6 FUNCTION 6 DIGIT ALARM-CHRONOGRAPH DUPLEXED LCD WATCH CIRCUIT

The NY5190 is a CMOS6 function watch circuit with alarm and auto ranging chronograph function; designed to for a 6 digit duplexed liquid crystal display, 7 day mark, date mark, AM/PM mark, and colon.

FUNCTIONS

- 6 Function: Month, Date, Day-of-Week, Hour, Minute, Second.
- Alarm function with 4 to 5 minute snooze.
- 6 digit Chronograph: Auto ranging after 30 minutes to hour, minute, second.
- User selectable 12 hour/24 hour format.
- Alarm output for melody IC.
- 4 year calendar.
- 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 chip CMOS construction.
- Drives 6 digit duplexed LCD with 7 day mark, AM/PM mark, date mark and alarm mark.
- Colon display.
- Direct drive of piezoelectric at 3 volt peak to peak.
- 32, 768 Hz crystal frequency.
- On-chip oscillator and resistors.
- On-chip voltage doubler.
- Single 1.5V battery operation.
- Low power dissipation.
- Denounce circuitry on switch inputs.
- Protection against static discharge.

LCD FORMAT

ABSOLUTE MAXIMUM RATINGS (Ta=25℃)

Characteristic	Symbol	Value	Unit
Supply Voltage (V_{DD}-V_{SS})	V_{DS}	- 0.3 ~ + 2.0	V
Supply Voltage (V_{DD}-V_{EE})	V_{DE}	- 0.3 ~ + 4.0	V
Operating Temperature	Topr	- 20 ~ + 75	℃
Storage Temperature	Tstg	- 55 ~ + 125	℃

Voltage greater than above may damage the circuit.

ELECTRICAL CHARACTERISTICS

(Ta = 25℃, V_{DD} = 0V, V_{SS}=-1.5V; unless otherwise specified)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Operating Voltage	[V_{SS}]		1.2	1.5	1.8	V
	[V_{EE}]		2.4	3.0	3.6	V
Supply Current	I_{DD}	Without Load		1.0	2.0	μA
Input High Voltage	V_{IH}		V_{DD}-0.3		V_{DD}	V
Input Low Voltage	V_{IL}		VSS		VSS + 0.3	V
Switch Activation Current	I_{SW}	V_{IN} = V_{DD}	0.1	0.5	3	μA
Oscillator Start Voltage	[V_{OSC}]	Within 5 sec			1.45	V
Oscillator stop Voltage	[V_{OSP}]				1.15	V
Alarm Drive Current	Iaia	Vsat = 0.5V (Both Direction)	0.5	2.0		mA
	Ialb	Vsat = 0.5V	10	20		μA
Oscillator Frequency	F_{OSC}			32.768		Hz
DC-DC Conversion Frequency	F_{CON}	C1 = C2 = 0.1 μF		1.024		KHz
LCD Frequency	F_d			32		Hz
Oscillator Input Capacitor	C_{IN}			22		pF
Oscillator Output Capacitor	C_{OUT}	Bonding Option		20		pF
Time Stability	T_{sta}	Vss = - 1.3 ~ - 1.8 (COUT = 25pF)		1	3	ppm
Switch Debouching Time	T_{deb}				31.25	msec