The clock IC SDL9051 is a low-threshold-voltage, ion-implanted metal gate CMOS integrated circuit that provides signals to drive an 4-digit duplexes liquid crystal display with colon, PM/AM-Time mark and ALM/CH mark.

FUNCTIONS

- 5 Functions: month, date, hour, minute, second
- Setting alarm time with/without 4.5min snooze
- 30-second alarm sound
- Chime on every hour
- User selectable 12-hour/24-hour format
- 4 year calendar
- One-touch correction of time error within ±30 seconds
- Alarm, chime enable/disable operation
- 2-switch sequential operation
- LCD test

FEATURES

- Single-chip CMOS construction
- Drives 4-bigit duplexes LCD with PM/AM-Time, alma mark and chime mark
- Colon display
- Direct drive of piezoelectric transducer
- Low power dissipation
- 32,768Hz crystal frequency
- On-chip oscillator, capacitor and resistors
- On-chip voltage doublers
- Single 1.5V battery operation
- Denounce circuitry on switch inputs
- Protection against static discharge

ABSOLUTE MAXIMUM RATINGS

(Ta = 25℃)

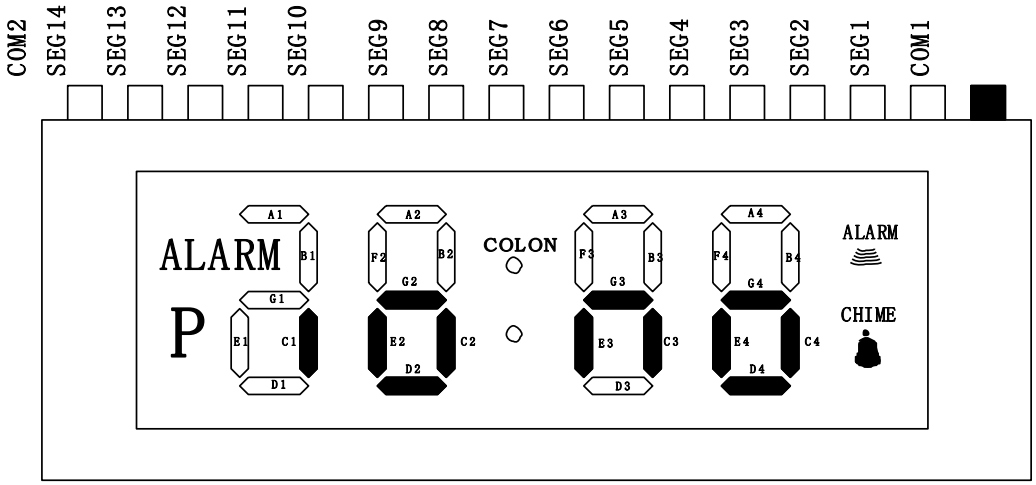
Characteristic	Symbol	Value	Unit
Supply voltage (0V-Vcc)	V_{DS}	-0.3 ~ +2.0	V
Supply voltage (0V-VOCC2)	V_{DE}	-0.3 ~ +4.0	V
Operating temperature	Topr	-20 ~ +75	℃
Storage temperature	Tstg	-55 ~ +125	℃

* Voltage greater than above may result in damage the circuit

* SUBSTRATE should be connected with Vdd

ELECTRICAL CHARACTERISTICS (Ta = 25℃, V_{DD} = 0V, Vss = 1.5V; unless otherwise specified)

Item	Conditions	Symbol	Min	Typ	Max	Unit
Operation voltage	-	Vss	1.2	1.5	1.8	V
	-	V_{EE}	2.4	3.0	3.6	V
Supply current	Without load	I_{DD}	-	1.0	2.0	uA
Input high voltage	-	V_{IH}	VDD-0.3	-	VDD	V
Input low voltage	-	V_{IL}	Vss	-	Vss+0.3	V
Switch activation current	$V_{IN} = V_{DD}$	Isw	0.1	5.0	10.0	uA
Oscillator start voltage	Sithin 5 sec	Vosc	-	-	1.45	V
Oscillator stop voltage	-	Vosp	-	-	1.15	V
Alarm drive current	V_{SAT} = 0.5V (Both direction)	I_{ALA}	0.5	2.0	-	mA
Oscillator frequency	-	Fosc	-	32.768	-	Hz
DC-DC conversion frequency	C1 = C2 = 0.2uF	Fcon	-	1.024	-	Hz
LCD frequency	-	F_D	-	32	-	Hz
Oscillator input capacitor	-	C_{IN}	-	20	-	pF
Time stability	Vss = -1.3-1.8 (C_{OUT} = 25pF)	T_{STB}	-	1	3	ppm



