

Features :

- * 2-Function : Hour and Minute.
- * 60-second Alarm.
- * Snooze function.
- * 7 switches.
- * 32768HZ quartz crystal time base.
- * Single 1.5v battery operation.
- * Low power dissipation.
- * Alarm sound demonstration with increasing alarm sound.
- * Direct drive 1/2 bias 1/3 duty LCD.
- * 12/24 Hour format bonding option.
- * Built-in EL driver.
- * 16 dots animation function.

Functional Description

The LS3273E is provided with HOUR, MINUTE and SNOOZE key. It also has two switches : the SETTING switch and ALARM ENABLE/DISABLE switch. It can be operated in 12 or 24 HOUR format depending on bonding option. This chip provides a variable alarm sound with crescendo. 16 dots animation function. Built-in EL driver with 1.5 seconds of delay.

Functional Description

24-hour format is selected when the MODE pad is connected to VDD.

12-hour format is selected when the MODE pad is connected to GND.

PM indicator is on from 12:00PM to 11:00PM off from 12:00AM to 11:59AM in 12-hour format.

Colon ON in “Alarm Time” mode and 0.5sec ON, 0.5 sec OFF in “Normal Time” mode.

Alarm Time indicator ON in “Alarm Time” mode, OFF in “Normal Time” mode.

Snooze indicator ON in “Snooze Standby” mode, 0.5 sec ON, 0.5 sec OFF in “Snooze” mode and OFF in “Alarm Off” mode.

Alarm indicator is ON in “Alarm ON” mode, OFF in “Alarm OFF” mode.

In “Setting” mode,

- hour digit advances by +1 when HR switch is depressed
- minute digit advances by +1 when MIN switch is depressed
- digit (hour or minute) advances automatically at 4 HZ rate by keeping HR switch or MIN switch depressed more than 2 seconds.

MODE SELECT

Alarm time is displayed while HR or MIN switch is depressed; “Setting” mode is selected by depressing either NORS or ALS switch; and “Alarm” is selected by pressing ALMOFF and SNZ switches simultaneously.

ALARM FUNCTION

Alarm function can be operated in all modes except alarm off mode.

Alarm buzzer sounds for 1 minute in either alarm standby or snooze standby mode when normal time corresponds to set alarm time. A momentary closure of ALSTOP, of changing of any mode switches will stop the alarm buzzer sound.

SNOOZE FUNCTION

Snooze function can be operated in Alarm Time mode, Alarm Time Setting mode, and Normal Time Setting mode. When Snooze Stand-by mode is selected and normal time corresponds to alarm time, buzzer sound will output and snooze indicator will flash at 1HZ rate; 0.5 sec ON, 0.5 sec OFF, and snooze function will operate.

If ALSTOP switch is turned ON while buzzer is sounding, alarm sound will be suspended once, but buzzer sound will start 4 minutes later and will continue.

If ALSTOP switch is not turned ON while buzzer is sounding, alarm sound will stop after 1 minute, and snooze operation will be released, returning the clock to Snooze Standby mode.

Snooze function can also be cancelled by changing of any mode switch.

EL FUNCTION

When KSET is pressed At any mode, the EL/LIGHT delay is around 1.5 seconds.

Pin Assignment

DESIGNATION	TYPE	DESCRIPTION
B0, B1	OUTPUT	Buzzer output
V1, V2	OUTPUT	Doubler output
VEE	OUTPUT	-1.5V
T1, T2	INPUT	TEST pin
OO	OUTPUT	32KHz oscillator output
OI	INPUT	32KHz oscillator input
VDD	POWER	+1.5V power supply
GND	POWER	Ground
HR,MIN,SNZ,I8	INPUT(PL)	Input key
ALS,NORS,ALOFF,MODE,ALSTOP	INPUT	Bonding option
PB	INPUT(PH)	Power up reset
C[1:3]	OUTPUT	LCD Common output
S[1:17]	OUTPUT	LCD Segment output

