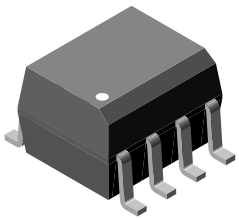
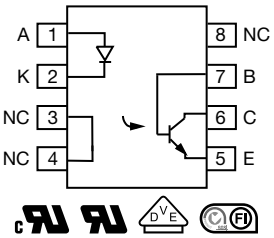
Optocoupler, Phototransistor Output, With Base Connection in SOIC-8 Package





FEATURES

- High BV_{CEO}, 70 V
- Isolation test voltage, 4000 V_{RMS}
- Industry standard SOIC-8A surface mountable package
- 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

Related Documents | Design Tools | SPICE Models

DESCRIPTION

The IL205AT, IL206AT, IL207AT, IL208AT 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-8 small outline package for surface mounting which makes them ideally suited for high density application with limited space. In addition to eliminating through-hole requirements, this package conforms to standards for surface mounted devices.

A specified minimum and maximum CTR allows a narrow tolerance in the electrical design of the adjacent circuits. The high BV_{CEO} of 70 V gives a higher safety margin compared to the industry standard 30 V.

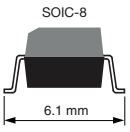
AGENCY APPROVALS

- UL
- cUL
- DIN EN 60747-5-5 (VDE 0884), available with option 1
- FIMKO

ORDERING INFORMATION

I	L	2	0	#	A	T

PART NUMBER — TAPE AND REEL



AGENCY CERTIFIED / PACKAGE	CTR (%) 10 mA			
UL, cUL, FIMKO	**40 to 80**	**63 to 125**	**100 to 200**	**160 to 320**
SOIC-8	IL205AT	IL206AT	IL207AT	IL208AT
UL, cUL, FIMKO, VDE (option 1)	**40 to 80**	**63 to 125**	**100 to 200**	**160 to 320**
SOIC-8	-	-	IL207A-X001T	-

Note

- Additional options may be possible, please contact sales office

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ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
Peak reverse voltage		V_R	6	V
Forward continuous current		I_F	60	mA
Power dissipation		P_{diss}	90	mW
Derate linearly from 25 °C			1.2	mW/°C
OUTPUT				
Collector emitter breakdown voltage		BV_{CEO}	70	V
Emitter collector breakdown voltage		BV_{ECO}	7	V
Collector-base breakdown voltage		BV_{CBO}	70	V
$I_{CMAX\ DC}$		$I_{CMAX\ DC}$	50	mA
I_{CMAX}	t < 1 ms	I_{CMAX}	100	mA
Power dissipation		P_{diss}	150	mW
Derate linearly from 25 °C			2	mW/°C
COUPLER				
Isolation test voltage		V_{ISO}	4000	V_{RMS}
Total package dissipation (LED and detector)		P_{tot}	240	mW
Derate linearly from 25 °C			3.3	mW/°C
Operating temperature		T_{amb}	-55 to +100	°C
Storage temperature		T_{stg}	-55 to +150	°C
Soldering time	At 260 °C		10	s

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 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT						
Forward voltage	I_F = 10 mA	V_F	-	1.3	1.5	V
Reverse current	V_R = 6 V	I_R	-	0.1	100	µA
Capacitance	V_R = 0 V	C_O	-	13	-	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	10	-	V
Collector emitter leakage current	V_{CE} = 10 V	I_{CEO}	-	5	50	nA
COUPLER						
Saturation voltage, collector emitter	I_C = 2 mA, I_F = 10 mA	V_{CEsat}	-	-	0.4	V
Capacitance, input to output		C_{IO}	-	0.5	-	pF
Resistance, input to output		R_{IO}	-	100	-	GΩ

Note

- Minimum and maximum values were tested requierements. 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.

