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[H11B1](#)

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PHOTODARLINGTON OPTOCOUPLEDERS

DESCRIPTION

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

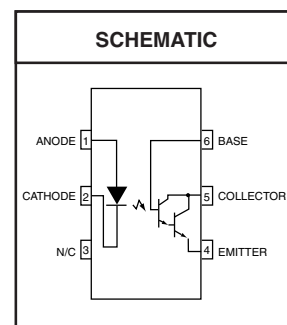
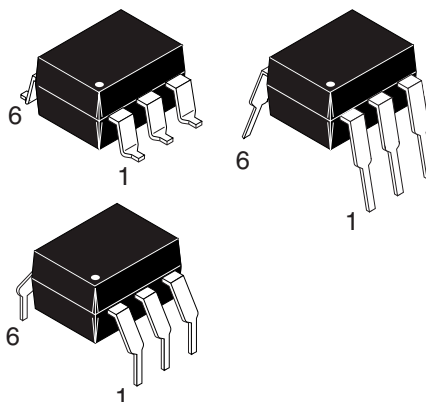
CNX48U	H11B1	H11B2	H11B255	H11B3
MOC8080	TIL113			

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
TOTAL DEVICE				
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
EMITTER				
Continuous Forward Current	I_F	All	100	mA
Reverse Voltage	V_R	All	6	V
Forward Current - Peak (300 μs , 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
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

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MOC8080	TIL113			

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise specified.)

INDIVIDUAL COMPONENT CHARACTERISTICS

Parameter	Test Conditions	Symbol	Device	Min	Typ**	Max	Unit	
EMITTER Input Forward Voltage	($I_F = 10\text{ mA}$)	V_F	H11B1, H11B2 H11B255 MOC8080 TIL113	0.8	1.2	1.5	V	
	($I_F = 10\text{ mA}$)		CNX48U		1.2	1.3		
	($I_F = 10\text{ mA}$, $T_A = -55^\circ\text{C}$)		MOC8080		0.9	1.3		1.7
	($I_F = 10\text{ mA}$, $T_A = 100^\circ\text{C}$)				0.7	1.05		1.4
	($I_F = 50\text{ mA}$)		H11B3			1.35		1.5
Reverse Leakage Current	($V_R = 6\text{ V}$)	I_R	All		0.001	10	μA	
Capacitance	($V_F = 0\text{ V}$, $f = 1.0\text{ MHz}$)	C	All		50		pF	
DETECTOR Collector-Emitter Breakdown Voltage	($I_C = 1\text{ mA}$, $I_F = 0$)	BV_{CEO}	CNX48U	30	60		V	
	($I_C = 100\text{ }\mu\text{A}$, $I_F = 0$)		TIL113					
	($I_C = 10\text{ mA}$, $I_F = 0$)		H11B1, H11B2 H11B3	25	60			
	($I_C = 100\text{ }\mu\text{A}$, $I_F = 0$)		H11B255	55	70			
	($I_C = 1\text{ mA}$, $I_F = 0$)		MOC8080					
Collector-Base Breakdown Voltage	($I_C = 100\text{ }\mu\text{A}$, $I_E = 0$)	BV_{CBO}	CNX48U, H11B1 H11B2, H11B3 TIL113	30	100		V	
	($I_C = 100\text{ }\mu\text{A}$, $I_F = 0$)		H11B255 MOC8080	55	100			
Emitter-Collector Breakdown Voltage	($I_E = 100\text{ }\mu\text{A}$, $I_B = 0$)	BV_{ECO}	All	7	10		V	
Collector-Emitter Dark Current	($V_{CE} = 10\text{ V}$, Base Open)	I_{CEO}	All		1	100	nA	

