



## BASIC FUNCTION 8 DIGITS LCD CALCULATOR

The SC876F is a single chip CMOS LSI with 8-digit arithmetic operation, single memory extraction-of-square-root, percentage calculation and auto power off function, designed for FEM LCD operation with a 1.5V power supply or dual power supply.

## FUNCTIONS

- Four standard functions(+, -, ×, ÷)
- Auto constant calculations (constant: multiplicand, divisor, addend and subtrahend).
- Square and reciprocal calculations.
- Mark-up and mark -down calculations.
- Extraction of square root.
- Percentage calculations.
- Chain multiplication and division.
- Power calculations.
- Rough estimate calculations.
- Clear key: ON/C, ON/CE, CE

## FEATURES

- Single chip CMOS construction.
- Rollover capability.
- Floating decimal point.
- LCD direct drive.
- Overflow indication: E.
- Accumulating memory: M+, M-, RM, CM, RM/CM.
- Only bare chip available.
- On chip supply voltage limiter by application.

## ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Rating	Unit	Note
Terminal voltage	$V_{GG}$	-0.3~+2.1	V	1
	$V_{IN}$	-0.3~ $V_{GG}+0.3$	V	
Solar supply voltage	$V_{SB}$	1.1~3.0	V	2
	$V_{GG}(\text{lim})$	1.1~1.8	V	3
Battery supply voltage	$V_{GG}$	1.1~1.8	V	
Operating temperature	Topr	0~+50	°C	
Storage temperature	Tstg	-55~+125	°C	

Note: 1. Maximum voltage on any pin with respect to the GND.

2. Vsb is solar supply voltage.

3.  $V_{GG}(\text{lim})$  is limited voltage.



#### ELECTRICAL CHARACTERISTICS (Ta = 25°C, V<sub>GG</sub> = 1.5V, unless otherwise specified)

Characteristic	Symbol	Test conditions	Min	Typ	Max	Unit	Note
Input voltage	V <sub>IH1</sub>		V <sub>GG</sub> -0.4			V	4
	V <sub>IL1</sub>				0.4		
Input current	I <sub>IH1</sub>	V <sub>IN</sub> = V <sub>GG</sub>			1	uA	5
	I <sub>IL1</sub>	V <sub>IN</sub> = 0V	0.3	1	3		
Output voltage 1	VOH1	Without load	V <sub>GG</sub> -0.15			V	6
	VOL1	Lout = 15uA			0.15		
Output voltage 2	VOA	Without load	2.80	2.95		V	7
	VOB	Without load	1.30	1.50	1.70		
	VOC	Without load		0	0.20		
Display frequency	Fd	V <sub>GG</sub> = 1.3V, while Display is on, Rf = 560Kohm	40	45	50	Hz	7
Dissipation	I <sub>off</sub>	Display off			0.1	uA	8
	I <sub>DIS</sub>	V <sub>GG</sub> = 1.3V While display is on		3.5	5		9
	I <sub>op</sub>	V <sub>GG</sub> = 1.1V While operation		5.6			10

Note: 4. Applies to pins K2~K6.

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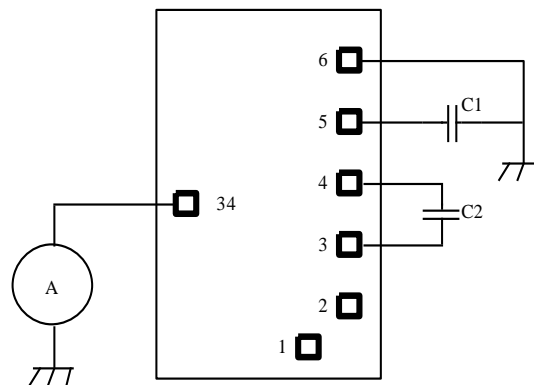
6. Applies to P1, P2, A2~A5.

7. Applies to H1~H3, a1~a8, b1~b8, c1~c8.

8. Measured by the below test circuit after power supply automatically turns off.

9. Measured by the below test circuit while "0" is being displayed after auto-clear operation and while key is not being depressed.

