

# Multifunction 12 Digits Watch CMOS

The BS6294 is a CMOS digital 6-function watch integrated circuit with alarm and chronograph function. It's designed for a 12-digit liquid crystal display. The BS6294 generates alarm, chime and touch-tone signals on the BD, BDN outputs to drive a buzzer and provides special signal on the ALB output to initiate a melody chip (same as BS8081, BS8018)

The BS6294 activates animation picture ("Garland") on the LCD. The BS6294 generates special signal to drive EL-backlight panel by external transistors.

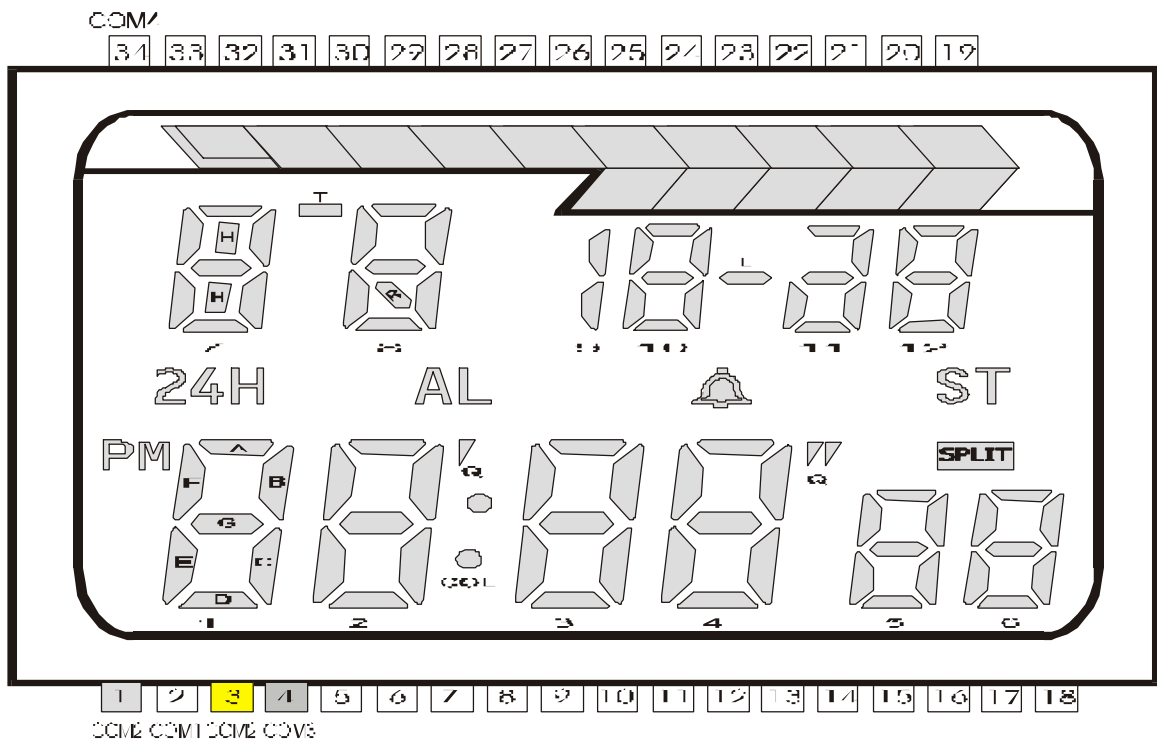
## FEATURES

- Single-chip CMOS construction
- Drives 12-digit multiplexed LCD (1:4)
- Colon display
- 32,768Hz crystal frequency
- On chip oscillator
- Single 3V battery operation
- Low power dissipation
- Debounce circuitry on switch inputs
- Animation picture («Garland»)

## FUNCTIONS

- 6 Functions: Month, Date, Day-of-Week, Hour, Minute, Second
- 3-switch sequential operation
- Alarm output for melody IC with 4 min snooze
- 6-digit Chronograph
- Split Function of Chronograph
- User selectable 12-hour/24-hour format
- 4-year calendar
- Fast advance for time and alarm time set
- Chime on every hour
- Backlight (EL) control outputs

