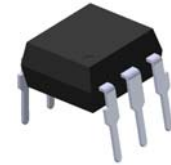


6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113
4NXX Series
H11BX Series

Features:

- 4NXX series: 4N29, 4N30, 4N31, 4N32, 4N33
- H11BX series: H11B1, H11B2, H11B3, H11B255
- High isolation voltage between input and output (Viso=5000 V rms)
- Creepage distance >7.62 mm
- Meets or exceeds all JEDEC registered specifications
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approval (No.132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved (No. 2007798)



Description

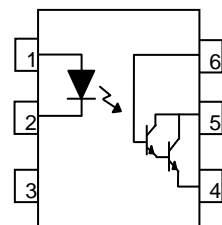
The TIL113, 4NXX and H11BX series of devices each consist of an infrared emitting diode optically coupled to a photo darlington detector.

They are packaged in a 6-pin DIP package and available in wide-lead spacing and SMD option.

Applications

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

Schematic



Pin Configuration

1. Anode
2. Cathode
3. No Connection
4. Emitter
5. Collector
6. Base



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6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113 4NXX Series H11BX Series

Absolute Maximum Ratings (T_a=25°C)

| Parameter | | Symbol | Rating | Unit |
|--------------------------|---|------------------|----------|-------|
| Input | Forward current | I _F | 60 | mA |
| | Peak forward current (t = 10μs) | I _{FM} | 1 | A |
| | Reverse voltage | V _R | 6 | V |
| | Power dissipation No derating needed | P _D | 120 | mW |
| | | | 3.8 | mW/°C |
| Output | Power dissipation No derating needed | P _C | 150 | mW |
| | | | 6.5 | mW/°C |
| | Collector-Emitter voltage | V _{CEO} | 55 | V |
| | Collector-Base voltage | V _{CBO} | 55 | V |
| | Emitter-Collector voltage | V _{ECO} | 7 | V |
| | Emitter-Base voltage | V _{EBO} | 7 | V |
| Total power dissipation | | P _{tot} | 200 | mW |
| Isolation voltage *1 | | V _{iso} | 5000 | V rms |
| Operating temperature | | T _{opr} | -55~+100 | °C |
| Storage temperature | | T _{stg} | -55~+125 | °C |
| Soldering temperature *2 | | T _{sol} | 260 | °C |

Notes

*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 & 3 are shorted together, and pins 4, 5 & 6 are shorted together.

*2 For 10 seconds.



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6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113
4NXX Series
H11BX Series

Electrical Characteristics ($T_a=25^{\circ}\text{C}$ unless specified otherwise)

Input

| Parameter | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|-------------------|----------|------|-------|------|---------------|--|
| Forward voltage | V_F | - | 1.2 | 1.5 | V | $I_F = 10\text{mA}$ $I_F = 50\text{mA}$ for H11B3 |
| Reverse current | I_R | - | - | 10 | μA | $V_R = 6\text{V}$ |
| Input capacitance | C_{in} | - | 50 | - | pF | $V = 0, f = 1\text{MHz}$ |

Output

| Parameter | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|-------------------------------------|------------|------|-------|------|------|-----------------------|
| Collector-Emitter dark current | I_{CEO} | - | - | 100 | nA | $V_{CE} = 10\text{V}$ |
| Collector-Emitter breakdown voltage | BV_{CEO} | 55 | - | - | V | $I_C = 1\text{mA}$ |
| Collector-Base breakdown voltage | BV_{CBO} | 55 | - | - | V | $I_C = 0.1\text{mA}$ |
| Emitter-Collector breakdown voltage | BV_{ECO} | 7 | - | - | V | $I_E = 0.1\text{mA}$ |

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



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6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113 4NXX Series H11BX Series

Transfer Characteristics ($T_a=25^{\circ}\text{C}$ unless specified otherwise)

