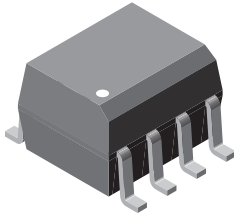
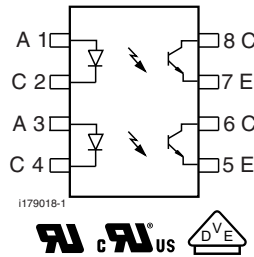




## Optocoupler, Phototransistor Output, Dual Channel, SOIC-8 Package



i179074



### FEATURES

- Two channel coupler
- SOIC-8 surface mountable package
- Standard lead spacing of 0.05"
- Available only on tape and reel option (conforms to EIA standard 481-2)
- Isolation test voltage, 4000 V<sub>RMS</sub>
- Compatible with dual wave, vapor phase and IR reflow soldering
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



RoHS COMPLIANT

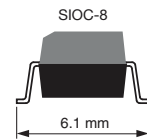
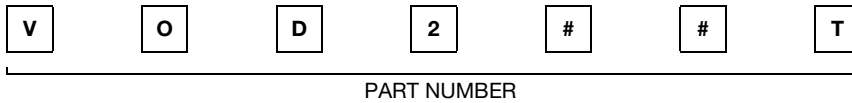
### DESCRIPTION

The VOD205T, VOD206T, VOD207T, VOD211T, VOD213T, VOD217T are optically coupled pairs with a gallium arsenide infrared LED and a silicon NPN phototransistor. Signal information, including a DC level, can be transmitted by the device while maintaining a high degree of electrical isolation between input and output.

### AGENCY APPROVALS

- UL1577, file no. E52744 system code Y
- cUL - file no. E52744, equivalent to CSA bulletin 5A
- DIN EN 60747-5-2 (VDE 0884) available with option 1

### ORDERING INFORMATION



AGENCY CERTIFIED/PACKAGE	CTR (%)					
	40 to 80	63 to 125	100 to 200	> 20	> 100 <sup>(1)</sup>	> 100 <sup>(2)</sup>
UL, cUL, VDE	VOD205T	VOD206T	VOD207T	VOD211T	VOD213T	VOD217T

### Notes

- (1) I<sub>F</sub> = 10 mA  
 (2) I<sub>F</sub> = 1 mA

### ABSOLUTE MAXIMUM RATINGS <sup>(1)</sup> (T<sub>amb</sub> = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
Peak reverse voltage		V <sub>R</sub>	6	V
Peak pulsed current	1 μs, 300 pps	I <sub>FM</sub>	1	A
Continuous forward current per channel		I <sub>F</sub>	30	mA
Power dissipation		P <sub>diss</sub>	50	mW
Derate linearly from 25 °C			0.66	mW/°C
<b>OUTPUT</b>				
Collector emitter breakdown voltage		BV <sub>CEO</sub>	70	V
Emitter collector breakdown voltage		BV <sub>ECO</sub>	7	V
Continuous output current		I <sub>Cmax.</sub>	50	mA
Power dissipation per channel		P <sub>diss</sub>	125	mW
Derate linearly from 25 °C			1.67	mW/°C

# VOD205T, VOD206T, VOD207T, VOD211T, VOD213T, VOD217T



Vishay Semiconductors Optocoupler, Phototransistor Output,  
Dual Channel, SOIC-8 Package

<b>ABSOLUTE MAXIMUM RATINGS (1)</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>COUPLER</b>				
Isolation test voltage	$t = 1\text{ s}$	$V_{ISO}$	4000	$V_{RMS}$
Total package dissipation ambient (2 LEDs and 2 detectors, 2 channels)		$P_{tot}$	300	mW
Derate linearly from 25 °C			4	mW/°C
Storage temperature		$T_{stg}$	- 40 to + 150	°C
Operating temperature		$T_{amb}$	- 40 to + 100	°C
Soldering time from 260 °C (2)		$T_{sld}$	10	s

## Notes

- (1) 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.

