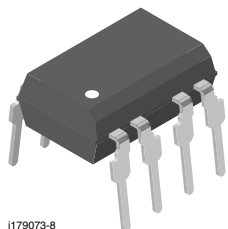
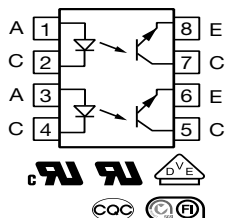




Optocoupler, Phototransistor Output, Dual Channel



1179073-8



FEATURES

- Dual version of SFH610 series
- Isolation rated voltage 4420 V_{RMS}
- V_{CEsat} 0.25 (≤ 0.4) V at $I_F = 10$ mA, $I_C = 2.5$ mA
- $V_{CEO} = 70$ V
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912

RoHS
COMPLIANT

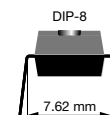
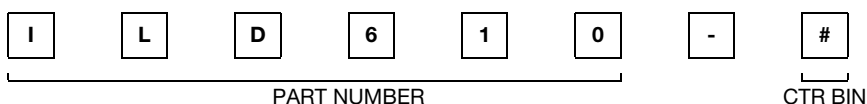
DESCRIPTION

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 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.

AGENCY APPROVALS

- [UL 1577](#)
- [cUL](#)
- [DIN EN 60747-5-5 \(VDE 0884\)](#), available with option 1
- [CQC](#)
- [FIMKO](#)

ORDERING INFORMATION



AGENCY CERTIFIED / PACKAGE		
UL, cUL, CQC, FIMKO	40 to 80	100 to 200
DIP-8	ILD610-1	ILD610-3

Note

- Additional options may be possible, please contact sales office

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Reverse voltage		V_R	6.0	V
Surge forward current	$t \leq 1.0$ ms	I_{FSM}	1.5	A
Power dissipation		P_{diss}	100	mW
Derate linearly from 25 °C			1.3	mW/°C
Forward continuous current		I_F	60	mA
OUTPUT				
Collector emitter voltage		V_{CEO}	70	V
Collector current		I_C	50	mA
	$t \leq 1.0$ ms	I_C	100	mA
Power dissipation		P_{diss}	150	mW
Derate linearly from 25 °C			2.0	mW/°C
COUPLER				
Storage temperature		T_{stg}	-55 to +150	°C
Operating temperature		T_{amb}	-55 to +100	°C
Junction temperature		T_j	100	°C
Lead soldering time at 260 °C			10	s

Note

- Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.



ELECTRICAL CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT							
Forward voltage	I _F = 60 mA		V _F	-	1.25	1.65	V
Reverse current	V _R = 6.0 V		I _R	-	0.01	10	μA
Capacitance	V _R = 0 V, f = 1.0 MHz		C _O	-	25	-	pF
OUTPUT							
Collector emitter breakdown voltage	I _C = 10 mA, I _E = 10 μA		BV _{CEO}	70	90	-	V
			BV _{CEO}	6.0	7.0	-	V
Collector emitter dark current	V _{CE} = 10 V		I _{CEO}	-	2.0	50	nA
Collector emitter capacitance	V _{CE} = 5.0 V, f = 1.0 MHz		C _{CE}	-	7.0	-	pF
Collector emitter leakage current	V _{CE} = 10 V	ILD610-1	I _{CEO}	-	2.0	50	nA
		ILD610-3	I _{CEO}	-	5.0	100	nA
COUPLER							
Collector emitter saturation voltage	I _F = 10 mA, I _C = 2.5 mA		V _{CEsat}	-	0.25	0.40	V
Coupling capacitance			C _C	-	0.35	-	pF

Note

- Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

CURRENT TRANSFER RATIO ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
$I_C/I_F^{(1)}$	$I_F = 10\text{ mA}$, $V_{CE} = 5.0\text{ V}$	ILD610-1	CTR	40	-	80	%
		ILD610-3	CTR	100	-	200	%
	$I_F = 1.0\text{ mA}$, $V_{CE} = 5.0\text{ V}^{\wedge}$	ILD610-1	CTR	13	-	-	%
		ILD610-3	CTR	34	-	-	%