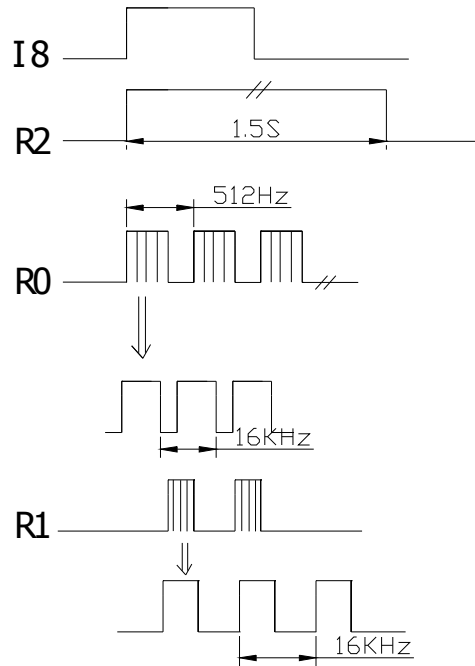
Note: (PH) - pull high;

16 Animation dots moving

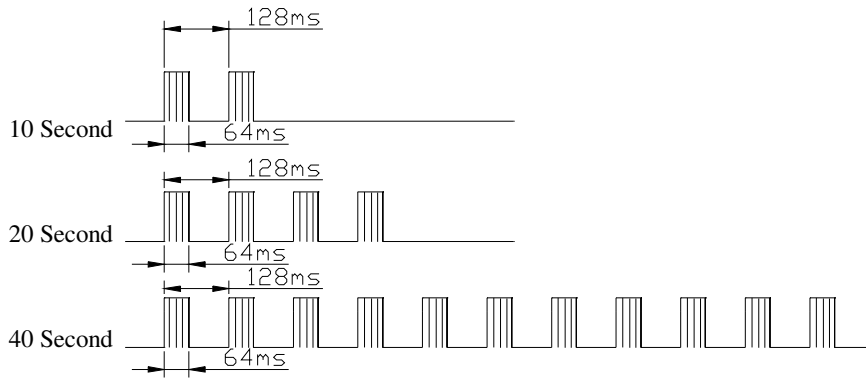
	AA1	AA2	AA3	AA4	AA5	AA6	AA7	AA8	AA9	AA10	BB1	BB2	BB3	BB4	BB5
Second1	*										*				
Second2	*	*									*	*			
Second3	*	*	*								*	*	*		
Second4	*	*	*	*							*	*	*	*	
Second5	*	*	*	*	*						*	*	*	*	*
Second6	*	*	*	*	*	*					*	*	*	*	
Second7	*	*	*	*	*	*	*				*	*	*		
Second8	*	*	*	*	*	*	*	*			*	*			
Second9	*	*	*	*	*	*	*	*	*		*				
Second10	*	*	*	*	*	*	*	*	*	*					
Second11		*	*	*	*	*	*	*	*	*	*				
Second12			*	*	*	*	*	*	*	*	*	*			
Second13				*	*	*	*	*	*	*	*	*	*		
Second14					*	*	*	*	*	*	*	*	*	*	
Second15						*	*	*	*	*	*	*	*	*	*
Second16							*	*	*	*	*	*	*	*	*
Second17								*	*	*	*	*	*		
Second18									*	*	*	*			
Second19										*	*				
Second20															

**** After second 20, it will be returned to second1.**

EL output Waveform



Alarm output Waveform (4KHz, 50% duty)



