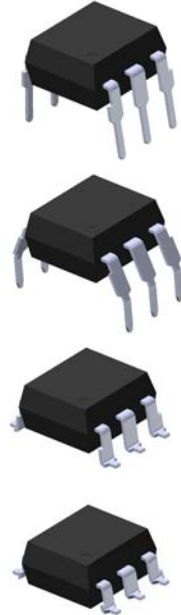


6 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

H11AAX Series

Features

- H11AAX series: H11AA1, H11AA2, H11AA3, H11AA4
- High isolation voltage between input and output
Viso = 5000 Vrms
- Creepage distance >7.62 mm
- Compact dual-in-line package
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No.132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved



Description

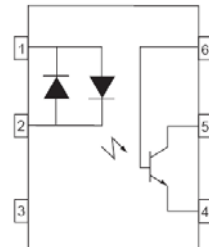
The H11AAX series of devices each consist of two infrared emitting diode, connected in inverse parallel, optically coupled to a phototransistor detector.

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

Applications

- AC line monitor
- Unknown polarity DC sensor
- Telephone line interface

Schematic



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



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6 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

H11AAX Series

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

| Parameter | | Symbol | Rating | Unit |
|-------------------------------------|---|-----------|----------|------------------------|
| Input | Forward current | I_F | 60 | mA |
| | Peak forward current ($t = 10\mu\text{s}$) | I_{FM} | 1 | A |
| | Power dissipation ($T_A = 25^{\circ}\text{C}$) | P_D | 120 | mW |
| | Derating factor (above 90°C) | | 3.8 | mW/ $^{\circ}\text{C}$ |
| Output | Power dissipation ($T_A = 25^{\circ}\text{C}$) No derating up to 100°C | P_C | 150 | mW |
| | Collector-Emitter voltage | V_{CEO} | 80 | V |
| | Collector-Base voltage | V_{CBO} | 80 | V |
| | Emitter-Collector voltage | V_{ECO} | 7 | V |
| Total power dissipation | | P_{tot} | 200 | mW |
| Isolation voltage ^{*1} | | V_{iso} | 5000 | Vrms |
| Operating temperature | | T_{opr} | -55~+100 | $^{\circ}\text{C}$ |
| 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.

6 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

H11AAX 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 | $I_F = \pm 10\text{mA}$ |
| Input capacitance | C_{in} | - | 80 | - | pF | $V = 0, f = 1\text{MHz}$ |

Output

| Parameter | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|-------------------------------------|------------|------|-------|------|------|---|
| Collector-Emitter dark current | I_{CEO} | - | - | 50 | nA | $V_{CE} = 10\text{V}, I_F = 0\text{mA}$ |
| Collector-Emitter breakdown voltage | BV_{CEO} | 80 | - | - | V | $I_C = 1\text{mA}$ |
| Collector-Base breakdown voltage | BV_{CBO} | 80 | - | - | V | $I_C = 0.1\text{mA}$ |
| Emitter-Collector breakdown voltage | BV_{ECO} | 7 | - | - | V | $I_E = 0.1\text{mA}$ |
| Collector-Emitter capacitance | C_{CE} | - | 10 | - | pF | $V_{CE} = 0\text{V}, f = 1\text{MHz}$ |

Transfer Characteristics

| Parameter | Symbol | Min. | Typ.* | Max. | Unit | Condition | |
|--------------------------------------|---------------|-----------|-------|------|---------------|---|--|
| Current Transfer Ratio | H11AA1 | CTR | 20 | - | - | % | $I_F = \pm 10\text{mA}, V_{CE} = 10\text{V}$ |
| | H11AA2 | | 10 | - | - | | |
| | H11AA3 | | 50 | - | - | | |
| | H11AA4 | | 100 | - | - | | |
| CTR Symmetry | | 0.5 | - | 2.0 | | $I_F = \pm 10\text{mA}, V_{CE} = 10\text{V}$ | |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | - | - | 0.4 | V | $I_F = \pm 10\text{mA}, I_C = 0.5\text{mA}$ | |
| Isolation resistance | R_{IO} | 10^{11} | - | - | Ω | $V_{IO} = 500\text{Vdc}$ | |
| Input-output capacitance | C_{IO} | - | 0.7 | - | pF | $V_{IO} = 0, f = 1\text{MHz}$ | |
| Turn-on time | T_{on} | - | - | 10 | μs | $V_{CC} = 10\text{V}, I_C = 10\text{mA}, R_L = 100\Omega$ | |
| Turn-off time | T_{off} | - | - | 10 | | | |
| Rise time | T_r | - | - | 10 | | | |
| Fall time | T_f | - | - | 10 | | | |

