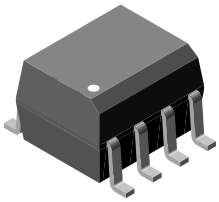
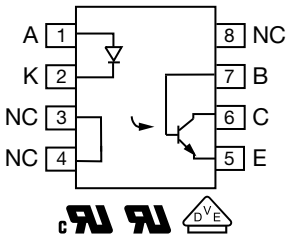
Optocoupler, Phototransistor Output, With Base Connection in SOIC-8 Package





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
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

LINKS TO ADDITIONAL RESOURCES

Related Documents

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.

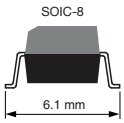
AGENCY APPROVALS

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

ORDERING INFORMATION

I	L	2	1	#	A	T

PART NUMBER



AGENCY CERTIFIED / PACKAGE	CTR (%)		
	1 mA		
UL, cUL	**> 20**	**> 50**	**> 100**
SOIC-8	IL215AT	IL216AT	IL217AT

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}	30	V
Emitter collector breakdown voltage		BV_{ECO}	7	V
Collector base breakdown voltage		V_{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	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

- 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 = 1 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	-	-	V
Collector dark current	V_{CE} = 10 V, I_F = 0 A	I_{CEO}	-	5	50	nA
Collector emitter capacitance	V_{CE} = 0 V	C_{CE}	-	10		pF
COUPLER						
Saturation voltage, collector emitter	I_F = 1.0 mA, I_C = 0.1 mA	V_{CEsat}	-	-	0.4	V
Isolation test voltage	1 s	V_{ISO}	4000	-	-	V_{RMS}
Capacitance (input to output)		C_{IO}	-	0.5	-	pF
Resistance (input to output)		R_{IO}	-	100	-	GΩ

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**
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**	**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 distance			4	-	-	mm
Clearance distance			4	-	-	mm
Insulation thickness			0.2	-	-	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)

