SIEMENS

# SINGLE CHANNEL IL250/251/252
# DUAL CHANNEL ILD250/251/252
## BIDIRECTIONAL INPUT OPTOCOUPLER

**FEATURES**

- **Selected Current Transfer Ratios 20%, 50%, 100% Minimum**
- **AC or Polarity Insensitive Input**
- **Built-in Reverse Polarity Input Protection**
- **Improved CTR Symmetry**
- **Industry Standard DIP Package**
- **Underwriters Lab File #E52744**
- **VDE 0884 Available with Option 1**

**Maximum Ratings** (Per Channel)

**Emitter**

Continuous Forward Current .....60 mA
Power Dissipation at 25°C.....100 mW
Derate Linearly from 25°C.....1.33 mW/°C

**Detector**

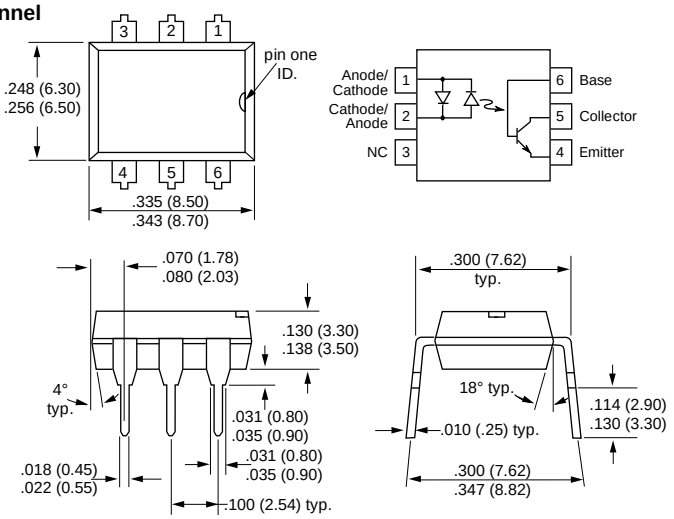
Collector-Emitter Breakdown Voltage..... 30 V
Emitter-Base Breakdown Voltage .....5 V
Collector-Base Breakdown Voltage .....70 V
Power Dissipation at 25°C
Single Channel .....200 mW
Dual Channel.....150 mW
Derate Linearly from 25°C
Single Channel .....2.6 mW/°C
Dual Channel.....2.0 mW/°C

**Package**

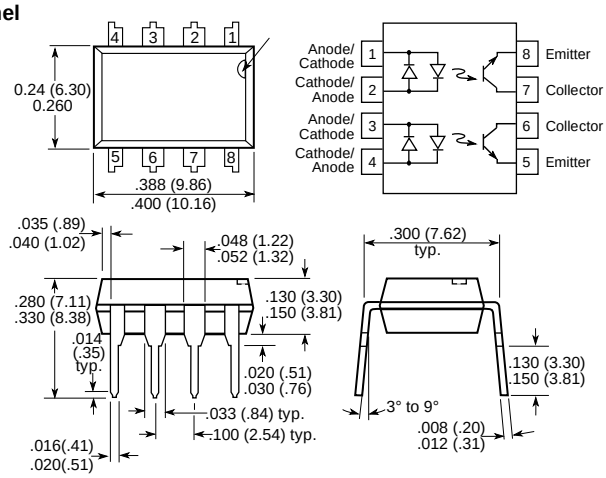
Isolation Test Voltage (between emitter and detector referred to standard climate 23°C/50%RH, DIN 50014) .....5300 $VAC_{RMS}$
Creepage ..... 7 mm min.
Clearance..... 7 mm min.
Isolation Resistance
$V_{IO}$=500V, $T_A$=25°C ..... $10^{12}$ Ω
$V_{IO}$=500V, $T_A$=100°C ..... $10^{11}$ Ω
Total Dissipation at 25°C
Single Channel .....250 mW
Dual Channel.....400 mW
Derate Linearly from 25°C
Single Channel .....3.3 mW/°C
Dual Channel.....5.3 mW/°C
Storage Temperature .....–55°C to +150°C
Operating Temperature .....–55°C to +100°C
Lead Soldering Time at 260°C..... 10 sec.

