

GENERAL DESCRIPTION

C6002 is a four digits counter down timer CMOS LSI circuit. It can directly drive 4 digits LCD with 1/2 duty cycle and 1/2 bias. It can count down from the set-in time to zero and alarm for 30 seconds when timer reaches zero. In addition, the timer also provides START/STOP and memory function. The max. setting time is 99 minutes and 59 seconds.

C6002 can be widely applied in pillbox timer, kitchen timer, parking alarm timer etc..

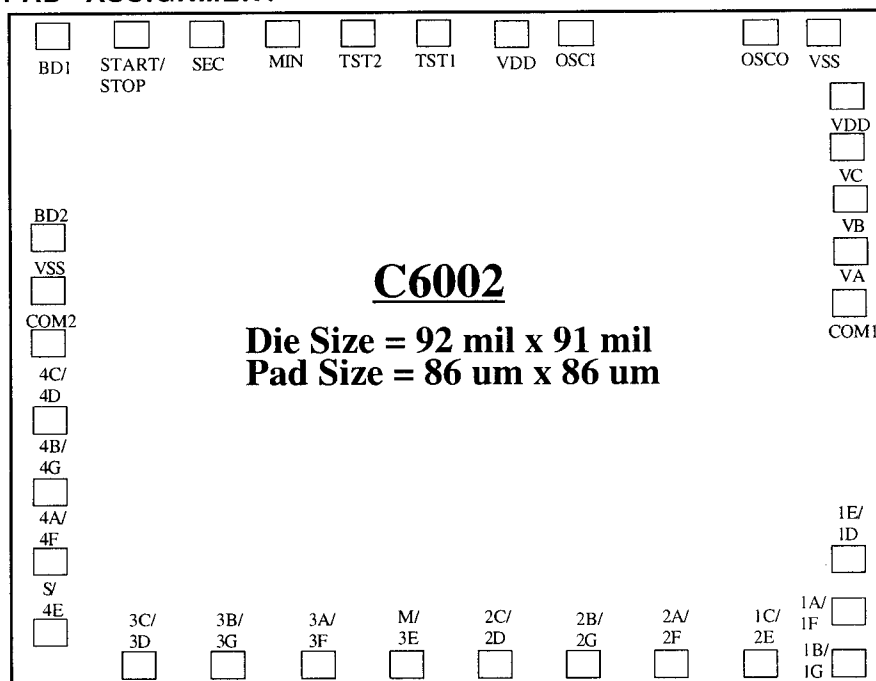
FUNCTIONS

- 4 digits LCD display with 1/2 duty cycle and 1/2 bias.
- MIN, SEC display with two icons M and S
- MIN, SEC set independently. Advanced once a pressing or fast advanced at 8 Hz rate
- Max. count down time 99 minutes 59 seconds
- Timer reset whenever MIN and SEC buttons are depressed simultaneously.
- During counting down, timer paused or re-start alternatively by pressing START/STOP
- Alarm interrupted by pressing START/STOP and LCD display the previously set in value
- Alarm also interrupted by pressing MIN or SEC once and re-set the new value to timer when MIN or SEC pressed again

FEATURES

- Single battery operation 1.5V
- 32768 Hz quartz crystal time base
- Built in voltage doubler
- Three buttons operation with touch tone feature: MIN, SEC, START/STOP
- Icons M and S flashing only during count down
- All the buttons debounced and pull-down
- All the segments/icons and alarm sound tested

