

GENERAL DESCRIPTION

C3802 is a CMOS digital thermometer LSI with auto power off function for measuring human body's temperature in Centigrade or Fahrenheit by bonding option. It was designed for 3.5 digits and 4 flags of duplexed LCD display with 1.5 V power supply.

FUNCTIONS

- One switch input(SW)operation
- Temperature measurement in Centigrade or Fahrenheit by bonding option
- Highest temperature hold function
- Alarm to indicate measuring time
- Automatic power off after 10 minutes since power up
- Drive 3.5 digits and 4 flags of duplexed LCD

APPLICATION

This specification contains a complete information of functional description, electrical characteristics, packaging, crating and application requirements of C3802.

FEATURES

- Single CMOS chip with built in capacitive voltage doubler
- Temperature measurement range :
+32.0 to +43.0 °C (+90.0 to +110 °F)
- Temperature measurement accuracy :
+/- 0.1 °C (+/- 0.3 °F)
- Resolution : 0.1 °C (0.1 °F)
- 1.5 V power supply
- Package Type : Bare chip

FUNCTIONAL DESCRIPTION**a. Switch Operation :**

As soon as SW is pressed under the power off condition, the temperature measurement is activated to make LCD start to display the present temperature or LO/HI condition at 1HZ rate.

b. Automatic Power Off Function :

The automatic power off function is enable after 10 minutes passed from the moment when SW is switched to power on, except when the pad APOD is connected to VDD.

c. Bonding Option :

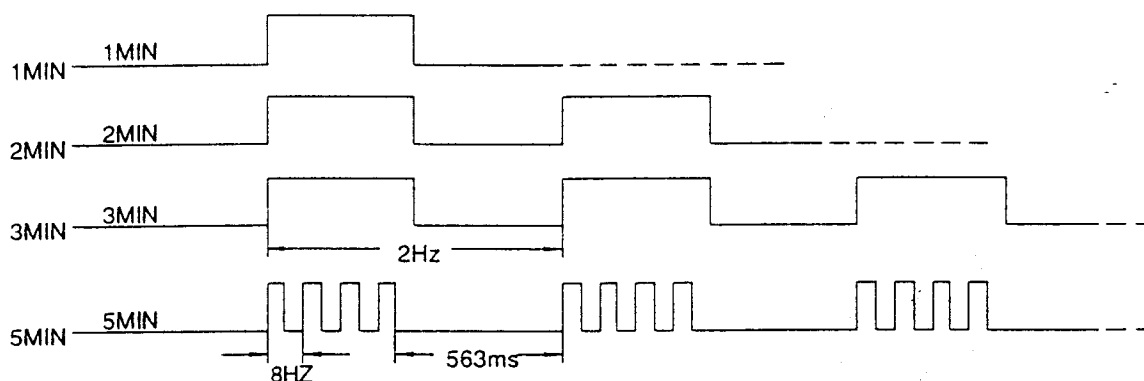
The Centigrade or Fahrenheit mode is selected by a bonding option. If the pad MS is left open, all circuits are used in the Centigrade mode, whereas, it will be in Fahrenheit mode if MS is connected to VDD.

d. Highest Temperature Hold Function :

The value of the temperature measured by a clinical thermometer will be changed as it is taken out from a human body. The highest temperature hold function can maintain the highest temperature value to be unchangeable until the power is turned off.

e. Alarm Function :

The corresponding alarm at the end of each minute after SW is pressed to power up(i.e. one, two, three and five minutes respectively) is generated to notice the end point of each measuring time . The output waveforms are shown below at the alarm out terminal AL. The tone frequency of alarm signal is same (4094Hz) for each minute, but the rythme of alarm signal is faster at the end of the five minutes than others. This faster signal with repeatable frequency 8HZ is modulated by the slower signal with repeatable frequency 2HZ.



