Features

- Operating voltage:2.2-5.5V

- Standby current:10uA/3.0V

- Power-On Reset（POR）

- Low Voltage Reset（LVR）

- Key Response Time：
    Normal Mode　48mS
    Standby Mode 160mS

- Open drain output，Active low

- The output data format is the number of pulses

- Maximum key on duration time：　13S

- Sensitivity adjustment using an external capacitor(1-47nF) on CS pin

- Add a capacitor（0-50pF） to a touch key pin can fine tune the sensitivity for single key

- After power-on have about 0.3S stable-time, during the time do not touch the key .

- Auto-calibration Function

- Anti-voltage fluctuation，High anti-interference

- Package
 SOT23-6L(3mm x 3mm PP=0.95mm)

1   General Description

VK36N2P is a touch pad detector IC which offers 2 touch keys，It can detect human body contact using external touch pads. The high level of device integration enable applications to be implemented with a minimum number of external components.

It Provides 1pulse output pin，Open-drain output requires an external pull-up resistor. The power-on output level,output mode, operating mode can be selected through IO pin. Special internal circuitry is also employed to ensure excellent power noise rejection to reduce the possibility of false

With auto-calibration, low standby current, excellent resistance to voltage fluctuation and other features, this range of touch key devices provide a simple and effective means of implementing touch key + Pulse output in a wide variety of applications.

2 Pinouts and pin description
## 2.1 VK36N2P SOT23-6L Pin Assignment

TOP VIEW

CS	1	6 Q
VSS	2	5 VDD
TP0	3	TP1
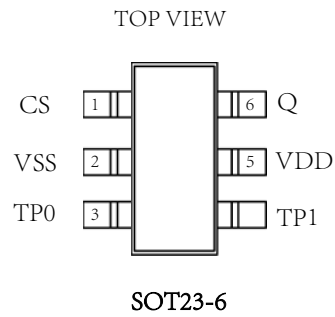
SOT23-6

2.2   VK36N2P SOT23-6L Pin Description

Pin name	I/O	Function Description
1-CS	IN	Capacitance detection,the larger the capacitance the higher the sensitivity(1-47nF)
2-VSS	VSS	Negative power supply
3-TP0	IN	Touch key input pin，Add a capacitor（0-50pF）to a touch key pin can fine tune the sensitivity
4-TP1	IN	Touch key input pin，Add a capacitor（0-50pF）to a touch key pin can fine tune the sensitivity
5-VDD	VDD	Positive power supply
6-Q	OUT	Open-drain output,Output high impedance when power on, output pulse signal when touched（External pull-up resistor）

3 Functional Description

3.1 Block diagram
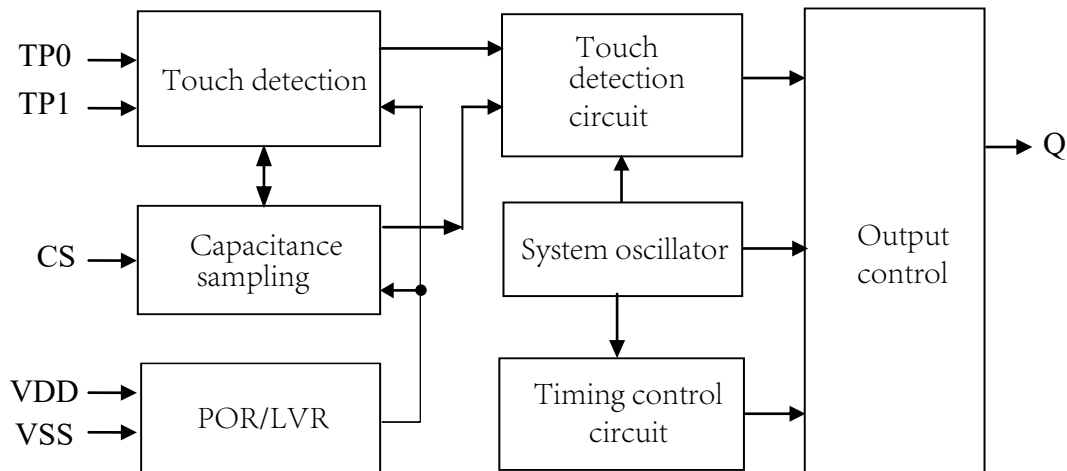
3.2 Auto-calibration Function

After power-on, the chip will be initialized to obtain the first reference value, If there is no touch，the chip will automatically calibrate the reference value，so that the reference value can be dynamically changed according to the external environment.

