



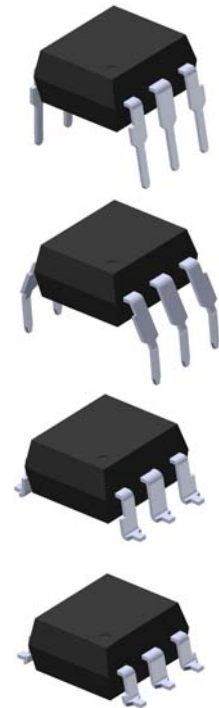
LIGHTING FOREVER

6 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

4N2X Series
4N3X Series
H11AX Series

Features:

- 4N2X series: 4N25, 4N26, 4N27, 4N28
- 4N3X series: 4N35, 4N36, 4N37, 4N38
- H11AX series: H11A1, H11A2, H11A3, H11A4, H11A5
- High isolation voltage between input and output
(Viso=5000 V rms)
- Creepage distance >7.62 mm
- Operating temperature up to +110°C
- Compact dual-in-line package
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved (No. 716108 /No. 716109)
- NEMKO approval (No. P06206747)
- DEMKO approval (No. 313924)
- FIMKO approval (No. FI 22807)
- CSA approved (No.1969132)

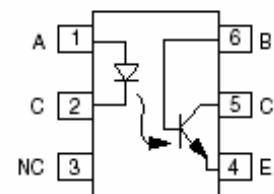


Description

The 4N2X, 4N3X, H11AX series of devices each consist of an infrared emitting diode optically coupled to a phototransistor.

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

Schematic



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

Applications

- Power supply regulators
- Digital logic inputs
- Microprocessor inputs



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Absolute Maximum Ratings ($T_a=25^{\circ}\text{C}$)

| Parameter | | Symbol | Rating | Unit |
|--|--|-----------|------------------------|------------------------|
| Input | Forward current | I_F | 50 | mA |
| | Peak forward current ($t = 10\mu\text{s}$) | I_{FM} | 1 | A |
| | Reverse voltage | V_R | 6 | V |
| | Power dissipation ($T_A = 25^{\circ}\text{C}$) | P_D | 70 | mW |
| | Derating factor (above 100°C) | | 3.8 | mW/ $^{\circ}\text{C}$ |
| Output | Collector-Emitter voltage | V_{CEO} | 80 | V |
| | Collector-Base voltage | V_{CBO} | 80 | V |
| | Emitter-Collector voltage | V_{ECO} | 7 | V |
| | Emitter-Base voltage | V_{EBO} | 7 | V |
| | Power dissipation ($T_A = 25^{\circ}\text{C}$) | P_C | 150 | mW |
| Derating factor (above 100°C) | 9.0 | | mW/ $^{\circ}\text{C}$ | |
| Total power dissipation | | P_{tot} | 200 | mW |
| Isolation voltage ^{*1} | | V_{iso} | 5000 | V _{rms} |
| Operating temperature | | T_{opr} | -55~+110 | $^{\circ}\text{C}$ |
| Storage temperature | | T_{stg} | -55~+125 | $^{\circ}\text{C}$ |
| Soldering temperature ^{*2} | | T_{sol} | 260 | $^{\circ}\text{C}$ |

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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Electrical Characteristics (T_a=25°C unless specified otherwise)

Input

| Parameter | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|-------------------|-----------------|------|-------|------|------|-----------------------|
| Forward voltage | V _F | - | 1.2 | 1.5 | V | I _F = 10mA |
| Reverse current | I _R | - | - | 10 | μA | V _R = 6V |
| Input capacitance | C _{in} | - | 30 | - | pF | V = 0, f = 1MHz |