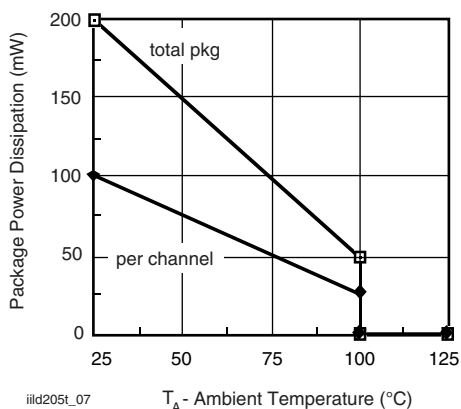


Fig. 1 - Power Dissipation vs. Ambient Temperature

<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	$I_F = 10\text{ mA}$		$V_F$		1.2	1.55	V
Reverse current	$V_R = 6\text{ V}$		$I_R$		0.1	100	$\mu\text{A}$
Capacitance	$V_R = 0\text{ V}$		$C_O$		25		pF
<b>OUTPUT</b>							
Collector emitter breakdown voltage	$I_C = 100\text{ }\mu\text{A}$		$BV_{CEO}$	70			V
Emitter collector breakdown voltage	$I_E = 100\text{ }\mu\text{A}$		$BV_{ECO}$	7			V
Collector emitter leakage current	$V_{CE} = 10\text{ V}, I_F = 0\text{ A}$		$I_{CEO}$		5	50	nA
Collector emitter capacitance	$V_{CE} = 0\text{ V}$		$C_{CE}$		10		pF
Collector emitter saturation voltage	$I_F = 10\text{ mA}, I_C = 2.5\text{ mA}$		$V_{CEsat}$			0.4	V
<b>COUPLER</b>							
Capacitance (input to output)			$C_{IO}$		0.5		pF

## Note

- Minimum and maximum values were tested requirements. Typical values are characteristics of the device and are the result of engineering evaluations. Typical values are for information only and are not part of the testing requirements.



# VOD205T, VOD206T, VOD207T, VOD211T, VOD213T, VOD217T

Optocoupler, Phototransistor Output, Vishay Semiconductors  
Dual Channel, SOIC-8 Package

CURRENT TRANSFER RATIO							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
$I_C/I_F$	$V_{CE} = 5\text{ V}, I_F = 10\text{ mA}$	VOD205T	$CTR_{DC}$	40		80	%
		VOD206T	$CTR_{DC}$	63		125	%
		VOD207T	$CTR_{DC}$	100		200	%
		VOD211T	$CTR_{DC}$	20			%
		VOD213T	$CTR_{DC}$	100			%
	$V_{CE} = 5\text{ V}, I_F = 1\text{ mA}$	VOD205T	$CTR_{DC}$	13	30		%
		VOD206T	$CTR_{DC}$	22	45		%
		VOD207T	$CTR_{DC}$	34	70		%
VOD217T	$CTR_{DC}$	100	120		%		

SWITCHING CHARACTERISTICS							
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT	
Turn-on time	$I_C = 2\text{ mA}, R_L = 100\ \Omega, V_{CC} = 5\text{ V}$	$t_{on}$		5		$\mu\text{s}$	
Turn-off time	$I_C = 2\text{ mA}, R_L = 100\ \Omega, V_{CC} = 5\text{ V}$	$t_{off}$		4		$\mu\text{s}$	
Rise time	$I_C = 2\text{ mA}, R_L = 100\ \Omega, V_{CC} = 5\text{ V}$	$t_r$		5		$\mu\text{s}$	
Fall time	$I_C = 2\text{ mA}, R_L = 100\ \Omega, V_{CC} = 5\text{ V}$	$t_f$		4		$\mu\text{s}$	

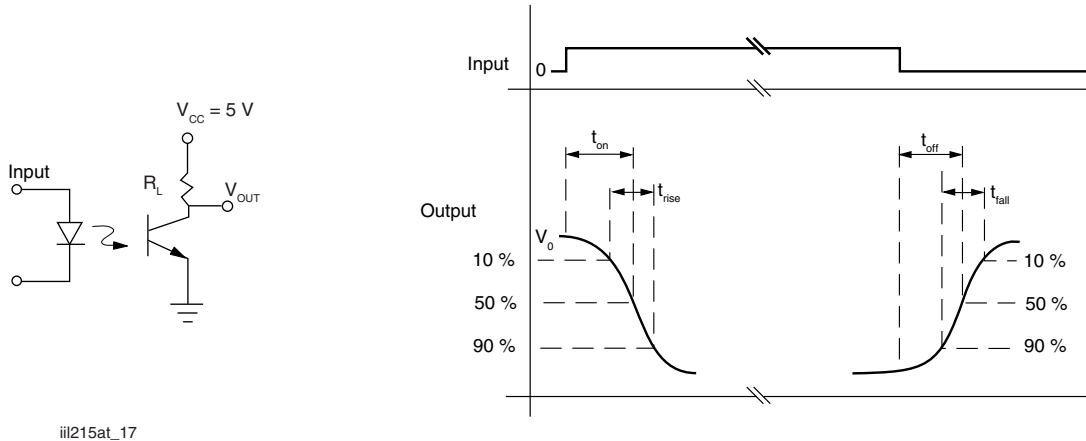


Fig. 2 - Switching Test Circuit

COMMON MODE TRANSIENT IMMUNITY						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Common mode transient immunity at logic high	$V_{CM} = 1000 V_{P-P}$ , $R_L = 1 k\Omega$ , $I_F = 0 mA$	$ C_{MH} $		10 000		V/ $\mu s$
Common mode transient immunity at logic low	$V_{CM} = 1000 V_{P-P}$ , $R_L = 1 k\Omega$ , $I_F = 10 mA$	$ C_{ML} $		10 000		V/ $\mu s$

