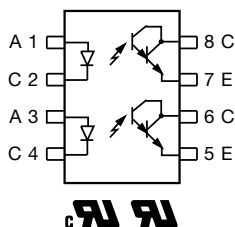
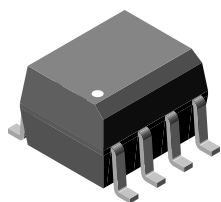


# Optocoupler, Photodarlington Output, Dual Channel, SOIC-8 Package



## FEATURES

- Two channel optocoupler
- High current transfer ratio at  $I_F = 1.0 \text{ mA}$ , 500 % minimum
- Isolation test voltage, 4000  $V_{RMS}$
- 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, 0.05"
- Available only on tape and reel (conforms to EIA standard 481-2)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

## LINKS TO ADDITIONAL RESOURCES



## DESCRIPTION

The ILD223T is a high current transfer ratio (CTR) optocoupler. It has a gallium arsenide infrared LED emitter and 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-8 foot print which makes it ideally suited for high density applications. In addition to eliminating through hole requirements, this package conforms to standards for surface mounted devices.

## AGENCY APPROVALS

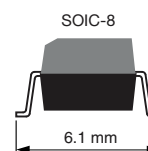
- [UL](#)
- [cUL](#)

## ORDERING INFORMATION

I	L	D	2	2	3	T	-	X	0	#	#
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PART NUMBER

PACKAGE OPTION



AGENCY CERTIFIED / PACKAGE	CTR (%)
	1 mA
UL, cUL	≥ 500
SOIC-8	ILD223T



<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
Peak reverse voltage		$V_R$	6.0	V
Forward current		$I_F$	60	mA
Peak pulsed current	1.0 $\mu\text{s}$ , 300 pps		3.0	A
Continuous forward current per channel			30	mA
Power dissipation		$P_{diss}$	45	mW
Derate linearly from 25 $^{\circ}\text{C}$			0.4	mW/ $^{\circ}\text{C}$
<b>OUTPUT</b>				
Collector emitter breakdown voltage		$BV_{CEO}$	30	V
Emitter collector breakdown voltage		$BV_{ECO}$	5.0	V
Power dissipation per channel		$P_{diss}$	75	mW
Derate linearly from 25 $^{\circ}\text{C}$			3.1	mW/ $^{\circ}\text{C}$
<b>COUPLER</b>				
Isolation test voltage	$t = 1.0\text{ s}$	$V_{ISO}$	4000	$V_{RMS}$
Total package dissipation (2 LEDs and 2 detectors, 2 channels)		$P_{tot}$	250	mW
Derate linearly from 25 $^{\circ}\text{C}$			2.0	mW/ $^{\circ}\text{C}$
Storage temperature		$T_{stg}$	-55 to +150	$^{\circ}\text{C}$
Operating temperature		$T_{amb}$	-55 to +100	$^{\circ}\text{C}$
Soldering temperature <sup>(1)</sup>		$T_{sld}$	260	$^{\circ}\text{C}$

**Notes**

- 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.

<sup>(1)</sup> Refer to reflow profile for soldering conditions for surface mounted devices (SOP/SOIC)

<b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>							
Forward voltage	$I_F = 10\text{ mA}$		$V_F$	-	-	1.3	V
Reverse current	$V_R = 6.0\text{ V}$		$I_R$	-	0.1	100	$\mu\text{A}$
Capacitance	$V_F = 0\text{ V}$ , $f = 1.0\text{ MHz}$		$C_O$	-	25	-	pF
<b>OUTPUT</b>							
Collector emitter breakdown voltage	$I_C = 10\text{ }\mu\text{A}$		$BV_{CEO}$	30	-	-	V
Emitter collector breakdown voltage	$I_C = 10\text{ }\mu\text{A}$		$BV_{ECO}$	5.0	-	-	V
Collector emitter leakage current	$V_{CE} = 50\text{ V}$ , $I_F = 0\text{ A}$		$I_{CEO}$	-	-	50	nA
Collector emitter capacitance	$V_{CE} = 5.0\text{ V}$		$C_{CE}$	-	3.4	-	pF
<b>COUPLER</b>							
Capacitance (input to output)		ILD223T	$C_{IO}$	0.5	-	-	pF
Saturation voltage, collector emitter	$I_F = 1.0\text{ mA}$ , $I_{CE} = 0.5\text{ mA}$	ILD223T	$V_{CEsat}$	-	-	1.0	V
Resistance, input to output		ILD223T	$C_{IO}$	100	-	-	G $\Omega$

