

CardBus Controller

FEATURES

- A 216-Terminal MicroStar BGA™ PBGA (GVF/ZVF) Package
- 2.5-V Core Logic and 3.3-V I/O with Universal PCI Interfaces Compatible with 3.3-V and 5-V PCI Signaling Environments
- Integrated Low-Dropout Voltage Regulator (LDO-VR) Eliminates the Need for an External 2.5-V Power Supply
- Mix-and-Match 5-V/3.3-V 16-Bit PC Cards and 3.3-V CardBus Cards
- A Single PC Card or CardBus Slot with Hot Insertion and Removal
- Parallel Interface to TI TPS2211A Single-Slot PC Card Power Switch
- Burst Transfers to Maximize Data Throughput with CardBus Cards
- Interrupt Configurations: Parallel PCI, Serialized PCI, Parallel ISA, and Serialized ISA
- Serial EEPROM Interface for Loading Subsystem ID, Subsystem Vendor ID, and Other Configuration Registers
- Pipelined Architecture for Greater Than 130-Mbps Throughput from CardBus-to-PCI and from PCI-to-CardBus
- Up to Five General-Purpose I/Os
- Programmable Output Select for $\overline{\text{CLKRUN}}$
- Five PCI Memory Windows and Two I/O Windows Available for the 16-Bit Interface
- Two I/O Windows and Two Memory Windows Available to the CardBus Socket
- Exchangeable-Card-Architecture- (ExCA-) Compatible Registers Are Mapped in Memory and I/O Space
- Intel™ 82365SL-DF and 82365SL Register Compatible
- Ring Indicate, $\overline{\text{SUSPEND}}$, PCI $\overline{\text{CLKRUN}}$, and CardBus $\overline{\text{CCLKRUN}}$
- Socket Activity LED Terminal
- PCI Bus Lock ($\overline{\text{LOCK}}$)
- Internal Ring Oscillator

DESCRIPTION

The Texas Instruments PCI1512 device, a 216-terminal MicroStar BGA™ single-slot CardBus controller designed to meet the *PCI Bus Power Management Interface Specification for PCI to CardBus Bridges*, is an ultralow-power high-performance PCI-to-CardBus controller that supports a single PC card socket compliant with the *PC Card Standard* (Revision 7.2). The controller provides features that make it the best choice for bridging between PCI and PC Cards in both notebook and desktop computers. The *PC Card Standard* retains the 16-bit PC Card specification defined in the PCI Local Bus Specification and defines the 32-bit PC Card, CardBus, capable of full 32-bit data transfers at 33 MHz. The controller supports both 16-bit and CardBus PC Cards, powered at 5 V or 3.3 V, as required.

The controller is compliant with the *PCI Local Bus Specification*, and its PCI interface can act as either a PCI master device or a PCI slave device. The PCI bus mastering is initiated during CardBus PC Card bridging transactions. The controller is also compliant with *PCI Bus Power Management Interface Specification* (Revision 1.1).

All card signals are internally buffered to allow hot insertion and removal without external buffering. The controller is register-compatible with the Intel 82365SL-DF and 82365SL ExCA controllers. The controller internal data path logic allows the host to access 8-, 16-, and 32-bit cards using full 32-bit PCI cycles for maximum performance. Independent buffering and a pipeline architecture provide an unsurpassed performance level with sustained bursting. The controller can also be programmed to accept fast posted writes to improve system-bus utilization.



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.

MicroStar BGA is a trademark of Texas Instruments.

Intel is a trademark of Intel Corporation.

Multiple system-interrupt signaling options are provided, including parallel PCI, parallel ISA, serialized ISA, and serialized PCI. Furthermore, general-purpose inputs and outputs are provided for the board designer to implement sideband functions. Many other features designed into the PCI1512 controller, such as a socket activity light-emitting diode (LED) outputs, are discussed in detail throughout this document.

An advanced complementary metal-oxide semiconductor (CMOS) process achieves low system power consumption while operating at PCI clock rates up to 33 MHz. Several low-power modes enable the host power-management system to further reduce power consumption.

