



**THE DATASHEET OF  
CYTT21401-56LQI48**



# 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 14-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>
  - 2.5-mm passive stylus with automatic mode switching and palm rejection
  - 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
  - Large object rejection
  - Automatic baseline tracking to environmental changes
  - Low-power look-for-touch mode
  - Field upgrades via bootloader
  - Android<sup>™</sup> driver support
  - Cypress Manufacturing Test Kit (MTK)
  - Touchscreen sensor self-test and Panel ID reporting
- System performance (configuration dependent)
  - Screen sizes up to 7.0-inch diagonal
    - 5.0-mm electrode pitch; 16:9 aspect ratio
  - Screen sizes up to 5.5-inch diagonal
    - 4.0-mm electrode pitch; 16:9 aspect ratio
  - Up to 48 sense pins
    - 527 intersections (31 × 17)
- 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<sub>PP</sub>)
  - 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
  - 9-mW average power
  - 10.7-μW 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)
    - On-cell touch-integrated display modules
    - 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
- Package
  - 56-pin 6 × 6 × 0.6-mm QFN (0.35-mm lead pitch)

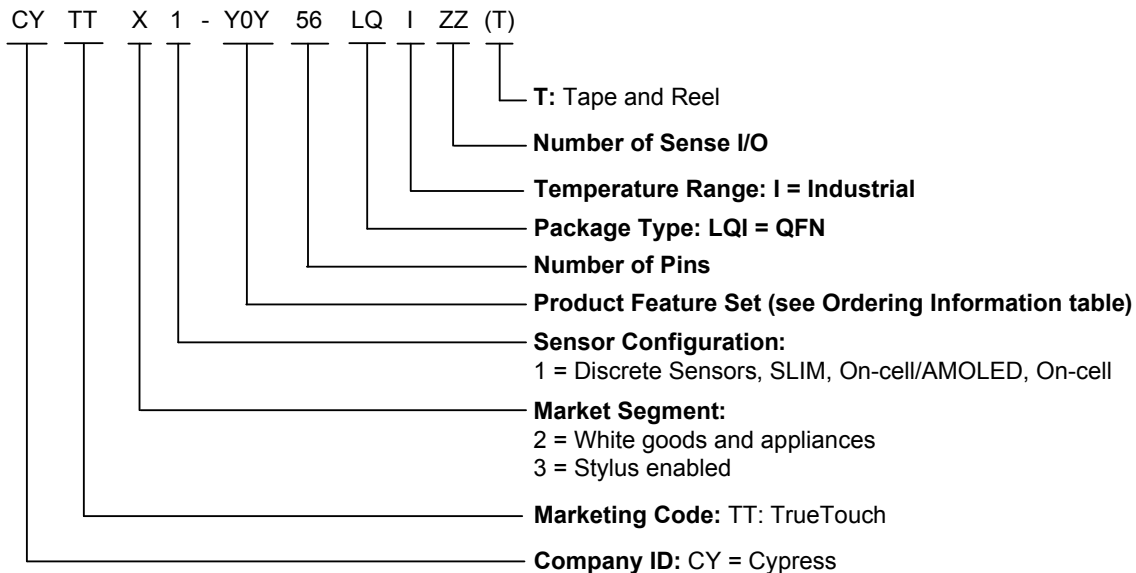
**Ordering Information**

Table 1 lists the CYTT21X/31X TrueTouch touchscreen controllers. For information on other TrueTouch families, visit <http://www.cypress.com/truetouch>.

**Table 1. Ordering Information** <sup>[1]</sup>

MPN	Top Marking	Features						Package
		Sense I/O	Max Touches	Charger Armor	Glove	Easy Wake <sup>[2]</sup>	Passive Stylus	
CYTT21100-56LQI48(T)	CYTT21000-56LQ	48	10	✓	–	–	–	56 QFN
CYTT21401-56LQI48(T)	CYTT21000-56LQ	48	10	✓	✓	–	–	56 QFN
CYTT21403-56LQI48(T)	CYTT21000-56LQ	48	10	✓	✓	✓	–	56 QFN
CYTT21100-56LQI44(T)	CYTT21001-56LQ	44	10	✓	–	–	–	56 QFN
CYTT21401-56LQI44(T)	CYTT21001-56LQ	44	10	✓	✓	–	–	56 QFN
CYTT21403-56LQI44(T)	CYTT21001-56LQ	44	10	✓	✓	✓	–	56 QFN
CYTT21100-56LQI40(T)	CYTT21001-56LQ	40	10	✓	–	–	–	56 QFN
CYTT21401-56LQI40(T)	CYTT21001-56LQ	40	10	✓	✓	–	–	56 QFN
CYTT21403-56LQI40(T)	CYTT21001-56LQ	40	10	✓	✓	✓	–	56 QFN
CYTT31702-56LQI48(T)	CYTT31000-56LQ	48	10	✓	✓	✓	✓	56 QFN

**Ordering Code Definitions**



**Notes**

1. All devices have the following base features: ChargerArmor, DualSense, CapSense buttons, Large Object Detection and Rejection, and Grip Suppression.
2. Easy-wake is a gesture made while the LCD is completely powered off to provide a quick and easy method to wake up a device and open a specific application. These gestures include finger swiping and tracing alphanumeric symbols.

**Document History Page**

Document Title: CYTT21X/31X (40, 44, 48 IOs) TrueTouch® Multi-Touch All-Points Touchscreen Controller Datasheet Document Number: 001-93968				
Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	4621131	SWU	01/14/2015	New datasheet.
*A	4670224	SWU	02/25/2015	Updated Document Title.
*B	4688471	SWU	03/25/2015	Updated Document Title. Updated Features: Replaced "Immunity up to 15-V peak-to-peak (V <sub>PP</sub> )" with "Immunity up to 35-V peak-to-peak (V <sub>PP</sub> )". Updated Ordering Information: Updated Table 1: Updated part numbers. Added a column "Top Marking".
*C	5073152	ELG	01/05/2016	Updated Features: Removed "Face detection up to 20 mm". Removed "Windows® Phone 8.1 driver". Updated Ordering Information: Updated Table 1: Updated part numbers. Removed "Face Detection" column. Updated Ordering Code Definitions. Updated to new template. Completing Sunset Review.

## 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	<a href="http://cypress.com/go/automotive">cypress.com/go/automotive</a>
Clocks & Buffers	<a href="http://cypress.com/go/clocks">cypress.com/go/clocks</a>
Interface	<a href="http://cypress.com/go/interface">cypress.com/go/interface</a>
Lighting & Power Control	<a href="http://cypress.com/go/powerpsoc">cypress.com/go/powerpsoc</a>
Memory	<a href="http://cypress.com/go/memory">cypress.com/go/memory</a>
PSoC	<a href="http://cypress.com/go/psoc">cypress.com/go/psoc</a>
Touch Sensing	<a href="http://cypress.com/go/touch">cypress.com/go/touch</a>
USB Controllers	<a href="http://cypress.com/go/USB">cypress.com/go/USB</a>
Wireless/RF	<a href="http://cypress.com/go/wireless">cypress.com/go/wireless</a>

#### PSoC<sup>®</sup> 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, 2015-2016. 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.

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

-  [View CYTT21401-56LQI48 on WIN SOURCE](#)
-  [Cypress Semiconductor Corp](#) Information

## Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management