

## DESCRIPTION

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

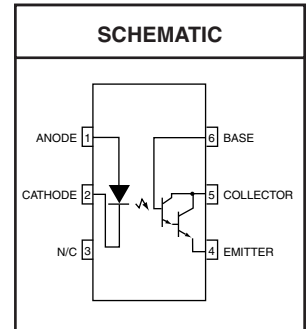
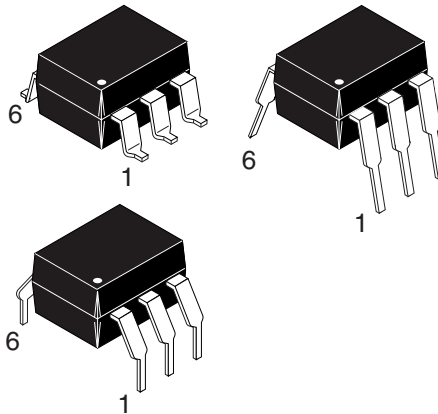
CNX48U	H11B1	H11B2	H11B255	H11B3
MOC8080	TIL113			

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

### INDIVIDUAL COMPONENT CHARACTERISTICS

Parameter	Test Conditions	Symbol	Device	Min	Typ**	Max	Unit
<b>EMITTER</b>  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	$\mu\text{A}$
Capacitance	( $V_F = 0\text{ V}$ , $f = 1.0\text{ MHz}$ )	C	All		50		pF
<b>DETECTOR</b>  Collector-Emitter Breakdown Voltage	( $I_C = 1\text{ mA}$ , $I_F = 0$ )	$BV_{CEO}$	CNX48U	30	60		V
	( $I_C = 100\ \mu\text{A}$ , $I_F = 0$ )		TIL113				
	( $I_C = 10\text{ mA}$ , $I_F = 0$ )		H11B1, H11B2 H11B3	25	60		
	( $I_C = 100\ \mu\text{A}$ , $I_F = 0$ )		H11B255	55	70		
	( $I_C = 1\text{ mA}$ , $I_F = 0$ )		MOC8080				
Collector-Base Breakdown Voltage	( $I_C = 100\ \mu\text{A}$ , $I_E = 0$ )	$BV_{CBO}$	CNX48U, H11B1 H11B2, H11B3 TIL113	30	100		V
	( $I_C = 100\ \mu\text{A}$ , $I_F = 0$ )		H11B255 MOC8080	55	100		
Emitter-Collector Breakdown Voltage	( $I_E = 100\ \mu\text{A}$ , $I_B = 0$ )	$BV_{ECO}$	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  $T_A = 25^\circ\text{C}$



# PHOTODARLINGTON OPTOCOUPERS

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

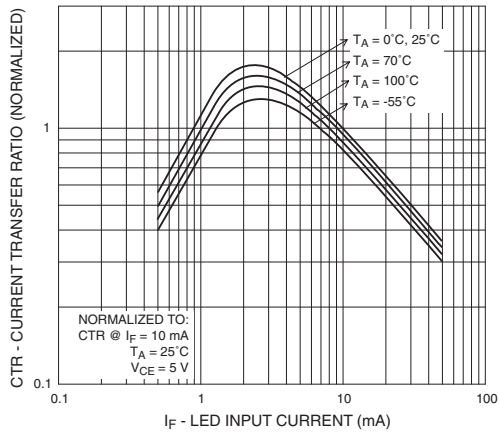
<b>TRANSFER CHARACTERISTICS</b> ( $T_A = 25^\circ\text{C}$ Unless otherwise specified.)								
DC Characteristics	Test Conditions	Symbol	Device	Min	Typ**	Max	Units	
Collector Output Current <sup>(1)</sup>	$(I_F = 10\text{ mA}, V_{CE} = 5\text{ V})$	$I_C$ (CTR)	MOC8080	50 (500)			mA (%)	
			H11B255	10 (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			1.0	V	
			H11B3, MOC8080					
	$(I_F = 5\text{ mA}, I_C = 10\text{ mA})$		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	

