T-41-89

Photon Coupled Isolator H11L1, H11L2, H11L3

Ga As Infrared Emitting Diode & Microprocessor Compatible Schmitt Trigger

The GE Solid State H11L series has a gallium arsenide, infrared emitting diode optically coupled across an isolating medium to a high speed integrated circuit detector. The output incorporates a Schmitt Trigger which provides hysteresis for noise immunity and pulse shaping. The detector circuit is optimized for simplicity of operation and utilizes an open collector output for maximum application flexibility. These devices are mounted in dual-in-line packages. These devices are also available in Surface-Mount packaging.

FEATURES

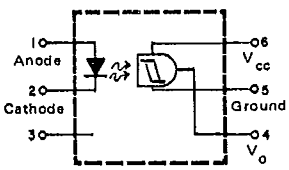
- Free from latch up and oscillation throughout voltage and temperature ranges
- High data rate, 1 MHz typical (NRZ)
- Microprocessor compatible drive
- Logic compatible output sinks 16 milliamperes at 0.4 volts maximum
- High isolation between input and output
- Guaranteed On/Off threshold hysteresis
- High common mode rejection ratio
- Fast switching: t_{rise}, t_{fall} = 100 nanoseconds typical
- Wide supply voltage capability, compatible with all popular logic systems

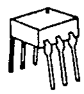
APPLICATIONS

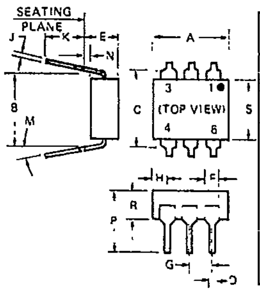
- Logic to logic isolator
- Programmable current level sensor
- Line receiver – eliminates noise and transient problems
- Logic level shifter – couples TTL to CMOS
- A.C. to TTL conversion – square wave shaping
- Digital programming of power supplies
- Interfaces computers with peripherals

MECHANICAL SPECIFICATIONS

- Plastic 6 PIN dual in line package, tin plated leads
- Lead orientation as shown:







SYMBOL	MILLIMETERS MIN.	MILLIMETERS MAX.	INCHES MIN.	INCHES MAX.	NOTES
A	8 38	8 89	330	350	
B	7 62 REF		300 REF.		1
C	–	8 64	–	340	2
D	406	508	016	020	
E	–	5 08	–	200	3
F	1 01	1 78	040	070	
G	2 28	2 80	090	110	
H	–	2 16	–	085	4
J	203	305	008	012	
K	2 54	–	100	–	
M	–	15	–	15	
N	381	–	015	–	
P	–	9 53	–	375	
R	2 92	3 43	115	135	
S	6 10	6 86	240	270	

NOTES
1 INSTALLED POSITION LEAD CENTERS
2 OVERALL INSTALLED DIMENSION
3 THESE MEASUREMENTS ARE MADE FROM THE SEATING PLANE 4 FOUR PLACES

absolute maximum ratings: (25°C)

INFRARED EMITTING DIODE		
Power Dissipation	*100	milliwatts
Forward Current (Continuous)	60	milliampere
Reverse Voltage	6	volts

*Derate 1.33 mW°C above 25°C ambient.

PHOTO DETECTOR		
Power Dissipation	**150	milliwatts
V_{45} Allowed Range	0 to 16	volts
V_{65} Allowed Range	0 to 16	volts
I_4 Output Current	50	milliampere

**Derate 2.0 mW/°C above 25°C ambient.

VDE Approved to 0883/6.80 0110b Certificate # 35025

TOTAL DEVICE
Storage Temperature -55°C to +150°C
Operating Temperature -55°C to +100°C
Lead Soldering Time (at 260°C) 10 seconds
Surge Isolation Voltage (Input to Output)
3535 $V_{(peak)}$ 2500 $V_{(RMS)}$
Steady-State Isolation Voltage (Input to Output)
3180$V_{(peak)}$ 2250$V_{(RMS)}$

UL Covered under U.L. component recognition program, reference file E51868

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electrical characteristics: (0-70°C)

INFRARED EMITTING DIODE		MIN.	TYP.	MAX.	UNITS	PHOTO DETECTOR		MIN.	TYP.	MAX.	UNITS
Forward Voltage	V_F					Operating Voltage Range	V_{CC}	3	–	15	volts
I_F = 10 mA		–	1.10	1.50	volts	Supply Current (I_F = 0, V_{CC} = 5V)	$I_{6(off)}$	–	1.0	5.0	milli-ampere
I_F = 0.3 mA		0.75	0.95	–	volts						
Reverse Current (V_R = 3V)	I_R	–	–	10	micro-ampere	Output Current, High (I_F = 0, V_{cc}=V_o=15V)	I_{OH}	–	–	100	micro-ampere
Capacitance (V = 0, f = 1 MHz)	C_J	–	–	100	picofarads						

coupled electrical characteristics (0-70°C)

