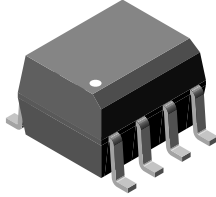
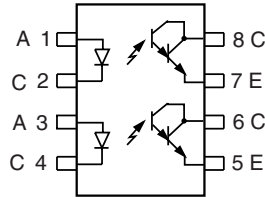


Optocoupler, Photodarlington Output, Dual Channel, SOIC-8 Package



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


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

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 μ 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 °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	$I_F = 10 \text{ mA}$	V_F			1.3	V
Reverse current	$V_R = 6 \text{ V}$	I_R		0.1	100	μA
Capacitance	$V_F = 0 \text{ V}, f = 1 \text{ MHz}$	C_O		25		pF
OUTPUT						
Collector emitter breakdown voltage	$I_C = 100 \mu\text{A}$	BV_{CEO}	30			V
Emitter collector breakdown voltage	$I_C = 10 \mu\text{A}$	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
COUPLER						
Capacitance (input to output)		C_{IO}	0.5			pF

Note

$T_{amb} = 25 \text{ }^\circ\text{C}$, 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	$I_F = 1 \text{ mA}, V_{CE} = 5 \text{ V}$	CTR_{DC}	500			%

SWITCHING CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	$V_{CC} = 10 \text{ V}, R_L = 100 \Omega, I_F = 5 \text{ mA}$	t_{on}	15			μs
Turn-off time	$V_{CC} = 10 \text{ V}, R_L = 100 \Omega, I_F = 5 \text{ mA}$	t_{off}	30			μs

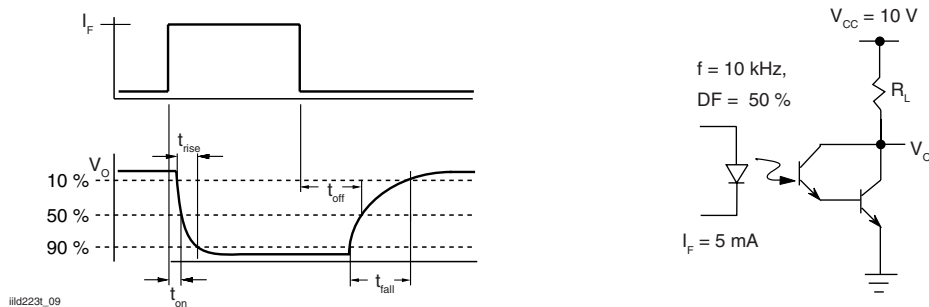


Fig. 1 - Switching Test Circuit



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			$G\Omega$
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	$^{\circ}C$
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

