



**THE DATASHEET OF
H11A1-X009**





ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Reverse voltage		V _R	6	V
Forward current		I _F	60	mA
Surge current	t ≤ 10 μs	I _{FSM}	2.5	A
Power dissipation		P _{diss}	100	mW
OUTPUT				
Collector emitter breakdown voltage		V _{CEO}	70	V
Emitter base breakdown voltage		V _{EBO}	7	V
Collector current		I _C	50	mA
	t < 1 ms	I _C	100	mA
Power dissipation		P _{diss}	150	mW
COUPLER				
Storage temperature range		T _{stg}	-55 to +150	°C
Operating temperature range		T _{amb}	-55 to +100	°C
Junction temperature		T _j	100	°C
Soldering temperature	Max. 10 s, dip soldering: distance to seating plane ≥ 1.5 mm	T _{slid}	260	°C

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	-	1.1	1.5	V
Reverse current	V _R = 3 V	I _R	-	-	10	μA
Capacitance	V _R = 0 V, f = 1 MHz	C _O	-	50	-	pF
OUTPUT						
Collector emitter breakdown voltage	I _C = 1 mA, I _F = 0 mA	BV _{CEO}	30	-	-	V
Emitter collector breakdown voltage	I _E = 100 μA, I _F = 0 mA	BV _{ECO}	7	-	-	V
Collector base breakdown voltage	I _C = 10 μA, I _F = 0 mA	BV _{CBO}	70	-	-	V
Collector emitter leakage current	V _{CE} = 10 V, I _F = 0 mA	I _{CEO}	-	5	50	nA
Emitter collector capacitance	V _{CE} = 0 V	C _{CE}	-	6	-	pF
COUPLER						
Collector emitter, saturation voltage	I _{CE} = 0.5 mA, I _F = 10 mA	V _{CEsat}	-	-	0.4	V
Capacitance (input-output)		C _{IO}	-	0.5	-	pF

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						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
I _C /I _F	V _{CE} = 10 V, I _F = 10 mA	CTR _{DC}	50	-	-	%

SWITCHING CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	I _C = 2 mA, R _L = 100 Ω, V _{CE} = 10 V	t _{on}	-	3	-	μs
Turn-off time		t _{off}	-	3	-	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}	8000	V_{peak}
Maximum repetitive peak isolation voltage		V_{IORM}	890	V_{peak}
Isolation resistance	$V_{IO} = 500\text{ V}, T_{amb} = 25\text{ }^{\circ}\text{C}$	R_{IO}	$\geq 10^{12}$	Ω
	$V_{IO} = 500\text{ V}, T_{amb} = 100\text{ }^{\circ}\text{C}$	R_{IO}	$\geq 10^{11}$	Ω
Output safety power		P_{SO}	700	mW
Input safety current		I_{SI}	400	mA
Safety temperature		T_S	175	$^{\circ}\text{C}$
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.

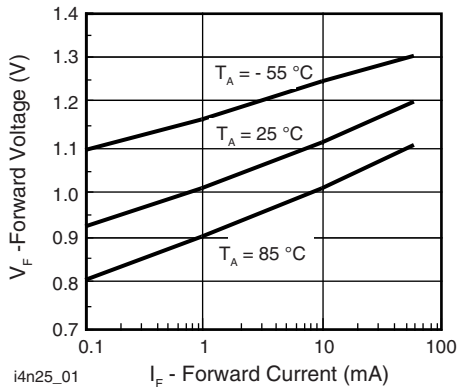
TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 1 - Forward Voltage vs. Forward Current

