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SS0802 COUNT UP/DOWN TIMER

The SS0802 is a timer with 4-digit, 1/4 duty cycle LCD display driver, fabricated in a low power CMOS technology. It can count either upward or downward, with alarm indication when timer-out is reached. In addition, the timer also provides stop/restart function. With bonbing option, the maximum setting for the SS0802 can be either 59:59 or 99:59.

FEATURES

- Operating voltage 1.5V
- Low stand-by current
- Minutes and second display.
- On-chip, 4-digit, 1/4 duty cycle, 1/2 bias, LCD driver.
- Bias level :-1.5, 0.0, 1.5 volts.
- 32.768KHz crystal oscillator for time base.
- On-chip buzzer output driver.
- Bonbing option for maximum timer count : 59:59 or 99:59.
- Timer-reset (clearing) by simultaneous pressing of MIN and SEC input.
- 2KHz , alarm sound.
- High ESD immunity.
- Bonding option for alarm time 32 or 64 second, 2KHz alarm sound.



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ELECTRICAL CHARACTERISTICS

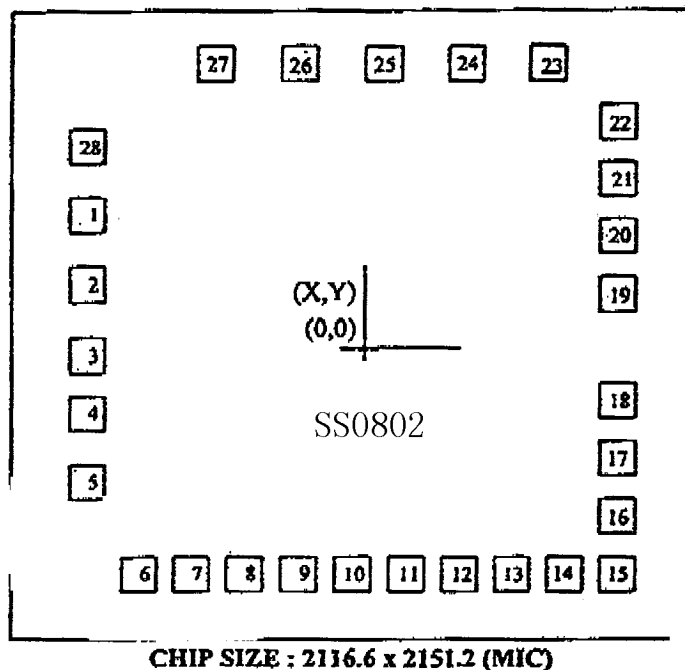
Parameter	Symbol	Min.	Typ.	Max.
Operating Voltage	VDD	---	1.5V	5V
Operating current	IDD	---	---	0.5mA
Stand-by	Ista	---	5 μ A	10 μ A
Storage Temp.	Tstr	-40°C	---	125°C
Operating Temp.	Top	-20°C	---	70°C
Input High	Ih	0.7×VDD	---	---
Input Low	Il	0.3×VDD	---	---
Output High	Vh	0.7×VDD	---	---
Output low	Vl			



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SIGNAL DESCRIPTION

The SS0802 is available in tested die for chip-on-board mounting. The following diagram gives signal pad location.



PAD NO.	DESTINATION	X	Y	PAD NO.	DESTINATION	X	Y
1	XF512	-909.8	263.2	15	SEG8	899.8	-927.6
2	CAP	-909.8	4.2	16	COM3	910.8	-636.6
3	TEST	901.4	-177	17	COM4	910.8	-456.8
4	OPT	-901.4	-352.6	18	OSC1	901.4	-283
5	VSS	-901.3	-588.2	19	OSC2	901.4	316
6	COM2	-702.8	-927.6	20	OUT	901.4	498.8
7	COM1	-519.8	-927.6	21	OPT2	902.4	685.2
8	SEG1	-342.2	-927.6	22	VDD	902.4	879.2
9	SEG2	-156	-927.6	23	BZ	646.4	912.2
10	SEG3	10.8	-927.6	24	GND	455.2	912.2
11	SEG4	197	-927.6	25	OPT1	271	913.2
12	SEG5	363.6	-927.6	26	ST	75.4	913.2
13	SEG6	548.6	-927.6	27	SEC	-100	913.2
14	SEG7	713.6	-927.6	28	MIN	-901.4	543.2



