
FEATURES

- Compliant With IEEE 1394-1995 Standards and 1394a-2000 Supplement for High Performance Serial Bus
- Supports Transfer Rates of 400, 200, or 100 Mbps
- Compatible With Texas Instruments Physical Layer Controllers (Phys)
- Supports the Texas Instruments Bus Holder Galvanic Isolation Barrier
- Glueless Interface to 68000 and ColdFire Microcontrollers/Microprocessors
- Supports ColdFire Burst Transfers
- Programmable Microcontroller Interface With 8-Bit or 16-Bit Data Bus, Multiple Modes of Operation Including Burst Mode, and Clock Frequency to 60 MHz
- 8-Bit or 16-Bit Data-Mover Port (DM Port) Supports Isochronous, Asynchronous, and Asynchronous Streaming Transmit/Receive From an Unbuffered Port at a Clock Frequency of 25 MHz.
- Backward Compatible With All TSB12LV31(GP2Lynx) Microcontroller and Data-Mover Functionality in Hardware
- Two-Channel Support for Isochronous Receive to Unbuffered 8/16 Data-Mover Port
- Four-Channel Support for Isochronous Transmit From Unbuffered 8/16 Bit Data-Mover Port
- Single 3.3-V Supply Operation With 5-V Tolerance Using 5-V Bias Terminals
- High Performance 100-Pin PZ Package

NOTE: Implements technology covered by one or more patents of Apple Computer, Incorporated and SGS Thomson, Limited.

DESCRIPTION

The TSB12LV32 (GP2Lynx) is a high-performance general-purpose IEEE 1394a-2000 link-layer controller (LLC) with the capability of transferring data between the 1394 Phy-link interface, an external host controller, and an external device connected to the data-mover port (local bus interface). The 1394 Phy-link interface provides the connection to a 1394 physical layer device and is supported by the LLC. The LLC provides the control for transmitting and receiving 1394 packet data between the microcontroller interface and the Phy-link interface via internal 2-Kbyte FIFOs at rates up to 400 Mbps. The TSB12LV32 transmits and receives correctly formatted 1394 packets, generates and detects the 1394 cycle start packets, communicates transaction layer transmit requests to the Phy, and generates and inspects the 32-bit cyclic redundancy check (CRC).

The TSB12LV32 is capable of being 1394 cycle master (CM), 1394 bus manager, 1394 isochronous resource manager (IRM) if additional control status registers (CSRs) are added via the external host controller, and supports reception of 1394 isochronous data on two channels and transmission of 1394 isochronous data on four channels.

The TSB12LV32 supports a direct interface to many microprocessors/microcontrollers by including programmable endian swapping. TSB12LV32 has a generic 16-/8-bit host bus interface which includes support for a ColdFireE microcontroller mode at rates up to 60 MHz. The microcontroller interface can operate in byte or word (16 bit) accesses.

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.
The data-mover block in GP2Lynx handles the external memory interface of large data blocks. This local bus interface can be configured either to transmit or receive data packets. The packets can be either asynchronous, isochronous, or asynchronous streaming data packets. The data-mover (DM) port can receive any type of packet, but it can only transmit one type of packet at a time: isochronous data packets, asynchronous data packets, or asynchronous stream data packets.

The internal FIFO is separated into an asynchronous transmit FIFO (ATF) and a general receive FIFO (GRF), each of 520 quadlets (2 Kbytes). Asynchronous and/or isochronous receive packets can be routed to either the DM port or the GRF via the receiver routing control logic. Asynchronous data packets or asynchronous stream data packets can be transmitted from the DM port or the internal FIFO: ATF. If there is contention the ATF has priority and is transmitted first. Isochronous packets can only be transmitted by the data-mover port.

The LLC also provides the capability to receive status information from the physical layer device and to access the physical layer control and status registers by the application software.

NOTE:

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

<table>
<thead>
<tr>
<th>Orderable Device</th>
<th>Status</th>
<th>Package Type</th>
<th>Package Drawing</th>
<th>Pins</th>
<th>Package Qty</th>
<th>Eco Plan</th>
<th>Lead finish/Ball material</th>
<th>MSL Peak Temp</th>
<th>Op Temp (°C)</th>
<th>Device Marking</th>
<th>Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSB12LV32PZ</td>
<td>ACTIVE</td>
<td>LQFP</td>
<td>PZ</td>
<td>100</td>
<td>90</td>
<td>RoHS &amp; Green</td>
<td>NIPDAU</td>
<td>Level-3-260C-168 HR</td>
<td>0 to 70</td>
<td>TSB12LV32</td>
<td>F711538A</td>
</tr>
<tr>
<td>TSB12LV32PZG4</td>
<td>ACTIVE</td>
<td>LQFP</td>
<td>PZ</td>
<td>100</td>
<td>90</td>
<td>RoHS &amp; Green</td>
<td>NIPDAU</td>
<td>Level-3-260C-168 HR</td>
<td>0 to 70</td>
<td>TSB12LV32</td>
<td>F711538A</td>
</tr>
</tbody>
</table>

(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) **RoHS**: TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
- **RoHS Exempt**: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
- **Green**: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

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

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices 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.

**Important Information and Disclaimer:** The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.
OTHER QUALIFIED VERSIONS OF TSB12LV32:


NOTE: Qualified Version Definitions:

- Enhanced Product - Supports Defense, Aerospace and Medical Applications
Chamfer on Tray corner indicates Pin 1 orientation of packed units.

*All dimensions are nominal

<table>
<thead>
<tr>
<th>Device</th>
<th>Package Name</th>
<th>Package Type</th>
<th>Pins</th>
<th>SPQ</th>
<th>Unit array matrix</th>
<th>Max temperature (°C)</th>
<th>L (mm)</th>
<th>W (mm)</th>
<th>K0 (µm)</th>
<th>P1 (mm)</th>
<th>CL (mm)</th>
<th>CW (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSB12LV32PZ</td>
<td>PZ</td>
<td>LQFP</td>
<td>100</td>
<td>90</td>
<td>6 x 15</td>
<td>150</td>
<td>315</td>
<td>135.9</td>
<td>7620</td>
<td>20.3</td>
<td>15.4</td>
<td>15.4</td>
</tr>
<tr>
<td>TSB12LV32PZG4</td>
<td>PZ</td>
<td>LQFP</td>
<td>100</td>
<td>90</td>
<td>6 x 15</td>
<td>150</td>
<td>315</td>
<td>135.9</td>
<td>7620</td>
<td>20.3</td>
<td>15.4</td>
<td>15.4</td>
</tr>
</tbody>
</table>
PZ (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
NOTES:

A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.
D. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.
IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI’s products are provided subject to TI’s Terms of Sale or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI’s provision of these resources does not expand or otherwise alter TI’s applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2022, Texas Instruments Incorporated