LSI *LS6027*

Game (Roulette) AND Watch

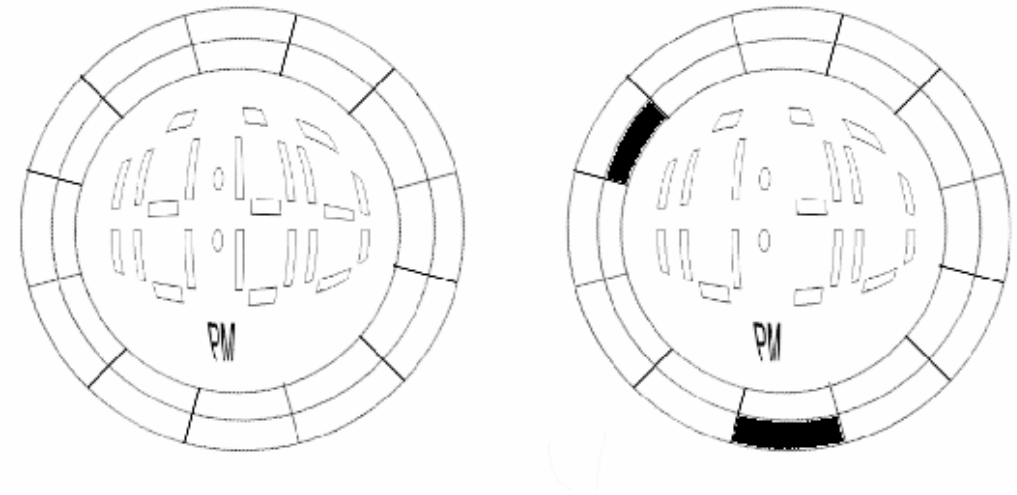
Features

* Real time clock.
* Alarm and snooze.
* 3 keys operation, KSET, KHR, KMIN.
* Analog display.
* Roulette game
* 1/2 bias 1/3 duty LCD format
* 32768 Crystal oscillator
* Single 3.0V operation.
* Direct buzzer driver.

General Description

The LS6027 is a roulette game with 3 1/2 digit LCD watch display. The current time is also displayed in an analog format with 5 minute step. It has an alarm and snooze function. It is ideal for a low cost watch, gift item or key chain. It is simple three keys operation : KSET, KHR, KMIN.

LCD Drawing



Functional Description

Power Up
At power up, all LCD segment turns on for 1 second.

Clock Mode
The LS6027 is a analog-digital watch with a roulette game. At clock mode, the LS6027 has 3 1/2 digit LCD for time display and a 12 section time range for analog clock display.

Three key operation

The LS6027 support 3 keys : KSET, KMIN, KHR.

Clock Mode:
1. Press KHR to toggle sound.
2. Press KMIN to enter Game Mode.
3. Press KSET to enter Setting Mode.

Setting Mode :
At Clock Mode, press KSET to enter Setting Mode in the following sequence:

Clock Mode ➔ Set Alarm enable/disable ➔ Set Alarm Hour:Minute ➔ Set Time Hour:Minute ➔Clock Mode……

In Set Alarm/Time Mode, press KHR to set hour, press KMIN to set minute.
In Set Alarm Enalble/Disable, press KHR/KMIN toggles alarm enalbe/disable.

In all setting mode, if the value is changed, press KSET set will exit setting mode and goes back to Clock Mode.

At Game Mode,
1. Press KMIN to start the roulette.
2. Press KHR to toggle sound.
3. Press KSET goes back to Clock Mode.

The Rule of the game.

Every time the KHR is pressed , 20 marks will be deducted.
If the icon stops at H12, M12, H4, M4, H8, H8, the mark will be incremented according to the table.

Pattern	Add Marks
H12	100
M12	50
H8	30
M8	20
H4	30
M4	20

Pin Assignment

DESIGNATION	TYPE	DESCRIPTION
B0, B1	OUTPUT	Buzzer output
F512, VCAP	OUTPUT	Doubler output
VEE	OUTPUT	VEE
T1, T2, XT4, XT5, XT6, XT7, XT8, XT9, XT10, XT11, XT3	INPUT	TEST pin
COSCO	OUTPUT	32KHz oscillator output
COSCI	INPUT	32KHz oscillator input
VDD	POWER	+3.0V power supply
GND	POWER	Ground
KSET, KMIN, KHR	INPUT(PH)	Input key
PB	INPUT(PH)	Power up reset
C[1:3]	OUTPUT	LCD Common output
S[1:16]	OUTPUT	LCD Segment output

