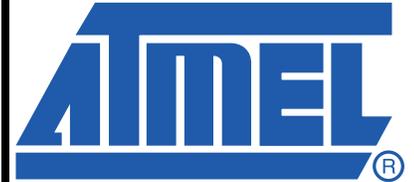


## Features

- **Configurations:**
  - Can be configured as a combination of touchscreen, sliders/wheels and keys, with Adjacent Key Suppression™ (AKS™) technology between groups
- **QField™ Touchscreen:**
  - Two-touch capable with independent XY tracking for one or two concurrent touches in real time, with touch size reporting
  - Up to eight-inch diagonal screen size supported
  - 1024 x 1024 resolution
- **Discrete Keys:**
  - Up to 32 (subject to other configurations)
- **QSlide™/QWheel™:**
  - Configurable up to four independent sliders/wheels
- **Linearity:**
  - Screen design dependent but typically better than ±1 percent
- **Filtering:**
  - Advanced digital filtering (user configurable)
- **Response Times:**
  - Sub 15 ms possible, depending on filter settings
- **Technology:**
  - Patented charge-transfer (transverse mode)
- **Panel Thickness:**
  - Glass up to 5 mm, screen size dependent
  - Plastic up to 3 mm, screen size dependent
- **Channel Sensitivity:**
  - Individually settable via simple commands over serial interface
- **Interface:**
  - I<sup>2</sup>C-compatible slave mode, 100 kHz or 400 kHz with 2.7V or greater V<sub>dd</sub>
- **Power:**
  - 1.8V to 5.5V (2.7V to 5.5V in high speed mode)
- **Packages:**
  - 32-pin 5 x 5mm MLF RoHS compliant
- **Signal Processing:**
  - Self-calibration, auto drift compensation, noise filtering, Adjacent Key Suppression technology



## QTwo™ 10-bit Touchscreen Controller

**AT42QT5320**

## Summary

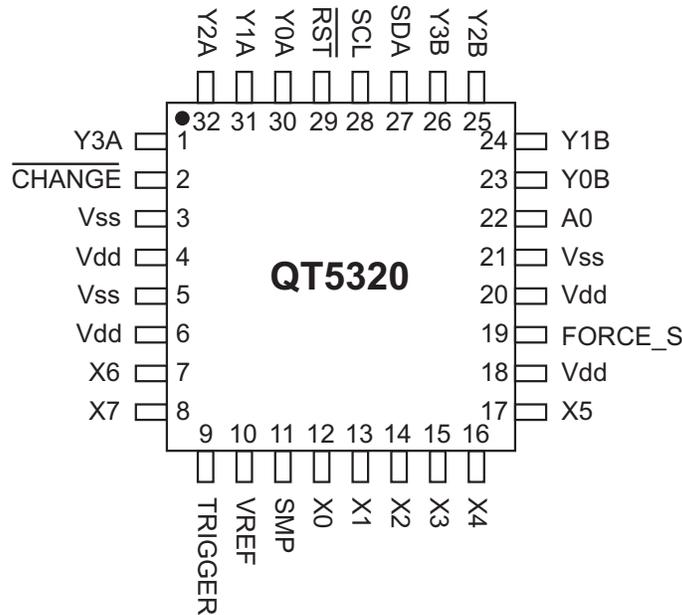
Note: This is a summary document. A complete document is available under NDA. For more information contact [www.atmel.com/touchscreen](http://www.atmel.com/touchscreen).

9509AS-AT42-10/08



# 1. Pinout and Schematic

## 1.1 Pinout Configuration



## 1.2 Pin Descriptions

Table 1-1. Pin Listing

Pin	Name	Type	Comments	If Unused, Connect To...
1	Y3A	I	Y line connection	Leave open
2	CHANGE	OD	State change notification	–
3	Vss	P	Supply ground	–
4	Vdd	P	Power	–
5	Vss	P	Supply ground	–
6	Vdd	P	Power	–
7	X6	O	X matrix drive line	Leave open
8	X7	O	X matrix drive line	Leave open
9	TRIGGER	I	Trigger input (active low)	Vdd or Vss
10	Vref	I	Supply ground	–
11	SMP	O	Sample output.	–
12	X0	O	X matrix drive line	Leave open
13	X1	O	X matrix drive line	Leave open
14	X2	O	X matrix drive line	Leave open
15	X3	O	X matrix drive line	Leave open
16	X4	O	X matrix drive line	Leave open
17	X5	O	X matrix drive line	Leave open

