

## DESCRIPTION

The CNX48U, H11BX, MOC8080 and TIL113 have a gallium arsenide infrared emitter optically coupled to a silicon planar photodarlington.

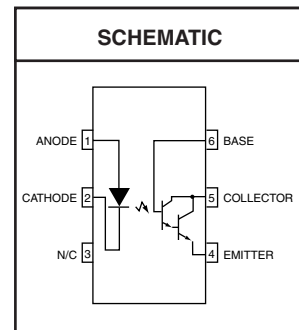
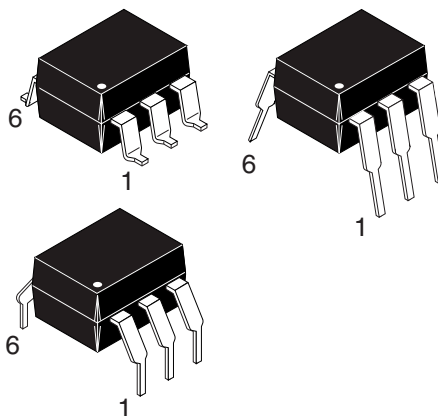
CNX48U	H11B1	H11B2	H11B255	H11B3
MOC8080	TIL113			

## FEATURES

- High sensitivity to low input drive current
- Meets or exceeds all JEDEC Registered Specifications
- VDE 0884 approval available as a test option  
-add option .300. (e.g., H11B1.300)

## APPLICATIONS

- Low power logic circuits
- Telecommunications equipment
- Portable electronics
- Solid state relays
- Interfacing coupling systems of different potentials and impedances.



Parameter	Symbol	Device	Value	Units
<b>TOTAL DEVICE</b>				
Storage Temperature	$T_{STG}$	All	-55 to +150	°C
Operating Temperature	$T_{OPR}$	All	-55 to +100	°C
Lead Solder Temperature	$T_{SOL}$	All	260 for 10 sec	°C
Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	$P_D$	All	250	mW
			3.3	mW/°C
<b>EMITTER</b>				
Continuous Forward Current	$I_F$	All	100	mA
Reverse Voltage	$V_R$	All	6	V
Forward Current - Peak (300 $\mu\text{s}$ , 2% Duty Cycle)	$I_{F(pk)}$	All	3.0	A
LED Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	$P_D$	All	100	mW
			1.8	mW/°C
<b>DETECTOR</b>				
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	CNX48U, TIL113	30	V
		H11B1, H11B2 H11B3	25	
		H11B255 MOC8080	55	
Collector-Base Breakdown Voltage	$BV_{CBO}$	CNX48U, H11B1 H11B2, H11B3 TIL113	30	V
		H11B255 MOC8080	55	V
Emitter-Collector Breakdown Voltage	$BV_{ECO}$	All	7	V
Detector Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	$P_D$	All	150	mW
			2.0	mW/°C

<b>CNX48U</b>	<b>H11B1</b>	<b>H11B2</b>	<b>H11B255</b>	<b>H11B3</b>
<b>MOC8080</b>	<b>TIL113</b>			

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C Unless otherwise specified.)

