
maXTouch 1066-node Touchscreen Controller

Product Brief

Description

The mXT1066T2 1.4 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 mXT1066T2 1.4 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 26 Y (receive) lines for use by touchscreen and keys.
- A maximum of 1066 nodes can be allocated to the touchscreen
- Touchscreen size of 12.4 inches (16:10 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
- 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 <10 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

MXT1066T2 1.4

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

Product Data Store Area

- Up to 60 bytes of user-defined data can be stored during production

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

- I²C 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)
- 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) 3.3 V nominal
- Analog (AVdd) 3.3 V nominal
- High voltage internal X line drive (XVdd) 6.6 V with internal voltage pump
- High voltage internal X line drive (XVdd) 9.9 V with internal voltage pump

Packages



















































































































- 114-ball UFBGA 7 × 5 × 0.65 mm, 0.5 mm pitch, High Density Interconnect
- 117-ball UFBGA 9.5 × 7 × 0.65 mm, 0.65 mm pitch, non-HDI package

Operating Temperature

- –40°C to +85°C

PIN CONFIGURATION






















































































































114-ball UFBGA

	1	2	3	4	5	6	7	8	9	10	11	12	13
A	 X21	 X22	 XVDD	 Y23	 Y19	 Y15	 Y11	 Y7	 Y3	 Y0	 AVDD	 X1	 X0
B	 X23	 X24	 GND	 Y24	 Y20	 Y16	 Y12	 Y8	 Y4	 Y1	 GND	 X3	 X2
C	 X25	 X26	 GND	 Y25	 Y21	 Y17	 Y13	 Y9	 Y5	 Y2	 XVDD	 X5	 X4
D	 X27	 X28	 X29	 AVDD	 Y22	 Y18	 Y14	 Y10	 Y6	 GND	 X8	 X7	 X6
E	 X30	 X31	 X32	 AVDD	 GND				 GND	 VDDIO	 X11	 X10	 X9
F	 X33	 X34	 X35	 VDDIO	 NC	 NOISE_IN	 GPIO1	 GPIO5	 <u>DBG_SS</u> TEST	 PTCX4	 X14	 X13	 X12
G	 X36	 X37	 XVDD	 <u>RESET</u>	 ADDSEL	 I2CMODE	 GPIO0	 GPIO4	 DBG_DAT A	 PTCX3	 XVDD	 X16	 X15
H	 X38	 X39	 EXTCAP0	 EXTCAP2	 SDA	 RESV	 <u>CHG</u>	 GPIO3	 DBG_CLK	 PTCX2	 PTCX6	 X18	 X17
J	 X40	 DS0	 EXTCAP1	 EXTCAP3	 SCL	 VDDCORE	 VDD	 GPIO2	 PTCX0	 PTCX1	 PTCX5	 X20	 X19

