
maXTouch 224 Channel Host-Client System Product Brief

Description

The ATMXT3072M1HC 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.

Automotive Applications

- AEC-Q100 Automotive Qualified (see ["Product Identification System" on page 9](#))
- CISPR 25 Class 5 compliant
- Separate RC oscillators for system and watchdog
- Embedded flash with Error Correcting Code (ECC)
- ISO26262 ASIL-A/B compliant

maXTouch® Adaptive Sensing Technology

- 224 configurable sensor lines across host and client devices, plus a guard track, which can be configured as an X/Y matrix to allow full flexibility in achievable aspect ratios
- Touchscreen size of 38.5 inches (5:1 aspect ratio), assuming a sensor electrode pitch of 6 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

Touch Sensor Technology

- Out-cell/touch-on display support including LCD/TFT
- 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 and Design

- Works with PET or glass (dependent on sensor size, touch size, configuration, and stack-up)
- Configuration and stack-up to be approved by Microchip or a Microchip-qualified touch sensor module partner
- Support for non-rectangular sensor designs (for example, circular, rounded or with cutouts)

Touch Performance

- Multiple acquisition schemes for robust and sensitive multi-touch sensing, including:
 - Standard Mutual capacitance and Smart Mutual capacitance measurements
 - P2P Mutual Capacitance measurements
- Noise suppression technology to combat ambient and power-line noise
 - Up to 240 V_{PP} between 1 Hz and 1 kHz sinusoidal waveform (no touches)
 - Up to 20 V_{PP} between 1 kHz and 1 MHz sinusoidal waveform
- Burst Frequency
 - Flexible and dynamic Tx burst frequency selection to reduce EMC disturbance
 - Controlled Tx burst frequency drift over process and temperature range
- Scan Speed
 - Typical report rate for 10 touches ≥120 Hz (subject to configuration)
 - Initial touch latency <25 ms for first touch from idle (subject to configuration)
 - Configurable for power and speed optimization
- Touch panel failure detection
 - Automatic touch sensor diagnostics to support the implementation of safety critical features
 - Diagnostics reported by the host device using dedicated output pin or by standard Object Protocol messages
 - Configurable test limits

PWM Signal Generation with Haptics

- PWM Output for display backlight control, audible speaker/buzzer output, or haptic feedback
- Dedicated PWM pins provide configurable PWM output as single-ended or differential signals
- Constant output PWM supported with configurable output frequency and duty cycle
- Stored patterns can be triggered for output, based on shape search information, using smart haptic triggers

Enhanced Algorithms

- Lens bending algorithms to remove display noise
- Touch suppression algorithms to remove unintentional large touches
- Palm Recovery Algorithm for quick restoration to normal state
- Display Noise Equalization to support free-form display shapes, such as rounded or circular shapes
- Enhanced Touch Separation algorithm for improved two touch separation/tracking in all directions.

On-chip Gestures

- Reports one-touch and two-touch gestures

Data Store

- 60-byte CRC checksummed data area for use as a run-time Product Data Store Area
- 64-byte data area for user's custom data (not CRC checksummed)

Device Security

- Firmware Authentication mechanism to ensure the authenticity of the application firmware in the device

Power Saving

- Programmable timeout for automatic transition from Active to Idle state
- Pipelined analog sensing detection and digital processing to optimize system power efficiency

Application Interfaces

- I²C client interface for main communication between the system host and the host device
 - 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)
- Separate High Speed Interchip Interface (HSII) between host and client device
- Interrupt to indicate when a message is available
- Additional SPI Debug Interface to read the raw data for tuning and debugging purposes

Power Supply

- Digital (V_{dd}) 3.3V nominal
- Digital I/O (V_{ddIO}) 3.3V nominal
- Analog (AV_{dd}) 3.3V nominal
- High voltage external X line drive (XV_{dd}) up to 8.5V (Smart Mutual mode 3.3V only)

