# SIEMENS

# 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 $VAC_{RMS}$**
- **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

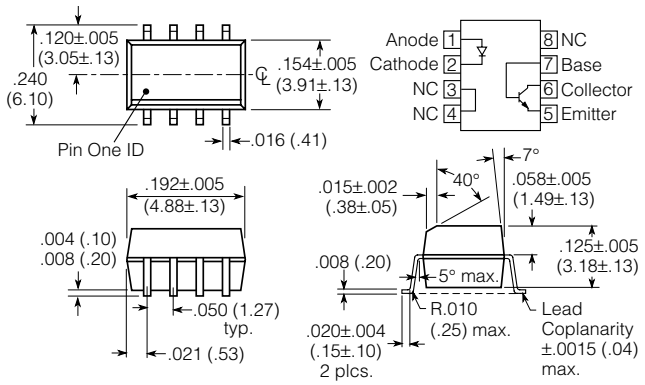
**Detector**

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.

Package Dimensions in Inches (mm)




TOLERANCE: ±.005 (unless otherwise noted)

### Characteristics ($T_A$=25°C)

| | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| **Emitter** | | | | | | |
| Forward Voltage | $V_F$ | | 1.0 | 1.5 | V | $I_F$=1 mA |
| Reverse Current | $I_R$ | | 0.1 | 100 | µA | $V_R$=6.0 V |
| Capacitance | $C_O$ | | 25 | | pF | $V_R$=0 |
| **Detector** | | | | | | |
| Breakdown Voltage | | | | | | |
| Collector-Emitter | $BV_{CEO}$ | 30 | | | V | $I_C$=10 µA |
| Emitter-Collector | $BV_{ECO}$ | 7 | | | V | $I_E$=10 µA |
| Collector-Emitter | | | | | | $V_{CE}$=10 V, |
| Dark Current | $I_{CEOdark}$ | | 5 | 50 | nA | $I_F$ =0 |
| Collector-Emitter | | | | | | |
| Capacitance | $C_{CE}$ | | 10 | | pF | $V_{CE}$=0 |
| **Package** | | | | | | |
| 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 | $V_{CE\,sat}$ | | | 0.4 | | $I_F$=1 mA |
| Isolation Test | | | | | | |
| Voltage | $V_{IO}$ | 2500 | | | $VAC_{RMS}$ | |
| 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 mA, $R_E$=100 Ω, $V_{CE}$=10 V |

