IL352

Phototransistor Optocoupler

FEATURES

- **Good CTR Linearity Depending on Forward Current**
- **Isolation Test Voltage, 3000 V_{RMS}**
- **High Collector-Emitter Voltage, V_{CEO}=30 V**
- **Low Saturation Voltage**
- **Fast Switching Times**
- **Field-Effect Stable by TRIOS***

DESCRIPTION

The IL352 is an optically coupled isolator that features a high current transfer ratio, low coupling capacitance and high isolation voltage. It has a GaAs infrared emitting diode emitter, which is optically coupled to a silicon planar phototransistor detector. The component is housed in a thin line package.

The coupling device is designed for signal transmission between two electrically separated circuits. The potential difference between the circuits to be coupled must not exceed the maximum permissible reference voltages.

Maximum Ratings

Emitter

Reverse Voltage .....6.0 V
DC Forward Current .....60 mA
Total Power Dissipation .....50 mW
Derate Linearly from 25°C.....0.66 mW/°C

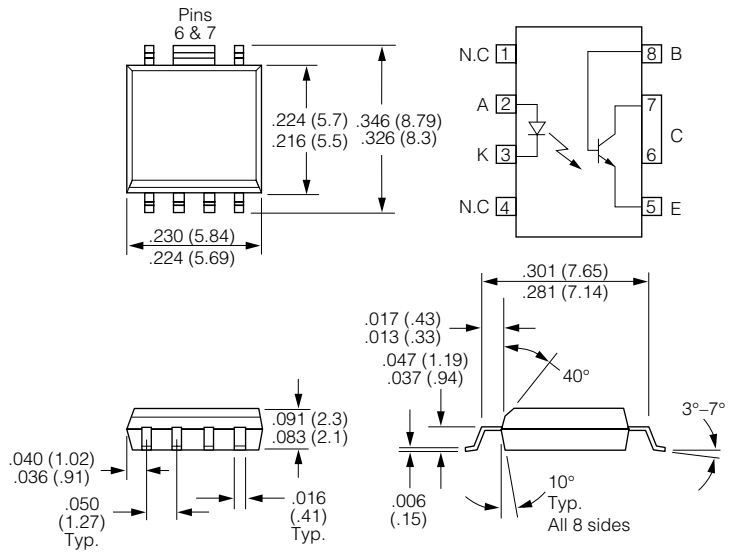
Detector

Collector-Emitter Voltage .....70 V
Emitter-Base Voltage .....7.0 V
Collector Current .....50 mA
Collector Current (t ≤1.0 ms).....100 mA
Total Power Dissipation .....150 mW
Derate Linearly from 25°C.....2.5 mW/°C

Package

Isolation Test Voltage (between emitter and detector referred to climate DIN 40046, part 2, Nov. 74)
t=1.0 sec..... 3000 V_{RMS}
Isolation Resistance
V_{IO}=500 V, T_A=25°C .....≥10^{12} Ω
V_{IO}=500 V, T_A=100°C .....≥10^{11} Ω
Storage Temperature Range .....–40°C to +150°C
Ambient Temperature Range .....–40°C to +85°C
Junction Temperature..... 100°C
Soldering Temperature (max 10 s, Dip Soldering Distance to Seating Plane ≥1.5 mm) .....260°C

Dimensions in Inches (mm)



Characteristics T_A=25°C

Emitter	Sym.	Min.	Typ.	Max.	Units	Condition
Forward Voltage	V_F	—	1.3	1.5	V	I_F=10 mA
Reverse Current	I_R	—	0.1	10	µA	V_R=6.0 V
Capacitance	C_O	—	25	—	pF	V_R=0 f=1.0 MHz
Detector						
Breakdown Voltage Collector-Emitter Emitter-Collector	BV_{CEO} BV_{ECO}	30 7.0	—	—	V	I_C=1.0 mA I_E=100 µA
Collector-Emitter Leakage	I_{CEO}	—	5.0	50	nA	V_{CE}=10 V I_F=0 T_A=25°C
		—	—	500	µA	V_{CE}=30 V I_F=0 T_A=85°C
Collector to Base	BV_{CBO}	70	—	—	V	I_C=100 µA
Capacitance Collector-Emitter	C_{CE}	—	6.0	—	pF	V_{CE}=0

***TR**ansparent **IO**n **S**hield

Characteristics T_A=25°C (continued)

Package	Symbol	Min.	Typ.	Max.	Units	Condition
DC Current Transfer Ratio	CTR	100	—	—	%	I_F=10 mA V_{CE}=10 V
DC Current Transfer Ratio	CTR	34	—	—	%	I_F=1.0 mA V_{CE}=10 V
Saturation Voltage Collector-Emitter	V_{CEsat}	—	—	0.3	V	I_F=10 mA, I_C=0.5 mA
Coupling Capacitance	C_{IO}	—	0.5	—	pF	f=1.0 MHz
Switching Time, Non-Saturated	t_{on}, t_{off}	—	10	—	µs	I_C=2.0 mA R_E=100 Ω V_{CC}=10 V RH≤50%

