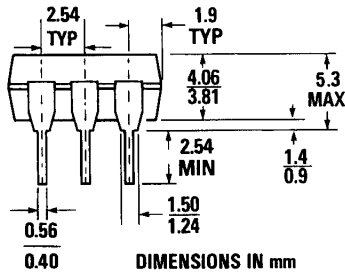
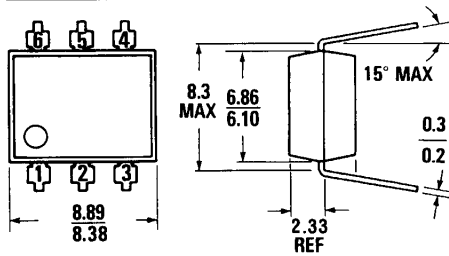
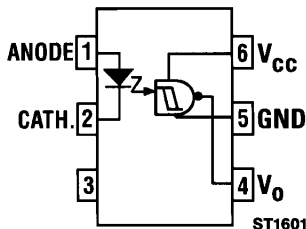


PACKAGE DIMENSIONS



DIMENSIONS IN mm
PACKAGE CODE K

ST1603A



Equivalent Circuit

DESCRIPTION

The H11L series has a medium-to-high speed integrated circuit detector optically coupled to a gallium-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

- High data rate, 1 MHz typical (NRZ)
- Free from latch up and oscillation throughout voltage and temperature ranges.
- Microprocessor compatible drive
- Logic compatible output sinks 16 mA at 0.4 V maximum
- Guaranteed on/off threshold hysteresis
- High common mode rejection ratio
- Fast switching: $t_r, t_f=100$ ns typical
- Wide supply voltage capability, compatible with all popular logic systems
- Underwriters Laboratory (UL) recognized — file #E90700

APPLICATIONS

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

ABSOLUTE MAXIMUM RATINGS

TOTAL PACKAGE

Storage temperature -55°C to 150°C
 Operating temperature -55°C to 100°C
 Lead solder temperature 260°C for 10 sec

INPUT DIODE

Power dissipation (25°C ambient) 100 mW
 Derate linearly (above 25°C ambient) 1.33 mW/ $^{\circ}\text{C}$
 Continuous forward current 60 mA
 Peak forward current ($1\ \mu\text{s}$ pulse, 300pps) 3 A
 Reverse voltage 6 V

DETECTOR

Power dissipation (at 25°C ambient) 150 mW
 Derate linearly (above 25°C ambient) 2 mW/ $^{\circ}\text{C}$
 V_{45} allowed range 0 to 16 V
 V_{65} allowed range 0 to 16 V
 I_o output current 50 mA

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

INDIVIDUAL COMPONENT CHARACTERISTICS

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNITS | TEST CONDITIONS |
|-------------------------|--------------|------|------|------|---------------|--|
| INPUT DIODE | | | | | | |
| Forward voltage | V_F | | 1.1 | 1.5 | V | $I_f = 10 \text{ mA}$ |
| | V_F | 0.75 | 0.95 | | V | $I_f = 0.3 \text{ mA}$ |
| Reverse current | I_R | | | 10 | μA | $V_R = 3 \text{ V}$ |
| Capacitance | C_J | | | 100 | pF | $V = 0, f = 1 \text{ MHz}$ |
| OUTPUT DETECTOR | | | | | | |
| Operating voltage range | V_{CC} | 3 | | 15 | V | |
| Supply current | $I_{c(off)}$ | | 1.0 | 5.0 | mA | $I_e = 0, V_{CC} = 5 \text{ V}$ |
| Output current, high | I_{OH} | | | 100 | μA | $I_e = 0, V_{CC} = V_O = 15 \text{ V}$ |