10. Measured by the below test circuit while operation is being made by ON/C key and while key is not being depressed.



TEST CIRCUIT  
(C1,C2:0.1uF)



### FUNCTIONAL DESCRIPTION

#### Decimal point system

Complete floating decimal point system.

**Integral number:** 8 digits leading zero suppression. Zero shift.

**Symbols:** -: negative number display.

E: error display.

M: memory display.

#### Error detections

##### System errors occur when:

1. The integral part of any memory calculation result exceeds 8 digits.
2. The division by zero.
3. The extraction of square root of a negative number.

##### Rough estimate calculation error

When the integral part of the result of any standard functions, percentage, square, reciprocal, or power calculations exceed 8 digits.

#### Error indications

##### System error

“0” is indicated in the 1-digit position and “E” in the sign-digit position.

##### Rough estimate calculation error

The high-order 8-digit calculation result is indicated together with “E”.

The decimal point is indicated in the position corresponding to a calculation result of time  $10^{-8}$ , and no zero shift is performed.

#### Error release

##### System error

A system error can be released by the ON/C or ON/CE key.

##### Rough estimate calculation error

A rough estimate calculation error can be released by the ON/C, ON/CE, CE key.

A calculation result is not cleared by ON/CE, CE key but is retained.

#### Number entry

Numerical can be entered up to 8 digits. Numerical entries equal to 9 digits or more are ignored.

#### Memory protection

In any error detection, the memory contents is retained.

#### Memory indication

If the memory content is not zero, “M” is indicated in the sign-digit position.

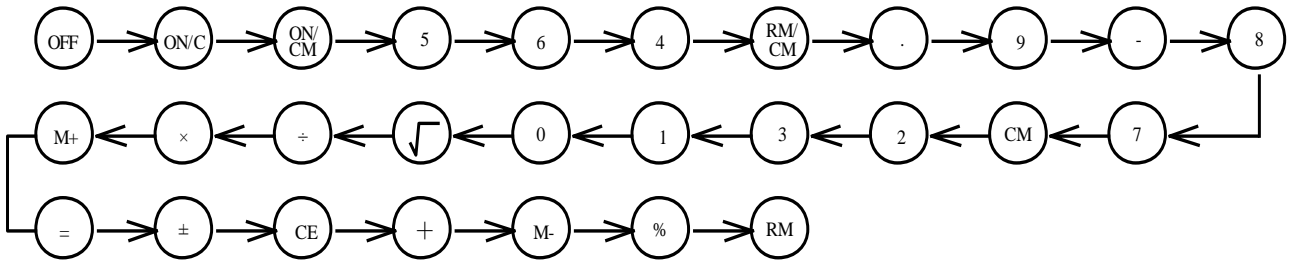
#### Doublers key depression

The order of the priority when two keys are being depressed simultaneously, is as follows:



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## 八位计算器



when the OFF and ON/C key are depressed simultaneously, the OFF key is given priority.

### Key bounce protection

#### Front edge

Down to 1 word and up to about 3 words.

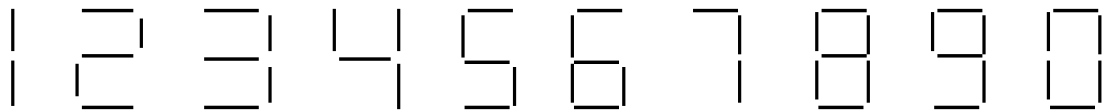
#### Trailing edge

9 words

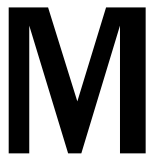
1 words is 3.3ms when display frequency is  $f_d = 100\text{Hz}$ .

