

Distributed by:

JAMECO[®]
ELECTRONICS

www.Jameco.com ♦ 1-800-831-4242

The content and copyrights of the attached
material are the property of its owner.

Jameco Part Number 1128621

1394b OHCI-Lynx Controller

FEATURES

- Single 3.3-V supply (1.8-V internal core voltage with regulator)
- 3.3-V and 5-V PCI signaling environments
- Serial bus data rates of 100M bits/s, 200M bits/s, 400M bits/s, and 800M bits/s
- Physical write posting of up to three outstanding transactions
- Serial ROM or boot ROM interface supports 2-wire serial EEPROM devices
- 33-MHz/64-bit and 33-MHz/32-bit selectable PCI interface
- Multifunction terminal (MFUNC terminal 1):
 - $\overline{\text{PCI_CLKRUN}}$ protocol per the *PCI Mobile Design Guide*
 - General-purpose I/O
 - CYCLEIN/CYCLEOUT for external cycle timer control for customized synchronization
- PCI burst transfers and deep FIFOs to tolerate large host latency:
 - Transmit FIFO—5K asynchronous
 - Transmit FIFO—2K isochronous
 - Receive FIFO—2K asynchronous
 - Receive FIFO—2K isochronous
- D0, D1, D2, and D3 power states and $\overline{\text{PME}}$ events per the *PCI Bus Power Management Interface Specification*
- Programmable asynchronous transmit threshold
- Isochronous receive dual-buffer mode
- Out-of-order pipelining for asynchronous transmit requests
- Register access fail interrupt when the PHY SYCLK is not active
- Initial bandwidth available and initial channels available registers
- Digital video and audio performance enhancements
- Fabricated in advanced low-power CMOS process
- Packaged in 144-terminal LQFP (PGE) or 176-ball MicroStar BGA (GGW)

DESCRIPTION

The TSB82AA2 OHCI-Lynx is a discrete 1394b link-layer device, which has been designed to meet the demanding requirements of today's 1394 bus designs. The TSB82AA2 device is capable of exceptional 800M bits/s performance; thus, providing the throughput and bandwidth to move data efficiently and quickly between the PCI and 1394 buses. The TSB82AA2 device also provides outstanding ultra-low power operation and intelligent power management capabilities. The device provides the IEEE 1394 link function and is compatible with 100M bits/s, 200M bits/s, 400M bits/s, and 800M bits/s serial bus data rates.

The TSB82AA2 improved throughput and increased bandwidth make it ideal for today's high-end PCs and open the door for the development of S800 RAID- and SAN-based peripherals.

The TSB82AA2 OHCI-Lynx operates as the interface between a 33-MHz/64-bit or 33-MHz/32-bit PCI local bus and a compatible 1394b PHY-layer device (such as the TSB81BA3 device) that is capable of supporting serial data rates at 98.304M, 196.608M, 393.216M, or 786.432M bits/s (referred to as S100, S200, S400, or S800 speeds, respectively). When acting as a PCI bus master, the TSB82AA2 device is capable of multiple cacheline bursts of data, which can transfer at 264M bytes/s for 64-bit transfers or 132M bytes/s for 32-bit transfers after connecting to the memory controller.



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.

Due to the high throughput potential of the TSB82AA2 device, it is possible to encounter large PCI and legacy 1394 bus latencies, which can cause the 1394 data to be overrun. To overcome this potential problem, the TSB82AA2 implements deep transmit and receive FIFOs to buffer the 1394 data, thus preventing possible problems due to bus latency. This also ensures that the device can transmit and receive sustained maximum size isochronous or asynchronous data payloads at S800.

The TSB82AA2 device implements other performance enhancements to improve overall performance of the device, such as: a highly tuned physical data path for enhanced SBP-2 performance, physical post writing buffers, multiple isochronous contexts, and advanced internal arbitration.

