(iShynx II) 1394 Integrated PHY and Link-Layer Controller for SBP-2 Products and DPP Products

FEATURES

- IEEE 1394a-2000 Compliant
- Single 3.3-V Supply
- Internal 1.8-V Circuit to Reduce Power Consumption
- Integrated 400-Mbps Two-Port Physical Layer (PHY)
- Internal Voltage Regulator
- IEEE 1394 Related Functions:
  - Automated Read Response for ConfigROM Register Access
  - Automated Single Retry Protocol and Split Transaction Control
- SBP-2 Related Functions:
  - Supports Four Initiators by Automated Transactions and More Can Be Supported Through Firmware.
  - Automated Management ORB Fetching
  - Automated Linked Command ORB Fetching
  - Automated PageTable Fetching
  - Automated Status Block Transmit
- Ability to Support Direct Print Protocol (DPP) Mode
- Data Transfers:
  - Auto Address Increment of Direct/Indirect Addressing on Data Transfer (Packetizer)
  - Automated Header Insert/Strip for DMA Data Transfers
  - 8-/16-Bit Asynchronous and Synchronous DMA I/F With Handshake and Burst Mode
  - Supports ATAPI (Ultra-DMA) Mode and SCSI Mode
  - 8-/16-Bit Data/Address Multiplex Microcontroller and 8-/16-Bit Separated Data/Address Bus
  - Three FIFO Configurations That Support High Performance for the DMA and for Command Exchanges
    - Asynchronous Command FIFO: 1512 Bytes
    - Config ROM/LOG FIFO: 504 Bytes
    - DMA FIFO: 4728 Bytes
- Multiple Package Options:
  - PGE Dual 1394 Port Package, 144-Terminal Plastic Quad Flatpack
  - GGW Commercial Dual 1394 Port Package, 176-Terminal BGA
  - GGW Industrial Dual 1394 Port Package (TSB43AA82I), 176-Terminal BGA With Operational Range From –40°C to 85°C

DESCRIPTION

The TSB43AA82 is a high performance 1394 integrated PHY and link layer controller. It is compliant with the IEEE 1394-1995 and IEEE 1394a-2000 specifications and supports asynchronous transfers.

TSB43AA82 has a generic 16-/8-bit host bus interface. It supports parallel or multiplexed connections to the microcontroller (MCU) at rates up to 40 MHz.

The TSB43AA82 offers large data transfers with three mutually independent FIFOs: 1) the asynchronous command FIFO with 1512 Bytes, 2) the DMA FIFO with 4728 bytes and 3) the Config ROM/LOG FIFO with 504 bytes.

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.

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.

Copyright © 2006, Texas Instruments Incorporated

The features of the TSB43AA82 support the serial bus protocol 2 (SBP-2). It handles up to four initiators with the SBP-2 transaction/timer manager. This SBP-2 transaction engine supports fully automated operation request block (ORB) fetches and fully automated memory page table fetches for both read and write transactions. Automated responses to other node requests are provided; this includes responding to another node's read request to the Config ROM and issuing ack_busy_X for a single retry. Various control registers enable the user to program IEEE 1394 asynchronous transaction settings. The user can program the number of retries and the split transaction time-out value by setting the time limit register in the CFR.

The TSB43AA82 also supports the direct print protocol (DPP). The asynchronous receive FIFO (ARF) in the TSB43AA82 is large enough to satisfy the connection register area, the DRF receiving FIFO can be used as the segment data unit (SDU) register to fulfill the large data transfer.

This document is not intended to serve as a tutorial on IEEE 1394; users are referred to IEEE Std 1394-1995 and IEEE 1394a-2000(1).

