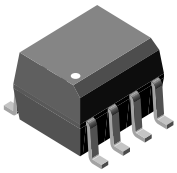
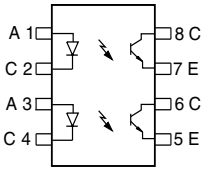
Optocoupler, Phototransistor Output, Dual Channel, SOIC-8 package, 110 °C Rated

Features

- Operating temperature from - 55 °C to + 110 °C
- Two Channel Coupler
- SOIC-8 Surface Mountable Package
- Isolation Test Voltage, 3000 V_{RMS}
- Compatible with Dual Wave, Vapor Phase and IR Reflow Soldering
- Lead-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC





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Agency Approvals

- UL - File No. E52744 System Code Y
- CUL - File No. E52744, equivalent to CSA bulletin 5A
- DIN EN 60747-5-2(VDE0884)
  Available with Option 1

Applications

AC Adapters
PLCs
Switch Mode Power Supplies
DC/DC Converters
Microprocessor I/O Interfaces
General impedance matching circuits

Description

The 110 °C rated ILD1205T/ 1206T/ 1207T are optically coupled pairs with 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 ILD1205T/ 1206T/ 1207T come in a standard SOIC-8 small outline package for surface mounting which makes it ideally suited for high density applications with limited space. In addition to eliminating through-holes requirements, this package conforms to standards for surface mounted devices.

A specified minimum and maximum CTR allows a narrow tolerance in the electrical design of the adjacent circuits. The high BV_{CEO} of 70 volts gives a higher safety margin compared to the industry standard of 30 volts.

Order Information

Part	Remarks
ILD1205T	CTR 40 - 80 %, SMD
ILD1206T	CTR 63 - 125 %, SMD
ILD1207T	CTR 100 - 200 %, SMD

Available only on Tape and Reel Option
(Conforms to EIA Standard 481-2)

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
Continuous forward current per channel		I_F	30	mA
Peak reverse voltage		V_R	6.0	V
Peak pulsed current	1.0 µs, 300 pps	I_{FSM}	1.0	A
Power dissipation		P_{diss}	50	mW
Derate linearly from 25 °C			0.5	mW/°C

Output

Parameter	Test condition	Symbol	Value	Unit
Collector-emitter voltage		V_{CE}	70	V
Power dissipation per channel		P_{diss}	125	mW
Derate linearly from 25 °C			1.25	mW/°C

Coupler

Parameter	Test condition	Symbol	Value	Unit
Isolation test voltage	t = 1.0 s	V_{ISO}	3000	V_{RMS}
Operating temperature		T_{amb}	- 55 to + 110	°C
Total package dissipation ambient (2 LEDs + 2 detectors, 2 channels)		P_{tot}	300	mW
Derate linearly from 25 °C			4.0	mW/°C
Storage temperature		T_{stg}	- 55 to + 150	°C
Soldering time from 260 °C		T_{sld}	10	sec.

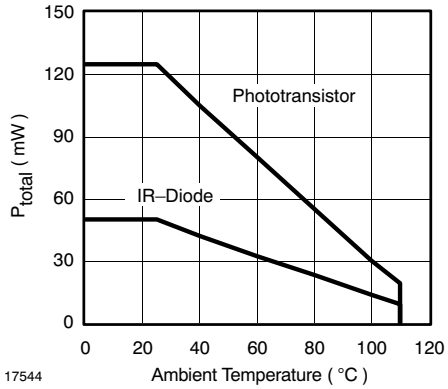


Figure 1. Power Dissipation vs. Ambient Temperature

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		1.2	1.55	V
Reverse current	V_R = 6.0 V	I_R		0.1	100	µA
Capacitance	V_R = 0	C_I		25		pF

