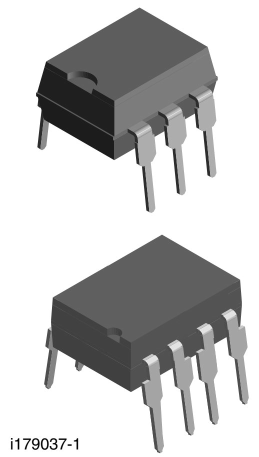
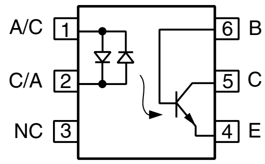
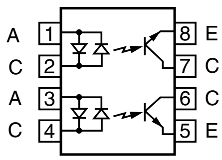
Optocoupler, Phototransistor Output, AC Input, with Base Connection



i179037-1





DESCRIPTION

The IL250, IL251, IL252, ILD250, ILD251, ILD252 are bidirectional input optically coupled isolators consisting of two gallium arsenide infrared LEDs coupled to a silicon NPN phototransistor per channel.

The IL250, ILD250 has a minimum CTR of 50 %, the IL251, ILD251 has a minimum CTR of 20 %, and the IL252, ILD252 has a minimum CTR of 100 %.

The IL250, IL251, IL252 are single channel optocouplers. The ILD250, ILD251, ILD252 has two isolated channels in a single DIP package.

FEATURES

- AC or polarity insensitive inputs
- Built-in reverse polarity input protection
- Improved CTR symmetry
- Industry standard DIP package
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3 RoHS COMPLIANT

APPLICATIONS

- Ideal for AC signal detection and monitoring

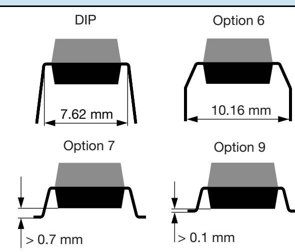
AGENCY APPROVALS

- UL1577, file no. E52744 system code H, double protection
- CSA 93751
- BSI IEC 60950; IEC 60065
- DIN EN 60747-5-5 (VDE 0884)
- CQC GB4943.1-2011 and GB8898-2011 (suitable for installation altitude below 2000 m)

ORDERING INFORMATION

I	L	x	2	5	x	-	#	X	0	#	#	T

PART NUMBER (I L x 2 5 x) - CTR BIN (#) - PACKAGE OPTION (X 0 # #) - TAPE AND REEL (T)



AGENCY CERTIFIED/PACKAGE	CTR (%)					
	SINGLE CHANNEL, 6 PIN			DUAL CHANNEL, 8 PIN		
UL, CSA, BSI, CQC	**≥ 20**	**≥ 50**	**≥ 100**	**≥ 20**	**≥ 50**	**≥ 100**
DIP-#	IL251	IL250	IL252	ILD251	ILD250	ILD252
SMD-#, option 7	-	-	IL252-X007T (1)	-	-	-
SMD-#, option 9	IL251-X009T	-	IL252-X009T (1)	-	ILD250-X009T (1)	ILD252-X009T (1)
VDE, UL, CSA, BSI, CQC	**≥ 20**	**≥ 50**	**≥ 100**	**≥ 20**	**≥ 50**	**≥ 100**
DIP-#	-	IL250-X001	IL252-X001	-	-	-
DIP-#, option 6	-	-	IL252-X016	-	-	-
SMD-#, option 7	-	-	IL252-X017T (1)	-	-	ILD252-X017T (1)

Notes

- Additional options may be possible, please contact sales office.

(1) Also available in tubes; do not add “T” to end.

