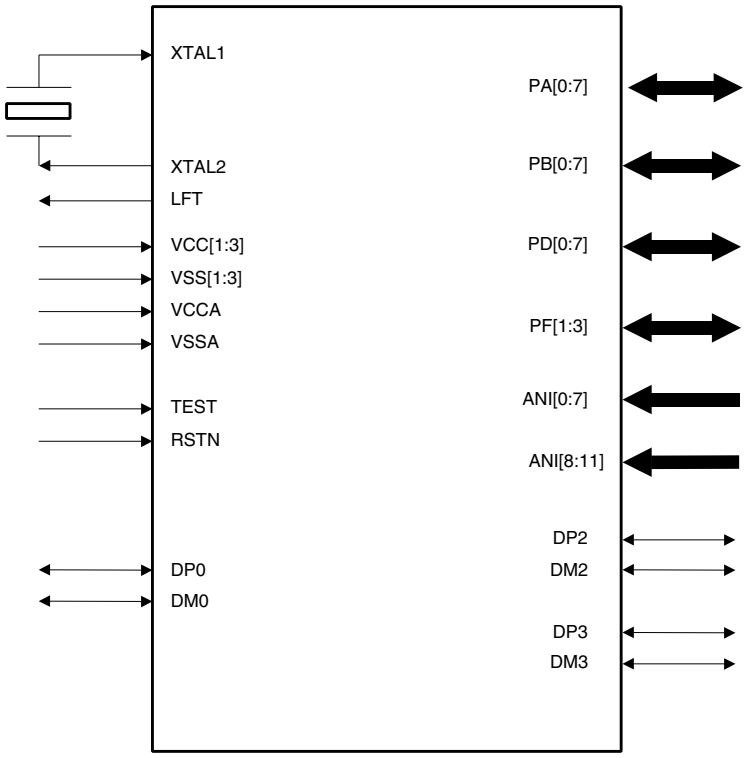
Features

- AVR® Microcontroller-based USB Hub and Function Controller
- Fully Programmable USB 1.1 Hub with 2 External and 1 Attached Downstream Ports
- Full Speed USB Function with 4 Endpoints
- High-performance and Low-power AVR RISC Microcontroller
- 120 Powerful Instructions – Most with 83 ns Execution Cycle Times
- 24K Bytes Program Memory in Masked ROM or Downloadable SRAM
- 1K Byte Internal SRAM
- 32 x 8 General Purpose Working Registers
- 27 Programmable I/O Port Pins
- 12 Channels 10-bit A-to-D Converter
- Programmable SPI Serial Interface
- One 8-bit Timer Counter with Separate Pre-scaler
- One 16-bit Timer Counter with Separate Pre-scaler and Two PWM
- External and Internal Interrupt Sources
- Programmable Watchdog Timer
- Low-power Idle and Power-down Modes
- 6 MHz Crystal Oscillator with PLL
- 5V Operation with On-chip 3.3V Regulators
- 64-lead LQFP Package



Full Speed USB Microcontroller with Embedded Hub, ADC and PWM

AT43USB355

Summary

Rev. 2603BS–USB–01/02

Overview

The Atmel AT43USB355 is a full speed USB AVR-based microcontroller with a USB 1.1 compliant embedded hub especially suitable for use in game controllers. The USB hub has 3 downstream ports, one of which is permanently attached to the USB function. The USB function controller has its own device address and endpoints. In game controller applications, the two external downstream USB ports can be used to connect other devices such as headphones sets for voice commands of games, Flash memory modules, or any other USB device.

The A-to-D converters have a minimum conversion time of 12 µs that together with the 12-input channel should cover even the most demanding game controllers such as gamepads, joysticks and racing wheels. The two PWM outputs can be programmed for 8-, 9- or 10-bit resolution for applications requiring force feedback. The 27 general-purpose programmable I/O pins provide generous inputs for the various buttons and switches and LED indicators that are being used in increasing numbers in today's game controllers.

