

# TrueTouch<sup>®</sup> Multi-Touch All-Points Touchscreen Controller Datasheet

## Features

- Multi-touch capacitive touchscreen controller
  - 32-bit ARM<sup>®</sup> Cortex<sup>™</sup> CPU
  - Register-configurable
  - Noise-suppression technologies for battery charger and display
    - Effective 24-V drive for higher signal-to-noise ratio (SNR)
    - ChargerArmor<sup>™</sup> for charger noise immunity
    - External display synchronization
  - Water rejection and wet-finger tracking using DualSense<sup>™</sup>
  - Multi-touch glove with automatic mode switching
    - Ten fingers with thin glove (≤1-mm thick)
    - Two fingers with thick glove (≤5-mm thick)
  - Fingernail tracking
  - Face detection up to 25 mm with grip suppression
  - Large object rejection
  - Automatic baseline tracking to environmental changes
  - Low-power look-for-touch mode
  - Field upgrades via bootloader
  - Android<sup>™</sup> and Windows<sup>®</sup> Phone 8 driver support
  - Cypress Manufacturing Test Kit (MTK)
  - Touchscreen sensor self-test and Panel ID reporting
- System performance (configuration dependent)
  - Screen sizes up to 5.0-inch diagonal
    - 4.8-mm sensor pitch; 16:9 aspect ratio
  - Up to 36 sense pins
    - 308 intersections (22 × 14)
  - Reports up to ten fingers
  - Small finger support down to 4 mm
  - Large finger support up to 30 mm
  - Refresh rate up to 300 Hz; other rates configurable
  - TX frequency up to 500 kHz
  - Best-in-class charger noise immunity
    - Immunity up to 35-V peak-to-peak ( $V_{PP}$ )
    - Immunity to AT&T<sup>®</sup> Zero charger
- Power (configuration-dependent)
  - 1.71- to 1.95-V or 2.0- to 5.5-V digital and I/O supply
  - 2.65- to 4.7-V analog supply
  - 4-mW average power
  - 5.7- $\mu$ W typical deep-sleep power
- Sensor and system design (configuration-dependent)
  - Supports a variety of touchscreen sensors and stackups
    - Manhattan, diamond, Single-Layer Independent Multi-touch (SLIM<sup>®</sup>), and Totem-pole patterns
    - Sensor-on-Lens (SOL)
    - Plastic (PET) and glass-sensor substrates
    - LCD, AMOLED, and IPS displays
    - Metal mesh
  - Single-layer flexible printed circuit (FPC) routing enabled by flexible TX/RX configurations
- Communication interface
  - I<sup>2</sup>C slave at 100 and 400 kbps
  - SPI slave bit rates up to 8 Mbps<sup>[1]</sup>
- Package options
  - 44-pin 5 × 5 × 0.6-mm QFN (0.35-mm lead pitch)
  - 48-pin 6 × 6 × 0.6-mm QFN (0.4-mm lead pitch)

### Note

1. SPI support is only available in 48-pin QFN package.

**Ordering Information**

Table 1 lists the CYTT21XXX TrueTouch touchscreen controllers. For information on other TrueTouch families, visit <http://www.cypress.com/truetouch>.

