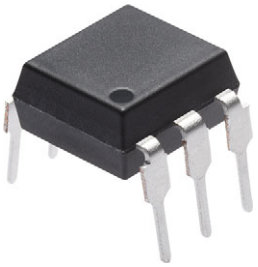
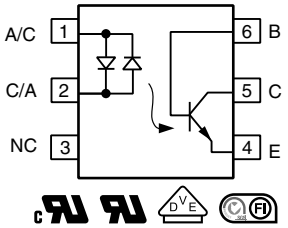
Optocoupler, Phototransistor Output, AC Input, With Base Connection





FEATURES

- AC or polarity insensitive input
- Built-in reverse polarity input protection
- Industry standard DIP package
- Isolation voltage: 5000 V_{RMS}
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

APPLICATIONS

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

AGENCY APPROVALS

- UL
- cUL
- DIN EN 60747-5-5 (VDE0884-5), available with option 1
- CQC
- FIMKO

DESCRIPTION

The H11AA1 is a bi-directional input optically coupled isolator consisting of two inverse parallel infrared LEDs coupled to a silicon NPN phototransistor in a 6 pin DIP package.

ORDERING INFORMATION

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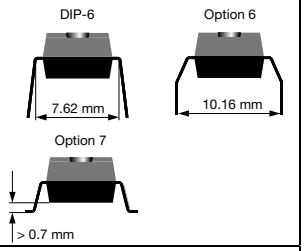
PART NUMBER							PACKAGE OPTION				TAPE AND REEL



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

Notes

- 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				
Forward continuous current		I_F	± 40	mA
Power dissipation		P_{diss}	120	mW
Derate linearly from 90 °C			3.8	mW/°C
OUTPUT				
Power dissipation		P_{diss}	150	mW
Collector emitter breakdown voltage		BV_{CEO}	80	V
Emitter collector breakdown voltage		BV_{ECO}	7	V
Collector base breakdown voltage		BV_{CBO}	80	V
COUPLER				
Total dissipation		P_{tot}	200	mW
Storage temperature range		T_{stg}	-55 to +125	°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}	80	-	-	V
Emitter collector breakdown voltage	I_E = 100 µA	BV_{ECO}	7	-	-	V
Collector base breakdown voltage	I_C = 100 µA	BV_{CBO}	80	-	-	V
Collector emitter leakage current	V_{CE} = 10 V, I_F = 0 mA	I_{CEO}	-	-	50	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	-	-	%

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}	5000	V_{RMS}
Maximum transient isolation voltage		V_{IOTM}	6000	V_{peak}
Maximum repetitive peak isolation voltage		V_{IORM}	850	V_{peak}
Isolation resistance	V_{IO} = 500 V, T_{amb} = 25 °C	R_{IO}	≥ 10^{11}	Ω
Output safety power		P_{SO}	150	mW
Input safety current		I_{SI}	60	mA
Safety temperature		T_S	125	°C
Creepage distance			≥ 7	mm
Clearance distance			≥ 7	mm
Insulation thickness		DTI	≥ 0.4	mm

Note

- As per IEC 60747-5-5, 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)