			MIN.	TYP.	MAX.	UNITS
Supply Current (I_F =10mA, V_{CC} = 5V)	$I_{6(on)}$		–	1.6	5.0	milliampere
Output Voltage, Low (R_{64}= 270 Ω, V_{CC} = 5V, I_F=$I_{F(on)}$ Max)	V_{OL}		–	0.2	0.4	volts
Turn-On Threshold Current (R_{64}= 270 Ω, V_{CC} = 5V)	$I_{F(on)}$	H11L1	–	1.0	1.6	milliampere
		H11L2	–	6.0	10.0	milliampere
		H11L3	–	3.0	5.0	milliampere
Turn-Off Threshold Current (R_{64}= 270 Ω, V_{CC} = 5V)	$I_{F(off)}$		0.3	1.0	–	milliampere
Hysteresis Ratio (R_{64}= 270 Ω, V_{CC} = 5V)	$I_{F(off)}/I_{F(on)}$		0.50	0.75	0.90	–

switching characteristics (25°C) H11L1

SWITCHING SPEED		MIN.	TYP.	MAX.	UNITS
R_E = 1200Ω, C=0					
Turn- On Time	t_{on}	–	1.0	–	µsec.
Fall Time	t_f	–	0.1	–	µsec.
Turn- Off Time	t_{off}	–	2.0	–	µsec.
Rise Time	t_r	–	0.1	–	µsec.
R_E=1200Ω, C=270ρF, f≤100KHz, tp≥1µsec					
Turn-On Time	t_{on}	–	0.65	–	µsec.
Fall Time	t_f	–	0.05	–	µsec.
Turn-Off Time	t_{off}	–	1.20	–	µsec.
Rise Time	t_r	–	0.07	–	µsec.
Data Rate (NRZ)		–	1.0*	–	MHz
Overdrive Switching					
V_{IN} = 5V DC, R_E = 75 Ω, C=0, V_{CC} = 5V, R_L = 270 Ω					
Turn-Off Time	t_{off}	–	–	10	µsec.

*Maximum data rate will vary depending on the bias conditions and is usually highest when R_E and C are matched to $I_{F(on)}$ and V_{CC} is between 3 and 5V, with this optimized bias, most units will operate at over 1.5 MHz, NRZ.

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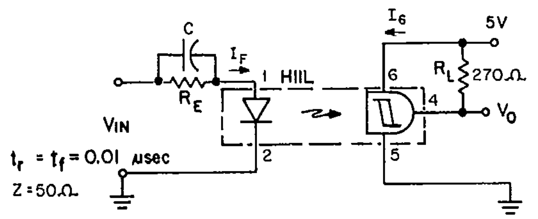
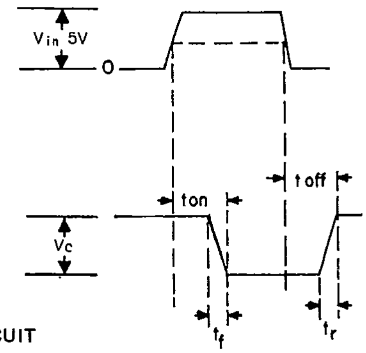
H11L1, H11L2, H11L3

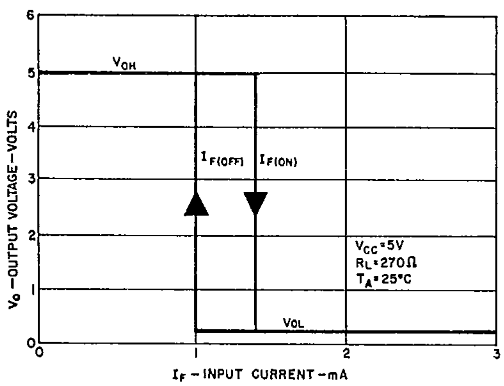
switching characteristics (25°C)



