

Hynitron Microelectronics Co., Ltd.



# CST826 Data sheet

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High performance self-capacitance touch chip

Rev: V1.1

[www.hynitron.com](http://www.hynitron.com)

## 1. Overview

CST826 self-capacitance touch chip, using high-speed MCU core and embedded DSP circuit, combined with its own fast self-capacitance sensing technology, can support a variety of self-capacitance patterns including triangles.

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## 2. Chip characteristics

### ◆ Built-in mutual capacitance detection circuit and high performance DSP module

- ✧ Support online programming;
- ✧ Built-in watchdog;
- ✧ Multiple buttons support;
- ✧ Support standby gesture wake-up function;

### ◆ Capacitive screen support

- ✧ Supports up to 28 sensing channels;
- ✧ Built-in watchdog;
- ✧ Support channel floating/pull down design;
- ✧ Module parameters are automatically adjusted;

### ◆ Performance

- ✧ Refresh rate > 100Hz;
- ✧ Single point gesture and real two-point operation;
- ✧ Typical power consumption in dynamic mode < 5.0mA;
- ✧ Typical power consumption in monitoring mode < 500uA;
- ✧ Typical power consumption in standby mode < 500uA;
- ✧ Typical power consumption in sleep mode < 10uA;

### ◆ Communication Interface

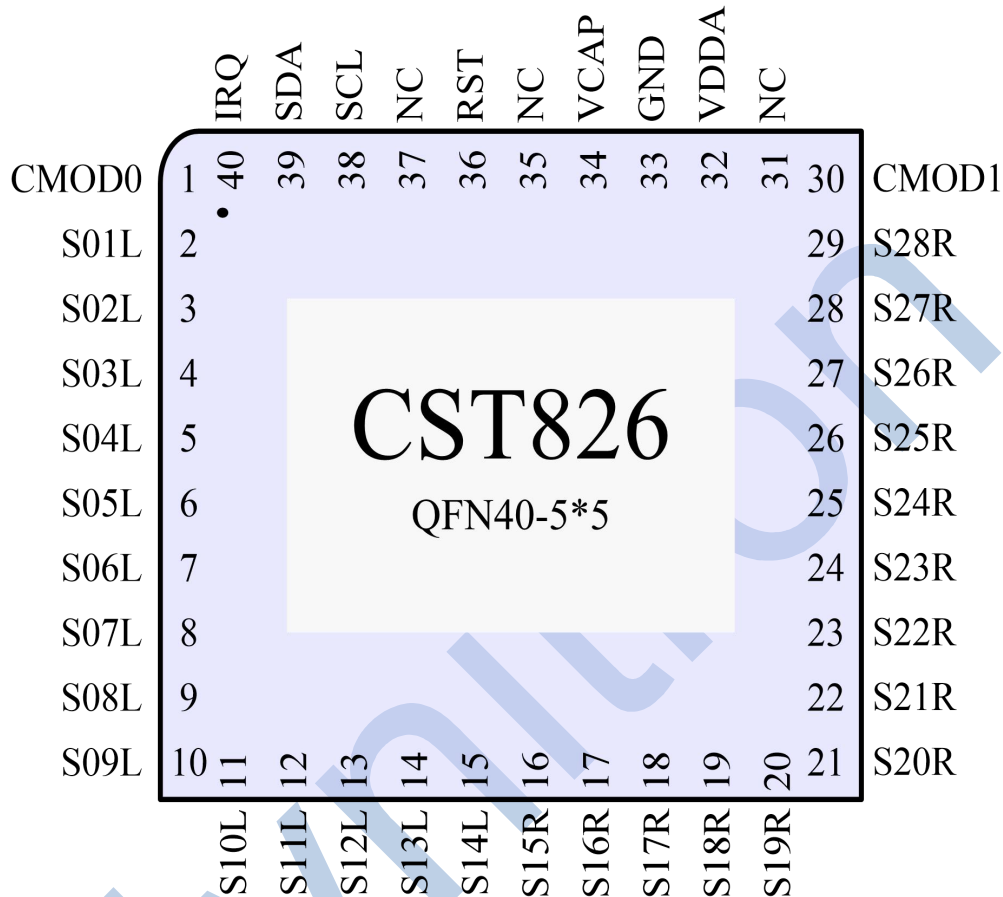
- ✧ I2C master/slave communication interface, configurable rate range 10KHz~1MHz;
- ✧ Compatible with 1.8V/3.3V interface levels;

### ◆ Power supply

- ✧ Single power supply range 2.7V ~ 3.6V, power supply ripple ≤ 50mV;
- ✧ No other components are required except the power supply bypass capacitor;

### ◆ Package type: QFN40 5mm\*5mm

### 3. Pinout / Description



Pin name	Description	Remarks
S0~S29	Sensing channels	
VDDA	Power supply	2.7V~3.6V, connect 2.2uF~10uF capacitor
CMOD0/CMOD1	Stabilizing capacitor	Connection 1nF~10nF stabilizing capacitor
IRQ	Interrupt output	Up/Down edge optional
VCAP	Stabilizing power supply	Connection 0.1uF capacitor
SCL/SDA	I2C	Optional internal pull-up/open drain mode

