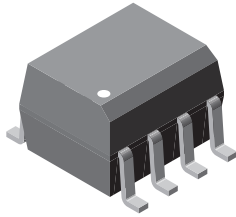
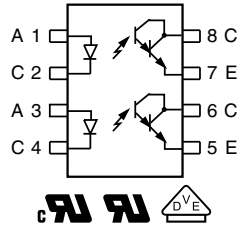


# Optocoupler, Photodarlington Output, Dual Channel, SOIC-8 Package



1179074



## FEATURES

- High current transfer ratio at  $I_F = 1 \text{ mA}$ , 500 % minimum
- Isolation test voltage, 4000  $V_{RMS}$
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

## DESCRIPTION

The VOD223T 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 mA. This low drive current permits easy interfacing from CMOS to LSTTL or TTL.

## AGENCY APPROVALS

- UL1577, file no. E52744 system code Y
- cUL - file no. E52744, equivalent to CSA bulletin 5A
- DIN EN 60747-5-5 (VDE 0884) available with option 1

ORDERING INFORMATION	
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<b>AGENCY CERTIFIED/PACKAGE</b>	<b>CTR (%)</b>
UL, cUL, VDE	≥ 500
SOIC-8	VOD223T

ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
Peak reverse voltage		$V_R$	6	V
Peak pulsed current	1 $\mu\text{s}$ , 300 pps	$I_{FM}$	3	A
Continuous forward current per channel		$I_F$	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	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 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	mW/ $^\circ\text{C}$
Storage temperature		$T_{stg}$	-40 to +150	$^\circ\text{C}$
Operating temperature		$T_{amb}$	-40 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.
- (1) 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	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>						
Forward voltage	$I_F = 10\text{ mA}$	$V_F$			1.3	V
Reverse current	$V_R = 6\text{ V}$	$I_R$		0.1	100	$\mu\text{A}$
Capacitance	$V_F = 0\text{ V}$ , $f = 1\text{ MHz}$	$C_O$		25		pF
<b>OUTPUT</b>						
Collector emitter breakdown voltage	$I_C = 100\text{ }\mu\text{A}$	$BV_{CEO}$	30			V
Emitter collector breakdown voltage	$I_C = 10\text{ }\mu\text{A}$	$BV_{ECO}$	5			V
Collector emitter leakage current	$V_{CE} = 5\text{ V}$ , $I_F = 0\text{ A}$	$I_{CEO}$			50	nA
Collector emitter capacitance	$V_{CE} = 5\text{ V}$	$C_{CE}$		3.4		pF
Saturation voltage, collector emitter	$I_F = 1\text{ mA}$ , $I_{CE} = 0.5\text{ mA}$	$V_{CEsat}$			1	V
<b>COUPLER</b>						
Capacitance (input to output)		$C_{IO}$	0.5			pF

**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> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
$I_C/I_F$	$I_F = 1\text{ mA}$ , $V_{CE} = 5\text{ V}$	$CTR_{DC}$	500			%

<b>SWITCHING CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	$V_{CC} = 10\text{ V}$ , $R_L = 100\text{ }\Omega$ , $I_F = 5\text{ mA}$	$t_{on}$	15			$\mu\text{s}$
Turn-off time	$V_{CC} = 10\text{ V}$ , $R_L = 100\text{ }\Omega$ , $I_F = 5\text{ mA}$	$t_{off}$	30			$\mu\text{s}$