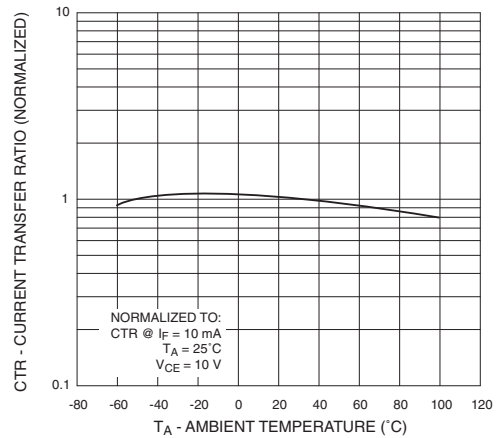
Note  
 \*\* Typical values at  $T_A = 25^\circ\text{C}$

CNX48U H11B1 H11B2 H11B255 H11B3  
MOC8080 TIL113

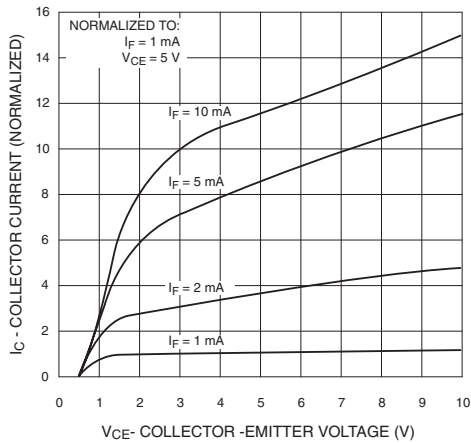
**Fig. 1 Output Current vs. Input Current**



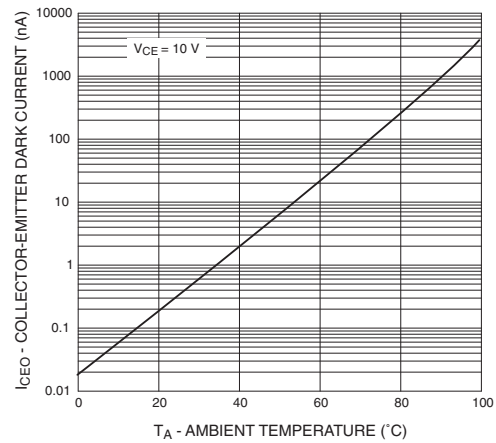
**Fig. 2 Current Transfer Ratio vs. Ambient Temperature**



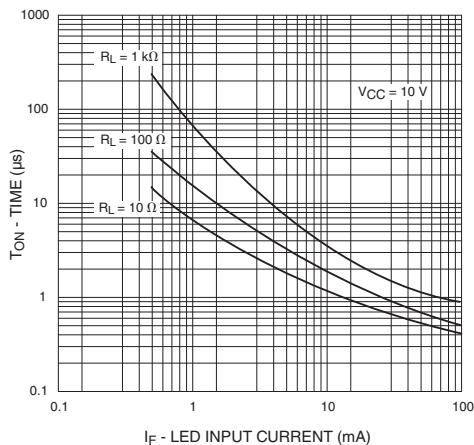
**Fig. 3 Collector Current vs. Collector-Emitter Voltage**



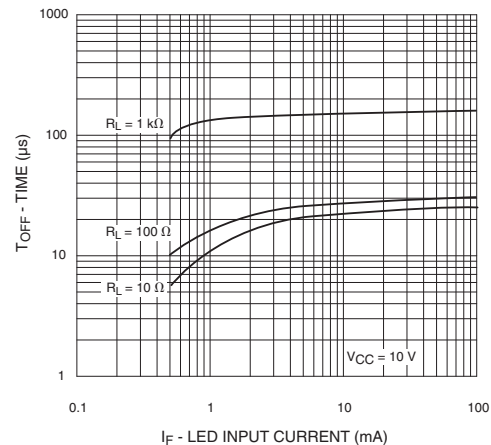
**Fig. 4 Dark Current vs. Ambient Temperature**



