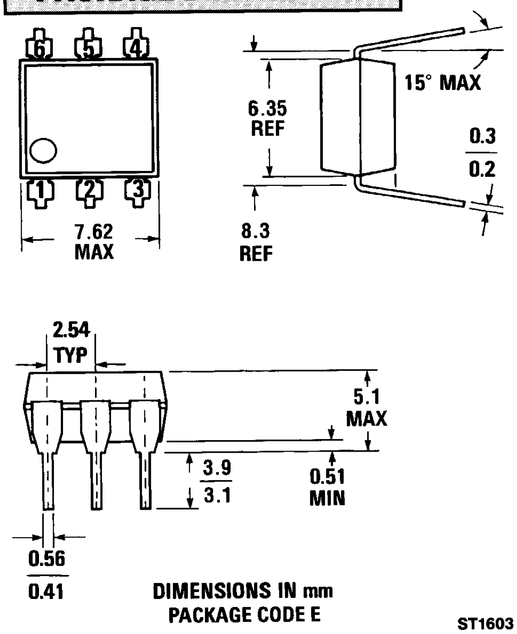
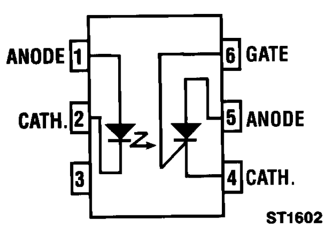
QT OPTOELECTRONICS

PHOTO SCR OPTOCOUPLERS

H11C1 H11C2 H11C3 H11C4 H11C5 H11C6

PACKAGE DIMENSIONS





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, T²L 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_A=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° Unless Otherwise Specified)

INDIVIDUAL COMPONENT CHARACTERISTICS

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

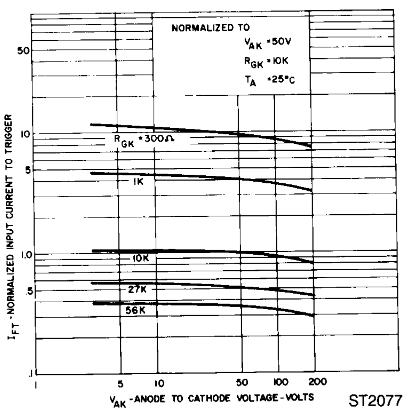
TRANSFER CHARACTERISTICS

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

TYPICAL CHARACTERISTICS



ST2077

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

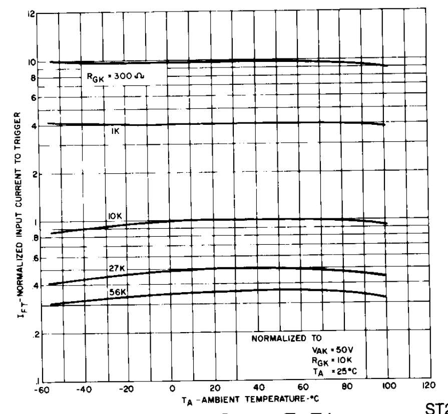


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Figure 2. Input Current To Trigger vs. Temperature

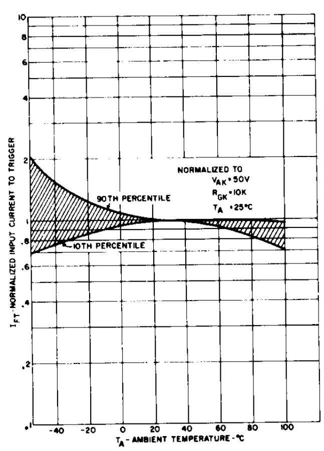

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Figure 3. Input Current to Trigger Distribution vs. Temperature

