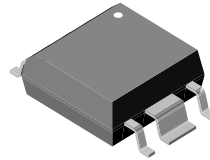


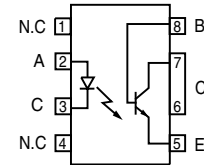
## Optocoupler, Phototransistor Output, With Base Connection

### Features

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



1179027



### 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

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.

### 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.

### Order Information

Part	Remarks
IL352	CTR > 100 %, SMD-8

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

### Absolute Maximum Ratings

T<sub>amb</sub> = 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 <sub>R</sub>	6.0	V
DC forward current		I <sub>F</sub>	60	mA
Total power dissipation		P <sub>diss</sub>	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
	$t \leq 1.0$ 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	$R_{IO}$	$\geq 10^{12}$	$\Omega$
	$V_{IO} = 500$ V, $T_{amb} = 100$ °C	$R_{IO}$	$\geq 10^{11}$	$\Omega$
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 $\geq 1.5$ 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	$\mu$ A
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, $I_E = 100$ $\mu$ A	$BV_{CEO}$	30			V
Emitter-collector breakdown voltage	$I_C = 1.0$ mA, $I_E = 100$ $\mu$ A	$BV_{ECO}$	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	$\mu$ A
Collector-base breakdown voltage	$I_C = 100$ $\mu$ A	$BV_{CBO}$	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	$I_F = 10 \text{ mA}, I_C = 0.5 \text{ mA}$	$V_{CEsat}$			0.3	V
Collector-emitter capacitance	$V_{CE} = 0$	$C_{CE}$		6.0		pF
Capacitance (input-output)	$f = 1.0 \text{ MHz}$	$C_{IO}$		0.5		pF

## Current Transfer Ratio

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

## Switching Characteristics

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Switching time, non-saturated	$I_C = 2.0 \text{ mA}, R_E = 100 \Omega,$ $V_{CC} = 10 \text{ V}, RH \leq 50 \%$	$t_{on}, t_{off}$		10		$\mu\text{s}$

