

#### 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 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<sub>cc</sub> 3V to 16V
- Operating Temperature Range
   55°C to +100°C
- High AC Isolation voltage 5000V<sub>RMS</sub>
- Lead Free and RoHS Compliant
- UL Approval Certificate E91231
- VDE Approval Certificate 40044376

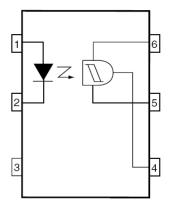
#### **APPLICATIONS**

- 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<sub>O</sub>
- 5 GND
- $6 V_{CC}$

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

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	16V
Supply Voltage	16V
Power Dissipation	150mW

#### Total Package

Isolation Voltage	$5000V_{\text{RMS}}$
Total Power Dissipation	250mW
Operating Temperature	-55 to 100 °C
Storage Temperature	-55 to 150 °C
Lead Soldering Temperature (10s)	260°C

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### **Truth Table**

LED	Vo
ON	LOW
OFF	HIGH

## **ELECTRICAL CHARACTERISTICS** ( $T_A = 25^{\circ}C$ , unless otherwise specified. Typical Values at $T_A = 25^{\circ}C$ )

### **INPUT**

Parameter	Symbol	Test Condition	Min	Тур.	Max	Unit
Forward Voltage	$V_{\mathrm{F}}$	$I_F = 10 \text{mA}$		1.15	1.5	V
Reverse Current	$I_R$	$V_R = 5V$			10	μΑ
Terminal Capacitance	$C_{IN}$	V = 0V, $f = 1MHz$		33		pF

### **OUTPUT**

Parameter	Symbol	Test Condition	Min	Тур.	Max	Unit
Operating Voltage	$V_{CC}$		3		15	V
Supply Current	$I_{\text{CC(off)}}$	$V_{CC} = 5V$ , $I_F = 0mA$		1.6	5	mA
High Level Output Current	І <sub>ОН</sub>	$I_F = 0 \text{mA}, V_{CC} = V_O = 15 \text{V}$			100	μΑ



## **ELECTRICAL CHARACTERISTICS** ( $T_A = 25^{\circ}C$ , unless otherwise specified, Typical Values at $T_A = 25^{\circ}C$ )

### **COUPLED**

Parameter	Symbol	Test Condition	Min	Тур.	Max	Unit
Supply Current	I <sub>CC(on)</sub>	$V_{CC} = 5V, I_F = 10mA$		1.6	5	mA
Low Level Output Voltage	$V_{OL}$	$V_{CC} = 5V$ , $I_F = I_{F(on)}$ (max), $R_L = 270\Omega$			0.4	V
Turn-On Threshold Current	$I_{F(on)}$	$V_{CC} = 5V, R_L = 270\Omega$			1.6	mA
Turn-Off Threshold Current	$I_{F(off)}$	$V_{CC} = 5V$ , $R_L = 270\Omega$		1		mA
Hysteresis Rtio	$I_{F(off)}/I_{F(on)}$	$V_{CC} = 5V, R_L = 270\Omega$	0.5		0.9	
Turn-On Time	t <sub>(on)</sub>	$V_{CC} = 5V$ , $I_F = I_{F(on)}$ (max),			4	μs
Fall Time	$t_{\mathrm{f}}$	$R_L = 270\Omega$		0.1		
Turn-Off Time	$t_{(off)}$				4	
Rise Time	t <sub>r</sub>			0.1		

### **ISOLATION**

Parameter	Symbol	Test Condition	Min	Тур.	Max	Unit
Isolation Voltage	$V_{\rm ISO}$	R.H. = 40% to 60%, t = 1 min, Note 1	5000			$V_{RMS}$
Input - Output Resistance	R <sub>I-O</sub>	$V_{I-O} = 500 VDC$ R.H. = 40% to 60%	10 <sup>11</sup>			Ω

