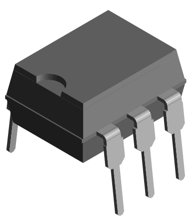
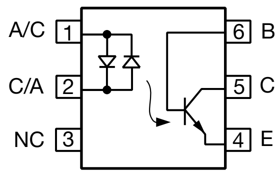
Optocoupler, Phototransistor Output, AC Input, With Base Connection





LINKS TO ADDITIONAL RESOURCES

Product Page
Design Tools
SPICE Models

DESCRIPTION

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

The IL250 has a minimum CTR of 50 % and the IL252 has a minimum CTR of 100 %.

The IL250 and IL252 are single channel optocouplers.

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

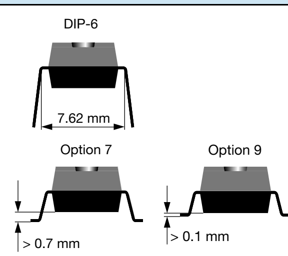
- Ideal for AC signal detection and monitoring

AGENCY APPROVALS

- UL 1577
- cUL
- DIN EN 60747-5-5 (VDE 0884-), available with option 1
- BSI
- CQC GB4943.1
- CQC GB8898
- FIMKO

ORDERING INFORMATION

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



AGENCY CERTIFIED / PACKAGE	CTR (%)	
	SINGLE CHANNEL, 6 PIN	
UL, cUL, CQC, CSA, BSI	**≥ 50**	**≥ 100**
DIP-6	IL250	IL252
SMD-6, option 7	-	IL252-X007T

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				
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**	**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	CTR_{DC}	50	-	-	%
		IL252	CTR_{DC}	100	-	-	%
Symmetry	I_F = ± 10 mA			0.50	1	2	

SWITCHING CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Turn-on time		t_{on}	-	TBD	-	μs
Turn-off time		t_{off}	-	TBD	-	μs

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 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_{IO} = 500 V, T_{amb} = 25 °C	R_{IO}	$\geq 10^{12}$	Ω
	V_{IO} = 500 V, T_{amb} = 100 °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	°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_{amb} = 25 °C, unless otherwise specified)