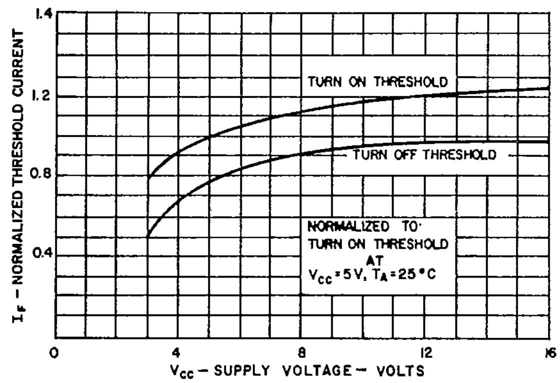


SWITCHING TEST CIRCUIT

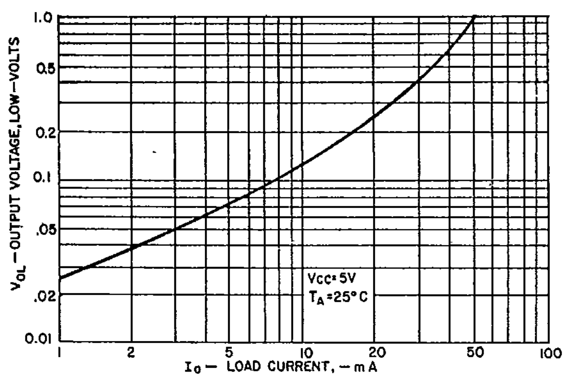
TYPICAL CHARACTERISTICS



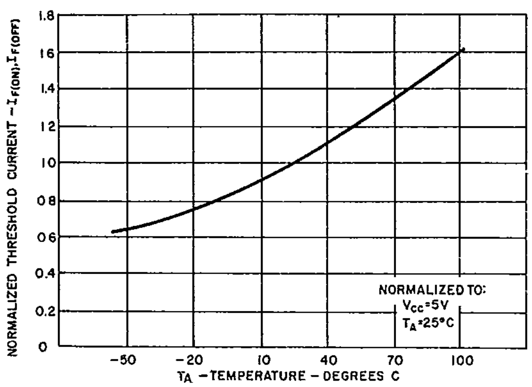
TRANSFER CHARACTERISTICS



THRESHOLD CURRENT VS. SUPPLY VOLTAGE



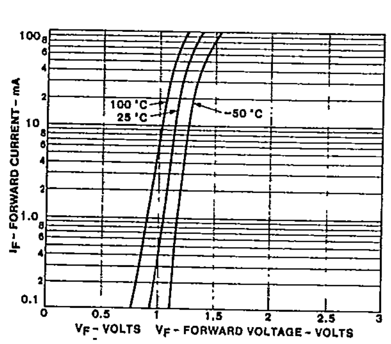
ON VOLTAGE VS. LOAD CURRENT



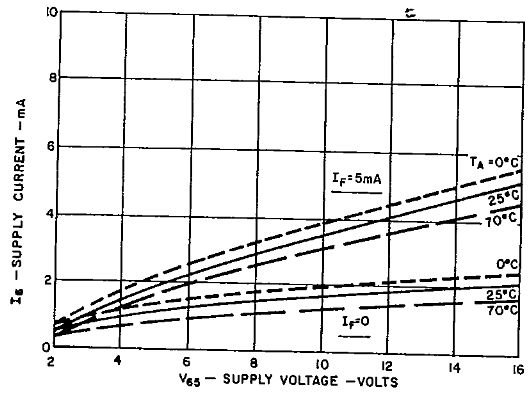
THRESHOLD CURRENTS VS. TEMPERATURE

2779 C-02

HARRIS SEMICOND SECTOR 37E D ■ 4302271 0027210 8 ■HAS

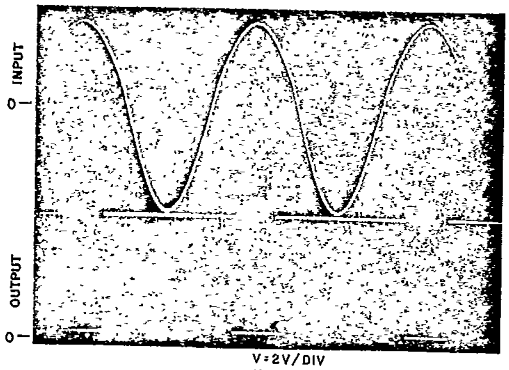


FORWARD VOLTAGE VS. FORWARD CURRENT



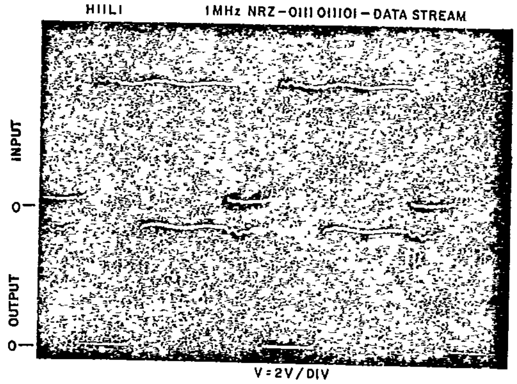
SUPPLY CURRENT VS. SUPPLY VOLTAGE

H11L1



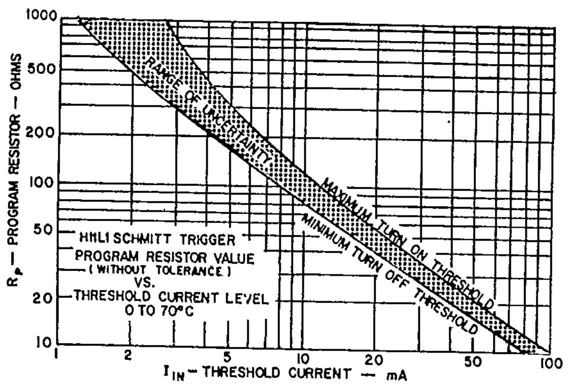
V=2V/DIV
H=5mS/DIV
R_L=270Ω
R_E=1200Ω
C=0

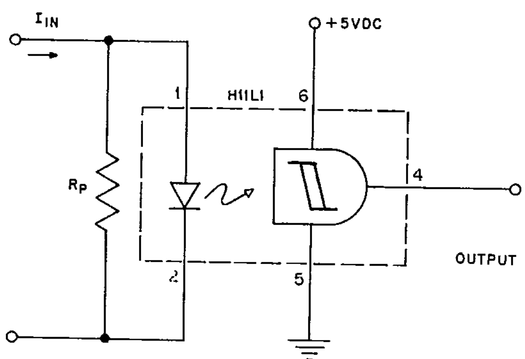
H11L1 1MHz NRZ-0111011101-DATA STREAM



V=2V/DIV
H=1μS/DIV
R_L=270Ω
R_E=1.2KΩ
C=270pf

TYPICAL APPLICATION





PROGRAMMABLE CURRENT
THRESHOLD SENSING CIRCUIT

PLEASE NOTE. THE INFORMATION INCLUDED IN THIS SPECIFICATION HAS BEEN CAREFULLY CHECKED AND IS BELIEVED TO BE RELIABLE, HOWEVER, NO RESPONSIBILITY IS ASSUMED FOR INACCURACIES.

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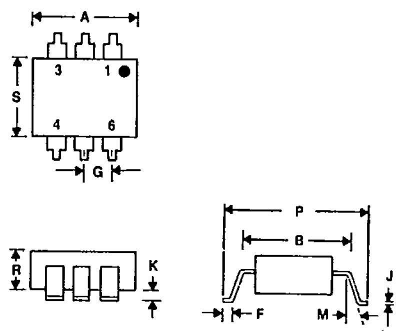
