

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.

Automotive TrueTouch® Multi-Touch All-Points Touchscreen Controller Datasheet

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
- System performance (configuration dependent)
 - Screen sizes up to 15-inch diagonal
 - 6.0-mm electrode pitch; 16:10 aspect ratio
 - Up to 88 sense pins, 1836 intersections; 16:10 aspect ratio (34 TX × 54 RX)
 - Reports up to ten fingers
 - Small finger support down to 4 mm
- 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
 - 30-mW average power
 - 30-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)
 - 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
- Package
 - 100-pin TQFP 14 × 14 × 1.4 mm (0.5-mm pitch)
 - 128-pin TQFP 14 × 20 × 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 CYAT81X TrueTouch touchscreen controllers.

Table 1. Ordering Information^[2]

MPN	Number of Sense pins	Number of fingers	Low-power wake-up Button	Capsense Buttons	Water Rejection	Thin Glove support	Display Armor	Gestures	Thick Overlay/Thick Glove support	5-V Tx	Package
CYAT81682-100AA61Z	61	10	–	✓	✓	✓	✓	–	–	–	100 TQFP
CYAT81682-100AS61Z	61	10	–	✓	✓	✓	✓	–	–	–	100 TQFP
CYAT81682-100AA71Z	71	10	–	✓	✓	✓	✓	–	–	–	100 TQFP
CYAT81682-100AS71Z	71	10	–	✓	✓	✓	✓	–	–	–	100 TQFP
CYAT81682-100AA77Z	77	10	–	✓	✓	✓	✓	–	–	–	100 TQFP
CYAT81682-100AS77Z	77	10	–	✓	✓	✓	✓	–	–	–	100 TQFP
CYAT81682-128AA88Z	88	10	–	✓	✓	✓	✓	–	–	–	128 TQFP
CYAT81682-128AS88Z	88	10	–	✓	✓	✓	✓	–	–	–	128 TQFP
CYAT81685-100AA61Z	61	10	–	✓	✓	✓	✓	✓	–	–	100 TQFP
CYAT81685-100AS61Z	61	10	–	✓	✓	✓	✓	✓	–	–	100 TQFP
CYAT81685-100AA71Z	71	10	–	✓	✓	✓	✓	✓	–	–	100 TQFP
CYAT81685-100AS71Z	71	10	–	✓	✓	✓	✓	✓	–	–	100 TQFP
CYAT81685-100AA77Z	77	10	–	✓	✓	✓	✓	✓	–	–	100 TQFP
CYAT81685-100AS77Z	77	10	–	✓	✓	✓	✓	✓	–	–	100 TQFP
CYAT81685-128AA88Z	88	10	–	✓	✓	✓	✓	✓	–	–	128 TQFP
CYAT81685-128AS88Z	88	10	–	✓	✓	✓	✓	✓	–	–	128 TQFP
CYAT81688-100AA61Z	61	10	–	✓	✓	✓	✓	✓	✓	✓	100 TQFP
CYAT81688-100AS61Z	61	10	–	✓	✓	✓	✓	✓	✓	✓	100 TQFP
CYAT81688-100AA71Z	71	10	–	✓	✓	✓	✓	✓	✓	✓	100 TQFP
CYAT81688-100AS71Z	71	10	–	✓	✓	✓	✓	✓	✓	✓	100 TQFP
CYAT81688-100AA77Z	77	10	–	✓	✓	✓	✓	✓	✓	✓	100 TQFP
CYAT81688-100AS77Z	77	10	–	✓	✓	✓	✓	✓	✓	✓	100 TQFP
CYAT81688-128AA88Z	88	10	–	✓	✓	✓	✓	✓	✓	✓	128 TQFP
CYAT81688-128AS88Z	88	10	–	✓	✓	✓	✓	✓	✓	✓	128 TQFP
CYAT81689-100AA61Z	61	10	✓	✓	✓	✓	✓	✓	✓	✓	100 TQFP

Note

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

Table 1. Ordering Information^[2] (continued)

MPN	Number of Sense pins	Number of fingers	Low-power wake-up Button	Capsense Buttons	Water Rejection	Thin Glove support	Display Armor	Gestures	Thick Overlay/Thick Glove support	5-V Tx	Package
CYAT81689-100AS61Z	61	10	✓	✓	✓	✓	✓	✓	✓	✓	100 TQFP
CYAT81689-100AA71Z	71	10	✓	✓	✓	✓	✓	✓	✓	✓	100 TQFP
CYAT81689-100AS71Z	71	10	✓	✓	✓	✓	✓	✓	✓	✓	100 TQFP
CYAT81689-100AA77Z	77	10	✓	✓	✓	✓	✓	✓	✓	✓	100 TQFP
CYAT81689-100AS77Z	77	10	✓	✓	✓	✓	✓	✓	✓	✓	100 TQFP
CYAT81689-128AA88Z	88	10	✓	✓	✓	✓	✓	✓	✓	✓	128 TQFP
CYAT81689-128AS88Z	88	10	✓	✓	✓	✓	✓	✓	✓	✓	128 TQFP

Ordering Code Definitions

CY AT X X XXX – XXX X X XX X T

- T = Tape and Reel
- Fab Location Indicator**
Z = New Fab Location
Blank/Non-Z = Initial Fab Location
- Number of Sense I/Os:** 61, 71, 77, or 88
- Temperature Range:** A = –40 °C to +85 °C; S = –40 °C to +105 °C
- Package Type:** A = TQFP
- Number of Pins:** 100 or 128
- 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: CYAT81X (61, 71, 77, 88 I/Os) Automotive TrueTouch® Multi-Touch All-Points Touchscreen Controller Datasheet Document Number: 002-04310			
Revision	ECN	Submission Date	Description of Change
**	4988927	10/28/2015	New summary datasheet
*A	5705461	04/21/2017	Updated Cypress Logo and Copyright.
*B	5962384	11/13/2017	Updated Ordering Information and Ordering Code Definition
*C	6759712	12/23/2019	Updated Ordering Information. Updated Sales links and copyright information.