Package

- 144-lead TQFP Exposed Pad 16 × 16 × 1 mm, 0.4 mm pitch

Operating Temperature

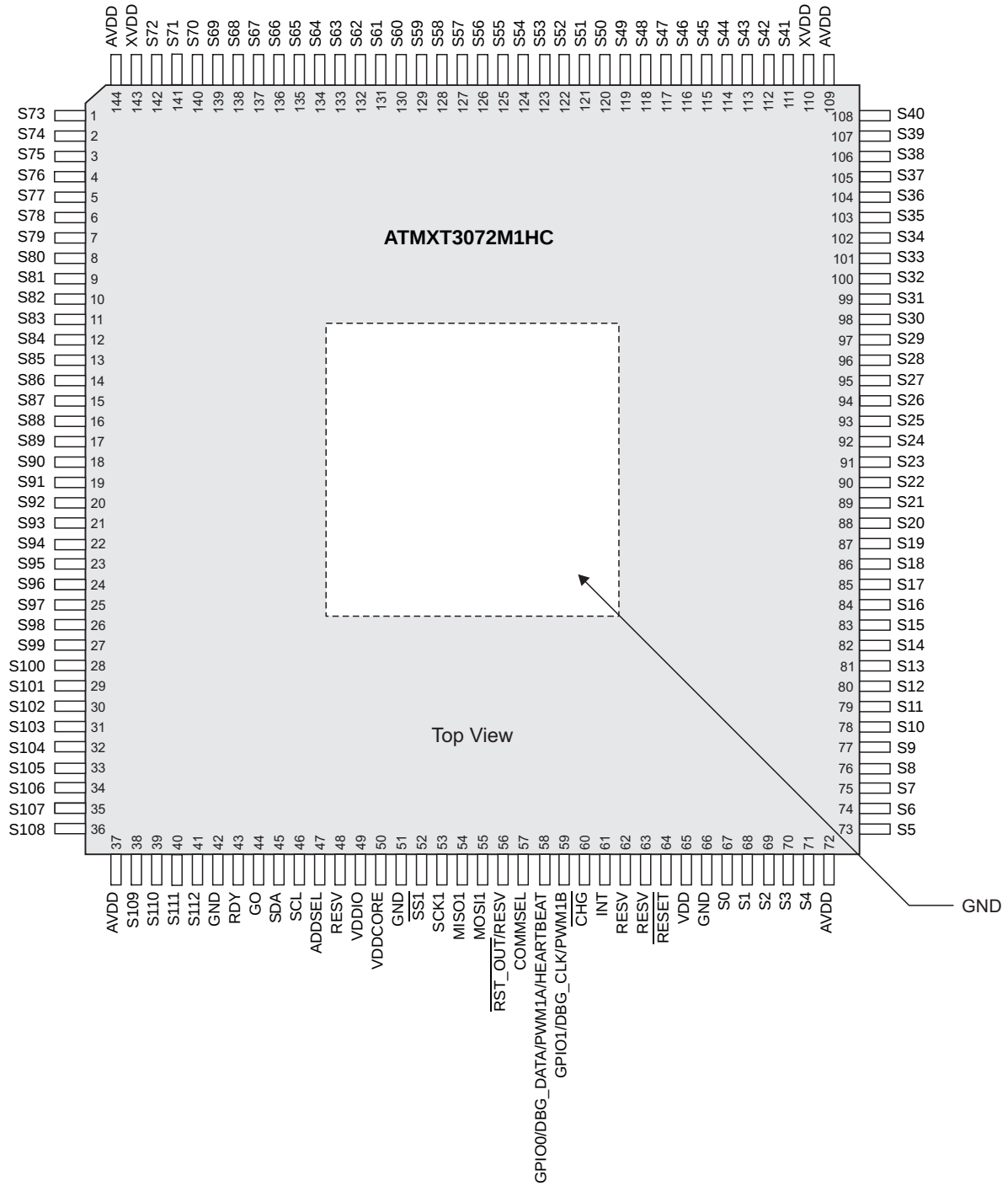
- –40°C to +105°C (Grade 2)

