S742

1 Form A
Solid State Relay

DESCRIPTION

The S742 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 transient immunity
- True zero-volt switching
- Input to output Isolation meets or exceeds VDE requirements
- 600V maximum Blocking Voltage
- 1.2A maximum Continuous Load Current

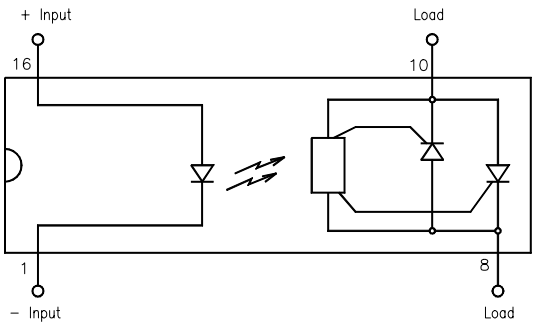
APPLICATIONS

- 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

SCHEMATIC DIAGRAM



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	W	-	-	1.2

APPROVALS

- BABT CERTIFICATE # 607837:
  BS EN 60950, BS EN 41003, BS EN 60065
- CSA CERTIFICATE # LR 111581-1
- UL FILE # E90096

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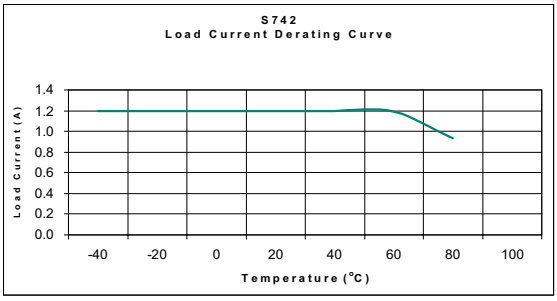
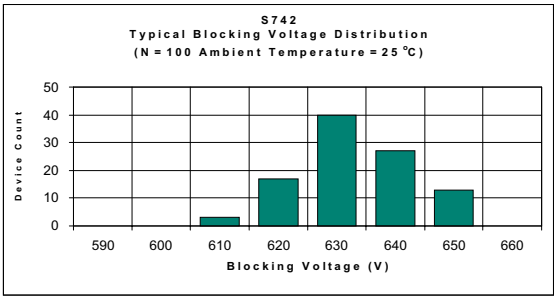
ELECTRICAL CHARACTERISTICS - 25°C

PARAMETER	UNIT	MIN	TYP	MAX	TEST CONDITIONS
INPUT SPECIFICATIONS					
LED Forward Voltage	V	-	1.2	1.5	I_f = 10mA
LED Reverse Voltage	V	6.0	12	-	I_r = 10μA
Must Operate Current	mA	-	2.5	5.0	Full Load, Resistive
Reverse Current	μA	-	-	10.0	V_r = 5.0V
Junction Capacitance	pF	5.0	-	-	V_f = 0V
Input Resistor	Ω	-	250	300	-
OUTPUT SPECIFICATIONS					
Blocking Voltage	V	-	-	600	I_O = 10μA
Continuous Load Current	A	-	-	1.2	I_{in} = 5.0mA
Surge Current Rating	A	-	-	10	T = 10mS
Holding Current	mA	-	-	10	-
On-Voltage	V	-	-	1.2	I_o = 1.2A
Voltage Across Load at Turn-On	V	-	-	5.0	I_f = 5.0mA
Leakage Current	μA	-	100	250	V_O = 250V
Thermal Resistance	°C/W	-	70	-	-
Power Factor	-	0.3	-	-	-
Critical Rate of Rise (dV/dt)	V/μS	400	-	-	-
COUPLED SPECIFICATIONS					
Isolation Voltage -H Suffix	V	2500 3750	-	-	T = 1 Minute
Isolation Resistance	Ω	10^{11}	-	-	-
Coupled Capacitance	pF	-	6.0	-	-

PERFORMANCE DATA





ZERO-VOLT SWITCHING

The S742 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:

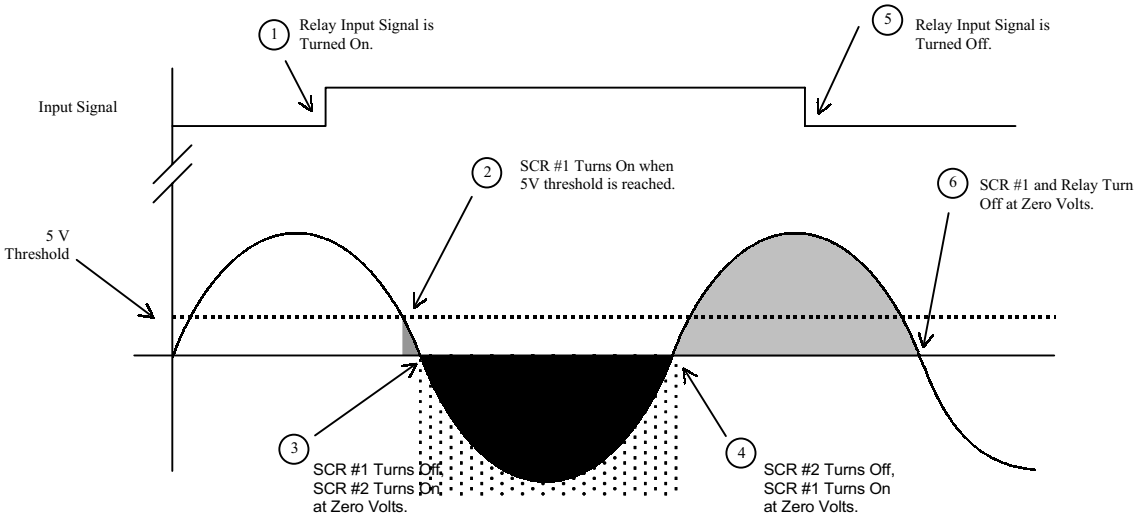
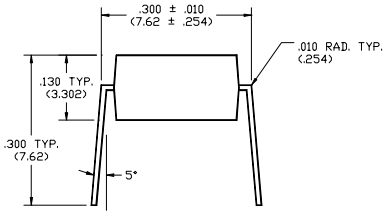


Figure 1: Zero-Volt Switching

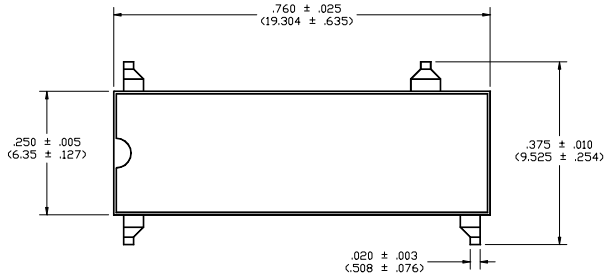
Figure 1 shows the sequence of zero-volt switching operation. At Stage 1, an input signal is applied to the relay. The relay will not turn on until the Threshold Voltage of 5V is reached. Once this point (Stage 2) is reached, SCR #1 (Designated as the SCR which controls positive AC voltage) turns on. 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

16 PIN DUAL IN-LINE PACKAGE

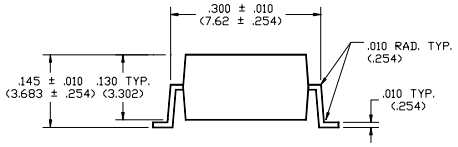


END VIEW

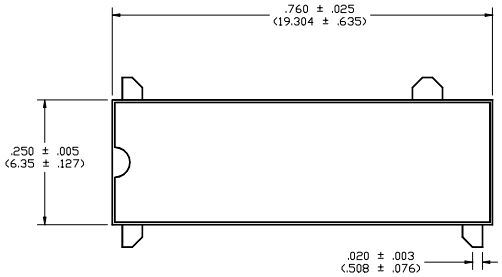


TOP VIEW

16 PIN SURFACE MOUNT DEVICE



END VIEW



TOP VIEW