- 3-pin LED Interface
  - Programmable Blink Rates
  - Breathing LED Output
  - Operational in EC Sleep State
- Programmable 16-bit Counter/Timer Interface
  - Four Wake-capable 16-bit Auto-reloading Counter/Timer Instances
  - Four Operating Modes per Instance: Timer, One-shot, Event and Measurement.
  - 4 External Inputs, 4 External Outputs
- Hibernation Timer Interface
  - Two 32.768 KHz Driven Timers
  - Programmable Wake-up from 0.5ms to 128 Minutes
- System Watch Dog Timer (WDT)
- Input Capture and Compare Timer
  - 32-bit Free-running timer
  - Six 32-bit Capture Registers
  - Two 32-bit Compare Registers
  - Capture, Compare and Overflow Interrupts
- Microchip's Multipoint VLPC™ Serial Interconnect Bus Master
  - Forwards LPC transactions to VLPC peripherals
  - Forwards ARC transactions to VLPC peripherals
- BC-Link™ Interconnection Bus
  - Three High Speed and one Low Speed Bus Masters Controllers
- Two General Purpose Serial Peripheral Interface Controllers (ECGP-SPI)
  - One 3-pin EC-driven Full Duplex Serial Communication Interface
  - One 4-pin EC/Host-driven Full Duplex Serial Communication Interface to SPI Flash Interface
  - Flexible Clock Rates
  - SPI Burst Capable
- SPI Flash Read Controller
  - 4 MB AHB Memory-Mapped address space
  - Supports 2 KB EC Instruction Cache
- FAN Support
  - 8 Programmable Pulse-Width Modulator Outputs
    - Multiple Clock Rates
    - 16-Bit 'On' & 16-Bit 'Off' Counters
  - Four Fan Tachometer Inputs
  - 6 x 2 Capture/Compare Timer Interface
- ADC Interface
  - 10-bit Conversion in 10µs
  - 16 Channels
  - Integral Non-Linearity of ±0.5 LSB; Differential Non-Linearity of ±0.5 LSB
- Two Pin Debug Port with Standard 16C550A Register Interface
  - Accessible from Host and EC
  - Programmable Input/output Pin Polarity Inversion
  - Programmable Main Power or Standby Power Functionality
  - Standard Baud Rates to 115.2 Kbps, Custom Baud Rates to 2 Mbps
- Resistor/Capacitor Identification Detection (RC_ID)
  - Single Pin Interface to External Inexpensive RC Circuit
  - Replacement for Multiple GPIO's
  - Provides 8 Quantized States on One Pin
- Integrated Standby Power Reset Generator
- Clock Generator
  - 32.768 KHz-input Clock
  - operational on Suspend Power
  - Programmable Clock Power Management Control & Distribution
  - 64.52 MHz ±2% Accuracy
- Packages
  - 144 Pin LFBGA RoHS Compliant package
  - 144 Pin TFBGA RoHS Compliant package
- Operating Temperature
  - The MEC1609 supports the commercial temperature range of 0^{o} C to $+70^{o}$ C
  - The MEC1609i supports the industrial temperature range of -40^{o} C to $+85^{o}$ C

Description

The MEC1609/MEC1609i is the mixed signal base component of a multi-device advanced I/O controller architecture. The MEC1609/MEC1609i incorporates a high-performance 32-bit ARC 625 embedded microcontroller with a 192 Kilobyte embedded Flash subsystem, 16 Kilobytes of SRAM and 2 Kilobytes of instruction cache with an AHB memory-mapped SPI Flash Read Controller. The MEC1609 communicates with the system host using the Intel® Low Pin Count bus.

There are two distinct protocols that provide communication between the MEC1609/MEC1609i base component and companion components: BC-Link™ and VLPC™. BC-Link™ in the MEC1609/MEC1609i can access up to four companion components. The BC-Link™ protocol is peer-to-peer providing communication between the MEC1609/MEC1609i embedded controller and registers located in a companion. VLPC™ is a multi-drop protocol that matches the MEC1609/MEC1609i with up to three untrusted companion components and one trusted companion component. The MEC1609/MEC1609i accepts LPC Host (ICH/PCH) transactions targeting blocks internal to the MEC1609/MEC1609i and blocks physically located in VLPC™ companions. The ARC 625 embedded microcontroller can also access blocks that are physically located in VLPC™ companion components.

The MEC1609/MEC1609i is directly powered by two separate suspend supply planes (VBAT and VTR) and senses a third runtime power plane (VCC) to provide “instant on” and system power management functions. The MEC1609/MEC1609i also contains an integrated VTR Reset Interface and a system Power Management Interface that supports low-power states and can drive state changes as a result of hardware wake events as defined by the MEC1609/MEC1609i Wake Interface.

