

1 Form A
Solid State Relay



DESCRIPTION

The S107 is a multipurpose, bi-directional, single-pole, single-throw, normally open multipurpose relay. The circuit is composed of one LED on the input side which activates an optically coupled IC circuit on the output side - controlling the firing angle of two back-to-back SCRs. This circuit assures no false triggering under most adverse conditions, and a tight zero-volt window not exceeding 5V.

FEATURES

- Inverse parallel SCR output
- High input to output Isolation
- High transient immunity
- Input to output Isolation exceeds 2500V AC
- 600V maximum Blocking Voltage
- 0.8A maximum Continuous Load Current
- Zero-volt switching

APPLICATIONS

- Interface between microprocessors and logic circuits
- Drive small lamps / solenoids
- Medical electronic equipment
- Communication equipment

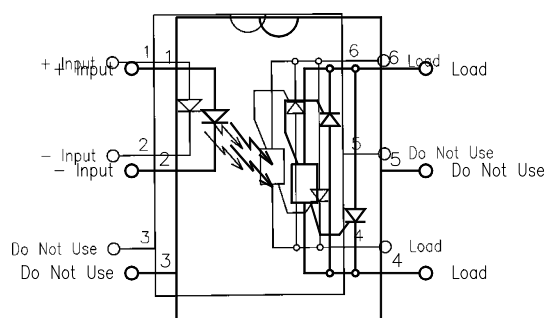
OPTIONS / SUFFIXES

- -H High Output Isolation
- -S Surface Mount Option
- -TR Tape and Reel
- -X 300W Input Resistor

MAXIMUM RATINGS

PARAMETER	UNIT	MIN	TYP	MAX
Storage Temperature	C	- 55°	-	125°
Operating Temperature	C	- 40°	-	85°
Continuous Input Current	mA	-	-	40
Transient Input Current	mA	-	-	400
Reverse Input Control Voltage	V	6.0	-	-
Blocking Voltage	V	-	-	± 600
Output Power Dissipation	mW	-	-	500

SCHEMATIC DIAGRAM



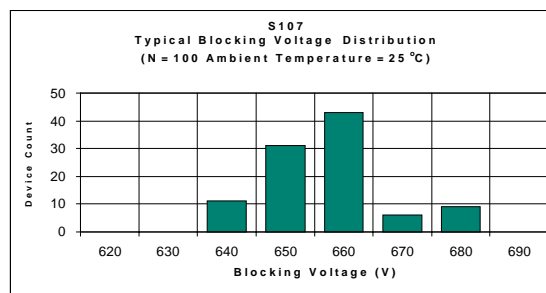
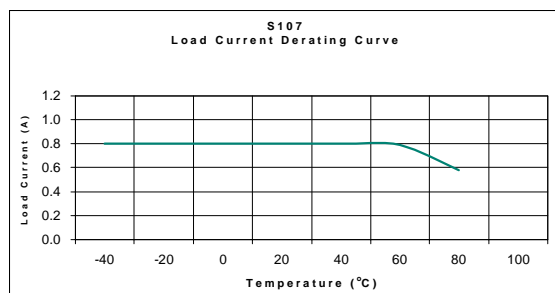
APPROVALS

- BABT CERTIFICATE # 608203:
BS EN 60950, BS EN 41003, BS EN 60065
- UL FILE # E90096

ELECTRICAL CHARACTERISTICS - 25°C

PARAMETER	UNIT	MIN	TYP	MAX	TEST CONDITIONS
INPUT SPECIFICATIONS					
LED Forward Voltage	V	-	1.2	1.5	$I_f = 10\text{mA}$
LED Reverse Voltage	V	6.0	12	-	$I_r = 10\mu\text{A}$
Must Operate Current	mA	-	2.5	5.0	Full Load, Resistive
Reverse Current	μA	-	-	10.0	$V_f = 5.0\text{V}$
Junction Capacitance	pF	5.0	-	-	$V_f = 0\text{V}$
Input Resistor	Ω	-	250	300	-
OUTPUT SPECIFICATIONS					
Blocking Voltage	V	-	-	600	$I_o = 10\mu\text{A}$
Continuous Load Current	A	-	-	0.8	$I_f = 5.0\text{mA}$
Surge Current Rating	A	-	-	5.0	$T = 10\mu\text{S}$
Holding Current	mA	-	-	10	-
On-Voltage	V	-	-	1.2	$I_o = 0.8\text{A}$
Voltage Across Load at Turn-On	V	-	-	5.0	$I_f = 5.0\text{mA}$
Leakage Current	μA	-	100	250	$V_o = 250\text{V}$
Thermal Resistance	$^{\circ}\text{C/W}$	-	150	-	-
Power Factor	-	0.3	-	-	-
Critical Rate of Rise (dV/dt)	V/ μS	400	-	-	-
COUPLED SPECIFICATIONS					
Isolation Voltage -H Suffix	V	2500 3750	-	-	$T = 1\text{ Minute}$
Isolation Resistance	Ω	10^{11}	-	-	-
Coupled Capacitance	pF	-	6.0	-	-

PERFORMANCE DATA



ZERO-VOLT SWITCHING

The S107 solid state relay has been designed with a driver circuit that controls the operation of two back-to-back silicon controlled rectifiers (SCRs), each responsible for one half of the AC cycle. If an AC signal is examined, the turn on, turn off, and zero-volt switching can be shown. Figure 1 shows a typical 60Hz, 120Vac signal with a corresponding relay input signal:

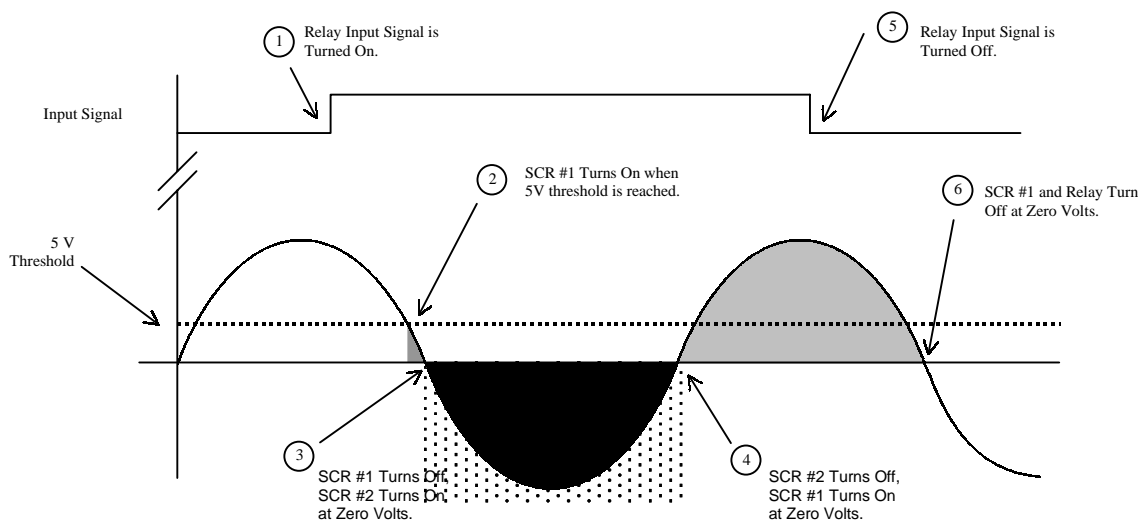
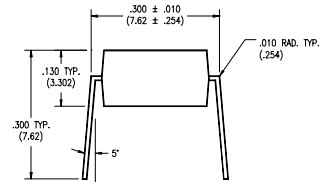


Figure 1: Zero-Volt Switching

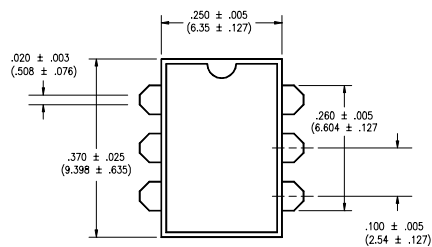
Figure 1 shows the sequence of zero-volt switching operation. At Stage 1, an input signal is applied to the relay. The relay will not turn on until the Threshold Voltage of 5V is reached. Once this point (Stage 2) is reached, SCR #1 (Designated as the SCR which controls positive AC voltage) turns on. However, SCR #1 only stays on for an instant, as the cycle quickly crosses zero. At this point (Stage 3), SCR #1 will turn off and SCR #2 (negative AC voltage) will turn on. Likewise, at the next zero cross (Stage 4), SCR #2 will turn off and SCR #1 will turn back on. Even though the input signal is terminated at Stage 5, the relay will still continue to conduct (typical SCR behavior) until Stage 6, when SCR #1 crosses zero and turns off. Please note that Turn On can likewise begin on the negative phase of the AC cycle with a -5V threshold as well, even though only the positive phase is shown here.

MECHANICAL DIMENSIONS

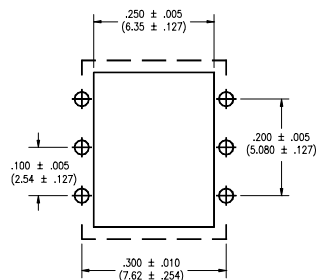
6 PIN DUAL IN-LINE PACKAGE



END VIEW

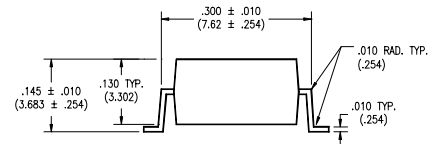


TOP VIEW

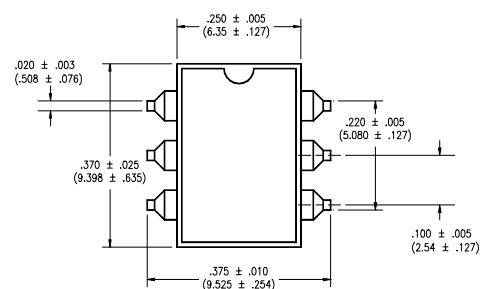


BOTTOM VIEW /
BOARD PATTERN

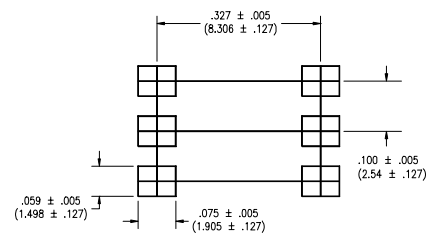
6 PIN SURFACE MOUNT DEVICE



END VIEW



TOP VIEW



BOTTOM VIEW /
BOARD PATTERN