PIN	COM2	SEG14	SEG13	SEG12	SEG11	SEG10	SEG9	SEG8
COM1	/	PM	C1	D2	E2	G2	C2	D4
COM2	COM2	AL	ADEG1	B1	F2	A2	B2	COLON
PIN	SEG7	SEG6	SEG5	SEG4	SEG3	SEG2	SEG1	COM1
COM1	E3	G3	C3	E4	G4	C4	CHIME	COM1
COM2	F3	AD3	B3	F4	A4	B4	ALARM	/

Fig.1

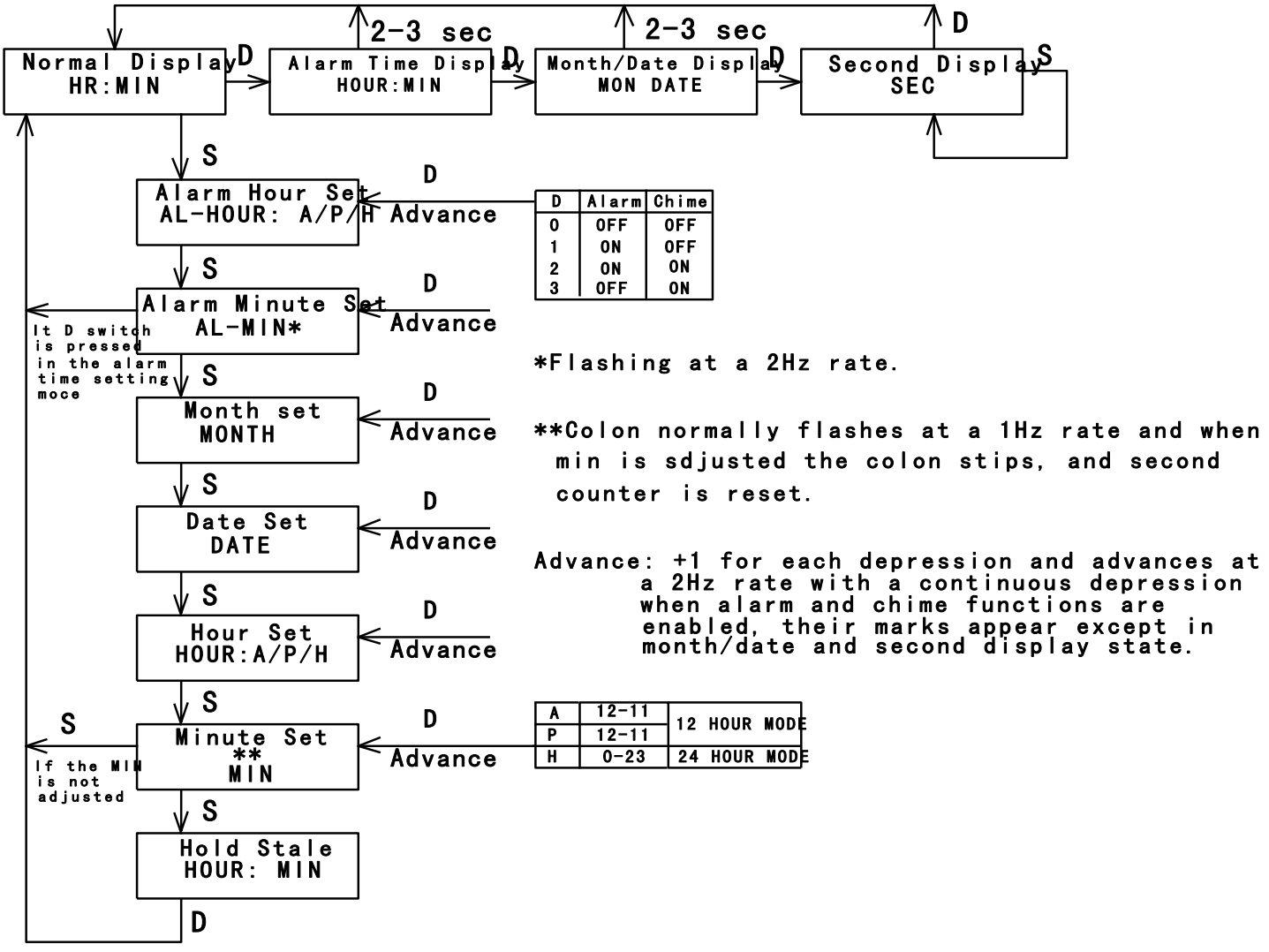

Normal Display
HR:MIN
Alarm Time Display
HOUR:MIN
Month/Date Display
MON DATE
Second Display
SEC
2-3 sec
2-3 sec
D
S
Alarm Hour Set
AL-HOUR: A/P/H
Advance
Alarm Minute Set
AL-MIN*
Month set
MONTH
Date Set
DATE
Hour Set
HOUR:A/P/H
Minute Set
**
MIN
Hold Stale
HOUR: MIN
If D switch is pressed in the alarm time setting moce
If the MIN is not adjusted
D Alarm Chime
0 OFF OFF
1 ON OFF
2 ON ON
3 OFF ON
A 12-11 12 HOUR MODE
P 12-11
