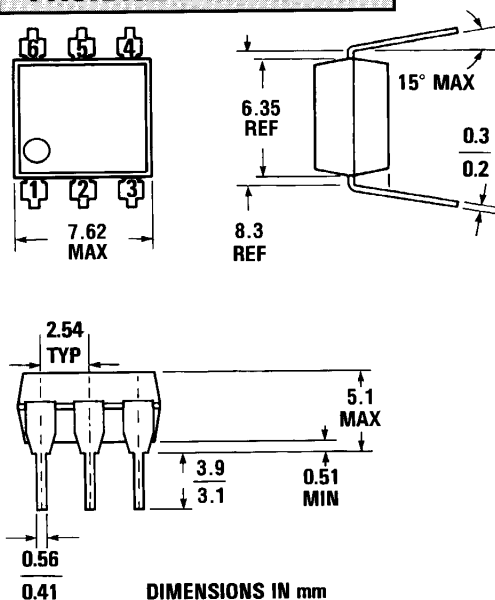
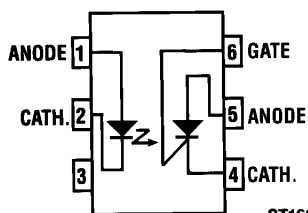


**H11C1 H11C2 H11C3  
H11C4 H11C5 H11C6**

**PACKAGE DIMENSIONS**



DIMENSIONS IN mm  
PACKAGE CODE E



Equivalent Circuit

**DESCRIPTION**

The H11C series consists of a gallium-arsenide infrared emitting diode optically coupled with a light activated silicon controlled rectifier in a dual-in-line package.

**FEATURES & APPLICATIONS**

- 10 A, T<sup>2</sup>L compatible, solid state relay
- 25 W logic indicator lamp driver
- High efficiency, low degradation, liquid epitaxial LED
- 200 V symmetrical transistor coupler (H11C1, H11C2, H11C3)
- 400 V symmetrical transistor coupler (H11C4, H11C5, H11C6)
- Underwriters Laboratory (UL) recognized—File #E90700

**ABSOLUTE MAXIMUM RATINGS** (T<sub>A</sub>=25° unless otherwise specified)

**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 ..... 100 mW  
Derate linearly (above 25°C) ..... 1.33 mW/°C  
Continuous forward current ..... 60 mA  
Peak forward current (1 μs pulse, 300 pps) ..... 3 A  
Reverse voltage ..... 6 V

**DETECTOR**

Power dissipation (ambient) ..... 400 mW  
Derate linearly (above 25°C ambient) ..... 5.3 mW/°C  
Power dissipation (case) ..... 1 W  
Derate linearly (above 25°C case) ..... 13.3 mW/°C  
Peak reverse gate voltage ..... 6 V  
RMS on-state current ..... 300 mA  
Peak on-state current (100 μs, 1% duty cycle) ... 10 A  
Surge current (10 ms) ..... 5 A  
Peak forward voltage (H11C1, H11C2, H11C3) .. 200 V  
Peak forward voltage (H11C4, H11C5, H11C6) .. 400 V

## ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ$ Unless Otherwise Specified)

### INDIVIDUAL COMPONENT CHARACTERISTICS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
<b>INPUT DIODE</b>						
Forward voltage	$V_F$		1.2	1.5	V	$I_F=10\text{ mA}$
Reverse leakage current	$I_R$			10	$\mu\text{A}$	$V_R=3\text{ V}$
Capacitance	C		50		pF	$V=0, f=1\text{ MHz}$
<b>OUTPUT DETECTOR</b>						
Off-state voltage (H11C1, H11C2, H11C3)	$V_{DM}$	200			V	$R_{GK}=10\text{ k}\Omega, T_A=100^\circ\text{C}, I_R=50\mu\text{A}$
(H11C4, H11C5, H11C6)	$V_{DM}$	400			V	$R_{GK}=10\text{ k}\Omega, T_A=100^\circ\text{C}, I_R=150\mu\text{A}$
Reverse voltage (H11C1, H11C2, H11C3)	$V_{RM}$	200			V	$R_{GK}=10\text{ k}\Omega, T_A=100^\circ\text{C}, I_R=50\mu\text{A}$
(H11C4, H11C5, H11C6)	$V_{RM}$	400			V	$R_{GK}=10\text{ k}\Omega, T_A=100^\circ\text{C}, I_R=150\mu\text{A}$
On-state voltage	$V_{TM}$		1.1	1.3	V	$I_{TM}=300\text{ mA}$
Off-state current (H11C1, H11C2, H11C3)	$I_{DM}$			50	$\mu\text{A}$	$V_{DM}=200\text{ V}, T_A=100^\circ\text{C}, I_F=0, R_{GK}=10\text{ k}\Omega$
(H11C4, H11C5, H11C6)	$I_{DM}$			150	$\mu\text{A}$	$V_{DM}=400\text{ V}, T_A=100^\circ\text{C}, I_F=0, R_{GK}=10\text{ k}\Omega$
Reverse current (H11C1, H11C2, H11C3)	$I_R$			50	$\mu\text{A}$	$V_R=200\text{ V}, T_A=100^\circ\text{C}, I_F=0$
(H11C4, H11C5, H11C6)	$I_R$			150	$\mu\text{A}$	$V_R=400\text{ V}, T_A=100^\circ\text{C}, I_F=0$

