



4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38 H11A1, H11A2, H11A3, H11A4, H11A5 DC Input 6-Pin Phototransistor Optocoupler

Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- Regulatory Approvals
 - UL - UL1577 (E364000)
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC – GB4943.1, GB8898
 - IEC60065, IEC60950

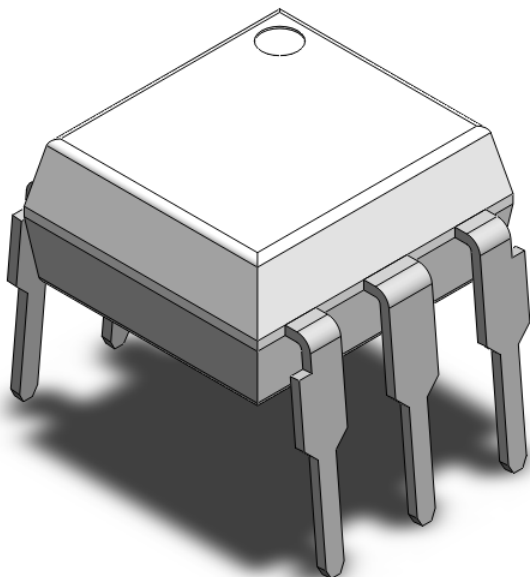
Applications

- Switch mode power supplies
- Computer peripheral interface
- Microprocessor system interface

Description

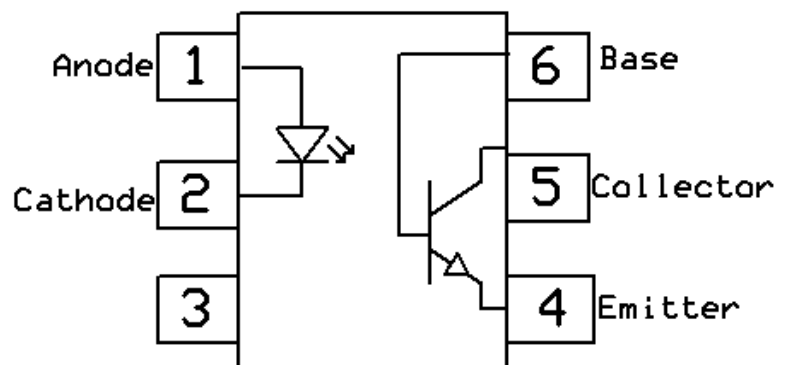
The 4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38, H11A1, H11A2, H11A3, H11A4, H11A5 series consists of a photo transistor optically coupled to a gallium arsenide Infrared-emitting diode in a 6-lead DIP package different lead forming options.

Package Outline



Note: Different bending options available. See package dimension.

Schematic





4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38 H11A1, H11A2, H11A3, H11A4, H11A5 DC Input 6-Pin Phototransistor Optocoupler

Absolute Maximum Rating at 25°C

| Symbol | Parameters | Ratings | Units | Notes |
|-----------------------|--|----------------|------------------|--------------|
| V _{ISO} | Isolation voltage | 5000 | V _{RMS} | |
| T _{OPR} | Operating temperature | -55 ~ +110 | °C | |
| T _{STG} | Storage temperature | -55 ~ +150 | °C | |
| T _{SOL} | Soldering temperature | 260 | °C | |
| Emitter | | | | |
| I _F | Forward current | 60 | mA | |
| I _{F(TRANS)} | Peak transient current (≤1μs P.W,300pps) | 1 | A | |
| V _R | Reverse voltage | 6 | V | |
| P _D | Power dissipation | 100 | mW | |
| Detector | | | | |
| P _D | Power dissipation | 150 | mW | |
| B _{VCEO} | Collector-Emitter Breakdown Voltage | 80 | V | |
| B _{VCBO} | Collector-Base Breakdown Voltage | 80 | V | |
| B _{VECO} | Emitter-Collector Breakdown Voltage | 7 | V | |
| B _{VEBO} | Emitter-Base Breakdown Voltage | 7 | V | |



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

Emitter Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes |
|----------|-------------------|---------------------|-----|------|-----|---------------|-------|
| V_F | Forward voltage | $I_F = 10\text{mA}$ | | 1.24 | 1.4 | V | |
| I_R | Reverse Current | $V_R = 6\text{V}$ | - | - | 5 | μA | |
| C_{IN} | Input Capacitance | $f = 1\text{MHz}$ | - | 45 | - | pF | |

Detector Characteristics

| Symbol | Parameters | | Test Conditions | Min | Typ | Max | Units | Notes |
|---------------|-----------------------------|---------------------|---|-----|-----|-----|-------|-------|
| $B_{V_{CEO}}$ | Collector-Emitter Breakdown | | $I_C = 0.1\text{mA}$ | 80 | - | - | V | |
| $B_{V_{ECO}}$ | Emitter-Collector Breakdown | | $I_E = 0.1\text{mA}$ | 7 | - | - | V | |
| $B_{V_{CBO}}$ | Collector-Base Breakdown | | $I_C = 0.1\text{mA}$ | 80 | - | - | V | |
| $B_{V_{EBO}}$ | Emitter-Base Breakdown | | $I_E = 0.1\text{mA}$ | 7 | - | - | V | |
| I_{CEO} | Collector-Emitter | 4N25,4N26,4N27,4N28 | $V_{CE} = 10\text{V}, I_F = 0\text{mA}$ | - | - | 50 | nA | |
| | Dark Current | H11A1,A2,A3,A4,A5 | | | | | | |
| | | 4N35,4N36,4N37,4N38 | | | | | | |
| I_{CBO} | Collector-Base Dark Current | | $V_{CB} = 10\text{V}, I_F = 0\text{mA}$ | - | - | 20 | nA | |

