



IL215AT/216AT/217AT

Phototransistor Small Outline Surface Mount Optocoupler

FEATURES

- **High Current Transfer Ratio, $I_F=1.0$ mA**
IL215AT—20% Minimum
IL216AT—50% Minimum
IL217AT—100% Minimum
- **Isolation Voltage, 3000 V_{RMS}**
- **Electrical Specifications Similar to Standard 6 Pin Coupler**
- **Industry Standard SOIC-8 Surface Mountable Package**
- **Standard Lead Spacing, .05"**
- **Available only on Tape and Reel Option (Conforms to EIA Standard RS481A)**
- **Compatible with Dual Wave, Vapor Phase and IR Reflow Soldering**
- **Underwriters Lab File #E52744 (Code Letter Y)**

DESCRIPTION

The IL215AT/216AT/217AT 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/216AT/217AT 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-holes 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.

Maximum Ratings

Emitter

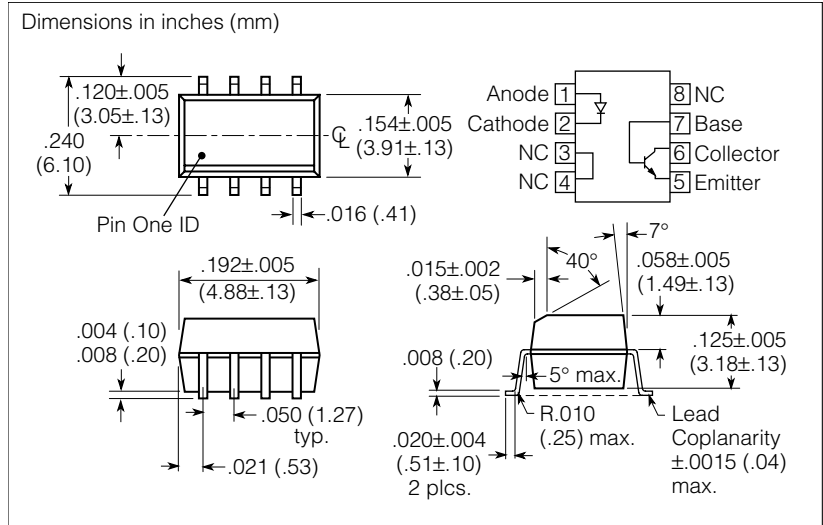
Peak Reverse Voltage..... 6.0 V
 Continuous Forward Current 60 mA
 Power Dissipation at 25°C 90 mW
 Derate Linearly from 25°C 1.2mW/°C

Detector

Collector-Emitter Breakdown Voltage 30 V
 Emitter-Collector Breakdown Voltage 7.0 V
 Collector-Base Breakdown Voltage 70 V
 I_{CMAX} DC 50 mA
 I_{CMAX} ($t < 1.0$ ms) 100 mA
 Power Dissipation 150 mW
 Derate Linearly from 25°C 2.0mW/°C

Package

Total Package Dissipation at 25°C Ambient
 (LED + Detector) 240 mW
 Derate Linearly from 25°C 3.2mW/°C
 Storage Temperature. -55°C to +150°C
 Operating Temperature -55°C to +100°C
 Soldering Time at 260°C 10 sec.



Characteristics $T_A=25^\circ\text{C}$

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Emitter						
Forward Voltage	V_F	—	1.0	1.5	V	$I_F=1.0\text{mA}$
Reverse Current	I_R	—	0.1	100	μA	$V_R=6.0$ V
Capacitance	C_O	—	13	—	pF	$V_R=0$
Detector						
Breakdown Voltage	B_{VCEO}	30	—	—	V	$I_C=10$ μA
	B_{VECO}	7.0	—	—	V	$I_E=10$ μA
Dark Current, Collector-Emitter	$I_{CEO\text{dark}}$	—	5.0	50	nA	$V_{CE}=10$ V $I_F=0$
Capacitance, Collector-Emitter	C_{CE}	—	10	—	pF	$V_{CE}=0$
Package						
DC Current Transfer Ratio	IL215AT	CTR _{DC}	20	50	—	% $I_F=1.0$ mA, $V_{CE}=5.0$ V
	IL216AT		50	80	—	
	IL217AT		100	130	—	
Saturation Voltage, Collector-Emitter	$V_{CE\text{sat}}$	—	—	0.4	—	$I_F=1.0$ mA, $I_C=0.1$ mA
Isolation Test Voltage	V_{IO}	3000	—	—	V_{RMS}	1 sec.
Capacitance, Input to Output	C_{IO}	—	0.5	—	pF	—
Resistance, Input to Output	R_{IO}	—	100	—	G Ω	—
Switching Time	t_{on}, t_{off}	—	3.0	—	μs	$I_C=2.0$ mA, $R_L=100$ Ω , $V_{CC}=10$ V

