
maXTouch 448-node Touchscreen Controller Product Brief

Description

The mXT449T-AT/mXT449T-AB 1.0 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 mXT449T-AT/mXT449T-AB 1.0 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 32 X (transmit) lines and 20 Y (receive) lines
- A maximum of 448 nodes can be allocated to the touchscreen
- Touchscreen size 7.62 inches (16:9 aspect ratio), assuming a sensor electrode pitch of 6 mm. Other sizes may be possible with different electrode pitches and appropriate sensor material
- Multiple touch support with up to 16 concurrent touches tracked in real time

Automotive Applications

- AEC-Q100 Qualified
- Developed following Automotive SPICE[®] Level 3 certified processes
- CISPR-25 compliant (for both mutual and self capacitance measurements)

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 recommended)

Front Panel Material

- Works with PET or glass, including curved profiles (configuration and stack-up to be approved by Microchip)
- Glass 0.5 mm to 2.0 mm (dependent on screen size, touch size, configuration and stack-up)
- Plastic 0.2 mm to 3.0 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 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
- Scan Speed
 - Up to 190 Hz one finger reporting rate (subject to configuration)
 - Typical report rate for 10 touches ≥ 60 Hz (subject to configuration)
 - Initial touch latency < 25 ms for first touch from idle (subject to configuration)
 - Configurable to allow for power and speed optimization

On-chip Gestures

- Reports one-touch and two-touch gestures

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

MXT449T-AT/MXT449T-AB 1.0

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 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)
- SPI slave interface (up to 8 MHz)
- 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
- 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 (XV_{dd} = V_{dd} if voltage pump not used)

Package

- 100-pin TQFP 14 × 14 × 1 mm, 0.5 mm pitch

Operating Temperature

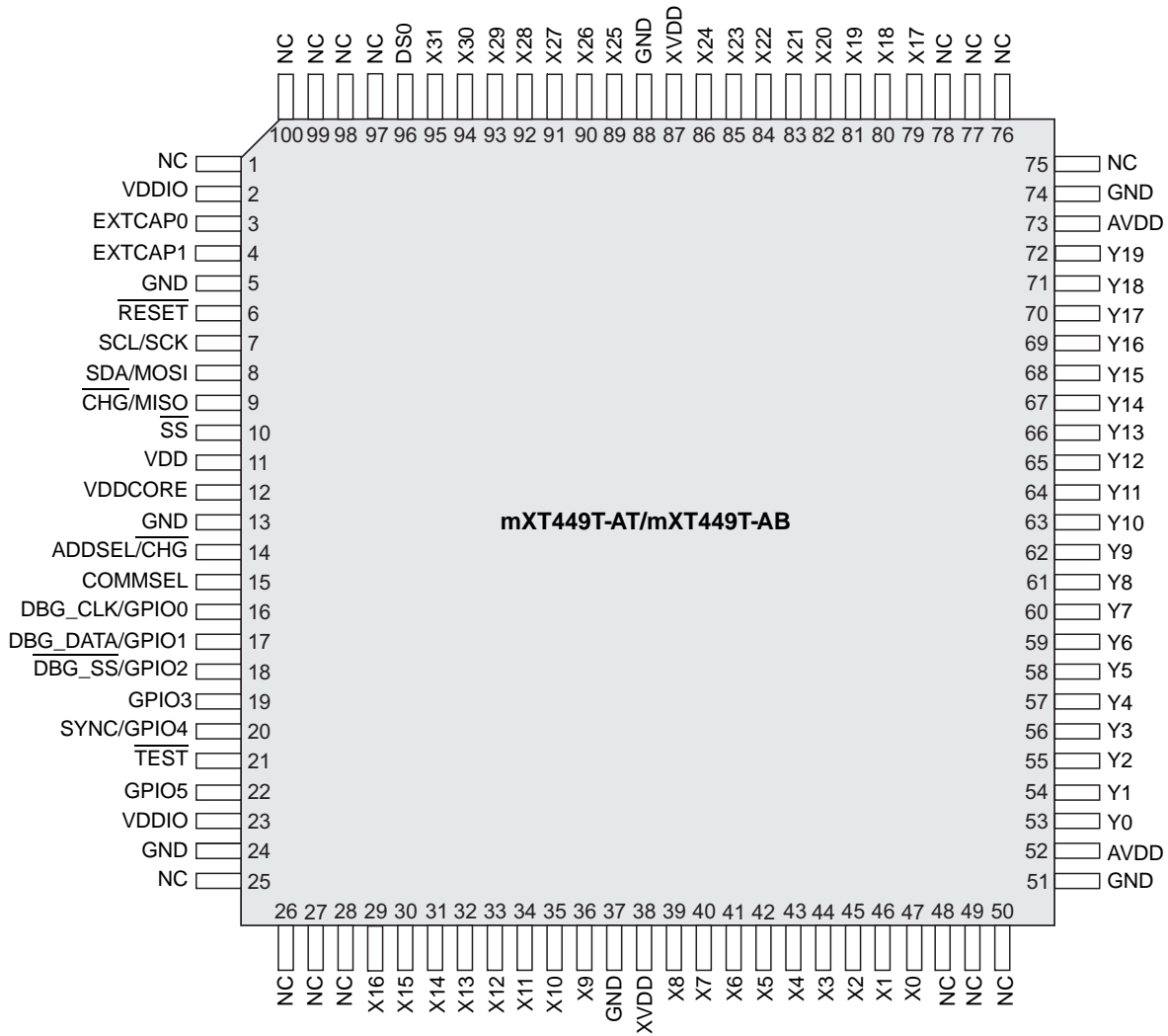
- mXT449T-AT: -40°C to +85°C (Grade 3)
- mXT449T-AB: -40°C to +105°C (Grade 2)