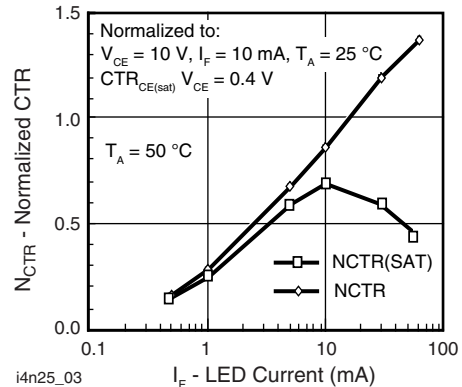


Fig. 3 - Normalized Non-Saturated and Saturated CTR vs. LED Current

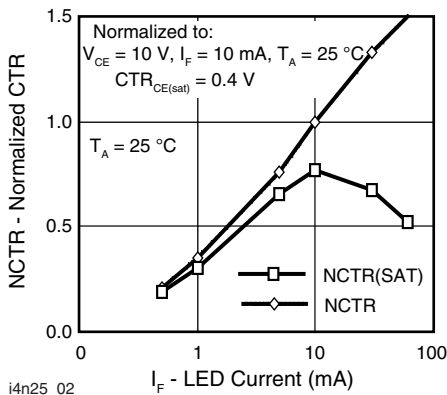


Fig. 2 - Normalized Non-Saturated and Saturated CTR vs. LED Current

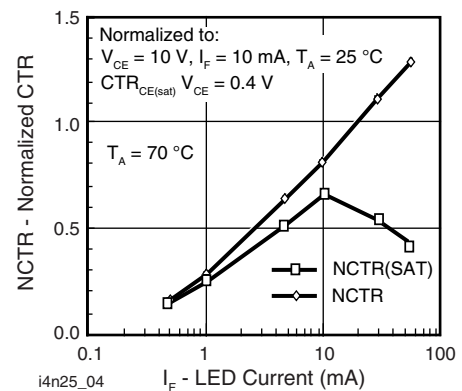


Fig. 4 - Normalized Non-Saturated and Saturated CTR vs. LED Current

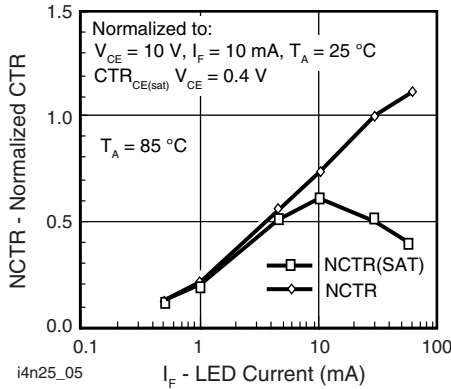


Fig. 5 - Normalized Non-Saturated and Saturated CTR vs. LED Current

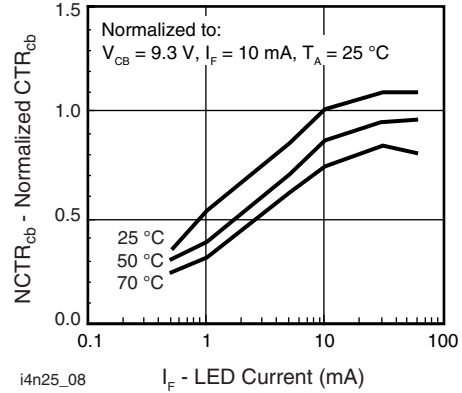


Fig. 8 - Normalized CTR_{cb} vs. LED Current and Temperature

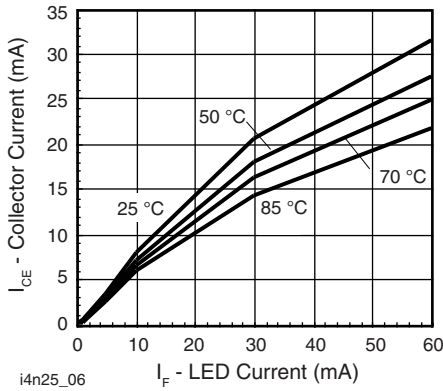


Fig. 6 - Collector Emitter Current vs. Temperature and LED Current