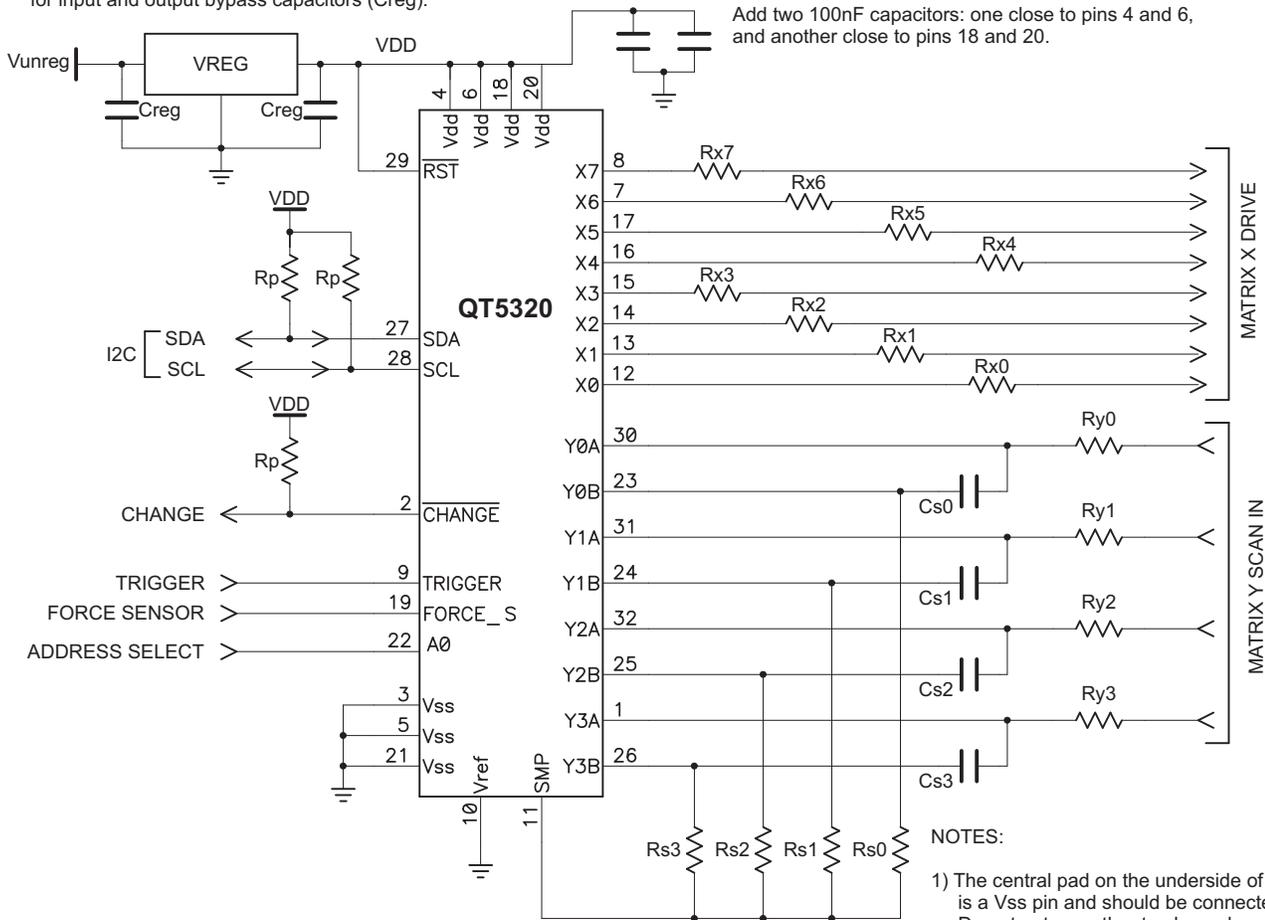
Table 1-1. Pin Listing

Pin	Name	Type	Comments	If Unused, Connect To...
18	Vdd	P	Power	–
19	FORCE_S	I	Force sensor input	Vdd or Vss
20	Vdd	P	Power	–
21	Vss	P	Supply ground	–
22	A0	I	I2C-compatible address select	–
23	Y0B	I	Y line connection	Leave open
24	Y1B	I	Y line connection	Leave open
25	Y2B	I	Y line connection	Leave open
26	Y3B	I	Y line connection	Leave open
27	SDA	OD	Serial Interface Data	–
28	SCL	OD	Serial Interface Clock	–
29	$\overline{\text{RST}}$	I	Reset low; has internal 30k - 60k pull-up	Leave open or Vdd
30	Y0A	I	Y line connection	Leave open
31	Y1A	I	Y line connection	Leave open
32	Y2A	I	Y line connection	Leave open

