

12 Digit LCD Watch with EL Driver

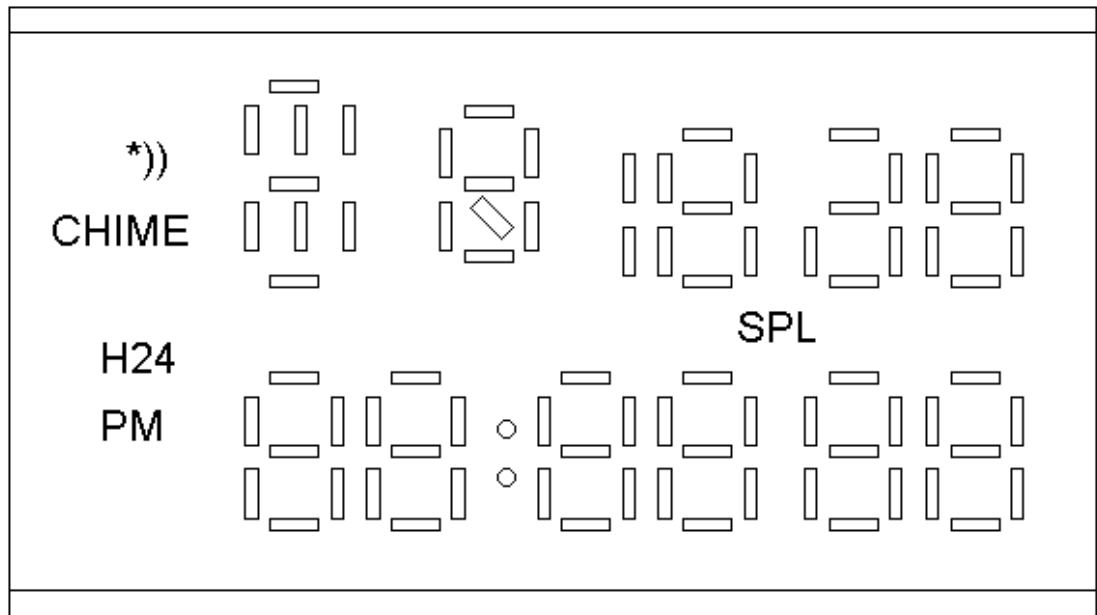
Features

- * 6 Function Real time clock.
Hour, Minute, Second, Month, Day, Weekday
- * Alarm and chime.
- * 12/24Hour format user select.
- * 4 year calendar.
- * Dual time (selected by bonding option)
- * 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 LS6103 is a 12 digit LCD watch which display Hour:Minute Second, Month, 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 3-4 second of delay. It has low power consumption.

LCD Drawing



Operation Modes

Depending on bonding option BDT, the LS6103 can be selected with/without dual time option.

When BDT is connected to GND:

The LS6103 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....

When BDT is connected to VDD (Dual Time selected):

The LS6103 has 5 modes – Clock, Alarm, Chronograph, Dual Time and Time Set Mode.

By pressing KMODE, it is shift from one mode to another as follow :

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

Time Mode

In Time Mode , the LS6103 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.

EL Output

The EL driver output is controlled by KEL. When KEL is connected to VDD, the EL driver is enabled. The EL delay is around 3 – 4 second. The EL pump frequency is 32kHz (1/2 duty cycle) at 512hz(1/2 duty cycle).

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
KEL	INPUT(PL)	Input Key
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)

