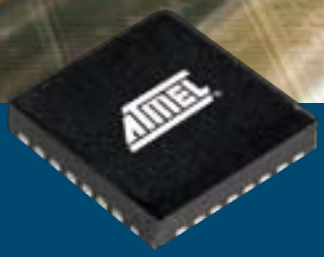
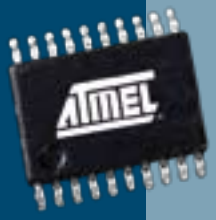




Automotive Solutions

Atmel's Automotive Commitment

Atmel®, a globally operating manufacturer of innovative integrated circuits, has more than 25 years of automotive electronics design expertise and is a market leader in various automotive areas. With a broad scope of automotive-dedicated technologies such as BCDMOS, BCD-on-SOI and non-volatile CMOS, and automotive-qualified fabs (ISO 9001:2000, ISO TS 16949:2002, ISO 14001:2004), Atmel is able to provide high-end products that meet the strict automotive quality demands and that make vehicles more safe, economical and convenient. Design-ins are supported by our application engineers, demonstration and evaluation kits, reference boards, software and detailed documentation.

Atmel's Automotive Products

- Multiplexing & Standard Microcontrollers
  - 32-bit AVR®
  - 8-bit Microcontrollers (AVR, 80C51)
  - Networking (LIN, CAN)
  - Capacitive Touch Microcontrollers
- Body Electronics & Powertrain
  - In-Vehicle Networking (IVN, Including LIN, CAN, Microcontrollers)
  - Motor Control (Drivers, High-temperature Solutions, Motor-driver System Basis Chips, Microcontrollers)
  - Fail-safe ICs
  - Watchdog ICs
  - Flashers
  - Lamp-outage Monitoring ICs
  - Airbag ICs
  - Long-time Timer ICs
  - Dashboard Dimmer ICs
  - Li-ion Battery Management
- Automotive RF Solutions
  - Car Access
  - Tire Pressure Monitoring
- Car Infotainment
  - Car Radio
  - GPS
- Serial EEPROMs

Innovative AVR Microcontroller Solutions for Automotive Applications

The automotive market for electronics is growing rapidly as the demand for comfort, safety and reduced fuel consumption increases. All of these new functions require local intelligence and control, which can be optimized by the use of small, powerful microcontrollers.

Taking advantage of its unsurpassed experience in embedded Flash memory microcontrollers, with a large number of devices of AVR devices from 8 to 32 bits, Atmel brings innovative solutions, whether for sensor or actuator control or more sophisticated networking applications.
These microcontrollers are fully-engineered to fulfill OEMs' quality requirements towards zero defects.

+150°C Qualified

Several AVR microcontrollers are qualified for operation up to +150°C ambient temperature (AEC-Q100 Grade0). Designers can distribute intelligence and control functions directly into or near gearboxes, transfer cases, engine sensors actuators, turbo chargers and exhaust systems.

Automotive AVR available in Grade0 are ATtiny45, ATtiny87/167, ATtiny261/461/861, ATmega88/168, ATmega16M1, ATmega32M1, ATmega32C1, ATmega64M1, ATmega64C1.

Atmel's automotive AVR microcontrollers are available in four different temperature ranges to serve various applications:

AEC-Q100 Grade3	T: -40°C to +85°C
AEC-Q100 Grade2	T1: -40°C to +105°C
AEC-Q100 Grade1	Z: -40°C to +125°C
AEC-Q100 Grade0	D, T2: -40°C to +150°C

AVR Architecture Benefits: 8-/32-bit RISC Core: High Performance, Low Power Consumption

The AVR 8-bit and 32-bit architectures have reached a high level of acceptance in many market segments for their:

- Highest System Integration with a Large Number of Analog and Digital Peripherals
- Highest CPU Performance with Executing Instructions in a Single Clock Cycle
- Highest Code Density with High-level C-language Optimization
- Dedicated DSP and Floating Point Instructions (32-bit)
- Self-programming Memory
- Product Compatibility for Both Code and Features
- Complete and Low-cost Tool Set
- Brown-out Detection and Flash Corruption Security

Capacitive Touch Products

With the ever-expanding popularity of touch-enabled products, such as portable media players and mobile phones, consumers have become comfortable with touch interfaces. It is natural that touch interfaces find their way into the automobile. From the proximity sensor for keyless door entry to the touch screen of the GPS system, touch interfaces give the driver and passengers a sense of luxury, quality, and differentiation. Atmel provides a touch solution for virtually any condition. In fact, Atmel delivers the most comprehensive portfolio of touch solutions in the industry – standard products and programmable products, button/slider/wheel controllers and touch screen controllers. The 11-channel QTouch® device AT42QT1110 is the first standard touchscreen controller for automotive applications.

Automotive: A Completely Distributed Architecture

Comfort and safety features are continuously being added to modern vehicles, requiring more embedded computing power. As cost-effective Flash microcontrollers become available, car makers now have the ability to design distributed architectures with scattered and re-programmable 8-bit controllers. Alternatively, they can merge all functions in one powerful 32-bit microcontroller with multiple peripherals and networking connections.

8-bit AVR microcontrollers are perfectly suited for distributed architectures. They feature on-chip analog interfaces for signal conditioning or programmable I/Os for actuator signaling, and CAN, LIN or PWM networking connections to the ECU.

Centralized architectures benefit from Atmel's 32-bit AVR microcontrollers with rich peripheral set and multiple CAN and LIN connections.