## LCD FORMAT



### ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Supply Voltage	$V_{CC}$	- 0.3 ~ + 2.0	V
Operating Temperature	$T_{opr}$	- 20 ~ + 70	°C
Storage Temperature	$T_{stg}$	- 55 ~ + 125	°C

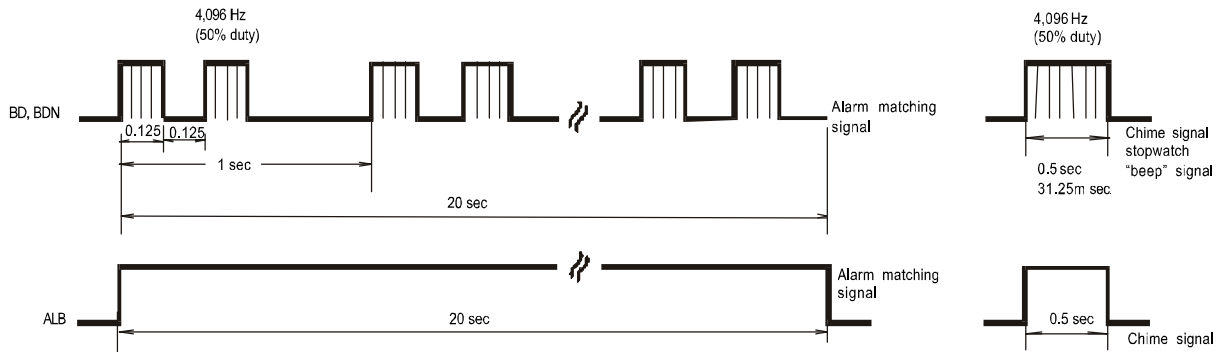
### ELECTRICAL CHARACTERISTICS

( $T_a = 25^\circ\text{C}$ ,  $V_{SS} = 0\text{V}$ ,  $V_{CC} = 3\text{V}$  unless otherwise specified)

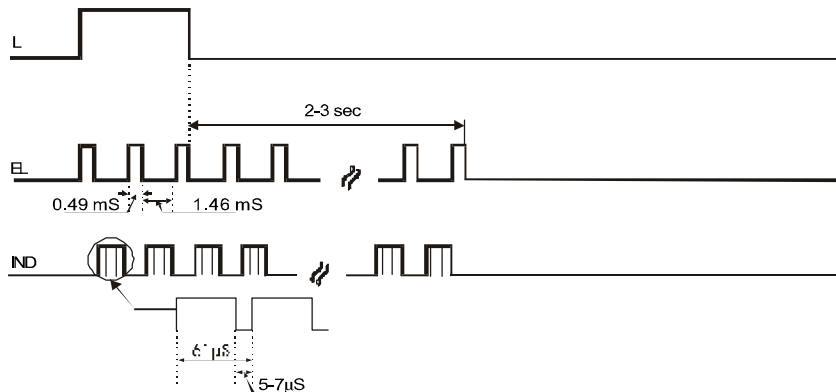
Characteristic		Symbol	Test Con dition	Min	Typ	Max	Unit
Operating Voltage		$V_{CC}$		2.4	3.0	3.6	V
Display Voltage		$V_{DD}$		3.6	4.5	5.4	V
Oscillator Start Voltage		$V_{OSC}$				2.7	V
Supply Current		$I_{CC}$	Without load		1.2	2.5	$\mu\text{A}$
Alarm Drive Current (BD, BDN)		$I_{BD}, I_{BDN}$	$V_{sat} = 0.5\text{V}$ (Both Direction)	1	2		mA
		$I_{ALB}$		10	50		$\mu\text{A}$
Output Current High	IND	$I_{OH}$	$V_{OH} = 0.8\text{V}$	1.2	1.6		mA
	EL			0.35	0.6		
Output Current Low	IND	$I_{OL}$	$V_{OL} = 0.8\text{V}$	10	20		
	EL			1	2		
Oscillator Frequency		$F_{OSC}$			32,768		Hz
Oscillator Input and Output Capacitor		$C_{IN}, C_{OUT}$			20		pF
EL Frequency		$F_{EL}$	EL Output		512		Hz
Pump Frequency		$F_{PUMP}$	IND Output		16,384		Hz

