mXT2952T2 2.3

maXTouch 2911-node Touchscreen Controller Product Brief

Description

The mXT2952T2 2.3 uses a unique charge-transfer acquisition engine to implement Microchip's patented capacitive sensing method. Coupled with a state-of-the-art CPU, the entire touchscreen sensing solution can measure, classify and track a number of individual finger touches with a high degree of accuracy in the shortest response time. The mXT2952T2 2.3 allows for both mutual and self capacitance measurements, with the self capacitance measurements being used to augment the mutual capacitance measurements to produce reliable touch information.

maXTouch® Adaptive Sensing Touchscreen Technology

- Up to 41 X (transmit) lines and 71 Y (receive) lines for use by touchscreen and keys.
- A maximum of 2911 nodes can be allocated to the touchscreen
- Touchscreen size 21 inches (16:9 aspect ratio), assuming a sensor electrode pitch of 6.5 mm. Other sizes are possible with different electrode pitches and appropriate sensor material
- Multiple touch support with up to 16 concurrent touches tracked in real time

Keys

- Up to 32 nodes can be allocated as mutual capacitance sensor keys (subject to other configurations)
- Adjacent Key Suppression (AKS) technology is supported for false key touch prevention

Touch Sensor Technology

- Discrete/out-cell support including glass and PET film-based sensors
- On-cell/touch-on display support including TFT, IPS and OLED
- Support for standard (for example, Diamond) and proprietary sensor patterns (review of designs by Microchip or a Microchip-qualified touch sensor module partner is recommended)

Front Panel Material

- Works with PET or glass, including curved profiles (configuration and stack-up to be approved by Microchip or a Microchip-qualified touch sensor module partner)
- Glass 0.4 mm to 4.5 mm (dependent on screen size, touch size, configuration and stack-up)
- Plastic 0.2 mm to 2.2 mm (dependent on screen size, touch size, configuration and stack-up)

Touch Performance

- Moisture/Water Compensation
  - No false touch with condensation or water drop up to 22 mm diameter
  - One-finger tracking with condensation or water drop up to 22 mm diameter
- Glove Support
  - Multiple-finger glove touches up to 1.5 mm thickness (subject to stack-up design)
  - Single-finger glove touch up to 5 mm thickness (subject to stack-up design)
- Mutual capacitance and self capacitance measurements supported for robust touch detection
- Noise suppression technology to combat ambient, charger, and power-line noise
  - Up to 240 V_{PP} between 1 Hz and 1 kHz sinusoidal waveform
  - Up to 20 V_{PP} between 1 kHz and 1 MHz sinusoidal waveform
- Stylus Support
  - Supports passive stylus with 1.5 mm contact diameter, subject to configuration, stack-up, and sensor design
- Scan Speed
  - Up to 250 Hz reporting rate for one finger (subject to configuration)
  - Typical report rate for 16 touches ≥100 Hz (subject to configuration)
  - Initial touch latency <15 ms for first touch from idle (subject to configuration)
  - Configurable to allow for power and speed optimization

On-chip Gestures

- Supports wake up/unlock gestures, including symbol recognition

Enhanced Algorithms

- Lens bending algorithms to remove display noise
- Touch suppression algorithms to remove unintentional large touches, such as palm
- Palm Recovery Algorithm for quick restoration to normal state

Power Saving

- Programmable timeout for automatic transition from active to idle states
- Pipelined analog sensing detection and digital processing to optimize system power efficiency

Application Interfaces

- I^2C slave with support for Standard mode (up to 100 kHz), Fast mode (up to 400 kHz), Fast-mode Plus (up to 1 MHz), High-speed mode (up to 3.4 MHz)
- USB HID interface for Microsoft® Windows® 8.x and later versions
- HID-I^2C interface for Microsoft® Windows® 8.x and later versions
- Interrupt to indicate when a message is available
- SPI Debug Interface to read the raw data for tuning and debugging purposes

Power Supply

- Digital (Vdd) 3.3 V nominal
- Digital I/O (VddIO) 1.8 to 3.3 V nominal
- Analog (AVdd) 3.3 V nominal
- High voltage external X line drive (XVdd) up to 9.2 V