Standard Automotive AVR 8-bit Microcontrollers

Part Number	Flash (kB)	EEPROM (Bytes)	SRAM (Bytes)	I/O Pins	Vcc (V)	10-bit A/D Channels	Analog Comparator	Motor Ctrl. Timer	16-bit Timer	8-bit Timer	Ext. Interrupts	Hardware Multiplier	PWM Channels	RTC	Self Program Memory	CAN (Mess. Obj.)	SPI	TWI	UART (LIN HW)	Packages	Max. Temp (°C)
CAN																					
AT90CAN32	32	1024	2048	53	2.7 - 5.5	8	Yes		2	2	8	Yes	8	Yes	Yes	1 (15)	Yes	--	2	VQFN64, LQFP64	125
AT90CAN64	64	2048	4096	53	2.7 - 5.5	8	Yes		2	2	8	Yes	8	Yes	Yes	1 (15)	Yes	--	2	VQFN64, LQFP64	125
AT90CAN128	128	4096	4096	53	2.7 - 5.5	8	Yes		2	2	8	Yes	8	Yes	Yes	1 (15)	Yes	--	2	VQFN64, LQFP64	125
megaAVR®																					
ATmega48	4	256	512	23	2.7 - 5.5	8	Yes		1	2	26	Yes	6	Yes	Yes		1+USART	Yes	1	TQFP32, VQFN32	125
ATmega88	8	512	1024	23	2.7 - 5.5	8	Yes		1	2	26	Yes	6	Yes	Yes		1+USART	Yes	1	TQFP32, VQFN32	125
ATmega88V	8	512	1024	23	1.8 - 3.6	8	Yes		1	2	26	Yes	6	Yes	Yes		1+USART	Yes	1	TQFP32, VQFN32	85
ATmega16M1	16	512	1024	27	2.7 - 5.5	11	4	1	1	1	27	Yes	10	--	Yes	1 (6)	Yes	Yes	1 (Y)	TQFP32, VQFN32	125
ATmega164P	16	512	1024	32	2.7 - 5.5	8	Yes		1	2	32	Yes	6	Yes	Yes		1+USART	Yes	2	VQFN44, TQFP44	125
ATmega168	16	512	1024	23	2.7 - 5.5	8	Yes		1	2	26	Yes	6	Yes	Yes		1+USART	Yes	1	TQFP32, VQFN32	125
ATmega169P	16	512	1024	54	2.7 - 5.5	8	Yes		1	2	17	Yes	4	Yes	Yes		Yes	USI	1	VQFN64, TQFP64	85
ATmega32C1	32	1024	2048	27	2.7 - 5.5	11	4		1	1	27	Yes	4	--	Yes	1 (6)	Yes	Yes	1 (Y)	TQFP32, VQFN32	125
ATmega32M1	32	1024	2048	27	2.7 - 5.5	11	4	1	1	1	27	Yes	10	--	Yes	1 (6)	Yes	Yes	1 (Y)	TQFP32, VQFN32	125
ATmega324P	32	1024	2048	32	2.7 - 5.5	8	Yes		1	2	32	Yes	6	Yes	Yes		1+USART	Yes	2	VQFN44, TQFP44	125
ATmega328P	32	1024	2048	23	2.7 - 5.5	8	Yes		1	2	26	Yes	6	Yes	Yes		1+USART	Yes	1	TQFP32, VQFN32	125
ATmega644P	64	2048	4096	32	2.7 - 5.5	8	Yes		1	2	32	Yes	6	Yes	Yes		1+USART	Yes	2	VQFN32, TQFP44	125
ATmega64C1	64	2048	4096	27	2.7 - 5.5	11	4		1	1	27	Yes	4	--	Yes	1 (6)	Yes	Yes	1 (Y)	TQFP32, VQFN32	125
ATmega64M1	64	2048	4096	27	2.7 - 5.5	11	4	1	1	1	27	Yes	10	--	Yes	1 (6)	Yes	Yes	1 (Y)	TQFP32, VQFN32	125
tinyAVR®																					
ATtiny24	2	128	128	12	2.7 - 5.5	8	Yes		1	1	12	--	4	--	Yes		USI	USI	--	VQFN20, SOIC14	125
ATtiny25	2	128	128	6	2.7 - 5.5	4	Yes		--	2	7	--	4	--	Yes		USI	USI	--	VQFN20, SOIC8	125
ATtiny261	2	128	128	16	2.7 - 5.5	11	Yes		1	1 (10bit)	16	--	6	--	Yes		Yes	USI	--	VQFN32, VQFN20, SOIC20, TSSOP20	125
ATtiny44	4	256	256	12	2.7 - 5.5	8	Yes		1	1	12	--	4	--	Yes		USI	USI	--	VQFN20, SOIC14	125
ATtiny44V	4	256	256	12	1.8 - 3.6	8	Yes		1	1	12	--	4	--	Yes		USI	USI	--	VQFN20, SOIC14	85
ATtiny45	4	256	256	6	2.7 - 5.5	4	Yes		--	2	7	--	4	--	Yes		USI	USI	--	VQFN20, SOIC8	125
ATtiny45V	4	256	256	6	1.8 - 3.6	4	Yes		--	2	7	--	4	--	Yes		USI	USI	--	VQFN20, SOIC8	85
ATtiny461	4	256	256	16	2.7 - 5.5	11	Yes		1	1 (10bit)	16	--	6	--	Yes		Yes	USI	--	VQFN32, VQFN20, SOIC20, TSSOP20	125
ATtiny84	8	512	512	12	2.7 - 5.5	8	Yes		1	1	12	--	4	--	Yes		USI	USI	--	VQFN20	125
ATtiny85	8	512	512	6	2.7 - 5.5	4	Yes		--	2	7	--	4	--	Yes		USI	USI	--	VQFN20, SOIC8	125
ATtiny85V	8	512	512	6	1.8 - 3.6	4	Yes		--	2	7	--	4	--	Yes		USI	USI	--	VQFN20, SOIC8	85
ATtiny87	8	512	512	16	2.7 - 5.5	11	Yes		1	1	16	--	3	Yes	Yes		1+USI	No	1 (Y)	VQFN32, SOIC20, TSSOP20	125
ATtiny88	8	64	512	28	2.7 - 5.5	8	Yes		1	1	28	--	4	--	Yes		Yes	Yes		TQFP32, VQFN32	125
ATtiny861	8	512	512	16	2.7 - 5.5	11	Yes		1	1 (10bit)	16	--	6	--	Yes		Yes	USI	--	VQFN32, VQFN20, SOIC20, TSSOP20	125
ATtiny167	16	512	512	16	2.7 - 5.5	11	Yes		1	1	16	--	3	Yes	Yes		1+USI	No	1 (Y)	VQFN32, SOIC20, TSSOP20	125

