

## PC Card Controllers

### FEATURES

- Ability to wake from D3<sub>hot</sub> and D3<sub>cold</sub>
- Fully compatible with the Intel 430TX (Mobile Triton II) chipset
- A 144-terminal low-profile QFP (PGE), 144-terminal MicroStar BGA™ ball grid array (GGU) package, or 209-terminal MicroStar BGA™ (GHK) package
- 3.3-V core logic with universal PCI interfaces compatible with 3.3-V and 5-V PCI signaling environments
- Mix-and-match 5-V/3.3-V 16-bit PC Cards and 3.3-V CardBus Cards
- Single PC Card or CardBus slot with hot insertion and removal
- Burst transfers to maximize data throughput on the PCI bus and the CardBus bus
- Parallel PCI interrupts, parallel ISA IRQ and parallel PCI interrupts, serial ISA IRQ with parallel PCI interrupts, and serial ISA IRQ and PCI interrupts
- Serial EEPROM interface for loading subsystem ID and subsystem vendor ID
- Pipelined architecture allows greater than 130-Mbps sustained throughput from CardBus to PCI and from PCI to CardBus
- Interface to parallel single-slot PC Card power interface switches like the TI TPS2211
- Up to five general-purpose I/Os
- Programmable output select for  $\overline{\text{CLKRUN}}$
- Five PCI memory windows and two I/O windows available to the 16-bit PC Card socket
- 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
- Distributed DMA (DDMA) and PC/PCI DMA
- 16-Bit DMA on the PC Card socket
- Ring indicate,  $\overline{\text{SUSPEND}}$ , PCI  $\overline{\text{CLKRUN}}$ , and CardBus  $\overline{\text{CCLKRUN}}$
- Socket activity LED pins
- PCI bus lock ( $\overline{\text{LOCK}}$ )
- Advanced submicron, low-power CMOS technology
- Internal ring oscillator

### DESCRIPTION

The TI™ PCI1410 is a high-performance PCI-to-PC Card controller that supports a single PC Card socket compliant with the *1997 PC Card Standard*. The PCI1410 provides features that make it the best choice for bridging between PCI and PC Cards in both notebook and desktop computers. The *1997 PC Card Standard* retains the 16-bit PC Card specification defined in *PCI Local Bus Specification* and defines the new 32-bit PC Card, CardBus, capable of full 32-bit data transfers at 33 MHz. The PCI1410 supports both 16-bit and CardBus PC Cards, powered at 5 V or 3.3 V, as required.

The PCI1410 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 16-bit PC Card DMA transfers or CardBus PC Card bridging transactions. The PCI1410 is also compliant with the latest *PCI Bus Power Management Interface Specification* and *PCI Bus Power Management Interface Specification for PCI to CardBus Bridges*.



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All card signals are internally buffered to allow hot insertion and removal without external buffering. The PCI1410 is register compatible with the Intel™ 82365SL-DF and 82365SL ExCA controllers. The PCI1410 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 PCI1410 can also be programmed to accept fast posted writes to improve system-bus utilization.

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 PCI1410, such as socket activity light-emitting diode (LED) outputs, are discussed in detail throughout the design specification.

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](mailto:support@ti.com).

**PACKAGING INFORMATION**

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
PCI1410GGU	NRND	BGA	GGU	144		TBD	SNPB	Level-3-220C-168 HR
PCI1410GHK	OBSOLETE	BGA MI CROSTAR	GHK	209		TBD	Call TI	Call TI
PCI1410PGE	NRND	LQFP	PGE	144		Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
PCI1410RFP	OBSOLETE	HTQFP	RFP	144		TBD	Call TI	Call TI

<sup>(1)</sup> 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.

