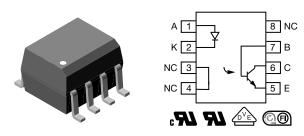


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# Optocoupler, Phototransistor Output, With Base Connection in SOIC-8 Package



### **LINKS TO ADDITIONAL RESOURCES**







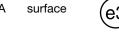
#### **DESCRIPTION**

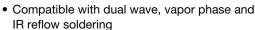
The IL205AT, IL206AT, IL207AT, IL208AT are optically coupled pairs with a gallium arsenide infrared LED and a silicon NPN phototransistor. Signal information, including a DC level, can be transmitted by the device while maintaining a high degree of electrical isolation between input and output. This 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<sub>CEO</sub> of 70 V gives a higher safety margin compared to the industry standard 30 V.

#### **FEATURES**

- High BV<sub>CEO</sub>, 70 V
- Isolation test voltage, 4000 V<sub>RMS</sub>
- Industry standard SOIC-8A surface mountable package







 Material categorization: for definitions of compliance please see <a href="https://www.vishav.com/doc?99912">www.vishav.com/doc?99912</a>

#### AGENCY APPROVALS

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

ORDERING INFORMATION				
I L 2 PART NUMBE	0 #	TAPE AND REEL		SOIC-8
AGENCY CERTIFIED / PACKAGE				
AGENCY CENTIFIED / PACKAGE	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

# IL205AT, IL206AT, IL207AT, IL208AT

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ABSOLUTE MAXIMUM RATINGS	(T <sub>amb</sub> = 25 °C, unless o	therwise speci	fied)	
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Peak reverse voltage		V <sub>R</sub>	6	V
Forward continuous current		I <sub>F</sub>	60	mA
Power dissipation		P <sub>diss</sub>	90	mW
Derate linearly from 25 °C			1.2	mW/°C
OUTPUT				
Collector emitter breakdown voltage		BV <sub>CEO</sub>	70	V
Emitter collector breakdown voltage		BV <sub>ECO</sub>	7	V
Collector-base breakdown voltage		BV <sub>CBO</sub>	70	V
I <sub>CMAX DC</sub>		I <sub>CMAX DC</sub>	50	mA
I <sub>CMAX</sub>	t < 1 ms	I <sub>CMAX</sub>	100	mA
Power dissipation		P <sub>diss</sub>	150	mW
Derate linearly from 25 °C			2	mW/°C
COUPLER				
Isolation test voltage		V <sub>ISO</sub>	4000	V <sub>RMS</sub>
Total package dissipation (LED and detector)		P <sub>tot</sub>	240	mW
Derate linearly from 25 °C			3.3	mW/°C
Operating temperature		T <sub>amb</sub>	-55 to +100	°C
Storage temperature		T <sub>stg</sub>	-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.

<b>ELECTRICAL CHARACTERISTICS</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified)									
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT			
INPUT									
Forward voltage	I <sub>F</sub> = 10 mA	$V_{F}$	-	1.3	1.5	V			
Reverse current	V <sub>R</sub> = 6 V	I <sub>R</sub>	-	0.1	100	μA			
Capacitance	$V_R = 0 V$	Co	-	13	-	pF			
OUTPUT									
Collector emitter breakdown voltage	I <sub>C</sub> = 100 μA	BV <sub>CEO</sub>	70		-	V			
Emitter collector breakdown voltage	I <sub>E</sub> = 100 μA	BV <sub>ECO</sub>	7	10	-	V			
Collector emitter leakage current	V <sub>CE</sub> = 10 V	I <sub>CEO</sub>	-	5	50	nA			
COUPLER									
Saturation voltage, collector emitter	$I_C = 2 \text{ mA}, I_F = 10 \text{ mA}$	V <sub>CEsat</sub>	-	-	0.4	V			
Capacitance, input to output		C <sub>IO</sub>	-	0.5	-	pF			
Resistance, input to output		R <sub>IO</sub>	-	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	
	I <sub>E</sub> = 10 mA, V <sub>CE</sub> = 5 V	IL205AT	CTR	40	-	80	%	
		IL206AT	CTR	63	-	125	%	
Current transfer ratio	IF = 10 IIIA, VCE = 5 V	IL207AT	CTR	100	-	200	%	
		IL208AT	CTR	100	-	320	%	
Current transfer fatio		IL205AT	CTR	13	25	-	%	
	1 m \ \/ - 5 \/	IL206AT	CTR	22	40	-	%	
	$I_F = 1 \text{ mA}, V_{CE} = 5 \text{ V}$	IL207AT	CTR	34	60	-	%	
		IL208AT	CTR	56	95	-	%	

