

SIEMENS

IL201/IL202/IL203 PHOTOTRANSISTOR OPTOCOUPLER

FEATURES

- High Current Transfer Ratio, 75% to 450%
- Minimum Current Transfer Ratio, 10%
- Guaranteed at $I_F=1\text{mA}$
- High Collector-Emitter Voltage, $BV_{CEO}=70\text{V}$
- Long Term Stability
- Industry Standard DIP Package
- Underwriters Lab File #E52744
- VDE 0884 Available with Option 1

DESCRIPTION

The IL201/202/203 are optically coupled pairs employing 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 IL201/202/203 can be used to replace relays and transformers in many digital interface applications, as well as analog applications such as CRT modulation.

Maximum Ratings

Emitter

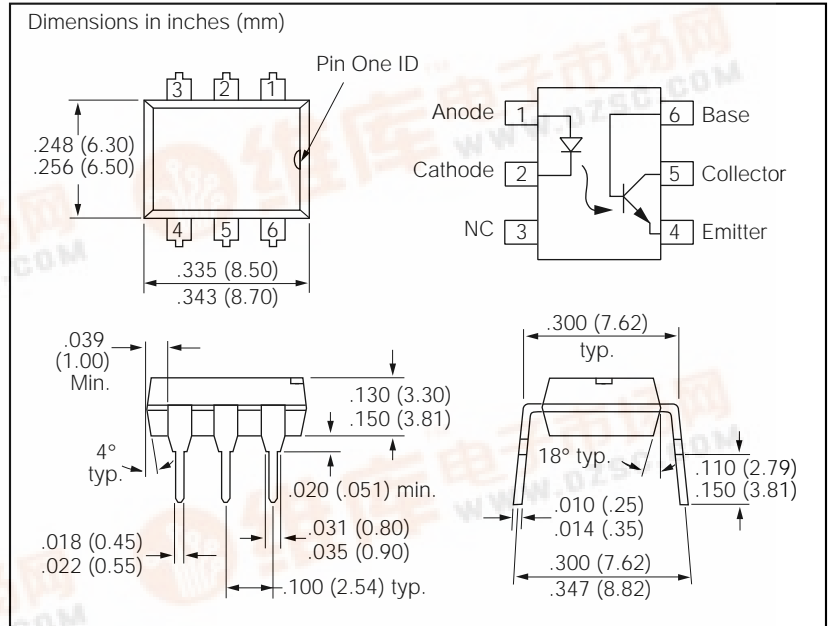
Peak Reverse Voltage..... 6 V
 Continuous Forward Current..... 60 mA
 Power Dissipation at 25°C..... 100 mW
 Derate Linearly from 25°C..... 1.33 mW/°C

Detector

Collector-Emitter Breakdown Voltage,
 BV_{CEO} 70 V
 Emitter-Collector Breakdown Voltage,
 BV_{ECO} 7 V
 Collector-Base Breakdown Voltage,
 BV_{CBO} 70 V
 Power Dissipation..... 200 mW
 Derate Linearly from 25°C..... 2.6 mW/°C

Package

Isolation Test Voltage (t=1 sec.)5300 VAC_{RMS}
 Total Package Dissipation at 25°C A
 (LED + Detector)..... 250 mW
 Derate Linearly from 25°C..... 3.3 mW/°C
 Creepage..... 7 min mm
 Clearance..... 7 min mm
 Storage Temperature..... -55°C to +150°C
 Operating Temperature..... -55°C to +100°C
 Lead Soldering Time at 260°C..... 10 sec.



Characteristics (0°C to 70°C unless otherwise specified)

	Symbol	Min.	Typ.	Max.	Unit	
Emitter						
Forward Voltage	V_F		1.2	1.5	V	$I_F=20\text{ mA}$
Forward Voltage	V_F		1.0	1.2	V	$I_F=1\text{ mA}$
Breakdown Voltage	V_F	6	20		V	$I_R=10\text{ }\mu\text{A}$
Reverse Current	I_R		0.1	10	μA	$V_R=6\text{ V}$ $T_A=25^\circ\text{C}$
Detector						
	HFE	100	200			$V_{CE}=5\text{ V}$ $I_C=100\text{ }\mu\text{A}$
	BV_{CEO}	70			V	$I_C=100\text{ }\mu\text{A}$
	BV_{ECO}	7	10		V	$I_E=100\text{ }\mu\text{A}$
	BV_{CBO}	70	90		V	$I_C=10\text{ }\mu\text{A}$
	I_{CEO}		5	50	nA	$V_{CE}=10\text{ V}$ $T_A=25^\circ\text{C}$
Package						
Base Current Transfer Ratio	CTR_{CB}	0.15			%	$I_F=10\text{ mA}$ $V_{CB}=10\text{ V}$
	V_{CEsat}			0.4	V	$I_F=10\text{ mA}$ $I_C=2\text{ mA}$
DC Current Transfer Ratio						$I_F=10\text{ mA}$ $V_{CE}=10\text{ V}$
IL201	CTR	75	100	150	%	
IL202	CTR	125	200	250	%	
IL203	CTR	225	300	450	%	
DC Current Transfer Ratio						$I_F=1\text{ mA}$ $V_{CE}=10\text{ V}$
IL201	CTR	10			%	
IL202	CTR	30			%	
IL203	CTR	50			%	