Transfer Characteristics

| Symbol | Parameters | | Test Conditions | Min | Typ | Max | Units | Notes | |
|---------------|--------------------------------------|---------------------------------------|--|--|-----|-----|-------|-------|-----|
| CTR | Current Transfer Ratio | 4N35 | $I_F = 10\text{mA}, V_{CE} = 10\text{V}$ | 100 | - | - | % | | |
| | | 4N25,4N26, 4N38, H11A2, H11A3 | | 20 | - | - | | | |
| | | 4N27, 4N28, H11A4 | | 10 | - | - | | | |
| | | H11A1 | | 50 | - | - | | | |
| | | H11A5 | | 30 | - | - | | | |
| | | 4N36 | | $I_F = 2\text{mA}, V_{CE} = 5\text{V}$ | 130 | - | | | 260 |
| | | 4N37 | | | 200 | - | | | 400 |
| $V_{CE(SAT)}$ | Collector-Emitter Saturation Voltage | 4N25,4N26, 4N27,4N28 | $I_F = 50\text{mA}, I_C = 2\text{mA}$ | - | - | 0.5 | V | | |
| | | 4N35,4N36,4N37 | $I_F = 10\text{mA}, I_C = 0.5\text{mA}$ | - | - | 0.3 | | | |
| | H11A1,H11A2, H11A3,H11A4,H11A5 | - | | - | 0.4 | | | | |
| | 4N38 | $I_F = 20\text{mA}, I_C = 4\text{mA}$ | | - | - | 1.0 | | | |



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Transfer Characteristics

| | | | | | | | |
|----------|-----------------------|----------------------|--------------------|------|--|----------|--|
| R_{IO} | Isolation Resistance | $V_{IO} = 500V_{DC}$ | 1×10^{11} | | | Ω | |
| C_{IO} | Isolation Capacitance | $f = 1MHz$ | | 0.25 | | pF | |

Switching Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes | |
|-----------|---------------|--|---|-----|-----|-------|---------|--|
| t_{on} | Turn On Time | 4N25,4N26,4N27,4N28 H11A1,A2,A3,A4,A5 | $I_F = 10mA, V_{CC} = 10V, R_L = 100\Omega$ | - | 4.3 | 9.8 | μs | |
| | | 4N35,4N36,4N37,4N38 | $I_C = 2mA, V_{CC} = 10V, R_L = 100\Omega$ | - | 9.8 | 11.5 | | |
| t_{off} | Turn Off Time | 4N25,4N26,4N27,4N28 H11A1,A2,A3,A4,A5 | $I_F = 10mA, V_{CC} = 10V, R_L = 100\Omega$ | - | 3.9 | 9.8 | μs | |
| | | 4N35,4N36,4N37,4N38 | $I_C = 2mA, V_{CC} = 10V, R_L = 100\Omega$ | - | 6.9 | 11.5 | | |



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Typical Characteristic Curves