<sup>(2)</sup> 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)

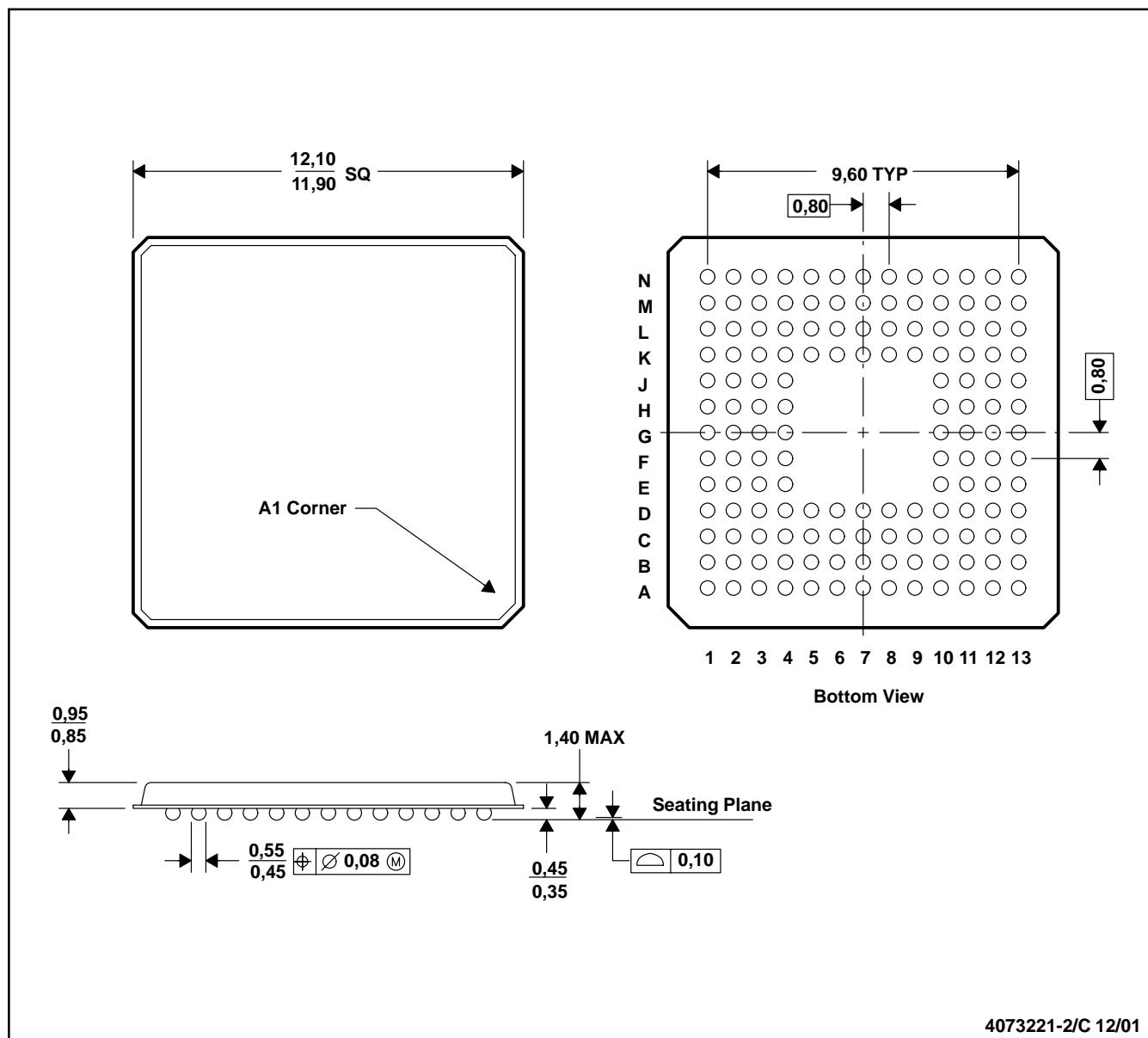
<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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## GGU (S-PBGA-N144)