Figure 1. Forward voltage versus forward current

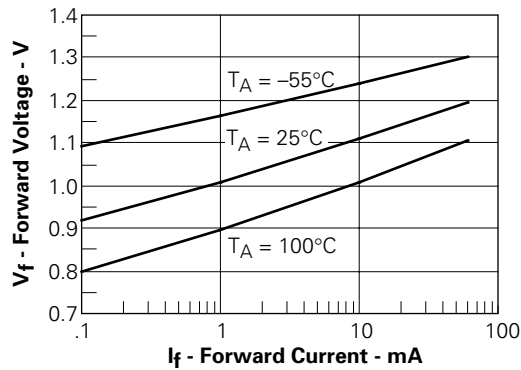


Figure 2. Normalized non-saturated and saturated CTR_{CE} versus LED current

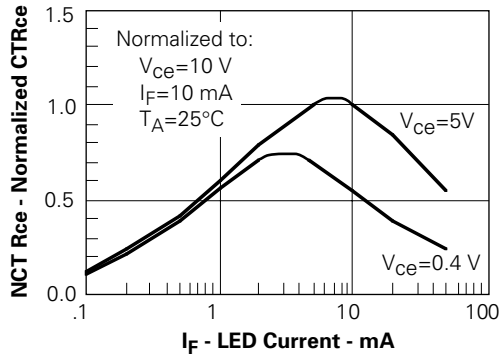


Figure 3. Collector-emitter current versus LED current

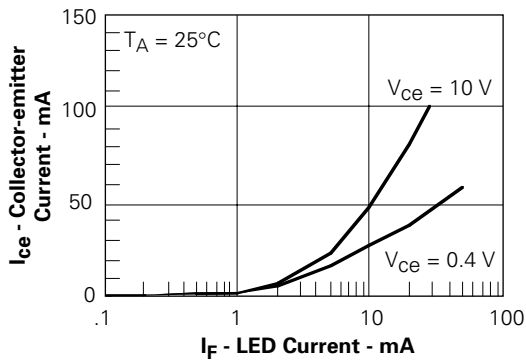


Figure 4. Normalized collector-base photocurrent versus LED current

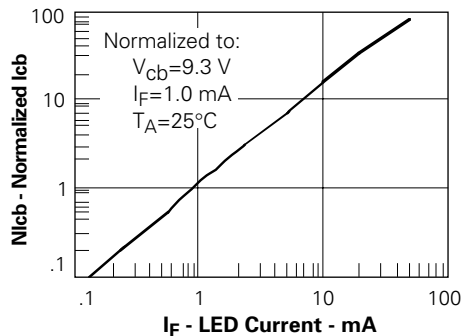


Figure 5. Collector-base photocurrent versus LED current

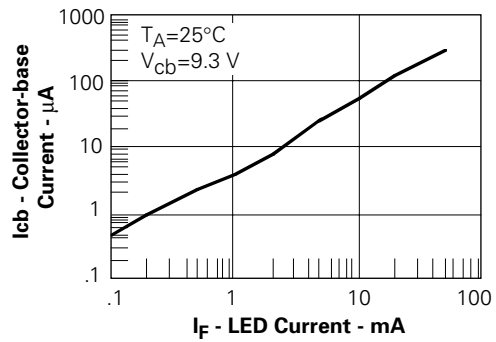


Figure 6. Collector-emitter leakage current versus temperature

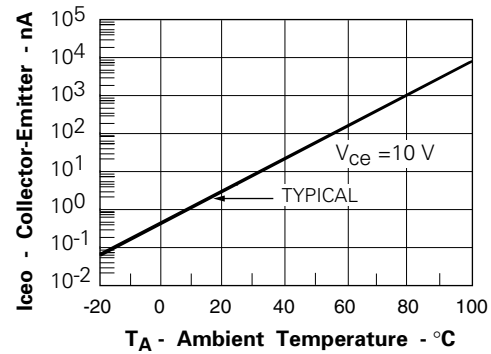


Figure 7. Normalized saturated HFE versus base current and temperature

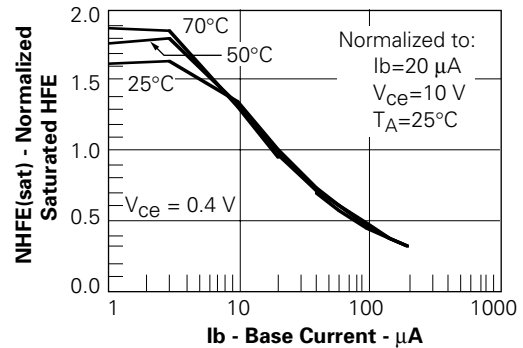


Figure 8. Normalized non-saturated and saturated CTR_{CE} versus LED current

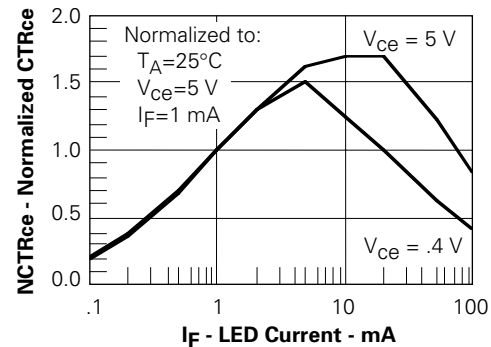


Figure 9. Normalized non-saturated and saturated collector-emitter current vs. LED current

