
maXTouch 336-node Touchscreen Controller Product Brief

Description

The mXT336U 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 mXT336U 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 14 X (transmit) lines and 24 Y (receive) lines
- A maximum of 336 nodes can be allocated to the touchscreen
- Touchscreen size 5.47 inches (16:9 aspect ratio), assuming a sensor electrode pitch of 5 mm. Other sizes may be possible with different electrode pitches and appropriate sensor material
- Multiple touch support with up to 10 concurrent touches tracked in real time

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
- Synchronization with display refresh timing capability
- Support for standard (for example, Diamond) and proprietary sensor patterns (review of designs by Microchip recommended)

Front Panel Material

- Works with PET or glass, including curved profiles (configuration and stack-up to be approved by Microchip)
- 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 noise, and power-line noise
 - Up to 240 Vpp between 1 Hz and 1 kHz sinusoidal waveform
 - Up to 20 Vpp between 1 kHz and 1 MHz sinusoidal waveform
- Stylus Support
 - Supports passive stylus with 2.5 mm contact diameter, subject to configuration, stack up, and sensor design
- Radiated Noise
 - Flexible and dynamic Tx burst frequency selection
 - Controlled Tx burst frequency drift over process and temperature range
- Scan Speed
 - Up to 250Hz one finger reporting rate, subject to configuration
 - Initial touch latency <12 ms for first touch from idle, subject to configuration
 - Typical report rate for 10 touches ≥60 Hz (subject to configuration)
 - Configurable to allow for power and speed optimization

On-chip Gestures

- Supports wake up/unlock gestures, including symbol recognition

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Keys

- Up to 8 nodes can be allocated as mutual capacitance sensor keys (subject to other configurations)
- Support for 3 Generic Keys in addition to the touchscreen array (subject to other configurations)
- Adjacent Key Suppression (AKS) technology is supported for false key touch prevention

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-compatible slave mode: Standard/Fast mode 400 kHz
- Interrupt to indicate when a message is available
- SPI Debug Interface to read the real-time raw data for tuning and debugging purposes

