StorageLynx 1394 Link-Layer Controller for ATA/ATAPI Storage Products

FEATURES

- **Serial bus data rates of 100, 200, and 400 Mbps**
- **IEEE P1394a compliant and IEEE Std 1394-1995**
- **Automated SBP-2 transport protocol engine**
- **ATA/ATAPI command translation by embedded processor and firmware**
- **Programmable ATA/ATAPI interface supporting PIO modes 0–4, DMA modes 0–2, and Ultra DMA modes 0–4**
- **Automated 1394 and SBP-2 header removal and insertion**
- **Internal parameter RAM for fast access to configuration ROM and key SBP-2 parameters**
- **Automatic response to configuration ROM quadlet and block read requests**
- **External flash PROM / EPROM interface for easy program code changes during prototyping**
- **Separate address and data busses for the external flash PROM / EPROM interface (no external latches)**
- **16K internal ROM program memory**
- **576 Byte (128 quadlet) transmit control FIFO, 576 byte (128 quadlet) receive control FIFO**
- **Bidirectional data FIFO**
- **0.18 micron CMOS technology with embedded RAM and ROM**
- **Space-saving 100 pin TQFP package**

DESCRIPTION

The Texas Instruments TSB42AA9A (StorageLynx) is a 1394 link layer controller designed to function as a native bridge between the 1394 bus and ATA (AT attachment) or ATAPI (AT attachment with packet interface) data storage applications. These data storage devices can include external hard disk drives (HDDs), ZIP drives, magneto-optical (MO) drives, ORB drives, CD-ROMs, CD-R/Ws, DVD-ROMs, and DVD-RAMs. The ATA/ATAPI interface of the TSB42AA9A supports signaling and timing for programmed input/output (PIO) modes 0–4, direct memory access (DMA) modes 0–2, and Ultra DMA modes 0–4. The 1394 interface of StorageLynx is IEEE P1394a(1) and IEEE Std 1394-1995(2) compliant and supports 400, 200, and 100 Mbps serial bus data rates.

StorageLynx is particularly designed for any data storage application that supports the SBP–2(3) (Serial Bus Protocol 2) transaction layer as a target device. The TSB42AA9A automates the SBP-2 target controller functions by implementing the management and command agents in hardware. Data handling is also executed in hardware, with no assistance from the processor needed to setup a DMA transaction to fetch data from the ATA/ATAPI device and return it to the SBP-2 initiator via the 1394 bus. StorageLynx translates SBP-2 protocol commands to ATA/ATAPI commands using the hardware-implemented functions and an embedded 8052 processor executing firmware. The firmware is located in the internal ROM of the device or optionally, an external memory location.

A 2-wire serial bus interface is included on the TSB42AA9A. This interface enables configuration ROM information required by IEEE Std 1394-1995(2) and SBP-2 to be loaded from a serial EEPROM into the device's internal parameter RAM. The internal parameter RAM allows StorageLynx faster access to important configuration information as well as automatic responses to configuration ROM read requests from the system host. In addition, StorageLynx provides a memory interface that can be used to access firmware from an external Flash PROM/EPROM for testing and development purposes, or to support storage applications that require specialized functionality. The StorageLynx memory interface also supports write operations to the Flash PROM/EPROM, removing the need for parts to be in sockets and allowing for easy software downloads. Flash memory is not required unless custom functionality and in-system reprogrammability are requirements.

(1) IEEE P1394a, Draft Standard for a High Performance Serial Bus (Supplement)
(2) IEEE Std 1394–1995, Standard for a High Performance Serial Bus
(3) T10 Project 1155D, ANSI NCTIS.xxx-199x, Serial Bus Protocol 2 (SBP-2)

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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of the Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

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NOTE:

This product is for high-volume PC applications only. For a complete datasheet or more information contact support@ti.com.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
TSB42AA9APZT	ACTIVE	TQFP	PZT	100	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-4-260C-72 HR
TSB42AA9APZTG4	ACTIVE	TQFP	PZT	100	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-4-260C-72 HR
TSB42AA9APZTR	ACTIVE	TQFP	PZT	100	1000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-4-260C-72 HR
TSB42AA9APZTRG4	ACTIVE	TQFP	PZT	100	1000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-4-260C-72 HR