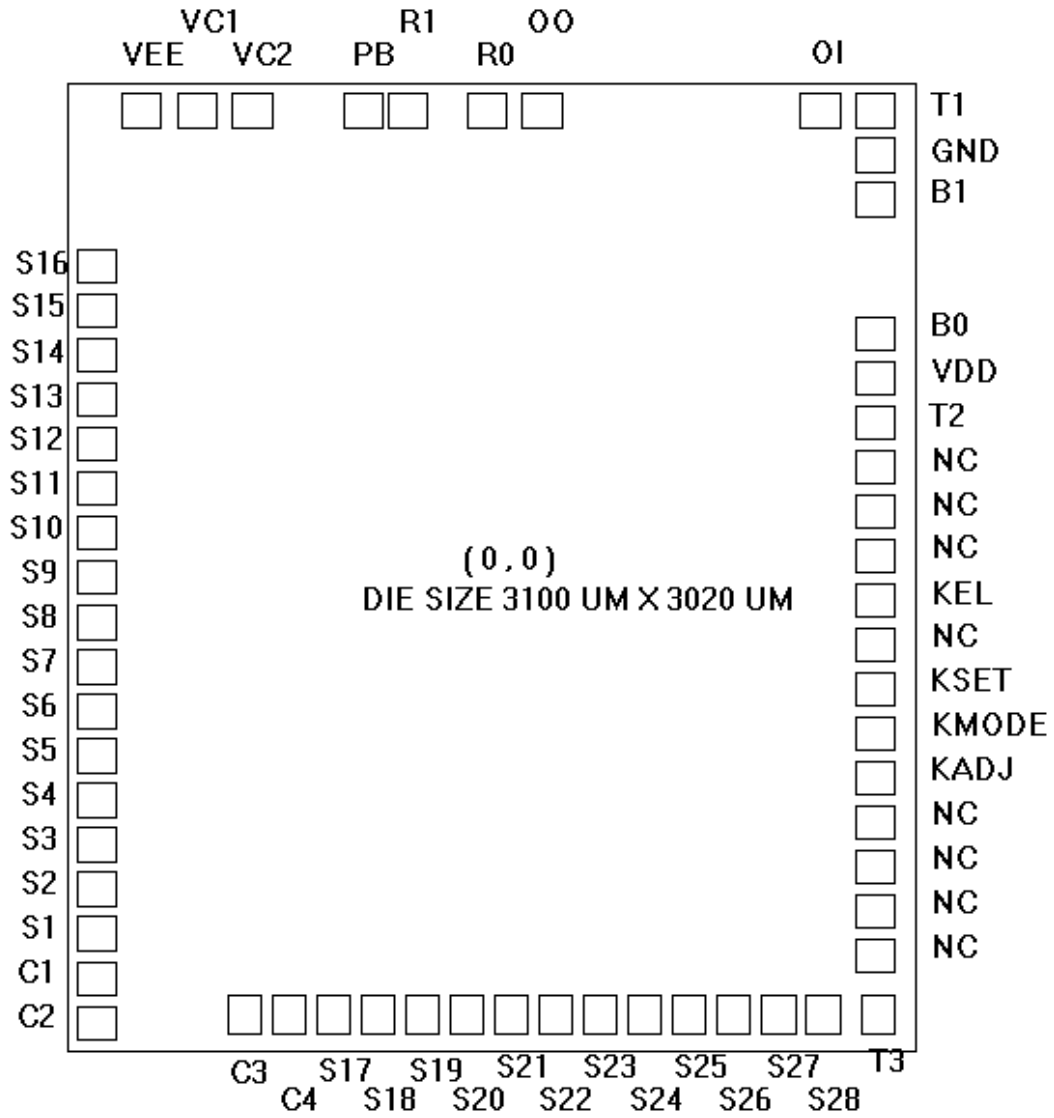
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply Voltage	Vdd	2.5	3.0	3.6	V	
Operating current	Idd	-	3	6	μA	No load
OSC. built-in cap	Cd	-	20	-	pF	
OSC. trimmer cap	Ctrim	5	-	35	pF	
Buzzer output current	Ib	500	-	-	μA	Vbd-Vss=0.5
LCD frequency	Flcd	-	64	-	Hz	
Segment current	Is	0.15	-	-	μA	Vseg=0.2V
Common current	Ic	3.0	-	-	μA	Vcom=0.2V
Trigger output current (R0, R1)	Ir	500	-	-	μA	Vr-Vss=0.7