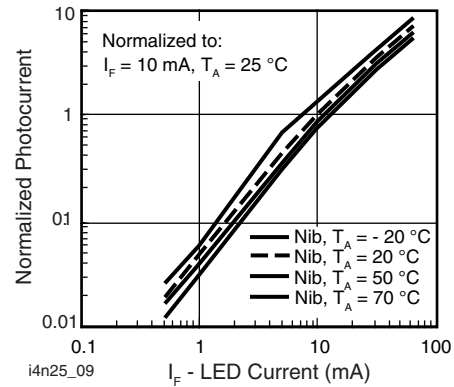


Fig. 9 - Normalized Photocurrent vs. I_F and Temperature

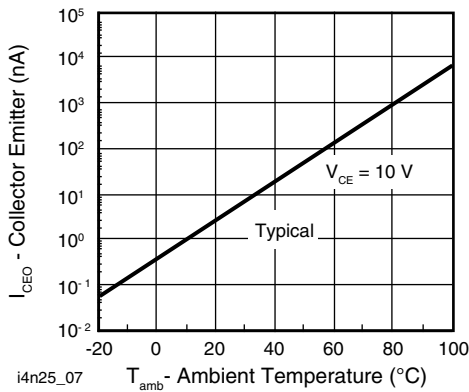


Fig. 7 - Collector Emitter Leakage Current vs. Temperature

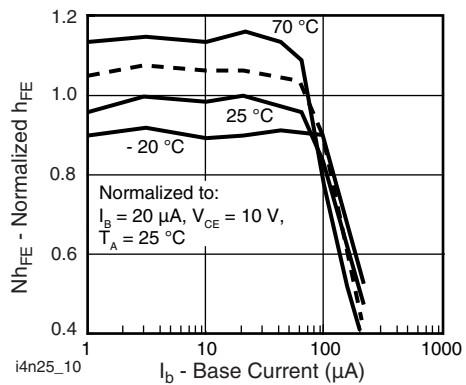


Fig. 10 - Normalized Non-Saturated h_{FE} vs. Base Current and Temperature

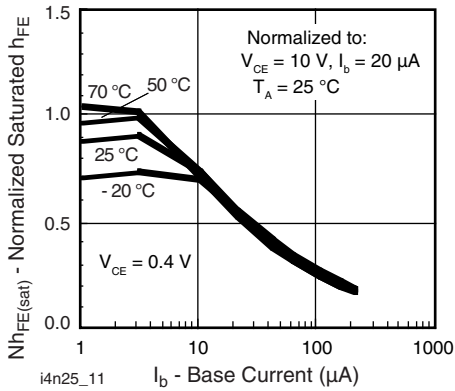
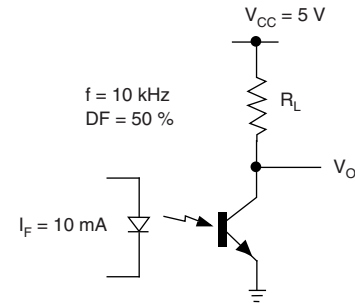


Fig. 11 - Normalized HFE vs. Base Current and Temperature

Fig. 13 - Switching Timing



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Fig. 14 - Switching Schematic

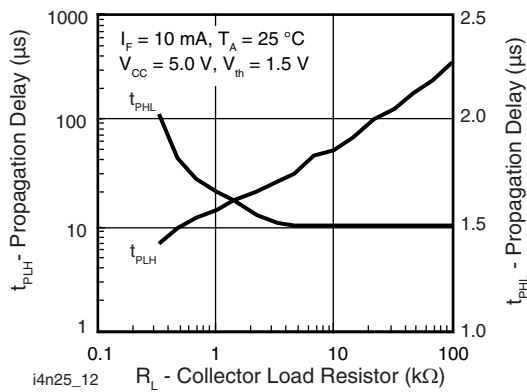
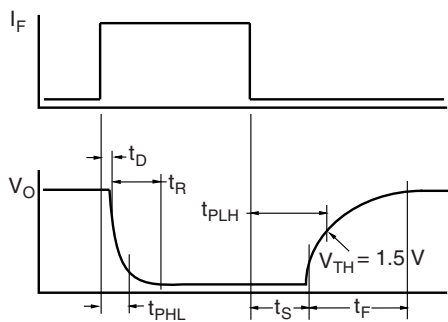


