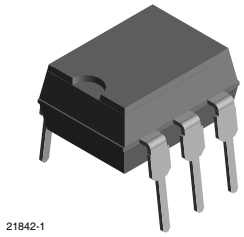
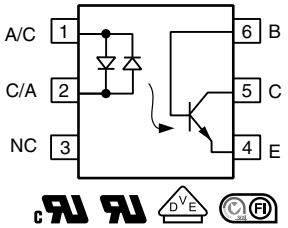
Optocoupler, Phototransistor Output, AC Input, With Base Connection





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}
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

LINKS TO ADDITIONAL RESOURCES

Product Page | Design Tools | Models | Footprints | Schematics

APPLICATIONS

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

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.

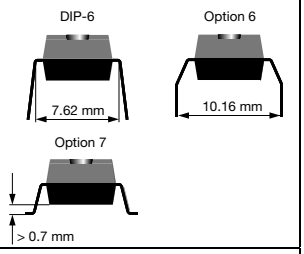
AGENCY APPROVALS

- UL 1577
- cUL
- DIN EN 60747-5-5 (VDE0884-5), available with option 1
- BSI
- 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
UL, cUL, BSI, FIMKO, VDE (Option 1)	**≥ 20**
DIP-6	H11AA1-X001

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			1.3	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				
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 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	-	-	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 requirements. 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	

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)