Output

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector-emitter leakage current	V_{CE} = 10 V, I_F = 0	I_{CEO}		5.0	50	nA
Collector-emitter breakdown voltage	I_C = 100 µA	BV_{CEO}	70			V
Emitter-collector breakdown voltage	I_E = 10 µA	BV_{ECO}	7.0			V
Collector-emitter saturation voltage	I_F = 10 mA, I_C = 2.5 mA	V_{CEsat}			0.4	V
Collector-emitter capacitance	V_{CE} = 0	C_{CE}		10		pF

Coupler

Parameter	Test condition	Part	Symbol	Min	Typ.	Max	Unit
DC Current Transfer Ratio	V_{CE} = 5.0 V, I_F = 10 mA	ILD1205T	CTR	40		80	%
		ILD1206T	CTR	63		125	%
		ILD1207T	CTR	100		200	%
Capacitance (input-output)			C_{IO}		0.5		pF

Switching Characteristics

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Turn-on time	I_C = 2.0 mA, R_L = 100 Ω, V_{CC} = 5.0 V	t_{on}	5.0			µs
Turn-off time	I_C = 2.0 mA, R_L = 100 Ω, V_{CC} = 5.0 V	t_{off}	4.0			µs

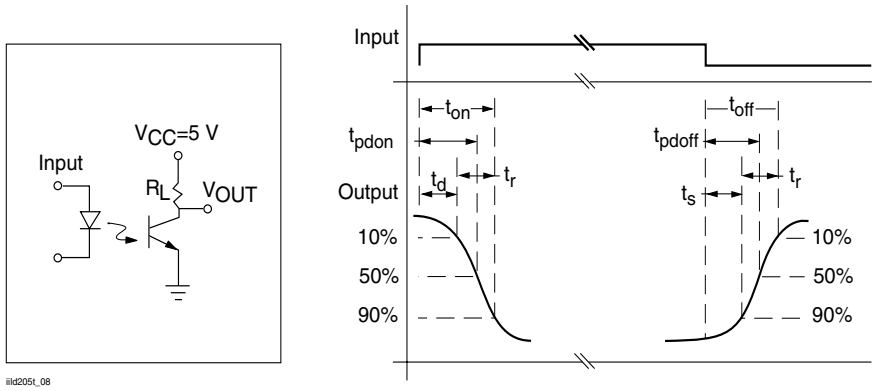


Figure 2. Switching Test Circuit

Safety and Insulation Ratings

As per IEC60747-5-2, §7.4.3.8.1, this optocoupler is suitable for "safe electrical insulation" only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Climatic Classification (according to IEC 68 part 1)				55/110/21		
Polution Degree (DIN VDE 0109)				2.0		mm
Comparative tracking index per DIN IEC112/VDE 0303 part 1, group IIIa per DIN VDE 6110 175 399			175		399	
V_{IOTM}		V_{IOTM}	5000			V
V_{IORM}		V_{IORM}	560			V
Resistance, input to output		R_{IO}		100		Ω
P_{SI}					350	mW
I_{SI}					150	mA
T_{SI}					165	°C
Creeapage			4.0			mm
Clearance			4.0			mm

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

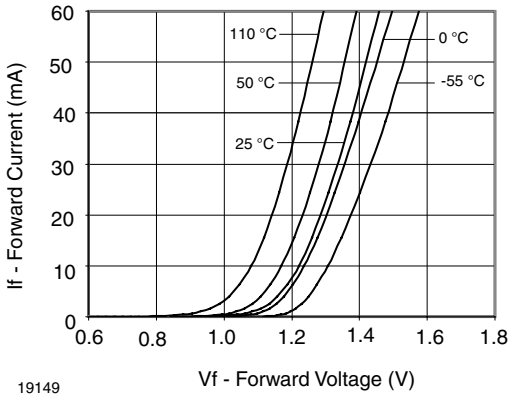


Figure 3. Forward Current vs. Forward Voltage

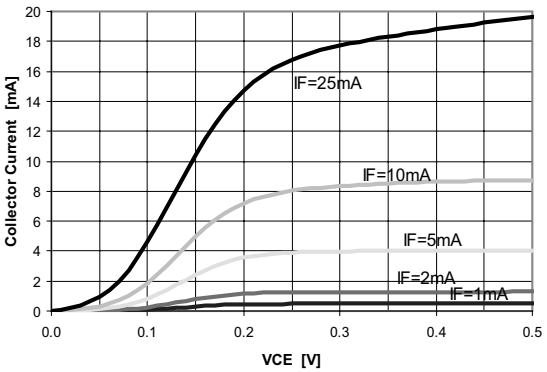


Figure 6. V_{CE} vs. I_C, (Saturated)

