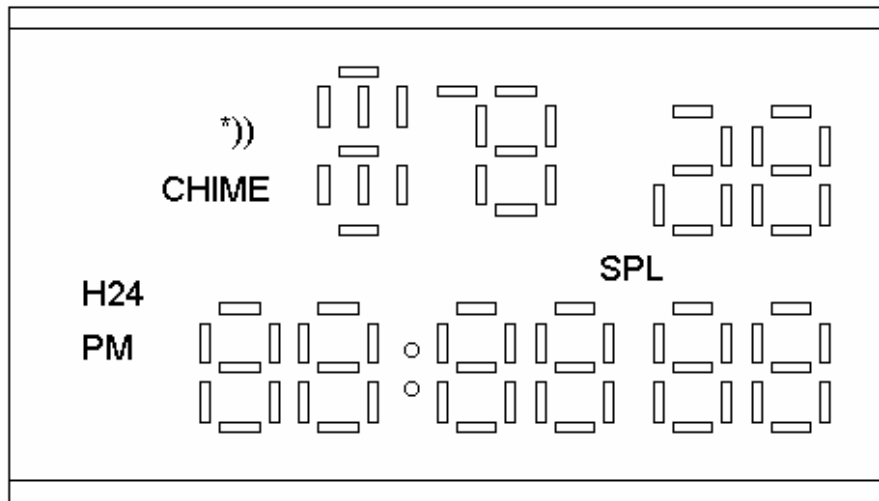


**Features**

- \* 5 Function Real time clock.  
Hour, Minute, Second, Date, Weekday
- \* Alarm and chime.
- \* 12/24Hour format user select.
- \* 4 year calendar.
- \* 3 keys operation, KSET, KMODE, KADJ.
- \* 1/100 second stop watch.
- \* EL Driver built in
- \* 1/2 bias 1/3 duty LCD format
- \* Very low power consumption
- \* 32768 Crystal oscillator
- \* Single 3.0V operation.
- \* Direct buzzer driver.

**General Description**

The LS6102 is a 10 digit LCD watch which display Hour:Minute Second, Date and Weekday. 12/24Hour display format user select. Hourly chime function. Alarm function. 1/100 second stop watch counter. It is simple three keys operation : KSET, KMODE, KADJ. The EL driver has 3 second of delay. It has low power consumption.

**LCD Drawing****Operation Modes**

The LS6102 has 4 modes – Clock, Alarm, Chronograph and Time Set Mode. By pressing KMODE, it is shift from one mode to another as follow :

Time Mode => Alarm Mode => Chronograph Mode=> Time Set Mode => Time Mode....

**Time Mode**

In Time Mode , the LS6102 display the current time information, Day, Hour, Minute, Second and Weekday. It also display the ON/OFF status of Alarm and Chime and 12Hr/24Hr format.

In Time Mode, press KADJ to toggle between 12HR and 24Hr display format.

**Time Set Mode**

In Time Mode, press KMODE 3 times to go to Time Set Mode.  
 On entering Time Set Mode, the second digits flash..

In Time Set Mode, press KSET to select the setting item with the sequence as follow :

Second => Hour => Minute => Month => Day => Weekday.

In Time Set Mode, press KADJ to adjust the value. Press and hold KADJ will cause rapid increment.  
 In Time Set Mode, press KMODE to exit setting mode.

**Alarm Mode**

In Time Mode, press KMODE to go to Alarm Mode.

In Alarm Mode, press KADJ to enable/disable Alarm and Chime which follows the sequence :

Alarm off      Alarm on      Alarm on      Alarm off      Alarm off  
 Chime off => Chime off => Chime on => Chime on => Chime off .....

In Alarm Mode, press KSET to set Alarm Hour, the Alarm will be set to ON, press KADJ to set value.  
 Press KSET to set Alarm Minute, press KADJ to set value.  
 Press KSET again exit Alarm Setting.  
 Press KMODE exit Alarm Mode.

**Chronograph Mode**

In Time Mode, press KMODE 2 times to go to Chronograph Mode. The sport timer counts up to 99 minutes 59.99 second with 1/100 second and Lap time function.

It is operated as follows:

Press KADJ to start/stop the timer.

If the timer is started, press KSET to have the Lap time.

If the timer is stopped, press KSET to reset the timer to 00:00 00.

