Atrua Wings™ ATW300 Family
Fingerprint Touch Sensor Data Sheet

KEY FEATURES

- **Low Power Consumption**
  - 1.4 mA avg. operating current
  - 1.1 mA avg. navigation operating current
  - 2.6 µA finger detection current
  - 0.2 µA power down current
- **High Performance**
  - Up to 48 cm/sec swipe/movement rate
  - Acquisition rate greater than 3,700 frames per sec. (512 bytes per frame)
- **Compact Size**
  - 0.56 x 8.73 mm active sensing area
  - 2.5 x 14.5 x 1.06 mm (1.32 mm package caps) package size
- **Integrated CLK & Over-Current Protection Circuits**
  - Reduces component count and BOM cost
  - Minimizes total solution board area
- **I/O Interface Flexibility**
  - 8-bit parallel MCU interface
  - High Speed Serial Peripheral Interface (SPI)
- **Low Voltage**
  - 1.8 V – 3.3 V I/O
  - 2.5 V – 3.3 V core
- **Highly Rugged**
  - ± 20 kV ESD protection (Exceeds max. IEC61000-4-2 level)
  - Withstands over 20 million swipes
  - Abrasion & corrosion resistant
- **Adaptable Sensitivity**
  - Automatic gain control for optimized gray-scale image with wide range of finger, skin & environmental conditions
- **Green/RoHS Compliant**

TYPICAL APPLICATIONS

ATW300 family's low cost, small size and low power consumption make it especially suited for use in mobile device applications such as:

- Mobile phones
- Smart cards
- Portable MP3 and media players
- Secure storage products
- Portable gaming devices
- PDAs
- Mobile computing devices and peripherals
- Portable products that benefit from small, feature-rich controls

QUICK TIME-TO-MARKET

Extending the ATW300's market-leading ease-of-integration, Atrua provides a comprehensive set of hardware and software support tools for rapid application development:

- Evaluation Kit
- Software Development Kit
- Hardware Development Kit for Embedded Systems

BLOCK DIAGRAM
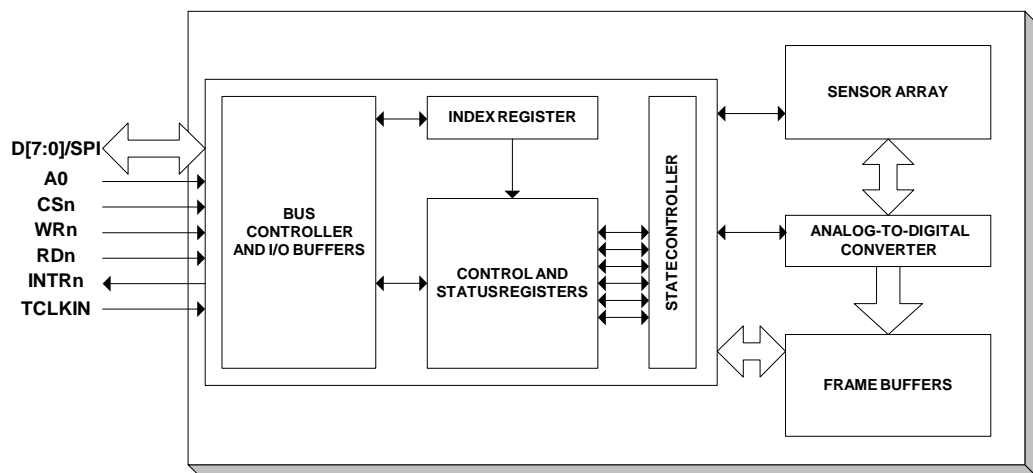
General Description

The ATW300 family of fingerprint touch sensors (ATW3xx) is the sensor portion of the Atrua Wings™ touch processing system. The system consists of:

- Touch sensors – small, low cost and low power sensors that provide information on finger features and movement.
- Algorithms – fingerprint recognition, navigation and control functions that are highly precise and accurate and operate in a very CPU- and memory-efficient manner.

The ATW3xx touch sensor creates partial images (frames) of the finger by sensing the ridges and valleys on the finger as it is moved or "swept" across its surface. This small Adaptive Capacitance™ sensor provides high performance and low power consumption through an integrated 124 x 8 sensing array of metal electrodes. Ridges and valleys on the finger yield varying capacitance values across the array, which are read to form a partial image of the fingerprint. Internal circuits within the sensor die convert the sensed data into a stream of digital data (a frame) that is presented to the host microprocessor via an 8-bit bidirectional bus interface, which is compatible with most microprocessors, or through a high-speed SPI interface.

There are two key classes of algorithms that execute on the host processor and comprise the core functions of this fingerprint touch processing system:

- Fingerprint Authentication

- Control and Navigation

These algorithms operate on the data streamed from the sensor. Authentication extracts minutiae features used for fingerprint verification, and matches the minutiae pattern to the template for the user's enrolled finger. The navigation/control algorithms analyze finger motions to provide control functions.

Optimized for use in mobile devices, the low cost, small physical size and minimal power consumption of the ATW3xx touch sensor simplify its integration into mobile phones and other small mobile devices. The ATW3xx integrates the typically external over-current protection circuit to enable significant BOM cost savings and to further minimize the board area required for the total solution.

Additionally, the ATW3xx has an integrated analog-to-digital converter to digitize the sensed data and an automatic gain control (AGC) function that provides high quality fingerprint images from all types of skin, dry to moist, in a wide range of climatic conditions, even cold and dry.

In addition to the sensor's low power requirements, the end system's power consumption can be further minimized by utilizing one of the ATW3xx's advanced finger detect modes. These modes are designed to analyze on-sensor the finger's characteristics and wake the host CPU only after the sensor concludes that contact was made by an actual finger, not a foreign object. This reduces the need to unnecessarily wake the CPU subsystem, thus saving even more power.

The ATW3xx touch sensor is fabricated in standard CMOS technology and is provided in a Green/RoHS compliant LGA package. The sensor surface is protected by a special abrasion and chemical-resistant coating to provide long life with high reliability.

Conventions

Unless otherwise noted, a positive logic (active High) convention is assumed throughout this document. A lowercase 'n' following a signal name (e.g., INTRn) indicates that the signal is active Low.

The designation 0xNNNN indicates a hexadecimal number.

