

## Features

- Number of Keys:
  - One
  - Configurable as either a single key or a proximity sensor
- Technology:
  - Patented spread-spectrum charge-transfer (direct mode)
- Key outline sizes:
  - 6 mm x 6 mm or larger (panel thickness dependent); widely different sizes and shapes possible
- Electrode design:
  - Solid or ring electrode shapes
- PCB Layers required:
  - One
- Electrode materials:
  - Etched copper, silver, carbon, Indium Tin Oxide (ITO)
- Electrode substrates:
  - PCB, FPCB, plastic films, glass
- Panel materials:
  - Plastic, glass, composites, painted surfaces (low particle density metallic paints possible)
- Panel thickness:
  - Up to 12 mm glass, 6 mm plastic (electrode size and Cs dependent)
- Key sensitivity:
  - Settable via capacitor (Cs)
- Interface:
  - Digital output, active high
- Moisture tolerance:
  - Good
- Power:
  - 1.8V – 5.5V; 17  $\mu$ A at 1.8V typical
- Package:
  - 6-pin SOT23-6 RoHS compliant
- Signal processing:
  - Self-calibration, auto drift compensation, noise filtering
  - Infinite max on-duration
- Applications:
  - Control panels, consumer appliances, proximity sensor applications, toys, lighting controls, mechanical switch or button,
- Patents:
  - QTouch<sup>®</sup> (patented charge-transfer method)
  - HeartBeat<sup>™</sup> (monitors health of device)



## One-channel Touch Sensor IC

**AT42QT1011**

## Summary

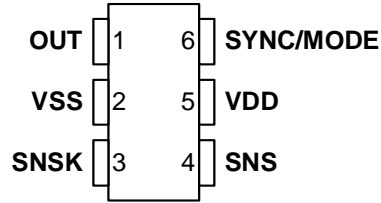
Note: This is a summary document.  
A complete document is available.  
For more information contact  
[www.atmel.com/touch](http://www.atmel.com/touch).

9542ES-AT42-02/10



# 1. Pinout and Schematic

## 1.1 Pinout Configuration



## 1.2 Pin Descriptions

Table 1-1. Pin Listing

Name	Pin	Type	Comments	If Unused, Connect To...
OUT	1	O	Output state	–
Vss	2	P	Supply ground	–
SNSK	3	I/O	Sense pin	Cs + Key
SNS	4	I/O	Sense pin	Cs
Vdd	5	P	Power	–
SYNC	6	I	SYNC and Mode Input	Pin is either SYNC/Slow/Fast Mode, depending on logic level applied

I Input only

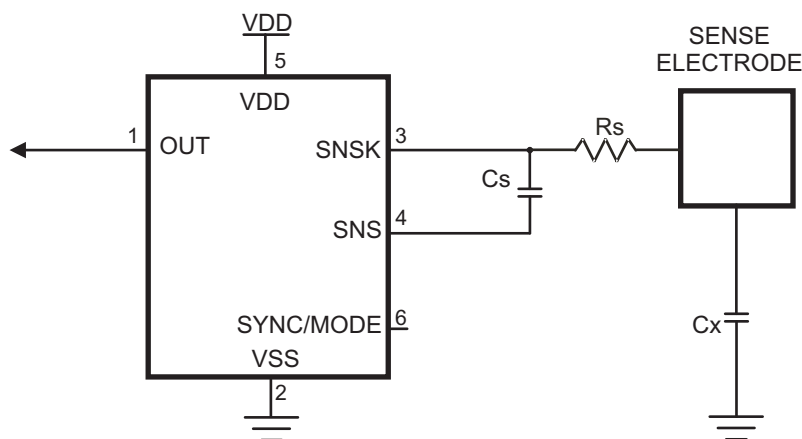
O Output only, push-pull

I/O Input and output

P Ground or power

## 1.3 Schematic

**Figure 1-1.** Basic Circuit Configuration



Note: A bypass capacitor should be tightly wired between Vdd and Vss and kept close to pin 5.

## 2. Overview of the AT42QT1011

The AT42QT1011 (QT1011) is a digital burst mode charge-transfer (QT™) sensor that is capable of detecting near-proximity or touch, making it ideal for implementing touch controls.