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⁾
PCI1512GVF	ACTIVE	BGA	GVF	216		TBD	Call TI	Call TI
PCI1512ZVF	NRND	BGA	ZVF	216	90	Pb-Free (RoHS)	SNAGCU	Level-3-250C-1 WEEK
SN2005111512ZVF	NRND	BGA	ZVF	216	90	Pb-Free (RoHS)	SNAGCU	Level-3-250C-1 WEEK

⁽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)

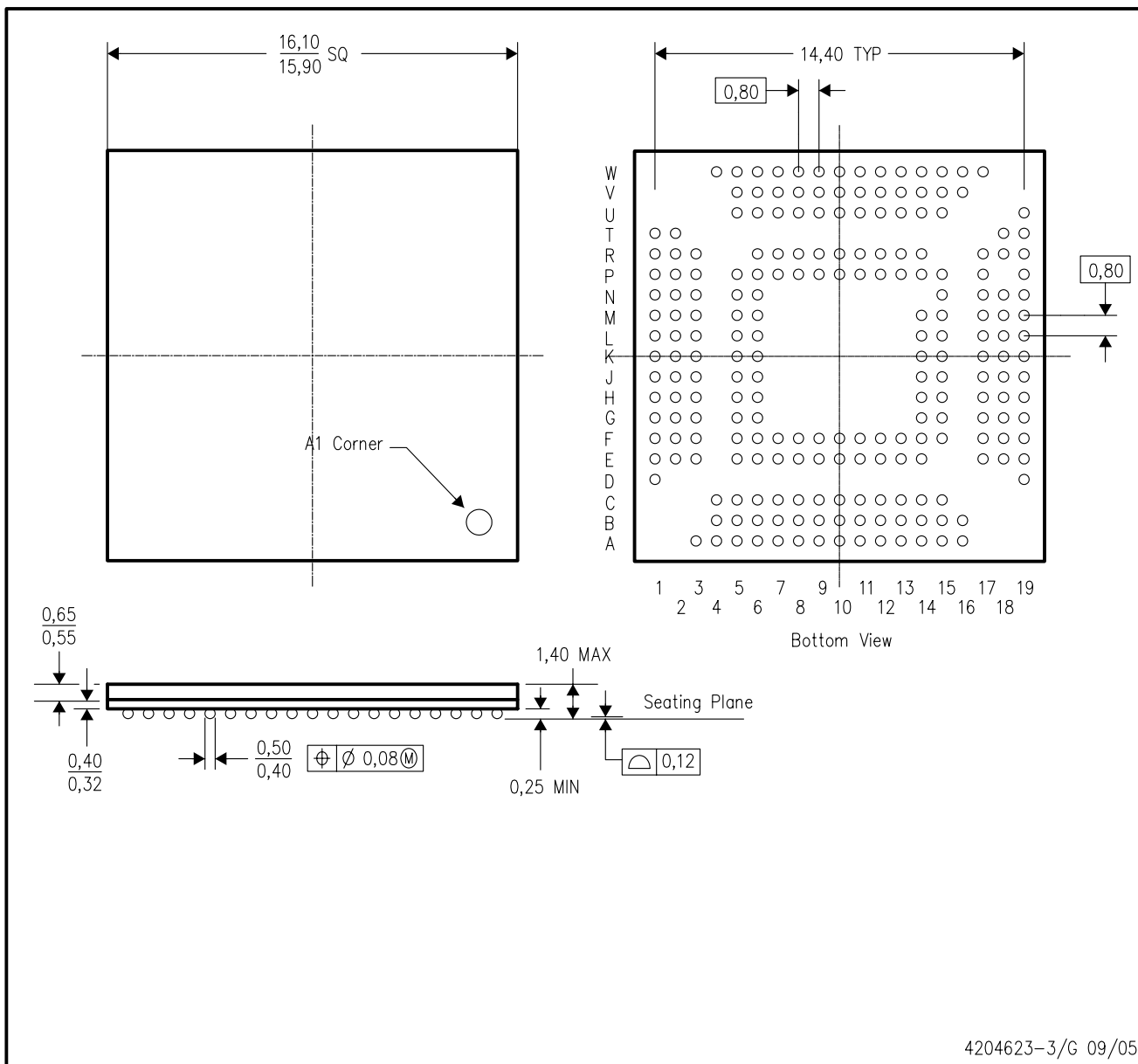
⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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.