Output

| Parameter | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|-------------------------------------|-------------------|------------------|-------|------|------|--|
| Collector-Base dark current | I _{CBO} | - | - | 20 | nA | V _{CB} = 10V |
| Collector-Emitter dark current | 4N2X | I _{CEO} | - | - | nA | V _{CE} = 10V, I _F =0mA |
| | H11AX | | | | | |
| | 4N3X | | | | | |
| Collector-Emitter breakdown voltage | BV _{CEO} | 80 | - | - | V | I _C =1mA |
| Collector-Base breakdown voltage | BV _{CBO} | 80 | - | - | V | I _C =0.1mA |
| Emitter-Collector breakdown voltage | BV _{ECO} | 7 | - | - | V | I _E =0.1mA |
| Emitter-Base breakdown voltage | BV _{EBO} | 7 | - | - | V | I _E =0.1mA |
| Collector-Emitter capacitance | C _{CE} | - | 8 | - | pF | V _{CE} =0V, f=1MHz |

* Typical values at T_a = 25°C



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6 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

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

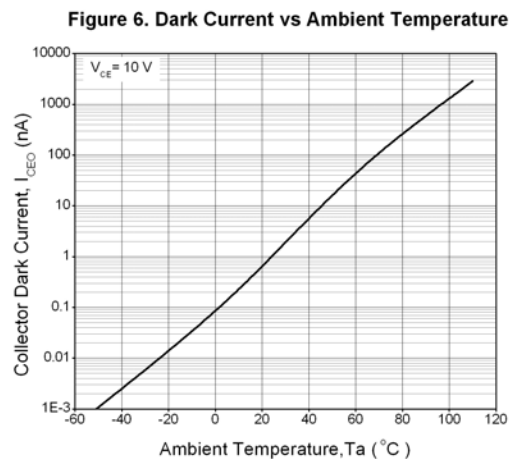
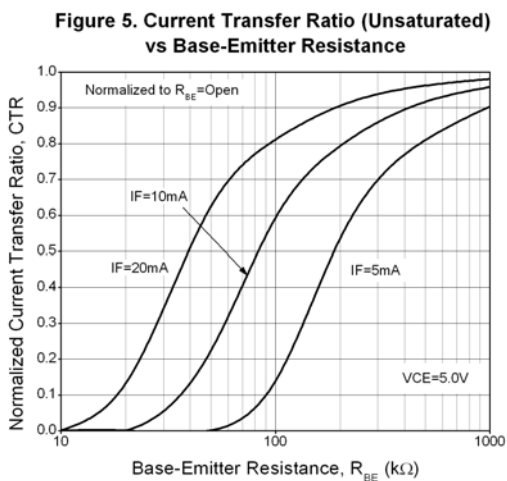
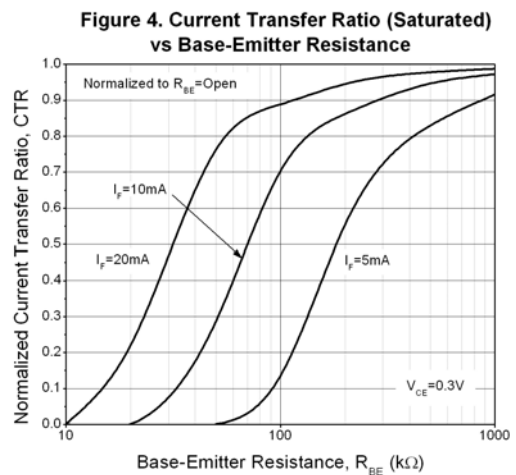
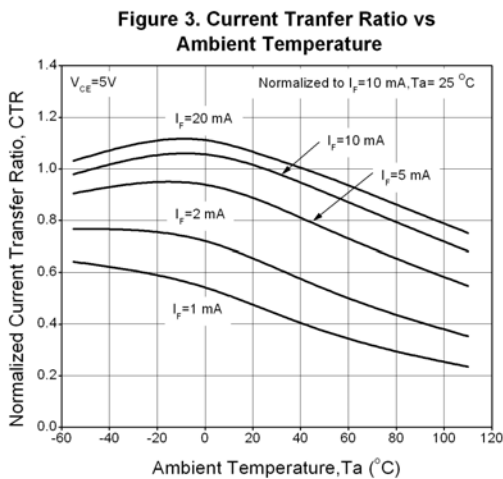
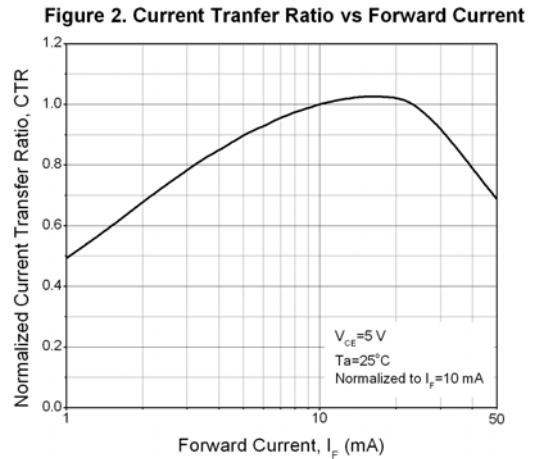
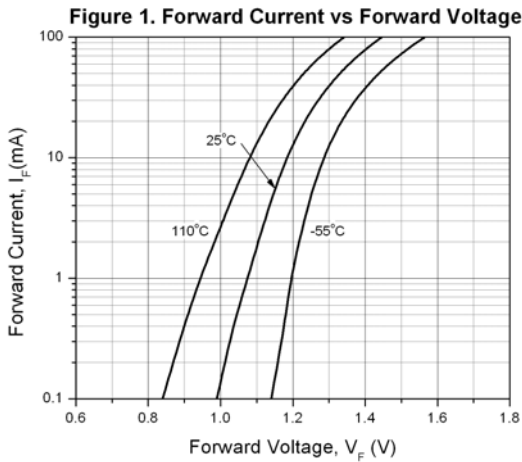
| Parameter | | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|--------------------------------------|---|---------------|-----------|-------|------|---------------|--|
| Current transfer ratio | 4N35, 4N36, 4N37 | CTR | 100 | - | - | % | $I_F = 10\text{mA}, V_{CE} = 10\text{V}$ |