### TRANSFER CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Input current to trigger (H11C1, H11C2, H11C4, H11C5)	$I_{FT}$			20	mA	$V_{AK}=50\text{ V}, R_{GK}=10\text{ k}\Omega$
(H11C3, H11C6)	$I_{FT}$			30	mA	$V_{AK}=50\text{ V}, R_{GK}=10\text{ k}\Omega$
(H11C1, H11C2, H11C4, H11C5)	$I_{FT}$			11	mA	$V_{AK}=100\text{ V}, R_{GK}=27\text{ k}\Omega$
(H11C3, H11C6)	$I_{FT}$			14	mA	$V_{AK}=100\text{ V}, R_{GK}=27\text{ k}\Omega$
Coupled dv/dt, input to output (fig. 13)	dv/dt	500			V/ $\mu\text{s}$	
Input to output capacitance				2	pF	Input to output voltage=0 $f=1\text{ MHz}$

### ISOLATION CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Surge isolation voltage	$V_{ISO}$	7500			V	1 Minute
Isolation voltage	$V_{ISO}$	5300			V	1 Minute
Isolation resistance	$R_{ISO}$	$10^{11}$			ohms	$V_{i-o}=500\text{ VDC}$

**TYPICAL CHARACTERISTICS**

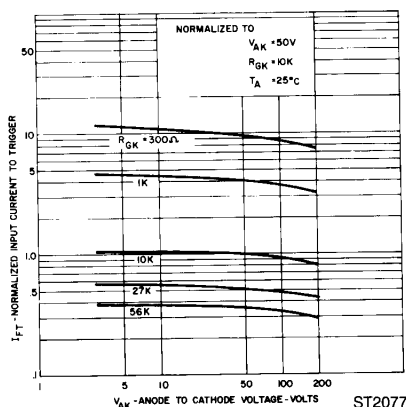


Figure 1. Input Current To Trigger vs. Anode-Cathode Voltage

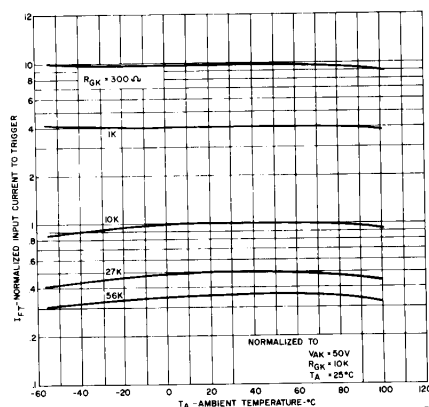


Figure 2. Input Current To Trigger vs. Temperature

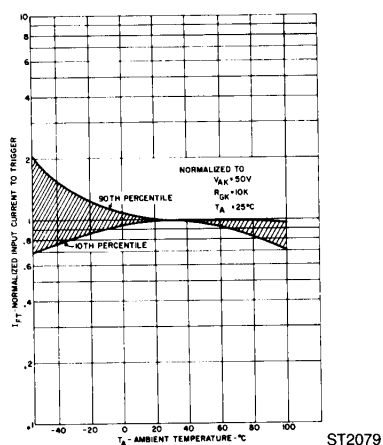


