



FUNCTION

1. Powerful instruction set (130 instructions).
 - Binary addition, subtraction, BCD adjust, logical operation in direct and index addressing mode.
 - Single-bit manipulation (set, reset, decision for branch).
 - Various conditional branch.
 - 16 working registers and manipulation.
 - Look-up table
 - LCD driver data transfer.
2. Memory capacity.
 - ROM capacity 1024 x 16 bits.
 - RAM capacity 64 x 4 bits.
3. Input/output ports.
 - Port IOC 1 pin (with internal pull-low, low-level-hold).
IOC port had built in the input signal chattering prevention circuitry.
 - Port IOA 4 pin (input mode only, with low-level-hold)
4. 8 level subroutine nesting.
5. Interrupt function
 - External factor 1 (Pin IOC3).
 - Internal factors 3 (Pre-Divider, Timer2 & RFC).
6. Built in Alarm, clock or single tone melody generator(BZB, BZ).
7. Built-in R to F Converter circuit.
 - CX, RR, RT.
8. One 6-bit programmable timer(timer 2) with programmable clock source.
9. LCD driver output.
 - 9 LCD driver outputs (up to drive 36 LCD segments).
 - 1/4 Duty for LCD display.
 - 1/2 Bias for LCD display.
 - Single instruction to turn off all segments.
10. Built-in Voltage doubler charge pump circuit.
11. Built-in internal RC oscillator(~128kHz) or External R oscillator , mask option.
12. HALT function.
13. STOP function.
14. Low battery detected function

APPLICATION

- Thermometer
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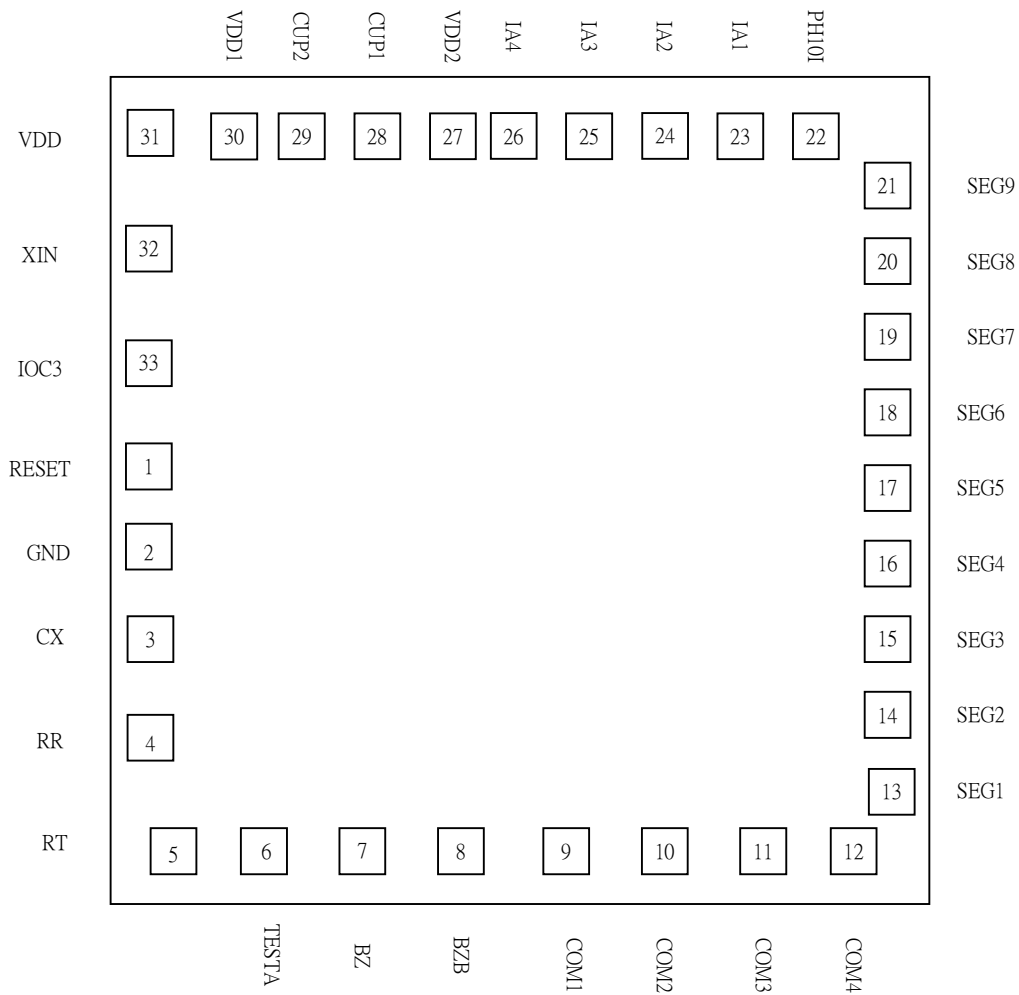
PIN DESCRIPTION