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CURRENT TRANSFER RATIO							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Current transfer ratio	I_F = 10 mA, V_{CE} = 5 V	IL205AT	CTR	40	-	80	%
		IL206AT	CTR	63	-	125	%
		IL207AT	CTR	100	-	200	%
		IL208AT	CTR	100	-	320	%
	I_F = 1 mA, V_{CE} = 5 V	IL205AT	CTR	13	25	-	%
		IL206AT	CTR	22	40	-	%
		IL207AT	CTR	34	60	-	%
		IL208AT	CTR	56	95	-	%

SWITCHING CHARACTERICTICS							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Switching time	I_C = 2 mA, R_L = 100 Ω, V_{CC} = 10 V		t_{on}, t_{off}	-	3	-	µs

SAFETY AND INSULATION RATINGS						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Climatic classification	According to IEC 68 part 1		-	55 / 110 / 21	-	
Pollution degree (DIN VDE 0109)			-	2.0	-	
Comparative tracking index		CTI	175	-	399	
V_{IOTM}	DIN IEC 112 / VDE 0303 part 1, group IIIa per DIN VDE 6110 175 399	V_{IOTM}	6000	-	-	V
V_{IORM}		V_{IORM}	560	-	-	V
Resistance (input to output)		R_{IO}	-	10^{12}	-	Ω
P_{SI}			-	-	350	mW
I_{SI}			-	-	150	mA
T_{SI}			-	-	165	°C
Creepage distance			4.0	-	-	mm
Clearance distance			4.0	-	-	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.

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

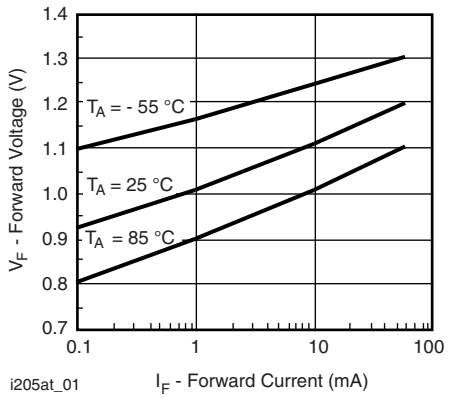

Fig. 1 - Forward Voltage vs. Forward Current

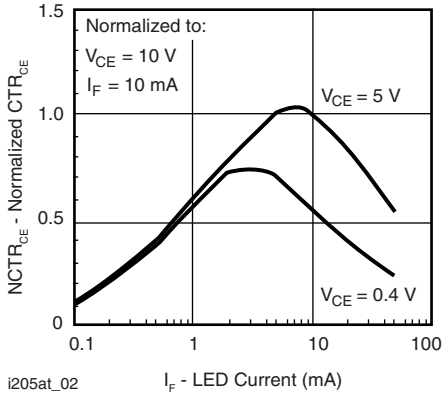

Fig. 2 - Normalized Non-Saturated and Saturated CTR_{CE} vs. LED Current

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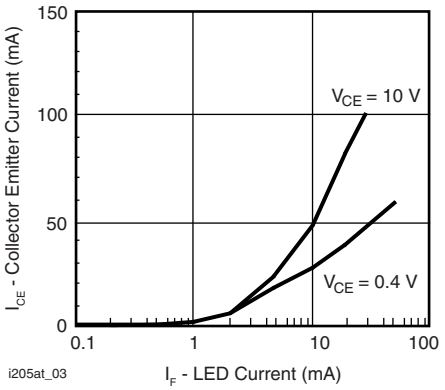

