



VK36N2P Datasheet

2-channel touch pulse output

Rev.1.2

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1 General Description

The VK36N2P has two touch channel, which can be used to detect the touch actions of human hands on the external touch buttons. This chip has a high degree of integration and only requires a few external components to achieve the detection of touch buttons.

It provides 1 pulse output pin. The open-drain output requires an external pull-up resistor. The chip uses a special integrated circuit with a high power supply voltage suppression ratio, which can reduce the occurrence of key detection errors. This feature ensures that the chip maintains high reliability even in adverse environmental conditions.

This touch chip features automatic calibration function, low standby current, and voltage stability resistance. It provides a simple and effective solution for various applications involving touch buttons and 1-channel pulse output.

2 Key Features

- Operating voltage: 2.2-5.5V
- Standby current 10 μ A/3.0V
- Power-on reset function (POR)
- Low-voltage reset function (LVR)
- Touch output response time: 48mS in working mode, 160mS in standby mode
- Open-collector output, low level is valid
- The output data format is the number of pulses.
- Anti-fraud function, maximum output time of the effective key: 13 seconds
- Touchless 4S enters standby mode
- The overall sensitivity (1-47nF) can be adjusted by connecting the CS terminal to the ground capacitor.
- Each touch channel is individually connected to a small ground-capacitor for fine-tuning the sensitivity (0-50pF)
- The power-on period of 0.3 seconds is the stabilization time. Do not touch during this period.
- When the power is turned on and no touch is detected, the environmental changes will automatically calibrate the reference value.
- Resistant to voltage fluctuations and has good anti-interference performance
- Available Packages:
SOT23-6L(3mm x 3mm PP=0.95mm)

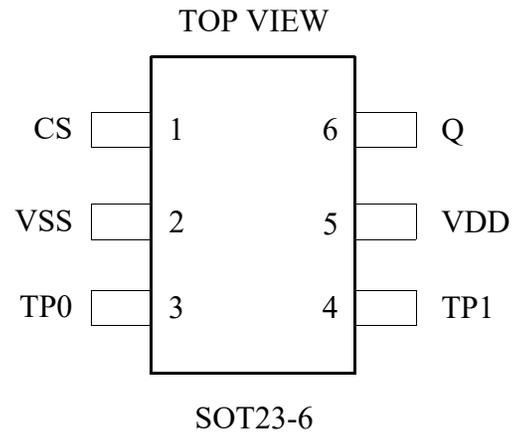
3 Product Selection

Part No.	Voltage/Standby Current	Output	Packaging
VK36N2P	2.2V-5.5V/7 μ A(3.3V)	Pulse encoding	SOT23-6
VK36N10P	2.2V-5.5V/7 μ A(3.3V)	Pulse encoding	SOP16/QFN16L

4 Ordering Information

Part No.	Packaging	Tube Qty	Tray(reel)Qty	Box Qty	Total Qty	Notes
VK36N2P	SOT23-6		3000/reel	30000/box	120000 PCS	
VK36N10P	SOP16	50/tube		5000/box	50000 PCS	
	QFN16L		3000/reel	30000/box	120000 PCS	

5 Package Pinout Information(SOT23-6)



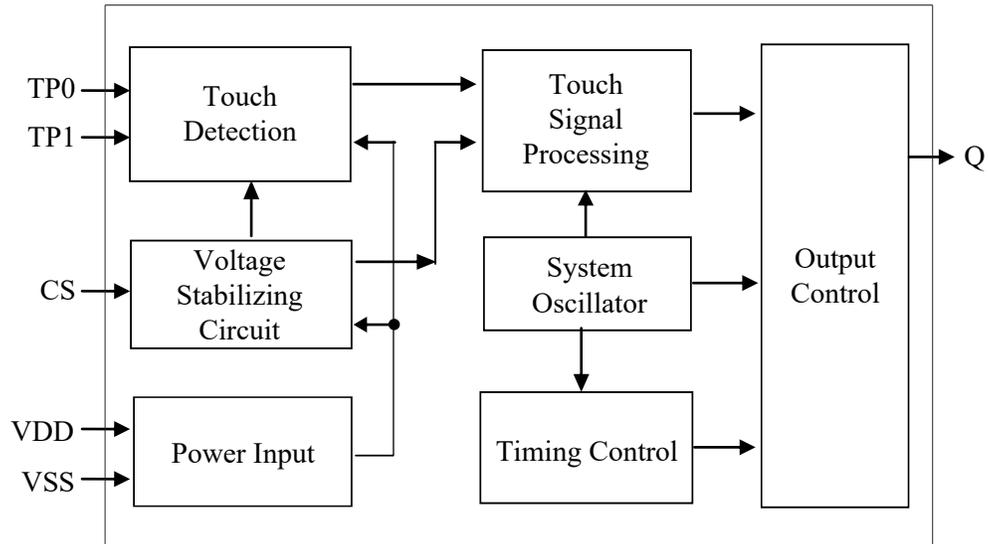
For more information: [Page 11](#)

