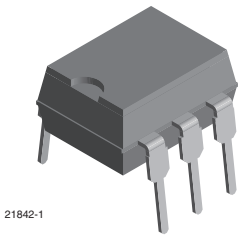
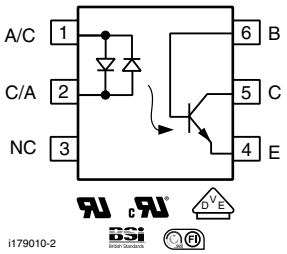
Optocoupler, Phototransistor Output, AC Input, with Base Connection





FEATURES

- AC or polarity insensitive input
- Built-in reverse polarity input protection
- I/O compatible with integrated circuits
- Industry standard DIP package
- Isolation test voltage: 5300 V_{RMS}
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

DESCRIPTION

The H11AA1 is a bi-directional input optically coupled isolator consisting of two inverse parallel gallium arsenide infrared LEDs coupled to a silicon NPN phototransistor in a 6 pin DIP package. The H11AA1 has a minimum CTR of 20 %, a CTR symmetry of 1:3 and is designed for applications requiring detection or monitoring of AC signals.

APPLICATIONS

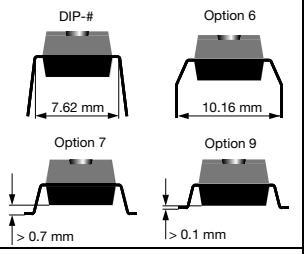
- Telephone line detection
- AC line motor
- PLC
- Instrumentation

AGENCY APPROVALS

- UL1577, file no. E52744 system code H, double protection
- CSA 93751
- BSI IEC 60950; IEC 60065
- DIN EN 60747-5-2 (VDE0884)/DIN EN 60747-5-5 (pending), available with option 1
- FIMKO

ORDERING INFORMATION

H	1	1	A	A	1	-	X	0	0	#	T
PART NUMBER							PACKAGE OPTION				TAPE AND REEL



AGENCY CERTIFIED/PACKAGE	CTR (%)
UL, cUL, BSI, FIMKO	**≥ 20**
DIP-6	H11AA1
DIP-6, 400 mil, option 6	H11AA1-X006
SMD-6, option 7	H11AA1-X007T (1)
SMD-6, option 9	H11AA1-X009T (1)
VDE, UL, cUL, BSI, FIMKO	**≥ 20**
DIP-6	H11AA1-X001

Note

- 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			1.3	mW/°C
OUTPUT				
Power dissipation		P_{diss}	200	mW
Derate linearly from 25 °C			2.6	mW/°C
Collector emitter breakdown voltage		BV_{CEO}	30	V
Emitter base breakdown voltage		BV_{EBO}	5	V
Collector base breakdown voltage		BV_{CBO}	70	V
COUPLER				
Isolation test voltage (RMS)	Between emitter and detector, referred to standard climate 23 °C/50% RH, DIN 50014	V_{ISO}	5300	V_{RMS}
Creepage distance			≥ 7	mm
Clearance distance			≥ 7	mm
Comparative tracking index	per DIN IEC 112/VDE 0303, part 1	CTI	175	
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
Storage temperature range		T_{stg}	- 55 to + 150	°C
Operating temperature range		T_{amb}	- 55 to + 100	°C
Lead soldering time at 260 °C		T_{sld}	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 CHARACTERISTCS (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			V
Emitter base breakdown voltage	I_E = 100 µA	BV_{EBO}	5			V
Collector base breakdown voltage	I_C = 100 µA	BV_{CBO}	70			V
Collector emitter leakage current	V_{CE} = 10 V	I_{CEO}		5	100	nA
COUPLER						
Collector emitter saturation voltage	I_F = ± 10 mA, I_C = 0.5 mA	V_{CEsat}			0.4	V

Note

- Minimum and maximum values were tested requierements. Typical values are characteristics of the device and are the result of engineering evaluations. 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**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
DC current transfer ratio	I_F = ± 10 mA, V_{CE} = 10 V	CTR_{DC}	20			%
Symmetry (CTR at + 10 mA)/(CTR at - 10 mA)			0.33	1	3	

