



H11L1, H11L1V



DESCRIPTION

The H11L1 (UL Approval) and H11L1V (UL and VDE Approvals) devices each consist of a GaAs infrared emitting diode optically coupled to a high speed open collector output integrated Microprocessor compatible Schmitt Trigger detector, which provides hysteresis for noise immunity and pulse shaping.

FEATURES

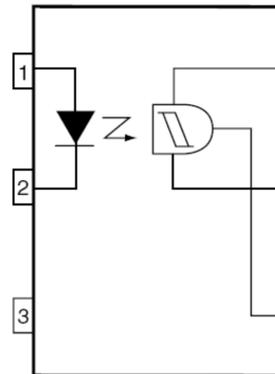
- High Data Rate, 1MHz typical (NRZ)
- Free from Latch Up and Oscillation
- Microprocessor Compatible Drive
- Logical Compatible Output sinks 16mA at 0.4V maximum
- Guaranteed On/Off Threshold Hysteresis
- Wide Supply Voltage Capability, compatible with all popular Logic Systems
- Operating Voltage Range V_{CC} 3V to 16V
- Operating Temperature Range - 55°C to +100°C
- High AC Isolation voltage 5000V_{RMS}
- Lead Free and RoHS Compliant
- UL Approval Certificate E91231
- VDE Approval Certificate 40044376

APPLICATIONS

- Logic to Logic isolator
- Line Receiver - eliminate noise and transient problems
- Programmable Current Level Sensor
- AC to TTL Conversion - Square Wave Shaping
- Power Supply Digital Programming
- Computer Peripherals Interface

ORDER INFORMATION

- Add G after PN for 10mm lead spacing
- Add SM after PN for Surface Mount
- Add SMT&R after PN for Surface Mount Tape & Reel



- 1 Anode
- 2 Cathode
- 3 NC
- 4 V_O
- 5 GND
- 6 V_{CC}

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Stresses exceeding the absolute maximum ratings can cause permanent damage to the device. Exposure to absolute maximum ratings for long periods of time can adversely affect reliability.

Input

| | |
|-------------------|-------|
| Forward Current | 60mA |
| Reverse Voltage | 6V |
| Power dissipation | 120mW |

Output

| | |
|-------------------|----------|
| Output Current | 50mA |
| Output Voltage | 3 to 16V |
| Supply Voltage | 0 to 16V |
| Power Dissipation | 150mW |

Total Package

| | |
|----------------------------------|----------------------|
| Isolation Voltage | 5000V _{RMS} |
| Total Power Dissipation | 250mW |
| Operating Temperature | -55 to 100°C |
| Storage Temperature | -55 to 125°C |
| Lead Soldering Temperature (10s) | 260°C |

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Truth Table

| LED | V _o |
|-----|----------------|
| ON | LOW |
| OFF | HIGH |

ELECTRICAL CHARACTERISTICS (T_A = 25°C, unless otherwise specified. Typical Values at T_A = 25°C)

INPUT

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|-------------------|-----------------|-----------------------|-----|------|-----|------|
| Forward Voltage | V _F | I _F = 10mA | | 1.15 | 1.5 | V |
| Reverse Current | I _R | V _R = 5V | | | 10 | μA |
| Input Capacitance | C _{IN} | V = 0V, f = 1MHz | | | 100 | pF |

OUTPUT

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---------------------------|----------------------|--|-----|------|-----|------|
| Operating Voltage | V _{CC} | | 3 | | 15 | V |
| Supply Current | I _{CC(off)} | V _{CC} = 5V, I _F = 0mA | | 1.6 | 5 | mA |
| High Level Output Current | I _{OH} | I _F = 0mA, V _{CC} = V _O = 15V | | | 100 | μA |

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ELECTRICAL CHARACTERISTICS (T_A = 25°C, unless otherwise specified, Typical Values at T_A = 25°C)