All devices have a programmable brown-out controller, on-chip 8-MHz RC oscillator and a watchdog. The maximum frequency is 16 MHz.

Grade0 (150°C) Automotive AVR 8-bit Microcontrollers

Part Number	Flash (KB)	EEPROM (Bytes)	SRAM (Bytes)	I/O Pins	Vcc (V)	10-bit A/D Channels	Analog Comparator	Motor Ctrl. Timer	16-bit Timers	8-bit Timer	Ext. Interrupts	Hardware Multiplier	PWM Channels	RTC	Self Program Memory	CAN (Mess. Obj.)	SPI	TWI	UART (LIN HW)	Packages	Max. Temp (°C)
megaAVR®																					
ATmega88	8	512	1024	23	2.7 - 5.5	8	Yes	0	1	2	26	Yes	6	Yes	Yes	0	1+USART	Yes	1	TQFP32, VQFN32	150
ATmega16M1	16	512	1024	27	2.7 - 5.5	11	4	1	1	1	27	Yes	10	--	Yes	1 (6)	Yes	Yes	1 (Y)	TQFP32, VQFN32	150
ATmega168	16	512	1024	23	2.7 - 5.5	8	Yes	0	1	2	26	Yes	6	Yes	Yes	0	1+USART	Yes	1	TQFP32, VQFN32	150
ATmega32C1	32	1024	2048	27	2.7 - 5.5	11	4	0	1	1	27	Yes	4	--	Yes	1 (6)	Yes	Yes	1 (Y)	TQFP32, VQFN32	150
ATmega32M1	32	1024	2048	27	2.7 - 5.5	11	4	1	1	1	27	Yes	10	--	Yes	1 (6)	Yes	Yes	1 (Y)	TQFP32, VQFN32	150
ATmega64C1	64	2048	4096	27	2.7 - 5.5	11	4	0	1	1	27	Yes	4	--	Yes	1 (6)	Yes	Yes	1 (Y)	TQFP32, VQFN32	150
ATmega64M1	64	2048	4096	27	2.7 - 5.5	11	4	1	1	1	27	Yes	10	--	Yes	1 (6)	Yes	Yes	1 (Y)	TQFP32, VQFN32	150
tinyAVR®																					
ATtiny261	2	128	128	16	2.7 - 5.5	11	Yes	0	1	1 (10bit)	16	--	6	--	Yes	0	Yes	USI	--	VQFN32, TSSOP20	150
ATtiny45	4	256	256	6	2.7 - 5.5	4	Yes	0	--	2	7	--	4	--	Yes	0	USI	USI	--	VQFN20	150
ATtiny461	4	256	256	16	2.7 - 5.5	11	Yes	0	1	1 (10bit)	16	--	6	--	Yes	0	Yes	USI	--	VQFN32, TSSOP20	150
ATtiny87	8	512	512	16	2.7 - 5.5	11	Yes	0	1	1	16	--	3	Yes	Yes	0	1+USI	No	1 (Y)	VQFN32, TSSOP20	150
ATtiny861	8	512	512	16	2.7 - 5.5	11	Yes	0	1	1 (10bit)	16	--	6	--	Yes	0	Yes	USI	--	VQFN32, TSSOP20	150
ATtiny167	16	512	512	16	2.7 - 5.5	11	Yes	0	1	1	16	--	3	Yes	Yes	0	1+USI	No	1 (Y)	VQFN32, TSSOP20	150

All devices have a programmable brown-out controller, on-chip 8-MHz RC oscillator and a watchdog. The maximum frequency is 16 MHz.