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

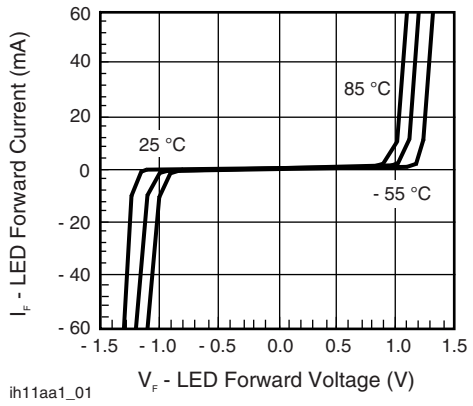


Fig. 1 - LED Forward Current vs.Forward Voltage

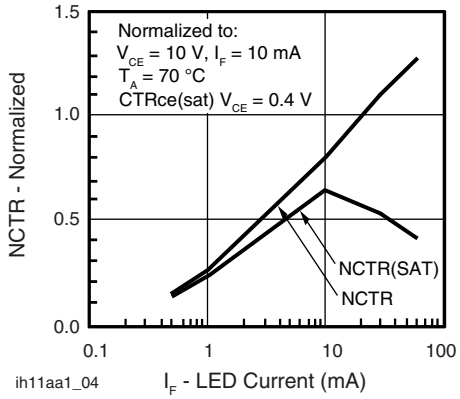


Fig. 4 - Normalized Non-Saturated and Saturated CTR vs. LED Current

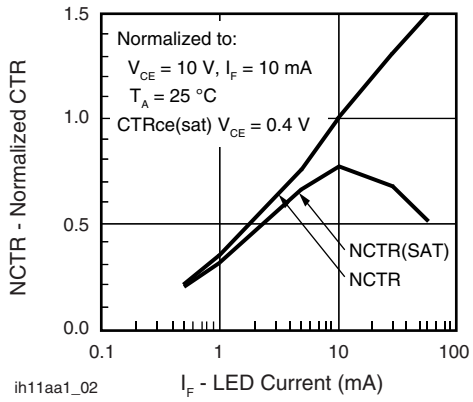


Fig. 2 - Normalized Non-Saturated and Saturated CTR vs. LED Current

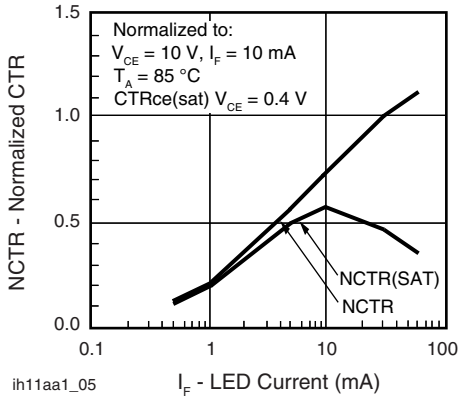


Fig. 5 - Normalized Non-Saturated and Saturated CTR vs. LED Current

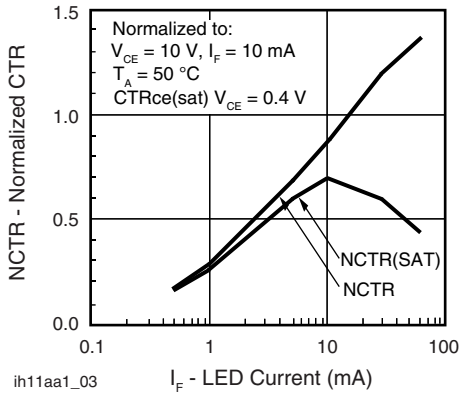


Fig. 3 - Normalized Non-Saturated and Saturated CTR vs. LED Current

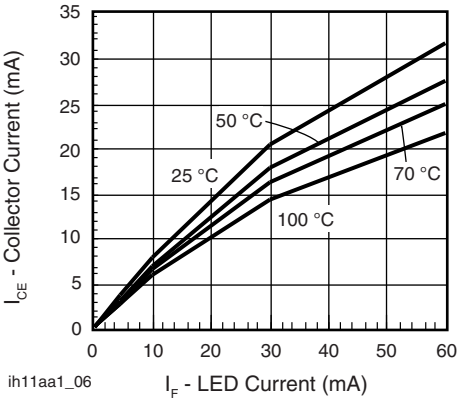


Fig. 6 - Collector Emitter Current vs. Temperature and LED Current

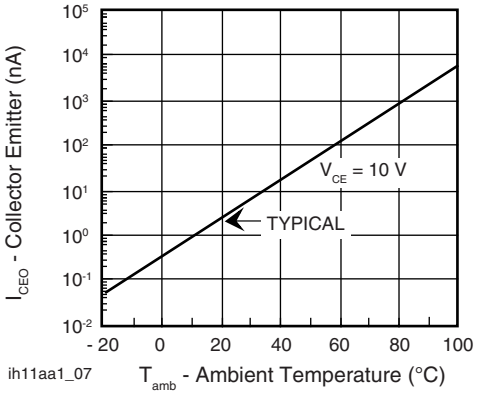


Fig. 7 - Collector Emitter Leakage Current vs. Temperature

