

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

## Features

- Multi-touch capacitive touchscreen controller
  - 32-bit ARM Cortex™ CPU
  - Register configurable
  - Noise suppression technologies for battery charger and display
    - Effective 28-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™
  - Multi-touch glove with automatic mode switching
    - 10 fingers with thin glove (≤1-mm thickness)
    - 2 fingers with thick glove (≤5-mm thickness)
  - Face detection with grip suppression
  - Finger nail tracking
  - Passive stylus with palm rejection
  - Hover finger sensing
  - Large object rejection
  - Automatic baseline tracking to environmental changes
  - Low-power look-for-touch mode
  - Field upgrades via bootloader
  - Android™ and Windows Phone 8 driver support
  - Cypress manufacturing test kit (MTK)
  - Touchscreen sensor self-test and 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
    - 299 intersections (23 × 13)
  - Reports up to 10 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
  - Fast first-touch response (≤13 ms)
- Best-in-class charger noise immunity
  - Immunity up to 60 peak-to-peak voltage (V<sub>PP</sub>)
  - Immunity to AT&T Zero charger and Duracell chargers
- Power (configuration dependent)
  - 1.71- to 5.5-V digital and I/O supply
  - 2.65- to 5.5-V analog supply
  - 5.6-mW average power
  - 4.5-μW typical deep-sleep power
- Sensor and system design (configuration dependent)
  - Supports a variety of touchscreen sensors and stackups
    - Manhattan, diamond, and SLIM<sup>®</sup> patterns
    - Sensor-on-lens (SOL)
    - On-cell touch integrated display modules
    - Plastic (PET) and glass sensor substrates
    - LCD and AMOLED displays
  - Single-layer flexible printed circuit (FPC) routing enabled by flexible TX/RX configurations
- Communication interface
  - I<sup>2</sup>C slave at all standard bit rates
    - 100 kbps, 400 kbps, 1 Mbps, and 3.4 Mbps
  - SPI slave bit rates up to 10 Mbps
- 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)

**Ordering Information**

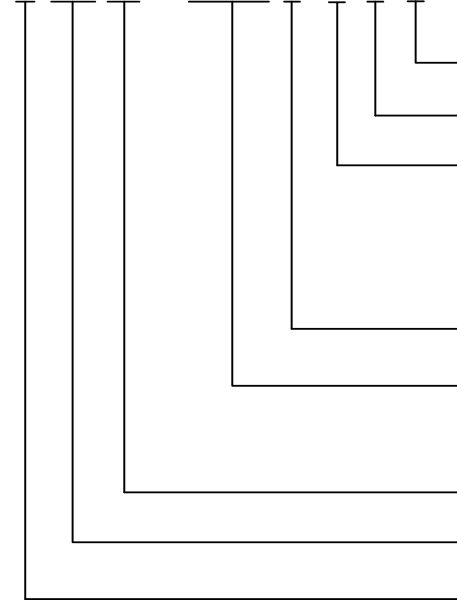
Table 1 lists the CYTMA545 TrueTouch touchscreen controllers. For information on other TrueTouch families, visit <http://www.cypress.com/truetouch>.

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

Device Family and Part Number		TrueTouch				Advanced Features				Package
Family	Part Number	Sense Pins	Typ Screen Size (inches) <sup>[2]</sup>	Max Fingers	TX Slew Rate Control	Glove	Stylus	Hover	Face Detection	
Base	CYTMA545-44LQI33AA(T)	33	4.5	10	–	–	–	–	–	44-Pin QFN
	CYTMA545-48LQI36AA(T)	36	5	10	–	–	–	–	–	48-Pin QFN
Water Rejection (DualSense)	CYTMA545-44LQI33AB(T)	33	4.5	10	–	–	–	–	–	44-Pin QFN
	CYTMA545-48LQI36AB(T)	36	5	10	–	–	–	–	–	48-Pin QFN
	CYTMA545-48LQI36BB(T)	36	5	10	–	✓	✓	–	–	48-Pin QFN
Custom Reserved for Kits	CYTMA545-48LQI36ZZ(T)	36	5	10	–	✓	✓	✓	✓	48-Pin QFN
Base	CYTMA545-44LQI33AAA(T)	33	4.5	10	✓	–	–	–	–	44-Pin QFN
	CYTMA545-48LQI36AAA(T)	36	5	10	✓	–	–	–	–	48-Pin QFN
Water Rejection (DualSense)	CYTMA545-44LQI33ABA(T)	33	4.5	10	✓	–	–	–	–	44-Pin QFN
	CYTMA545-48LQI36ABA(T)	36	5	10	✓	–	–	–	–	48-Pin QFN
	CYTMA545-48LQI36BBA(T)	36	5	10	✓	✓	✓	–	–	48-Pin QFN
Custom Reserved for Kits	CYTMA545-48LQI36ZZA(T)	36	5	10	✓	✓	✓	✓	✓	48-Pin QFN

**Ordering Code Definitions**

CY TMA 545 - ##LQI ## XX A (T)



**T = Tape and Reel**

**A = TX Slew Rate Control**

**Features (XX)**

AA = Base

AB = Base Part + Water Rejection (DualSense)

BB = Base Part + Water Rejection (DualSense) + Stylus + Glove

ZZ = Custom Development

**Number of Sense I/O (##):** 33 or 36

**Pins/Package Type (##LQI)**

44LQI = 44-pin QFN

48LQI = 48-pin QFN

**Part Number:** 545

**Family Code:** TMA = Multi-Touch All-Points Controller

**Marketing Code:** CY = Cypress PSoC

**Notes**

1. All devices have the following base features: 10-V TX, ChargerArmor, CapSense Buttons, Large Object Detection and Rejection, Grip Suppression, Water Rejection, Self-capacitance, and High Noise Immunity (see Table 2 on page 6).
2. 4.7-mm pitch for screen sizes up to 4.9-inch diagonal, 4.8-mm pitch for 5.0-inch diagonal screen size, 16:9 aspect ratio. Larger screen sizes can be supported with a larger pitch.

**Document History Page**

<b>Document Title: CYTMA545 TrueTouch® Multi-Touch All-Points Touchscreen Controller</b> <b>Document Number: 001-90908</b>				
Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	4267426	SWU	02/19/2014	New datasheet.

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