

## Features

- Operating voltage:2.4-5.5V
- Standby current: 2.5uA/3.0V
- Operating current: 13uA/3.0V
- Built in special voltage stabilizing circuit for touch detection
- Key Response Time: Normal Mode 60mS , Standby Mode 160mS
- CMOS output, support multi-key
- AHLB pin selects the output level: Active level- high or Active level- low
- TOG pin selects the output mode: Direct output or Latch output
- No touch 8S enters standby mode
- Add a capacitor (0-50pF) to a touch key pin can fine tune the sensitivity for single key
- After power-on have about 0.5S stable-time, during the time do not touch the key .
  
- Package  
SOP8(150mil)(4.9mm x 3.9mm PP=1.27mm)

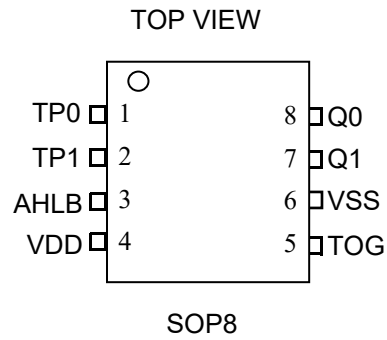
## 1 General Description

VKD104CR 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 has 2 output pin, Special internal circuitry is also employed to reduce the possibility of false detections, 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 2 touch key + IO operation in a wide variety of applications.

## 2 Pinouts and pin description

### 2.1 VKD104CR SOP8 Pin Assignment

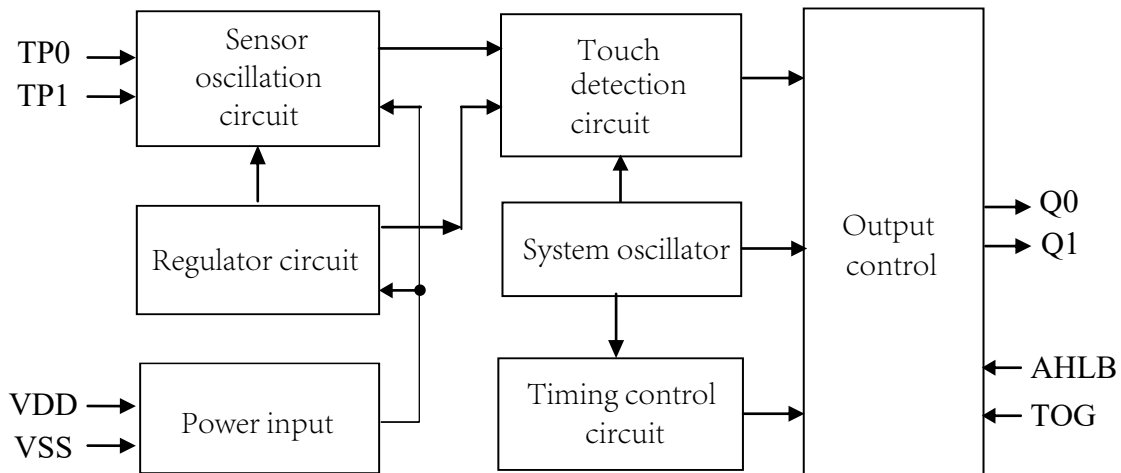


## 2.2 VKD104CR SOP8 Pin Description

Pin No.	Pin name	I/O	Function Description
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	AHLB	IN	Built-in pull-down resistor, Selects the output level: 0->Active level- high(default), 1->Active level- low
4	VDD	VDD	Positive power supply
5	TOG	IN	Built-in pull-down resistor, Selects the output mode: 0->Direct output(default), 1->Latch output
6	VSS	VSS	Negative power supply
7	Q1	OUT	Touch key output pin
8	Q0	OUT	Touch key output pin

## 3 Functional Description

### 3.1 Block diagram



### 3.2 Auto-calibration Function

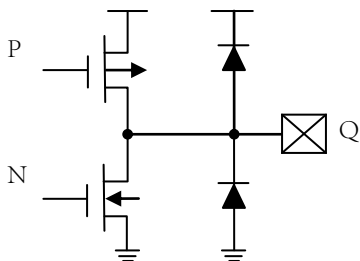
The re-calibration period is about 1s within 8S after power-on. Do not refresh with touch, If there is no touch after 8S, the recalibration time will be switched to 4S.

### 3.3 Output mode

The output of VKD104CR is CMOS direct output (Q0~Q1), supporting multi-key output.

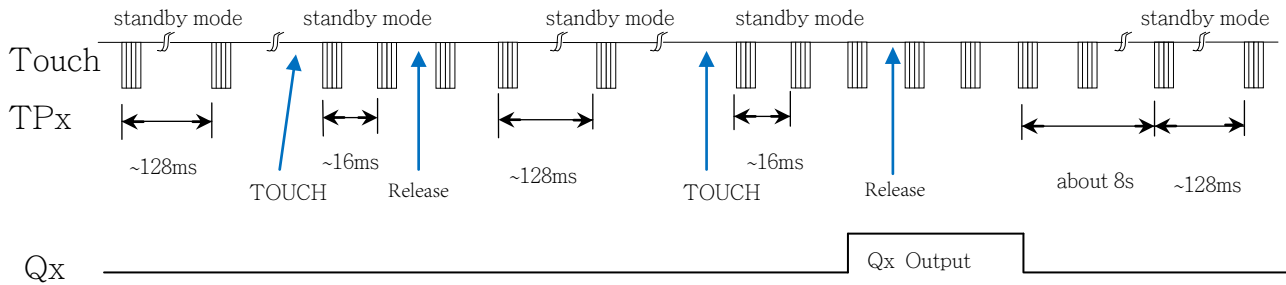
AHLB pin selects the output level: 0->Active level- high(default), 1->Active level- low

TOG pin selects the output mode: 0->Direct output(default), 1->Latch output.