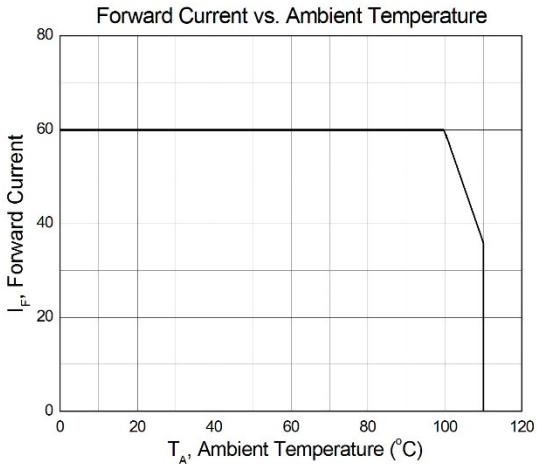


Figure 1

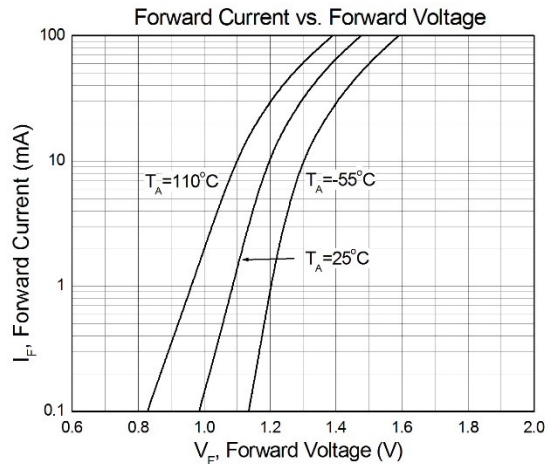


Figure 2

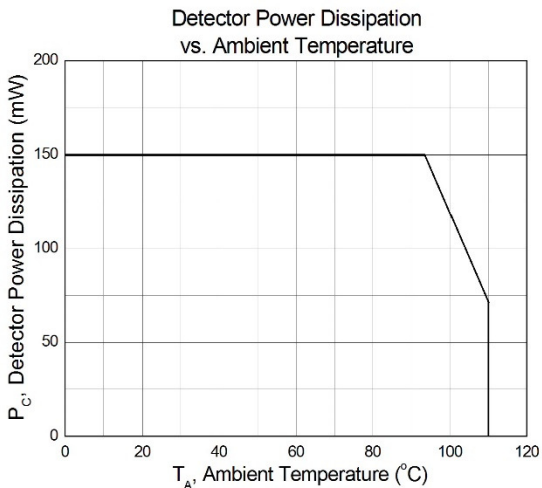


Figure 3

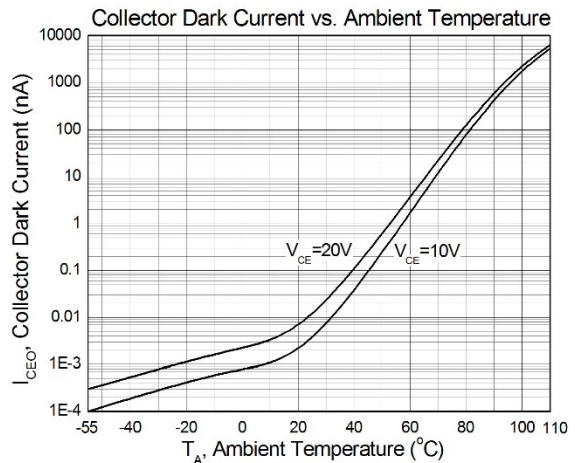


Figure 4

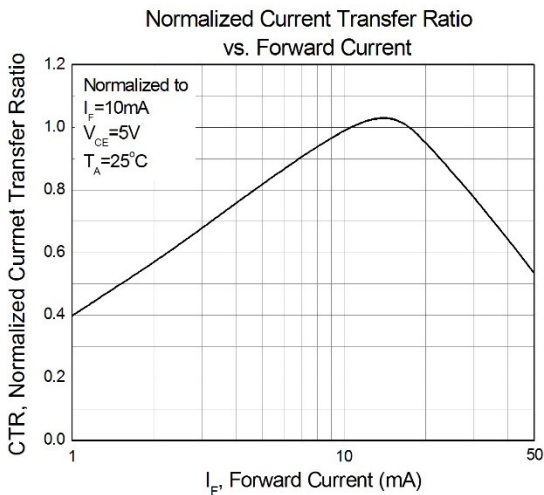


Figure 5

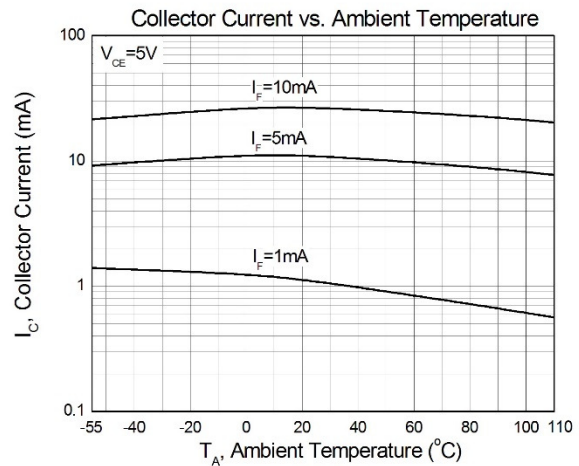


Figure 6



4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38 H11A1, H11A2, H11A3, H11A4, H11A5 DC Input 6-Pin Phototransistor Optocoupler

