

# Automotive TrueTouch® Multi-Touch All-Points Touchscreen Controller

## Features

- Multi-touch capacitive touchscreen controller
  - 32-bit ARM® Cortex® CPU
  - Register-configurable
  - Noise-suppression technologies for display and EMI
    - Effective 20-V drive for higher signal-to-noise ratio (SNR)<sup>[1]</sup>
    - AutoArmor™ improves both electromagnetic emissions and immunity
    - External display synchronization
  - Water rejection and wet-finger tracking using DualSense™
  - Multi-touch glove with automatic mode switching
    - Ten fingers with thin glove (≤1-mm thick)
    - Two fingers with thick glove (≤5-mm thick)
  - Large object rejection
  - Automatic baseline tracking to environmental changes
  - Low-power look-for-touch mode
  - Field upgrades via bootloader
  - Cypress Manufacturing Test Kit (MTK)
  - Touchscreen sensor self-test
- System performance (configuration dependent)
  - Screen sizes up to 8.5-inch diagonal
    - 6.2-mm electrode pitch; 16:9 aspect ratio
  - Up to 48 sense pins, 527 intersections; 16:9 aspect ratio (17 RX and 31 TX)
  - Reports up to ten fingers
  - Small finger support down to 4 mm
  - Refresh rate up to 250 Hz; other rates configurable
  - TX frequency up to 350 kHz
- Power (configuration-dependent)
  - 1.71- to 1.95-V and 3.0- to 5.5-V logic and digital I/Os supply
  - 3.0- to 5.5-V analog supply
  - 9-mW average power
  - 11-μW typical deep-sleep power
- Sensor and system design (configuration-dependent)
  - Supports a variety of touchscreen sensors and stackups
    - Manhattan, diamond
    - Sensor-on-Lens (SOL)
    - On-cell
    - Plastic (PET) and glass-sensor substrates
    - LCD, AMOLED, and IPS displays
    - Metal mesh
- Communication interface
  - I<sup>2</sup>C slave at 100 and 400 kbps
  - SPI slave bit rates up to 8 Mbps
- Package
  - 100-pin TQFP 14 × 14 × 1.4 mm (0.5-mm pitch)
- Ambient temperature range
  - Automotive-A: -40 °C to 85 °C
  - Automotive-S: -40 °C to 105 °C

### Note

1. Effective voltage when using 17 multi-phase TX and 5-V V<sub>CCTX</sub> supply.



### Table 1. Ordering Information<sup>[2]</sup>

**Figure 1. PSoC 4000 Part Numbering System**

The diagram illustrates the structure of a PSoC 4000 part number, showing how each segment of the alphanumeric string corresponds to a specific product attribute. The part number is segmented as follows:

- CY**: Marketing Code (e.g., CY = Cypress)
- AT**: Business Unit (e.g., AT = Automotive)
- X**: Market Segment (e.g., 8 = Automotive Touchscreen)
- X**: Sensor Configuration (e.g., 1 = Discrete Sensors)
- X**: Product Feature Set (See Ordering Information table)
- XXX**: Number of Pins (e.g., 100)
- X**: Package Type (e.g., A = TQFP)
- X**: Temperature Range (e.g., A = -40 °C to 85 °C; S = -40 °C to 105 °C)
- XX**: Number of Sense I/Os

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## Document History Page

| Document Title: CYAT8165X (48 I/Os), Automotive TrueTouch® Multi-Touch All-Points Touchscreen Controller<br>Document Number: 002-16617 |         |                 |                 |                       |
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| Revision                                                                                                                               | ECN     | Orig. of Change | Submission Date | Description of Change |
| **                                                                                                                                     | 5437893 | GACH            | 09/16/2016      | Initial release       |

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