Dimensions in inches (mm)

**Single Channel**




**Dual Channel**




**DESCRIPTION**

The IL/ILD250/251/252 are bidirectional input optically coupled isolators consisting of two Gallium Arsenide infrared LEDs coupled to a silicon NPN phototransistor per channel.

The IL/ILD250 has a minimum CTR of 50%, the IL/ILD251 has a minimum CTR of 20%, and the IL/ILD252 has a minimum CTR

of 100%.

The IL/IL250/1/2 are single channel optocouplers. The

ILD250/1/2 has two isolated channels in a single DIP package.

These optocouplers are ideal for applications requiring AC signal detection and monitoring.

**Electrical Characteristics** ($T_A$=25 C)

| Parameter | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|
| **Emitter** | | | | | |
| Forward Voltage $V_F$ | | 1/2 | 1.5 | V | $I_F$=±10 mA |
| **Detector** | | | | | |
| $BV_{CEO}$ | 30 | 50 | | V | $I_C$=1 mA |
| $BV_{EBO}$ | 7 | 10 | | V | $I_E$=100 µA |
| $BV_{CBO}$ | 70 | 90 | | V | $I_C$=10 µA |
| $I_{CEO}$ | | 5 | 50 | nA | $V_{CE}$=10 V |
| **Package** | | | | | |
| $V_{CEsat}$ | | | 0.4 | V | $I_F$=±16 mA, $I_C$=2 mA |
| DC Current Transfer Ratio | | | | % | $I_F$=±10 mA, $V_{CE}$=10 V |
| IL/D250 | 50 | | | | |
| IL/D251 | 20 | | | | |
| IL/D252 | 100 | | | | |
| Symmetry $\frac{\text{CTR @ +10 mA}}{\text{CTR @ - 10 mA}}$ | 0.50 | 1.0 | 2.0 | | |

