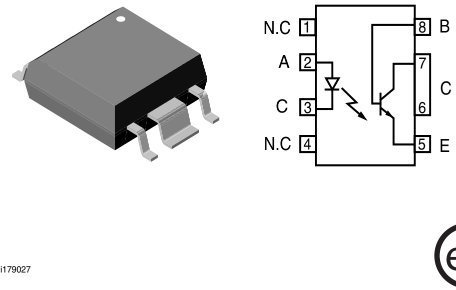
Optocoupler, Phototransistor Output, With Base Connection

Features

- Good CTR Linearly Depending on Forward Current
- Isolation Test Voltage, 3000 V_{RMS}
- High Collector-Emitter Voltage, V_{CEO} = 30 V
- Low Saturation Voltage
- Fast Switching Times
- Lead-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



Agency Approvals

- UL1577, File No. E52744 System Code S
- DIN EN 60747-5-2 (VDE0884)
  DIN EN 60747-5-5 pending
  Available with Option 1

Description

The IL352 optically coupled isolator that features a high current transfer ratio, low coupling capacitance and high isolation voltage. It has a GaAs infrared emitting diode emitter, which is optically coupled to a silicon planar phototransistor detector. The component is housed in a thin line package.

The coupling device is designed for signal transmission between two electrically separated circuits. The potential difference between the circuits to be coupled must not exceed the maximum permissible reference voltages.

Order Information

Part	Remarks
IL352	CTR > 100 %, SMD-8

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
Reverse voltage		V_R	6.0	V
DC forward current		I_F	60	mA
Total power dissipation		P_{diss}	50	mW
Derate linearly from 25 °C			0.66	mW/°C

Output

Parameter	Test condition	Symbol	Value	Unit
Collector-emitter voltage		V_{CE}	70	V
Emitter-base voltage		V_{EBO}	7.0	V
Collector current		I_C	50	mA
	t ≤ 1.0 ms	I_C	100	mA
Total power dissipation		P_{diss}	150	mW
Derate linearly from 25 °C			2.5	mW/°C

Coupler

Parameter	Test condition	Symbol	Value	Unit
Isolation test voltage (between emitter and detector referred to climate DIN 40046, part 2, Nov. 74)	t = 1.0 sec.	V_{ISO}	3000	V_{RMS}
Isolation resistance	V_{IO} = 500 V, T_{amb} = 25 °C	R_{IO}	$\geq 10^{12}$	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C	R_{IO}	$\geq 10^{11}$	Ω
Storage temperature range		T_{stg}	- 40 to + 150	°C
Ambient temperature range		T_{amb}	- 40 to + 85	°C
Junction temperature		T_j	100	°C
Soldering temperature	max 10 s, Dip soldering distance to seating plane ≥ 1.5 mm	T_{sld}	260	°C

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 = 10 mA	V_F		1.3	1.5	V
Reverse current	V_R = 6.0 V	I_R		0.1	10	µA
Capacitance	V_R = 0, f = 1.0 MHz	C_O		25		pF

Output

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector-emitter breakdown voltage	I_C = 1.0 mA, I_E = 100 µA	BV_{CEO}	30			V
Emitter-collector breakdown voltage	I_C = 1.0 mA, I_E = 100 µA	BV_{ECO}	7.0			V
Collector-emitter leakage current	V_{CE} = 10 V, I_F = 0, T_A = 25 °C	I_{CEO}		5.0	50	nA
	V_{CE} = 30 V, I_F = 0, T_A = 85 °C	I_{CEO}			500	µA
Collector-base breakdown voltage	I_C = 100 µA	BV_{CBO}	70			V
Collector-emitter capacitance	V_{CE} = 0	C_{CE}		6.0		pF

Coupler

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Saturation voltage collector-emitter	I_F = 10 mA, I_C = 0.5 mA	V_{CEsat}			0.3	V
Collector-emitter capacitance	V_{CE} = 0	C_{CE}		6.0		pF
Capacitance (input-output)	f = 1.0 MHz	C_{IO}		0.5		pF

Current Transfer Ratio

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
DC Current Transfer Ratio	I_F = 10 mA, V_{CE} = 10 V	CTR_{DC}	100			%
	I_F = 1.0 mA, V_{CE} = 10 V	CTR_{DC}	34			%