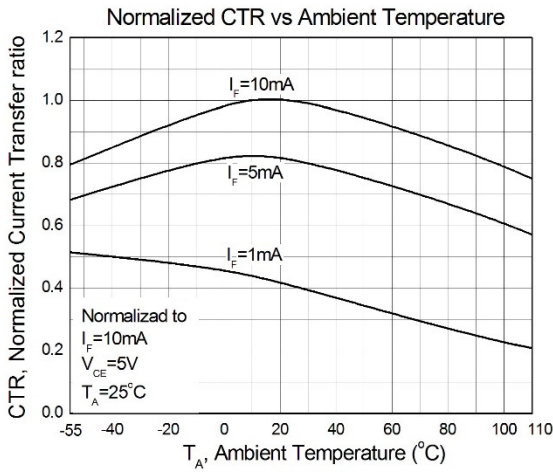


Figure 7

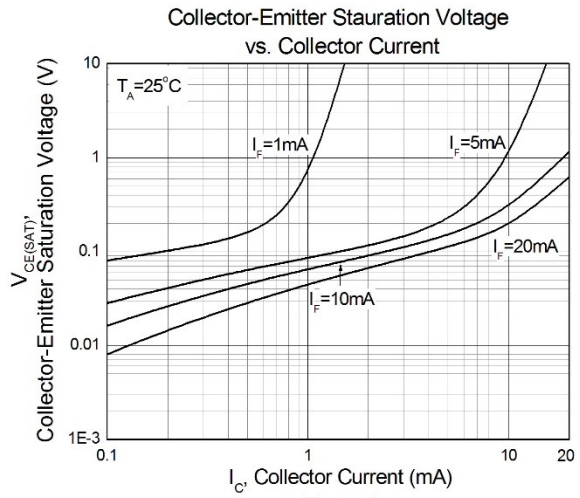


Figure 8

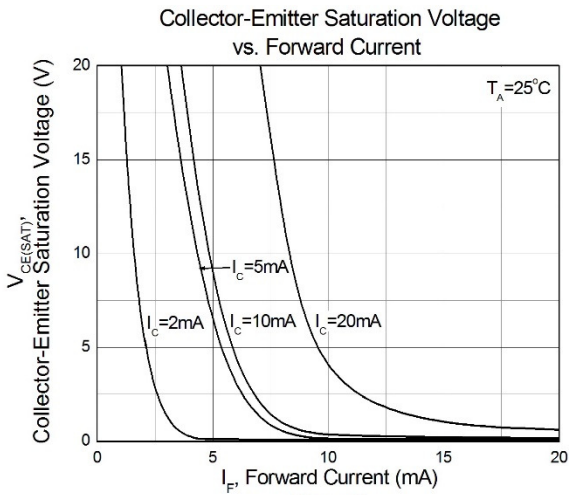


Figure 9

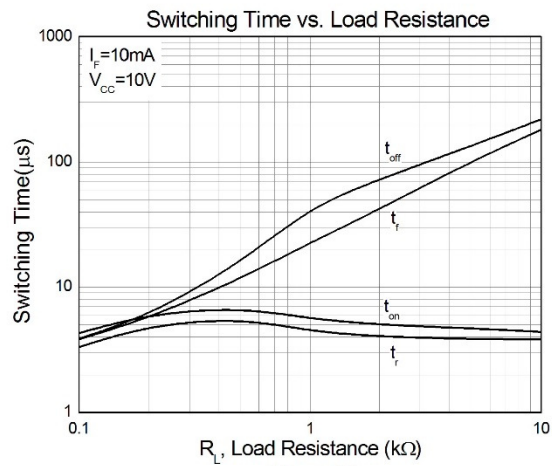


Figure 10

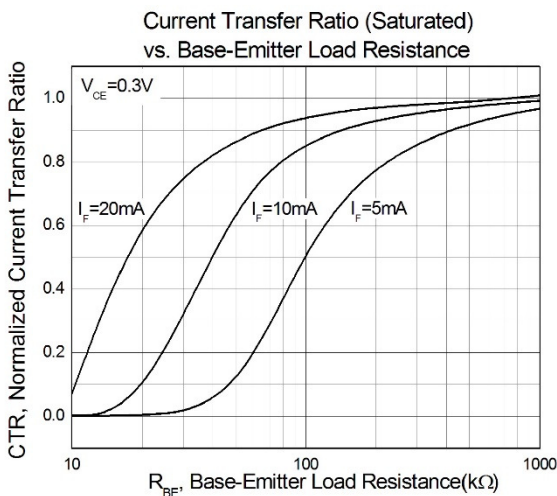


Figure 11

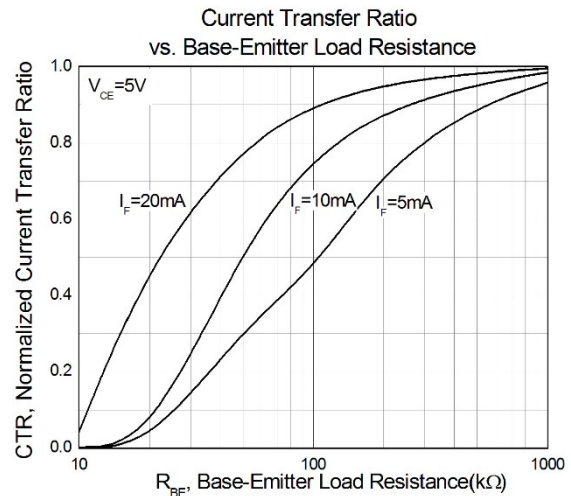


Figure 12



4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38 H11A1, H11A2, H11A3, H11A4, H11A5 DC Input 6-Pin Phototransistor Optocoupler