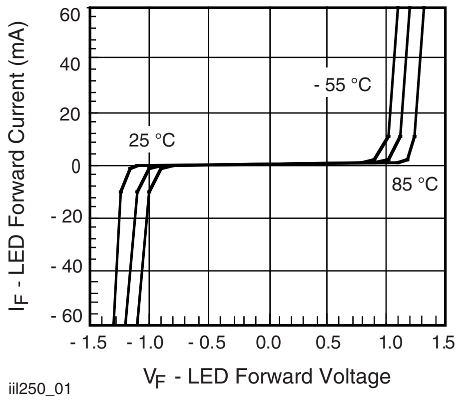


Fig. 1 - LED Forward Current vs.Forward Voltage

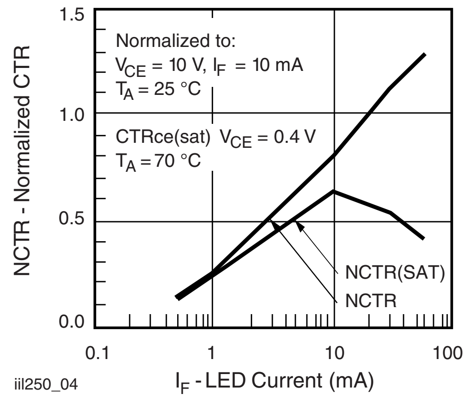


Fig. 4 - Normalized Non-Saturated and Saturated CTR vs. LED Current

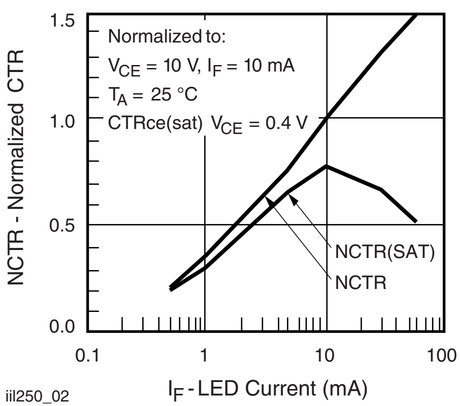


Fig. 2 - Normalized Non-Saturated and Saturated CTR vs. LED Current

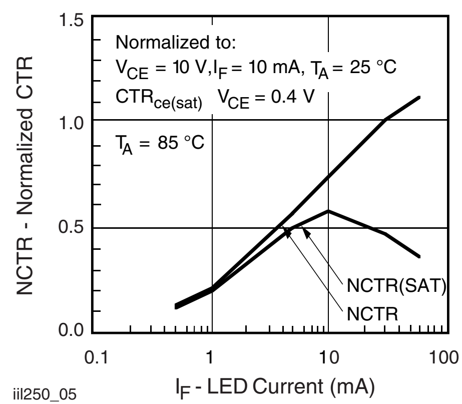


Fig. 5 - Normalized Non-Saturated and Saturated CTR vs. LED Current

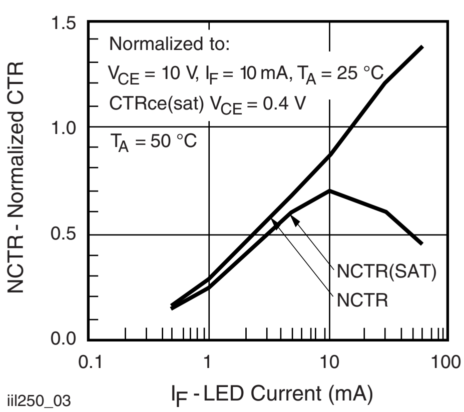


Fig. 3 - Normalized Non-Saturated and Saturated CTR vs. LED Current

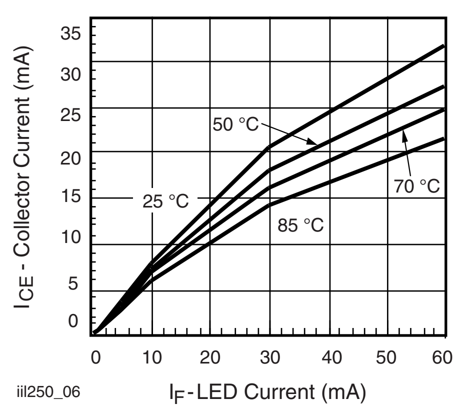


Fig. 6 - Collector Emitter Current vs. Temperature and LED Current

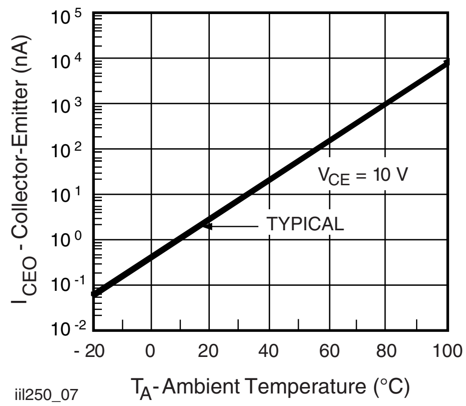


Fig. 7 - Collector Emitter Leakage Current vs.Temperature

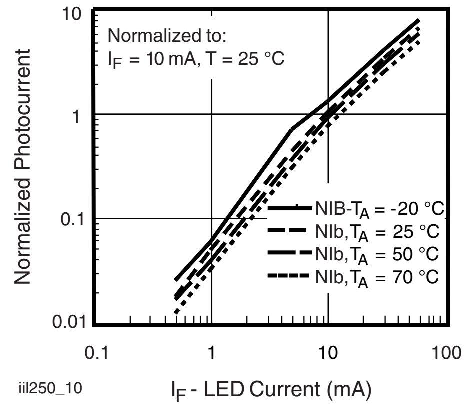


Fig. 10 - Normalized Photocurrent vs. I_F and Temperature

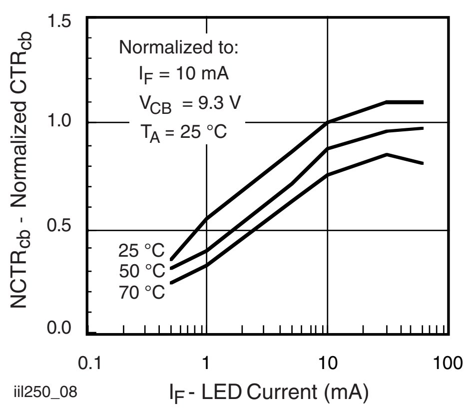