The MEC1609/MEC1609i defines a software development system interface that includes an MCU Serial Debug Port, a two pin serial debug port with a 16C550A register interface that is accessible to the EC or to the LPC host and can operate up to 2 MB/s, a flexible Flash programming interface and a JTAG interface. The EC can also drive the JTAG interface as a master.

A top-level block diagram of the MEC1609/MEC1609i is shown in FIGURE 1: MEC1609/MEC1609i Top-Level Block Diagram on page 5. An example of system level connection is shown in FIGURE 2: Example of MEC1609/MEC1609i’s Connections to System Components on page 6.

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BLOCK DIAGRAM

FIGURE 1: MEC1609/MEC1609i TOP-LEVEL BLOCK DIAGRAM

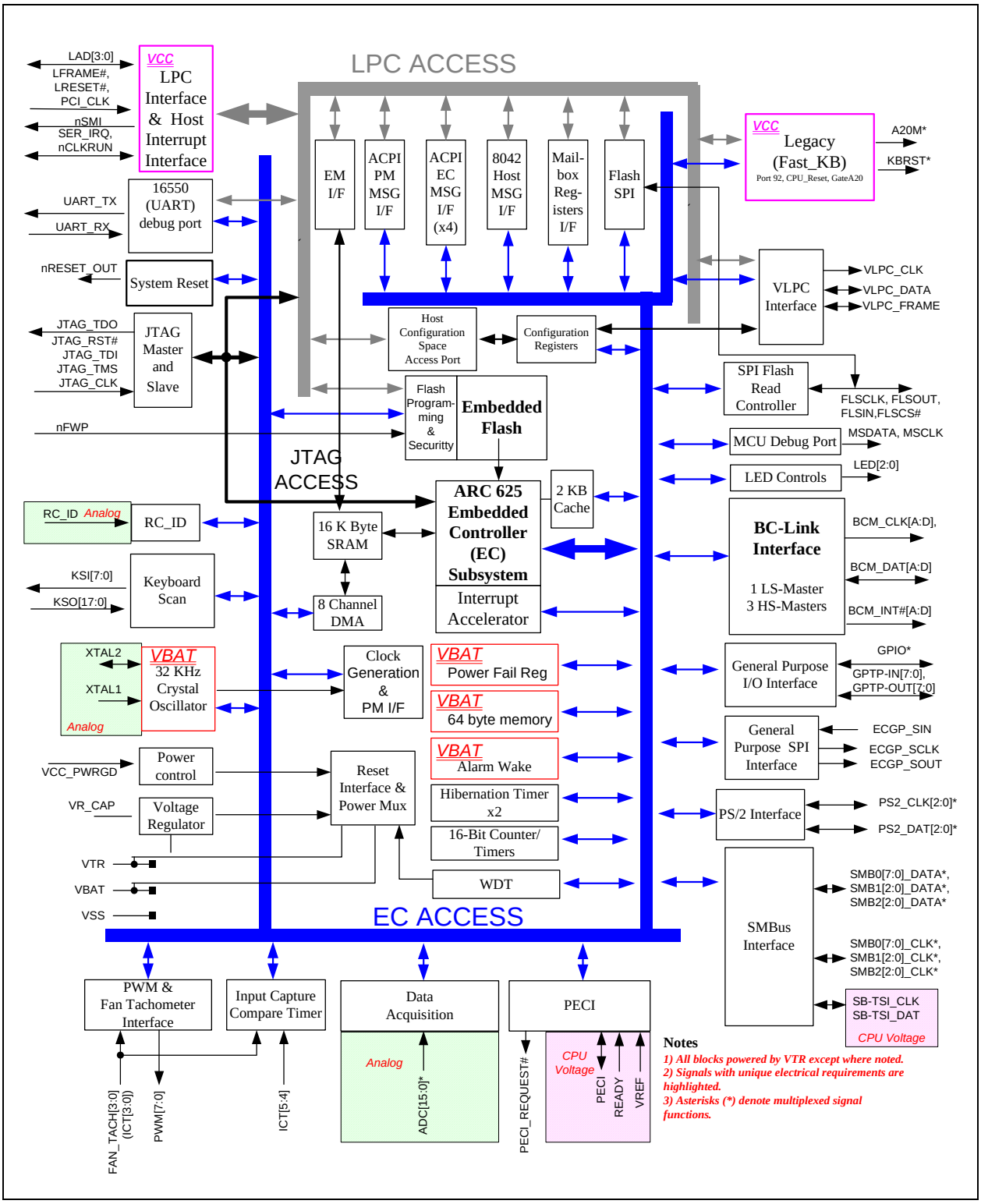
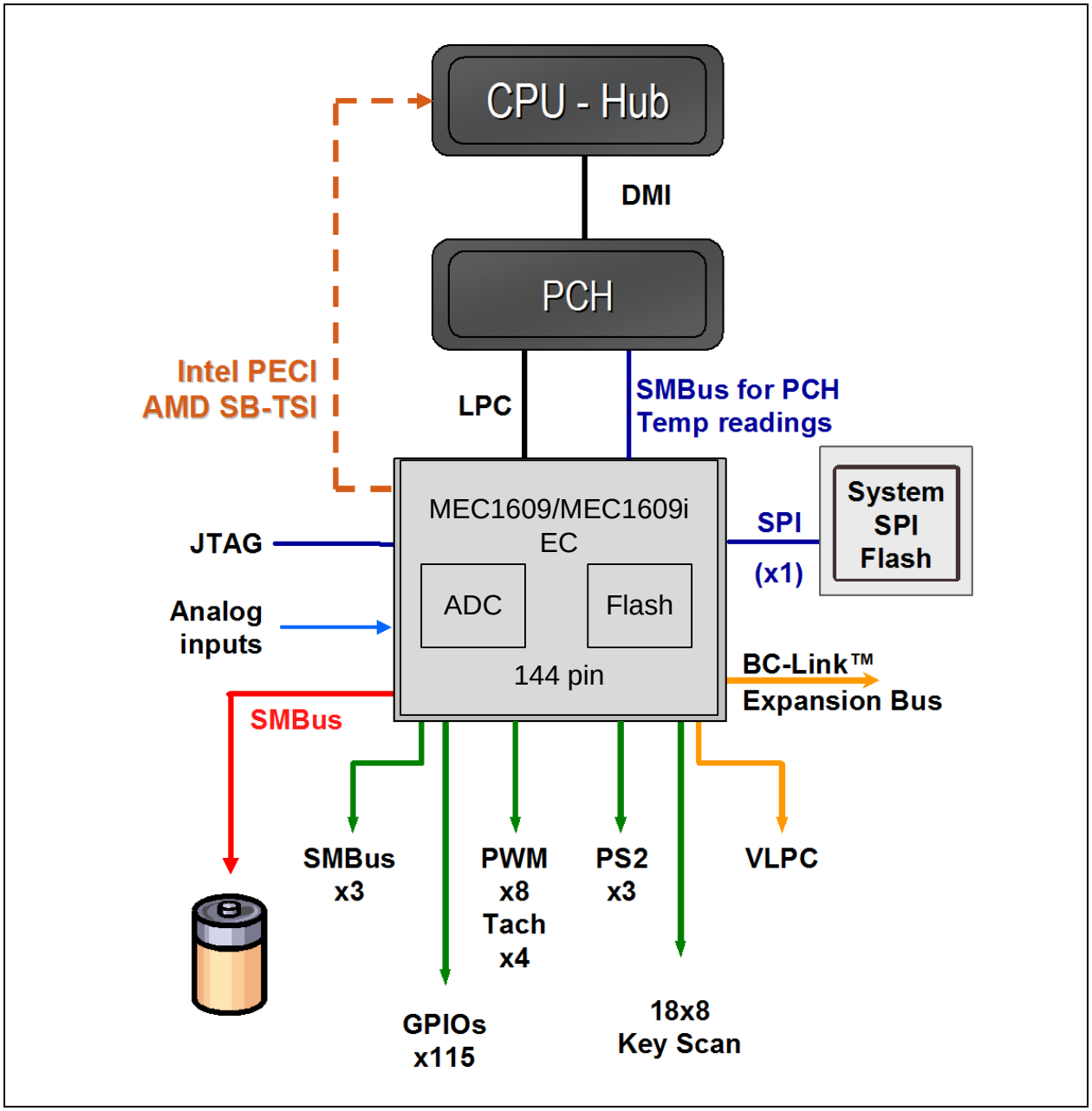


FIGURE 2: EXAMPLE OF MEC1609/MEC1609i'S CONNECTIONS TO SYSTEM COMPONENTS



PACKAGE OUTLINES

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging.