| Parameter | | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|--------------------------------------|------------------------------|---------------|------|-------|------|-------------------------------|--|
| Current transfer ratio | 4N32 4N33 | CTR | 500 | - | - | % | $I_F = 10\text{mA}, V_{CE} = 10\text{V}$ |
| | 4N29 4N30 | | 100 | - | - | | |
| | 4N31 | | 50 | - | - | | |
| | H11B1 | | 500 | - | - | | |
| | H11B2 | | 200 | - | - | | $I_F = 1\text{mA}, V_{CE} = 5\text{V}$ |
| | H11B3 | | 100 | - | - | | |
| | H11B255 | | 100 | - | - | | |
| | TIL113 | | 300 | - | - | | |
| Collector-emitter saturation voltage | 4N29 4N30 4N32 4N33 | $V_{CE(sat)}$ | - | - | 1.0 | V | $I_F = 8\text{mA}, I_C = 2\text{mA}$ |
| | 4N31 TIL113 | | - | - | 1.2 | | $I_F = 8\text{mA}, I_C = 2\text{mA}$ |
| | H11B1 H11B2 H11B3 | | - | - | 1.0 | | $I_F = 1\text{mA}, I_C = 1\text{mA}$ |
| | H11B255 | | - | - | 1.0 | | $I_F = 50\text{mA}, I_C = 50\text{mA}$ |
| | | | | | | | |
| Isolation resistance | R_{IO} | 10^{11} | - | - | : | $V_{IO} = 500\text{Vdc}$ | |
| Input-output capacitance | C_{IO} | - | 0.8 | - | pF | $V_{IO} = 0, f = 1\text{MHz}$ | |



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6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113 4NXX Series H11BX Series

Transfer Characteristics

| Parameter | | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|---------------|--|--------|------|-------|------|------|---|
| Turn-on time | H11B1 H11B2 H11B3 H11B255 | Ton | - | 25 | - | μs | V _{CC} = 10V, I _F = 10mA, R _L = 100: |
| | 4N29 4N30 4N31 4N32 4N33 TIL113 | | - | - | 5 | | V _{CC} = 10V, I _C = 50mA, I _F = 200mA |
| Turn-off time | H11B1 H11B2 H11B3 H11B255 | Toff | - | 18 | - | μs | V _{CC} = 10V, I _F = 10mA, R _L = 100: |
| | 4N32 4N33 TIL113 | | - | - | 100 | | V _{CC} = 10V, I _C = 50mA, I _F = 200mA |
| | 4N29 4N30 4N31 | | - | - | 40 | | |

