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.

SUMMARY

CYAT8165X/7165X (41/48 I/Os)

PSoC™ Automotive Multitouch All-Points Touchscreen/Trackpad Controller

Features

- Automotive Electronics Council (AEC) Q100 qualified
- Multi-touch capacitive touchscreen (CYAT8165X)/ trackpad (CYAT7165X) 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
  - Multitouch 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
  - I^2C 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)
  - 56-pin QFN wettable flank, 8 × 8 × 1 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/7165X touchscreen/trackpad controllers.

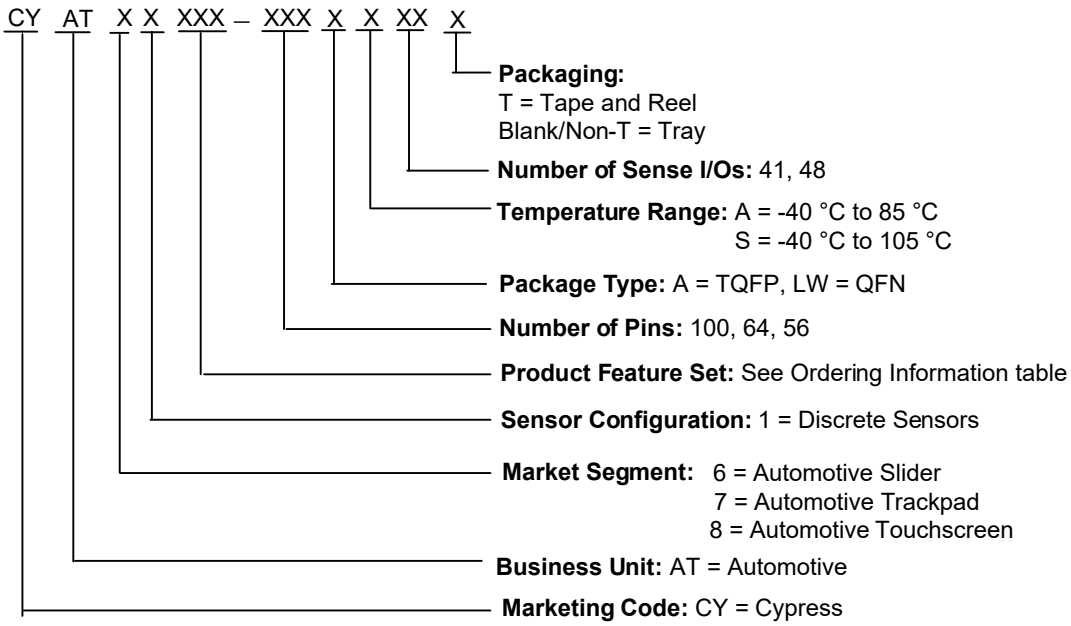
Table 1. Ordering Information[2]

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
CYAT71658-56LWA41[3]	41	10	✔	✔	✔	✔	✔	✔	56-pin QFN
CYAT71658-56LWS41[3]	41	10	✔	✔	✔	✔	✔	✔	56-pin QFN

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

Notes
2. All devices have the following base features: Water Rejection, DisplayArmor, AutoArmor, DualSense, CapSense buttons, and Large Object Detection and Rejection.
3. These are trackpad part numbers.

Ordering Code Definitions



Document History Page

Document Title: CYAT8165X/7165X (41/48 I/Os), PSoC™ Automotive Multitouch All-Points Touchscreen/Trackpad 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.
*B	7031970	11/27/2020	Updated the title to “CYAT8165X/7165X (41/48 I/Os), Automotive MultiTouch All-Points Touchscreen/Trackpad Controller”. Added trackpad reference. Added AEC Q100 qualification statement in Features. Added 56-pin QFN in Ordering Information. Updated Ordering Code Definitions.
*C	7762698	05/16/2022	Updated to the PSoC™ Automotive Multitouch branding guidelines.

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