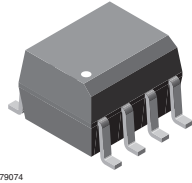
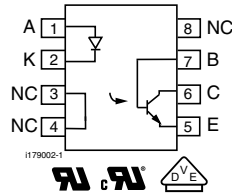




Optocoupler, Phototransistor Output, with Base Connection in SOIC-8 Package



1179074



DESCRIPTION

The VO205AT, VO206AT, VO207AT, VO208AT 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. This family comes in a standard SOIC-8A small outline package for surface mounting which makes them ideally suited for high density application with limited space.

FEATURES

- High BV_CEO, 70 V
• Isolation test voltage, 4000 V_RMS
• Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



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 0884-5) approved, contact customer service if this option is required

ORDERING INFORMATION

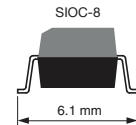
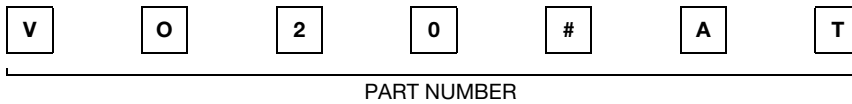


Table with columns: AGENCY CERTIFIED/PACKAGE, CTR (%), and sub-columns for CTR ranges (40 to 80, 63 to 125, 100 to 200, 160 to 320) and corresponding part numbers (VO205AT, VO206AT, VO207AT, VO208AT).

ABSOLUTE MAXIMUM RATINGS (T_amb = 25 °C, unless otherwise specified)

Table with columns: PARAMETER, TEST CONDITION, SYMBOL, VALUE, UNIT. Rows include INPUT (Peak reverse voltage, Forward continuous current, Peak forward current, Power dissipation, Derate linearly from 25 °C), OUTPUT (Collector emitter breakdown voltage, Emitter collector breakdown voltage, Collector-base breakdown voltage, I_Cmax, DC, I_Cmax, Power dissipation, Derate linearly from 25 °C), and COUPLER (Isolation test voltage, Total package dissipation (LED and detector), Derate linearly from 25 °C, Operating temperature, Storage temperature, Soldering time).

Note

- 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.

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

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT							
Forward voltage	$I_F = 10\text{ mA}$		V_F		1.3	1.5	V
Reverse current	$V_R = 6\text{ V}$		I_R		0.1	100	μA
Capacitance	$V_R = 0\text{ V}$		C_O		13		pF
OUTPUT							
Collector emitter breakdown voltage	$I_C = 100\text{ }\mu\text{A}$		BV_{CEO}	70			V
Emitter collector breakdown voltage	$I_E = 10\text{ }\mu\text{A}$		BV_{ECO}	7	10		V
Collector base breakdown voltage	$I_C = 100\text{ }\mu\text{A}$		BV_{CBO}	100			V
Collector base current			I_{CBO}			1	nA
Emitter base current			I_{EBO}			1	nA
Collector emitter leakage current	$V_{CE} = 10\text{ V}$		I_{CEO}		5	50	nA
Saturation voltage, collector emitter	$I_C = 2\text{ mA}, I_F = 10\text{ mA}$		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	$I_F = 10\text{ mA}, V_{CE} = 5\text{ V}$	VO205AT	CTR	40		80	%
		VO206AT	CTR	63		125	%
		VO207AT	CTR	100		200	%
		VO208AT	CTR	160		320	%

SWITCHING CHARACTERISTICS

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	$I_C = 2\text{ mA}, R_L = 100\text{ }\Omega, V_{CC} = 10\text{ V}$		t_{on}		3		μs
Turn-off time	$I_C = 2\text{ mA}, R_L = 100\text{ }\Omega, V_{CC} = 10\text{ V}$		t_{off}		3		μs
Rise time	$I_C = 2\text{ mA}, R_L = 100\text{ }\Omega, V_{CC} = 10\text{ V}$		t_r		3		μs
Fall time	$I_C = 2\text{ mA}, R_L = 100\text{ }\Omega, V_{CC} = 10\text{ V}$		t_f		2		μs

