UMC

UM3203A

5 Functions 3½-Digit Multiplexed LCD Watch With Stopwatch

Features

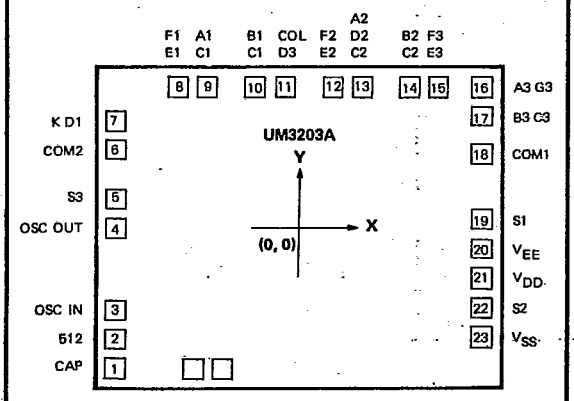
- 5 Functions (MONTH, DATE, HOUR, MINUTE and SECOND)
- A 15-minute, 1-second resolution stopwatch
- Direct driving of a standard 3½-digit multiplexed liquid crystal display
- 32768Hz quartz crystal controlled oscillator
- Built-in voltage doubler for display
- Single 1.5V battery operation
- 12-hour format
- 4-year calendar
- 3-push button control
- On-chip debounce circuit
- Power-on reset and manual reset
- High speed test capability

General Description

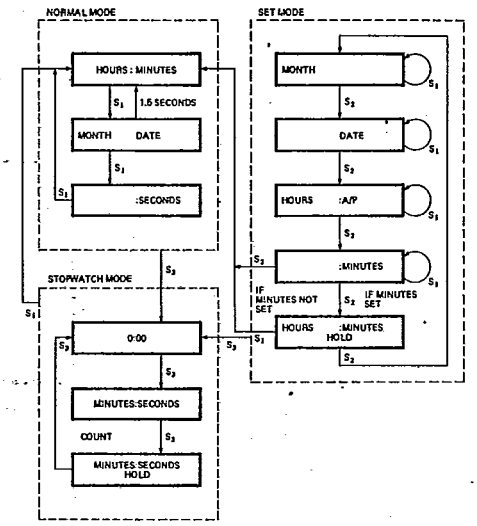
The UM3203A is a single chip CMOS watch circuit with five functions. It is designed to drive a standard 3½-digit, multiplexed liquid crystal display. The watch circuit is based on a 32768Hz quartz crystal controlled oscillator, subsequent countdown logic and a display section to provide the HOUR MINUTE, the MONTH/DATE and the SECOND readout. The circuit also includes a 15-minute, 1-second resolution stopwatch. An oscillator capacitor integrated on the chip. An external 32768Hz quartz crystal and trimming capacitor C1 is required to complete the oscillator circuit. The operation of the basic timekeeping functions is controlled via two switches, S1 and S2, and the operation of the stopwatch is controlled via the third switch S3. With onset of power, or while simultaneously pressing S1 and S2, the watch will reset to January 1, 1:00 AM and 00 seconds. The circuit has a built-in voltage doubler (to drive the multiplexed LCD) which needs two external capacitors, C2 and C3. Only one 1.5V battery is required to power the entire circuit. The UM3203A is supplied in the chip form.

Timekeeping

Pad Configuration



Block Diagram



Absolute Maximum Ratings*

Supply Voltage $V_{DD} - V_{SS}$ ..... 0V to 6V
Supply Voltage $V_{DD} - V_{EE}$ ..... 0V to 6V
Input Voltage ..... V_{SS} to V_{DD}
Operating Temperature ..... 0°C to 70°C
Storage Temperature ..... –20°C to 70°C

*Comments

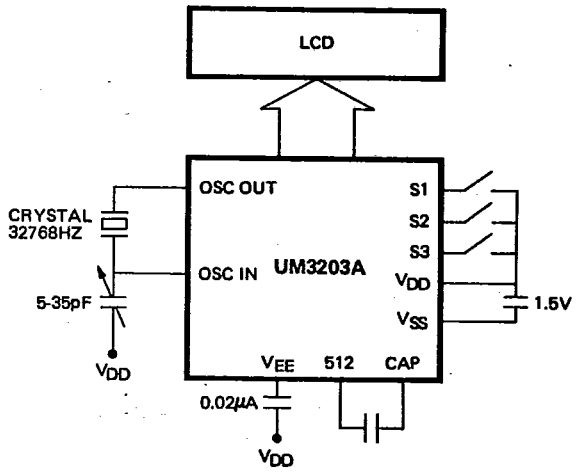
Strees above levels listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of this device at these or any other conditions above those indicated in the operational sections of this specification is not implied and exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Electrical Characteristics