### INDIVIDUAL COMPONENT CHARACTERISTICS

Parameter	Test Conditions	Symbol	Device	Min	Typ**	Max	Unit
EMITTER	(I <sub>F</sub> = 10 mA)	V <sub>F</sub>	H11B1, H11B2	0.8	1.2	1.5	V
			H11B255				
			MOC8080				
			TIL113				
			CNX48U				
Input Forward Voltage	(I <sub>F</sub> = 10 mA)	V <sub>F</sub>	CNX48U		1.2	1.3	V
	(I <sub>F</sub> = 10 mA, T <sub>A</sub> = -55°C)		MOC8080	0.9	1.3	1.7	
	(I <sub>F</sub> = 10 mA, T <sub>A</sub> = 100°C)		MOC8080	0.7	1.05	1.4	
	(I <sub>F</sub> = 50 mA)		H11B3		1.35	1.5	
Reverse Leakage Current	(V <sub>R</sub> = 6 V)	I <sub>R</sub>	All		0.001	10	μA
Capacitance	(V <sub>F</sub> = 0 V, f = 1.0 MHz)	C	All		50		pF
DETECTOR	(I <sub>C</sub> = 1 mA, I <sub>F</sub> = 0)	BV <sub>CEO</sub>	CNX48U	30	60		V
	(I <sub>C</sub> = 100 μA, I <sub>F</sub> = 0)		TIL113				
	(I <sub>C</sub> = 10 mA, I <sub>F</sub> = 0)		H11B1, H11B2				
	(I <sub>C</sub> = 100 μA, I <sub>F</sub> = 0)		H11B3				
	(I <sub>C</sub> = 1 mA, I <sub>F</sub> = 0)		H11B255				
Collector-Base Breakdown Voltage	(I <sub>C</sub> = 100 μA, I <sub>E</sub> = 0)	BV <sub>CBO</sub>	CNX48U, H11B1	30	100		V
	(I <sub>C</sub> = 100 μA, I <sub>F</sub> = 0)		H11B2, H11B3				
Collector-Base Breakdown Voltage	(I <sub>C</sub> = 100 μA, I <sub>E</sub> = 0)	BV <sub>CBO</sub>	TIL113	55	70		V
	(I <sub>C</sub> = 100 μA, I <sub>F</sub> = 0)		H11B255				
Collector-Base Breakdown Voltage	(I <sub>C</sub> = 100 μA, I <sub>F</sub> = 0)	BV <sub>CBO</sub>	MOC8080	55	100		V
Emitter-Collector Breakdown Voltage	(I <sub>E</sub> = 100 μA, I <sub>B</sub> = 0)	BV <sub>ECO</sub>	All	7	10		V
Collector-Emitter Dark Current	(V <sub>CE</sub> = 10 V, Base Open)	I <sub>CEO</sub>	All		1	100	nA

Note

\*\* Typical values at T<sub>A</sub> = 25°C

**CNX48U H11B1 H11B2 H11B255 H11B3**  
**MOC8080 TIL113**

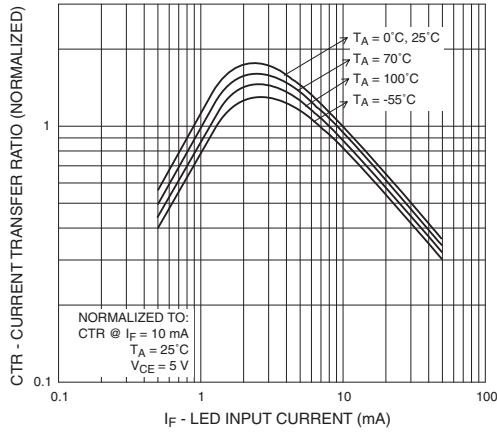
<b>TRANSFER CHARACTERISTICS</b> ( $T_A = 25^\circ\text{C}$ Unless otherwise specified.)								
DC Characteristics	Test Conditions	Symbol	Device	Min	Typ**	Max	Units	
Collector Output Current <sup>(1)</sup>	$(I_F = 10\text{ mA}, V_{CE} = 5\text{ V})$	$I_C$ (CTR)	MOC8080	50 (500)			mA (%)	
			H11B255	10 (100)				
	$(I_F = 10\text{ mA}, V_{CE} = 1\text{ V})$		CNX48U	60 (600)				
			TIL113	30 (300)				
	$(I_F = 1\text{ mA}, V_{CE} = 5\text{ V})$		H11B1	5 (500)				
			H11B2	2 (200)				
	$(I_F = 1\text{ mA}, V_{CE} = 1\text{ V})$		CNX48U	5 (500)				
$(I_F = 0.5\text{ mA}, V_{CE} = 1\text{ V})$	1.75 (350)							
Saturation Voltage	$(I_F = 1\text{ mA}, I_C = 1\text{ mA})$	$V_{CE(sat)}$	H11B1, H11B2 H11B3, MOC8080			1.0	V	
	$(I_F = 5\text{ mA}, I_C = 10\text{ mA})$		CNX48U			1.0		
	$(I_F = 50\text{ mA}, I_C = 50\text{ mA})$		H11B255			1.0		
	$(I_F = 8\text{ mA}, I_C = 2\text{ mA})$		TIL113			1.25		
AC Characteristics	$(I_C = 10\text{ mA}, V_{CE} = 10\text{ V})$ $(R_L = 100\ \Omega)$ (Fig.7)	$t_{on}$	H11B1 H11B2		25		$\mu\text{s}$	
		$t_{off}$	H11B255 H11B3		18			
	$(I_F = 10\text{ mA}, V_{CC} = 5\text{ V})$ $(R_E = 100\ \Omega), (R_{BE} = 1\text{M}\Omega)$ (Fig. 8)	$t_{on}$	CNX48U			3.5		
		$t_{off}$				36		
	$(I_F = 1\text{ mA}, V_{CC} = 5\text{ V})$ $(R_E = 1\text{k}\Omega), (R_{BE} = 10\text{M}\Omega)$ (Fig. 8)	$t_{on}$				70		
		$t_{off}$				190		
	$(I_F = 5\text{ mA}, V_{CC} = 10\text{ V})$ $(R_L = 100\ \Omega)$ (Fig.7)	$t_{on}$	MOC8080			3.5		
		$t_{off}$				25		
	$(I_F = 200\text{ mA}, I_C = 50\text{ mA})$ $(V_{CC} = 10\text{ V}) (R_L = 100\ \Omega)$ (Fig.7)	$t_{on}$	TIL113			0.35		5
		$t_{off}$				55		100

