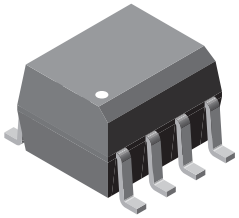
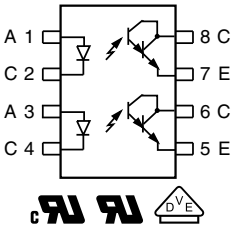
Optocoupler, Photodarlington Output, Dual Channel, SOIC-8 Package





FEATURES

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

Pb-free
e3
RoHS COMPLIANT

DESCRIPTION

The VOD233T 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.

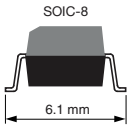
AGENCY APPROVALS

- 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

V	O	D	2	2	3	T

PART NUMBER



AGENCY CERTIFIED/PACKAGE	CTR (%)
UL, cUL, VDE	**≥ 500**
SOIC-8	VOD223T

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

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Peak reverse voltage		V_R	6	V
Peak pulsed current	1 µs, 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 °C			0.4	mW/°C
OUTPUT				
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 °C			3.1	mW/°C
COUPLER				
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 °C			2	mW/°C
Storage temperature		T_{stg}	-40 to +150	°C
Operating temperature		T_{amb}	-40 to +100	°C
Soldering temperature (1)		T_{sld}	260	°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).

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT						
Forward voltage	I_F = 10 mA	V_F			1.3	V
Reverse current	V_R = 6 V	I_R		0.1	100	µA
Capacitance	V_F = 0 V, f = 1 MHz	C_O		25		pF
OUTPUT						
Collector emitter breakdown voltage	I_C = 100 µA	BVCEO	30			V
Emitter collector breakdown voltage	I_C = 10 µA	BVECO	5			V
Collector emitter leakage current	V_{CE} = 5 V, I_F = 0 A	I_{CEO}			50	nA
Collector emitter capacitance	V_{CE} = 5 V	C_{CE}		3.4		pF
Saturation voltage, collector emitter	I_F = 1 mA, I_{CE} = 0.5 mA	V_{CEsat}			1	V
COUPLER						
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.

CURRENT TRANSFER RATIO (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
I_C/I_F	I_F = 1 mA, V_{CE} = 5 V	CTR_{DC}	500			%

SWITCHING CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Turn-on time	V_{CC} = 10 V, R_L = 100 Ω, I_F = 5 mA	t_{on}	15			µs
Turn-off time	V_{CC} = 10 V, R_L = 100 Ω, I_F = 5 mA	t_{off}	30			µs

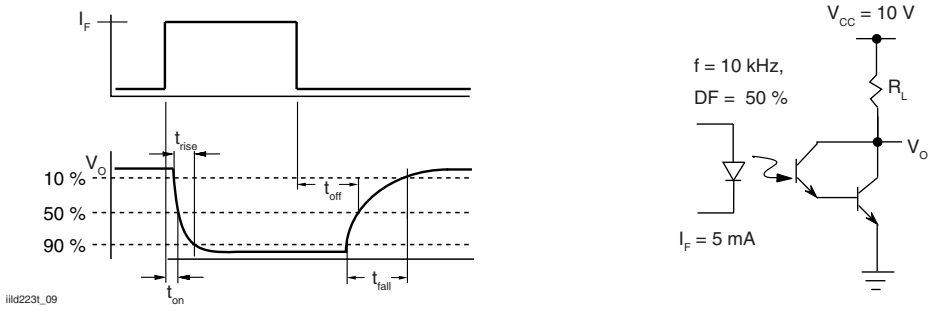


Fig. 1 - Switching Test Circuit

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 prodective circuits.