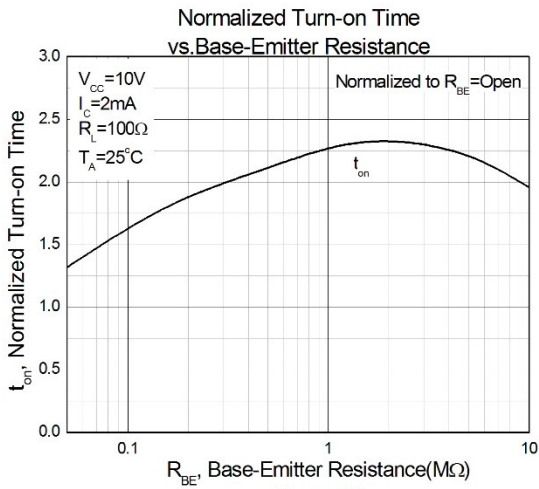


Figure 13

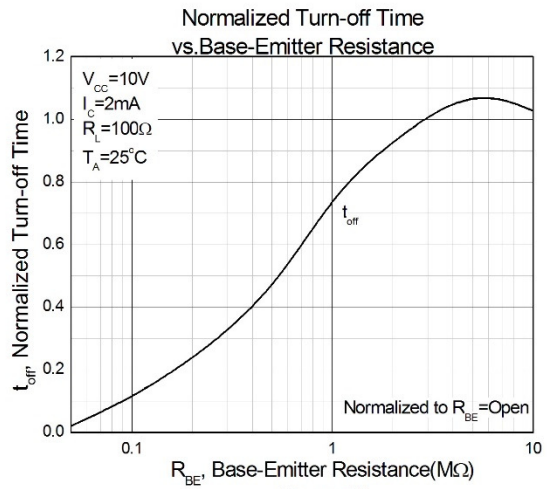


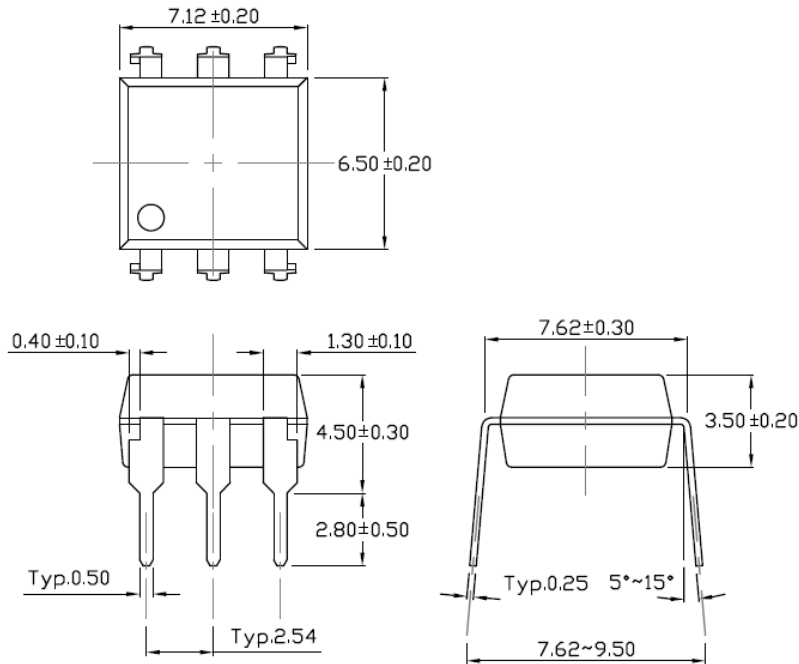
Figure 14



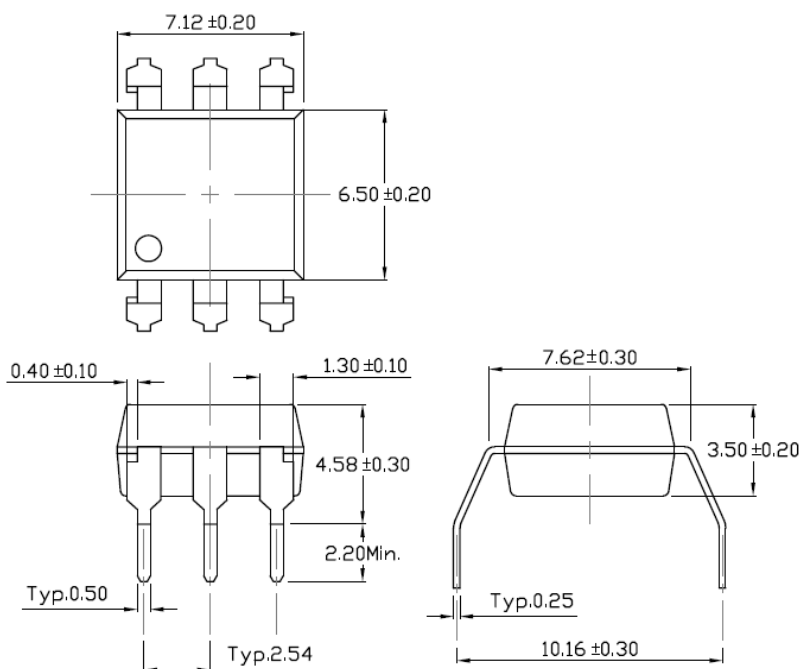
4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38 H11A1, H11A2, H11A3, H11A4, H11A5 DC Input 6-Pin Phototransistor Optocoupler

