

## IL215AT/216AT/217AT PHOTOTRANSISTOR SMALL OUTLINE SURFACE MOUNT OPTOCOUPLER

### FEATURES

- High Current Transfer Ratio,  $I_F=1$  mA  
IL215AT, 20% Minimum  
IL216AT, 50% Minimum  
IL217AT, 100% Minimum
- Isolation Voltage, 2500 VAC<sub>RMS</sub>
- Electrical Specifications Similar to Standard 6 Pin Coupler
- Industry Standard SOIC-8 Surface Mountable Package
- Standard Lead Spacing, .05"
- Available in Tape and Reel (suffix T) (Conforms to EIA Standard RS481A)
- Compatible with Dual Wave, Vapor Phase and IR Reflow Soldering
- Underwriters Lab File #E52744 (Code Letter P)

### DESCRIPTION

The IL215AT/216AT/217AT is an optically coupled pair 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

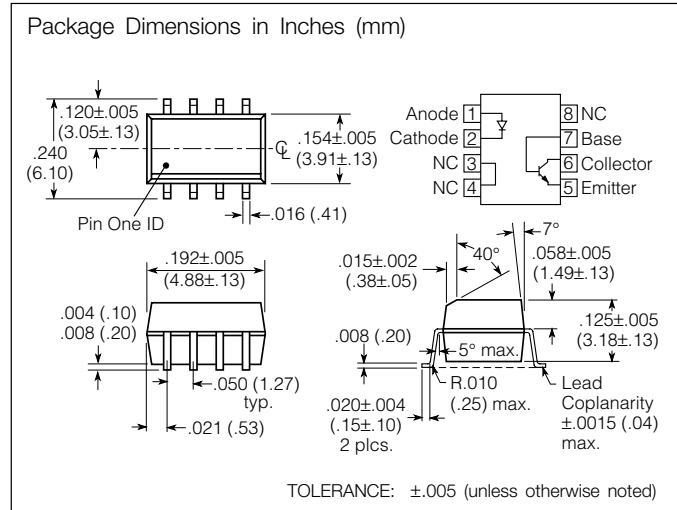
Peak Reverse Voltage ..... 6.0 V  
Continuous Forward Current ..... 60 mA  
Power Dissipation at 25°C ..... 90 mW  
Derate Linearly from 25°C ..... 1.2 mW/°C

#### Detector

Collector-Emitter Breakdown Voltage ..... 30 V  
Emitter-Collector Breakdown Voltage ..... 7 V  
Collector-Base Breakdown Voltage ..... 70 V  
Power Dissipation ..... 150 mW  
Derate Linearly from 25°C ..... 2.0 mW/°C

#### Package

Total Package Dissipation at 25°C Ambient (LED + Detector) ..... 280 mW  
Derate Linearly from 25°C ..... 3.3 mW/°C  
Storage Temperature ..... -55°C to +150°C  
Operating Temperature ..... -55°C to +100°C  
Soldering Time at 260°C ..... 10 sec.



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

	Symbol	Min.	Typ.	Max.	Unit	Condition
<b>Emitter</b>						
Forward Voltage	$V_F$		1.0	1.5	V	$I_F=1$ mA
Reverse Current	$I_R$		0.1	100	$\mu\text{A}$	$V_R=6.0$ V
Capacitance	$C_O$		25		pF	$V_R=0$
<b>Detector</b>						
Breakdown Voltage						
Collector-Emitter	$BV_{CEO}$	30			V	$I_C=10$ $\mu\text{A}$
Emitter-Collector	$BV_{ECO}$	7			V	$I_E=10$ $\mu\text{A}$
Collector-Emitter						$V_{CE}=10$ V,
Dark Current	$I_{CEO\text{dark}}$	5	50		nA	$I_F=0$
Collector-Emitter						
Capacitance	$C_{CE}$		10		pF	$V_{CE}=0$
<b>Package</b>						
DC Current Transfer	$CTR_{DC}$				%	$I_F=1$ mA $V_{CE}=5$ V
IL215AT		20	50			
IL216AT		50	80			
IL217AT		100	130			
Collector-Emitter						$I_C=0.1$ mA,
Saturation Voltage	$V_{CE\text{sat}}$			0.4		$I_F=1$ mA
Isolation Test						
Voltage	$V_{IO}$	2500			VAC <sub>RMS</sub>	
Capacitance,						
Input to Output	$C_{IO}$		0.5		pF	
Resistance,						
Input to Output	$R_{IO}$		100		G $\Omega$	
Switching Time	$t_{ON}, t_{OFF}$		3.0		$\mu\text{s}$	$I_C=2$ mA, $R_E=100$ $\Omega$ , $V_{CE}=10$ V