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

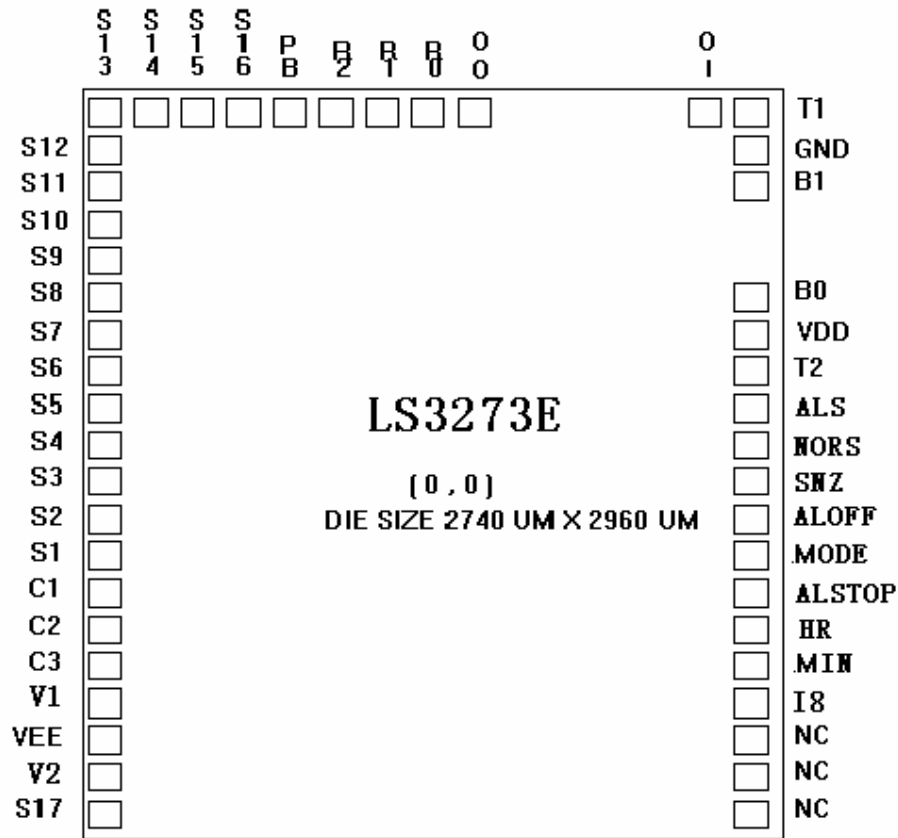
(GND = 0V, Vdd = 1.5V, Ta = 25°C unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply Voltage	Vdd	1.25	1.5	1.75	V	
Operating current	Idd	-	2	3	μA	No load
OSC. built-in cap	Cd	-	20	-	pF	
OSC. trimmer cap	Ctrim	5	-	35	pF	
Frequency stability	$\Delta f/f$	-	-	10	ppM	Vdd=1.6-1.4
Buzzer output current	Ib	200	-	-	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