### DISPLAY FONTS

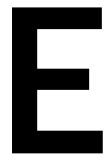
#### Numericals font



#### Sign font



Memory



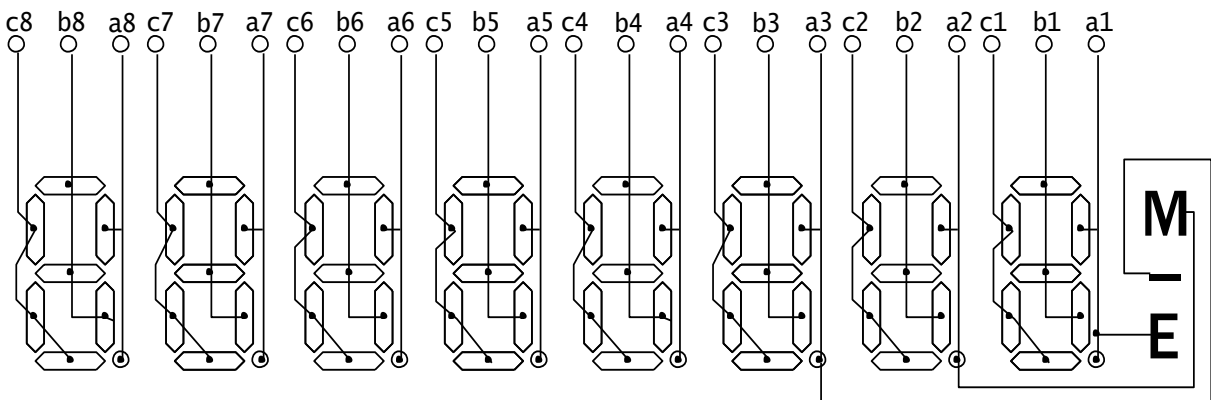
Error



Minus

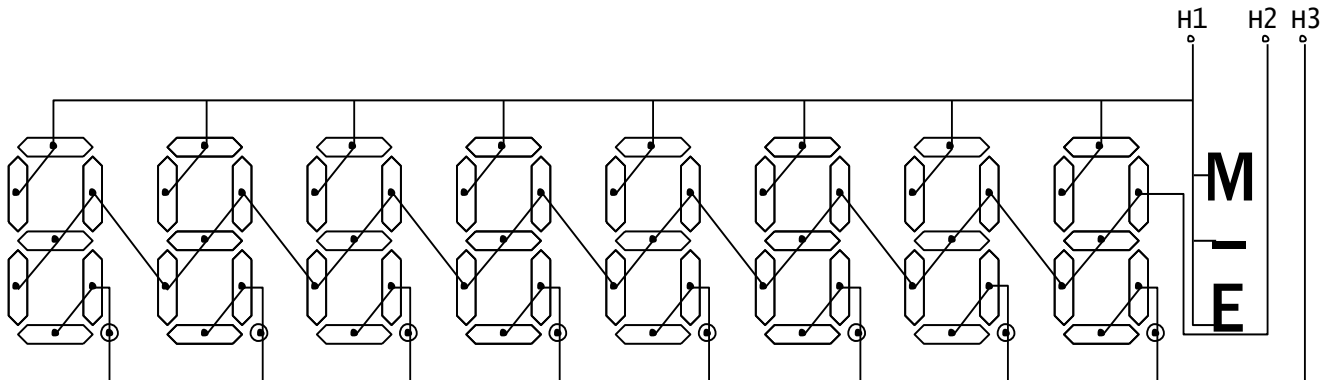
### CONNECTION OF LCD

#### SEGMENT





### COMMON



### AUTO POWER OFF

Power automatically turns off after 9-11 minutes pass from the last key pressure.

### ON/C KEY

All operations except memory content are cleared by ON/C key.

### MARK-UP AND MARK-DOWN CALCULATION

Mark-up and mark -down calculations are performed as follows.