The designation 0bNNNN indicates a binary number.

Signal Descriptions

Name	Type	Description
D[7:0]	Bi-directional	**8-bit Mode**: **Data bus with CMOS inputs.** These pins provide an 8-bit data path for read and write operations. The bus is in the high-impedance state when CSn or RDn is negated. **SPI Mode:** D7/MISO functions as the MISO (Master In Slave Out). Data is shifted out of the SPI slave and into the SPI master. D6/MOSI functions as the MOSI (Master Out Slave In). Data is shifted out of the SPI master and into the SPI slave. D5/SCK_INV selects the polarity of SCK. When SCK_INV is Low, data is shifted out of the MISO on the falling edge of SCK and the MOSI is sampled on the rising edge of SCK. When SCK_INV is High, data is shifted out of the MISO on the rising edge of SCK and the MOSI is sampled on the falling edge of SCK.
A0/SCK	Input	**8-bit Mode:** **Address.** CMOS input. When A0 is Low, the Index Address register (IDX_REG) is selected as the source/destination for read and write transactions. When A0 is High, the indexed register (see Functional Description) is selected as the source/destination for read and write transactions. **SPI Mode:** **SPI Clock.** CMOS input. When SCK_INV is Low, data is shifted out the MISO on the falling edge of SCK and the MOSI is sampled on the rising edge of SCK. When SCK_INV is High, data is shifted out the MISO on the rising edge of SCK and the MOSI is sampled on the falling edge of SCK.

CSn/SCSn	Input	**8-bit Mode:** **Chip Select, active Low.** CMOS input. This input must be asserted to read data from or write data to the ATW3xx. When High, the data bus is in the high impedance state. **SPI Mode:** **Slave Chip Select, active Low.** CMOS input. Drive SCSn Low to select the device as an SPI slave. Drive SCSn High to deselect the device, reset the SPI, and to place the MISO in the high impedance state.
RDn	Input	**8-bit Mode:** **Read Enable, active Low.** CMOS input. This input must be asserted for read operations and negated for write operations. When High, data outputs from the device are disabled and the data bus pins are placed in the high impedance state. **SPI Mode:** RDn must be driven Low. Drive both RDn and WRn Low to place the device into SPI mode. The device returns to 8-bit Mode if either RDn or WRn is driven High.
WRn	Input	**8-bit Mode:** **Write Enable, active Low.** CMOS input. Controls writing of commands or data to the ATW3xx. A write operation takes place when WRn is asserted while CSn is Low and RDn is High. The data is latched on the rising edge of WRn. **SPI Mode:** WRn must be driven Low. Drive both RDn and WRn Low to place the device into SPI mode. The device returns to 8-bit Mode if either RDn or WRn is driven High.
INTRn	Output	**Interrupt Request, active Low.** INTRn is asserted if interrupts are enabled and an interrupt event takes place.
TCLKIN	Input	**External Clock Input.** The ATW3xx has an internal clock and does not require an external clock input. This input is for testing only and should be left unconnected for normal operation.
V_{DDC}	Power	**Core Power.**
V_{SSC}	Ground	**Core Ground.**
V_{DDO}	Power	**I/O Power.**
V_{SSO}	Ground	**I/O Ground.**
SHGND	Ground	**ESD Ground.** These pins are intended to provide a discharge path during an electrostatic discharge event. Connect these pins to chassis ground.

ABSOLUTE MAXIMUM RATINGS[1]

Symbol	Parameter	Value	Unit
T_{STG}	Storage Temperature	-40 to +125	°C
T_{BIAS}	Ambient Temperature with Power Applied	-40 to +85	°C
T_L	Lead Temperature, max 20s duration[2]	+250	°C

V_{IN}	Voltage on Pin with Respect to V_{SSO}:
	   V_{DDO}
	   All Other Pins
		
		 -0.5 to +4.0
		 -0.5 to (V_{DD} + 0.5)
			
			 V
			 V

I_{OS}	Output Short Circuit Current	200	mA
ESD (HBM)	Electrostatic Discharge, Human Body Model, EIA/JEDEC JESD22-A114	± 2000	V
ESD (CDM)	Electrostatic Discharge, Charged Device Model, EIA/JEDEC JESD22-C101	±1800	V
Surface ESD	Electrostatic Air Discharge, IEC-61000-4-2[3]	± 20	kV

Notes:

1. Conditions in excess of those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those indicated in the operational sections of this data sheet is not implied. Exposure of the device to absolute maximum rating conditions for extended periods may affect device reliability.

2. Reflow details per Lead-Free IR Reflow Profile in IPC/JEDEC J-STD-020.

3. Per internal procedure for testing the component on a standard development board per IEC-61000-4-2.

RECOMMENDED OPERATING CONDITIONS[1]

Symbol	Parameter	Value	Unit
T_A	Ambient Operating Temperature	-20 to +70	°C
V_{DDC}	Core Power Operating Supply Voltage	+2.5 to +3.3	V
V_{DDO}	I/O Power Operating Supply Voltage[2]	+1.8 to +3.3	V
MSL	JEDEC Moisture Sensitivity Level	3	---

Notes:

1. Recommended Operating Conditions define those limits between which the functionality of the device is guaranteed.

2. V_{DDO} can be at a lower supply level than V_{DDC} if the application requires. Allowed modes of operation are in the following table.

ALLOWED POWER SUPPLY VOLTAGE COMBINATIONS

V_{DDO}	V_{DDC}
1.8 V	2.5 V or 3.3 V
2.5 V	2.5 V or 3.3 V
3.3 V	3.3 V

Notes:

1. V_{DDC} must be equal to or higher than V_{DDO}.

2. V_{DDO} is not allowed to be higher than V_{DDC}.

POWER SEQUENCING

V_{DDC} and V_{DDO} should be applied at the same time. If V_{DDC} and V_{DDO} cannot be applied concurrently, then V_{DDC} must be applied before applying voltage to V_{DDO} or any signal pin.