NOTE:

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

(1) IEEE Std 1394-1995, *IEEE Standard for a High Performance Serial Bus*
IEEE Std 1394a–2000, *IEEE Standard for a High Performance Serial Bus – Amendment 1*

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
TSB43AA82GGW	ACTIVE	BGA MI CROSTAR	GGW	176		TBD	Call TI	Call TI
TSB43AA82GHH	OBSOLETE	BGA	GHH	179		TBD	Call TI	Call TI
TSB43AA82IGGW	ACTIVE	BGA MI CROSTAR	GGW	176		TBD	Call TI	Call TI
TSB43AA82PGE	ACTIVE	LQFP	PGE	144	60	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
TSB43AA82PGEG4	ACTIVE	LQFP	PGE	144	60	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR

(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)

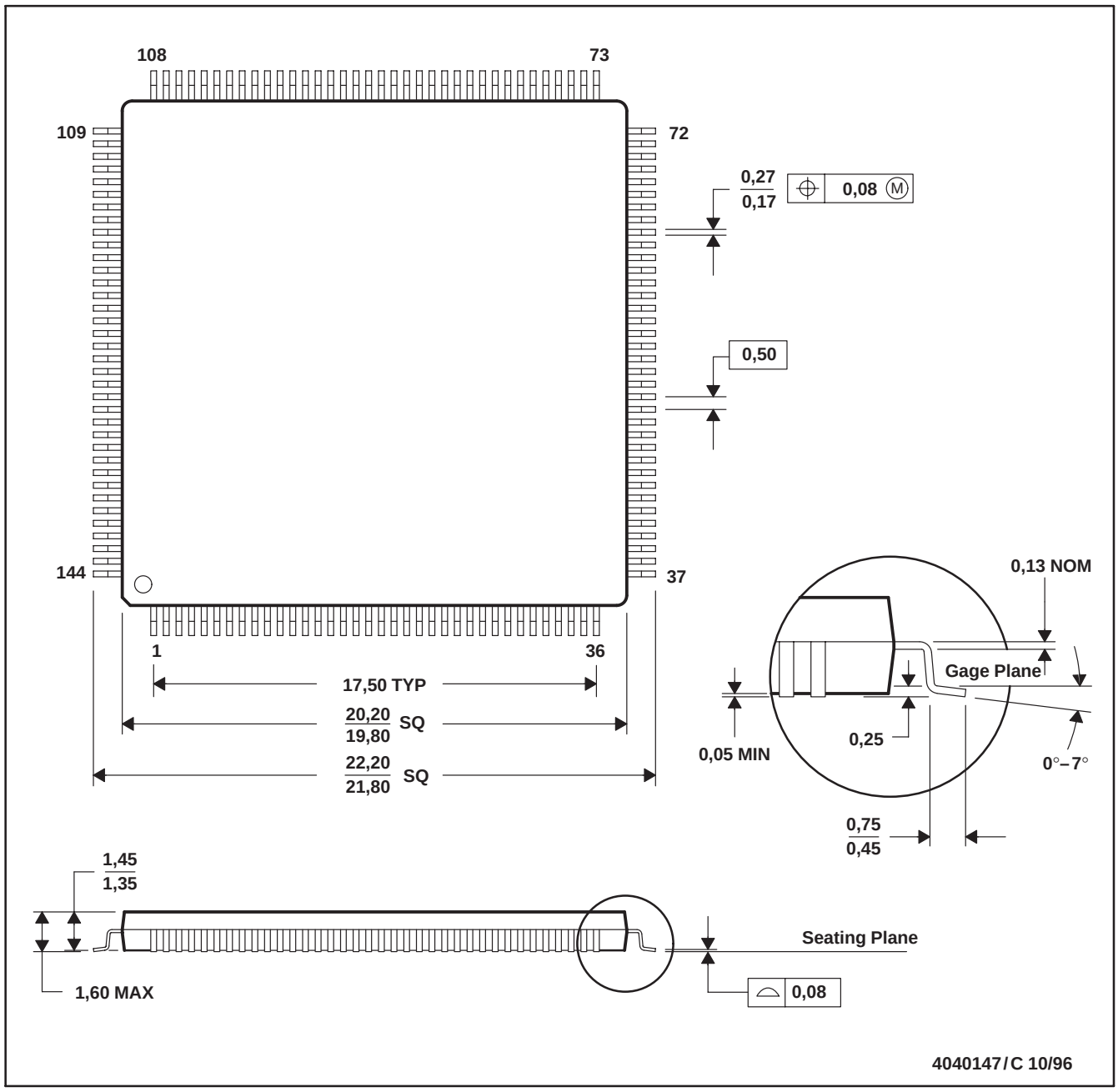
(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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.