<b>ISOLATION CHARACTERISTICS</b>							
Characteristic	Test Conditions	Symbol	Min	Typ**	Max	Units	
Input-Output Isolation Voltage <sup>(2)</sup>	$(I_{I-O} \leq 1\ \mu\text{A}, V_{rms}, t = 1\text{ min.})$		5300			Vac(rms)	
Isolation Resistance <sup>(2)</sup>	$(V_{I-O} = 500\text{ VDC})$	$R_{ISO}$		$10^{11}$		$\Omega$	
Isolation Capacitance <sup>(2)</sup>	$(V_{I-O} = \emptyset, f = 1\text{ MHz})$	$C_{ISO}$		0.8		pf	

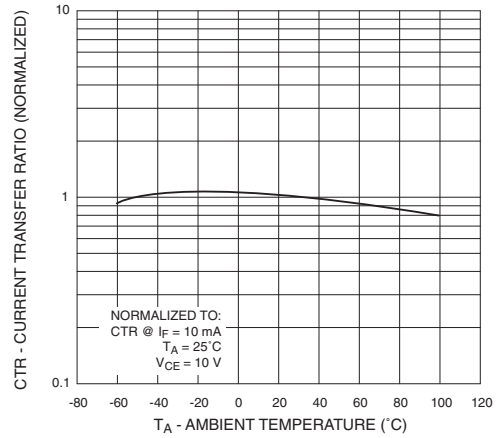
Note  
\*\* Typical values at  $T_A = 25^\circ\text{C}$

**CNX48U H11B1 H11B2 H11B255 H11B3  
MOC8080 TIL113**

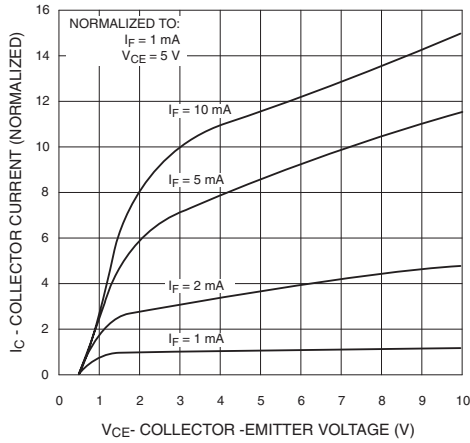
**Fig. 1 Output Current vs. Input Current**



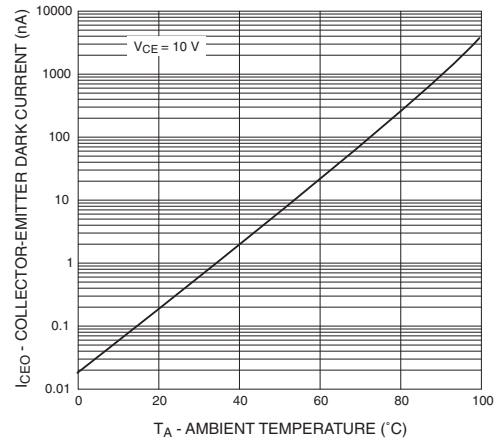
**Fig. 2 Current Transfer Ratio vs. Ambient Temperature**