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

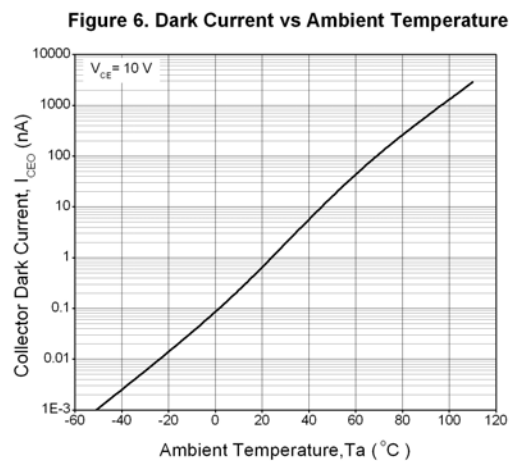
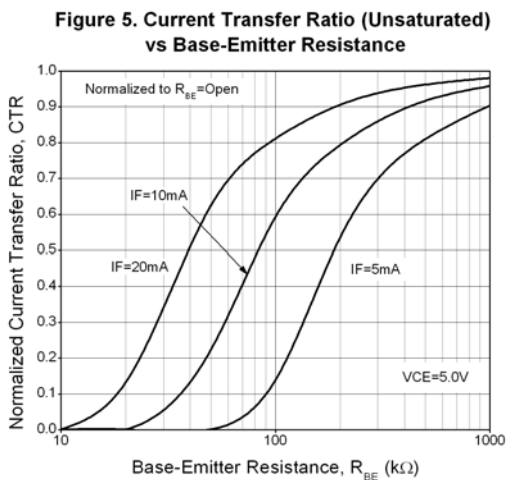
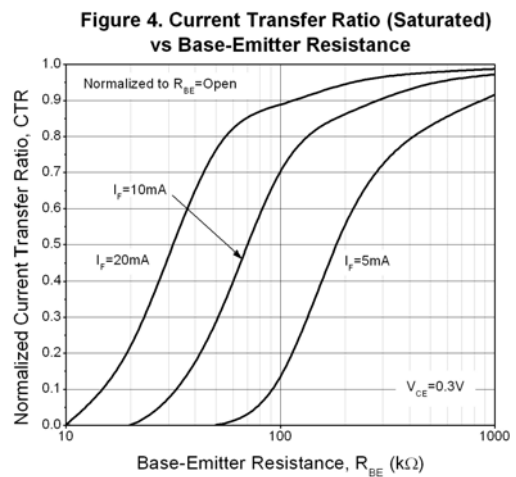
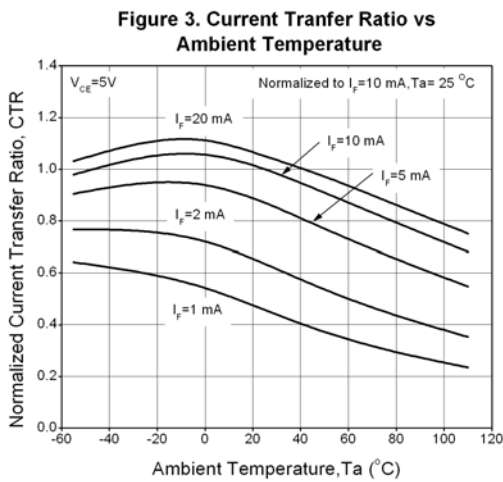
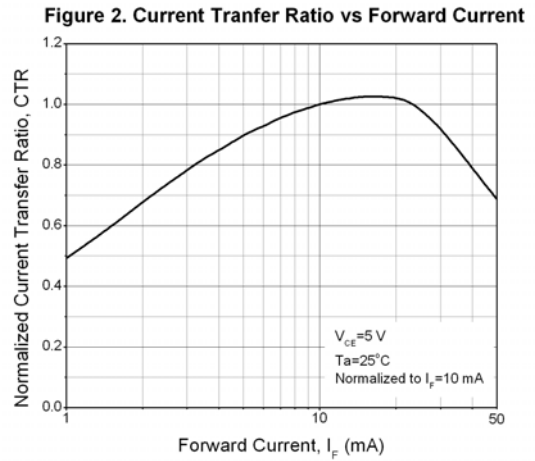
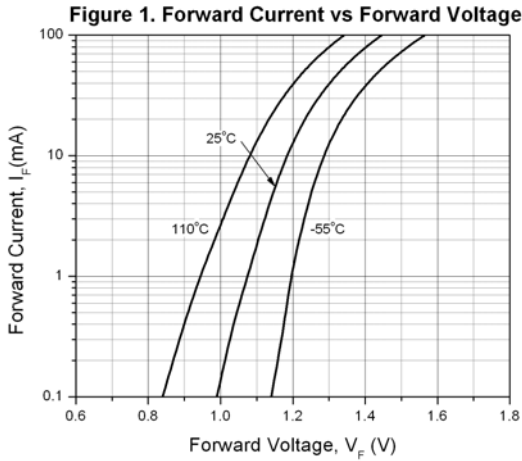


