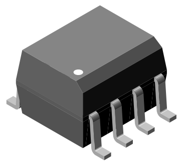
THE DATASHEET OF

IL217AT

Optocoupler, Phototransistor Output, Low Input Current, with Base Connection



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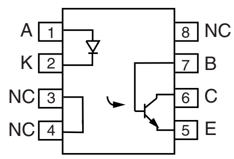

FEATURES

- High current transfer ratio
- Isolation test voltage, 4000 V_{RMS}
- Industry standard SOIC-8 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

DESCRIPTION

The IL215AT/IL216AT/IL217AT 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. The IL215AT/IL216AT/IL217AT comes in a standard SOIC-8 small outline package for surface mounting which makes it ideally suited for high density applications with limited space. In addition to eliminating through hole requirements, this package conforms to standards for surface mounted devices.

The high CTR at low input current is designed for low power consumption requirements such as CMOS microprocessor interfaces.

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

ORDER INFORMATION

PART	REMARKS
IL215AT	CTR > 20 %, SOIC-8
IL216AT	CTR > 50 %, SOIC-8
IL217AT	CTR > 100 %, SOIC-8

ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Peak reverse voltage		V_R	6.0	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}	30	V
Emitter collector breakdown voltage		BV_{ECO}	7.0	V
Collector base breakdown voltage		BV_{CBO}	70	V
$I_{CMAX\ DC}$		$I_{CMAX\ DC}$	50	mA
I_{CMAX}	t < 1.0 ms	I_{CMAX}	100	mA
Power dissipation		P_{diss}	150	mW
Derate linearly from 25 °C			2.0	mW/°C

ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
COUPLER				
Isolation test voltage	1 s	V_{ISO}	4000	V_{RMS}
Total package dissipation	LED and detector	P_{tot}	240	mW
Derate linearly from 25 °C			3.2	mW/°C
Storage temperature		T_{stg}	- 55 to + 150	°C
Operating temperature		T_{amb}	- 55 to + 100	°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 = 1.0 mA		V_F		1.0	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 = 10 µA		BV_{CEO}	30			V
Emitter collector breakdown voltage	I_E = 10 µA		BV_{ECO}	7.0			V
Dark current collector emitter	V_{CE} = 10 V, I_F = 0 A		I_{CEO}		5.0	50	nA
Collector emitter capacitance	V_{CE} = 0		C_{CE}		10		pF
COUPLER							
Saturation voltage, collector emitter	I_F =1.0 mA, I_C = 0.1 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
DC current transfer ratio	I_F = 1.0 mA, V_{CE} = 5.0 V	IL215AT	CTR_{DC}	20	50		%
		IL216AT	CTR_{DC}	50	80		%
		IL217AT	CTR_{DC}	100	130		%

SWITCHING CHARACTERISTICS

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Switching time	I_F = 2.0 mA, R_L = 100 Ω, V_{CC} = 10 V		t_{on}, t_{off}		3.0		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