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
Forward continuous current		I_F	60	mA
Power dissipation		P_{diss}	100	mW
Derate linearly from 25 °C			1.33	mW/°C
OUTPUT				
Collector emitter breakdown voltage		BV_{CEO}	30	V
Emitter base breakdown voltage		BV_{EBO}	5	V
Collector base breakdown voltage		BV_{CBO}	70	V
Power dissipation single channel		P_{diss}	200	mW
Power dissipation dual channel		P_{diss}	150	mW
Derate linearly from 25 °C single channel			2.6	mW/°C
Derate linearly from 25 °C dual channel			2	mW/°C
COUPLER				
Isolation test voltage between emitter and detector		V_{ISO}	5300	V_{RMS}
Creepage distance			≥ 7	mm
Clearance distance			≥ 7	mm
Isolation resistance	V_{IO} = 500 V, T_{amb} = 25 °C	R_{IO}	10^{12}	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C	R_{IO}	10^{11}	Ω
Total dissipation single channel		P_{tot}	250	mW
Total dissipation dual channel		P_{tot}	400	mW
Derate linearly from 25 °C single channel			3.3	mW/°C
Derate linearly from 25 °C dual channel			5.3	mW/°C
Storage temperature		T_{stg}	- 55 to + 150	°C
Operating temperature		T_{amb}	- 55 to + 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 = ± 10 mA		V_F		1.2	1.5	V
OUTPUT							
Collector emitter breakdown voltage	I_C = 1 mA		BV_{CEO}	30	50		V
Emitter base breakdown voltage	I_E = 100 µA		BV_{EBO}	7	10		V
Collector base breakdown voltage	I_C = 10 µA		BV_{CBO}	70	90		V
Collector emitter leakage current	V_{CE} = 10 V		I_{CEO}		5	50	nA
COUPLER							
Collector emitter saturation voltage	I_F = ± 16 mA, I_C = 2 mA		V_{CEsat}			0.4	V

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 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
I_C/I_F	I_F = ± 10 mA, V_{CE} = 10 V	IL250, ILD250	CTR_{DC}	50			%
		IL251, ILD251	CTR_{DC}	20			%
		IL252, ILD252	CTR_{DC}	100			%
Symmetry	I_F = ± 10 mA			0.50	1	2	

TYPICAL CHARACTERSITICS (T_{amb} = 25 °C, unless otherwise specified)