Figure 3. Input Current to Trigger Distribution vs. Temperature

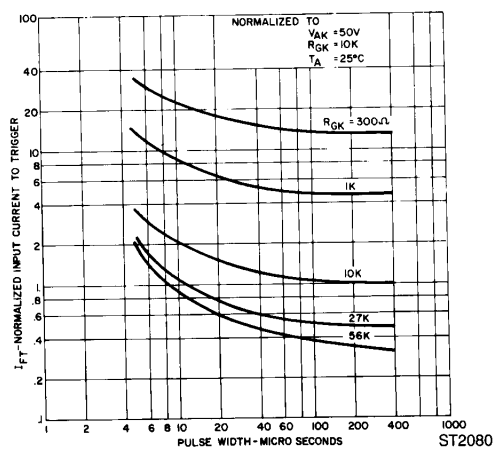


Figure 4. Input Current to Trigger vs. Pulse Width

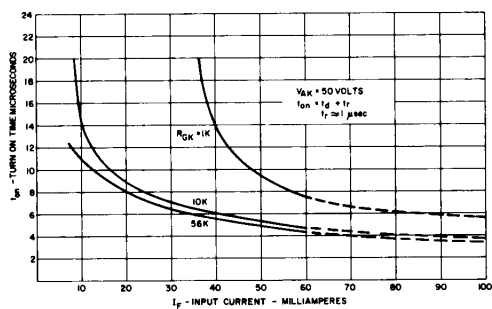


Figure 5. Turn on Time vs. Input Current

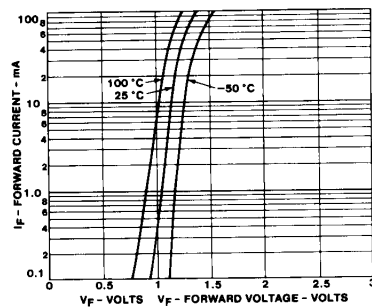


Figure 6. Input Characteristics  $I_F$  vs.  $V_F$

**TYPICAL CHARACTERISTICS OF OUTPUT (SCR)**

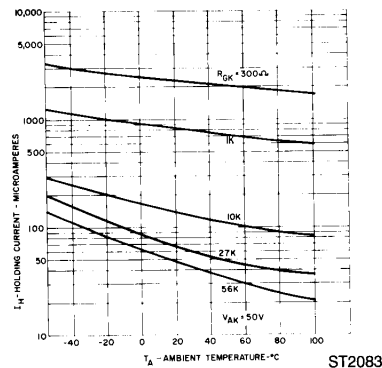


Figure 7. Holding Current vs. Temperature

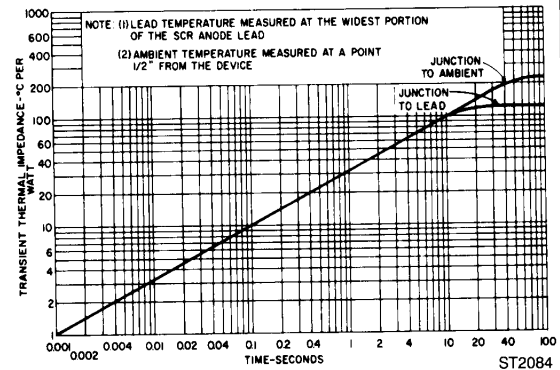


Figure 8. Maximum Transient Thermal Impedance

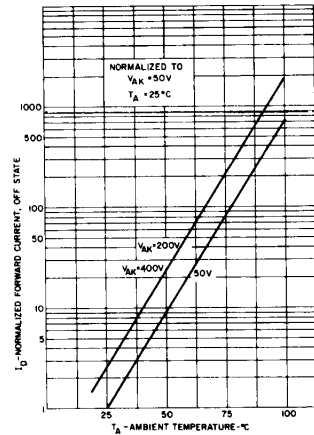


Figure 9. Off State Forward Current vs. Temperature

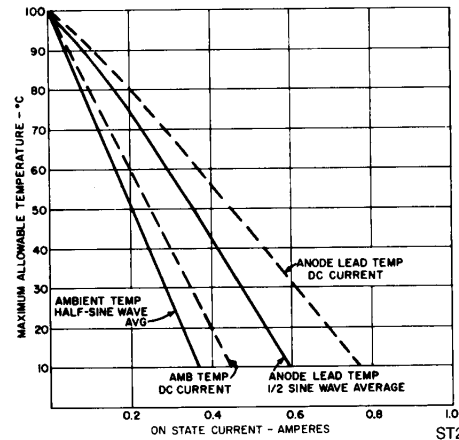


Figure 10. On State Current vs. Maximum Allowable Temperature

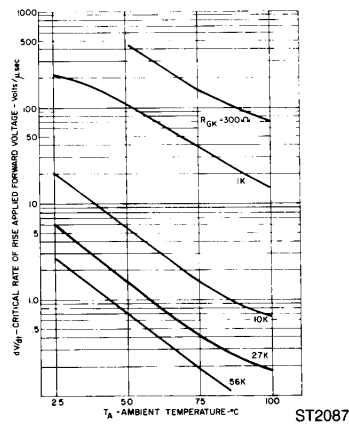


Figure 11.  $dV/dt$  vs. Temperature

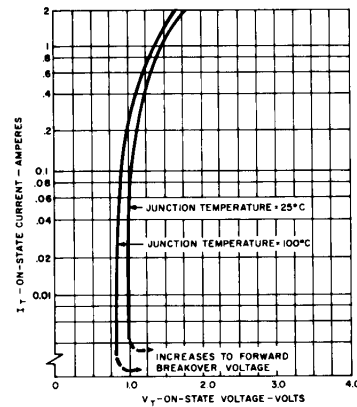
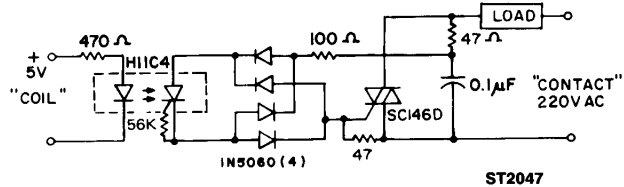


Figure 12. On-State Characteristics

### TYPICAL APPLICATIONS

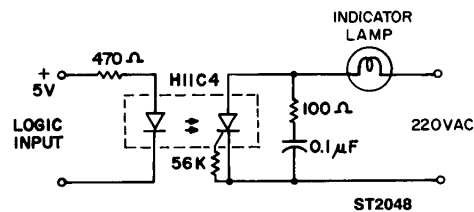