* Typical values at T_a = 25°C

Typical Performance Curves

Figure 1. Forward Current vs Forward Voltage

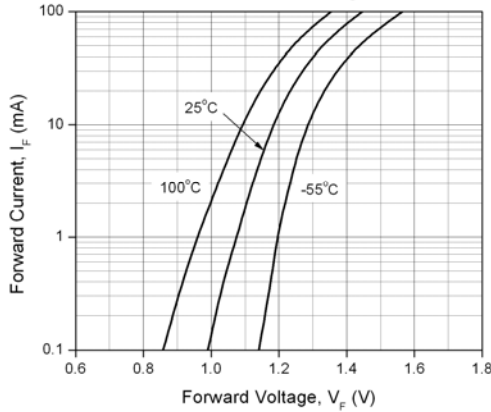


Figure 2. Current Transfer Ratio vs. Ambient Temperature

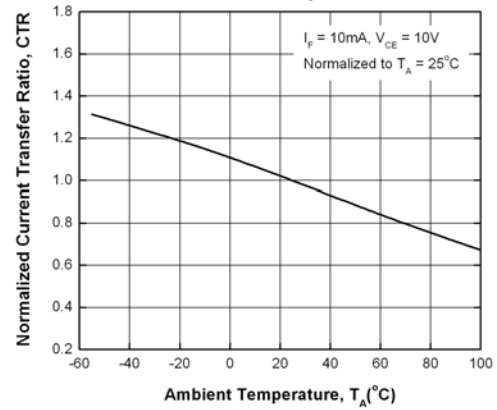


Figure 3. Normalized Current Transfer Ratio vs Forward Current

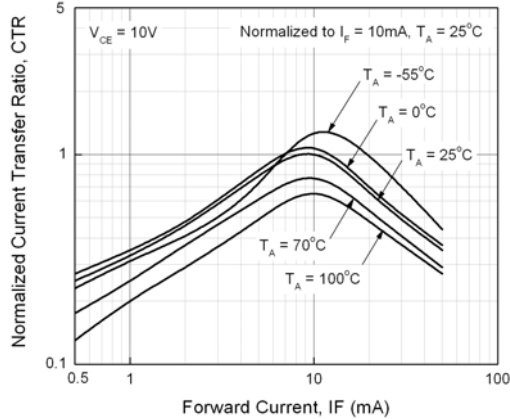


Figure 4. Collector Dark Current vs Ambient Temperature

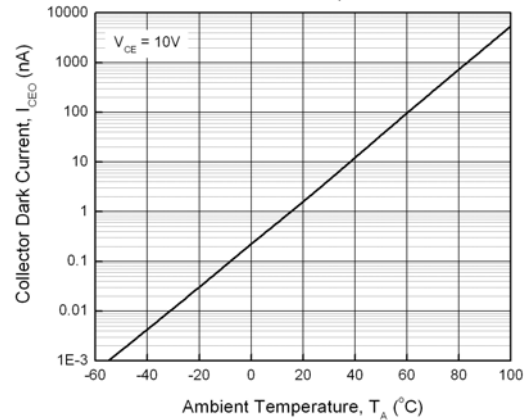


Figure 5. Turn-on Time vs Forward Current

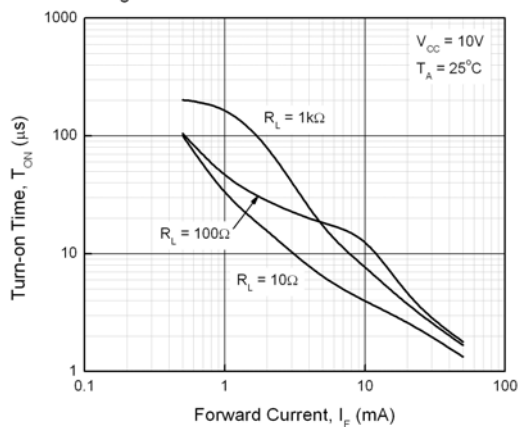
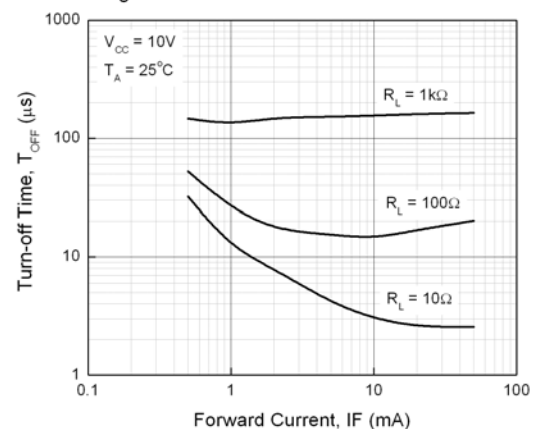


Figure 6. Turn-off Time vs Forward Current



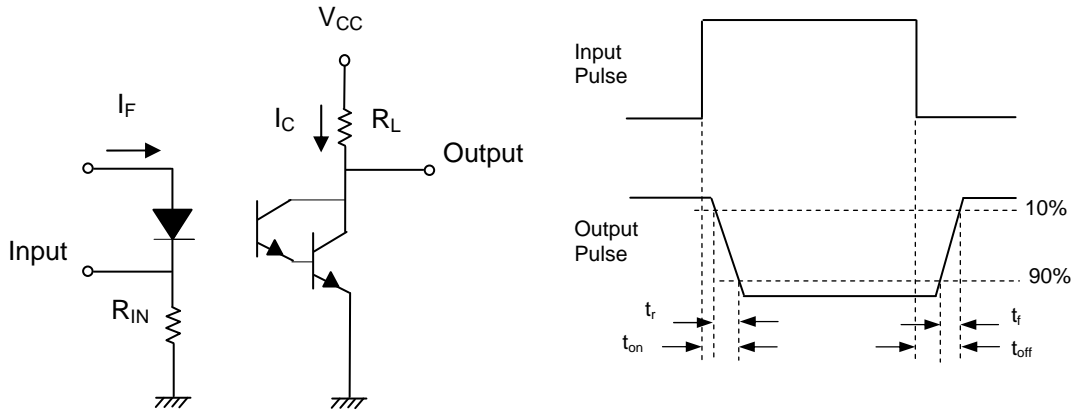


Figure 7. Switching Time Test Circuit & Waveforms

Order Information

Part Number

4NXXY(Z)-V
or **H11BXY(Z)-V**
or **TIL113Y(Z)-V**

Note

- XX = Part No. for 4NX series (29, 30, 31, 32 or 33)
- X = Part No. for H11BX series (1, 2, 3 or 255)
- Y = Lead form option (S, S1, M or none)
- Z = Tape and reel option (TA, TB or none).
- V = VDE safety (optional)

| Option | Description | Packing quantity |
|---------|---|---------------------|
| None | Standard DIP-6 | 65 units per tube |
| M | Wide lead bend (0.4 inch spacing) | 65 units per tube |
| S (TA) | Surface mount lead form + TA tape & reel option | 1000 units per reel |
| S (TB) | Surface mount lead form + TB tape & reel option | 1000 units per reel |
| S1 (TA) | Surface mount lead form (low profile) + TA tape & reel option | 1000 units per reel |
| S1 (TB) | Surface mount lead form (low profile) + TB tape & reel option | 1000 units per reel |