Fig. 8 - Normalized CTR_{CB} vs. LED Current and Temperature

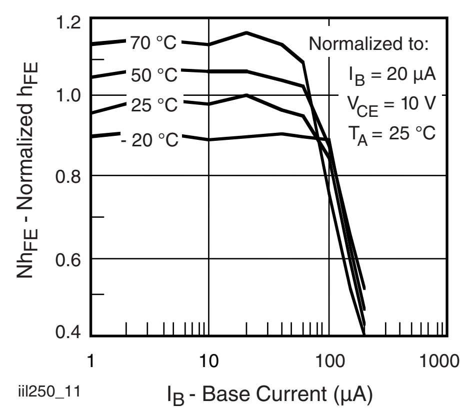


Fig. 11 - Normalized Non Saturated h_{FE} vs. Base Current and Temperature

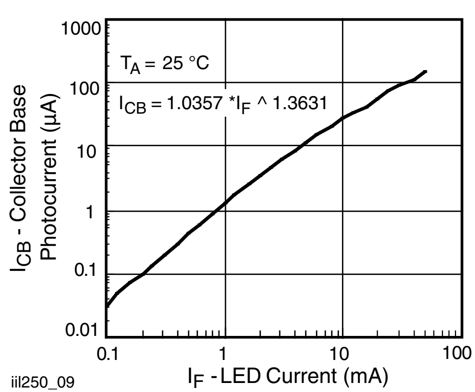


Fig. 9 - Collector Base Photocurrent vs. LED Current

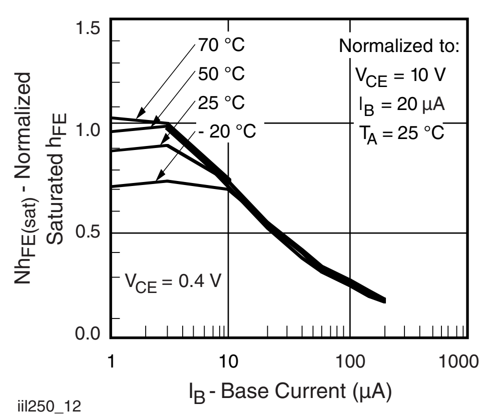


Fig. 12 - Normalized Saturated h_{FE} vs. Base Current and Temperature

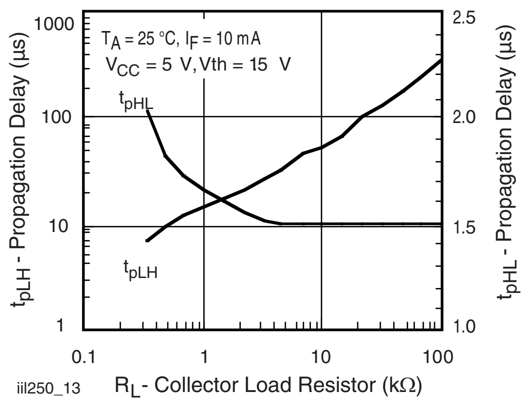


Fig. 13 - Propagation Delay vs. Collector Load Resistor

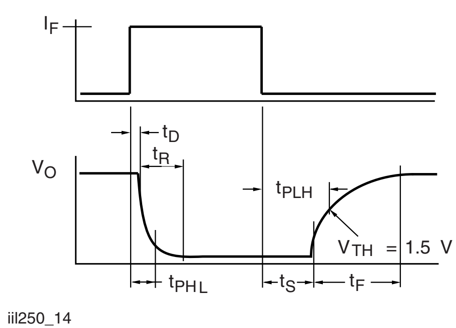


Fig. 14 - Switching Timing

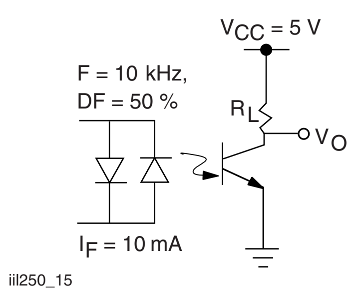
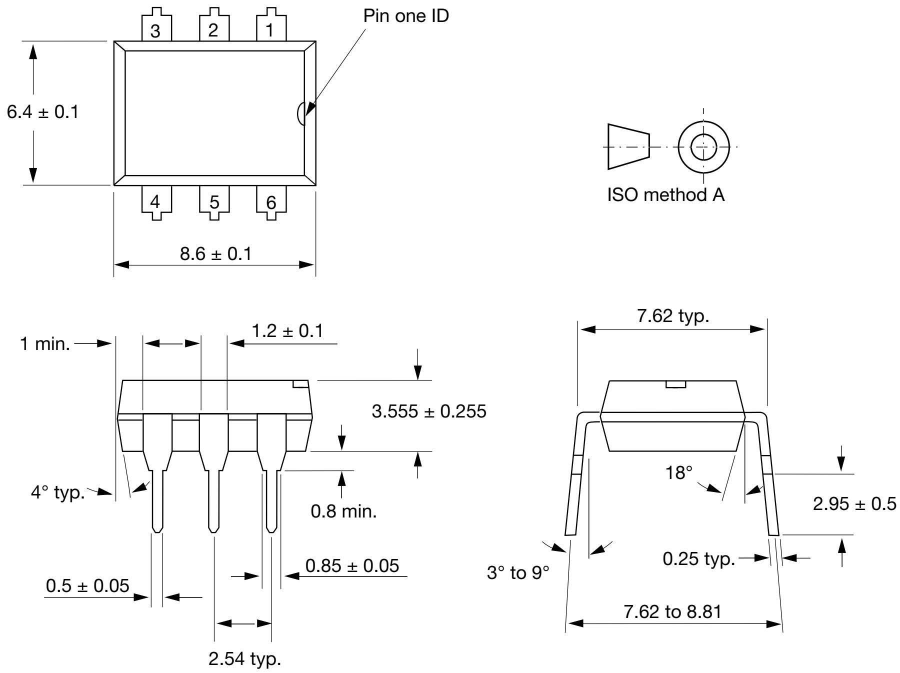
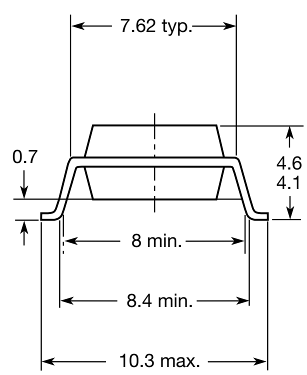


Fig. 15 - Switching Schematic

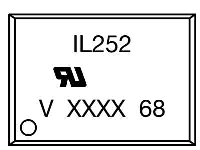
PACKAGE DIMENSIONS in inches (millimeters)



Option 7



PACKAGE MARKING



Note

- XXXX = LMC (lot marking code)

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