| | H11A1 | | 50 | - | - | | |
| | H11A5 | | 30 | - | - | | |
| | 4N25, 4N26, 4N38, H11A2, H11A3 | | 20 | - | - | | |
| | 4N27, 4N28, H11A4 | | 10 | - | - | | |
| Collector-Emitter saturation voltage | 4N25, 4N26, 4N27, 4N28 | $V_{CE(sat)}$ | - | - | 0.5 | V | $I_F = 50\text{mA}, I_C = 2\text{mA}$ |
| | 4N35, 4N36, 4N37 | | - | - | 0.3 | | $I_F = 10\text{mA}, I_C = 0.5\text{mA}$ |
| | H11A1, H11A2, H11A3, H11A4, H11A5 | | - | - | 0.4 | | |
| | 4N38 | | - | - | 1.0 | | $I_F = 20\text{mA}, I_C = 4\text{mA}$ |
| Isolation resistance | | R_{IO} | 10^{11} | - | - | Ω | $V_{IO} = 500\text{Vdc}$ |
| Input-output capacitance | | C_{IO} | - | 0.2 | - | pF | $V_{IO} = 0, f = 1\text{MHz}$ |
| Turn-on time | 4N25, 4N26, 4N27, 4N28, H11A1, H11A2, H11A3, H11A4, H11A5 | Ton | - | 3 | 10 | μs | $V_{CC} = 10\text{V}, I_F = 10\text{mA}, R_L = 100\Omega$ See Fig. 11 |
| | 4N35, 4N36, 4N37, 4N38 | | - | 10 | 12 | | $V_{CC} = 10\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$, See Fig. 11 |
| Turn-off time | 4N25, 4N26, 4N27, 4N28, H11A1, H11A2, H11A3, H11A4 | Toff | - | 3 | 10 | μs | $V_{CC} = 10\text{V}, I_F = 10\text{mA}, R_L = 100\Omega$ See Fig. 11 |
| | 4N35, 4N36, 4N37, 4N38 | | - | 9 | 12 | | $V_{CC} = 10\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$, See Fig. 11 |

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

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**4N2X Series
4N3X Series
H11AX Series**