**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.

<b>CURRENT TRANSFER RATIO</b>						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
$I_C/I_F$	$I_F = 1.0\text{ mA}$ , $V_{CE} = 5.0\text{ V}$	$CTR_{DC}$	500	-	-	%

**SWITCHING CHARACTERISTICS**

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	$V_{CC} = 10\text{ V}$ , $R_L = 100\ \Omega$ , $I_F = 5.0\text{ mA}$	ILD223T	$t_{on}$	15	-	-	$\mu\text{s}$
Turn-off time	$V_{CC} = 10\text{ V}$ , $R_L = 100\ \Omega$ , $I_F = 5.0\text{ mA}$	ILD223T	$t_{off}$	30	-	-	$\mu\text{s}$

**SAFETY AND INSULATION RATINGS**

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Climatic classification	According to IEC 68 part 1		-	55 / 100 / 21	-	
Comparative tracking index		CTI	175	-	399	
$V_{IOTM}$			6000	-	-	V
$V_{IORM}$			560	-	-	V
PSO			-	-	350	mW
$I_{SI}$			-	-	150	mA
$T_{SI}$			-	-	165	$^{\circ}\text{C}$
Creepage distance			4	-	-	mm
Clearance distance			4	-	-	mm
Insulation thickness			0.2	-	-	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.

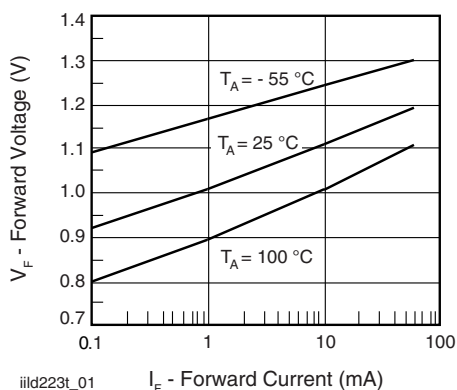
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\ ^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Forward Voltage vs. Forward Current

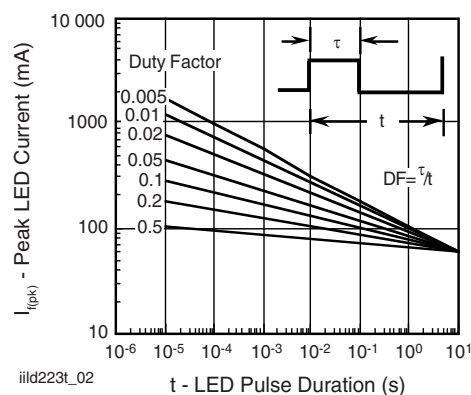


Fig. 2 - Peak LED Current vs. Duty Factor, t

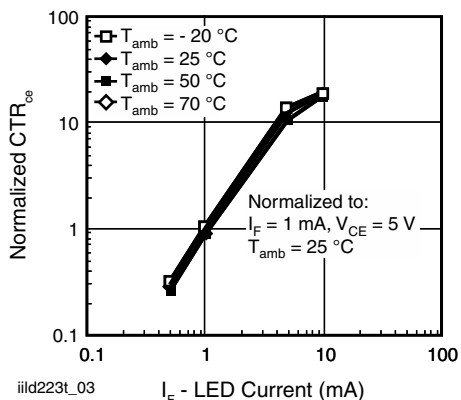
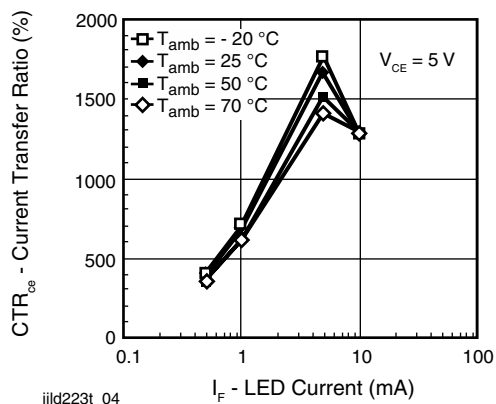