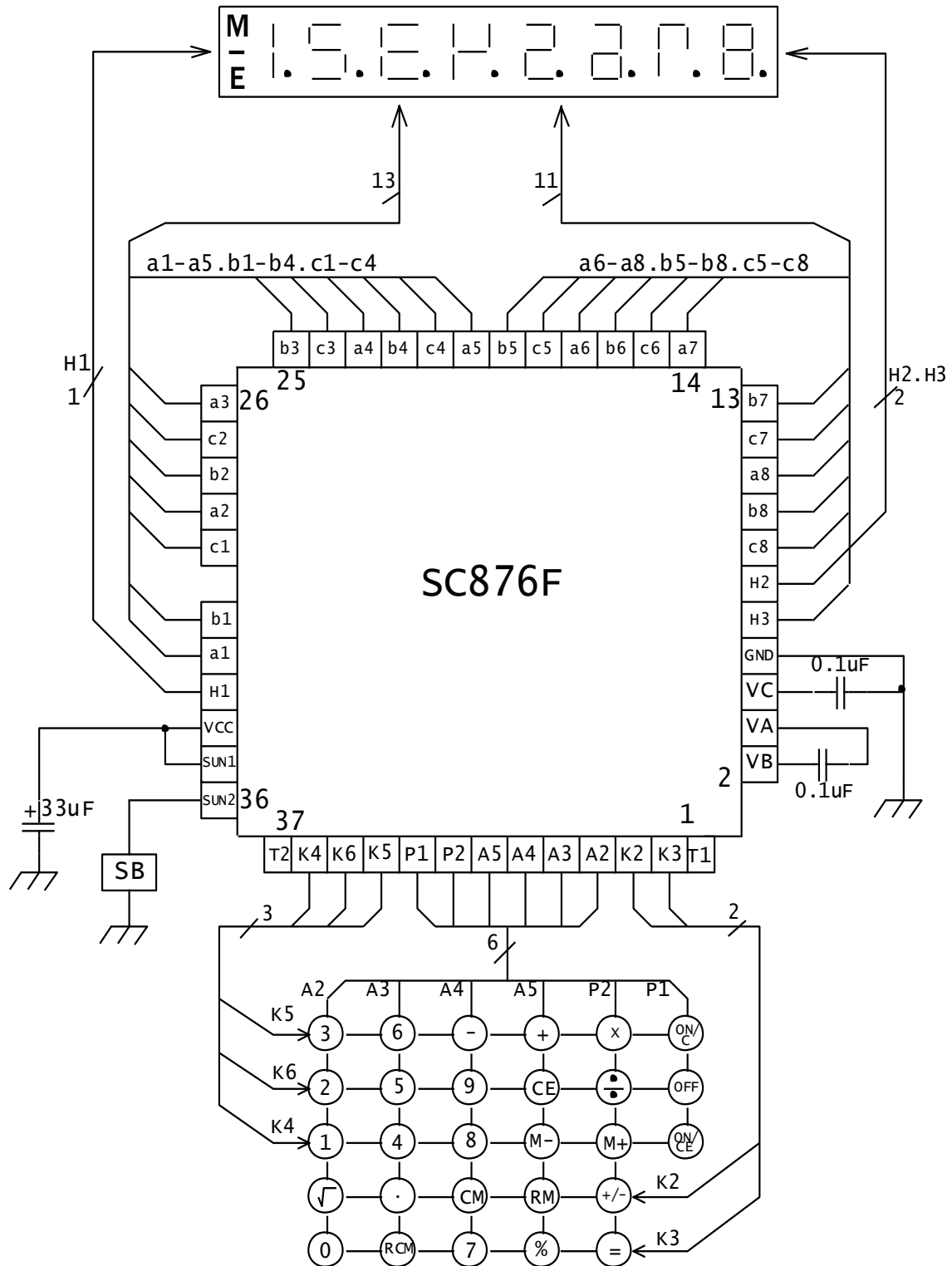
ENTRY		DISPLAY	
A	A	A	A
±	×	A	A
B	B	B	B
%	%	$A + AM/100$	$AM/100$
	+OR-		$AM/100$
	=		$A + AM/100$ OR $A - AM/100$