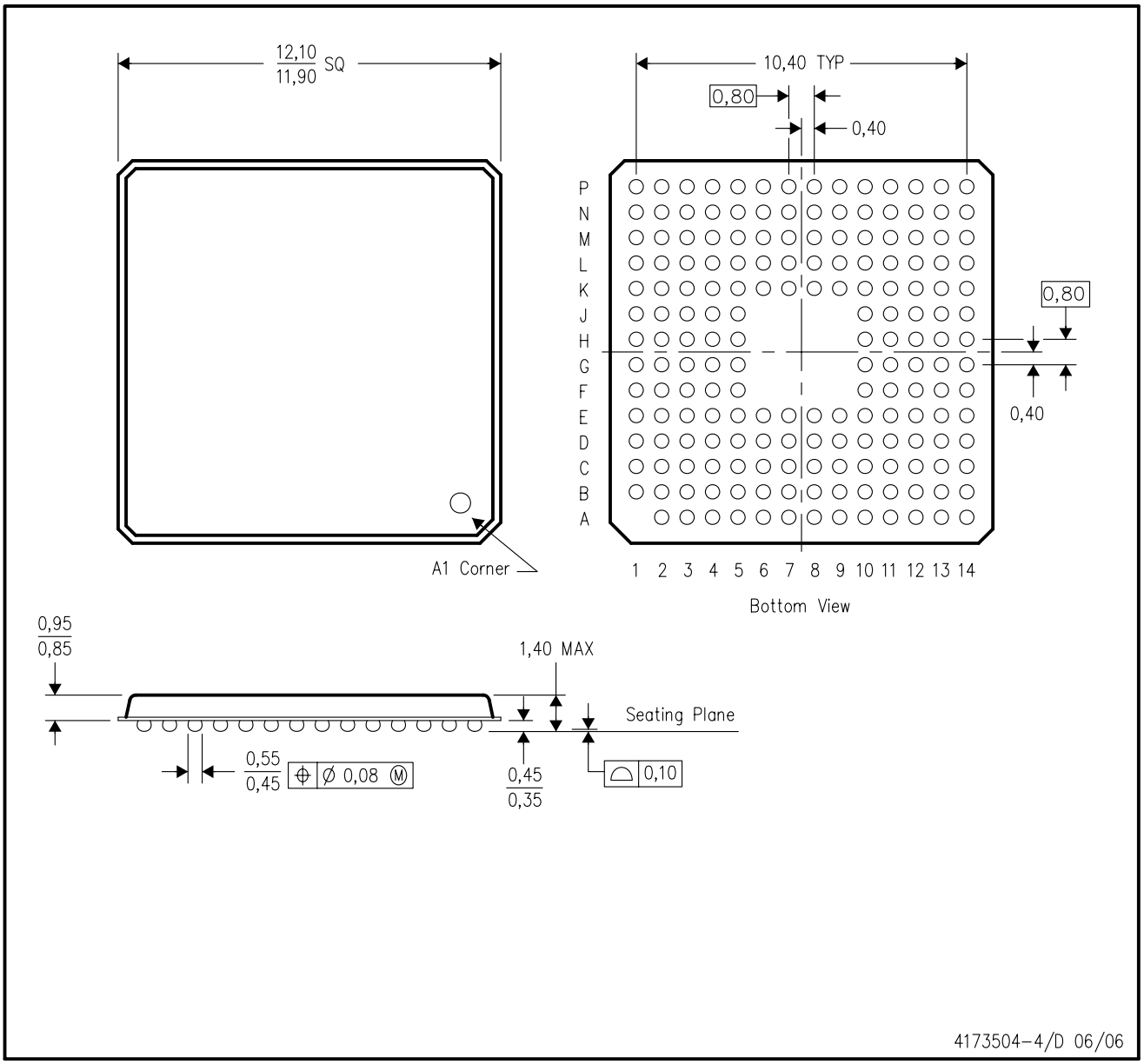
MTQF017A – OCTOBER 1994 – REVISED DECEMBER 1996

