

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 on
- 4 point water level detection
- One-to-one output
- Any channel has water W_FLAG output signal
- OPT pin selects the output level on power-on: level- high or level- low
- 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

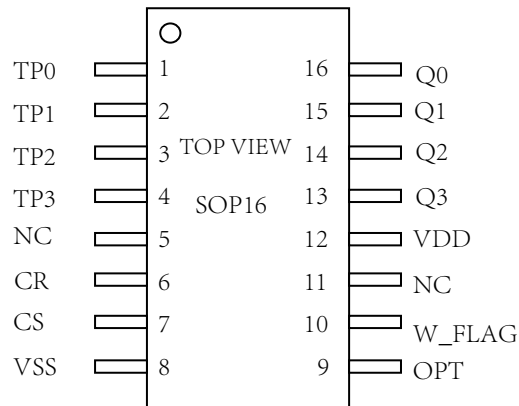
VK36W4D is a touch pad detector IC which offers 4 touch key, It can detect 4 points water level. The high level of device integration enable applications to be implemented with a minimum number of external components.

It has 4 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 4 point water level operation in a wide variety of applications.

2 Pinouts and pin description

2.1 VK36W4D SOP16 Pin Assignment

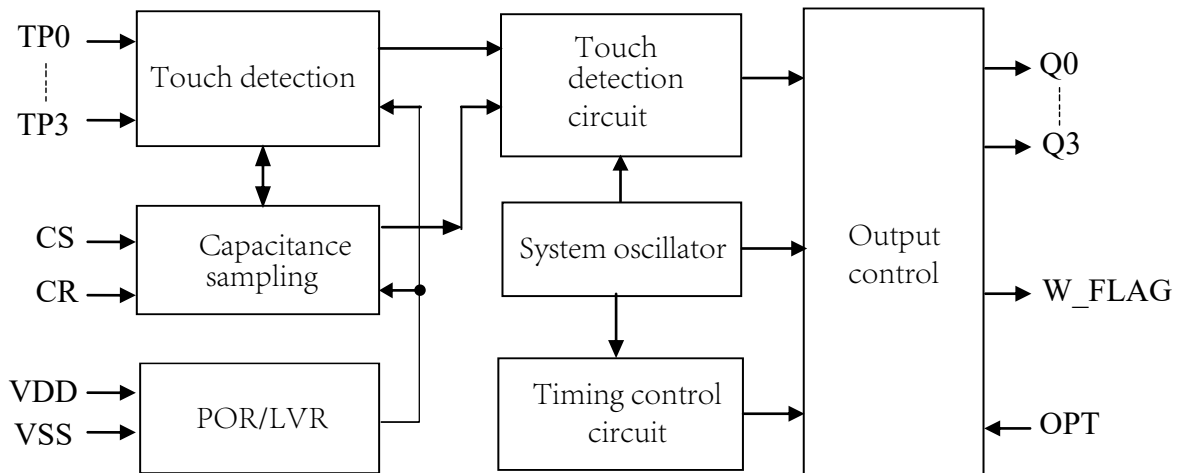


2.2 VK36W4D SOP16 Pin Description

Pin name	I/O	Function Description
SOP16		
1-TP0	IN	Touch key input pin, Add a capacitor (0-50pF) to a touch key pin can fine tune the sensitivity
2-TP1	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-TP3	IN	Touch key input pin, Add a capacitor (0-50pF) to a touch key pin can fine tune the sensitivity
5-NC	----	Not connect
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-OPT	IN	Selects the output level: floating->Active level- low, VSS->Active level- high
10-W_FLAG	OUT	Touch status output pin, direct output, power-on output high (default), OPT pin selection
11-NC	----	Not connect
12-VDD	VDD	Positive power supply
13-Q3	OUT	Touch key output pin
14-Q2	OUT	Touch key output pin
15-Q1	OUT	Touch key output pin
16-Q0	OUT	Touch key output pin

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 VK36W4D, 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;

Any channel of the 4 channels detects water, and the W_FLAG pin outputs a signal.