**Pin Assignment**

DESIGNATION	TYPE	DESCRIPTION
B [0:1]	OUTPUT	Buzzer output
VC1, VC2	OUTPUT	Halfer output
VEE	OUTPUT	Halfer voltage
T2, T1	INPUT (PL)	TEST pin
OO	OUTPUT	oscillator output
OI	INPUT	oscillator input
VDD	POWER	+3.0V power supply
GND	POWER	Ground
KSET,KMODE, KADJ	INPUT(PL)	Input key/option
IO[0:3]	INPUT(PL)/OUTPUT	Input /Output.
R[0:1]	OUTPUT	Output /EL output
C[1:4]	OUTPUT	LCD Common output
S[1:28]	OUTPUT	LCD Segment output

Note: (PL) – pull low  
 (PH) - pull high

**Absolute Maximum Ratings**

Supply voltage Vdd - Vss.....0 to 5V  
 Input voltage Vin.....Vss to Vdd  
 Operating temperature Top .....-10°C to 60°C  
 Storing temperature Tst .....-40°C to 70°C

**Comments**

Stress above those listed under “absolute Maximum Ratings” may cause permanent damage to the device. These are stress rating only. Functional operation of this device at these or any other conditions above those indicated in the operational sections of this specification is not implied and exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**D.C. Electrical Characteristics**

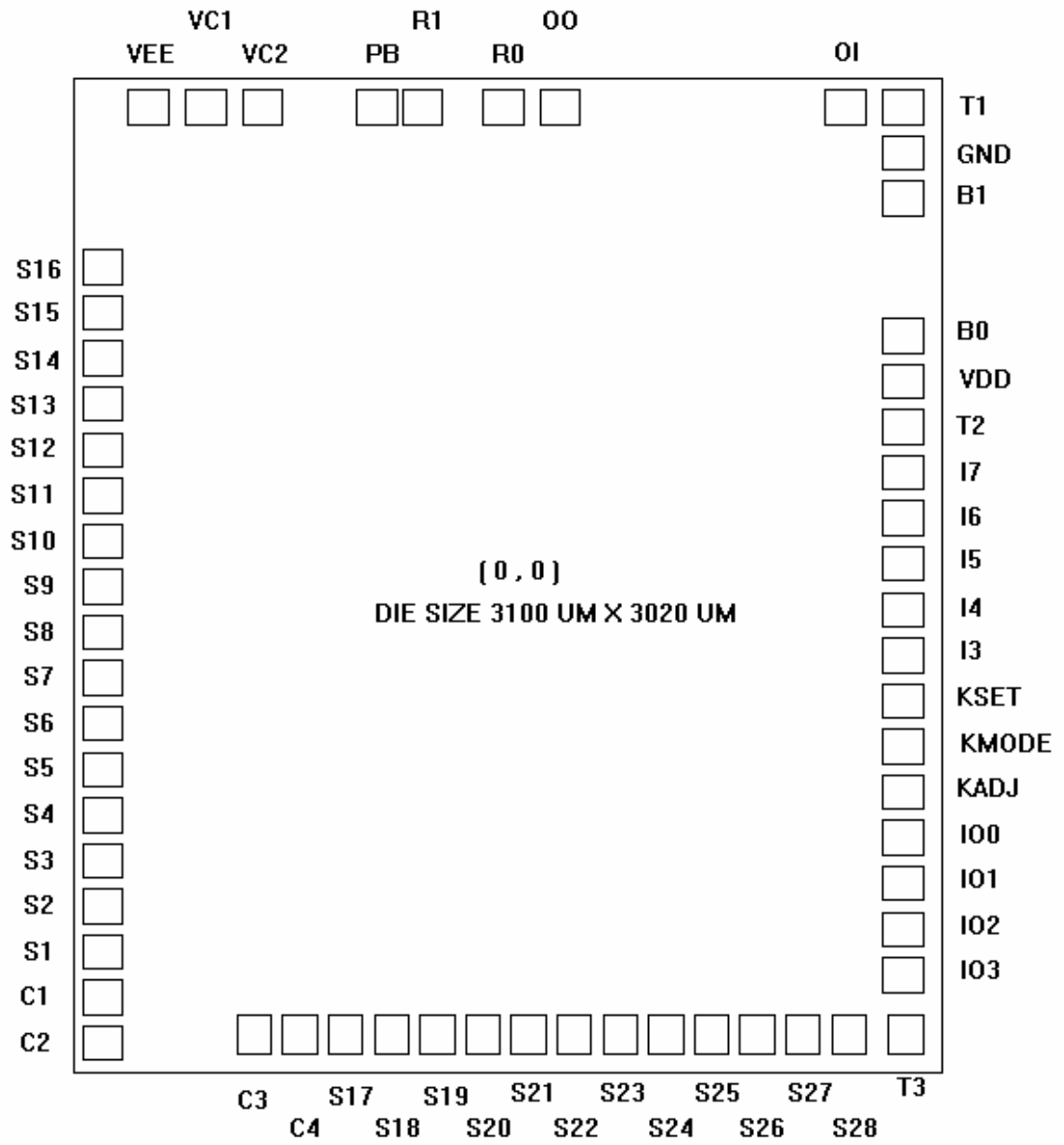
(GND = 0V, Vdd = 3.0V, Ta = 25°C unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply Voltage	Vdd	2.5	3.0	3.6	V	
Operating current	Idd	-	3	6	μA	No load
OSC. built-in cap	Cd	-	20	-	pF	
OSC. trimmer cap	Ctrim	5	-	35	pF	
Buzzer output current	Ib	500	-	-	μA	Vbd-Vss=0.5
LCD frequency	Flcd	-	64	-	Hz	
Segment current	Is	0.15	-	-	μA	Vseg=0.2V
Common current	Ic	3.0	-	-	μA	Vcom=0.2V
Trigger output current	Ir	100	-	-	μA	Vr-Vss=0.5

