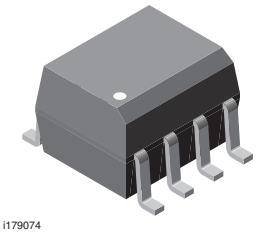
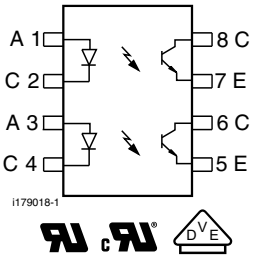
Optocoupler, Phototransistor Output, Dual Channel, SOIC-8 Package





FEATURES

- Dual channel coupler
- SOIC-8 surface mountable package
- Standard lead spacing of 0s.05"
- Available only on tape and reel option (conforms to EIA standard 481-2)
- Isolation test voltage, 4000 V_{RMS}
- Compatible with dual wave, vapor phase and IR reflow soldering
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

LINKS TO ADDITIONAL RESOURCES

Product Page | Design Tools | 3D Models | SPICE Models | Footprints | Schematics

AGENCY APPROVALS

- UL
- cUL
- DIN EN 60747-5-5 (VDE 0884-5), approved, contact customer service if this option is required

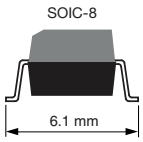
DESCRIPTION

The VOD205T, VOD206T, VOD207T, VOD211T, VOD213T, VOD217T are optically coupled pairs with a GaAs 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.

ORDERING INFORMATION

V	O	D	2	#	#	T

PART NUMBER



AGENCY CERTIFIED / PACKAGE	CTR (%)					
UL, cUL, VDE, CQC	40 to 80	63 to 125	100 to 200	> 20	> 100 (1)	> 100 (2)
SOIC-8	VOD205T	VOD206T	VOD207T	VOD211T	VOD213T	VOD217T

Notes

- Additional options may be possible, please contact sales office.

(1) I_F = 10 mA

(2) I_F = 1 mA

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}	1	A
Continuous forward current per channel		I_F	30	mA
Power dissipation		P_{diss}	50	mW
Derate linearly from 25 °C			0.66	mW/°C
OUTPUT				
Collector emitter breakdown voltage		BV_{CEO}	70	V
Emitter collector breakdown voltage		BV_{ECO}	7	V
Continuous output current		$I_{Cmax.}$	50	mA
Power dissipation per channel		P_{diss}	125	mW
Derate linearly from 25 °C			1.67	mW/°C
COUPLER				
Isolation test voltage	t = 1 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 (1)		T_{sld}	10	s

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.

(3) Refer to reflow profile for soldering conditions for surface mounted devices

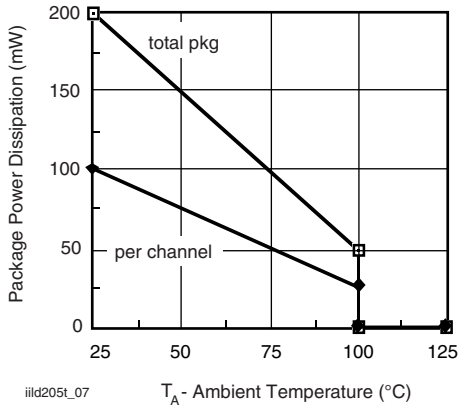


Fig. 1 - Power Dissipation vs. Ambient Temperature

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT							
Forward voltage	I_F = 10 mA		V_F	-	1.2	1.55	V
Reverse current	V_R = 6 V		I_R	-	0.1	100	µA
Capacitance	V_R = 0 V		C_O	-	25	-	pF
OUTPUT							
Collector emitter breakdown voltage	I_C = 100 µA		BV_{CEO}	70	-	-	V
Emitter collector breakdown voltage	I_E = 100 µA		BV_{ECO}	7	-	-	V
Collector emitter leakage current	V_{CE} = 10 V, I_F = 0 A		I_{CEO}	-	5	50	nA
Collector emitter capacitance	V_{CE} = 0 V		C_{CE}	-	10	-	pF
Collector emitter saturation voltage	I_F = 10 mA, I_C = 2.5 mA		V_{CEsat}	-	-	0.4	V
COUPLER							
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.