Note

⁽¹⁾ CTR will match within a ratio of 1.7:1

SWITCHING CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
NON-SATURATED							
Rise time	V _{CC} = 5.0 V, R _L = 75 Ω, I _F = 10 mA	ILD610-1	t _r	-	2.0	-	μs
		ILD610-3			2.9		
Fall time	V _{CC} = 5.0 V, R _L = 75 Ω, I _F = 10 mA	ILD610-1	t _f	-	2.0	-	μs
		ILD610-3			3.1		
Turn-on time	V _{CC} = 5.0 V, R _L = 75 Ω, I _F = 10 mA	ILD610-1	t _{on}	-	3.0	-	μs
		ILD610-3			3.6		
Turn-off time	V _{CC} = 5.0 V, R _L = 75 Ω, I _F = 10 mA	ILD610-1	t _{off}	-	2.9	-	μs
		ILD610-3			3.7		
SATURATED							
Rise time	V _{CC} = 5.0 V, R _L = 1.0 kΩ, I _F = 20 mA	ILD610-1	t _r	-	2.0	-	μs
	V _{CC} = 5.0 V, R _L = 1.0 kΩ, I _F = 10 mA	ILD610-3			2.8		
Fall time	V _{CC} = 5.0 V, R _L = 1.0 kΩ, I _F = 20 mA	ILD610-1	t _f		11		μs
	V _{CC} = 5.0 V, R _L = 1.0 kΩ, I _F = 10 mA	ILD610-3			14		
Turn-on time	V _{CC} = 5.0 V, R _L = 1.0 kΩ, I _F = 20 mA	ILD610-1	t _{on}		3.0		μs
	V _{CC} = 5.0 V, R _L = 1.0 kΩ, I _F = 10 mA	ILD610-3			4.3		
Turn-off time	V _{CC} = 5.0 V, R _L = 1.0 kΩ, I _F = 20 mA	ILD610-1	t _{off}		18		μs
	V _{CC} = 5.0 V, R _L = 1.0 kΩ, I _F = 10 mA	ILD610-3			25		

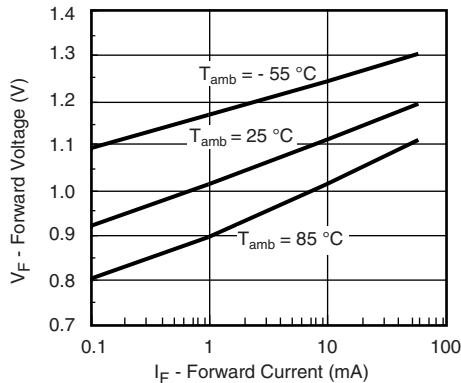


SAFETY AND INSULATION RATINGS

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Climatic classification	According to IEC 68 part 1		55 / 100 / 21	
Comparative tracking index		CTI	175	
Maximum rated withstanding isolation voltage	$t = 1 \text{ min}$	V_{ISO}	4420	V_{RMS}
Maximum transient isolation voltage		V_{IOTM}	10 000	V_{peak}
Maximum repetitive peak isolation voltage		V_{IORM}	890	V_{peak}
Isolation resistance	$V_{\text{IO}} = 500 \text{ V}, T_{\text{amb}} = 25 \text{ }^{\circ}\text{C}$	R_{IO}	$\geq 10^{12}$	Ω
	$V_{\text{IO}} = 500 \text{ V}, T_{\text{amb}} = 100 \text{ }^{\circ}\text{C}$	R_{IO}	$\geq 10^{11}$	Ω
Output safety power		P_{SO}	400	mW
Input safety current		I_{SI}	275	mA
Safety temperature		T_{S}	175	$^{\circ}\text{C}$
Creepage distance			≥ 7	mm
Clearance distance			≥ 7	mm
Insulation thickness		DTI	≥ 0.4	mm

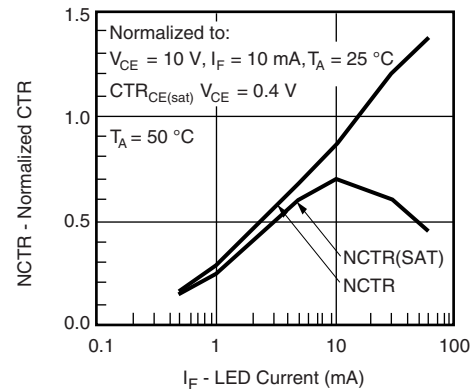
Note

- As per IEC 60747-5-5, § 7.4.3.8.2, this optocoupler is suitable for “safe electrical insulation” only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

TYPICAL CHARACTERISTICS ($T_{\text{amb}} = 25 \text{ }^{\circ}\text{C}$, unless otherwise specified)