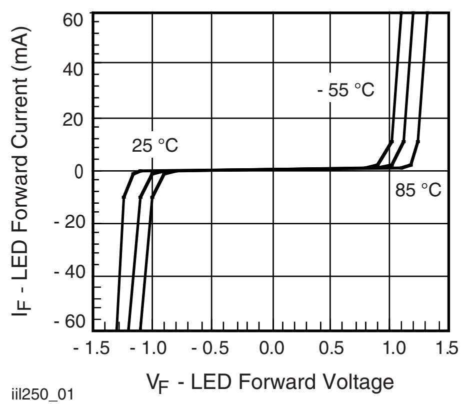


Fig. 1 - LED Forward Current vs.Forward Voltage

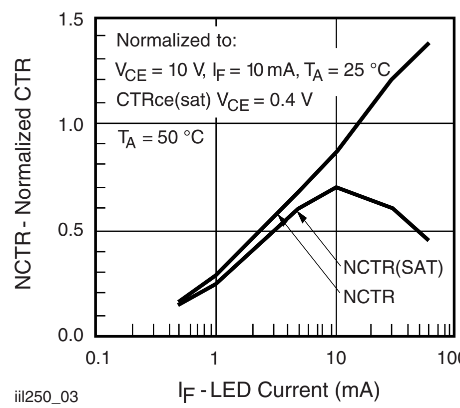


Fig. 3 - Normalized Non-Saturated and Saturated CTR vs. LED Current

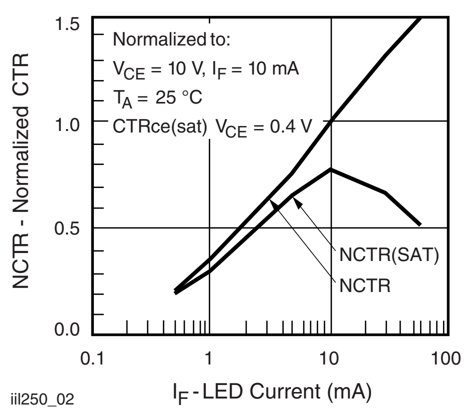


Fig. 2 - Normalized Non-Saturated and Saturated CTR vs. LED Current

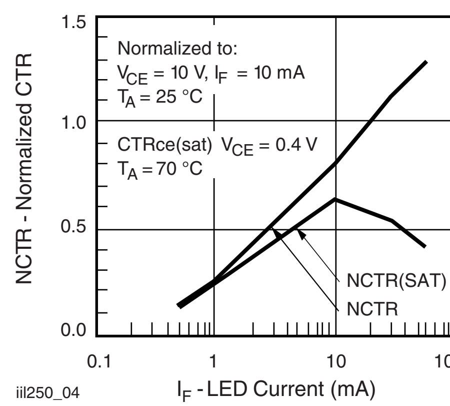


Fig. 4 - Normalized Non-Saturated and Saturated CTR vs. LED Current

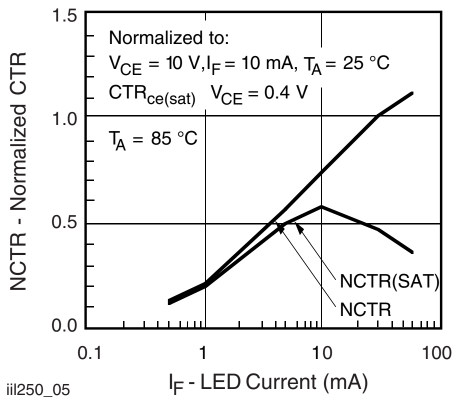


Fig. 5 - Normalized Non-Saturated and Saturated CTR vs. LED Current

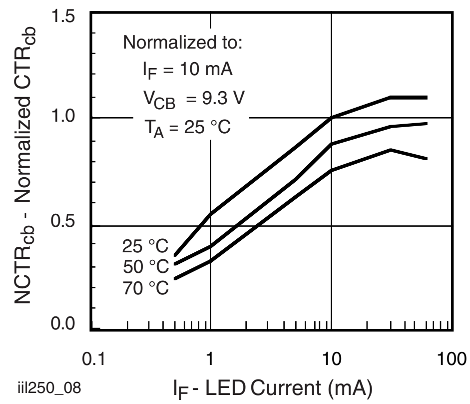