$T_{amb} = 25\text{ }^{\circ}C$, unless otherwise specified

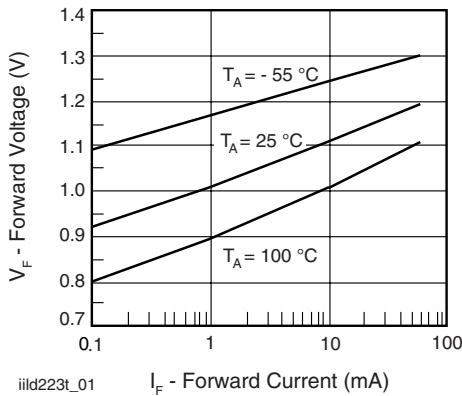


Fig. 2 - Forward Voltage vs. Forward Current

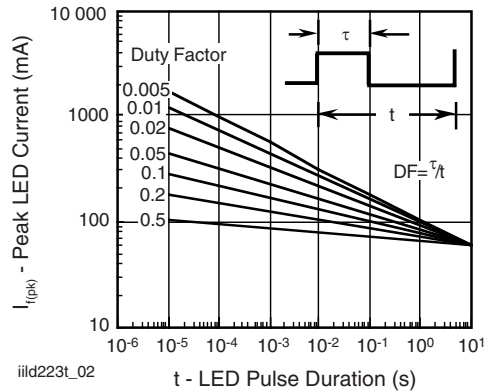


Fig. 3 - Peak LED Current vs. Duty Factor, τ

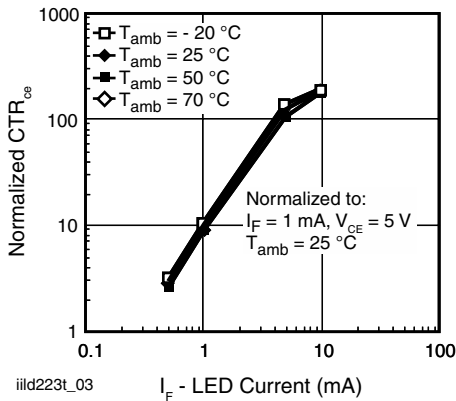


Fig. 4 - Normalized CTR_{CE} vs. LED Current

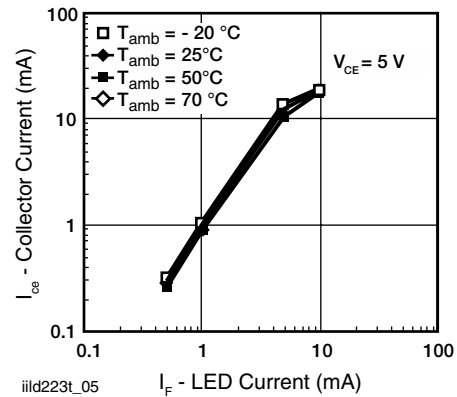


Fig. 6 - Collector Current vs. LED Current

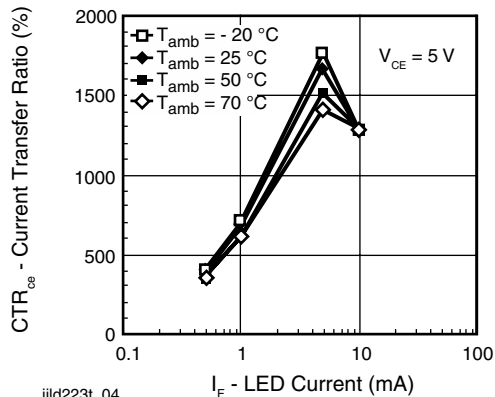
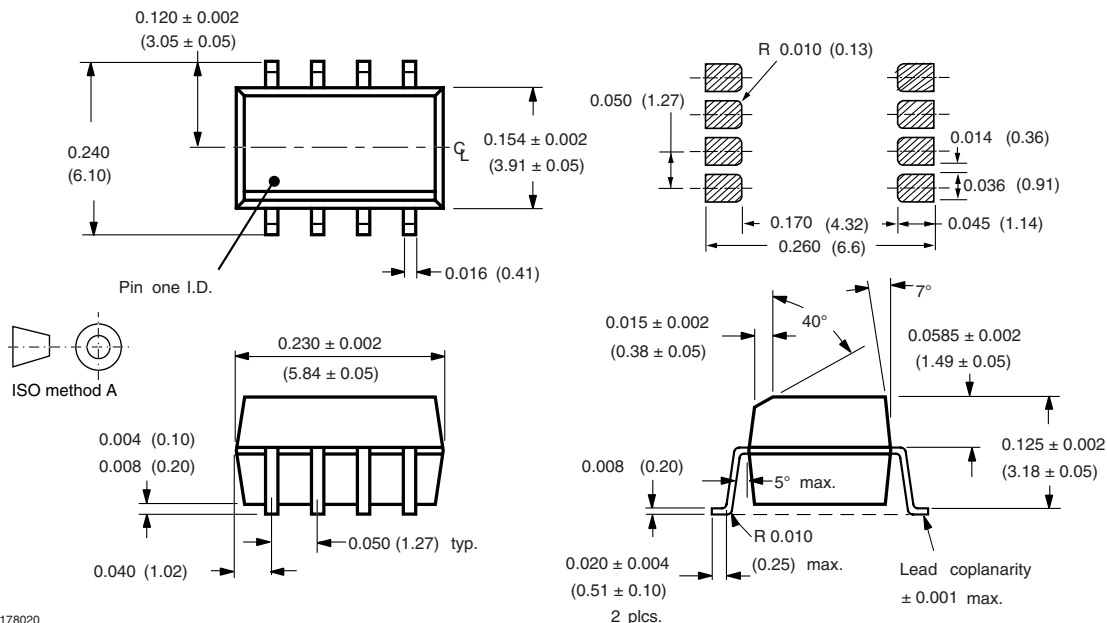


Fig. 5 - CTR vs. LED Current

PACKAGE DIMENSIONS in inches (millimeters)





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

Vishay Semiconductors

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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.

We reserve the right to make changes to improve technical design
and may do so without further notice.

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



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