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

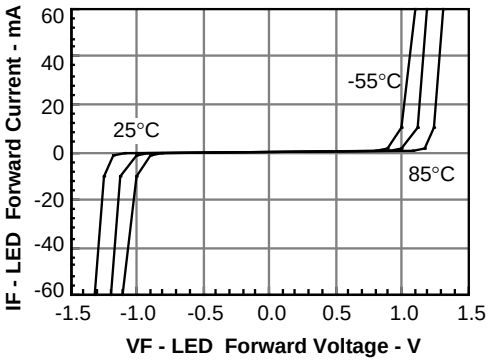



**Figure 2. Normalized non-saturated and saturated CTR at $T_A$ = 25°C versus LED currenth**

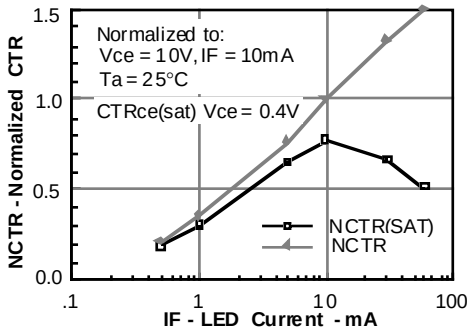



**Figure 3. Normalized non-saturated and saturated CTR at $T_A$ = 50°C versus LED current**

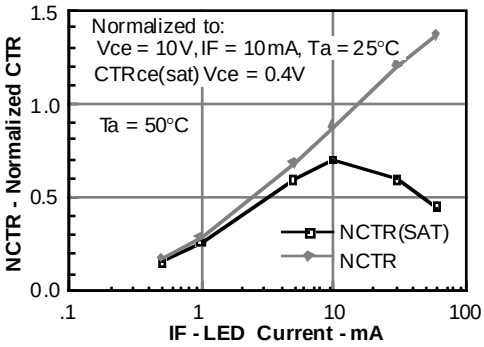



**Figure 4. Normalized non-saturated and saturated CTR at $T_A$ = 70°C versus LED current**

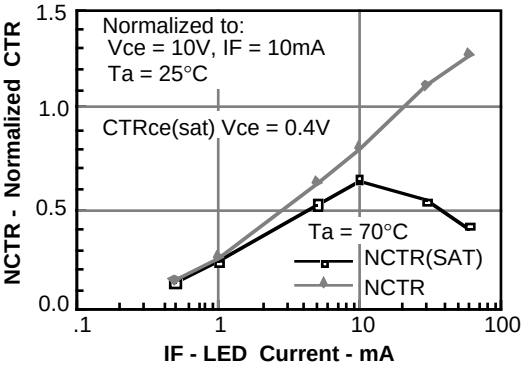



**Figure 5. Normalized non-saturated and saturated CTR at $T_A$ = 85°C versus LED current**

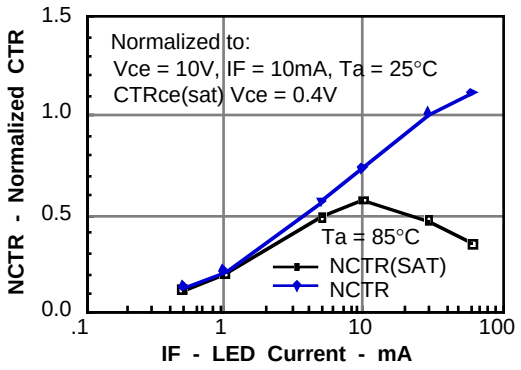



**Figure 6. Collector-emitter current versus temperature and LED current**

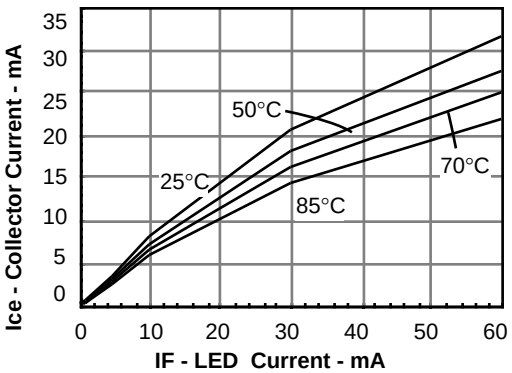