Figure 1. Switching waveform

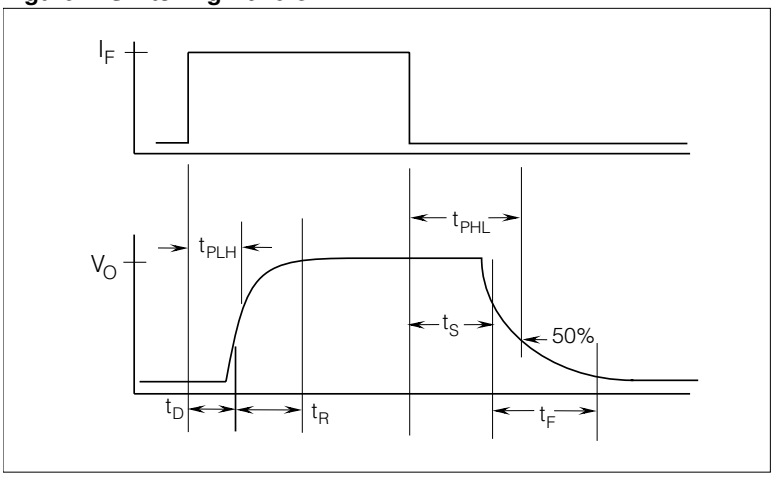


Figure 2. Switching schematic

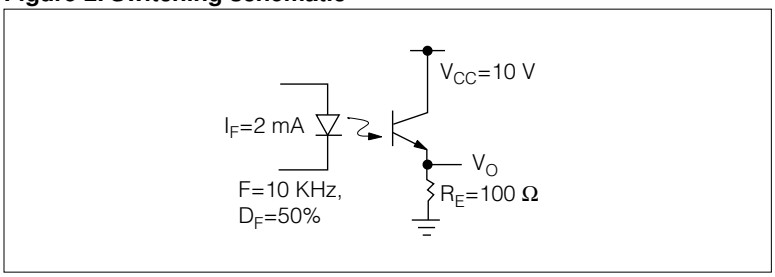


Figure 3. Forward voltage versus forward current

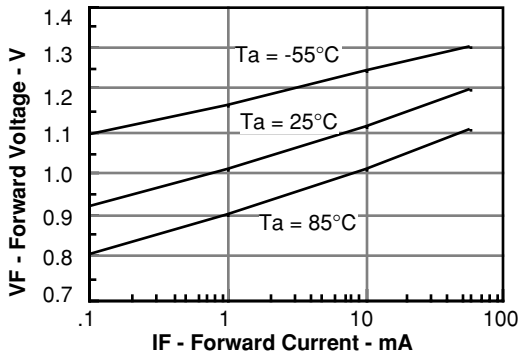


Figure 4. Normalized non-saturated and saturated CTR at T_A=25°C versus LED current

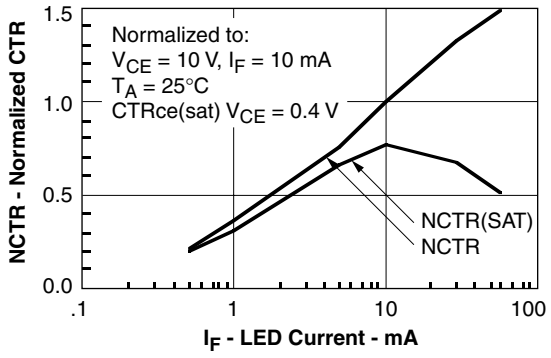


Figure 5. Normalized non-saturated and saturated CTR at T_A=50°C versus LED current

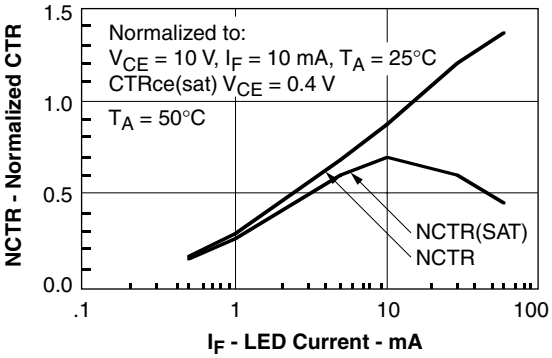


Figure 6. Normalized non-saturated and saturated CTR at T_A=70°C versus LED current