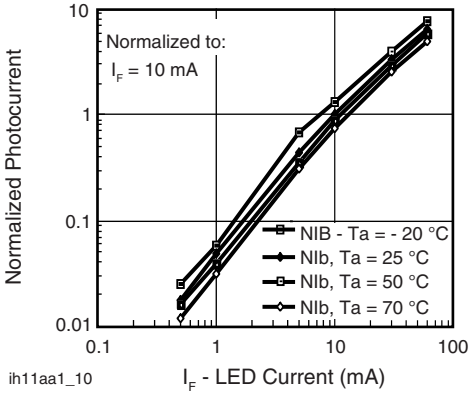


Fig. 10 - Normalized Photocurrent vs. LED Current

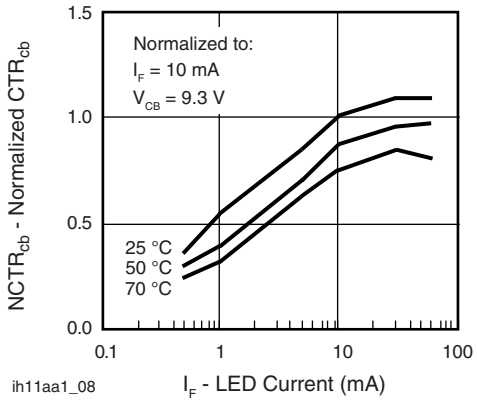


Fig. 8 - Normalized CTR_{cb} vs. LED Current and Temperature

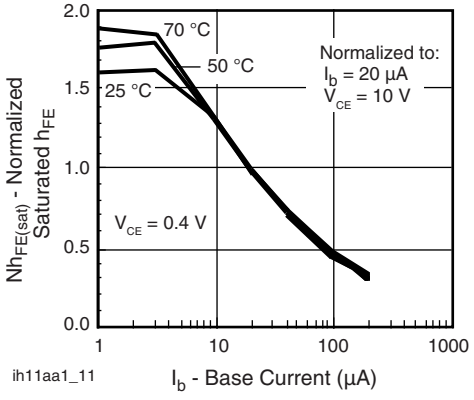


Fig. 11 - Normalized Saturated h_{FE} vs. Base Current and Temperature

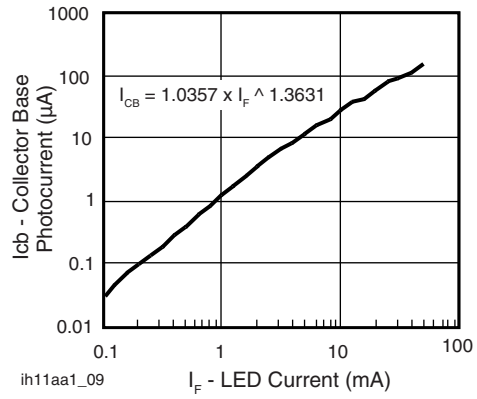


Fig. 9 - Collector Base Photocurrent vs. LED Current

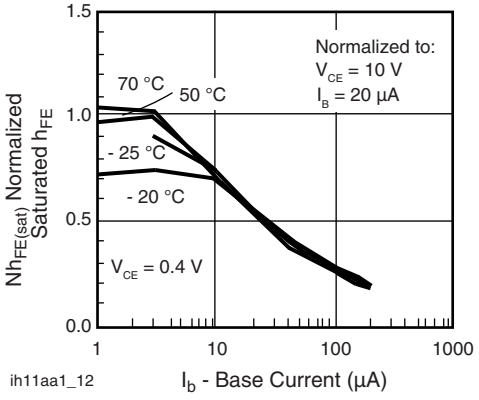


Fig. 12 - Normalized Saturated h_{FE} vs. Base Current and Temperature

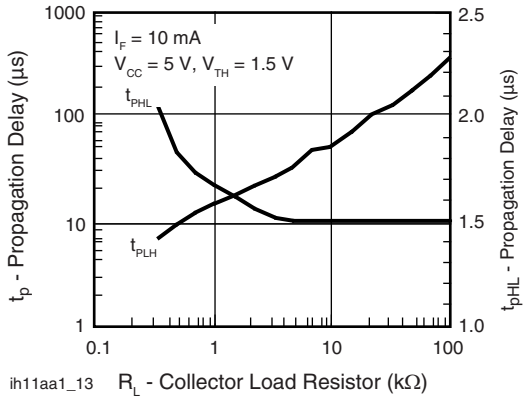


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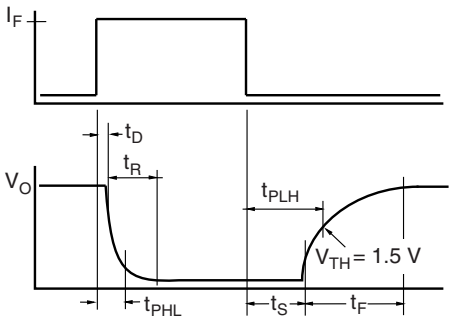
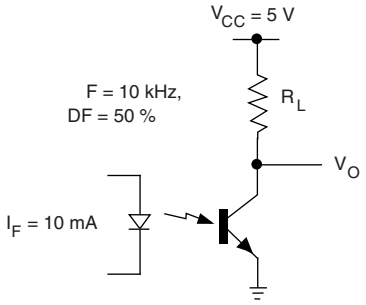
Fig. 13 - Propagation Delay vs. Collector Load Resistor