Fig. 8 - Normalized CTR_{CB} vs. LED Current and Temperature

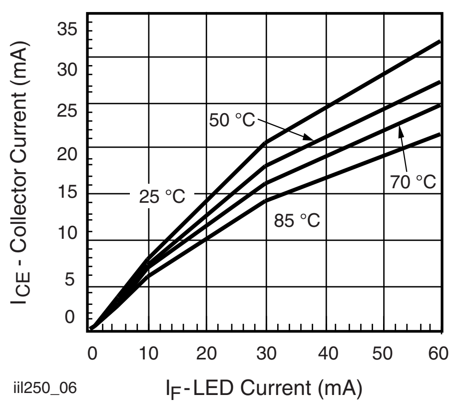


Fig. 6 - Collector Emitter Current vs. Temperature and LED Current

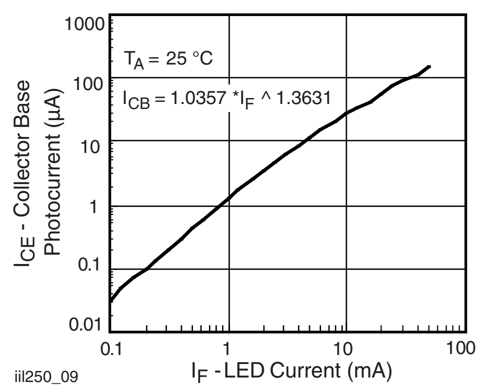


Fig. 9 - Collector Base Photocurrent vs. LED Current

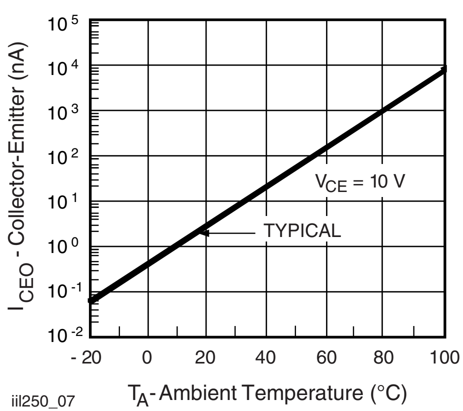


Fig. 7 - Collector Emitter Leakage Current vs.Temperature

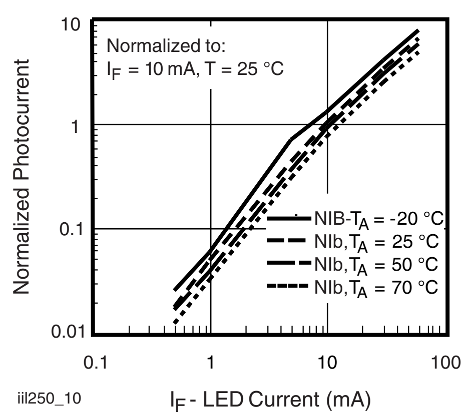


Fig. 10 - Normalized Photocurrent vs. I_F and Temperature

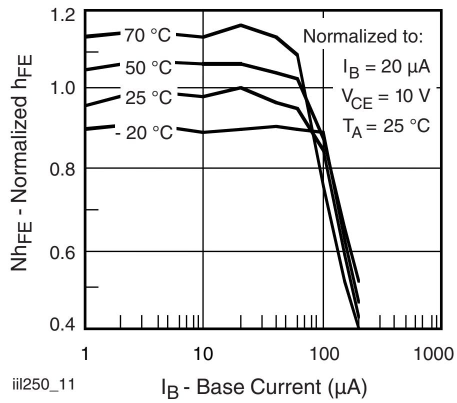


Fig. 11 - Normalized Non Saturated h_{FE} vs. Base Current and Temperature