GVF (S-PBGA-N216)

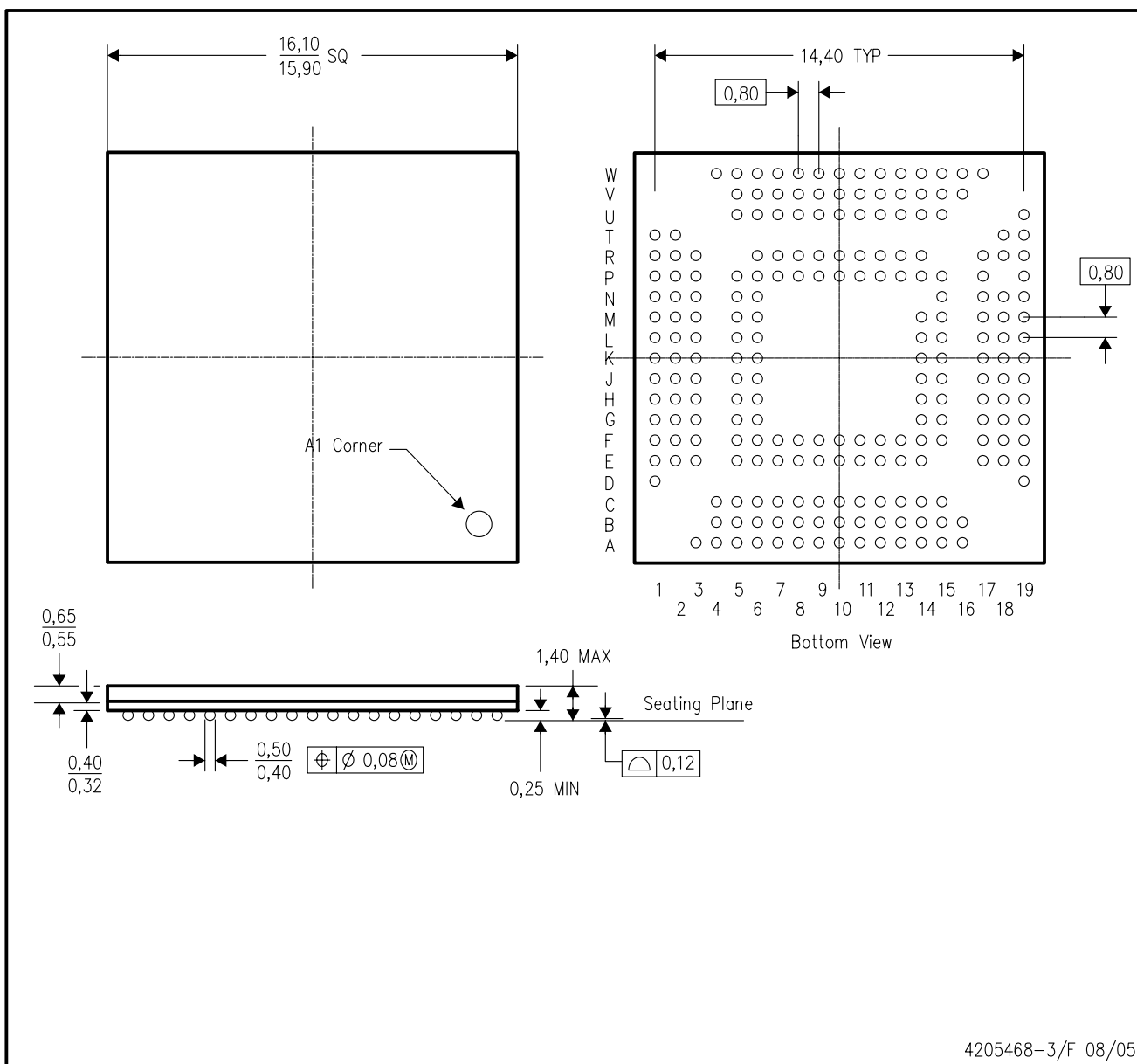
PLASTIC BALL GRID ARRAY



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

ZVF (S-PBGA-N216)

PLASTIC BALL GRID ARRAY



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

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
Interface	interface.ti.com	Digital Control	www.ti.com/digitalcontrol
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
Low Power Wireless	www.ti.com/lpw	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