



Fuman Microelectronics Group Co., Ltd.

FINE MADE MICROELECTRONICS GROUP CO., LTD. Single key touch sensor trigger chip

TC233A (Document No.: S&CIC1955)

overview

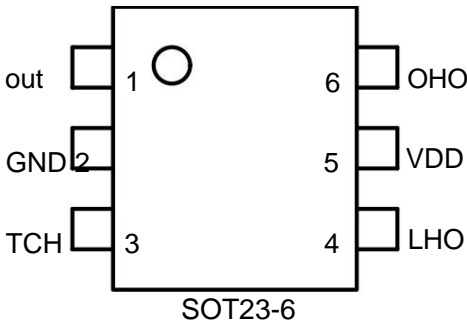
TC233A is a single button capacitive sensing control switch chip. The chip has built-in high-precision LDO, low-voltage reset, anti-jitter and other measures to ensure the anti-interference and stability of the chip. This touch detection chip is specially designed to replace traditional buttons.

Working voltage: 2.3V---5.5V. Standby current 1.5uA (3V). Chips are widely used in button batteries, dry batteries, lithium batteries, AC Convert to DC power supply products, such as Bluetooth headsets, desk lamps, etc.

features

- OUT trigger output is open-drain output
- Ultra-low standby current 1.5uA@VDD=3V, typical value 2.5uA at 4V
- Built-in high-precision LDO module
- Embedded common mode interference removal circuit
- Synchronous mode and hold mode optional
- Output Low level is active
- There is about 0.5 seconds of stabilization time after power-on, do not touch the detection point during this period, all functions are disabled at this time
- The longest output time is about 16 seconds
- @VDD=3.0V
- SOT23-6L package

Pin Arrangement



Pin function description

Pin number	Pin name	input/output	Function
1	out	output	description Trigger
2	GND	---	drive output negative
3	TCH	input	pole (ground) Touch
4	LHO	input	sensing pin LHO pin connected to VDD, OUT pin output low
5	VDD	---	active power positive pole
6	OHO	enter	The OHO pin is connected to VDD, and the OUT pin is in hold output mode; the OHO pin is grounded, and the OUT pin is in synchronous output mode. (One shot or Hold mode Option)



Fuman Microelectronics Group Co., Ltd.

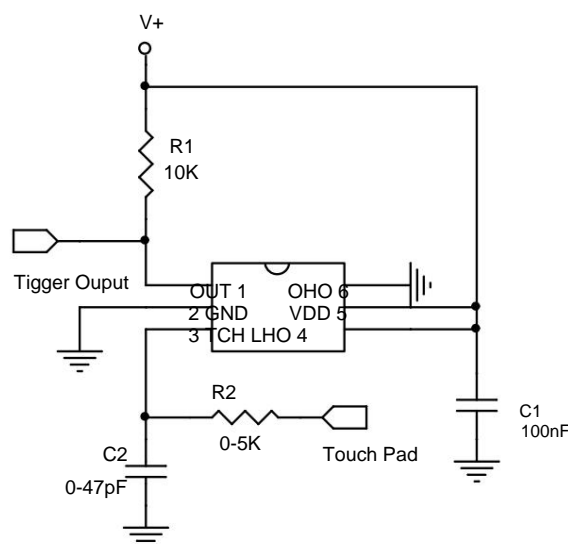
FINE MADE MICROELECTRONICS GROUP CO., LTD. Single key touch sensor trigger chip

TC233A (Document No.: S&CIC1955)

The maximum effective time of the key

TC233A When OHO (One shot or Hold mode Option) is grounded, when the chip is in synchronous mode, the internal timer will monitor the key detection, and the timer sets the maximum output duration of about 16 seconds. When the timer time expires, the system will automatically return to the initial state of power-on, and the output will become invalid until the key is detected again.

Application Schematic



TC233A Application Schematic

The OUT terminal is an open-drain output. If the chip to be triggered has a built-in pull-up resistor, the external R1 can be omitted.

C2 is the sensitivity adjustment capacitor, the capacitance value range (0~47pF), the larger the capacitance value of C2, the lower the sensitivity

(if the interference is not large, this capacitor can be omitted, and an adjustment interface is reserved on the board, which is convenient for initial debugging That's it.)

Sensitivity adjustment

The total load of electrode size and capacitance on the PCB (the sum of parasitic capacitance and C2 capacitance) will affect the sensitivity, so the sensitivity adjustment needs to conform to the actual situation of the PCB. 1. The dynamic balance between the size of the touch pad and the material and thickness of the touch medium. The larger the size of the touch pad, the higher the sensitivity.

Touch the same medium, the thicker the medium, the lower the sensitivity. The same size and thickness of the touch pad, the sensitivity of different media materials will be different, please adjust according to the actual application of the media. 2. Adjust the capacitance value of C2 and the resistance value of R2 Under the condition that other conditions remain unchanged, there is an inverse proportional relationship between the capacitance value of C2 and the sensitivity.

