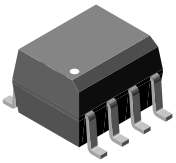
Optocoupler, Phototransistor Output, with Base Connection in SOIC-8 Package



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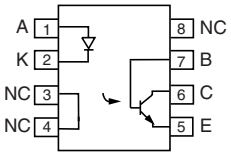


FEATURES

- 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
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Pb-free

e3

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 available with option 1

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-8A 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.

ORDER INFORMATION	
PART	**REMARKS**
IL205AT	CTR 40 to 80 %, SOIC-8
IL206AT	CTR 63 to 125 %, SOIC-8
IL207AT	CTR 100 to 200 %, SOIC-8
IL208AT	CTR 160 to 320 %, SOIC-8

ABSOLUTE MAXIMUM RATINGS

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

T_{amb} = 25 °C, unless otherwise specified.
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 CHARACTERISTCS

PARAMETER	TEST CONDITION	PART	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

T_{amb} = 25 °C, unless otherwise specified.
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.

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 CHARACTERISTICS							
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)				55/100/21		
Comparative tracking index		CTI	175		399	
V_{IOTM}			6000			V
V_{IORM}			560			V
P_{SO}					350	mW
I_{SI}					150	mA
T_{SI}					165	°C
Creepage			4			mm
Clearance			4			mm
Insulation thickness, reinforced rated	per IEC 60950 2.10.5.1		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 °C, unless otherwise specified

