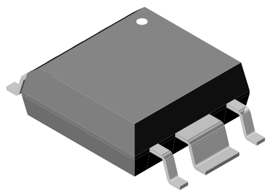
Optocoupler, Phototransistor Output, with Base Connection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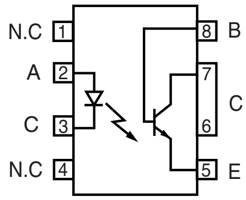


DESCRIPTION

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.

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 (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

RoHS
COMPLIANT

AGENCY APPROVALS

- UL1577, file no. E52744 system code S
- DIN EN 60747-5-5 (VDE 0884) available with option 1

ORDER INFORMATION

PART	REMARKS
IL352	CTR > 100 %, SMD-8

ABSOLUTE MAXIMUM RATINGS (1)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Reverse voltage		V_R	6	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				
Collector emitter voltage		V_{CE}	70	V
Emitter base voltage		V_{EBO}	7	V
Collector current		I_C	50	mA
	t ≤ 1 ms	I_C	100	mA
Total power dissipation		P_{diss}	150	mW
Derate linearly from 25 °C			2.5	mW/°C
COUPLER				
Isolation test voltage between emitter and detector	t = 1.0 s	V_{ISO}	3000	V_{RMS}
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 range		T_{stg}	- 40 to + 150	°C
Ambient temperature range		T_{amb}	- 40 to + 85	°C
Junction temperature		T_j	100	°C
Soldering temperature (2)	max. 10 s, dip soldering: distance to seating plane ≥ 1.5 mm	T_{sld}	260	°C

Notes

(1) 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.

(2) Refer to reflow profile for soldering conditions for surface mounted devices.

ELECTRICAL CHARACTERISTCS

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT							
Forward voltage	I_F = 10 mA		V_F		1.3	1.5	V
Reverse current	V_R = 6 V		I_R		0.1	10	µA
Capacitance	V_R = 0 V, f = 1.0 MHz		C_O		25		pF
OUTPUT							
Collector emitter breakdown voltage	I_C = 1 mA, I_E = 100 µA		BV_{CEO}	30			V
Emitter collector breakdown voltage	I_C = 1 mA, I_E = 100 µA		BV_{ECO}	7			V
Collector emitter leakage current	V_{CE} = 10 V, I_F = 0, T_A = 25 °C		I_{CEO}		5	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		pF
COUPLER							
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		pF
Capacitance (input to output)	f = 1 MHz		C_{IO}		0.5		pF

Note

T_{amb} = 25 °C, unless otherwise specified.
Minimum and maximum values were tested requierements. Typical values are characteristics of the device and are the result of engineering evaluations. 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		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 mA, R_E = 100 Ω, V_{CC} = 10 V, RH ≤ 50 %	t_{on}, t_{off}		10		µs