DC CHARACTERISTICS (2.5 V Core) [1, 2, 3]

Parameter	Description	Test Conditions	Min	Typical		Max	Unit
V_{DDC}	Core Supply Voltage		2.25	2.5	2.5	2.75	V
V_{DDO}	I/O Supply Voltage		1.65	1.8	2.5	2.75	V
I_I	Input Leakage	$0 \leq V_{IN} \leq V_{DDO}$, V_{DDO} = Max	-3			3	µA
I_{OZ}	Input current for outputs in Hi-Z	$0 \leq V_{OUT} \leq V_{DDO}$, V_{DDO} = Max	-1			1	µA
I_{DD1}	V_{DD} Stand-by without partial power down, Quiescent Current	V_{DDC} = Max		15	20	72	µA
I_{DD2}	V_{DD} Peak Operating Current [4]	V_{DDC} = Max		3.9	3.9	6.8	mA
I_{DD3}	V_{DD} Average Operating Current, 500 fps	V_{DDC} = Typ		1.4	1.5		mA
I_{DD4}	V_{DD} Average Operating Current, 250 fps (Navigation)	V_{DDC} = Typ		1.1	1.1		mA
I_{DD5}	V_{DD} Average Operating Current with Finger Detect Surface Contact Detect State Active (Monitoring)	V_{DDC} = Max		2.6	2.7	27	µA
I_{DD6}	V_{DD} Peak Operating Current [4] with Finger Detect Mode 3 Active (Monitoring) or Mode 2 prior to asserting the interrupt	V_{DDC} = Max		3.9	3.9	6.8	mA
I_{DD7}	V_{DD} Average Operating Current with Finger Detect Mode 3 Active (Monitoring, Interval=400 ms)	V_{DDC} = Max		3.9	4.0	45	µA
I_{DD8}	V_{DD} Quiescent Current with Finger Detect Mode 1, 2 or 3 Triggered (After interrupt asserted)	V_{DDC} = Max		23	23	60	µA
I_{DD9}	V_{DD} Partial Power Down, Quiescent Current	V_{DDC} = Max		0.7	1.5	19	µA
I_{DD10}	V_{DD} Full Power Down Quiescent Current	V_{DDC} = Max		0.2	0.2	3	µA
V_{IL}	Input Low Voltage					0.3 x V_{DDO}	V
V_{IH}	Input High Voltage		0.7 x V_{DDO}				V
V_{OL}	Low-Level Output Voltage	I_{OL} = Min				0.2 x V_{DDO}	V
V_{OH}	High-Level Output Voltage	I_{OH} = Max	0.8 x V_{DDO}				V

Notes:
1. All maximum I_{DD} specifications in table are tested with $V_{DD} = V_{DD}$ Max and ambient temperature = 85°C.
2. All typical specifications in table are measured with ambient temperature = 25°C.
3. All operating I_{DD} specifications in table are tested with 2X clock.
4. Peak operating current (I_{DD2}, I_{DD6}) is observed when performing an A/D conversion, which lasts nominally 256 µs.

DC CHARACTERISTICS (3.3 V Core) [1, 2, 3]

Parameter	Description	Test Conditions	Min	Typ	Max	Unit
V_{DDC}	Core Supply Voltage		3.0	3.3	3.63	V
V_{DDO}	I/O Supply Voltage		1.65	3.3	3.63	V
I_I	Input Leakage	$0 \leq V_{IN} \leq V_{DDO}$, V_{DDO} = Max	-3		3	µA
I_{OZ}	Input current for outputs in Hi-Z	$0 \leq V_{OUT} \leq V_{DDO}$, V_{DDO} = Max	-1		1	µA
I_{DD1}	V_{DD} Stand-by without partial power down, Quiescent Current	V_{DDC} = Max		40	95	µA
I_{DD2}	V_{DD} Peak Operating Current [4]	V_{DDC} = Max		5	9	mA
I_{DD3}	V_{DD} Average Operating Current, 500 fps	V_{DDC} = Typ		2		mA
I_{DD4}	V_{DD} Average Operating Current, 250 fps (Navigation)	V_{DDC} = Typ		1.7		mA
I_{DD5}	V_{DD} Average Operating Current with Finger Detect Surface Contact Detect State Active (Monitoring)	V_{DDC} = Max		4.6	36	µA
I_{DD6}	V_{DD} Peak Operating Current [4] with Finger Detect Mode 3 Active (Monitoring) or Mode 2 prior to asserting the interrupt	V_{DDC} = Max		5	9	mA
I_{DD7}	V_{DD} Average Operating Current with Finger Detect Mode 3 Active (Monitoring, Interval=400 ms)	V_{DDC} = Max		4.4	60	µA
I_{DD8}	V_{DD} Quiescent Current with Finger Detect Mode 1, 2 or 3 Triggered (After interrupt asserted)	V_{DDC} = Max		38	80	µA
I_{DD9}	V_{DD} Partial Power Down, Quiescent Current	V_{DDC} = Max		1.6	25	µA
I_{DD10}	V_{DD} Full Power Down Quiescent Current	V_{DDC} = Max		0.2	4	µA
V_{IL}	Input Low Voltage				0.3 x V_{DDO}	V
V_{IH}	Input High Voltage		0.7 x V_{DDO}			V
V_{OL}	Low-Level Output Voltage	I_{OL} = Min			0.2 x V_{DDO}	V
V_{OH}	High-Level Output Voltage	I_{OH} = Max	0.8 x V_{DDO}			V

Notes:
1. All maximum I_{DD} specifications in table are tested with V_{DD} = V_{DD} Max and ambient temperature = 85°C.
2. All typical specifications in table are measured with ambient temperature = 25°C.
3. All operating I_{DD} specifications in table are tested with 2X clock.
4. Peak operating current (I_{DD2}, I_{DD6}) is observed when performing an A/D conversion, which lasts nominally 256 µs.

Parameter	Description	Test Conditions		Min	Max	Unit
I_{OH}	High-Level Output Current	$V_{DDO} \geq 2.25V$	Strong Drivers		-6	mA
			Medium Drivers		-4	mA
			Weak Drivers		-2	mA
		$1.65V \leq V_{DDO} \leq 1.95V$	Strong Drivers		-3	mA
			Medium Drivers		-2	mA
			Weak Drivers		-1	mA
I_{OL}	Low-Level Output Current	$V_{DDO} \geq 2.25V$	Strong Drivers	6		mA
			Medium Drivers	4		mA
			Weak Drivers	2		mA
		$1.65V \leq V_{DDO} \leq 1.95V$	Strong Drivers	3		mA
			Medium Drivers	2		mA
			Weak Drivers	1		mA

Note: Default setting is "Strong Drivers".