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



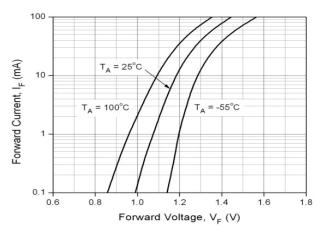


Fig 1 Forward Current vs Forward Voltage

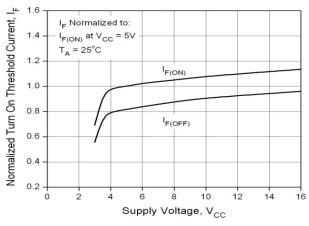


Fig 3 Normalized Turn-On Current vs Supply Voltage

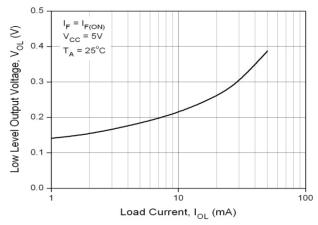


Fig 5 Low Level Output Voltage vs Load Current

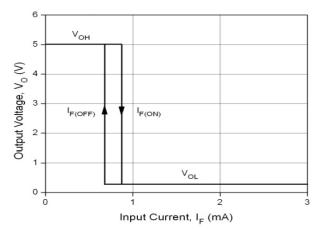


Fig 2 Transfer Characteristics

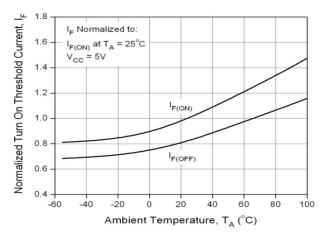


Fig 4 Normalized Turn-On Current vs Ambient temperature

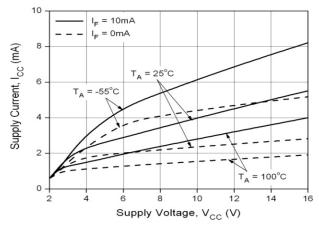
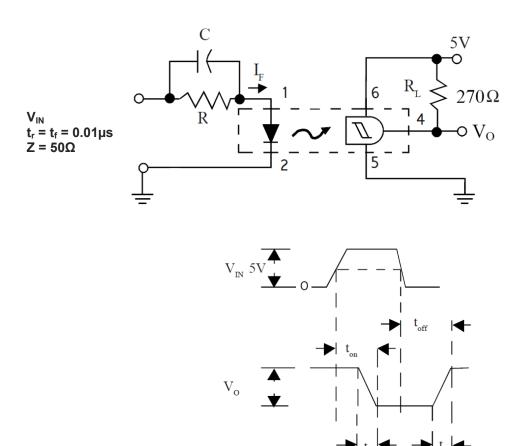


Fig 6 Supply Current vs Supply Voltage





**Switching Time Test Circuit and Waveform** 



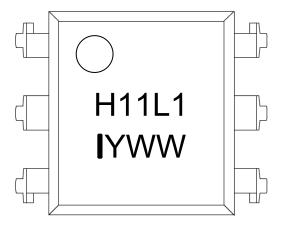
### **ORDER INFORMATION**

	H11L1 (UL Approval)						
After PN	PN Description Packing qua						
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 qua						
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				



### **DEVICE MARKING**



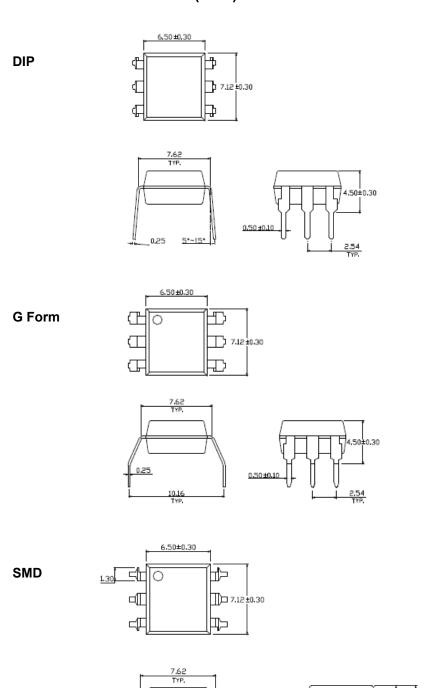
H11L1 denotes Device Part Number (H11L1 as example)