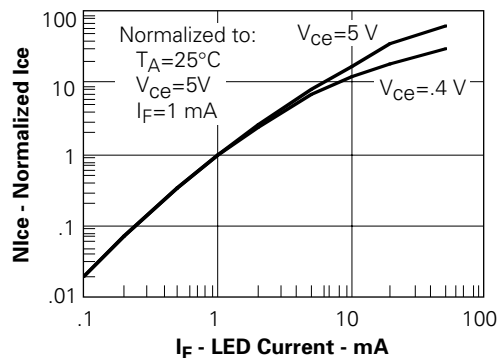


Figure 10. Normalized collector-base photocurrent vs. LED current

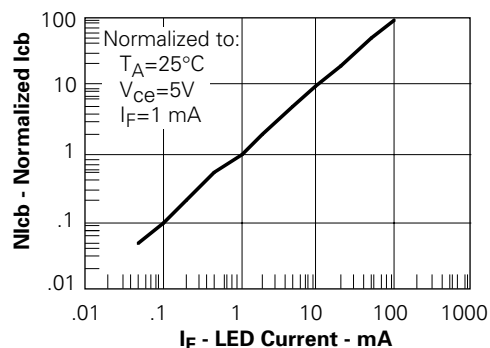


Figure 11. Collector-base photocurrent vs. LED current

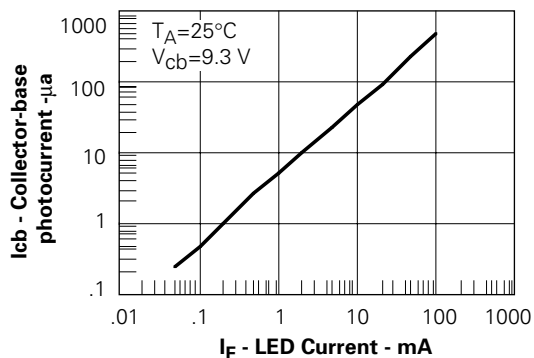


Figure 12. High to low propagation delay vs. LED current and load resistor

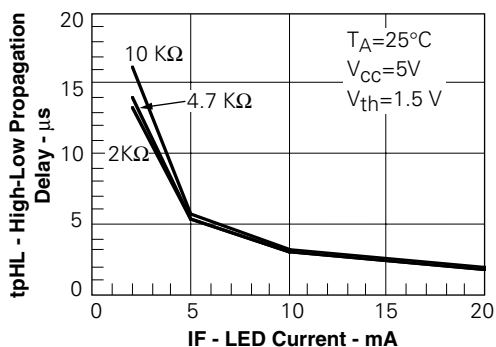


Figure 13. Low to high propagation delay vs. LED current and load resistor

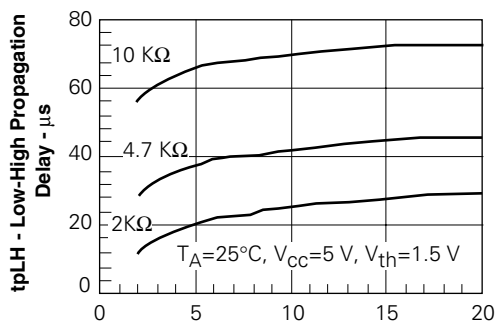


Figure 14. Normalized non-saturated HFE vs. base current and temperature

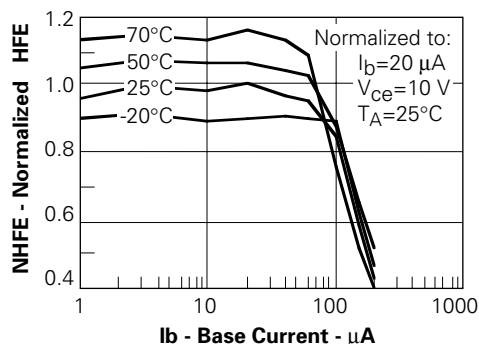


Figure 15. Typical switching characteristics vs. base resistance (saturated operation)

Figure 16. Typical switching times vs. load resistance

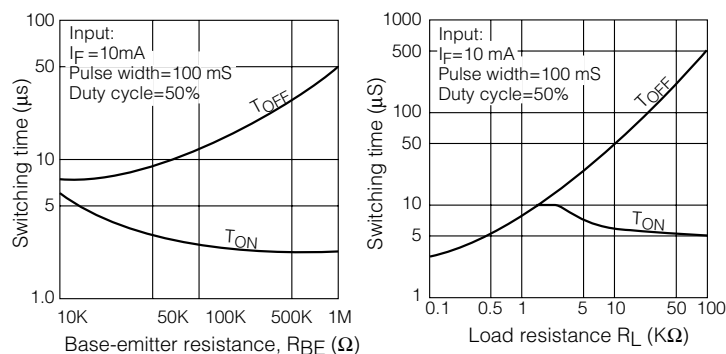


Figure 17. Switching time test schematic and waveform