COUPLED

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|----------------------------|---|--|-----|------|-----|------|
| Supply Current | I _{CC(on)} | V _{CC} = 5V, I _F = 10mA | | 1.6 | 5 | mA |
| Low Level Output Voltage | V _{OL} | V _{CC} = 5V, I _F = I _{F(on)} (max), R _L = 270Ω | | | 0.4 | V |
| Turn-On Threshold Current | I _{F(on)} | V _{CC} = 5V, R _L = 270Ω | | | 1.6 | mA |
| Turn-Off Threshold Current | I _{F(off)} | V _{CC} = 5V, R _L = 270Ω | | 1 | | mA |
| Hysteresis Ratio | I _{F(off)} /I _{F(on)} | V _{CC} = 5V, R _L = 270Ω | 0.5 | | 0.9 | |
| Turn-On Time | t _(on) | V _{CC} = 5V, I _F = I _{F(on)} (max), R _L = 270Ω | | | 4 | μs |
| Fall Time | t _f | | | 0.1 | | |
| Turn-Off Time | t _(off) | | | | 4 | |
| Rise Time | t _r | | | 0.1 | | |

ISOLATION

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|----------------------|------------------|--|------------------|------|-----|------------------|
| Isolation Voltage | V _{ISO} | R.H. = 40% to 60%, t = 1 min, Note 1 | 5000 | | | V _{RMS} |
| Isolation Resistance | R _{ISO} | V _{L-O} = 500VDC R.H. = 40% to 60% | 10 ¹¹ | | | Ω |

Note 1 : Measured with input leads shorted together and output leads shorted together.



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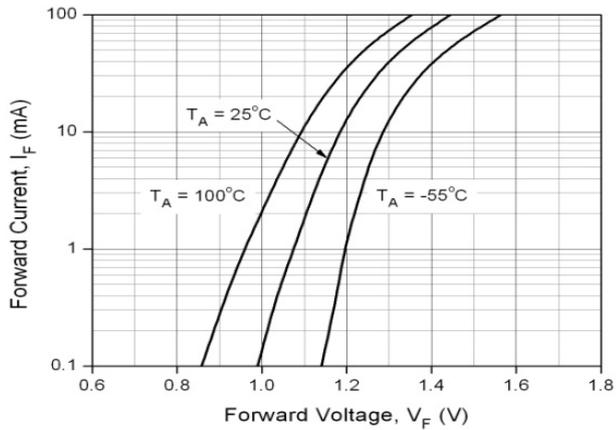