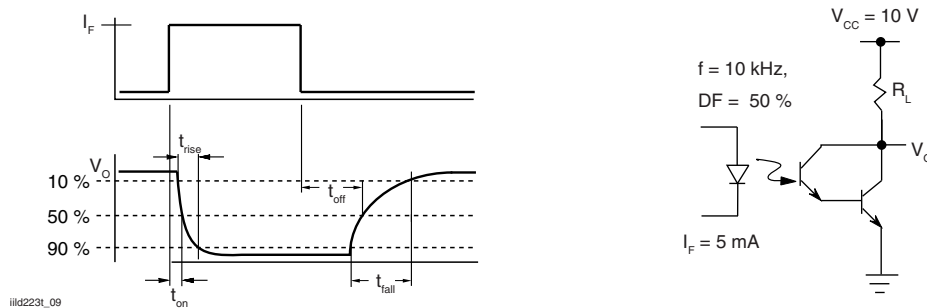


Fig. 1 - Switching Test Circuit

SAFETY AND INSULATION RATINGS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Climatic classification	according to IEC 68 part 1			40/100/21		
Polution degree				2		
Comparative tracking index		CTI	175		399	
Isolation test voltage	1 s	$V_{ISO}$	4000			$V_{RMS}$
Peak transient overvoltage		$V_{IOTM}$	6000			V
Peak insulation voltage		$V_{IORM}$	560			V
Safety rating - power output		PSO			350	mW
Resistance (input to output)		$R_{IO}$	100			GW
Apparent charge method a		$q_{pd}$				C
Apparent charge method b		$q_{pd}$				C
Safety rating - input current		$I_{SI}$			150	mA
Safety rating - temperature		$T_{SI}$			165	°C
External creepage distance			4			mm
Internal creepage distance			4			mm
External clearance distance			4			mm
Insulation thickness			0.2			mm

**Note**

- As per IEC 60747-5-2, §7.4.3.8.1, 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.

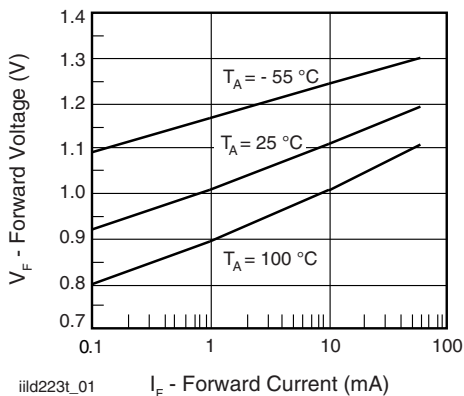
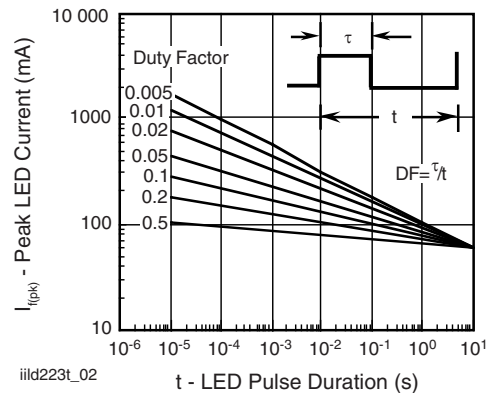
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ °C}$ , unless otherwise specified)