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PAD NO.	DESIGNATION	DESCRIPTION
1	XF512	LCD negative bias (-1.5 volts) generation.
2	CAP	A 0.1 μ F ceramic capacitor should be connected across these two pads.
3	TEST	Test pin.
4	OPT	Bonding option for maximum minute count. This input has an interal pull-low resitor. When it is connected to VDD, the maximum MINUTE count is 99. When it is unconnected or connected to VSS, the maximum MINUTE count is 59.
5	VSS	Ground.
6	COM2	LCD common driver 2.
7	COM1	LCD common driver 1.
8-15	SEG 1-8	LCD segment driver 1-8.
16	COM 3	LCD common driver 3.
17	COM 4	LCD common driver 4.
18	OSC 2	Pads for connection of external 32.768KH.
19	OSC 1	Pads for connection of external 32.768KH.
20	OUT	Buzzer output indication. When the buzzer starts, this output rises to HIGH. When the buzzer stops, this output drops to LOW again.
21	OPT 2	Bonding option for up/down or just down.
22	VDD	1.5 volts positive power supply.
16	VI2	Inverter 2 input pin for power amplification

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PAD NO.	DESIGNATION	DESCRIPTION
23	BZ	Buzzer output.
24	GND	Ground.
25	OPT 1	bonding option for alarm time.
26	ST	Input for timer start and stop.
27	SEC.	Second adjustment.
28	MIN	Minute adjustment.

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OPERATION PROCEDURE

MINUTE ADJUSTMENT :

To adjust minute, add HIGH pulses to the MIN input. The " minute " can be adjusted in the range of either $0 \rightarrow 59 \rightarrow 0$ or $0 \rightarrow 99 \rightarrow 0$, depending on the bonding option OPT. If OPT is connected to VDD, the minute adjustment range is $0 \rightarrow 99 \rightarrow 0$. If OPT is connected to VSS, the minute adjustment range is $0 \rightarrow 59 \rightarrow 0$. If logic HIGH is added to the MIN input for more than 1 second, the setting is continuous with a speed of 8Hz.

SECOND ADJUSTMENT :

To adjust second, add HIGH pulses to the SEC input. The SEC input. The " second " can be adjusted in the range of $0 \rightarrow 59 \rightarrow 0$. If logic HIGH is added to the SEC input for more than 1 second, the setting is continuous with a speed of 8Hz.

TIMER START/STOP :

The ST input is timer op/off toggle switch. When the timer is counting either up/down, adding a HIGH pulse to the ST input holds the timer at the current value. When the timer is in held state, adding a HIGH pulse to the ST input re-starts the timer.

COUNT DOWNWARD :

When the timer is set to a non-zero value, starting the timer makes it count downward. When the timer counts downward to 00:00, the buzzer alarms for 32 seconds. During the 32 seconds period, if a HIGH pulse is added to any of the three input MIN, SEC, and ST, the buzzer stops, the timer returns to its set value.

COUNT UPWARD :

When the timer is set or cleared to 00:00, starting the timer make it count from 00:00 to 59:59, and then back to 00. No alarm comes out of the buzzer in upward counting.

RESET TIMER :

To reset the timer to 00:00, add a HIGH pulse to the MIN input and the SEC input simultaneously.

