RCL Semiconductors Ltd.

Six Functions Six Digit Alarm Watch With EL Back Light Control

C1927

GENERAL DESCRIPTION

C1927 is a CMOS digital 6-function watch integrated circuit with alarm, snooze, auto-ranging chronograph function and EL Back light control; designed to for a 6-digit duplex liquid crystal display, 7-day mark, date mark, AM/PM mark and colon.

FUNCTIONS

- 6 Functions: Month, Date, Day-of-Week, Hour, Minute, Second.
- EL Back light control with 3 seconds delay.
- 6-digits Chronograph: Auto-ranging after 30 minutes to hour, minute; second.
- User selectable 12-hour/24-hour format.
- Alarm output for melody IC.
- Snooze function with 5 minutes interval.
- One-touch correction of time error within +/-30 seconds.
- Fast advance for time and alarm time set.
- Chime on every hour.
- 3-switch sequential operation.
- LCD test.

FEATURES

- Single battery operation (2.6-3.6V).
- 32,768Hz crystal frequency.
- Single-chip CMOS construction and low power dissipation.
- On chip voltage divider transducer.
- Drives 6-digit duplex LCD with 7-day mark, AM/PM mark, date mark and alarm mark.
- Built-in EL Back light control circuit.
- Colon display.
- Direct drive of piezoelectric transducer at 3-volt peak to peak.
- De-bounced circuitry on switch inputs.
- ESD protection.

ABSOLUTE MAXIMUM RATINGS

(T2 = 25 °C)

Parameter	Symbol	Limits
Supply Voltage (V_{DD1} - V_{SS})	V_{DS1}	- 0.3V to +2.0V
Supply Voltage (V_{DD2} - V_{SS})	V_{DS2}	- 0.3 V to +4.0V
Operating Temperature	T2	-10°C to +60°C
Storage Temperature	Tstg	-55°C to +125°C

3 Dai Fu Street, Tai Po Industrial Estate, Tai Po, N.T. , Hong Kong.
Tel : (852)-26659229 Fax : (852)-26652201

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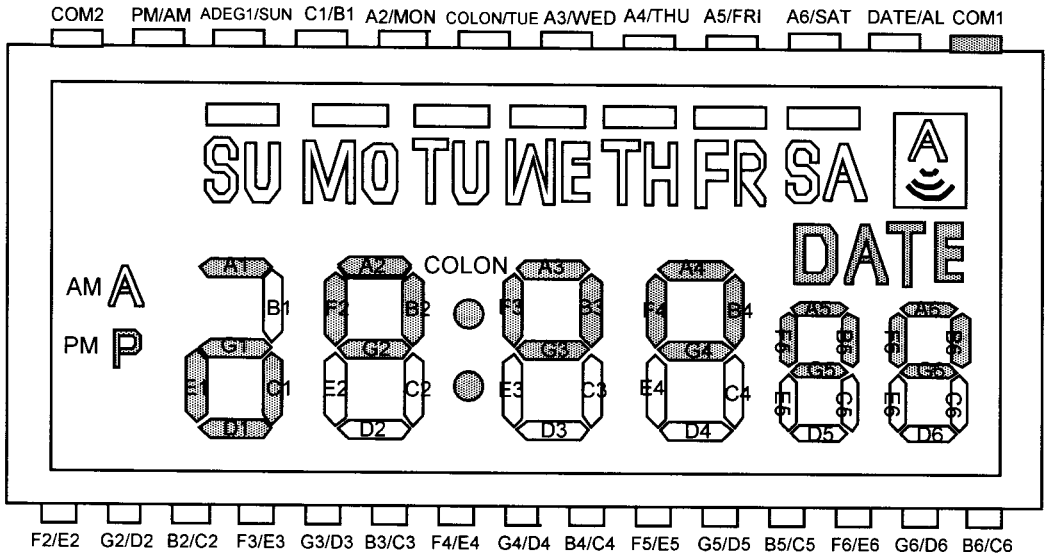
DC ELECTRICAL CHARACTERISTICS