Note: (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

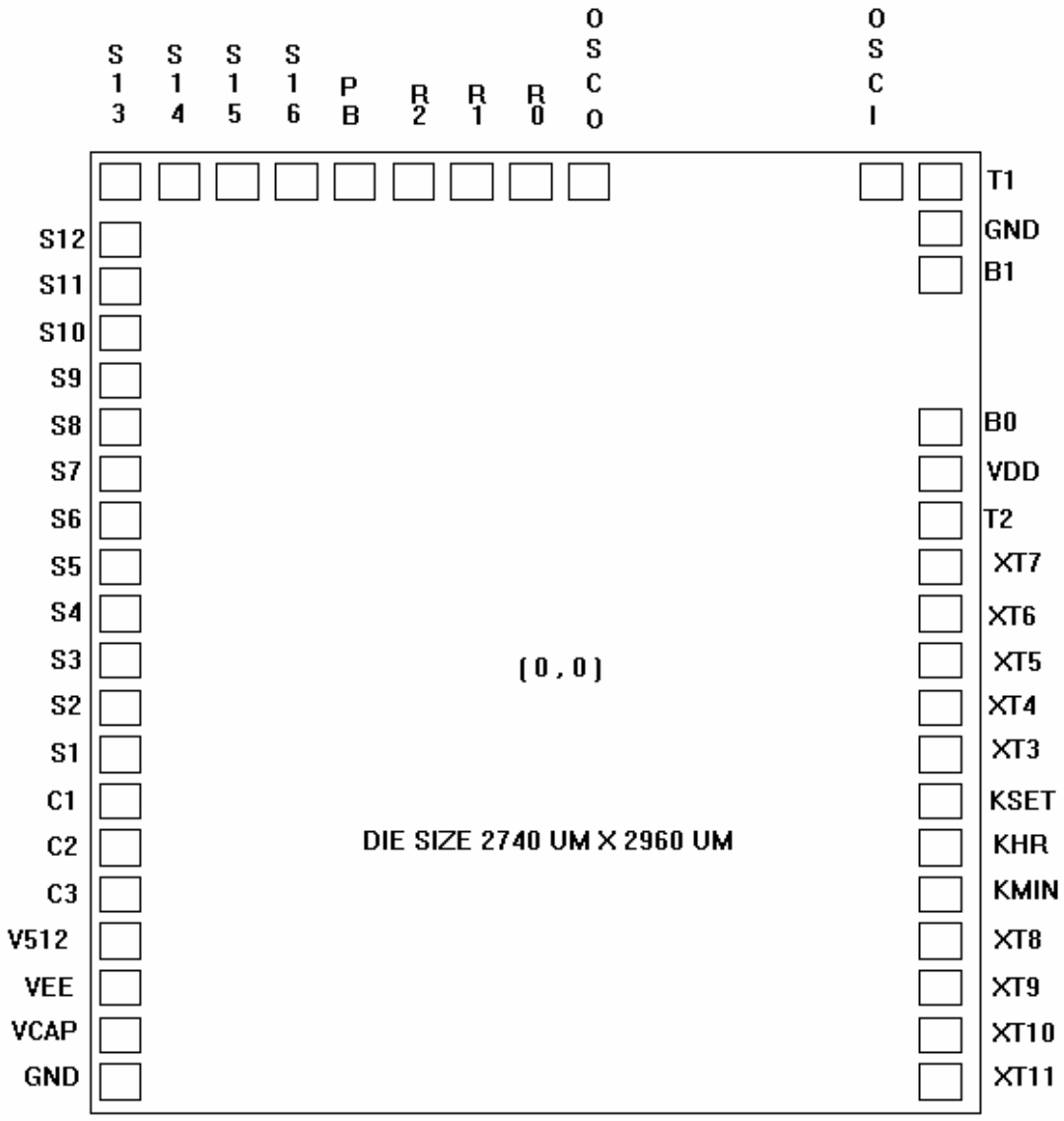
(GND = 0V, Vdd = 1.5V, Ta = 25°C unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply Voltage	Vdd	2.4	3.0	3.6	V	
Operating current	Idd	-	5	9	µA	No load
OSC. built-in cap	Cd	-	20	-	pF	
OSC. trimmer cap	Ctrim	5	-	35	pF	
Frequency stability	^f/f	-	-	10	ppM	Vdd=3.0
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