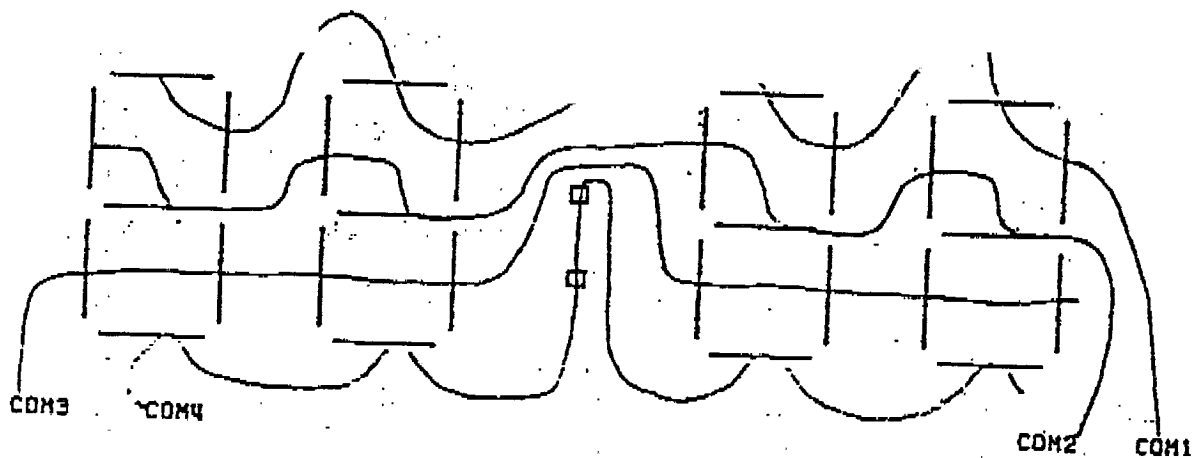
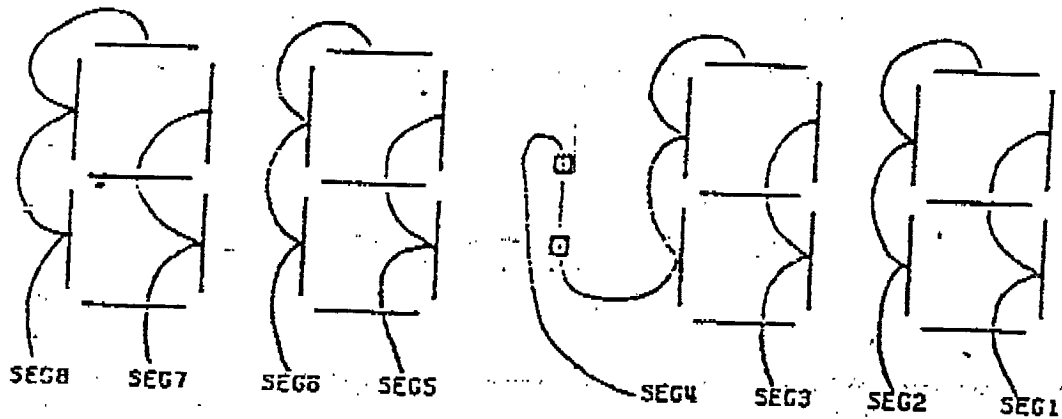
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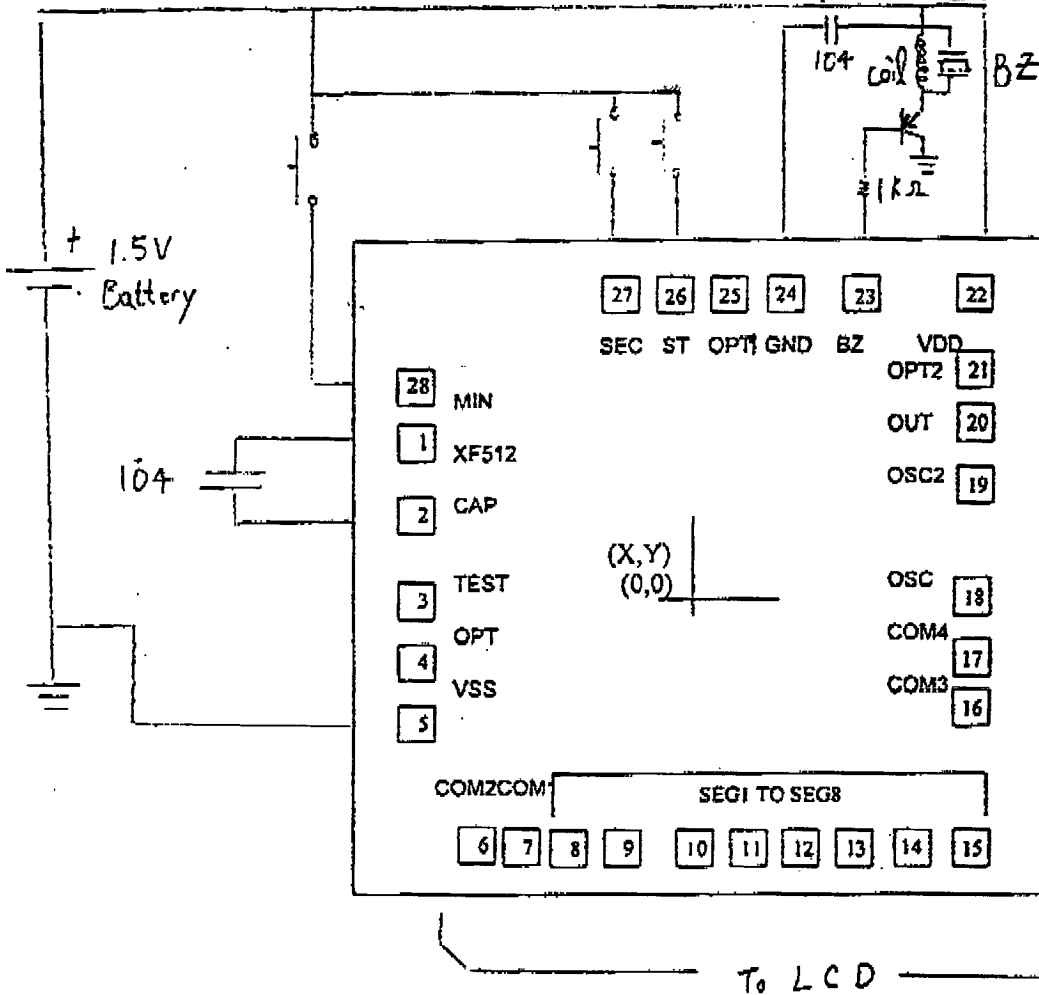
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LCD DISPLAY AND WIRING



