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.

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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)[1]
    - 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
  - Low-power CapSense® wake-up button with power consumption of 50 µA
  - Low-power wake-on-touchscreen with power consumption of 120 µA
- 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, 560 intersections; 16:9 aspect ratio (28 x 20)
  - 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
  - I²C slave at 100 and 400 kbps
  - SPI slave bit rates up to 8 Mbps
- Packages
  - 100-pin TQFP 14 × 14 × 1.4 mm (0.5-mm pitch)
  - 64-pin TQFP 10 × 10 × 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_{CCTX} supply.

Ordering Information

Table 1 lists the CYAT8165X TrueTouch touchscreen controllers.
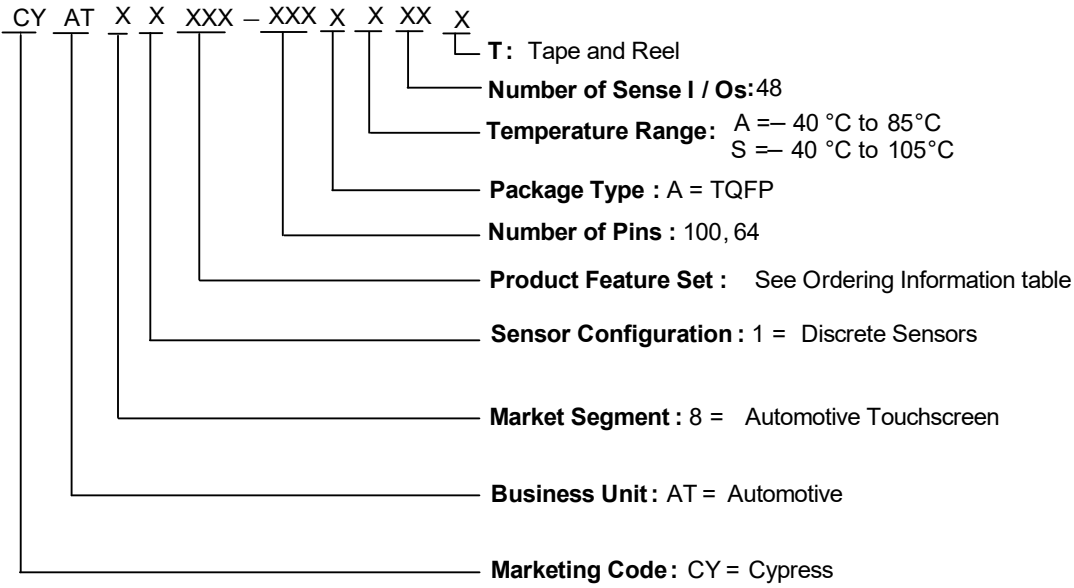
Table 1. Ordering Information[2]

Marketing Part Number	Number of Sense Pins	Number of Fingers	Wake up Button Support (or) Wake-on-Screen Support	Capsense Buttons	Water Rejection	Thin Glove Support	Gestures	Thick Overlay/Thick Glove Support	Package
CYAT81650-100AA48	48	10	–	–	–	–	–	–	100-pin TQFP
CYAT81650-100AS48	48	10	–	–	–	–	–	–	100-pin TQFP
CYAT81652-100AA48	48	10	–	✔	✔	✔	–	–	100-pin TQFP
CYAT81652-100AS48	48	10	–	✔	✔	✔	–	–	100-pin TQFP
CYAT81655-100AA48	48	10	–	✔	✔	✔	✔	–	100-pin TQFP
CYAT81655-100AS48	48	10	–	✔	✔	✔	✔	–	100-pin TQFP
CYAT81658-100AA48	48	10	–	✔	✔	✔	✔	✔	100-pin TQFP
CYAT81658-100AS48	48	10	–	✔	✔	✔	✔	✔	100-pin TQFP
CYAT81659-100AA48	48	10	✔	✔	✔	✔	✔	✔	100-pin TQFP
CYAT81659-100AS48	48	10	✔	✔	✔	✔	✔	✔	100-pin TQFP
CYAT81650-64AA48	48	10	–	–	–	–	–	–	64-pin TQFP
CYAT81650-64AS48	48	10	–	–	–	–	–	–	64-pin TQFP
CYAT81652-64AA48	48	10	–	✔	✔	✔	–	–	64-pin TQFP
CYAT81652-64AS48	48	10	–	✔	✔	✔	–	–	64-pin TQFP
CYAT81655-64AA48	48	10	–	✔	✔	✔	✔	–	64-pin TQFP
CYAT81655-64AS48	48	10	–	✔	✔	✔	✔	–	64-pin TQFP
CYAT81658-64AA48	48	10	–	✔	✔	✔	✔	✔	64-pin TQFP
CYAT81658-64AS48	48	10	–	✔	✔	✔	✔	✔	64-pin TQFP
CYAT81659-64AA48	48	10	✔	✔	✔	✔	✔	✔	64-pin TQFP
CYAT81659-64AS48	48	10	✔	✔	✔	✔	✔	✔	64-pin TQFP

Custom generic part numbers with customized firmware available for touchpad applications.

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

Ordering Code Definitions

CY AT X X XXX — XXX X X XX X

T : Tape and Reel

Number of Sense I / Os : 48

Temperature Range : A = − 40 °C to 85°C
S = − 40 °C to 105°C

Package Type : A = TQFP

Number of Pins : 100, 64

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: CYAT8165X (48 I/Os), Automotive TrueTouch® Multi-Touch All-Points Touchscreen Controller Document Number: 002-16617			
Revision	**ECN**	**Submission Date**	**Description of Change**
**	5437893	09/16/2016	Initial release
*A	6689991	10/03/2019	Updated Features, Ordering Information, and Sales, Solutions, and Legal Information.

Sales, Solutions, and Legal Information

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