Sales, Solutions, and Legal Information

Worldwide Sales and Design Support

Cypress maintains a worldwide network of offices, solution centers, manufacturer's representatives, and distributors. To find the office closest to you, visit us at [Cypress Locations](#).

Products

Arm® Cortex® Microcontrollers	cypress.com/arm
Automotive	cypress.com/automotive
Clocks & Buffers	cypress.com/clocks
Interface	cypress.com/interface
Internet of Things	cypress.com/iot
Memory	cypress.com/memory
Microcontrollers	cypress.com/mcu
PSoC	cypress.com/psoc
Power Management ICs	cypress.com/pmic
Touch Sensing	cypress.com/touch
USB Controllers	cypress.com/usb
Wireless Connectivity	cypress.com/wireless

PSoC® Solutions

[PSoC 1](#) | [PSoC 3](#) | [PSoC 4](#) | [PSoC 5LP](#) | [PSoC 6 MCU](#)

Cypress Developer Community

[Community](#) | [Projects](#) | [Video](#) | [Blogs](#) | [Training](#) | [Components](#)

Technical Support

cypress.com/support

© Cypress Semiconductor Corporation, 2015-2019. This document is the property of Cypress Semiconductor Corporation and its subsidiaries ("Cypress"). This document, including any software or firmware included or referenced in this document ("Software"), is owned by Cypress under the intellectual property laws and treaties of the United States and other countries worldwide. Cypress reserves all rights under such laws and treaties and does not, except as specifically stated in this paragraph, grant any license under its patents, copyrights, trademarks, or other intellectual property rights. If the Software is not accompanied by a license agreement and you do not otherwise have a written agreement with Cypress governing the use of the Software, then Cypress hereby grants you a personal, non-exclusive, nontransferable license (without the right to sublicense) (1) under its copyright rights in the Software (a) for Software provided in source code form, to modify and reproduce the Software solely for use with Cypress hardware products, only internally within your organization, and (b) to distribute the Software in binary code form externally to end users (either directly or indirectly through resellers and distributors), solely for use on Cypress hardware product units, and (2) under those claims of Cypress's patents that are infringed by the Software (as provided by Cypress, unmodified) to make, use, distribute, and import the Software solely for use with Cypress hardware products. Any other use, reproduction, modification, translation, or compilation of the Software is prohibited.

TO THE EXTENT PERMITTED BY APPLICABLE LAW, CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS DOCUMENT OR ANY SOFTWARE OR ACCOMPANYING HARDWARE, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. No computing device can be absolutely secure. Therefore, despite security measures implemented in Cypress hardware or software products, Cypress shall have no liability arising out of any security breach, such as unauthorized access to or use of a Cypress product. CYPRESS DOES NOT REPRESENT, WARRANT, OR GUARANTEE THAT CYPRESS PRODUCTS, OR SYSTEMS CREATED USING CYPRESS PRODUCTS, WILL BE FREE FROM CORRUPTION, ATTACK, VIRUSES, INTERFERENCE, HACKING, DATA LOSS OR THEFT, OR OTHER SECURITY INTRUSION (collectively, "Security Breach"). Cypress disclaims any liability relating to any Security Breach, and you shall and hereby do release Cypress from any claim, damage, or other liability arising from any Security Breach. In addition, the products described in these materials may contain design defects or errors known as errata which may cause the product to deviate from published specifications. To the extent permitted by applicable law, Cypress reserves the right to make changes to this document without further notice. Cypress does not assume any liability arising out of the application or use of any product or circuit described in this document. Any information provided in this document, including any sample design information or programming code, is provided only for reference purposes. It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. "High-Risk Device" means any device or system whose failure could cause personal injury, death, or property damage. Examples of High-Risk Devices are weapons, nuclear installations, surgical implants, and other medical devices. "Critical Component" means any component of a High-Risk Device whose failure to perform can be reasonably expected to cause, directly or indirectly, the failure of the High-Risk Device, or to affect its safety or effectiveness. Cypress is not liable, in whole or in part, and you shall and hereby do release Cypress from any claim, damage, or other liability arising from any use of a Cypress product as a Critical Component in a High-Risk Device. You shall indemnify and hold Cypress, its directors, officers, employees, agents, affiliates, distributors, and assigns harmless from and against all claims, costs, damages, and expenses, arising out of any claim, including claims for product liability, personal injury or death, or property damage arising from any use of a Cypress product as a Critical Component in a High-Risk Device. Cypress products are not intended or authorized for use as a Critical Component in any High-Risk Device except to the limited extent that (i) Cypress's published data sheet for the product explicitly states Cypress has qualified the product for use in a specific High-Risk Device, or (ii) Cypress has given you advance written authorization to use the product as a Critical Component in the specific High-Risk Device and you have signed a separate indemnification agreement.

Cypress, the Cypress logo, Spansion, the Spansion logo, and combinations thereof, WICED, PSoC, CapSense, EZ-USB, F-RAM, and Traveo are trademarks or registered trademarks of Cypress in the United States and other countries. For a more complete list of Cypress trademarks, visit cypress.com. Other names and brands may be claimed as property of their respective owners.