Typical Performance Curves



6 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

**4N2X Series
4N3X Series
H11AX Series**

Figure 7. Collector-Emitter Saturation Voltage vs Collector Current

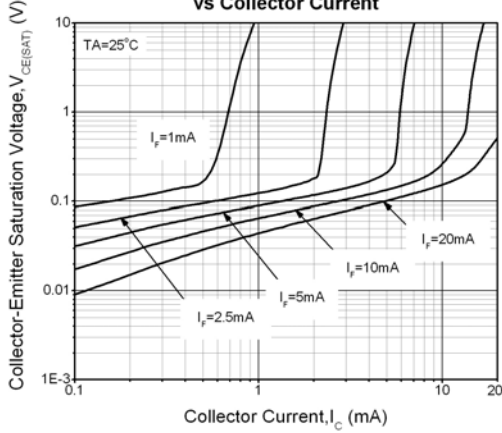


Figure 8. Switching Time vs Load Resistance

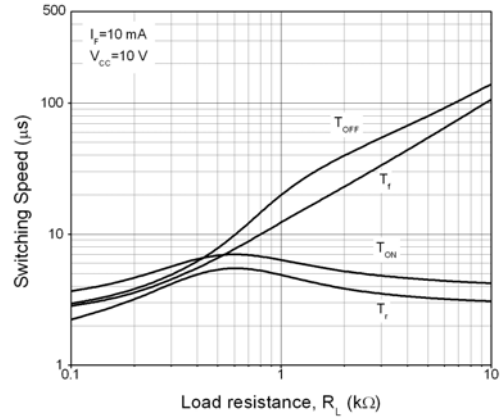


Figure 9. Turn-on Time vs Base-Emitter Resistance

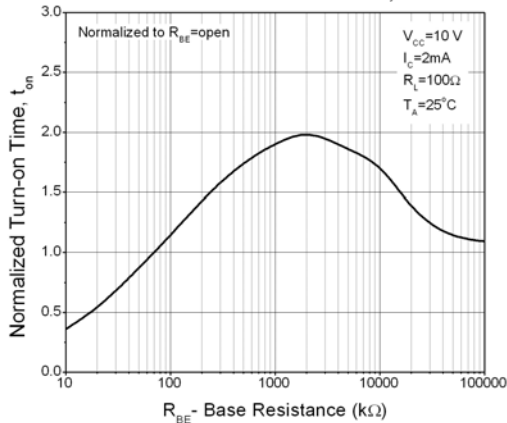


Figure 10. Turn-off Time vs Base-Emitter Resistance

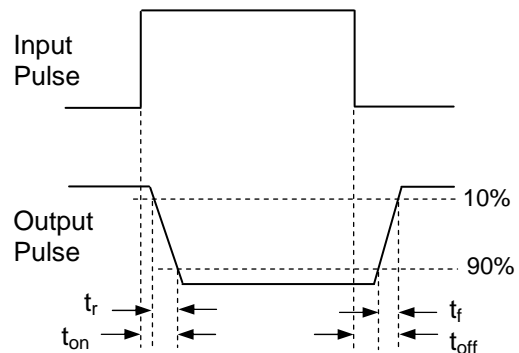
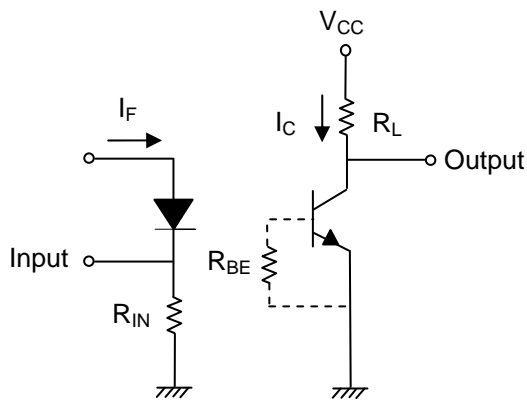
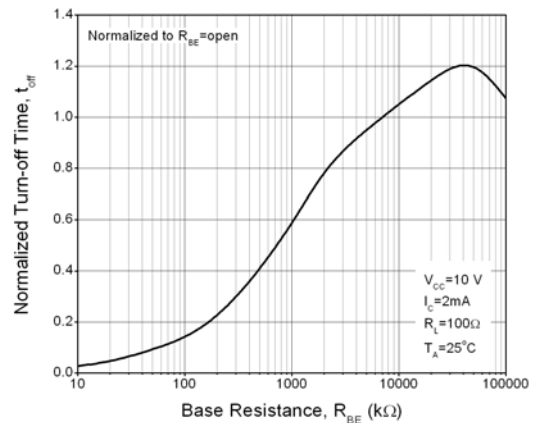


