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)**
- **VDE 0884 Available with Option 1**

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 ..... 1.2 mW/°C

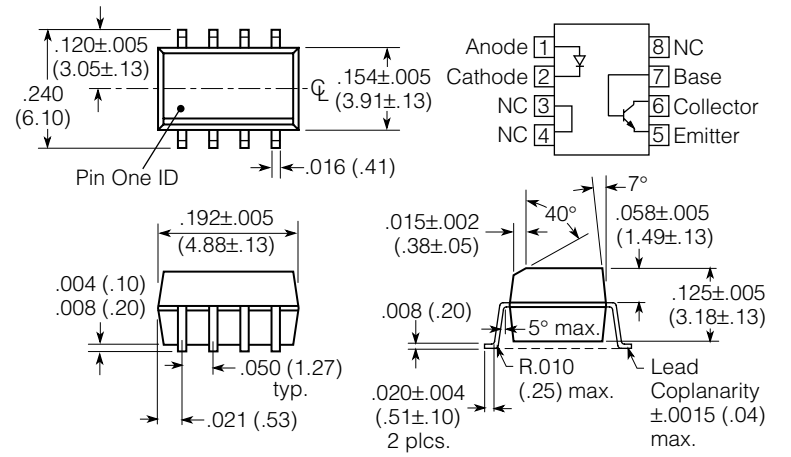
Detector

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 ..... 2.0 mW/°C

Package

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

Dimensions in inches (mm)



Characteristics T_A=25°C

Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
Emitter							
Forward Voltage		V_F	—	1.0	1.5	V	I_F=1.0mA
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		$I_{CEOdark}$	—	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_{CEsat}	—	—	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	—	GΩ	—
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