ih11aa1_14

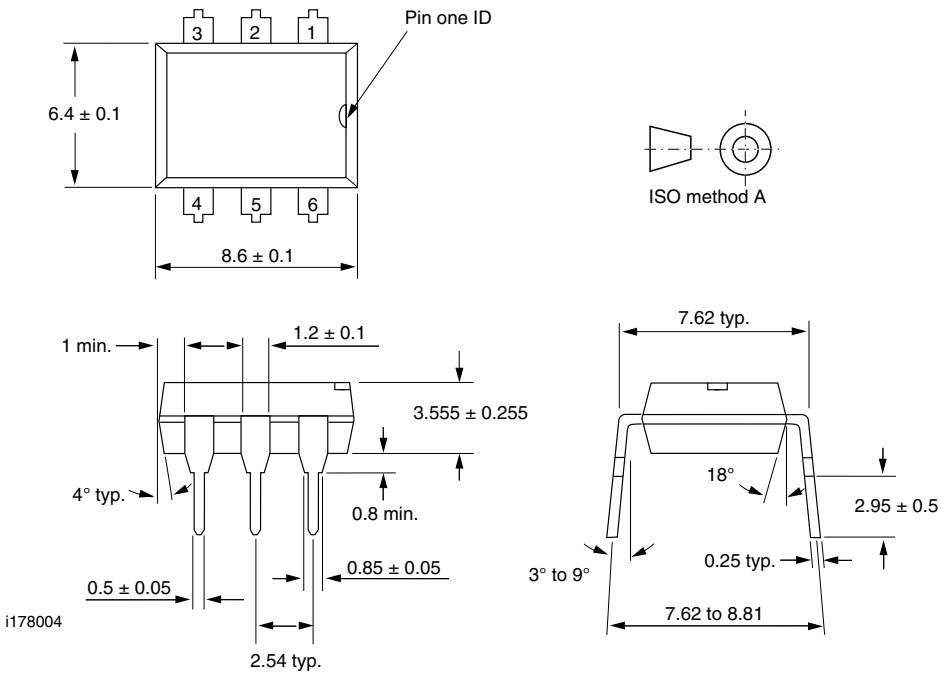
Fig. 14 - Switching Waveform



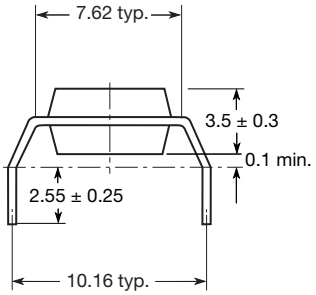
ih11aa1_15

Fig. 15 - Switching Schematic

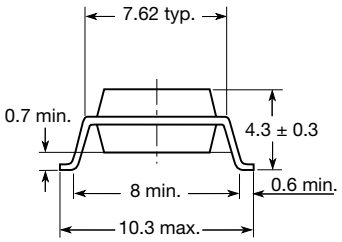
PACKAGE DIMENSIONS in millimeters



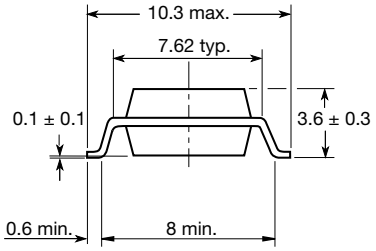
Option 6

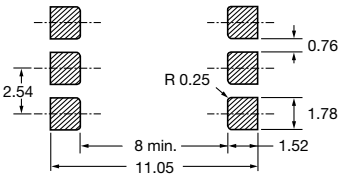


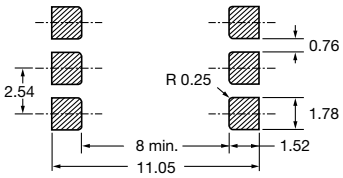
Option 7



Option 9

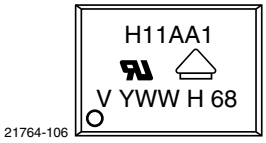






20802-24

PACKAGE MARKING



Notes

- Only options 1 and 7 are reflected in the package marking.
- The VDE Logo is only marked on option1 parts.
- Tape and reel suffix (T) is not part of the package marking.

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