Figure 11. Switching Time Test Circuit & Waveforms



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4N2X Series
4N3X Series
H11AX Series

Order Information

Part Number

4NXXY(Z)-V

or

H11AXY(Z)-V

Note

XX = Part no. for 4NXX series (25, 26, 27, 28, 35, 36, 37 or 38)

X = Part no. for H11AX series (1, 2, 3, 4, or 5)

Y = Lead form option (S, S1, M or none)

Z = Tape and reel option (TA, TB or none).

V = VDE (optional)

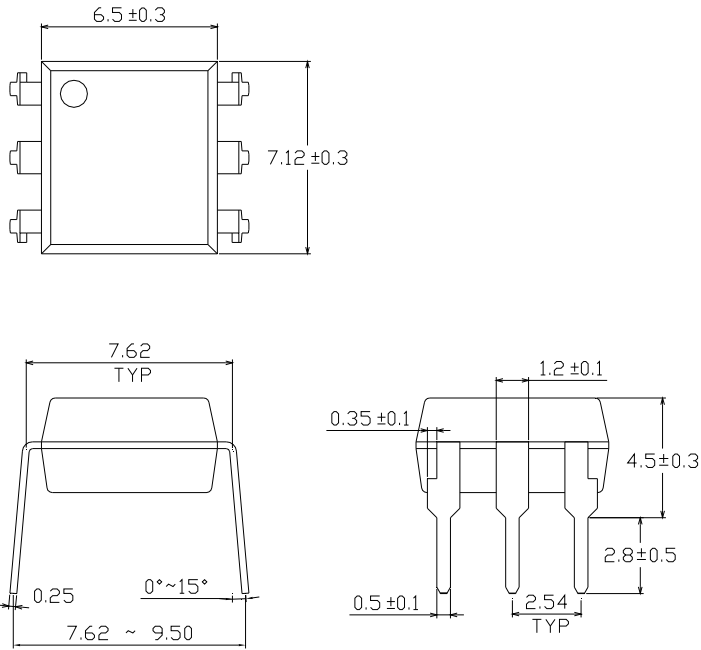
| Option | Description | Packing quantity |
|---------|---|---------------------|
| None | Standard DIP-6 | 65 units per tube |
| M | Wide lead bend (0.4 inch spacing) | 65 units per tube |
| S (TA) | Surface mount lead form + TA tape & reel option | 1000 units per reel |
| S (TB) | Surface mount lead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

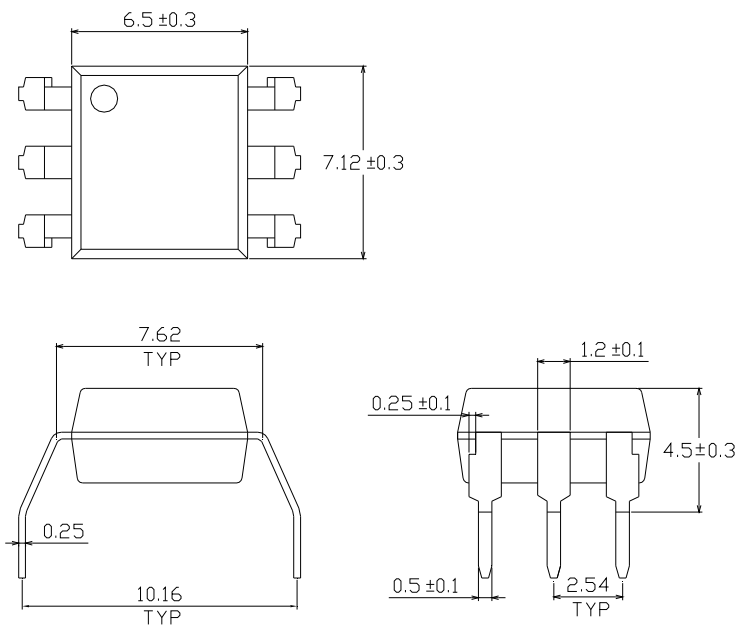
**4N2X Series
4N3X Series
H11AX Series**

