

## 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
- AHLB pin selects the output level on power-on: level- high or level- low
- One-to-one output pin
- Maximum key on duration time : 13S
- No touch 4S to enter standby mode
- 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
- VK36N1DD Direct output  
VK36N1DT Latch output
- Package  
SOT23-6L(3mm x 3mm PP=0.95mm)

# 1 General Description

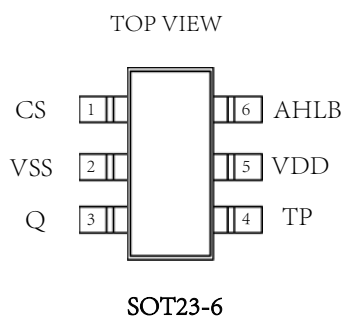
VK36N1D is a touch pad detector IC which offers 1 touch key, It can detect human body contact using external touch pads. The high level of device integration enable applications to be implemented with a minimum number of external components.

It has 1 One-to-one output pin, the power-on output level can be selected through the IO pin. There are 2 types of chips: direct output and latched output. Special internal circuitry is also employed to ensure excellent power noise rejection to reduce the possibility of false detections, increasing the touch switch application reliability under adverse environmental conditions.

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 1 touch key + One-to-one output operation in a wide variety of applications.

## 2 Pinouts and pin description

### 2.1VK36N1D SOT23-6L Pin Assignment

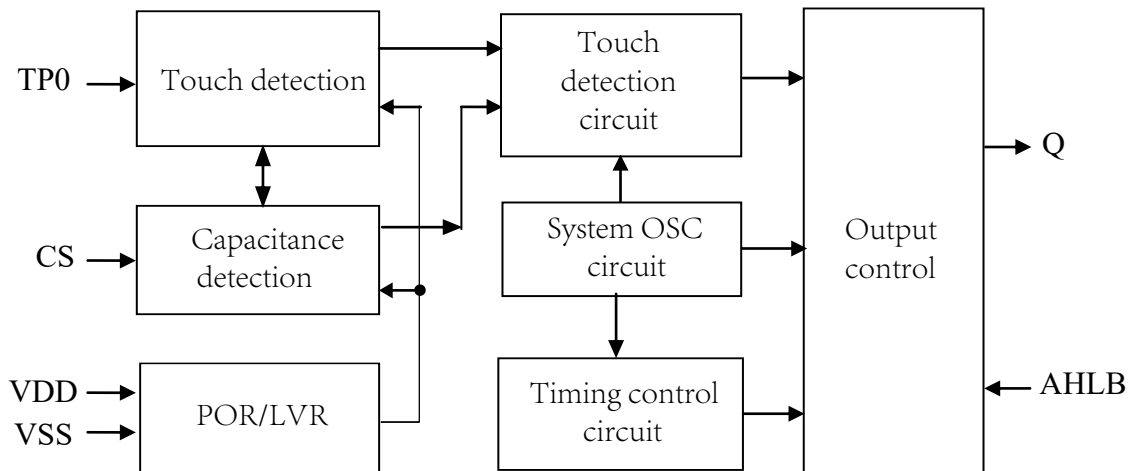


## 2.2 VK36N1D SOT23-6L Pin Description

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-Q	OUT	Touch key output pin
4-TP	IN	Touch key input pin
5-VDD	VDD	Positive power supply
6-AHLB	IN	Selects the output level: VDD>Active level- low, VSS->Active level- high

## 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

CMOS output.

AHLB pin selects the output level on power-on, AHLB cannot be NC.

AHLB	Output Function
VSS	active level- high,Power-on output 0
VDD	active level- low,Power-on output 1