Automotive AVR 32-bit Microcontrollers

Part Number	MIPS	Flash (KB)	SRAM (KB)	I/O Pins	Vcc (V)	10-bit A/D Channels	Analog Comparator	DAC	32-bit Timers	16-bit Timer	DMA Channels	On-chip Oscillator	Ext. Bus (EBI)	Ethernnet	USB	CAN (Mess. Obj.)	SSC (I2S)	SPI	TWI	Packages	UART (LIN HW)	Touch Hardware	Max. Temp (°C)
megaAVR®																							
UC3L016	64	16	8	36	1.6 - 3.6	12b 9c	8			6	12	3	--	--	--	--	--	1	2	TQFP48, QFN48	4	Y	125
UC3L032	64	32	16	36	1.6 - 3.6	12b 9c	8			6	12	3	--	--	--	--	--	1	2	TQFP48, QFN48	4	Y	125
UC3L064	64	64	16	36	1.6 - 3.6	12b 9c	8			6	12	3	--	--	--	--	--	1	2	TQFP48, QFN48	4	Y	125
UC3C0128	68	128	32	125	4.5 - 5.5	12b 16c	4	2 12bit	20bit 4c	6	12	3	Y	Y	FS-OTG	2 (16)	1	2	2	VQFP144	4	--	125
UC3C1128	68	128	32	83	4.5 - 5.5	12b 16c	4	2 12bit	20bit 4c	6	12	3	--	Y	FS-OTG	2 (16)	1	2	2	TQFP100	4	--	125
UC3C2128	68	128	32	47	4.5 - 5.5	12b 11c	2	1 12bit	20bit 4c	6	12	3	--	Y	FS-OTG	2 (16)	1	1	2	TQFP64	3	--	125
UC3C0256	68	256	64	125	4.5 - 5.5	12b 16c	4	2 12bit	20bit 4c	6	12	3	Y	Y	FS-OTG	2 (16)	1	2	2	VQFP144	4	--	125
UC3C1256	68	256	64	83	4.5 - 5.5	12b 16c	4	2 12bit	20bit 4c	6	12	3	--	Y	FS-OTG	2 (16)	1	2	2	TQFP100	4	--	125
UC3C2256	68	256	64	47	4.5 - 5.5	12b 11c	2	1 12bit	20bit 4c	6	12	3	--	Y	FS-OTG	2 (16)	1	1	2	TQFP64	3	--	125
UC3C0512	68	512	64	125	4.5 - 5.5	12b 16c	4	2 12bit	20bit 4c	6	12	3	Y	Y	FS-OTG	2 (16)	1	2	2	VQFP144	4	--	125
UC3C1512	68	512	64	83	4.5 - 5.5	12b 16c	4	2 12bit	20bit 4c	6	12	3	--	Y	FS-OTG	2 (16)	1	2	2	TQFP100	4	--	125
UC3C2512	68	512	64	47	4.5 - 5.5	12b 11c	2	1 12bit	20bit 4c	6	12	3	--	Y	FS-OTG	2 (16)	1	1	2	TQFP64	3	--	125
UC3A0512	91	512	64	109	1.8 - 3.6	10b 8c	--	--	20bit 7c	1(3c)		2	Y	Y	FS-OTG		1	2	1	LQFP144	4	--	85

All devices have a programmable brown-out controller, on-chip 8-MHz RC oscillator and a watchdog. The maximum frequency is 66 MHz (UC3A0512) and 50 MHz (all others).

Body Electronics & Powertrain

Atmel has more than 25 years experience in body electronic and powertrain designs and is a market leader in various areas (e.g., direction indicator ICs). In the ever-growing LIN Bus system segment, Atmel offers products at all integration levels from simple transceiver ICs to complex system basis chips (SBC). At higher integration levels, Atmel provides complete System-in-Package (SIP) solutions including an AVR microcontroller, LIN transceiver, voltage regulator and watchdog in one single package.

Due to the advantages of SOI technology, the development of ICs with outstanding electromagnetic immunity (EMI and ESD) is possible. Atmel is committed to offering its customers optimal LIN solutions as the LIN area continues to develop and evolve. Atmel's driver ICs are capable of reaching environmental temperatures of 150ºC and junction temperatures of 200ºC, making their use possible in most high-temperature automotive applications.

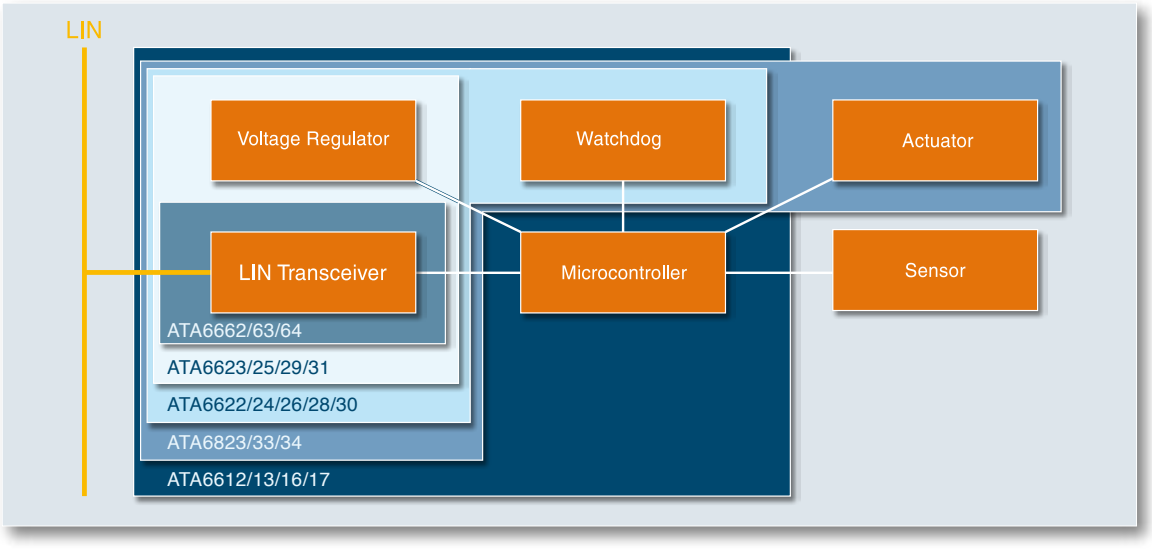
With few external components, Atmel's driver ICs with LIN communication and Atmel's AVR microcontrollers combine to create cost-efficient motor driver modules complete with LIN functionality, which can equally be used in harsh automotive conditions.

- In-Vehicle Networking (IVN, Including LIN, CAN, Microcontrollers)
- Standard and High-temperature Drivers, Motor-driver System Basis Chips
- Fail-safe Systems
- Watchdogs
- Flashers
- Airbag ICs
- Timers
- Dimmers
- Li-ion Battery Management

Body Electronic & Powertrain Devices

In-Vehicle Networking ICs

Atmel's modular LIN family includes simple transceiver ICs (ATA6662/63/64), complex system basis chips (ATA6622/23/24/25/26/28/29/30/31) and system-in-package modules (ATA6612/13/16/17) with complete system integration as well as system basis chips for motor-driver applications.



