

(ceLynx) IEEE 1394-a Consumer Electronics Link Layer Controller

FEATURES

- DTCP content protection (TSB42AA4 only). A separate document explains the DTCP hardware errata for TSB42AA4. It is available upon request to DTLA licensees only.
- Interfaces directly to industry standard 400-, 200-, and 100-Mbps physical layer devices, including Texas Instruments TSB41LV0X and TSB41AXX family of physical layer devices
- Compliant with IEEE 1394-1995 and IEEE 1394a-2000 standards
- MPEG2 time stamp-based release, as described in IEC 61883-4
- High-speed data interface (HSDI):
 - Byte-wide or serial mode
 - Two independent HSDI ports
 - Bidirectional
 - Several control modes for a variety of applications
 - Connects seamlessly to common MPEG2 decoder chipsets
- 16-bit microprocessor interface supports Motorola 68000/68020-style bus
- Large 8K-byte FIFO can be configured up to eight independent Tx or Rx FIFOs
- 8K-byte FIFO supports the following data types:
 - DVB MPEG2 transport streams (IEC 61883-4)
 - DirecTV™ transport streams
 - DV program streams (IEC 61883-2)
 - Asynchronous streams
 - Support for external processor DMA
- Programmable data-/space-available indications for flow control; *almost full* and *almost empty* indicators
- Supports bus manager functions and automatic 1394 self-ID verification
- Interrupt driven to minimize host polling
- Single 3.3-V supply
- Separate async acknowledge buffer decreases the ack-tracking burden on host
- JTAG interface to support post-assembly scan of device I/O
- Bus holder isolation
- Embedded support for DTCP content protection:
 - Two M6 baseline ciphers (one per HSDI port)
 - Random number generator in hardware
 - SHA-1 secure hash algorithm in hardware
 - Authentication key cipher in hardware
- Optional auto-configuration for MPEG2/DV transmit and receive functions
- PID filtering and packet insertion for MPEG2 transport stream

DESCRIPTION

Consumer Electronics Link (ceLynx) is a high-performance 1394 link layer device designed specifically to support advanced consumer electronics applications, particularly those applications which require the transmission of Moving Picture Expert Group 2 (MPEG2) transport streams and encryption/decryption of those streams across a 1394 network. The device supports both digital video broadcasting (DVB) and DirecTV™ type MPEG2 streams using the digital transmission content protection method (DTCP) method of encryption, as well as digital video (DV) encoded streams. The ceLynx supports both the IEC 61883 standard for DVB and DV streams over 1394 and the 1394 Trade Association standard for DirecTV over 1394.



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The ceLynx is also versatile enough to handle asynchronous data and asynchronous streams. A key feature of the ceLynx is its ability to handle multiple data type streams simultaneously; the user may transport DVB, DirecTV, DV data streams, and asynchronous data *simultaneously*. The ceLynx can also support multiple streams of the same data type simultaneously, (for example, transmit or receive two DVB transport streams or two DV streams).

The ceLynx is full duplex, allowing simultaneous playback and recording of audio/video data. Full duplex support also includes the capability of using the DTCP method, simultaneously using the two embedded M6 cipher modules. The large internal 8-Kbyte FIFO is very flexible, allowing the user to partition it into eight independent first in first out (FIFOs) and allowing the user to determine the exact configuration of each of these FIFOs to fit the application. Advanced features have been added to support program ID (PID) filtering and packet insertions.

The ceLynx is also designed to interface seamlessly with popular MPEG2 decoder chipsets. This decreases the design-in effort of customers when using these popular chipsets.

NOTE:

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

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package Pins	Package qty Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
TSB42AB4PDT	Active	Production	TQFP (PDT) 128	90 JEDEC TRAY (5+1)	Yes	NIPDAU	Level-3-260C-168 HR	0 to 70	TSB42AB4 F731992D
TSB42AB4PDT.A	Active	Production	TQFP (PDT) 128	90 JEDEC TRAY (5+1)	Yes	NIPDAU	Level-3-260C-168 HR	0 to 70	TSB42AB4 F731992D

⁽¹⁾ **Status:** For more details on status, see our [product life cycle](#).