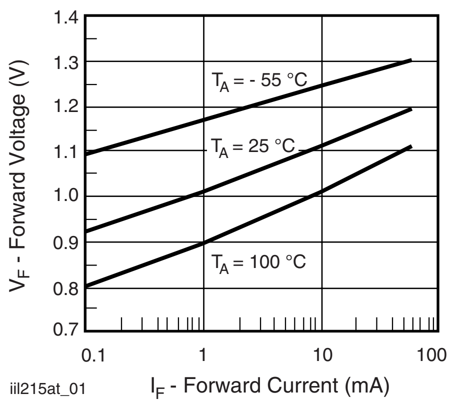

Fig. 1 - Forward Voltage vs. Forward Current

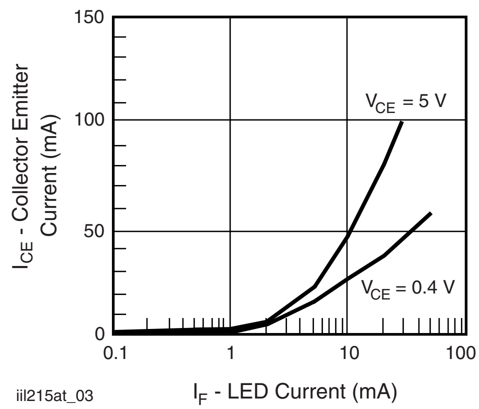

Fig. 3 - Collector Emitter Current vs. LED Current

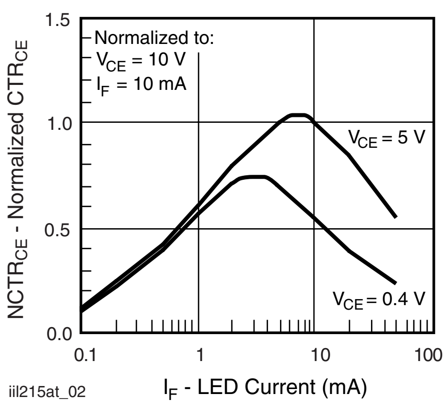

Fig. 2 - Normalized Non-Saturated and Saturated CTR_{CE} vs. LED Current

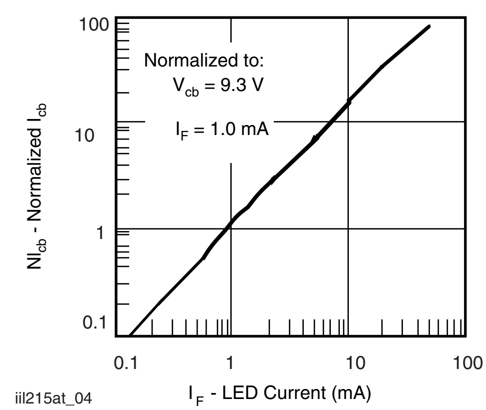

Fig. 4 - Normalized Collector Base Photocurrent vs. LED Current

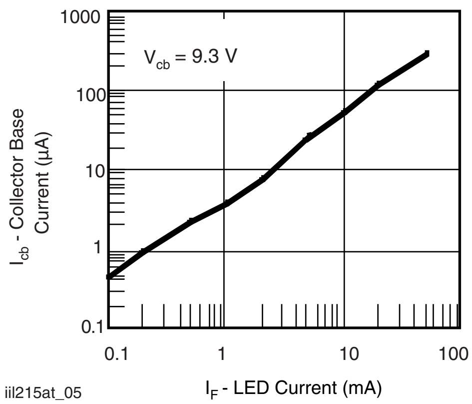

Fig. 5 - Collector Base Photocurrent vs. LED Current

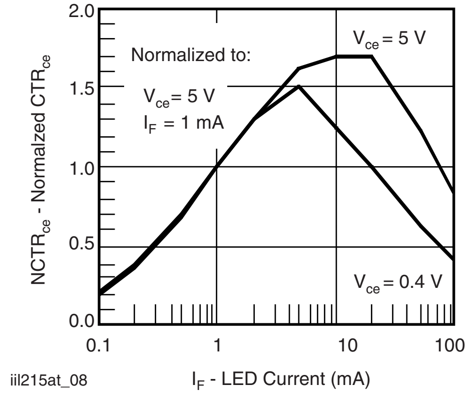

Fig. 8 - Normalized Non-Saturated and Saturated CTR_{CE} vs. LED Current

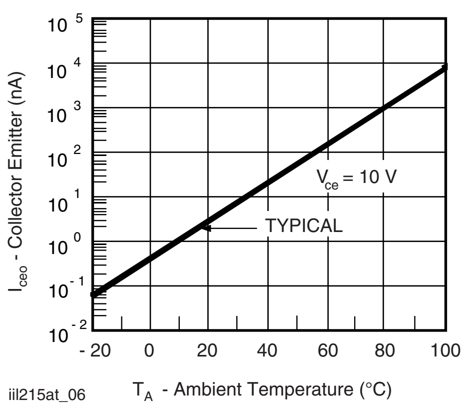

Fig. 6 - Collector Emitter Leakage Current vs.Temperature

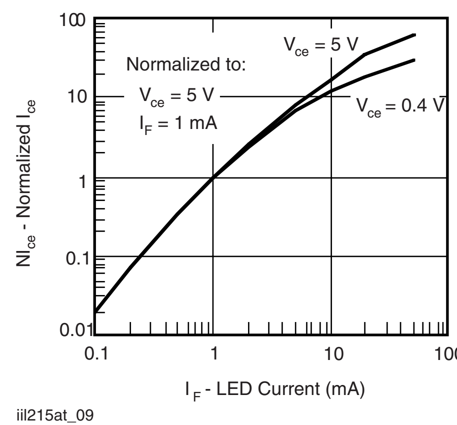

Fig. 9 - Normalized Non-Saturated and Saturated Collector Emitter Current vs. LED Current

