

# IL205AT/206AT/207AT/ 208AT

## PHOTOTRANSISTOR SMALL OUTLINE SURFACE MOUNT OPTOCOUPLER

### FEATURES

- High Current Transfer Ratio,  $I_F=10\text{mA}$ ,  $V_{CE}=5\text{V}$   
IL205AT, 40 – 80%  
IL206AT, 63 – 125%  
IL207AT, 100 – 200%  
IL208AT, 160 – 320%
- High  $BV_{CEO}$ , 70 V
- Isolation Voltage, 2500  $V_{AC_{RMS}}$
- 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 IL205AT/206AT/207AT/208AT 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 IL205/6/7/8 come in a standard SOIC-8 small outline package for surface mounting which makes them 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.

A specified minimum and maximum CTR allows a narrow tolerance in the electrical design of the adjacent circuits. The high  $BV_{CEO}$  of 70 volts gives a higher safety margin compared to the industry standard 30 volts.

### Maximum Ratings

#### Emitter

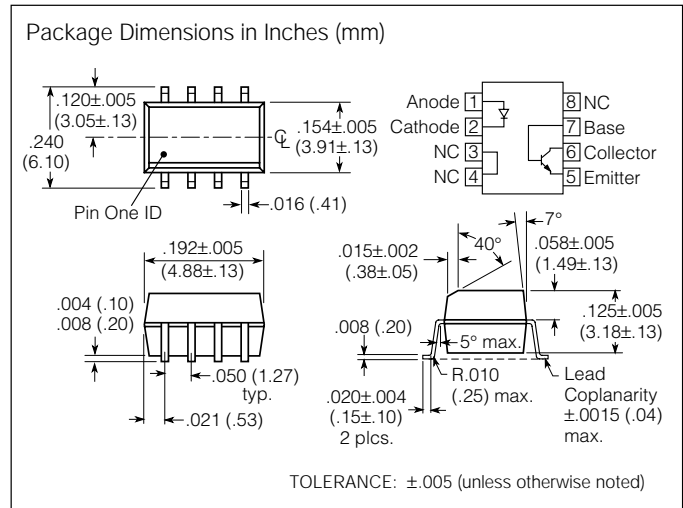
Peak Reverse Voltage ..... 6.0 V  
Continuous Forward Current ..... 60 mA  
Power Dissipation at 25°C ..... 90 mW  
Derate Linearly from 25°C ..... 1.2 mW/°C

#### Detector

Collector-Emitter Breakdown Voltage ..... 70 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) ..... 240 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	$V_F$		1.3	1.5	V	$I_F=10\text{ mA}$
Reverse Current	$I_R$		0.1	100	$\mu\text{A}$	$V_R=6.0\text{ V}$
Capacitance	$C_O$		25		pF	$V_R=0$
<b>Detector</b>						
Breakdown Voltage						
Collector-Emitter	$BV_{CEO}$	70			V	$I_C=100\ \mu\text{A}$
Emitter-Collector	$BV_{ECO}$	7	10		V	$I_E=100\ \mu\text{A}$
Collector-Emitter						$V_{CE}=10\text{ V}$ , $I_F=0$
Dark Current	$I_{CEO\text{dark}}$		5	50	nA	
Collector-Emitter						$V_{CE}=0$
Capacitance	$C_{CE}$		10		pF	
<b>Package</b>						
DC Current Transfer	$CTR_{DC}$				%	$I_F=10\text{ mA}$ , $V_{CE}=5\text{ V}$
			40	80		
			63	125		
			100	200		
			160	320		
DC Current Transfer	$CTR_{DC}$				%	$I_F=1\text{ mA}$ , $V_{CE}=5\text{ V}$
			13	25		
			22	40		
			34	60		
			56	95		
Collector-Emitter						$I_C=2.0\text{ mA}$ , $I_F=10\text{ mA}$
Saturation Voltage	$V_{CE\text{sat}}$			0.4		
Isolation Test Voltage	$V_{IO}$	2500			$V_{AC_{RMS}}$	
Equivalent DC						
Isolation Voltage		3535			VDC	
Capacitance,						
Input to Output	$C_{IO}$		0.5		pF	
Resistance,						
Input to Output	$R_{IO}$		100		$\text{G}\Omega$	
Switching Time	$t_{ON}$ , $t_{OFF}$		3.0		$\mu\text{s}$	$I_C=2\text{ mA}$ , $R_E=100\ \Omega$ , $V_{CE}=10\text{ V}$

Specifications subject to change.