LIN Family ICs

Part Number	Description	Package
ATA6612	AVR LIN SiP, ATmega88 Microcontroller with LIN Transceiver, 5V Voltage Regulator, and Window Watchdog in Single Package	QFN48
ATA6613	AVR LIN SiP, ATmega168 Microcontroller with LIN Transceiver, 5V Voltage Regulator, and Window Watchdog in Single Package	QFN48
ATA6616	AVR LIN SiP, ATtiny87 Microcontroller with LIN Transceiver, 5V Voltage Regulator, Window Watchdog and Hardware LIN UART in Tiny Single Package	QFN32
ATA6617	AVR LIN SiP, ATtiny167 Microcontroller with LIN Transceiver, 5V Voltage Regulator, Window Watchdog and Hardware LIN UART in Tiny Single Package	QFN32
ATA6622	LIN System Basis Chip with LIN Transceiver, Integrated 3.3V/50 mA Voltage Regulator and Window Watchdog	QFN20
ATA6623	LIN System Basis Chip with LIN Transceiver and Integrated 3.3V/50 mA Voltage Regulator	SO8
ATA6624	LIN System Basis Chip with LIN Transceiver, Integrated 5V/50 mA Voltage Regulator and Window Watchdog	QFN20
ATA6625	LIN System Basis Chip with LIN Transceiver and Integrated 5V/50 mA Voltage Regulator	SO8
ATA6626	LIN System Basis Chip Including LIN Transceiver without TxD Time-out Timer, Integrated 5V/50 mA Voltage Regulator and Window Watchdog	QFN20
ATA6628	LIN System Basis Chip with LIN Transceiver, Integrated 3.3V/50 mA Voltage Regulator and Window Watchdog	QFN20
ATA6629	LIN System Basis Chip with LIN Transceiver and Integrated 3.3V/50 mA Voltage Regulator	SO8
ATA6630	LIN System Basis Chip with LIN Transceiver, Integrated 3.3V/50 mA Voltage Regulator and Window Watchdog	QFN20
ATA6631	LIN System Basis Chip with LIN Transceiver and Integrated 3.3V/50 mA Voltage Regulator	SO8
ATA6662	LIN Transceiver, Physical Layer According to Specification 2.1 (Backwards Compatible)	SO8
ATA6663	LIN Transceiver, Physical Layer According to Specification 2.1	SO8
ATA6664	LIN Transceiver, Physical Layer According to Specification 2.1, without Time-out Feature	SO8
ATA6823	LIN System Basis Chip with H-bridge DC Motor Driver. Integrated 3.3V/5V/100 mA Power Supply, LIN Transceiver, Watchdog, 2 High-side and 2 Low-side Gate Drivers	QFN32
ATA6833	BLDC Motor System Basis Chip with 3 Half-bridge Gate Drivers, LIN Interface, Window Watchdog and Voltage Regulator	QFN48
ATA6834	BLDC Motor System Basis Chip with 3 Half-bridge Gate Drivers, LIN Interface, Window Watchdog and Voltage Regulator, $T_{junction}$ up to 200°C	QFN48

High-temperature Drivers

Atmel's driver ICs are also available for high-temperature applications. In mechatronic solutions, for example, turbo charger or exhaust gas recirculation systems, many flaps have to be controlled by DC motor driver ICs, which are located very close to the hot engine. Due to the advantages of Atmel's own SOI technology SMART-I.S.™, these driver ICs can withstand ambient temperatures up to 150°C/302°F and chip temperatures up to 200°C/392°F.