**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.)

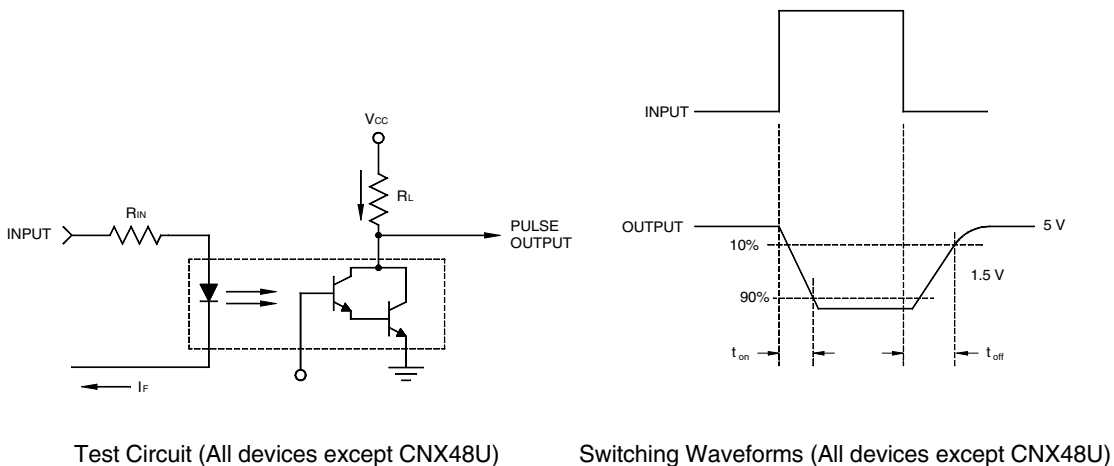


Fig. 7 Switching Time Test Circuit and Waveforms (All devices except CNX48U)