Surface-Mount Optoisolators



Surface-mount packaging for the entire 6-pin DIP opto-isolator line!

Add the "SMA" or "SMB" suffix to any 6-pin optoisolator part number when ordering.

DIMENSIONAL OUTLINE NO. 298
All Surface-Mount Types

SMB (Standard)
Surface-Mount Package

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	0.330	0.350	8.38	8.89	
B	0.330 REF		8.38 REF		
F	0.020	0.040	0.508	1.02	
J	0.008	0.012	0.203	0.305	
K	0.0040	0.0098	0.102	0.249	
M	—	15°	—	15°	
P	0.375	0.395	9.53	10.03	
R	0.115	0.135	2.92	3.43	
S	0.240	0.270	6.10	6.86	
Coplan-arity	0	0.002	0	0.051	1

92CS-42862

1. Coplanarity is the distance from a plane, defined by the end of the three longest legs to the end of the shortest leg.

SMA (Low Profile)
Surface-Mount Package

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	0.330	0.350	8.38	8.89	
B	0.330 REF		8.38 REF		
F	0.020	0.040	0.508	1.02	
J	0.008	0.012	0.203	0.305	
K	0.0005	0.0040	0.013	0.102	
M	—	15°	—	15°	
P	0.373	0.393	9.47	9.98	
R	0.115	0.135	2.92	3.43	
S	0.240	0.270	6.10	6.86	
Coplan-arity	0	0.002	0	0.051	1

92CS-42861

1. Coplanarity is the distance from a plane, defined by the end of the three longest legs to the end of the shortest leg.