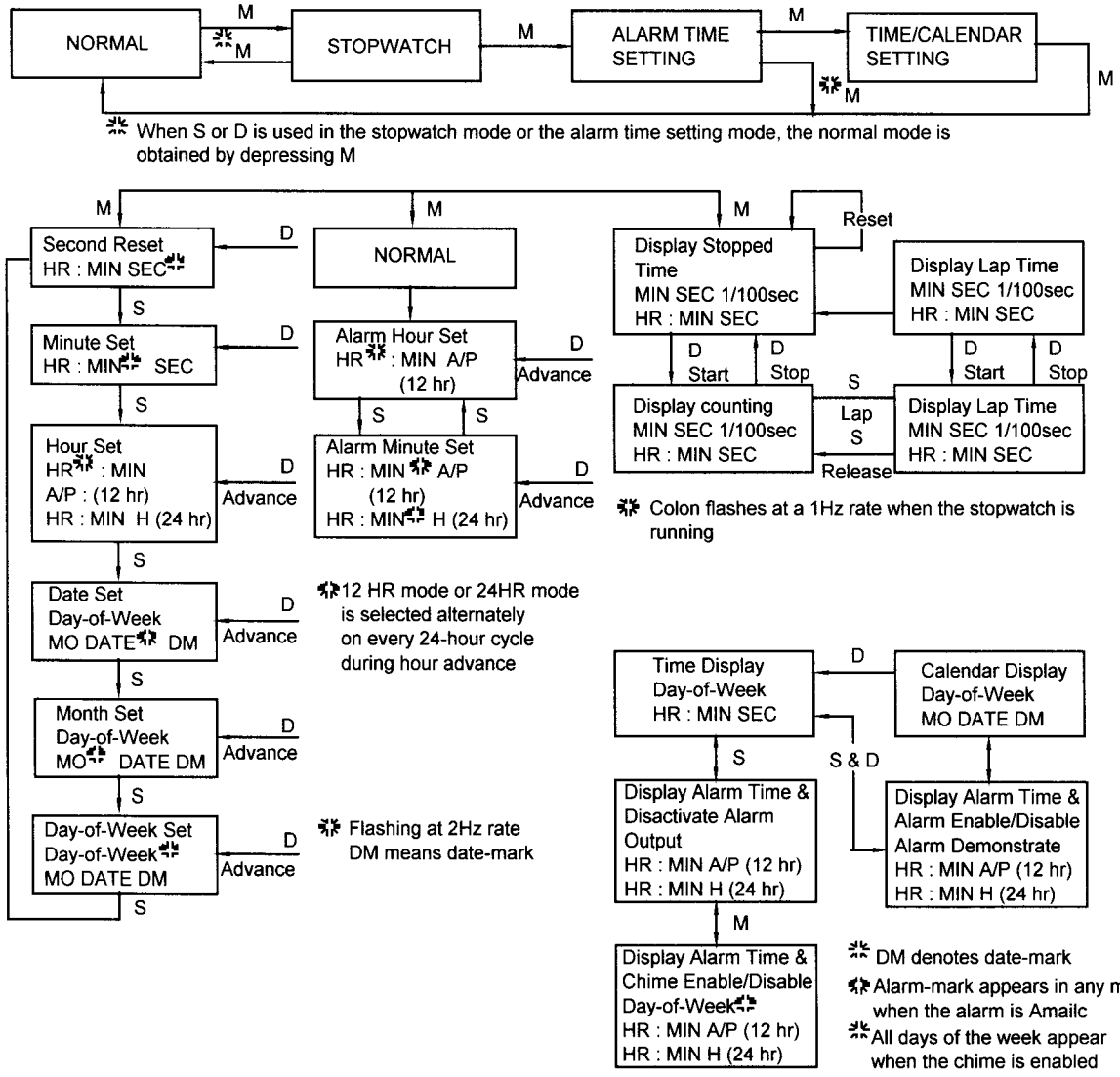
(T_2 = 25°C, V_{SS} = 0V, V_{DD} = 3.0V unless otherwise specified.)