**Table 1. Device Ordering Information**

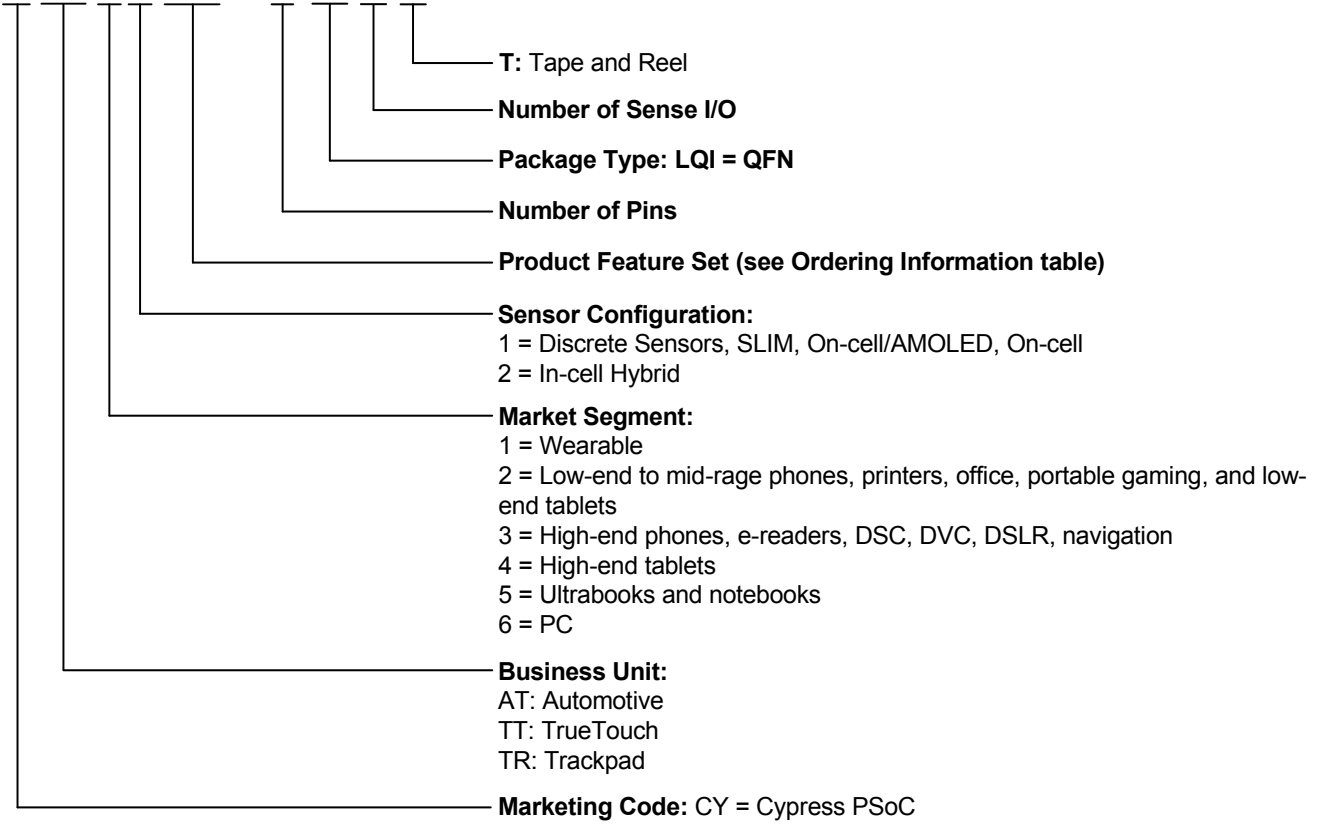
| Part Number          | Top Marking     | TrueTouch |                              |                              |       |           |                | Package    |
|----------------------|-----------------|-----------|------------------------------|------------------------------|-------|-----------|----------------|------------|
|                      |                 | Sense I/O | Base Features <sup>[2]</sup> | Advanced Wet-finger Tracking | Glove | Easy Wake | Face Detection | Type       |
| CYTT21100-44LQI28(T) | CYTT21000-44LQI | 28        | ✓                            | –                            | –     | –         | –              | 44-Pin QFN |
| CYTT21401-44LQI28(T) | CYTT21000-44LQI | 28        | ✓                            | ✓                            | ✓     | –         | –              | 44-Pin QFN |
| CYTT21402-44LQI28(T) | CYTT21000-44LQI | 28        | ✓                            | ✓                            | ✓     | ✓         | –              | 44-Pin QFN |
| CYTT21100-44LQI33(T) | CYTT21000-44LQI | 33        | ✓                            | –                            | –     | –         | –              | 44-Pin QFN |
| CYTT21401-44LQI33(T) | CYTT21000-44LQI | 33        | ✓                            | ✓                            | ✓     | –         | –              | 44-Pin QFN |
| CYTT21402-44LQI33(T) | CYTT21000-44LQI | 33        | ✓                            | ✓                            | ✓     | ✓         | –              | 44-Pin QFN |
| CYTT21100-44LQI35(T) | CYTT21000-44LQI | 35        | ✓                            | –                            | –     | –         | –              | 44-Pin QFN |
| CYTT21401-44LQI35(T) | CYTT21000-44LQI | 35        | ✓                            | ✓                            | ✓     | –         | –              | 44-Pin QFN |
| CYTT21402-44LQI35(T) | CYTT21000-44LQI | 35        | ✓                            | ✓                            | ✓     | ✓         | –              | 44-Pin QFN |
| CYTT21403-44LQI35(T) | CYTT21000-44LQI | 35        | ✓                            | ✓                            | ✓     | ✓         | ✓              | 44-Pin QFN |
| CYTT21100-48LQI36(T) | CYTT21000-48LQI | 36        | ✓                            | –                            | –     | –         | –              | 48-Pin QFN |
| CYTT21401-48LQI36(T) | CYTT21000-48LQI | 36        | ✓                            | ✓                            | ✓     | –         | –              | 48-Pin QFN |
| CYTT21402-48LQI36(T) | CYTT21000-48LQI | 36        | ✓                            | ✓                            | ✓     | ✓         | –              | 48-Pin QFN |
| CYTT21403-48LQI36(T) | CYTT21000-48LQI | 36        | ✓                            | ✓                            | ✓     | ✓         | ✓              | 48-Pin QFN |

**Notes**

2. All devices have the following base features: Water Rejection, ChargerArmor, CapSense buttons, Large Object Detection and Rejection, and Grip Suppression.

