
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 (V_{dd}) 3.3 V nominal
- Digital I/O (V_{ddIO}) 3.3 V nominal
- Analog (AV_{dd}) 3.3 V nominal
- High voltage internal X line drive (XV_{dd}) 6.6 V with internal voltage pump
- High voltage internal X line drive (XV_{dd}) 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

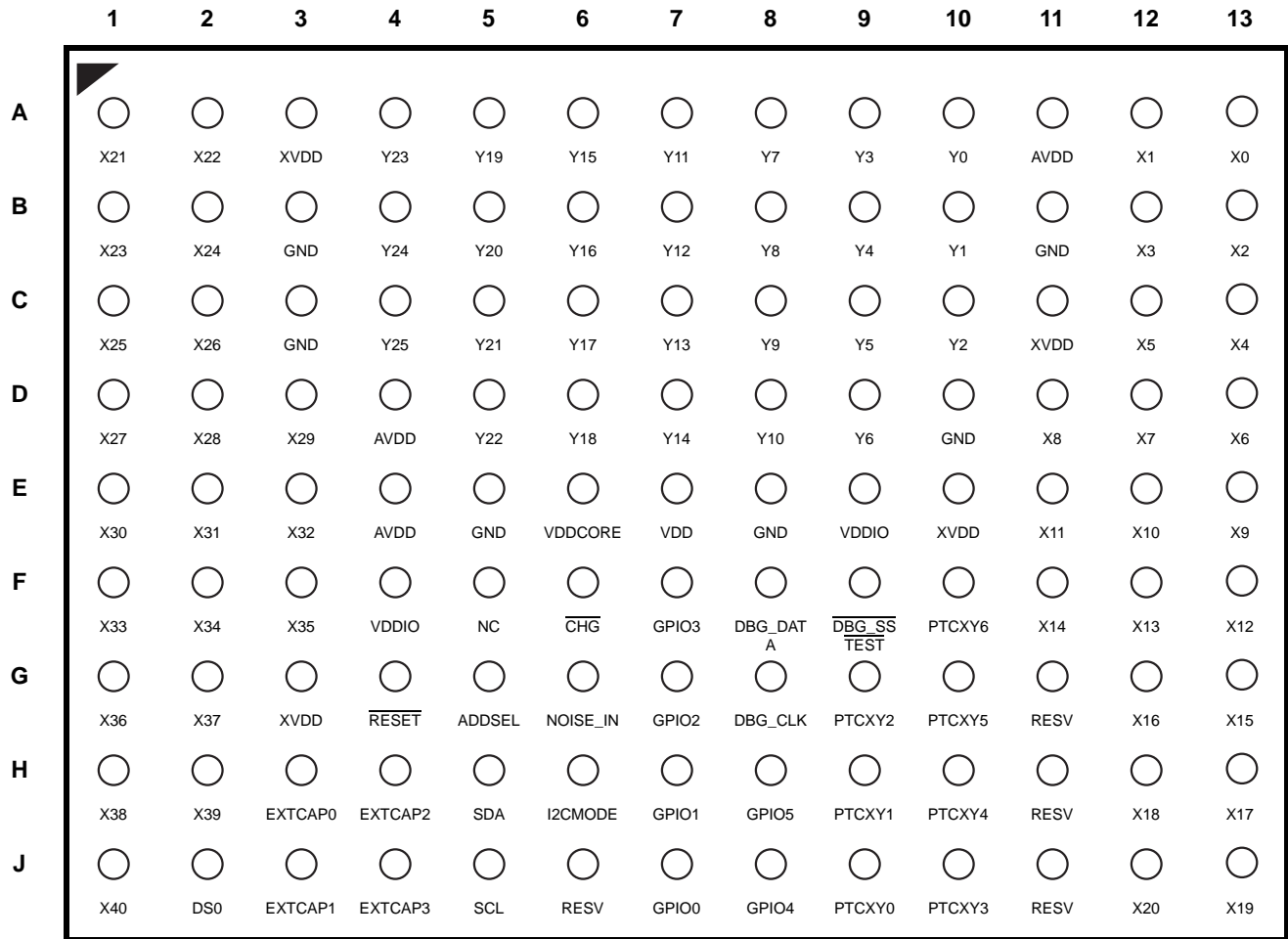
114-ball UFBGA

| | 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

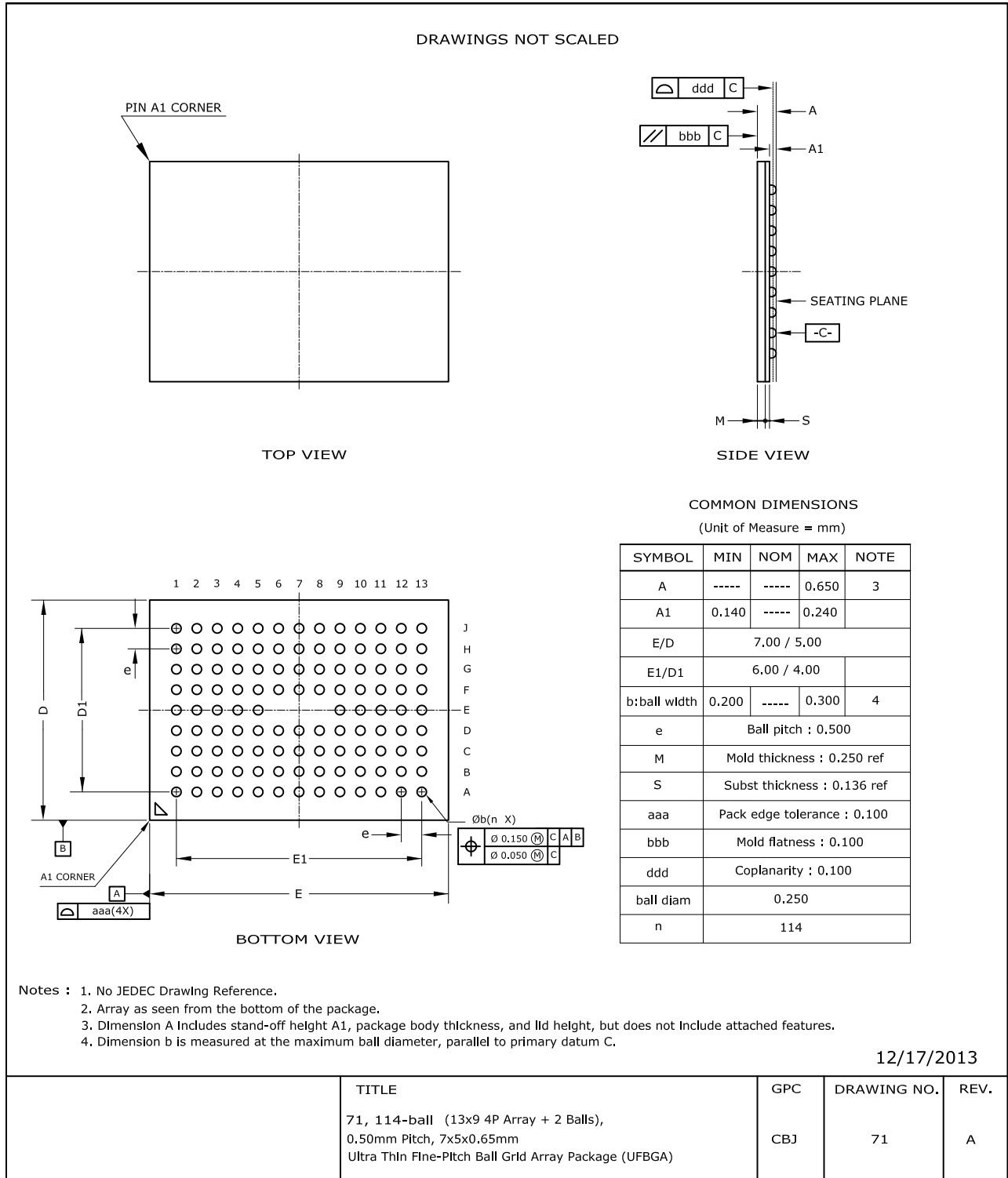


Top View

1.0 PACKAGING INFORMATION

1.1 114-ball UFBGA 7 × 5 × 0.65 mm

