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## Atmel introduces the AVR XMEGA E Series MCU

The ATxmega32E5, ATxmega16E5 and ATxmega8E5 are the first AVR XMEGA devices with 32 pins that are available in the smallest 4mm x 4mm QFN packaging. The devices offer a set of new features not found in any other AVR XMEGA devices. In addition, the AVR XMEGA E MCUs are the most power efficient of all AVR XMEGA devices, truly demonstrating the potential of Atmel® picoPower® technology with an unmatched combination of memory size, low sleep current and short wake-up time.

### Key Features

- **Atmel picoPower Technology** is further enhanced in the AVR XMEGA E devices. AVR XMEGA E devices can stay in sleep mode and use only 180nA while the brown-out detection, watchdog, real-time counter, I/O pin change interrupts, I2C address match logic, and USART can continue operation. Full data and SRAM retention are also included, so wake-up to active mode happens in 5µS. This is an unmatched level of functionality for 180nA, and will help increase battery life because existing MCUs need 10-50 times this power consumption to keep the same functions running. Compared to other AVR XMEGA devices, the active power consumption is also reduced by 40% down to 100uA/MHz.
- **XMEGA Custom Logic:** The AVR XMEGA E devices feature an innovative XMEGA Custom Logic module (XCL) consisting of timer/counter and glue logic. It is designed to reduce bill of material (BOM) and PCB size as the XCL can replace external circuitry such as delay elements, RS-latch, D-latch, D-flip-flop chip-select logic, AND/OR/XOR gates commonly used in applications such as power supply, drive and LED control, and board control. In addition it can enable customized communication protocols including selectable frame length, Manchester coding, amplitude shift keying (ASK), etc.

Device	Current Consumption in Sleep Mode with RTC and RAM Retention	Current Consumption in Active Mode
Atmel ATxmega32E5/16E5/8E5	0.1 uA	~100uA/MIPS @ 1.8V / 12MHz ~195uA/MIPS @ 3.0V / 32MHz
Atmel ATxmega32D4/16D4	0.6 uA	170uA/MIPS @ 1.8V / 12MHz 300uA/MIPS @ 3.0V / 32MHz
Microchip PIC18FxxKx	0.65uA	700uA/MIPS @ 3.0V / 64MHz
ST STM8L151x	1.4uA	170uA/MIPS @ 3.0V / 16MHz
Ti MSP430F51/3/4	1.1uA	240uA/MIPS @ 3.0V / 25MHz
<b>Comparison with some 32-bit MCUs:</b>		
Atmel ATSAM4L4/L2	0.9uA	106uA/MIPS @ 1.8V / 12MHz 180uA/MIPS @ 3.0V / 50MHz
Energy Micro EFM32ZG	0.9uA	130uA/MIPS @ 3.0V / 32MHz
Freescale Kinetis L	2.3uA	133uA/MIPS @ 3.0V / 48MHz
ST ST32F0	4.5uA	340uA/MIPS @ 3.0V / 48MHz

- Analog performance:** The AVR XMEGA E MCU has a differential 12-bit analog-to-digital converter (ADC). The ADC has built-in oversampling to improve resolution up to 16-bit by averaging up to 1024 samples. In addition, it contains functions for offset- and gain-error measurement and compensation. This reduces CPU load for average and error compensation functions, provides lower power consumption, and enables the device to be used in applications that demand the next level of analog accuracy from an MCU.
- Real-time performance:** AVR XMEGA E devices have the event system that facilitates inter-peripheral signaling for short and 100% predictable response time. It also supports asynchronous events, which is an advantage in drive and control applications where fault handling needs to happen within nanoseconds (nS) from the fault condition, independently from the clock frequency and CPU state. The AVR XMEGA E devices also include DMA Controller that can maintain high and predictable data throughput between peripherals and memory without CPU load.
- Easy migration:** All AVR XMEGA MCUs are designed to support easy migration between devices. With a linear address map, similar peripheral modules and consistent bit and register naming, migration between the different AVR XMEGA series devices can happen in minutes. With the new AVR XMEGA E series, designers can now choose AVR XMEGA devices with 8KB (ATxmega8E5) to 384KB (ATxmega382C3/384D3) memory range within one fully compatible product family with the same functions and low-power characteristics.

## Competitive Landscape

Device	XMEGA E	PIC18K	STM8L151x	MSP430F51	Kinetis L0	STM32 F0	EFM32ZG
CPU	AVR – 8-bit	PIC18 – 8-bit	STM8 – 8 bit	MSP430 – 16-bit	Cortex-M0+	Cortex-M0	Cortex-M0+
Max. Speed (MHz / MIPS)	32 / 32	64 / 16	16 / 16	25 / 25	48 / 48	48 / 48	32 / 32
DMA / Event Sys.	4-ch / 8-ch	- / -	4-ch / -	3-ch / -	4-ch / yes	3-ch / -	- / 4-ch
Flash	8+2k to 32+4kB	8k to 64kB	4k to 32kB	8k to 32kB	32kB	16k to 64kB	4 to 32kB
SRAM	1kB to 4kB	256B to 4kB	2kB	1k to 2kB	4kB	4k to 8kB	2 to 4kB
EEPROM	0.5kB to 1kB	256B to 1kB	256B to 1kB	-	-	-	-
Internal Osc. (% over temperature)	±1%	±5%	±5%	±3.5%	±2%	±5%	±1.5%
CRC	Yes	-	-	-	-	Yes	-
RTC	Yes	-	Yes	Yes	Yes	Yes	Yes
I/Os	26	15 to 25	18 to 30	29	28	18 to 27	17 – 24
Max. UART/PC/SPI	2/1/1	2/2/2	1/1/1	1/1/2	1/1/2	2/2/2	2/1/1