## PLASTIC BALL GRID ARRAY

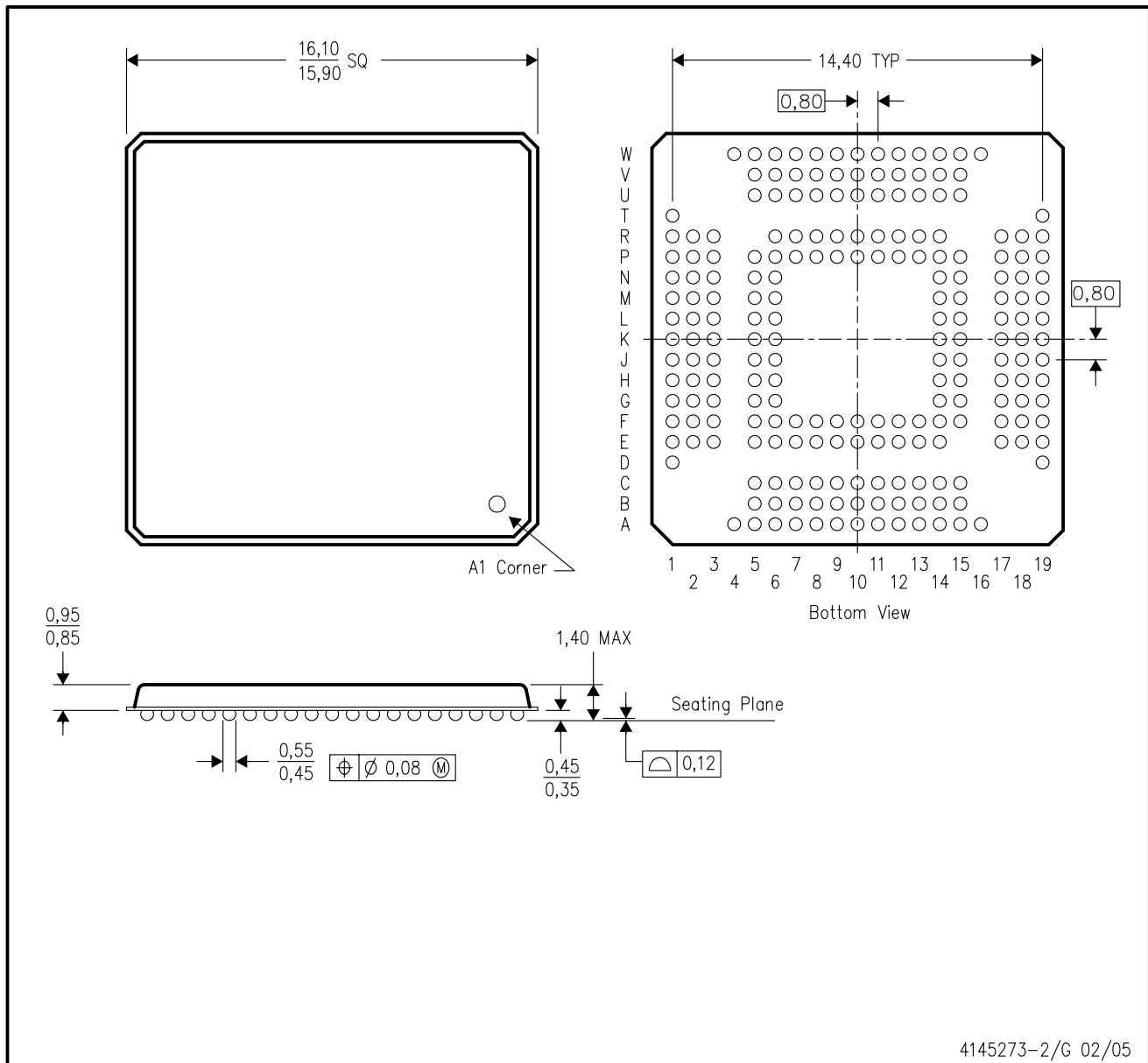


- NOTES: A. All linear dimensions are in millimeters.  
 B. This drawing is subject to change without notice.  
 C. MicroStar BGA™ configuration

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GHK (S-PBGA-N209)

