



THE DATASHEET OF CNX48US



DESCRIPTION

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

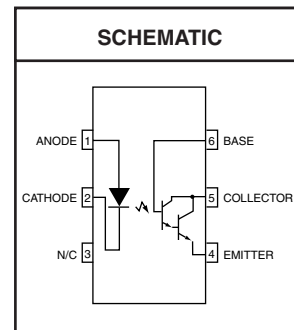
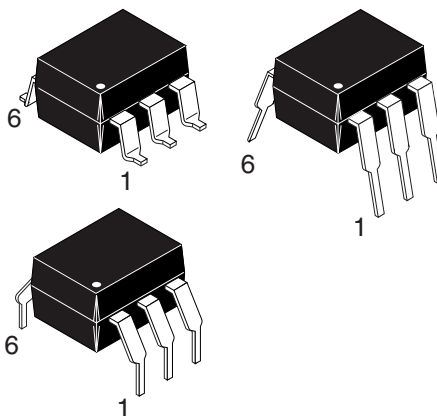
| | | | | |
|---------|--------|-------|---------|-------|
| CNX48U | H11B1 | H11B2 | H11B255 | H11B3 |
| MOC8080 | TIL113 | | | |

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 |
| DETECTOR | | | | |
| 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 |

| | | | | |
|----------------|---------------|--------------|----------------|--------------|
| CNX48U | H11B1 | H11B2 | H11B255 | H11B3 |
| 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 |
| | ($I_C = 100\ \mu\text{A}$, $I_F = 0$) | | 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 $T_A = 25^\circ\text{C}$

| | | | | |
|----------------|---------------|--------------|----------------|--------------|
| CNX48U | H11B1 | H11B2 | H11B255 | H11B3 |
| MOC8080 | TIL113 | | | |

| TRANSFER CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise specified.) | | | | | | | | |
|---|--|---------------|--------------------------------|----------|-------|------|---------------|-----|
| DC Characteristics | Test Conditions | Symbol | Device | Min | Typ** | Max | Units | |
| Collector Output Current ⁽¹⁾ | $(I_F = 10\text{ mA}, V_{CE} = 5\text{ V})$ | 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 | | μs | |
| | | 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} | CNX48U | | | 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 |

