



# ILCT6/MCT6

## Dual Phototransistor Optocoupler

### FEATURES

- **Current Transfer Ratio, 50% Typical**
- **Leakage Current, 1.0 nA Typical**
- **Two Isolated Channels Per Package**
- **Direct Replacement for MCT6**
- **Underwriters Lab File #E52744**
- **VDE 0884 Available with Option1**

### DESCRIPTION

The ILCT6 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 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.

### Maximum Ratings

#### Emitter (each channel)

Rated Forward Current, DC ..... 60 mA  
Peak Forward Current, DC

(1.0  $\mu$ s pulse, 300 pps) ..... 3.0 A  
Power Dissipation at 25°C Ambient ..... 100 mW  
Derate Linearly from 25°C ..... 1.3 mW/°C

#### Detector (each channel)

Collector Current ..... 30 mA  
Collector-Emitter Breakdown Voltage ..... 30 V  
Power Dissipation at 25°C Ambient ..... 150 mW  
Derate Linearly from 25°C ..... 2 mW/°C

#### Package

Isolation Test Voltage ..... 5300 V<sub>RMS</sub>  
Isolation Resistance  
V<sub>IO</sub>=500 V, T<sub>A</sub>=25°C .....  $\geq 10^{12} \Omega$   
V<sub>IO</sub>=500 V, T<sub>A</sub>=100°C .....  $\geq 10^{11} \Omega$   
Creepage .....  $\geq 7.0$  mm  
Clearance .....  $\geq 7.0$  mm  
Total Package Dissipation  
at 25°C Ambient ..... 400 mW  
Derate Linearly from 25°C ..... 5.33 mW/°C  
Storage Temperature ..... -55°C to +150°C  
Operating Temperature ..... -55°C to +100°C  
Lead Soldering Time at 260°C ..... 10 sec.

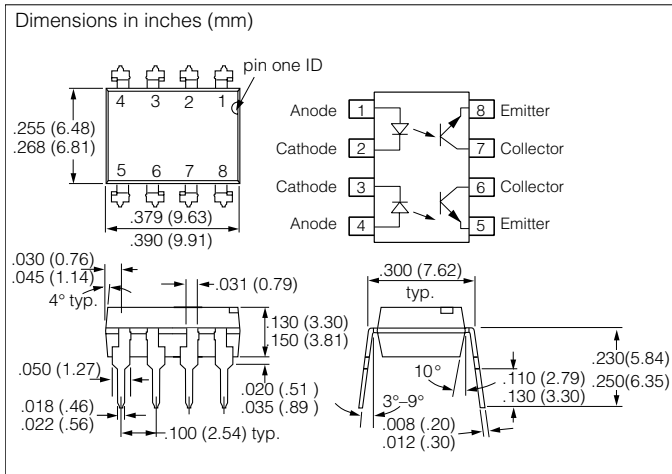
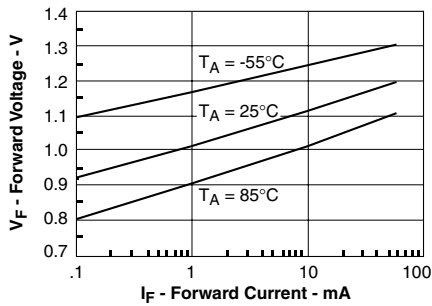


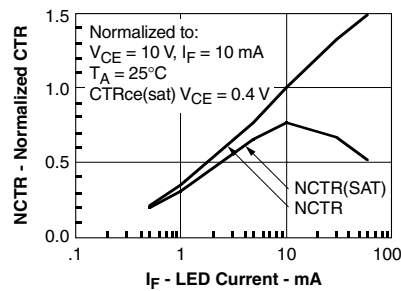
Table 1. Electrical Characteristics T<sub>A</sub>=25°C

	Symbol	Min.	Typ.	Max.	Unit	Condition
<b>Emitter</b>						
Forward Voltage	V <sub>F</sub>	—	1.25	1.50	V	I <sub>F</sub> =20 mA
Reverse Current	I <sub>R</sub>	—	0.1	10	$\mu$ A	V <sub>R</sub> =3.0 V
Junction Capacitance	C <sub>J</sub>	—	25	—	pF	V <sub>F</sub> =0 V
<b>Detector</b>						
Breakdown Voltage	BV <sub>CEO</sub>	30	65	—	V	I <sub>C</sub> =10 $\mu$ A I <sub>E</sub> =10 $\mu$ A
	BV <sub>ECO</sub>	7.0	10	—	—	
Leakage Current, Collector-Emitter	I <sub>CEO</sub>	—	1.0	100	nA	V <sub>CE</sub> =10 V
Capacitance, Collector-Emitter	C <sub>CE</sub>	—	8.0	—	pF	V <sub>CE</sub> =0 V
<b>Package</b>						
DC Current Transfer Ratio	CTR	20	50	—	%	I <sub>F</sub> =10 mA V <sub>CE</sub> =10 V
Saturation Voltage, Collector-Emitter	V <sub>CEsat</sub>	—	—	0.40	V	I <sub>C</sub> =2.0 mA I <sub>F</sub> =16 mA
Isolation Capacitance	C <sub>ISOL</sub>	—	0.5	—	pF	f=1.0 MHz
Capacitance between Channels	—	—	0.4	—	pF	f=1.0 MHz
Bandwidth	—	—	150	—	kHz	I <sub>C</sub> =2.0 mA V <sub>CC</sub> =10 V R <sub>L</sub> =100 $\Omega$
Switching Times, Output Transistor	t <sub>on</sub> , t <sub>off</sub>	—	3.0	—	$\mu$ s	I <sub>C</sub> =2.0 mA R <sub>E</sub> =100 $\Omega$ V <sub>CE</sub> =10