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
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Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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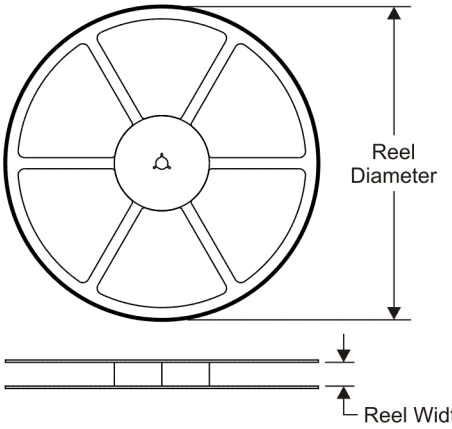
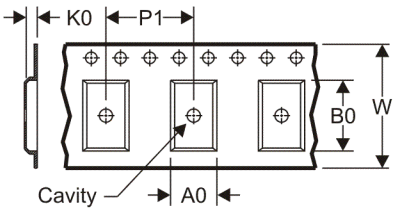
TAPE AND REEL INFORMATION

REEL DIMENSIONS

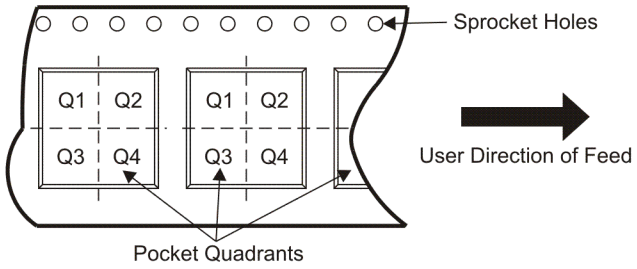


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

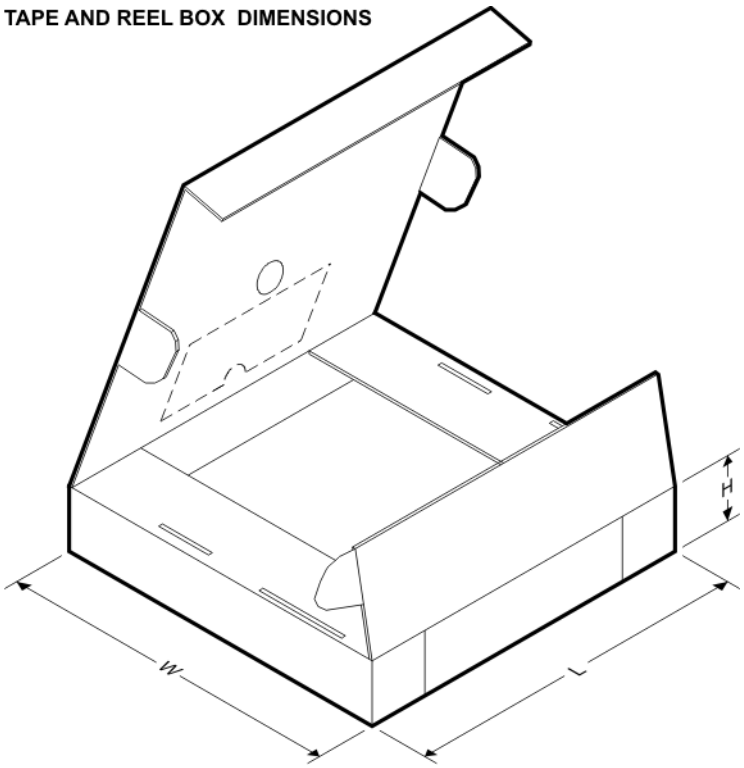
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TSB42AA9APZTR	TQFP	PZT	100	1000	330.0	24.4	17.0	17.0	1.5	20.0	24.0	Q2