Figure 1. Forward voltage versus forward current

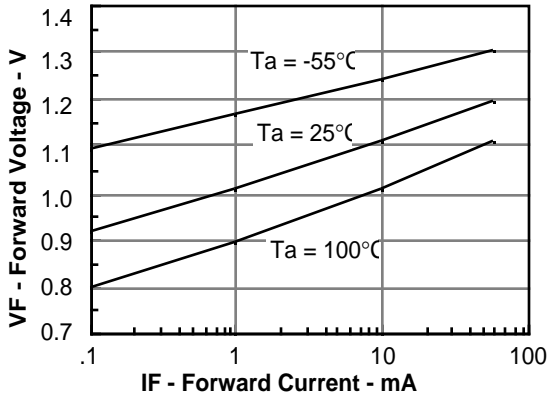


Figure 2. Normalized non-saturated and saturated CTR at $T_A=25^\circ\text{C}$ versus LED current

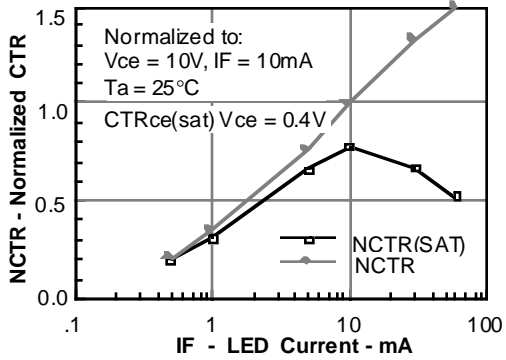


Figure 3. Normalized non-saturated and saturated CTR at $T_A=50^\circ\text{C}$ versus LED current

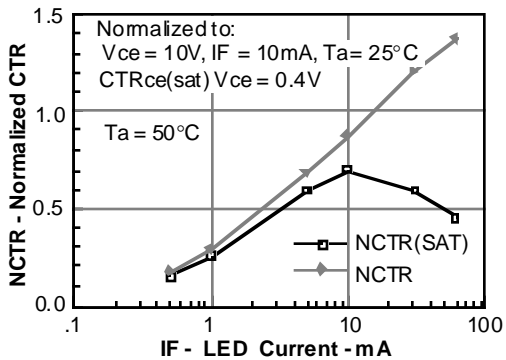


Figure 4. Normalized non-saturated and saturated CTR at $T_A=70^\circ\text{C}$ versus LED current

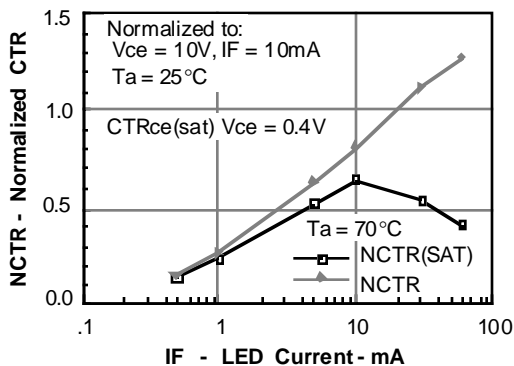


Figure 5. Normalized non-saturated and saturated CTR at $T_A=85^\circ\text{C}$ versus LED current