TRANSFER CHARACTERISTICS

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNITS | TEST CONDITIONS |
|----------------------------|--------------------------|------|------|------|-------|--|
| Supply current | $I_{e(on)}$ | | 1.6 | 5 | mA | $I_e = 10 \text{ mA}, V_{CC} = 5 \text{ V}$ |
| Output voltage, low | V_{OL} | | 0.2 | 0.4 | V | $R_L = 270 \Omega, V_{CC} = 5 \text{ V}, I_e = I_{F(on)} \text{ max.}$ |
| Turn-on threshold current | (H11L1) $I_{F(on)}$ | | 1.0 | 1.6 | mA | $R_L = 270 \Omega, V_{CC} = 5 \text{ V}$ |
| | (H11L2) $I_{F(on)}$ | | 6.0 | 10.0 | mA | $R_L = 270 \Omega, V_{CC} = 5 \text{ V}$ |
| | (H11L3) $I_{F(on)}$ | | 3.0 | 5.0 | mA | $R_L = 270 \Omega, V_{CC} = 5 \text{ V}$ |
| Turn-off threshold current | $I_{F(off)}$ | 0.3 | 1.0 | | mA | $R_L = 270 \Omega, V_{CC} = 5 \text{ V}$ |
| Hysteresis ratio | $I_{F(off)} / I_{F(on)}$ | 0.50 | 0.75 | 0.90 | | $R_L = 270 \Omega, V_{CC} = 5 \text{ V}$ |

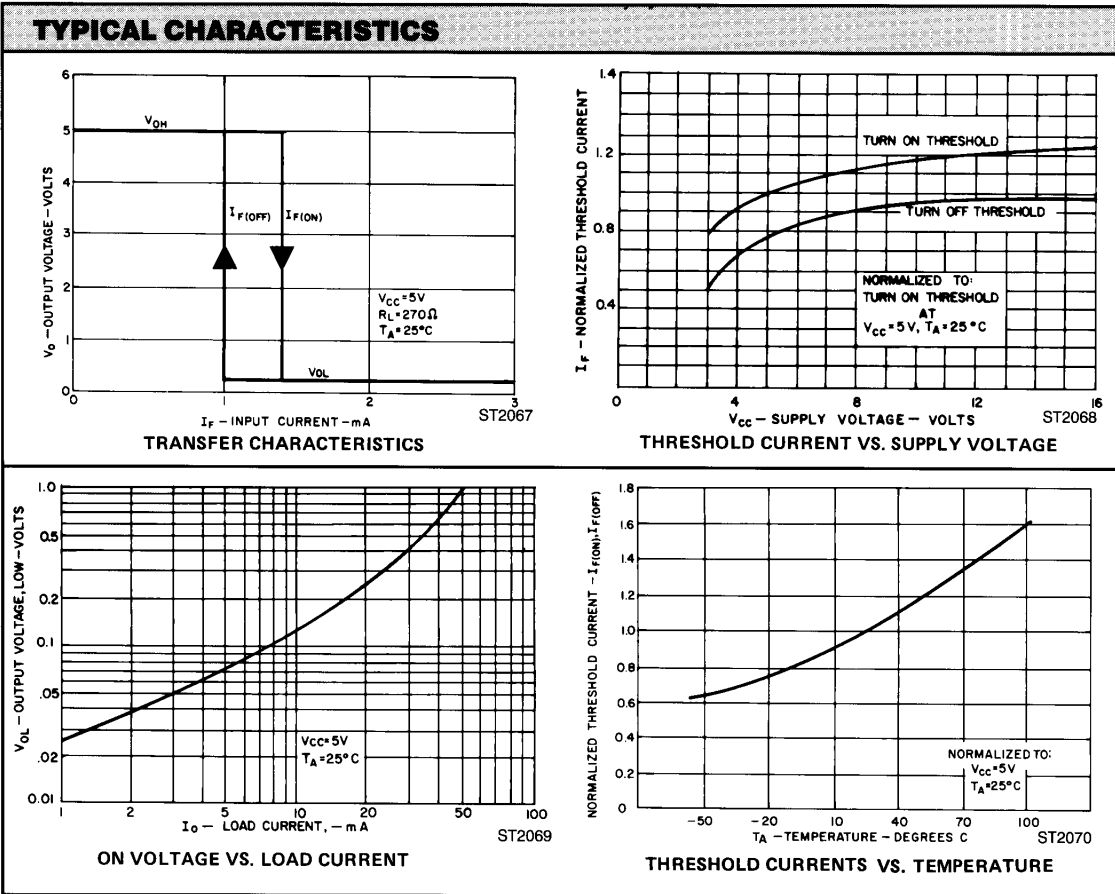
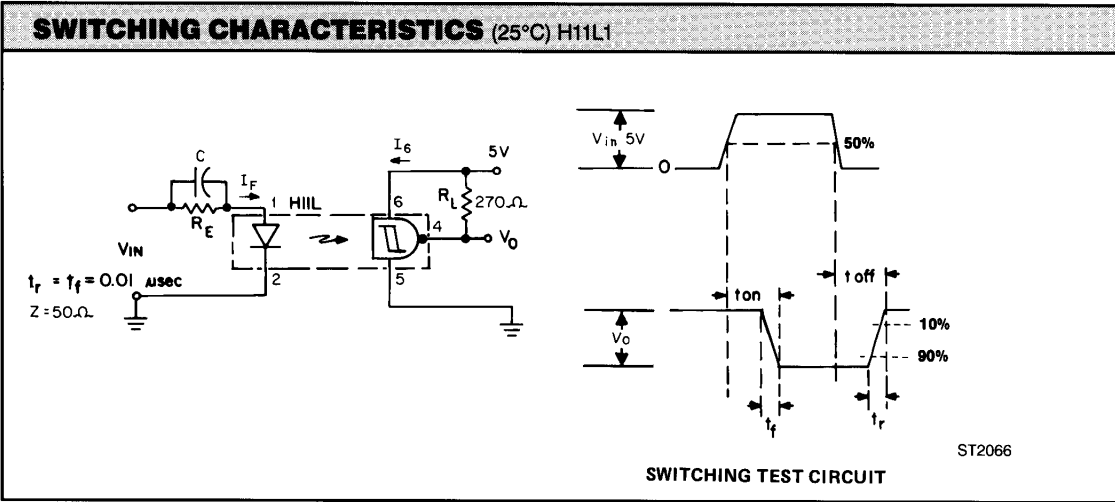