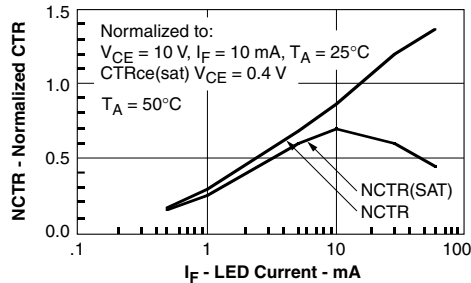
**Figure 1. Forward voltage versus forward current**



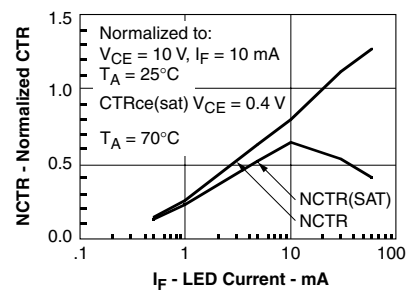
**Figure 2. Normalized non-saturated and saturated CTR at T<sub>A</sub>=25°C versus LED current**



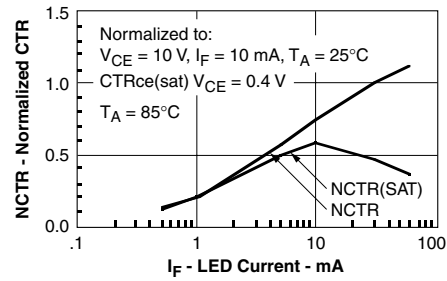
**Figure 3. Normalized non-saturated and saturated CTR at T<sub>A</sub>=50°C versus LED current**



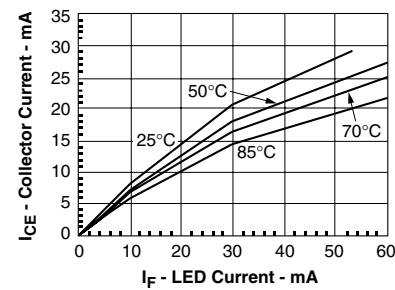
**Figure 4. Normalized non-saturated and saturated CTR at T<sub>A</sub>=70°C versus LED current**



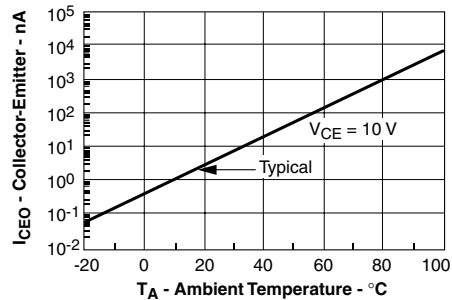
**Figure 5. Normalized non-saturated and saturated CTR at T<sub>A</sub>=85°C versus LED current**



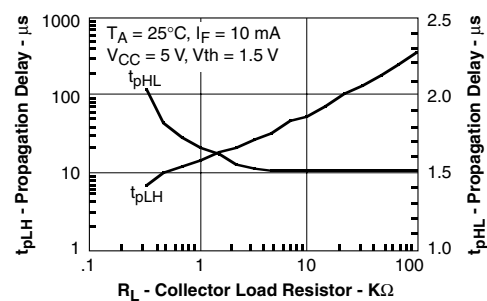
**Figure 6. Collector-emitter current versus temperature and LED current**



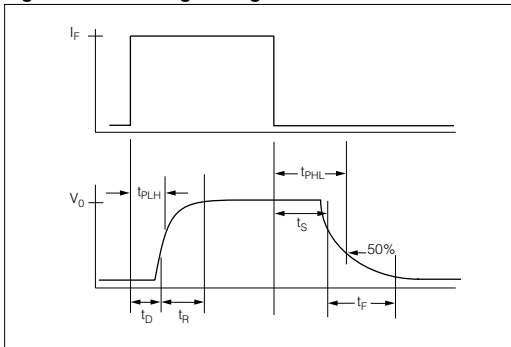
**Figure 7. Collector-emitter leakage current versus temperature**



**Figure 8. Propagation delay versus collector load resistor**



**Figure 9. Switching Timing**



**Figure 10. Switching schematic**