**6 PIN PHOTODARLINGTON
PHOTOCOUPLER**

Package Drawings
(Dimensions in mm)

Standard DIP Type



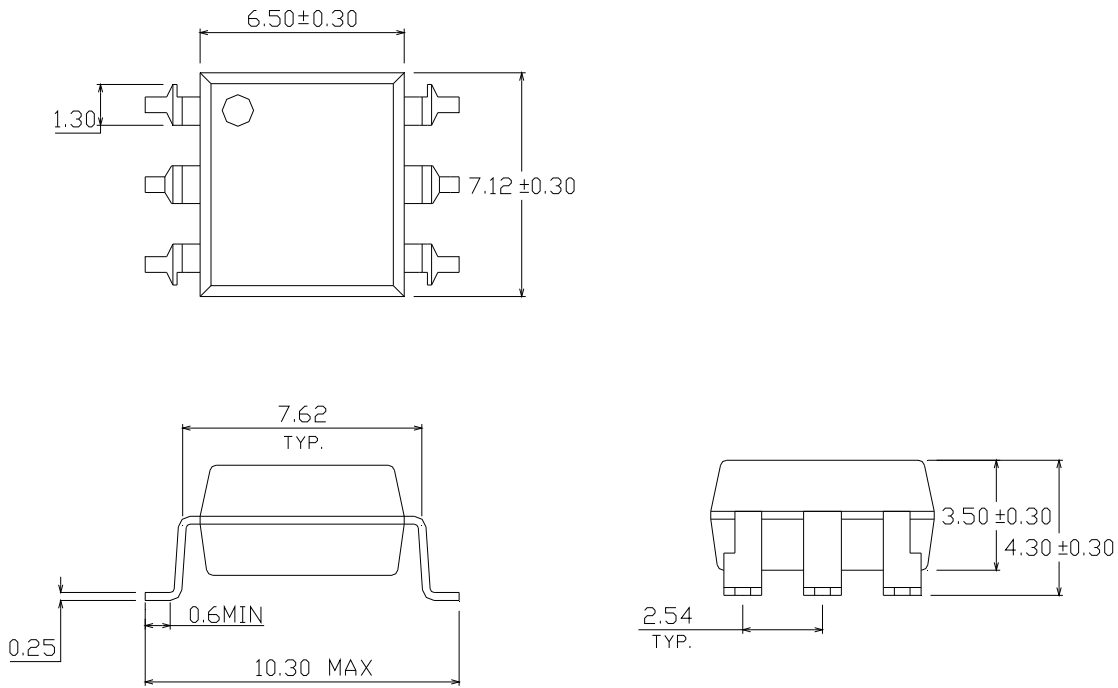
Option M Type



6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113
4NXX Series
H11BX Series

Option S Type



Option S1 Type



6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113
4NXX Series
H11BX Series

Recommended pad layout for surface mount leadform



Device Marking



Notes

- EL denotes Everlight
- 4N33 denotes Part Number
- H11B1 denotes Part Number
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code
- V denotes VDE safety (optional)