CURRENT TRANSFER RATIO							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
I_C/I_F	V_{CE} = 5 V, I_F = 10 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 V, I_F = 1 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 mA, R_L = 100 Ω, V_{CC} = 5 V	t_{on}	-	5	-	µs
Turn-off time	I_C = 2 mA, R_L = 100 Ω, V_{CC} = 5 V	t_{off}	-	4	-	µs
Rise time	I_C = 2 mA, R_L = 100 Ω, V_{CC} = 5 V	t_r	-	5	-	µs
Fall time	I_C = 2 mA, R_L = 100 Ω, V_{CC} = 5 V	t_f	-	4	-	µs

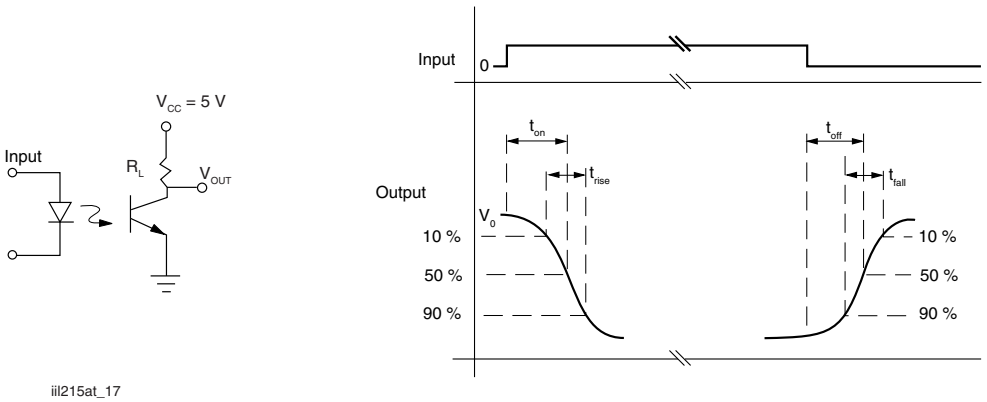


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Fig. 2 - Switching Test Circuit

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 kΩ, I_F = 0 mA	$\|C_{MH}\|$	-	10 000	-	V/µs
Common mode transient immunity at logic low	V_{CM} = 1000 V_{P-P}, R_L = 1 kΩ, I_F = 10 mA	$\|C_{ML}\|$	-	10 000	-	V/µs