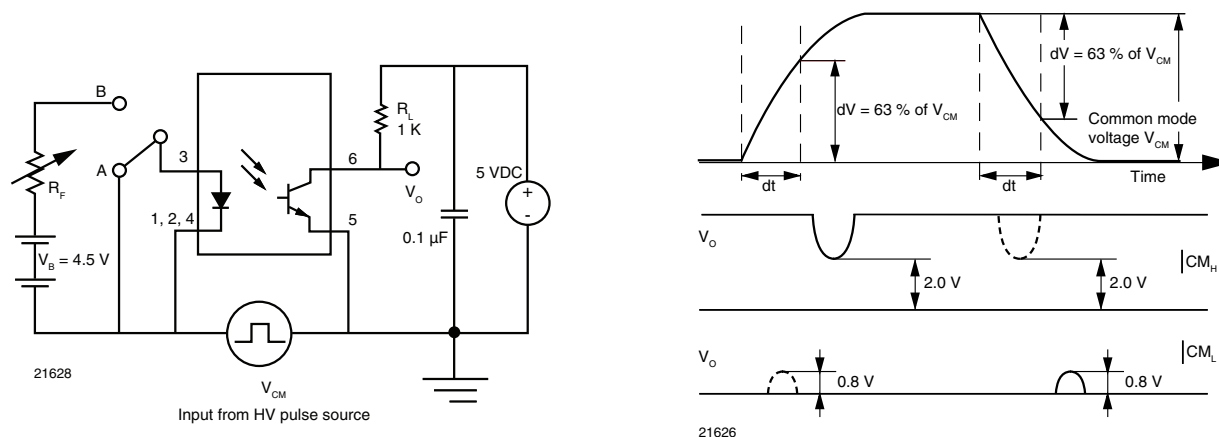


Fig. 3 - Test Circuit for Common Mode Transient Immunity

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	
Peak transient overvoltage		$V_{IOTM}$	6000			V
Peak insulation voltage		$V_{IORM}$	560			V
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 - power output		$P_{SO}$			350	mW
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**

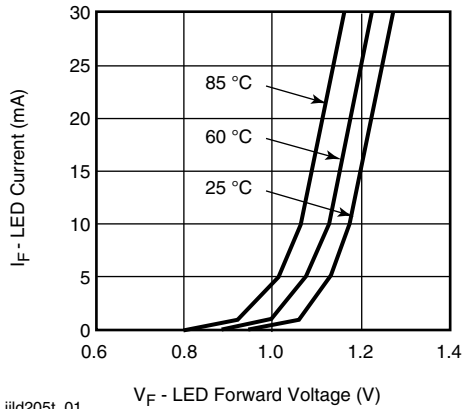
- As per IEC 60747-5-5, §7.4.3.8.1, this optocoupler is suitable for “safe electrical insulation” only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.



# VOD205T, VOD206T, VOD207T, VOD211T, VOD213T, VOD217T

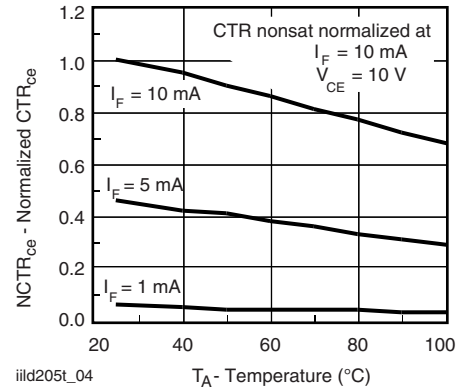
Optocoupler, Phototransistor Output, Vishay Semiconductors  
Dual Channel, SOIC-8 Package

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



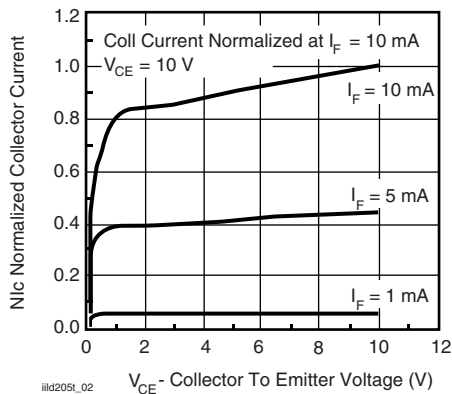
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Fig. 4 - Forward Current vs. Forward Voltage



