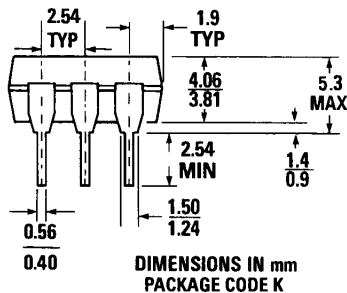
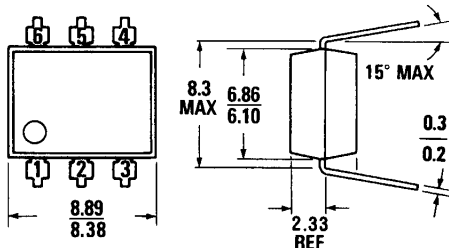




HIGH-SPEED AlGaAs SCHMITT TRIGGER OPTOCOUPLERS

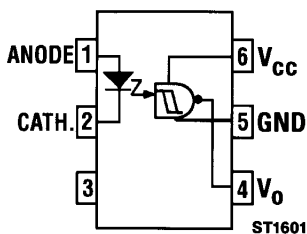
H11N1 H11N2 H11N3

PACKAGE DIMENSIONS



DIMENSIONS IN mm
PACKAGE CODE K

ST1603A



Equivalent Circuit

DESCRIPTION

The H11N series has a medium-to-high speed integrated circuit detector optically coupled to a gallium-aluminum-arsenide infrared emitting diode. 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.

FEATURES & APPLICATIONS

- High data rate, 5 MHz typical (NRZ)
- Free from latch up and oscillation throughout voltage and temperature ranges
- Microprocessor compatible drive
- Logic compatible output sinks 16 mA at 0.5 V maximum
- Guaranteed on/off threshold hysteresis
- High common mode transient immunity 2000 V/ μ s minimum
- Fast switching: t_r , t_f = 10 ns typical
- Wide supply voltage capability, compatible with all popular logic systems
- Underwriters Laboratory (UL) recognized — file #E90700
- 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
- Isolated power MOS driver for power supplies
- Interfaces computers with peripherals

ABSOLUTE MAXIMUM RATINGS

TOTAL PACKAGE

Storage temperature -55°C to 125°C
Operating temperature -25°C to 85°C
Lead solder temperature 260°C for 10 sec

INPUT DIODE

Power dissipation (25°C ambient) 50 mW
Derate linearly (above 70°C) $1.67\text{ mW}/^{\circ}\text{C}$
Continuous forward current 30 mA
Peak forward current
($300\mu\text{s}$ pulse, 2% duty cycle) 50 mA
Reverse voltage 6 V

DETECTOR

Power dissipation (at 25°C ambient) 150 mW
Derate linearly (above 25°C ambient) $5\text{ mW}/^{\circ}\text{C}$
 V_{as} allowed range 0 to 16 V
 V_{es} allowed range 0 to 16 V
 I_o output current 50 mA



HIGH-SPEED AlGaAs SCHMITT TRIGGER OPTOCOUPLEDERS

ELECTRICAL CHARACTERISTICS ($T_A = 0-70^\circ\text{C}$ Unless Otherwise Specified) Note 1

INDIVIDUAL COMPONENT CHARACTERISTICS



PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
SWITCHING SPEED (Figures 7&8)						
Propagation delay, high to low	t_{PHL}		150	330	ns	C=120 pF, $t_p=1\ \mu s$, R_E : Note 4
Rise time	t_r		10		ns	C=120 pF, $t_p=1\ \mu s$, R_E : Note 4
Propagation delay, low to high	t_{PLH}		150	330	ns	C=120 pF, $t_p=1\ \mu s$, R_E : Note 4
Fall time	t_f		15		ns	C=120 pF, $t_p=1\ \mu s$, R_E : Note 4
Data rate			5		MHz	Note 3
OVERDRIVE SWITCHING (FIGURES 7&8), NOTE 2						
Turn-off time	t_{off}		0.2	0.5	μs	C=O, $R_L=270\ \Omega$, I_E (MAX) H11N1: 5 mA H11N2: 10 mA H11N3: 20 mA
TRANSIENT IMMUNITY (FIGURE 9)						
Common mode transient immunity	CM _{ri}	±2000	±10000		V/ μs	V _{pk} =50 V, V _{cc} =5 V, R _L =270 Ω , I _E =0
Common mode transient immunity	CM _L	±2000	±10000		V/ μs	V _{pk} =50 V, V _{cc} =5 V, R _L =270 Ω , I _E =0