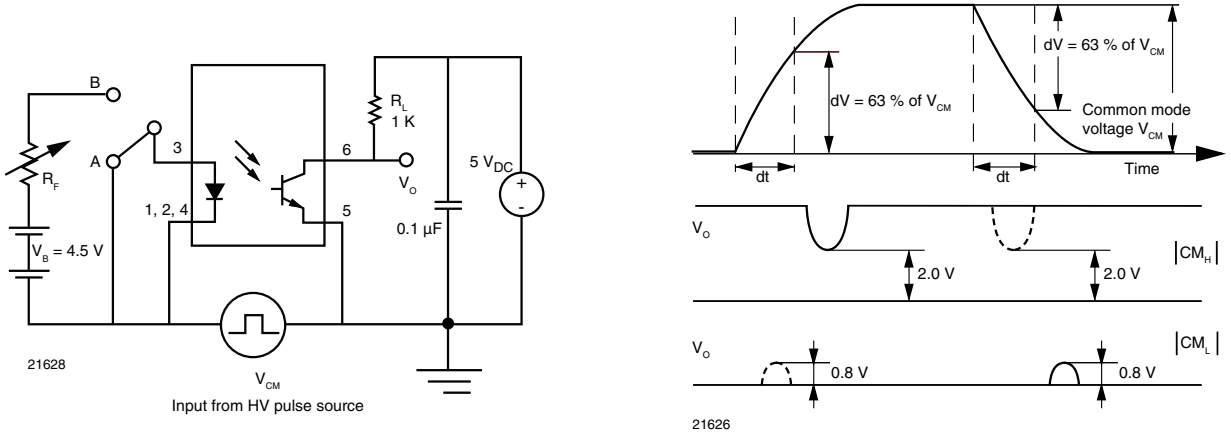


Fig. 3 - Test Circuit for Common Mode Transient Immunity

SAFETY AND INSULATION RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Climatic classification	According to IEC 68 part 1		40 / 100 / 21	
Pollution degree	According to DIN VDE 0109		2	
Comparative tracking index	Insulation group IIIa	CTI	175	
Maximum rated withstanding isolation voltage	According to UL1577, t = 1 min	V_{ISO}	3333	V_{RMS}
Tested withstanding isolation voltage	According to UL1577, t = 1 s	V_{ISO}	4000	V_{RMS}
Maximum transient isolation voltage	According to DIN EN 60747-5-5	V_{IOTM}	6000	V_{peak}
Maximum repetitive peak isolation voltage	According to DIN EN 60747-5-5	V_{IORM}	560	V_{peak}
Isolation resistance	T_{amb} = 25 °C, V_{IO} = 500 V	R_{IO}	≥ 10^{12}	Ω
	T_{amb} = 100 °C, V_{IO} = 500 V	R_{IO}	≥ 10^{11}	Ω
Output safety power		P_{SO}	350	mW
Input safety current		I_{SI}	150	mA
Input safety temperature		T_S	165	°C
Creepage distance			≥ 4	mm
Clearance distance			≥ 4	mm
Insulation thickness		DTI	≥ 0.2	mm

Note

- As per IEC 60747-5-5, §7.4.3.8.2, 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 °C, unless otherwise specified)

