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**Continuity of ordering part numbers**

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**Automotive 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 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 15-inch diagonal
    - 6.0-mm electrode pitch; 16:10 aspect ratio
  - Up to 88 sense pins, 1836 intersections; 16:10 aspect ratio (34 TX × 54 RX)
  - Reports up to ten fingers
  - Small finger support down to 4 mm
- 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
  - 30-mW average power
  - 30-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)
    - 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)
  - 128-pin TQFP 14 × 20 × 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.

## Ordering Information

Table 1 lists the CYAT81X TrueTouch touchscreen controllers.

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

| MPN                | Number of Sense pins | Number of fingers | Low-power wake-up Button | Capsense Buttons | Water Rejection | Thin Glove support | Display Armor | Gestures | Thick Overlay/Thick Glove support | 5-V Tx | Package  |
|--------------------|----------------------|-------------------|--------------------------|------------------|-----------------|--------------------|---------------|----------|-----------------------------------|--------|----------|
| CYAT81682-100AA61Z | 61                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | –        | –                                 | –      | 100 TQFP |
| CYAT81682-100AS61Z | 61                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | –        | –                                 | –      | 100 TQFP |
| CYAT81682-100AA71Z | 71                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | –        | –                                 | –      | 100 TQFP |
| CYAT81682-100AS71Z | 71                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | –        | –                                 | –      | 100 TQFP |
| CYAT81682-100AA77Z | 77                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | –        | –                                 | –      | 100 TQFP |
| CYAT81682-100AS77Z | 77                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | –        | –                                 | –      | 100 TQFP |
| CYAT81682-128AA88Z | 88                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | –        | –                                 | –      | 128 TQFP |
| CYAT81682-128AS88Z | 88                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | –        | –                                 | –      | 128 TQFP |
| CYAT81685-100AA61Z | 61                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | ✓        | –                                 | –      | 100 TQFP |
| CYAT81685-100AS61Z | 61                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | ✓        | –                                 | –      | 100 TQFP |
| CYAT81685-100AA71Z | 71                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | ✓        | –                                 | –      | 100 TQFP |
| CYAT81685-100AS71Z | 71                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | ✓        | –                                 | –      | 100 TQFP |
| CYAT81685-100AA77Z | 77                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | ✓        | –                                 | –      | 100 TQFP |
| CYAT81685-100AS77Z | 77                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | ✓        | –                                 | –      | 100 TQFP |
| CYAT81685-128AA88Z | 88                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | ✓        | –                                 | –      | 128 TQFP |
| CYAT81685-128AS88Z | 88                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | ✓        | –                                 | –      | 128 TQFP |
| CYAT81688-100AA61Z | 61                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | ✓        | ✓                                 | ✓      | 100 TQFP |
| CYAT81688-100AS61Z | 61                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | ✓        | ✓                                 | ✓      | 100 TQFP |
| CYAT81688-100AA71Z | 71                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | ✓        | ✓                                 | ✓      | 100 TQFP |
| CYAT81688-100AS71Z | 71                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | ✓        | ✓                                 | ✓      | 100 TQFP |
| CYAT81688-100AA77Z | 77                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | ✓        | ✓                                 | ✓      | 100 TQFP |
| CYAT81688-100AS77Z | 77                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | ✓        | ✓                                 | ✓      | 100 TQFP |
| CYAT81688-128AA88Z | 88                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | ✓        | ✓                                 | ✓      | 128 TQFP |
| CYAT81688-128AS88Z | 88                   | 10                | –                        | ✓                | ✓               | ✓                  | ✓             | ✓        | ✓                                 | ✓      | 128 TQFP |
| CYAT81689-100AA61Z | 61                   | 10                | ✓                        | ✓                | ✓               | ✓                  | ✓             | ✓        | ✓                                 | ✓      | 100 TQFP |

**Note**

- All devices have the following base features: Water Rejection, DisplayArmor™, AutoArmor™, DualSense™, CapSense buttons, Large Object Detection and Rejection, and Grip Suppression.

Table 1. Ordering Information<sup>[2]</sup> (continued)

| MPN                | Number of Sense pins | Number of fingers | Low-power wake-up Button | Capsense Buttons | Water Rejection | Thin Glove support | Display Armor | Gestures | Thick Overlay/Thick Glove support | 5-V Tx | Package  |
|--------------------|----------------------|-------------------|--------------------------|------------------|-----------------|--------------------|---------------|----------|-----------------------------------|--------|----------|
| CYAT81689-100AS61Z | 61                   | 10                | ✓                        | ✓                | ✓               | ✓                  | ✓             | ✓        | ✓                                 | ✓      | 100 TQFP |
| CYAT81689-100AA71Z | 71                   | 10                | ✓                        | ✓                | ✓               | ✓                  | ✓             | ✓        | ✓                                 | ✓      | 100 TQFP |
| CYAT81689-100AS71Z | 71                   | 10                | ✓                        | ✓                | ✓               | ✓                  | ✓             | ✓        | ✓                                 | ✓      | 100 TQFP |
| CYAT81689-100AA77Z | 77                   | 10                | ✓                        | ✓                | ✓               | ✓                  | ✓             | ✓        | ✓                                 | ✓      | 100 TQFP |
| CYAT81689-100AS77Z | 77                   | 10                | ✓                        | ✓                | ✓               | ✓                  | ✓             | ✓        | ✓                                 | ✓      | 100 TQFP |
| CYAT81689-128AA88Z | 88                   | 10                | ✓                        | ✓                | ✓               | ✓                  | ✓             | ✓        | ✓                                 | ✓      | 128 TQFP |
| CYAT81689-128AS88Z | 88                   | 10                | ✓                        | ✓                | ✓               | ✓                  | ✓             | ✓        | ✓                                 | ✓      | 128 TQFP |

### Ordering Code Definitions

CY AT X X XXX – XXX X X XX X T  
 | | | | | | | | | |  
 | | | | | | | | | |

T = Tape and Reel

**Fab Location Indicator**

Z = New Fab Location

Blank/Non-Z = Initial Fab Location

**Number of Sense I/Os:** 61, 71, 77, or 88

**Temperature Range:** A = –40 °C to +85 °C; S = –40 °C to +105 °C

**Package Type:** A = TQFP

**Number of Pins:** 100 or 128

**Product Feature Set (see Ordering Information table)**

**Sensor Configuration:** 1 = Discrete Sensors

**Market Segment:** 8 = Automotive Touchscreen

**Business Unit:** AT = Automotive

**Marketing Code:** CY = Cypress

**Document History Page**

| Document Title: CYAT81X (61, 71, 77, 88 I/Os) Automotive TrueTouch® Multi-Touch All-Points Touchscreen Controller Datasheet<br>Document Number: 002-04310 |         |                 |                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------------|---------------------------------------------------------------------------------|
| Revision                                                                                                                                                  | ECN     | Submission Date | Description of Change                                                           |
| **                                                                                                                                                        | 4988927 | 10/28/2015      | New summary datasheet                                                           |
| *A                                                                                                                                                        | 5705461 | 04/21/2017      | Updated Cypress Logo and Copyright.                                             |
| *B                                                                                                                                                        | 5962384 | 11/13/2017      | Updated Ordering Information and Ordering Code Definition                       |
| *C                                                                                                                                                        | 6759712 | 12/23/2019      | Updated Ordering Information.<br>Updated Sales links and copyright information. |

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