Package

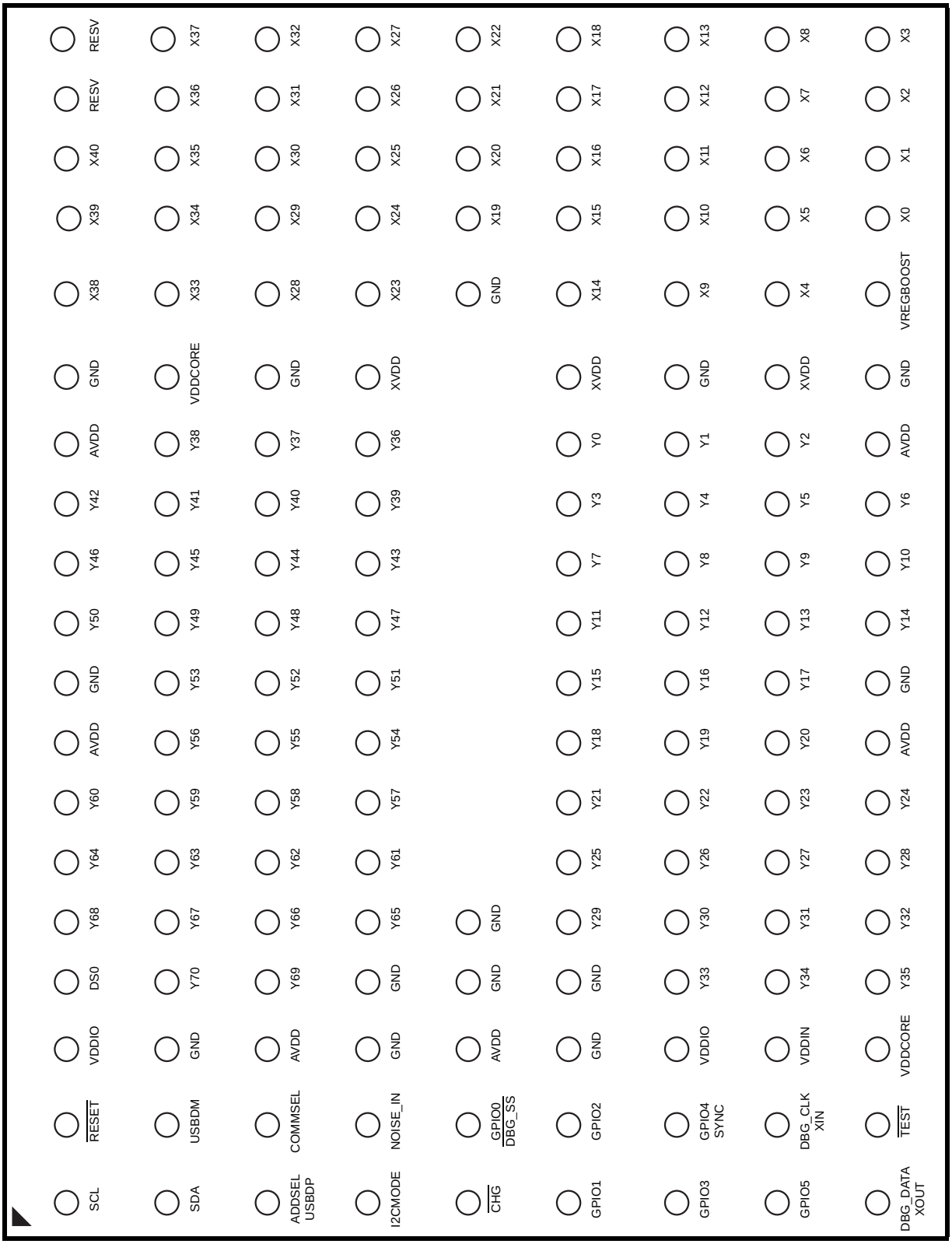
- 162-ball UFBGA 10 × 5 × 0.6 mm, 0.5 mm pitch