SWITCHING CHARACTERI	CTICS						
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Switching time	$I_C$ = 2 mA, $R_L$ = 100 $\Omega$ , $V_{CC}$ = 10 $V$		t <sub>on</sub> , t <sub>off</sub>	-	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 <sub>IOTM</sub>	DIN IEC 112 / VDE 0303 part 1, group IIIa per DIN VDE 6110 175 399	V <sub>IOTM</sub>	6000	-	-	V	
V <sub>IORM</sub>		$V_{IORM}$	560	-	-	V	
Resistance (input to output)		R <sub>IO</sub>	=	10 <sup>12</sup>	-	Ω	
P <sub>SI</sub>			=	-	350	mW	
I <sub>SI</sub>			-	-	150	mA	
T <sub>SI</sub>			-	-	165	°C	
Creepage distance			4.0	-	=	mm	
Clearance distance			4.0	-	-	mm	

#### Note

#### TYPICAL CHARACTERISTICS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

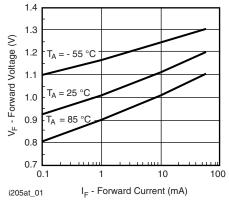


Fig. 1 - Forward Voltage vs. Forward Current

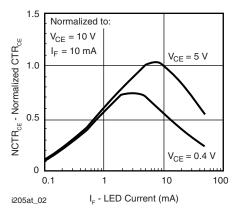


Fig. 2 - Normalized Non-Saturated and Saturated CTR $_{\mbox{\scriptsize CE}}$  vs. LED Current

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.

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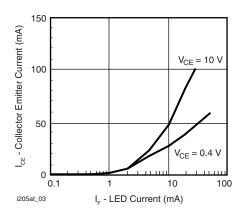


Fig. 3 - Collector Emitter Current vs. LED Current

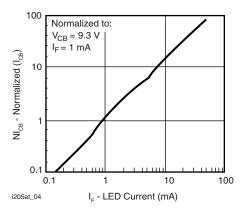


Fig. 4 - Normalized Collector-Base Photocurrent vs. LED Current

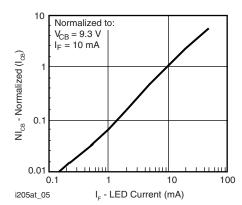


Fig. 5 - Normalized Collector-Base Photocurrent vs. LED Current

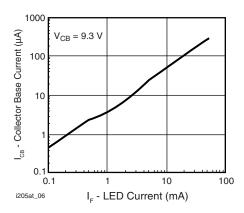


Fig. 6 - Collector Emitter Photocurrent vs. LED Current

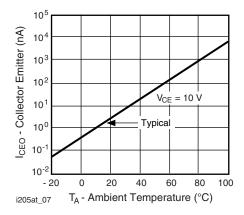


Fig. 7 - Collector Emitter Photocurrent vs. LED Current

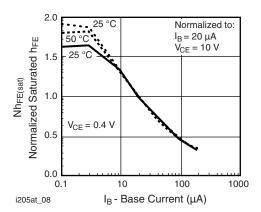


Fig. 8 - Base Current vs. I<sub>F</sub> and h<sub>FE</sub>

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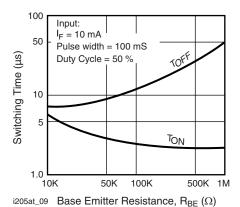
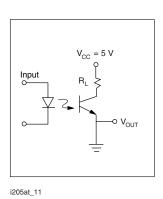


Fig. 9 - Typical Switching Characteristics vs. Base Resistance (Saturated Operation)



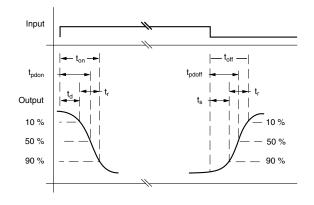
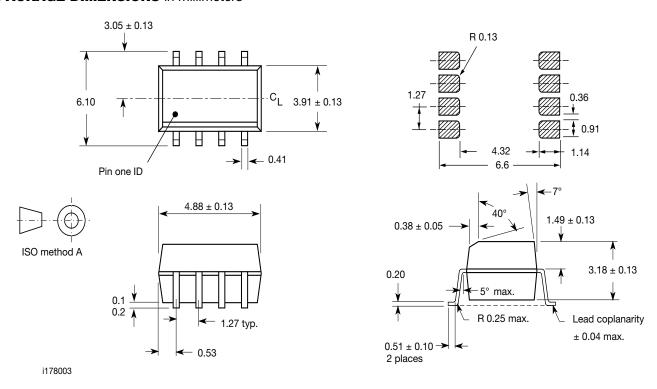


Fig. 10 - Switching Test Circuit

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#### **PACKAGE DIMENSIONS** in millimeters



#### **PACKAGE MARKING** (example)

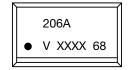


Fig. 11 - Example of IL206AT

#### Notes

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



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