High-temperature Driver ICs

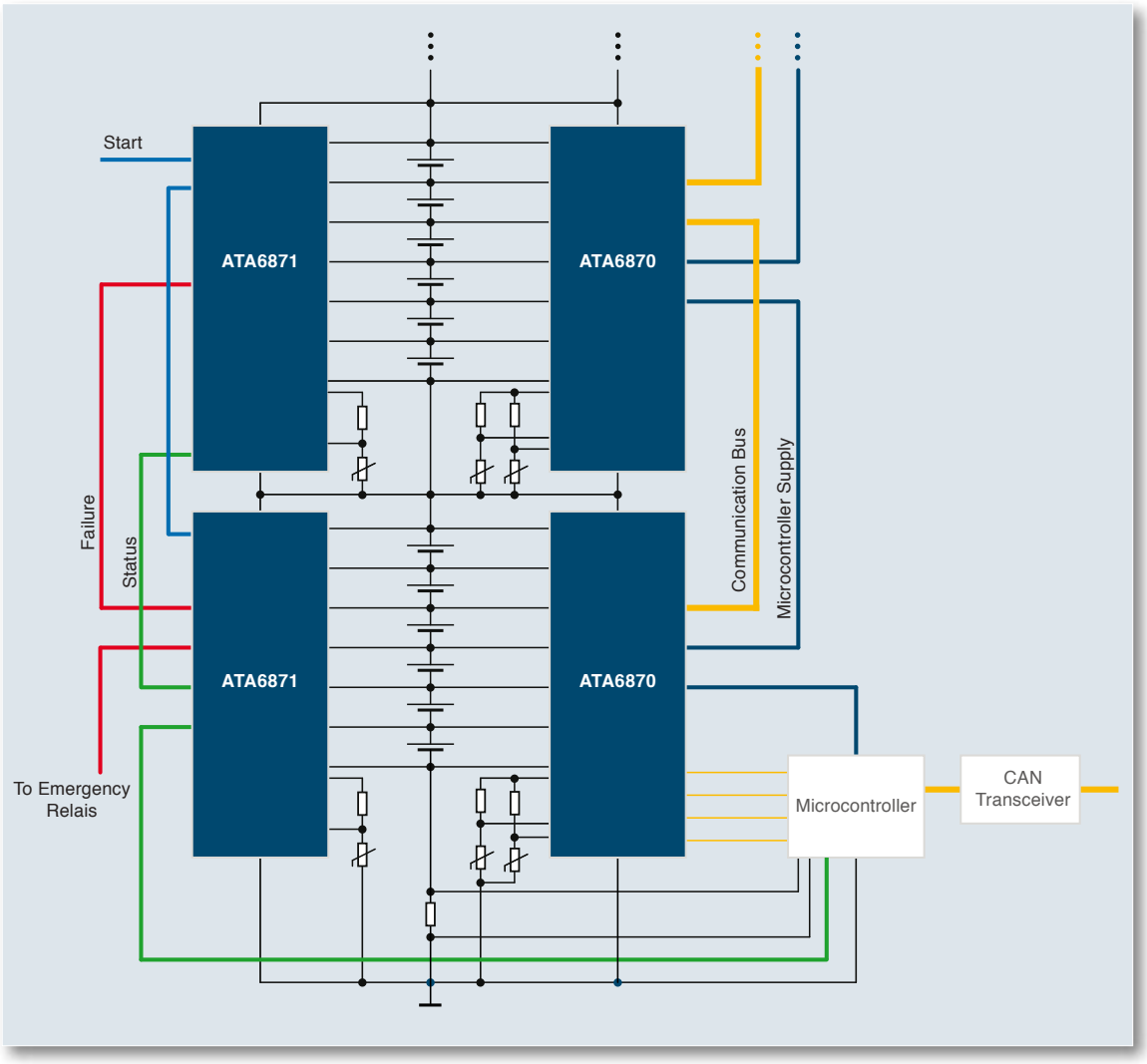
Part Number	Description	Package
ATA6824	H-bridge DC Motor Driver System Basis Chip. Integrated 3.3V/5V /100 mA Power Supply	QFN32
ATA6827	Triple Half-bridge Driver with 3 High-side and 3 Low-side Drivers, 1000 mA Current Limitation	QFN18
ATA6832	Triple Half-bridge Driver with 3 High-side and 3 Low-side Drivers, 1000 mA Current Limitation and PWM > 20 kHz	QFN18
ATA6834	BLDC Motor System Basis Chip with 3 Half-bridge Gate Drivers, LIN Interface, Window Watchdog and Voltage Regulator, $T_{junction}$ up to 200°C	QFN48
ATA6837	Hex Half-bridge Driver with Serial Input Control, 650 mA Current Limitation	SO28, QFN24

Standard Driver ICs

Part Number	Description	Package
T6801	Single-channel Driver; 25 mA Output with Thermal Monitoring, Thermal Shutdown, Short-circuit Protection	SO8
U6803B	Triple Driver; 3 x 25 mA Output with Thermal Monitoring, Common Thermal Shutdown, Short-circuit Protection	SO8
U6815BM	Dual Hex Driver with Serial Input Control, 6 High-side and 6 Low-side Drivers, 600 mA Current Limitation	SO28
T6816	40V Dual Hex Driver with Serial Input Control, 6 High-side and 6 Low-side Drivers, 600 mA Current Limitation	SO28
T6817	Dual Triple Driver with Serial Input Control, 3 High-side and 3 Low-side Drivers, 600 mA Current Limitation	SSO20
T6818	Triple Half-bridge Driver with Serial Input Control, 3 High-side and 3 Low-side Drivers, 1500 mA Current Limitation	SO14
U6820BM	Dual Quad Driver with Serial Input Control, 4 High-side Output Stages, 4 Low-side Output Stages, 50 mA Capability, Current Limitation	SO16
ATA6823	LIN System Basis Chip with H-bridge DC Motor Driver. Integrated 3.3V/5V/100 mA Power Supply, LIN Transceiver, Watchdog, 2 High-side and 2 Low-side Gate Drivers	QFN32
ATA6826	Triple Half-bridge Driver with Serial Input Control, 3 High-side and 3 Low-side Drivers, 1000 mA Current Limitation	SO14
ATA6829	Dual Triple Driver with Serial Input Control and PWM Input, 3 High-side and 3 Low-side Drivers, 1500 mA Current Limitation	SO16 Heat Slug
ATA6831	Triple Half-bridge Driver with Serial Input Control and 25-kHz PWM Input, 3 High-side and 3 Low-side Drivers, 1000 mA Current Limitation	QFN18
ATA6833	BLDC Motor System Basis Chip with 3 Half-bridge Gate Drivers, LIN Interface, Window Watchdog and Voltage Regulator	QFN48
ATA6836	Hex Half-bridge Driver with Serial Input Control, 6 High-side and 6 Low-side Drivers, 650 mA Current Limitation	SO28, QFN24

Li-ion Battery Management

Li-ion batteries are the 1st choice for modern high-performance batteries due to their cutting-edge characteristics. They store much more energy than conventional NiMH batteries as they are up to 30% smaller and 50% lighter. While these Li-ion batteries offer concrete advantages in terms of size, weight, recharge speed, life span, and resistance to memory effects, they do have a tendency to overheat when overcharged or during deep discharging. Therefore, with Li-ion battery usage, protection and safety functions are paramount. With the ATA6870 and ATA6871, Atmel offers the safest solution on the market for the monitoring of Li-ion batteries.