#### 10A, T<sup>2</sup>L COMPATIBLE, SOLID STATE RELAY

Use of the H11C4 for high sensitivity, 5300V isolation capability, provides this highly reliable solid state relay design. This design is compatible with 74, 74S and 74H series T<sup>2</sup>L logic systems inputs and 220V AC loads up to 10A.



#### 25W LOGIC INDICATOR LAMP DRIVER

The high surge capability and non-reactive input characteristics of the H11C allow it to directly couple, without buffers, T<sup>2</sup>L and DTL logic to indicator and alarm devices, without danger of introducing noise and logic glitches.



#### 400V SYMMETRICAL TRANSISTOR COUPLER

Use of the high voltage PNP portion of the H11C provides a 400V transistor capable of conducting positive and negative signals with current transfer ratios over 1%. This function is useful in remote instrumentation, high voltage power supplies and test equipment. Care should be taken not to exceed the H11C 400 mW power dissipation rating when used at high voltages.

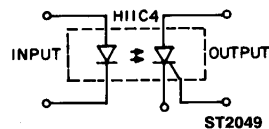
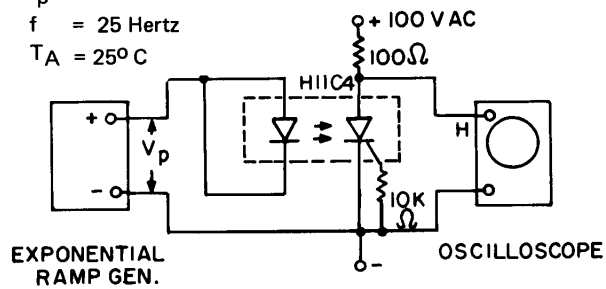
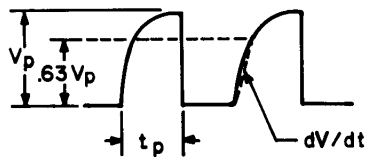


Fig 13.  
Coupled  $dV/dt$  - Test circuit

$V_p = 800$  Volts  
 $t_p = .010$  Seconds  
 $f = 25$  Hertz  
 $T_A = 25^\circ C$



ST2050