*Specifications subject to change.*

**Figure 1. Forward voltage versus forward current**

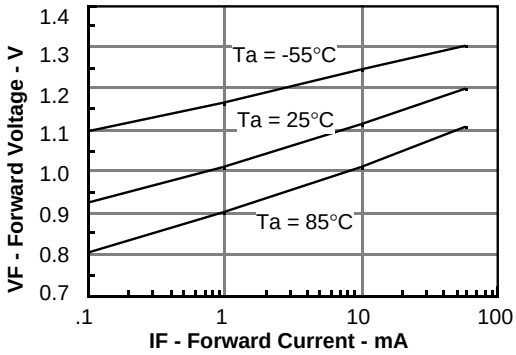



**Figure 2. Normalized non-saturated and saturated CTRce versus LED current**

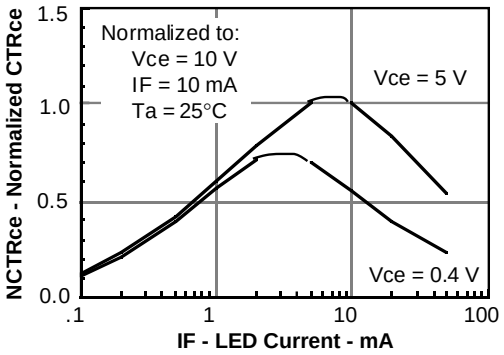



**Figure 3. Collector-emitter current versus LED current**

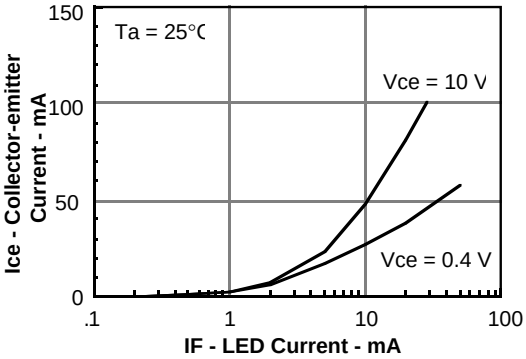



**Figure 4. Normalized collector-base photocurrent versus LED current**

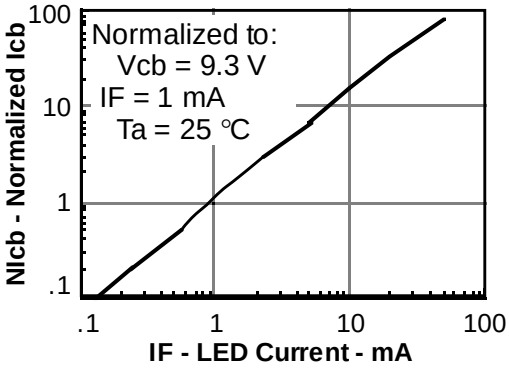



**Figure 5. Collector-base photocurrent versus LED current**

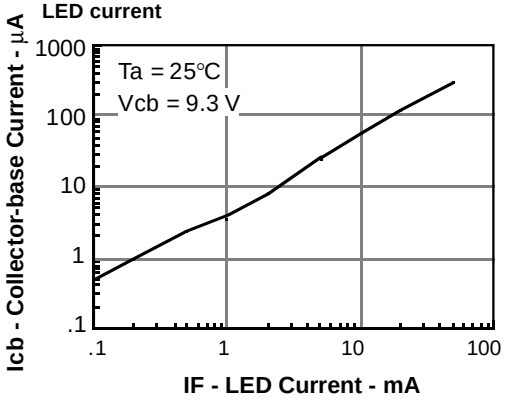



**Figure 6. Collector-emitter leakage current versus temperature**

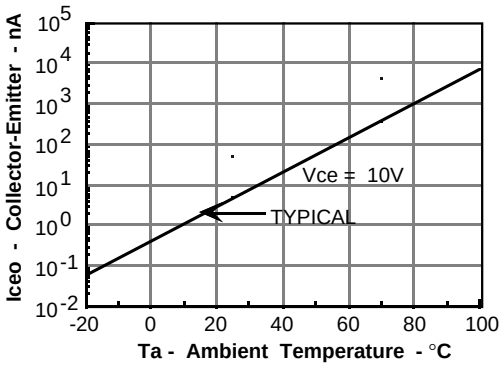



**Figure 7. Normalized saturated HFE versus base current and temperature**

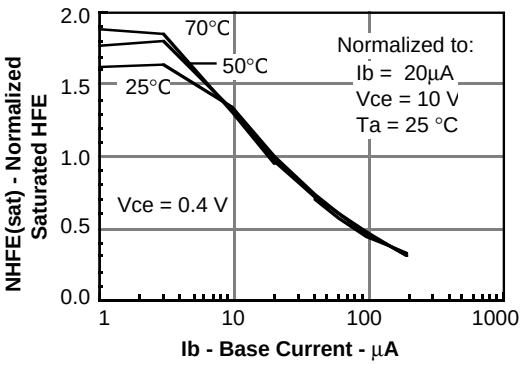



**Figure 8. Normalized non-saturated and saturated CTRce versus LED current**

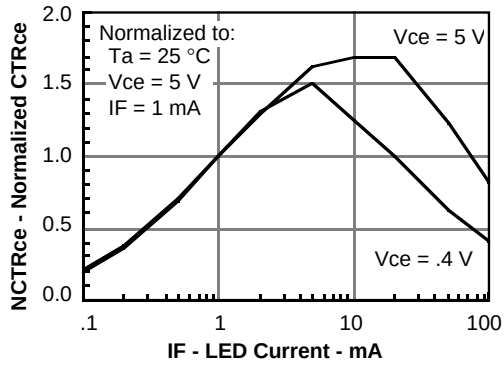