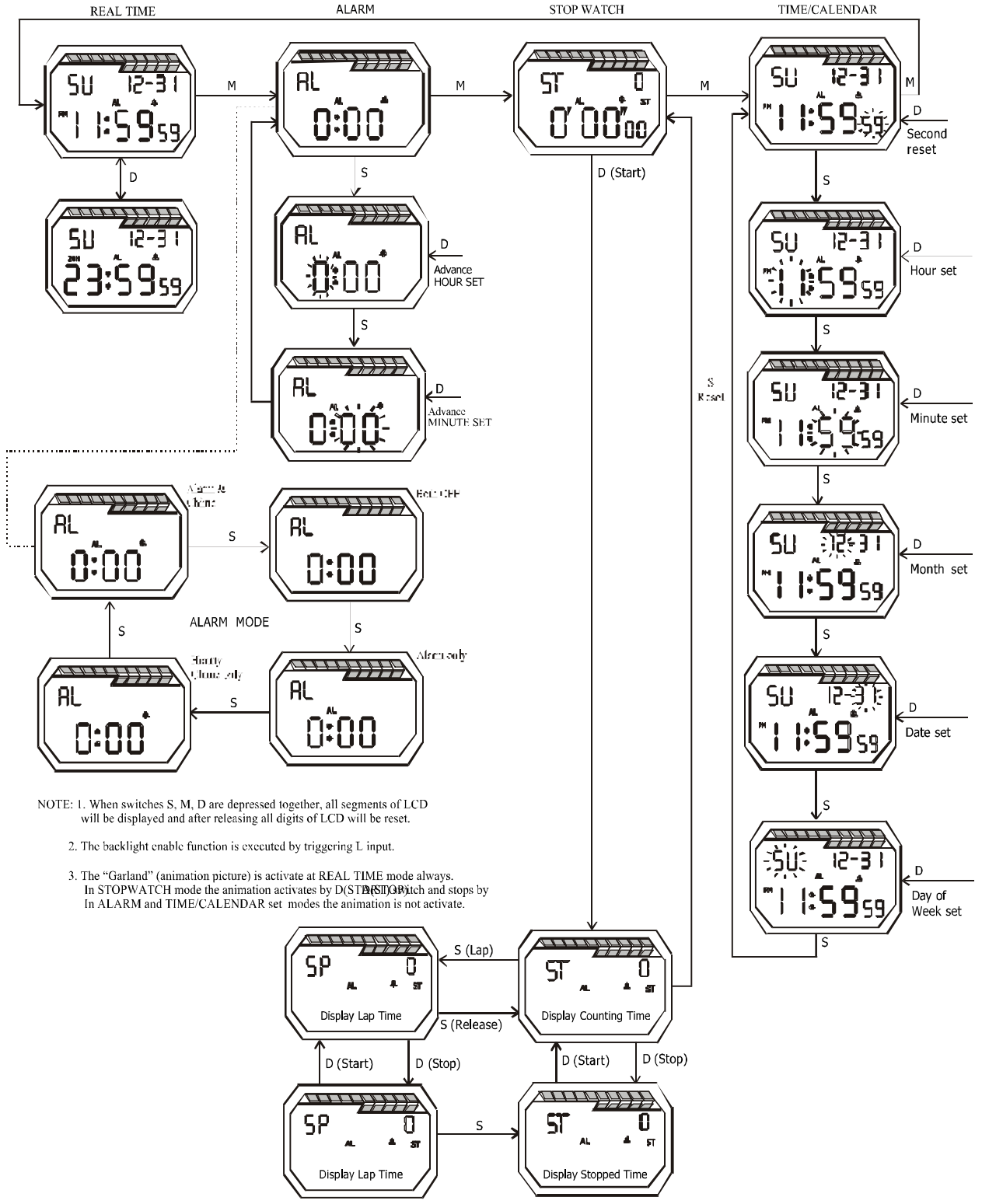
LCD	CHIP	SEGMENTS			LCD	CHIP	SEGMENTS			
Pin No.	Pad Name	COM1	COM2	COM3	Pin No.	Pad Name	COM1	COM2	COM3	COM4
1	COM2		COM2		18	SEG14	SPLIT	B6	C6	
2	COM1	COM1			19	SEG15		D12		S15
3	COM2		COM2		20	SEG16	C12	G12	B12	S10
4	COM3			COM3	21	SEG17	E12	F12	A12	S14
5	SEG1	F1	E1	AD1	22	SEG18	D10	C11	B11	S9
6	SEG2	B1	G1	C1	23	SEG19	C10	E11	ADG11	S13
7	SEG3	F2	E2	D2	24	SEG20	L	B10	A10	S8
8	SEG4	A2	G2	C2	25	SEG21	E10	G10	F10	S12
9	SEG5	B2	COL	E3	26	SEG22	D8	C8	BC9	S7
10	SEG6	F3	G3	AD3	27	SEG23	R8	G8	B8	S11
11	SEG7	B3	C3	E4	28	SEG24	'/'/ST	EF8	A8	S6
12	SEG8	F4	G4	D4	29	SEG25	D7	C7	T	S5
13	SEG9	A4	B4	C4	30	SEG26	G7	B7	A7	S4
14	SEG10	F5	E5	D5	31	SEG27	E7	H7	F7	S3
15	SEG11	A5	G5	C5	32	SEG28			24H	S2
16	SEG12	B5	F6	E6	33	SEG29	AL	PM	CHIME	S1
17	SEG13	A6	G6	D6	34	COM4				COM4