KEY TO SWITCHING WAVEFORMS

WAVEFORM	INPUTS	OUTPUTS
	Steady	
	Changing from H to L	
	Changing from L to H	
	Don't Care, Any Change Permitted	Changing, State Unknown
	Does Not Apply	Centerline is High Impedance State (Hi-Z)

TEST CONDITIONS
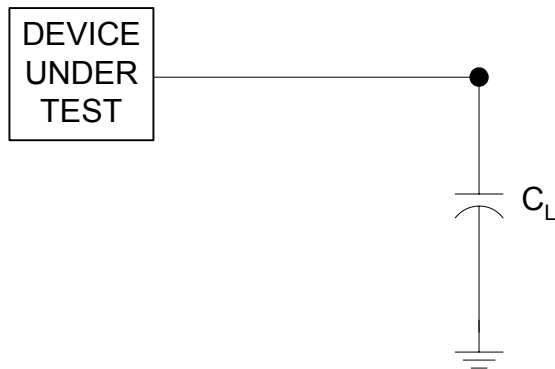
Figure 1. Test Setup

Table 1. AC Test Specifications

Test Condition	Value	Unit
Output Load	See Test Setup	
Output Load Capacitance	15	pF
Input Rise and Fall Times	5	ns
Input Signal Low Level	0	V
Input Signal High Level	$0.9 \times V_{DDO}$	V
Input Timing Reference Level	$0.5 \times V_{DDO}$	V
Output Timing Reference Level	$0.5 \times V_{DDO}$	V

AC CHARACTERISTICS

Read Operation

	Parameter	Description	Test Setup	Min	Max	Unit
t_1	td(W-R)	WRn High to RDn Low delay		20		ns
t_2	tsu(A-R)	A0 setup to RDn Low		10		ns
t_3	tsu(S-R)	CSn setup to RDn Low		0		ns
t_4	ta(S)	D[7:0] valid from CSn Low	RDn ≤ V_{IL}		40	ns
t_5	ta(R)	D[7:0] valid from RDn Low	CSn ≤ V_{IL}		40	ns
t_6	th(R-A)	A0 hold after RDn High		5		ns
t_7	th(R-S)	CSn hold after RDn High		0		ns
t_8	th(R-Q)	D[7:0] hold after RDn High		0		ns
t_9	th(R-S)	D[7:0] hold after CSn High		0		ns
t_{10}	tdis(R)	D[7:0] Hi-Z after RDn High	CSn ≤ V_{IL}		20	ns
t_{11}	tdis(S)	D[7:0] Hi-Z after CSn High	RDn ≤ V_{IL}		20	ns
t_{12}	tw(RL)	RDn Low pulse width	CSn ≤ V_{IL}	40		ns
t_{13}	tw(RH)	RDn High pulse width	RDn ≤ V_{IL}	20		ns
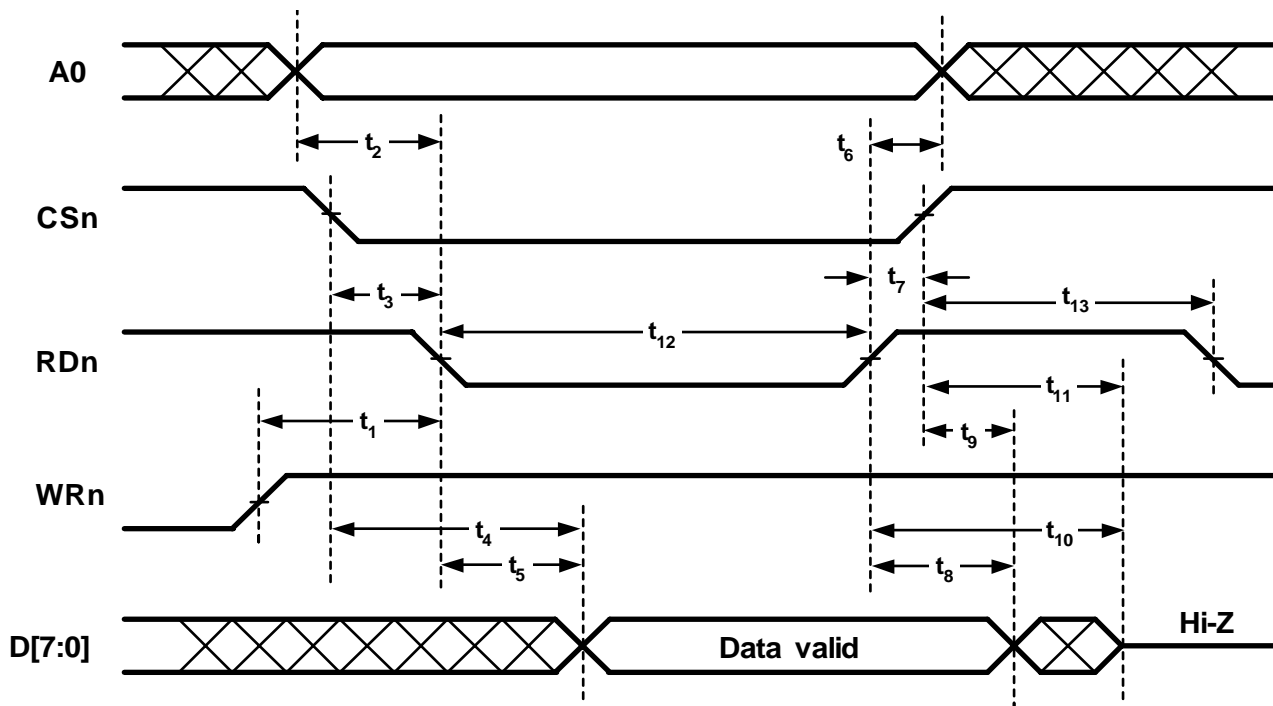
Figure 2. Read Operation Timing