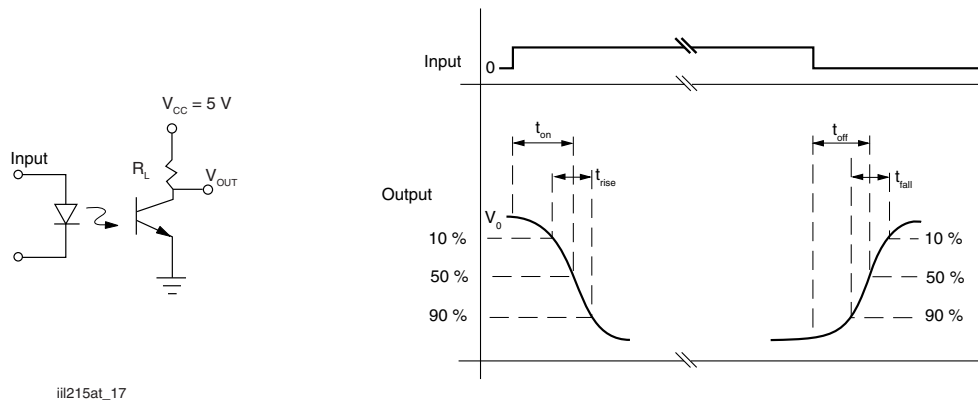


Fig. 1 Switching Test Circuit

COMMON MODE TRANSIENT IMMUNITY

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Common mode transient immunity at logic high	$V_{CM} = 1000\text{ V}_{P-P}$, $R_L = 1\text{ k}\Omega$, $I_F = 0\text{ mA}$	$ C_{MH} $		5000		V/ μs
Common mode transient immunity at logic low	$V_{CM} = 1000\text{ V}_{P-P}$, $R_L = 1\text{ k}\Omega$, $I_F = 10\text{ mA}$	$ C_{ML} $		5000		V/ μs

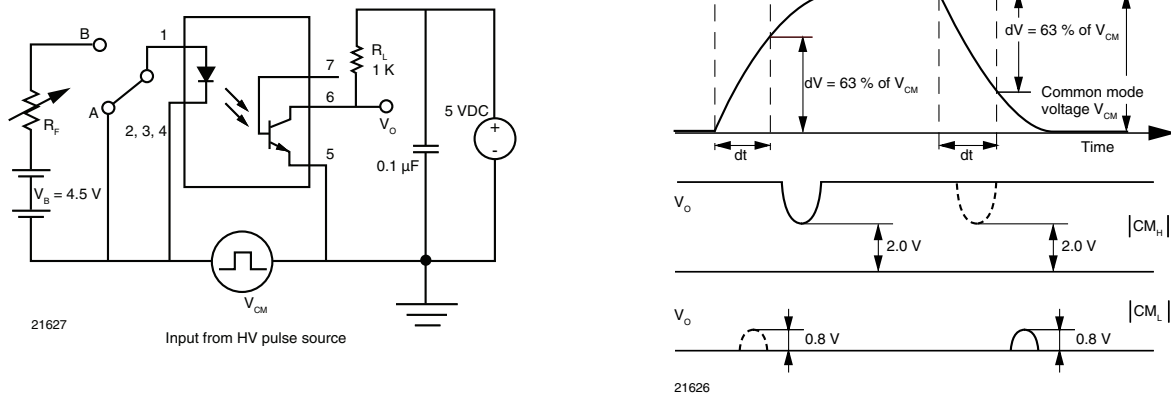


Fig. 1 - Test Circuit for Common Mode Transient Immunity

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	
Isolation test voltage	1 s	V_{ISO}	4000			V_{RMS}
Peak transient overvoltage		V_{IOTM}	6000			V
Peak insulation voltage		V_{IORM}	560			V
Resistance (input to output)		R_{IO}		100		$G\Omega$
Safety rating - power output		P_{SO}			350	mW
Safety rating - input current		I_{SI}			150	mA
Safety rating - temperature		T_{SI}			165	$^{\circ}\text{C}$
External creepage distance			4			mm
External clearance distance			4			mm
Internal creepage distance			3.3			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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