Design Services

- Specific design and tuning tools available as maXTouch Studio plug-ins

PIN CONFIGURATION

144-lead TQFP

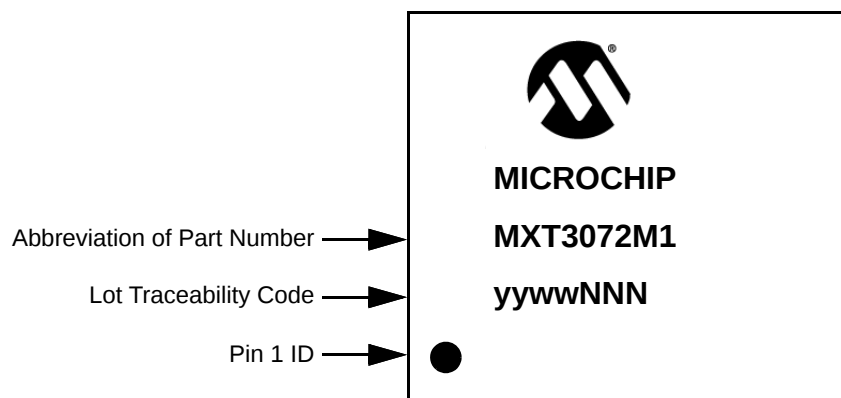


ATMXT3072M1HC

1.0 PACKAGING INFORMATION

1.1 Package Marking Information

1.1.1 144-LEAD TQFP



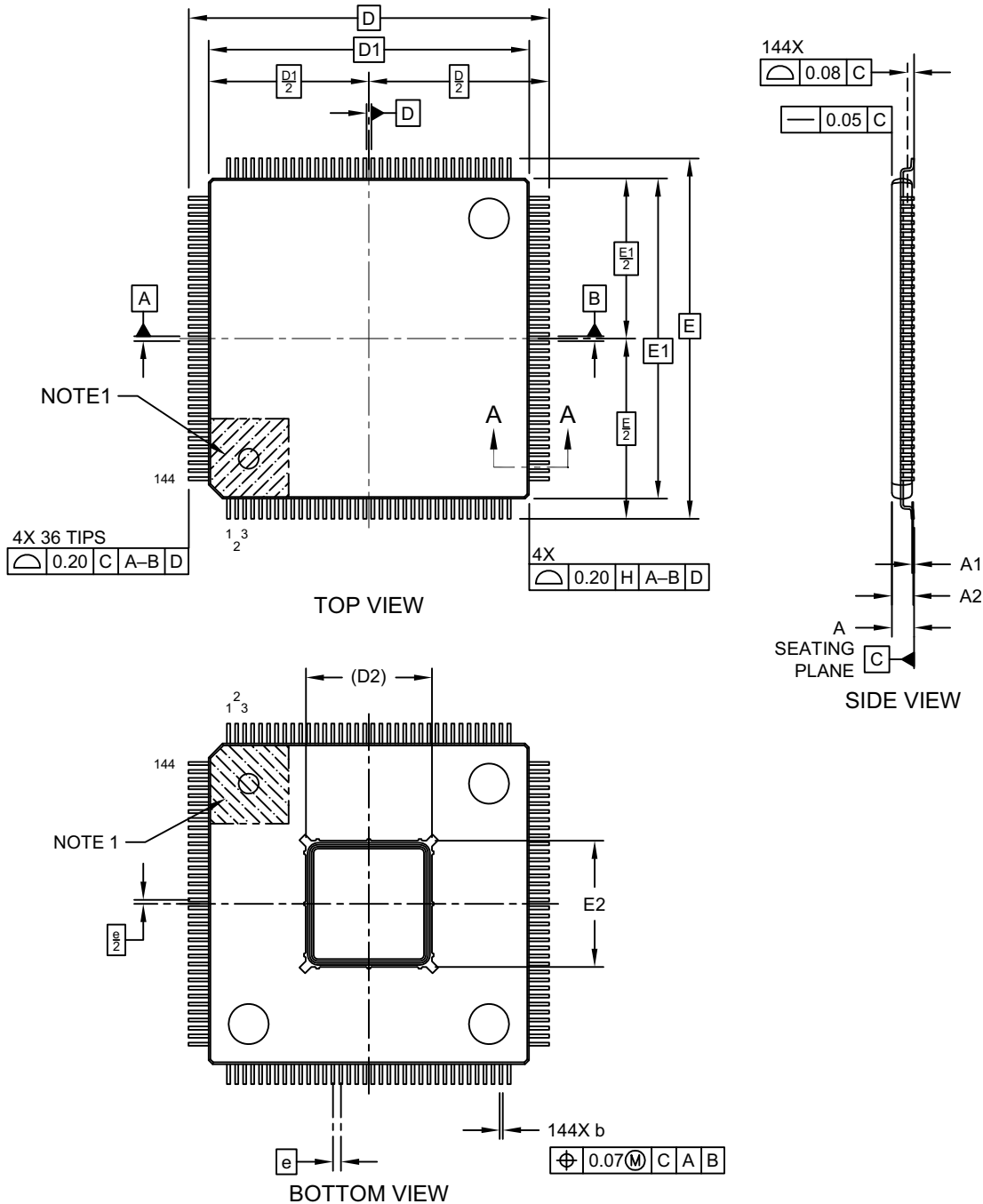
1.1.2 ORDERABLE PART NUMBERS

The product identification system for maXTouch devices is described in ["Product Identification System" on page 9](#). That section also lists example part numbers for the device.

