SIEMENS

ILD610 SERIES
DUAL PHOTOTRANSISTOR OPTOCOUPLER

FEATURES

- **Dual Version of SFH610 Series**
- **High Current Transfer Ratios**
  ILD610-1, 40-80%
  ILD610-2, 63-125%
  ILD610-3, 100-200%
  ILD610-4, 160-320%
- **Isolation Test Voltage, 5300 V_{RMS}**
- **V_{CEsat} 0.25 (≤0.4) V at I_F=10 mA, I_C=2.5 mA**
- **V_{CEO}=70 V**
- **Underwriters Lab File #E52744**
- **VDE #0884 Available with Option 11**

DESCRIPTION

The ILD610 Series is a dual channel optocoupler series for high density applications. Each channel consists of an optically coupled pair 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. The ILD610 Series is the dual version of SFH610 Series and uses a repetitive pin-out configuration instead of the more common alternating pin-out used in most dual couplers.

Maximum Ratings (Each Channel)

Emitter

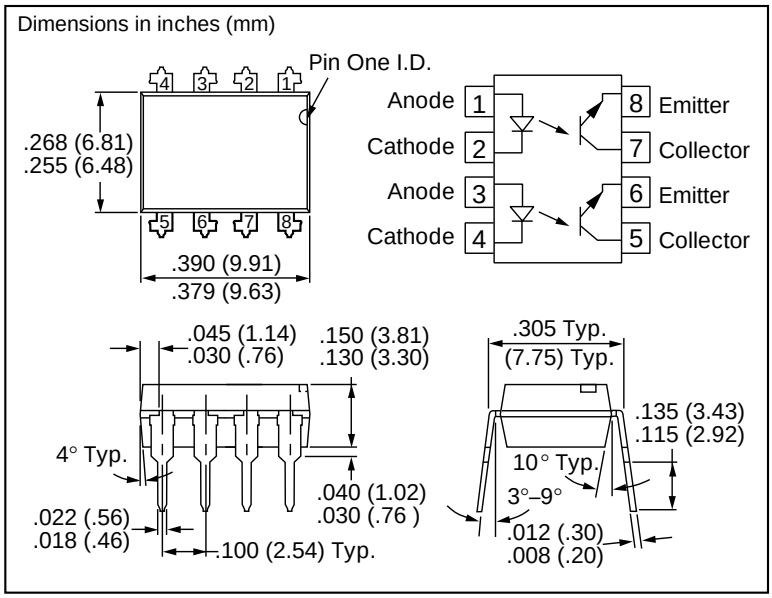
Reverse Voltage ..... 6 V
Surge Forward Current (t £10 ms)..... 1.5 A
Total Power Dissipation ..... 100 mW
Derate Linearly from 25°C ..... 1.3 mW/°C
DC Forward Current ..... 60 mA

Detector

Collector-Emitter Voltage ..... 70 V
Collector Current ..... 50 mA
Collector Current (t ≤1 ms) ..... 100 mA
Total Power Dissipation ..... 150 mW
Derate Linearly from 25°C ..... 2.0 mW/°C

Package

Isolation Test Voltage (t=1 sec.) ..... 5300 VAC_{RMS}
Isolation Resistance
V_{IO}=500 V, T_A=25°C ..... $\geq 10^{12}\ \Omega$
V_{IO}=500 V, T_A=100°C ..... $\geq 10^{11}\ \Omega$
Storage Temperature ..... –55°C to +150°C
Operating Temperature ..... –55°C to +100°C
Junction Temperature ..... 100°C
Lead Soldering Time at 260°C ..... 10 sec.