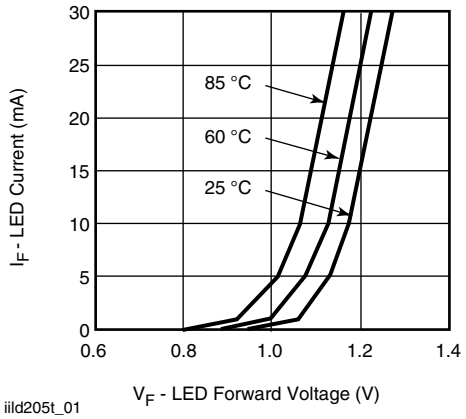


Fig. 4 - Forward Current vs. Forward Voltage

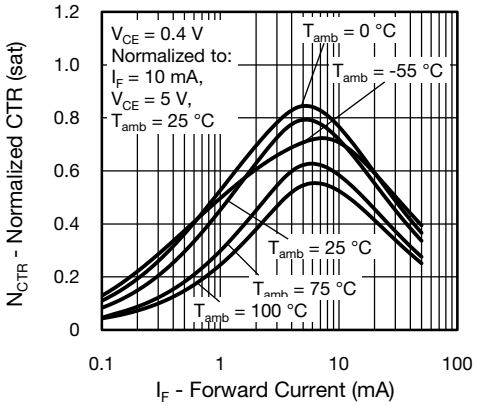


Fig. 7 - Normalized CTR (saturated) vs. Forward Current

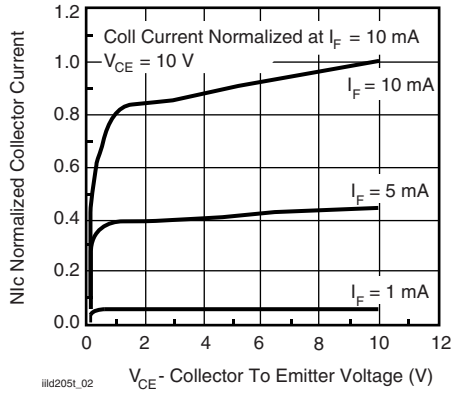


Fig. 5 - Collector Emitter Current vs. V_{CE}

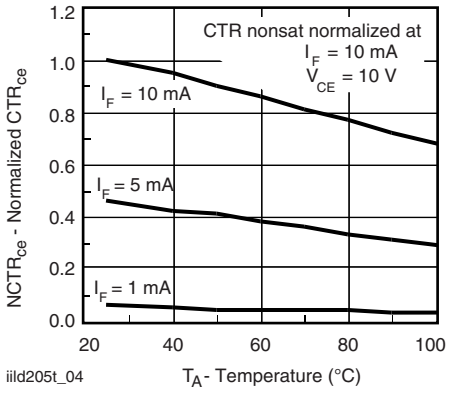


Fig. 8 - Current Transfer Ratio (normalized) vs. Ambient Temperature

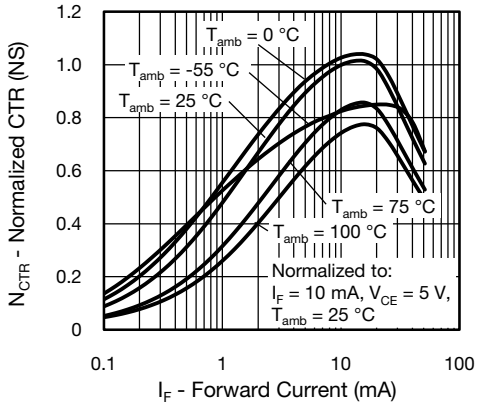


Fig. 6 - Normalized CTR (non-saturated) vs. Forward Current

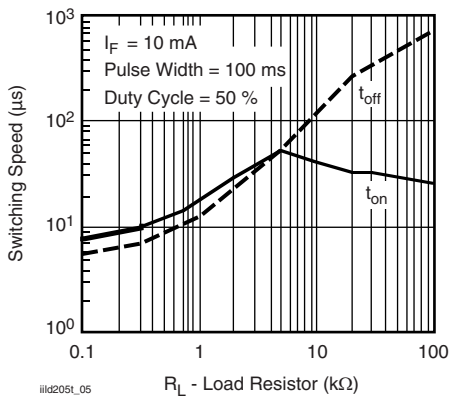


Fig. 9 - Switching Speed vs. Load Resistor

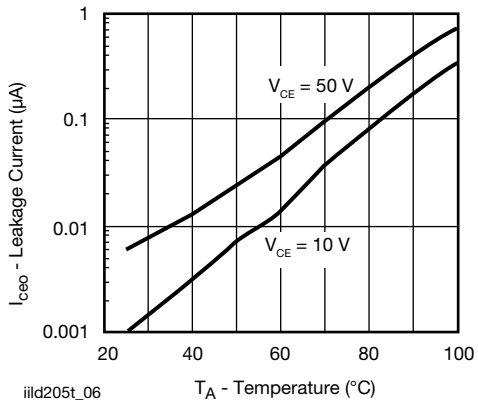
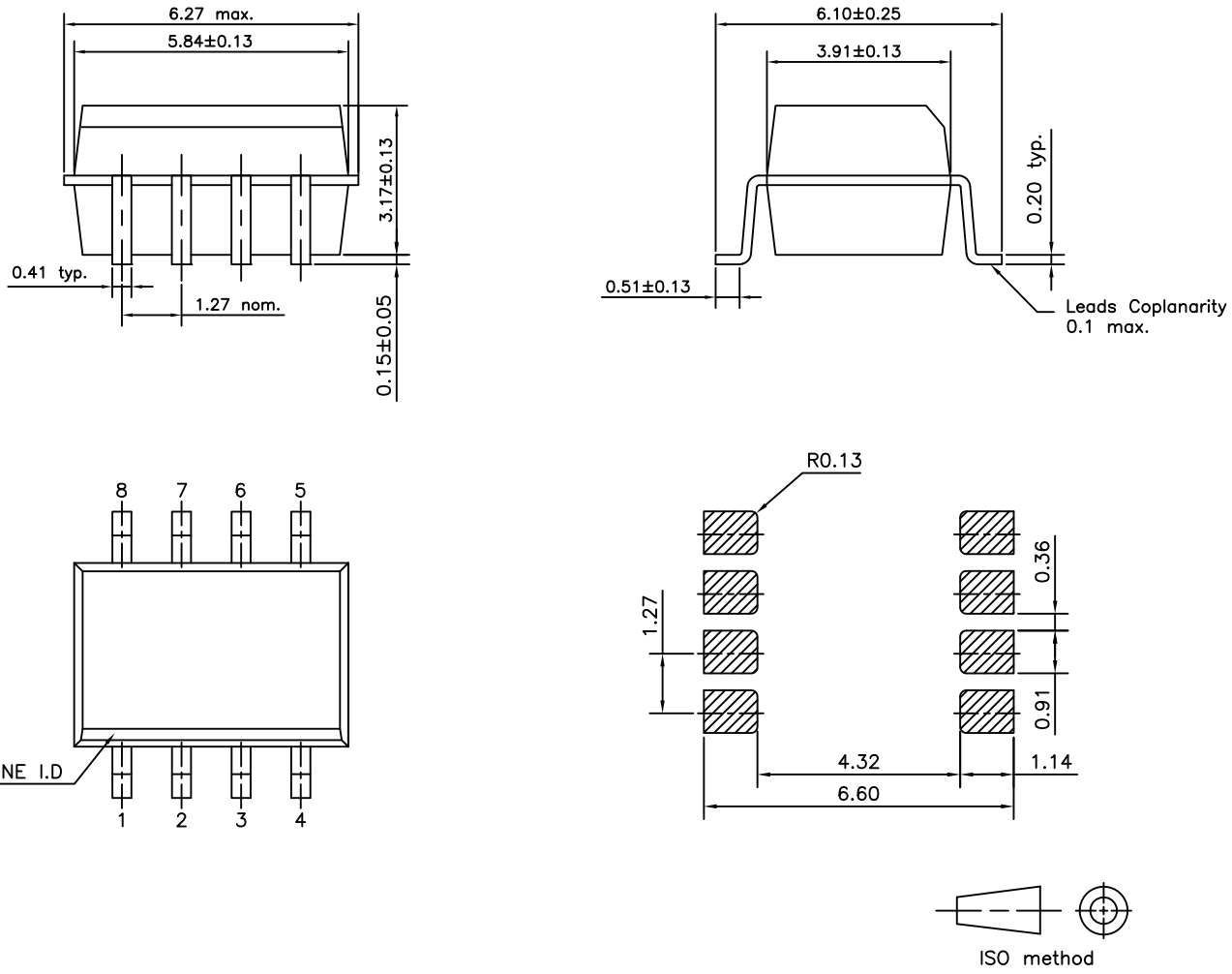
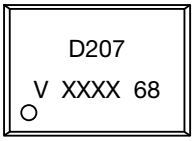