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6 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

H11AAX Series

Typical Performance Curves



6 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

H11AAX Series

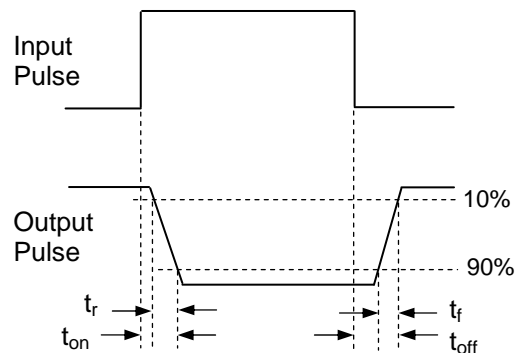
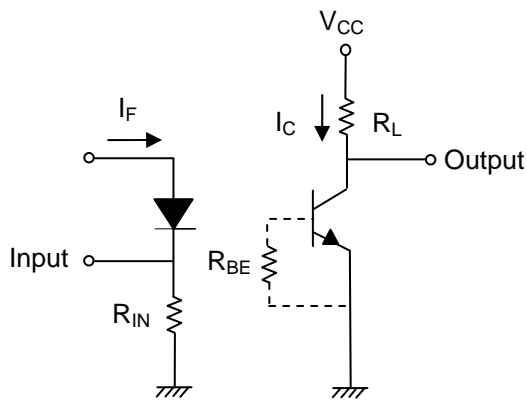
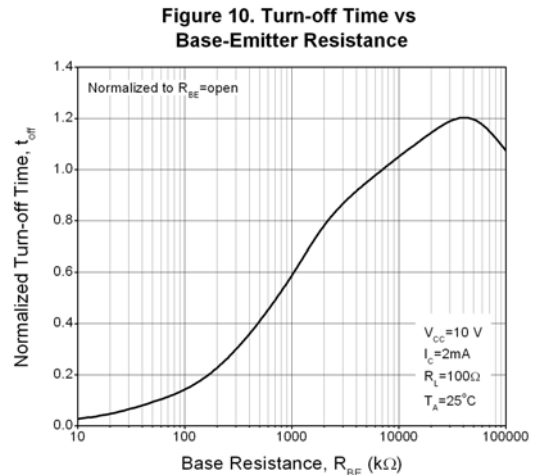
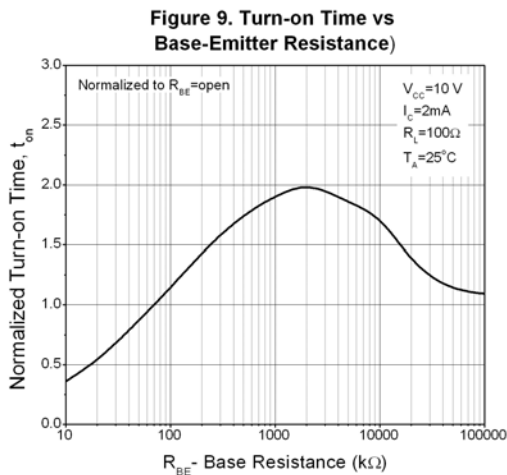
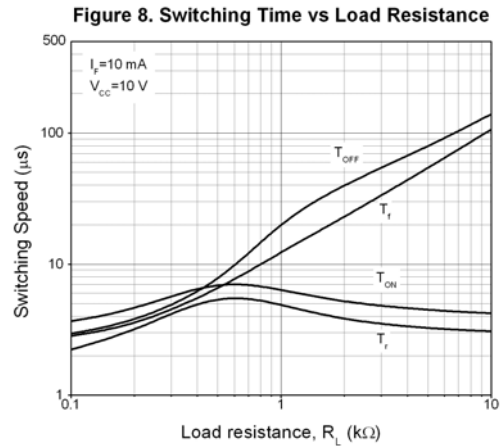
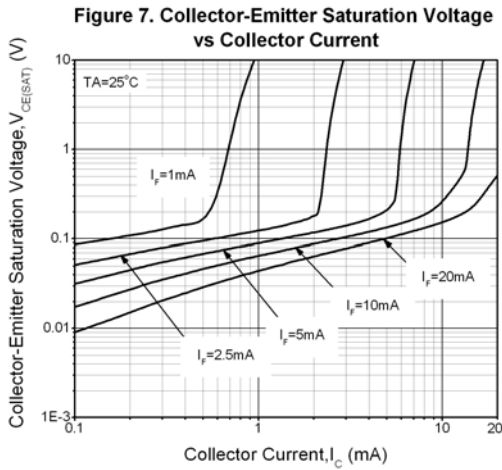