6 PIN PHOTODARLINGTON PHOTOCOUPLER

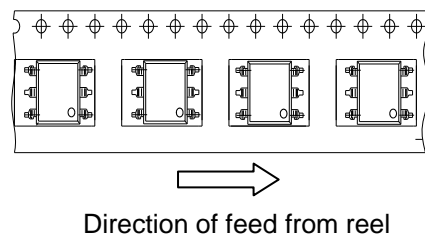
TIL113
4NXX Series
H11BX Series

Tape & Reel Packing Specifications

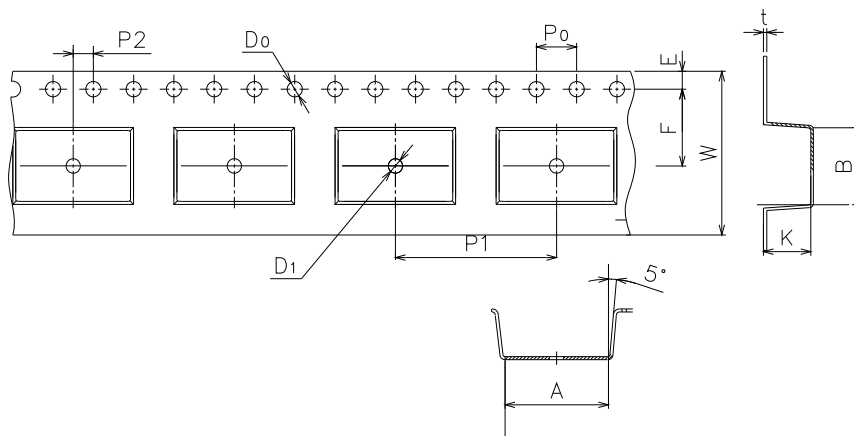
Option TA



Option TB



Tape dimensions



| Dimension No. | A | B | Do | D1 | E | F |
|----------------|----------|----------|---------|------------|----------|---------|
| Dimension (mm) | 10.4±0.1 | 7.52±0.1 | 1.5±0.1 | 1.5+0.1/-0 | 1.75±0.1 | 7.5±0.1 |

| Dimension No. | Po | P1 | P2 | t | W | K |
|----------------|----------|----------|---------|-----------|----------|---------|
| Dimension (mm) | 4.0±0.15 | 16.0±0.1 | 2.0±0.1 | 0.35±0.03 | 16.0±0.2 | 4.5±0.1 |

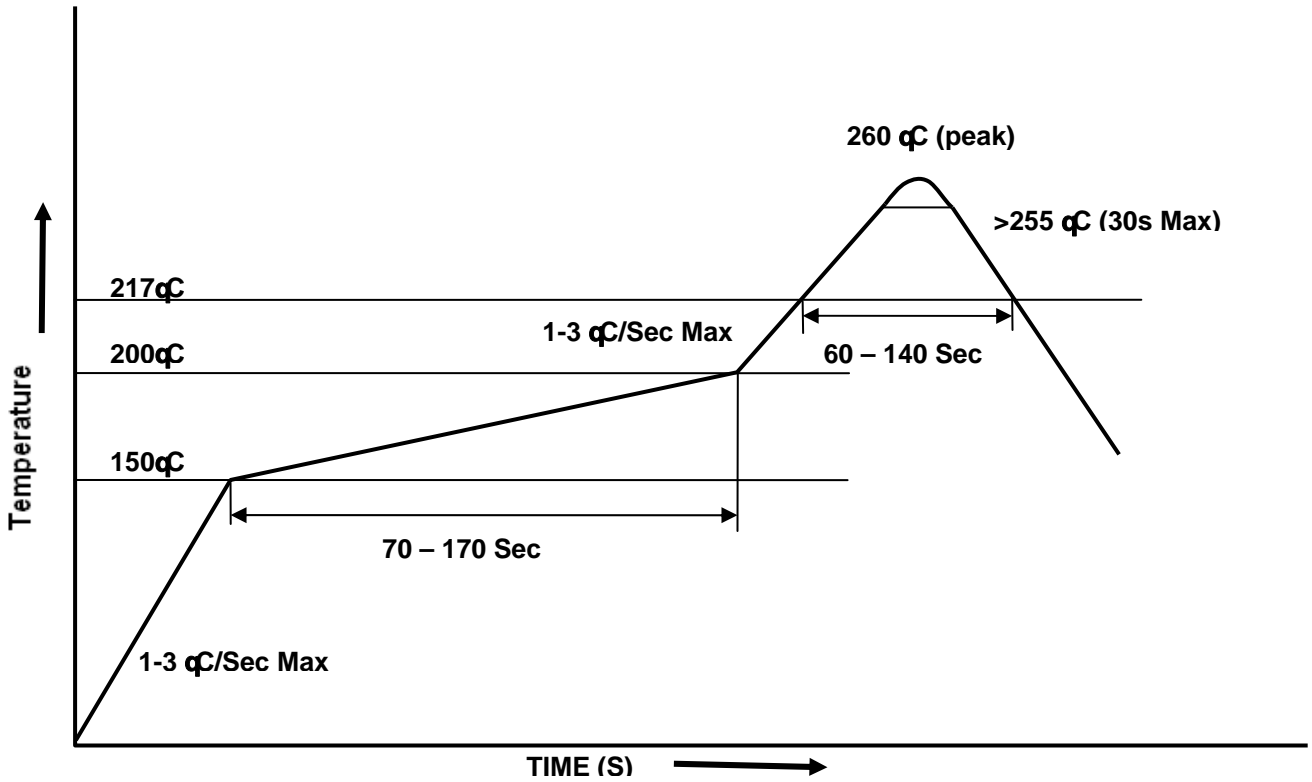


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6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113
4NXX Series
H11BX Series

Solder Reflow Temperature Profile





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TIL113
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H11BX Series

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