\*AM : AMOUNT



#### APPLICATION CIRCUIT (for use with a solar cell)

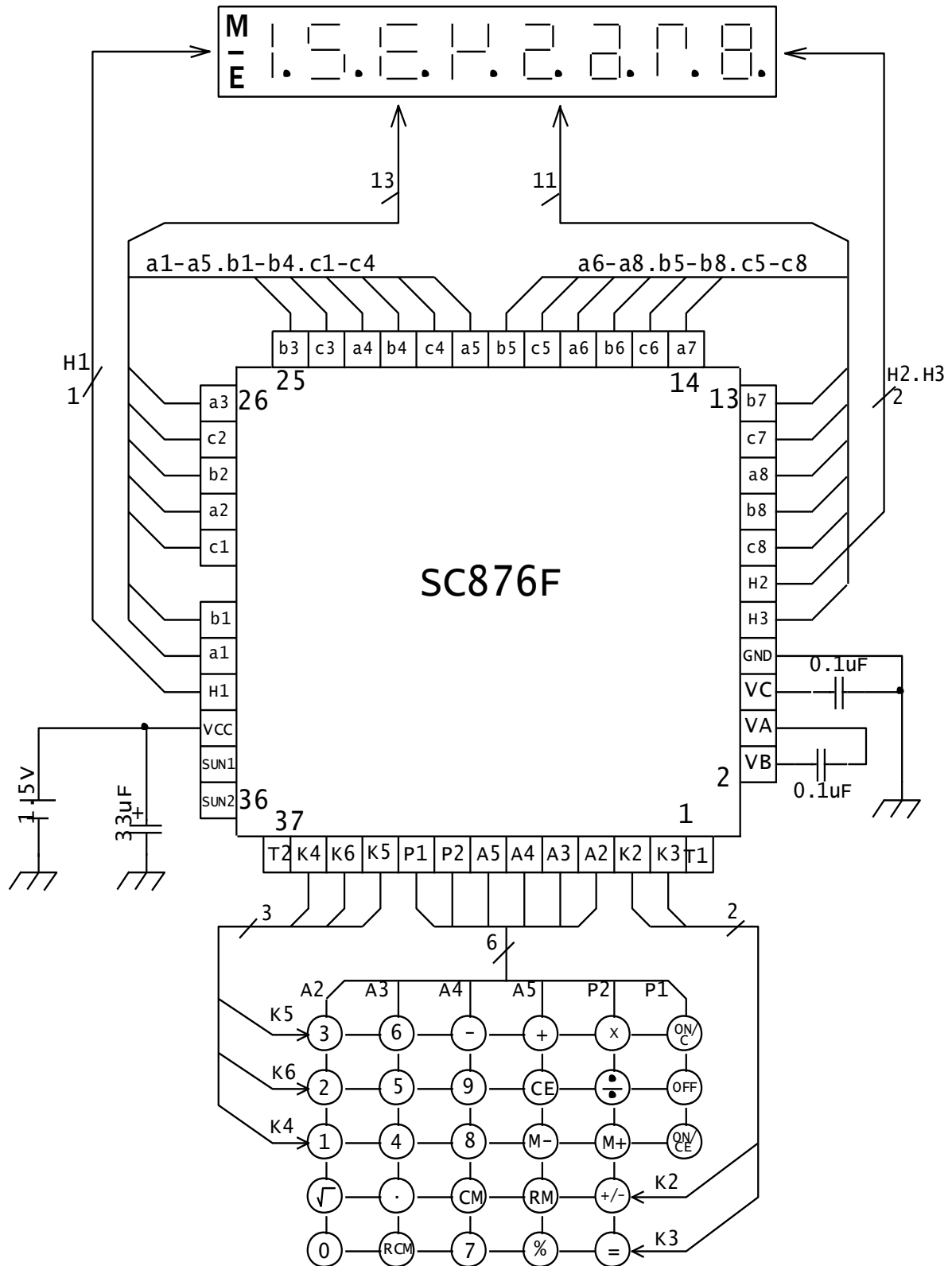
图 1:



\*SC876F's substrate(the back side of SC876F's chip)should be connected to the GND level.