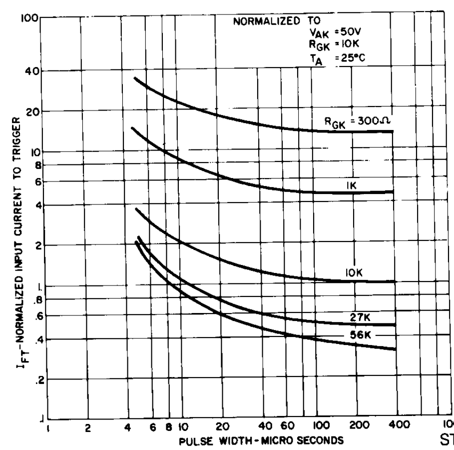

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Figure 4. Input Current to Trigger vs. Pulse Width

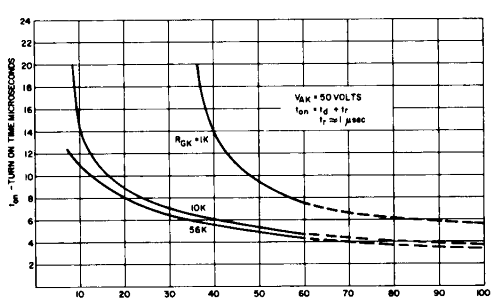


Figure 5. Turn on Time vs. Input Current ST2081

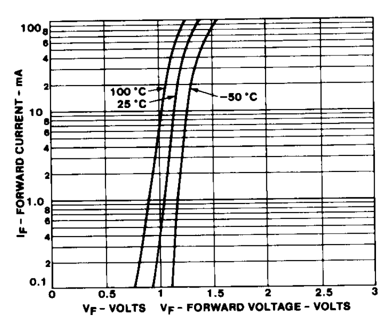


Figure 6. Input Characteristics I_F vs. V_F ST2082

TYPICAL CHARACTERISTICS OF OUTPUT (SCR)

