IL205AT/206AT/207AT/208AT

Phototransistor
Small Outline Surface Mount
Optocoupler

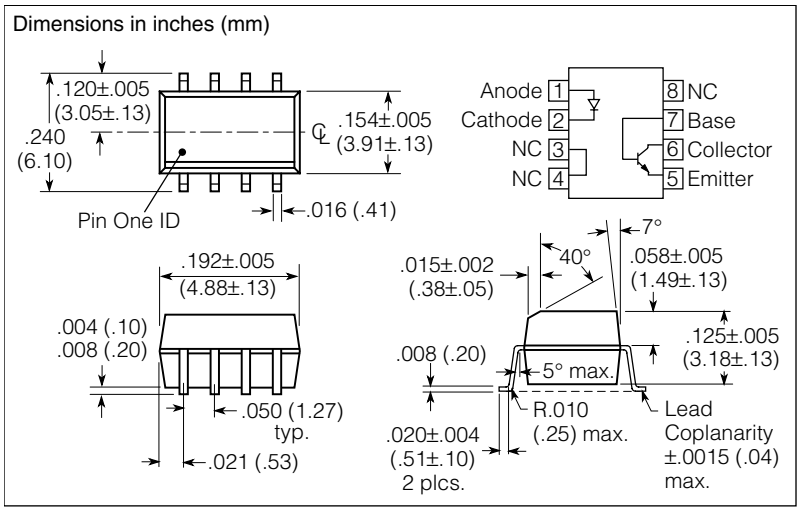
FEATURES

- **High Current Transfer Ratio, I_F=10 mA, V_{CE}=5.0 V**
  IL205AT, 40–80%
  IL206AT, 63–125%
  IL207AT, 100–200%
  IL208AT, 160–320%
- **High BV_{CEO}, 70 V**
- **Isolation Test Voltage, 3000 V_{RMS}, 1 s**
- **Industry Standard SOIC-8A Surface Mountable Package,**
- **Standard Lead Spacing, .05"**
- **Compatible with Dual Wave, Vapor Phase and IR Reflow Soldering**
- **Underwriters Lab File #E52744 (Code Letter Y)**

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. This family comes in a standard SOIC-8A 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, T_A=25°C (except where noted)

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 ..... 7.0 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 ..... 3.3 mW/°C
Operating Temperature ..... –55°C to +100°C
Storage Temperature ..... –55°C to +150°C
Soldering Time at 260°C ..... 10 s

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Characteristics, T_A=25°C

Parameter		Sym.	Min.	Typ.	Max.	Unit	Condition
Emitter							
Forward Voltage		V_F	—	1.3	1.5	V	I_F=10 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		BV_{CEO}	70	—	—	V	I_C=100 µA
		BV_{ECO}	7.0	10	—		I_E=100 µA
Leakage Current, Collector-Emitter		I_{CEO}	—	5.0	50	nA	V_{CE}=10 V
Package							
DC Current Transfer	IL205AT	CTR_{DC}	40	—	80	%	I_F=10 mA, V_{CE}=5.0 V
	IL206AT		63	—	125		
	IL207AT		100	—	200		
	IL208AT		100	—	320		
DC Current Transfer	IL205AT	CTR_{DC}	13	25	—	%	I_F=1.0 mA, V_{CE}=5.0 V
	IL206AT		22	40	—		
	IL207AT		34	60	—		
	IL208AT		56	95	—		
Saturation Voltage, Collector-Emitter		V_{CEsat}	—	—	0.4	—	I_C=2.0 mA, I_F=10 mA,
Isolation Test Voltage		V_{IO}	3000	—	—	V_{RMS}	—
Equivalent DC, Isolation Voltage		—	3535	—	—	VDC	—
Capacitance, Input to Output		C_{IO}	—	0.5	—	pF	—
Resistance, Input to Output		R_{IO}	—	100	—	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 vs. forward current