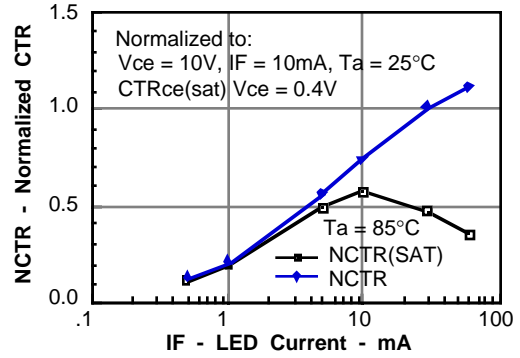


Figure 6. Collector-emitter current versus temperature and LED current

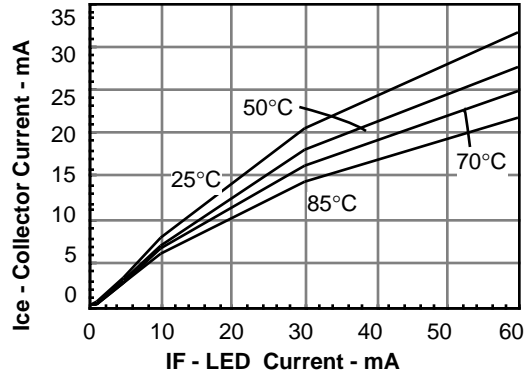


Figure 7. Collector-emitter leakage current versus temperature

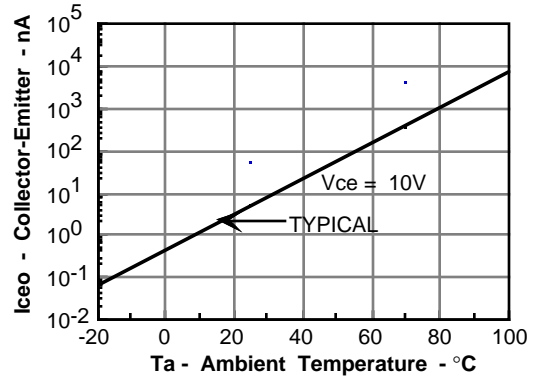


Figure 8. Normalized CTR_{cb} versus LED current and temperature

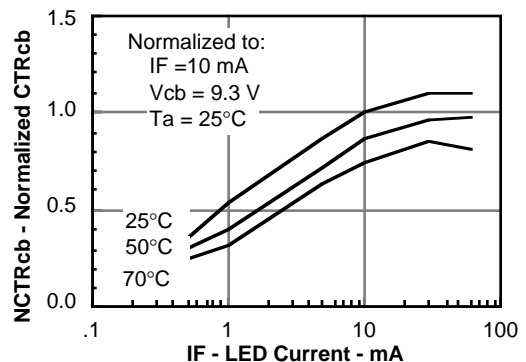


Figure 9. Collector base photocurrent versus LED current

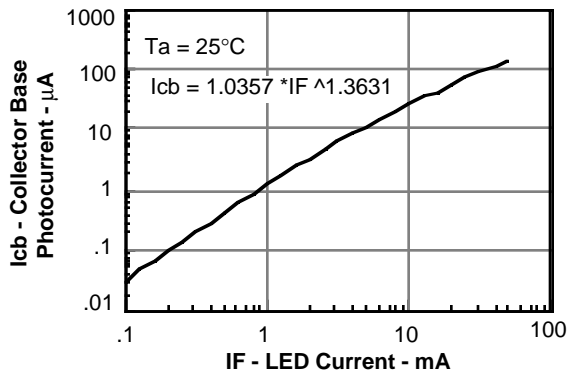


Figure 10. Normalized photocurrent versus I_f and temperature

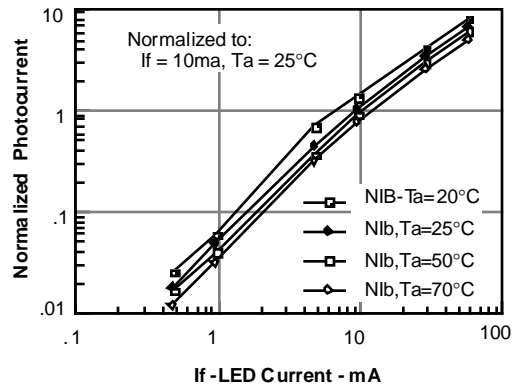


Figure 11. Normalized saturated HFE versus base current and temperature

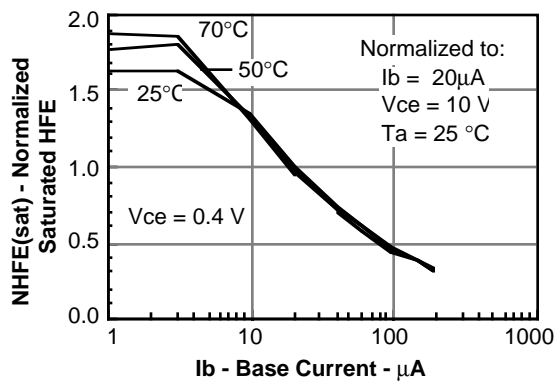


Figure 12. Propagation delay versus collector load resistor

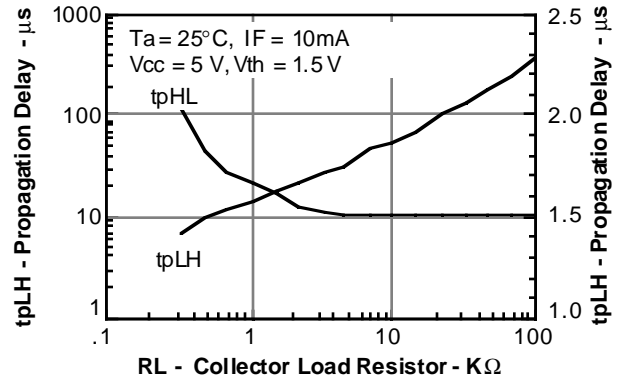


Figure 13. Normalized non-saturated and saturated CTR_{ce} versus LED current

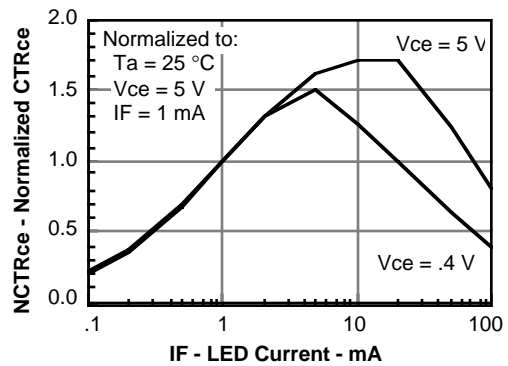


Figure 14. Normalized non-saturated HFE versus base current and temperature