1.2 Package Details

144-Lead Plastic Thin Quad Flatpack (4KB) - 16x16 mm Body [TQFP] With 6.3 mm Grooved Exposed Pad

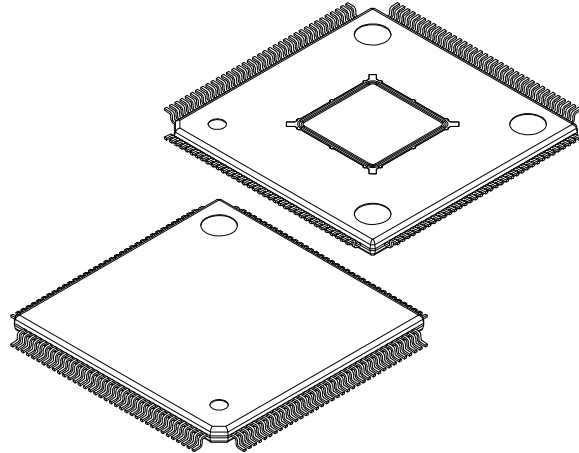
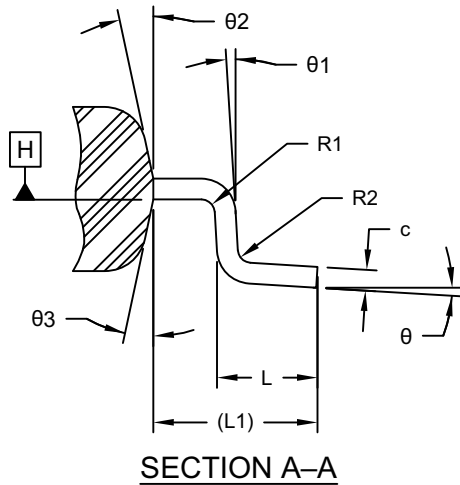
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Microchip Technology Drawing C04-21546 Rev A Sheet 1 of 2

144-Lead Plastic Thin Quad Flatpack (4KB) - 16x16 mm Body [TQFP] With 6.3 mm Grooved Exposed Pad