**Figure 9. Normalized non-saturated and saturated collector-emitter current versus LED current**

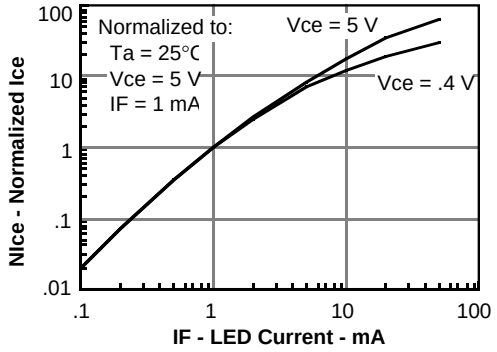



**Figure 10. Normalized collector-base photocurrent versus LED current**

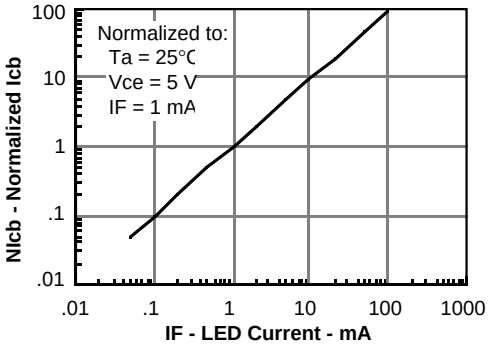



**Figure 11. Collector-base photocurrent versus LED current**

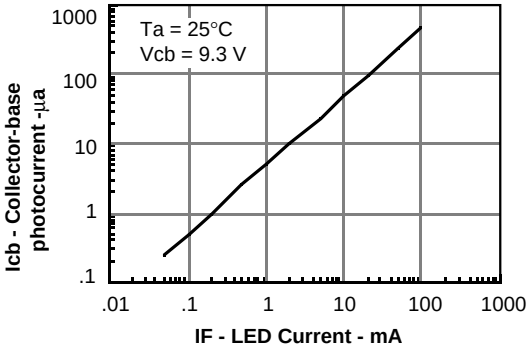



**Figure 12. High to low propagation delay versus LED current and load resistor**

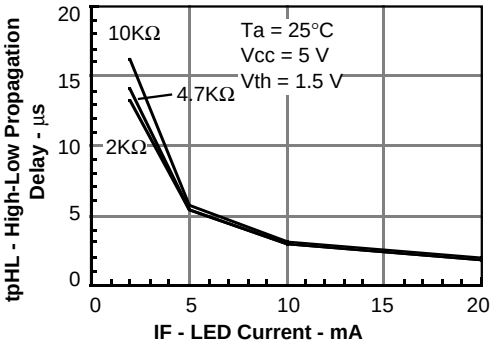



**Figure 13. Low to high propagation delay versus LED current and load resistor**

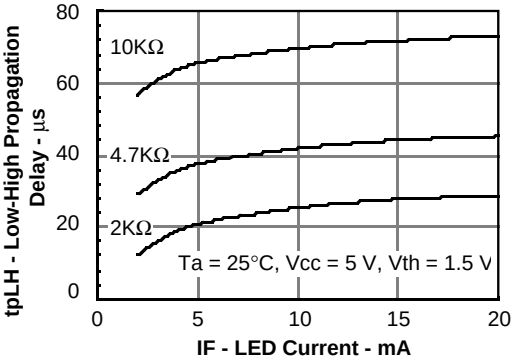



**Figure 14. Normalized non-saturated HFE versus base current and temperature**

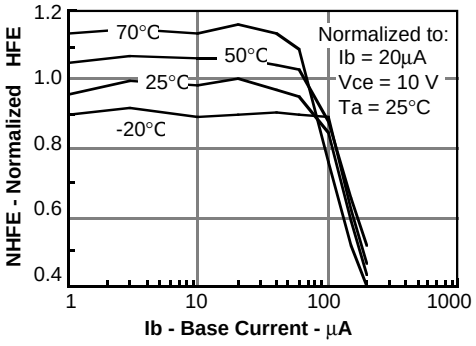



**Figure 15. Typical switching characteristics versus base resistance** (saturated operation)

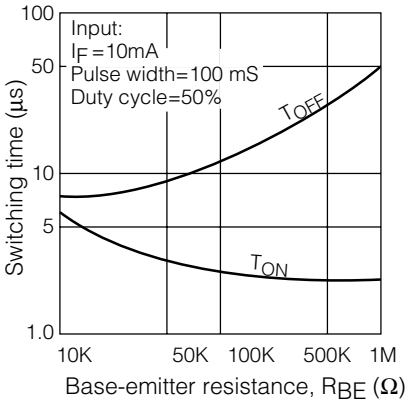



**Figure 16. Typical switching times versus load resistance**