MICROPROCESSOR COMPATIBLE GaAs SCHMITT TRIGGER OPTOCOUPLEDERS

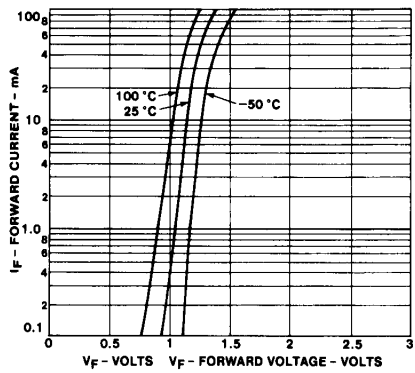
| DYNAMIC CHARACTERISTICS | | | | | | |
|--------------------------------|-----------|------|------|------|---------|---|
| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNITS | TEST CONDITIONS |
| SWITCHING SPEED | | | | | | |
| Turn-on time | t_{ON} | | 1.0 | | μS | $C=0, R_E=1.2 k\Omega$ |
| | t_{ON} | | 0.65 | | μS | $C=270 pF, R_E=1.2 k\Omega$ $f \leq 100 KHz, t_p \geq 1 \mu s$ |
| Fall time | t_f | | 0.1 | | μS | $C=0, R_E=1.2 k\Omega$ |
| | t_f | | 0.05 | | μS | $C=270 pF, R_E=1.2 k\Omega$ $f \leq 100 KHz, t_p \geq 1 \mu s$ |
| Turn-off time | t_{OFF} | | 2.0 | | μS | $C=0, R_E=1.2 k\Omega$ |
| | t_{OFF} | | 1.20 | | μS | $C=270 pF, R_E=1.2 k\Omega$ $f \leq 100 KHz, t_p \geq 1 \mu s$ |
| Rise time | t_r | | 0.1 | | μS | $C=0, R_E=1.2 k\Omega$ |
| | t_r | | 0.07 | | μS | $C=270 pF, R_E=1.2 k\Omega$ $f \leq 100 KHz, t_p \geq 1 \mu s$ |
| Data rate | | | 1.0* | | MHz | |

| ISOLATION CHARACTERISTICS | | | | | | |
|----------------------------------|-----------|------|------|------|------------|-----------------|
| 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 |

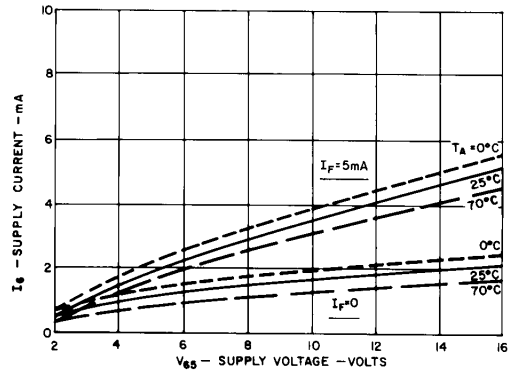
*Maximum data rate will vary depending on the bias conditions and is usually highest when R_E and C are matched to $I_{F(ON)}$ and V_{CC} is between 3 and 15 V. With this optimized bias, most units will operate over 1.5 MHz (NRZ).



