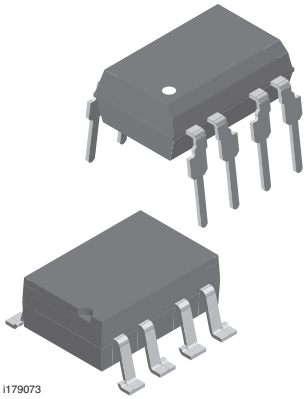
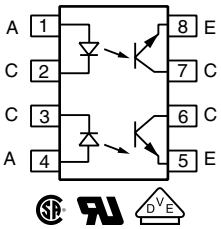
Optocoupler, Phototransistor Output, Dual Channel





FEATURES

- Current transfer ratio, 50 % typical
- Leakage current, 1.0 nA typical
- Two isolated channels per package
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

AGENCY APPROVALS

- UL1577, file no. E52744 system code H, double protection
- cUL tested to CSA 22.2 bulletin 5A
- DIN EN 60747-5-5 (VDE 0884-5), available with option 1
- CSA 93751
- BSI EN 60950, BSI EN 60065

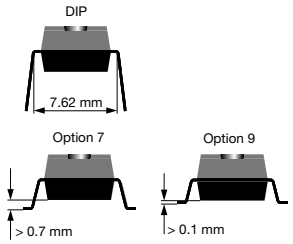
DESCRIPTION

The 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 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.

ORDERING INFORMATION

M	C	T	6	-	X	0	0	#	T
PART NUMBER					PACKAGE OPTION				TAPE AND REEL



AGENCY CERTIFIED/PACKAGE	CTR
UL, CSA, BSI	**≥ 20**
DIP-8	MCT6
SMD-8, option 7	MCT6-X007T (1)
SMD-8, option 9	MCT6-X009T (1)
VDE, UL, CSA, BSI	**≥ 20**
DIP-8	MCT6-X001

Notes

- Additional options may be possible, please contact sales office

(1) Also available in tubes, do not put “T” on the end

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ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
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				
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

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

- 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 (T_{amb} = 25 °C, unless otherwise specified)						
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 (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Switching times, output transistor	I_C = 2.0 mA, R_L = 100 Ω, V_{CE} = 5 V	t_{on}, t_{off}		3.0		µs

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SAFETY AND INSULATION RATINGS				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Climatic classification	According to IEC 68 part 1		55/100/21	
Comparative tracking index		CTI	175	
Maximum rated withstanding isolation voltage	t = 1 min	V_{ISO}	4420	V_{RMS}
Maximum transient isolation voltage		V_{IOTM}	10 000	V_{peak}
Maximum repetitive peak isolation voltage		V_{IORM}	890	V_{peak}
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
Output safety power		P_{SO}	400	mW
Input safety current		I_{SI}	275	mA
Safety temperature		T_S	175	°C
Creepage distance			≥ 7	mm
Clearance distance			≥ 7	mm
Insulation thickness		DTI	≥ 0.4	mm

Note

- As per IEC 60747-5-5, § 7.4.3.8.2, 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.

