Please note that Cypress is an Infineon Technologies Company.
The document following this cover page is marked as “Cypress” document as this is the company that originally developed the product. Please note that Infineon will continue to offer the product to new and existing customers as part of the Infineon product portfolio.

Continuity of document content
The fact that Infineon offers the following product as part of the Infineon product portfolio does not lead to any changes to this document. Future revisions will occur when appropriate, and any changes will be set out on the document history page.

Continuity of ordering part numbers
Infineon continues to support existing part numbers. Please continue to use the ordering part numbers listed in the datasheet for ordering.
THIS SPEC IS OBSOLETE.

Spec No: 001-90908

Spec Title: CYTMA545 TRUETOUCH(R) MULTI-TOUCH ALL-POINTS TOUCHSCREEN CONTROLLER DATASHEET (SUMMARY)

Replaced by: None
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_{PP})
  - 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® 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
  - I²C 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[^1]

<table>
<thead>
<tr>
<th>Device Family and Part Number</th>
<th>TrueTouch</th>
<th>Advanced Features</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Family</strong></td>
<td><strong>Part Number</strong></td>
<td><strong>Sense Pins</strong></td>
<td><strong>Typ Screen Size (inches)</strong>[^2]</td>
</tr>
<tr>
<td>Base</td>
<td>CYTMA545-44LQI33AA(T)</td>
<td>33</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>CYTMA545-48LQI36AA(T)</td>
<td>36</td>
<td>5</td>
</tr>
<tr>
<td>Water Rejection (DualSense)</td>
<td>CYTMA545-44LQI33AB(T)</td>
<td>33</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>CYTMA545-48LQI36AB(T)</td>
<td>36</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>CYTMA545-48LQI36BB(T)</td>
<td>36</td>
<td>5</td>
</tr>
<tr>
<td>Custom Reserved for Kits</td>
<td>CYTMA545-48LQI36ZZ(T)</td>
<td>36</td>
<td>5</td>
</tr>
<tr>
<td>Base</td>
<td>CYTMA545-44LQI33AAA(T)</td>
<td>33</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>CYTMA545-48LQI36AAA(T)</td>
<td>36</td>
<td>5</td>
</tr>
<tr>
<td>Water Rejection (DualSense)</td>
<td>CYTMA545-44LQI33ABA(T)</td>
<td>33</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>CYTMA545-48LQI36ABA(T)</td>
<td>36</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>CYTMA545-48LQI36BBA(T)</td>
<td>36</td>
<td>5</td>
</tr>
<tr>
<td>Custom Reserved for Kits</td>
<td>CYTMA545-48LQI36ZZA(T)</td>
<td>36</td>
<td>5</td>
</tr>
</tbody>
</table>

#### Ordering Code Definitions

- **CY TMA 545 - ##LQI ##.XX (A) (T)**
  - **T**: Tape and Reel
  - **A**: TX Slew Rate Control
  - **Features (XX)**
    - **AA**: Base Part
    - **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

#### 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.
SUMMARY

Document History Page

<table>
<thead>
<tr>
<th>Revision</th>
<th>ECN</th>
<th>Orig. of Change</th>
<th>Submission Date</th>
<th>Description of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>**</td>
<td>4267426</td>
<td>SWU</td>
<td>02/19/2014</td>
<td>New datasheet.</td>
</tr>
</tbody>
</table>

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
- Clocks & Buffers: cypress.com/go/clocks
- Interface: cypress.com/go/interface
- Lighting & Power Control: cypress.com/go/powerpsoc, cypress.com/go/plc
- Memory: cypress.com/go/memory
- PSoC: cypress.com/go/psoc
- Touch Sensing: cypress.com/go/touch
- USB Controllers: cypress.com/go/USB
- Wireless/RF: cypress.com/go/wireless

PSoC® Solutions

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

Technical Support

cypress.com/go/support

© Cypress Semiconductor Corporation, 2014. 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.

Document Number: 001-90908 Rev. *A

Revised August 11, 2014