The TSB82AA2 device also implements hardware enhancements to better support digital video (DV) and MPEG data stream reception and transmission. These enhancements are enabled through the isochronous receive digital video enhancements register at TI extension offset A80h. These enhancements include automatic time stamp insertion for transmitted DV and MPEG-formatted streams and common isochronous packet (CIP) header stripping for received DV streams.

The CIP format is defined by the IEC 61883-1:1998 specification. The enhancements to the isochronous data contexts are implemented as hardware support for the synchronization timestamp for both DV and audio/video CIP formats. The TSB82AA2 device supports modification of the synchronization timestamp field to ensure that the value inserted via software is not stale—that is, less than the current cycle timer when the packet is transmitted.

The TSB82AA2 performance and enhanced throughput make it an excellent choice for today's 1394 PC market; however, the portable, mobile, and even today's desktop PCs power management schemes continue to require devices to use less and less power, and Texas Instrument's 1394 OHCI-Lynx product line has continued to raise the bar by providing the lowest power 1394 link-layers in the industry. The TSB82AA2 device represents the next evolution of Texas Instruments commitment to meet the challenge of power-sensitive applications. The TSB82AA2 device has ultra-low operational power requirements and intelligent power management capabilities that allow it to autonomously conserve power based on the device usage.

One of the key elements for reducing the TSB82AA2 operational power requirements is Texas Instrument's advanced CMOS process and the implementation of an internal 1.8-V core, which is supplied by an improved integrated 3.3-V to 1.8-V voltage regulator. The TSB82AA2 device implements a next generation voltage regulator which is more efficient than its predecessors, thus providing an overall reduction in the device's operational power requirements especially when operating in D3_{cold} using auxiliary power. In fact, the TSB82AA2 device fully supports D0, D1, D2, and D3_{hot/cold} power states as specified in the *PC 2001 Design Guide* requirements and the *PCI Power Management Specification*. PME wake event support is subject to operating system support and implementation.

As required by the *1394 Open Host Controller Interface Specification* (OHCI) and IEEE Std 1394a–2000, internal control registers are memory-mapped and nonprefetchable. The PCI configuration header is accessed through configuration cycles as specified by the *PCI Local Bus Specification*, and provides plug-and-play (PnP) compatibility. Furthermore, the TSB82AA2 device is fully compliant with the latest *PCI Local Bus Specification*, *PCI Bus Power Management Interface Specification*, IEEE Draft Std 1394b, IEEE Std 1394a–2000, and *1394 Open Host Controller Interface Specification*.

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⁾
TSB82AA2GGW	ACTIVE	BGA MI CROSTAR	GGW	176	126	TBD	SNPB	Level-3-220C-168 HR
TSB82AA2IPGE	ACTIVE	LQFP	PGE	144	60	TBD	CU NIPDAU	Level-1-235C-UNLIM
TSB82AA2PGE	ACTIVE	LQFP	PGE	144	60	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-3-260C-168 HR
TSB82AA2PGE4	ACTIVE	LQFP	PGE	144	60	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-3-260C-168 HR
TSB82AA2ZGW	ACTIVE	BGA MI CROSTAR	ZGW	176	126	Green (RoHS & no Sb/Br)	SNAGCU	Level-3-260C-168 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.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

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)