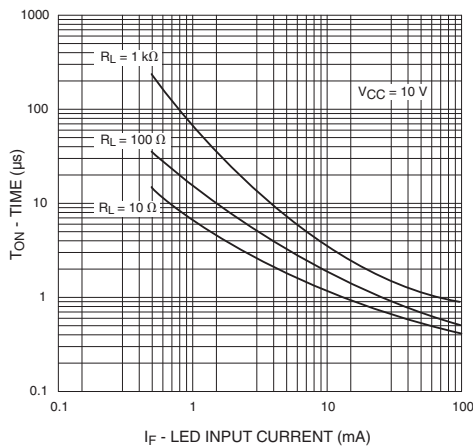
**Fig. 3 Collector Current vs. Collector-Emitter Voltage**



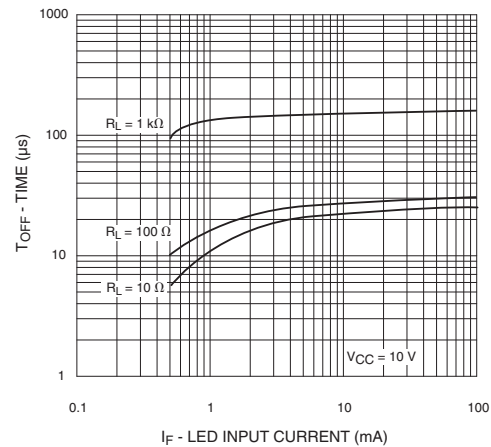
**Fig. 4 Dark Current vs. Ambient Temperature**



**Fig. 5 Turn-On Time vs. Input Current**



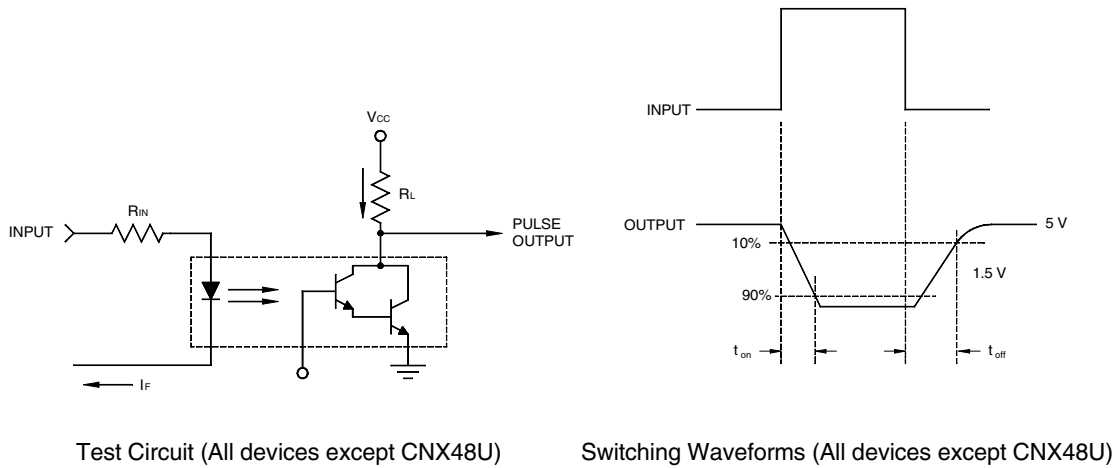
**Fig. 6 Turn-Off Time vs. Input Current**



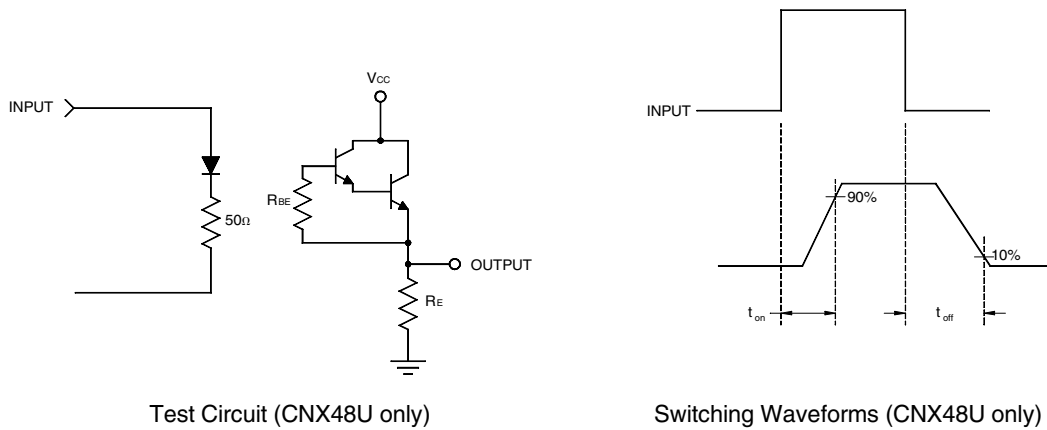
CNX48U H11B1 H11B2 H11B255 H11B3  
MOC8080 TIL113