Write Operations

	Parameter	Description	Min	Max	Unit
t_{14}	td(R-W)	RDn High to WRn Low delay	20		ns
t_{15}	tsu(A-W)	A0 setup to WRn Low	10		ns
t_{16}	tsu(S-W)	CSn setup to WRn Low	10		ns
t_{17}	tsu(D-W)	Input data setup to WRn Low	10		ns
t_{18}	th(W-A)	A0 hold after WRn High	5		ns
t_{19}	th(W-S)	CSn hold after WRn High	5		ns
t_{20}	th(W-D)	Input data hold after WRn High	5		ns
t_{21}	th(W-S)	Input data hold after CSn High	5		ns
t_{22}	tw(WL)	WRn Low pulse width	20		ns
t_{23}	tw(WH)	WRn High pulse width	20		ns
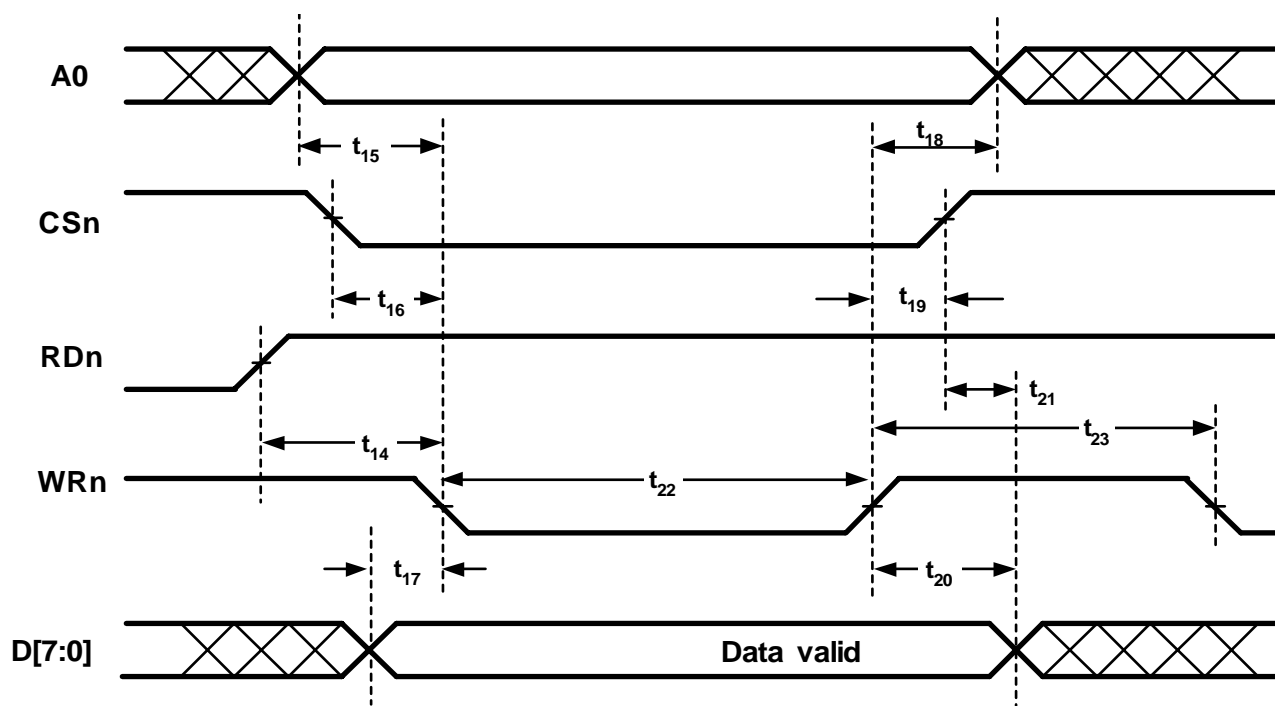
Figure 3. Write Operation Timings

SPI Slave Timing (1.8 V V$_{DDO}$)

	Parameter	Description	Test Setup	Min	Max	Unit
t$_{24}$	tw(KL)	SCK Low pulse width		35		ns
t$_{25}$	tw(KH)	SCK High pulse width		35		ns
t$_{26}$	ta(S)	MISO valid from SCSn Low			25	ns
t$_{27}$	tsu(D-K)	MOSI setup to SCK High		10		ns
t$_{28}$	ta(K-Q)	SCK Low to MISO valid	SCSn ≤ V$_{IL}$		27	ns
t$_{29}$	tdis(S)	SCSn High to MISO Hi-Z			15	ns

SPI Slave Timing (2.5 V or 3.3 V V$_{DDO}$)

	Parameter	Description	Test Setup	Min	Max	Unit
t$_{24}$	tw(KL)	SCK Low pulse width		25		ns
t$_{25}$	tw(KH)	SCK High pulse width		25		ns
t$_{26}$	ta(S)	MISO valid from SCSn Low			20	ns
t$_{27}$	tsu(D-K)	MOSI setup to SCK High		5		ns
t$_{28}$	ta(K-Q)	SCK Low to MISO valid	SCSn ≤ V$_{IL}$		20	ns
t$_{29}$	tdis(S)	SCSn High to MISO Hi-Z			15	ns
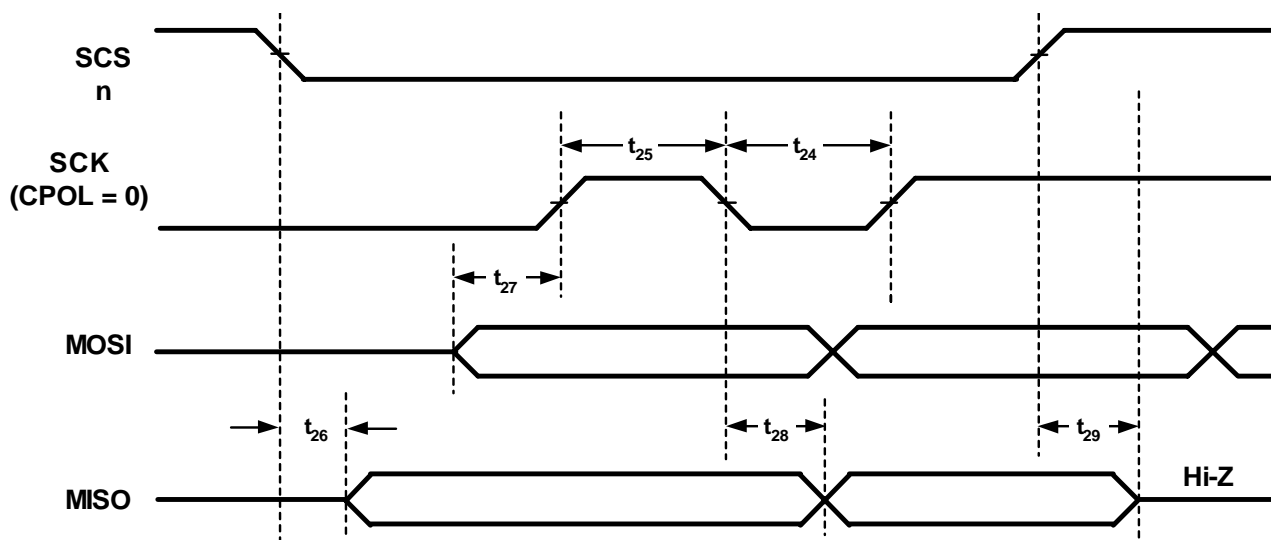
Figure 4. SPI Slave Timing