For example, reliable touch detection can be achieved through this mechanism when temperature changes or when there is environmental noise.

3.3 Max Key On Duration Time

To minimise the possibility of unintentional switch detections, such as undesired objects covering the sensing electrodes, the devices include a Maximum Key On duration time function. To implement this function the devices include an internal timer, which starts running after each switch detection. If the key on time of a touch key exceeds a value of about 13S, then the device will re-calibrate the key state, obtain a new reference value, while the output status is reset to the initial state.

3.4 Anti-Voltage Fluctuation

The chip has a built-in anti-voltage fluctuation function,which can prevent the touch button from malfunctioning caused by the external high current drive and the instantaneous drop of the working voltage.

3.5 Output mode

VK36N2P output is Q pin，open-drain output requires an external pull-up resistor.
The output is the number of pulses with a fixed width。

Data Format：

Q pin output high level when power on.(with an external pull-up resistor)

TP0 Short Press:

When TP0 is pressed ,Q outputs a 4mS low and 4mS high pulse，and then the key does not release and output maintains the low level, and the key release and output restores the high level.

TP0 Long Press:

TP0 long press to maintain low level, send a 4mS high pulse every 100mS.

TP1 Short Press:

When TP1 is pressed ,Q outputs 2 4mS low and 4mS high pulses，and then the key does not release and output maintains the low level, and the key release and output restores the high level.
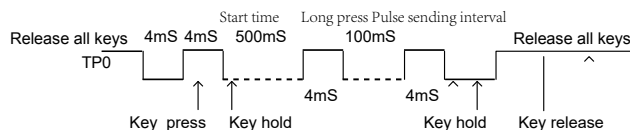
TP1 Long Press:

TP1 long press to maintain low level, send two 4mS high pulses every 100mS.
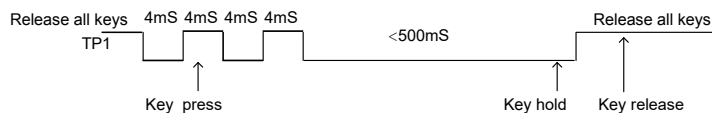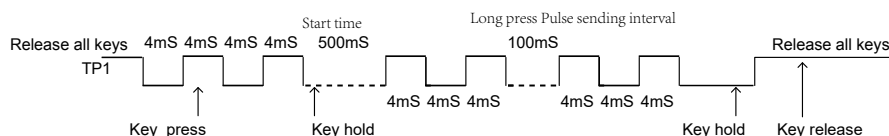
Output mode:
TP0 Short Press
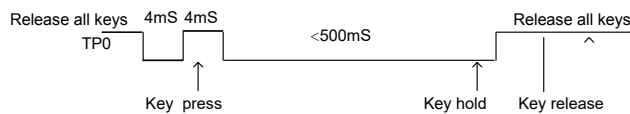
TP0 Long Press

Output mode:
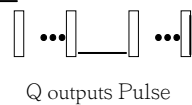TP1 Short Press

TP1 Long Press

3.6 Operating Mode

There are two operating modes for VK36N2P, the normal mode and the standby mode. If any key is pressed, the device will be waken up and will then enter the normal mode .If no key press,After 4S, the system will then return to the standby mode again,it will be saving power. When VDD=5V ,at standby mode output response time about 160ms, at detective mode output response time about 48 ms.

Touch
TPx

~128ms   TOUCH   ~16ms   Release   ~128ms   TOUCH   ~16ms   Release   about 4s   ~128ms
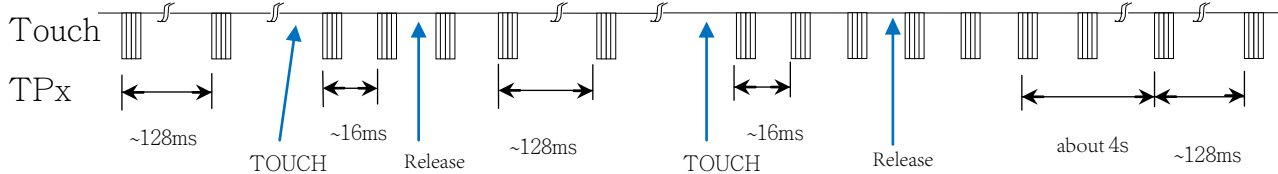
With an external pull-up resistor

