

## Features

- Operating voltage: 2.2-5.5V
- Standby current:10uA/3.0V
- Power-On Reset (POR)
- Low Voltage Reset (LVR)
- Auto-calibration Function
- Reliable touch key detection
- No touch 4S to enter standby mode
- Reliable detection of water even before power up
- 6 point water level detection
- One-to-one output
- Sensitivity adjustment using an external capacitor(1-47nF) on CS pin
- Anti-voltage fluctuation, High anti-interference
- Can use metal probe to touch water detection, also can detect signal outside the water tank without touching water
- Package  
SOP16(150mil)(9.9mm x 3.9mm PP=1.27mm)

## 1 General Description

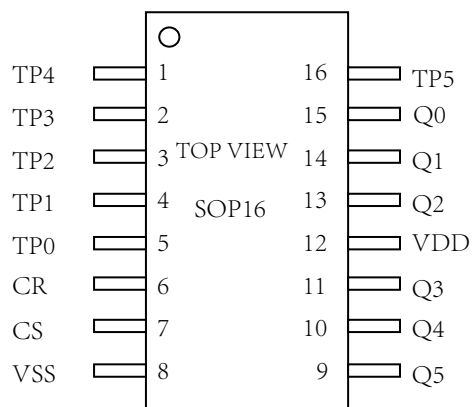
**VK36W6D** is a touch pad detector IC which offers 6 touch key, It can detect 6 points water level. The high level of device integration enable applications to be implemented with a minimum number of external components.

It has 6 output pins. 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 detect 6 point water level operation in a wide variety of applications.

## 2 Pinouts and pin description

### 2.1 VK36W6D SOP16 Pin Assignment

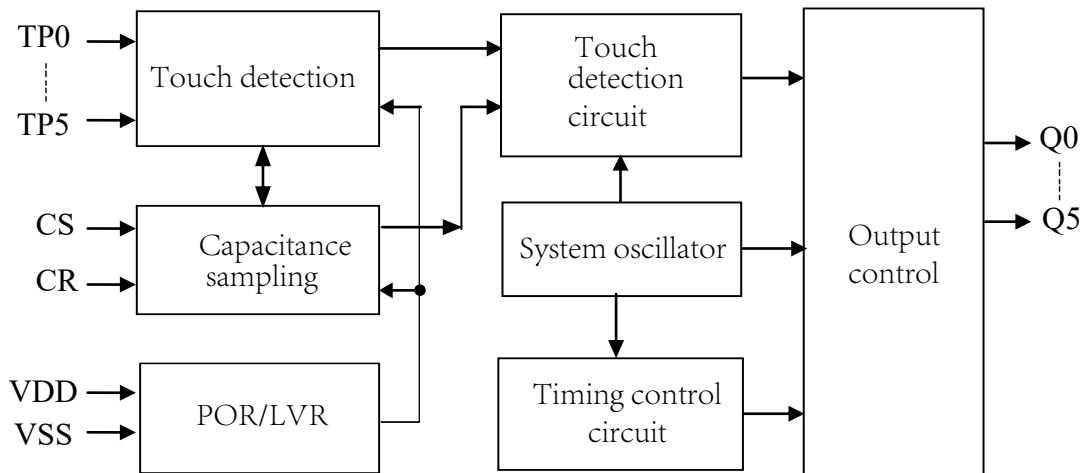


## 2.2 VK36W6D SOP16 Pin Description

Pin name	I/O	Function Description
SOP16		
1-TP4	IN	Touch key input pin, Add a capacitor (0-50pF) to a touch key pin can fine tune the sensitivity
2-TP3	IN	Touch key input pin, Add a capacitor (0-50pF) to a touch key pin can fine tune the sensitivity
3-TP2	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-TP0	IN	Touch key input pin, Add a capacitor (0-50pF) to a touch key pin can fine tune the sensitivity
6-CR	IN	Reference capacitance
7-CS	IN	Capacitance detection,the larger the capacitance the higher the sensitivity(1-47nF)
8-VSS	VSS	Negative power supply
9-Q5	OUT	Touch key output pin
10-Q4	OUT	Touch key output pin
11-Q3	OUT	Touch key output pin
12-VDD	VDD	Positive power supply
13-Q2	OUT	Touch key output pin
14-Q1	OUT	Touch key output pin
15-Q0	OUT	Touch key output pin
16-TP5	OUT	Touch key input pin, Add a capacitor (0-50pF) to a touch key pin can fine tune the sensitivity

## 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 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.

### 3.4 Operating Mode

There are two operating modes for VK36W6D, the normal mode and the standby mode.

After the system is powered on, it immediately detects whether there is water or not.