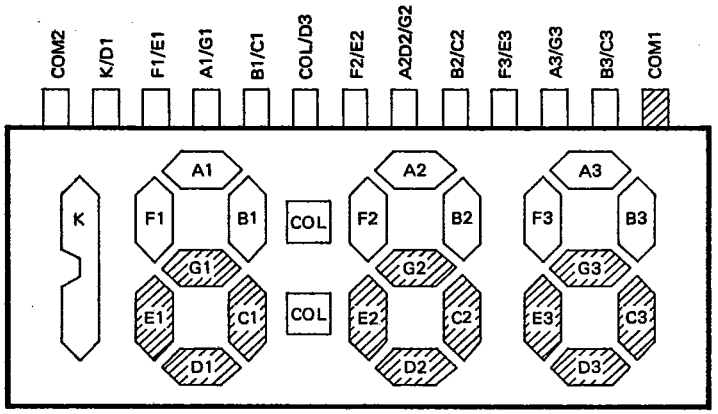
(T_A = 25°C, V_{SS} = 0V, V_{DD} = 1.5V, F_{OSC} = 32768 Hz, unless otherwise specified.)

Parameter	Symbol	Min.	Type	Max.	Unit	Condition
Supply Voltage	V_{DD}	1.3	1.5	1.6	V	–
Supply Current	I_{DD}	–	1.5	2	μA	no load
Generated Display	$-V_{EE}$	1.4	–	–	V	I_{EE} = 1μA
Switch Input Current	I_{IN}	1	–	100	μA	$V_{IN} = V_{DD}$
Start Oscillation Voltage	V_{START}	–	–	1.35	V	–
Switch Input Debounce Time	T_{DB}	–	62.5	–	mS	–

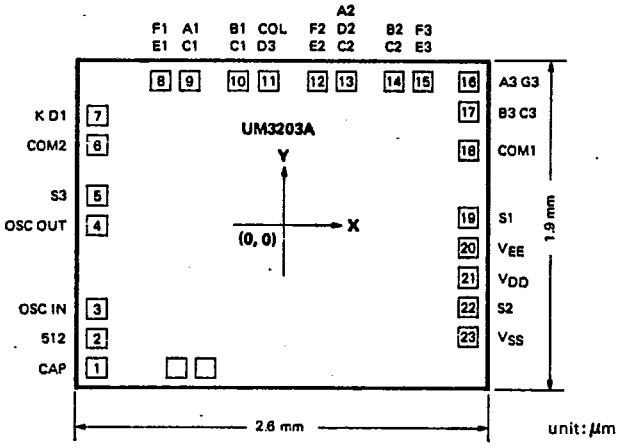
Typical Application



LCD Format



Bonding Diagram



Pad No.	Designation	X	Y	Pad No.	Designation	X	Y
1	CAP	−1145.29	−841.25	14	B2, C2	669.29	834.14
2	512	−1145.29	−656.34	15	F3, E3	819.91	833.12
3	OSC IN	−1145.29	−487.68	16	A3, G3	1145.03	834.90
4	OSC OUT	−1145.29	− 8.38	17	B3, C3	1144.02	668.27
5	S3	−1145.29	161.04	18	COM1	1141.98	419.61
6	COM2	−1154.68	456.95	19	S1	1154.94	0.76
7	K, D1	−1155.19	619.00	20	V_{EE}	1154.94	−212.60
8	F1, E1	− 736.6	834.14	21	V_{DD}	1154.94	−415.54
9	A1, C1	− 587.25	833.12	22	S2	1154.94	−598.42
10	B1, C1	− 271.02	834.14	23	V_{SS}	1154.94	−836.17
11	COL, D3	− 118.87	833.12	24	TP	− 495.81	−824.23
12	F2, E2	200.15	834.14	25	TEST	− 643.89	−824.23
13	A2, D2, C2	350.52	833.12				

Notes:
1. Pad number is assigned clockwise from the lower left corner of the chip.
2. All dimensions are in mils.
3. All bond pad dimensions are 102 x 102 μm^2
4. Chip size: 2.6 mm x 1.9 mm.