TYPICAL CHARACTERISTICS

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

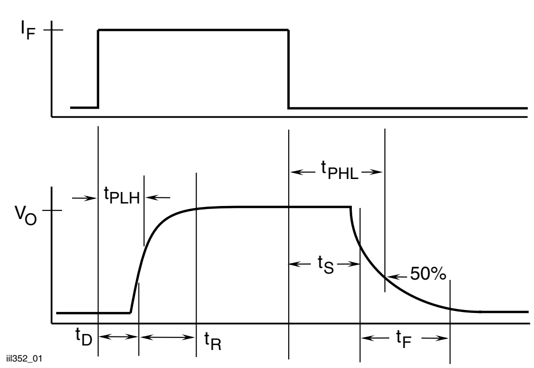


Fig. 1 - Switching Waveform

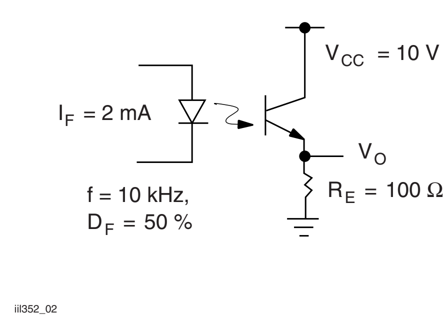


Fig. 2 - Switching Schematic

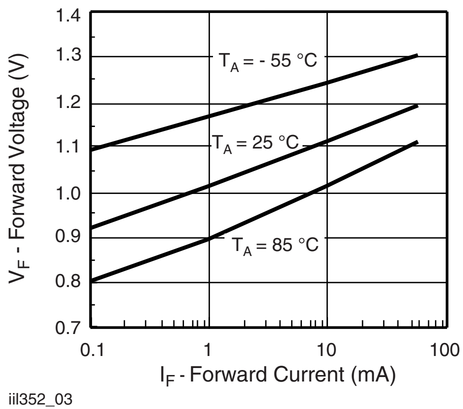


Fig. 3 - Forward Voltage vs. Forward Current

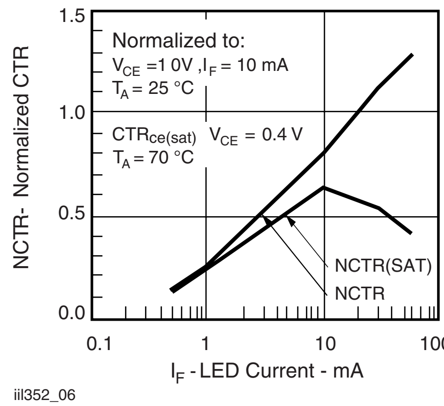


Fig. 6 - Normalized Non-Saturated and Saturated CTR vs. LED Current

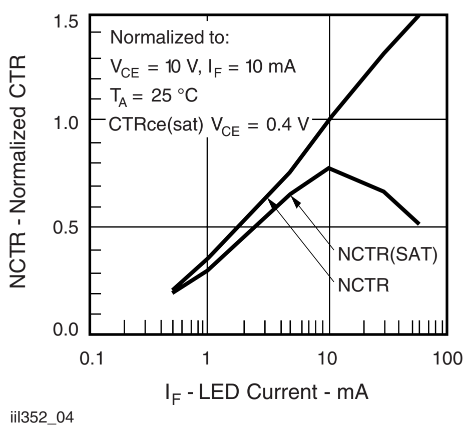


Fig. 4 - Normalized Non-Saturated and Saturated CTR vs. LED Current

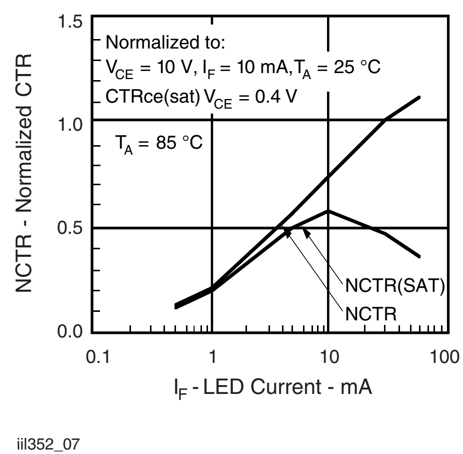


Fig. 7 - Normalized Non-Saturated and Saturated CTR vs. LED Current

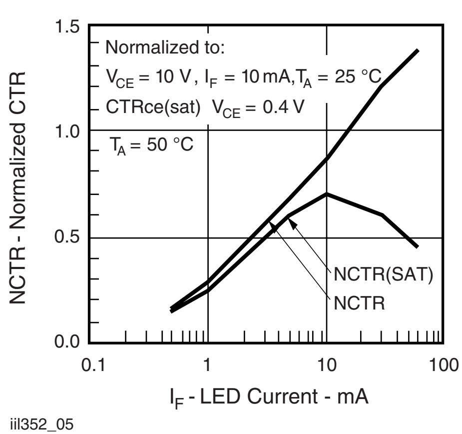


Fig. 5 - Normalized Non-Saturated and Saturated CTR vs. LED Current