TYPICAL CHARACTERISTICS (Cont'd)

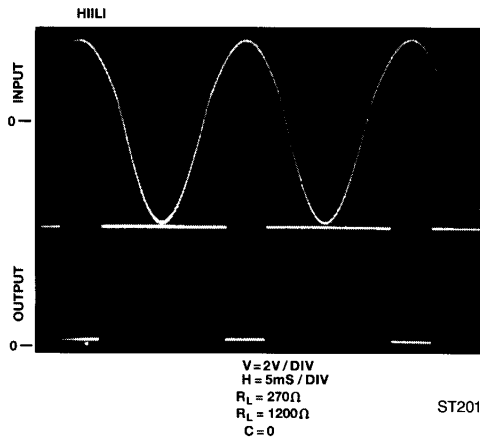


ST2015



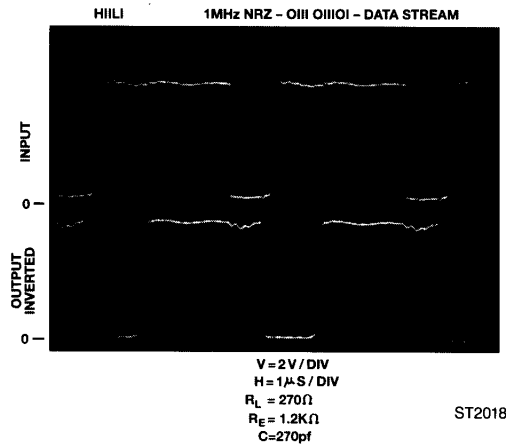
ST2016

FORWARD VOLTAGE VS. FORWARD CURRENT

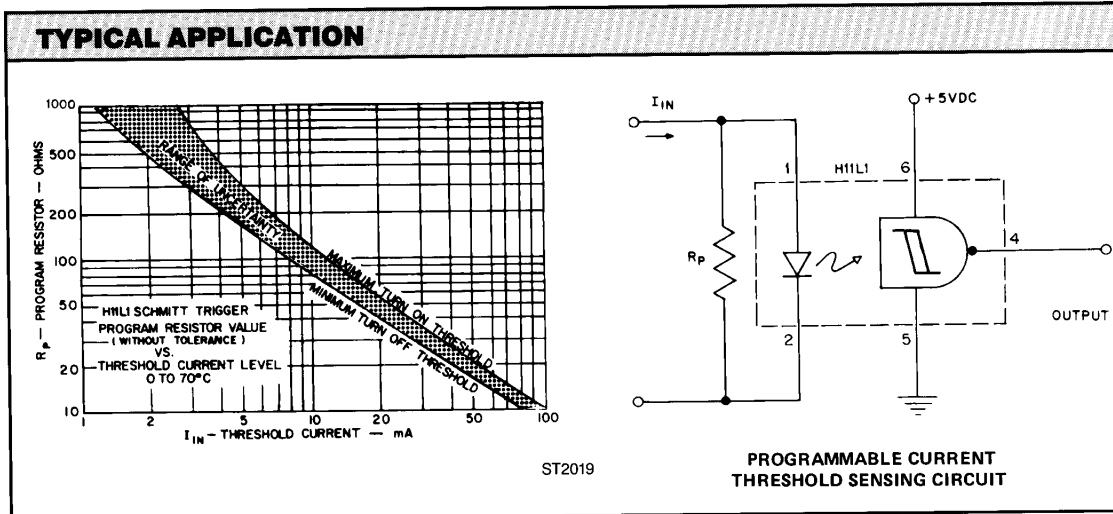


ST2017

SUPPLY CURRENT VS. SUPPLY VOLTAGE



ST2018





MICROPROCESSOR COMPATIBLE GaAs SCHMITT TRIGGER OPTOCOUPLEDERS

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.