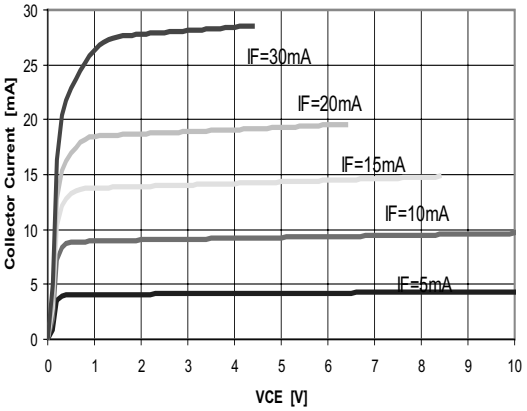


Figure 4. V_{CE} vs. I_C, (Non-Saturated)

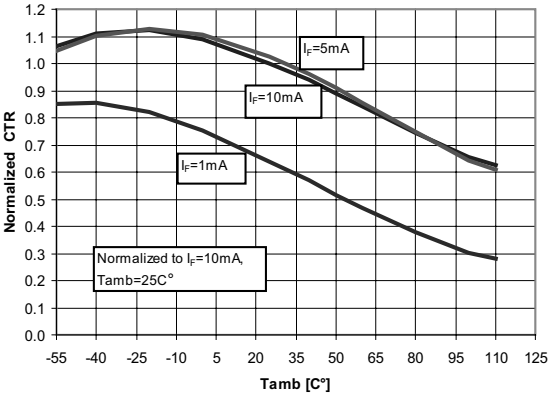


Figure 7. Normalized CTR vs. Ambient Temperature (Saturated, V_{CE} = 0.4 V

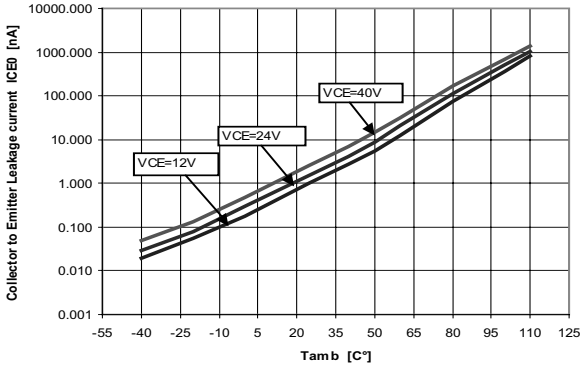


Figure 5. Collector to Emitter Leakage Current vs. Ambient Temperature

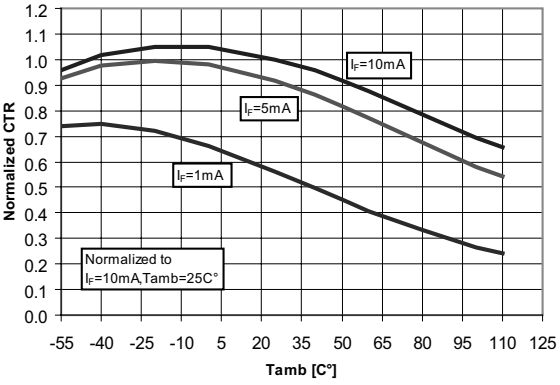