Switching Characteristics

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Switching time, non-saturated	I_C = 2.0 mA, R_E = 100 Ω, V_{CC} = 10 V, RH ≤ 50 %	t_{on}, t_{off}		10		µs

Typical Characteristics (Tamb = 25 °C unless otherwise specified)

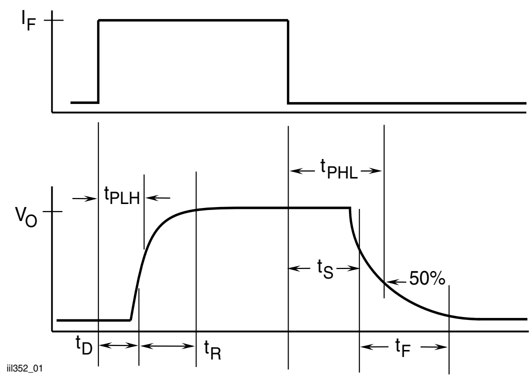


Figure 1. Switching Waveform

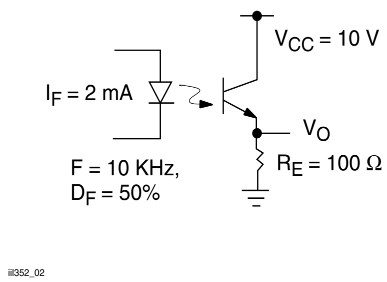


Figure 2. Switching Schematic

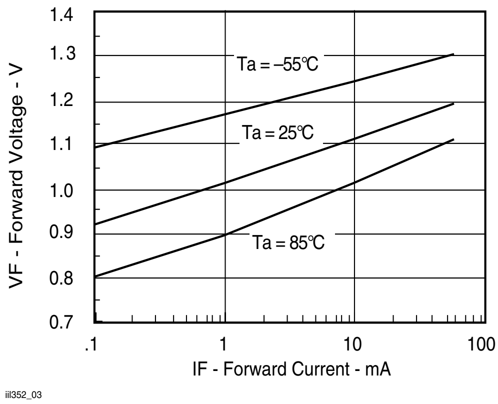


Figure 3. Forward Voltage vs. Forward Current

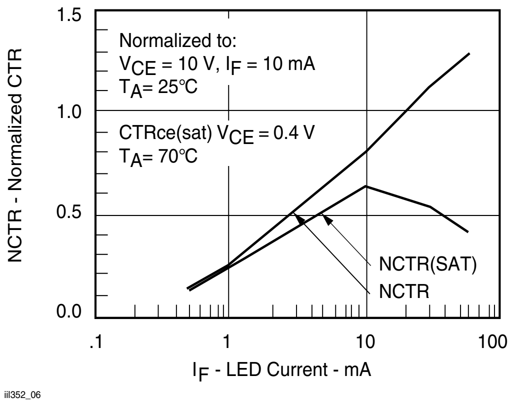


Figure 6. Normalized Non-saturated and saturated CTR vs. LED Current