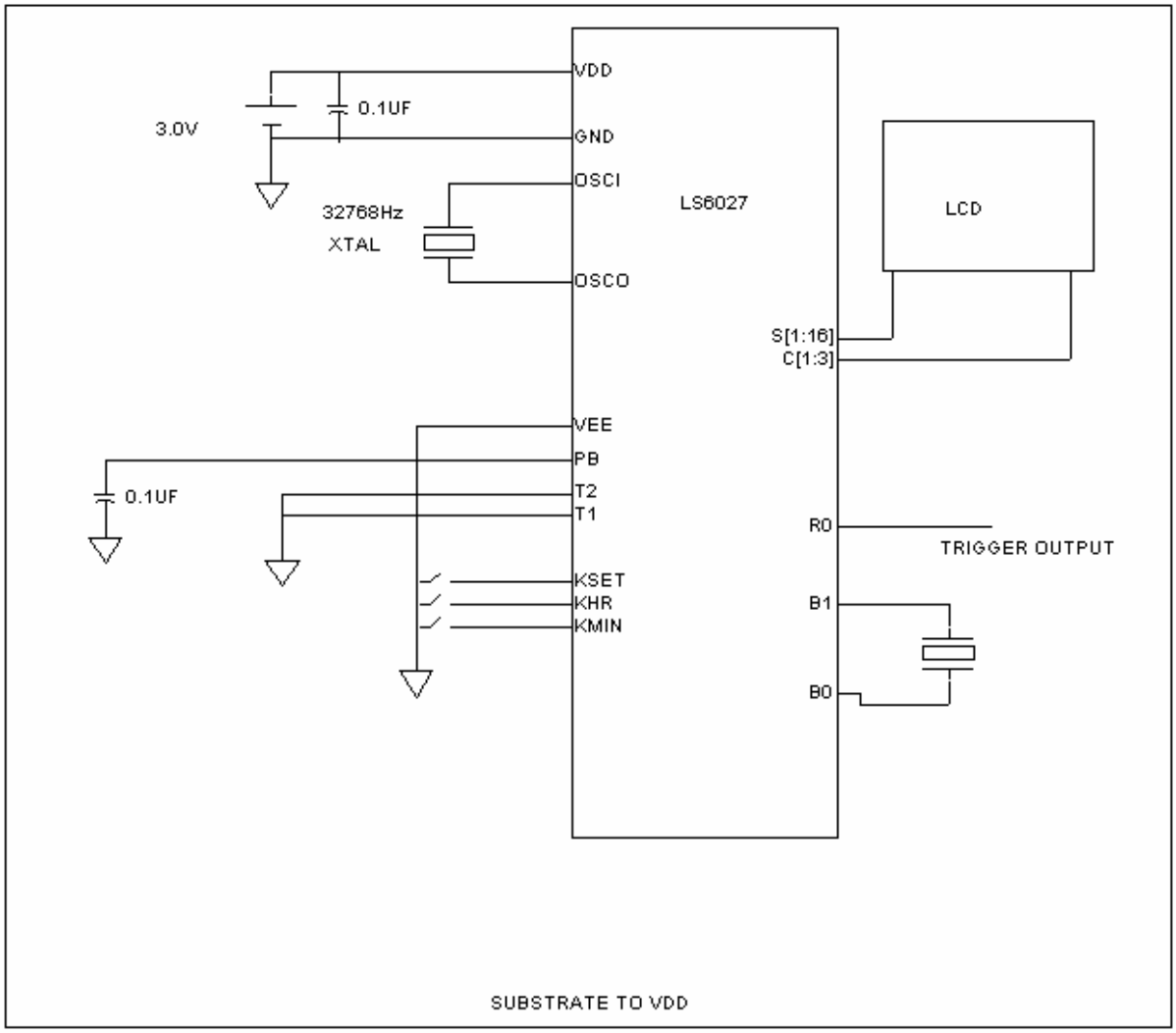
Pad Coordinate

PAD	X(μm)	Y(μm)	PAD	X(μm)	Y(μm)
GND	-1295.0	-1394.0	PB	-743.0	+1350.0
VCAP	-1295.0	-1251.0	R2	-593.0	+1350.0
VEE	-1295.0	-1110.0	R1	-449.0	+1350.0
V512	-1295.0	-965.0	R0	-225.0	+1350.0
C3	-1295.0	-825.0	OSCO	-75.0	+1350.0
C2	-1295.0	-685.0	OSCI	+1105.0	+1340.0
C1	-1295.0	-545.0	T1	+1246.0	+1340.0
S1	-1295.0	-400.0	GND	+1246.0	+1140.0
S2	-1295.0	-260.0	B1	+1246.0	+988.0
S3	-1295.0	-120.0	B0	+1246.0	+678.0
S4	-1295.0	+20.0	VDD	+1246.0	+543.0
S5	-1295.0	+160.0	T2	+1246.0	+395.0
S6	-1295.0	+300.0	XT7	+1246.0	+226.0
S7	-1295.0	+440.0	XT6	+1246.0	+78.0
S8	-1295.0	+580.0	XT5	+1246.0	-70.0
S9	-1295.0	+720.0	XT4	+1246.0	-216.0
S10	-1295.0	+860.0	XT3	+1246.0	-365.0
S11	-1295.0	+1000.0	KSET	+1246.0	-513.0
S12	-1295.0	+1140.0	KHR	+1246.0	-661.0
S13	-1303.0	+1350.0	KMIN	+1246.0	-809.0
S14	-1163.0	+1350.0	XT8	+1246.0	-957.0
S15	-1023.0	+1350.0	XT9	+1246.0	-1105.0
S16	-883.0	+1350.0	XT10	+1246.0	-1253.0
			XT11	+1246.0	-1400.0