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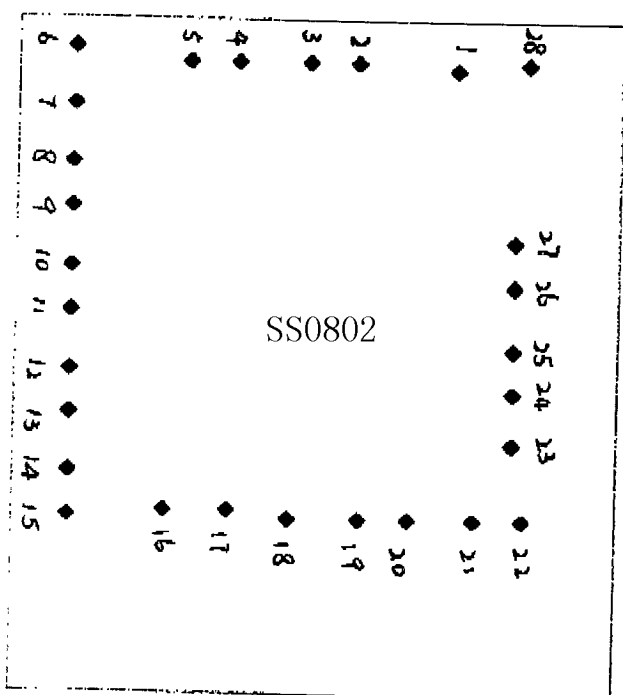


If OPT connected to (Pin 24)
*Vss = count from 0 → 99min → 0
*Vss = count from 0 → 99min → 0
If OPT2 connected to (Pin 21)
*Vss = counting method will up & down
*Vss = counting method will down only.

32.768KHz

If OPT1 connected to (Pin 26)
*Vss = Buzzer alarm for 64 sec
*Vss = Buzzer alarm for 32 sec

PAD NO DESTINATION			X	Y
1	XF512		144.6	1166.2
2	CAP		124.6	905.2
3	TEST		124.6	775.2
4	OPT		124.6	587.2
5	VSS		124.6	457.2
6	TCOM2		84.4	150.6
7	TCOM1		254.4	150.6
8	SEG1		427.6	148.6
9	SEG2		557.6	148.6
10	SEG3		734	148.6
11	SEG4		864	148.6
12	SEG5		1040.4	148.6
13	SEG6		1170.4	148.6
14	SEG7		1346.8	148.6
15	SEG8		1476.8	148.6
16	TCOM3		1459.8	403
17	TCOM4		1459.8	573
18	OSC2		1485.2	922.2
19	OSC1		1485.2	734.2
20	OUT		1485.2	1052.2
21	OPT2		1485.2	1224.2
22	VDD		1485.2	1354.2
23	BZ		1257.6	1325
24	VEE		1103.6	1325
25	OPT1		973.6	1325
26	ST		785.6	1325
27	SEC		655.6	1325
28	MIN		124.6	1354.2



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