Electrical Characteristics (T_A=25°C)

	Symbol	Typ.	Unit	Condition
Emitter				
Forward Voltage	V_F	1.25 (≤1.65)	V	I_F=60mA
Reverse Current	I_R	0.01 (≤10)	µA	V_R=6V
Capacitance	C_O	25	pF	V_R=0 V, f=1 MHz
Detector				
Breakdown Voltage Collector-Emitter Emitter-Collector	 BV_{CEO} BV_{CEO}	 90 (≥70) 7.0 (≥6.0)	 V V	 I_C=10 µA I_E=10 µA
Collector-Emitter Dark Current	I_{CEO}	2 (≤50)	nA	V_{CE}=10 V
Capacitance	C_{CE}	7	pF	V_{CE}=5 V, f=1 MHz
Package				
Collector-Emitter Saturation Voltage	V_{CEsat}	0.25 (≤0.40)	V	I_F=10 mA, I_C=2.5 mA
Coupling Capacitance	C_C	0.35	pF	

	-1	-2	-3	-4	
CTR[1], I_F =10 mA, V_{CE}=5 V	40-80	63-125	100-200	160-320	%
CTR[1], I_F =1 mA, V_{CE}=5 V	13 min.	22 min.	34 min.	56 min.	%
I_{CEO} (V_{CE}=10 V)	2 (≤50)	2 (≤50)	5 (≤100)	5 (≤100)	nA

CTR will match within a ratio of 1.7:1

Switching Characteristics

Linear Operation (without saturation) I_F=10 mA, V_{CC}=5 V, R_C=75 Ω, Typical

		-1	-2	-3	-4	
Turn on time	t_{on}	3.0	3.2	3.6	4.1	µs
Rise time	t_r	2.0	2.5	2.9	3.3	µs
Turn off time	t_{off}	2.3	2.9	3.4	3.7	µs
Fall time	t_f	2.0	2.6	3.1	3.5	µs

Switching Operation (with saturation) V_{CC}=5 V, R_C=1 Ω, Typicall

		-1 I_F = 20 mA	-2 I_F = 10 mA	-3 I_F = 10 mA	-4 I_F = 5 mA	
Turn on time	t_{on}	3.0	4.3	4.6	6.0	µs
Rise time	t_r	2.0	2.8	3.3	4.6	µs
Turn off time	t_{off}	18	2.9	3.4	25	µs
Fall time	t_f	11	2.6	3.1	15	µs

Figure 1. Forward voltage versus forward current

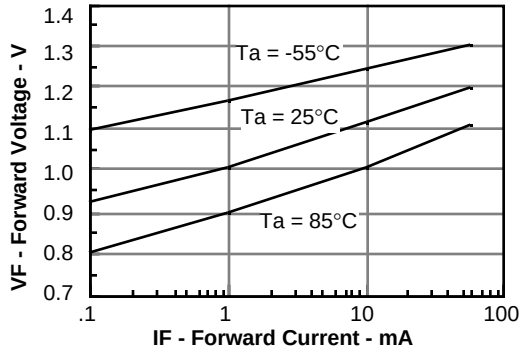


Figure 2. Normalized non-saturated and saturated CTR at T_A=25°C versus LED current

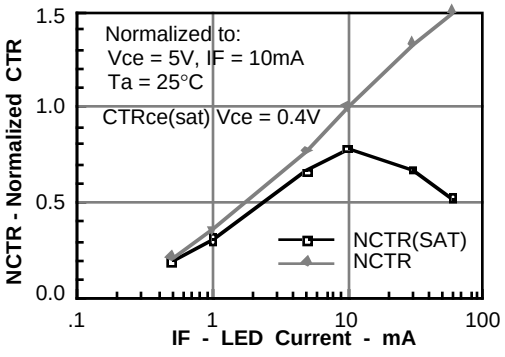


Figure 3. Normalized non-saturated and saturated CTR at T_A=50°C versus LED current

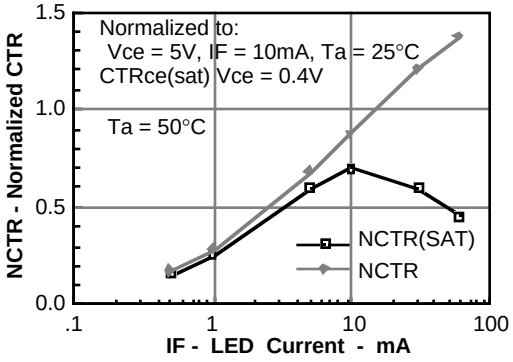


Figure 4. Normalized non-saturated and saturated CTR at T_A=70°C versus LED curent