⁽²⁾ **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

⁽³⁾ **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

⁽⁴⁾ **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

⁽⁵⁾ **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

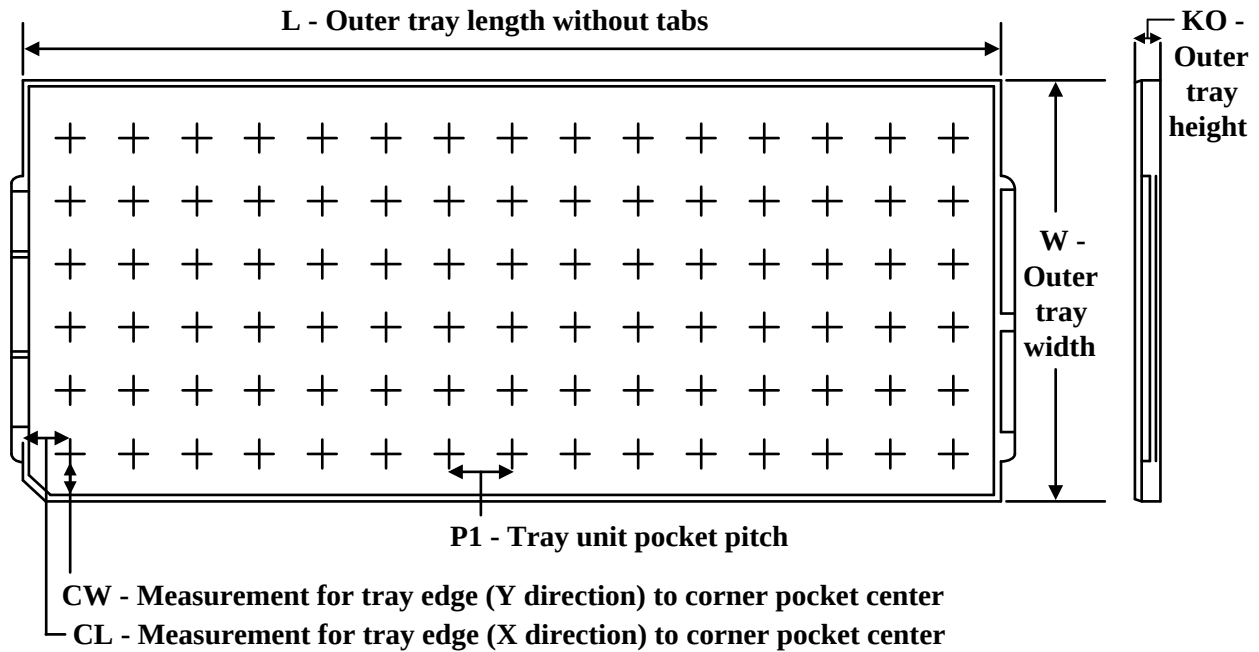
⁽⁶⁾ **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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TRAY



Chamfer on Tray corner indicates Pin 1 orientation of packed units.