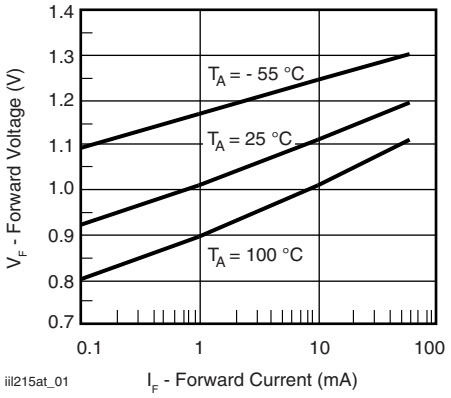


Fig. 1 Forward Voltage vs. Forward Current

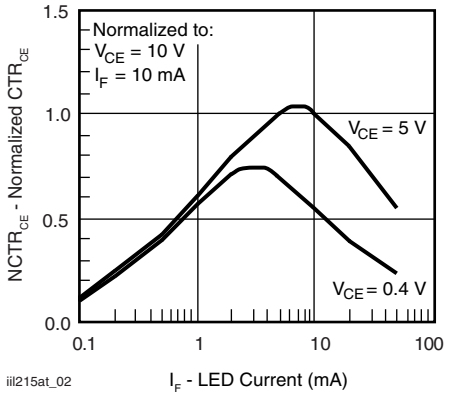


Fig. 2 - Normalized Non-Saturated and Saturated CTR_{CE} vs. LED Current

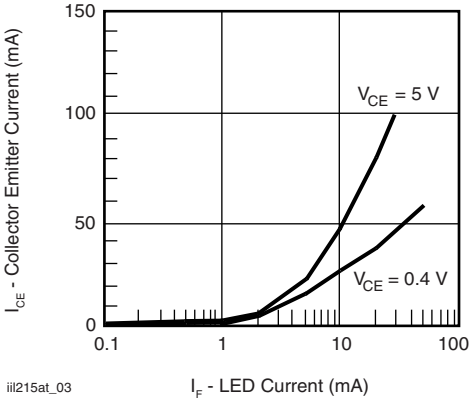


Fig. 3 - Collector Emitter Current vs. LED Current

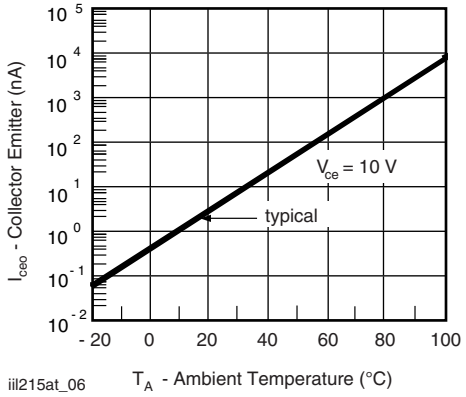


Fig. 6 - Collector Emitter Leakage Current vs.Temperature

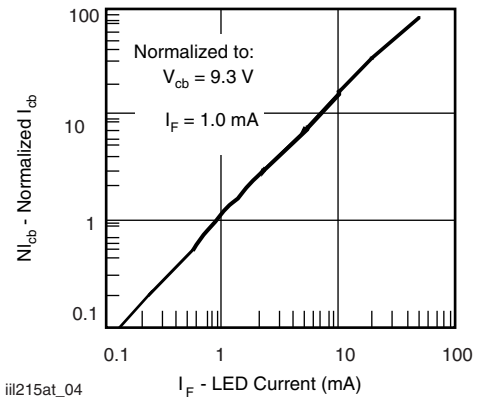


Fig. 4 - Normalized Collector Base Photocurrent vs. LED Current

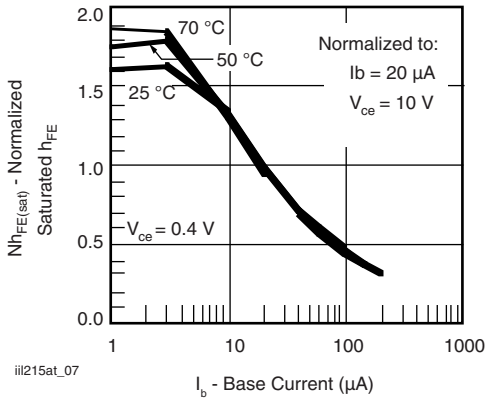


Fig. 7 - Normalized Saturated h_{FE} vs. Base Current and Temperature

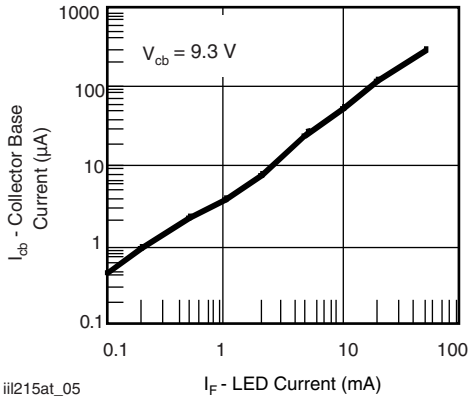


Fig. 5 - Collector Base Photocurrent vs. LED Current

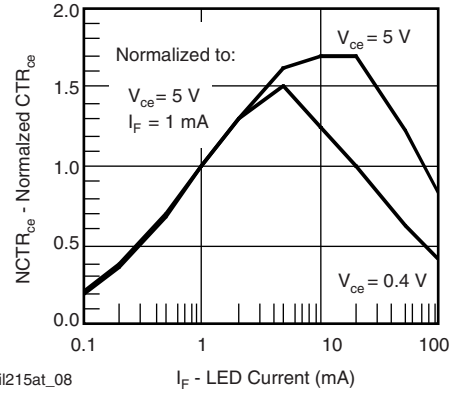


Fig. 8 - Normalized Non-Saturated and Saturated CTR_{CE} vs. LED Current

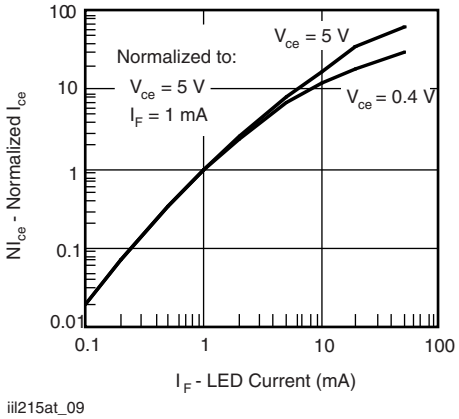


Fig. 9 - Normalized Non-Saturated and Saturated Collector Emitter Current vs. LED Current

