

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 1**

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

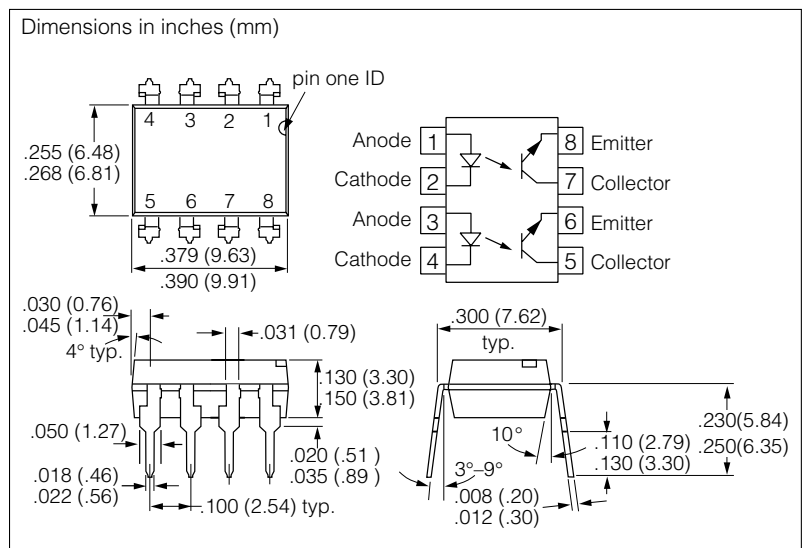
Reverse Voltage 6.0 V
Surge Forward Current (t ≤ 10 ms) 1.5 A
Total Power Dissipation 100 mW
Derate Linearly from 25°C 1.3 mW/°C
DC Forward Current 60 mA

Detector

Collector-Emitter Voltage 70 V
Collector Current 50 mA
Collector Current (t ≤ 1.0 ms) 100 mA
Total Power Dissipation 150 mW
Derate Linearly from 25°C 2.0 mW/°C

Package

Isolation Test Voltage (t=1.0 sec.) 5300 V_{RMS}
Isolation Resistance
V_{IO}=500 V, T_A=25°C ≥10¹² Ω
V_{IO}=500 V, T_A=100°C ≥10¹¹ Ω
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 =6.0 V
Capacitance	C _O	25	pF	V _R =0 V f=1.0 MHz
Detector				
Breakdown Voltage	BV _{CEO}	90 (≥70)	V	I _C =10 mA I _E =10 μA
	BV _{CE0}	7.0 (≥6.0)		
Collector-Emitter Dark Current	I _{CEO}	2.0 (≤50)	nA	V _{CE} =10 V
Capacitance	C _{CE}	7.0	pF	V _{CE} =5.0 V f=1.0 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 , $I_F=10\text{ mA}$, $V_{CE}=5.0\text{ V}$	40-80	63-125	100-200	160-320	%
CTR ¹ , $I_F=1.0\text{ mA}$, $V_{CE}=5.0\text{ V}$	13 min.	22 min.	34 min.	56 min.	%
I_{CEO} ($V_{CE}=10\text{ V}$)	2.0 (≤ 50)	2.0 (≤ 50)	5.0 (≤ 100)	5.0 (≤ 100)	nA

CTR will match within a ratio of 1.7:1

Switching Characteristics

Linear Operation (without saturation) $I_F=10\text{ mA}$, $V_{CC}=5.0\text{ V}$, $R_C=75\text{ }\Omega$, 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) $V_{CC}=5.0\text{ V}$, $R_C=1.0\text{ }\Omega$, Typical

		-1 $I_F = 20\text{ mA}$	-2 $I_F = 10\text{ mA}$	-3 $I_F = 10\text{ mA}$	-4 $I_F = 5.0\text{ mA}$	
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

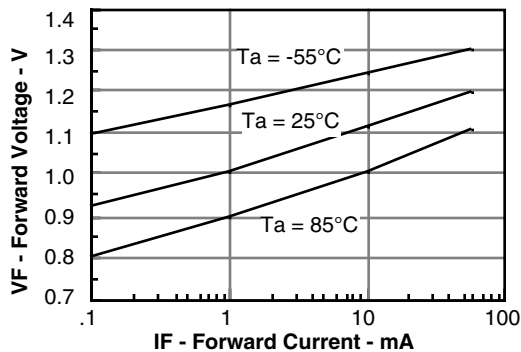


Figure 3. Normalized non-saturated and saturated CTR at $T_A=50^\circ\text{C}$ versus LED current

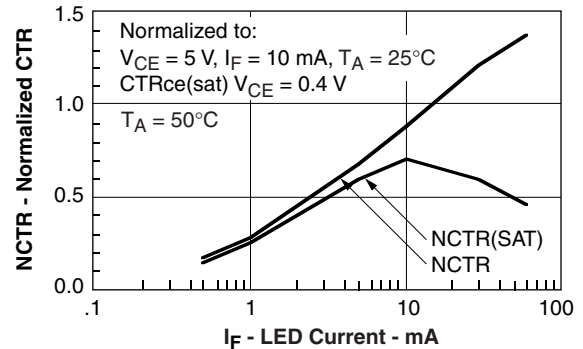


Figure 2. Normalized non-saturated and saturated CTR at $T_A=25^\circ\text{C}$ versus LED current

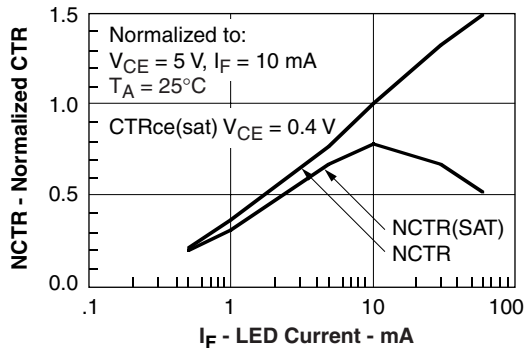


Figure 4. Normalized non-saturated and saturated CTR at $T_A=70^\circ\text{C}$ versus LED current