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Operating Voltage	VDD1	1.3	1.5	1.8	V	-
	VDD2	2.6	3.0	3.6	V	-
Supply Current	IDD	-	1.0	3.5	µA	Without load
Oscillator Frequency	FOSC	-	32,768	-	Hz	-
LCD Frequency	FD	-	32	-	Hz	-
IND Output Source Current	IOH1	0.6	1.0	-	mA	VOH = 0.8V
EL Output Source Current	IOH2	0.4	0.8	-	mA	VOH = 0.8V
EL Ouput Sink Current	IOL2	0.5	0.8	-	mA	VOL = 0.8V
IND Ouput Sink Current	IOL1	4.0	15	-	mA	VOL = 0.8V

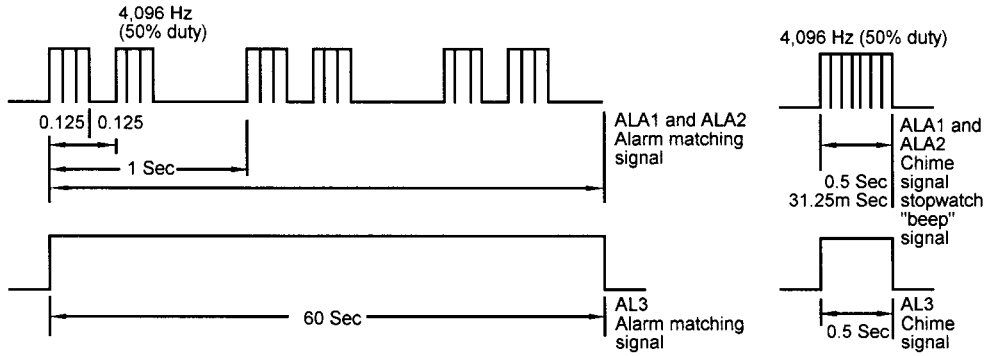
LCD FORMAT



ETTING SEQUENCE AND SWITCH OPERATION



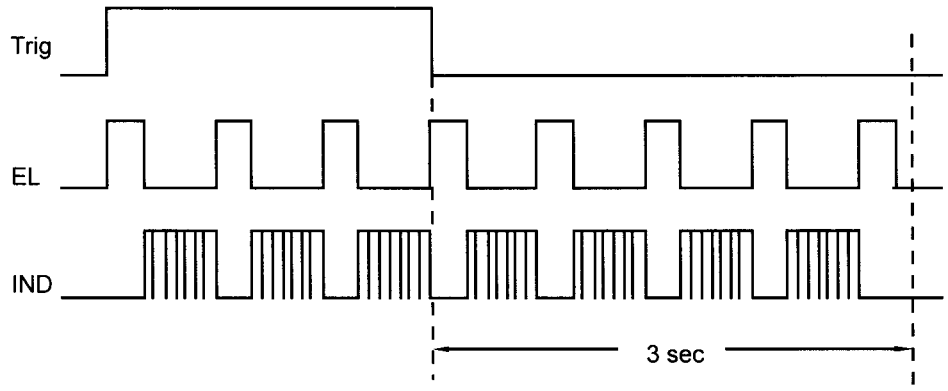
a) ALARM OUTPUT WAVEFORM



Note:
1. When it is the set-in alarm time in normal time mode, alarm will sound for 60 seconds.
2. If the switch "D" is depressed during this 60 seconds, alarm will stop and snooze function will be active with 5 minutes interval.
3. If the switch "S" is depressed during this 60 seconds, alarm will stop and snooze function is inactive.