Fig 1 Forward Current vs Forward Voltage

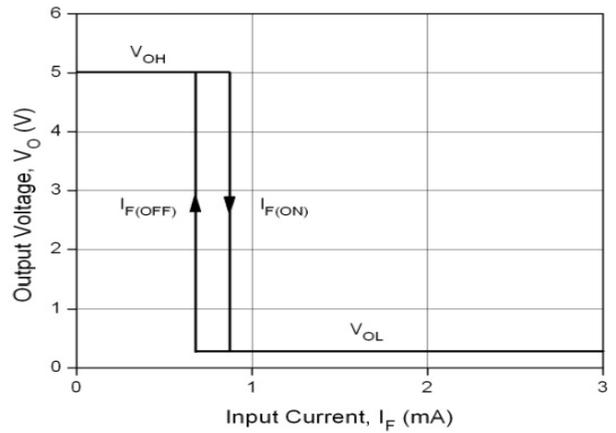


Fig 2 Transfer Characteristics

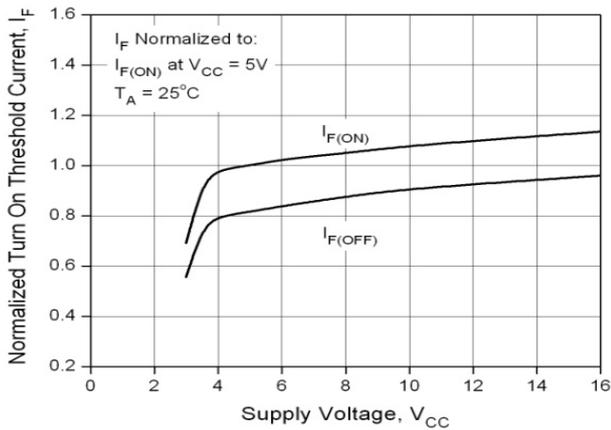


Fig 3 Normalized Turn-On Current vs Supply Voltage

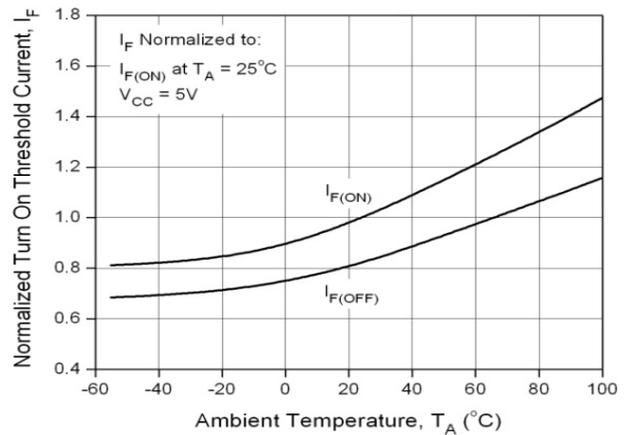


Fig 4 Normalized Turn-On Current vs Ambient temperature

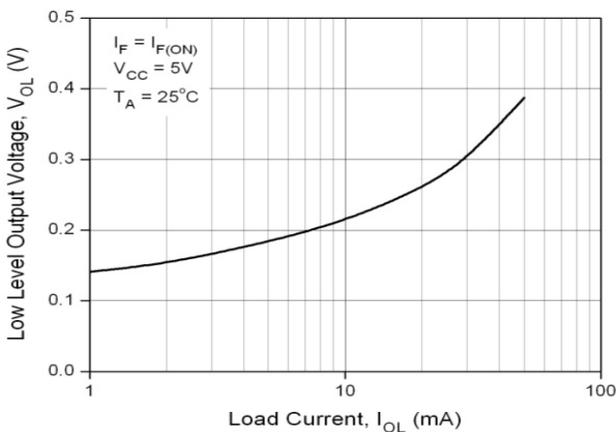


Fig 5 Low Level Output Voltage vs Load Current

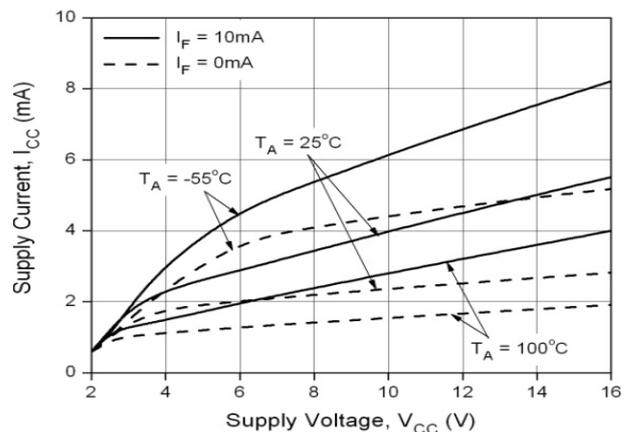
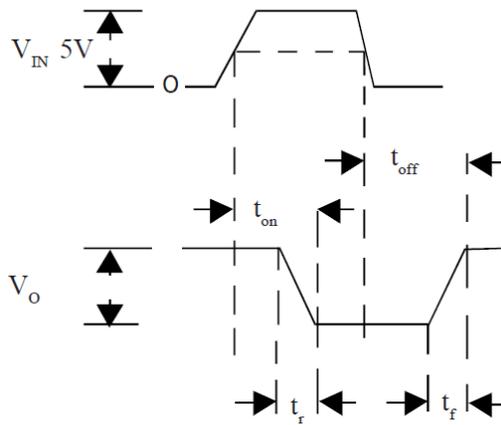
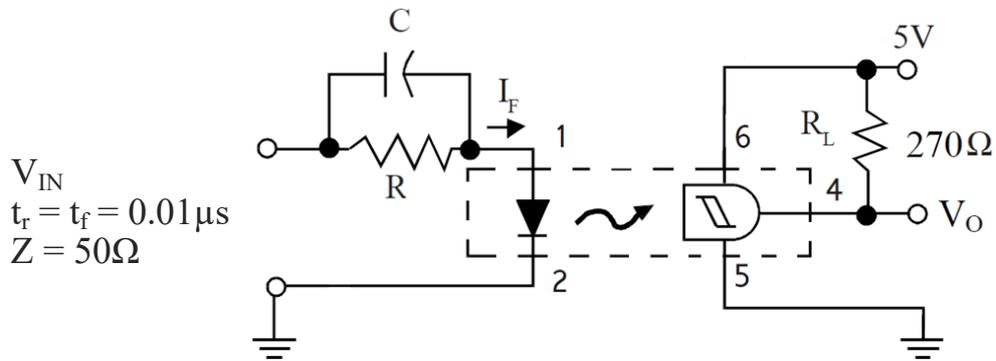