Fig. 2 - Forward Voltage vs. Forward Current


 Fig. 3 - Peak LED Current vs. Duty Factor,  $t$

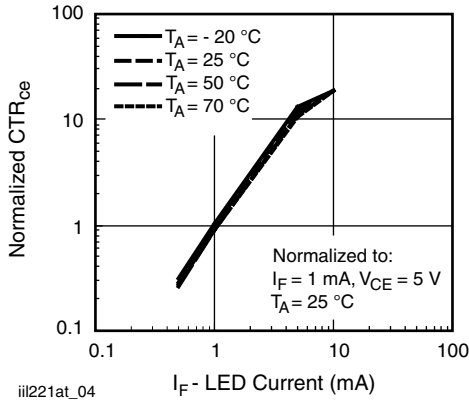


Fig. 4 - Normalized CTR<sub>CE</sub> vs. LED Current

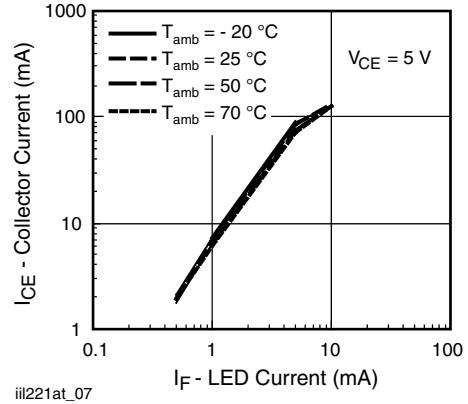


Fig. 6 - Collector Current vs. LED Current

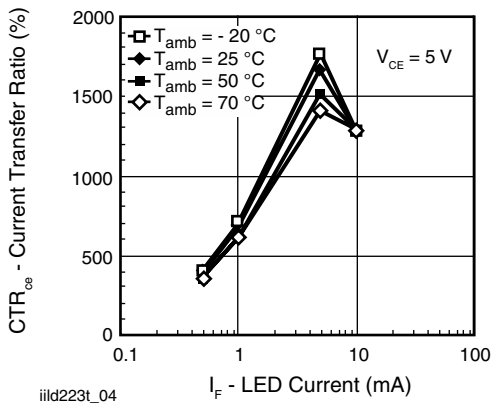
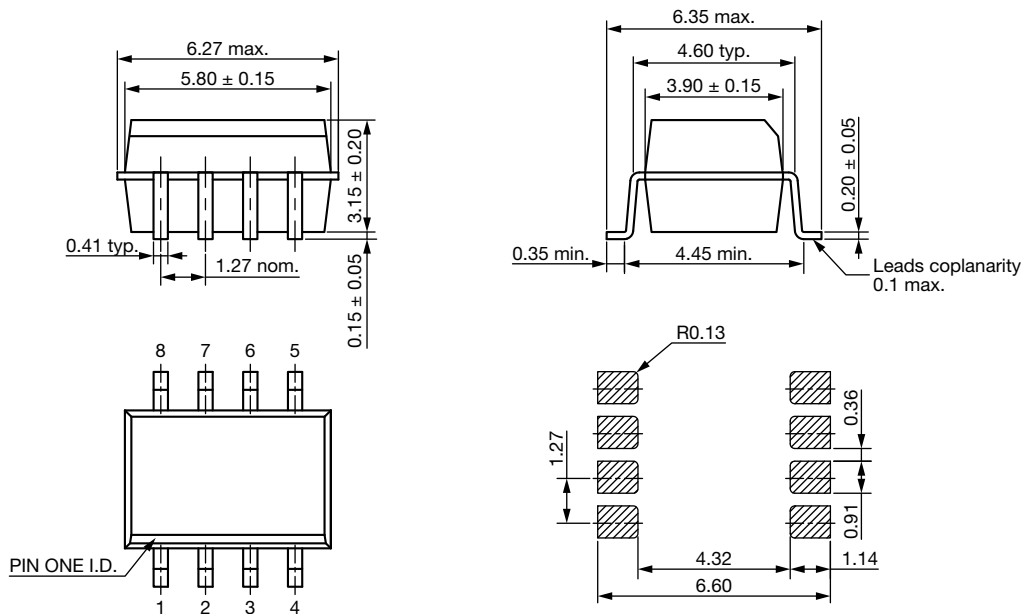
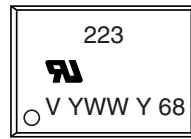


Fig. 5 - CTR vs. LED Current

**PACKAGE DIMENSIONS** in millimeters



**PACKAGE MARKING** (example)



**TAPE AND REEL PACKAGING**

Dimensions in millimeters

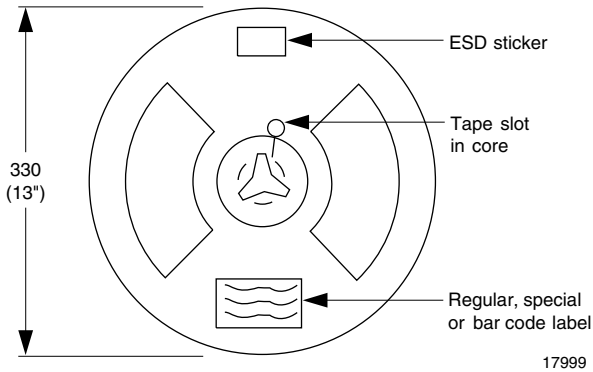


Fig. 7 - Tape and Reel Shipping Medium (EIA-481, revision A, and IEC 60286), 2000 units per reel

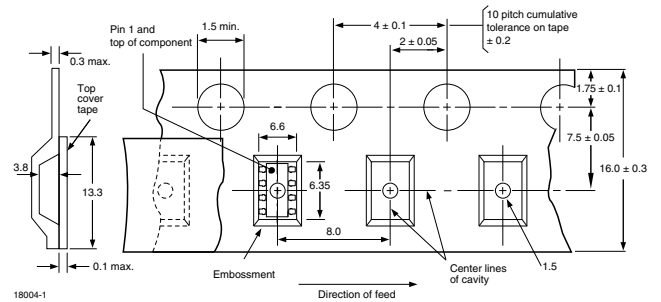


Fig. 8 - Tape Dimensions, 2000 Parts per Reel



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