Note

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

CNX48U	H11B1	H11B2	H11B255	H11B3
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TRANSFER CHARACTERISTICS (T _A = 25°C Unless otherwise specified.)								
DC Characteristics	Test Conditions	Symbol	Device	Min	Typ**	Max	Units	
Collector Output Current ⁽¹⁾	(I _F = 10 mA, V _{CE} = 5 V)	I _C (CTR)	MOC8080	50 (500)			mA (%)	
			H11B255	10 (100)				
	(I _F = 10 mA, V _{CE} = 1 V)		CNX48U	60 (600)				
			TIL113	30 (300)				
	(I _F = 1 mA, V _{CE} = 5 V)		H11B1	5 (500)				
			H11B2	2 (200)				
			H11B3	1 (100)				
	(I _F = 1 mA, V _{CE} = 1 V)		CNX48U	5 (500)				
	(I _F = 0.5 mA, V _{CE} = 1 V)			1.75 (350)				
Saturation Voltage	(I _F = 1 mA, I _C = 1 mA)	V _{CE(sat)}	H11B1, H11B2 H11B3, MOC8080			1.0	V	
	(I _F = 5 mA, I _C = 10 mA)		CNX48U			1.0		
	(I _F = 50 mA, I _C = 50 mA)		H11B255			1.0		
	(I _F = 8 mA, I _C = 2 mA)		TIL113			1.25		
AC Characteristics	(I _C = 10 mA, V _{CE} = 10 V) (R _L = 100 Ω) (Fig.7)	t _{on}	H11B1 H11B2		25		μs	
		t _{off}	H11B255 H11B3		18			
	(I _F = 10 mA, V _{CC} = 5 V) (R _E = 100 Ω), (R _{BE} = 1MΩ) (Fig. 8)	t _{on}	CNX48U			3.5		
		t _{off}				36		
	(I _F = 1 mA, V _{CC} = 5 V) (R _E = 1kΩ), (R _{BE} = 10MΩ) (Fig. 8)	t _{on}				70		
		t _{off}				190		
	(I _F = 5 mA, V _{CC} = 10 V) (R _L = 100 Ω) (Fig.7)	t _{on}	MOC8080			3.5		
		t _{off}				25		
	(I _F = 200 mA, I _C = 50 mA) (V _{CC} = 10 V) (R _L = 100 Ω) (Fig.7)	t _{on}	TIL113			0.35		5
		t _{off}				55		100

ISOLATION CHARACTERISTICS							
Characteristic	Test Conditions	Symbol	Min	Typ**	Max	Units	
Input-Output Isolation Voltage ⁽²⁾	(I _{I-O} ≤ 1 μA, V _{rms} , t = 1 min.)		5300			Vac(rms)	
Isolation Resistance ⁽²⁾	(V _{I-O} = 500 VDC)	R _{ISO}		10 ¹¹		Ω	
Isolation Capacitance ⁽²⁾	(V _{I-O} = ∅, f = 1 MHz)	C _{ISO}		0.8		pf	