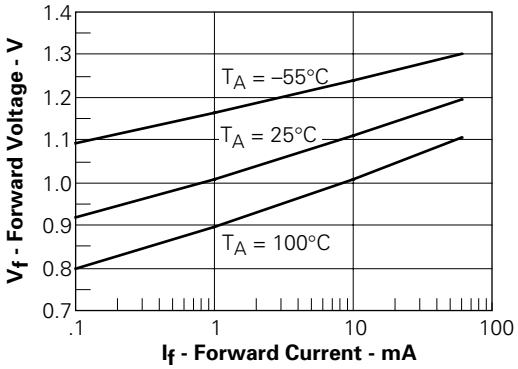


Figure 2. Normalized non-saturated and saturated CTR_{CE} versus LED current

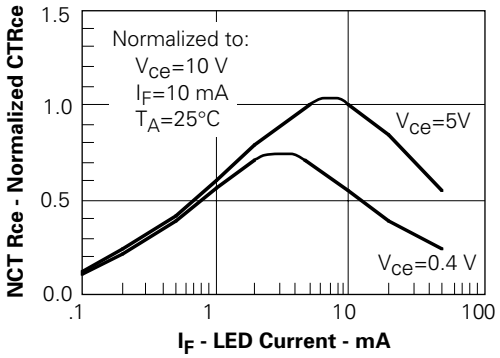


Figure 3. Collector-emitter current versus LED current

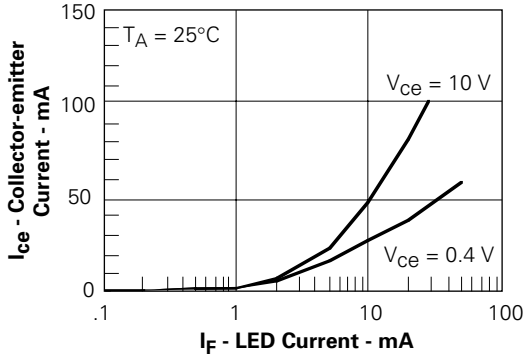


Figure 4. Normalized collector-base photocurrent versus LED current

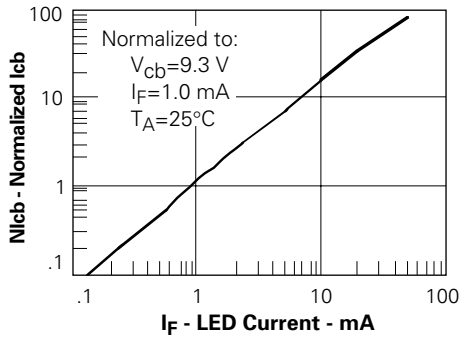


Figure 5. Collector-base photocurrent versus LED current

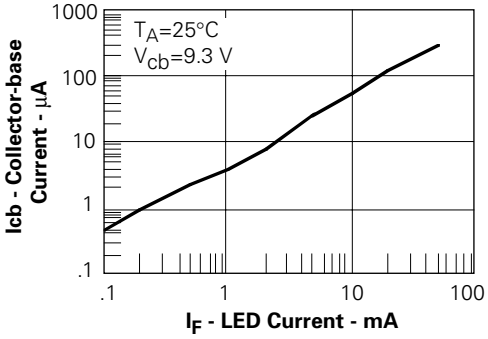


Figure 6. Collector-emitter leakage current versus temperature

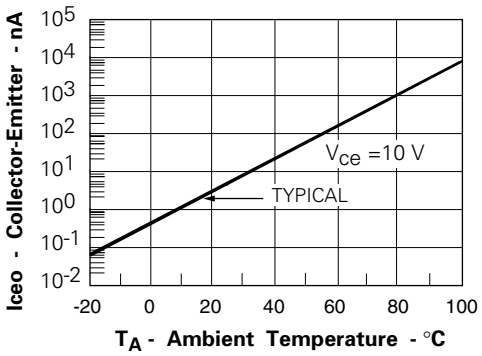


Figure 7. Normalized saturated HFE versus base current and temperature

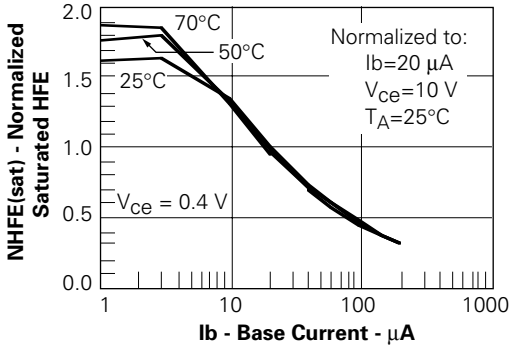


Figure 8. Normalized non-saturated and saturated CTR_{ce} versus LED current

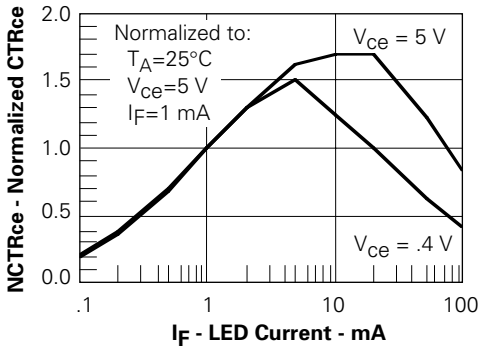


Figure 9. Normalized non-saturated and saturated collector-emitter current vs. LED current

