

General Description

With human-machine interfacing requiring ever higher functionality and intuitiveness, touch panel type interfaces are rapidly becoming the norm for the new millennium.

TC301A(B) is a one channel capacitive sensing device. The device can operate as a controller for one key.

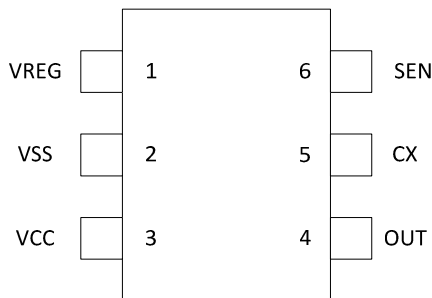
Features

- The device controls one touch sensing keys
- Autocal for life - no adjustments required
- System cost reduction
- Reliability through reducing system complexity
- Embedded noise immunity circuit
- RoHS compliant SOT23-6L package

Applications

- Media Players
- Consumer Electronics
- Home appliances
- Keypads
- Mechanical switch replacement
- Sealed control panels, keypads

Pin Diagram



Pin Description

Pin	Name	I/O	Description
1	VREG	Analog Output	Reference output
2	VSS	Ground	Supply Ground
3	VCC	Pwr	Power in
4	OUT	Digital Output	Output for chanel0
5	CX	Analog I/O	Sensor pad
6	SEN	Analog I/O	Sensitivity Set

SEN

Sensitivity set pin, the capacitance range is 10pf~100pf , the smaller the value the higher the sensitivity.

VREG

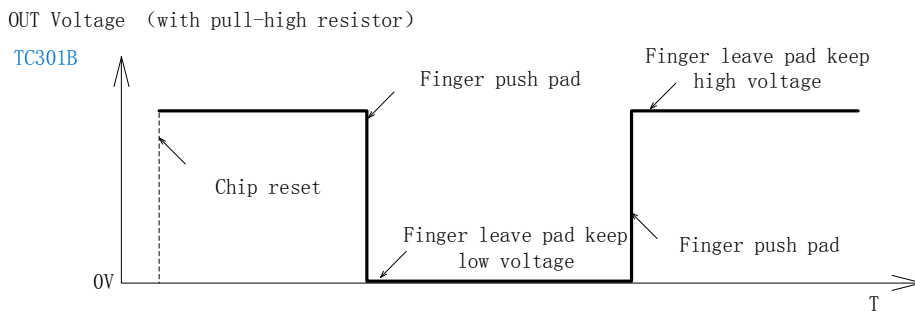
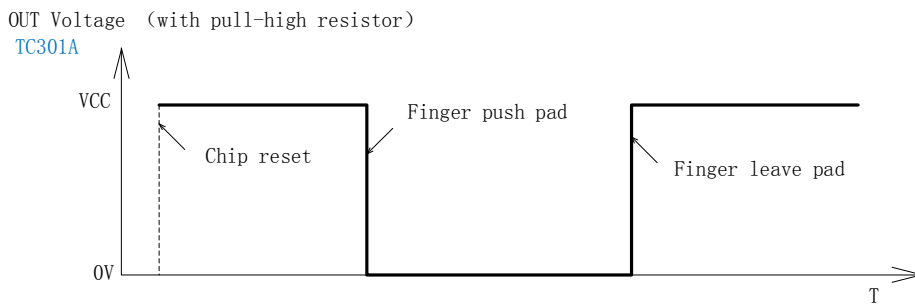
Reference voltage output, connected to 4.7nf capacitance.

CX

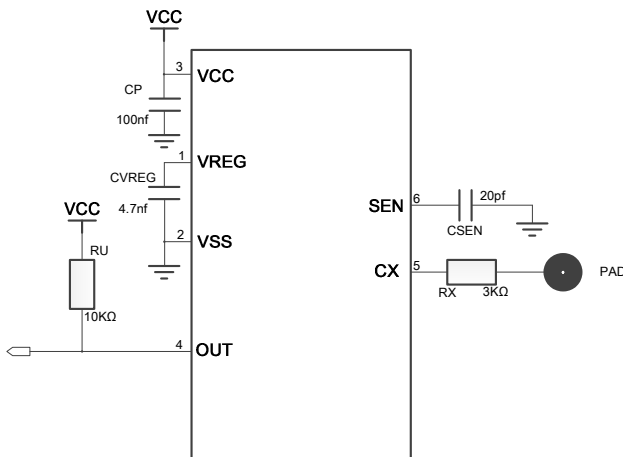
Capacitive sense pin connected to electrode. Series resistance is 3KΩ.

OUT

Output ports of CX. The structure of output ports is open drain NMOS for active low output level operation.



Application Circuit



PCB Layout Notice

1. VCC and VSS power line should be drawn alone, and can not share power line with other chips(micro-controller and LCD driver,etc.). So as to prevent the chip from being affected by noise signal going through the power line.
2. CP, CVREG, CSEN these three capacitances should be placed as close as possible to the chip. And the series resistors on wire of sense pad should also be placed as close as possible to the chip.
3. The larger area of grounded copper, the more immunity to noise Interference.
4. The sense traces and pad should be paid more attention to. The chip should be placed as close as possible to sense pad. The sense traces should be drawn to sense pad directly. The length of the different sense traces is not necessarily equal. The width of sense traces should be as small as possible. There should not be other power line and signal traces around the sense trace. If it can not be avoided, the other traces should cross the sense trace vertically. The distance between sense pads should be greater than 5mm. The distance between sense pad and grounded copper should be greater than 1.5mm.

Absolute Maximum Rating *

Operating temperature	-40 ~ +85°C
Storage temp	-50 ~ +150°C
VCC	-0.3 ~ +6.5V
Max continuous pin current, any control or drive pin	±10mA
Voltage forced onto any pin	-0.3V ~ (Vcc+ 0.3) Volts

* NOTICE: Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device.

Electrical Characteristics

TA = 25°C

Characteristics	Symbo	Condition	Min	Typ	Max	Units
Operating voltage	Vcc		2.5		6.5	V
Current consumption	Idd	VCC=5.0V		810		uA
		VCC=3.0V		460		uA
		VCC=5.0V &SLEEP		70		uA
		VCC=3.0V &SLEEP		38		uA
Self calibration time after chip reset	Tini			120		ms
Range of capacitance on Pad	CX				2.5*CSE N	
Output impedance (open drain)	Zo	Low voltage		50		Ohm
		Hi-z		100M		
Output sink current	Isk	VCC=5V			10.0	mA
Minimum detective capacitance difference	delta_CX	CSEN=15pf		0.2		pF
Sample cycle	Tsi	Normal working		2.7		ms

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ESD Characteristics

Mode	Polarity	Max	Reference
H.B.M	POS/NEG	8000V	VDD
		8000V	VSS
		8000V	P to P
M.M	POS/NEG	500V	VDD
		500V	VSS
		500V	P to P

Package Diagram (SO-16)