Li-ion Battery Management ICs

Part Number	Description	Package
ATA6870	Battery-cell Measuring, Power Supply and Charge Balancing Circuit for Multi-cell Li-ion Battery Stacks	QFN48
ATA6871	Battery-cell Over-/Undervoltage, Overtemperature Monitoring Circuit for Multi-cell Li-ion Battery Stacks	SSO28

Stand-alone Body Electronics and Powertrain ICs

Airbag ICs

Part Number	Description	Package
ATA6264	Flexible Airbag Power Supply IC with Rich Set of Functionalities	QFP44
U6268B	Side Airbag Sensor Dual Interface (Satellite Interface), 50 mA Sensor Supply	SO16

Watchdog ICs

Part Number	Description	Package
ATA6020	Watchdog IC, Programmable via Metal Mask (Based on Microcontroller ATAR080)	SO20
ATA6025	Watchdog IC with Fail-safe Output, Low Power Consumption in Standby Mode	SO8
ATA5021	Watchdog Timer, Active and Sleep Mode, 1 Wake-up Input, Enable Output	SO8

Lamp Outage Monitoring ICs

Part Number	Description	Package
U4793B	2 Comparators, 44 mV Threshold, Glow-plug Application, ESD Protection up to 10 kV	DIP8, SO8
U479B	2 Comparators, 8 mV Threshold, Single-lamp Application, ESD Protection up to 2 kV	DIP8

Fail-safe ICs

Part Number	Description	Package
ATA6842	Fail-safe System IC with 4-channel Relay Driver, Power Supply, and Watchdog	QFN48
U6813B	Fail-safe IC, Watchdog Timer, Relay Driver, Lamp Driver, and Charge Pump	SO16

Wiper and Wash Control ICs

Part Number	Description	Package
U641B	Wipe/Wash Control with Prewash Delay, INT/WIWA Switches to VBATT	DIP8, SO8
U642B	Wipe/Wash Control without Prewash Delay, INT/WIWA Switches to VBATT	DIP8, SO8

Long-time Timer ICs

Part Number	Description	Package
U6032B	Toggle IC for Switch-over Function, Defined Status after POR	DIP8, SO8
U6046B	Adjustable Delay Time 4s to 20h, Delay Adjustable with RC Oscillator	DIP8, SO8

Dashboard Dimmer ICs

Part Number	Description	Package
U6083B	PWM High-side Driver, 18 to 100% Duty Cycle, Minimum External Components	DIP8

Flasher ICs

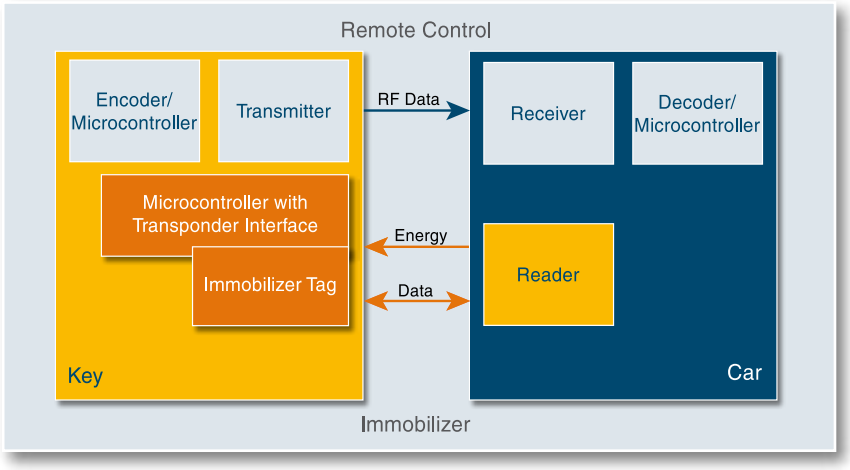
Part Number	Description	Package
ATA6140	Twin Relay Flasher for 12/24V Applications, Standby Current < 10 µA	SO16
U2043B	Lamp Load > 10W, 30 mΩ Shunt, Improved EMC, Pilot Lamp	DIP8, SO8
U2044B	Lamp Load > 10W, 30 mΩ Shunt, Standby Current < 10 µA, Twin Relay Flasher	DIP14, SO14
ATA2069	Trailer Flasher for Lamp Loads > 10W	DIP8, SO8
U6043B	Lamp Load > 1W, 18 mΩ Shunt, Improved EMC, Load-dump Protected	DIP8, SO8
U643B	Lamp Load > 1W, 30 mΩ Shunt, Improved EMC, Load-dump Protected	DIP8, SO8

Automotive RF Solutions

Car Access

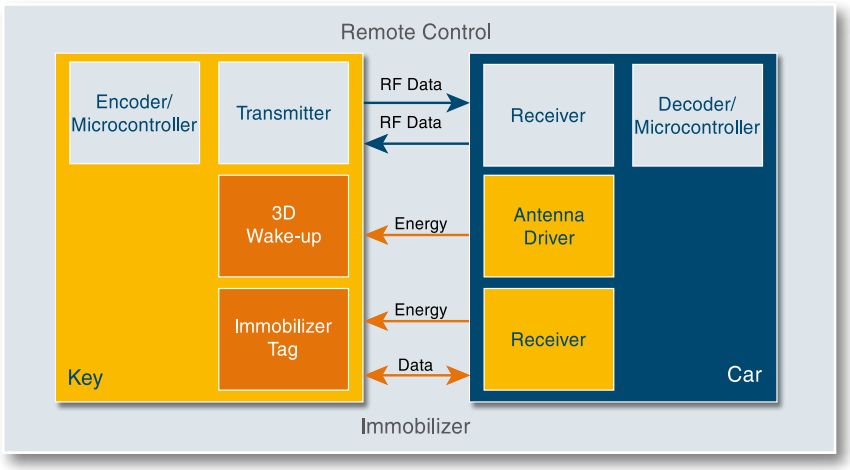
Atmel, having launched its first dedicated car access transmitter in 1997, continues to recognize the importance of security in the automotive area, and as such offers a range of car access solutions from immobilizers to full-duplex transceivers perfect for the prevention of automotive theft. Atmel's automotive safety portfolio also features extremely secure Passive Entry Go (PEG) solutions. Atmel provides all devices needed to design a complete car access system solution. Customers have the flexibility to create their own dedicated designs using Atmel's low-power transmitter IC, receiver IC, and microcontroller families.