Figure 1. Forward voltage versus forward current

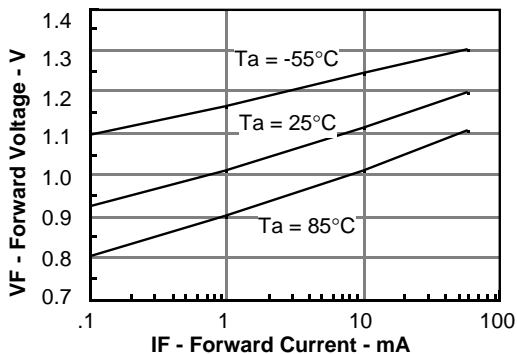


Figure 2. Normalized non-saturated and saturated CTRce versus LED current

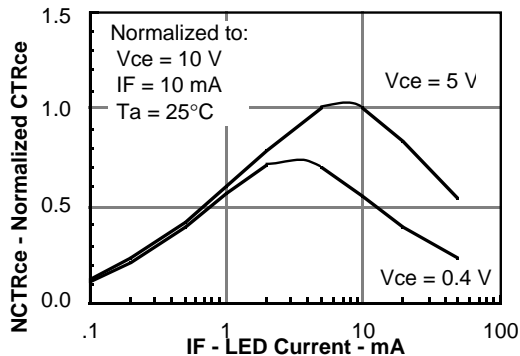


Figure 3. Collector-emitter current versus LED current

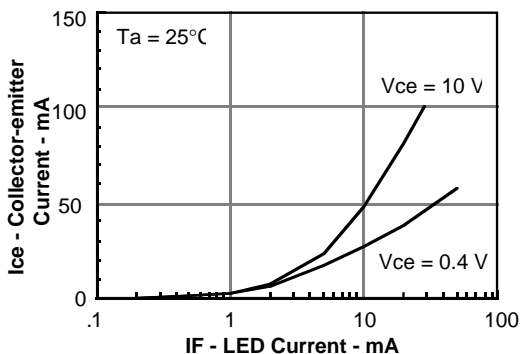


Figure 4. Normalized collector-base photocurrent versus LED current

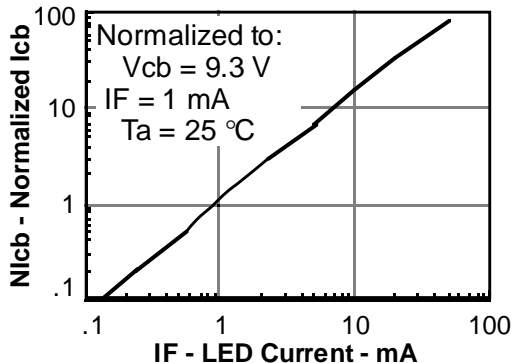


Figure 5. Normalized collector-base photocurrent versus LED current

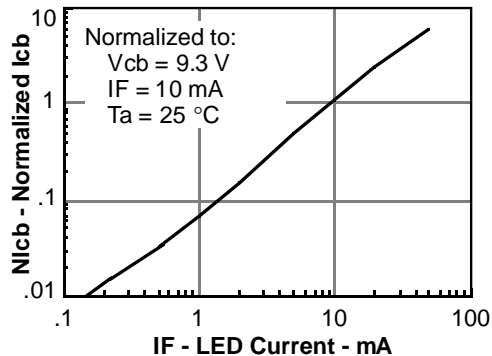


Figure 6. Collector-base photocurrent versus LED current

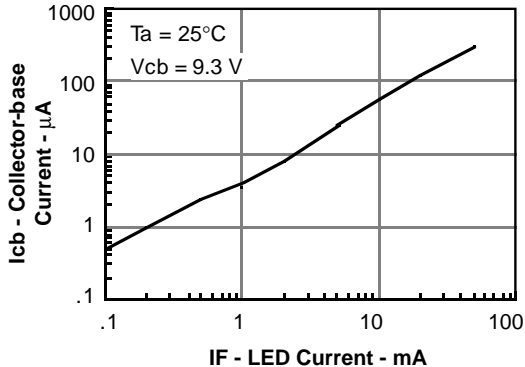


Figure 7. Collector-emitter leakage current versus temperature

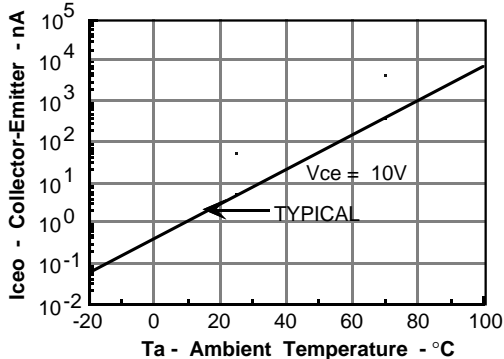
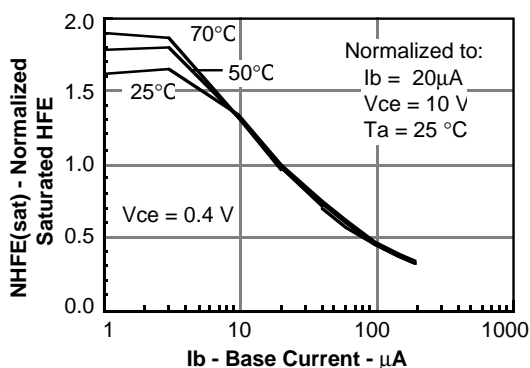
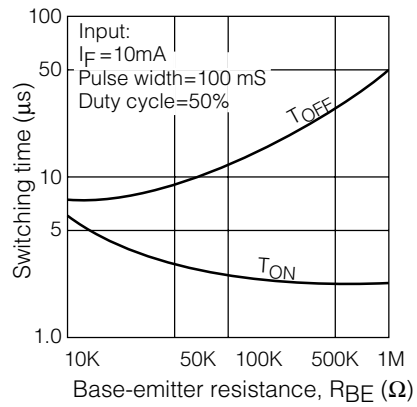


Figure 8. Normalized saturated HFE versus base current and temperature



**Figure 9. Typical switching characteristics versus base resistance** (saturated operation)



**Figure 10. Typical switching times versus load resistance**