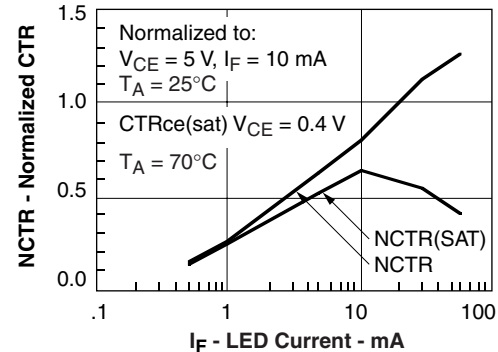


Figure 5. Normalized non-saturated and saturated CTR at $T_A=85^\circ\text{C}$ versus LED current

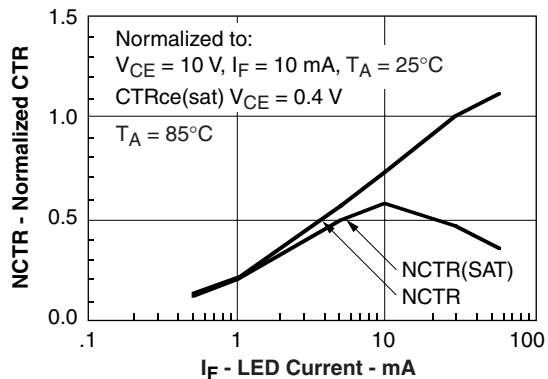


Figure 6. Collector-emitter current versus temperature and LED current

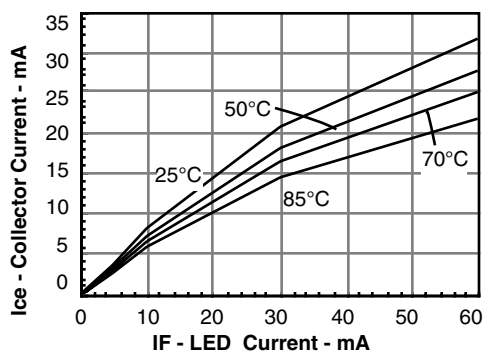


Figure 7. Collector-emitter leakage current versus temperature

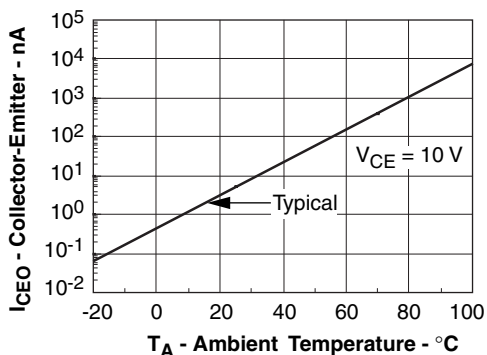


Figure 8. Propagation delay versus collector load resistor

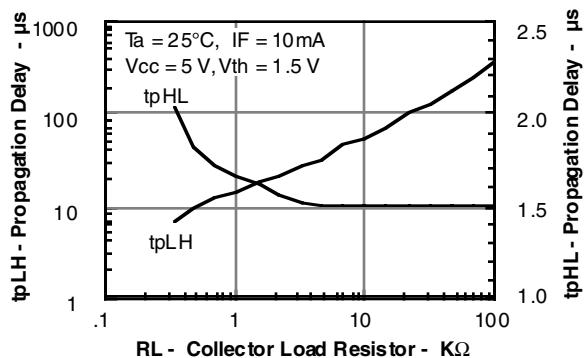


Figure 9. Switching timing

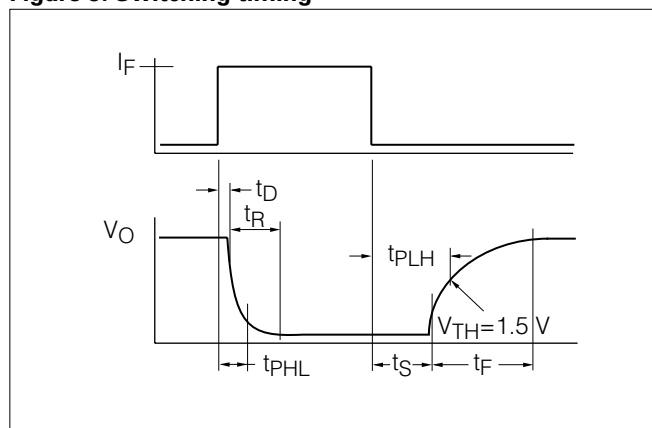


Figure 10. Non-saturated switching schematic

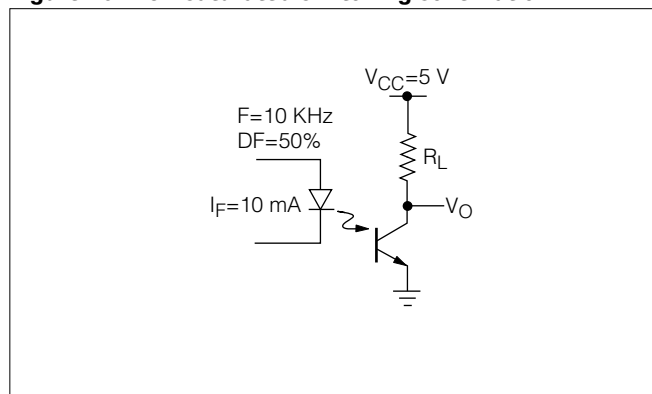


Figure 11. Saturated switching time test waveform