Fig 6 Supply Current vs Supply Voltage

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Switching Time Test Circuit and Waveform

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ORDER INFORMATION

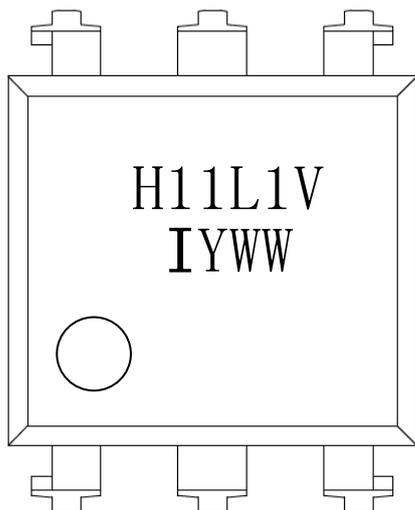
| H11L1 (UL Approval) | | | |
|---------------------|------------|---------------------------|-------------------|
| After PN | PN | Description | Packing quantity |
| None | H11L1 | Standard DIP6 | 65 pcs per tube |
| G | H11L1G | 10mm Lead Spacing | 65 pcs per tube |
| SM | H11L1SM | Surface Mount | 65 pcs per tube |
| SMT&R | H11L1SMT&R | Surface Mount Tape & Reel | 1000 pcs per reel |

| H11L1V (UL Approval and VDE Approvals) | | | |
|--|-------------|---------------------------|-------------------|
| After PN | PN | Description | Packing quantity |
| None | H11L1V | Standard DIP6 | 65 pcs per tube |
| G | H11L1VG | 10mm Lead Spacing | 65 pcs per tube |
| SM | H11L1VSM | Surface Mount | 65 pcs per tube |
| SMT&R | H11L1VSMT&R | Surface Mount Tape & Reel | 1000 pcs per reel |