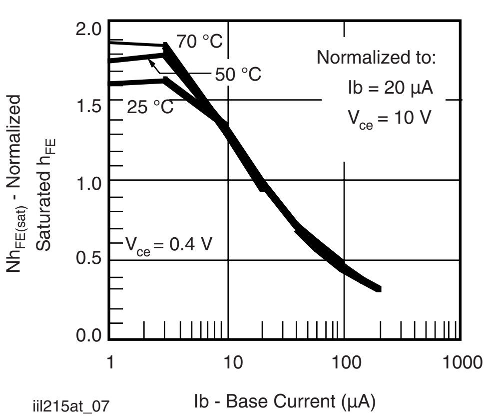

Fig. 7 - Normalized Saturated h_{FE} vs. Base Current and Temperature

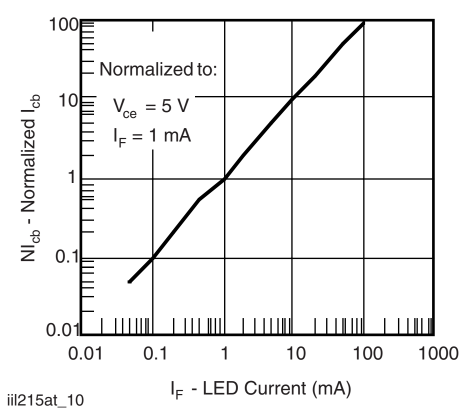

Fig. 10 - Normalized Collector Base Photocurrent vs. LED Current

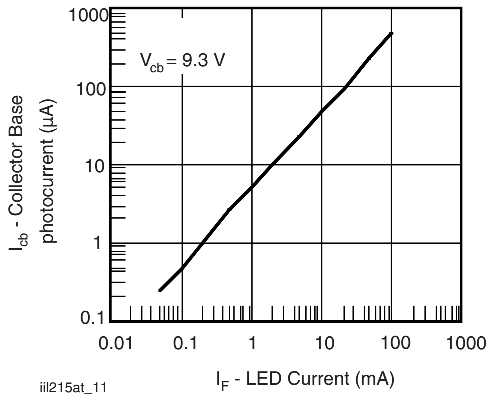

Fig. 11 - Collector Base Photocurrent vs. LED Current

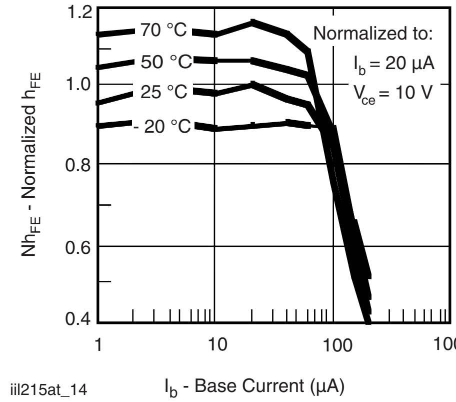

Fig. 14 - Normalized Non-Saturated h_{FE} vs. Base Current and Temperature

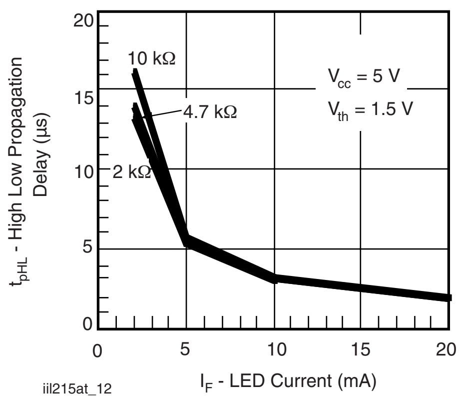

Fig. 12 - High to Low Propagation Delay vs. LED Current and Load Resistor

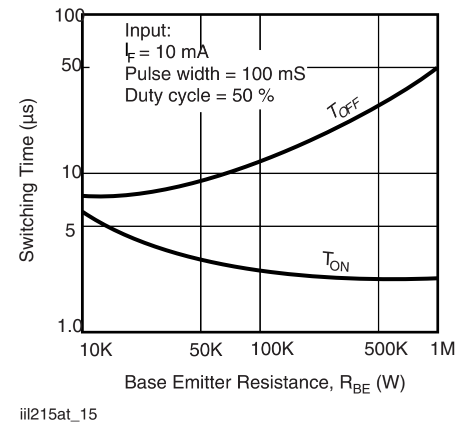

Fig. 15 - Typical Switching Characteristics vs. Base Resistance (Saturated Operation)