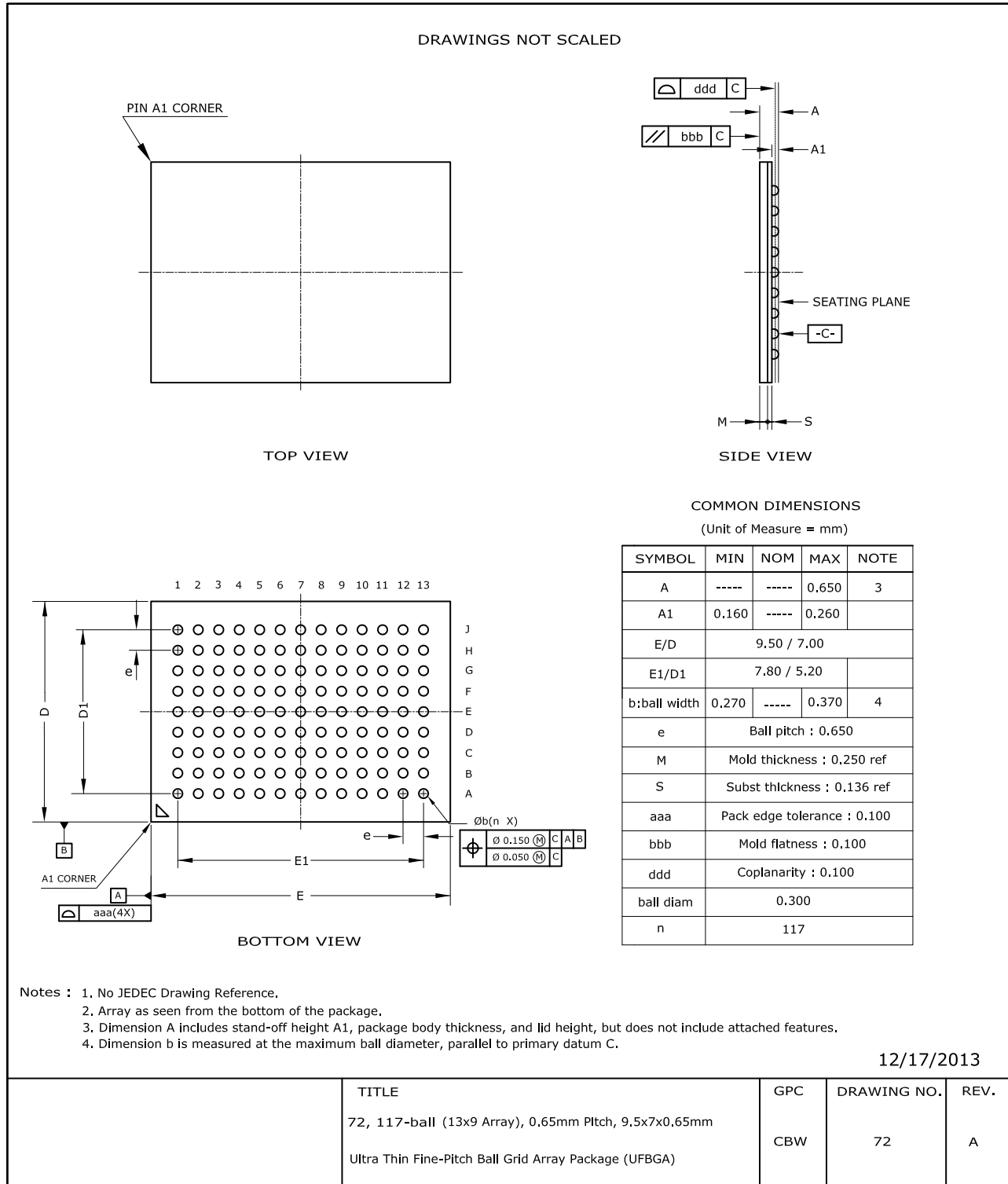
NOTE For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



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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.

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