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DEVICE MARKING

Example : H11L1V



H11L1V Device Part Number

I Isocom

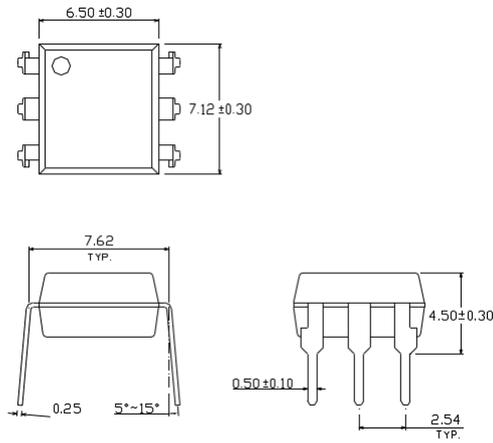
Y 1 digit Year code

WW 2 digit Week code

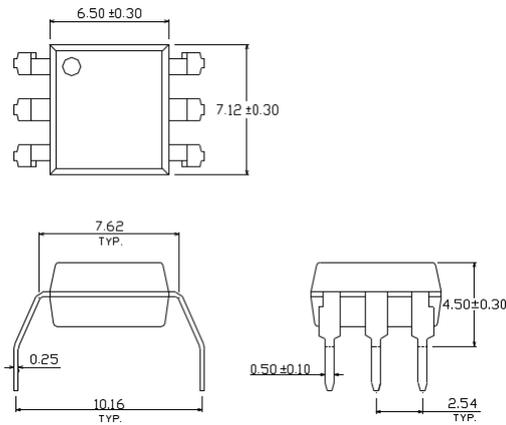
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PACKAGE DIMENSIONS in mm (inch)

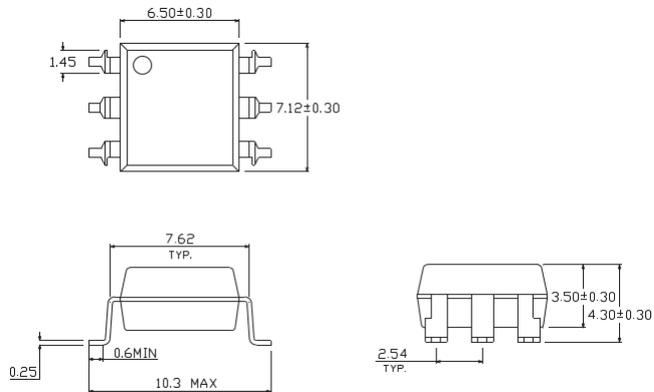
DIP



G Form



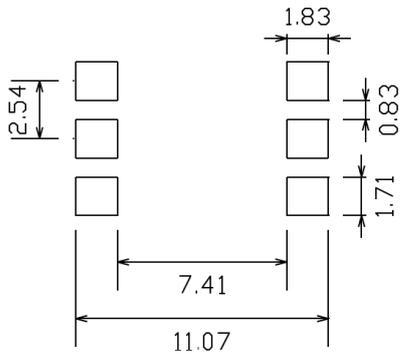
SMD



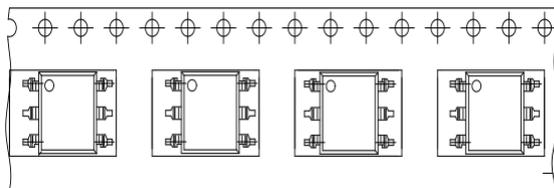


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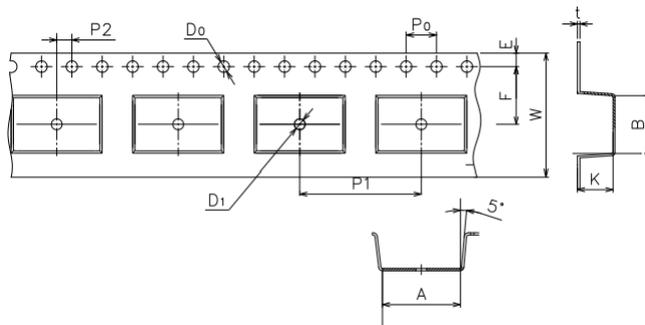
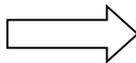
RECOMMENDED PAD LAYOUT FOR SMD (mm)