Note
 ** Typical values at T_A = 25°C

**CNX48U H11B1 H11B2 H11B255 H11B3
MOC8080 TIL113**

Fig. 1 Output Current vs. Input Current

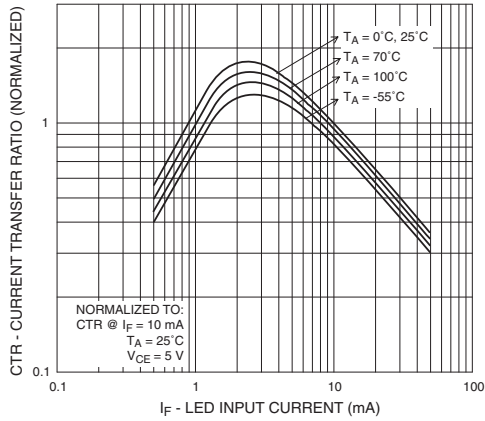


Fig. 2 Current Transfer Ratio vs. Ambient Temperature

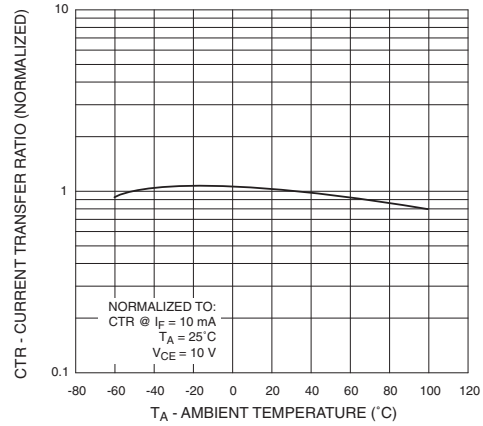


Fig. 3 Collector Current vs. Collector-Emitter Voltage

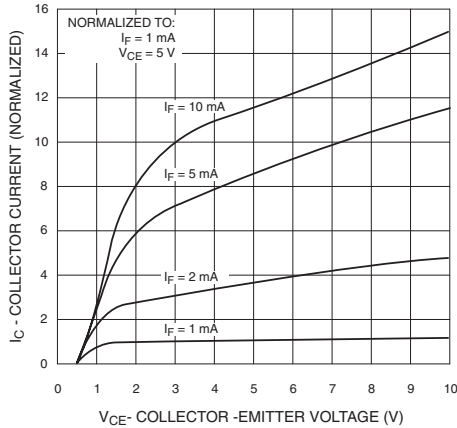


Fig. 4 Dark Current vs. Ambient Temperature

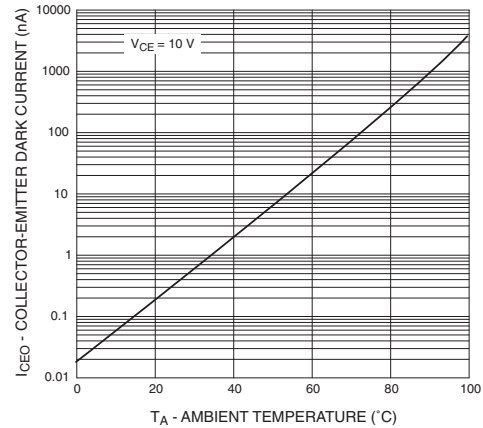


Fig. 5 Turn-On Time vs. Input Current

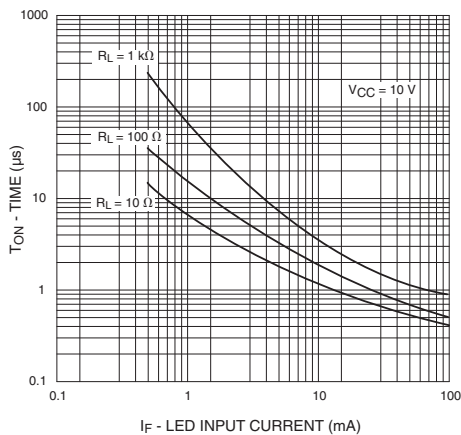
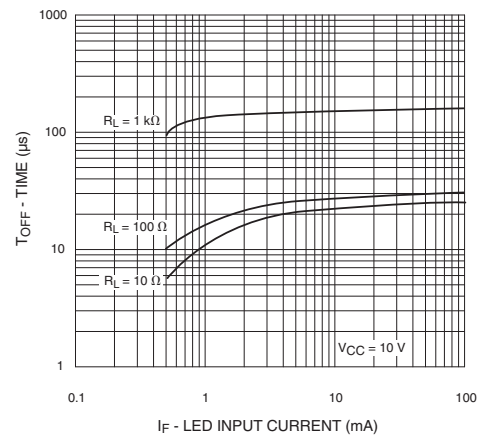