5.1 VK36N2P/SOT23-6L Pin Description

Pin Names	I/O	Function Description
1-CS	I	Sensitivity adjustment, connecting ground capacitor (1-47nF)
2-VSS	VSS	Negative power supply
3-TP0	I	Touch input, connect to ground with a small capacitor for fine-tuning sensitivity (1-50pF)
4-TP1	I	Touch input, connect to ground with a small capacitor for fine-tuning sensitivity (1-50pF)
5-VDD	VDD	Positive power supply
6-Q	O	When powered on, it outputs a high resistance. When touched, it outputs a pulse signal (with an external pull-up resistor added).

6 Functional Description

6.1 Block Diagram



6.2 Auto-calibration Function

After power-on, the chip will perform initialization and obtain the first reference value. Subsequently, when there is no touch, the touch chip will automatically calibrate the reference value, enabling the reference value to dynamically change according to the external environment.

For example, this mechanism can achieve reliable touch detection when there is a temperature change or environmental noise.

6.3 Anti-defect Function

To minimize unintended key detection situations such as accidental contact with the sensing pad, a maximum key duration function is set within the chip. When a touch key is pressed, the internal timer starts timing. If the pressing time exceeds approximately 13 seconds, the touch chip will ignore the state of the touched key, re-calibrate, obtain a new reference value, and simultaneously reset the status to the initial state upon power-on.

6.4 Resist Voltage Fluctuations

The chip is equipped with an anti-voltage fluctuation function, which can prevent the occurrence of touch button malfunction caused by the sudden drop in working voltage due to the large current driving from the peripheral devices.

6.5 Output Mode

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

Data format

When powered on, the Q pin outputs a high level (with an external pull-up resistor connected to the pin).

TP0 Touch:

TP0 outputs a 4mS low and 4mS high pulse when touched. Once the touch is removed, it maintains the low level; when the touch reappears, it returns to the high level.

TP0 Long press:

TP0 Press and hold to maintain a low level. Every 100 milliseconds, send a 4-millisecond high pulse.

TP1 Touch:

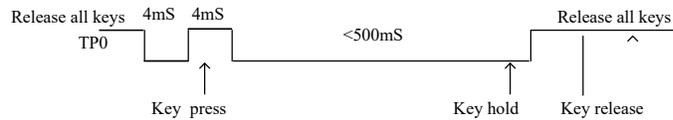
TP1 outputs 2 4mS low and 4mS high pulses when touched. Once the touch is removed, it maintains the low level. When the touch reoccurs, it returns to the high level.

TP1 Long press:

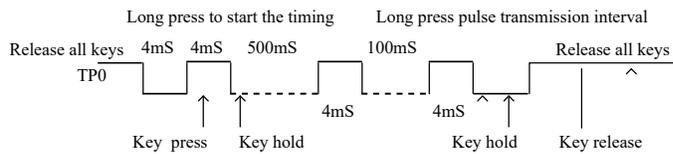
TP1 Press and hold to maintain a low level. Send two 4-millisecond high pulses every 100 milliseconds.

Output Mode:

TP0 Short press



TP0 Long press

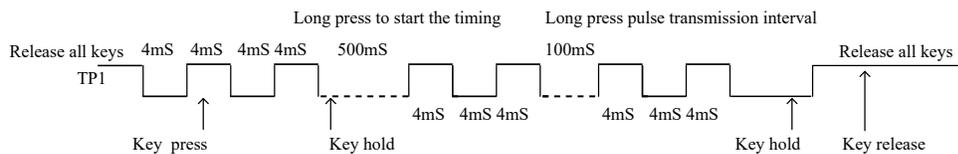


Output Mode:

TP1 Short press



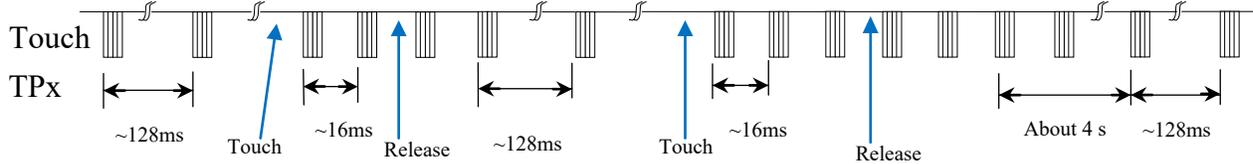
TP1 Long press



6.6 Operating Mode

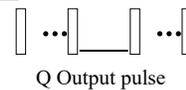
The VK36N2P chip has two operating modes: standby mode and normal mode.