H 0-23 24 HOUR MODE
*Flashing at a 2Hz rate.
**Colon normally flashes at a 1Hz rate and when min is sdjusted the colon stips, and second counter is reset.
Advance: +1 for each depression and advances at a 2Hz rate with a continuous depression when alarm and chime functions are enabled, their marks appear except in month/date and second display state.

Fig.2

ALARM TIMING DIAGRAMIN THE SNOOZE MODE

In the existing version the SNOOZE function is executed when the ALARM mode is set (the ALARM icon is tumid on). When the current time reaches a preset alarm time a 30sec. Alarm sound is generated (period T1 in Fig.3). pressing the D

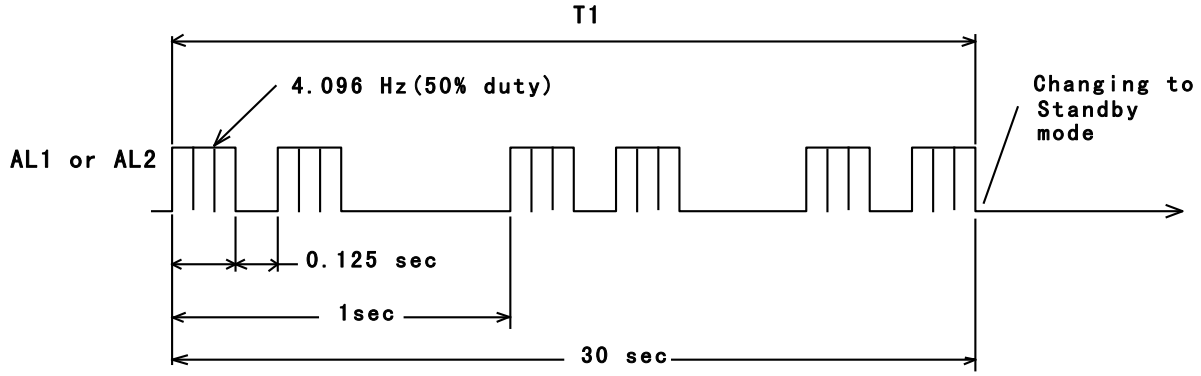
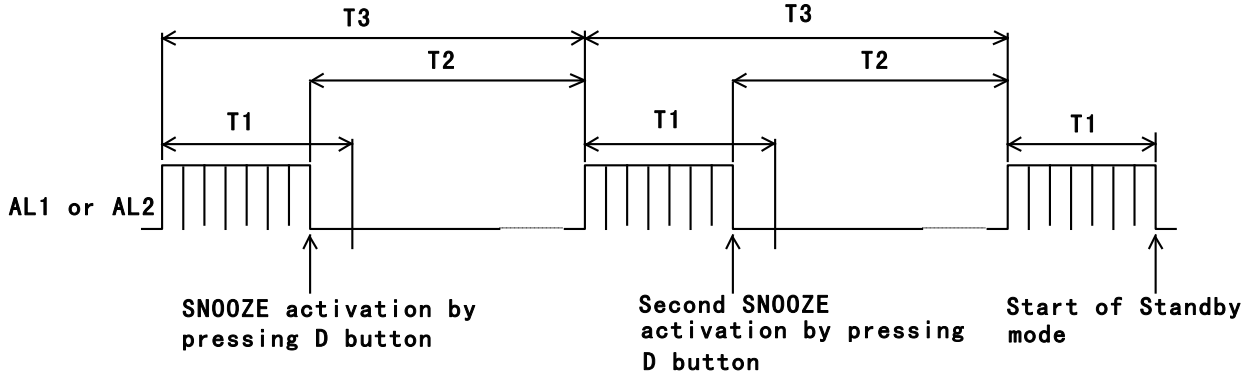


