

## Dual Photodarlington Small Outline Surface Mount Optocoupler

### FEATURES

- **Two Channel Optocoupler**
- **High Current Transfer Ratio at  $I_F=1.0$  mA, 500% Min.**
- **Isolation Test Voltage, 3000  $V_{RMS}$**
- **Electrical Specifications Similar to Standard 6-pin Coupler**
- **Compatible with Dual Wave, Vapor Phase and IR Reflow Soldering**
- **SOIC-8 Surface Mountable Package**
- **Standard Lead Spacing, .05"**
- **Available only on Tape and Reel Option (Conforms to EIA Standard 481-2)**
- **Underwriters Lab File #E52744**

### DESCRIPTION

The ILD223T is a high current transfer ratio (CTR) optocoupler. It has a Gallium Arsenide infrared LED emitter and a silicon NPN photodarlington transistor detector.

This device has CTRs tested at an LED current of 1.0 mA. This low drive current permits easy interfacing from CMOS to LSTTL or TTL.

The ILD223T is constructed in a standard SOIC-8A foot print which makes it ideally suited for high density applications. In addition to eliminating through-holes requirements, this package conforms to standards for surface mounted devices.

### Maximum Ratings (Each Channel)

#### Emitter

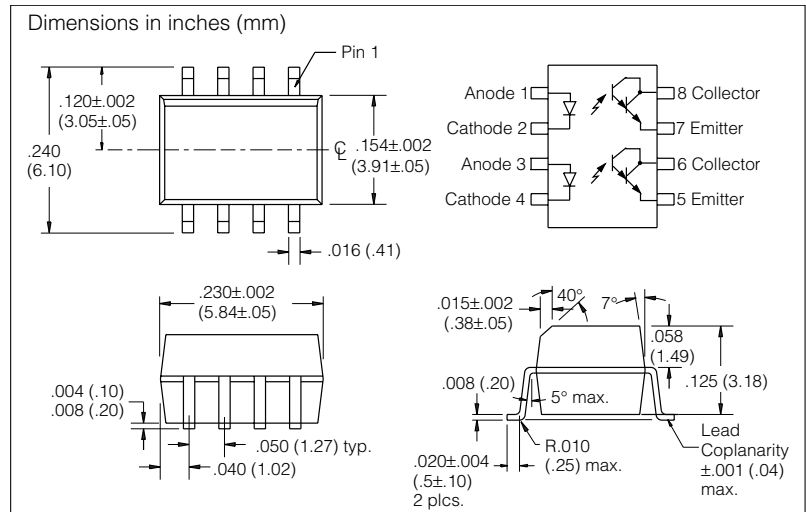
Peak Reverse Voltage ..... 6.0 V  
 Peak Pulsed Current (1.0  $\mu$ s, 300 pps) ..... 3.0 A  
 Continuous Forward Current per Channel .... 30 mA  
 Power Dissipation at 25°C ..... 45 mW  
 Derate Linearly from 25°C ..... 0.4 mW/°C

#### Detector

Collector-Emitter Breakdown Voltage ..... 30 V  
 Emitter-Collector Breakdown Voltage ..... 5.0 V  
 Power Dissipation per Channel ..... 75 mW  
 Derate Linearly from 25°C ..... 3.1 mW/°C

#### Package

Total Package Dissipation at 25°C Ambient  
 (2 LEDs + 2 Detectors, 2 Channels) ..... 240 mW  
 Derate Linearly from 25°C ..... 2.0 mW/°C  
 Storage Temperature ..... -55°C to +150°C  
 Operating Temperature ..... -55°C to +100°C  
 Soldering Time at 260°C ..... 10 sec



**Table 1. Characteristics  $T_A=25^\circ\text{C}$**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
<b>Emitter</b>						
Forward Voltage	$V_F$	—	—	1.3	V	$I_F=1.0$ mA
Reverse Current	$I_R$	—	0.1	100	$\mu$ A	$V_R=6.0$ V
Capacitance	$C_O$	—	25	—	pF	$V_F=0$ V $F=1.0$ MHz
<b>Detector</b>						
Breakdown Voltage	$BV_{CEO}$	30	—	—	V	$I_C=10$ $\mu$ A $I_E=10$ $\mu$ A
	$BV_{ECO}$	5.0	—	—	V	
Current, Collector-Emitter	$I_{CEO}$	—	—	50	nA	$V_{CE}=5.0$ V $I_F=0$
Capacitance, Collector-Emitter	$C_{CE}$	—	3.4	—	pF	$V_{CE}=5.0$ V
<b>Package</b>						
DC Current Transfer Ratio	$CTR_{DC}$	500	—	—	%	$I_F=1.0$ mA, $V_{CE}=5.0$ V
Saturation Voltage, Collector-Emitter	$V_{CEsat}$	—	—	1.0	V	$I_F=1.0$ mA, $I_{CE}=0.5$ mA
Capacitance, Input to Output	$C_{IO}$	0.5	—	—	pF	—
Resistance, Input to Output	$R_{IO}$	100	—	—	G $\Omega$	—
Turn-On Time	$t_{ON}$	15	—	—	$\mu$ s	$V_{CC}=10$ V $R_L=100$ $\Omega$ $I_F=5.0$ mA
Turn-Off Time	$t_{OFF}$	30	—	—	$\mu$ s	
Isolation Test Voltage	$V_{IO}$	3000	—	—	$V_{RMS}$	t=1.0 sec.