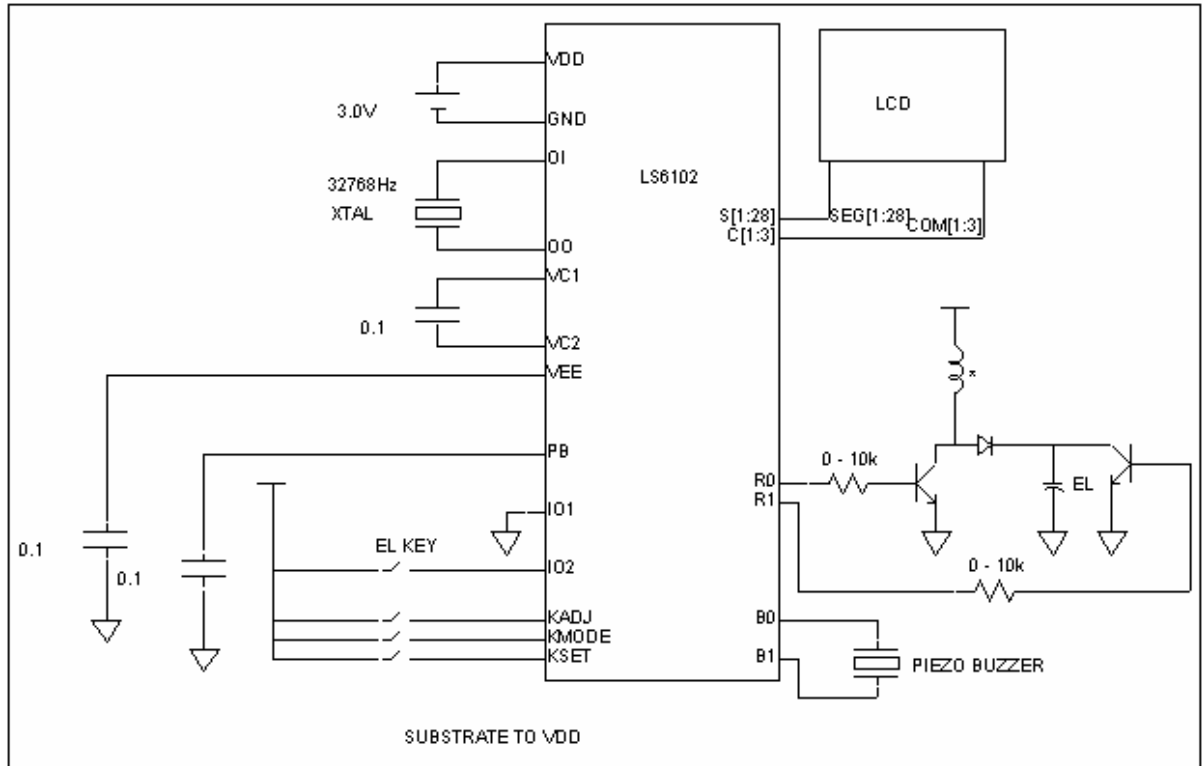
## Pad Coordinate

PAD	X( $\mu$ m)	Y( $\mu$ m)	PAD	X( $\mu$ m)	Y( $\mu$ m)
C2	-1500.0	-1500.0	GND	+1372.0	+1282.0
C1	-1500.0	-1366.0	B1	+1372.0	+1129.0
S1	-1500.0	-1232.0	B0	+1372.0	+821.0
S2	-1500.0	-1098.0	VDD	+1372.0	+676.0
S3	-1500.0	-963.0	T2	+1372.0	+538.0
S4	-1500.0	-766.0	I7	+1372.0	+368.0
S5	-1500.0	-632.0	I6	+1372.0	+220.0
S6	-1500.0	-434.0	I5	+1372.0	+72.0
S7	-1500.0	-300.0	I4	+1372.0	-75.0
S8	-1500.0	-102.0	I3	+1372.0	-224.0
S9	-1500.0	+31.0	KSET	+1372.0	-371.0
S10	-1500.0	+229.0	KMODE	+1372.0	-519.0
S11	-1500.0	+363.0	KADJ	+1372.0	-667.0
S12	-1500.0	+561.0	IO0	+1372.0	-830.0
S13	-1500.0	+695.0	IO1	+1372.0	-979.0
S14	-1500.0	+892.0	IO2	+1372.0	-1127.0
S15	-1500.0	+1027.0	IO3	+1372.0	-1276.0
S16	-1500.0	+1224.0	T3	+1343.0	-1510.0
VEE	-1322.0	+1350.0	S28	+1209.0	-1510.0
VC1	-1189.0	+350.0	S27	+1076.0	-1510.0
VC2	-1055.0	+1492.0	S26	+942.0	-1510.0
PB	-605.0	+1492.0	S25	+807.0	-1510.0
R0	-569.0	+1492.0	S24	+674.0	-1510.0
R1	-100.0	+1492.0	S23	+539.0	-1510.0
OO	+49.0	+1492.0	S22	+405.0	-1510.0
OI	+1229.0	+1482.0	S21	+271.0	-1510.0
