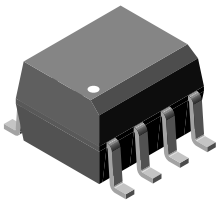
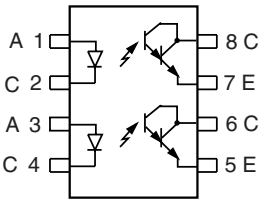
Optocoupler, Photodarlington Output, Dual Channel, SOIC-8 Package





i179042

FEATURES

- High current transfer ratio at I_F = 1 mA, 500 % minimum
- Isolation test voltage, 4000 V_{RMS}
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

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

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.

ORDER INFORMATION	
PART	**REMARKS**
VOD223T	CTR > 500 %, SOIC-8

ABSOLUTE MAXIMUM RATINGS (1)				
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 (2)		T_{sld}	260	°C

Notes

(1) T_{amb} = 25 °C, unless otherwise specified
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.

(2) Refer to reflow profile for soldering conditions for surface mounted devices (SOP/SOIC).

ELECTRICAL CHARACTERISTICS

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	BV_{CEO}	30			V
Emitter collector breakdown voltage	I_C = 10 µA	BV_{ECO}	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

T_{amb} = 25 °C, unless otherwise specified
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

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
DC current transfer ratio	I_F = 1 mA, V_{CE} = 5 V	CTR_{DC}	500			%

SWITCHING CHARACTERISTICS

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

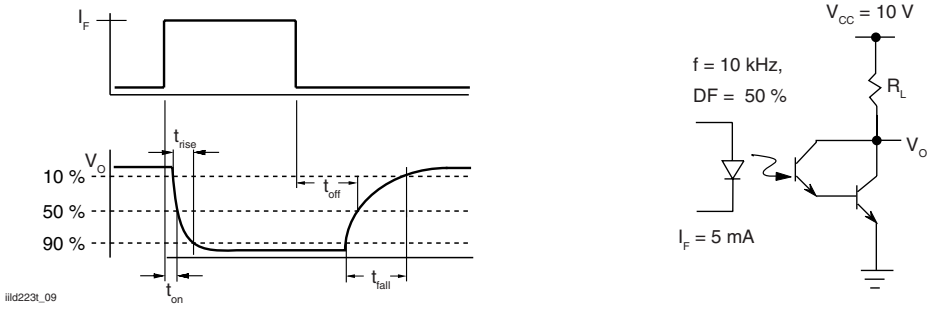


Fig. 1 - Switching Test Circuit

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		P_{SO}			350	mW
Resistance (input to output)		R_{IO}	100			GΩ
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