Fig. 12 - Propagation Delay vs. Collector Load Resistor

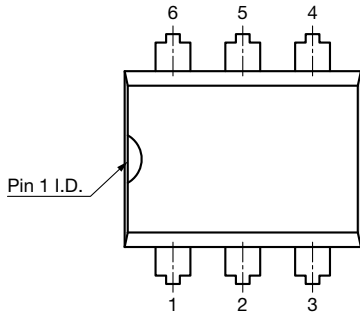
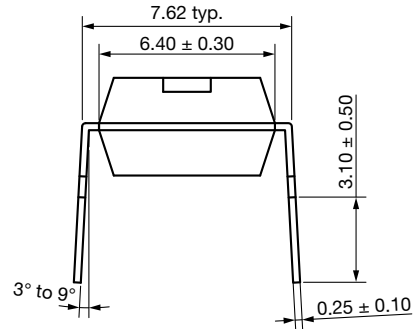
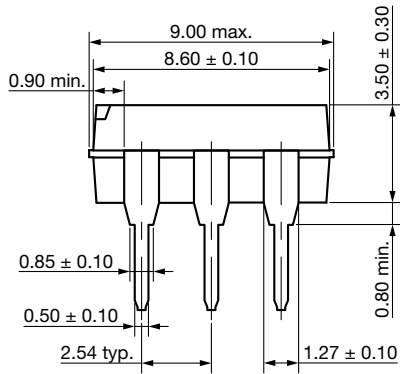


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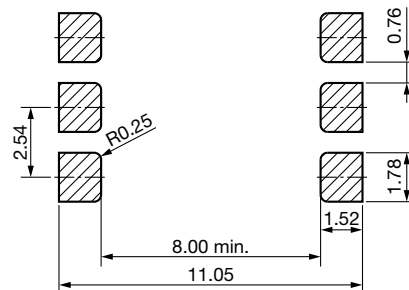
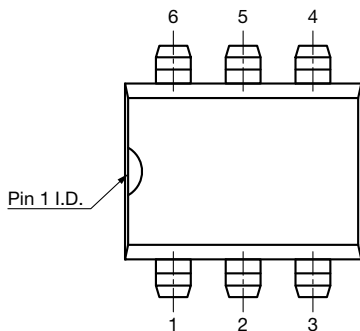
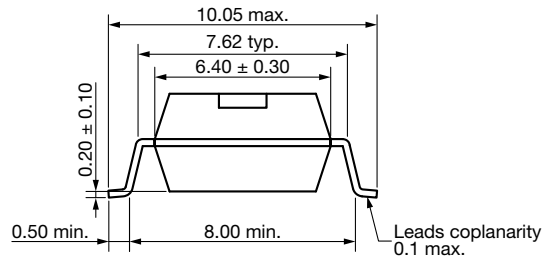
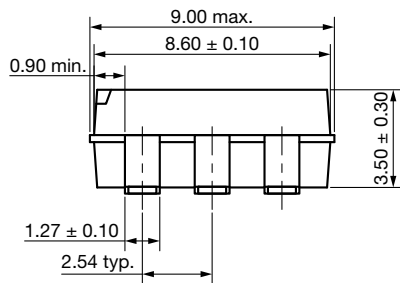


PACKAGE DIMENSIONS in millimeters

DIP-6

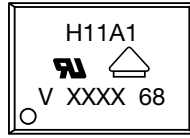


Option 9





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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