Fig. 6 Turn-Off Time vs. Input Current



CNX48U H11B1 H11B2 H11B255 H11B3
 MOC8080 TIL113

TYPICAL ELECTRO-OPTICAL CHARACTERISTIC CURVES

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

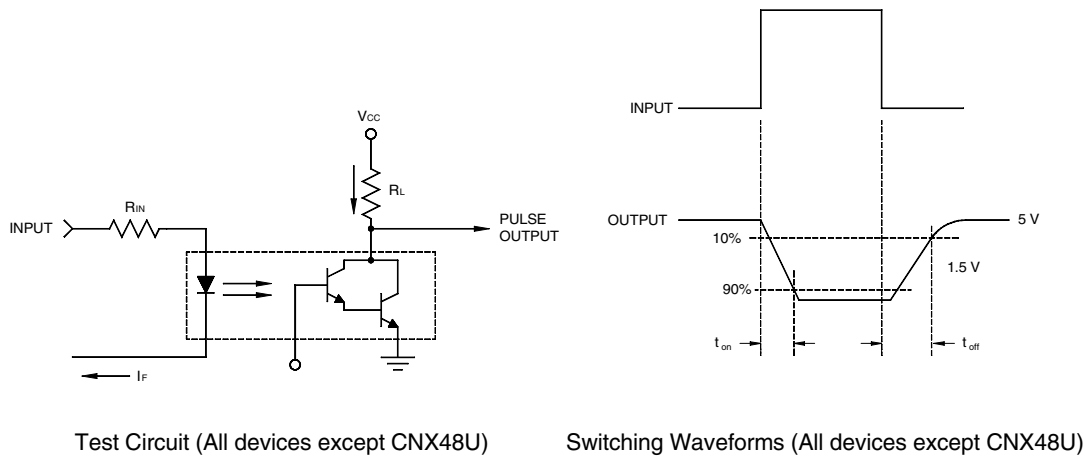


Fig. 7 Switching Time Test Circuit and Waveforms (All devices except CNX48U)

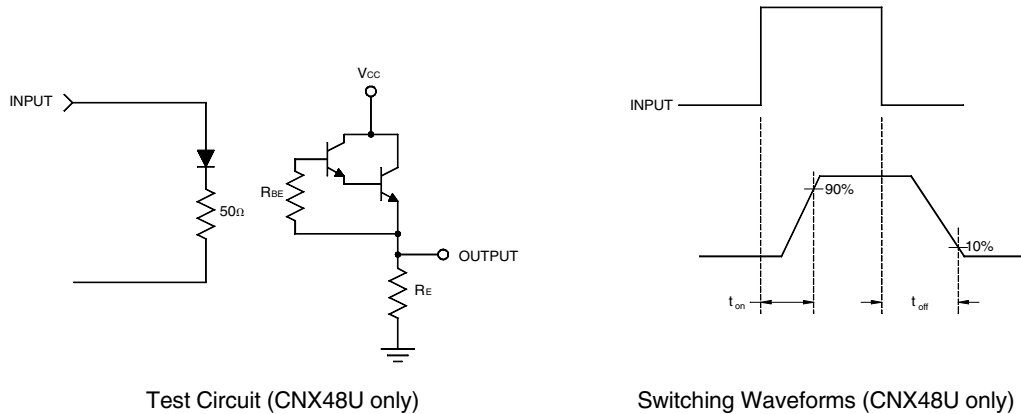


Fig. 8 Switching Time Test Circuit and Waveforms (CNX48U only)

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.



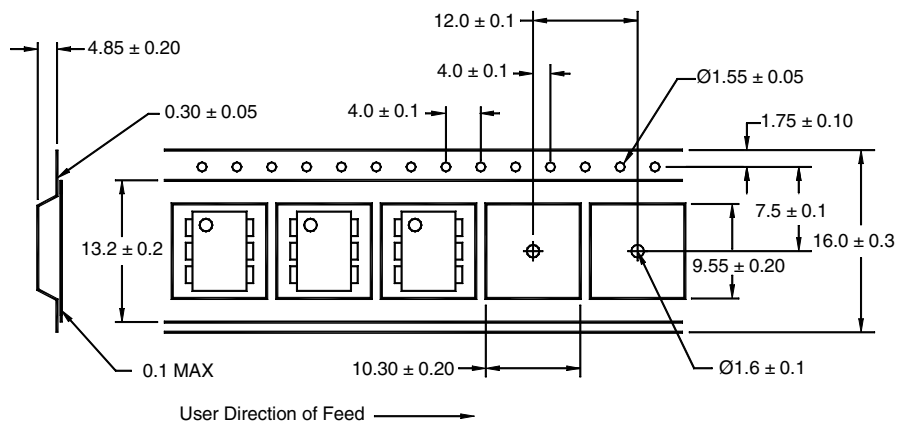
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MOC8080	TIL113			

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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