INTRn Timing

	Parameter	Description	Test Setup	Min	Max	Unit
t_{30}	td(E-I)	Interrupt Event or INT Register status to INTRn valid.			60	ns
t_{31}	td(W-I)	Writing INT Register to INTRn valid.			60	ns
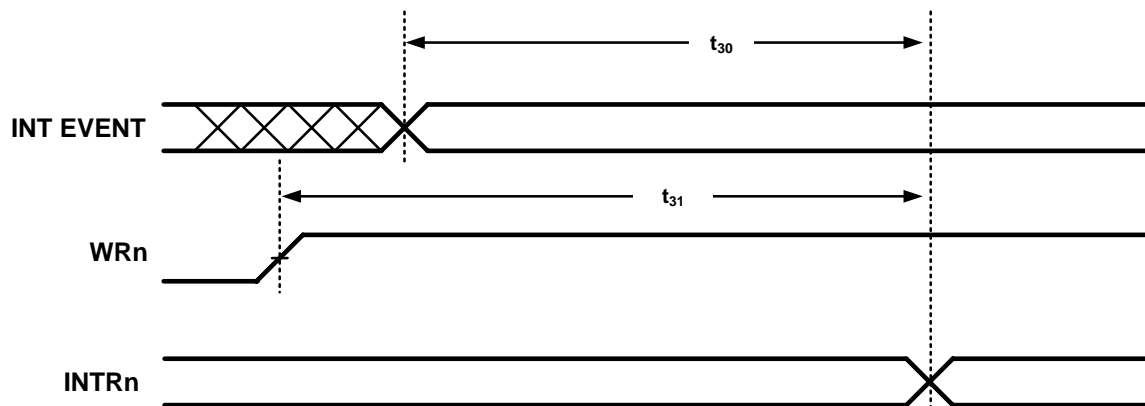
Figure 5. INTRn Timing

SENSOR PINOUT DESCRIPTION

14	13	12	11	10	9	8	7	6	5	4	3	2	1
D6/ MOSI	D7/ MISO	TCLKIN	A0/ SCK	RDn	WRn	CSn/ SCSn	V_{SSC}	V_{SSC}	V_{DDC}	V_{DDO}	V_{SSO}	SHGND	SHGND
					Top View								
D5/ SCK_ INV	D4	D3	D2	D1	D0	INTRn	V_{SSC}	V_{SSC}	V_{DDC}	V_{DDO}	V_{SSO}	SHGND	SHGND
15	16	17	18	19	20	21	22	23	24	25	26	27	28

Sensor Pinout Table

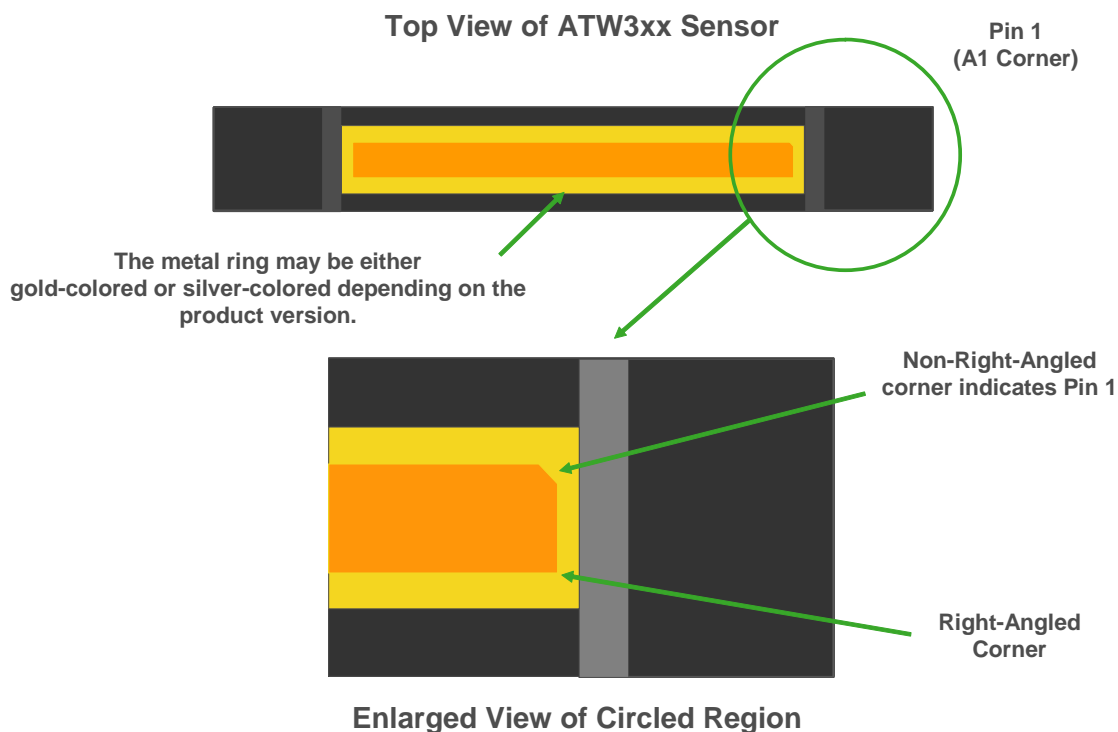| Pin#	Name
1	SHGND
2	SHGND
3	V_{SSO}
4	V_{DDO}
5	V_{DDC}
6	V_{SSC}
7	V_{SSC}
8	CSn / SCSn
9	WRn
10	RDn
11	A0 / SCK
12	TCLKIN
13	D7 / MISO
14	D6 / MOSI
15	D5 / SCK_INV
16	D4
17	D3
18	D2
19	D1
20	D0
21	INTRn
22	V_{SSC}
23	V_{SSC}
24	V_{DDC}
25	V_{DDO}
26	V_{SSO}
27	SHGND
28	SHGND