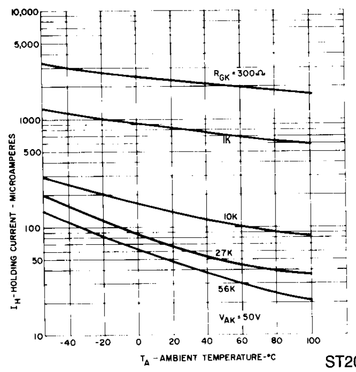


Figure 7. Holding Current vs. Temperature

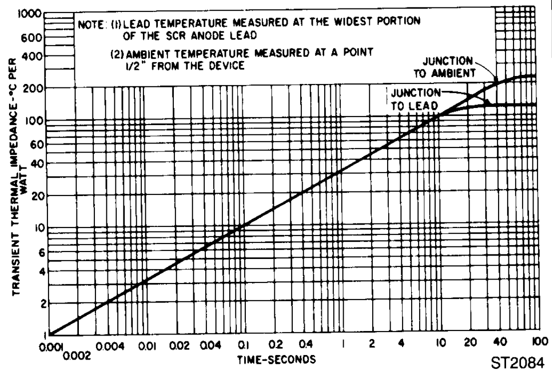


Figure 8. Maximum Transient Thermal Impedance

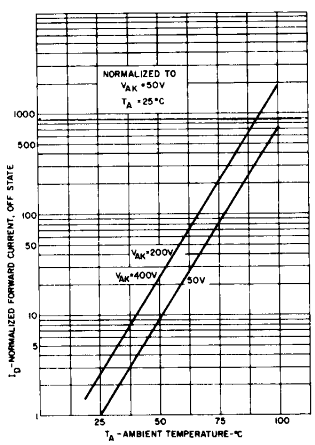


Figure 9. Off State Forward Current vs. Temperature

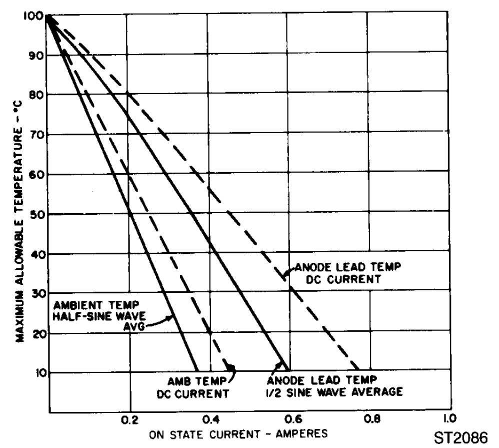


Figure 10. On State Current vs. Maximum Allowable Temperature

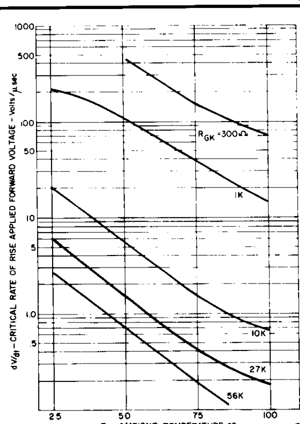


Figure 11. dV/dt vs. Temperature

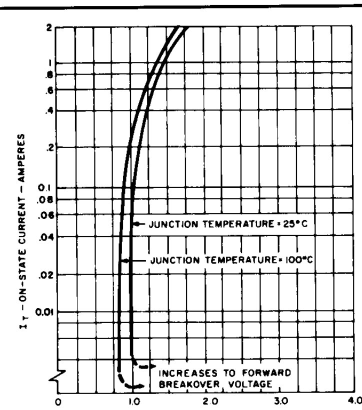


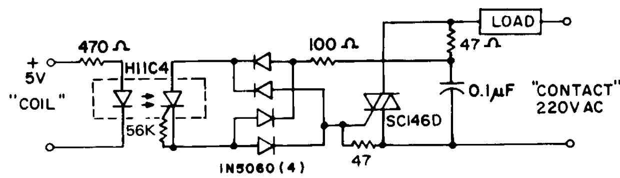
Figure 12. On-State Characteristics

ST2088

TYPICAL APPLICATIONS

10A, T²L COMPATIBLE, SOLID STATE RELAY

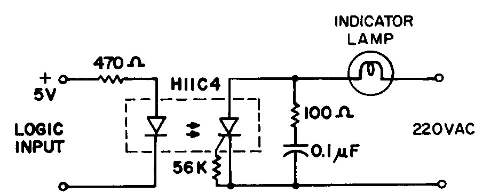
Use of the H11C4 for high sensitivity, 5300V isolation capability, provides this highly reliable solid state relay design. This design is compatible with 74, 74S and 74H series T²L logic systems inputs and 220V AC loads up to 10A.



ST2047

25W LOGIC INDICATOR LAMP DRIVER

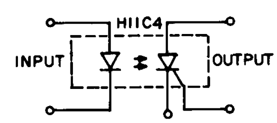
The high surge capability and non-reactive input characteristics of the H11C allow it to directly couple, without buffers, T²L and DTL logic to indicator and alarm devices, without danger of introducing noise and logic glitches.



ST2048

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.



ST2049

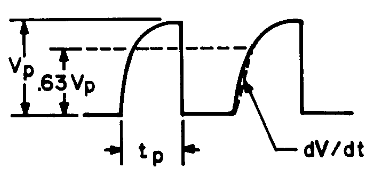
Fig 13.
Coupled dV/dt - Test circuit

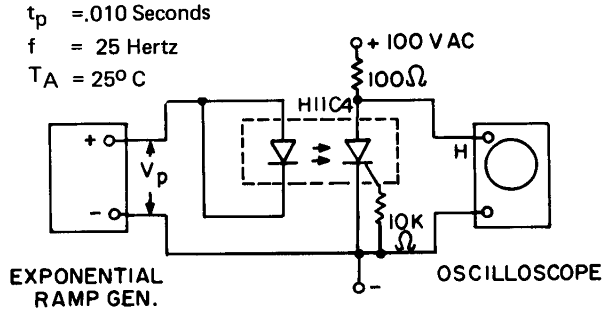
V_p = 800 Volts

t_p =.010 Seconds

f = 25 Hertz

T_A = 25° C





ST2050

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