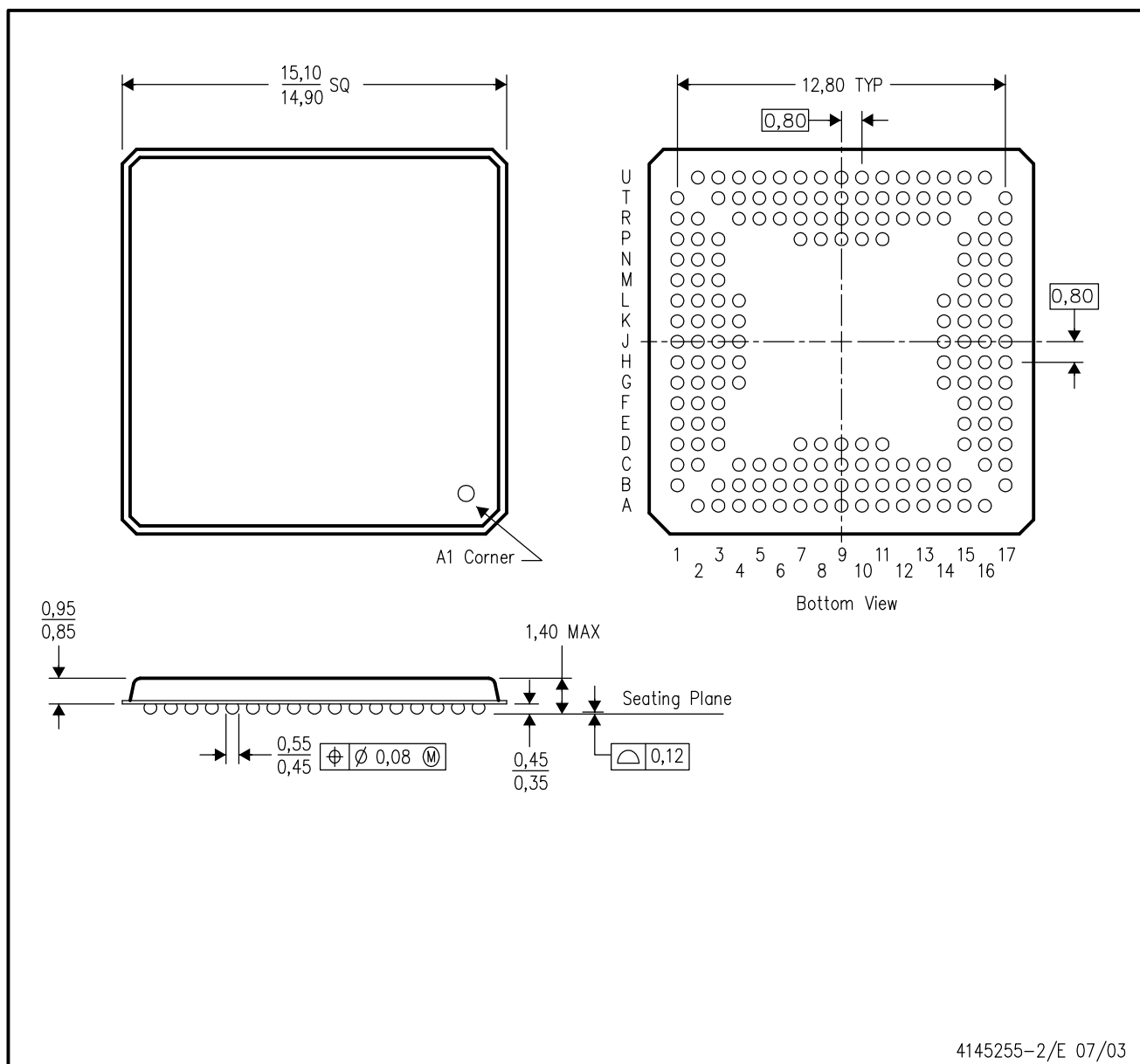
⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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.

GGW (S-PBGA-N176)

