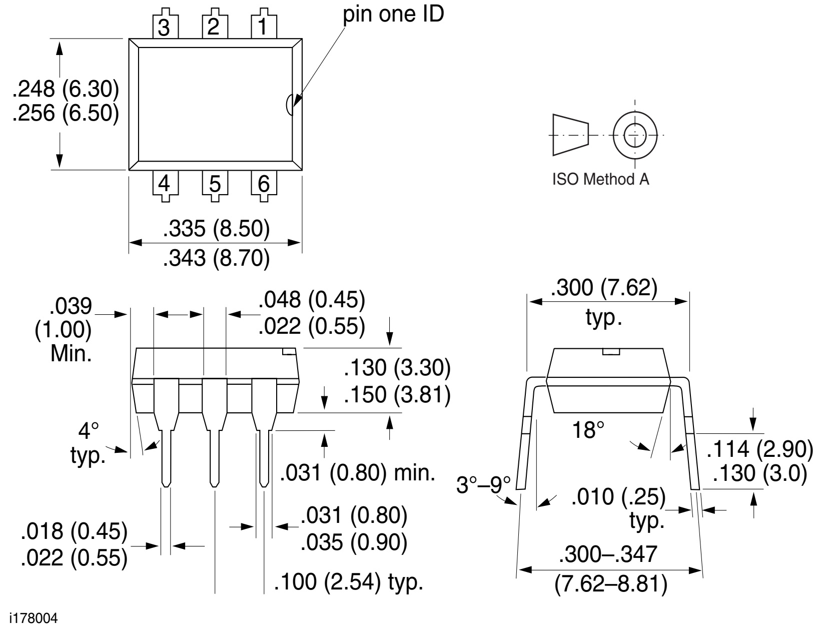
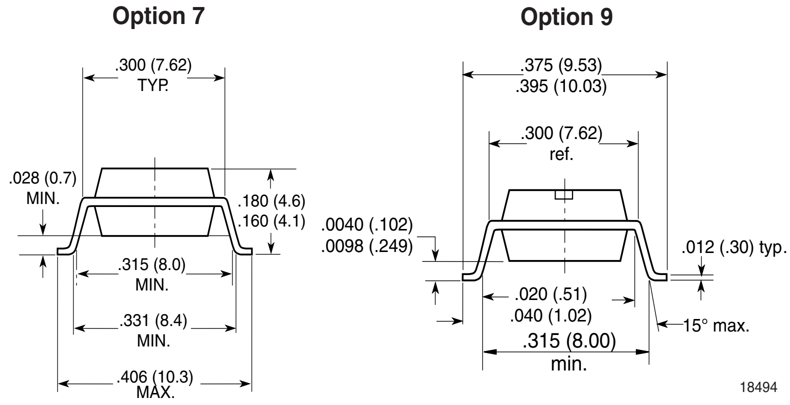


Figure 13. Normalized Non-Saturated and Saturated CTR_{CE} vs. LED Current

Package Dimensions in Inches (mm)





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 operatingsystems 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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