

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

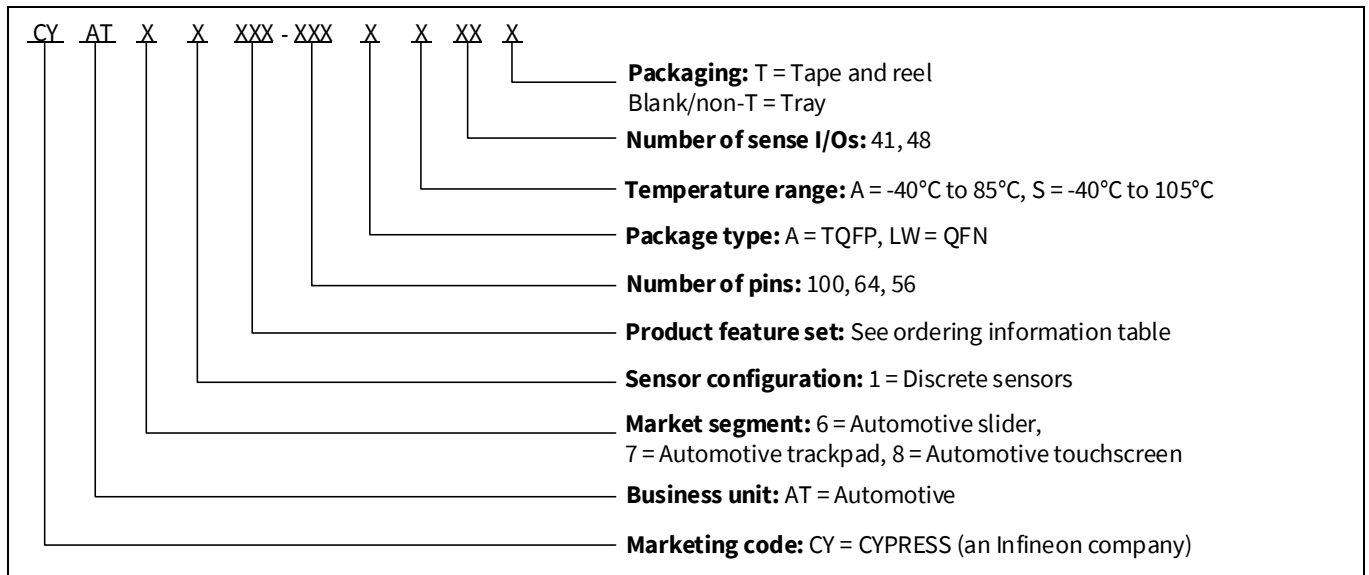
Custom generic part numbers with customized firmware available for trackpad applications.

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.

Trademarks

All referenced product or service names and trademarks are the property of their respective owners.

Edition 2022-07-26
Published by
Infineon Technologies AG
81726 Munich, Germany

© 2022 Infineon Technologies AG.
All Rights Reserved.

Do you have a question about this document?
Go to www.infineon.com/support

Document reference
002-16617 Rev. *D

IMPORTANT NOTICE

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenhheitsgarantie").

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on the product, technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies office (www.infineon.com).

WARNINGS

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Infineon:

[CYAT81655-100AA48](#) [CYAT81650-100AA48](#) [CYAT81652-100AA48](#) [CYAT81650-100AS48](#) [CYAT81652-100AS48](#)
[CYAT81655-100AS48](#) [CYAT81658-100AA48](#) [CYAT81658-100AS48](#) [CYAT81659-100AA48](#) [CYAT81659-100AS48](#)
[CYAT81650-64AA48](#) [CYAT81658-64AS48](#) [CYAT81659-64AA48](#) [CYAT81659-64AS48](#) [CYAT81655-64AA48](#)
[CYAT81655-64AS48](#) [CYAT81658-64AA48](#) [CYAT81650-64AS48](#) [CYAT81652-64AA48](#) [CYAT81652-64AS48](#)
[CYAT71658-56LWA41](#) [CYAT71658-56LWS41](#)