## Typical Characteristics ( $T_{amb} = 25^\circ\text{C}$ unless otherwise specified)

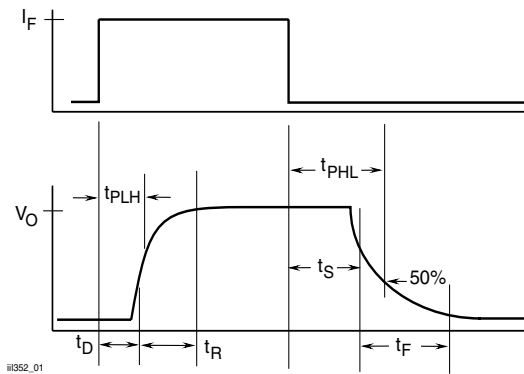


Figure 1. Switching Waveform

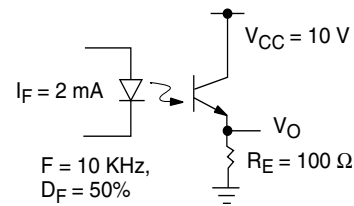


Figure 2. Switching Schematic

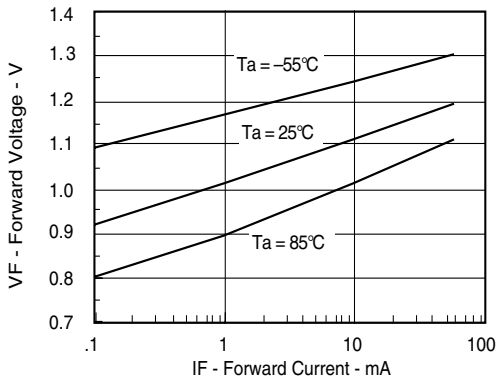


Figure 3. Forward Voltage vs. Forward Current

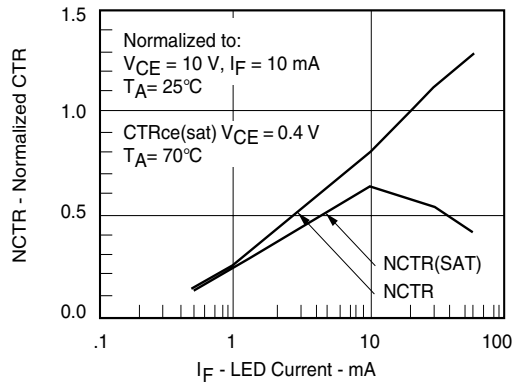


Figure 6. Normalized Non-saturated and saturated CTR vs. LED Current

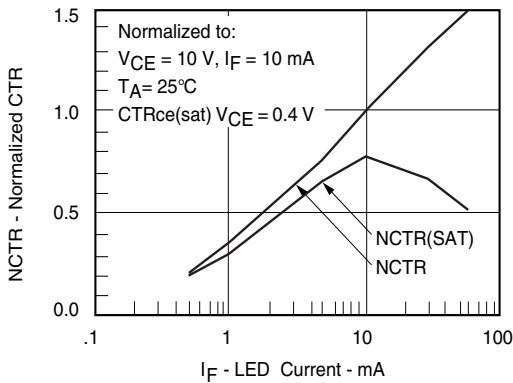


Figure 4. Normalized Non-Saturated and Saturated CTR vs. LED Current

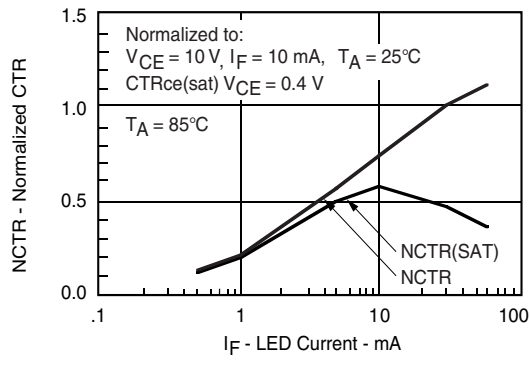


Figure 7. Normalized Non-saturated and saturated CTR vs. LED Current

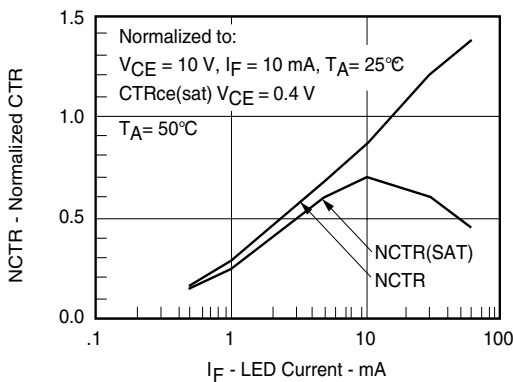


Figure 5. Normalized Non-saturated and Saturated CTR vs. LED Current

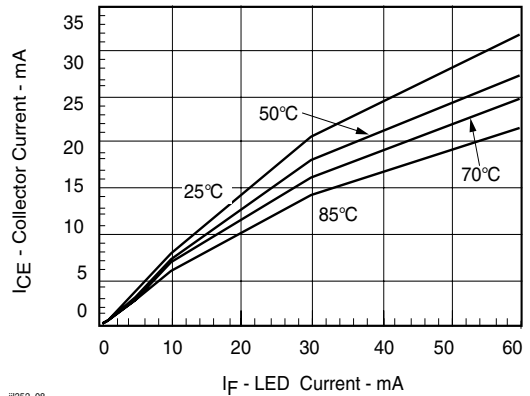


Figure 8. Collector-Emitter Current vs. Temperature and LED Current

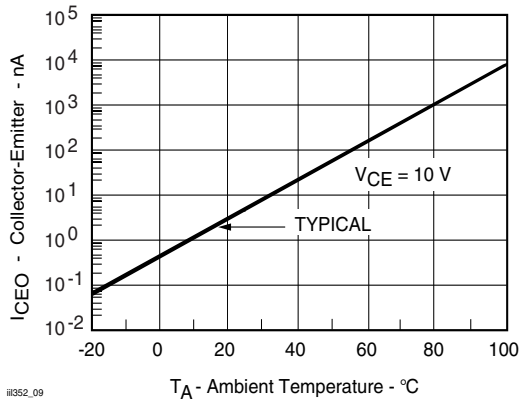


Figure 9. Collector-Emitter Leakage Current vs. Temp.

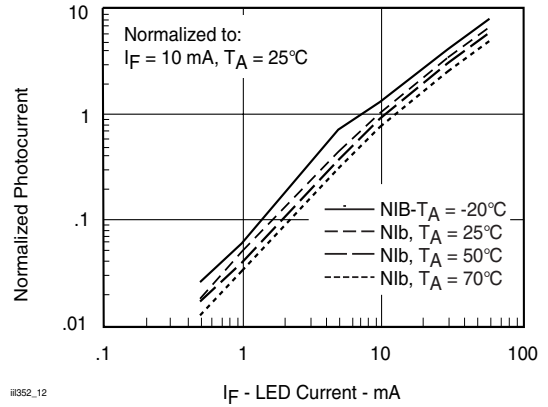


Figure 12. Normalized Photocurrent vs.  $I_F$  and Temp.