PLASTIC BALL GRID ARRAY

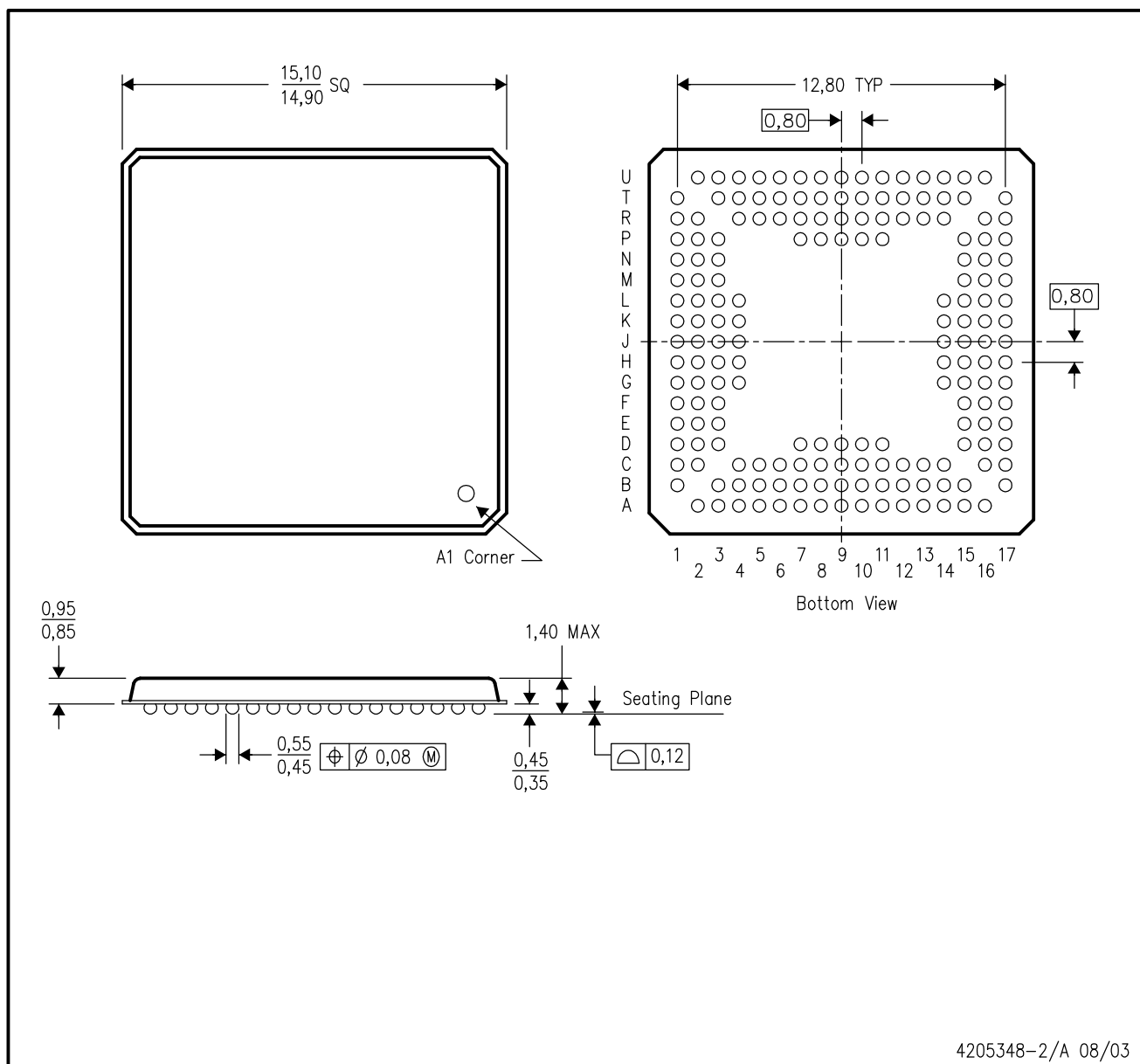


- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. MicroStar BGA™ configuration

MicroStar BGA is a trademark of Texas Instruments.

ZGW (S-PBGA-N176)

