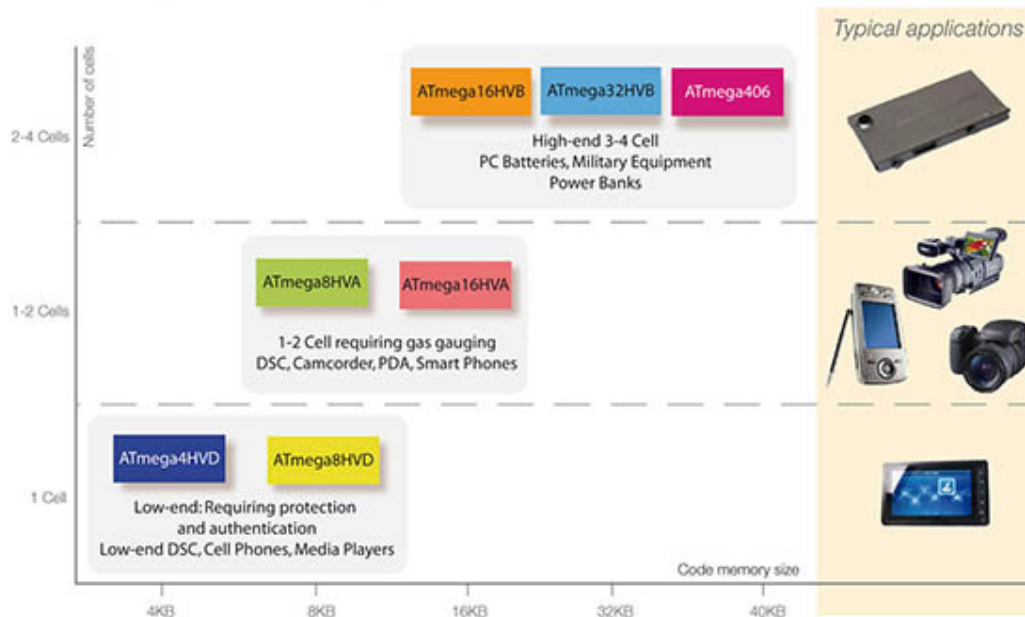


Atmel's battery management devices combine all the necessary functions into one monolithic chip. Manufactured in Atmel's patented high voltage process with elements of the picoPower™ design techniques, the devices offer a unique performance and flexibility at very low power consumption. The integrated and high accuracy analog functions ensure the maximum available energy in the batteries can be used while keeping the cost down.

The AVR Battery Management offering

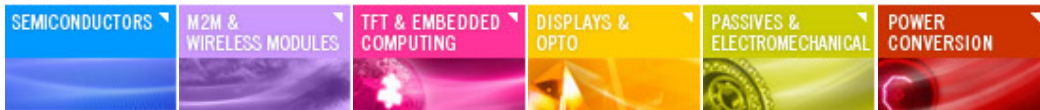


Products	Flash (KB)	EEPROM (Bytes)	SRAM (Bytes)	I/O pins	FET Drive	V _{gs} typ (V)	12-bit A/D (Channel)	Voltage Measure Accuracy (mV)*	Coulomb Counter	V _{cc} Range (V)
ATmega8HVA	8	256	512	6	N	4.5	5	12.5	18-bit	1.8-9.0
ATmega16HVA	16	256	512	6	N	4.5	5	12.5	18-bit	1.8-9.0
ATmega406	40	512	2048	18	P	1	10	12.5	18-bit	4.0-25
ATmega4HVD	4	256	512	5	N	4.5	2 (10-bit)	50	--	2.0-5.5
ATmega8HVD	8	256	512	5	N	4.5	2 (10-bit)	50	--	2.0-5.5
ATmega16HVB	16	512	1024	18	N	12	10	12.5	18-bit	4.0-25
ATmega32HVB	32	1024	2048	18	N	12	10	12.5	18-bit	4.0-25

* In the 0°C to +60°C temperature range.



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Battery management made smart!

Atmel's battery management solutions give designers and users significant benefits in addition to safe operation.

Safety

Atmel's high accuracy analog functions combined with several layers of safety functions ensures the safest operation of the lithium-ion batteries.

Communication

Communication with the battery enables advanced functions that can be used to improve the safety as well as extend the battery life. Such functions are authentication, communication with smart chargers, Gas gauging, Battery history and the possibility to do field upgrades of the code or battery parameters.

Gas gauging

For applications that require a controlled shut down of the system, gas gauging is the solution.

Notebook PC's need to store user data, digital cameras need to retract the zoom-lens and close the lens protection, and smart phones can still be operative if the non-vital functions are powered down early enough.

Authentication

To ensure safe detection of potentially unsafe copy batteries, authentication should be used. When detecting an unsafe battery, it can be charged and discharged in a safe way.

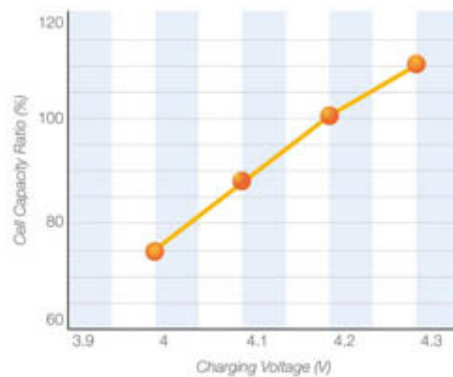
History log

During the lifetime of a product, warranty claims sometimes happen. If the battery includes an MCU, the battery performance history and usage log will be of great help during battery analysis.

Flexibility

Since the Lithium-ion battery is still a young technology, the programmable microcontroller solution offers full flexibility to support new regulations.

Accuracy and safety



Accuracy and safety are two major functions that need to be considered for a successful battery management system. The gas gauge enabled battery management devices have a very accurate internal voltage reference, enabling voltage protection with an absolute accuracy of ± 25 mV over the entire temperature and voltage range, and ± 12.5 mV over the 0-60°C range. This enables the battery to deliver maximum amount of energy without risking damage to the device or the user by over charging or too deep discharging. With an absolute accuracy of ± 12.5 mV, Atmel's battery management solutions are able to safely use 95% of the available battery energy. If the accuracy is reduced to ± 100 mV, only 70% of the energy can be used. To simplify manufacturing, calibration values are recorded and stored in the device by Atmel during chip testing. This enables customers to get the maximum performance of the chip with a minimal calibration effort.



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