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

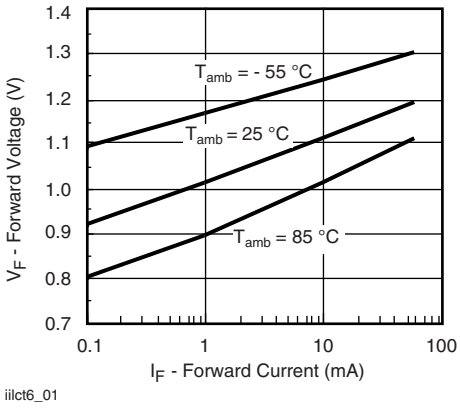


Fig. 1 - Forward Voltage vs. Forward Current

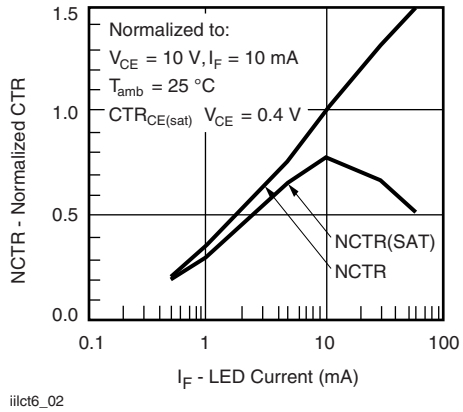


Fig. 2 - Normalized Non-Saturated and Saturated CTR vs. LED Current

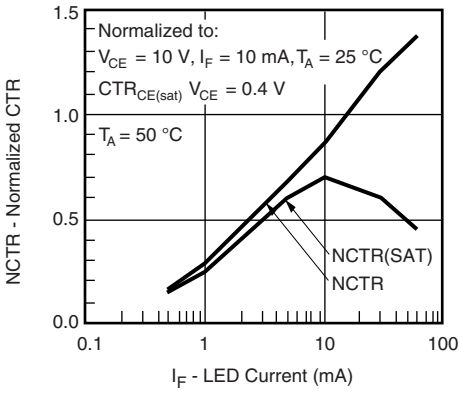
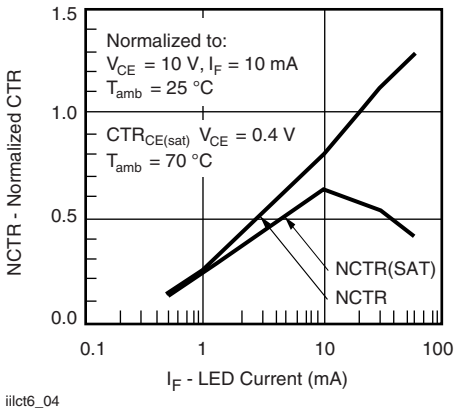