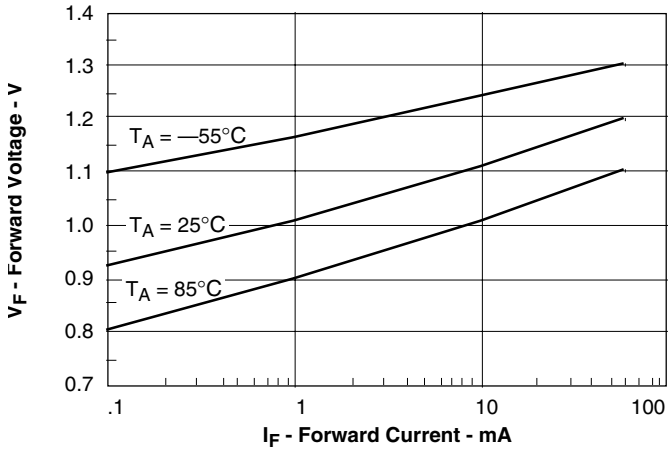

Figure 2. Normalized non-saturated and saturated CTR_{CE} vs. LED current

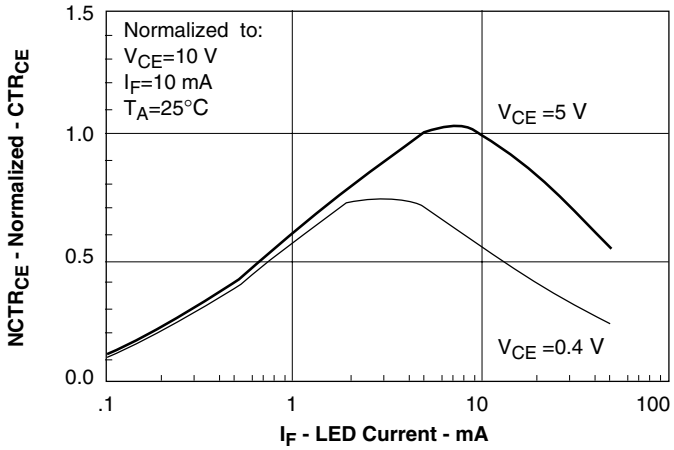

Figure 3. Collector-emitter current vs. LED current

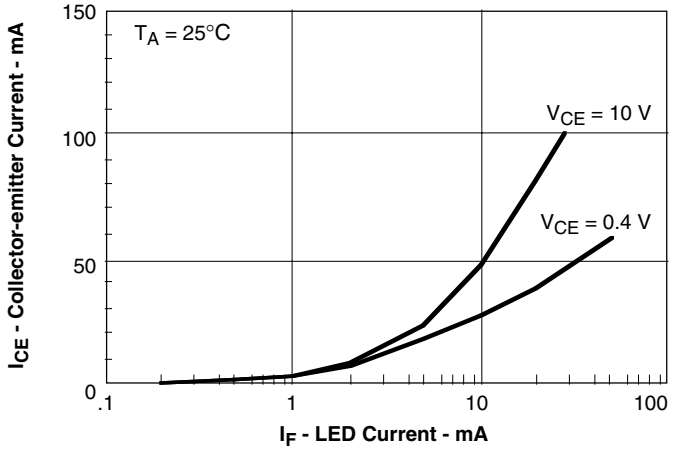

Figure 4. Normalized collector-base photo current vs. LED current

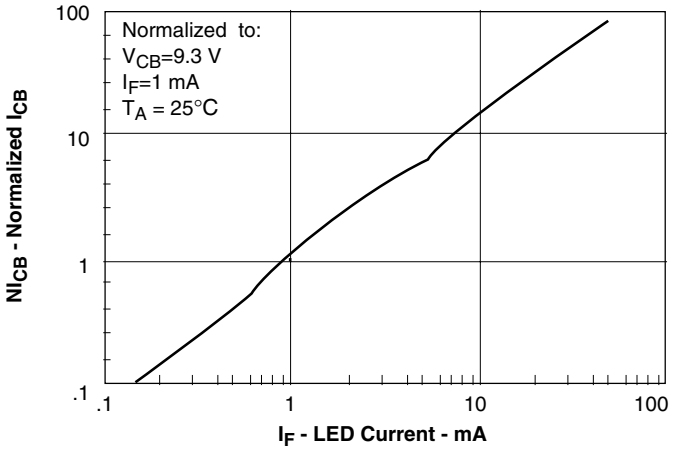

Figure 5. Normalized collector-base photo current vs. LED current

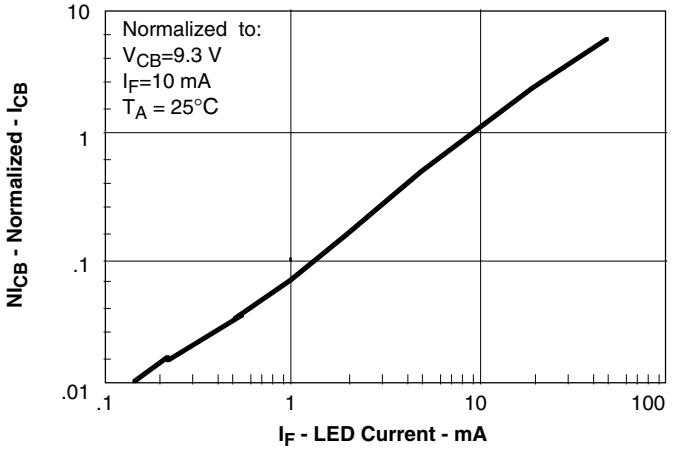

Figure 6. Collector-emitter photo current vs. LED current

