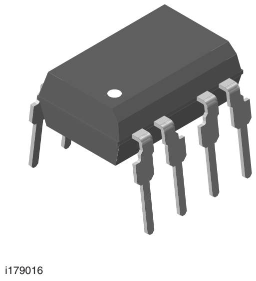
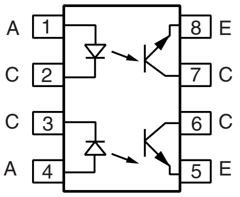
Optocoupler, Phototransistor Output, Dual Channel





FEATURES

- Current transfer ratio, 50 % typical
- Leakage current, 1.0 nA typical
- Two isolated channels per package
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

AGENCY APPROVALS

- UL1577, file no. E52744 system code H or J, double protection
- DIN EN 60747-5-2 (VDE 0884)/DIN EN 60747-5-5 pending available with option 1
- CSA 93751
- BSI IEC 60950; IEC 60065

DESCRIPTION

The ILCT6/MCT6 is a two channel optocoupler for high density applications. Each channel consists of an optically coupled pair 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 ILCT6/MCT6 is especially designed for driving medium-speed logic, where it may be used to eliminate troublesome ground loop and noise problems. It can also 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
ILCT6	CTR ≥ 20 %, DIP-8
MCT6	CTR ≥ 20 %, DIP-8
ILCT6-X007	CTR ≥ 20 %, SMD-8 (option 7)
ILCT6-X009	CTR ≥ 20 %, SMD-8 (option 9)
MCT6-X007	CTR ≥ 20 %, SMD-8 (option 7)
MCT6-X009	CTR ≥ 20 %, SMD-8 (option 9)

Note

For additional information on the available options refer to option information.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Rated forward current, DC			60	mA
Peak forward current, DC	1.0 µs pulse, 300 pps	I_{FM}	3.0	A
Power dissipation		P_{diss}	100	mW
Derate linearly from 25 °C			1.3	mW/°C
OUTPUT				
Collector current		I_C	30	mA
Collector emitter breakdown voltage		BV_{CEO}	30	V
Power dissipation		P_{diss}	150	mW
Derate linearly from 25 °C			2.0	mW/°C
COUPLER				
Isolation test voltage		V_{ISO}	5300	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
Creepage distance			≥ 7.0	mm
Clearance distance			≥ 7.0	mm
Total package dissipation		P_{tot}	400	mW
Derate linearly from 25 °C			5.33	mW/°C
Storage temperature		T_{stg}	- 55 to + 150	°C
Operating temperature		T_{amb}	- 55 to + 100	°C
Lead soldering time at 260 °C			10	s

Note

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.

ELECTRICAL CHARACTERISTICS

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
Forward voltage	I_F = 20 mA	V_F		1.25	1.50	V
Reverse current	V_R = 3.0 V	I_R		0.1	10	µA
Junction capacitance	V_F = 0 V	C_j		25		pF
OUTPUT						
Collector emitter breakdown voltage	I_C = 1.0 µA, I_E = 10 µA	BV_{CEO}	30	65		V
Emitter collector breakdown voltage	I_C = 10 µA, I_E = 10 µA	BV_{ECO}	7.0	10		V
Collector emitter leakage current	V_{CE} = 10 V	I_{CEO}		1.0	100	nA
Collector emitter capacitance	V_{CE} = 0 V	C_{CE}		8.0		pF
COUPLER						
Saturation voltage, collector emitter	I_C = 2.0 mA, I_F = 16 mA	V_{CEsat}			0.40	V
Capacitance (input to output)	f = 1.0 MHz	C_{IO}		0.5		pF
Capacitance between channels	f = 1.0 MHz			0.4		pF
Bandwidth	I_C = 2.0 mA, V_{CC} = 10 V, R_L = 100 Ω			150		kHz

Note

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.

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}	20	50		%

SWITCHING CHARACTERISTICS						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Switching times, output transistor	I_C = 2.0 mA, R_E = 100 Ω, V_{CE} = 10 V	t_{on}, t_{off}		3.0		µs