Fig. 3 - Normalized Non-Saturated and Saturated CTR vs. LED Current



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

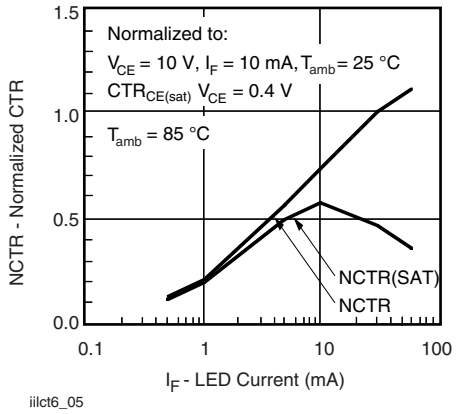


Fig. 5 - Normalized Non-Saturated and Saturated CTR vs. LED Current

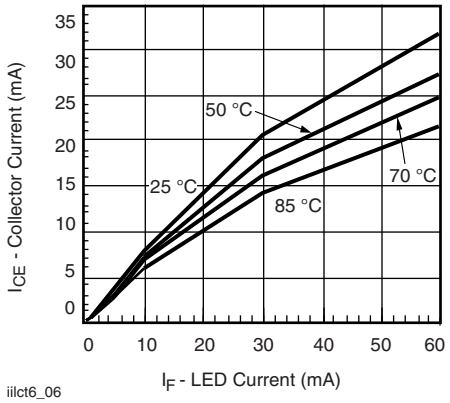


Fig. 6 - Collector Emitter Current vs. Temperature and LED Current

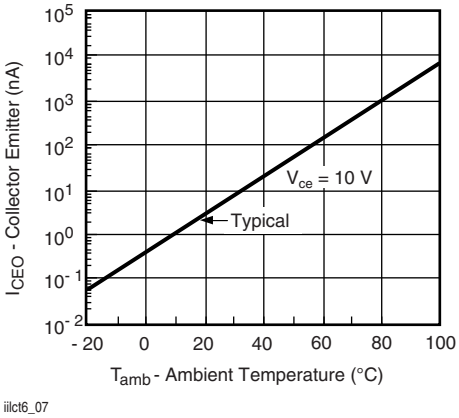


Fig. 7 - Collector Emitter Leakage Current vs.Temperature

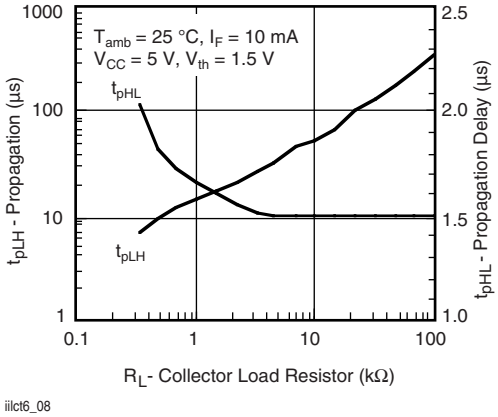


Fig. 8 - Propagation Delay vs. Collector Load Resistor

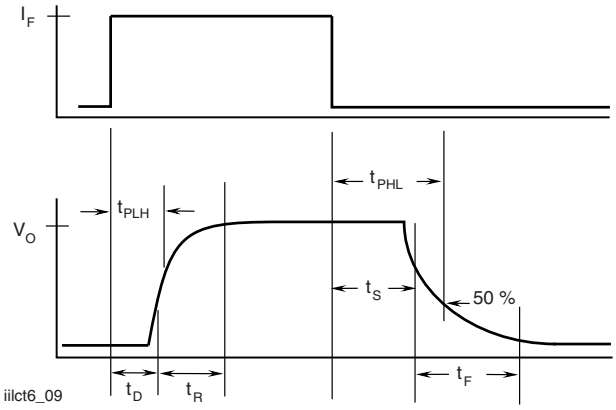


Fig. 9 - Switching Timing

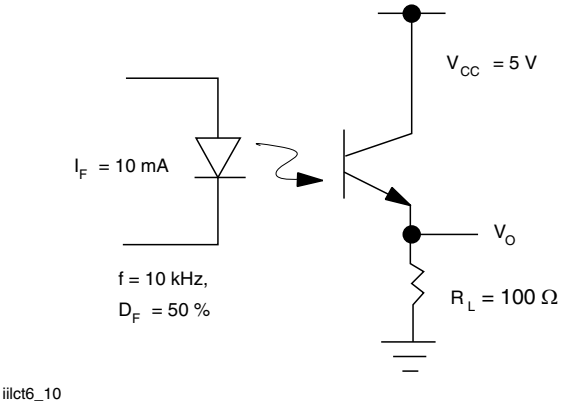
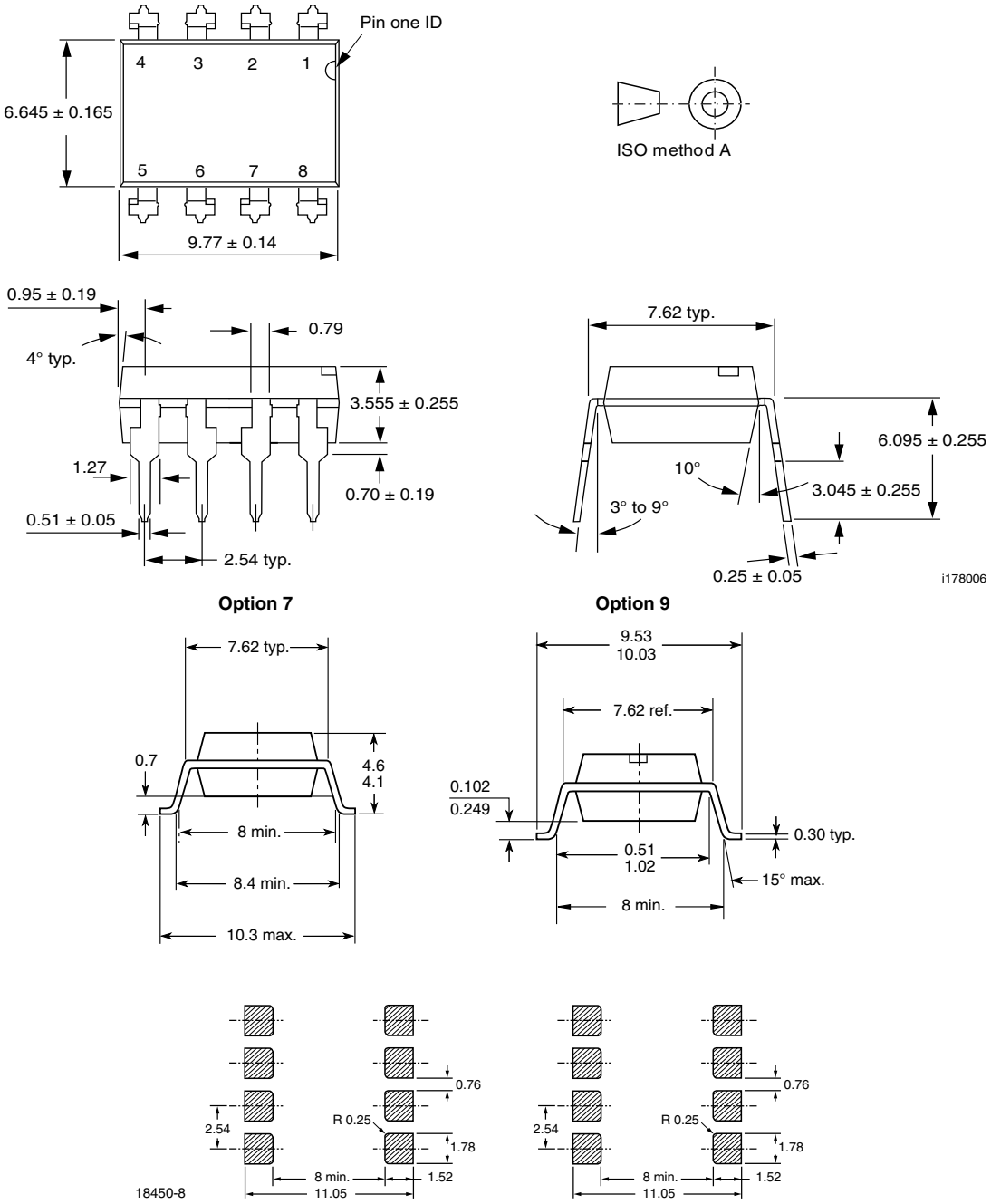


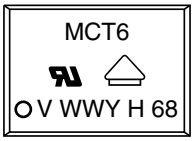
Fig. 10 - Switching Schematic

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PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING



Notes

- Only options 1 and 7 reflected in the package marking
- The VDE logo is only marked on option 1 parts
- Tape and reel suffix (T) is not part of the package marking

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