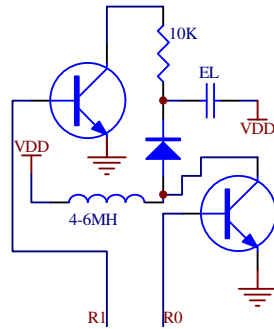
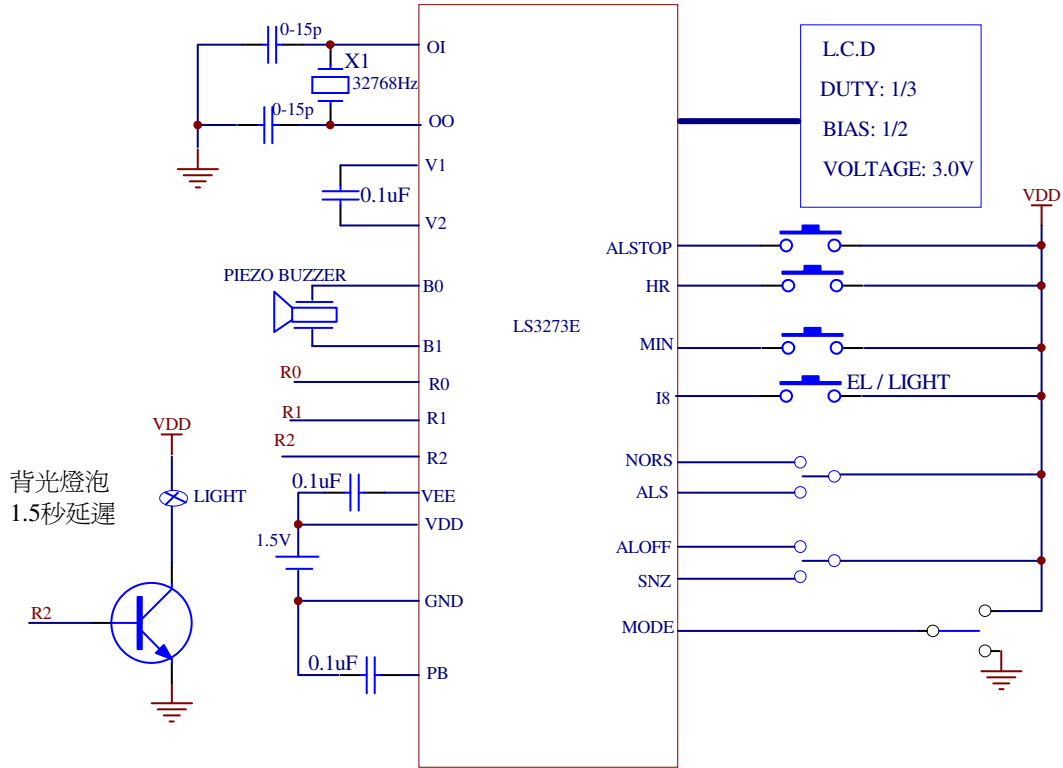
PAD	X(μ m)	Y(μ m)	PAD	X(μ m)	Y(μ m)
S17	-1295.0	-1394.0	PB	-743.0	+1350.0
V2	-1295.0	-1251.0	R2	-593.0	+1350.0
VEE	-1295.0	-1110.0	R1	-449.0	+1350.0
V1	-1295.0	-965.0	R0	-225.0	+1350.0
C3	-1295.0	-825.0	OO	-75.0	+1350.0
C2	-1295.0	-685.0	OI	+1105.0	+1340.0
C1	-1295.0	-545.0	T1	+1246.0	+1340.0
S1	-1295.0	-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	ALS	+1246.0	+226.0
S7	-1295.0	+440.0	NORS	+1246.0	+78.0
S8	-1295.0	+580.0	SNZ	+1246.0	-70.0
S9	-1295.0	+720.0	ALOFF	+1246.0	-216.0
S10	-1295.0	+860.0	MODE	+1246.0	-365.0
S11	-1295.0	+1000.0	ALSTOP	+1246.0	-513.0
S12	-1295.0	+1140.0	HR	+1246.0	-661.0
S13	-1303.0	+1350.0	MIN	+1246.0	-809.0
S14	-1163.0	+1350.0	I8	+1246.0	-957.0
S15	-1023.0	+1350.0	NC	+1246.0	-1105.0
S16	-883.0	+1350.0	NC	+1246.0	-1253.0
			NC	+1246.0	-1400.0

Pad Location



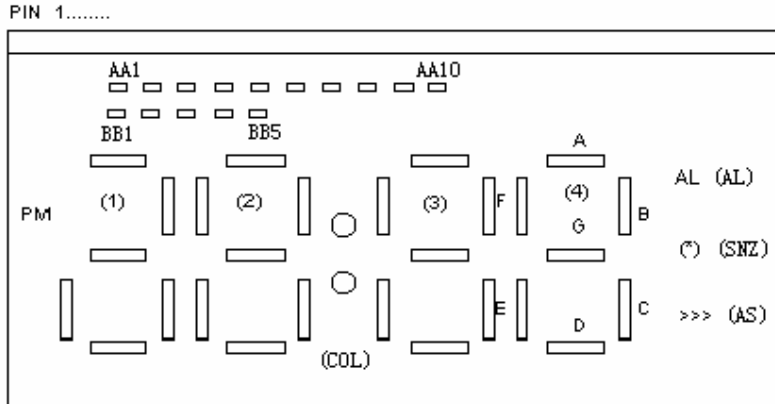
IC Substrate to VDD

Application Circuit



VDD=1.5V

Lcd pinout



PIN	SIG	COM1	COM2	COM3
1	C2	/	COM2	/
2	S2	/	/	AA1
3	S3	COL	PM	AA2
4	S4	C1	ADEG1	AA3
5	S5	D2	B1	AA4
6	S6	E2	F2	AA5
7	S7	G2	A2	AA6
8	S8	C2	B2	AA7
9	S9	E3	F3	AA8
10	S10	G3	AD3	AA9
11	S11	C3	B3	AA10
12	S13	E4	F4	BB2
13	S14	G4	A4	BB3
14	S15	C4	B4	BB4
15	S16	D4	AS	BB5
16	S12	SNZ	AL	BB1
17	C1	COM1	/	/
18	C3	/	/	COM3