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

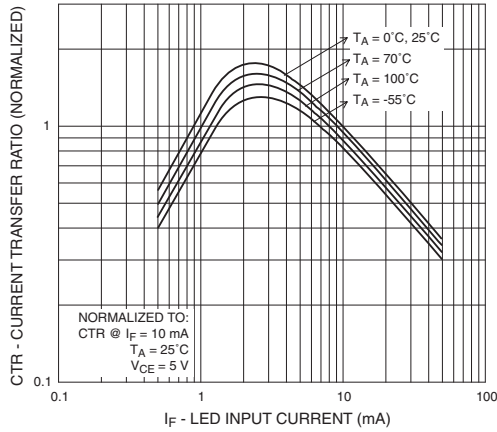


Fig. 2 Current Transfer Ratio vs. Ambient Temperature

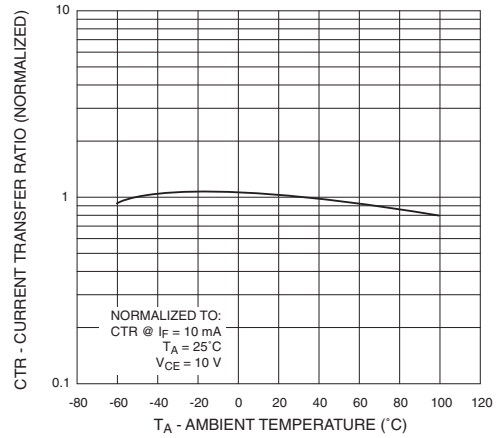


Fig. 3 Collector Current vs. Collector-Emitter Voltage

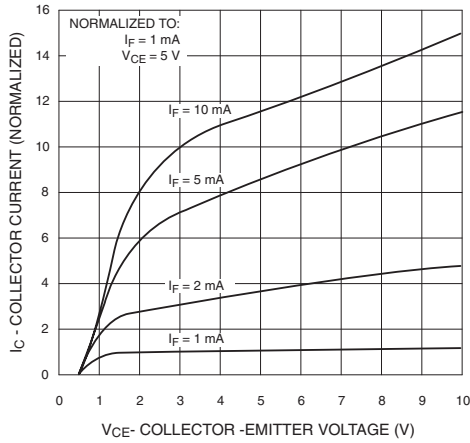


Fig. 4 Dark Current vs. Ambient Temperature

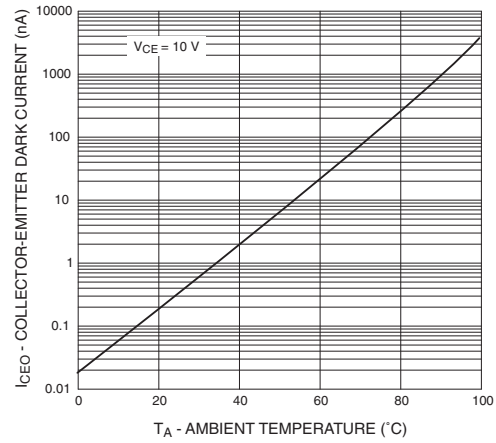


Fig. 5 Turn-On Time vs. Input Current

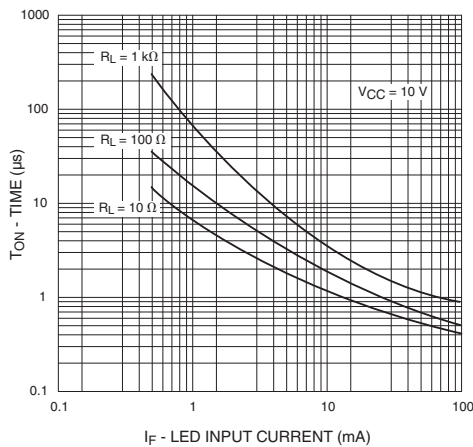
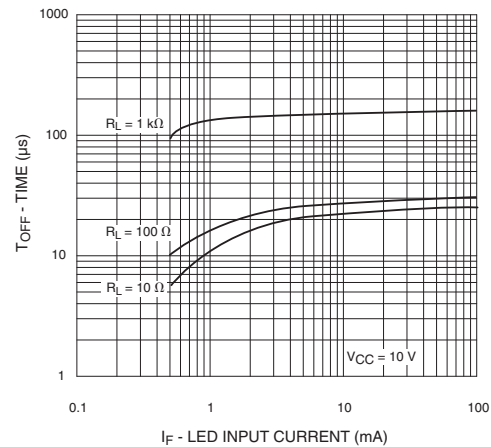


Fig. 6 Turn-Off Time vs. Input Current



CNX48U H11B1 H11B2 H11B255 H11B3
MOC8080 TIL113

TYPICAL ELECTRO-OPTICAL CHARACTERISTIC CURVES

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

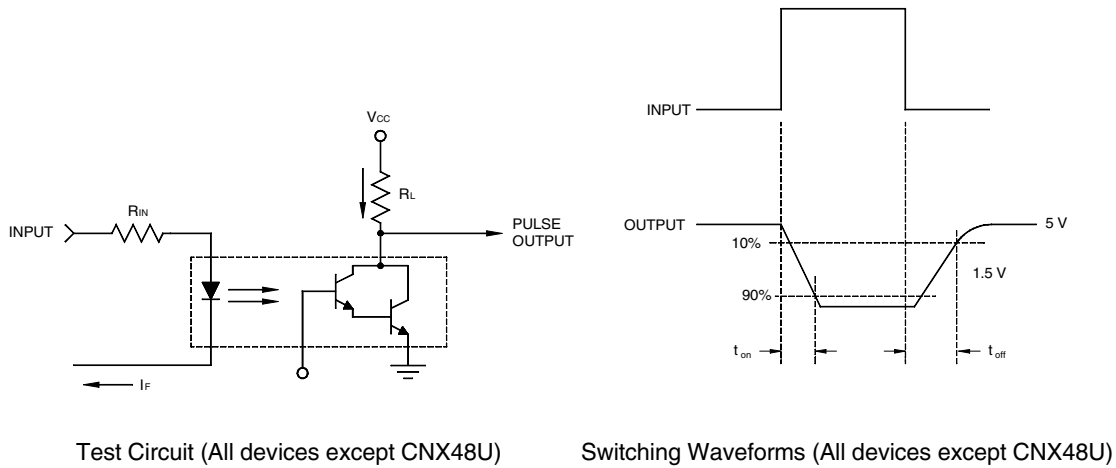


Fig. 7 Switching Time Test Circuit and Waveforms (All devices except CNX48U)