### ALARM OUTPUT WAVEFORM



### CONTROL OUTPUTS WAVEFORM



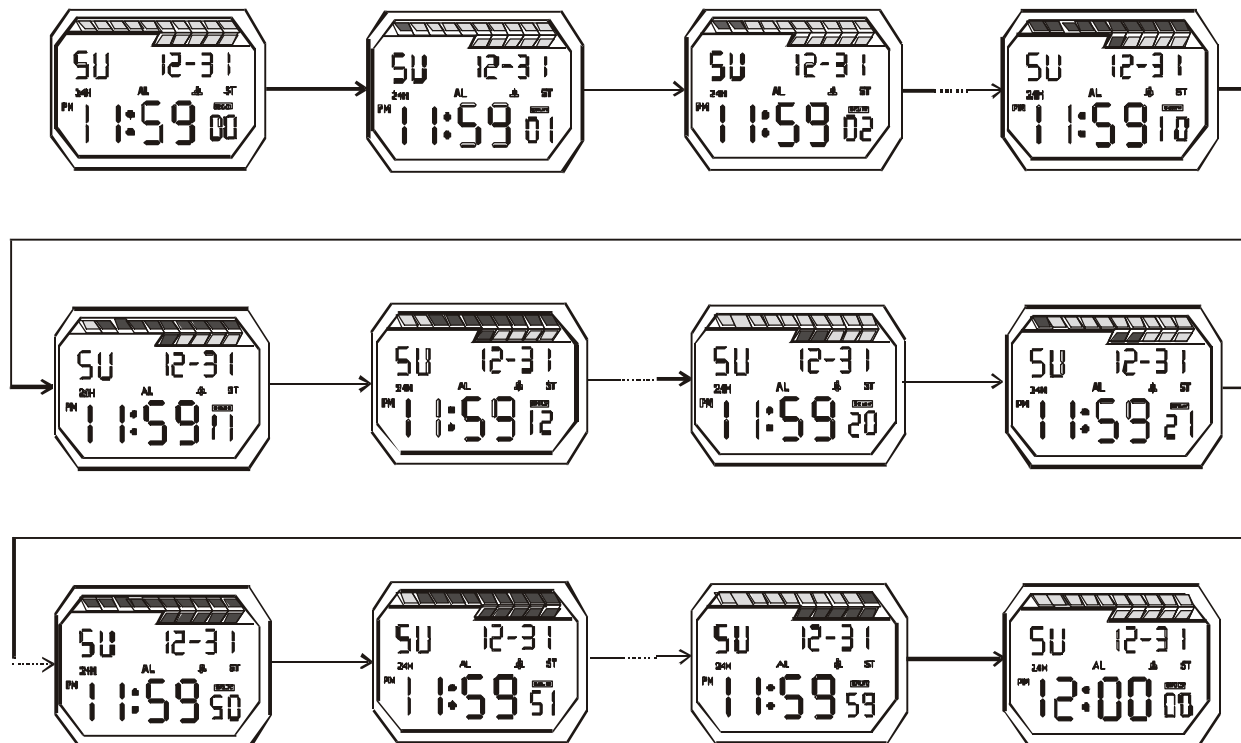


- NOTE: 1. When switches S, M, D are depressed together, all segments of LCD will be displayed and after releasing all digits of LCD will be reset.
2. The backlight enable function is executed by triggering L input.
3. The "Garland" (animation picture) is activate at REAL TIME mode always.  
 In STOPWATCH mode the animation activates by D(ST/STOP) switch and stops by  
 In ALARM and TIME/CALENDAR set modes the animation is not activate.