PAD ASSIGNMENT



The Co-ordinates of Low Left Corner for Each Pad

| | | | |
|-------------------------|-----------------------|------------------------|-------------------------|
| 3C/3D(-837.7, -1045.2) | 1B/1G(972.7, -1045.2) | VSS (920.1, 966.2) | BD2 (-1064.0, 314.2) |
| 3B/3G(-611.4, -1045.2) | 1A/1F(972.7, -879.2) | OSCO (754.1, 966.2) | VSS (-1064.0, 148.2) |
| 3A/3F (-385.1, -1045.2) | 1E/1D(972.7, -713.2) | OSCI (284.5, 966.2) | COM2 (-1064.0, -17.8) |
| M/3E (-158.8, -1045.2) | COM1(978.1, 97.8) | VDD (118.4, 966.2) | 4C/4D (-1064.3, -260.3) |
| 2C/2D(67.5, -1045.2) | VA (985.0, 263.8) | TST1 (-80.9, 966.2) | 4B/4G (-1064.3, -486.0) |
| 2B/2G(293.8, -1045.2) | VB (985.0, 429.8) | TST2 (-272.7, 966.2) | 4A/4F (-1064.3, -711.7) |
| 2A/2F(520.1, -1045.2) | VC (978.1, 595.8) | MIN (-464.5, 966.2) | S/4E (-1064.3, -937.8) |
| 1C/2E(746.4, -1045.2) | VDD (978.0, 761.8) | SEC (-656.3, 966.2) | |
| | | START/ (-848.1, 966.2) | |
| | | STOP | |
| | | BD1 (-1049.1, 966.2) | |

ABSOLUTE MAXIMUM RATINGS(Ta = 25 °C)

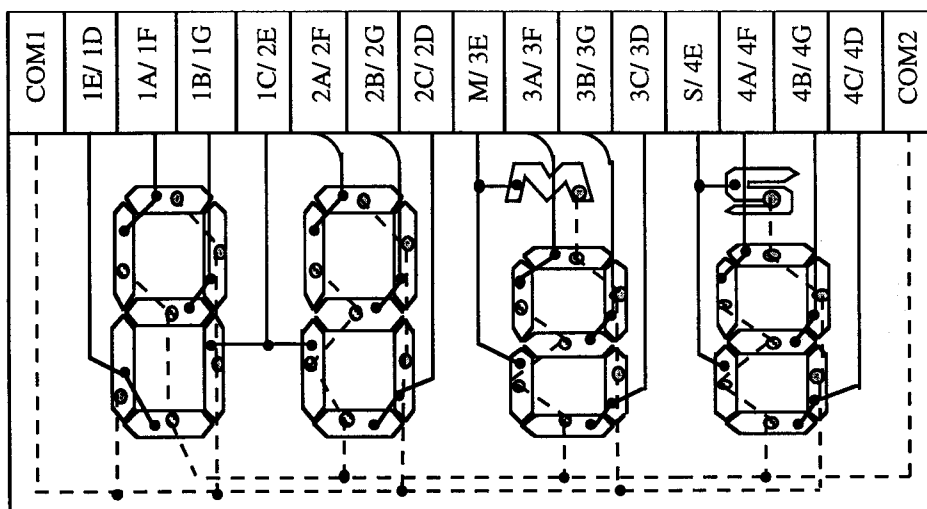
| Parameter | Symbol | Limits |
|-----------------------------|-----------|----------------------|
| Power supply voltage range | VSS - VDD | -0.3 V to +1.8V |
| Input voltage range | Vin | VSS -0.3 to VDD +0.3 |
| Operating temperature range | TA | -20 to +60°C |
| Storage temperature range | Tstg | -40 to +70°C |

DC ELECTRICAL CHARACTERISTICS

Unless otherwise specified, Ta = 25°C, VDD = 1.5V, VSS = 0V, Fosc = 32768 Hz

| Characteristics | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|--|--------|------|--------------|------|------|--------------------------|
| Operating voltage range | VDD | 1.3 | 1.5 | 1.7 | V | - |
| Doubler Output Voltage | Vc | -1.3 | -1.5 | -1.7 | V | - |
| Supply current | IDIS | - | 1.0 | 2.5 | μA | LCD is off (Vdd=1.3V) |
| LCD Driving Current | ILCD | 0.1 | - | - | μA | |
| LCD Display Frequency | Fd | - | 32 | - | Hz | Vdd=1.3V while LCD is on |
| Alarm Output Frequency | FBD | - | 2048x8 x1 | - | Hz | - |
| Alarm and touch tone Output Drive Current | IBD1 | 0.5 | 1.5 | - | MA | Vsat=0.6V |
| | IBD2 | 10 | 25 | - | | VO=0.6V |
| Input high voltage | VIH | 1.3 | 1.5 | 1.7 | V | |
| Input low voltage | VIL | -0.3 | 0 | 0.3 | V | |
| Frequency Stability | Δf/f | - | - | 1 | ppm | VDD =1.3V to 1.7V |
| Oscillator Built-in Capacitor | CD | - | 20 | - | pF | - |
| Oscillator Start up Time | TOSC | - | - | 3 | sec | VDD= 1.3V |