Package Dimension *Dimensions in mm unless otherwise stated*

Standard DIP – Through Hole



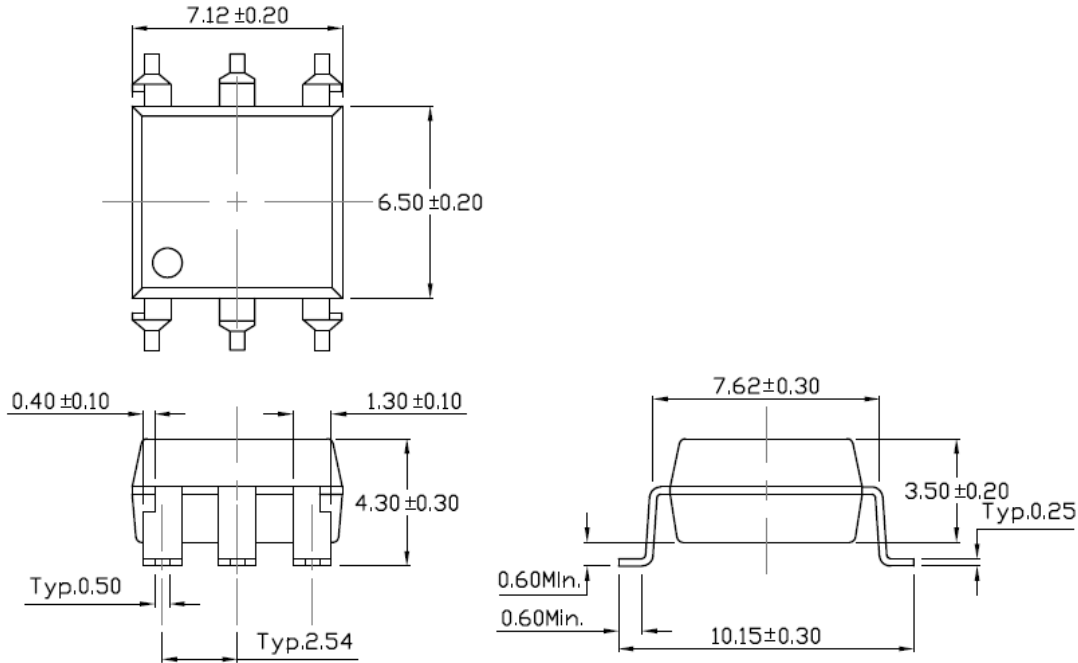
Wide Lead Forming – Through Hole (M Type)



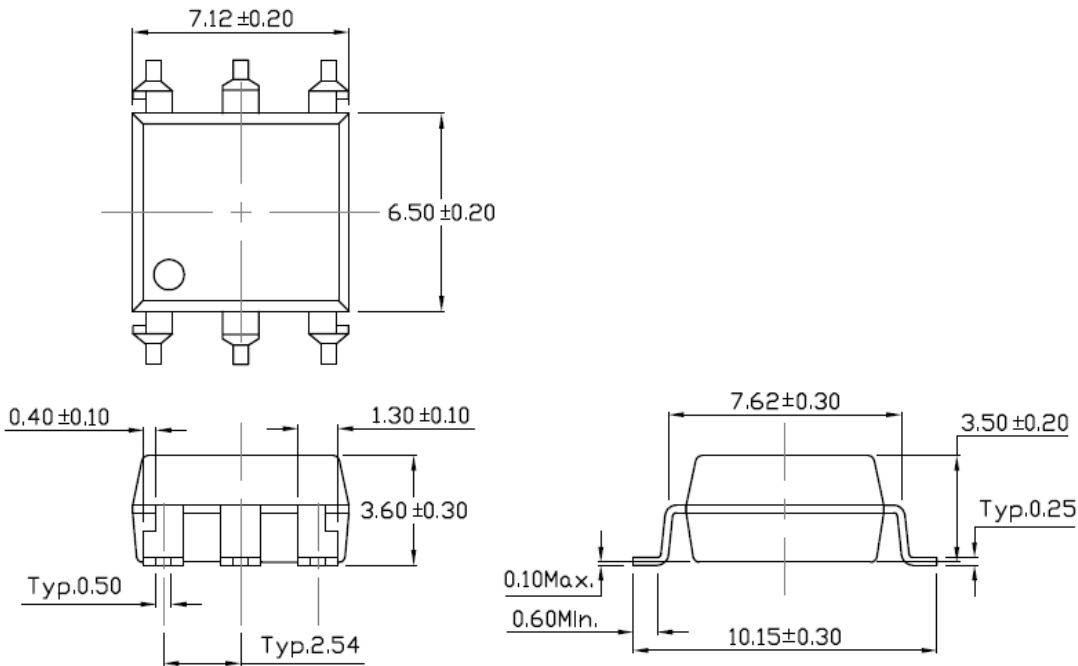


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Surface Mount Forming (S Type)



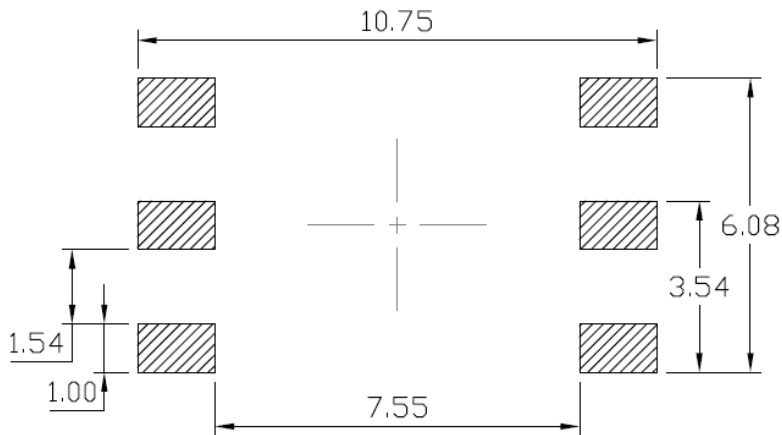
Surface Mount Forming (Low Profile) (SL Type)



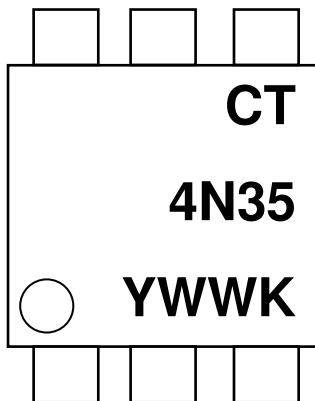


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Recommended Solder Mask *Dimensions in mm unless otherwise stated*



Marking Information



Note:

- CT : Denotes "CT Micro"
- 4N35 : Part Number
- Y : Fiscal Year
- WW : Work Week
- K : Manufacturing Code



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Ordering Information

4N2X(Y)(Z)-G, 4N3X(Y)(Z)-G, H11AX(Y)(Z)-G

X = Part No.

