

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 μ A
 - Low-power wake-on-touchscreen with power consumption of 120 μ A
- 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- μ W typical deep-sleep power

Note

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

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
 - 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)
 - 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

Ordering information

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 |

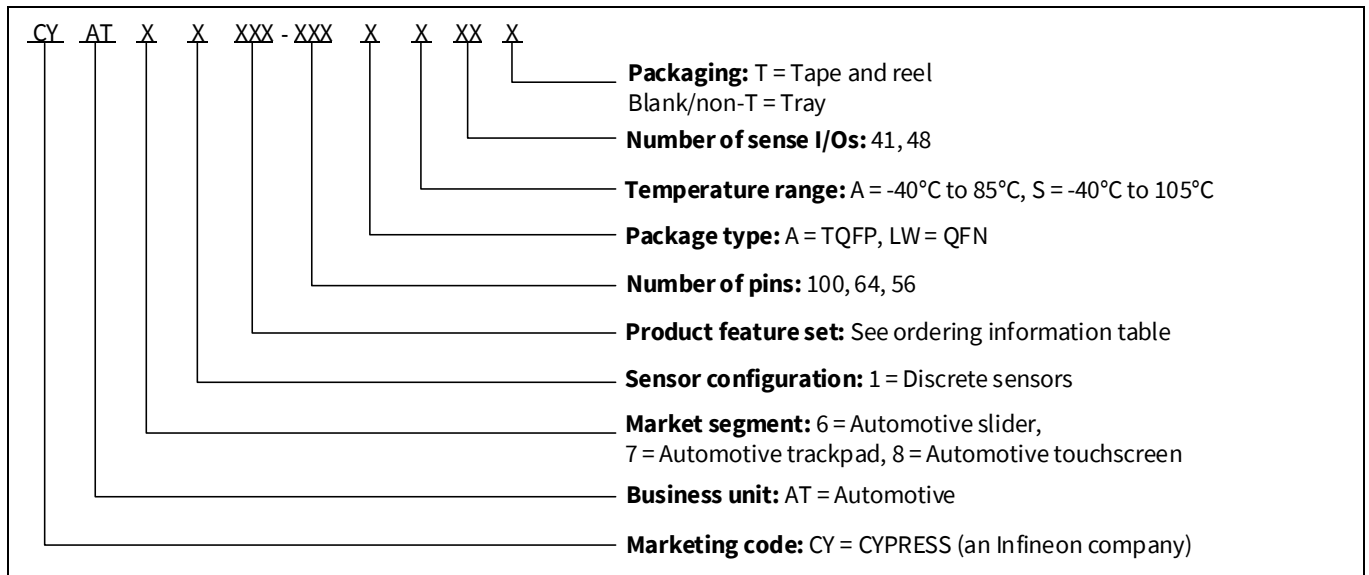
Custom generic part numbers with customized firmware available for trackpad applications.

Notes

- All devices have the following base features: Water rejection, DisplayArmor, AutoArmor, DualSense, CAPSENSE™ buttons, and large object detection and rejection.
- These are trackpad part numbers.

Ordering information

1.1 Ordering code definitions



Revision history

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. |