With the proper electrode and circuit design, the self-contained digital IC will project a touch or proximity field to several centimeters through any dielectric like glass, plastic, stone, ceramic, and even most kinds of wood. It can also turn small metal-bearing objects into intrinsic sensors, making them responsive to proximity or touch. This capability, coupled with its ability to self-calibrate, can lead to entirely new product concepts.

The QT1011 is designed specifically for human interfaces, like control panels, appliances, toys, lighting controls, or anywhere a mechanical switch or button may be found. It includes all hardware and signal processing functions necessary to provide stable sensing under a wide variety of changing conditions. Only a single low-cost capacitor is required for operation.



## Revision History

Revision No.	History
Revision A – May 2009	<ul style="list-style-type: none"><li>• Initial release</li></ul>
Revision B – August 2009	<ul style="list-style-type: none"><li>• Updated for chip revision 2.2.2</li></ul>
Revision C – August 2009	<ul style="list-style-type: none"><li>• Minor updates for clarity</li></ul>
Revision D – January 2010	<ul style="list-style-type: none"><li>• Updated for revision 2.4.1</li></ul>
Revision ES – February 2010	<ul style="list-style-type: none"><li>• Minor updates</li></ul>

Notes



## Headquarters

---

**Atmel Corporation**  
2325 Orchard Parkway  
San Jose, CA 95131  
USA  
Tel: 1(408) 441-0311  
Fax: 1(408) 487-2600

## International

---

**Atmel Asia**  
Unit 01-05 & 16, 19/F  
BEA Tower, Millennium City 5  
418 Kwun Tong Road  
Kwun Tong  
Kowloon  
Hong Kong  
Tel: (852) 2245-6100  
Fax: (852) 2722-1369

**Atmel Europe**  
Le Krebs  
8, Rue Jean-Pierre Timbaud  
BP 309  
78054 Saint-Quentin-en-  
Yvelines Cedex  
France  
Tel: (33) 1-30-60-70-00  
Fax: (33) 1-30-60-71-11

**Atmel Japan**  
9F, Tonetsu Shinkawa Bldg.  
1-24-8 Shinkawa  
Chuo-ku, Tokyo 104-0033  
Japan  
Tel: (81) 3-3523-3551  
Fax: (81) 3-3523-7581

### **Touch Technology Division**

1 Mitchell Point  
Ensign Way  
Hamble  
Southampton  
Hampshire SO31 4RF  
United Kingdom  
Tel: (44) 23-8056-5600  
Fax: (44) 23-8045-3939

## Product Contact

---

**Web Site**  
[www.atmel.com](http://www.atmel.com)

**Technical Support**  
[touch@atmel.com](mailto:touch@atmel.com)

**Sales Contact**  
[www.atmel.com/contacts](http://www.atmel.com/contacts)

**Literature Requests**  
[www.atmel.com/literature](http://www.atmel.com/literature)

---

**Disclaimer:** The information in this document is provided in connection with Atmel products. No license, express or implied, by estoppel or otherwise, to any intellectual property right is granted by this document or in connection with the sale of Atmel products. **EXCEPT AS SET FORTH IN ATMEL'S TERMS AND CONDITIONS OF SALE LOCATED ON ATMEL'S WEB SITE, ATMEL ASSUMES NO LIABILITY WHATSOEVER AND DISCLAIMS ANY EXPRESS, IMPLIED OR STATUTORY WARRANTY RELATING TO ITS PRODUCTS INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. IN NO EVENT SHALL ATMEL BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE, SPECIAL OR INCIDENTAL DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF PROFITS, BUSINESS INTERRUPTION, OR LOSS OF INFORMATION) ARISING OUT OF THE USE OR INABILITY TO USE THIS DOCUMENT, EVEN IF ATMEL HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.** Atmel makes no representations or warranties with respect to the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and product descriptions at any time without notice. Atmel does not make any commitment to update the information contained herein. Unless specifically provided otherwise, Atmel products are not suitable for, and shall not be used in, automotive applications. Atmel's products are not intended, authorized, or warranted for use as components in applications intended to support or sustain life.

© 2009 – 2010 Atmel Corporation. All rights reserved. Atmel®, Atmel logo and combinations thereof, QTouch® and others are registered trademarks, QT™, HeartBeat™ and others are trademarks of Atmel Corporation or its subsidiaries. Other terms and product names may be registered trademarks or trademarks of others.