**TYPICAL ELECTRO-OPTICAL CHARACTERISTIC CURVES**

(25°C Free air temperature unless otherwise specified) (Cont.)



**Fig. 7 Switching Time Test Circuit and Waveforms (All devices except CNX48U)**



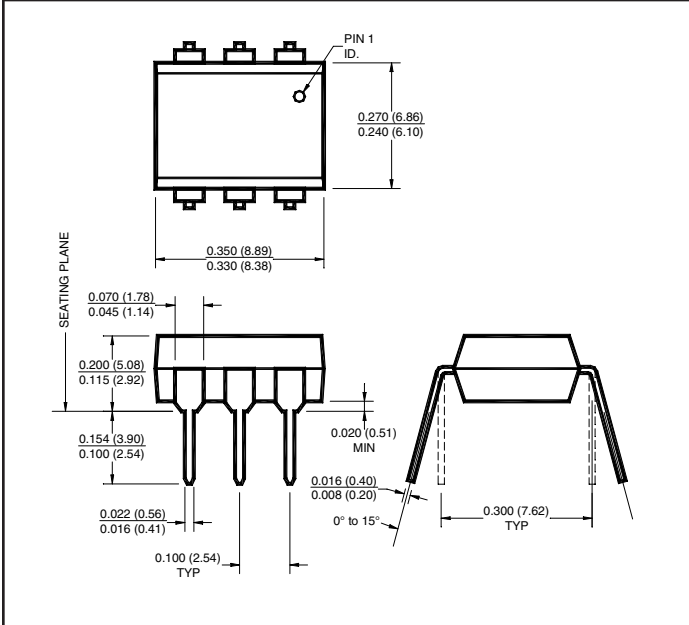
**Fig. 8 Switching Time Test Circuit and Waveforms (CNX48U only)**

**Notes**

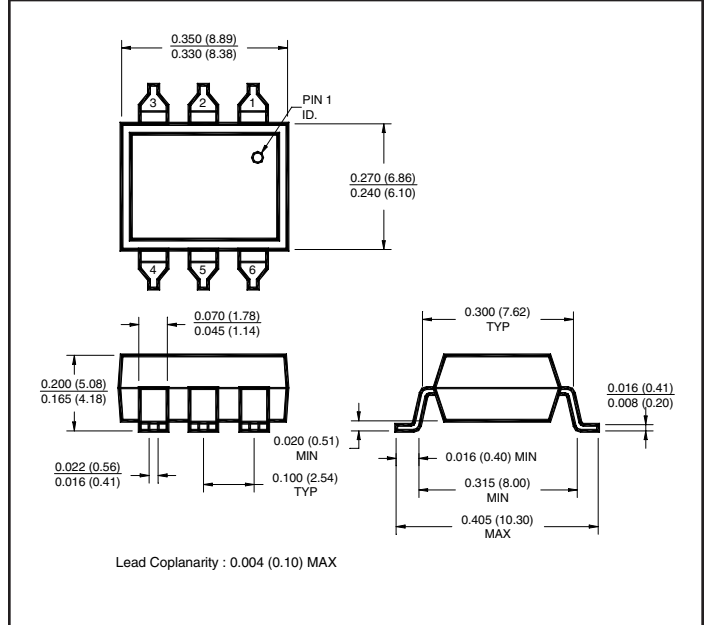
1. The current transfer ratio ( $I_C/I_F$ ) is the ratio of the detector collector current to the LED input current with  $V_{CE} @ 10 V$ .
2. For this test, LED pins 1 and 2 are common and phototransistor pins 4,5 and 6 are common.