LGA PACKAGE MECHANICAL DIMENSIONS
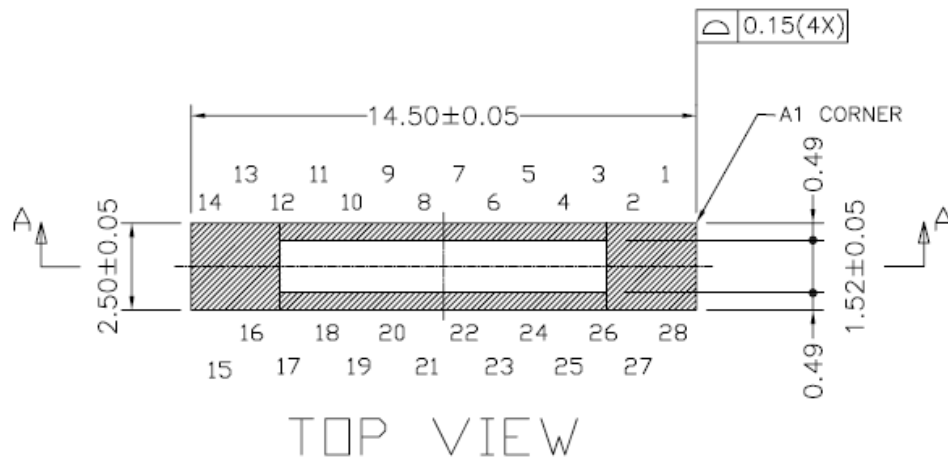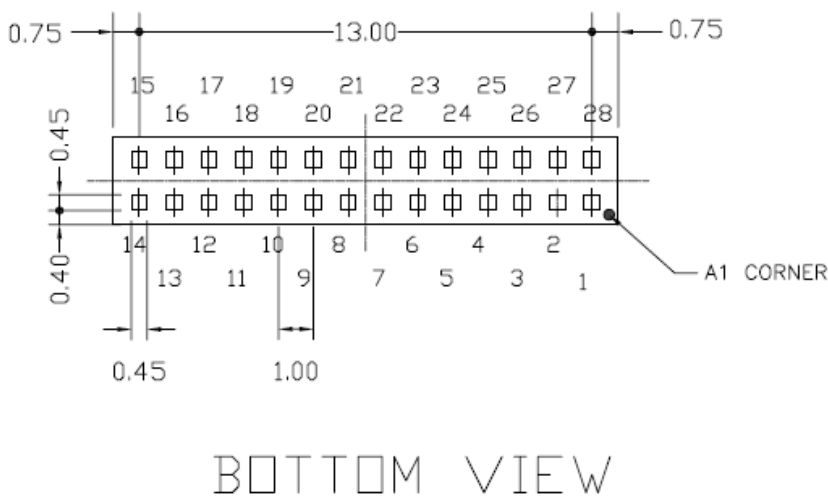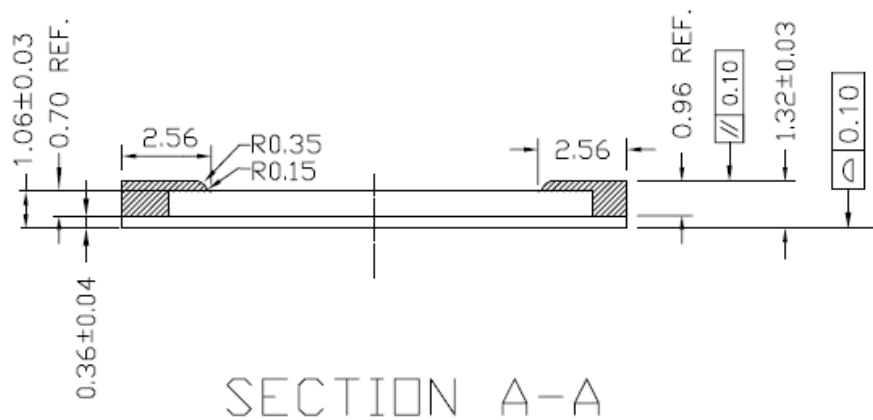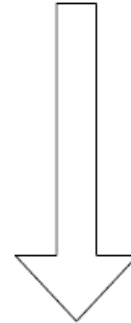
All measurements in millimeters.

TOP VIEW PIN 1 MARK

ATW3xx sensors have a microscopic pin 1 indicator on the top surface of the package to mark the orientation of pin 1. Please refer to the diagram below. The pin 1 orientation is marked by a single non-right-angled corner of the sensing region. The other three corners of the sensing region have right-angled corners. The pin 1 indicator allows the orientation of the sensor to be determined by microscope inspection and/or through automated optical inspection of the top surface of the sensor.

Top View of ATW3xx Sensor

**Pin 1
(A1 Corner)**

**The metal ring may be either
gold-colored or silver-colored depending on the
product version.**

**Non-Right-Angled
corner indicates Pin 1**

**Right-Angled
Corner**

Enlarged View of Circled Region

This marking is a recent addition to the ATW3xx. For information on whether the particular sensors that you have include this marking or not, please contact your local sales person.

