

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 1.33mW/°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 2.6mW/°C
Dual Channel 2.0mW/°C

Package

Isolation Test Voltage (between emitter and detector referred to standard climate 23°C/50%RH, DIN 50014) 5300 VAC_{RMS}

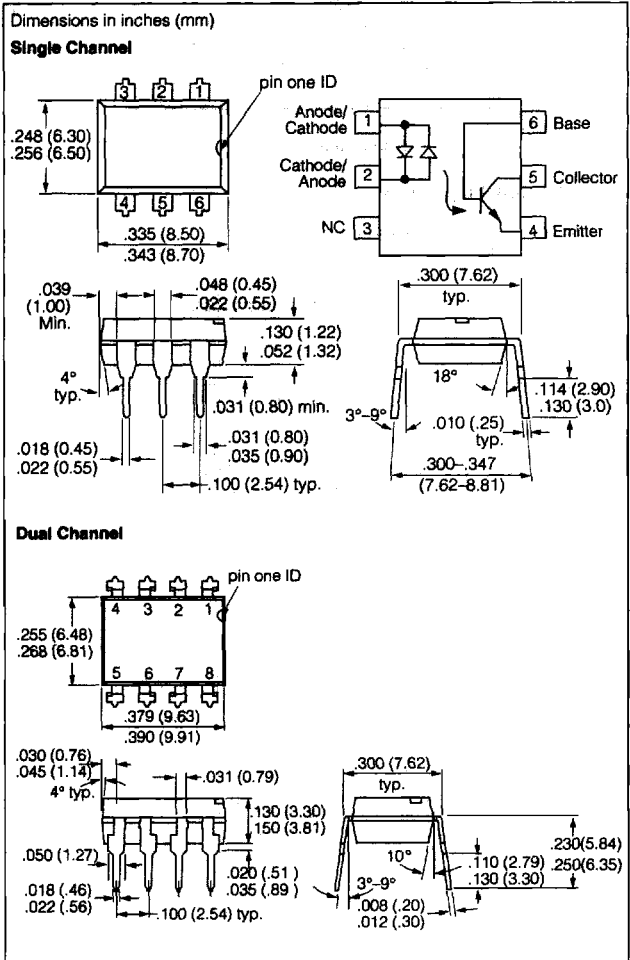
Creepage 7 mm min.
Clearance 7 mm min.

Isolation Resistance
V_{IO}=500V, T_A=25°C 10¹² Ω
V_{IO}=500V, T_A=100°C 10¹¹ 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.



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 $T_A=25^\circ\text{C}$

| Parameter | Min. | Typ. | Max. | Unit | Condition |
|--|-----------------|------|------|------|--|
| Emitter | | | | | |
| Forward Voltage V_F | | 1.2 | 1.5 | V | $I_F=\pm 10\text{ mA}$ |
| Detector | | | | | |
| BV_{CEO} | 30 | 50 | | V | $I_C=1\text{ mA}$ |
| BV_{EBO} | 7 | 10 | | V | $I_E=100\ \mu\text{A}$ |
| BV_{CBO} | 70 | 90 | | V | $I_C=10\ \mu\text{A}$ |
| I_{CEO} | | 5 | 50 | nA | $V_{CE}=10\text{ V}$ |
| Package | | | | | |
| V_{CEsat} | | | 0.4 | V | $I_F=\pm 16\text{ mA}$, $I_C=2\text{ mA}$ |
| DC Current Transfer Ratio IL/D250 IL/D251 IL/D252 | 50 20 100 | | | % | $I_F=\pm 10\text{ mA}$, $V_{CE}=10\text{ V}$ |
| Symmetry CTR @ +10 mA CTR @ -10 mA | 0.50 | 1.0 | 2.0 | | |

Figure 1. LED forward current versus forward voltage

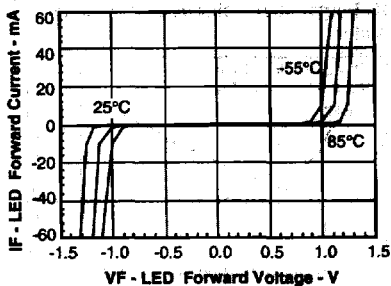


Figure 2. Normalized non-saturated and saturated CTR at $T_A = 25^\circ\text{C}$ versus LED current

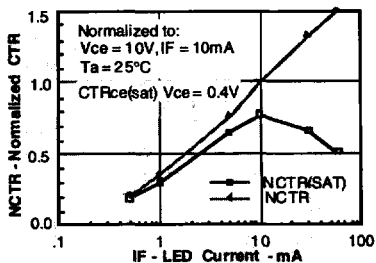


Figure 3. Normalized non-saturated and saturated CTR at $T_A = 50^\circ\text{C}$ versus LED current

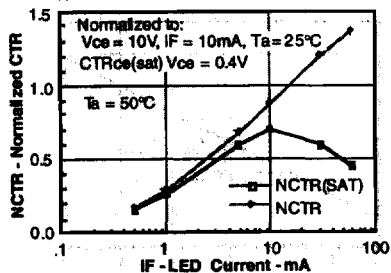


Figure 4. Normalized non-saturated and saturated CTR at $T_A = 70^\circ\text{C}$ versus LED current