When the key is touched, it switches to the normal mode. Without key touch, the 4S automatically enters the standby mode to reduce power consumption. When VDD=5V, the output response of D4-D0 in the standby mode is approximately 160 milliseconds, and in the operating mode it is approximately 48 milliseconds.



In addition, add a pull-up resistor

Q



6.7 Sensitivity Adjustment

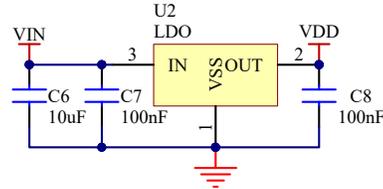
The sensitivity of VK36N2P is related to the size of the touch pad, the thickness of the casing, the size of the sensitivity capacitor, etc. The sensitivity should be adjusted according to the actual application of the product. The sensitivity can be adjusted from the following four aspects:

1. Touch the area of the PAD
Other conditions remaining constant, the larger the touch area, the more sensitive it will be. However, the area must be within the effective range.
2. The thickness of the shell
If all other conditions remain the same, the thinner the casing, the higher the sensitivity; the thicker the casing, the lower the sensitivity. However, the thickness must not exceed the maximum limit.
3. Adjust the capacitance value of the CS terminal to ground
The CS adjusts the overall sensitivity. The higher the value, the more sensitive it is. The common values range from 1-47 nF. For some special applications, there are even values exceeding 200 nF.
4. Adjust the small capacitance between the touch pad and the ground
Adjust the sensitivity of the small capacitance for touching the ground with your foot. The larger the capacitance, the lower the sensitivity. Without connecting the capacitor, the sensitivity is the highest. The common values range from 1-50 pF.

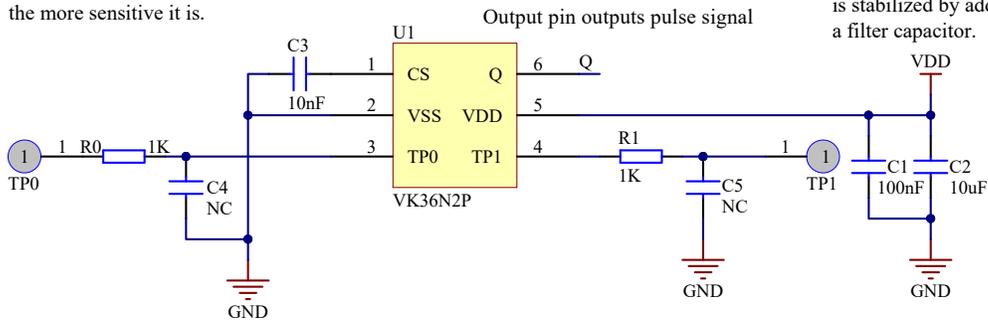
Shell thickness (acrylic or glass)	CS Electrical value (for reference only)
<3mm	6.8nF/25V
3-6mm	10nF/25V
6-10mm	22nF/25V

7 Application Circuits

It is recommended to use LDO for power supply



C3 is used to adjust the overall sensitivity generally. The larger the value of 1nF to 47nF, the more sensitive it is.



The power supply pin is stabilized by adding a filter capacitor.

C4 and C5 are used to fine-tune the sensitivity of each channel. Generally, the larger the capacitance (from 0pF to 50pF), the less sensitive it is. The least sensitive is when they are not connected.

The touch pins are connected in series with a 1K resistor to enhance anti-interference. The resistance value of the 1K resistor is usually in the range of 0R to 10K. Depending on the interference situation, the resistance value should be increased if the interference is severe.