Operating Temperature

- –40°C to +85°C

PIN CONFIGURATION

0.1 162-ball UFBGA



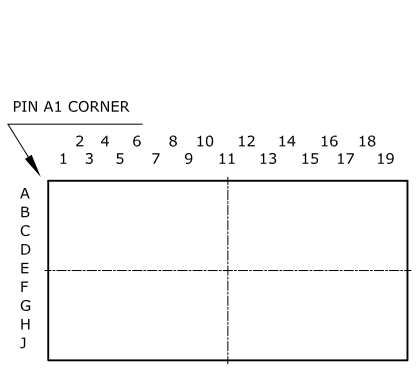
Top View

1.0 PACKAGING INFORMATION

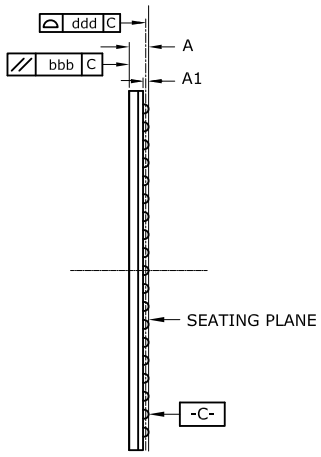
1.1 162-ball UFBGA 10 × 5 × 0.6 mm

NOTE For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

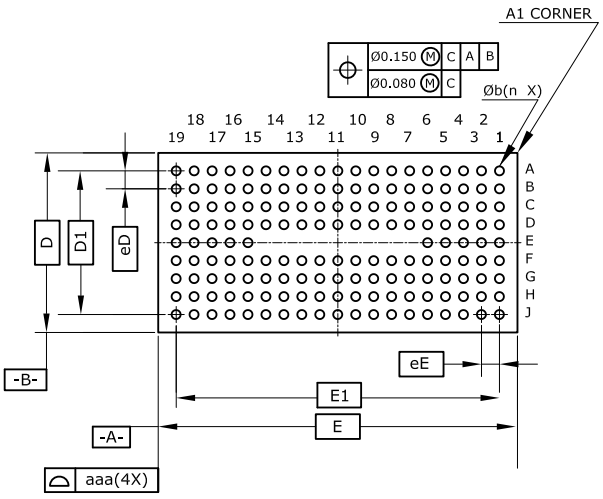
DRAWINGS NOT SCALED



TOP VIEW



SIDE VIEW



BOTTOM VIEW

COMMON DIMENSIONS

(Unit of Measure = mm)

SYMBOL	MIN	NOM	MAX	NOTE
A	0.488	0.546	0.600	3
A1	0.120	0.155	0.190	
E	9.90	10.00	10.10	
D	4.90	5.00	5.10	
E1	8.90	9.00	9.10	
D1	3.90	4.00	4.10	
ball width	0.250	-----	0.350	4
eD/eE	Ball pitch : 0.500			
aaa	Package edge tolerance : 0.100			
bbb	Mold flatness : 0.100			
ddd	Coplanarity : 0.080			
ball diam	0.250			
n	162			

Notes :
1. No JEDEC Drawing Reference.
2. Array as seen from the bottom of the package.
3. Dimension A includes stand-off height A1, package body thickness, and lid height, but does not include attached features.
4. Dimension b is measured at the maximum ball diameter, parallel to primary datum C.

02/13/2015

	TITLE	GPC	DRAWING NO.	REV.
	7M, 162-ball - 19x9 4P array (+ 2 balls), 0.5mm pitch, 10x5x0.6mm Ultra Thin Fine-Pitch Ball Grid Array Package (UFBGA)	CAK	7M	D

APPENDIX A: REVISION HISTORY

Revision A (June 2018)

Initial edition for firmware revision 2.3 – Release

PRODUCT IDENTIFICATION SYSTEM

The table below gives details on the product identification system for maXTouch devices. See "Orderable Part Numbers" below for example part numbers for the mXT2952T2.

To order or obtain information, for example on pricing or delivery, refer to the factory or the listed sales office.

PART NO.	–XXX	[X]	[XX]	[X]	[XXX]
Device	Package	Temperature Range	Sample Type	Tape and Reel Option	Pattern

Device:	Base device name		
Package:	A	=	QFP (Plastic Quad Flatpack)
	CC	=	UFBGA (Ultra Thin Fine-pitch Ball Grid Array)
	C2	=	UFBGA (Ultra Thin Fine-pitch Ball Grid Array)
	NH	=	UFBGA (Ultra Thin Fine-pitch Ball Grid Array)
	C4	=	X1FBGA (Extra Thin Fine-pitch Ball Grid Array)
	MA	=	XQFN (Super Thin Quad Flat No Lead Sawn)
	MA5	=	XQFN (Super Thin Quad Flat No Lead Sawn)
Temperature Range:	U	=	–40°C to +85°C (Grade 3)
	T	=	–40°C to +85°C (Grade 3)
	B	=	–40°C to +105°C (Grade 2)
Sample Type:	Blank	=	Release Sample
	ES	=	Pre-release (Engineering) Sample
Tape and Reel Option:	Blank	=	Standard Packaging (Tube or Tray)
	R	=	Tape and Reel (1)
Pattern:	QTP, SQTP, Code or Special Requirements (Blank Otherwise)		

Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. See "Orderable Part Numbers" below or check with your Microchip Sales Office for package availability with the Tape and Reel option.

Orderable Part Numbers

Orderable Part Number	Firmware Revision	Description
ATMXT2952T2-C2U078 (Supplied in trays)	2.3.AC	162-ball UFBGA 10 × 5 × 0.6 mm, RoHS compliant Industrial grade; not suitable for automotive characterization
ATMXT2952T2-C2UR078 (Supplied in tape and reel)		

Atmel SL Code

An SL (QS) code was required on Atmel purchase orders, but is no longer used by Microchip. The SL code has been replaced by the 3-digit QTP code suffix on all Microchip industrial grade orderable part numbers.

The legacy Atmel SL (QS) code for mXT2952T2 is Q1185.

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
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- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

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