Waveform of the Alarm Signal at Terminal AL

ABSOLUTE MAXIMUM RATINGS

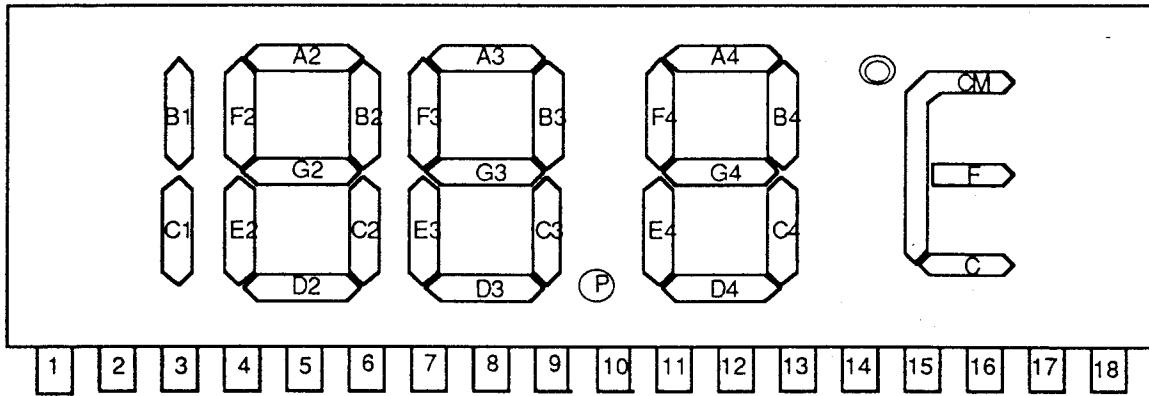
Parameters	Symbol	Value	Unit
Supply Voltage (VDD1 - VSS)	VDS1	- 0.1 ~ + 0.3	V
Supply Voltage (VDD2 - VSS)	VDS2	- 0.2 ~ + 0.4	V
Operation Temperature	TOP	0 ~ + 50	°C
Storage Temperature	TSTG	- 40 ~ + 125	°C

ELECTRICAL CHARACTERISTICS

(Ta = 25°C, VDD1 = 1.5V, VDD2 = 3V, VSS = 0V, unless otherwise specified)

Parameters	Symbol	Min	Typ	Max	Unit	Test Condition
Operating Voltage	VDD1	1.25	1.50	1.80	V	
Operating Voltage	VDD2	-	3.00	-	V	
Current Consumption	Isup1	-	-	100	µA	
Current Consumption	Isup2	-	-	0.1	µA	Power off
Output Current (COM1,COM2)VDD1	IOL1 IOH1	60.0 -	- -	- - 60.0	µA	VOL1 = 0.3V VOH1 = 1.3V
Output Current (COM1,COM2)VDD2	IOH2	-	-	- 40.0	µA	VOH2 = 2.7V
Output Current (Segment,COM3)	IOL3 IOH3	20.0 -	- -	- - 20.0	µA	VOL3 = 0.3V VOH3 = 2.7V
Output Current (Alarm)	IOH4	-	-	- 80.0	µA	VOH4 = 1.3V
Input Current (SW)	IIL1 IIH1	- 0.1	- 1.0	0.1 10.0	µA	VIL1 = 0.0V VOH1 = 1.5V
Frequency Deviation	Fosc	- 10	64KHz	+ 10	%	VDD = 1.5V Fosc=120 - 150K

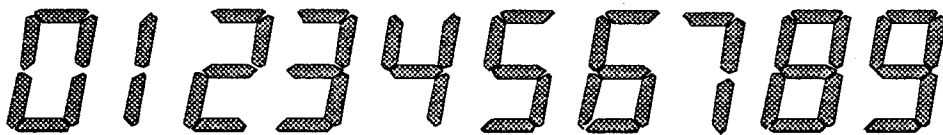
LCD FORMAT



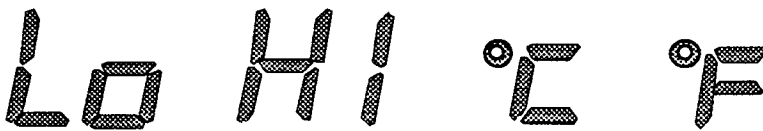
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
COM1		BC1	E2	D2	C2	A3	E3	D3	C3	P	E4	D4	C4				
	COM2	A2	F2	G2	B2	A4	F3	G3	B3		F4	G4	B4				
														CM	C	F	COM3