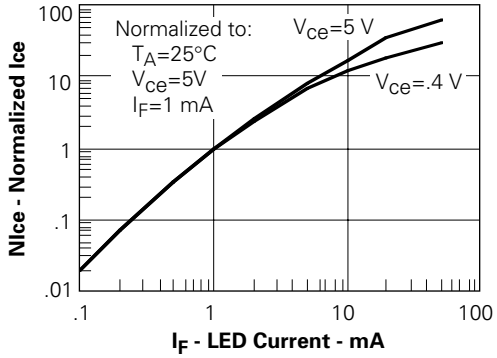


Figure 10. Normalized collector-base photocurrent vs. LED current

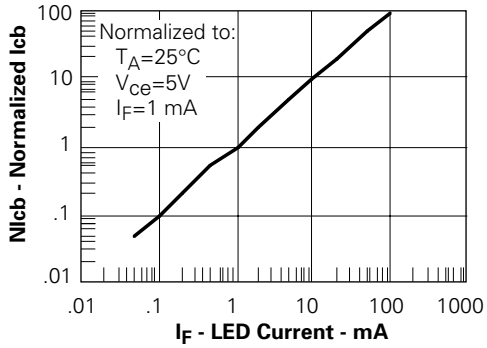


Figure 11. Collector-base photocurrent vs. LED current

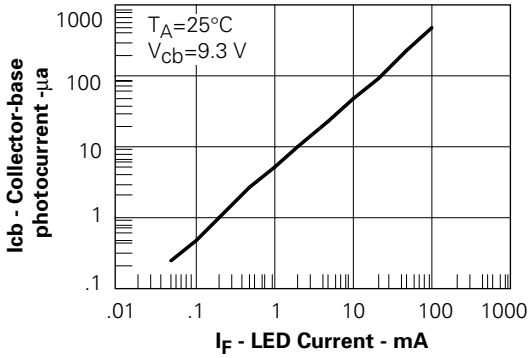


Figure 12. High to low propagation delay vs. LED current and load resistor

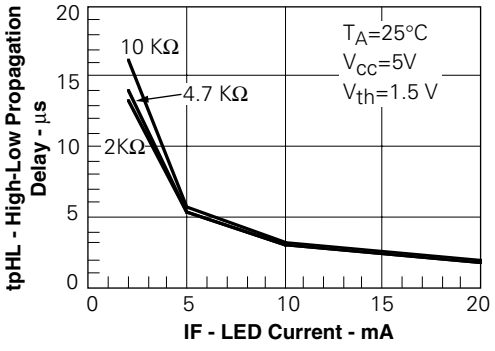


Figure 13. Low to high propagation delay vs. LED current and load resistor

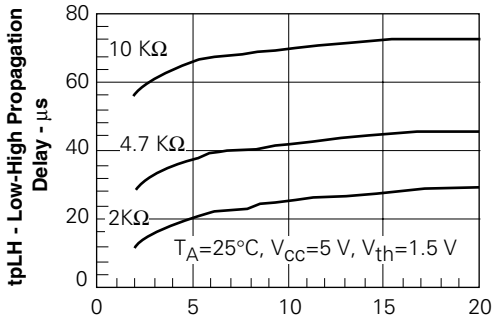


Figure 14. Normalized non-saturated HFE vs. base current and temperature

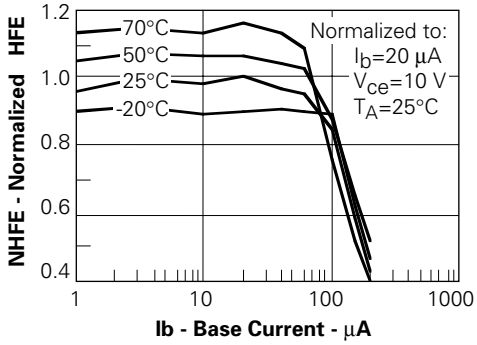


Figure 15. Typical switching characteristics vs. base resistance (saturated operation)
Figure 16. Typical switching times vs. load resistance

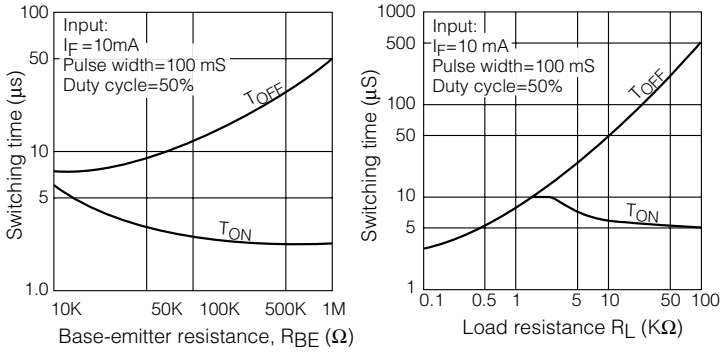
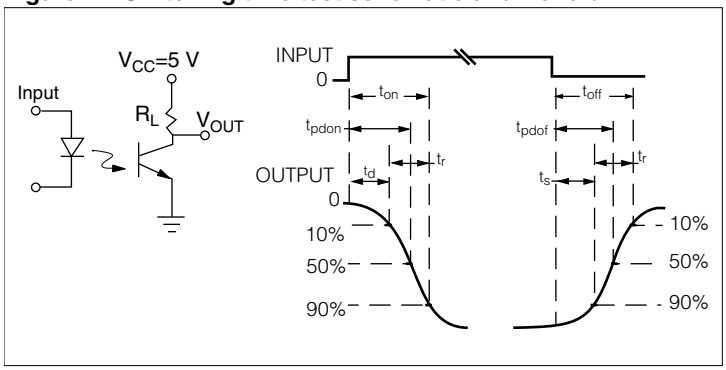



Figure 17. Switching time test schematic and waveform