Fig. 3 - Collector Emitter Current vs. LED Current

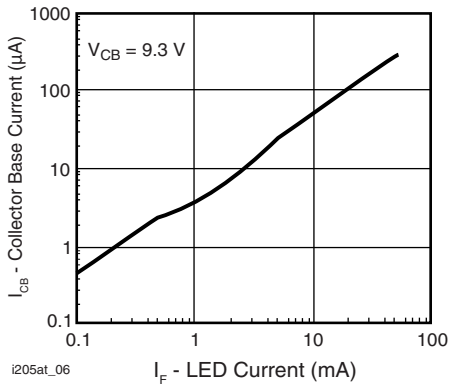

Fig. 6 - Collector Emitter Photocurrent vs. LED Current

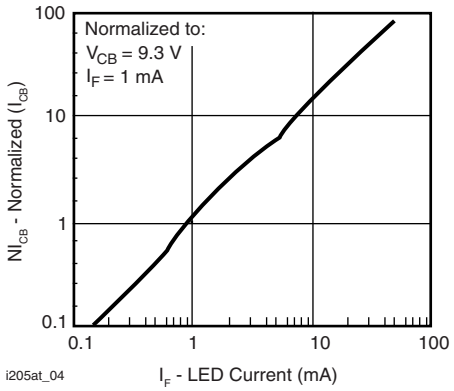

Fig. 4 - Normalized Collector-Base Photocurrent vs. LED Current

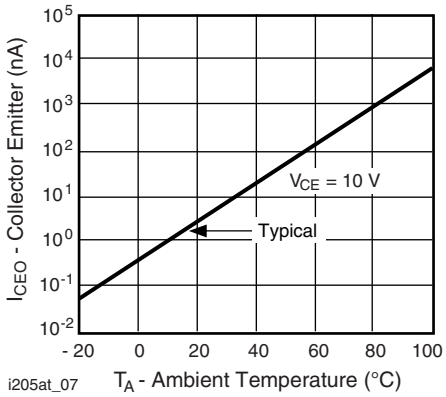

Fig. 7 - Collector Emitter Photocurrent vs. LED Current

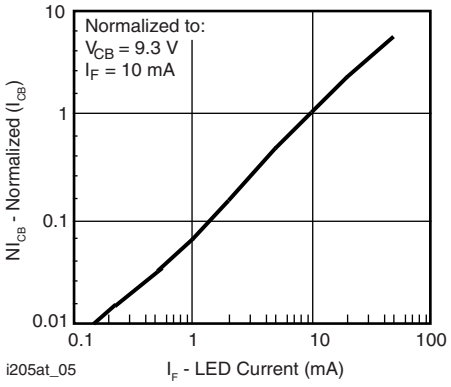

Fig. 5 - Normalized Collector-Base Photocurrent vs. LED Current

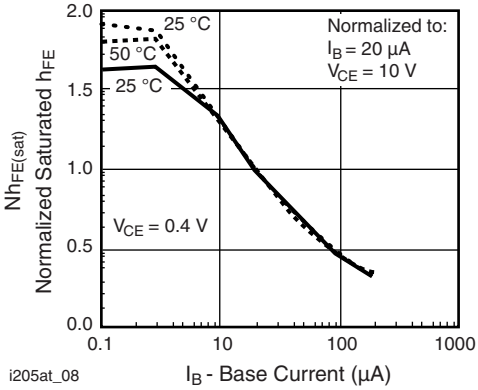

Fig. 8 - Base Current vs. I_F and h_{FE}

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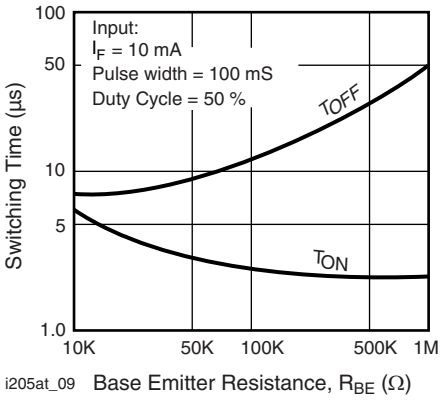

Fig. 9 - Typical Switching Characteristics vs. Base Resistance (Saturated Operation)