Figure 11. Switching Time Test Circuit & Waveforms



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6 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

H11AAX Series

Order Information

Part Number

H11AAXY(Z)-V

Note

X = Part no. (1, 2, 3 or 4)

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 |



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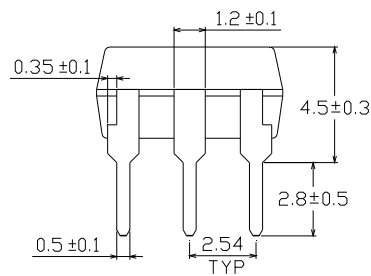
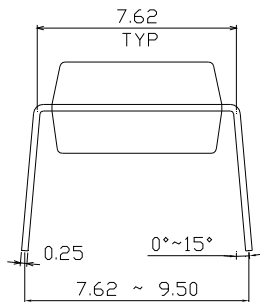
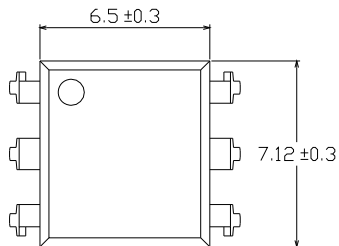
6 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

H11AAX Series

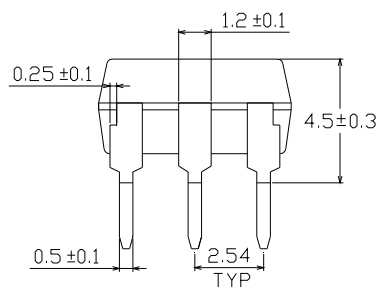
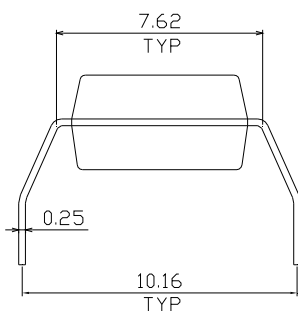
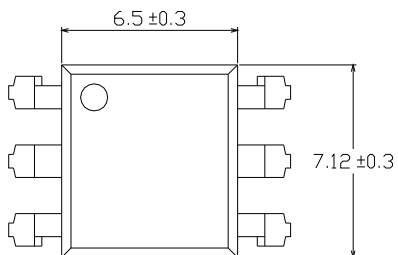
Package Drawings