FIGURE 3: 144-PIN LFBGA 10X10X0.8 MM PACKAGE OUTLINE (1.4 MM HEIGHT)

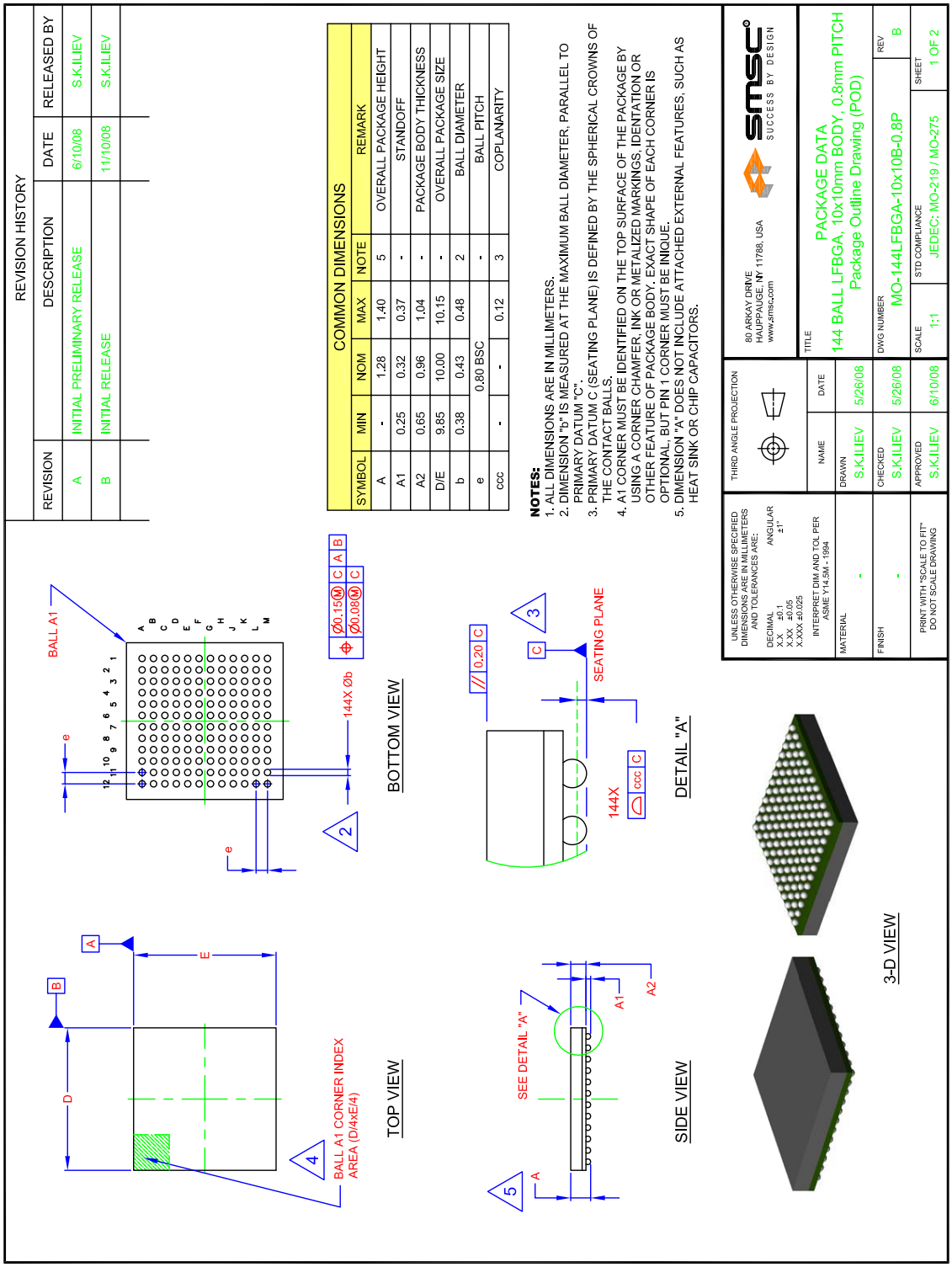
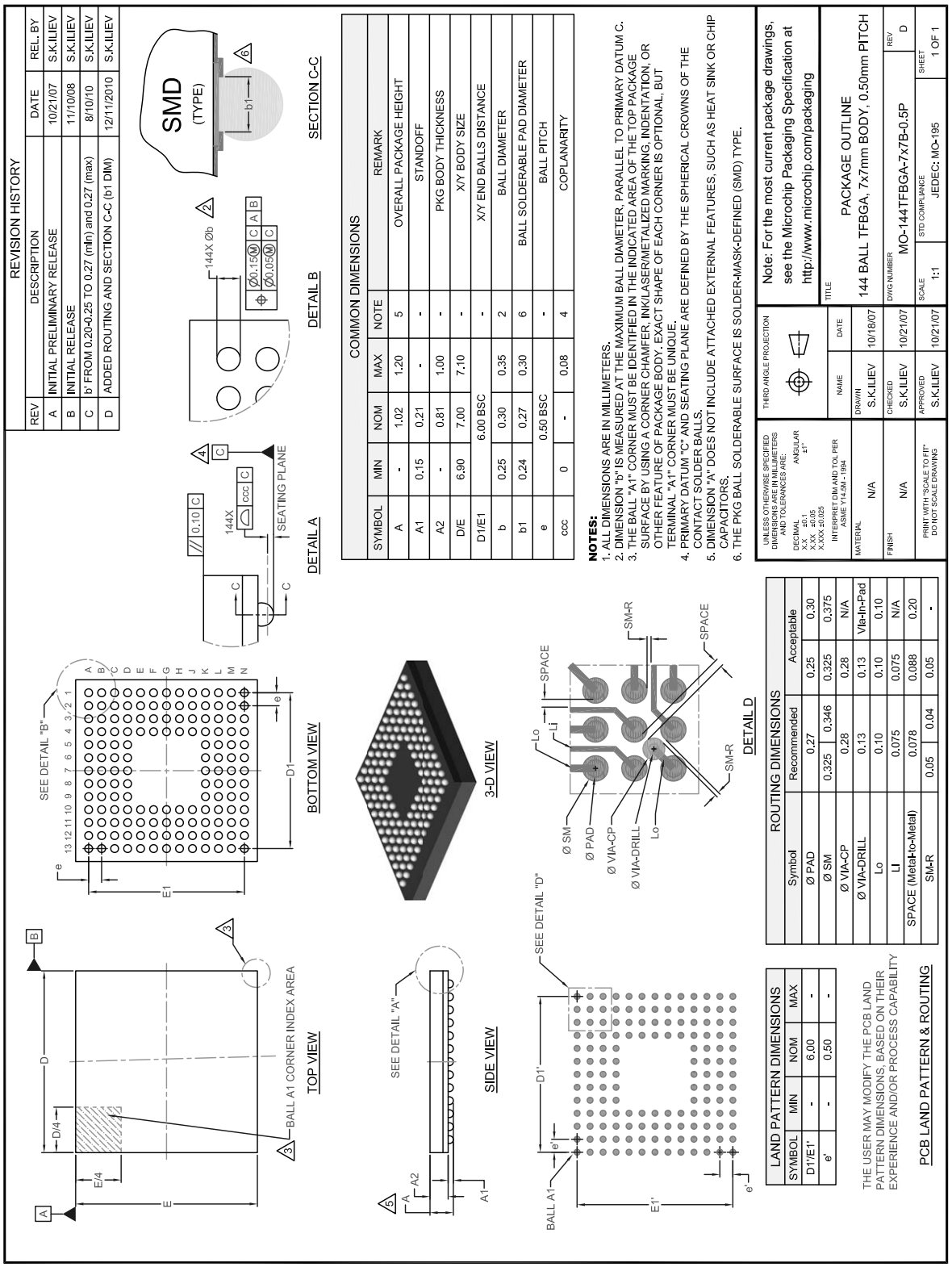