TAPE AND REEL PACKAGING



Direction of feed from reel

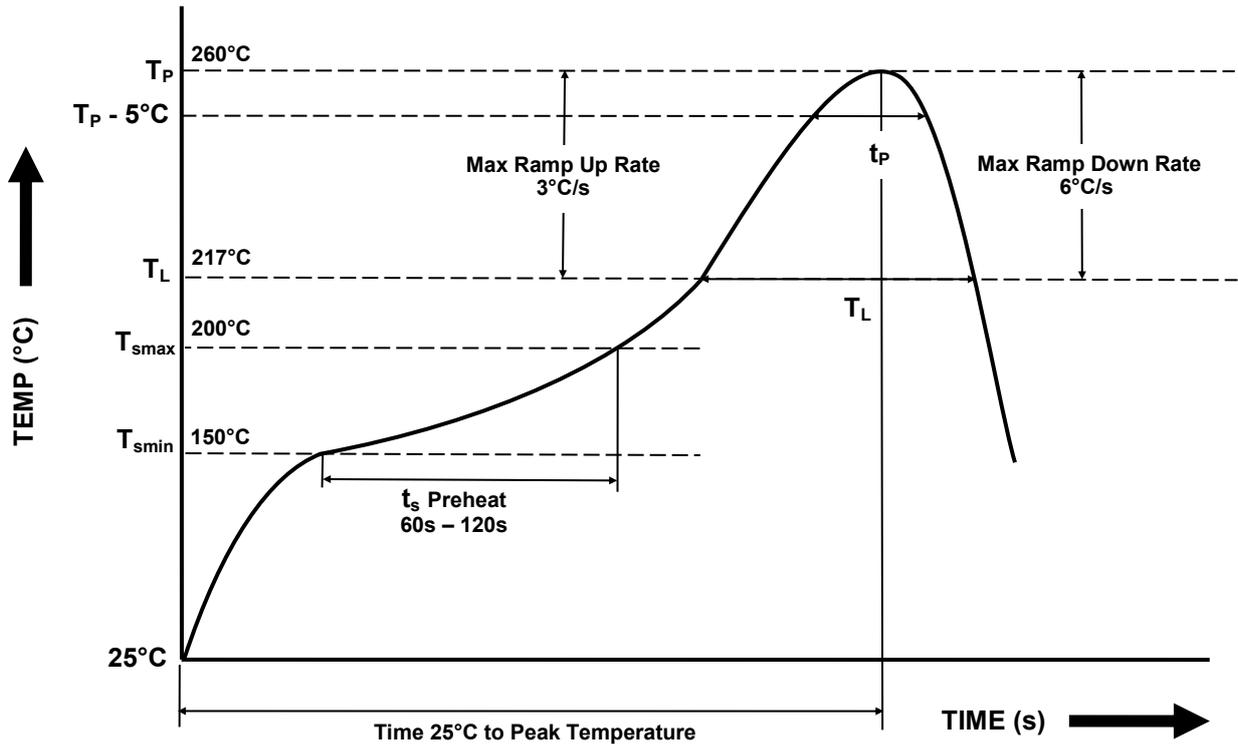


| | | | | | | |
|----------------|-----------|-----------|-----------|------------|----------|----------|
| Dimension No. | A | B | Do | D1 | E | F |
| Dimension(mm) | 10.8±0.1 | 7.55±0.1 | 1.5±0.1 | 1.5+0.1/-0 | 1.75±0.1 | 7.5±0.1 |
| Dimension No. | Po | P1 | P2 | t | W | K |
| Dimension (mm) | 4.0±0.15 | 12.0±0.1 | 2.0±0.1 | 0.35±0.03 | 16.0±0.2 | 4.5±0.1 |



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IR REFLOW SOLDERING TEMPERATURE PROFILE
(One Time Reflow Soldering is Recommended)



| Profile Details | Conditions |
|---|--|
| Preheat - Min Temperature (T_{SMIN}) - Max Temperature (T_{SMAX}) - Time T_{SMIN} to T_{SMAX} (t_s) | 150°C 200°C 60s - 120s |
| Soldering Zone - Peak Temperature (T_P) - Time at Peak Temperature - Liquidous Temperature (T_L) - Time within 5°C of Actual Peak Temperature ($T_P - 5^\circ C$) - Time maintained above T_L (t_L) - Ramp Up Rate (T_L to T_P) - Ramp Down Rate (T_P to T_L) | 260°C 10s max 217°C 30s max 60s - 100s 3°C/s max 6°C/s max |
| Average Ramp Up Rate (T_{smax} to T_P) | 3°C/s max |
| Time 25°C to Peak Temperature | 8 minutes max |



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