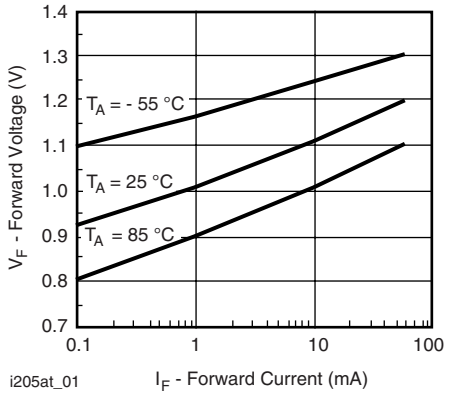


Fig. 1 - Forward Voltage vs. Forward Current

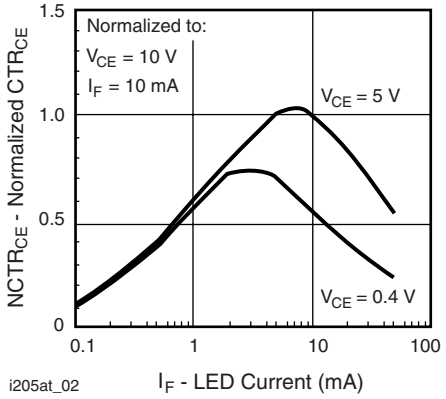


Fig. 2 - Normalized Non-Saturated and Saturated CTR_{CE} vs. LED Current

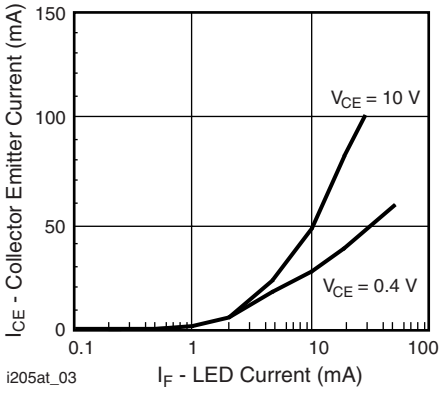


Fig. 3 - Collector Emitter Current vs. LED Current

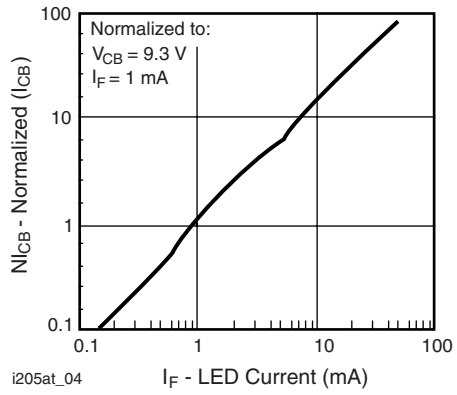


Fig. 4 - Normalized Collector-Base Photocurrent vs. LED Current

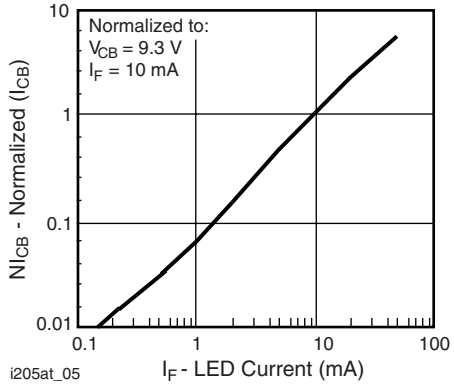


Fig. 5 - Normalized Collector-Base Photocurrent vs. LED Current

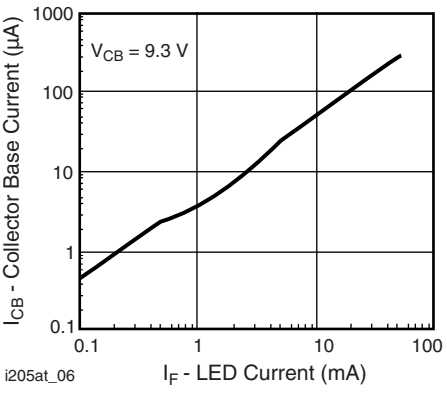


Fig. 6 - Collector Emitter Photocurrent vs. LED Current

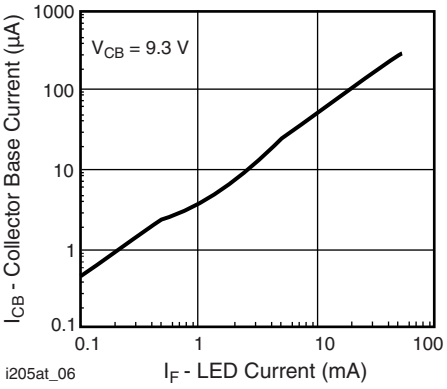


Fig. 7 - Collector Emitter Photocurrent vs. LED Current

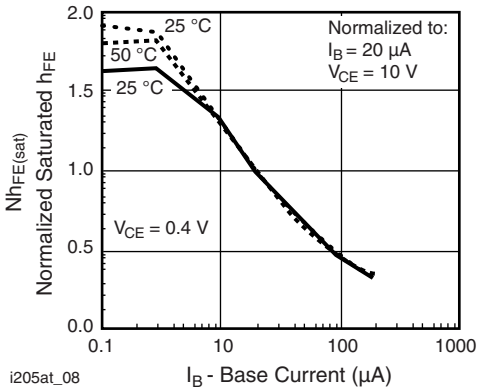


Fig. 9 - Typical Switching Characteristics vs. Base Resistance (Saturated Operation)

