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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
  - I²C 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 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. Updated Sales links and copyright information.

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