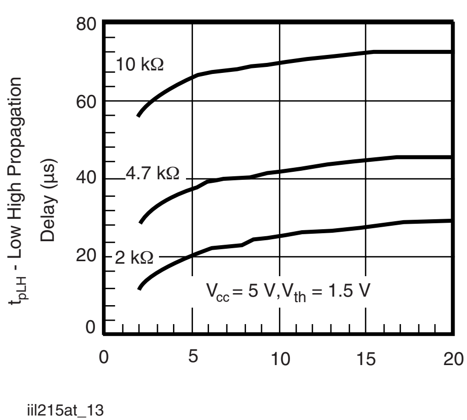

Fig. 13 - Low to High Propagation Delay vs. LED Current and Load Resistor

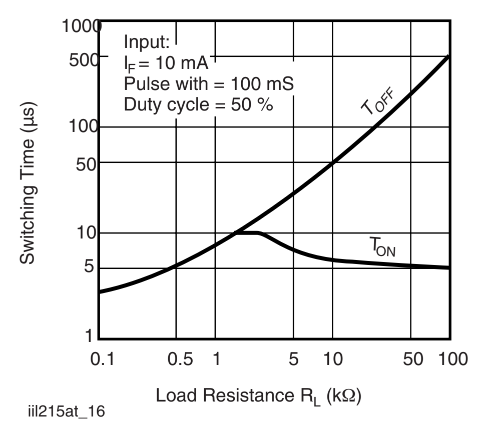

Fig. 16 - Typical Switching Times vs. Load Resistance

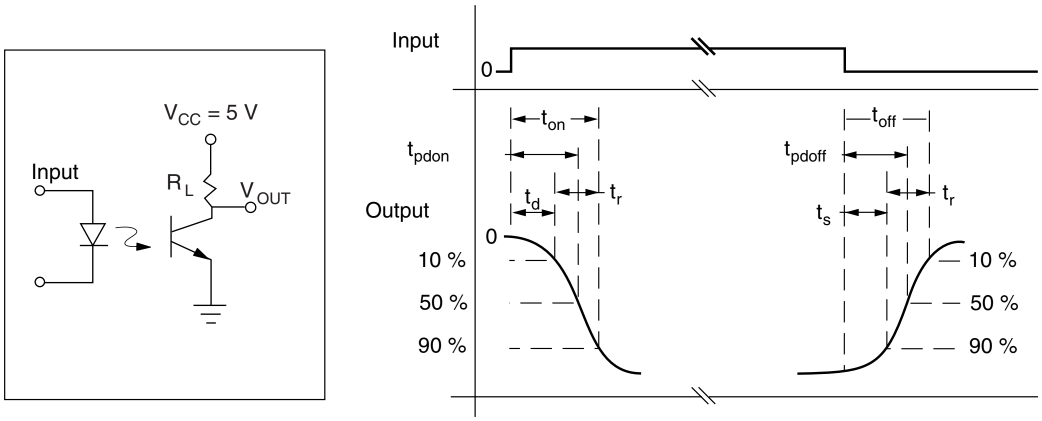