Power Supply

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

Package

- 56-pin XQFN 6 × 6 × 0.4 mm, 0.35 mm pitch

Environmental Conditions

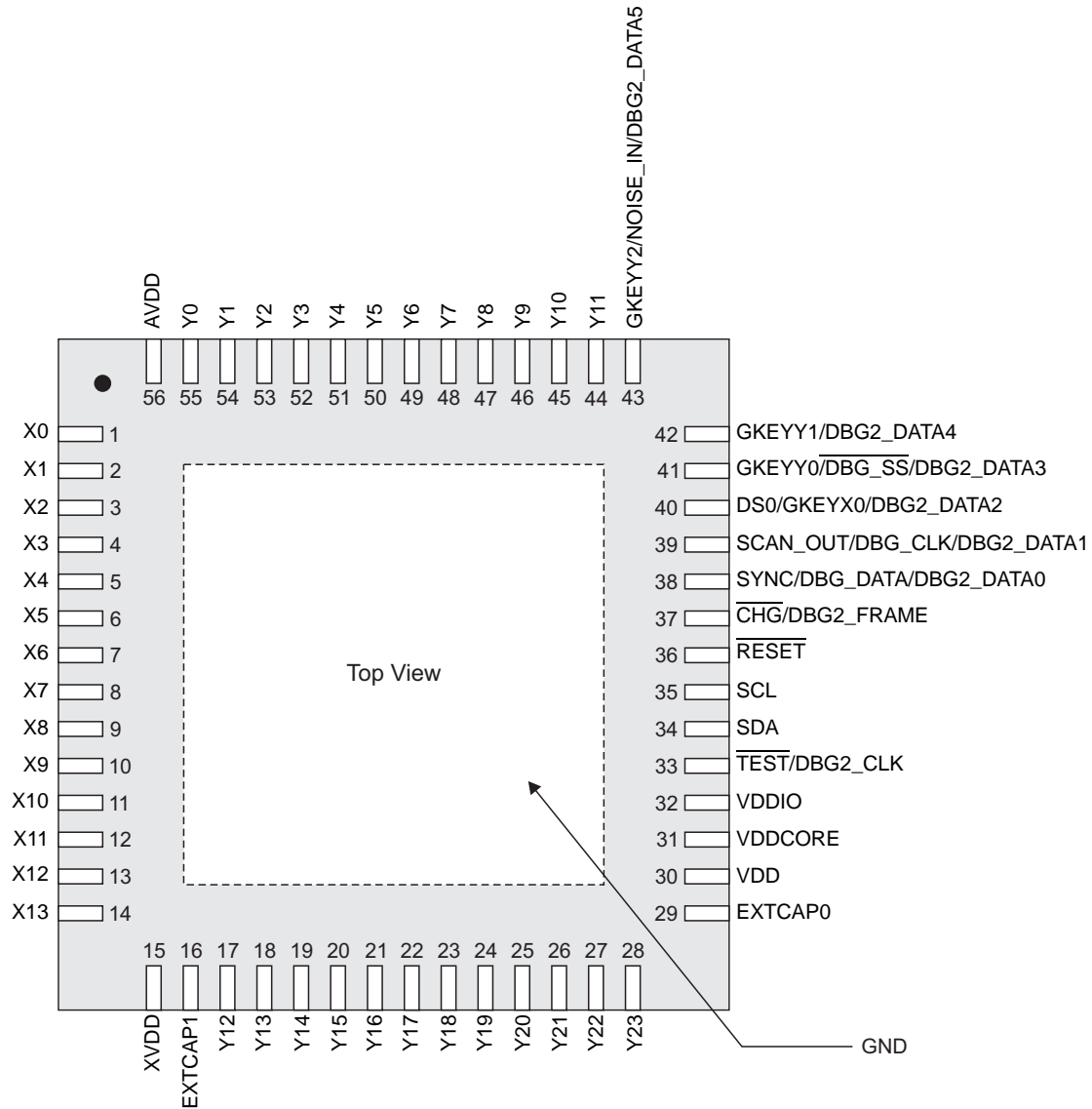
- Operating temperature –40°C to +85°C

Design Services

- Review of device configuration, stack-up and sensor patterns
- Custom firmware versions can be considered, such as specific gestures or proprietary OEM host communication protocols
- Contact your Microchip representative for more information