*All dimensions are nominal

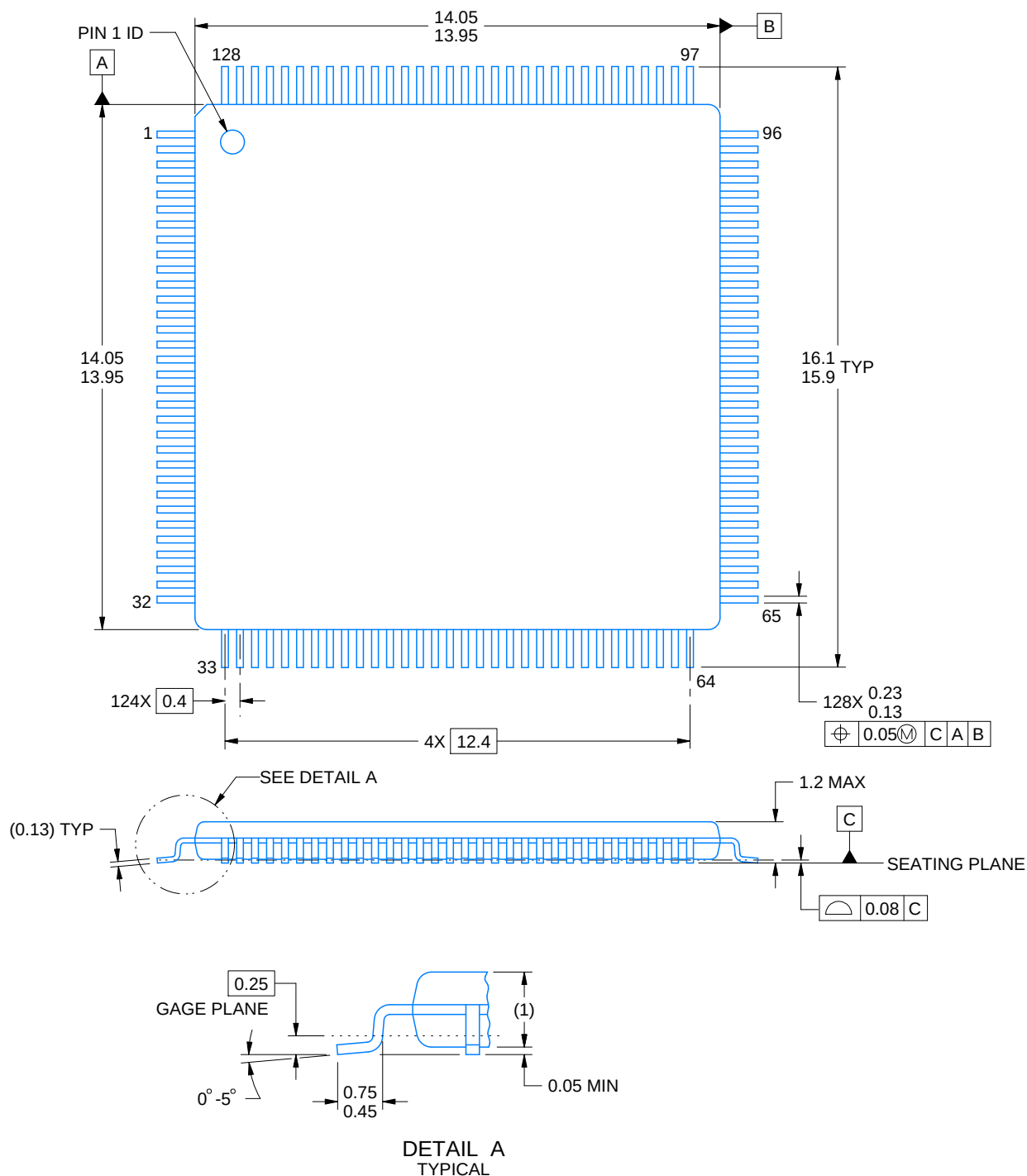
Device	Package Name	Package Type	Pins	SPQ	Unit array matrix	Max temperature (°C)	L (mm)	W (mm)	K0 (μm)	P1 (mm)	CL (mm)	CW (mm)
TSB42AB4PDT	PDT	TQFP	128	90	6 X 15	150	315	135.9	7620	15.4	20.3	21
TSB42AB4PDT.A	PDT	TQFP	128	90	6 X 15	150	315	135.9	7620	15.4	20.3	21

PACKAGE OUTLINE

PDT0128A

TQFP - 1.2 mm max height

PLASTIC QUAD FLATPACK



4215171/A 10/2023

NOTES:

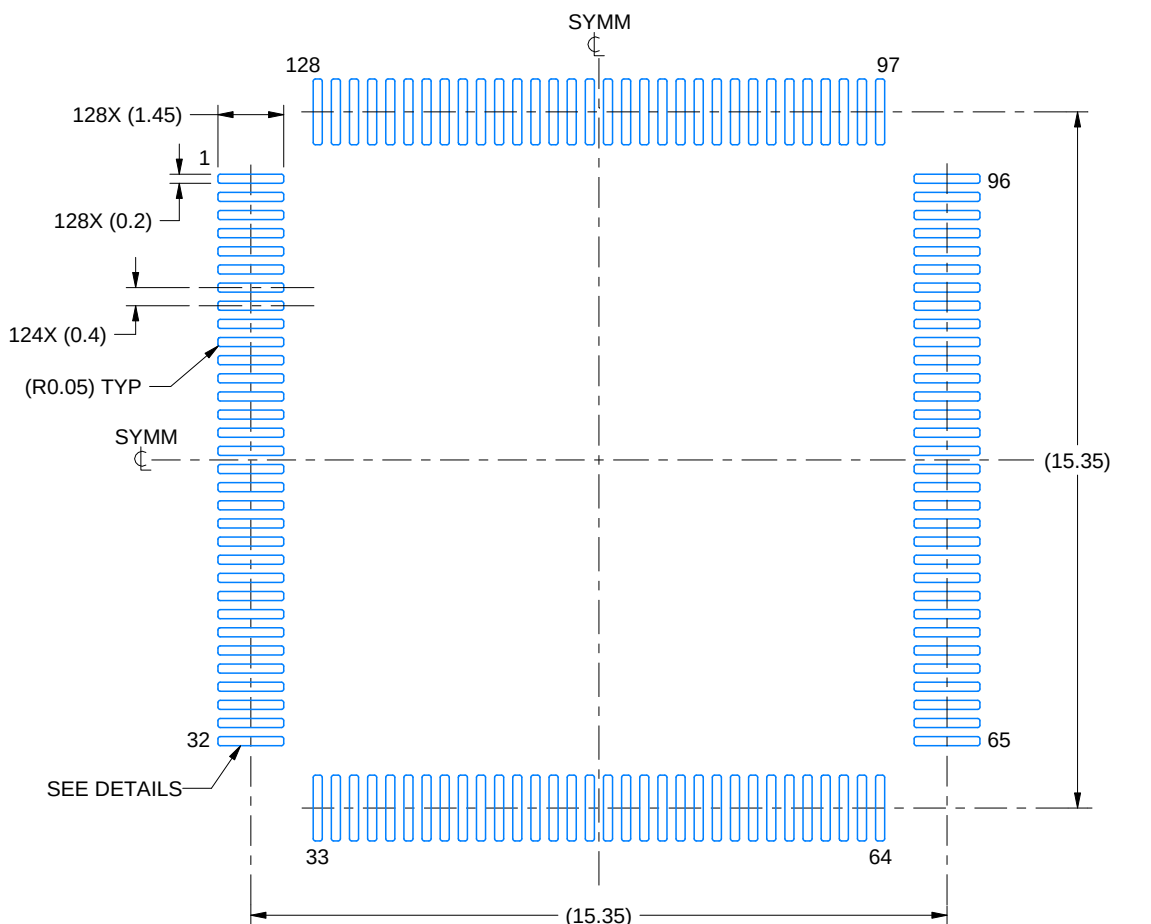
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

EXAMPLE BOARD LAYOUT

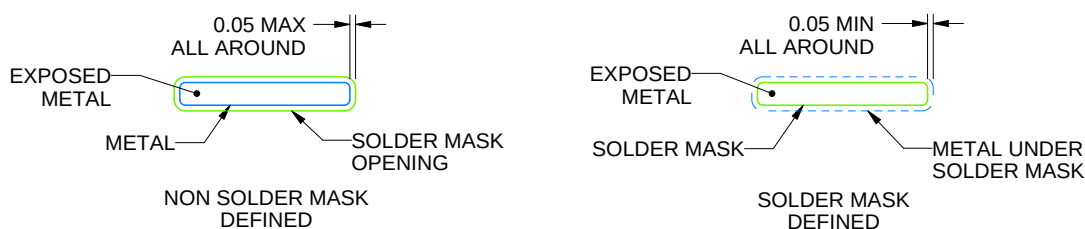
PDT0128A

TQFP - 1.2 mm max height

PLASTIC QUAD FLATPACK



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:6X



SOLDER MASK DETAILS

4215171/A 10/2023

NOTES: (continued)