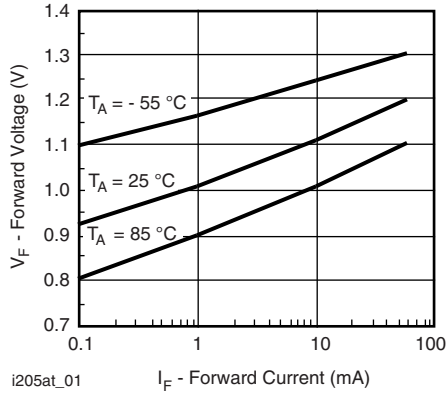


Fig. 2 - Forward Voltage vs. Forward Current

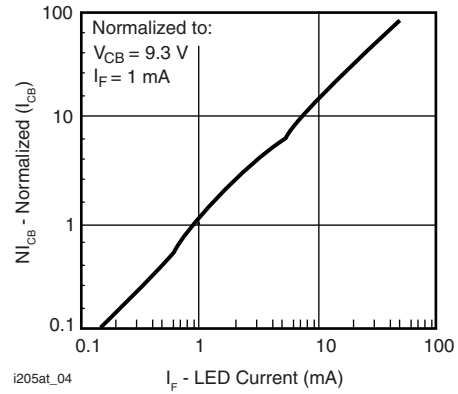


Fig. 5 - Normalized Collector-Base Photocurrent vs. LED Current

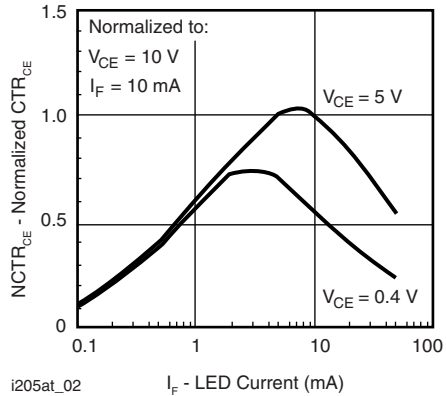


Fig. 3 - Normalized Non-Saturated and Saturated CTR_{CE} vs. LED Current

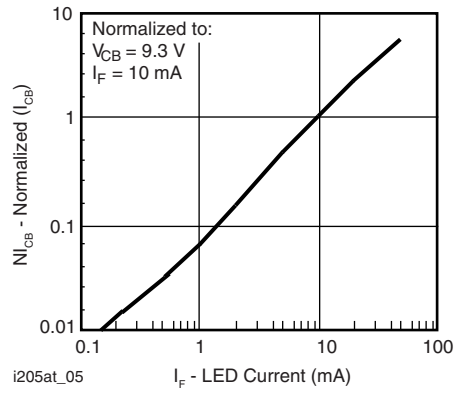


Fig. 6 - Normalized Collector-Base Photocurrent vs. LED Current

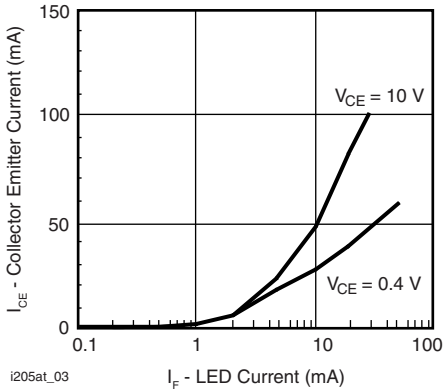


Fig. 4 - Collector Emitter Current vs. LED Current

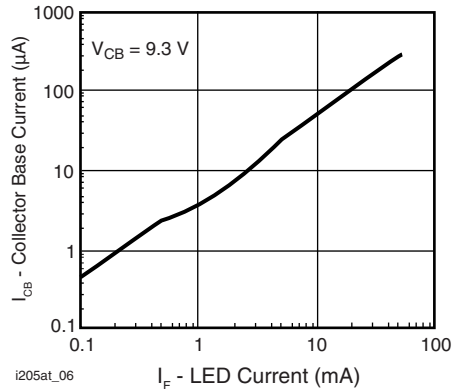


Fig. 7 - Collector Base Photocurrent vs. LED Current



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