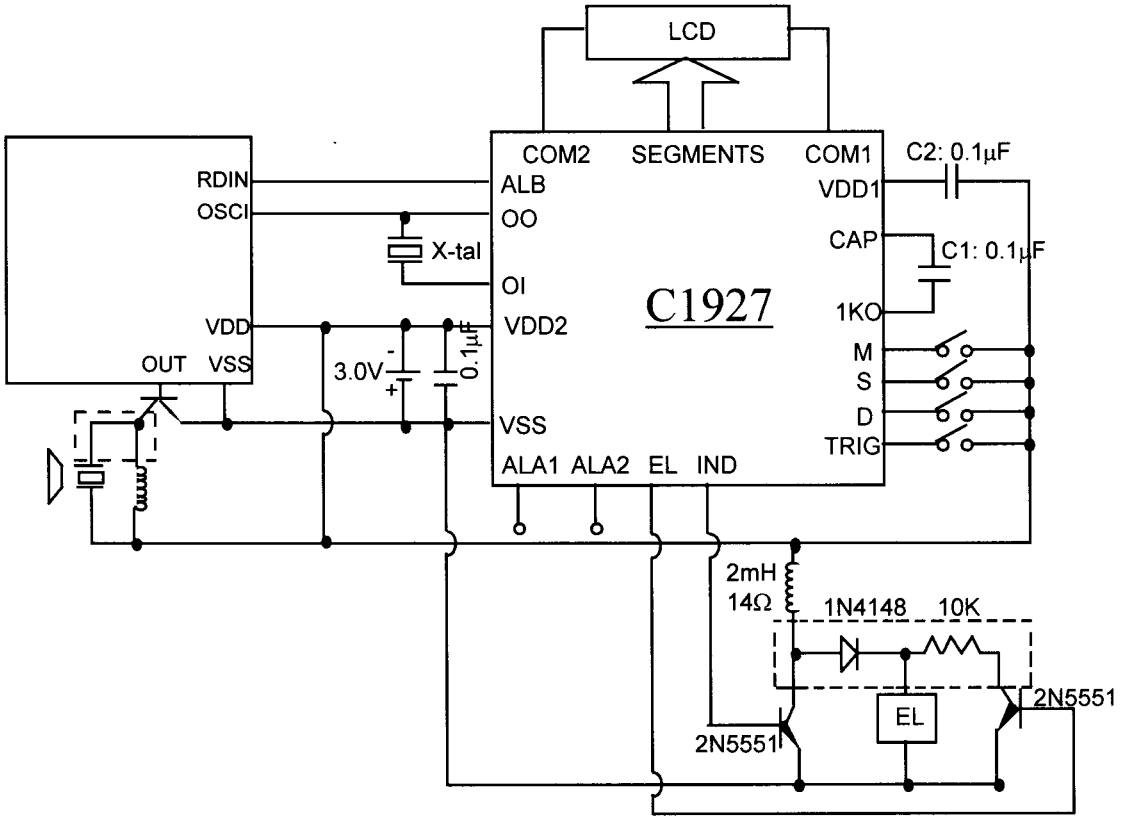
b) EL ELECTROLUMINESCENCE LAMP DRIVER OUTPUT WAVEFORM

Trigger with 3 Sec Delay :