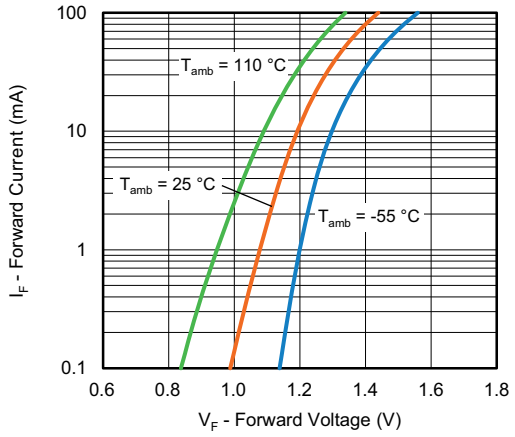


Fig. 1 - Forward Current vs. Forward Voltage

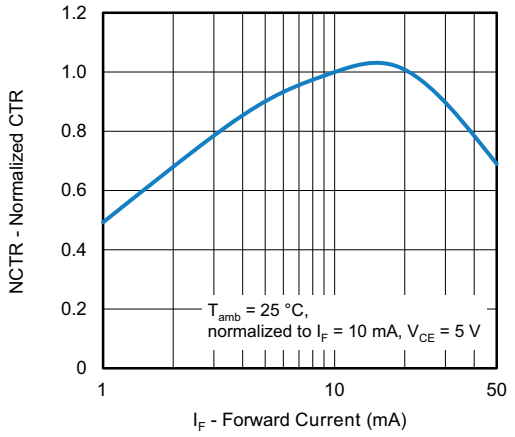


Fig. 2 - Normalized CTR vs. Forward Current

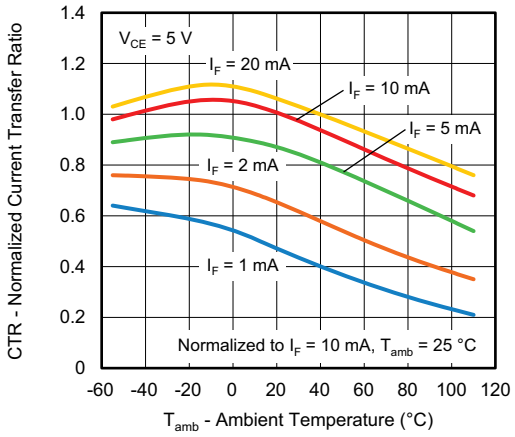


Fig. 3 - Current Transfer Ratio vs. Ambient Temperature

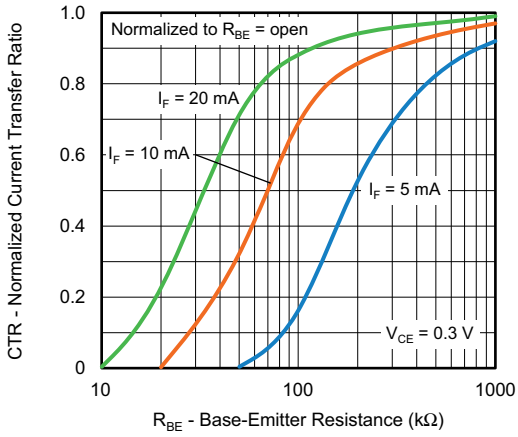


Fig. 4 - Current Transfer Ratio (saturated) vs. Base Emitter Resistance

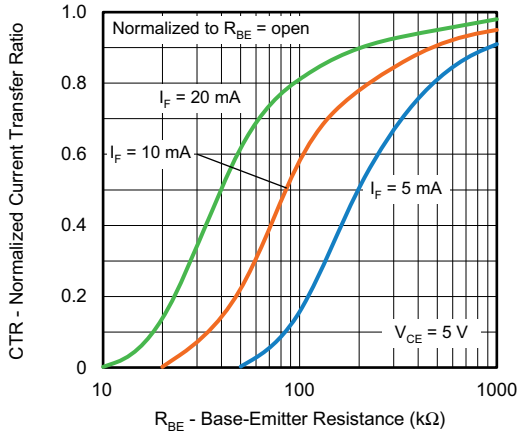


Fig. 5 - Current Transfer Ratio (non-saturated) vs. Base Emitter Resistance

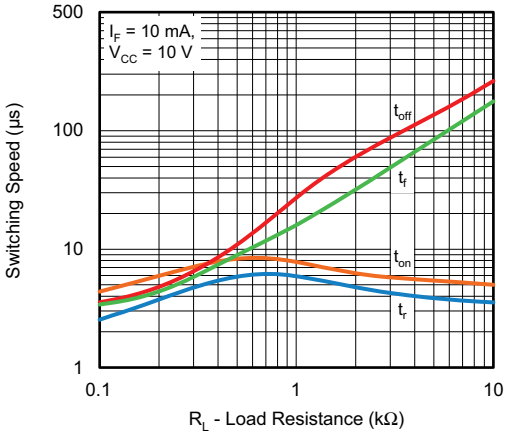