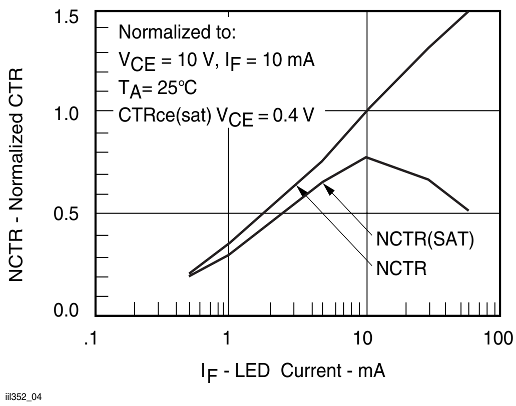


Figure 4. Normalized Non-Saturated and Saturated CTR vs. LED Current

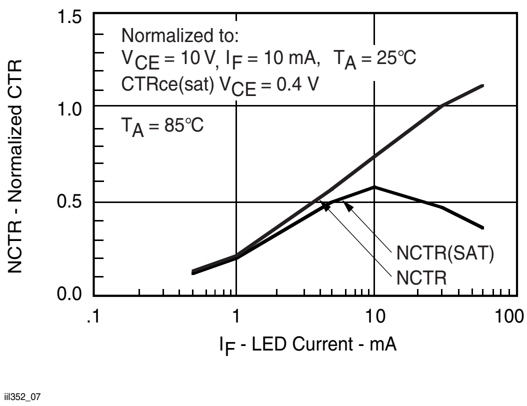


Figure 7. Normalized Non-saturated and saturated CTR vs. LED Current

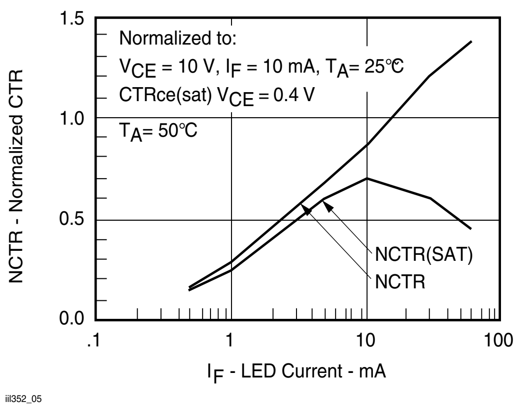


Figure 5. Normalized Non-saturated and Saturated CTR vs. LED Current

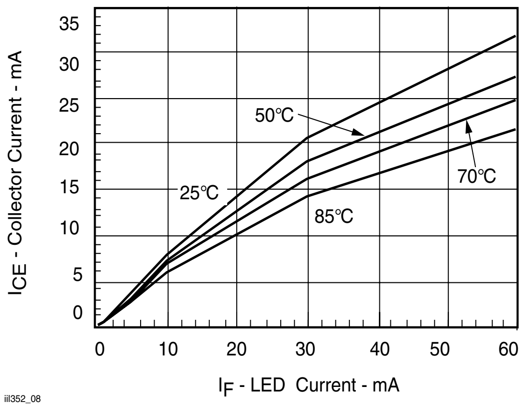


Figure 8. Collector-Emitter Current vs. Temperature and LED Current

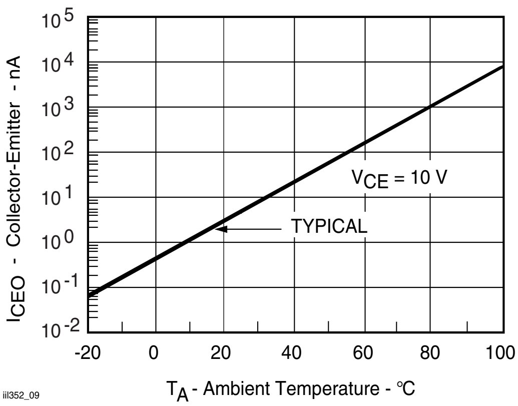


Figure 9. Collector-Emitter Leakage Current vs.Temp.

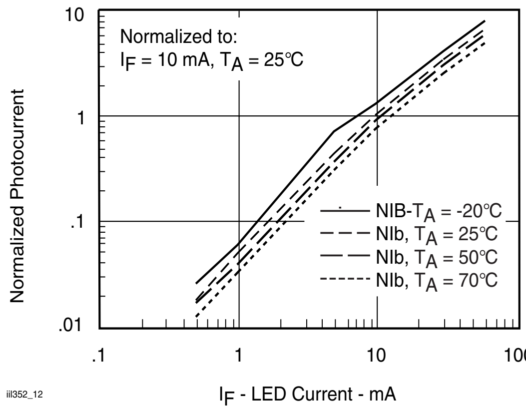


Figure 12. Normalized Photocurrent vs. I_F and Temp.