Fig.3. Alarm timings Diagram

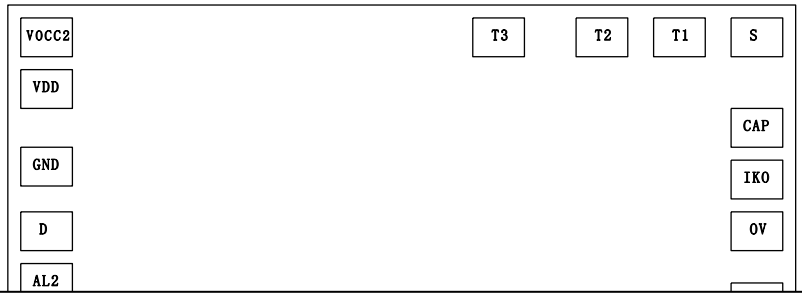


T1 = 30sec, alarm sound duration.

T2 = 4-5min, time to next alarm sound in the SNOOZE mode, ALARM icon flashing.

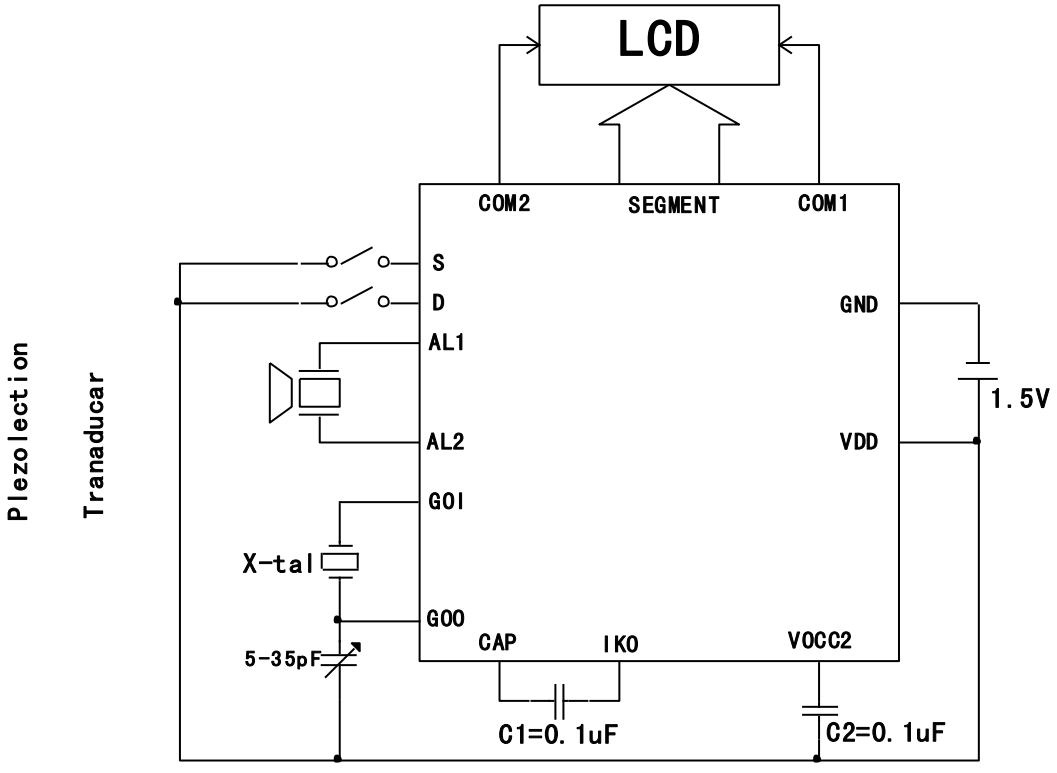
T3 = 5min.

Fig.4. Alarm timings Diagram in the SNOOZE mode.



IC尺寸:
1100*1100

2 3 4



升压比是倍负压,蜂鸣片用4K,1/2DUTY 1/2BIAS