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

MXT336U 1.0

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

- I^2C-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 (Vdd) 3.3 V nominal
- Analog (AVdd) 3.3 V nominal
- Host interface I/O voltage (VddIO) 3.3 V nominal
- High voltage internal X line drive (XVdd) 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

Product Brief

CONNECTION AND CONFIGURATION INFORMATION
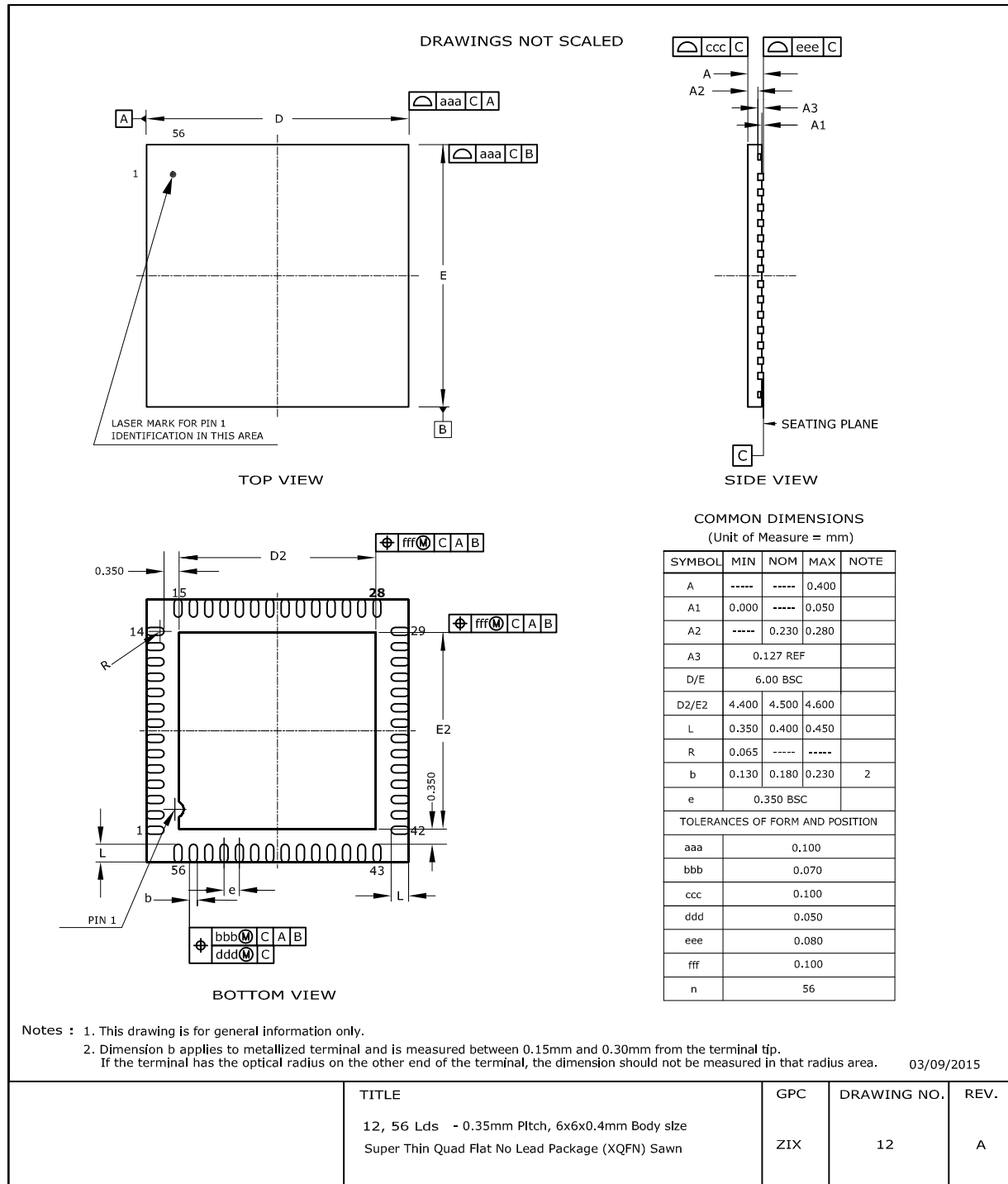
Pin Configuration – 56-pin XQFN
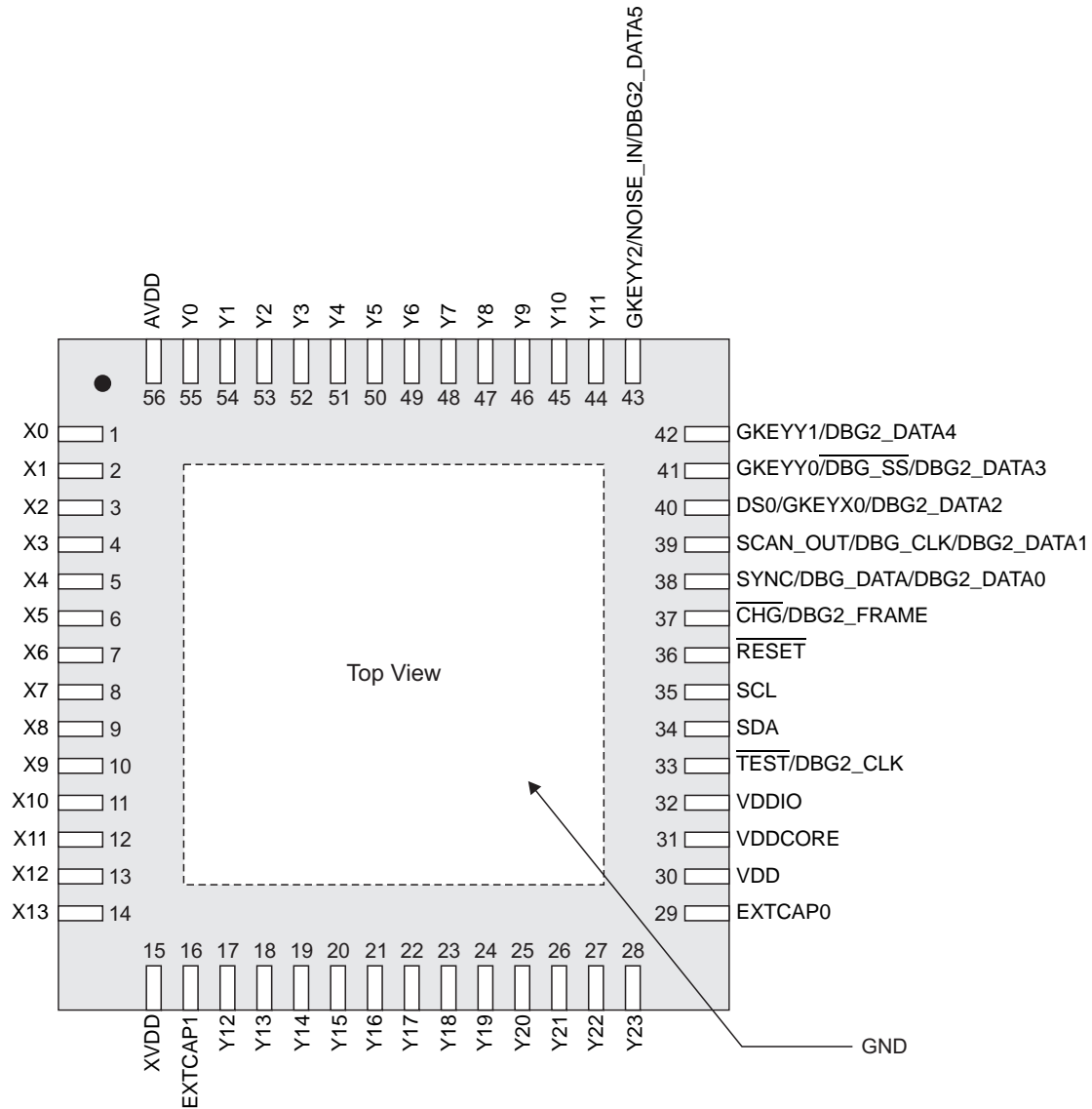
1.0   PACKAGING INFORMATION