(4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38, H11A1, H11A2, H11A3, H11A4, H11A5)

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

Z = Tape and reel option (T1, T2 or none)

G= Material option (G: Green, None: Non-green)

| Option | Description | Quantity |
|---------------|--|-----------------|
| None | Standard 6 Pin Dip | 50Units/Tube |
| M | Wide Lead Forming | 50Units/Tube |
| S(T1) | Surface Mount Lead Forming – With Option A Taping | 1000 Units/Reel |
| S(T2) | Surface Mount Lead Forming – With Option B Taping | 1000 Units/Reel |
| SL(T1) | Surface Mount Lead Forming(Low Profile) – With Option A Taping | 1000 Units/Reel |
| SL(T2) | Surface Mount Lead Forming(Low Profile) – With Option B Taping | 1000 Units/Reel |

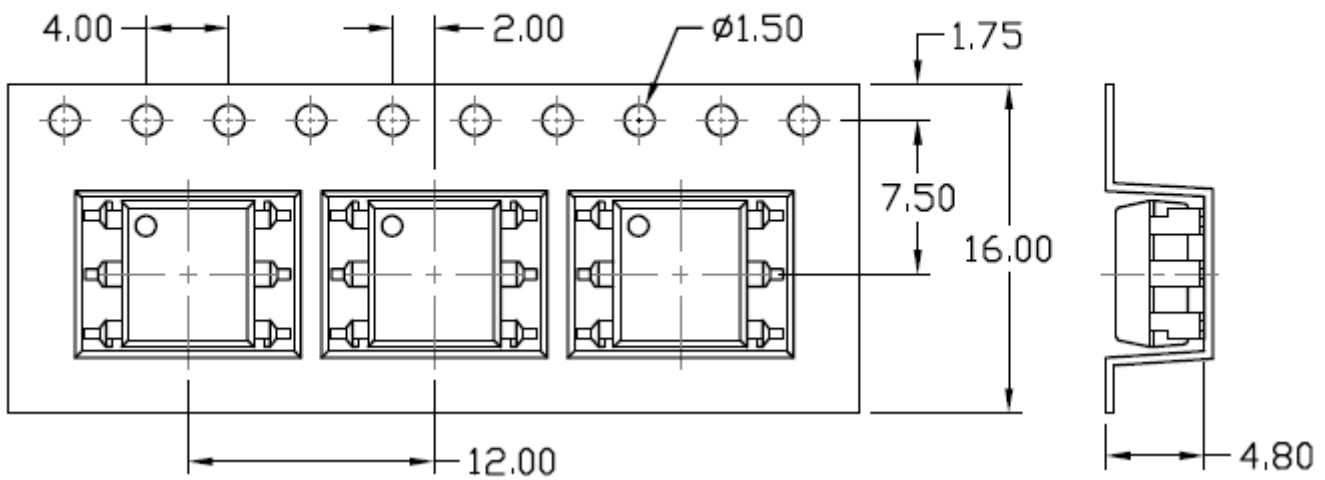


4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38
H11A1, H11A2, H11A3, H11A4, H11A5
DC Input 6-Pin Phototransistor Optocoupler

Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

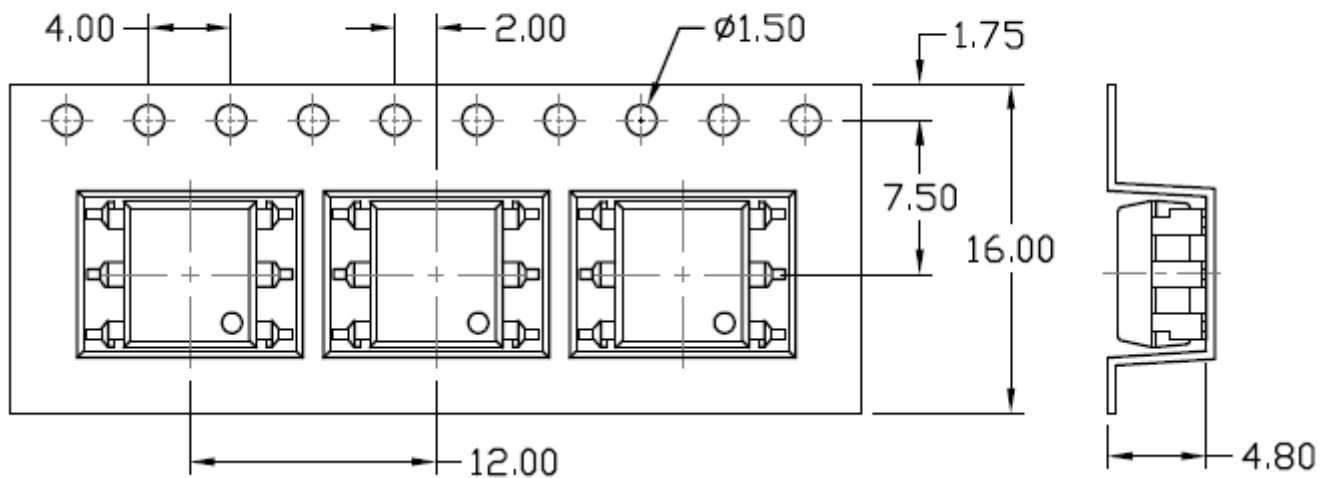
Option S(T1) & SL(T1)