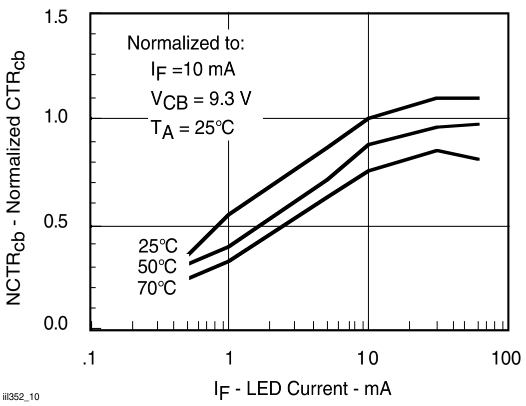


Figure 10. Normalized CTR_{cb} vs. LED Current and Temperature

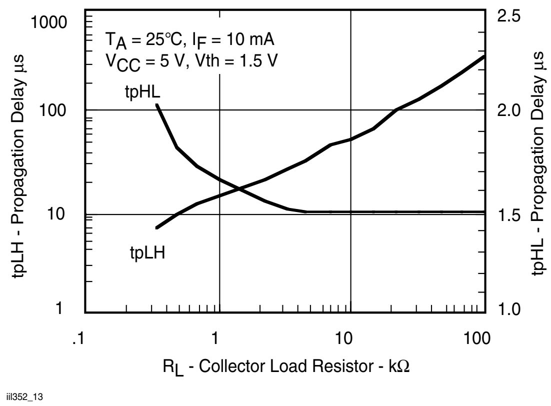


Figure 13. Propagation Delay vs. Collector Load Resistor

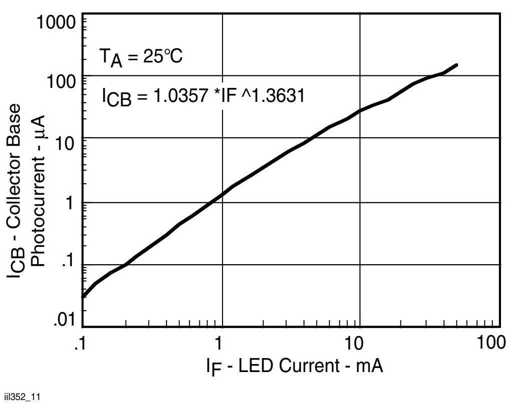
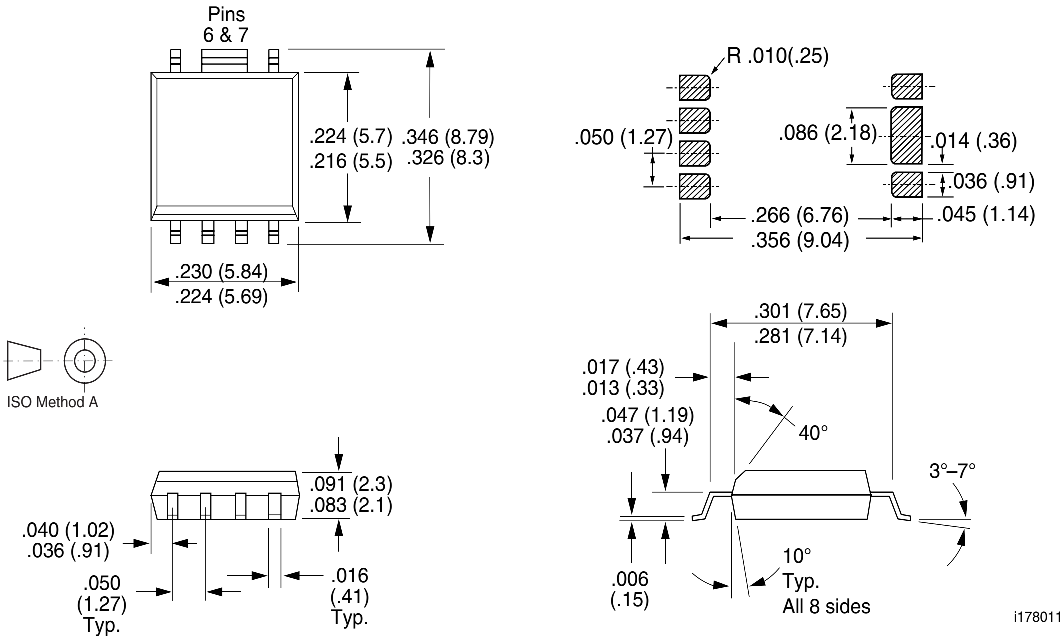


Figure 11. Collector-Base Photocurrent vs. LED Current

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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