Custom Logic	Yes	-	-	-	-	-	-
A/D	12-bit	up to 12-bit	12-bit	up to 12-bit	12-bit	12-bit	12-bit
(speed)	[300 kbps]	[100 kbps]	[1 Mbps]	[200 kbps]	[800 kbps]	[1 Mbps]	[1 Mbps]
D/A	12-bit	up to 5-bit	12-bit	-	12-bit	12-bit	-
V <sub>DD</sub>	1.82V	1.8V	1.8V	1.8V	1.7	2.0	1.85
V <sub>DDmin</sub>	3.6V	3.6 to 5.5V	3.6V	3.6V	3.6	3.6	3.8
Active @ 3V	195µA/MIPS 3V – 32MIPS	700+ µA/MIPS 64 MHz - 16 MIPS	170 µA/MIPS 16 MHz - 16 MIPS	240 µA/MIPS 25 MHz - 25 MIPS	135 µA/MIPS 48 MHz - 48 MIPS	250 µA/MIPS 48 MHz - 48 MIPS	130 µA/MIPS 32 MHz - 32 MIPS
Active @ 1.8V	100µA/MIPS 12MHz - 12 MIPS	500 µA/MIPS 16 MHz - 4 MIPS	170 µA/MIPS 16 MHz - 16 MIPS	200 µA/MIPS 8 MHz - 8 MIPS	Data not available	Data not available	Data not available
Static w/RTC+RAM	0.1µA	0.65 µA	1.4 µA	1.1 µA	2.3 µA	4.5 µA	0.9µA
Package(s)	32 pins	20 to 28 pins	20 to 32 pins	38 to 40 pins	32 pins	20 to 32 pins	24 to 32 pins

## Target Applications

- Battery-driven applications such as toys, watches, portable devices, etc.
- Real-time low-latency applications
- Motor, drive and ballast control
- Board control
- Power supplies / DC-DC converters / H-bridge drives
- LED drives
- Battery monitoring / power management

## Documentation

AVR XMEGA product information may be found at [www.atmel.com/XMEGA/](http://www.atmel.com/XMEGA/).

Updated presentation material and datasheets are available online from the AVR sales portal.

An updated introduction flyer is available from our print-on-demand service, <http://www.visionpress.com/atmel/>

Until the public release January 21st 2013, preliminary datasheet, manual, application notes, presentation material etc. are available from the Atmel Sales Portal.

## Tools Support

**Software:** The latest version of Atmel Studio 6 with Atmel Software Framework version 3.5 supports the new AVR XMEGA E devices, and can be downloaded from: <http://www.atmel.com/studio/> (available November 13). The Atmel Software Framework has 35 examples for the AVR XMEGA E MCU today, and more are being added prior to the full launch, January 21st 2013.

**Hardware:** The AVR XMEGA E device can be used together with the STK600 Starter Kit. STK600 requires a STK600-TQFP32 socket board and the STK600-RC032X-64 routing card for the 32-pin AVR XMEGA E devices. STK600 requires another socket board and routing card for the QFN package options – these will be announced closer to the official launch date.

**Documentation and application notes:** The preliminary datasheet and manual are available. A number of application notes has been prepared for utilization of the new features in the AVR XMEGA E MCU.

## Product Availability, Price and Ordering Information

Product, Ordering Code	Flash Memory	Package/ Pin-count	Samples	Volume Shipments	10K Pricing Per Unit
ATxmega32E5-AU	32+4kB	TQFP32 7x7mm	13 <sup>th</sup> November	January 2013	inquiry to
ATxmega32E5-MU	32+4kB	QFN32 5x5mm	13 <sup>th</sup> November	January 2013	info@ineltek.com
ATxmega16E5-AU	16+2kB	TQFP32 7x7mm	13 <sup>th</sup> November	January 2013	inquiry to
ATxmega16E5-MU	16+2 kB	QFN32 5x5mm	13 <sup>th</sup> November	January 2013	info@ineltek.com
ATxmega8E5-AU	8+1kB	TQFP32 7x7mm	13 <sup>th</sup> November	January 2013	inquiry to
ATxmega8E5-MU	8+1kB	QFN32 5x5mm	13 <sup>th</sup> November	January 2013	info@ineltek.com
<p>A 4x4mm QFN package option is in development.            Estimated samples availability in December 2012; volume shipments from February 2013.</p> <p>Volume orders can be placed when samples are available, and volume shipment date shows the 4-12 week lead time from that date. Lead time will depend on order quantity.</p>					

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