Fig. 8 - Switching Time vs. Load Resistance

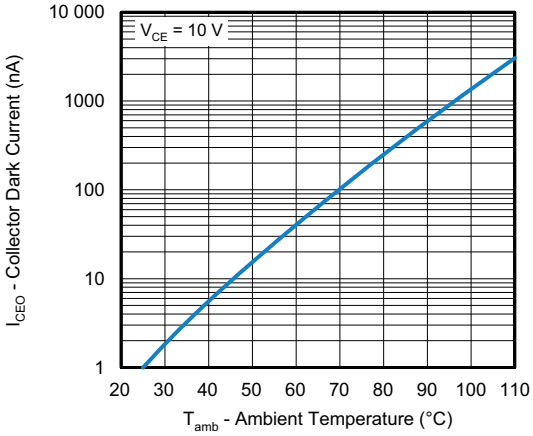


Fig. 6 - Dark Current vs. Ambient Temperature

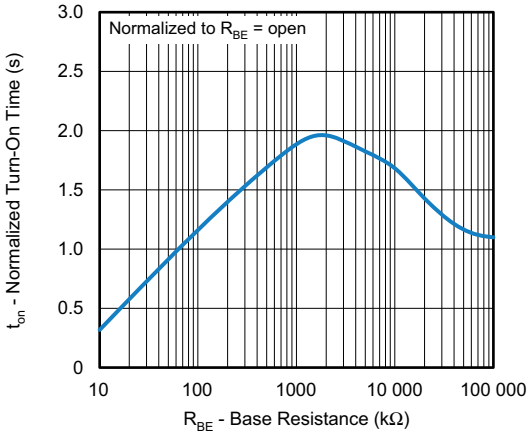


Fig. 9 - Turn-On Time vs. Base Emitter Resistance

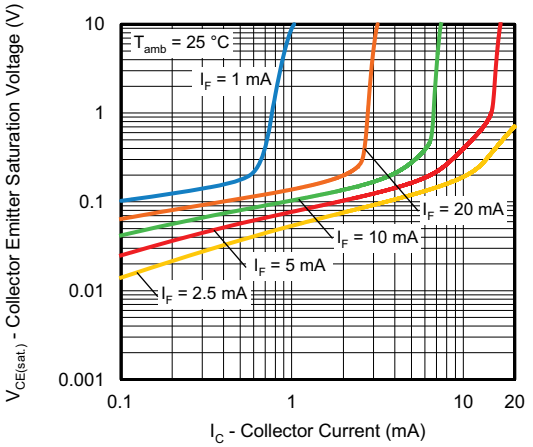


Fig. 7 - Collector Emitter Saturation Voltage vs. Collector Current

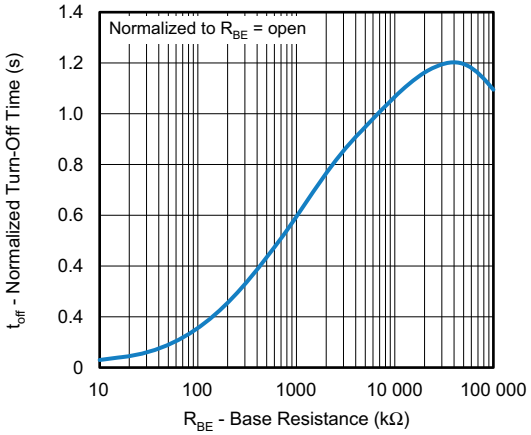


Fig. 10 - Turn-Off Time vs. Base Emitter Resistance

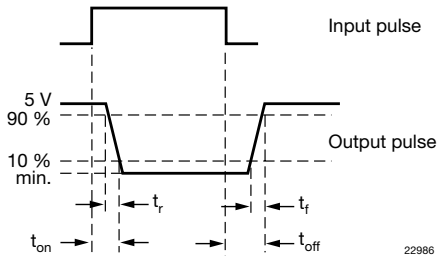


Fig. 11 - Switching Waveform

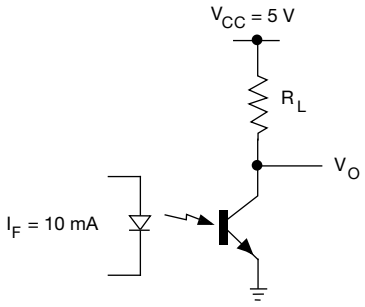
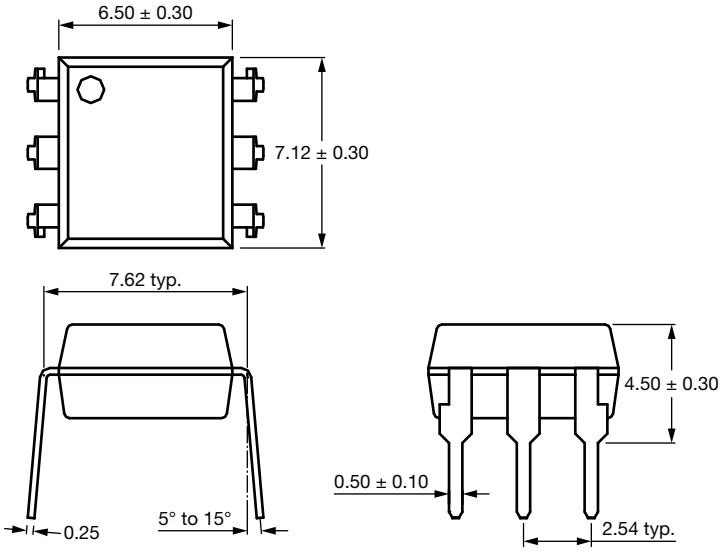