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

1.1   56-pin XQFN 6 × 6 × 0.4 mm

DRAWINGS NOT SCALED

| ccc | C |
| eee | C |

A
A2
A3
A1

TOP VIEW

SIDE VIEW

LASER MARK FOR PIN 1
IDENTIFICATION IN THIS AREA

SEATING PLANE

BOTTOM VIEW

PIN 1

COMMON DIMENSIONS
(Unit of Measure = mm)

SYMBOL	MIN	NOM	MAX	NOTE
A	-----	-----	0.400	
A1	0.000	-----	0.050	
A2	-----	0.230	0.280	
A3	0.127 REF			
D/E	6.00 BSC			
D2/E2	4.400	4.500	4.600	
L	0.350	0.400	0.450	
R	0.065	-----	-----	
b	0.130	0.180	0.230	2
e	0.350 BSC			
TOLERANCES OF FORM AND POSITION				
aaa	0.100			
bbb	0.070			
ccc	0.100			
ddd	0.050			
eee	0.080			
fff	0.100			
n	56			

Notes : 1. This drawing is for general information only.
2. Dimension b applies to metallized terminal and is measured between 0.15mm and 0.30mm from the terminal tip.
If the terminal has the optical radius on the other end of the terminal, the dimension should not be measured in that radius area.

03/09/2015

	TITLE	GPC	DRAWING NO.	REV.
	12, 56 Lds - 0.35mm Pitch, 6x6x0.4mm Body size Super Thin Quad Flat No Lead Package (XQFN) Sawn	ZIX	12	A

Product Brief

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:	*Blank*	=	−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:	*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
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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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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