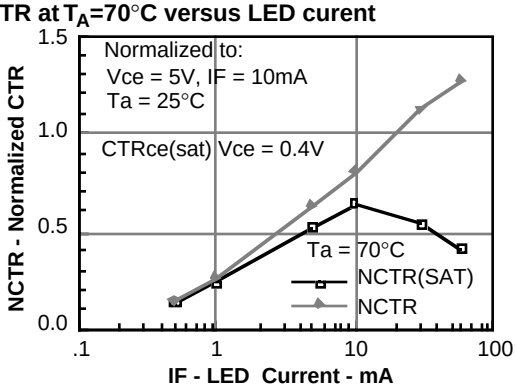


Figure 5. Normalized non-saturated and saturated CTR at T_A=85°C versus LED current

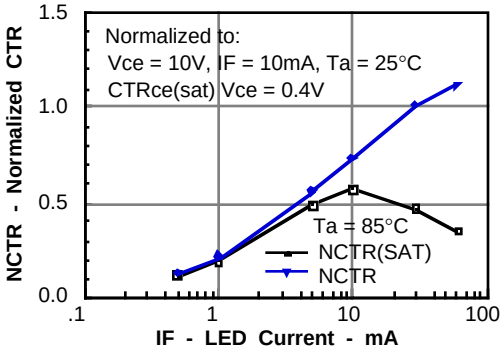


Figure 6. Collector-emitter current versus temperature and LED current

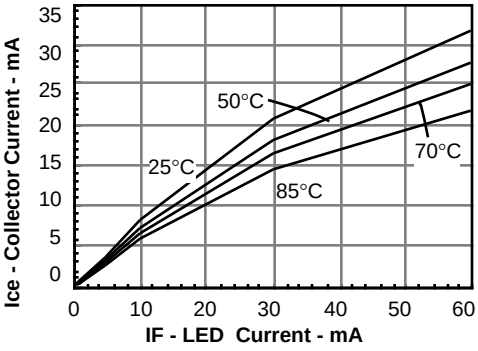


Figure 7. Collector-emitter leakage current versus temperature

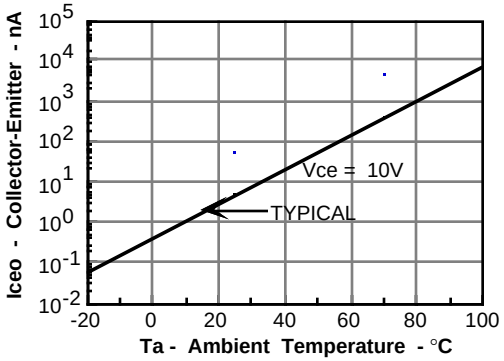


Figure 8. Propagation delay versus collector load resistor

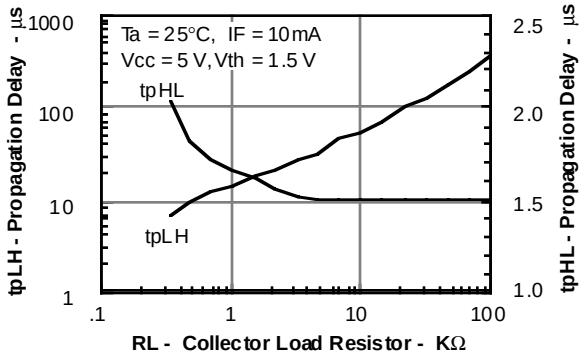


Figure 9. Switching timing

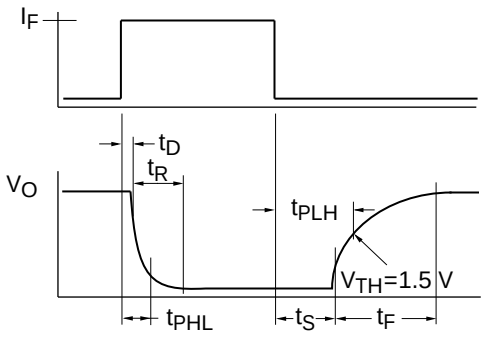


Figure 10. Non-saturated switching schematic

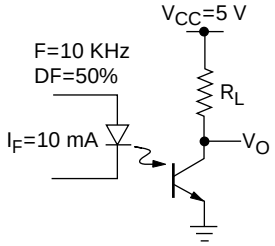


Figure 11. Saturated switching time test waveform