Detected as anhydrous, and it will automatically enter standby mode after 4S.

Detected as water, switch to normal mode.

Detected as water, Corresponding Q pin outputs signal;

Detected as anhydrous, Corresponding Q pin outputs signal;

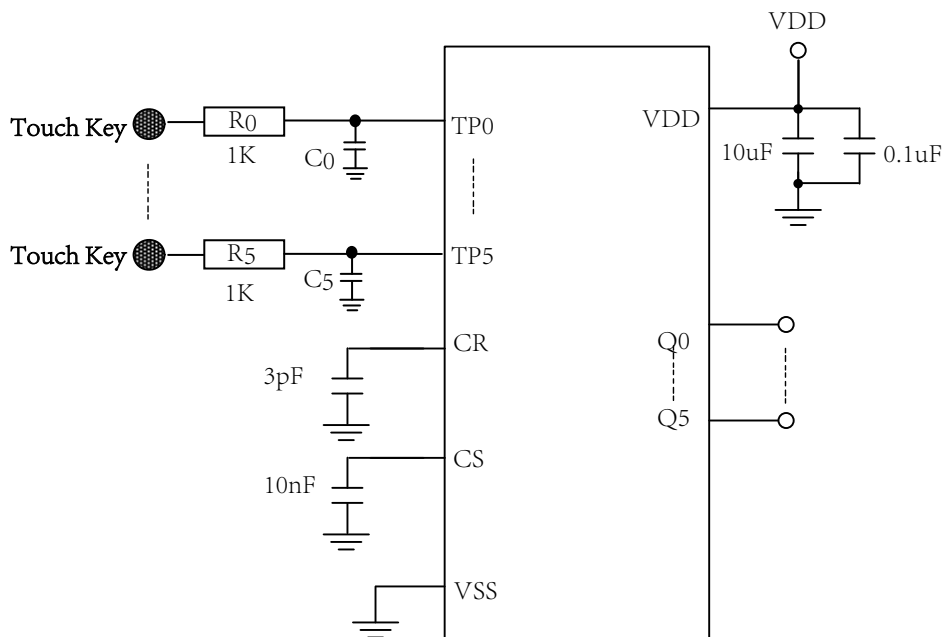
### 3.5 Sensitivity Adjustment

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 VK36W6D 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. The sensitivity can be adjusted by adjusting the capacitance of CR pin. The lower the capacitance value, the higher the sensitivity. (Generally, 1-10 pF capacitor is used.)
- V. Capacitor to a touch key pin  
Add a capacitor (0-50pF) to a touch key can fine tune the sensitivity for single key. The greater the capacitance, the more sensitive.

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

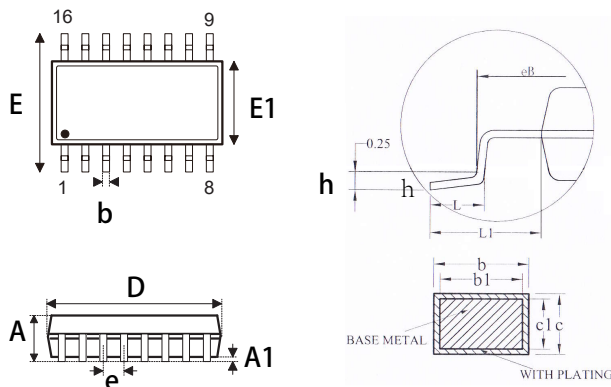
Item	Symbol	Ratings	Unit
Power voltage	VDD	-0.3~6.0	V
Input Voltage	VIN	$V_{SS}-0.3 \sim V_{DD}+0.3$	V
Storage Temperature	TSTG	-50~+125	°C
Operating Temperature	TOTG	-40~+85	°C
Human Body Mode	ESD	4KV-8KV(Class 3A)	KV

### 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>	—	8	—	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
Q Pin pull-up resistor	R <sub>PH</sub>	—	60k	—	ohm	3.0V	VDD=3V
Output Response Time	T <sub>R</sub>	—	125	—	mS	3.0V	normal mode
		—	125	—		5.0V	normal mode
		—	150	—	mS	3.0V	standby mode
		—	150	—		5.0V	standby mode

## 6 Package Information

### 6.1 SOP16(9.9mm x3.9mm PP=1.27mm):



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	---	---	1.55
A1	0.10	---	0.225
b	0.39	---	0.47
b1	0.38	0.41	0.44
c	0.20	---	0.24
c1	0.19	0.20	0.21
D	9.80	9.90	10.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27BSC		
h	0.25	---	0.50
L	0.50	---	0.80
L1	1.05REF		

## 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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