APPLICATION CIRCUIT

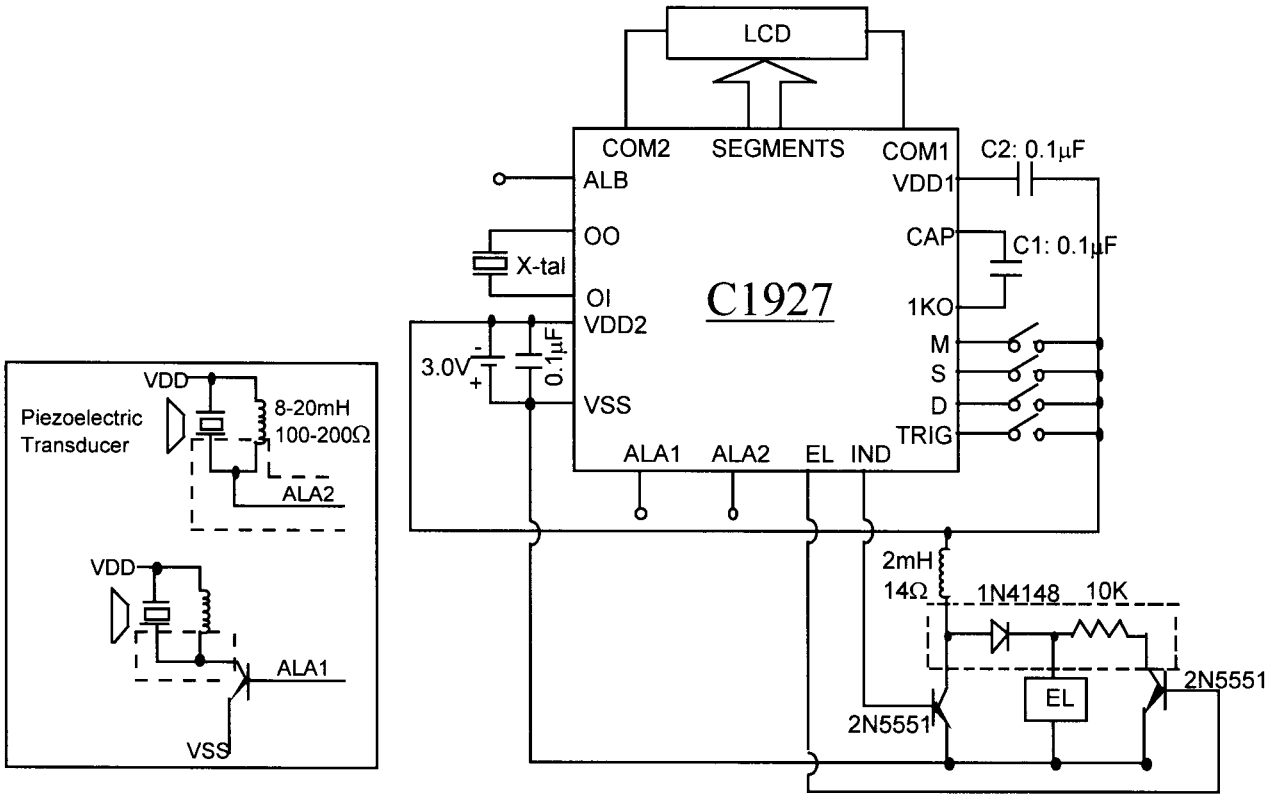
a) MELODY DRIVE TYPE



NOTE:

1. Substrate is connector to VSS.
2. In C1927 pad diagram, there are tow VDD1 and two VDD2 pads. Two VDD1 pads should be connected together during PCB layout. Two VDD2 also should be connected together on PCB.
3. The wires connected to Trig cannot across the lines inside the black dote line box. Furthermore, these wires should be separated from the lines inside the black dote line box by Vss or Vdd.
4. The two wires connected to crystal are better to be surrounded by Vss or Vdd, and they are the farer the better away from the wire inside the black dote line box.
5. The items 2 , 3 and 4 are very important for PCB layout..

