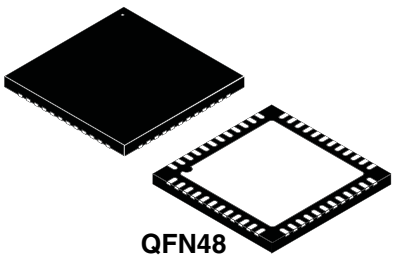
STMT05E

S-Touch® FingerTip
5-inch multi-touch capacitive touchscreen controller

Data brief

Features

- True multi-touch:
  - Independent XY tracking with 10 simultaneous touches in real time
  - Up to 12 force and 20 sense channels
- Single chip solution:
  - Up to 5 inches screen size
  - Supports multiple touchscreen configurations including touch keys with no external components on touch channels
- High SNR:
  - Common mode charger noise rejection up to 40 Vpp
  - Advanced filtering techniques for strong noise immunity
- Fast report rate: > 150 Hz
- High response time: < 2x report rate
- Power consumption:
  - 7 mW in active mode (multi-touch)
  - 5 µW in sleep mode
- 32-bit RISC processor
  - Flexibility for customer code implementation
  - Allows customization of proprietary touch pattern and gestures
- Multiple input types: finger and stylus pen
  - Up to 2 mm stylus
  - Simultaneous finger and stylus
  - Stylus recognition with palm rejection



QFN48
(6 x 6 mm)

- Large area recognition and rejection
- Advanced signal processing and calibration:
  - Water recovery, self-calibration with auto-drift compensation and fast start-up
  - Hardware coordinate scalar to match touchscreen and display resolution
  - Supports axis flipping and axis switch-over for portrait and landscape modes
- Sensor types:
  - Works with plastic or glass sensors, with different types of sensor patterns with or without ground shield
  - Supports on-cell, laminated and touch-on-lens touch display
- Power supply scheme:
  - 2.8 V to 5 V A_{VDD} and 1.8 V D_{VDD}
- Serial interface:
  - Supports high speed I^2C and SPI
  - 3.3 V tolerant interface for I^2C and SPI
- I/Os: RESETB, INTB hardware pins to host interface and 4 GPIOs with full programmability
- High ESD protection:
  - ±8 KV HBM ESD protection on all the force and sense pins

Table 1. Device summary

Order code	Package	Packing
STMT05EN1QTR	QFN48 (6 x 6 mm); 0.4 mm pitch and 0.55 mm thick	Tape and reel

1 Description

The STMT05E device represents a marked improvement over competing technologies by providing an optimal mix of low power, small size, feature flexibility with unmatched true multi-touch performance in a single-chip touchscreen controller.

The FingerTip STMT05E uses a unique capacitance to voltage conversion acquisition engine to implement the S-Touch® capacitive sensing method. Coupled with the flexibility offered by the internal processor engine, the entire touchscreen sensing solution can measure, classify and track a single finger touch with fast report rate and response times on 240 nodes. Built-in movement tracking engine tracks greater than 10 independent touch movements.

The acquisition engine uses an optimal measurement approach to ensure almost complete immunity from parasitic capacitance on the receiver inputs (sense lines). The engine includes sufficient dynamic range to cope with touchscreens of different size and configuration. This offers great flexibility to use with multiple touchscreens with different ITO designs and overlay materials. One and two layer ITO sensors are possible using glass or PET substrates.

The STMT05E's capacitive analog front-end provides enhanced noise suppression capabilities for various noise sources such as display, human body captured noise, system generated noise and severe common mode noise introduced by battery chargers. ST's advanced capacitive sensing technology coupled with a powerful digital 32-bit DSP engine is able to address common mode noise to provide high level of noise immunity without reducing the overall touch performance in terms of response time, frame rate and power consumption.

The device has an external SYNC pin for LCD noise filtering for an "on-cell" display touchscreen technology. The synchronization of the signal acquisition with the LCD SYNC signal helps in removal of LCD noise. This benefits the touch module maker to employ glass screens with ITO to be used without any GND shield that can significantly reduce the cost of the touch module.

The STMT05E supports multiple input types including stylus detection (up to 2 mm) for smooth handwriting capability on touchscreens while detecting and rejecting large area such as palm or hand. The device also supports touchkeys using the same ITO.

The main processor engine offers flexibility with required performance by an efficient pre-processing, post-processing and house-keeping. This gives ample scope for sensing algorithm, touch tracking or advanced shape based filtering, area definition and event reporting. Built-in associated processor memory (ROM, RAM) is optimized to run the desired fixed program codes in the ROM and to maintain the data, event stack and system variables in a RAM. An additional patch RAM can be used for implementing customized codes or algorithms.

Besides I^2C serial interface, the device supports a SPI interface freeing up the overloaded I^2C bus and providing more flexibility.

2 Revision history

Table 2. Document revision history

Date	Revision	Changes
31-Aug-2011	1	Initial release.

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