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Surge isolation voltage	V_{ISO}	7500			V_{PEAK}	1 Minute
Surge isolation voltage	V_{ISO}	5300			V_{RMS}	1 Minute

1. All measurements are with 100nF bypass capacitor from pin 6 to pin 5.
2. Steady overdrive increases t_{sh} . Use of a large R_C and a small C as in figure 7 is preferred over overdrive current.
3. Maximum t_{sh} is at $I_{sh} = 0$. Use of decreasing I_{sh} at the bias level I_{sh} and is usually highest when R_C and C are matched to I_{sh} and V_{sh} is between 5 and 75V.

TYPICAL CHARACTERISTICS

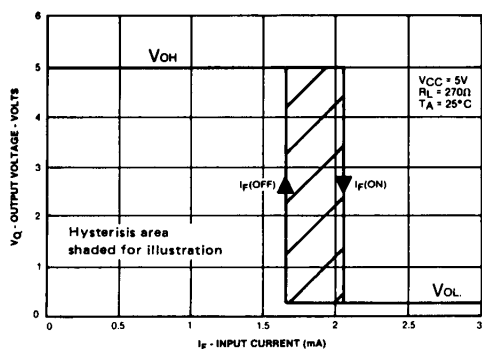


Figure 1. Transfer characteristics ST2022

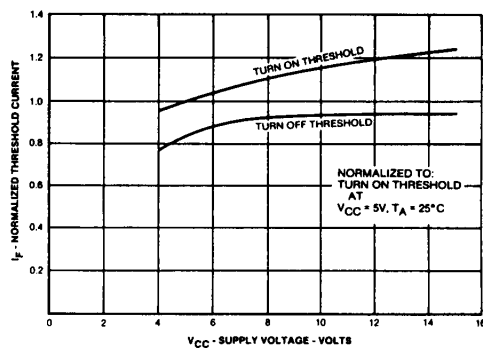


Figure 2. Threshold current vs. supply voltage ST2023

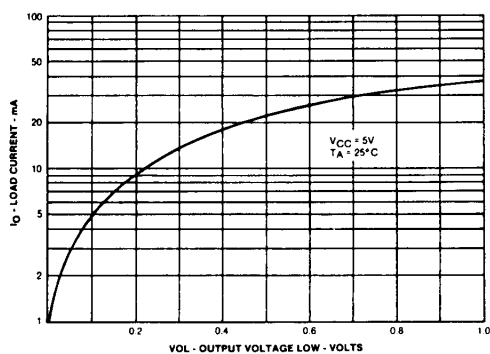


Figure 3. ON voltage vs. current ST2024

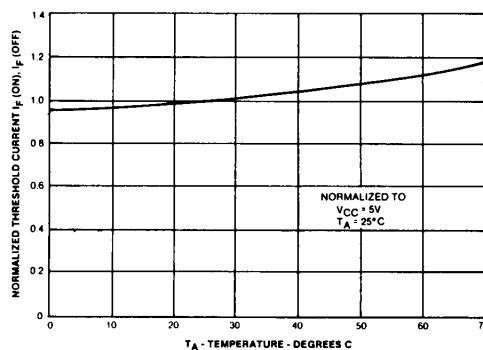