T1	+1371.0	+1482.0	S20	+128.0	-1510.0
			S19	-70.0	-1510.0
			S18	-204.0	-1510.0
			S17	-401.0	-1510.0
			C4	-536.0	-1510.0
			C3	-734.0	-1510.0

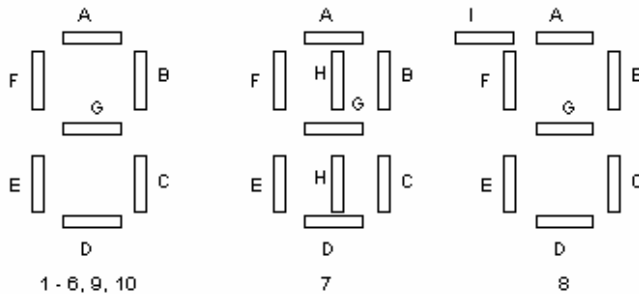
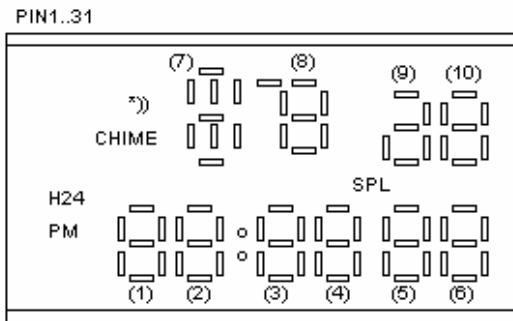
### Pad Location



### Application Circuit



### LCD Drawing



PIN	1	2	3	4	5	6	7	8
SIG	S16	S15	S14	S13	S12	S11	S10	S9
C1	2D	2C	2G	2B	3D	3C	3G	3B
C2	H24	2E	2F	2A	:	3E	3F	3A
C3	PM	1D	1C	1G	1B	1A	1F	1E

→

PIN	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SIG	S28	S27	S26	S26	S24	S23	S22	S21	S20	S19	S18	S17	C1	C2	C3
C1	7E	7H	7F	7A	8E	8G	8F	8A	/	10E	10F	10A	C1	/	/
C2	7D	7C	7G	7B	8D	8C	8B	8I	10D	10C	10G	10B	/	C2	/
C3	/	/	/	/	/	/	/	/	9B	9C	9AGD	9E	/	/	C3

PIN	24	25	26	27	28	29	30	31
SIG	S1	S2	S3	S4	S5	S6	S7	S8
C1	5B	5G	5C	5D	4B	4G	4C	4D
C2	5A	5F	5E	SPL	4A	4F	4E	CH
C3	6E	6F	6A	6B	6G	6C	6D	*) )

**Revision :**

**Version0.5 :**

- 1. pad KADJ, KSET exchanged on Page 5 and 6, Pad Coordinate/Location.**
- 2. IO1 was bonded to GND on Page 7, Application Circuit.**

**Version 0.6 :**

**Modification of LCD pin out table (4, June, 00).**