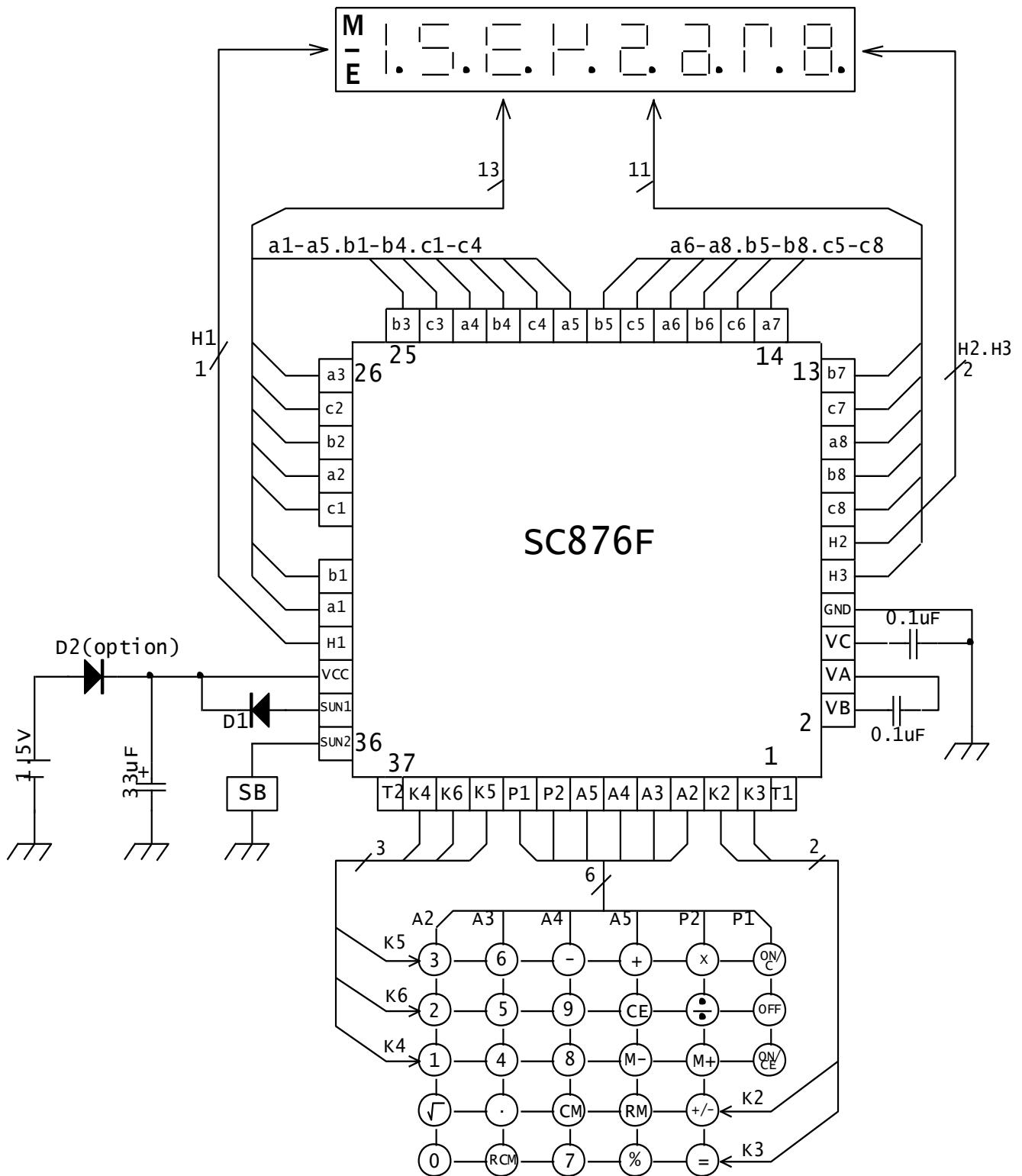
图 2:



\*SC876F's substrate(the back side of SC876F's chip)should be connected to the GND level.