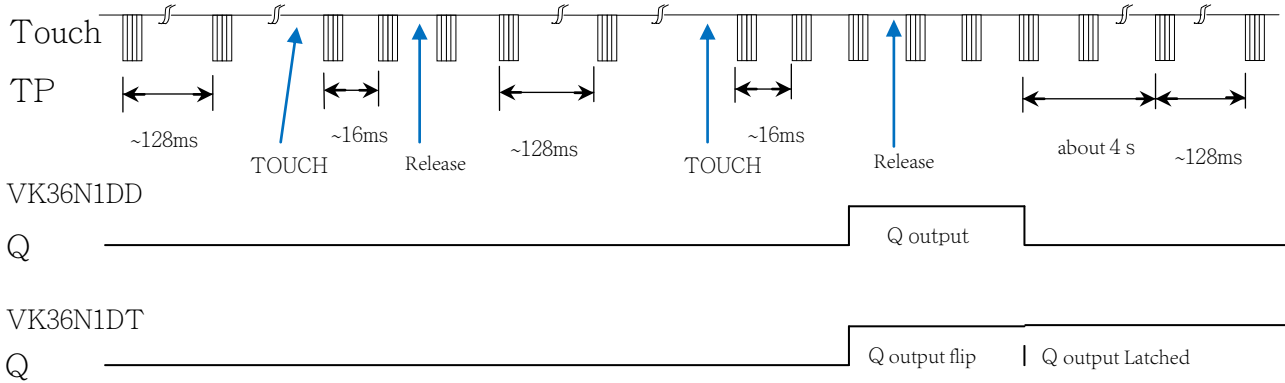
**Data Format:** 1 to 1 key value.

VK36N1DD					
Touch pin	AHLB=VSS		Touch pin	AHLB=VDD	
	Touch	Release		Touch	Release
TP0	D0=1	D0=0	TP0	D0=0	D0=1
Power on: D0=0			Power on: D0=1		

VK36N1DT					
Touch pin	AHLB=VSS		Touch pin	AHLB=VDD	
	Touch	Release		Touch	Release
TP0	D0 flip	D0 retain	TP0	D0 flip	D0 retain
Power on: D0=0			Power on: D0=1		

## 3.6 Operating Mode

There are two operating modes for VK36N1D, the normal mode and the standby mode. If 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.



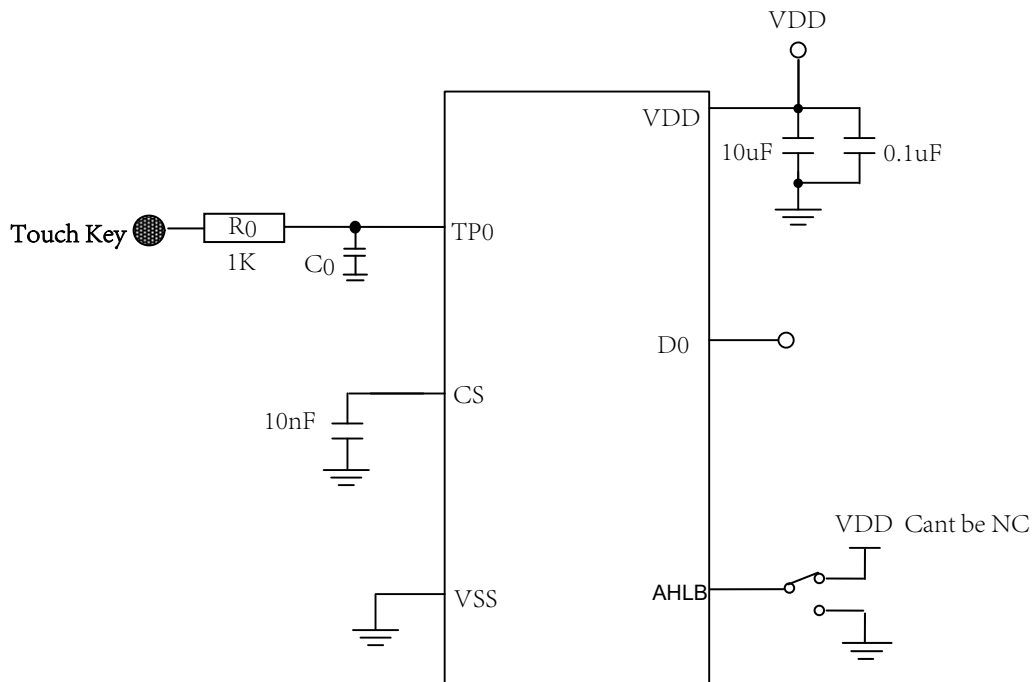
## 3.7 Sensitivity Adjustment

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 VK36N1D 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