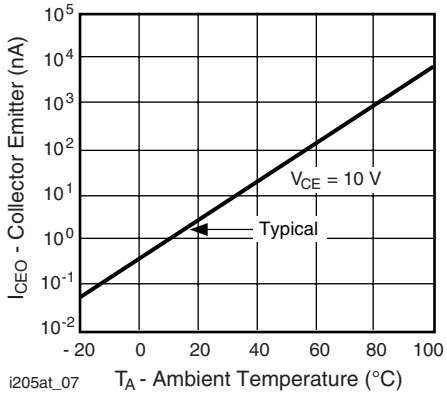


Fig. 8 - Base Current vs. I_F and h_{FE}

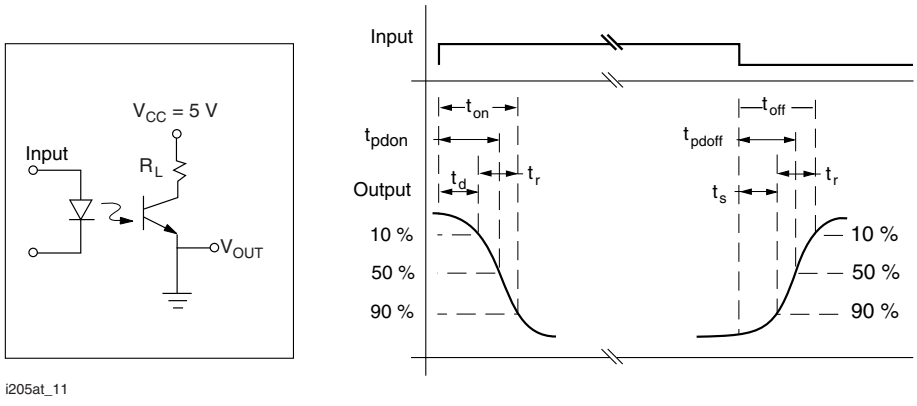
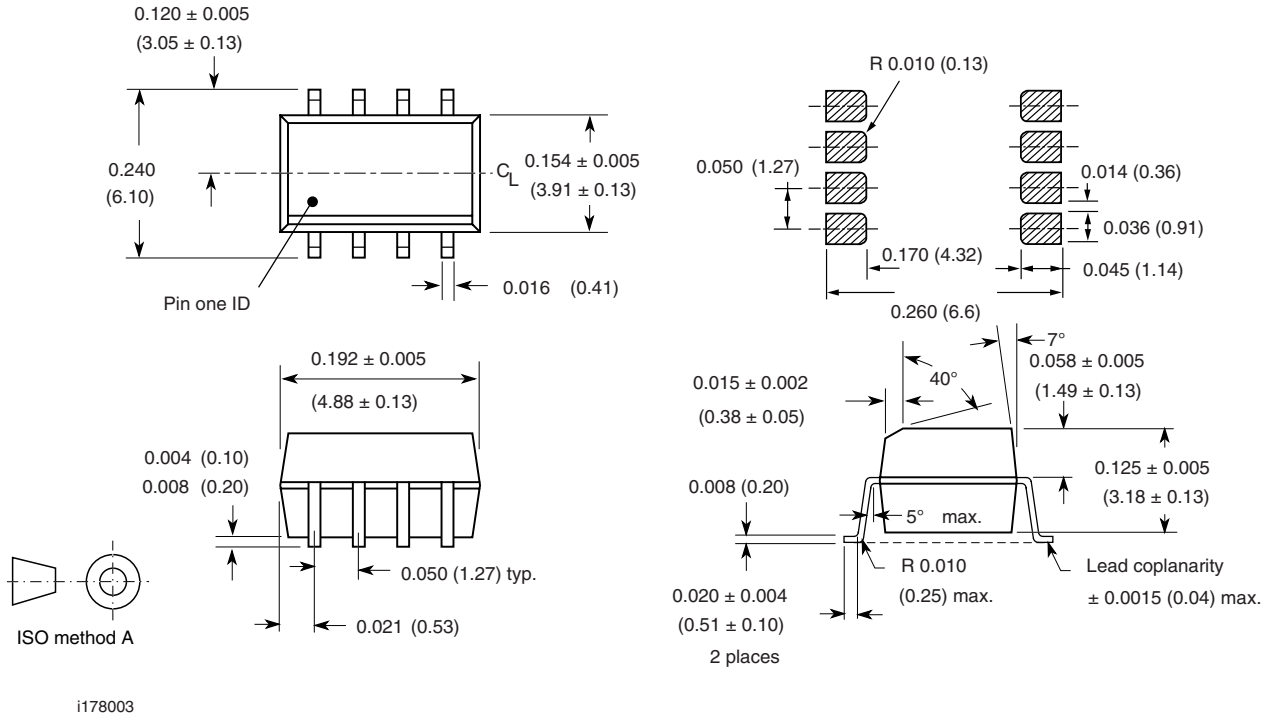


Fig. 10 Switching Test Circuit

PACKAGE DIMENSIONS in inches (millimeters)



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OZONE DEPLETING SUBSTANCES POLICY STATEMENT

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively.
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

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