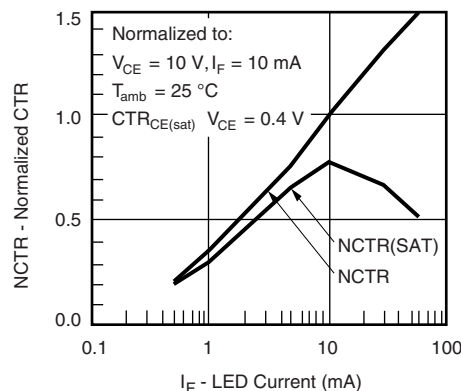
iilct6_01

Fig. 1 - Forward Voltage vs. Forward Current



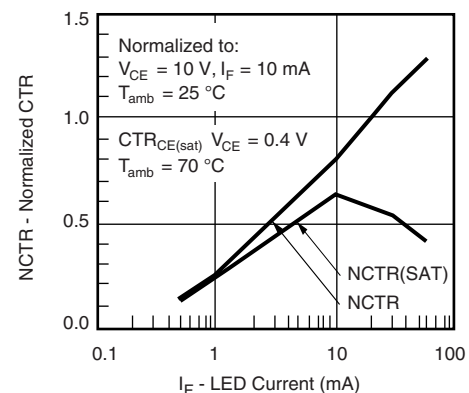
iilct6_03

Fig. 3 - Normalized Non-Saturated and Saturated CTR vs. LED Current



iilct6_02

Fig. 2 - Normalized Non-Saturated and Saturated CTR vs. LED Current



iilct6_04

Fig. 4 - Normalized Non-Saturated and Saturated CTR vs. LED Current

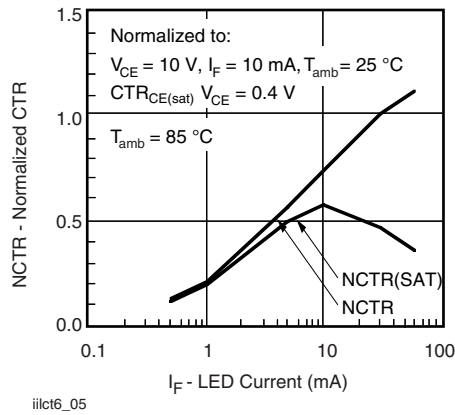


Fig. 5 - Normalized Non-Saturated and Saturated CTR vs. LED Current

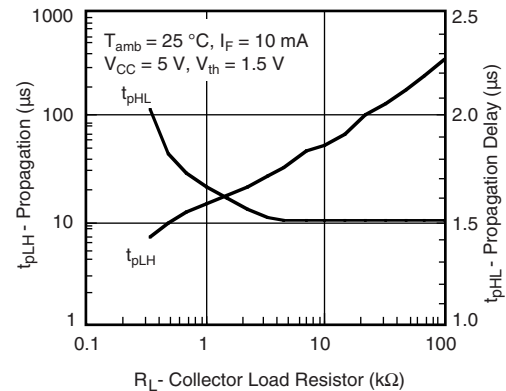


Fig. 8 - Propagation Delay vs. Collector Load Resistor

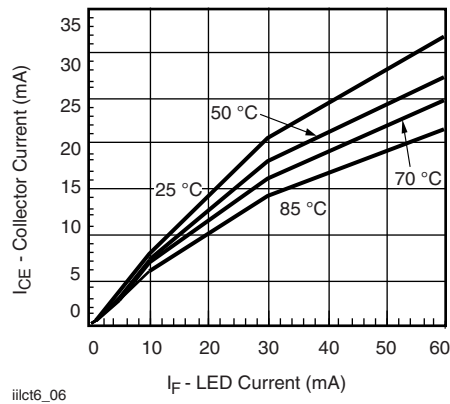


Fig. 6 - Collector Emitter Current vs. Temperature and LED Current