**Package Drawings
(Dimensions in mm)**

Standard DIP Type



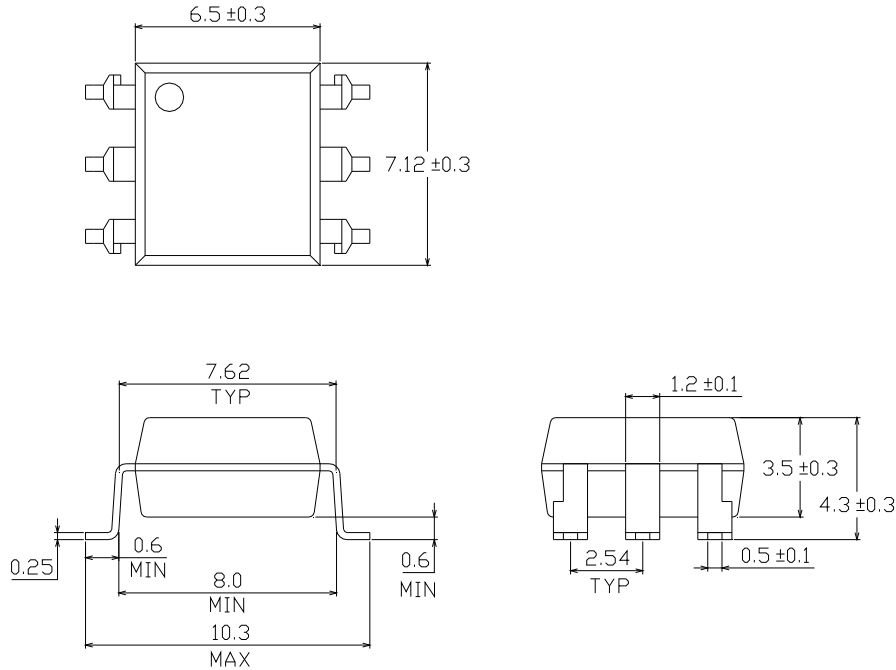
Option M Type



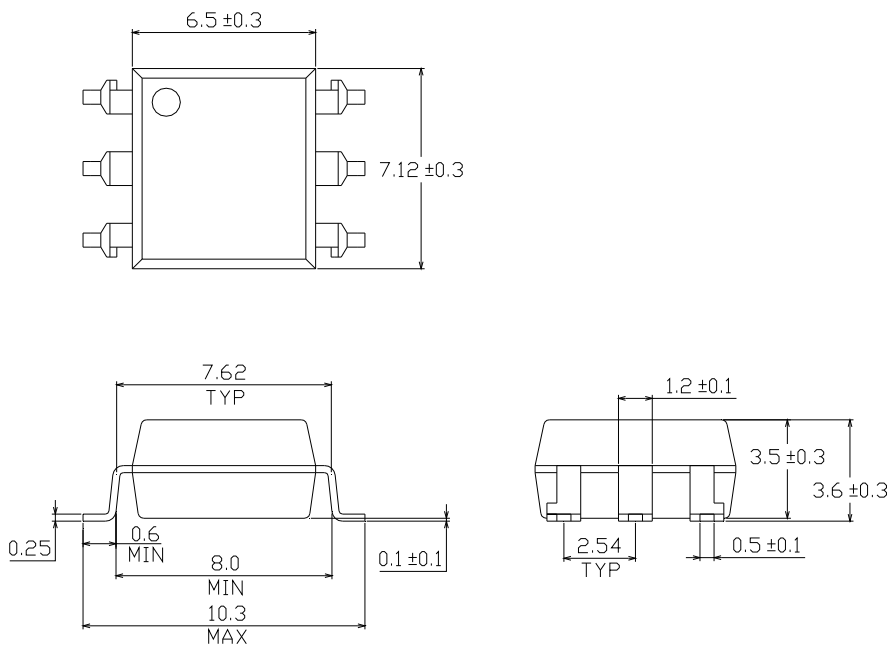
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**4N2X Series
4N3X Series
H11AX Series**