FIGURE 4: 144-PIN TFBGA 7X7X0.5 MM PACKAGE OUTLINE (1.2 MM HEIGHT)



APPENDIX A: PRODUCT BRIEF REVISION HISTORY

TABLE A-1: REVISION HISTORY

Revision	Section/Figure/Entry	Correction
DS00001769A (06-03-14)	Document Release	

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PART NO.	[X]	-	XXX	-	[X](1)
Device	Temperature Range		Package		Tape and Reel Option

Device:	MEC1609, MEC1609i			
Temperature Range:	Blank	=	0°C to +70°C	(Extended Commercial)
	i	=	-40°C to +85°C	(Industrial)
Package:	PZV	=	144-pin TFBGA	
	PZP	=	144-pin LFBGA	
Tape and Reel Option:	Blank	=	Standard packaging (tray)	
	TR	=	Tape and Reel(1)	

Examples:

a) MEC1609-PZV
144-pin TFBGA (7mm x 7mm, 0.5 pitch)
RoHS Compliant package

b) MEC1609-PZP
144-pin TFBGA (10mm x 10mm, 0.8 pitch)
RoHS Compliant package

c) MEC1609i-PZV
Industrial temperature,
144-pin TFBGA (7mm x 7mm, 0.5 pitch)
RoHS Compliant package

d) MEC1609i-PZP
Industrial temperature,
144-pin TFBGA (10mm x 10mm, 0.8 pitch)
RoHS Compliant package

Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option. Reel size is 4,000.

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