

TrueTouch® Multi-Touch All-Points Touchscreen Controller Datasheet

Features

■ Multi-touch capacitive touchscreen controller

- 32-bit ARM® Cortex™ CPU
- Register-configurable
- Noise-suppression technologies for battery charger and display
 - Effective 14-V drive for higher signal-to-noise ratio (SNR)
 - ChargerArmor™ for charger noise immunity
 - External display synchronization
- Water rejection and wet-finger tracking using DualSense™
- 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™ 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_{PP})
 - Immunity to AT&T® 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®), 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

- I²C 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)

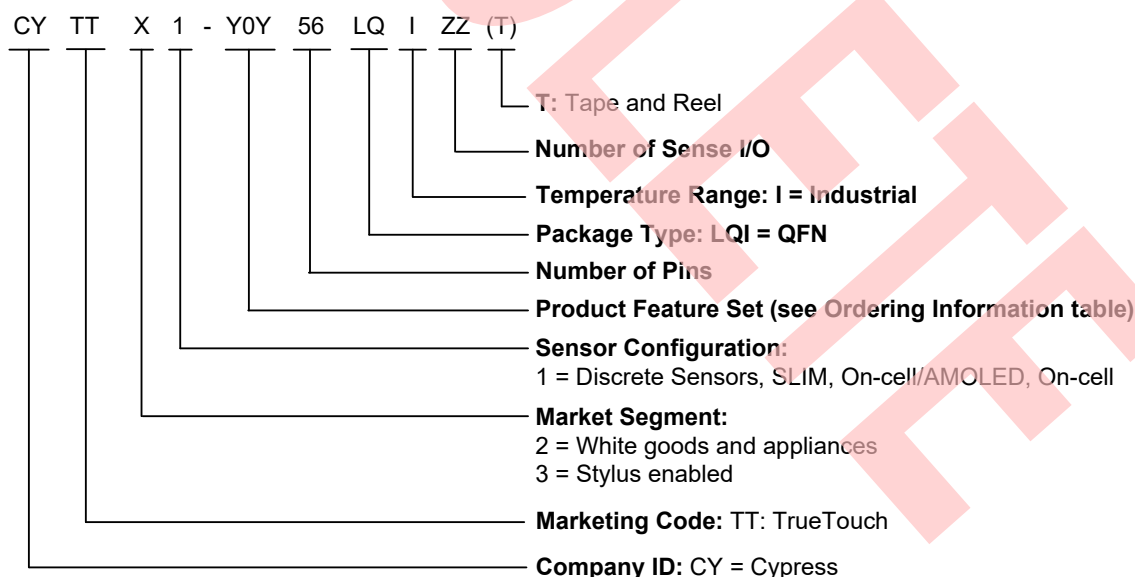
Ordering Information

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 ^[1]

MPN	Top Marking	Features						Package
		Sense I/O	Max Touches	Charger Armor	Glove	Easy Wake ^[2]	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 _{PP})" with "Immunity up to 35-V peak-to-peak (V _{PP})". 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.
*D	6383043	ELG	11/14/2018	Obsoleting the spec.

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

Arm® Cortex® Microcontrollers	cypress.com/arm
Automotive	cypress.com/automotive
Clocks & Buffers	cypress.com/clocks
Interface	cypress.com/interface
Internet of Things	cypress.com/iot
Memory	cypress.com/memory
Microcontrollers	cypress.com/mcu
PSoC	cypress.com/psoc
Power Management ICs	cypress.com/pmic
Touch Sensing	cypress.com/touch
USB Controllers	cypress.com/usb
Wireless Connectivity	cypress.com/wireless

PSoC® Solutions

[PSoC 1](#) | [PSoC 3](#) | [PSoC 4](#) | [PSoC 5LP](#) | [PSoC 6 MCU](#)

Cypress Developer Community

[Community](#) | [Projects](#) | [Video](#) | [Blogs](#) | [Training](#) | [Components](#)

Technical Support

cypress.com/support

© Cypress Semiconductor Corporation, 2015-2018. This document is the property of Cypress Semiconductor Corporation and its subsidiaries, including Spansion LLC ("Cypress"). This document, including any software or firmware included or referenced in this document ("Software"), is owned by Cypress under the intellectual property laws and treaties of the United States and other countries worldwide. Cypress reserves all rights under such laws and treaties and does not, except as specifically stated in this paragraph, grant any license under its patents, copyrights, trademarks, or other intellectual property rights. If the Software is not accompanied by a license agreement and you do not otherwise have a written agreement with Cypress governing the use of the Software, then Cypress hereby grants you a personal, non-exclusive, nontransferable license (without the right to sublicense) (1) under its copyright rights in the Software (a) for Software provided in source code form, to modify and reproduce the Software solely for use with Cypress hardware products, only internally within your organization, and (b) to distribute the Software in binary code form externally to end users (either directly or indirectly through resellers and distributors), solely for use on Cypress hardware product units, and (2) under those claims of Cypress's patents that are infringed by the Software (as provided by Cypress, unmodified) to make, use, distribute, and import the Software solely for use with Cypress hardware products. Any other use, reproduction, modification, translation, or compilation of the Software is prohibited.

TO THE EXTENT PERMITTED BY APPLICABLE LAW, CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS DOCUMENT OR ANY SOFTWARE OR ACCOMPANYING HARDWARE, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. No computing device can be absolutely secure. Therefore, despite security measures implemented in Cypress hardware or software products, Cypress does not assume any liability arising out of any security breach, such as unauthorized access to or use of a Cypress product. In addition, the products described in these materials may contain design defects or errors known as errata which may cause the product to deviate from published specifications. To the extent permitted by applicable law, Cypress reserves the right to make changes to this document without further notice. Cypress does not assume any liability arising out of the application or use of any product or circuit described in this document. Any information provided in this document, including any sample design information or programming code, is provided only for reference purposes. It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. Cypress products are not designed, intended, or authorized for use as critical components in systems designed or intended for the operation of weapons, weapons systems, nuclear installations, life-support devices or systems, other medical devices or systems (including resuscitation equipment and surgical implants), pollution control or hazardous substances management, or other uses where the failure of the device or system could cause personal injury, death, or property damage ("Unintended Uses"). A critical component is any component of a device or system whose failure to perform can be reasonably expected to cause the failure of the device or system, or to affect its safety or effectiveness. Cypress is not liable, in whole or in part, and you shall and hereby do release Cypress from any claim, damage, or other liability arising from or related to all Unintended Uses of Cypress products. You shall indemnify and hold Cypress harmless from and against all claims, costs, damages, and other liabilities, including claims for personal injury or death, arising from or related to any Unintended Uses of Cypress products.

Cypress, the Cypress logo, Spansion, the Spansion logo, and combinations thereof, WICED, PSoC, CapSense, EZ-USB, F-RAM, and Traveo are trademarks or registered trademarks of Cypress in the United States and other countries. For a more complete list of Cypress trademarks, visit cypress.com. Other names and brands may be claimed as property of their respective owners.