(Dimensions in mm)

Standard DIP Type



Option M Type



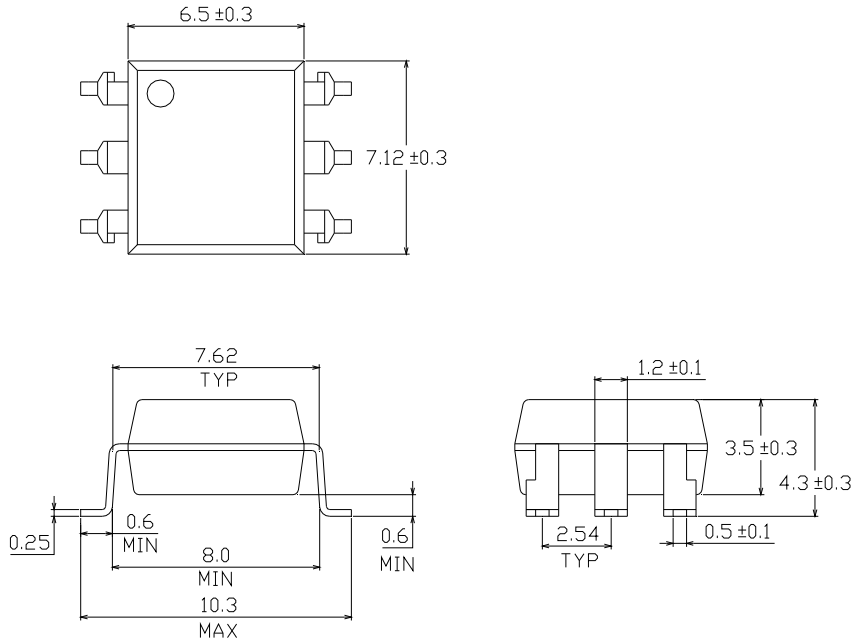


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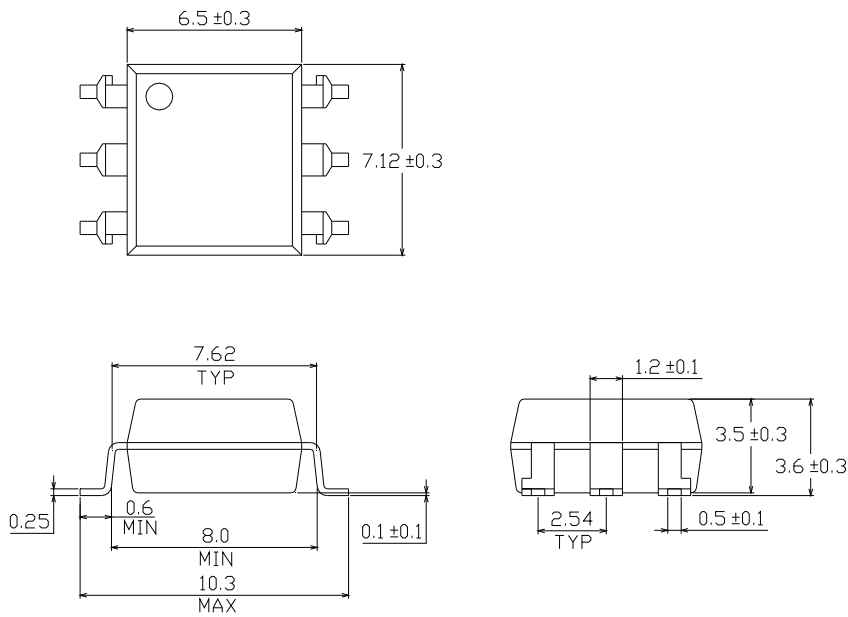
6 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