图 3:

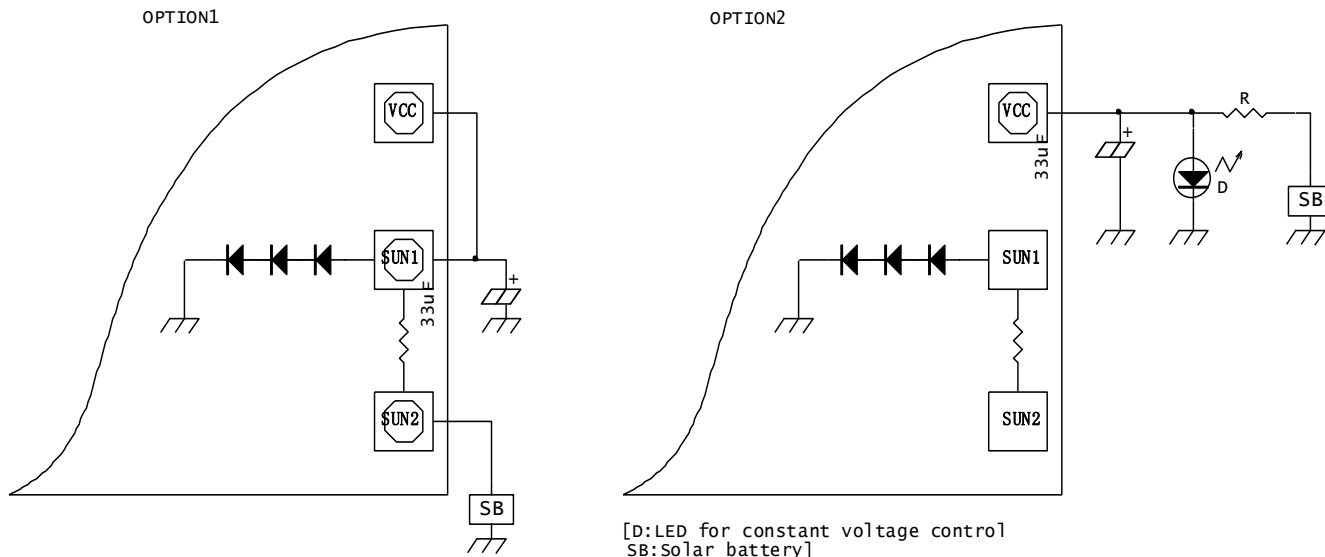


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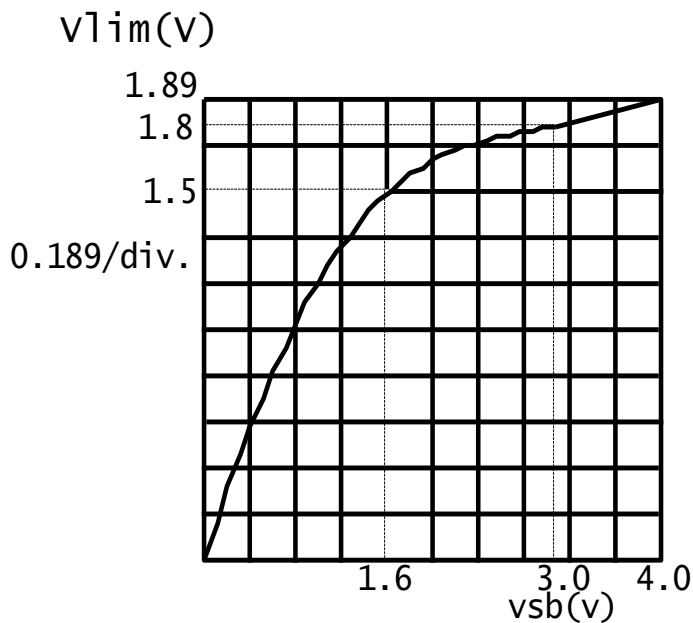


#### INTERNAL VOLTAGE LIMITER BONDING OPTION METHOD



(configuration using internal voltage limiter)