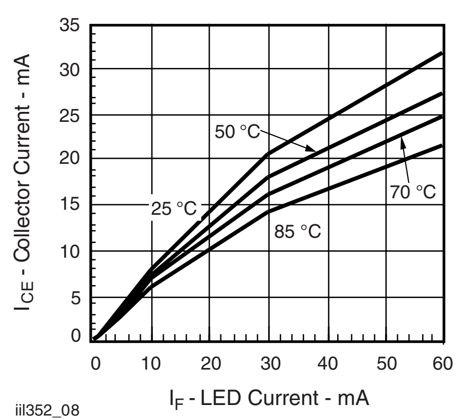


Fig. 8 - Collector Emitter Current vs. Temperature and LED Current

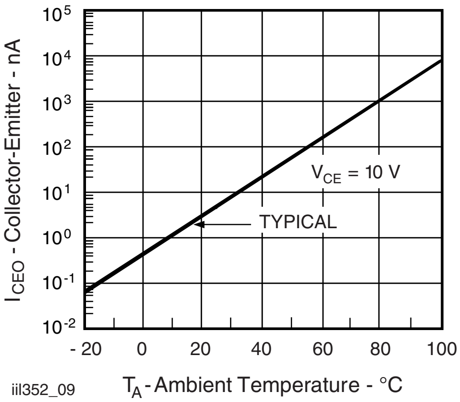


Fig. 9 - Collector Emitter Leakage Current vs.Temperature

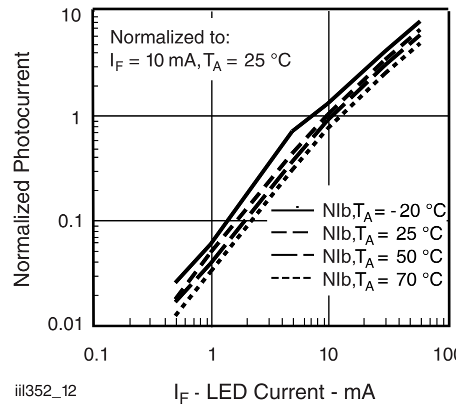


Fig. 12 - Normalized Photocurrent vs. I_F and Temperature

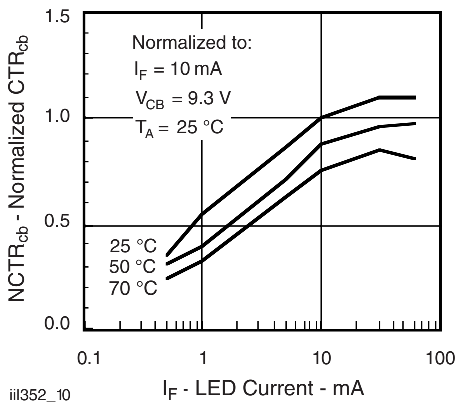


Fig. 10 - Normalized CTR_{cb} vs. LED Current and Temperature

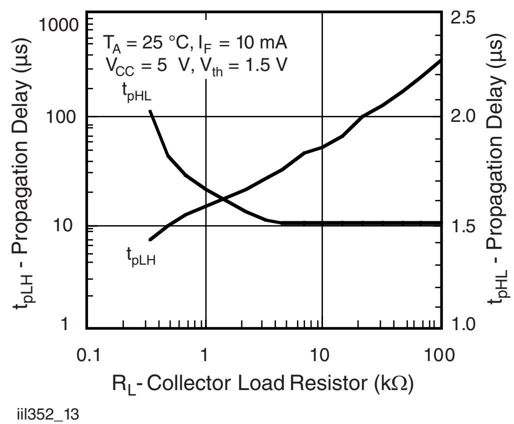


Fig. 13 - Propagation Delay vs. Collector Load Resistor

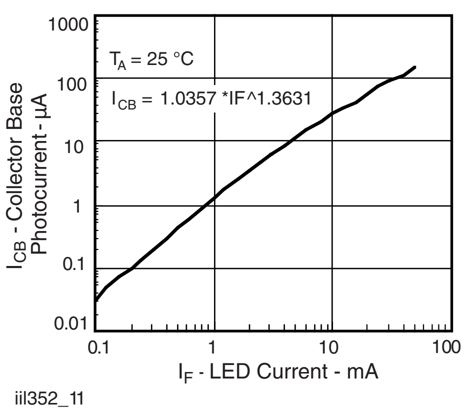
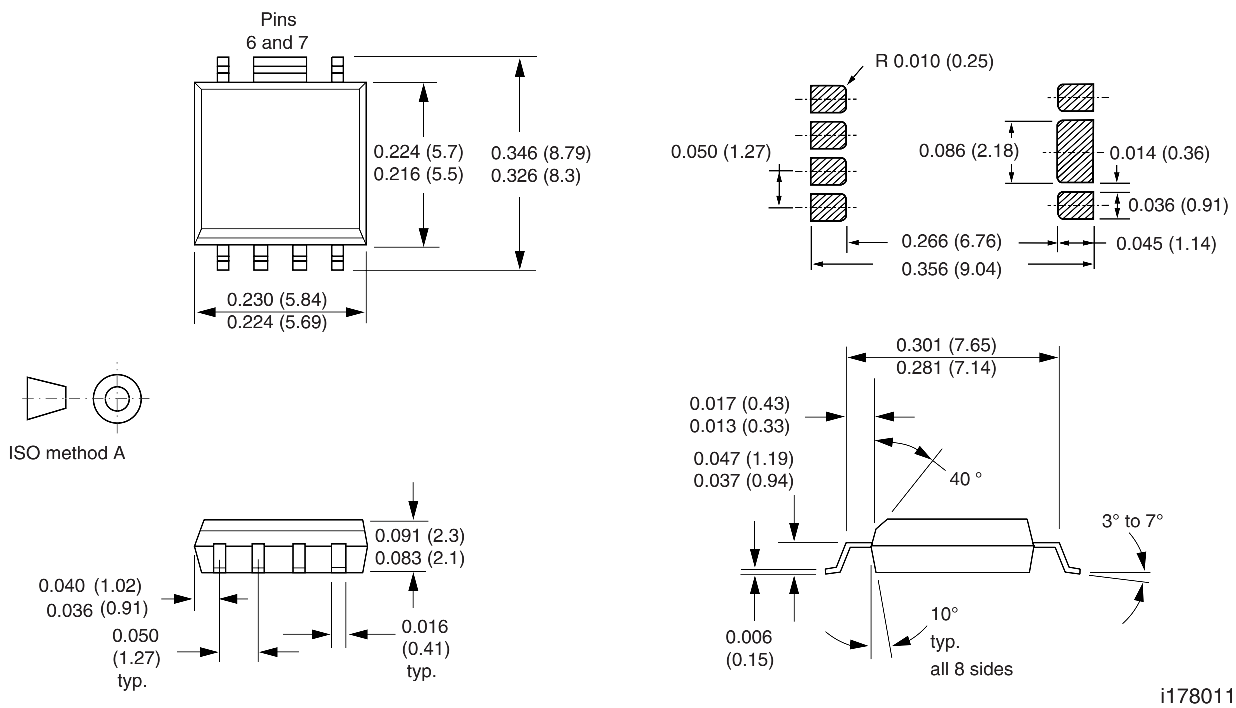


Fig. 11 - Collector Base Photocurrent vs. LED Current

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.
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