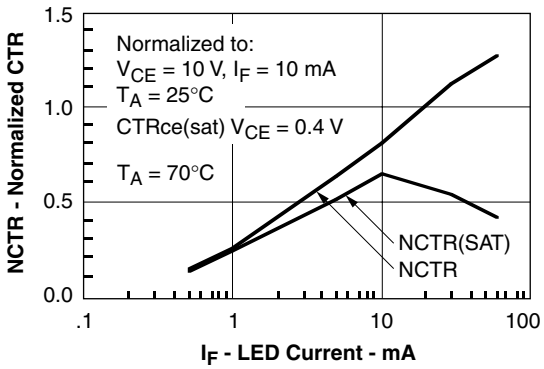


Figure 7. Normalized non-saturated and saturated CTR at T_A=85°C versus LED current

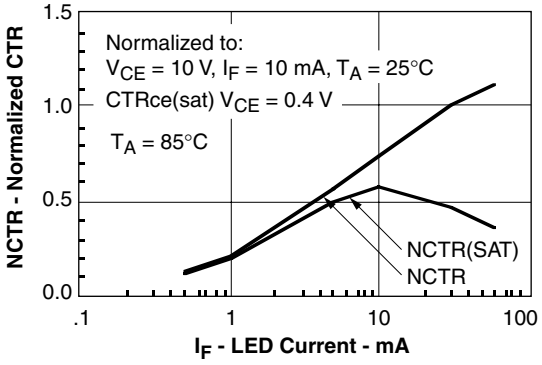


Figure 8. Collector-emitter current versus temperature and LED current

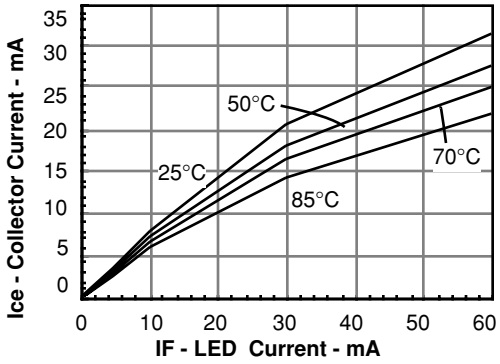


Figure 9. Collector-emitter leakage current versus temperature

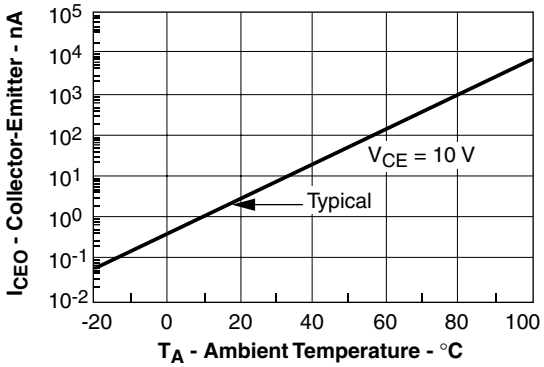


Figure 10. Normalized CTR_{cb} versus LED current and temperature

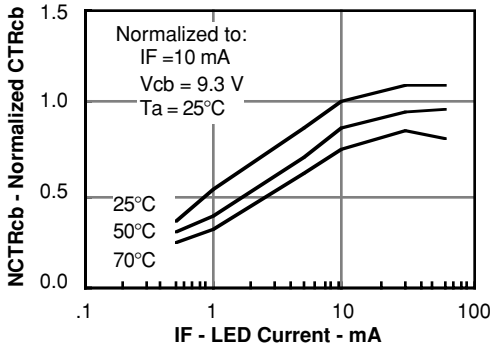


Figure 11. Collector base photocurrent versus LED current

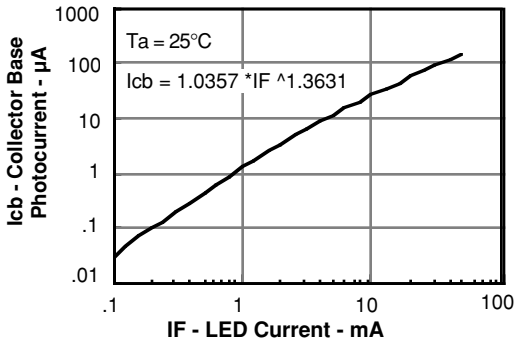


Figure 12. Normalized photocurrent versus I_F and temperature

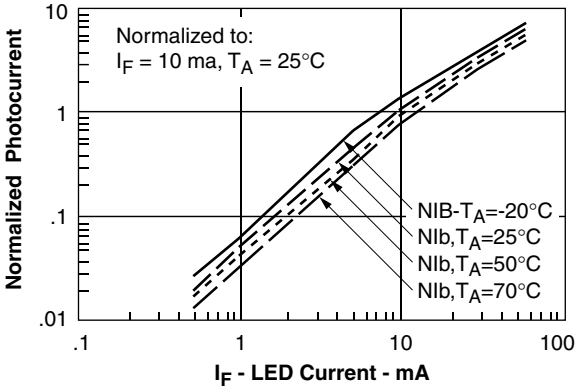


Figure 13. Propagation delay versus collector load resistor