### 1.3 Schematic

**Figure 1-1. Typical Circuit**

Follow regulator manufacturer's recommended values for input and output bypass capacitors (Creg).



Add two 100nF capacitors: one close to pins 4 and 6, and another close to pins 18 and 20.

- NOTES:
- 1) The central pad on the underside of the chip is a Vss pin and should be connected to ground. Do not put any other tracks underneath the body of the chip.
  - 2) It is important to place all Cs, Rs, Rx and Ry components physically near to the chip.
  - 3) Leave YnA, YnB unconnected if not used.

Suggested regulator manufacturers:

- Torex (XC6215 series)
- Seiko (S817 series)
- BCDSemi (AP2121 series)

## 2. Overview of the QT5320

### 2.1 Introduction

The QT5320 is a versatile capacitive touchscreen controller, able to support a diagonal touchscreen of up to 8 inches. The IC supports Two Touch™ operation, part of the QTwo™ family of devices from Atmel®.

The QT5320 uses Atmel's patented QMatrix™ capacitive sensing technique, which offers excellent moisture tolerance, fast acquisition and outstanding ground load immunity.

A unique feature of the QT5320 is that it allows a choice to be made as to how many of the capacitive measurement channels form part of a touchscreen, and which ones form discrete keys or sliders.

This controller offers unrivalled flexibility to create touchscreens, sliders and keys. The device can report two touches on a touchscreen making it suitable for next generation touch interfaces. Concurrent use of a touchscreen plus keys or sliders is also possible.

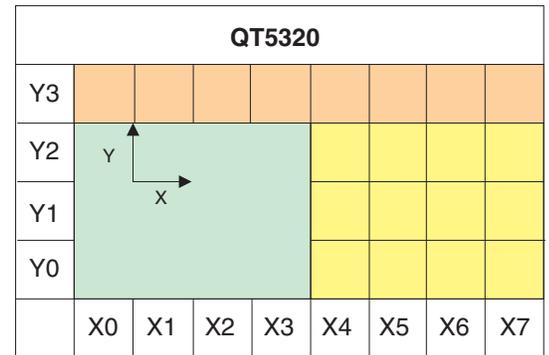
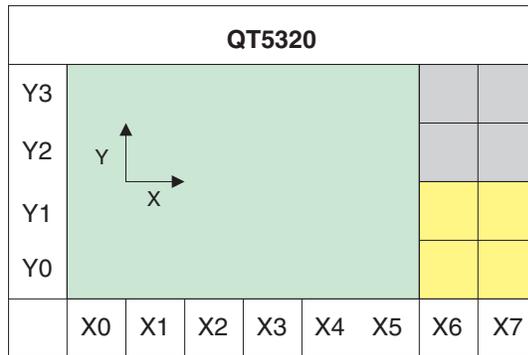
By treating all capacitive channels equally during measurement, and then applying additional signal processing, the device allows the channels to be used as part of a touchscreen, or part of one or more sliders, or as discrete touch keys.

Touchscreens can be created that are of arbitrary channel length and width. Channels not used in the touchscreen can either be turned into sliders or keys. There are some constraints on the starting channels for touchscreens and sliders, but these have no practical impact for most applications.

The controller also has the ability to save a Y line when configuring a touchscreen, reusing it in the touchscreen pattern at the two edges. This saved Y line can then be used to create extra objects like a slider or multiple keys, while allowing the touchscreen to be sized as though it was “one Y line larger”. In this “wrapped Y line” mode Two Touch processing cannot be used.

See [Figure 2-1](#) for configuration examples.

**Figure 2-1.** Example Touchscreen Configurations



Object Color Code	
	= disabled
	= key
	= slider
	= touchscreen

### 3. Revision History

Revision No.	History
Revision AS – October 2008	•Initial release for chip revision 5.0



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