Fig. 3 - Normalized  $CTR_{CE}$  vs. LED Current


Fig. 4 - CTR vs. LED Current

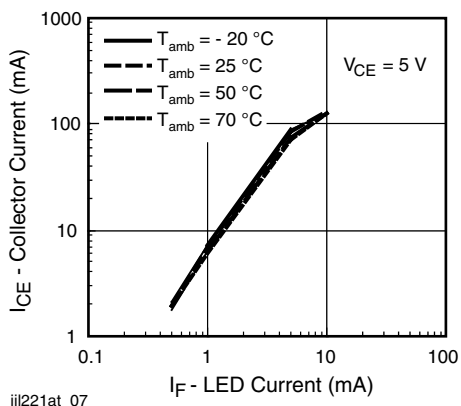


Fig. 5 - Collector Current vs. LED Current

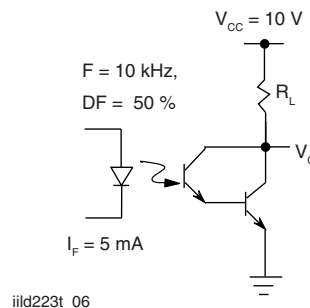


Fig. 6 - Switching Schematic

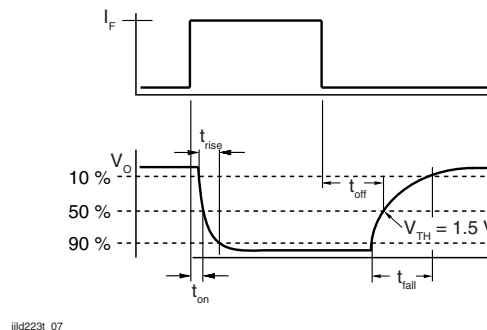
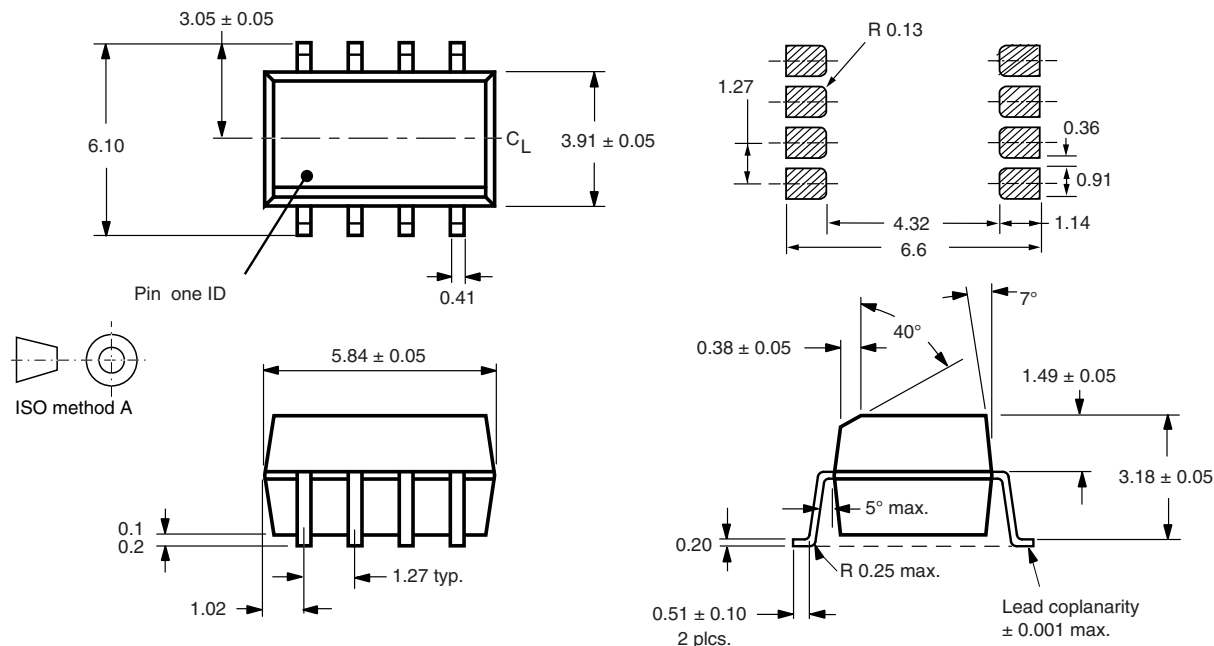
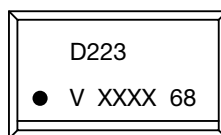


Fig. 7 - Switching Timing

**PACKAGE DIMENSIONS** in inches (millimeters)


i178020

**PACKAGE MARKING** (example)

**Notes**

- XXXX = LMC (lot marking code)
- Tape and reel suffix (T) is not part of the package marking



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