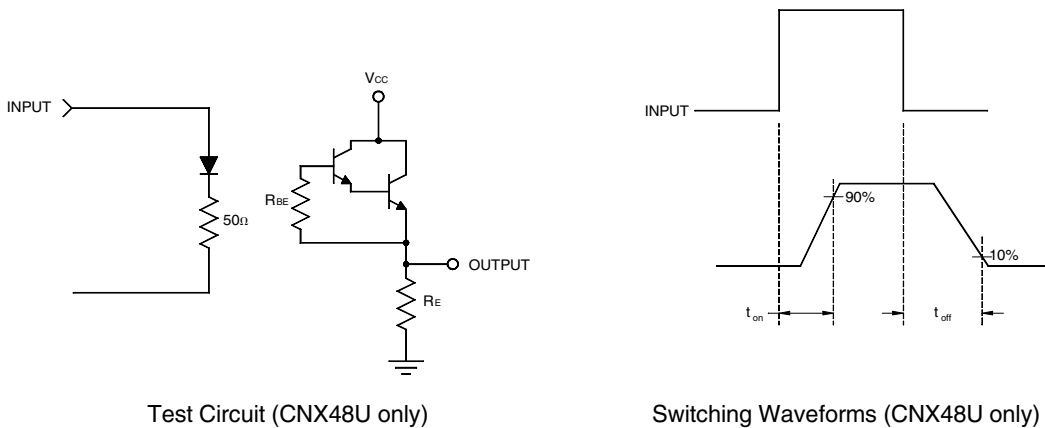


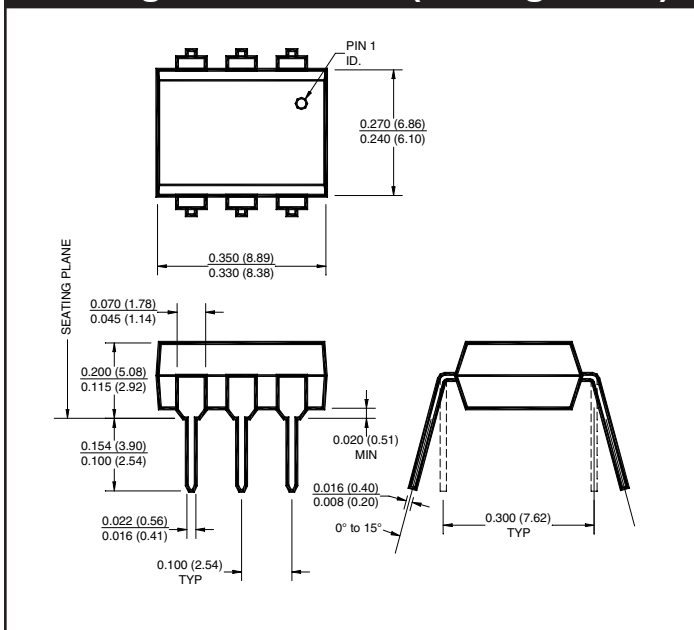
Fig. 8 Switching Time Test Circuit and Waveforms (CNX48U only)

### Notes

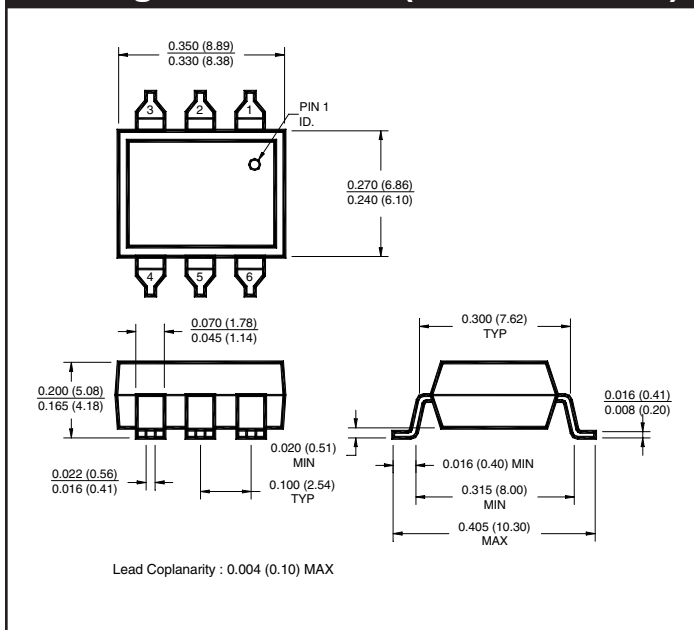
1. The current transfer ratio ( $I_C/I_F$ ) is the ratio of the detector collector current to the LED input current with  $V_{CE} @ 10\text{ V}$ .
2. For this test, LED pins 1 and 2 are common and phototransistor pins 4,5 and 6 are common.

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

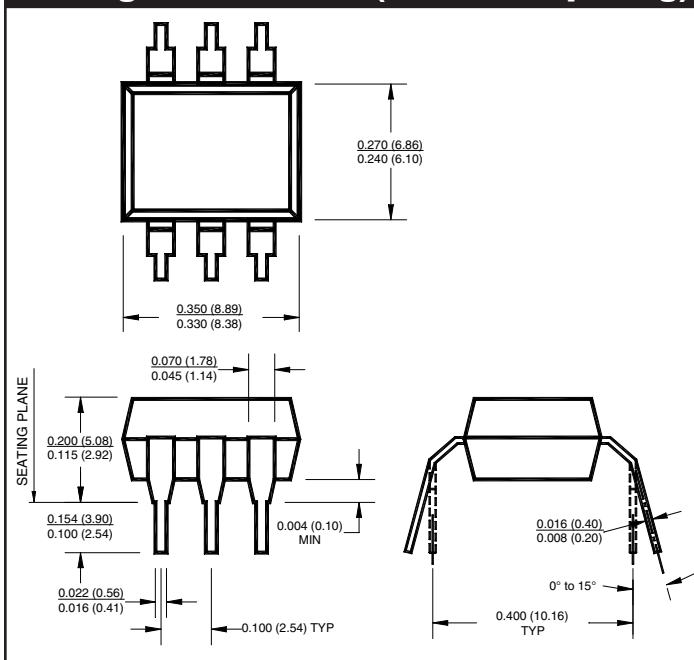
## Package Dimensions (Through Hole)