CNX48U H11B1 H11B2 H11B25 H11B3  
MOC8080 TIL113

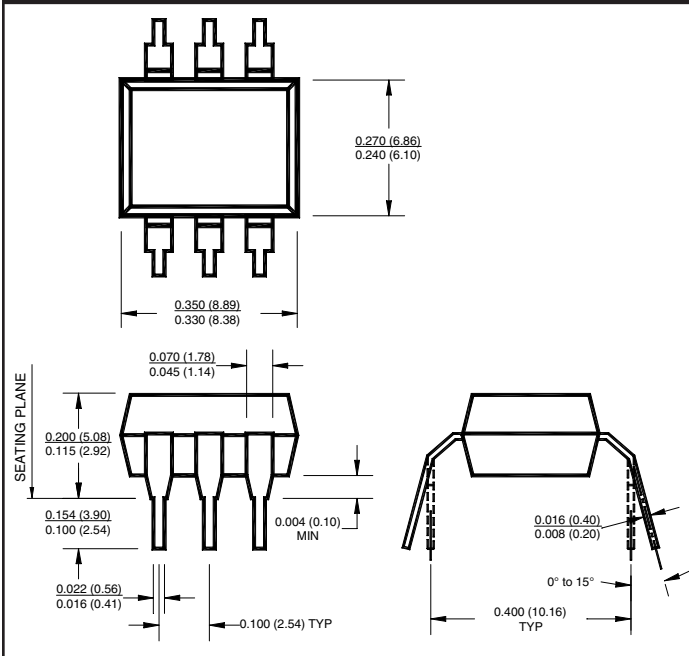
**Package Dimensions (Through Hole)**



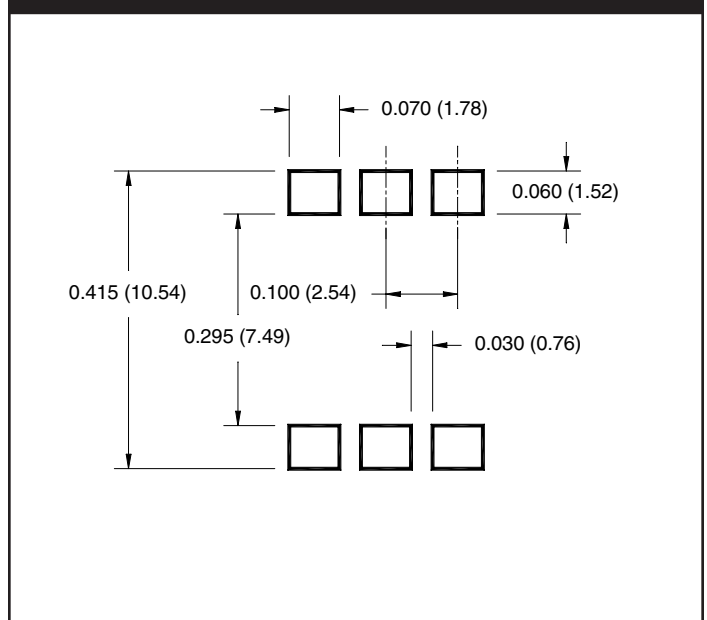
**Package Dimensions (Surface Mount)**



**Package Dimensions (0.4" Lead Spacing)**



**Recommended Pad Layout for Surface Mount Leadform**



**NOTE**

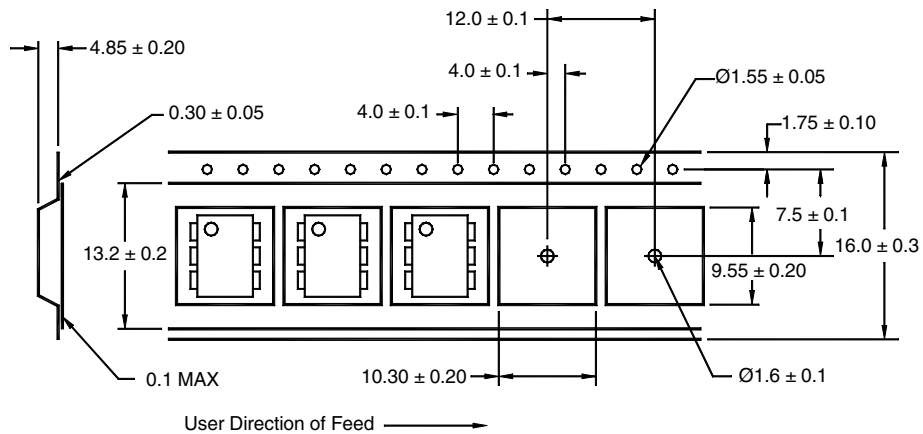
All dimensions are in inches (millimeters)