Pad Coordinate

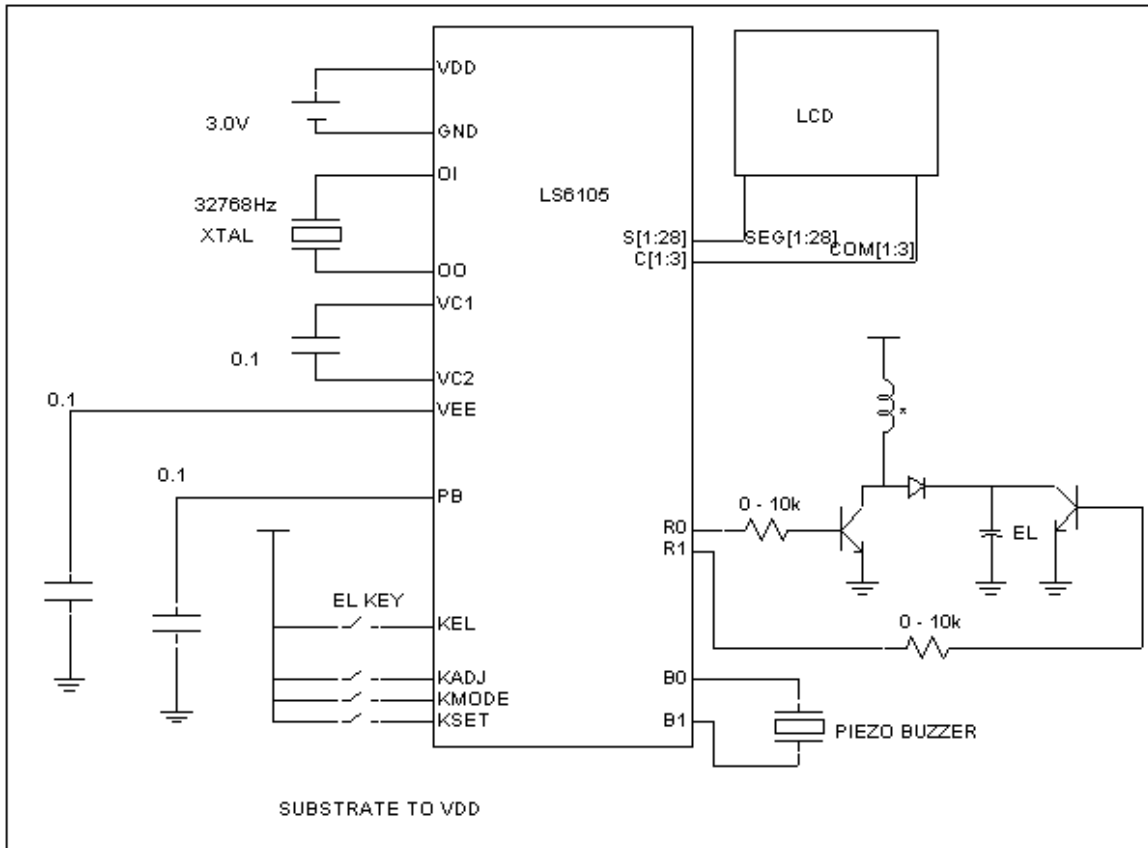
PAD	X(μm)	Y(μm)	PAD	X(μm)	Y(μm)
C2	-1500.0	-1500.0	GND	+1372.0	+1282.0
C1	-1500.0	-1366.0	B1	+1372.0	+1129.0
S1	-1500.0	-1232.0	B0	+1372.0	+821.0
S2	-1500.0	-1098.0	VDD	+1372.0	+676.0
S3	-1500.0	-963.0	T2	+1372.0	+538.0
S4	-1500.0	-766.0	NC	+1372.0	+368.0
S5	-1500.0	-632.0	NC	+1372.0	+220.0
S6	-1500.0	-434.0	NC	+1372.0	+72.0
S7	-1500.0	-300.0	KEL	+1372.0	-75.0
S8	-1500.0	-102.0	NC	+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	NC	+1372.0	-830.0
S13	-1500.0	+695.0	NC	+1372.0	-979.0
S14	-1500.0	+892.0	NC	+1372.0	-1127.0
S15	-1500.0	+1027.0	NC	+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 TABLE

PIN	SIG	C1	C2	C3
1	Seg 16	2D	H24	PM
2	Seg 15	2C	2E	1D
3	Seg 14	2G	2F	1C
4	Seg 13	2B	2A	1G
5	Seg 12	3D	:	1B
6	Seg 11	3C	3E	1A
7	Seg 10	3G	3F	1F
8	Seg 9	3B	3A	1E
9	Seg 8	4D	CH	*)
10	Seg 7	4C	4E	6D
11	Seg 6	4G	4F	6C
12	Seg 5	4B	4A	6G
13	Seg 4	5D	SPL	6B
14	Seg 3	5C	5E	6A
15	Seg 2	5G	5F	6F
16	Seg 1	5B	5A	6E
17	COM 1	C1	—	—
18	COM 2	—	C2	—
19	COM 3	—	—	C3
20	Seg 17	10A	10B	9E
21	Seg 18	10F	10G	9ADG
22	Seg 19	10E	10C	9C
23	Seg 20		10D	9B
24	Seg 21	T	P	
25	Seg 22	K	J	
26	Seg 23	D	E	
27	Seg 24	A	B	
28	Seg 25	C	F	
29	Seg 24	A'	B'	
30	Seg 23	D'	E'	WD
31	COM 3	—	—	C3
32	Seg 26	G	H	I
33	Seg 27	L	M	O
34	Seg 28	Q	R	S