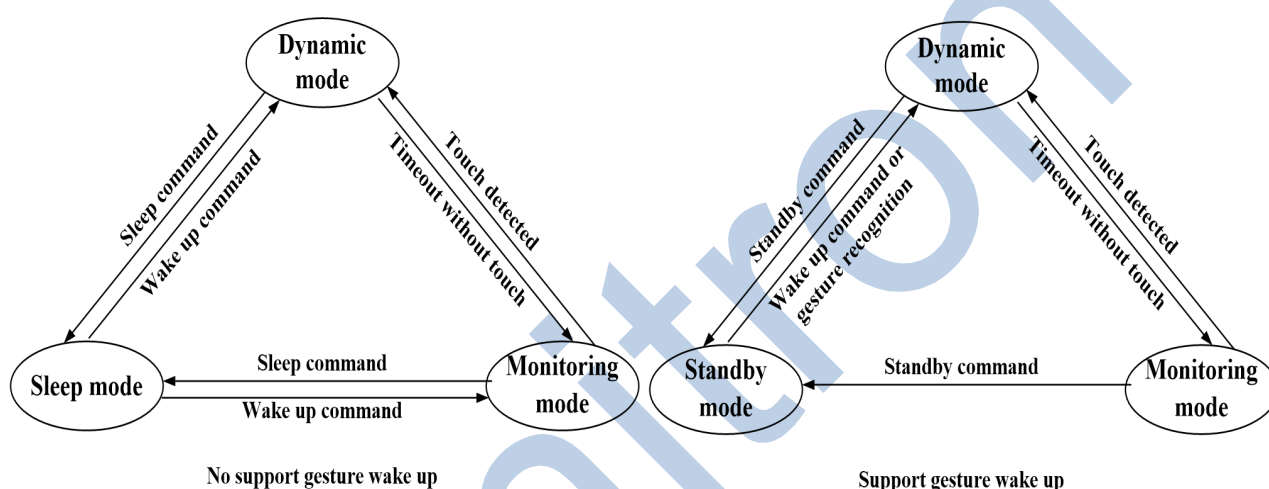
#### Remarks:

- 1.CMOD0/CMOD1 must be connected to a voltage regulator capacitor, and the size is 1nF~10nF.

## 4. Functional description

CST826 self-capacitance touch chip, through its built-in fast self-capacitance sensor module, can realize single-point gesture and real two-point function on triangles and other patterns without any external devices (except circuit bypass capacitor); the chip has excellent anti-noise, waterproof and low-power performance while achieving rapid response.

### 4.1 Operating mode



- **Dynamic mode**  
When there is frequent touch operation, it is in this mode. In this mode, The touch chip quickly performs self-capacitance scanning on the touch screen, to detect the touch and report it to the host.
- **Monitoring mode**  
When the touch screen timeout has no touch action, the chip automatically switches to the monitoring mode. In this mode, the touch chip detects a possible touch action by scanning at a lower frequency, and quickly switches to the dynamic mode.
- **Standby mode**  
After receiving the standby command, it is in this mode. In this mode, the touch chip scans the touch screen at a lower frequency, and enters the dynamic mode after the matching wake-up gesture is completed. At the same time, the touch chip wakes up the host through the IRQ pin, or switches to dynamic mode through the wake-up command.
- **Sleep mode**  
After receiving the sleep command, the chip is in this mode. In this mode, the touch chip is in a deep sleep state to maximize power consumption, and can be switched to the dynamic mode by the wake-up command.

## 4.2 Channels/nodes configuration

The CST826 self-capacitance touch chip provides up to 28 sensing channels, each of which supports self-capacitance scanning without the need for an external device.

The range of self-capacitance that can be supported per channel: 1pF ~ 400pF.

## 4.3 Power on/Reset

The built-in power-on reset module will keep the chip in reset until the voltage is normal. When the voltage is lower than a certain threshold, the chip will also be reset. When the external reset pin  $RSTn$  is low, the whole chip will be reset. This pin has a built-in pull-up resistor and RC filter, which can also be left floating. The built-in watchdog ensures that the chip can still return to normal operation within the specified time when an abnormal situation occurs.

## 4.4 Low power mode

The CST826 Self-capacitance touch chip supports the following low power modes:

- Sleep mode  
After the host sends a sleep command to the chip, the chip will immediately enter deep sleep mode to achieve the lowest power consumption; after receiving the wake-up command, the chip will wake up and enter the dynamic working mode.
- Monitoring mode  
In dynamic working mode, when there is no touch timeout, the chip will automatically enter the monitoring mode. In this mode, the chip will wake up periodically at a lower frequency to detect the effective touch. If the touch is detected, it will enter the dynamic working mode and provide the most excellent performance, otherwise continue to sleep and wait for the next wake up command.
- Standby mode  
In this mode, the chip is always at a lower frequency for minimal scanning to match predefined wake gestures.