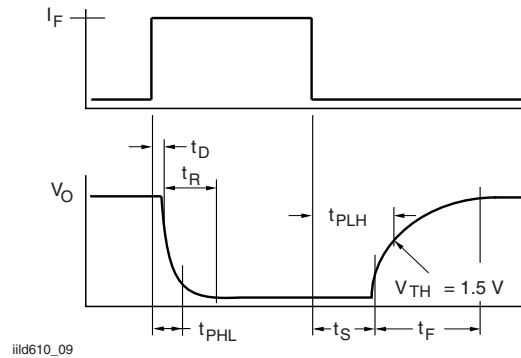


Fig. 9 - Switching Timing

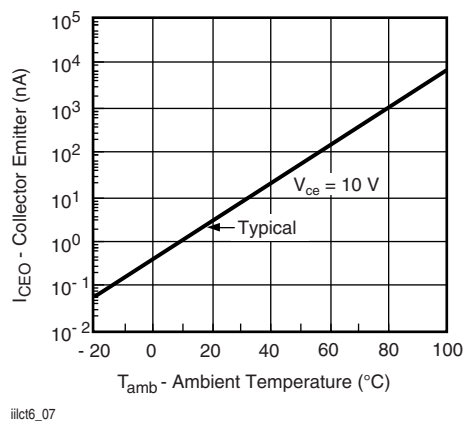


Fig. 7 - Collector Emitter Leakage Current vs. Temperature

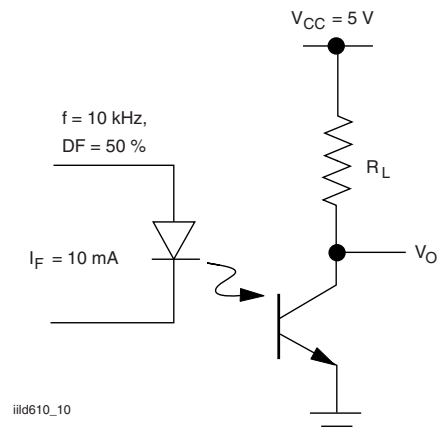
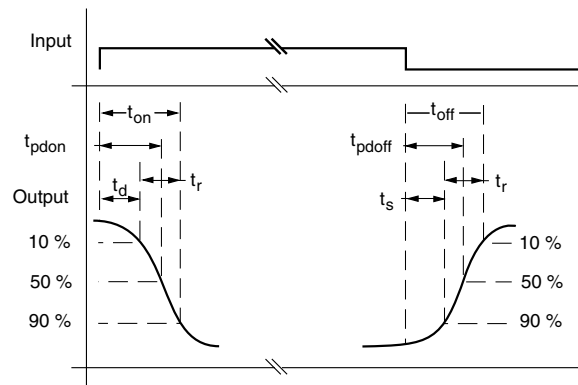
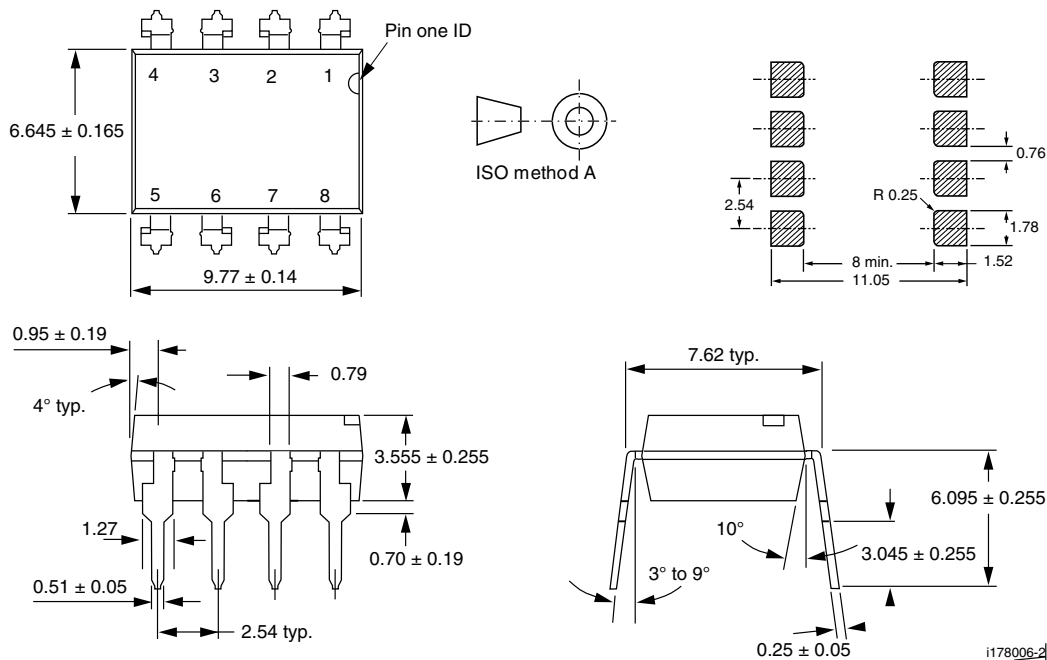
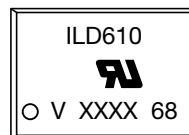


Fig. 10 - Non-Saturated Switching Schematic



iild610_11

Fig. 11 - Saturated Switching Time Test Waveform

PACKAGE DIMENSIONS in millimeters**PACKAGE MARKING****Notes**

- XXXX = LMC (lot marking code)
- Option 1 is reflected in the package marking
- Tape and reel suffix (T) is not part of the package marking



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