# LSI/CSI

**ASOT**
**ASOTR     ASOTR1**
**ASOTT     ASOTT1**

ISO 9001 REGISTERED FIRM A3800

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## 3, 4 AND 8 PIN AUTOMATIC SHUT-OFF TIMERS
### ADVANCE INFORMATION

*January 2002*

**FEATURES:**
• Minimizes external components and power consumption
• Factory calibrated timer
• Mask programmable from 2.5 minutes to 32 hours

**APPLICATIONS**
Control of household appliances, heaters, lighting and AC motors.

**DESCRIPTION**

The basic ASOT is a CMOS integrated circuit timer that can be mask programmed from 2.5 minutes to 32 hours as shown in Table 1. The output of the IC is used to turn on a 12V relay and has a duty cycle which can be mask programmed from 5% to 37.5% in 2.5% steps as shown in Table 2. The duty cycle can be selected to optimize operation for a particular relay coil. There are 5 different versions of the IC.

The ASOT is a 3-Pin version housed in a TO-92 package. The application schematic is shown in Figure 2. When latching switch S1 is closed, the output turns on energizing relay L1 and keeping switch S1 closed. When the programmed time-out expires, the output turns off deenergizing relay L1 and causing switch S1 to open.

The ASOTR is a 4-Pin version as shown in Figure 3. The output turns on in the same manner as in the 3-Pin version. If momentary switch S2 is closed, the timer resets and starts timing out again. The S2 input has an internal pull-up resistor. Every subsequent momentary switch closure resets the timer. As in the 3-Pin version, the output remains on until the timeout expires.

The ASOTT is also a 4-Pin version as shown in Figure 4. In this version contacts C1 replace switch S1 and are not accessible. The application of power caused by closing
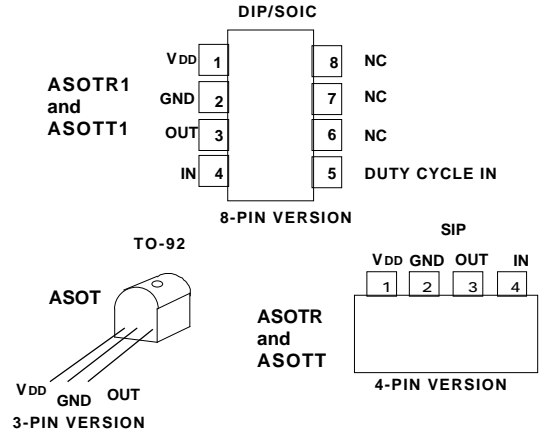
the momentary switch S2 causes the output to toggle on as in the 3-Pin version. If the momentary switch is closed again, the output toggles off causing contact C1 to open and power to be removed. The R2 input has an internal pull-up resistor.

The default operaton of the output produces a double duty cycle for the first 10 milliseconds of output activation to increase the pull-in torque of the relay. The option to remove this feature is factory selectable in the ASOT (3-Pin), ASOTR (4-Pin) and ASOTT (4-Pin) versions. There are also two 8-Pin versions available which allow the user to change this feature. The ASOTR1 is the 8-Pin version used in the Figure 3 application and the ASOTT1 is the 8-Pin version used in the Figure 4 application. In both cases, the duty cycle input has an internal pull-up resistor. Tying the input to Vss removes the double duty cycle feature.



**FIGURE 1. PACKAGE OPTIONS**

**TABLE 1**

| Timeout Numbers | Auto Shut-Off Times | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 - 10 | 0h 2.5m | 0h 5m | 0h 7.5m | 0h 10m | 0h 12.5m | 0h 15m | 0h 17.5m | 0h 20m | 0h 22.5m | 0h 25m |
| 11 - 20 | 0h 30m | 0h 35m | 0h 37.5m | 0h 40m | 0h 45m | 0h 50m | 0h 52.5m | 1h 0m | 1h 10m | 1h 15m |
| 21 - 30 | 1h 20m | 1h 30m | 1h 40m | 1h 45m | 2h 0m | 2h 20m | 2h 30m | 2h 40m | 3h 0m | 3h 20m |
| 31 - 40 | 3h 30m | 4h 0m | 4h 40m | 5h 0m | 5h 20m | 6h 0m | 6h 40m | 7h 0m | 8h 0m | 9h 0m |
| 41 - 50 | 9h 20m | 10h 0m | 10h 40m | 12h 0m | 14h 0m | 16h 0m | 20h 0m | 24h 0m | 28h 0m | 32h 0m |