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



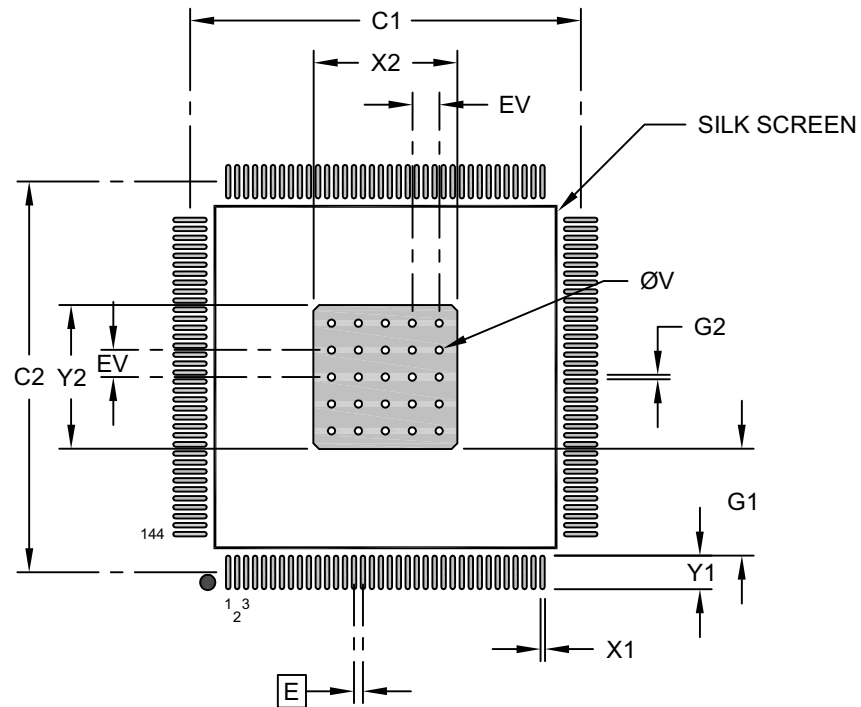
Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Terminals	N	144		
Pitch	e	0.40 BSC		
Overall Height	A	-	-	1.20
Standoff	A1	0.05	-	0.15
Molded Package Thickness	A2	0.95	1.00	1.05
Overall Length	D	18.00 BSC		
Molded Package Length	D1	16.00 BSC		
Exposed Pad Length	D2	6.30 REF		
Overall Width	E	18.00 BSC		
Molded Package Width	E1	16.00 BSC		
Exposed Pad Width	E2	6.30 REF		
Terminal Width	b	0.13	0.16	0.23
Terminal Thickness	c	0.09	.127	0.20
Terminal Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Lead Bend Radius	R1	0.08	-	-
Lead Bend Radius	R2	0.08	-	0.20
Foot Angle	θ	0°	3.5°	7°
Lead Angle	θ1	0°	-	-
Mold Draft Angle	θ2	11°	12°	13°
Mold Draft Angle	θ3	11°	12°	13°

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package is saw singulated
- Dimensioning and tolerancing per ASME Y14.5M
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

**144-Lead Plastic Thin Quad Flatpack (4KB) - 16x16 mm Body [TQFP]
With 6.3 mm Grooved Exposed Pad**

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



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.40 BSC		
Optional Center Pad Width	X2			6.40
Optional Center Pad Length	Y2			6.40
Contact Pad Spacing	C1		17.40	
Contact Pad Spacing	C2		17.40	
Contact Pad Width (Xnn)	X1			0.20
Contact Pad Length (Xnn)	Y1			1.50
Contact Pad to Center Pad (Xnn)	G1	4.75		
Contact Pad to Contact Pad (Xnn)	G2	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-23546 Rev A

APPENDIX A: REVISION HISTORY

Revision A (June 2025)

Initial edition for firmware revision 1.0.AB – Release

Revision B (January 2026)

Updated for firmware revision 1.0.AC – Release

- CLKDRVP and CLKDRVN pins removed

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 ATMXT3072M1HC.

To order or obtain information, for example on pricing or delivery, refer to the factory or the listed sales office.

<u>PART-NO.</u>	<u>-XXX</u>	<u>[X]</u>	<u>[XX]</u>	<u>[XXX]</u>
Device	Package	Tape and Reel Option	Variant	Qualification

Device:	Base device name			
Package:	A	=	QFP (Plastic Quad Flatpack)	
Tape and Reel Option: ⁽¹⁾	Blank	=	Standard Packaging (Tube or Tray)	
	R	=	Tape and Reel	
Variant:	Text	=	Product Variant Code (Blank Otherwise)	
Qualification:	VAX	=	AEC-Q100 Automotive Qualified	
	Other Text	=	Industrial (Non-automotive) Part	

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	Family ID	Variant ID	Description
ATMXT3072M1HC-AVAO (Supplied in trays)	1.0.AC	0xA7	0x0B	144-lead TQFP Exposed Pad 16 × 16 × 1 mm, RoHS compliant Operating temperature range –40°C to +105°C (Grade 2)
ATMXT3072M1HC-ARVAO (Supplied in tape and reel)				

Note: Host and client are identical devices, so only one orderable part number is listed.

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