Design Services

- Review of device configuration, stack-up and sensor patterns
- Custom firmware versions can be considered
- Contact your Microchip representative for more information

PIN CONFIGURATION

100-pin TQFP



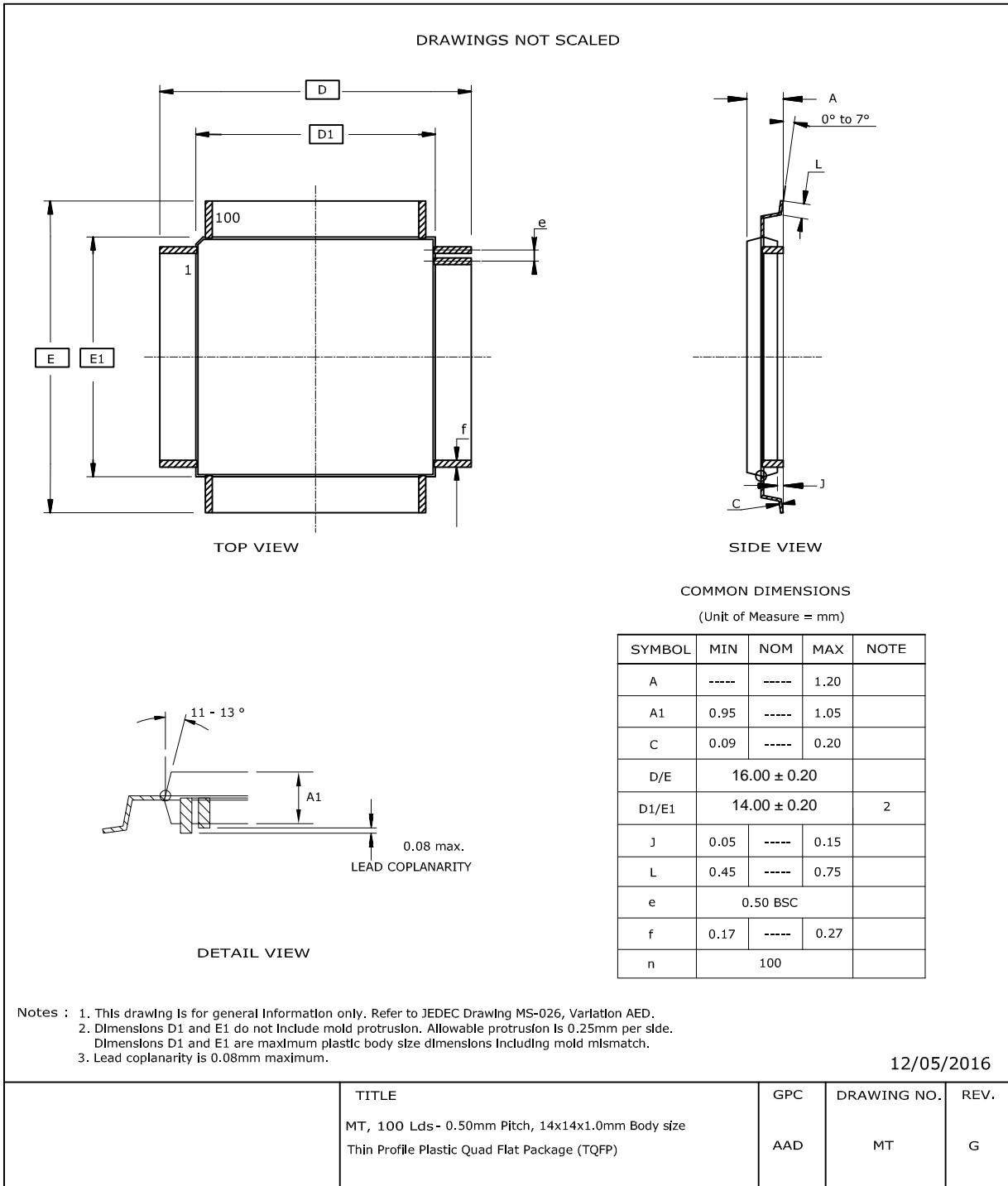
Top view

MXT449T-AT/MXT449T-AB 1.0

1.0 PACKAGING INFORMATION

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

1.1 100-pin TQFP 14 x 14 x 1 mm



APPENDIX A: REVISION HISTORY

Revision A (January 2018)

Initial edition for firmware revision 1.0 – Release

MXT449T-AT/MXT449T-AB 1.0

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 mXT449T-AT/mXT449T-AB.

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)		
	NHU	=	UFBGA (Ultra Thin Fine-pitch Ball Grid Array)		
	C4U	=	X1FBGA (Extra Thin Fine-pitch Ball Grid Array)		
	MAU	=	XQFN (Super Thin Quad Flat No Lead Sawn)		
	MA5U	=	XQFN (Super Thin Quad Flat No Lead Sawn)		
	UU	=	WLCSP (Wafer Level Chip Scale Package)		
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)		
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
ATMXT449T-AT (Supplied in trays)	1.0.AA	100-pin TQFP 14 x 14 x 1 mm, RoHS compliant Operating temperature range -40°C to +85°C (Grade 3)
ATMXT449T-ATR (Supplied in tape and reel)		
ATMXT449T-AB (Supplied in trays)	1.0.AA	100-pin TQFP 14 x 14 x 1 mm, RoHS compliant Operating temperature range -40°C to +105°C (Grade 2)
ATMXT449T-ABR (Supplied in tape and reel)		

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