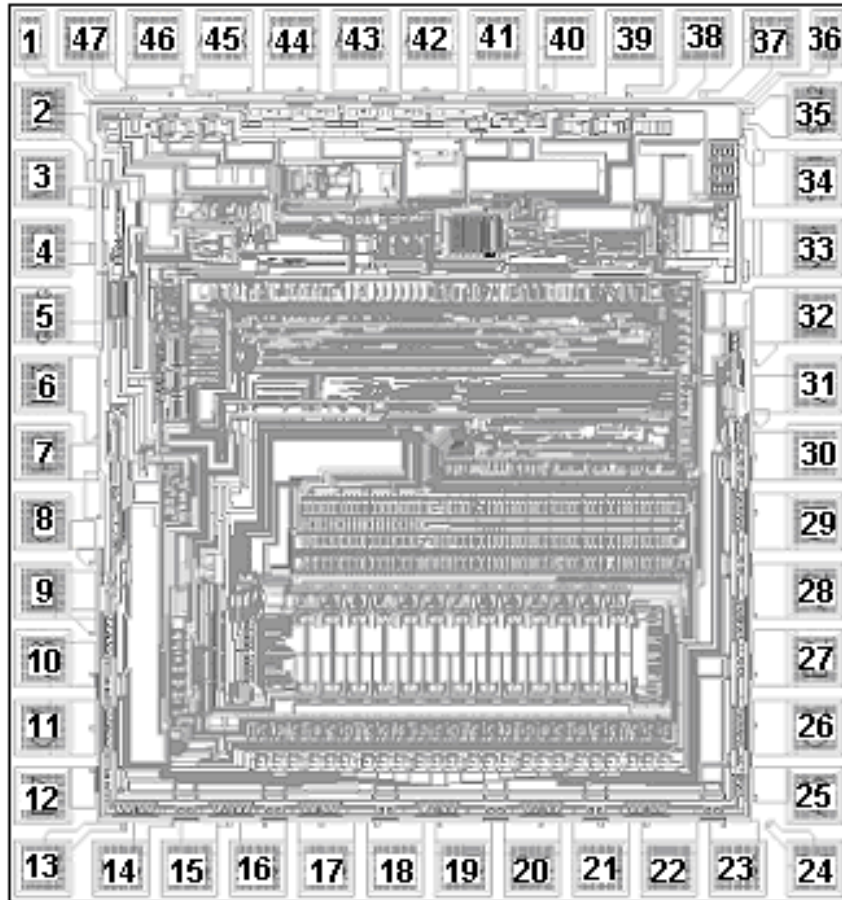
(configuration using external voltage limiter)



VOLTAGE LIMITER CHARACTERISTIC



#### PAD ASSIGNMENT



The IC substrate should be connected to **VSS** in the PCB layout artwork

Pad No.	Pad Name	X	Y	Pad No.	Pad Name	X	Y
1	T1	-640.00	665.00	25	A3	620.00	-550.00
2	VB	-620.00	550.00	26	C2	620.00	-440.00
3	VA	-620.00	440.00	27	B2	620.00	-330.00
4	VC	-620.00	330.00	28	A2	620.00	-220.00
5	GND	-620.00	220.00	29	C1	620.00	-110.00
6	H3	-620.00	110.00	30	B1	620.00	0.00
7	H2	-620.00	0.00	31	A1	620.00	110.00
8	C8	-620.00	-110.00	32	H1	620.00	220.00
9	B8	-620.00	-220.00	33	VCC	620.00	330.00
10	A8	-620.00	-330.00	34	SUN1	620.00	440.00
11	C7	-620.00	-440.00	35	SUN2	620.00	550.00
12	B7	-620.00	-550.00	36	T2	640.00	665.00
13	A7	-620.00	-665.00	37	K4	550.00	664.95
14	C6	-495.00	-665.00	38	K6	440.00	665.00



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15	B6	-385.00	-665.00	39	K5	330.00	665.00
16	A6	-275.00	-665.00	40	P1	220.00	665.00
17	C5	-165.00	-665.00	41	P2	110.00	665.00
18	B5	-55.00	-665.00	42	A5X	0.00	665.00
19	A5	55.00	-665.00	43	A4X	-110.00	665.00
20	C4	165.00	-665.00	44	A3X	-220.00	665.00
21	B4	275.00	-665.00	45	A2X	-330.00	665.00
22	A4	385.00	-665.00	46	K2	-440.00	665.00
23	C3	495.00	-665.00	47	K3	-550.00	665.00
24	B3	620.00	-665.00				