TYPICAL CHARACTERISTICS

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

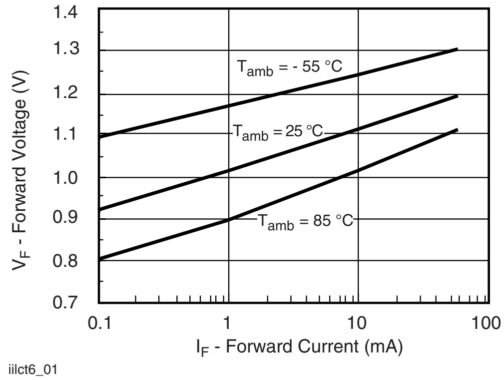


Fig. 1 - Forward Voltage vs. Forward Current

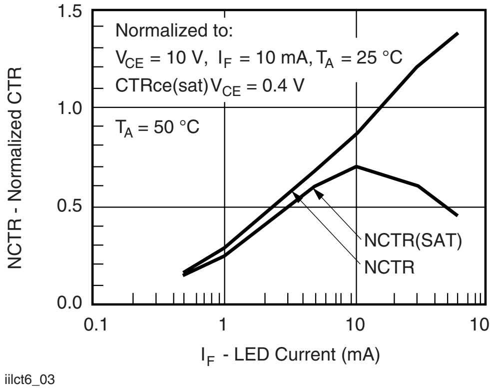


Fig. 3 - Normalized Non-Saturated and Saturated CTR vs. LED Current

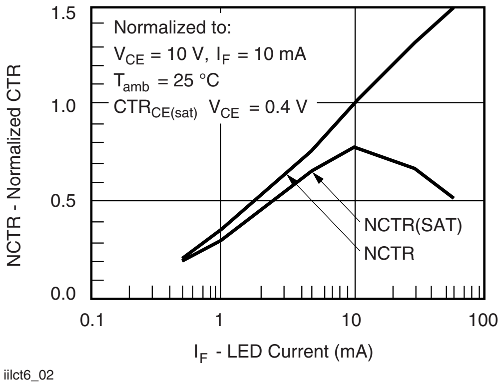


Fig. 2 - Normalized Non-Saturated and Saturated CTR vs. LED Current

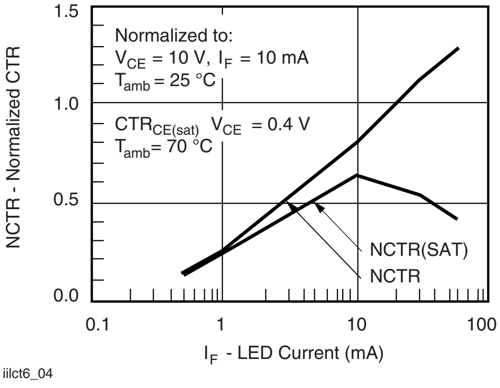


Fig. 4 - Normalized Non-Saturated and Saturated CTR vs. LED Current

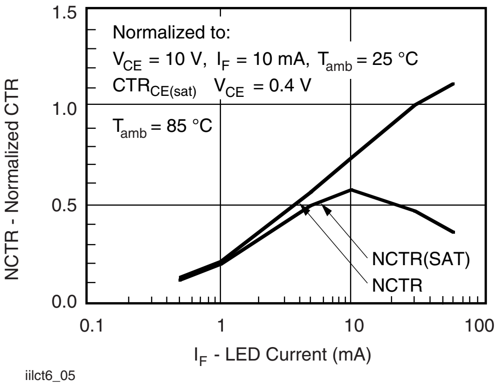


Fig. 5 - Normalized Non-Saturated and Saturated CTR vs. LED Current

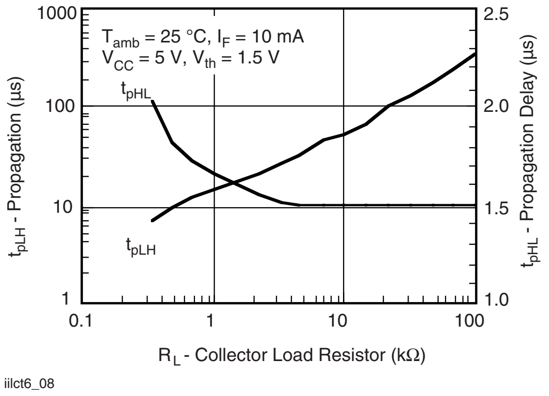


Fig. 8 - Propagation Delay vs. Collector Load Resistor