The smaller the capacitance value of C2, the higher the sensitivity, the recommended capacitance value of C2 (0~47pF)--in most applications, it can be left in the air. The smaller the resistance value of R2, the higher the sensitivity, the recommended resistance value of R2 (0~5k) - the typical application value is 1K. 3. The power supply must be stable. If the voltage of the power supply drifts or shifts rapidly, it may cause abnormal sensitivity or false detection. 4. The capacitor (C2) for adjusting sensitivity must be selected with a smaller temperature coefficient and a more stable one. Capacitor; such as X7R, NPO, so for touch applications, it is recommended to choose NPO capacitors to reduce the sensitivity caused by temperature changes.



Fuman Microelectronics Group Co., Ltd.

FINE MADE MICROELECTRONICS GROUP CO., LTD. Single key touch sensor trigger chip

TC233A (Document No.: S&CIC1955)

PCB layout considerations

1. The 104 capacitor between VDD and GND should be as close to VDD as possible to reduce the interference introduced by the power line. 2. The R2 resistor connected in series on the sensing line should be placed close to the chip. 3. Appropriate paving area can improve anti-interference. 4. Prioritize layout of sensing wiring and sensing pads. The chip is placed close to the sensing pad, and the sensing wire is directly connected to the sensing pad (or spring pad). The line width of the sensing connection should be as small as possible. Do not run other signal lines in close parallel around the induction connection. If it is unavoidable, do ground isolation from other traces. The distance between the sensing pad and the ground is greater than 1mm.

Absolute Maximum Ratings

Features	symbol	condition	value	unit
Operating	TOP		-20 ~ +85	°C
temperature	TSTG		-40~ +125	°C
Storage	VDD		-0.3 ~ +5.5V	V
temperature	VIN		-0.3 ~ +0.3V 5K	V
Power supply	ESD (HMB)			V

voltage Input voltage Anti-static * Attention Exceeding the rated value may cause permanent damage to the chip

electrical characteristics

(Test condition is room temperature = 25°C)

Characteristic operating	Symbol	Condition	Min	Typ	Max	Unit
voltage	Vcc			2.3	3	5.5V
current consumption	IVDD	standby mode			1.5	5 uA
Power-on stabilization time	Tini				500	ms
Output sink current	SINK	VDD=4V Minimum			26	mA
detection capacitance	delta_CX				0.2	pF
The sampling period	Tsi	working status			1.5	ms
Response time	Tre				46	ms
The longest effective time of the button	Ts	OHO=0			18	S
Pull-down resistor	RPL				25K	Ω
Internal LDO value	VLDO			2.2	2.3	2.4 V
ESD	HMB			5K		V

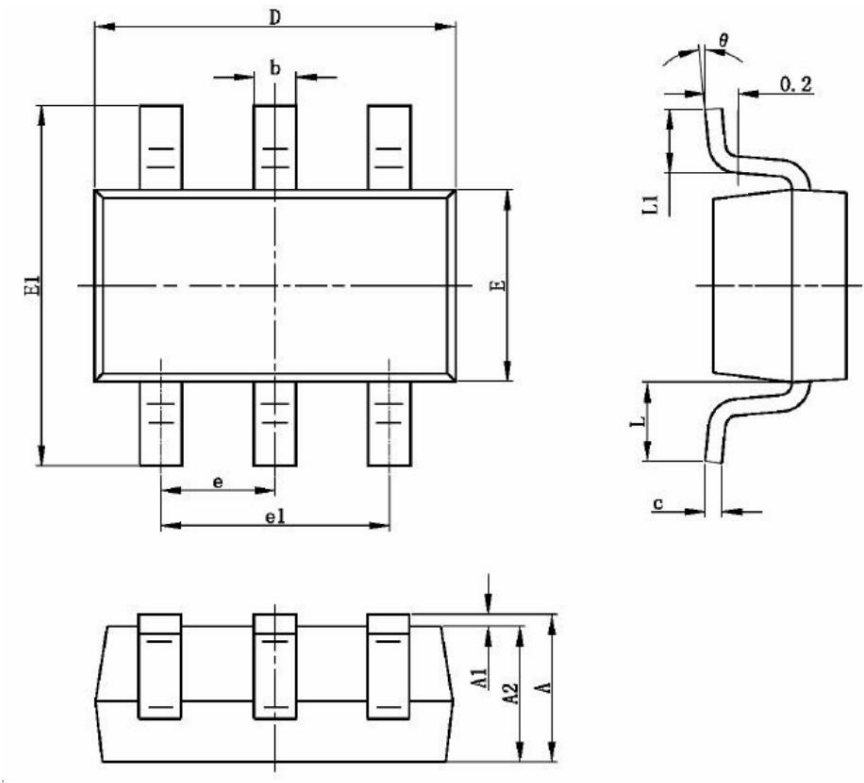


Fuman Microelectronics Group Co., Ltd.
FINE MADE MICROELECTRONICS GROUP CO., LTD. Single key touch

TC233A (Document No.: S&CIC1955)

sensor trigger chip

Package Dimensions (SOT23-6L)



symbol	mm		inch	
	minimum value	maximum value	min	max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.400	0.012	0.016
c	0.100	0.200	0.004	0.008
D.	2.820	3.020	0.111	0.119
E.	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 (typical)		0.037 (typical value)	
e1	1.800	2.000	0.071	0.079
L	0.700		0.028	
L1	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°