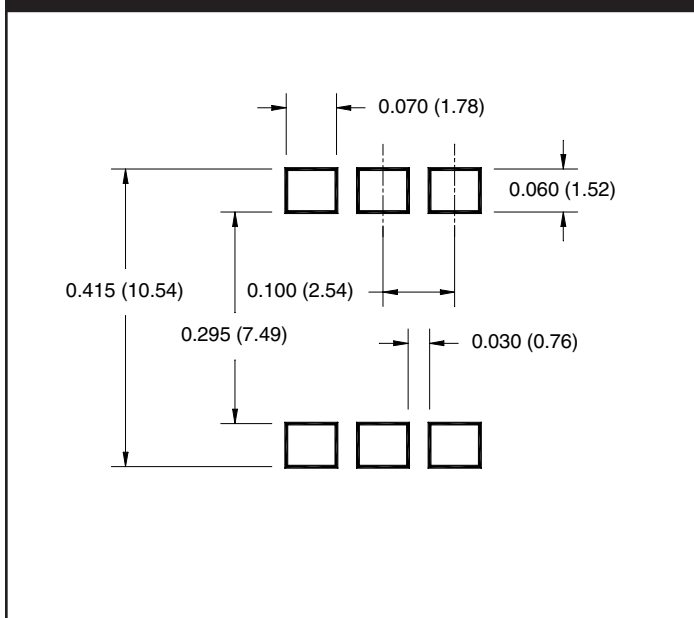
## Package Dimensions (Surface Mount)



## Package Dimensions (0.4" Lead Spacing)



## Recommended Pad Layout for Surface Mount Leadform



### NOTE

All dimensions are in inches (millimeters)

**Call QT Optoelectronics for more information or the phone number of your nearest distributor.**

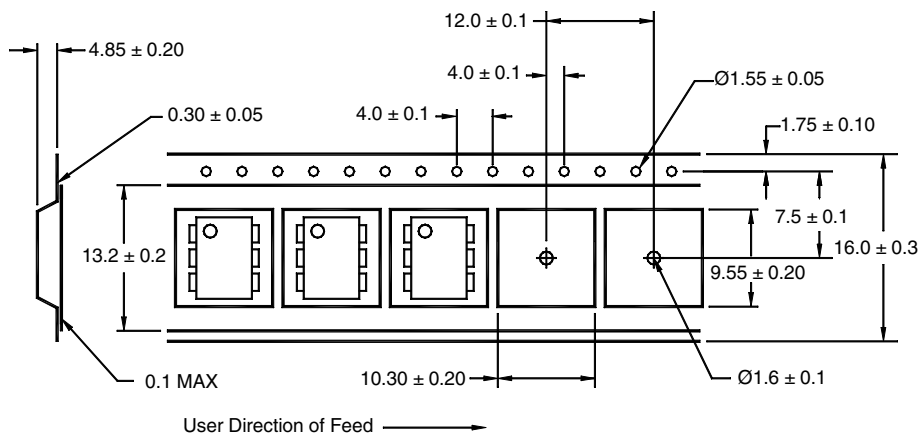
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CNX48U	H11B1	H11B2	H11B255	H11B3
MOC8080	TIL113			

## 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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