Figure 8. Normalized CTR vs. Ambient Temperature (Non-Saturated, V_{CE} = 5 V

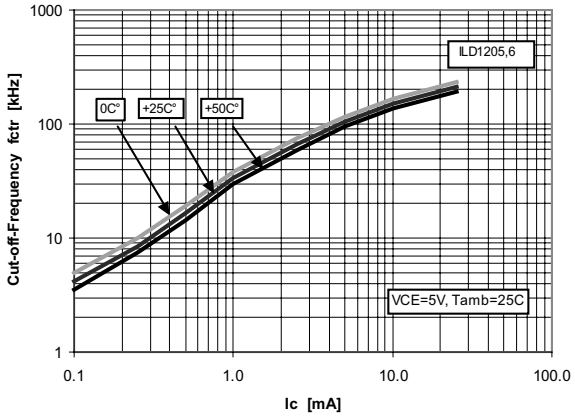


Figure 9. Cut-off-Frequency (-3dB) vs. Collector Current

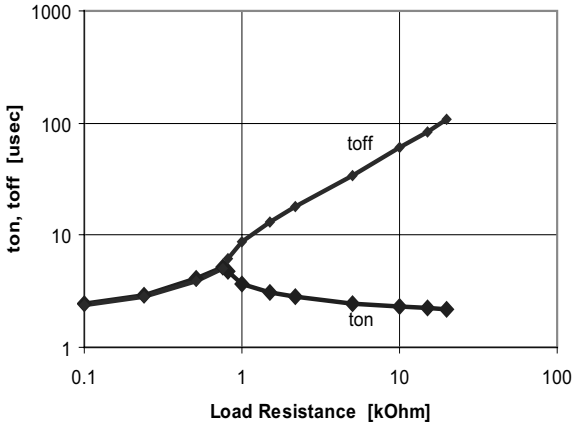
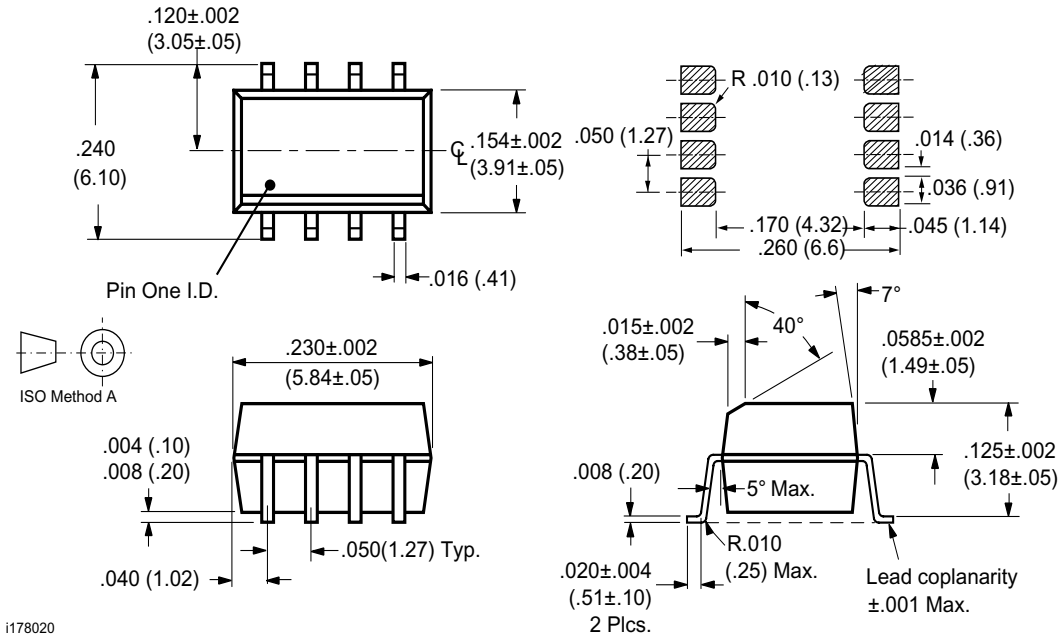


Figure 10. ton, toff vs. Load Resistance (100 Ohm... 20000 Ohm)

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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