CNX48U	H11B1	H11B2	H11B255	H11B3
MOC8080	TIL113			

**ORDERING INFORMATION**

Option	Order Entry Identifier	Description
S	.S	Surface Mount Lead Bend
SD	.SD	Surface Mount; Tape and reel
W	.W	0.4" Lead Spacing
300	.300	VDE 0884
300W	.300W	VDE 0884, 0.4" Lead Spacing
3S	.3S	VDE 0884, Surface Mount
3SD	.3SD	VDE 0884, Surface Mount, Tape & Reel

**QT Carrier Tape Specifications ("D" Taping Orientation)**



**NOTE**

All dimensions are millimeters

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.



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## H11B1

6-Pin DIP Photodarlington Output Optocoupler

### Contents

- [General description](#)
- [Features](#)
- [Applications](#)
- [Ordering information](#)
- [Product status/pricing/packaging](#)
- [Order Samples](#)
- [Safety agency certificates](#)
- [Qualification Support](#)

### General description

The CNX48U, H11BX, MOC8080 and TIL113 have a gallium arsenide infrared emitter optically coupled to a silicon planar photodarlington.

[back to top](#)

### Features

- High sensitivity to low input drive current
- Meets or exceeds all JEDEC registered specifications
- VDE 0884 approval available as a test option - add option .300 (e.g. H11B1.300)

[back to top](#)

### Applications

- Low power logic circuits
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- Interfacing coupling systems of different potentials and impedances

[back to top](#)

BUY

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[Quality and reliability](#)

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## Ordering information









The following options can be ordered with this part:

Option	Order Entry Identifier	Description
300	.300	VDE 0884
3S	.3S	Option S (see below); VDE 0884
3SD	.3SD	Option S (see below); VDE 0884; Tape and Reel
S	.S	Surface-Mount Lead Bend
SD	.SD	Option S; Tape and Reel
W	.W	10 mm Lead Bend
300W	.300W	10 mm Lead Bend; VDE 0884

[back to top](#)

## Product status/pricing/packaging

**BUY**

Product	Product status	Pb-free Status	Package type	Leads	Packing method
H11B1	Lifetime Buy		DIP-B	6	BULK
H11B1300	Lifetime Buy		DIP-B	6	BULK
H11B1300W	Lifetime Buy		DIP-B	6	BULK
H11B13S	Lifetime Buy		SMDIP-B	6	BULK
H11B13SD	Lifetime Buy		SMDIP-B	6	TAPE REEL
H11B1S	Lifetime Buy		SMDIP-B	6	BULK
H11B1SD	Lifetime Buy		SMDIP-B	6	TAPE REEL
H11B1W	Lifetime Buy		DIP-B	6	BULK



Indicates product with Pb-free second-level interconnect. For more information [click here](#).

[back to top](#)

## Safety agency certificates

Certificate	Agency	
<a href="#">E90700, Vol. 1</a> (936 K)	UL (1577)	Underwriters Laboratories Inc.
<a href="#">E90700, Vol. 1</a> (936 K)	C-UL	Underwriters Laboratories Inc.
<a href="#">0122085</a> (677 K)	SEMKO	SEMKO
<a href="#">P01101067</a> (1638 K)	NEMKO	NEMKO
<a href="#">FI 16812</a> (964 K)	FIMKO	FIMKO
<a href="#">310684-02</a> (623 K)	DEMKO	DEMKO Testing & Certification
<a href="#">1027742</a> (2305 K)	CSA	Canadian Standards Association
<a href="#">94766</a> (1673 K)	VDE	VDE Pruf-und Zertifizierungsinstitut

[back to top](#)

## Qualification Support

Click on a product for detailed qualification data

Product
<a href="#">H11B1</a>
<a href="#">H11B1300</a>
<a href="#">H11B1300W</a>
<a href="#">H11B13S</a>
<a href="#">H11B13SD</a>
<a href="#">H11B1S</a>
<a href="#">H11B1SD</a>
<a href="#">H11B1W</a>

[back to top](#)

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