8 Electrical Characteristics

Absolute Maximum Ratings

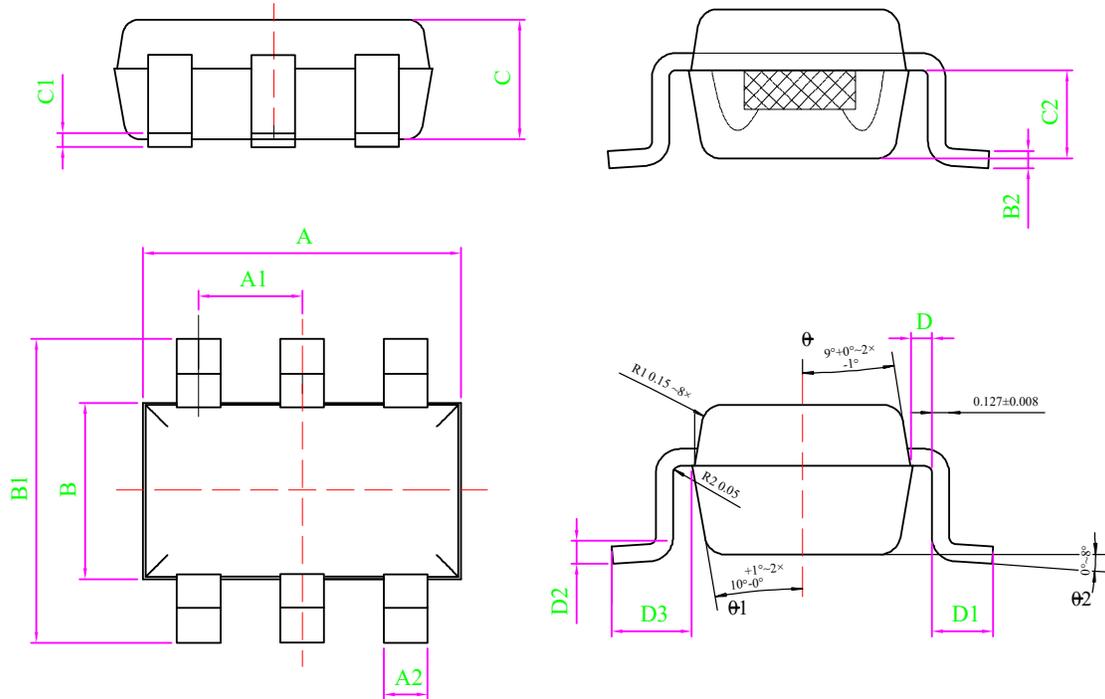
Parameter	Symbol	Ratings	Unit
Power Voltage	VDD	-0.3~6.0	V
Input Voltage	V _{IN}	VSS-0.3~VDD+0.3	V
Storage Temperature	T _{STG}	-50~+125	°C
Operating Temperature	T _{OTG}	-40~+85	°C
Human Body Mode	ESD	4KV-8KV(Class 3A)	KV

8.1 DC Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions (25 °C)	
						VDD	Conditions
Operating voltage	VDD	2.2	3.0	5.5	V	—	—
Low-voltage reset	LVR	—	2.0	2.1	V	—	—
Operating current	IOP	—	1.3	—	mA	3.0V	CS=10nF
		—	2.2	—		5.0V	
Standby current	IST	—	10	—	μA	3.0V	CS=10nF
		—	33	—		5.0V	
Output sink current	IIL	—	4	—	mA	3.0V	VOL=0.6V
		—	8	—		5.0V	
Output source current	IOL	—	-2	—	mA	3.0V	VOH=2.6V
		—	-4	—		5.0V	VOH=4.3V
Input low voltage	VIL	—	—	0.3	VDD	VDD	Input low voltage
Input high voltage	VIH	0.7	—	1	VDD	VDD	Input high voltage
Input pull-up resistor	RPH	—	150k	—	ohm	3.0V	VDD=3V
Input pull-down resistor	RPL	—	50k	—	ohm	3.0V	VDD=3V
Output response time	TR	—	45	—	mS	3.0V	Normal mode
		—	48	—		5.0V	Normal mode
		—	150	—	mS	3.0V	Standby mode
		—	160	—		5.0V	Standby mode

9 Package Information

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



MILLIMETER			
SYMBOL	MIN	NOM	MAX
A	2.72	2.92	3.12
A1	0.90	0.95	1.00
A2	0.30	0.35	0.40
B	1.40	1.60	1.80
B1	2.60	2.80	3.00
B2	0.12	0.128	0.135
C	1.00	1.10	1.20
C1	0.04	-	0.10
C2	0.60	0.65	0.70
D	0.03	0.08	0.13
D1	0.30	-	0.60
D2	0.25TYP		
D3	0.60	0.65	0.70

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11 Revision History

No.	Version	Date	Modify the content	Check
1	1.0	2018-08-10	Original version	YES
2	1.1	2020-02-11	Add reference circuit	YES
3	1.2	2026-01-29	Update version	YES

[1] Consult the recently published documents before starting or finishing the design.

[2] Since the release of this document , the device product status described in this document may have changed and may differ in several cases. The latest product status information can be found on the Internet at <https://www.szvinka.com/>