PSoC™ Automotive Multitouch Generation 6L

Datasheet Summary

Note that this is a Summary Datasheet. To access the full version of this datasheet, register in My Infineon Collaboration Platform (MyICP).

Features

- Automotive Electronics Council (AEC) Q100 qualified

- Multitouch 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
  - 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

Note
1. Effective voltage when using 17 multi-phase TX and 5-V V_{CCTX} supply.

Datasheet Summary
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Features

- 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

1   Ordering information

Table 1 lists the CYAT8165X/7165X touchscreen/trackpad controllers.

Table 1   Ordering information

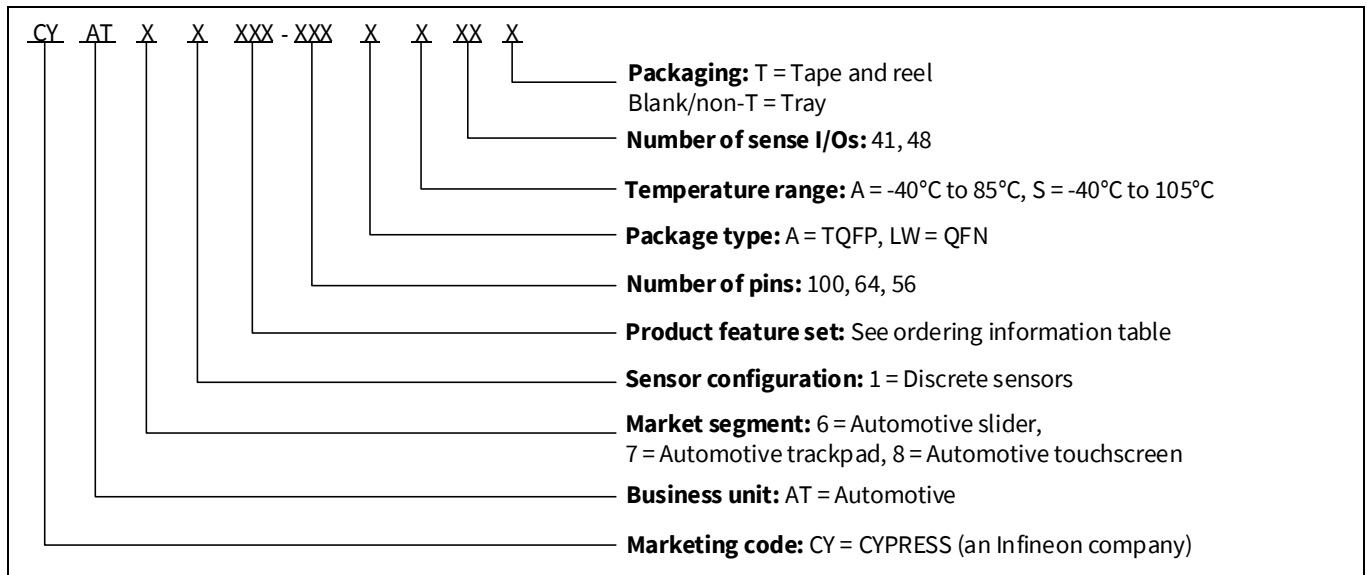| Marketing part number	Number of sense pins	Number of fingers	Wake up button support (or) wake-on-screen support	CAPSENSE™ buttons	Water rejection	Thin glove support	Gestures	Thick overlay/ thick glove support	Package
CYAT81650-100AA48	48	10	–	–	–	–	–	–	100-pin TQFP
CYAT81650-100AS48	48	10	–	–	–	–	–	–	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.

1.1 Ordering code definitions

CY AT X X XXX - XXX X X XX X

Packaging: T = Tape and reel
Blank/non-T = Tray

Number of sense I/Os: 41, 48

Temperature range: A = -40°C to 85°C, S = -40°C to 105°C

Package type: A = TQFP, LW = QFN

Number of pins: 100, 64, 56

Product feature set: See ordering information table

Sensor configuration: 1 = Discrete sensors

Market segment: 6 = Automotive slider,
7 = Automotive trackpad, 8 = Automotive touchscreen

Business unit: AT = Automotive

Marketing code: CY = CYPRESS (an Infineon company)

Revision history

Document revision	Date	Description of changes
**	2016-09-16	Initial release
*A	2019-03-10	Updated **Features**, **Ordering information**, and Sales, Solutions, and Legal Information.
*B	2020-11-27	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	2022-05-16	Updated to the PSoC™ Automotive Multitouch branding guidelines.
*D	2022-07-26	Updated to IFX template. Added MyICP link.

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