**Figure 7. Collector-emitter leakage current versus temperature**

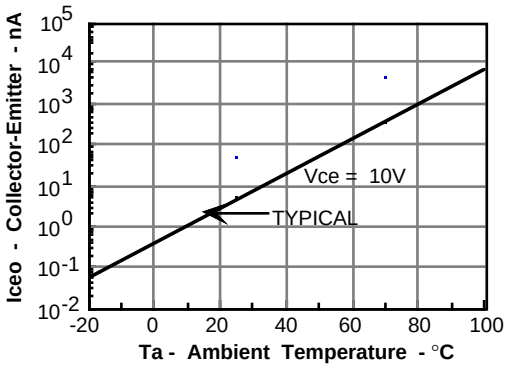



**Figure 8. Normalized CTRcb versus LED current and temperature**

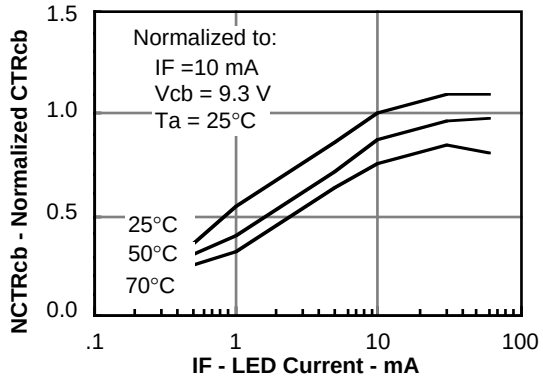



**Figure 9. Collector base photocurrent versus LED current**

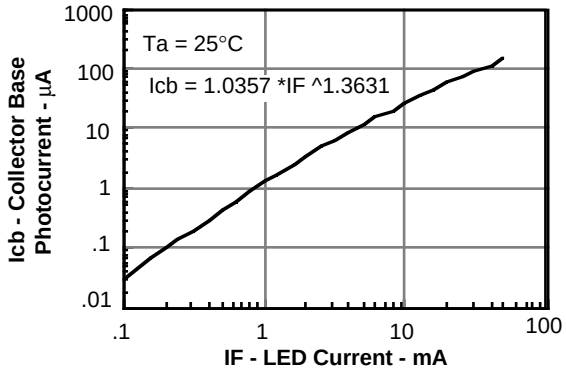



**Figure 10. Normalized photocurrent versus If and temperature**

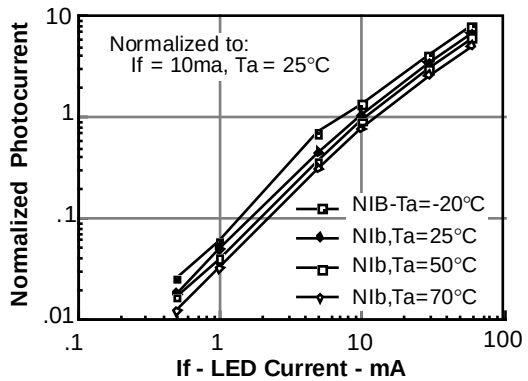



**Figure 11. Normalized non-saturated HFE versus base current and temperature**

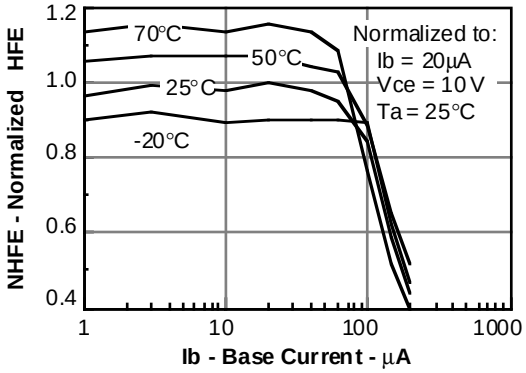



**Figure 12. Normalized saturated HFE versus base current and temperature**

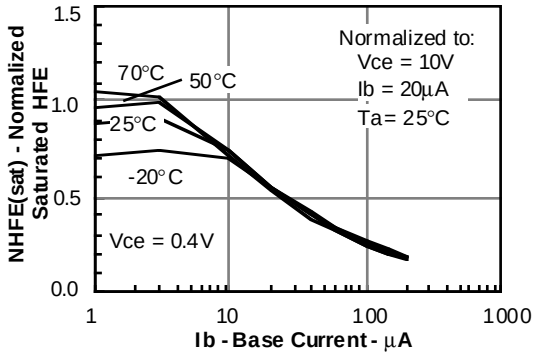



**Figure 13. . Propagation delay versus collector load resistor**

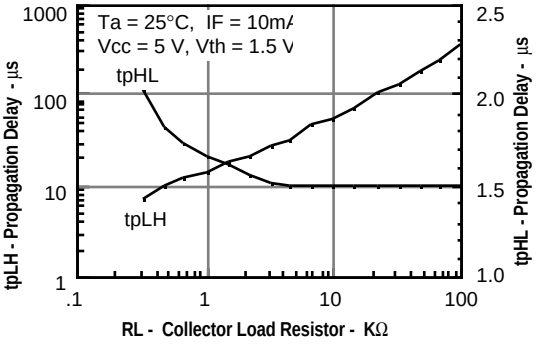



**Figure 14. Switching timing and schematic**