### 3.4 Operating modes

There are two operating modes for VKD104CR, the normal mode and the standby mode. The key is touched to switch to the normal mode. If there is no touch after 8S, VKD104CR enters standby mode to reduce power consumption. VDD=5V , Key Response Time is about 60mS in normal Mode and about 160mS in standby mode



### 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 VKD104CR 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.

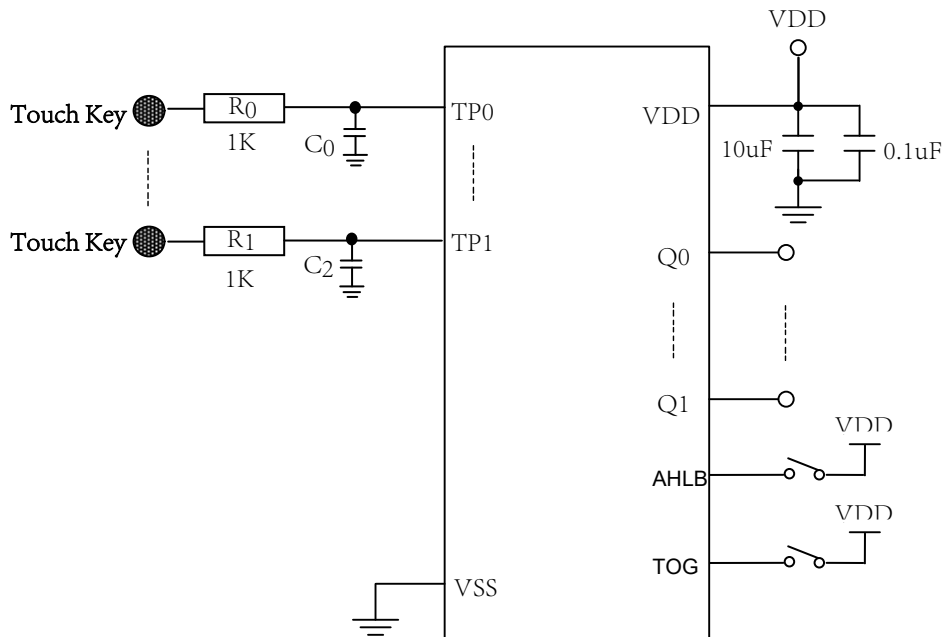
#### II. Panel Thickness

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. 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

## 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	$\geq 5$	KV

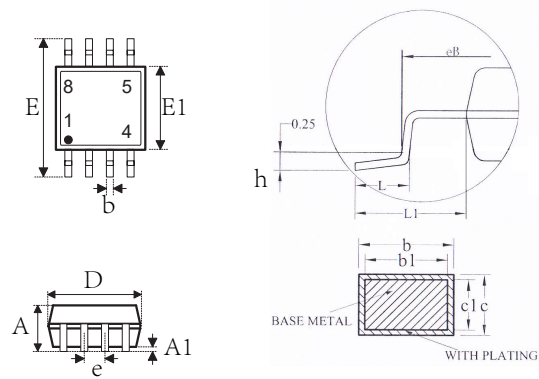
### 5.2 DC Characteristics

Item	Symbol	Min.	Typ.	Max	Unit	Test Conditions (25 °C)	
						VDD	Conditions
Operating voltage	VDD	2.4	—	5.5	V	—	Internal voltage regulation enable
Internal voltage regulator	I <sub>ST</sub>	2.2	2.3	2.4	V	—	—
Operating current	I <sub>OP</sub>	—	13	—	μA	3.0V	normal mode, VDD=3V
Standby current	I <sub>ST</sub>	—	2.5	—	μA	3.0V	standby mode, VDD=3V
Input Low Voltage	V <sub>IL</sub>	0	—	0.2	VDD	—	Input Low Voltage
Input high Voltage	V <sub>IH</sub>	0.8	—	1	VDD	—	Input High Voltage
Output Sink Current	I <sub>IL</sub>	—	8.0	—	mA	3.0V	VDD=3V, VOL=0.6V
Output Source Current	I <sub>OL</sub>	—	-4.0	—	mA	3.0V	VDD=3V, VOH=2.4V
Input pull-low resistor	R <sub>PL</sub>	—	25k	—	ohm	3.0V	VDD=3V
Output Response Time	T <sub>R</sub>	—	60	—	mS	3.0V	normal mode
		—	160	—		3.0V	standby mode



## 6 Package Information

### 6.1 SOP8(150mil)(4.9mm x 3.9mm PP=1.27mm):



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	---	---	1.75
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	4.80	4.90	5.00
E	5.80	6.10	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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