**TABLE 2**

| Duty Cycle Numbers | Duty Cycle Percentages | | | | | | |
|---|---|---|---|---|---|---|---|
| 01 - 07 | 5 | 7.5 | 10 | 12.5 | 15 | 17.5 | 20 |
| 08 - 14 | 22.5 | 25 | 27.5 | 30 | 32.5 | 35 | 37.5 |

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## ABSOLUTE MAXIMUM RATINGS:
(All voltages referenced to Vss)

| | SYMBOL | VALUE | UNIT |
|---|---|---|---|
| Maximum | $V_{DD}$ | +85 | V |
| Input | $V_{IN}$ | +5 to $V_{SS}$ - 0.3 | V |
| Operating Temperature | $T_A$ | 0 to +85 | °C |
| Storage Temperature | $T_{STG}$ | -65 to +150 | °C |

## ELECTRICAL CHARACERISTICS:
(All voltages referenced to Vss)

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT | CONDITION |
|---|---|---|---|---|---|---|
| Shunt Regulator Voltage | $V_{DD}$ | 70 | 75 | 80 | V | - |
| Regulator Sink Current | $I_{SK}$ | - | - | 10 | mA | - |
| Supply Current | $I_{DD}$ | - | - | 370 | µA | $V_{DD}$ = 48V |
| Power-On-Reset | $V_{POR}$ | 32 | 37 | 42 | V | - |
| POR Hysteresis | $V_{HYS}$ | 7 | - | 12 | V | - |
| Output Driver  - ON | $I_O$ | 70 | - | - | mA | $V_O$ = 5V |
| | $I_O$ | 50 | - | - | mA | $V_O$ = 3V |
| Output Driver - OFF | $I_O$ | - | - | 50 | µA | $V_O = V_{DD}$ |
| Output Frequency | $F_O$ | 20.5 | 21.8 | 23.11 | kHz | - |
| Switch On Delay | $S_{OD}$ | - | 47 | - | ms | $V_{DD} > V_{POR}$ |
| **INPUT** | | | | | | |
| Switching Voltage | $V_{SW}$ | - | - | 2.5 | V | ASOTR, ASOTT |
| Source Current @$V_{IN}$ = 0V | $I_{SC}$ | - | 20 | - | µA | ASOTR |
| Positive Clamp Voltage @Input Sink Current = 350µA | $V_{PC}$ | - | - | 4 | V | ASOTT |
| Negative Clamp Voltage @Input Sink Current = 350µA | $V_{NC}$ | - | - | 1 | V | ASOTT |
| Duty Cycle Select Source Current @$V_{IN}$ = 0V | $I_{DC}$ | - | 20 | - | µA | ASOTR1, ASOTT1 |
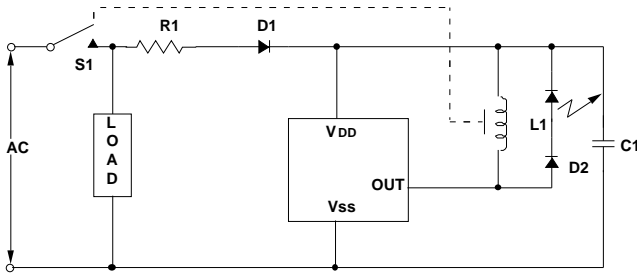


FIGURE 2.  ASOT
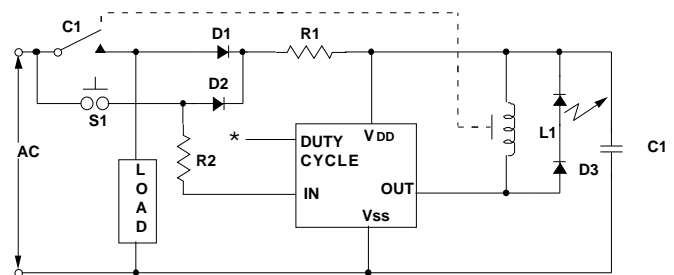


FIGURE 4.  ASOTT, ASOTT1
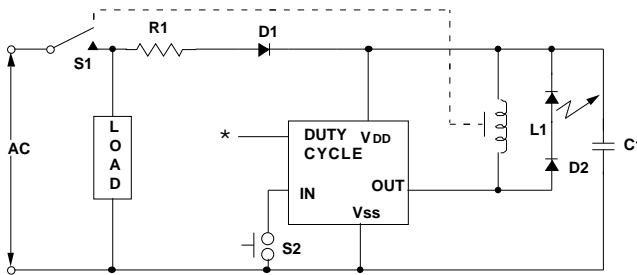★ This input available only for ASOTT1



FIGURE 3.  ASOTR, ASOTR1
★ This input available only for ASOTR1

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