Top View

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117-ball UFBGA

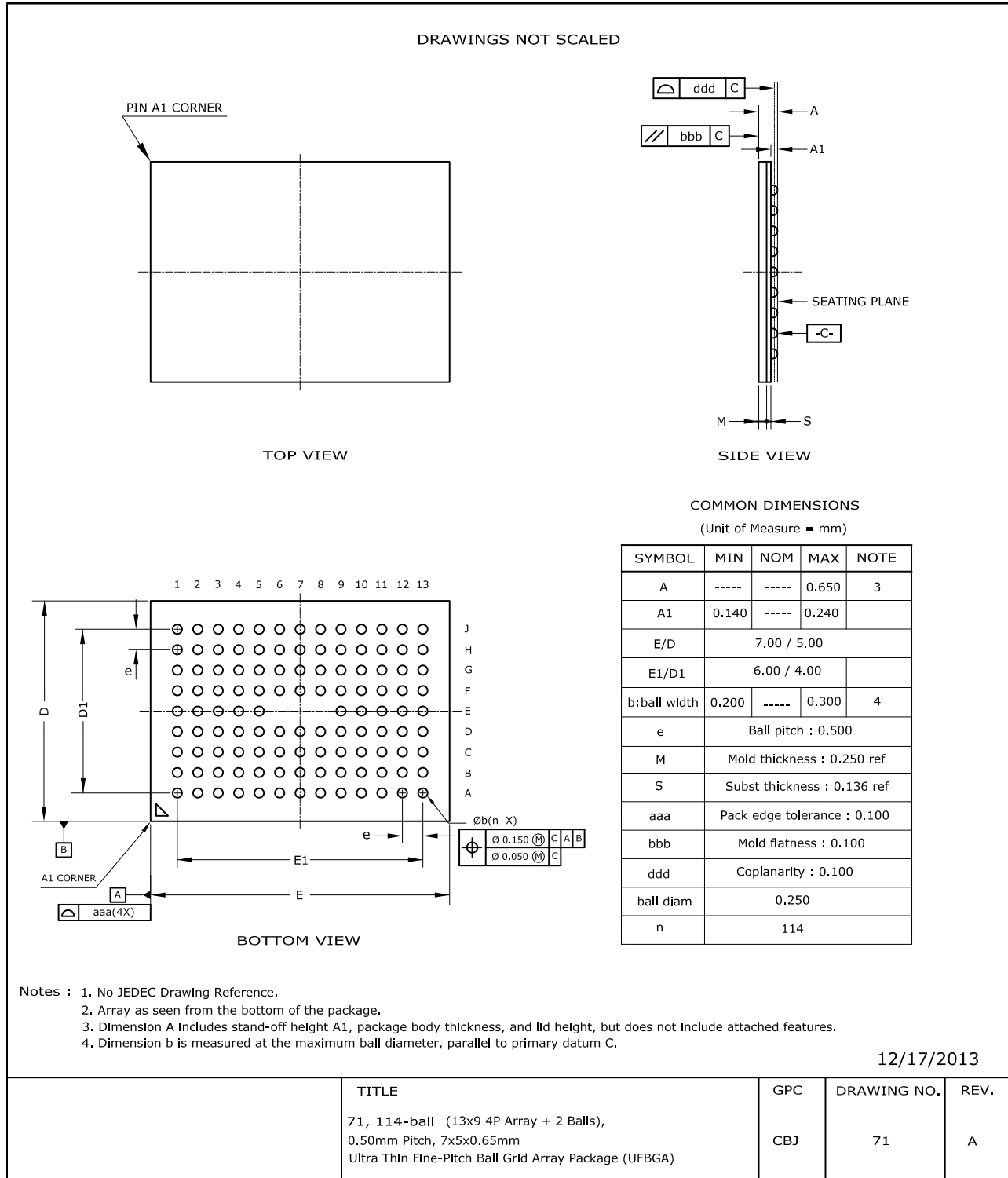
	1	2	3	4	5	6	7	8	9	10	11	12	13
A	 X21	 X22	 XVDD	 Y23	 Y19	 Y15	 Y11	 Y7	 Y3	 Y0	 AVDD	 X1	 X0
B	 X23	 X24	 GND	 Y24	 Y20	 Y16	 Y12	 Y8	 Y4	 Y1	 GND	 X3	 X2
C	 X25	 X26	 GND	 Y25	 Y21	 Y17	 Y13	 Y9	 Y5	 Y2	 XVDD	 X5	 X4
D	 X27	 X28	 X29	 AVDD	 Y22	 Y18	 Y14	 Y10	 Y6	 GND	 X8	 X7	 X6
E	 X30	 X31	 X32	 AVDD	 GND	 VDDCORE	 VDD	 GND	 VDDIO	 XVDD	 X11	 X10	 X9
F	 X33	 X34	 X35	 VDDIO	 NC	 $\overline{\text{CHG}}$	 GPIO3	 DBG_DAT A	 $\overline{\text{DBG_SS}}$ TEST	 PTCX Y6	 X14	 X13	 X12
G	 X36	 X37	 XVDD	 $\overline{\text{RESET}}$	 ADDSEL	 NOISE_IN	 GPIO2	 DBG_CLK	 PTCX Y2	 PTCX Y5	 RESV	 X16	 X15
H	 X38	 X39	 EXTCAP0	 EXTCAP2	 SDA	 I2CMODE	 GPIO1	 GPIO5	 PTCX Y1	 PTCX Y4	 RESV	 X18	 X17
J	 X40	 DS0	 EXTCAP1	 EXTCAP3	 SCL	 RESV	 GPIO0	 GPIO4	 PTCX Y0	 PTCX Y3	 RESV	 X20	 X19