CONNECTION AND CONFIGURATION INFORMATION

Pin Configuration – 56-pin XQFN

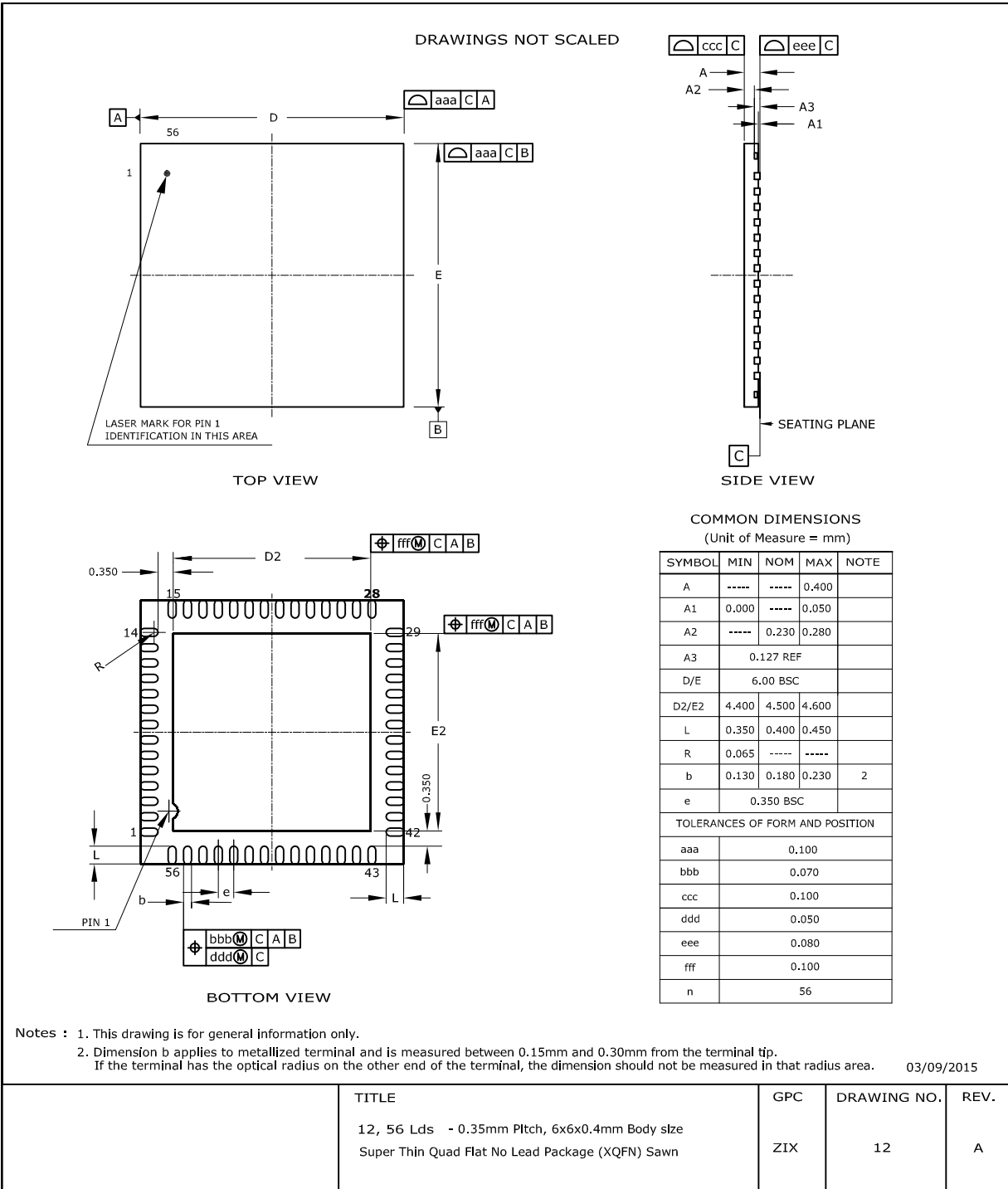


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1.0 PACKAGING INFORMATION

The following section gives the technical details of the package for the device.

1.1 56-pin XQFN 6 x 6 x 0.4 mm



APPENDIX A: REVISION HISTORY

Revision A (July 2017)

Initial edition for firmware revision 1.0 – Release

Revision B (June 2018)

This revision incorporates the following updates:

- Features:
 - Front Panel Material updated
 - Touch Performance: Glove Support updated

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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 mXT336U device.

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)		
	CCU	=	UFBGA (Ultra Thin Fine-pitch Ball Grid Array)		
	C2U	=	UFBGA (Ultra Thin Fine-pitch Ball Grid Array)		
	C4U	=	X1FBGA (Extra Thin Fine-pitch Ball Grid Array)		
	MA5U	=	QFN (Quad Flat No Lead Sawn)		
Temperature Range:	<i>Blank</i>	=	-40°C to +85°C (Grade 3)		
	T	=	-40°C to +85°C (Grade 3)		
	B	=	-40°C to +105°C (Grade 2)		
	X	=	0°C to +70°C (Engineering Samples)		
Sample Type:	<i>Blank</i>	=	Release Sample		
	ES	=	Pre-release (Engineering) Sample		
Tape and Reel Option:	<i>Blank</i>	=	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
ATMXT336U-MAU021 (Supplied in trays)	1.0.AB	56-pin XQFN 6 × 6 × 0.4 mm RoHS compliant Industrial grade sample; not suitable for automotive characterization
ATMXT336U-MAUR021 (Supplied in tape and reel)		

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AMERICAS

Corporate Office
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 480-792-7200
Fax: 480-792-7277
Technical Support:
[http://www.microchip.com/
support](http://www.microchip.com/support)
Web Address:
www.microchip.com

Atlanta
Duluth, GA
Tel: 678-957-9614
Fax: 678-957-1455

Austin, TX
Tel: 512-257-3370

Boston
Westborough, MA
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Fax: 774-760-0088

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Fax: 216-447-0643

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Los Angeles
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New York, NY
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San Jose, CA
Tel: 408-735-9110

Canada - Toronto
Tel: 905-673-0699
Fax: 905-673-6509

ASIA/PACIFIC

Asia Pacific Office
Suites 3707-14, 37th Floor
Tower 6, The Gateway
Harbour City, Kowloon

Hong Kong
Tel: 852-2943-5100
Fax: 852-2401-3431

Australia - Sydney
Tel: 61-2-9868-6733
Fax: 61-2-9868-6755

China - Beijing
Tel: 86-10-8569-7000
Fax: 86-10-8528-2104

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Malaysia - Kuala Lumpur
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Germany - Munich
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Fax: 49-89-627-144-44

Italy - Milan
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Fax: 39-0331-466781

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Tel: 44-118-921-5800
Fax: 44-118-921-5820