The USB hardware block consists of a USB transceiver, SIE, hub repeater, endpoint controllers, and an interface to the microcontroller. The USB hardware of the AT43USB355 supports the physical and link layers of the USB protocol while the transaction layer and hub controller functions must be implemented in the microcontroller's firmware. If the application does not require a hub, it can be disabled. The AVR architecture was developed to be programmed in C efficiently and without loss in performance.

There are two versions of the chip. The AT43USB355E has a SRAM program memory that is automatically loaded from an external serial Flash/EEPROM during power on reset. The AT43USB355M stores its firmware in a masked ROM. The two versions are pin and function compatible.

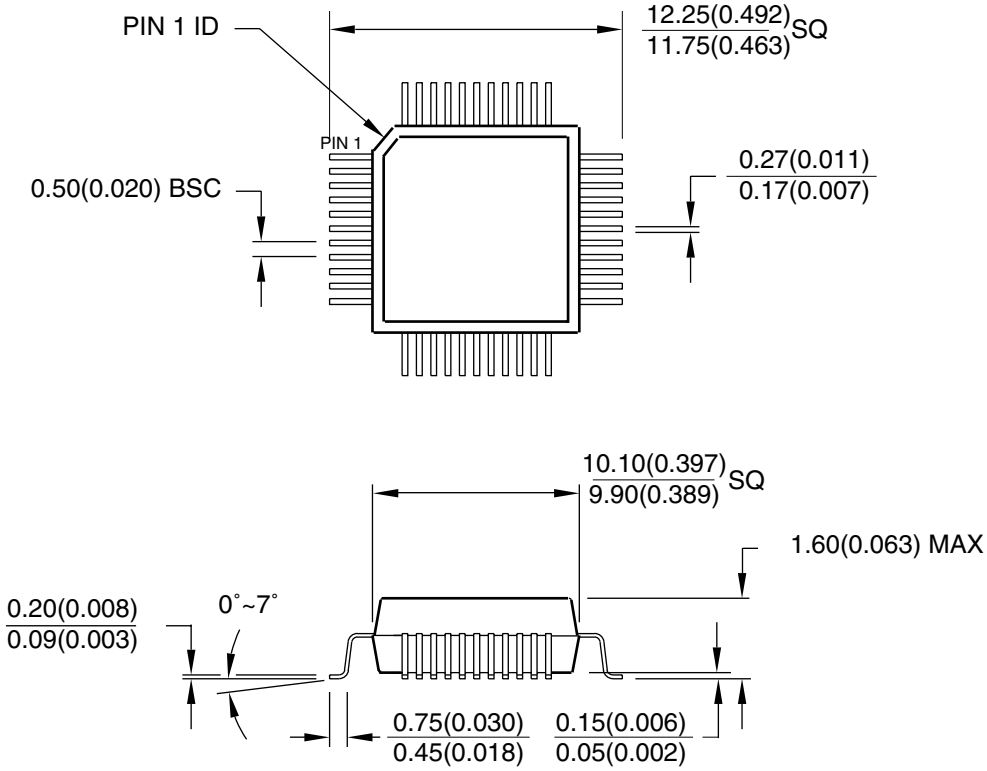
Development Support

The AT43USB355 uses the same program and development tools as the Atmel AVR microcontrollers including: C compilers, macro assemblers, program debuggers/simulators, in-circuit emulators. A development kit is also available including firmware source code for the most common USB applications.

Packaging Information

64AA – LQFP

Dimensions in Millimeters and (Inches)
Controlling Dimensions: Millimeters
JEDEC STANDARD MS-026 ACB



REV. A 1/15/2002

	TITLE	DRAWING NO.	REV.
2325 Orchard Parkway San Jose, CA 95131	**64AA**, 64-lead, Low-profile (1.4 mm) Plastic Quad Flat Package (LQFP)	64AA	A

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2603BS–USB–01/02 xM

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