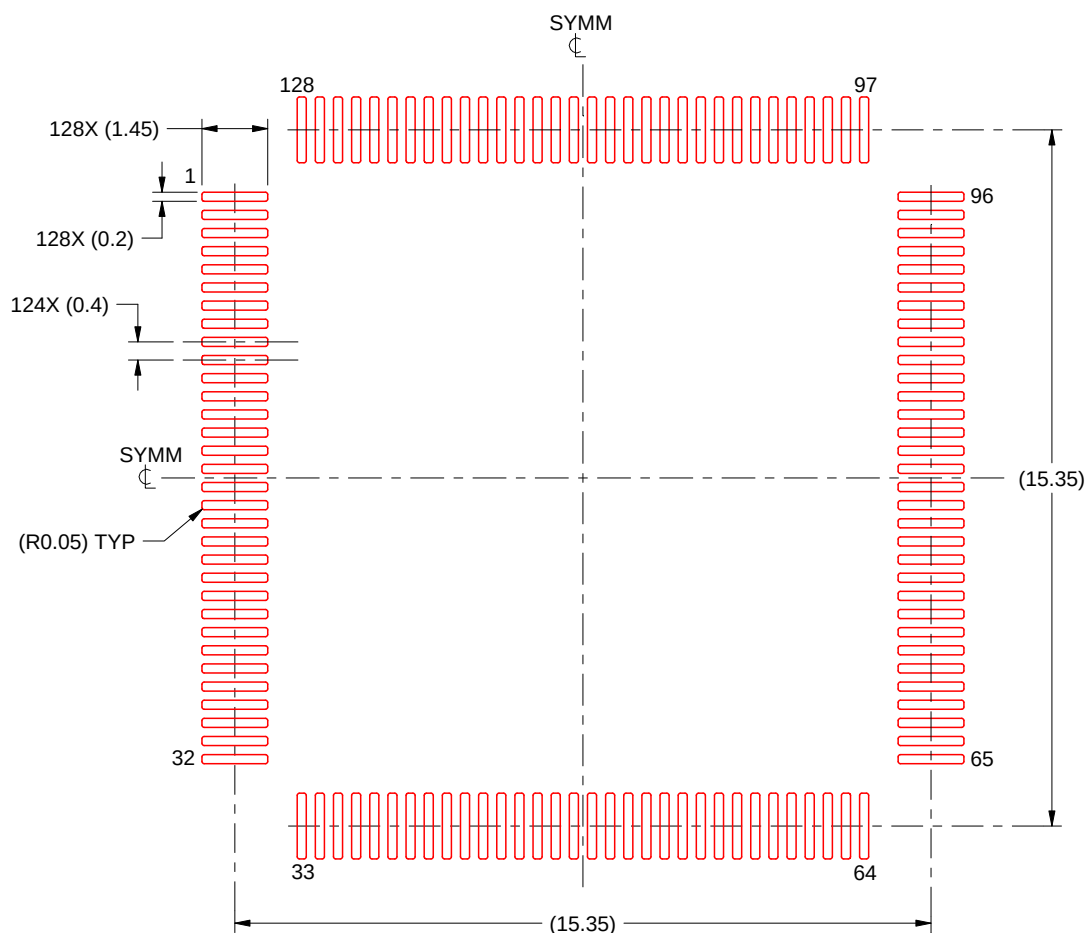
3. Publication IPC-7351 may have alternate designs.
4. Solder mask tolerances between and around signal pads can vary based on board fabrication site.
5. For more information, see Texas Instruments literature numbers SLMA002 (www.ti.com/lit/slma002) and SLMA004 (www.ti.com/lit/slma004).

EXAMPLE STENCIL DESIGN

PDT0128A

TQFP - 1.2 mm max height

PLASTIC QUAD FLATPACK



SOLDER PASTE EXAMPLE
BASED ON 0.1 mm THICK STENCIL
SCALE:6X

4215171/A 10/2023

NOTES: (continued)

6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
7. Board assembly site may have different recommendations for stencil design.

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Last updated 10/2025