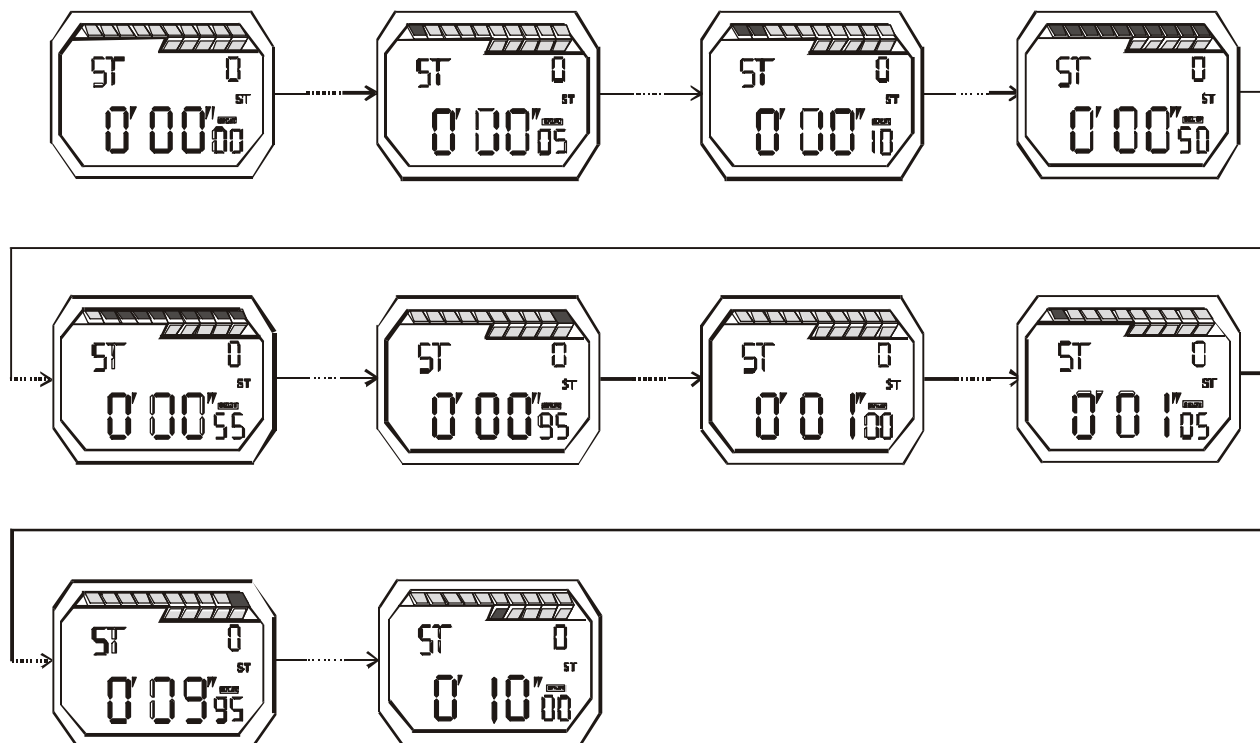
and flashing at 2Hz when counting

# ANIMATION SEQUENCE

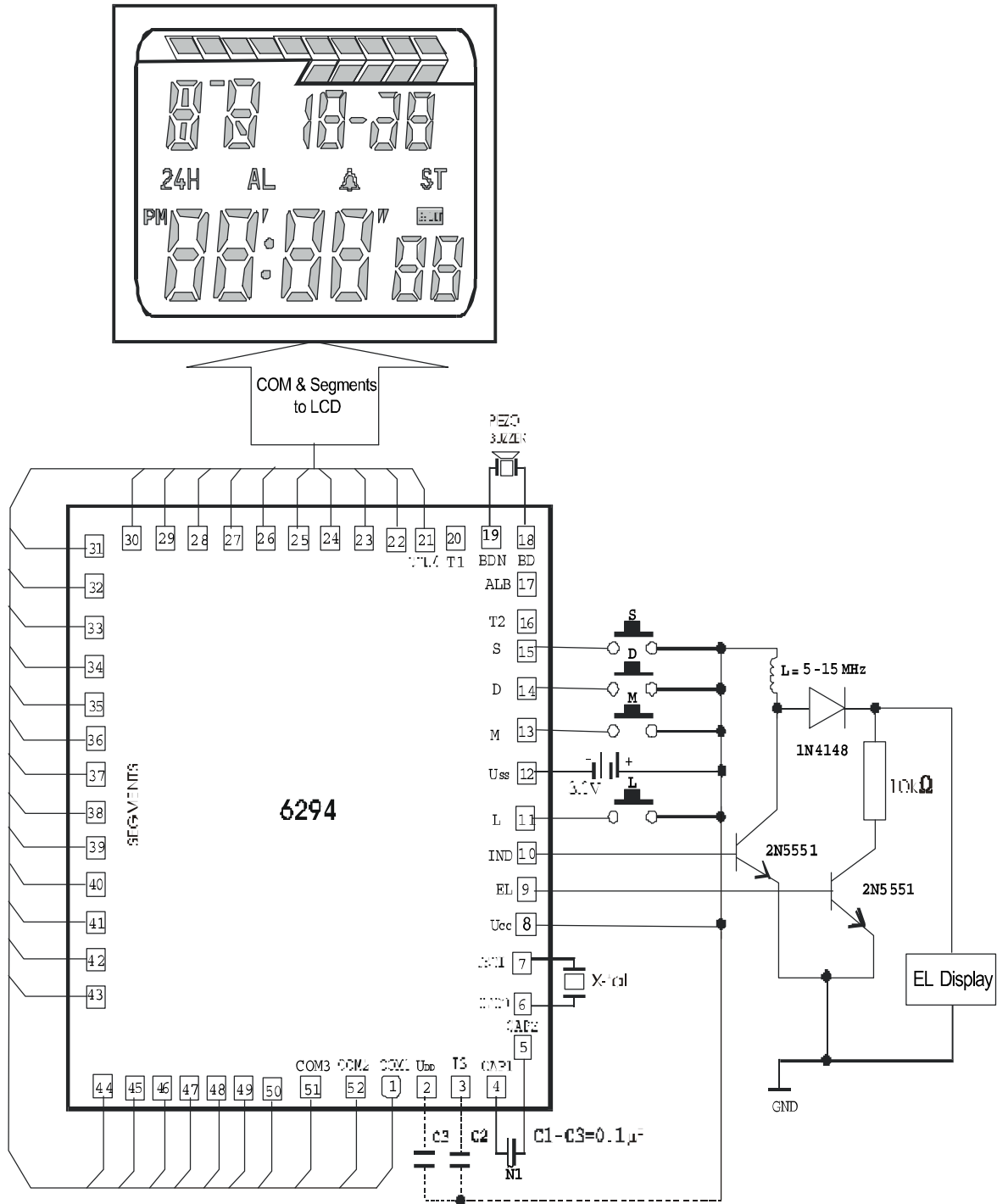
## REAL TIME MODE



## STOPWATH MODE

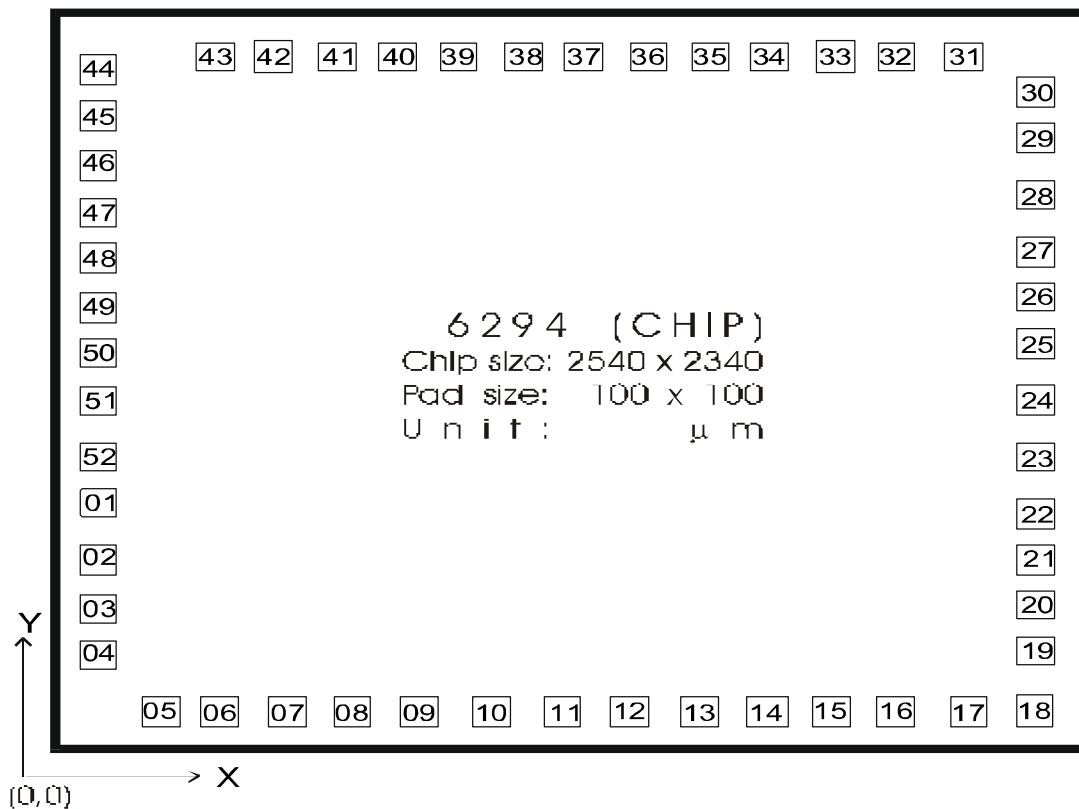


### APPLICATION CIRCUIT



NOTE: The die area should be isolated or connected to  $V_{SS}$ .

PAD DIAGRAM



PAD LOCATION

Pad No.	Pad Name	X	Y	Pad No.	Pad Name	X	Y	Pad No.	Pad Name	X	Y
01	COM1	105	743	19	BDN	2330	364	37	SEG16	1223	2134