Figure 4. Threshold current vs. temperature ST2025

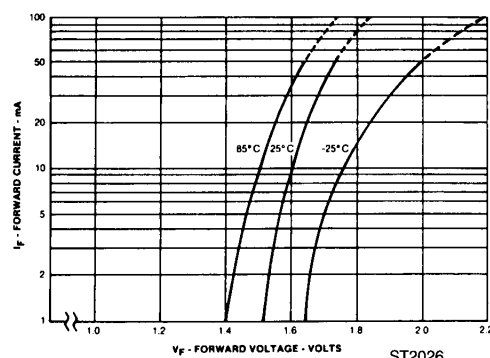


Figure 5. Forward voltage vs. forward current ST2026

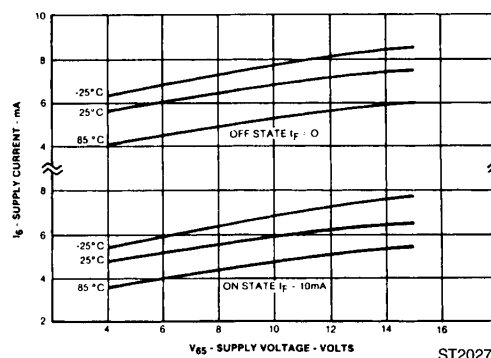
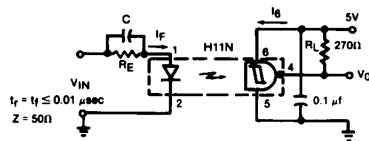


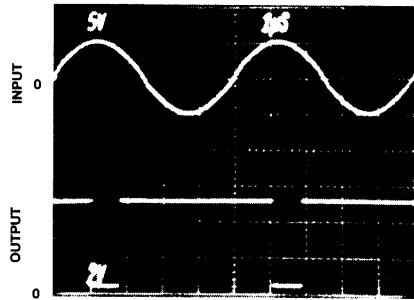
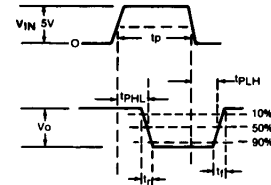
Figure 6. Supply current vs. supply voltage ST2027

TYPICAL CHARACTERISTICS

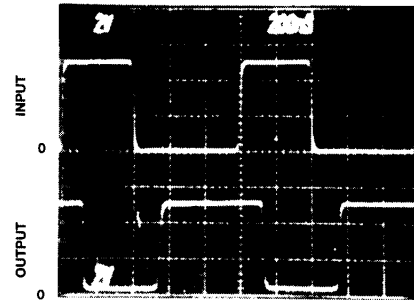


ST2028

Figure 7. Switching test circuit

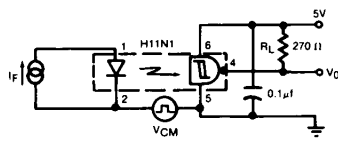


ST2029



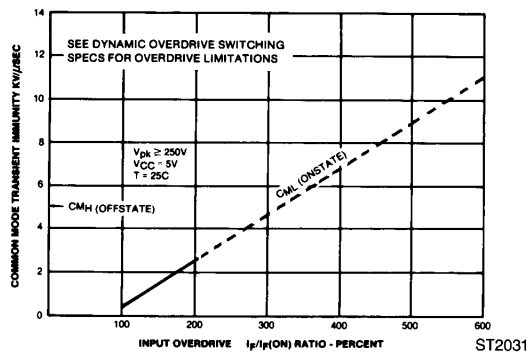
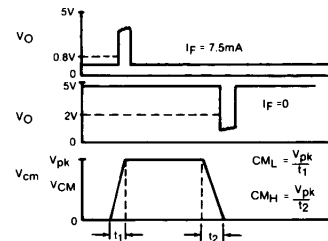
R_E = 910 Ω
C = 120 pF

Figure 8. Switching test waveforms



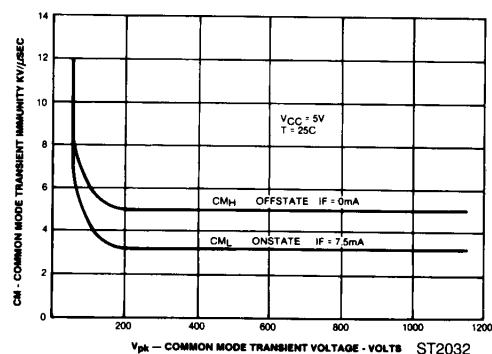
ST2030

Figure 9. Common-mode transient immunity, test circuit and voltage waveforms



ST2031

Figure 10. CM_L and CM_H input current



ST2032

Figure 11. CM_L and CM_H vs. common-mode transient voltage