Name	I/O	Description
VDD	P	Positive power supply. Connect a 0.1u capacitor to GND.
VDD1,2	P	LCD supply voltage, and reference power supply voltage. Both pins have to connect a 0.1uf capacitor to GND.
RESET	I	Input pin for chip reset request signal, with internal pull-down resistor.
TESTA		Test signal input pin.
CUP1,2	O	Switching pins for supply the LCD driving voltage. Connect the CUP1 and CUP2 pins with a 0.1uf non-polarized electrolytic capacitor,
COM1~4	O	Output pins for driving the common pins of the LCD panel.
SEG1-9	O	Output pins for driving the LCD panel segment.
IOC3	I/O	1. Input / Output port C, can use software to define internal pull-low / low-level-hold Resistor and Chattering clock to reduce input bounce. 2.ROUT in Ext-R option mode , in the mode IOC function no used.
CX RR, RT	I O	1 input pin and 2 output pins for RFC application.
BZB, BZ	O	Output port for alarm, frequency or melody generator
GND	P	Negative supply voltage.
XIN	I	RIN in Ext-R option.
PH10I	I	For testing
IA1	I	Input pin
IA2	I	Input pin
IA3	I	Input pin
IA4	I	Input pin

PAD COORDINATE

No	Name	X	Y	No	Name	X	Y
1	RESET	87.5	742.55	18	SEG8	1302.5	813.35
2	GND	87.5	606.05	19	SEG7	1302.5	928.35
3	CX	87.5	419.55	20	SEG8	1302.5	1043.35
4	RR	87.5	239.45	21	SEG9	1302.5	1173.35
5	RT	141.55	87.5	22	PH10I	1182.7	1262.5
6	TESTA	329.65	87.5	23	IA1	1052.7	1262.5
7	BZ	487.65	87.5	24	IA2	932.7	1262.5
8	BZB	645.65	87.5	25	IA3	812.7	1262.5
9	COM1	802.5	87.5	26	IA4	692.7	1262.5
10	COM2	952.5	87.5	27	VDD2	562.7	1262.5
11	COM3	1102.5	87.5	28	CUP1	322.5	1262.5
12	COM4	1252.5	87.5	29	CUP2	437.5	1262.5
13	SEG1	1302.5	223.35	30	VDD1	207.5	1262.5
14	SEG2	1302.5	353.35	31	VDD	87.5	1262.5
15	SEG3	1302.5	468.35	32	XIN	87.5	1058.55
16	SEG4	1302.5	583.35	33	IOC3	87.5	900.55
17	SEG5	1302.5	698.35				

PAD DIAGRAM



The substrate of chip should be connected to GND.

ABSOLUTE MAXIMUM RATINGS

at Ta=-20 to 70°C, GND= 0V

Name	Symbol	Range	Unit
Maximum Supply Voltage	VDD	-0.3 to 1.8	V
	VDD1	-0.3 to 1.8	V
	VDD2	-0.3 to 3.6	V
Maximum Input Voltage	Vin	-0.3 to VDD+0.3	V
Maximum output Voltage	Vout1	-0.3 to VDD1+0.3	V
	Vout2	-0.3 to VDD2+0.3	V
Maximum Operating Temperature	Topg	-20 to +70	°C
Maximum Storage Temperature	Tstg	-25 to +125	°C

ALLOWABLE OPERATING CONDITIONS

at Ta=-20 to 70°C, GND= 0V

Name	Symb.	Condition	Min.	Typ.	Max.	Unit
Supply Voltage	VDD		1.2	1.5	1.8	V
	VDD1		1.0	1.1	1.3	V
	VDD2		2.0	2.2	2.6	V
Operating current	Iop	RFC operating	20	45	60	uA
Stand-by current	I _{sb}	STOP mode	-	-	1	uA
Voltage detector	V _{bat}		1.15	1.25	1.35	
Input "H" Voltage	V _{ih1}	Ag Battery Mode	VDD-0.7	-	VDD+0.7	V
Input "L" Voltage	V _{il1}		-0.7	-	0.7	V
Oscillator Freq	F _{opg1}	Built-in oscillator	-	128	-	KHZ