Specifications subject to change.

Figure 1. Forward voltage versus forward current

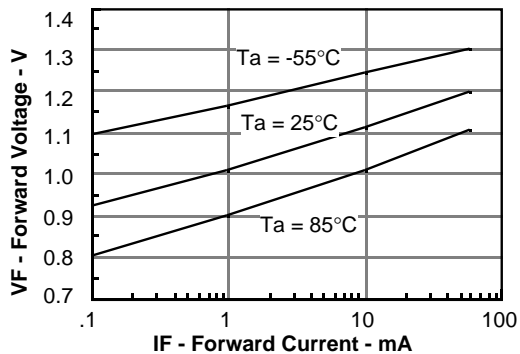


Figure 2. Normalized non-saturated and saturated CTRce versus LED current

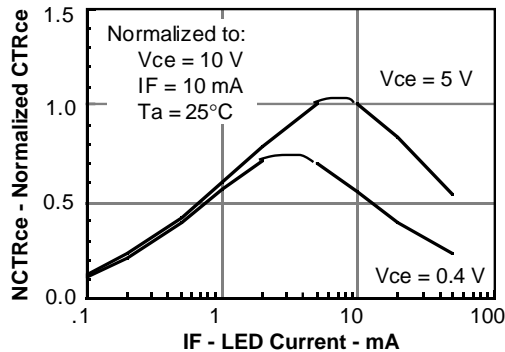


Figure 3. Collector-emitter current versus LED current

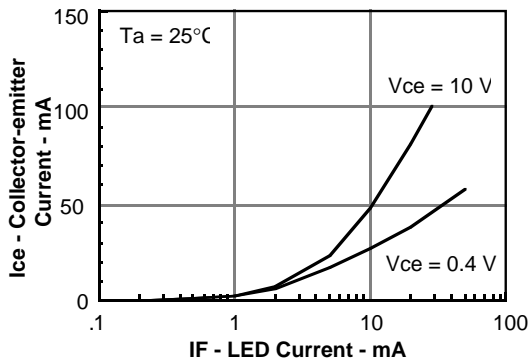


Figure 4. Normalized collector-base photocurrent versus LED current

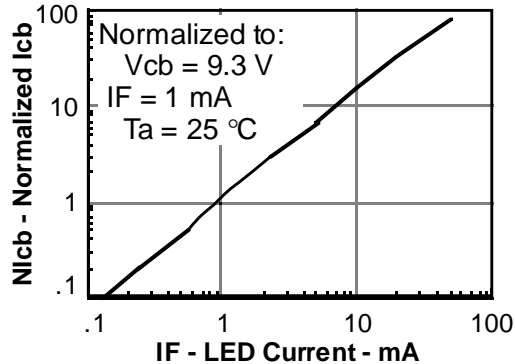


Figure 5. Collector-base photocurrent versus LED current