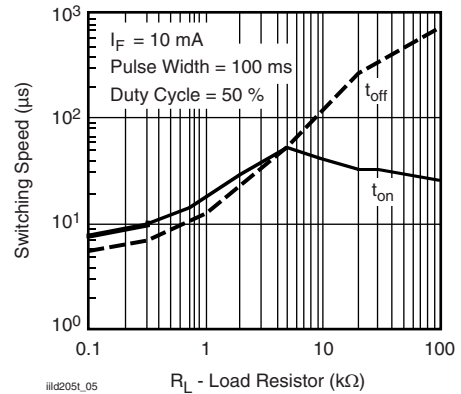
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Fig. 7 - Current Transfer Ratio (normalized) vs. Ambient Temperature



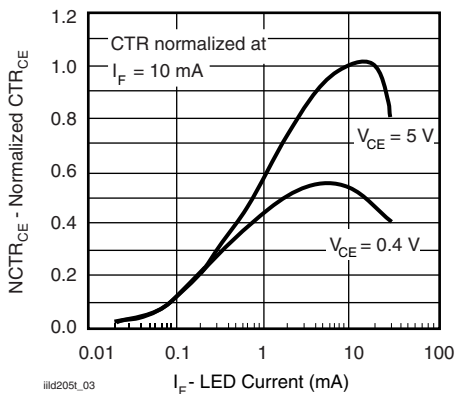
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Fig. 5 - Collector Emitter Current vs.  $V_{CE}$



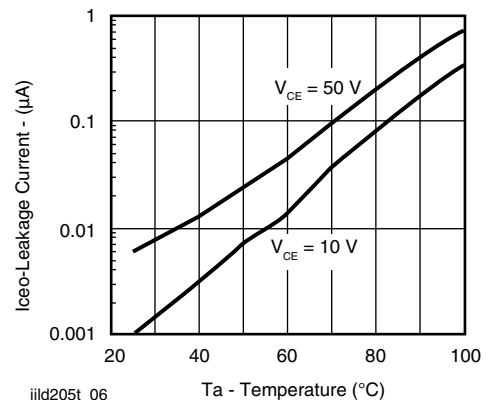
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Fig. 8 - Switching Speed vs. Load Resistor



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Fig. 6 - Normalized  $CTR_{CE}$  vs. Forward Current



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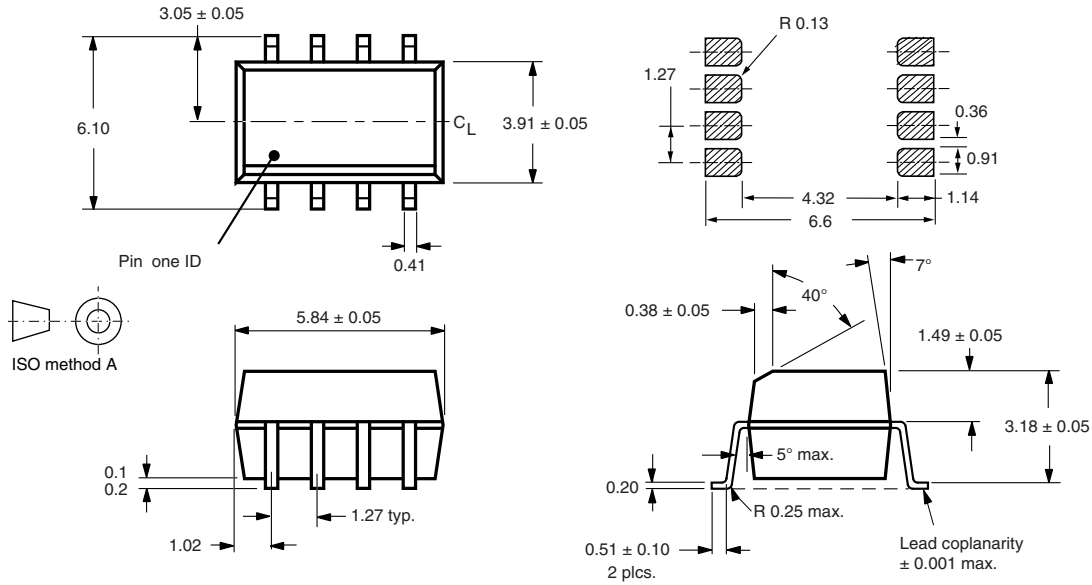
Fig. 9 - Collector Current vs. Ambient Temperature

# VOD205T, VOD206T, VOD207T, VOD211T, VOD213T, VOD217T



Vishay Semiconductors Optocoupler, Phototransistor Output,  
Dual Channel, SOIC-8 Package

## PACKAGE DIMENSIONS in millimeters



i178020



## Disclaimer

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