Figure 1. Forward voltage versus forward current

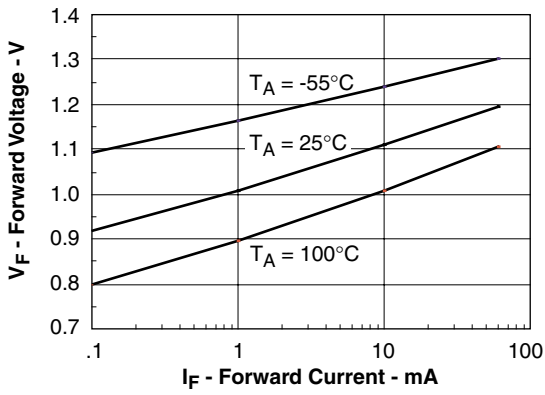


Figure 2. Peak LED current versus duty factor, Tau

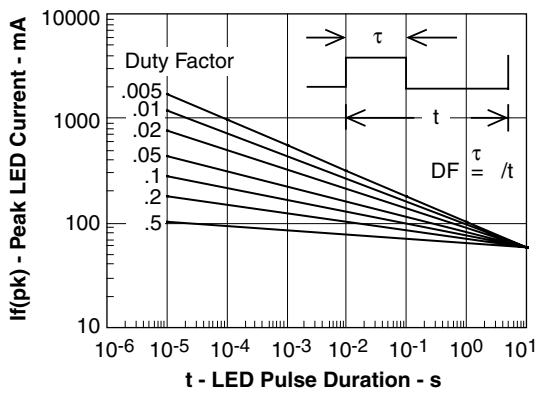


Figure 3. Normalized  $CTR_{CE}$  versus LED current

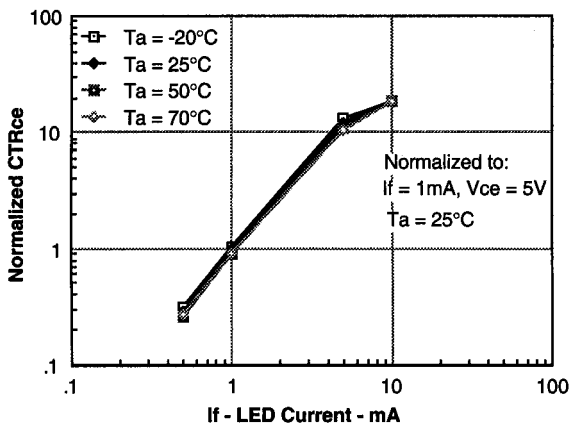


Figure 4. CTR versus LED current

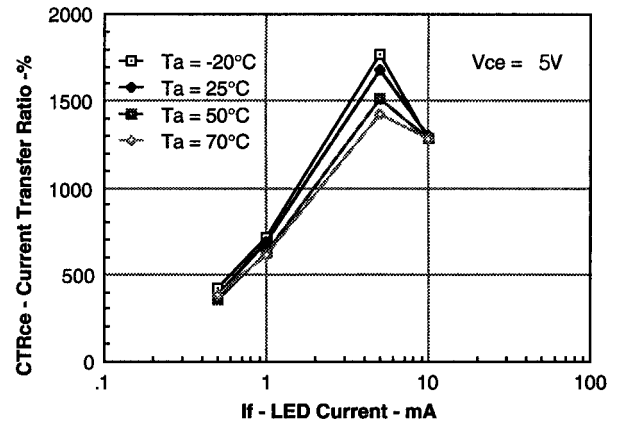


Figure 5. Collector current versus LED current

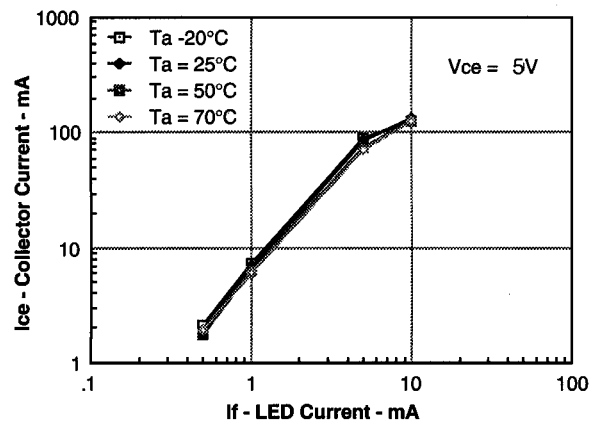


Figure 6. Switching schematic and switching timing