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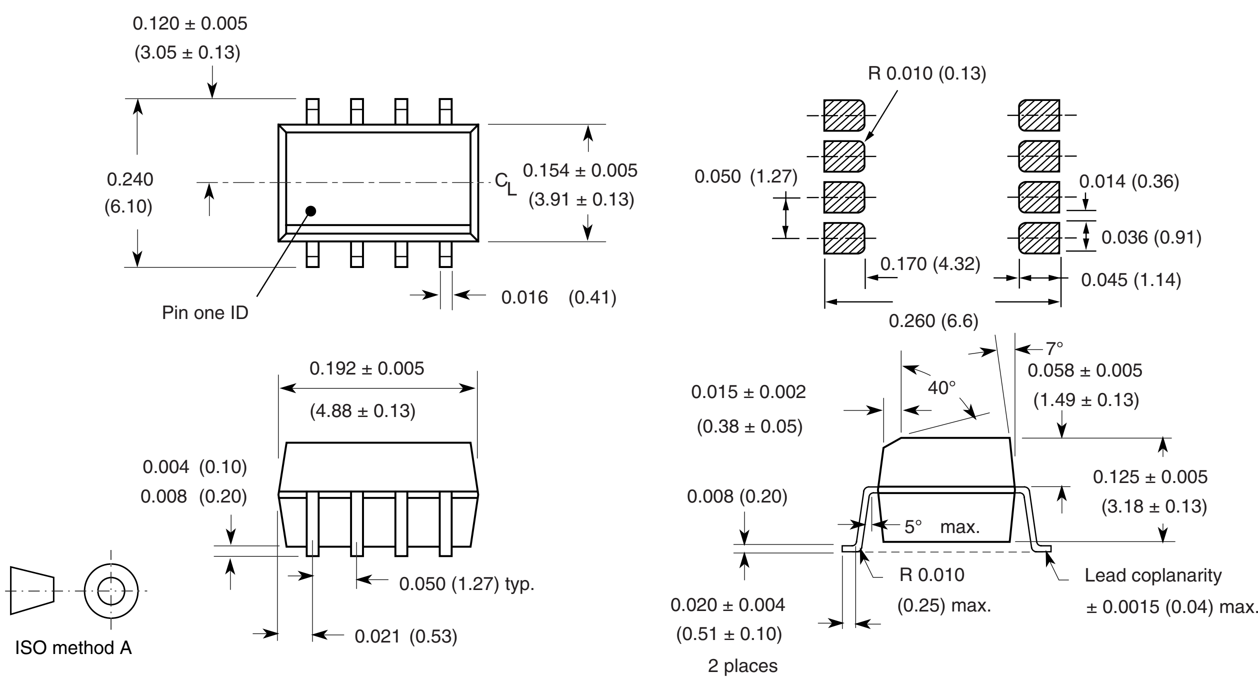
Fig. 17 Switching Test Circuit

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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