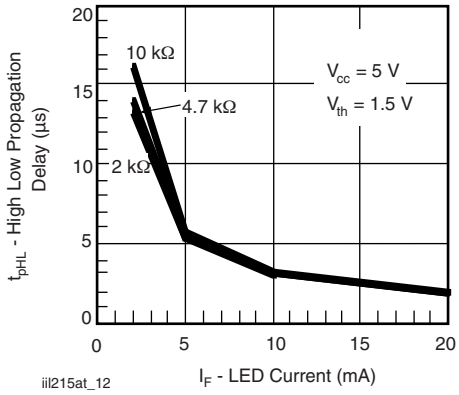


Fig. 12 - High to Low Propagation Delay vs. LED Current and Load Resistor

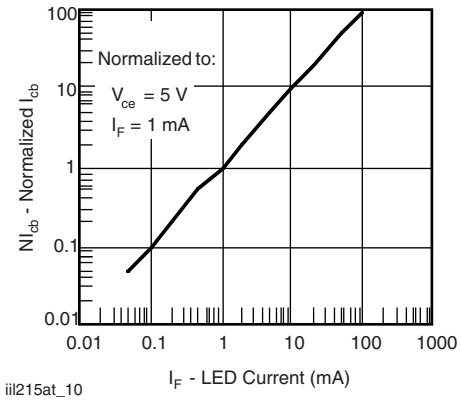


Fig. 10 - Normalized Collector Base Photocurrent vs. LED Current

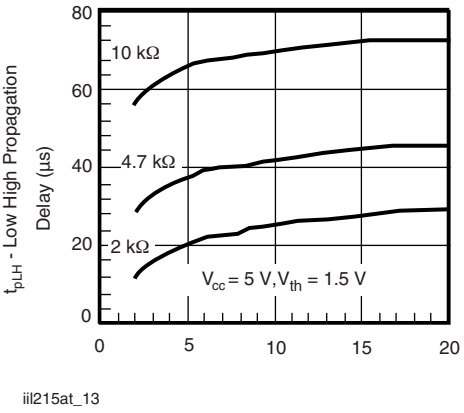


Fig. 13 - Low to High Propagation Delay vs. LED Current and Load Resistor

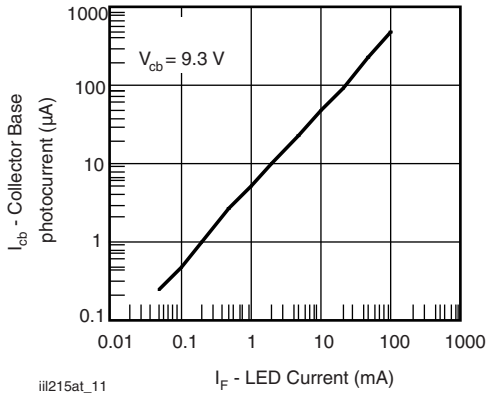


Fig. 11 - Collector Base Photocurrent vs. LED Current

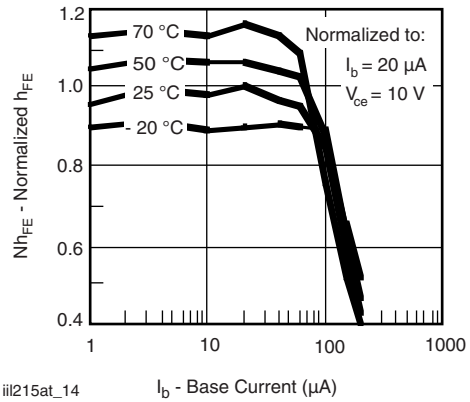


Fig. 14 - Normalized Non-Saturated h_{FE} vs. Base Current and Temperature

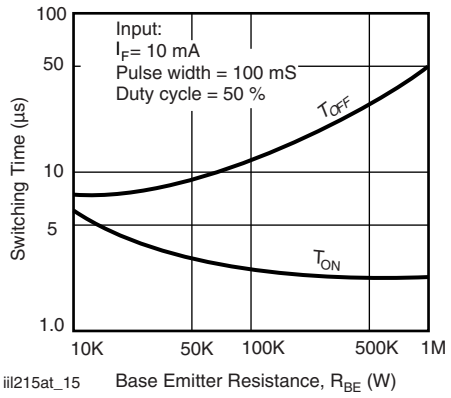


Fig. 15 - Typical Switching Characteristics vs. Base Resistance (Saturated Operation)