TAPE AND REEL BOX DIMENSIONS

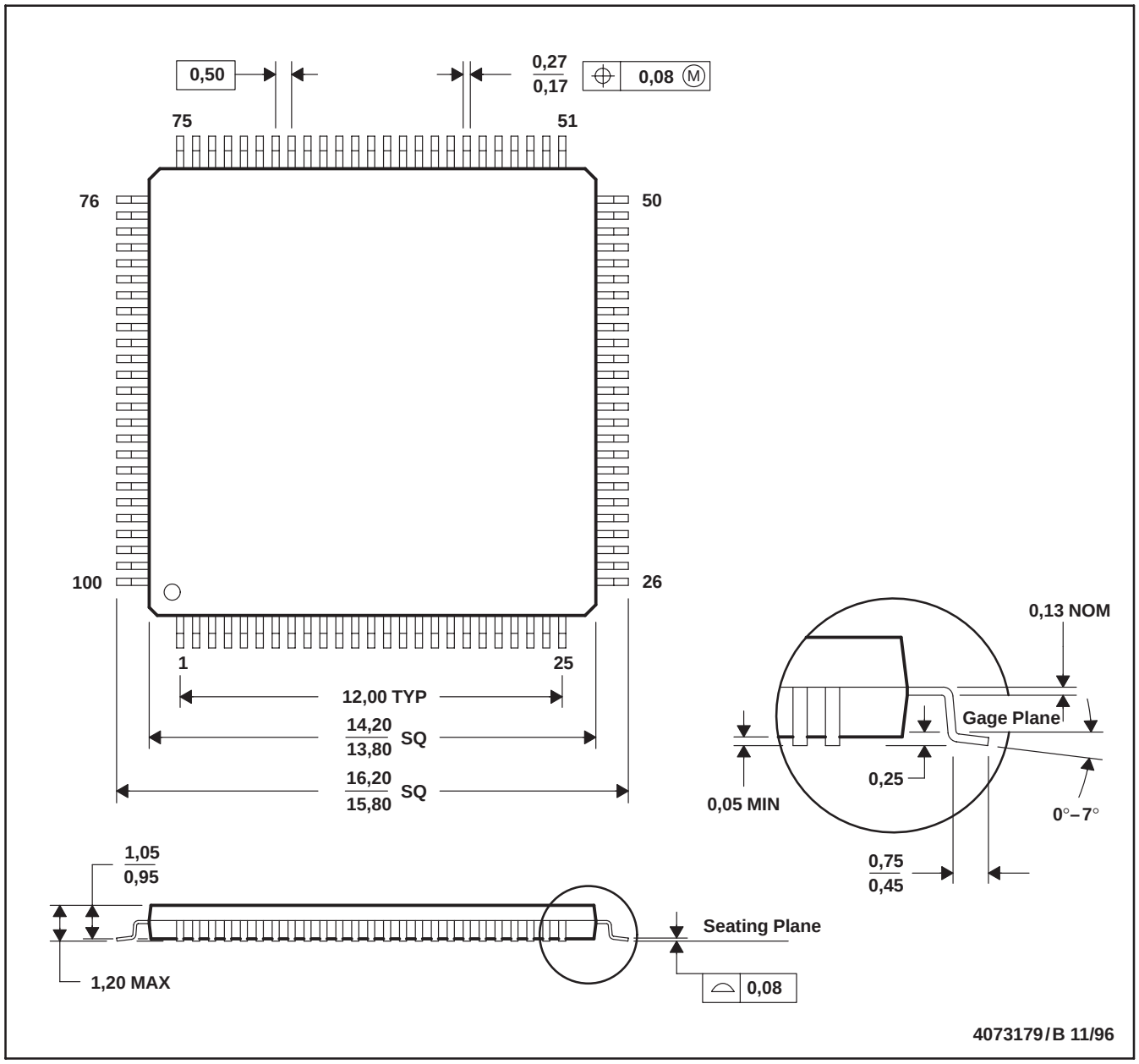


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TSB42AA9APZTR	TQFP	PZT	100	1000	346.0	346.0	41.0

MTQF012B – OCTOBER 1994 – REVISED DECEMBER 1996

PZT (S-PQFP-G100) **PLASTIC QUAD FLATPACK**



NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Falls within JEDEC MS-026

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