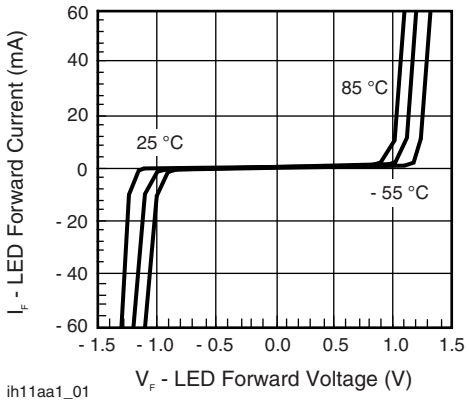


Fig. 1 - LED Forward Current vs.Forward Voltage

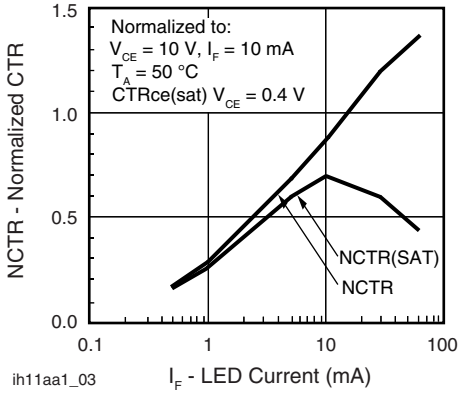


Fig. 3 - Normalized Non-Saturated and Saturated CTR vs. LED Current

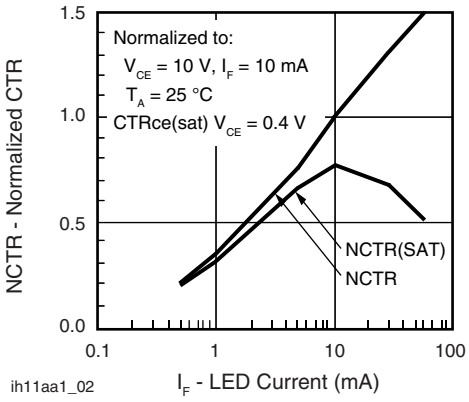


Fig. 2 - Normalized Non-Saturated and Saturated CTR vs. LED Current

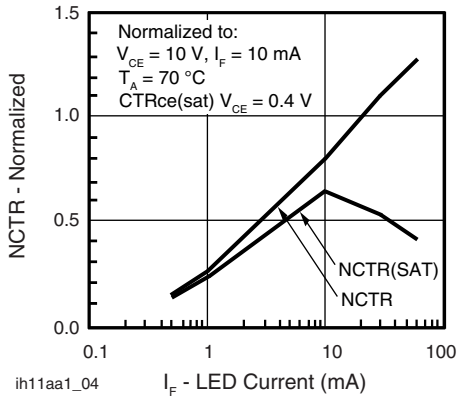


Fig. 4 - Normalized Non-Saturated and Saturated CTR vs. LED Current

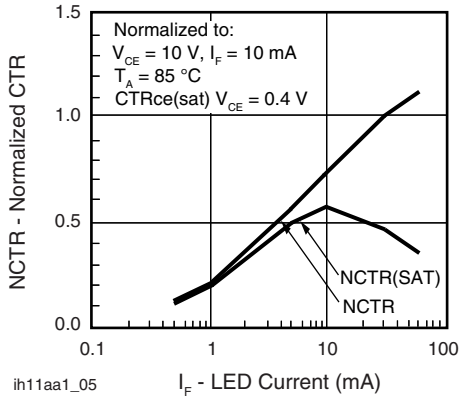


Fig. 5 - Normalized Non-Saturated and Saturated CTR vs. LED Current

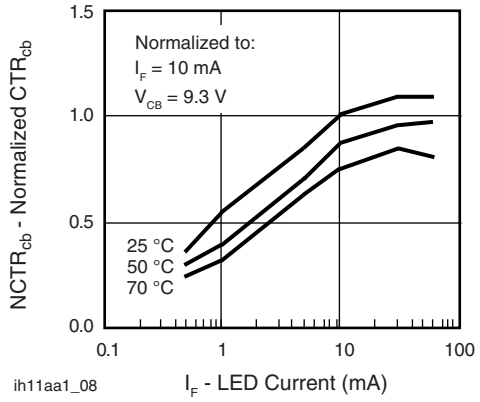


Fig. 8 - Normalized CTR_{cb} vs. LED Current and Temperature