Q

Q outputs Pulse

3.7 Sensitivity Adjustment

The touch PAD size and capacitance of connecting line on PCB can affect the sensitivity. The sensitivity adjustment must according to the practical application on PCB. The VK36N2P offers some methods for adjusting the sensitivity outside:

I. Touch PAD Size
Under other conditions are fixed. Using a larger Touch PAD size can increase sensitivity. Otherwise it can decrease sensitivity. But the touch PAD size must use in the effective scope.

II. Panel Thickness
Under other conditions are fixed. Using a thinner panel can increase sensitivity. Otherwise it can decrease sensitivity. But the panel thickness must be below the maximum value.

III. Value of CS
Under other conditions are fixed. CS pin to VSS capacitor Cs can adjust sensitivity, When adding the value of CS will increase sensitivity in the useful range（1nF-47nF）.

IV. Capacitor to a touch key pin
Add a capacitor（0-50pF） to a touch key can fine tune the sensitivity for single key,When adding the value of capacitor will decrease sensitivity..

Panel Thickness （Acrylic or Glass)	CS value （only reference)
<3mm	6.8nF/25V
3-6mm	10nF/25V
6-10mm	22nF/25V

4 Application Circuits
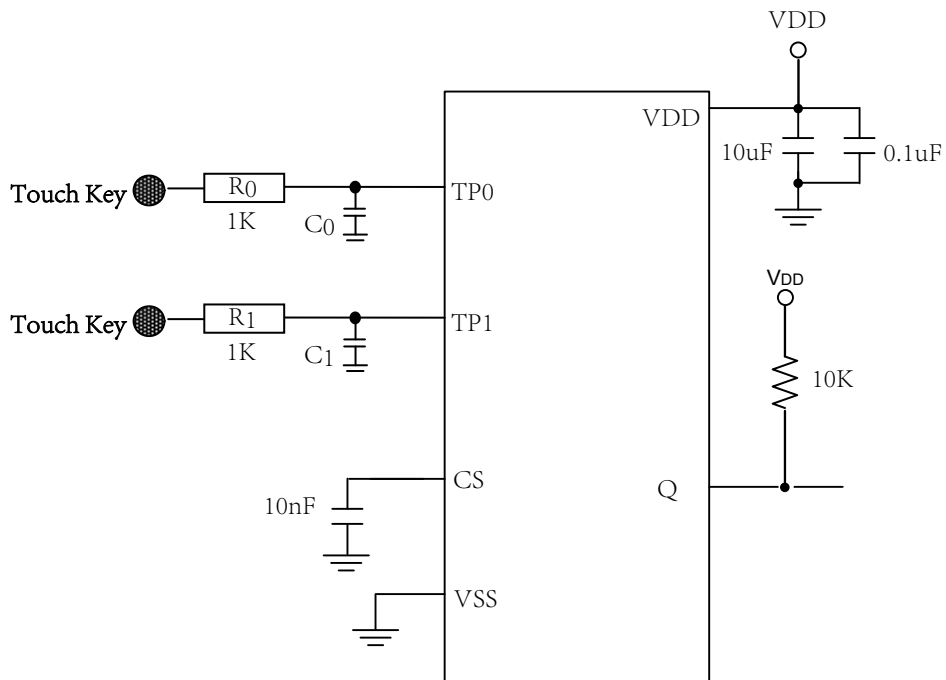
5   Electrical characteristics

5.1 Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Power voltage	VDD	-0.3～6.0	V
Input Voltage	VIN	V_{SS}-0.3～V_{DD}+0.3	V
Storage Temperature	T_{STG}	-50～+125	℃
Operating Temperature	T_{OTG}	-40～+85	℃
Human Body Mode	ESD	4KV-8KV(Class 3A)	KV