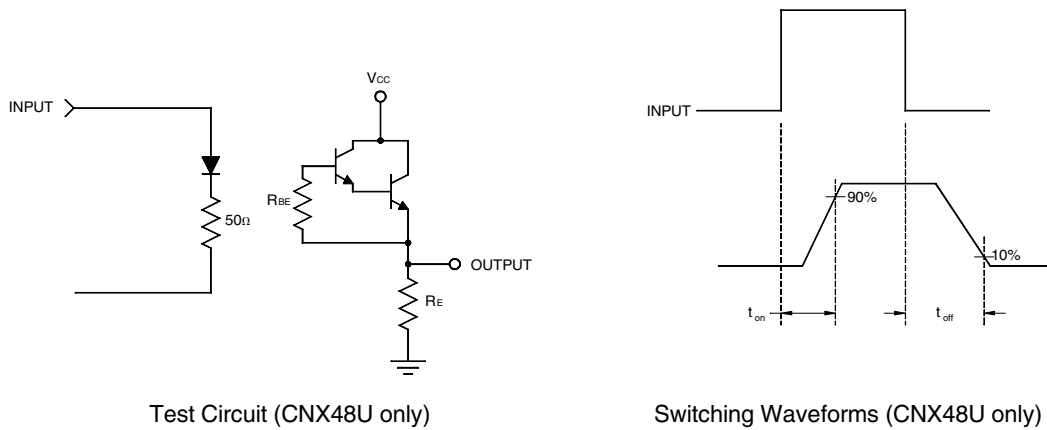


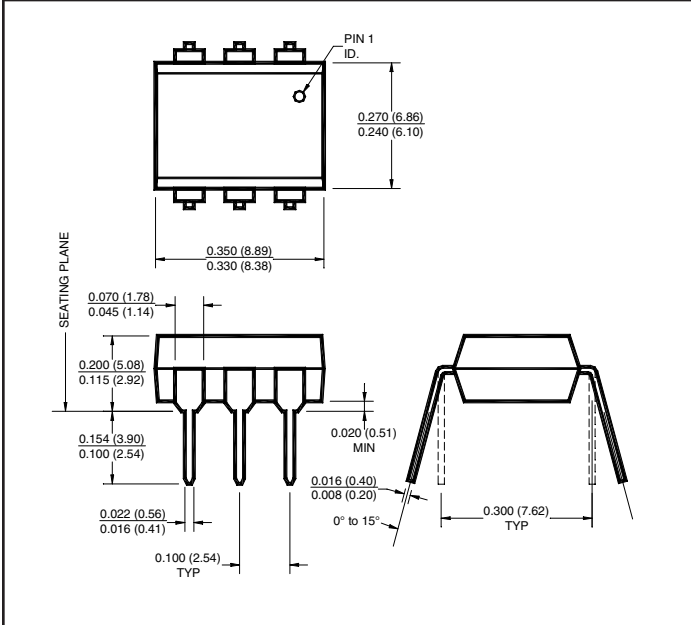
Fig. 8 Switching Time Test Circuit and Waveforms (CNX48U only)

Notes

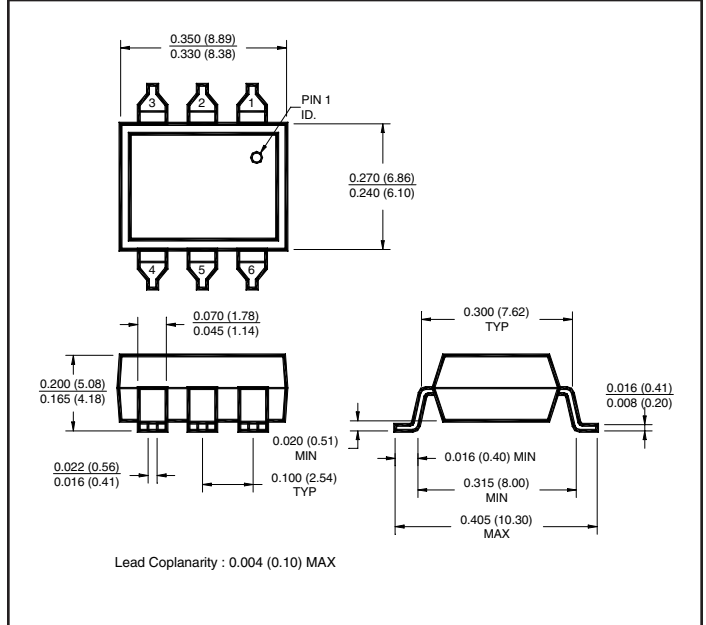
1. The current transfer ratio(I_C/I_F) is the ratio of the detector collector current to the LED input current with V_{CE} @ 10 V.
2. For this test, LED pins 1 and 2 are common and phototransistor pins 4,5 and 6 are common.