Input Direction
→



Option S(T2) & SL(T2)

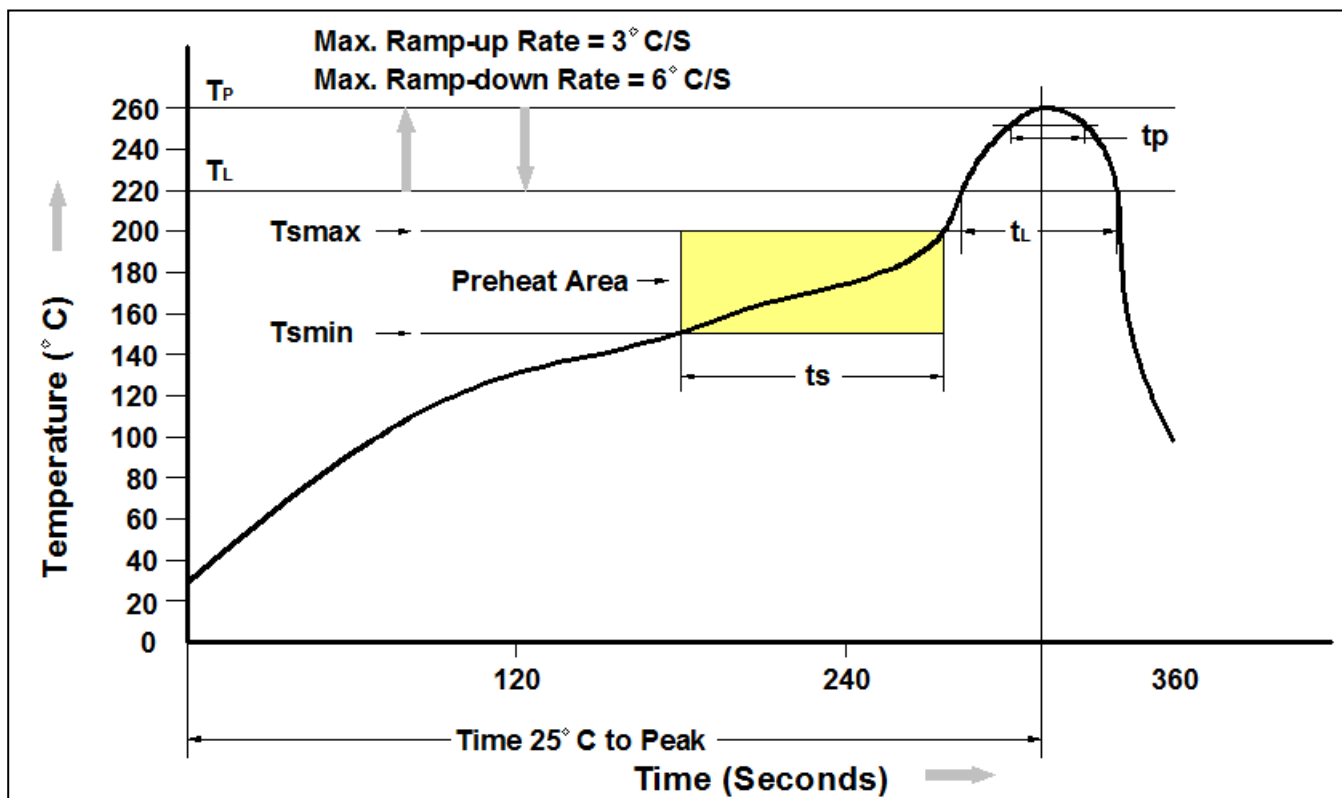
Input Direction
→





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H11A1, H11A2, H11A3, H11A4, H11A5
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Reflow Profile



| Profile Feature | Pb-Free Assembly Profile |
|---|--------------------------|
| Temperature Min. (T _{smin}) | 150 °C |
| Temperature Max. (T _{smax}) | 200 °C |
| Time (t _s) from (T _{smin} to T _{smax}) | 60-120 seconds |
| Ramp-up Rate (t _L to t _P) | 3 °C/second max. |
| Liquidous Temperature (T _L) | 217 °C |
| Time (t _L) Maintained Above (T _L) | 60 – 150 seconds |
| Peak Body Package Temperature | 260 °C +0 °C / -5 °C |
| Time (t _P) within 5 °C of 260 °C | 30 seconds |
| Ramp-down Rate (T _P to T _L) | 6 °C/second max |
| Time 25 °C to Peak Temperature | 8 minutes max. |



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H11A1, H11A2, H11A3, H11A4, H11A5
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