H11AAX Series

Option S Type



Option S1 Type



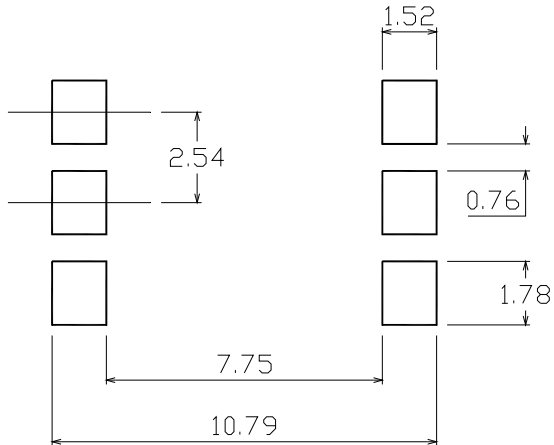


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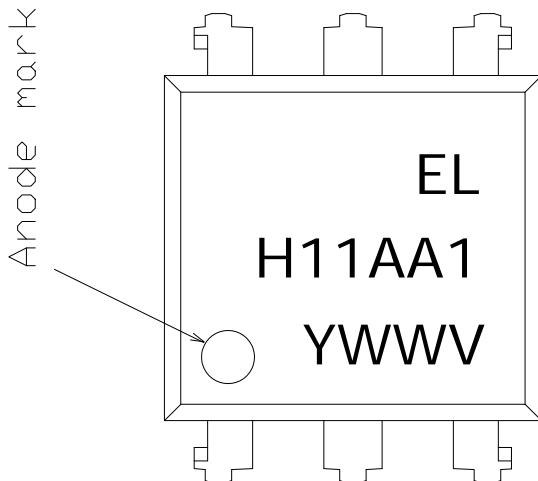
6 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

H11AAX Series

Recommended pad layout for surface mount leadform



Device Marking



Notes

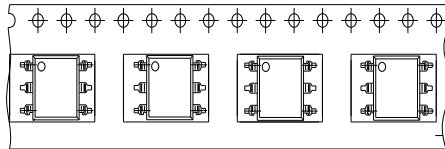
- EL denotes Everlight
- H11AA1 denotes Part Number
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code
- V denotes VDE safety (optional)

