

Automotive TrueTouch[®] Multi-Touch All-Points Touchscreen Controller

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 8.5-inch diagonal
 - 6.2-mm electrode pitch; 16:9 aspect ratio
 - Up to 48 sense pins, 527 intersections; 16:9 aspect ratio (17 RX and 31 TX)
 - 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
 - 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)
- 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 TrueTouch touchscreen controllers.

Table 1. Ordering Information^[2]

| Marketing Part Number | Number of Sense Pins | Number of Fingers | 5-V Tx | Display Armor | Capsense Buttons | Water Rejection | Thin Glove Support | Gestures | Thick Overlay/Thick Glove Support | Package |
|-----------------------|----------------------|-------------------|--------|---------------|------------------|-----------------|--------------------|----------|-----------------------------------|--------------|
| CYAT81650-100AA48 | 48 | 10 | ✓ | ✓ | - | - | - | - | - | 100-pin TQFP |
| CYAT81650-100ASA48 | 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 |

Ordering Code Definitions



Note

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

Document History Page

| Document Title: CYAT8165X (48 I/Os), Automotive TrueTouch® Multi-Touch All-Points Touchscreen Controller Document Number: 002-16617 | | | | |
|--|---------|-----------------|-----------------|-----------------------|
| Revision | ECN | Orig. of Change | Submission Date | Description of Change |
| ** | 5437893 | GACH | 09/16/2016 | Initial release |

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