5.2 DC Characteristics

Item	Symbol	Min.	Typ.	Max	Unit	Test Conditions（25℃） VDD	Test Conditions（25℃） Conditions
Operating voltage	VDD	2.2	3.0	5.5	V	—	—
Low voltage Reset	LVR	—	2.0	2.1	V	—	—
Operating current	I_{OP}	—	1.3	—	mA	3.0V	CS=10nF
		—	2.2	—		5.0V	
Standby current	I_{ST}	—	10	—	μA	3.0V	CS=10nF
		—	33	—		5.0V	
Output Sink Current	I_{IL}	—	4	—	mA	3.0V	V_{OL}=0.6V
		—	8	—		5.0V	
Output Source Current	I_{OL}	—	-2	—	mA	3.0V	V_{OH}=2.6V
		—	-4	—		5.0V	V_{OH}=4.3V
Input Low Voltage	V_{IL}	—	—	0.3	VDD	VDD	Input Low Voltage
Input high Voltage	V_{IH}	0.7	—	1	VDD	VDD	Input High Voltage
Input pull-up resistor	R_{PH}	—	150k	—	ohm	3.0V	VDD=3V
Input pull-low resistor	R_{PL}	—	50k	—	ohm	3.0V	VDD=3V
Output Response Time	T_R	—	45	—	mS	3.0V	normal mode
		—	48	—		5.0V	normal mode
		—	150	—	mS	3.0V	standby mode
		—	160	—		5.0V	standby mode

6 Package Information

6.1 SOT23-6L(3mm x3mm PP=0.95mm)：

SECTION B-B
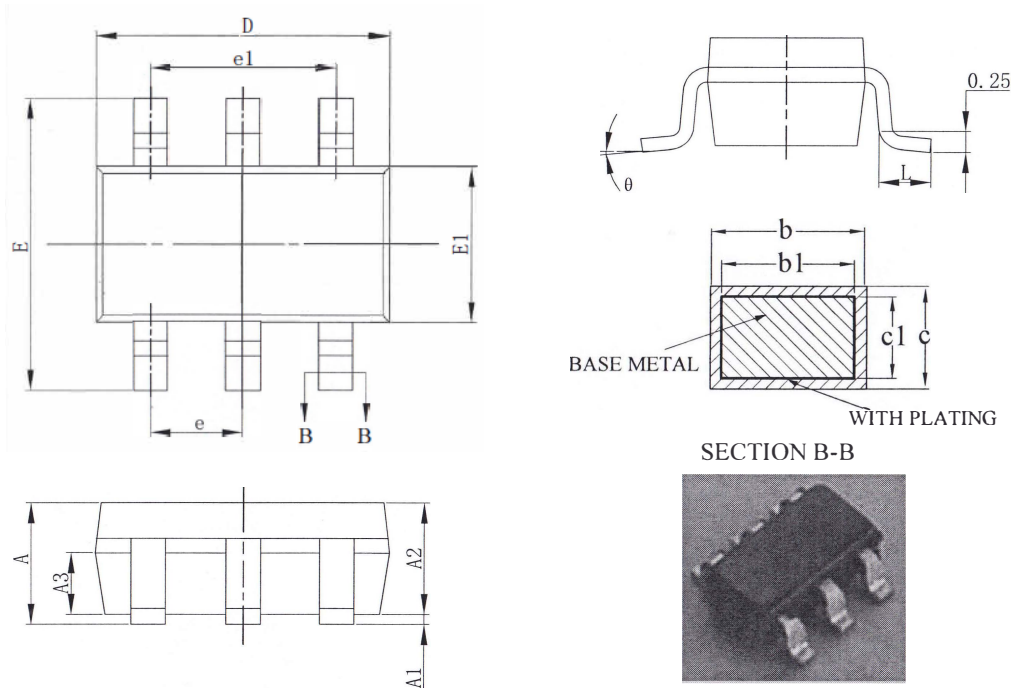
SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	---	---	1.25
A1	0.04	---	0.10
A2	1.00	1.10	1.20
A3	0.55	0.65	0.75
b	0.38	---	0.48
b1	0.37	0.40	0.43
c	0.11	---	0.21
c1	0.10	0.13	0.16
D	2.72	2.92	3.12
E	2.60	2.80	3.00
E1	1.40	1.60	1.80
e	0.95BSC		
e1	1.90BSC		
L	0.30	---	0.60
θ	0	---	8°

7　Revision history

No.	Version	Date	Modify the content	Check
1	1.0	2018-08-10	Original version	Yes
2	1.1	2020-02-11	Update version	Yes

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