## 4.5 I2C communication

The chip supports the standard I2C communication protocol, which can achieve the 10KHz~1MHz compatible communication rate.

Two I2C pins, SCL and SDA, support both open-drain mode and internal pull-up mode for flexible selection.

## 4.6 Interrupt mode

The touch chip only informs the host to read valid data through the IRQ pin when it detects a valid touch and needs to report it to the host, so as to improve efficiency and reduce CPU load.

The interrupt edge can be configured as a rising edge or a falling edge as needed.

The IRQ pin is also used to wake up the host when matching predefined gestures in standby mode.

#### 4.7 Parameter settings

Please refer to the CST8xx Touch Development Kit help documentation for this section.

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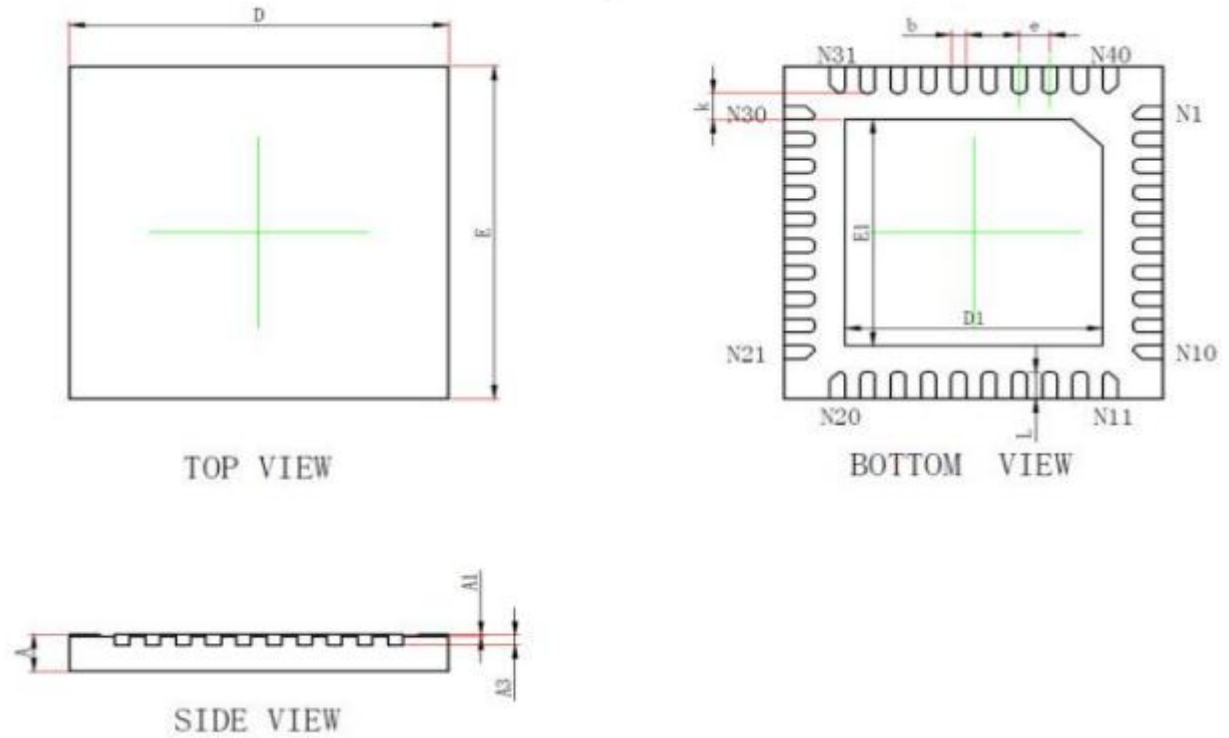
## 5. Electrical characteristics

Ambient temperature 25 °C, VDDA = 3.3V.

Parameters	Minimum value	Typical value	Maximum value	unit
Operating Voltage	2.7	3.3	3.6	V
Operating temperature	-40	+25	+85	°C
Storage temperature	-60	-	+150	°C
Working humidity	-	-	95	%
Power ripple	-	-	50	mV
Working current(Dynamic mode)	-	5.0	-	mA
Working current(Monitoring mode)	-	500@50Hz	-	uA
Working current(Standby mode)	-	500@50Hz	-	uA
Working current(Sleep mode)	-	10	-	uA



## 6. Product packaging



### 1. QF40 outline drawing

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.500	0.600	0.020	0.024
A1	0.000	0.050	0.000	0.002
A3	0.152REF.		0.006REF.	
D	4.924	5.076	0.194	0.200
E	4.924	5.076	0.194	0.200
D1	3.300	3.500	0.130	0.138
E1	3.300	3.500	0.130	0.138
b	0.150	0.250	0.006	0.010
e	0.400TYP.		0.016TYP.	
k	0.200MIN.		0.008MIN.	
L	0.350	0.450	0.014	0.018

### 2. QF40 dimensions

## 7. Reference circuit

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