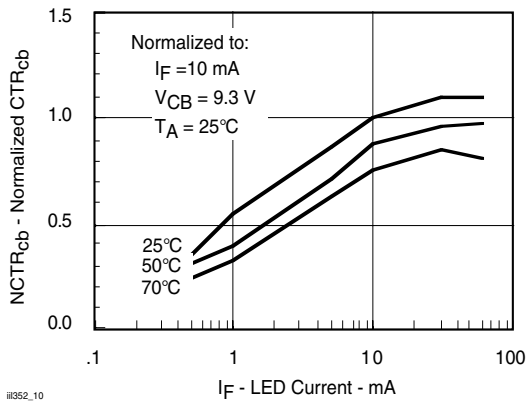


Figure 10. Normalized  $CTR_{cb}$  vs. LED Current and Temperature

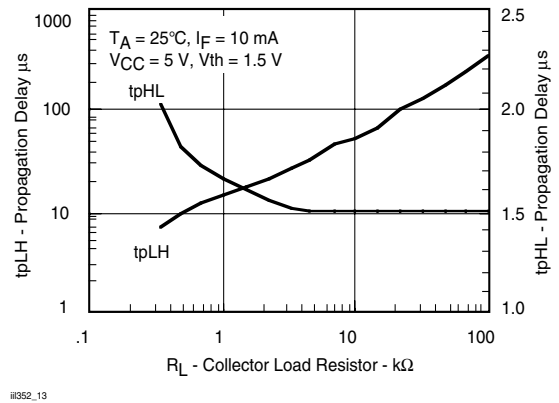


Figure 13. Propagation Delay vs. Collector Load Resistor

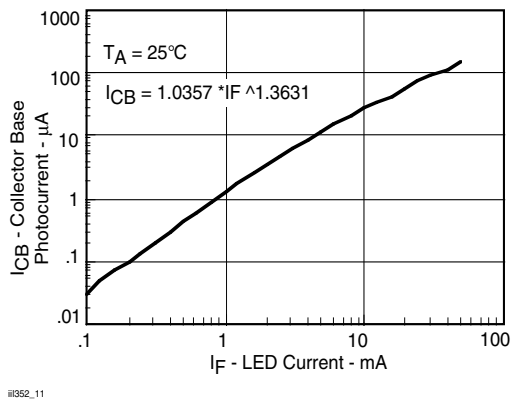
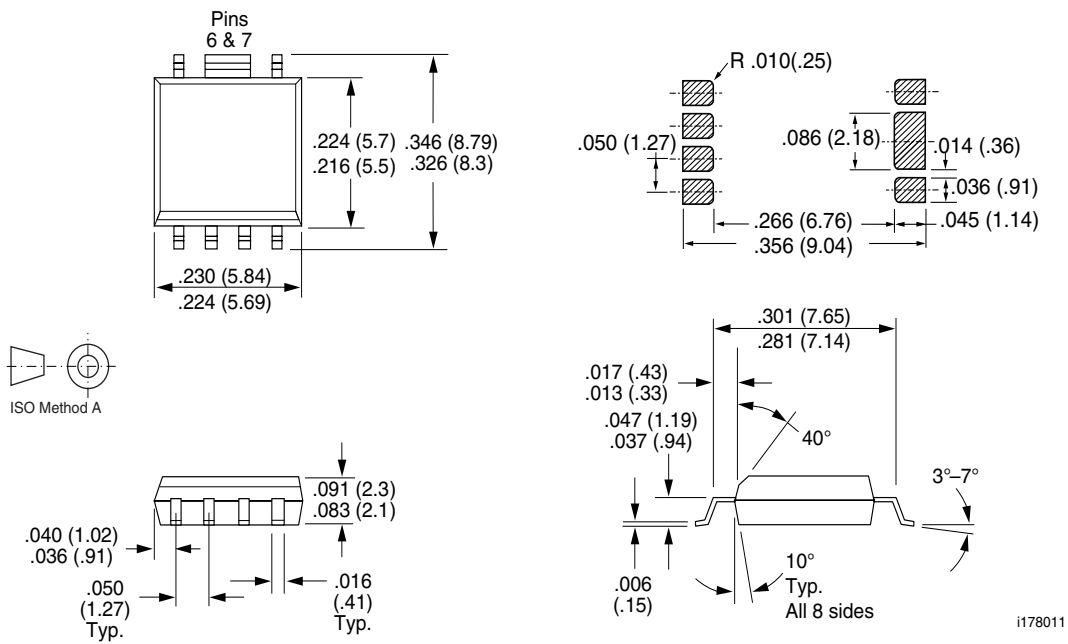


Figure 11. Collector-Base Photocurrent vs. LED Current

### Package Dimensions in Inches (mm)



i178011

## 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.

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