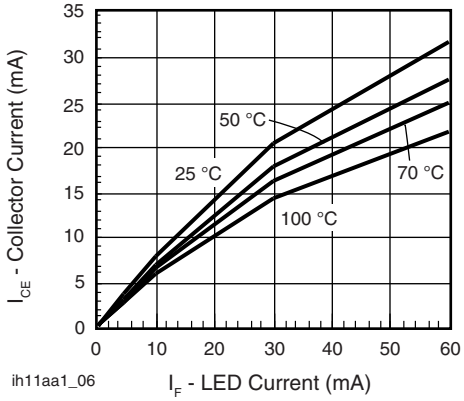


Fig. 6 - Collector Emitter Current vs. Temperature and LED Current

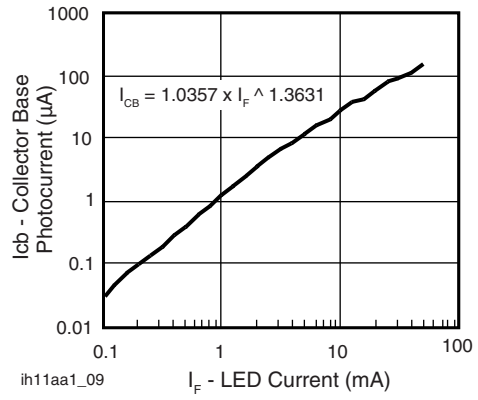


Fig. 9 - Collector Base Photocurrent vs. LED Current

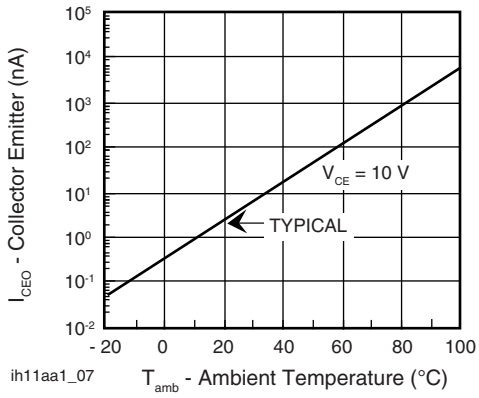


Fig. 7 - Collector Emitter Leakage Current vs. Temperature

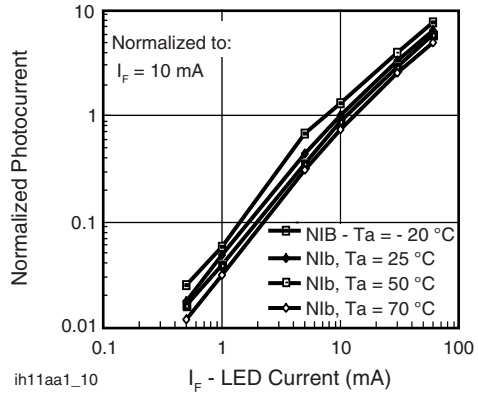


Fig. 10 - Normalized Photocurrent vs. LED Current

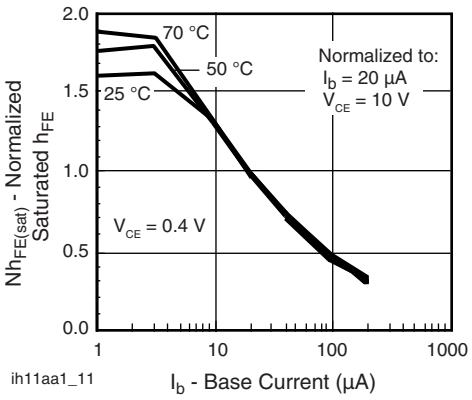


Fig. 11 - Normalized Saturated h_{FE} vs. Base Current and Temperature

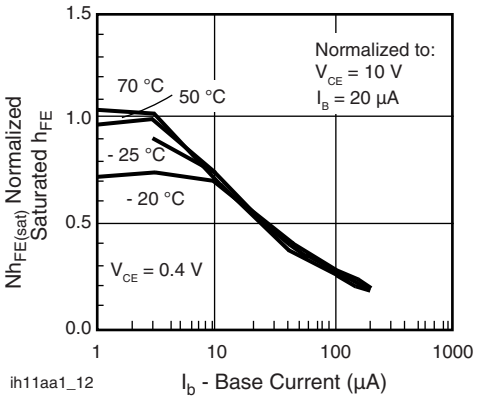


Fig. 12 - Normalized Saturated h_{FE} vs. Base Current and Temperature