6 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

H11AAX Series

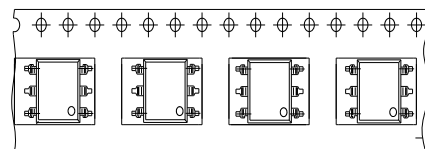
Tape & Reel Packing Specifications

Option TA



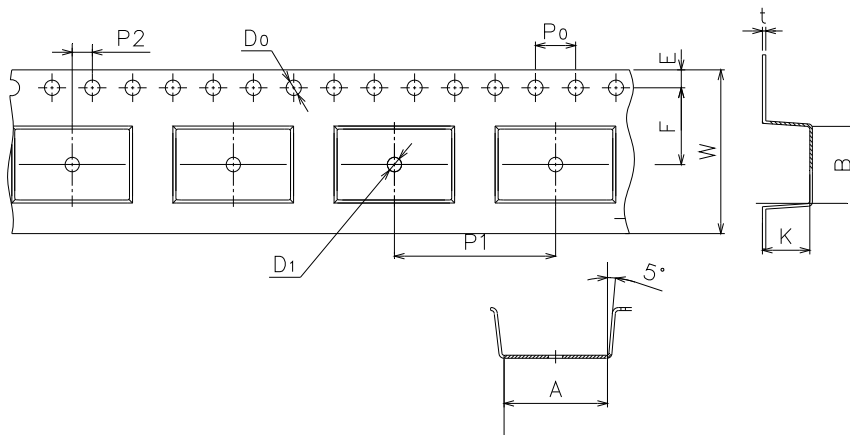
Direction of feed from reel

Option TB



Direction of feed from reel

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 |

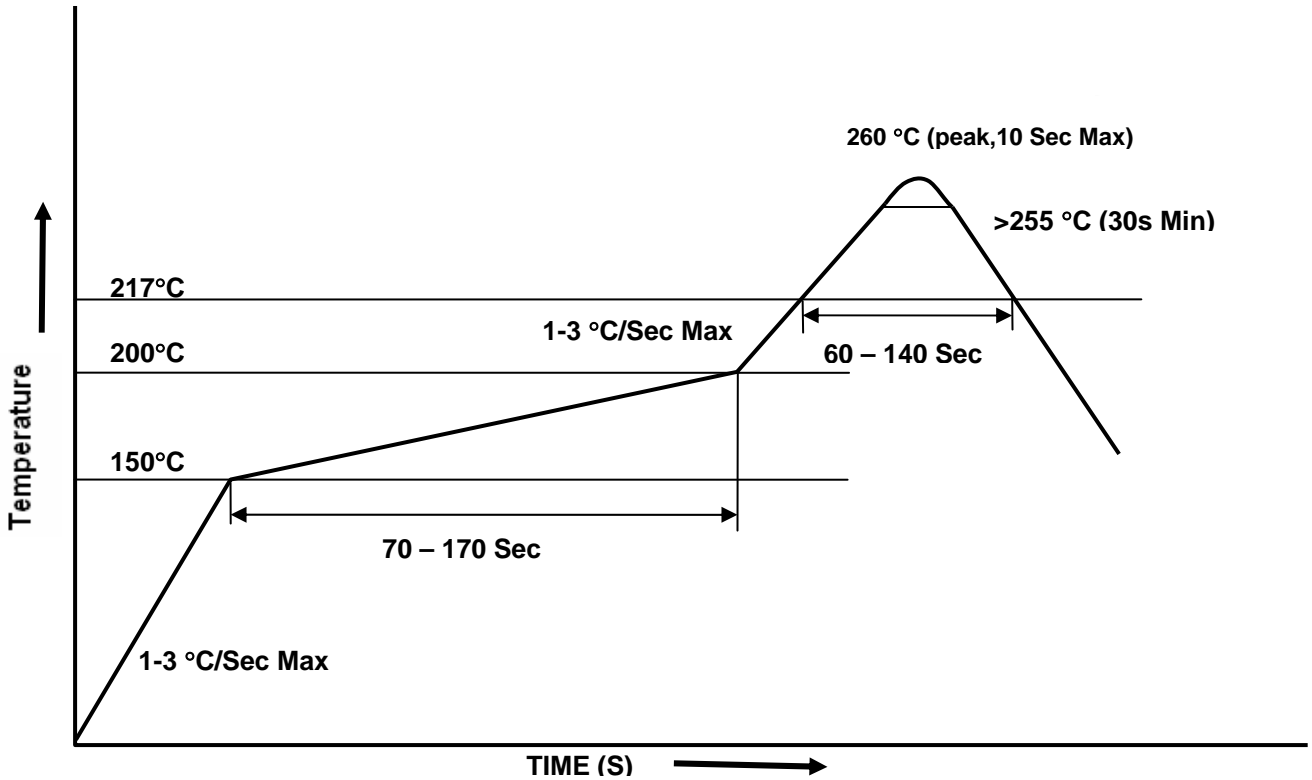


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6 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

H11AAX Series

Solder Reflow Temperature Profile





6 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

H11AAX Series

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[H11AA1S1\(TB\)-V](#) [H11AA1-V](#) [H11AA2](#) [H11AA2M](#) [H11AA2S\(TA\)](#) [H11AA2S\(TA\)-V](#) [H11AA2S\(TB\)](#) [H11AA2S\(TB\)-V](#)
[H11AA2S1\(TA\)](#) [H11AA2S1\(TA\)-V](#) [H11AA2S1\(TB\)](#) [H11AA2S1\(TB\)-V](#) [H11AA2-V](#) [H11AA3](#) [H11AA3M](#) [H11AA3S\(TA\)](#)
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[H11AA3S1\(TB\)-V](#) [H11AA3-V](#) [H11AA4](#) [H11AA4M](#) [H11AA4S\(TA\)](#) [H11AA4S\(TA\)-V](#) [H11AA4S\(TB\)](#) [H11AA4S\(TB\)-V](#)
[H11AA4S1\(TA\)](#) [H11AA4S1\(TA\)-V](#) [H11AA4S1\(TB\)](#) [H11AA4S1\(TB\)-V](#) [H11AA4-V](#)