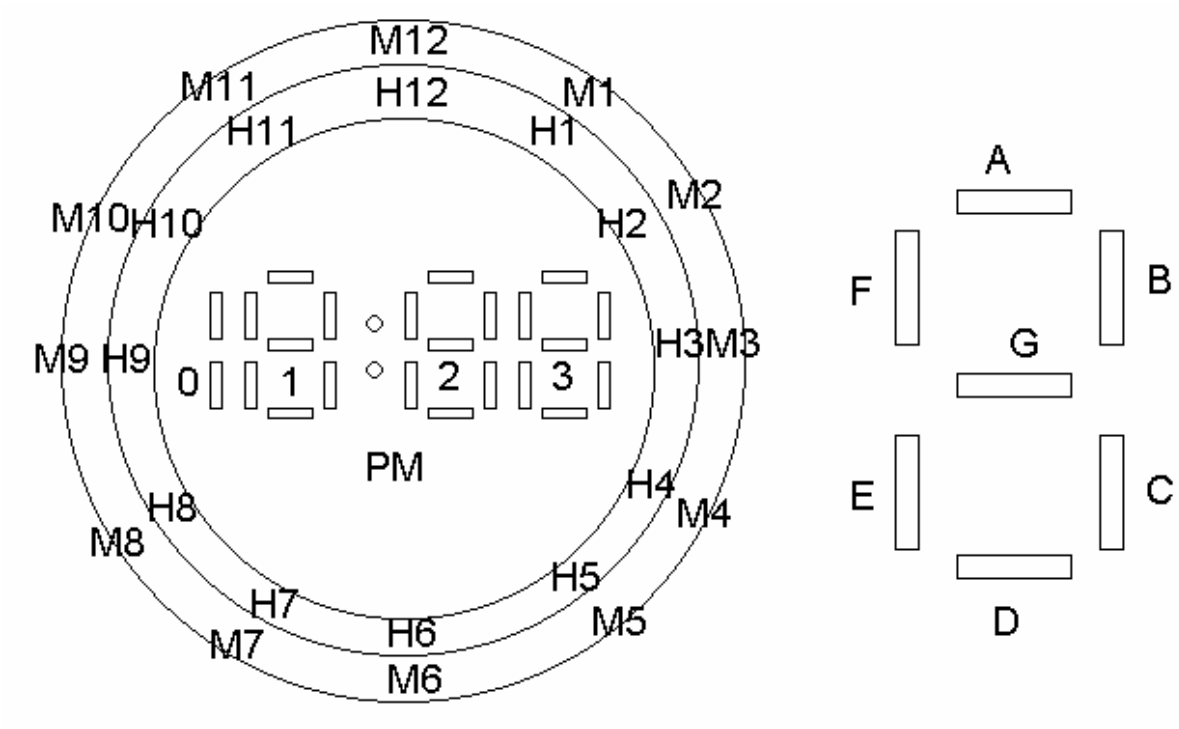
Pad Location



Application Circuit



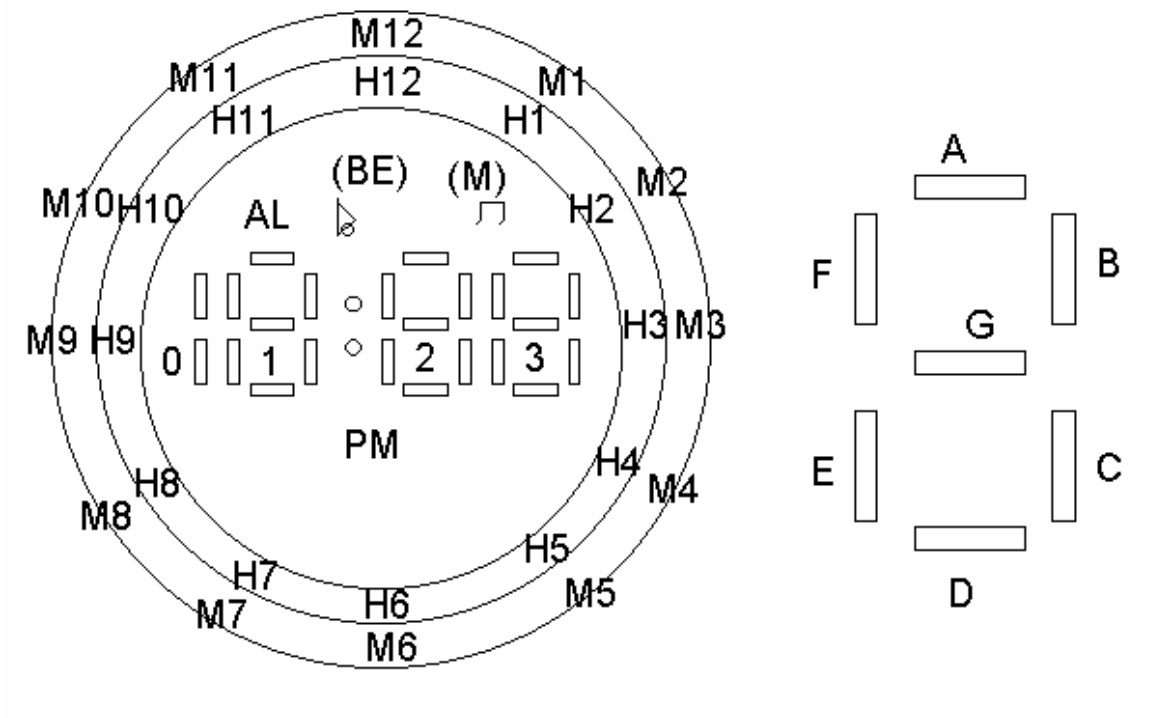
LCD Drawing



	S16	S15	S14	S13	S12	S11	S10	S9	S8	S7	S6	S5	S4	S3	S2	S1
C1:	3C	3G	3E	3D	2C	2G	2E	2D	1C	1G	1E	1D	H6	M6	H9	M9
C2:	3B	3A	3F	PM	2B	2A	2F	:	1B	1A	1F	0BC	H5	M5	H8	M8
C3:	H3	M3	H2	M10	M2	H1	M1	H12	M12	H11	M11	H10	H4	M4	H7	M7

Note: Pin out at top of the LCD

PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
SX	C3	C2	C1	S1	S2	S3	S4	S13	S5	S6	S7	S8	S9	S10	S11	S12	S14	S15	S16
C1	/	/	C1	M9	H9	M6	H6	3D	1D	1E	1G	1C	2D	2E	2G	2C	3E	3G	3C
C2	/	C2	/	M8	H8	M5	H5	PM	0BC	1F	1A	1B	:	2F	2A	2B	3F	3A	3B
C3	C3	/	/	M7	H7	M4	H4	M10	H10	M11	H11	M12	H12	M1	H1	M2	H2	M3	H3



PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
SX	C3	C2	C1	S1	S2	S3	S4	S13	S5	S6	S7	S17	S8	S9	S18	S10	S11	S12	S14	S19	S15	S16
C1	/	/	C1	M9	H9	M6	H6	3D	1D	1E	1G	/	1C	2D	/	2E	2G	2C	3E	/	3G	3C
C2	/	C2	/	M8	H8	M5	H5	PM	0BC	1F	1A	/	1B	:	/	2F	2A	2B	3F	/	3A	3B
C3	C3	/	/	M7	H7	M4	H4	M10	H10	M11	H11	AL	M12	H12	BE	M1	H1	M2	H2	M	M3	H3