02	U <sub>DD</sub>	105	604	20	T1	2330	514	38	SEG17	1072	2134
03	Ö3	105	442	21	COM4	2330	664	39	SEG18	922	2134
04	CAP1	105	292	22	SEG1	2330	815	40	SEG19	772	2134
05	CAP2	325	105	23	SEG2	2330	965	41	SEG20	621	2134
06	OSCO	475	105	24	SEG3	2330	1116	42	SEG21	471	2134
07	OSCI	626	105	25	SEG4	2330	1266	43	SEG22	320	2134
08	U <sub>CC</sub>	776	105	26	SEG5	2330	1416	44	SEG23	104	2097
09	EL	926	105	27	SEG6	2330	1567	45	SEG24	105	1946
10	IND	1077	105	28	SEG7	2330	1717	46	SEG25	105	1796
11	L	1227	105	29	SEG8	2330	1868	47	SEG26	105	1646
12	U <sub>SS</sub>	1394	105	30	SEG9	2330	2008	48	SEG27	105	1495
13	M	1545	105	31	SEG10	2125	2134	49	SEG28	105	1345
14	D	1695	105	32	SEG11	1975	2134	50	SEG29	105	1194
15	S	1845	105	33	SEG12	1824	2134	51	COM3	105	1044
16	T2	1996	105	34	SEG13	1674	2134	52	COM2	105	894
17	ALÂ	2146	105	35	SEG14	1524	2134				
18	BD	2297	105	36	SEG15	1373	2134				