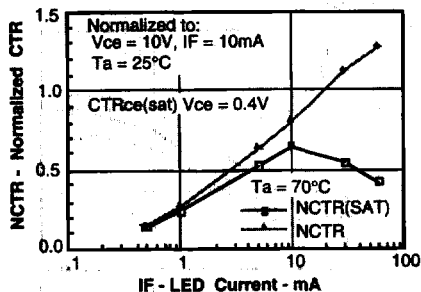


Figure 5. Normalized non-saturated and saturated CTR at $T_A = 85^\circ\text{C}$ versus LED current

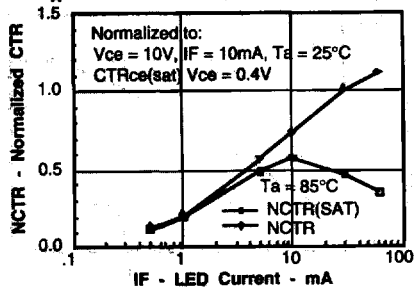
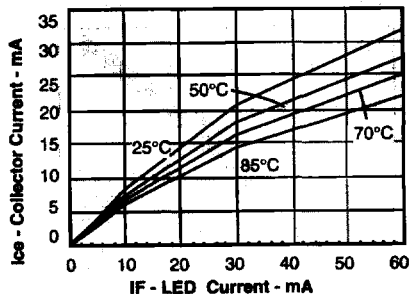


Figure 6. Collector-emitter current versus temperature and LED current



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Product

Figure 7. Collector-emitter leakage current versus temperature

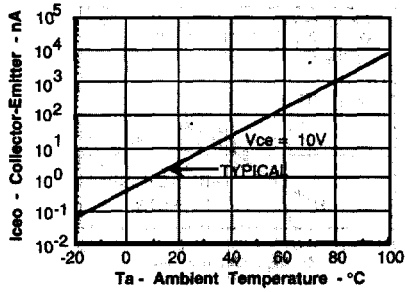


Figure 8. Normalized CTR_{cb} versus LED current and temperature

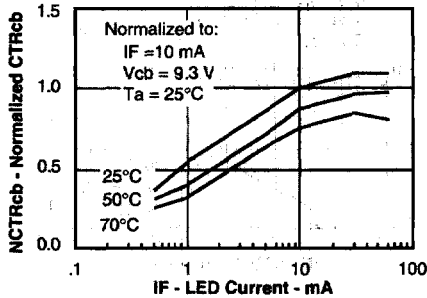


Figure 9. Collector base photocurrent versus LED current

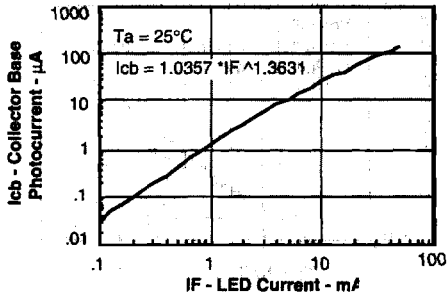


Figure 10. Normalized photocurrent versus I_f and temperature

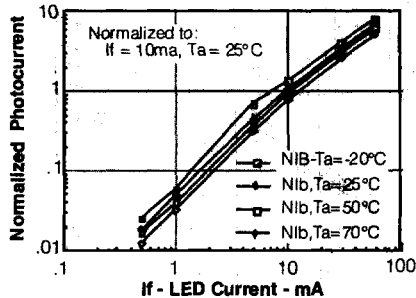


Figure 11. Normalized non-saturated HFE versus base current and temperature

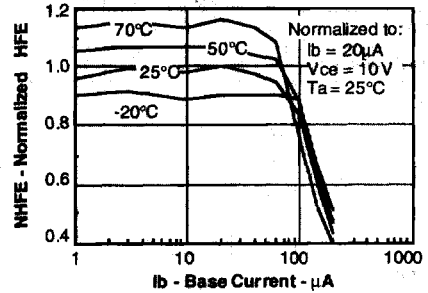


Figure 12. Normalized saturated HFE versus base current and temperature

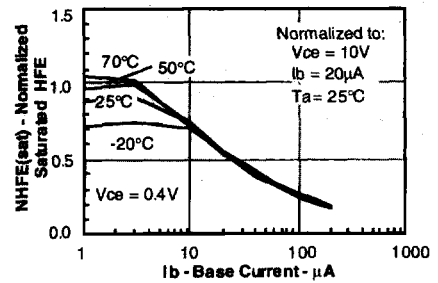


Figure 13. Propagation delay versus collector load resistor

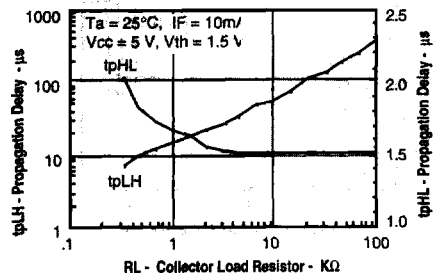


Figure 14. Switching timing and schematic