4-DIGITS LCD FORMAT



15 LCD SEGMENT OUTPUT PADS:

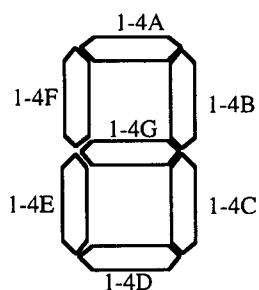
- | | | | |
|---------|---------|---------|---------|
| 1E / 1D | 1A / 1F | 1B / 1G | 1C / 2E |
| 2A / 2F | 2B / 2G | 2C / 2D | M / 3E |
| 3A / 3F | 3B / 3G | 3C / 3D | S / 4E |
| 4A / 4F | 4B / 4G | 4C / 4D | |

2 LCD BACKPLANES OUTPUT PADS

- | | |
|------|------|
| COM1 | COM2 |
|------|------|

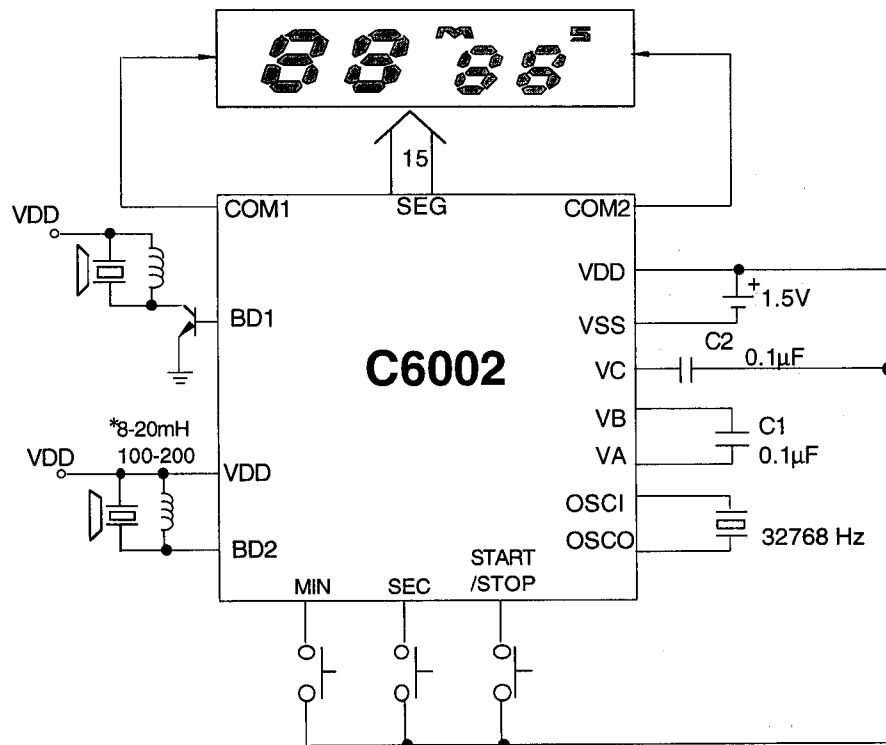
LCD BIPLEX SEGMENT ARRANGEMENT

| | | | | | | | | | | | | | | | | | |
|---------------|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------|
| Pad NC. in IC | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 35 | 34 | 33 | 32 |
| | COM1 | 1E | 1A | 1B | 1C | 2A | 2B | 2C | M | 3A | 3B | 3C | S | 4A | 4B | 4C | |
| | | 1D | 1F | 1G | 2E | 2F | 2G | 2D | 3E | 3F | 3G | 3D | 4E | 4F | 4G | 4D | COM2 |



The 1st - 4th digits

APPLICATION CIRCUIT



Note: Substrate must be connected to VDD.