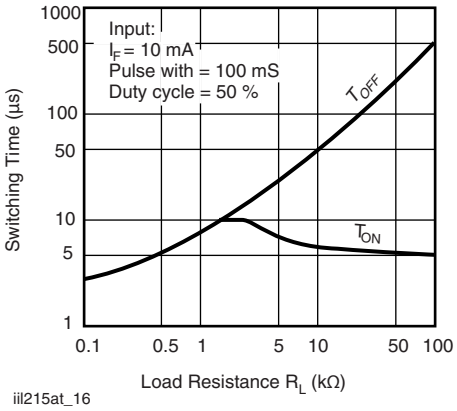


Fig. 16 - Typical Switching Times vs. Load Resistance

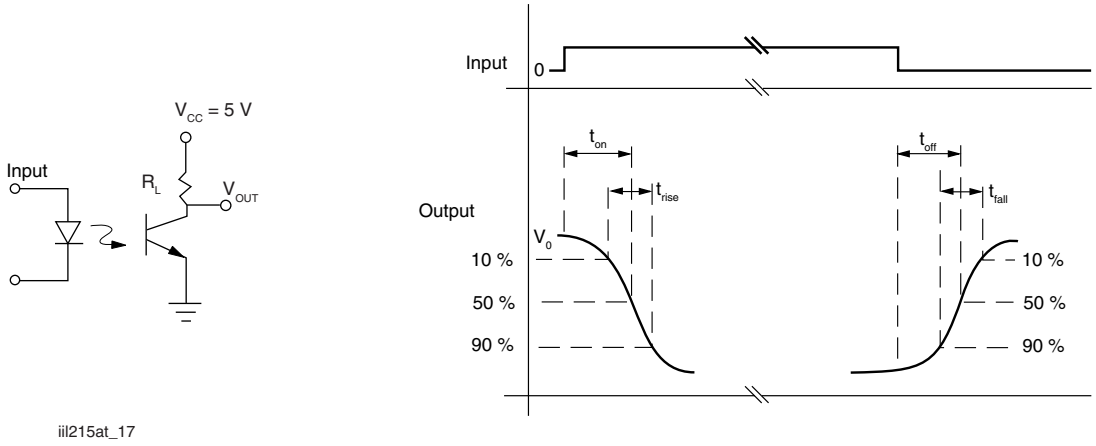
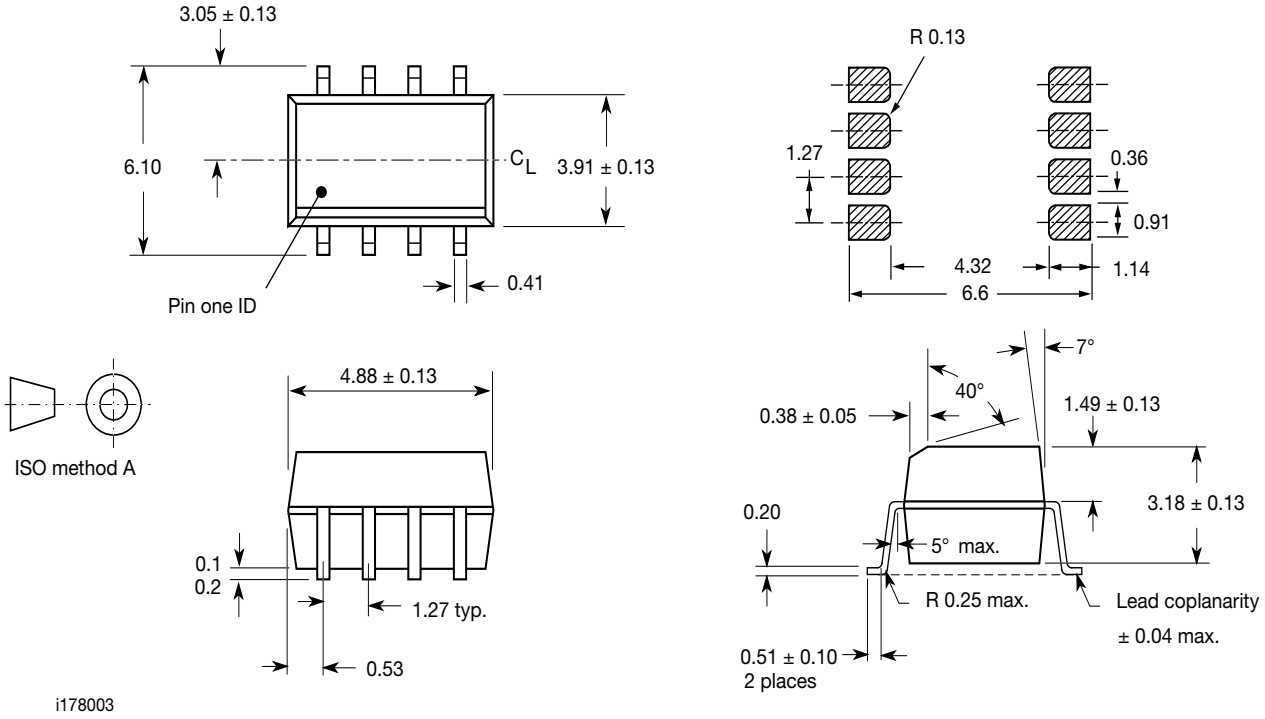


Fig. 17 - Switching Test Circuit

PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example)

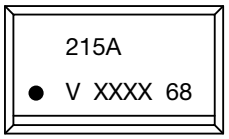


Fig. 18 - Example of IL215AT

Notes

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

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