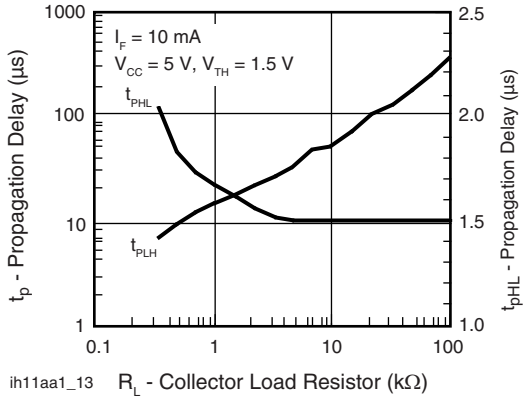


Fig. 13 - Propagation Delay vs. Collector Load Resistor

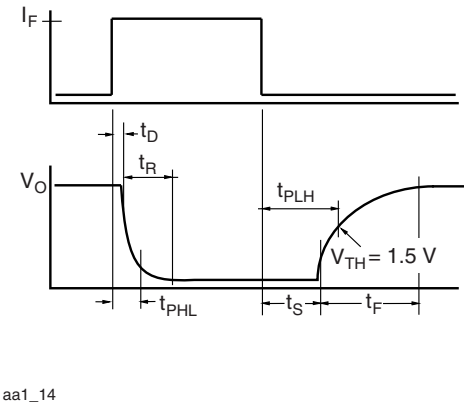


Fig. 14 - Switching Waveform

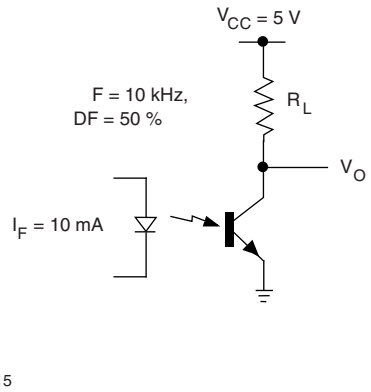
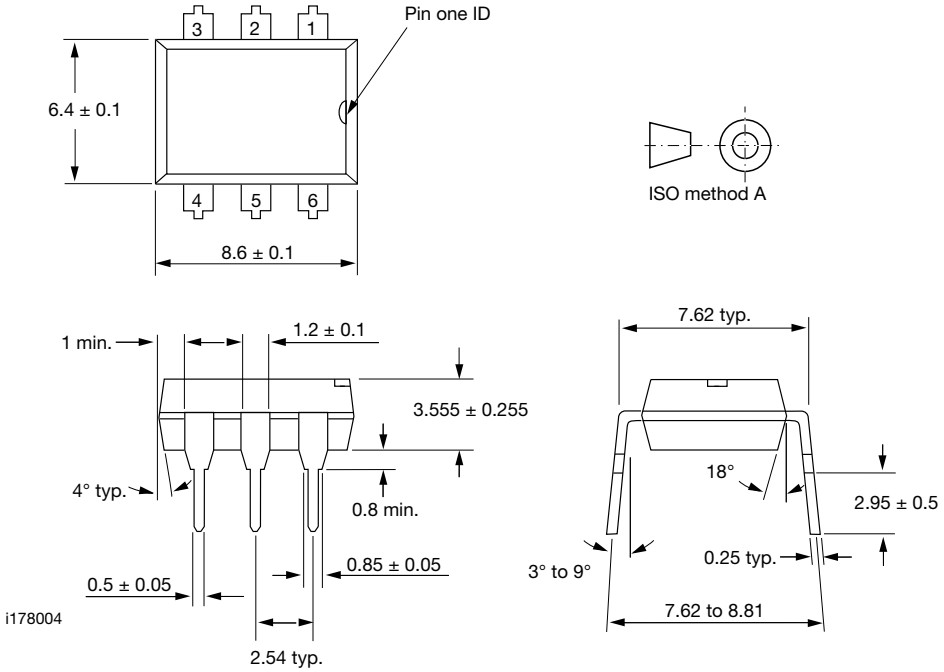
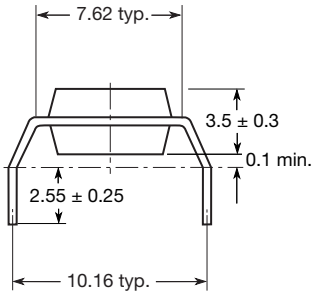


Fig. 15 - Switching Schematic

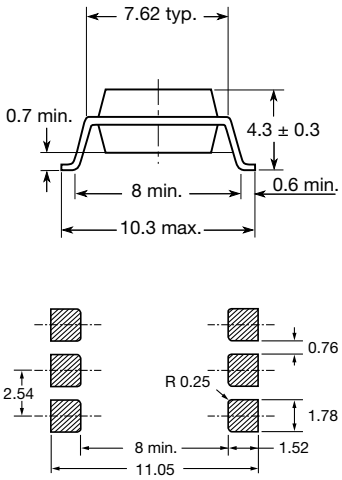
PACKAGE DIMENSIONS in millimeters



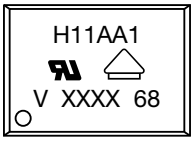
Option 6



Option 7



PACKAGE MARKING



Notes

- XXXX = LMC (lot marking code)
- 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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