b) PIEZO DRIVE TYPE



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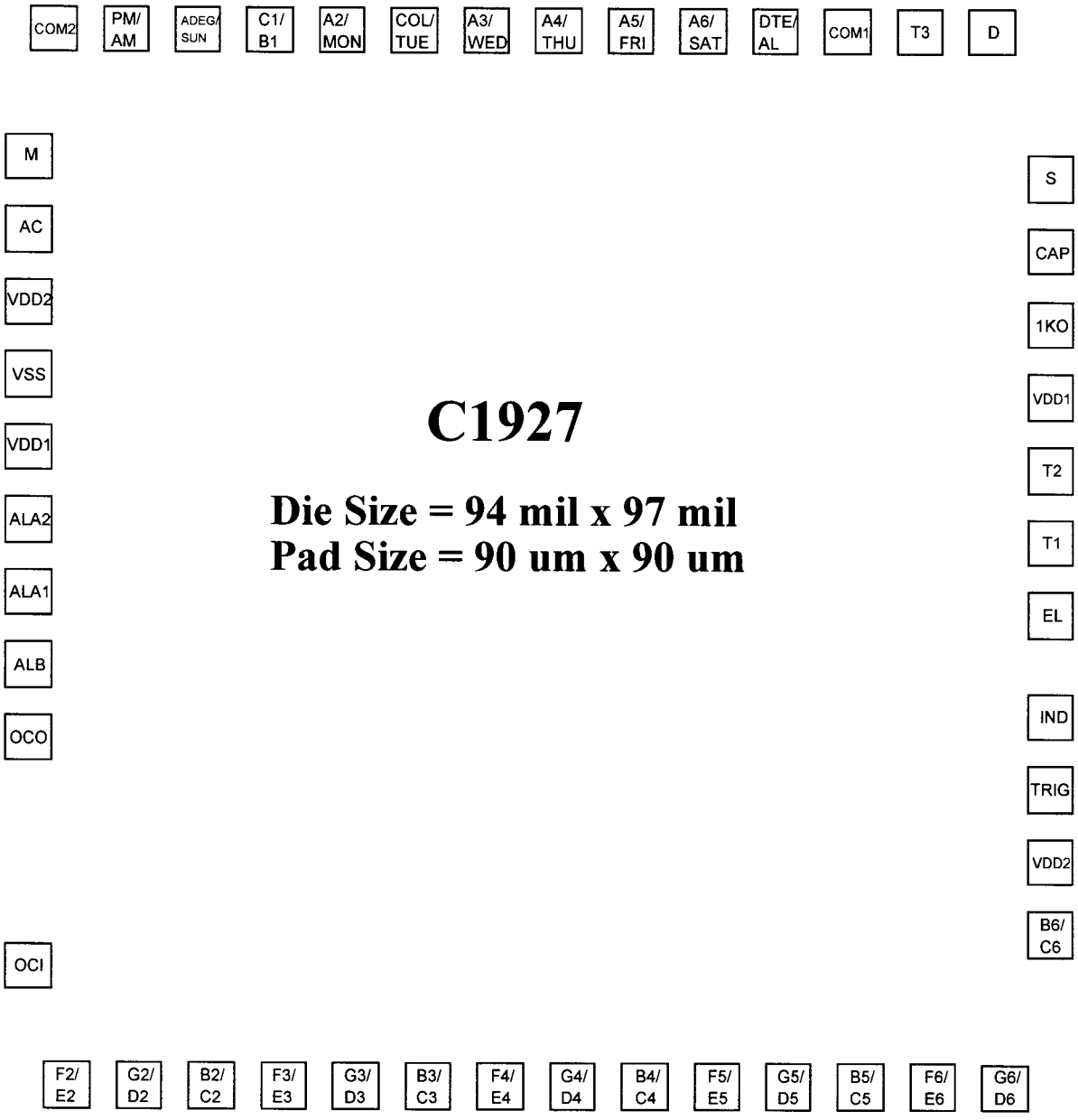
PAD DIAGRAM


COM2
PM/ AM
ADEG/ SUN
C1/ B1
A2/ MON
COL/ TUE
A3/ WED
A4/ THU
A5/ FRI
A6/ SAT
DTE/ AL
COM1
T3
D
M
AC
VDD2
VSS
VDD1
ALA2
ALA1
ALB
OCO
OCI
S
CAP
1KO
VDD1
T2
T1
EL
IND
TRIG
VDD2
B6/ C6
F2/ E2
G2/ D2
B2/ C2
F3/ E3
G3/ D3
B3/ C3
F4/ E4
G4/ D4
B4/ C4
F5/ E5
G5/ D5
B5/ C5
F6/ E6
G6/ D6
C1927
Die Size = 94 mil x 97 mil
Pad Size = 90 um x 90 um