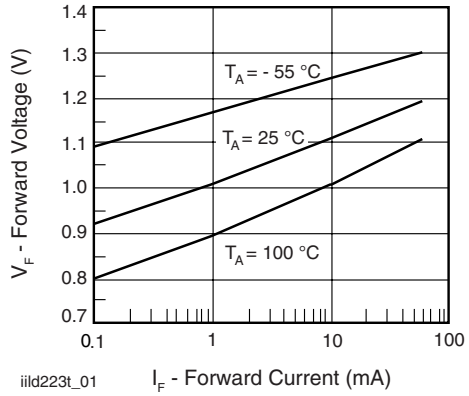


Fig. 2 - Forward Voltage vs. Forward Current

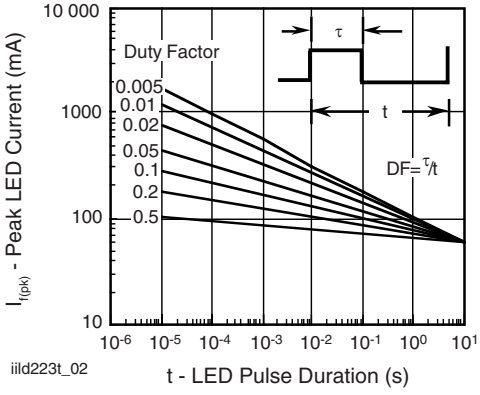


Fig. 3 - Peak LED Current vs. Duty Factor, τ

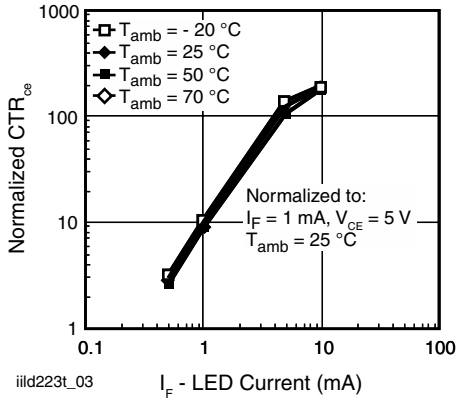


Fig. 4 - Normalized CTR_{CE} vs. LED Current

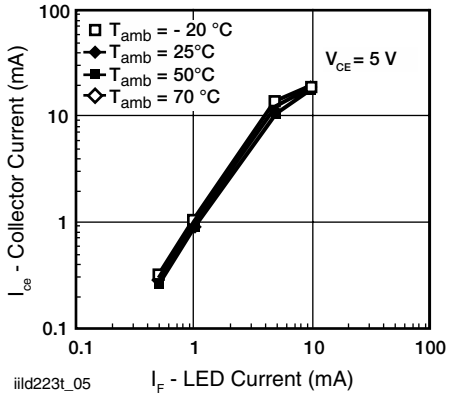


Fig. 6 - Collector Current vs. LED Current

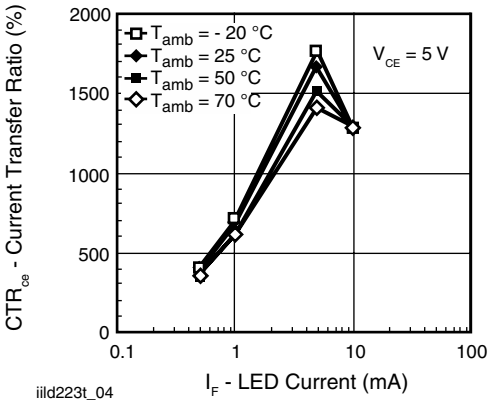
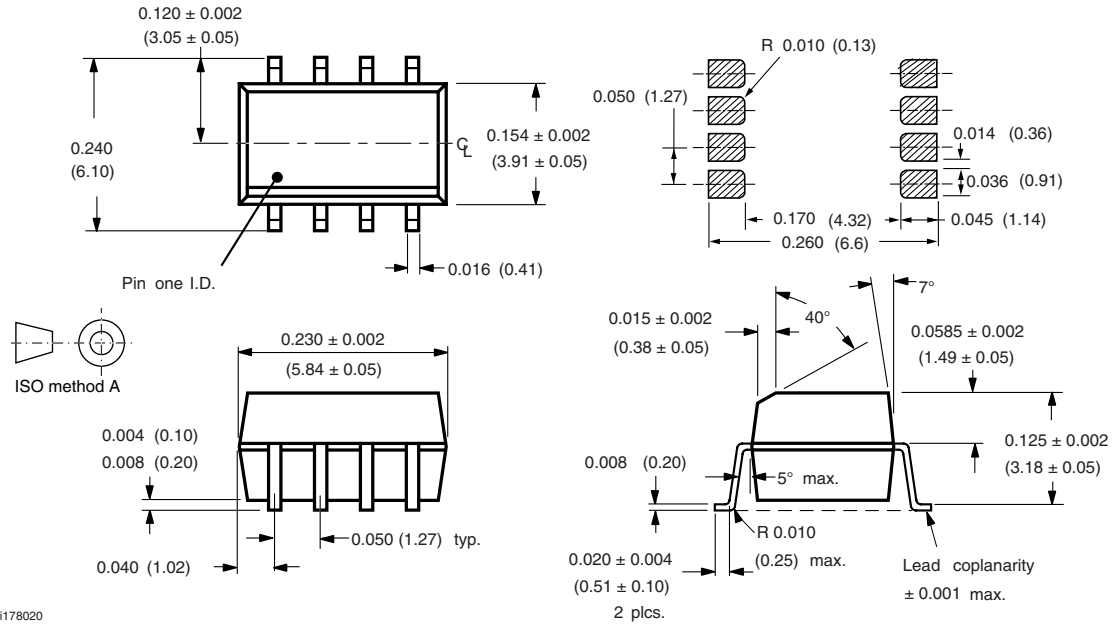


Fig. 5 - CTR vs. LED Current

PACKAGE DIMENSIONS in inches (millimeters)



OZONE DEPLETING SUBSTANCES POLICY STATEMENT

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively.
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA.
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.