Fig. 10 - Collector Current vs. Ambient Temperature

PACKAGE DIMENSIONS (in millimeters)



PACKAGE MARKING (example of VOD207T)



Notes

- XXXX = LMC (lot marking code)
- Tape and reel suffix (T) is not part of the package marking

TAPE AND REEL PACKAGING

Dimensions in millimeters

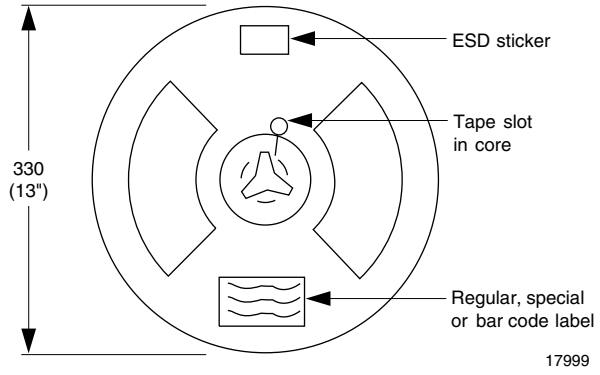


Fig. 11 - Tape and Reel Shipping Medium
(EIA-481, revision A, and IEC 60286), 2000 Units per Reel

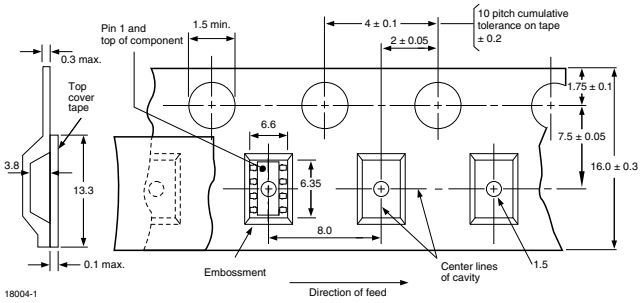


Fig. 12 - Tape Dimensions, 2000 Parts per Reel

SOLDER PROFILE

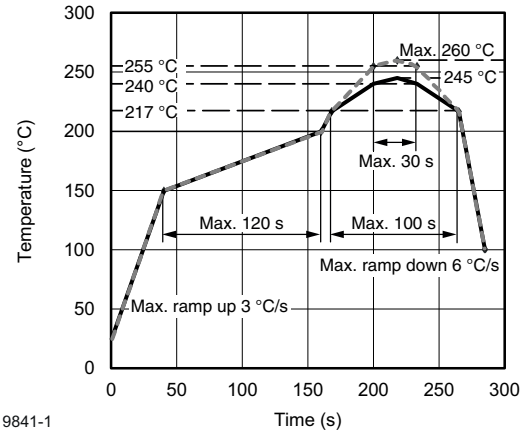


Fig. 13 - Lead (Pb)-free Reflow Solder Profile
according to J-STD-020

HANDLING AND STORAGE CONDITIONS

ESD level: HBM class 2

Floor life: unlimited

Conditions: T_{amb} < 30 °C, RH < 85 %

Moisture sensitivity level 1, according to J-STD-020

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