RECOMMENDED LAND PATTERN
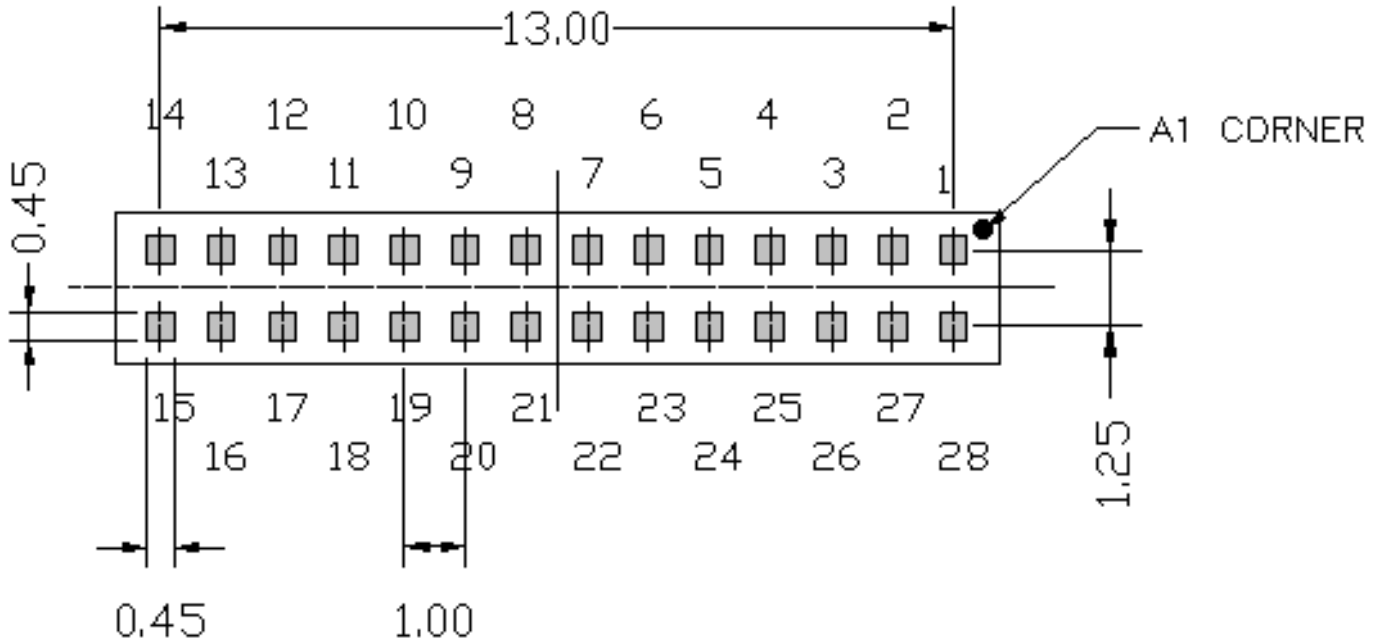
Recommended land pattern for the ATW3xx LGA. All dimensions are in millimeters.

Please note that the recommended land pattern pad size is the same as the LGA pad size. No over or under sizing of pads is recommended.

SENSOR HANDLING GUIDELINES

This information is provided for reference only. Refer to the Manufacturing Guidelines document (631-0002-002) for the latest and most complete guidelines and for additional details on sensor handling during manufacturing operations such as SMT and assembly.

1) Do not allow the sensor's exposed die surface to come in contact with any hard or metallic objects.
2) If the sensors need to be manipulated by hand, operators should use anti-static finger cots and either a static dissipative rubber tipped vacuum wand (or pen) or static dissipative (conductive filament) plastic tipped tweezers. When using vacuum wands (or pens), ensure that the tip of the metal capillary does not extend beyond the rubber suction cup. When using tweezers, ensure the sensor die surface is not allowed to come in contact with the tweezers' tips. Both tweezers tips and rubber cups should be placed on a regular replacement schedule to prevent wear-out damage.
3) Do not stack sensor boards directly on top of each other. Use anti-static foam spacers to separate boards if stacking is absolutely necessary.
4) If protective tape is used on the sensor surface, it should be electrically conductive/static dissipative and not leave adhesive residue, such as a Kapton film tape with silicone adhesive.
5) When handling sensors and sensor sub-assemblies, operators must be properly grounded by one of the following:
   - A wrist strap connected to ground
   - A minimum of one heel ground with both feet on a static dissipative floor surface.
6) When not being processed, sensors and sensor assemblies must be stored in static shielded boxes or antistatic or static dissipative plastic bags.

PRODUCT CONFIGURATION OPTIONS

ATW3XX–YY–$Z_1Z_2Z_3Z_4$

└─Special Configuration Designator

└─Shipping Configuration

└─Package
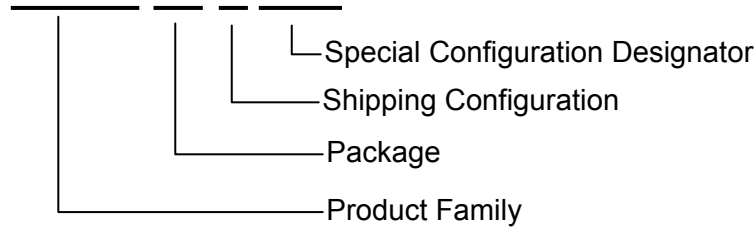
└─Product Family

Where:
ATW3XX indicates the ATRUA Wings Product Family and Surface Color:
    ATW310 – Gold-Colored Sensor Surface Border
    ATW320 – Silver-Colored Sensor Surface Border
YY indicates PACKAGE:
    LA – Land Grid Array (LGA) package
Z_1 indicates the SHIPPING CONFIGURATION :
    0 – Standard Trays – maximum of 240 units per tray
    1 – Standard Tape & Reel[1] – maximum of 3500 units per reel
$Z_2Z_3Z_4$ is a designator for other SPECIAL CONFIGURATIONS:
    000 – Standard Configuration

Example:

ATW310-LA-1000 designates an ATW300 family sensor with gold-color sensor surface, LGA package, shipped in Tape & Reel configuration.

Note 1: Please refer to Atrua's LGA Tape and Reel Specification for further detail.

IMPORTANT NOTICE

This document describes a device currently under development by Atrua, and the information in this document is subject to change without notice. Atrua shall not be responsible for any errors that may appear in this document and makes no commitment to update or keep current the information contained in this document. Atrua advises its customers to obtain the latest version of the device specification to verify, before placing orders, that the information being relied upon by the customer is current.

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Atrua's products are not authorized for use as critical components in life support devices or systems unless a specific written agreement pertaining to such intended use is executed between the customer and Atrua prior to use. Life support devices or systems are those which are intended for surgical implantation into the body, or which sustain life whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

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