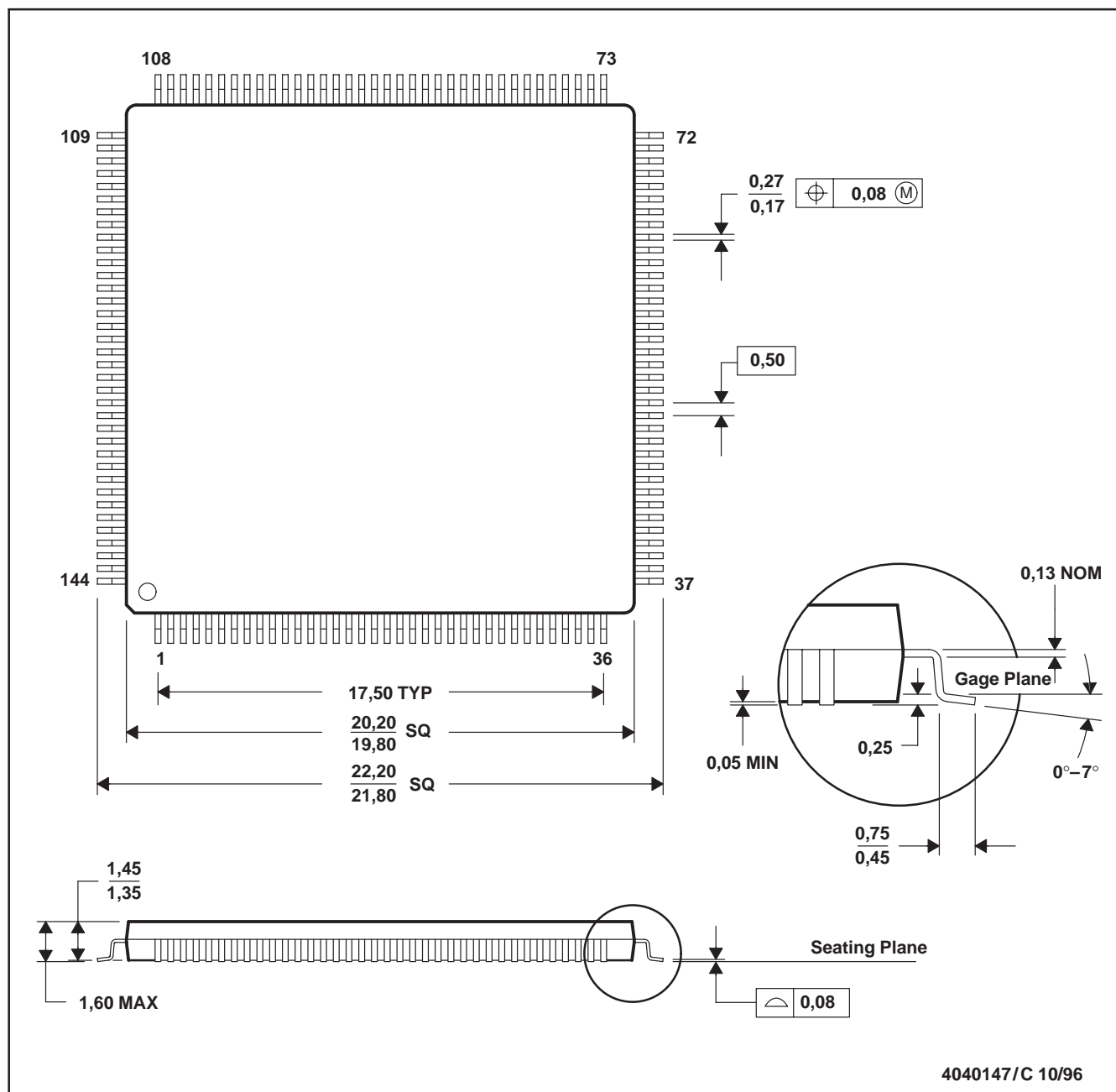
PLASTIC BALL GRID ARRAY



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

## PGE (S-PQFP-G144)

## PLASTIC QUAD FLATPACK



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 C. Falls within JEDEC MS-026

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