I denotes Isocom

Y denotes 1 digit Year code WW denotes 2 digit Week code



## **PACKAGE DIMENSIONS in mm (inch)**



0.6MIN

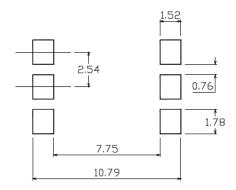
10.30 MAX

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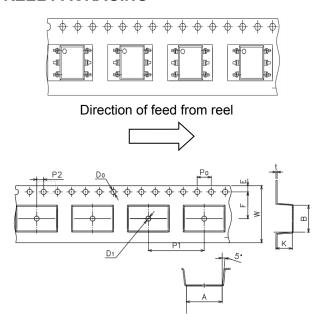
3.50 ±0.30 4.30 ±0.30



## **RECOMMENDED PAD LAYPUT FOR SMD (mm)**



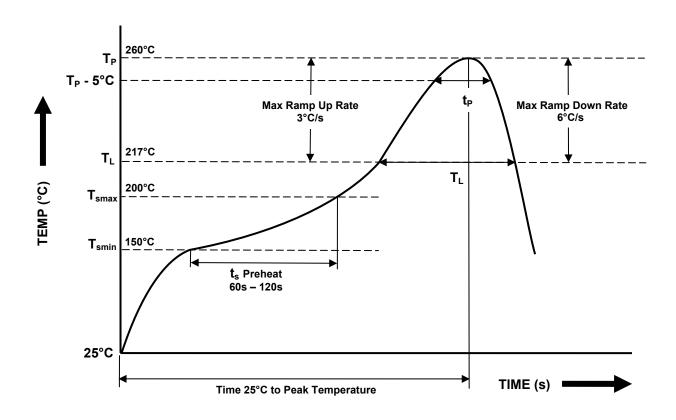
### **TAPE AND REEL PACKAGING**



Dimension No.	Α	В	Do	D1	E	F
Dimension( mm)	10.4±0.1	7.5±0.1	1.5±0.1	1.5+0.1/-0	1.75±0.1	7.5±0.1
Dimension No.	Ро	P1	P2	t	w	К
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



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



Profile Details	Conditions
$ \begin{array}{l} \textbf{Preheat} \\ \textbf{- Min Temperature } (T_{SMIN}) \\ \textbf{- Max Temperature } (T_{SMAX}) \\ \textbf{- Time } T_{SMIN} \ to \ T_{SMAX} \ (t_s) \end{array} $	150°C 200°C 60s - 120s
$\begin{tabular}{ll} \textbf{Soldering Zone} \\ - & \mbox{Peak Temperature } (T_P) \\ - & \mbox{Time at Peak Temperature} \\ - & \mbox{Liquidous Temperature } (T_L) \\ - & \mbox{Time within 5°C of Actual Peak Temperature } (T_P - 5°C) \\ - & \mbox{Time maintained above } T_L \ (t_L) \\ - & \mbox{Ramp Up Rate } (T_L \ to \ T_P) \\ - & \mbox{Ramp Down Rate } (T_P \ to \ T_L) \\ \end{tabular}$	260°C 10s max 217°C 30s max 60s - 100s 3°C/s max 6°C/s max
Average Ramp Up Rate (T <sub>smax</sub> to T <sub>P</sub> )	3°C/s max
Time 25°C to Peak Temperature	8 minutes max



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- The contents described herein are subject to change without prior notice.
- Do not immerse device body in solder paste.



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