PLASTIC BALL GRID ARRAY

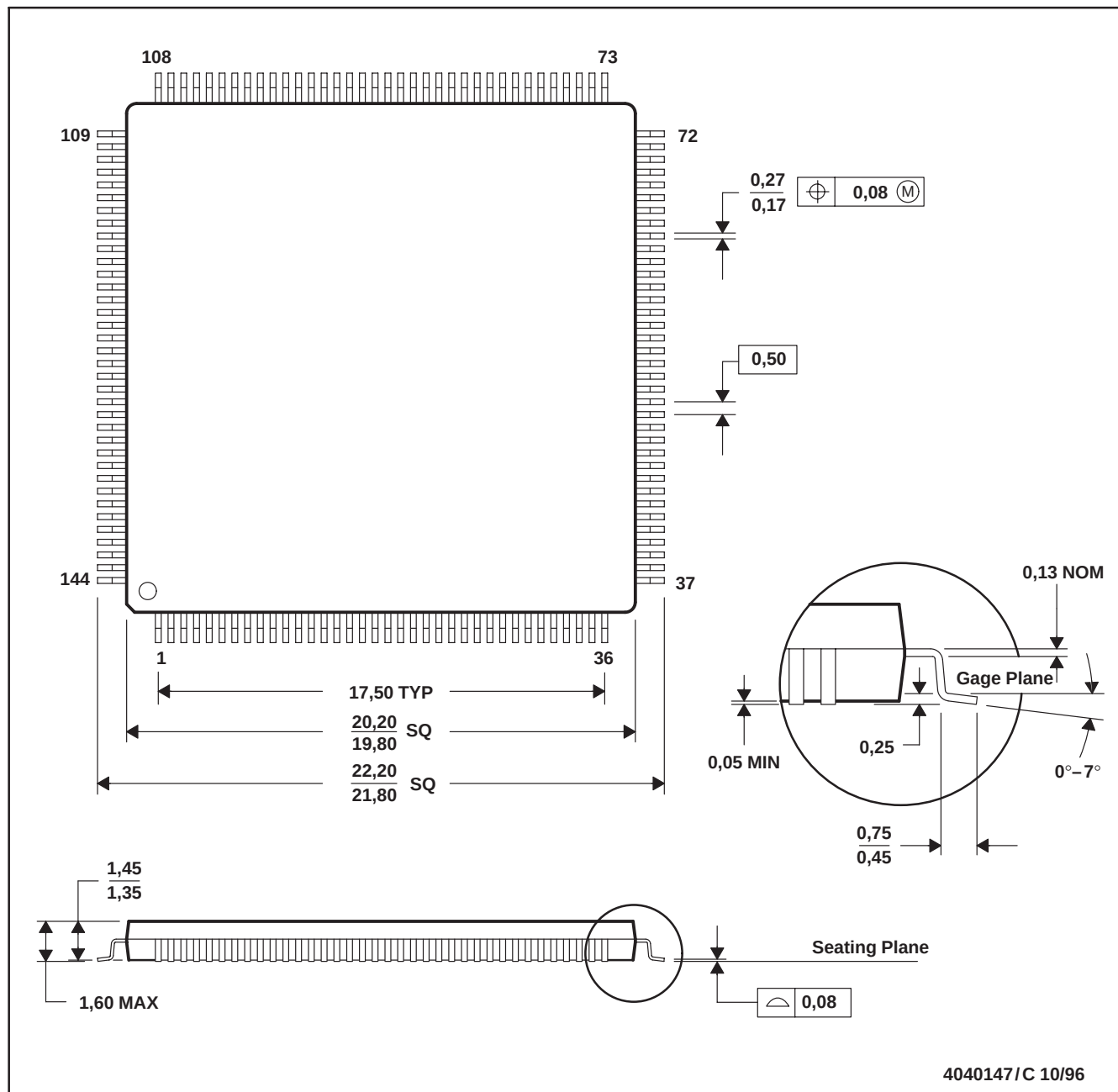


- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. MicroStar BGA™ configuration
 - D. This package is lead-free.

MicroStar BGA is a trademark of Texas Instruments.

PGE (S-PQFP-G144)

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

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products

Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DSP	dsp.ti.com
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
Low Power	www.ti.com/lpw
Wireless	

Applications

Audio	www.ti.com/audio
Automotive	www.ti.com/automotive
Broadband	www.ti.com/broadband
Digital Control	www.ti.com/digitalcontrol
Military	www.ti.com/military
Optical Networking	www.ti.com/opticalnetwork
Security	www.ti.com/security
Telephony	www.ti.com/telephony
Video & Imaging	www.ti.com/video
Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2007, Texas Instruments Incorporated