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

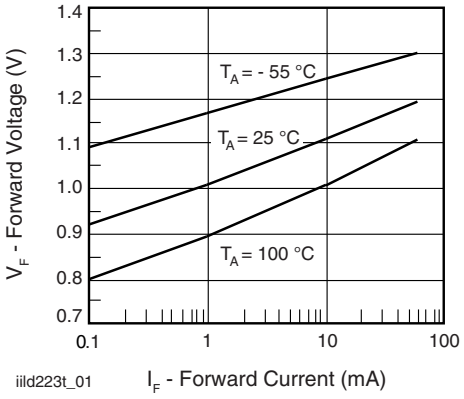


Fig. 2 - Forward Voltage vs. Forward Current

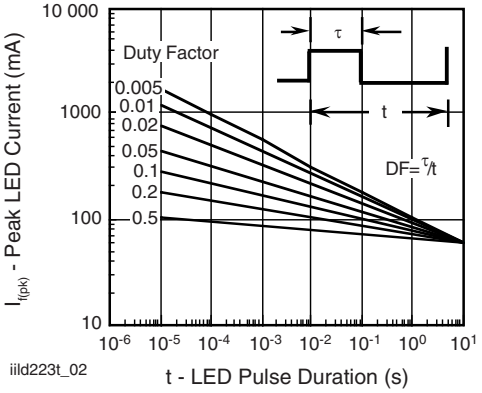


Fig. 3 - Peak LED Current vs. Duty Factor, t

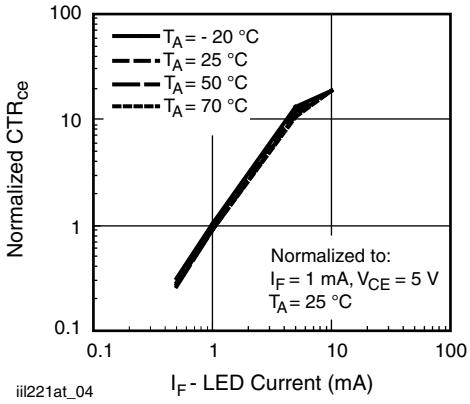


Fig. 4 - Normalized CTR_{CE} vs. LED Current

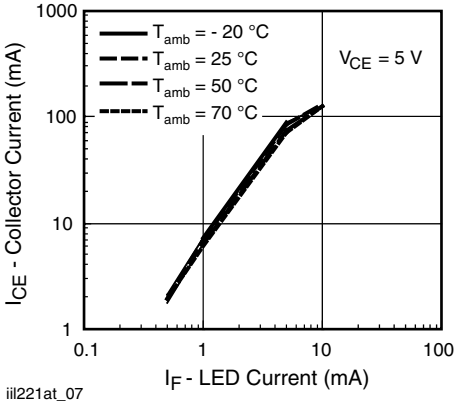


Fig. 6 - Collector Current vs. LED Current

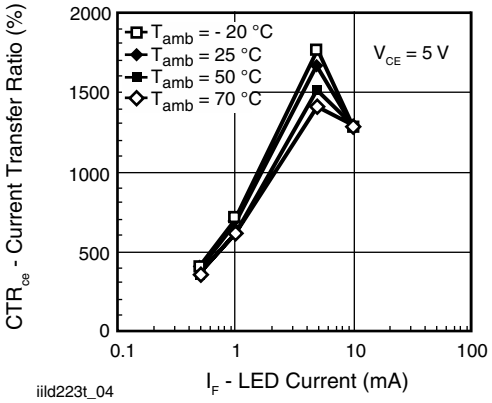
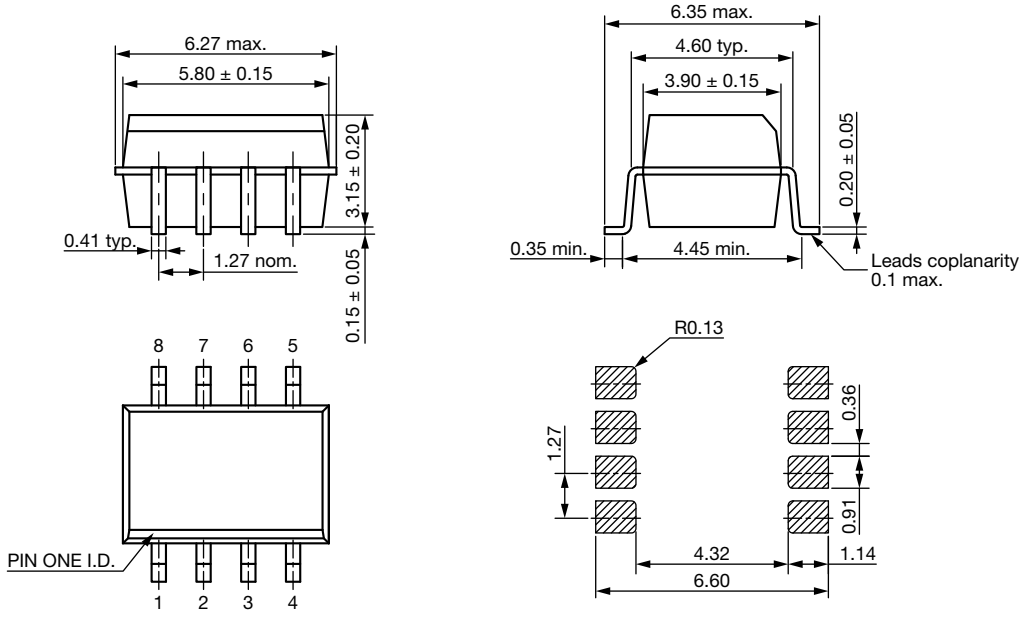
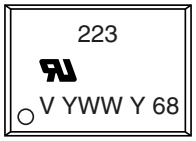


Fig. 5 - CTR vs. LED Current

PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example)



TAPE AND REEL PACKAGING

Dimensions in millimeters

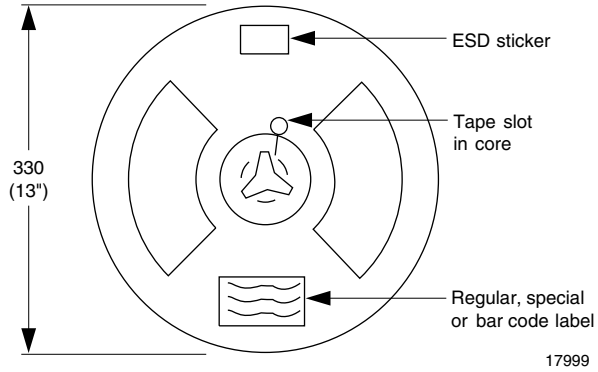


Fig. 7 - Tape and Reel Shipping Medium
(EIA-481, revision A, and IEC 60286), 2000 units per reel

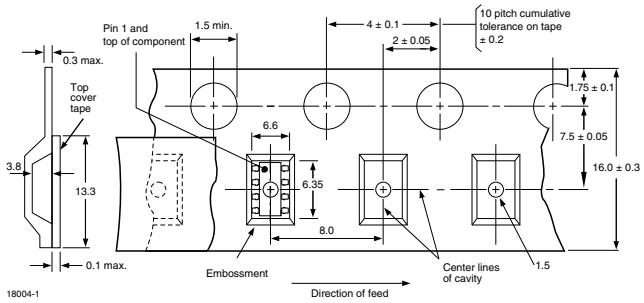


Fig. 8 - Tape Dimensions, 2000 Parts per Reel

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