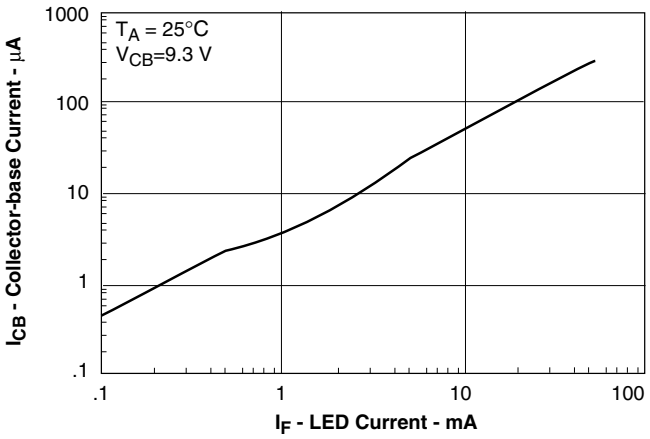

Figure 7. Collector-emitter photo current vs. LED current

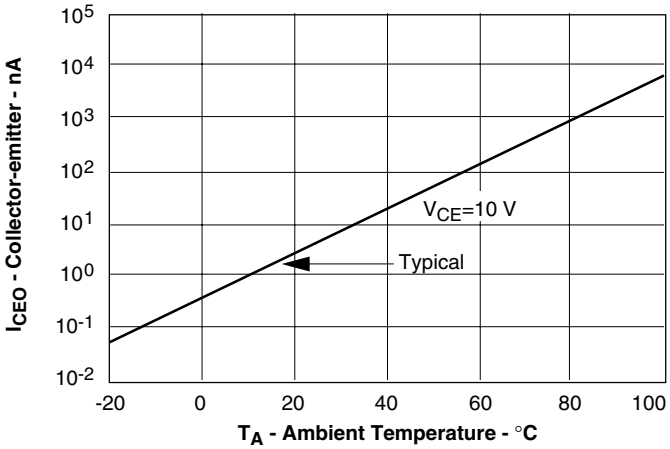

Figure 8. Base current vs. I_F and HFE

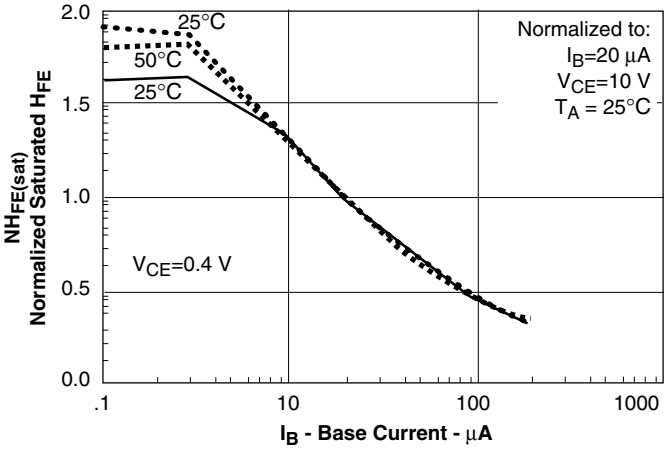

Figure 9. Typical switching characteristics vs. base resistance (saturated operation)

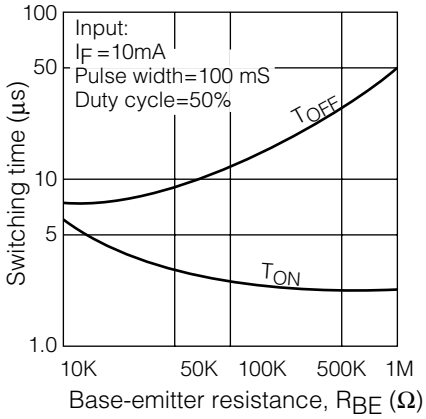

Figure 10. Typical switching times vs. load resistance

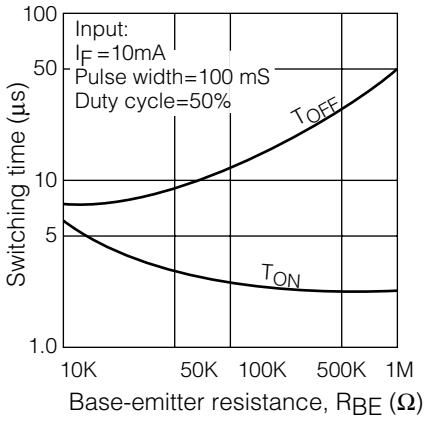

Figure 11. Switching time test schematic and waveform