Option S Type



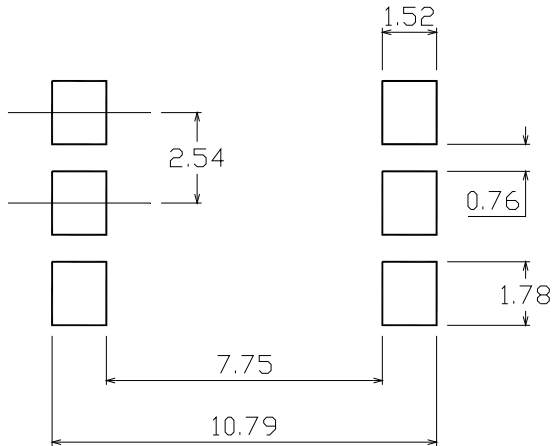
Option S1 Type



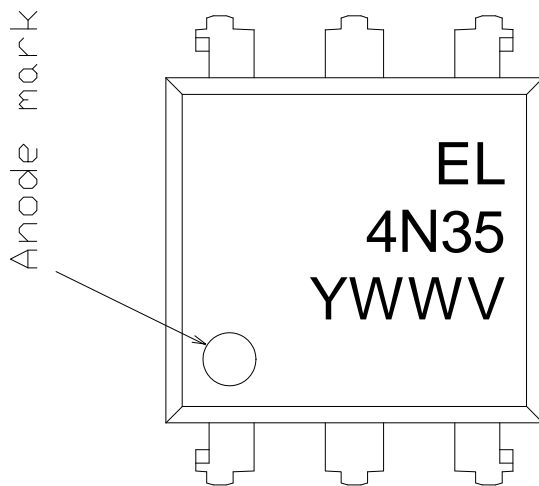
**6 PIN DIP PHOTOTRANSISTOR
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**4N2X Series
4N3X Series
H11AX Series**

Recommended pad layout for surface mount leadform



Device Marking



Notes

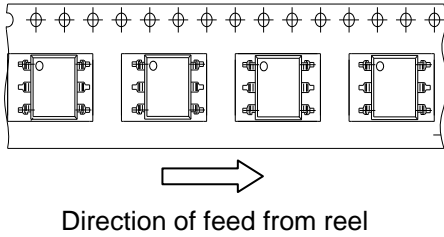
- EL denotes Everlight
- 4N35 denotes Device Number
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code
- V denotes VDE (optional)

**6 PIN DIP PHOTOTRANSISTOR
PHOTOCOUPLER**

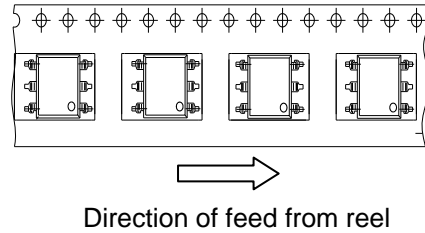
**4N2X Series
4N3X Series
H11AX Series**