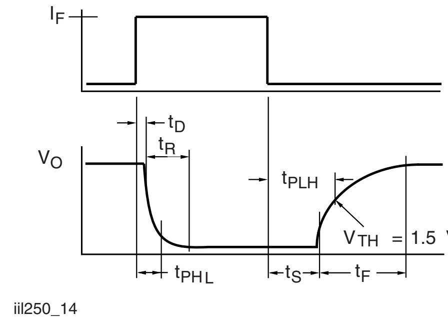


Fig. 14 - Switching Timing

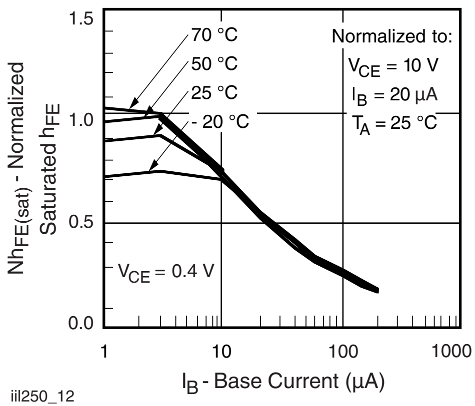


Fig. 12 - Normalized Saturated h_{FE} vs. Base Current and Temperature

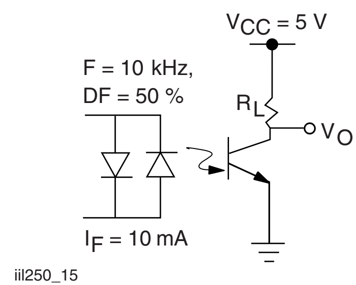


Fig. 15 - Switching Schematic

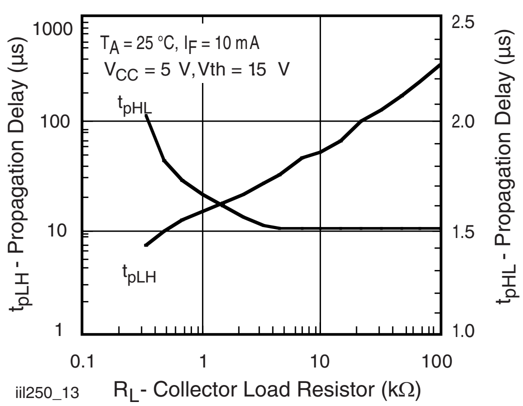
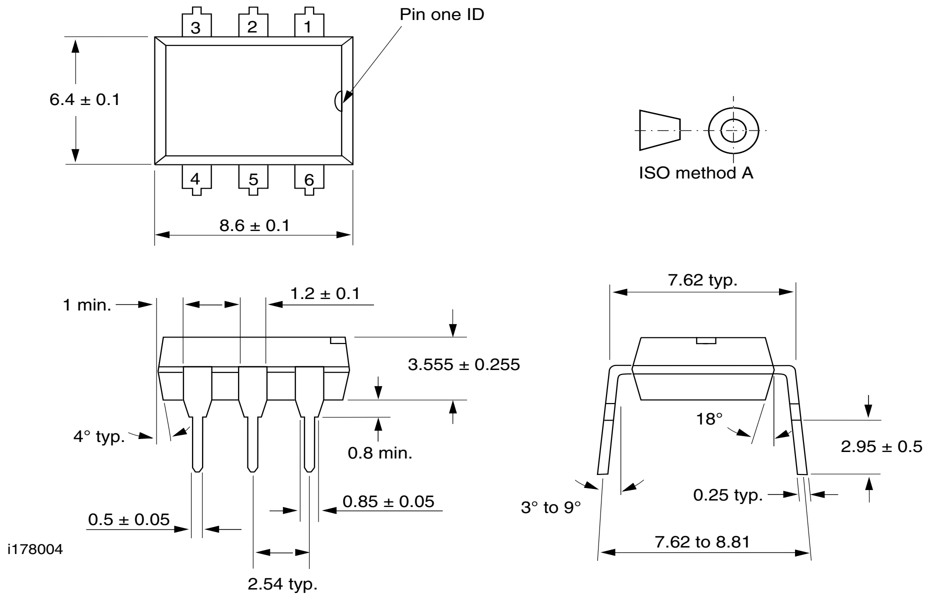
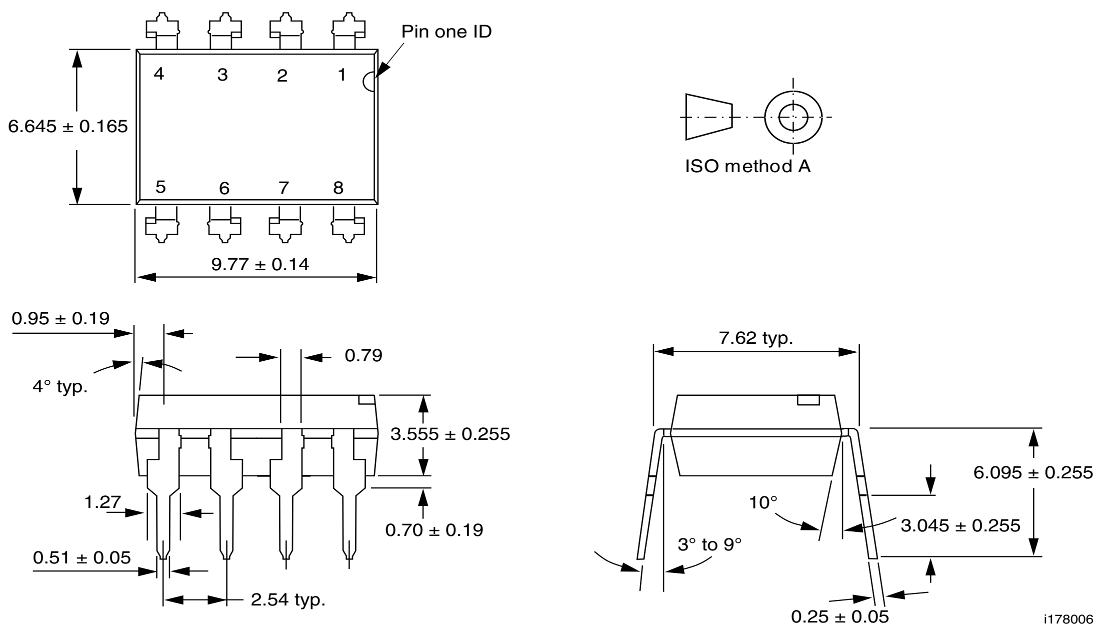
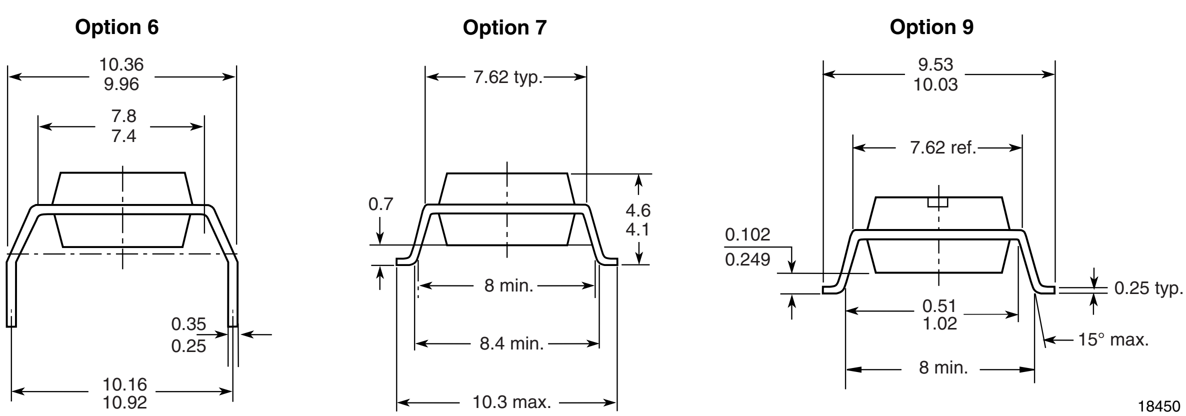


Fig. 13 - Propagation Delay vs. Collector Load Resistor

PACKAGE DIMENSIONS in inches (millimeters)







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