ELECTRICAL CHARACTERISTICS

Input Resistance

Name	Symb.	Condition	Min.	Typ.	Max.	Unit
"L" Level Hold Tr.(IOC3)	R _{llh1}	V _i =0.2VDD1	10	40	100	Kohm
IOC3 Pull-Down Tr.	R _{mad1}	V _i =VDD1	200	500	1000	Kohm
RES Pull-Down R	R _{res1}	V _i =GND or VDD1	5	20	50	Kohm

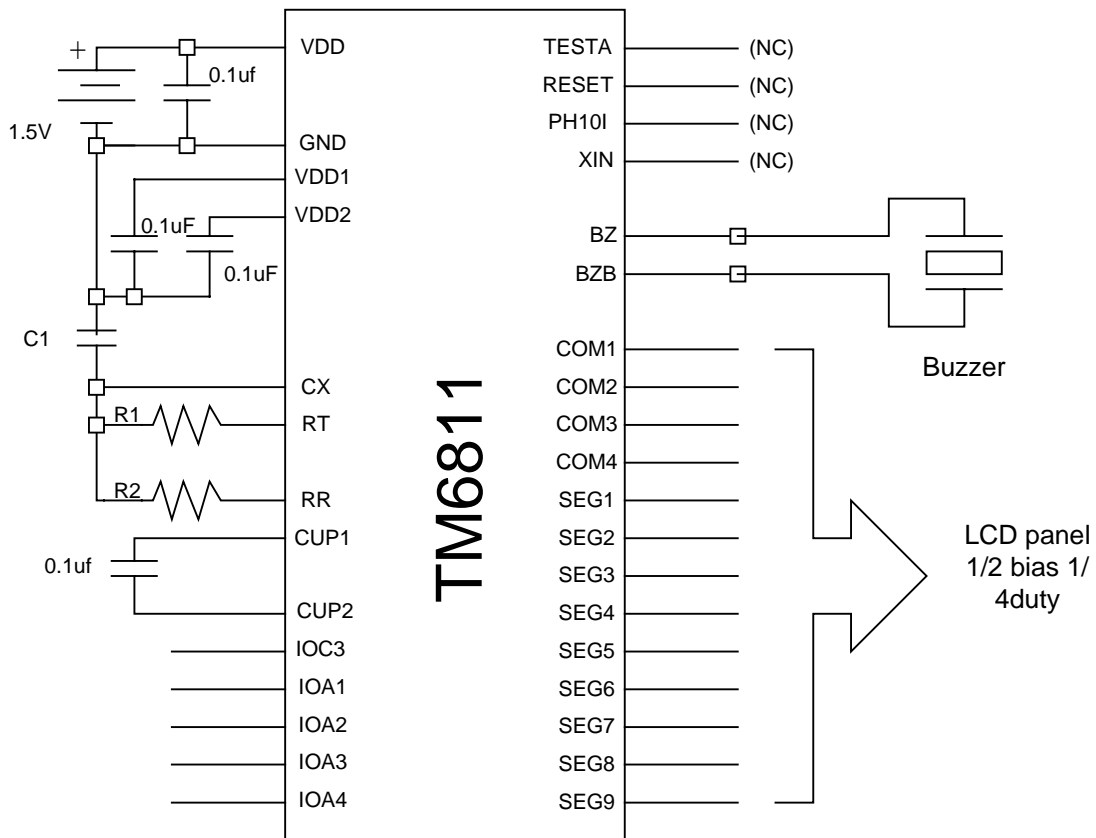
DC Output Characteristics

Name	Symb.	Condition	Port	Min.	Typ.	Max.	Unit
Output "H" Voltage	V _{oh1c}	I _{oh} =-200uA	SEG1~9	0.8	0.9	1.0	V
Output "L" Voltage	V _{ol1c}	I _{ol} =400uA		0.2	0.3	0.4	V

Segment Driver Output Characteristics

Name	Symb.	Condition	For	Min.	Typ.	Max.	Unit.
1/2 Bias Display Mode							
Output "H" Voltage	V _{oh12f}	I _{oh} =-1uA	SEG-n	2.2			V
Output "L" Voltage	V _{ol12f}	I _{ol} =1uA					0.2
Output "H" Voltage	V _{oh12g}	I _{oh} =-10uA	COM-n	2.2			V
Output "M" Voltage	V _{om12g}	I _{ol/h} =+/-10uA			1.0		1.4
Output "L" Voltage	V _{ol12g}	I _{ol} =10uA	COM-n			0.2	V

Typical Application Circuit



Comp.	Value	Remark
C1	0.01uF	
R1	30K	thermistor at 37 degree
R2	20K	

Note : This application circuit is for internal RC oscillator option.