CNX48U H11B1 H11B2 H11B25 H11B3
MOC8080 TIL113

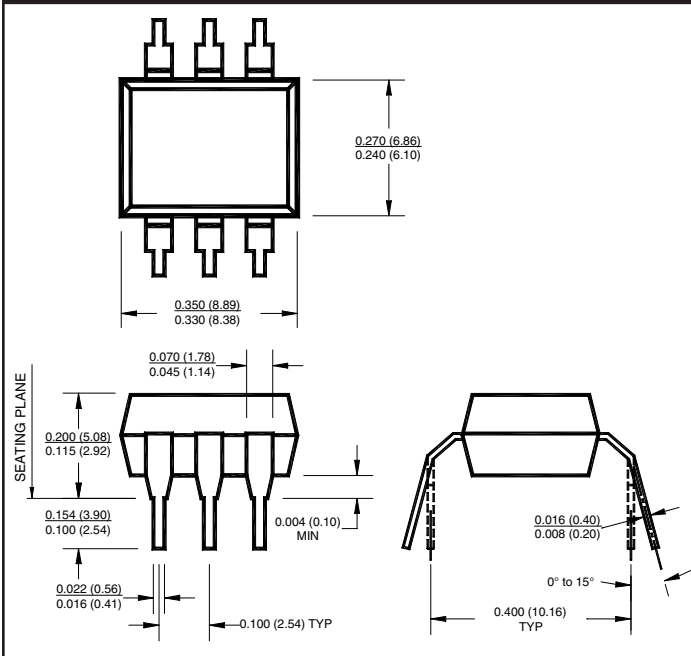
Package Dimensions (Through Hole)



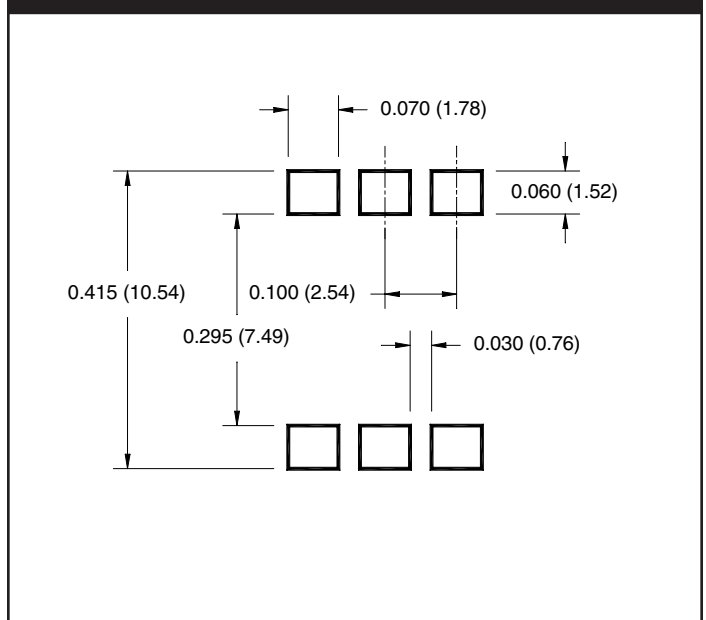
Package Dimensions (Surface Mount)



Package Dimensions (0.4" Lead Spacing)



Recommended Pad Layout for Surface Mount Leadform



NOTE

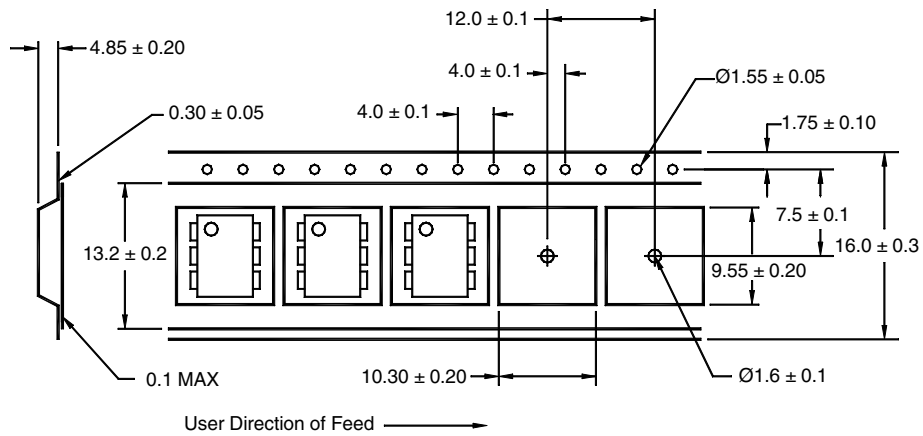
All dimensions are in inches (millimeters)

| | | | | |
|---------|--------|-------|---------|-------|
| 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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