PGE (S-PQFP-G144) **PLASTIC QUAD FLATPACK**



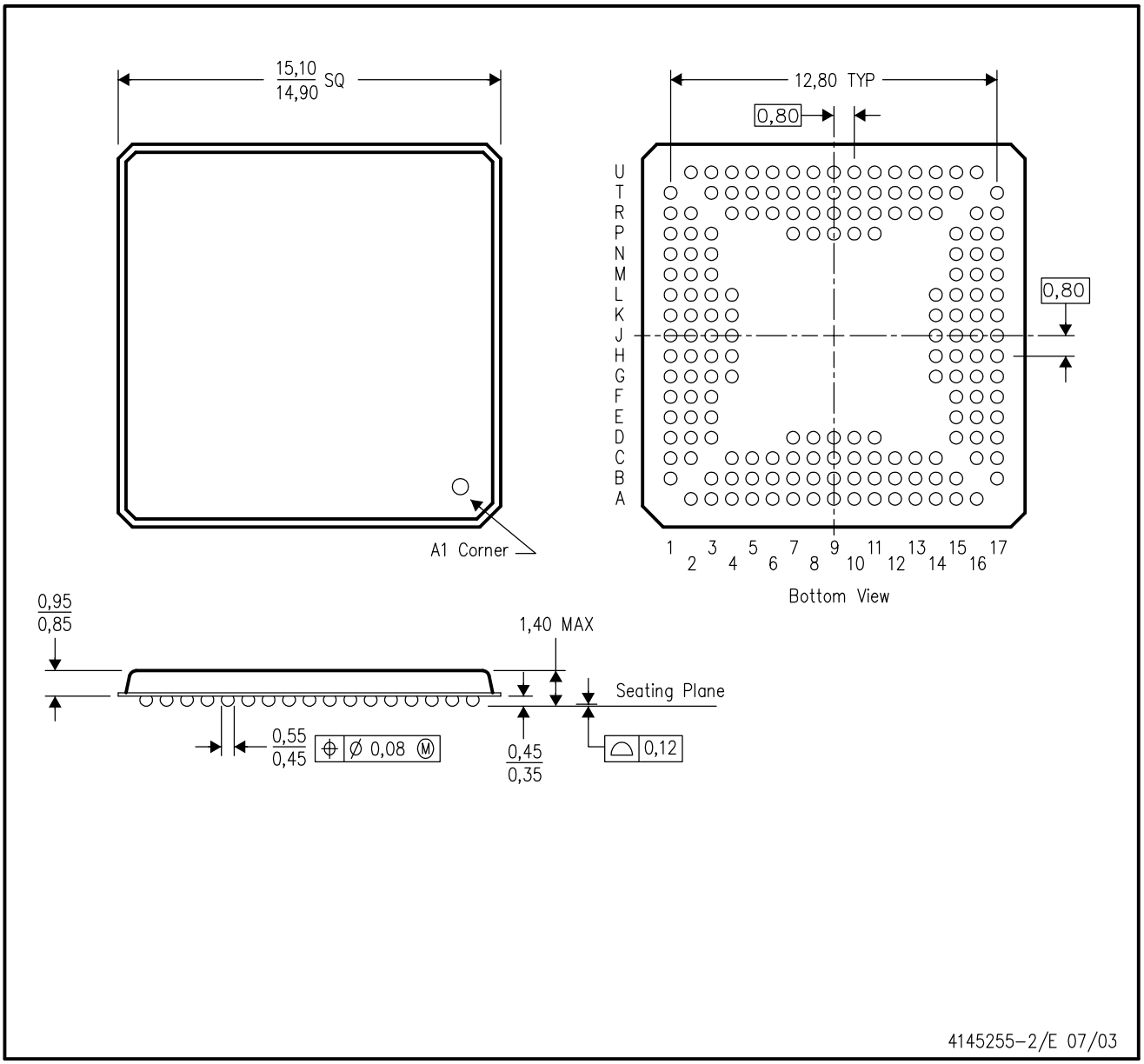
NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Falls within JEDEC MS-026

GHH (S–PBGA–N179) PLASTIC BALL GRID ARRAY



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

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.

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		**Applications**	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DSP	dsp.ti.com	Broadband	www.ti.com/broadband
Clocks and Timers	www.ti.com/clocks	Digital Control	www.ti.com/digitalcontrol
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
RFID	www.ti-rfid.com	Telephony	www.ti.com/telephony
RF/IF and ZigBee® Solutions	www.ti.com/lprf	Video & Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2008, Texas Instruments Incorporated