OPT	Output Function
VSS	Q & W_FLAG active level- high , Anhydrous output 0
NC	Q & W_FLAG active level- low , Anhydrous output 1

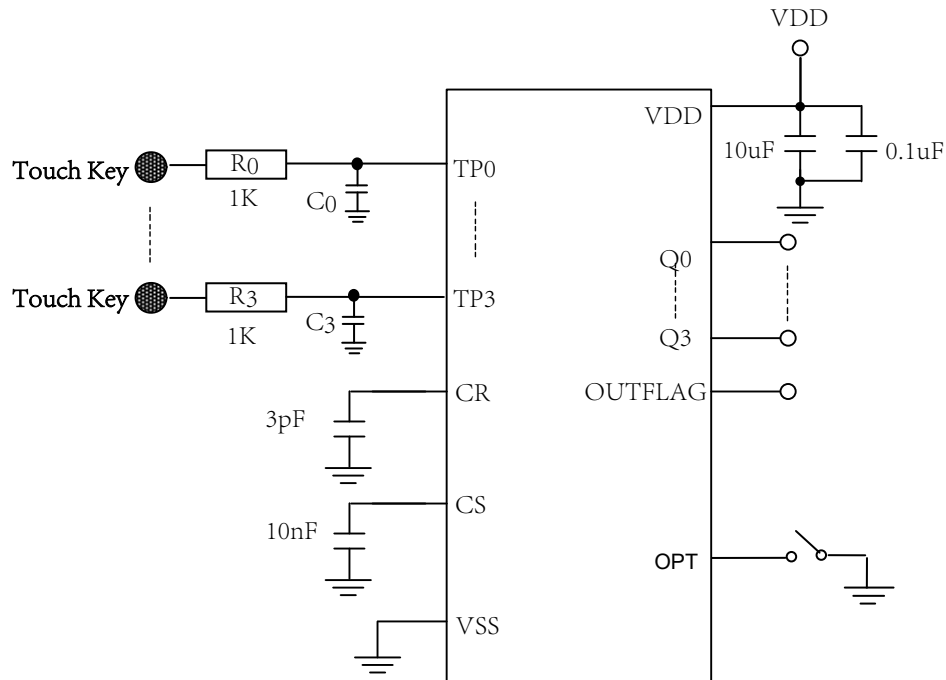
3.5 Sensitivity Adjustment

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 VK36W4D 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

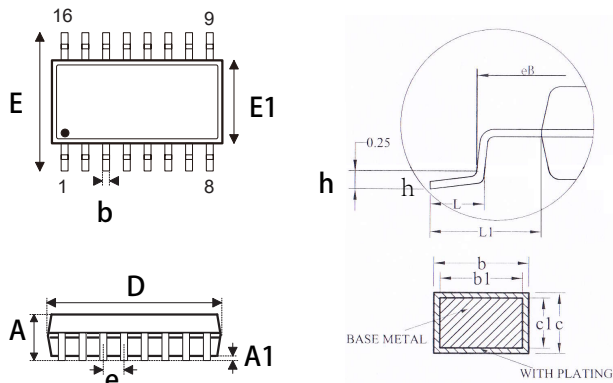
Item	Symbol	Ratings	Unit
Power voltage	VDD	-0.3~6.0	V
Input Voltage	VIN	$V_{SS}-0.3 \sim V_{DD}+0.3$	V
Storage Temperature	TSTG	-50~+125	°C
Operating Temperature	TOTG	-40~+85	°C
Human Body Mode	ESD	4KV-8KV(Class 3A)	KV

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 _{OP}	—	1.3	—	mA	3.0V	CS=10nF
		—	2.2	—		5.0V	
Standby current	I _{ST}	—	8	—	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
OPT Pin pull-up resistor	R _{PH}	—	60k	—	ohm	3.0V	VDD=3V
Output Response Time	T _R	—	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

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.