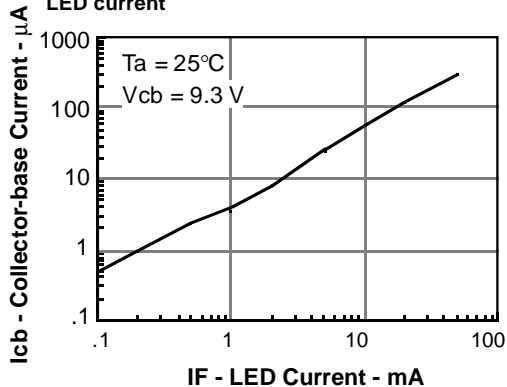


Figure 6. Collector-emitter leakage current versus temperature

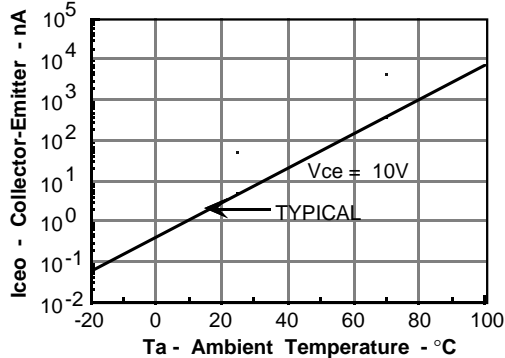


Figure 7. Normalized saturated HFE versus base current and temperature

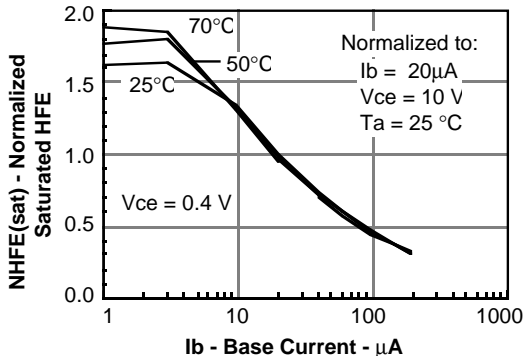
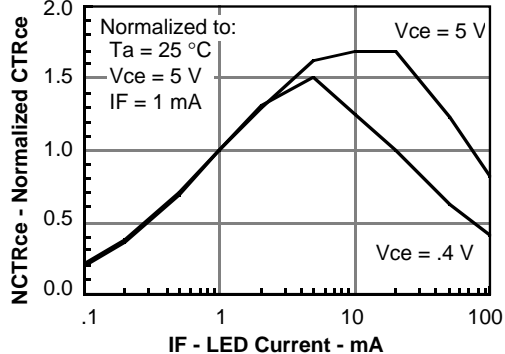
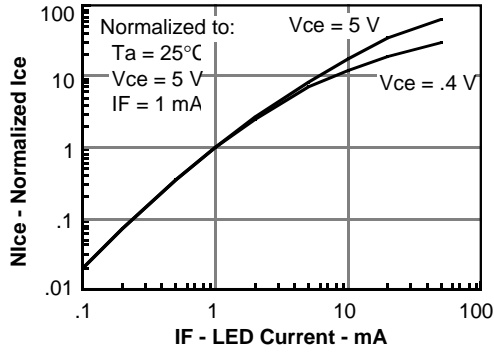


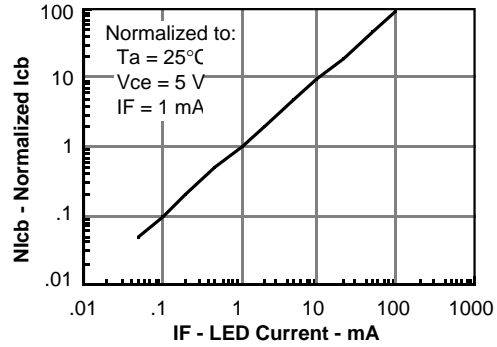
Figure 8. Normalized non-saturated and saturated CTRce versus LED current