DISPLAY FONTS

a. Numerical Fonts

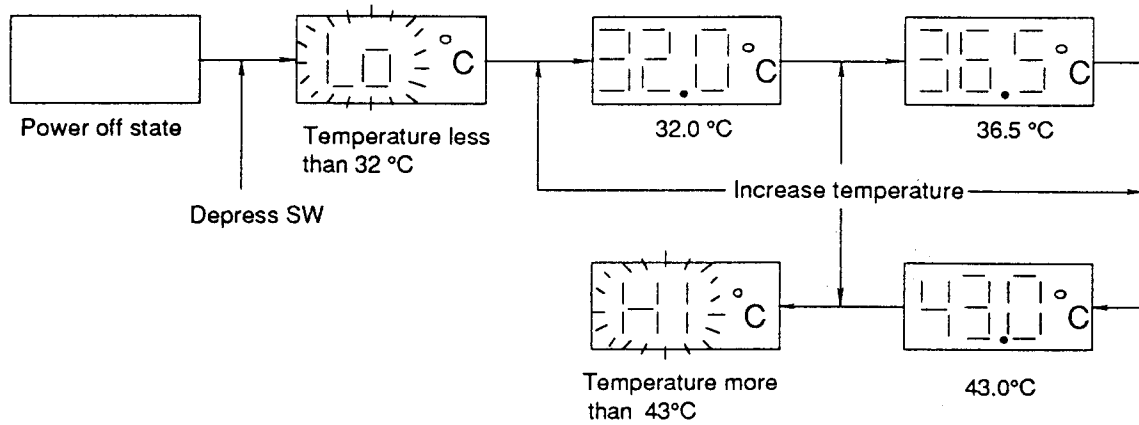


b. Character Fonts

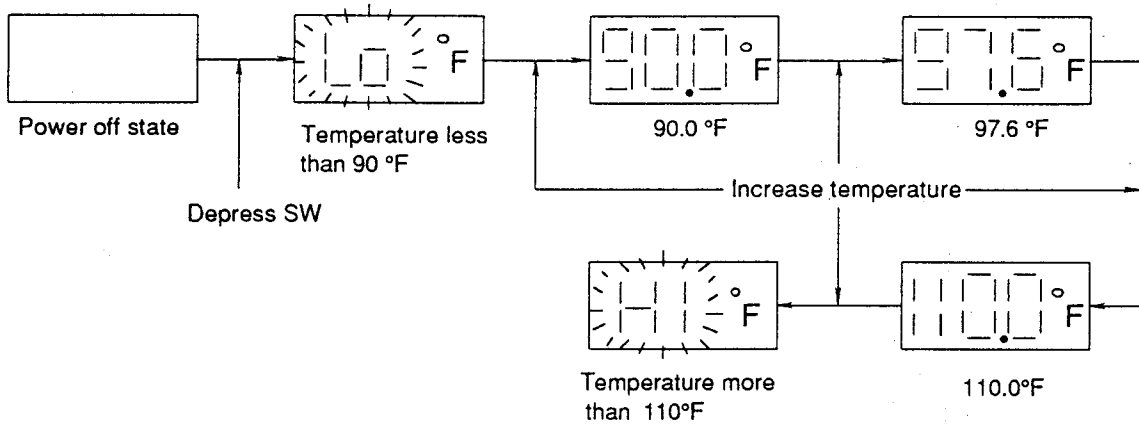


DISPLAY CONDITION

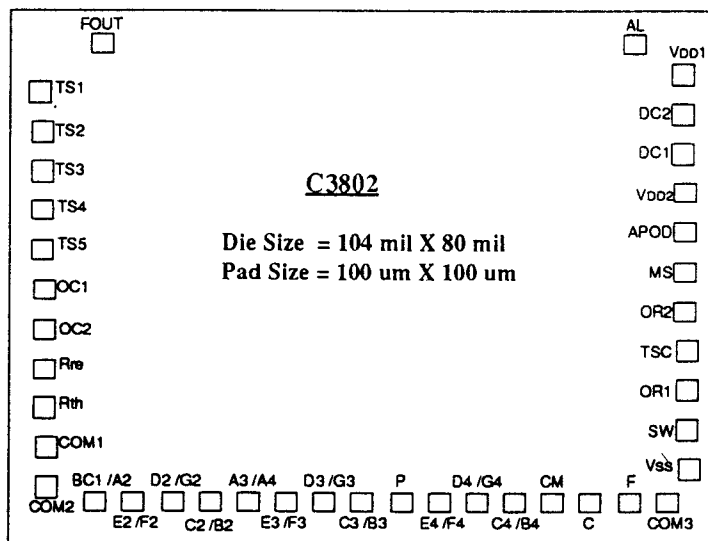
a. Centigrade Mode (MS = open)



b. Fahrenheit Mode (MS = VDD)



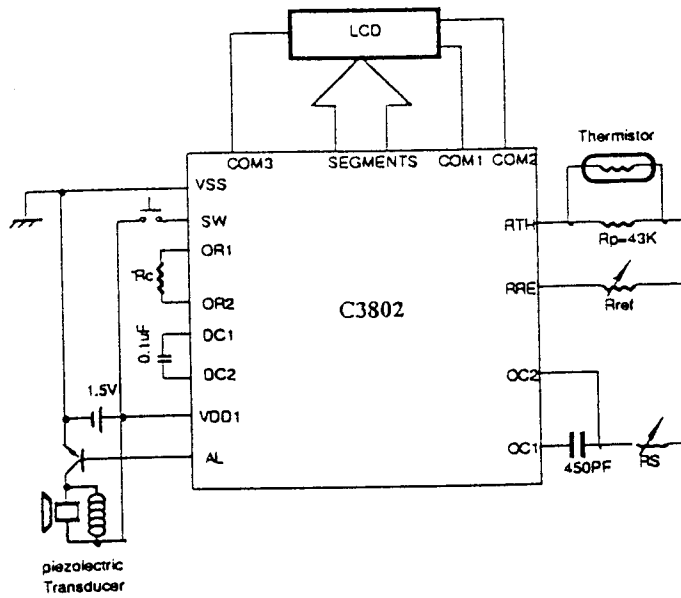
PAD DIAGRAM



PIN DESCRIPTION

Pad No.	Signal	I/O	Description	Pad No.	Signal	I/O	Description
1	FOUT	O	OSC.Test Output	21	P	O	Display Output
2	TS1	I	Test Input	22	E4 /F4	O	Display Output
3	TS2	I	Test Input	23	D4 /G4	O	Display Output
4	TS3	I	Test Input	24	C4 /B4	O	Display Output
5	TS4	I	Test Input	25	CM	O	Display Output
6	TS5	I	Test Input	26	C	O	Display Output
7	OC1		Capacitor Terminal for Oscillator	27	F	O	Display Output
8	OC2		Capacitor Terminal for Oscillator	28	COM3	O	Display Output
9	Rre		Resistor Terminal for Oscillator	29	Vss		Power Supply
10	Rth		Resistor Terminal for Oscillator	30	SW	I	Switch Terminal for Power on/off
11	COM1	O	Display Output	31	OR1		Resistor Terminal for Oscillator
12	COM2	O	Display Output	32	TSC	O	Capacitor Test Output
13	BC1 /A2	O	Display Output	33	OR2		Resistor Terminal for Oscillator
14	E2 /F2	O	Display Output	34	MS	I	°F / °C Mode select input
15	D2 /G2	O	Display Output	35	APOD	I	Auto Power Off Disable Input
16	C2 /B2	O	Display Output	36	VDD2		Power Supply
17	A3 /A4	O	Display Output	37	DC1		Capacitor Terminal For Double
18	E3 /F3	O	Display Output	38	DC2		Capacitor Terminal For Double
19	D3 /G3	O	Display Output	39	VDD1		Power Supply
20	C3 /B3	O	Display Output	40	AL	O	Alarm Output

APPLICATION CIRCUIT



- Note : 1. The value of *Rc is 120 - 150K
 2. Chip substrate must be connected to GND or left floating.