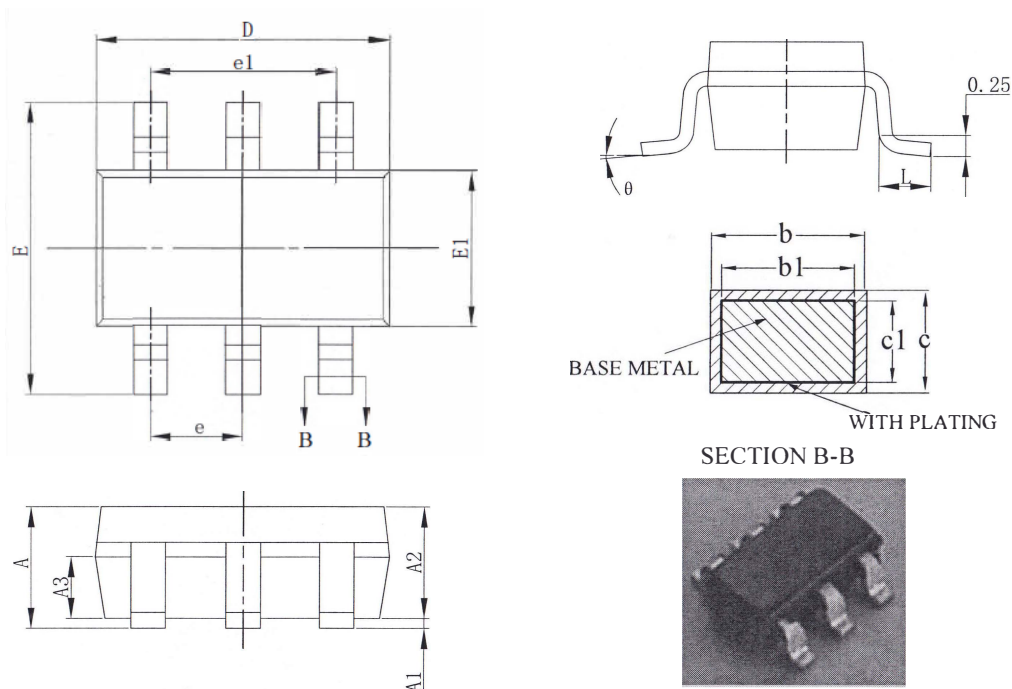
Item	Symbol	Ratings	Unit
Power voltage	VDD	-0.3~6.0	V
Input Voltage	VIN	$V_{SS}-0.3 \sim V_{DD}+0.3$	V
Storage Temperature	TSTG	-50~+125	°C
Operating Temperature	TOTG	-40~+85	°C
Human Body Mode	ESD	4KV-8KV(Class 3A)	KV

### 5.2 DC Characteristics

Item	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	I <sub>OP</sub>	—	1.3	—	mA	3.0V	CS=10nF
		—	2.2	—		5.0V	
Standby current	I <sub>ST</sub>	—	10	—	μA	3.0V	CS=10nF
		—	33	—		5.0V	
Output Sink Current	I <sub>IL</sub>	—	4	—	mA	3.0V	V <sub>OL</sub> =0.6V
		—	8	—		5.0V	
Output Source Current	I <sub>OL</sub>	—	-2	—	mA	3.0V	V <sub>OH</sub> =2.6V
		—	-4	—		5.0V	V <sub>OH</sub> =4.3V
Input Low Voltage	V <sub>IL</sub>	—	—	0.3	VDD	VDD	Input Low Voltage
Input high Voltage	V <sub>IH</sub>	0.7	—	1	VDD	VDD	Input High Voltage
Input pull-up resistor	R <sub>PH</sub>	—	150k	—	ohm	3.0V	VDD=3V
Input pull-low resistor	R <sub>PL</sub>	—	50k	—	ohm	3.0V	VDD=3V
Output Response Time	T <sub>R</sub>	—	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):



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

### Disclaimers

Information in this document is believed to be accurate and reliable. However, VinKa does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information. VinKa reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof. For the latest information, please visit <https://www.szvinka.com> Or contact VinKa's staff.