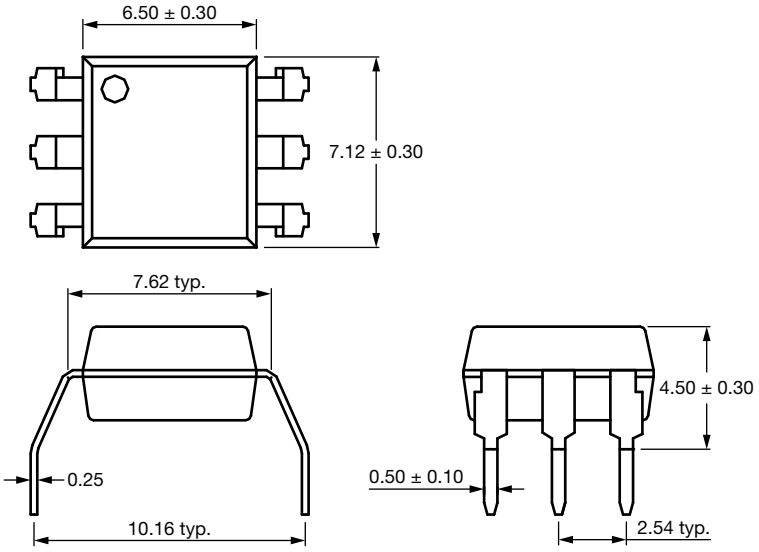
Fig. 12 - Switching Schematic

PACKAGE DIMENSIONS in millimeters

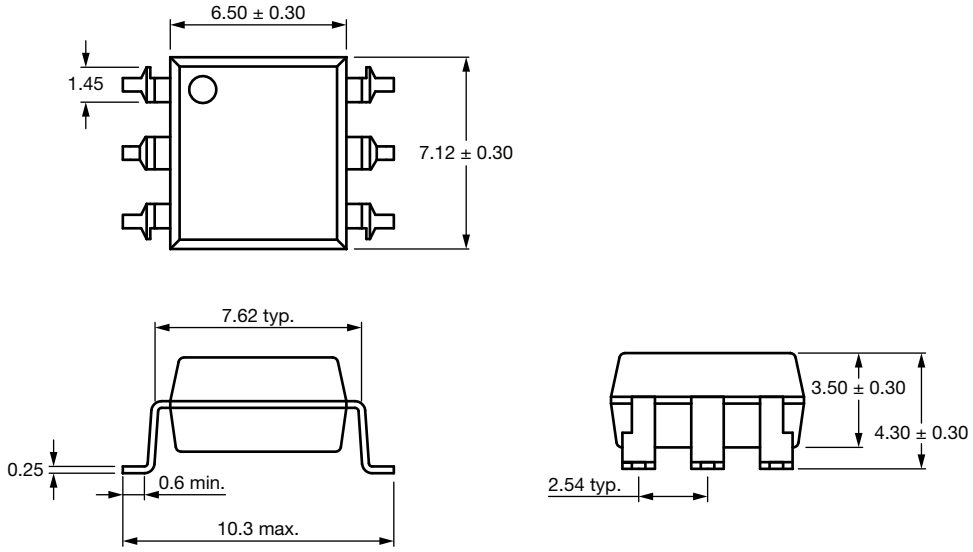
DIP-6



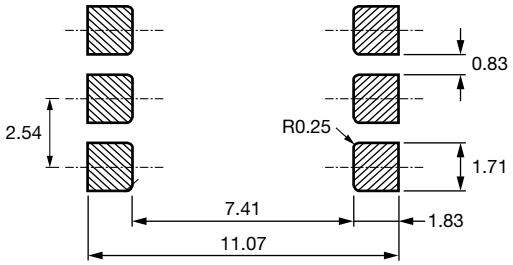
DIP-6, Option 6



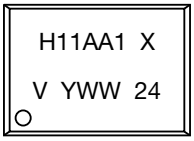
SMD-6, Option 7



RECOMMENDED PAD LAYOUT



PACKAGE MARKING (example)



Notes

- YWW = date code
- Option 1 is reflected with letter “X”
- Tape and reel suffix (T) is not part of the package marking

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