**Ordering Code Definitions**

CY TT Y Y XXX – ## LQI ZZ (T)



**Document History Page**

| <b>Document Title: CYTT21XXX (28, 33, 35, 36 I/Os) TrueTouch® Multi-Touch All-Points Touchscreen Controller Datasheet</b> |         |                 |                 |                       |
|---|---------|-----------------|-----------------|-----------------------|
| <b>Document Number: 001-96564</b>   |         |                 |                 |                       |
| Revision  | ECN     | Orig. of Change | Submission Date | Description of Change |
| **  | 4670224 | SWU             | 02/25/2015      | New datasheet.        |

**Sales, Solutions, and Legal Information**

**Worldwide Sales and Design Support**

Cypress maintains a worldwide network of offices, solution centers, manufacturer’s representatives, and distributors. To find the office closest to you, visit us at Cypress Locations.

**Products**

- Automotive ..... [cypress.com/go/automotive](http://cypress.com/go/automotive)
- Clocks & Buffers..... [cypress.com/go/clocks](http://cypress.com/go/clocks)
- Interface ..... [cypress.com/go/interface](http://cypress.com/go/interface)
- Lighting & Power Control ..... [cypress.com/go/powerpsoc](http://cypress.com/go/powerpsoc)
- Memory ..... [cypress.com/go/memory](http://cypress.com/go/memory)
- PSoC..... [cypress.com/go/psoc](http://cypress.com/go/psoc)
- Touch Sensing..... [cypress.com/go/touch](http://cypress.com/go/touch)
- USB Controllers ..... [cypress.com/go/USB](http://cypress.com/go/USB)
- Wireless/RF..... [cypress.com/go/wireless](http://cypress.com/go/wireless)

**PSoC® Solutions**

[psoc.cypress.com/solutions](http://psoc.cypress.com/solutions)  
 PSoC 1 | PSoC 3 | PSoC 4 | PSoC 5LP

**Cypress Developer Community**

[Community](#) | [Forums](#) | [Blogs](#) | [Video](#) | [Training](#)

**Technical Support**

[cypress.com/go/support](http://cypress.com/go/support)

© Cypress Semiconductor Corporation, 2015. The information contained herein is subject to change without notice. Cypress Semiconductor Corporation assumes no responsibility for the use of any circuitry other than circuitry embodied in a Cypress product. Nor does it convey or imply any license under patent or other rights. Cypress products are not warranted nor intended to be used for medical, life support, life saving, critical control, or safety applications, unless pursuant to an express written agreement with Cypress. Furthermore, Cypress does not authorize its products for use as critical components in life-support systems where a malfunction or failure may reasonably be expected to result in significant injury to the user. The inclusion of Cypress products in life-support systems application implies that the manufacturer assumes all risk of such use and in doing so indemnifies Cypress against all charges.

Any Source Code (software and/or firmware) is owned by Cypress Semiconductor Corporation (Cypress) and is protected by and subject to worldwide patent protection (United States and foreign), United States copyright laws and international treaty provisions. Cypress hereby grants to licensee a personal, non-exclusive, non-transferable license to copy, use, modify, create derivative works of, and compile the Cypress Source Code and derivative works for the sole purpose of creating custom software and/or firmware in support of licensee product to be used only in conjunction with a Cypress integrated circuit as specified in the applicable agreement. Any reproduction, modification, translation, compilation, or representation of this Source Code except as specified above is prohibited without the express written permission of Cypress.

Disclaimer: CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Cypress reserves the right to make changes without further notice to the materials described herein. Cypress does not assume any liability arising out of the application or use of any product or circuit described herein. Cypress does not authorize its products for use as critical components in life-support systems where a malfunction or failure may reasonably be expected to result in significant injury to the user. The inclusion of Cypress’ product in a life-support systems application implies that the manufacturer assumes all risk of such use and in doing so indemnifies Cypress against all charges.

Use may be limited by and subject to the applicable Cypress software license agreement.