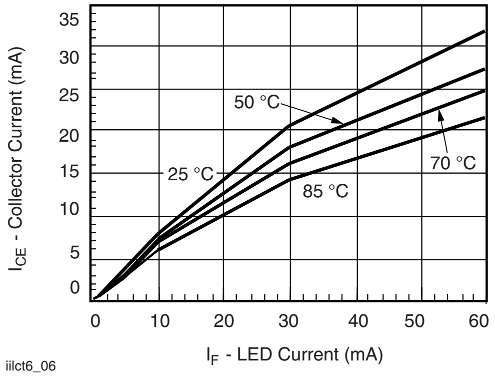


Fig. 6 - Collector Emitter Current vs. Temperature and LED Current

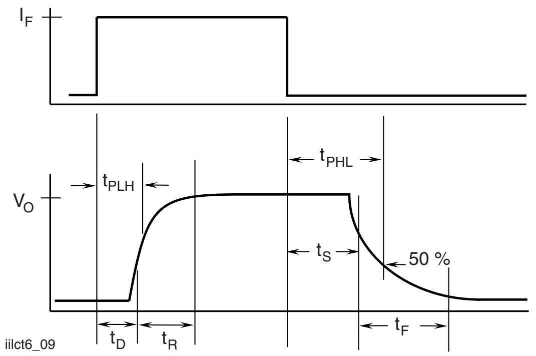


Fig. 9 - Switching Timing

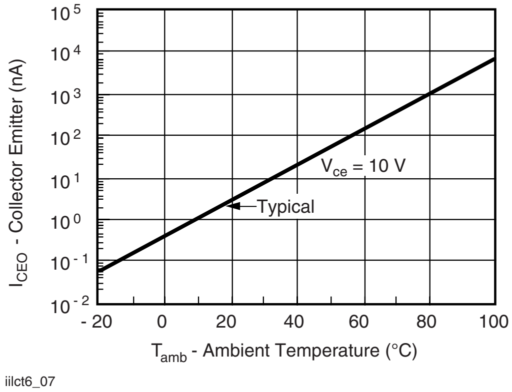


Fig. 7 - Collector Emitter Leakage Current vs.Temperature

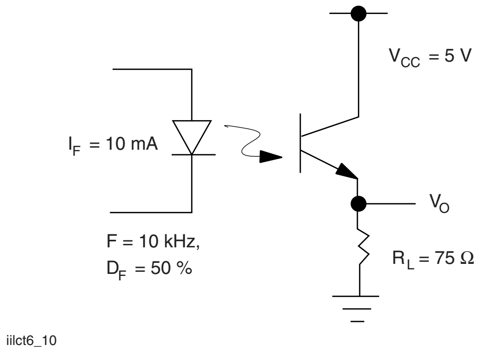
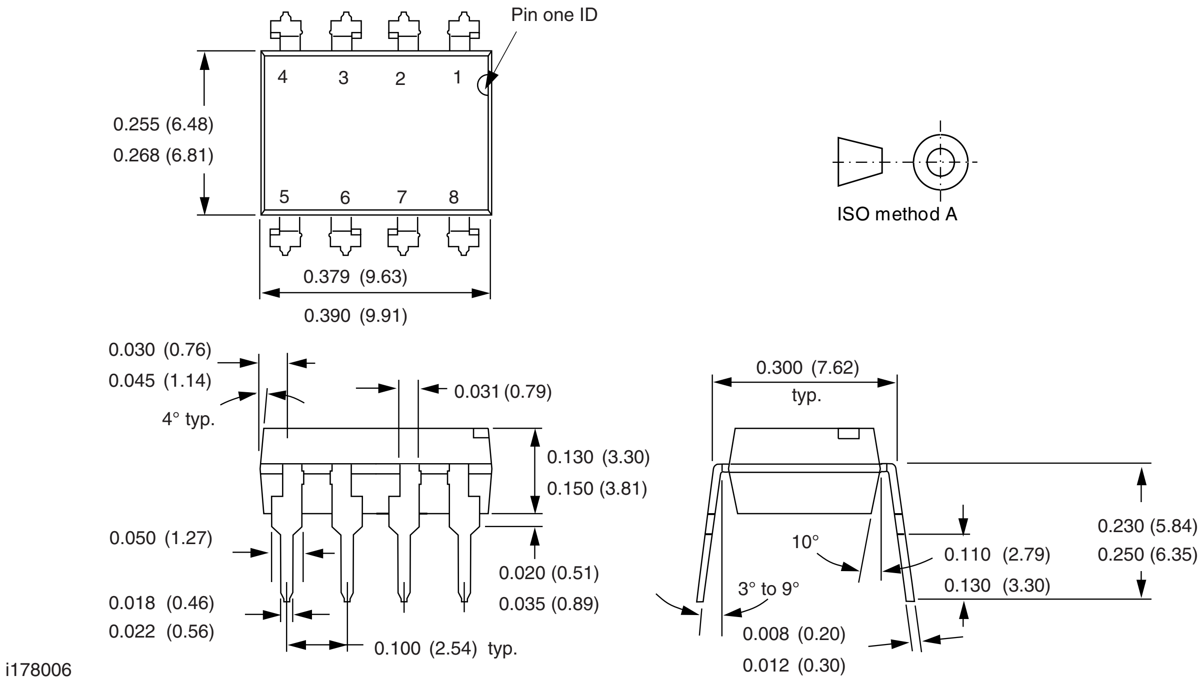
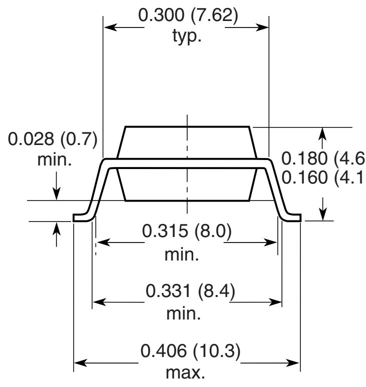


Fig. 10 - Switching Schematic

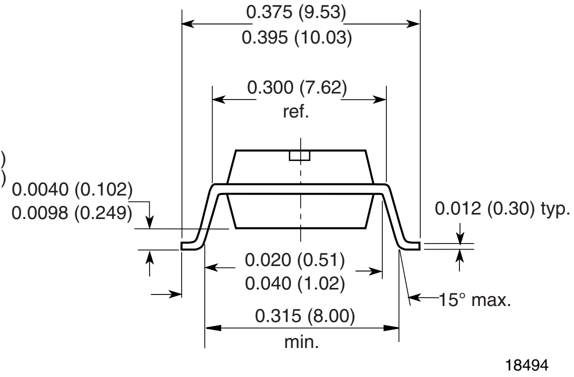
PACKAGE DIMENSIONS in inches (millimeters)



Option 7



Option 9



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.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

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