Tape & Reel Packing Specifications

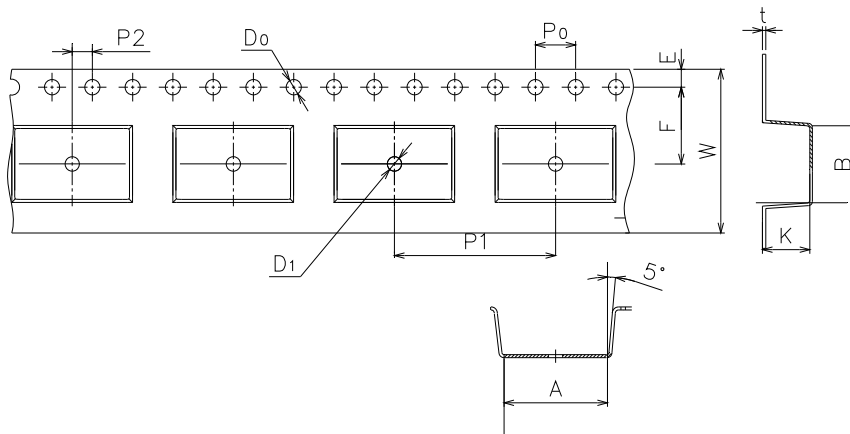
Option TA



Option TB



Tape dimensions



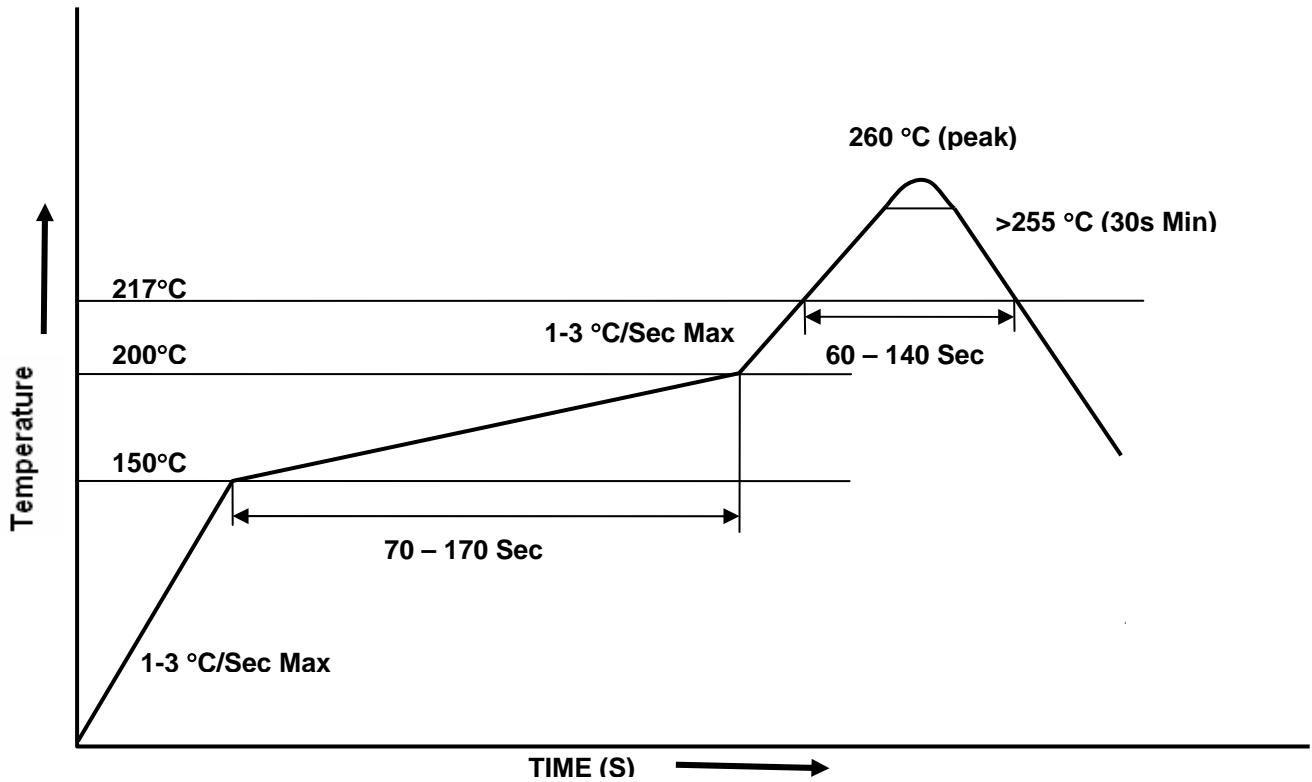
| Dimension No. | A | B | Do | D1 | E | F |
|----------------|----------|----------|---------|------------|----------|---------|
| Dimension (mm) | 10.4±0.1 | 7.52±0.1 | 1.5±0.1 | 1.5+0.1/-0 | 1.75±0.1 | 7.5±0.1 |

| 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 |

**6 PIN DIP PHOTOTRANSISTOR
PHOTOCOUPLER**

**4N2X Series
4N3X Series
H11AX Series**

Solder Reflow Temperature Profile





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4N2X Series
4N3X Series
H11AX Series

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