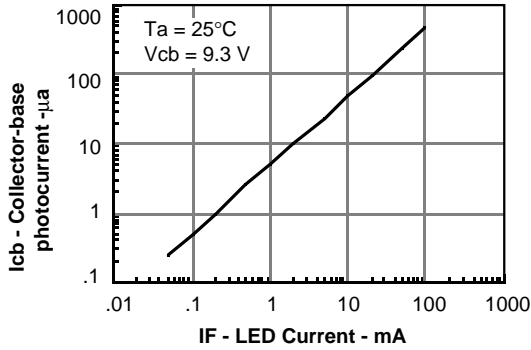
**Figure 9. Normalized non-saturated and saturated collector-emitter current versus LED current**



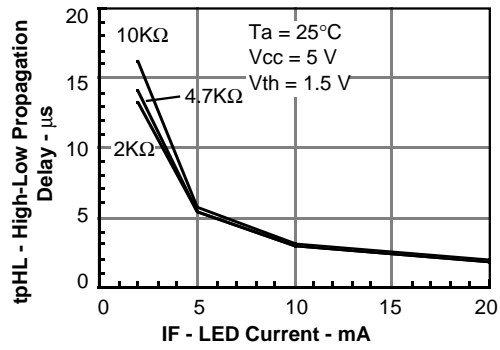
**Figure 10. Normalized collector-base photocurrent versus LED current**



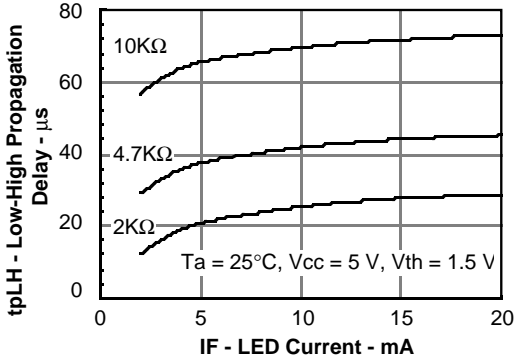
**Figure 11. Collector-base photocurrent versus LED current**



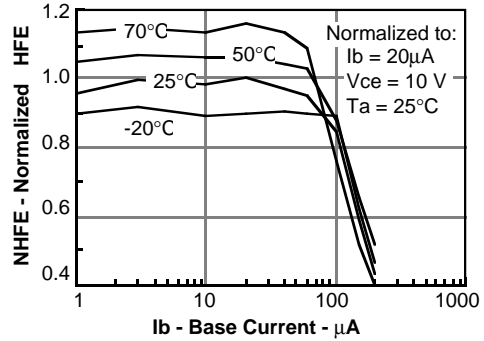
**Figure 12. High to low propagation delay versus LED current and load resistor**



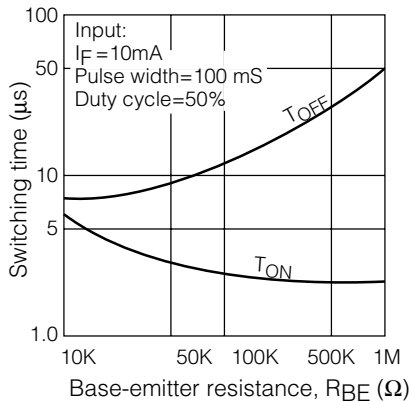
**Figure 13. Low to high propagation delay versus LED current and load resistor**



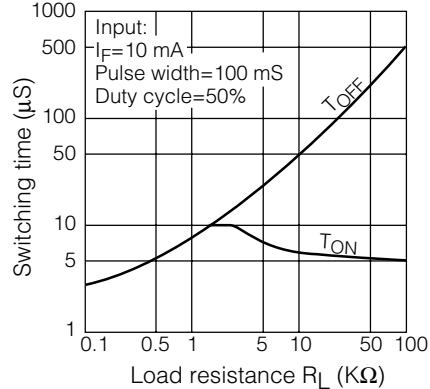
**Figure 14. Normalized non-saturated HFE versus base current and temperature**



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



**Figure 16. Typical switching times versus load resistance**





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