Top View

1.0 PACKAGING INFORMATION

1.1 114-ball UFBGA 7 × 5 × 0.65 mm

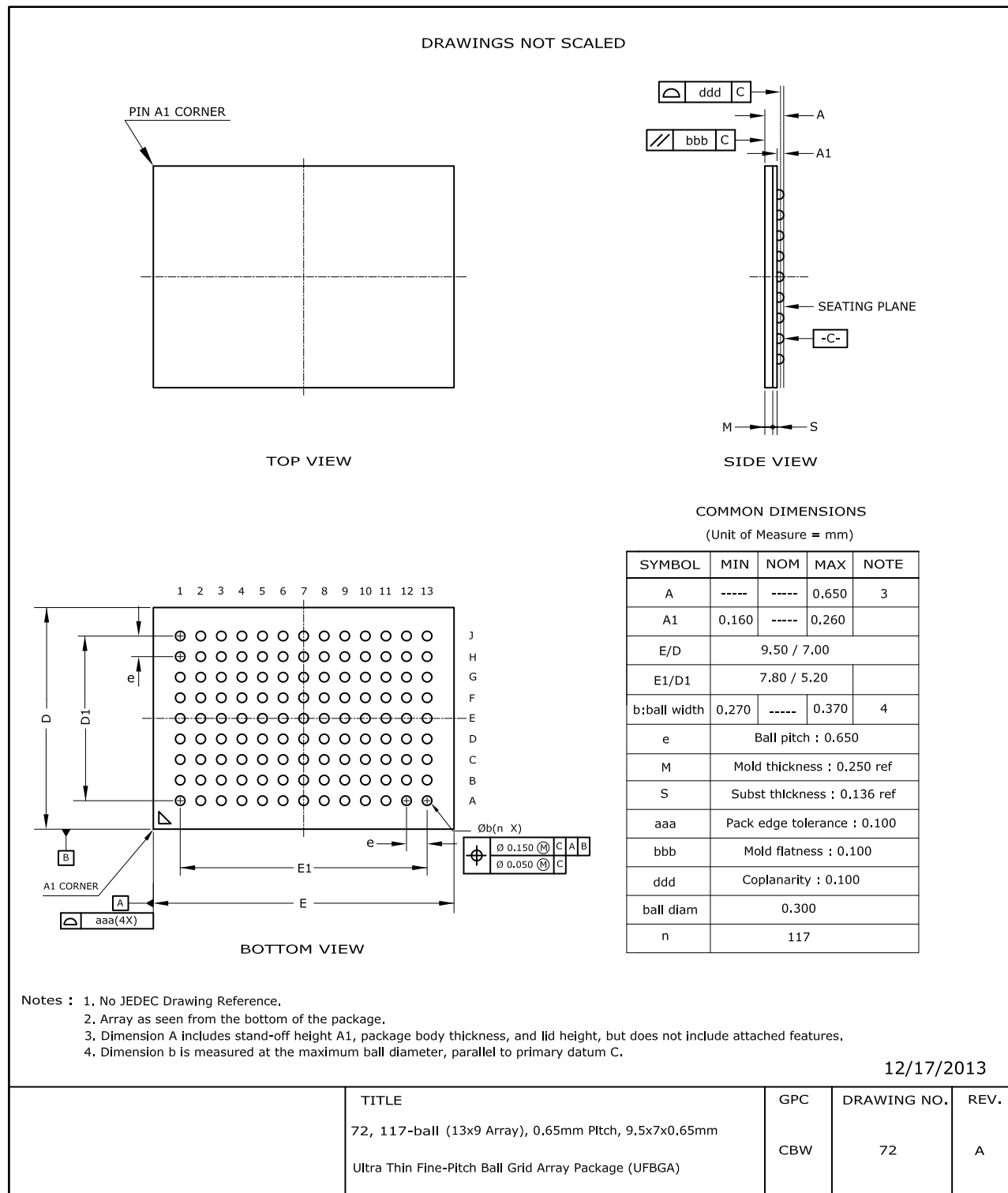
NOTE For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



MXT1066T2 1.4

1.2 117-ball UFBGA 9.5 × 7 × 0.65 mm

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



APPENDIX A: REVISION HISTORY

Revision A (August 2018)

Initial edition for firmware revision 1.4 – Release

MXT1066T2 1.4

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 mXT1066T2.

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
ATMXT1066T2-C2U025 (Supplied in trays)	1.4.AA	114-ball UFBGA 7 × 5 × 0.65 mm, RoHS compliant Industrial grade; not suitable for automotive characterization
ATMXT1066T2-C2UR025 (Supplied in tape and reel)		
ATMXT1066T2-NHU025 (Supplied in trays)	1.4.AA	117-ball UFBGA 9.5 × 7 × 0.65 mm, RoHS compliant Industrial grade; not suitable for automotive characterization
ATMXT1066T2-NHUR025 (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 mXT1066T2 1.4.AA is Q1108.

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

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- 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.
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