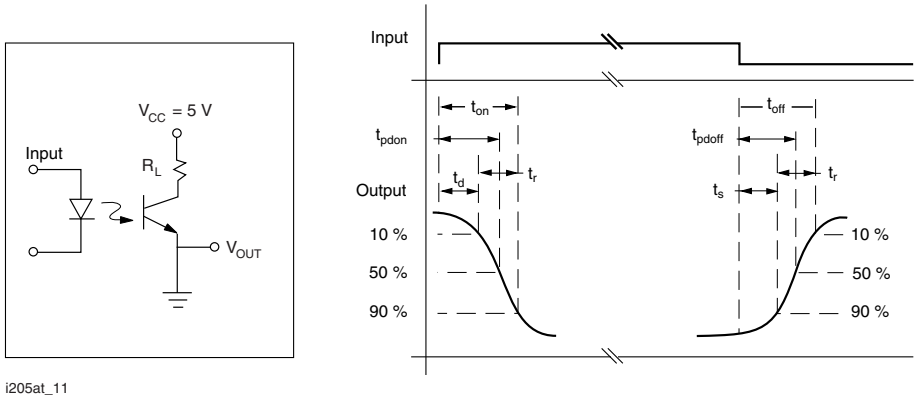

Fig. 10 - Switching Test Circuit

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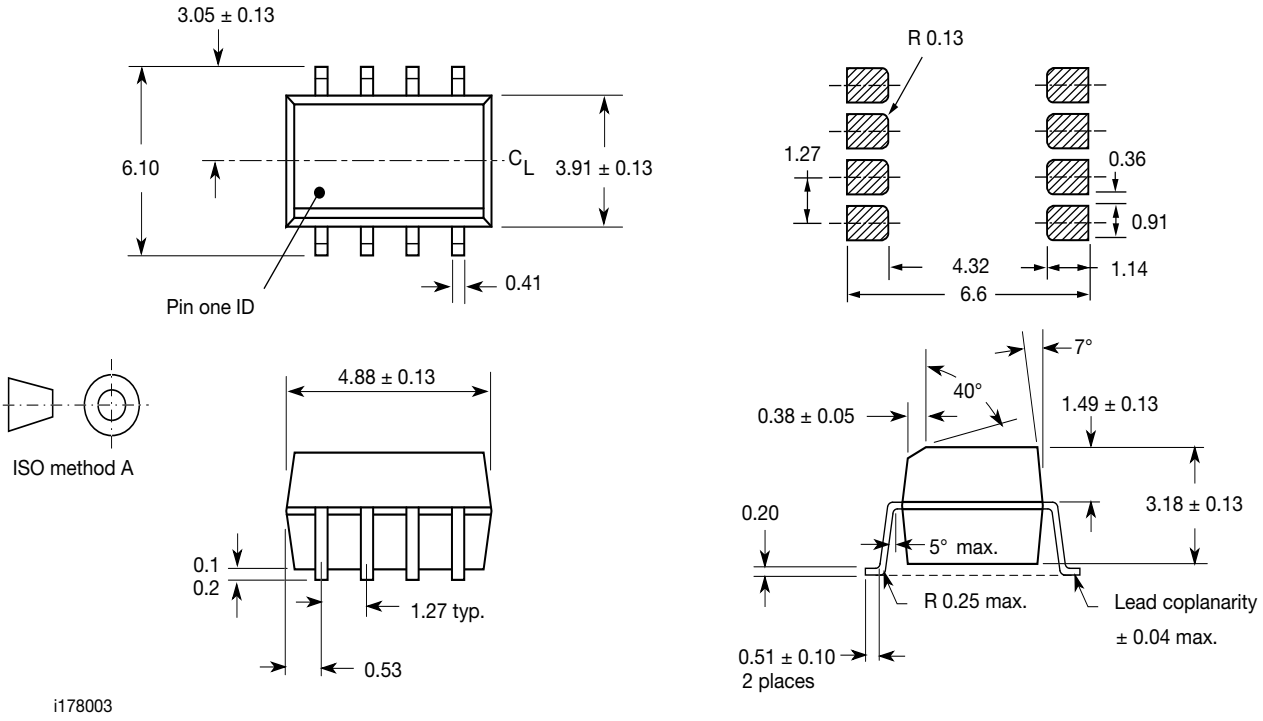
PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example)

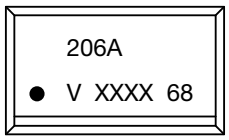


Fig. 11 - Example of IL206AT

Notes

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

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