Uni-directional System



Uni-directional RF link for the keyless entry function to open or lock the doors. The immobilizer system is built with a bi-directional LF link operating with the AUT64 crypto algorithm.

Bi-directional System and Wake-up Channel for PEG Solution



Bi-directional RF link for the RKE function as well as for the extremely secure duplex RF link in a Passive Entry Go system. The IF link is used for the wake-up channel in a PEG system as well as for the immobilizer function to start the RF communication.

Car Access Devices

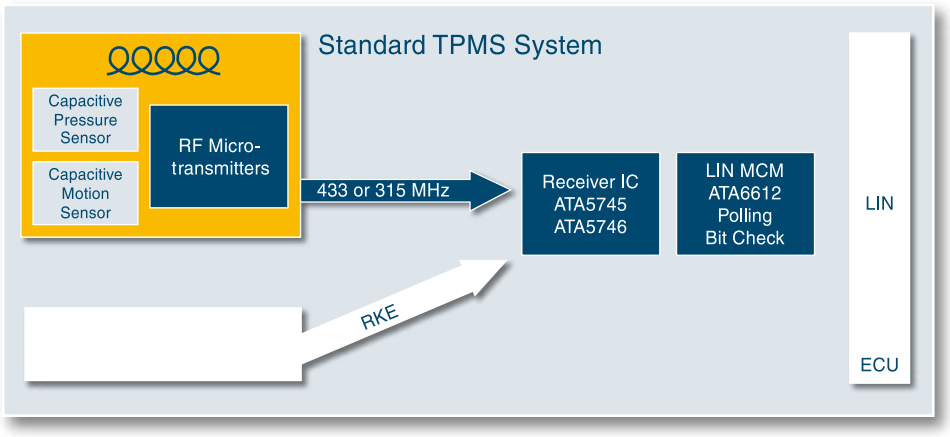
Part Number	Frequency Range [MHz]	Modulation	Description	Package
ATA5278	100 – 150 kHz	ASK/PSK	Stand-alone Antenna Driver/Transmitter IC	QFN28
ATA5279	105 – 155 kHz	ASK/FSK	Six-fold LF Antenna Driver IC	QFN48
ATA5723	315	ASK/FSK	UHF Remote Control Receiver, 300 kHz Bandwidth RSSI Pin Compatible to ATA5724, ATA5728	SSO20
ATA5724	433	ASK/FSK	UHF Remote Control Receiver, 300 kHz Bandwidth, RSSI Pin Compatible to ATA5723, ATA5728	SSO20
ATA5728	868	ASK/FSK	UHF Remote Control Receiver, 600 kHz Bandwidth, RSSI Pin Compatible to ATA5723, ATA5724	SSO20
ATA5743	300 – 450	ASK/FSK	UHF Remote Control Receiver IC with High FSK Sensitivity and Automotive-compatible Data Interface, Self-polling Mode	SO20
ATA5744	300 – 450	ASK	Easy-to-use Transparent UHF Receiver IC	SO20 SS020
ATA5749	315 – 433	ASK/FSK	Low-current Fully Integrated Fractional-N PLL Transmitter with Scalable Output Power (–0.5 to 12.5 dBm)	TSSOP10
ATA5745 ATA5746	433 315	ASK/FSK	Transparent UHF Receiver IC with Fast RKE/TPMS Switching Rate, Suited to 1 to 20 Kbits/s Manchester FSK with 4 Programmable Bit-rate Ranges, High FSK Sensitivity (–114 dBm at 2.4 Kbits/s), High Blocking Capability	QFN24
ATA5756 ATA5757	315 433	ASK/FSK	UHF Transmitter ICs with Low Settling Time and Active Current Consumption	TSSOP10
ATA5760	868 – 870	ASK/FSK	UHF Receiver IC, Functionally Compatible to ATA5743	SO20
ATA5771 ATA5773 ATA5774	868 – 928 315 433	ASK/FSK	AVR Microcontroller-based RF Transmitter Family	QFN24
ATA5790	125 kHz	BPLM*/ QPLM**/ Manchester/ Biphase	Passive Entry Go (PEG) IC for the Key, Including an Embedded Ultra-low-power AVR 8-bit Microcontroller, an LF Hardware AES Module for Immobilization, and a 3D LF Receiver Module	QFN38
ATA5795	125 kHz 315 – 433	BPLM*/ QPLM**/ Manchester/ Biphase ASK/FSK	Remote Keyless Entry (RKE) IC for the Key, Including an Embedded Ultra-low-power AVR 8-bit Microcontroller, the Dedicated RF Transmitter ATA5749 and the LF Hardware AES Module for Immobilization in a Single Package	QFN32
ATA5811 ATA5812	433.868 315	ASK/FSK	UHF Transceiver IC with Extremely Low Current Consumption and Small Size	QFN48
ATA5823 ATA5824	312.5 – 317.5 433 – 868	ASK/FSK	UHF Multi-channel Half-/Full-duplex Transceiver with Low Power Consumption	QFN48
T5750 T5753 T5754	868 – 928 310 – 330 429 – 439	ASK/FSK	UHF Transmitter IC with High Output Power and Wide Temperature Range (–40°C/F to +85°C/185°F, +125°C/257°F)	TSSOP8
TK5561	125 kHz	Manchester/ Bi-phase	Read/Write Transponder with Encryption Algorithm	Plastic Package (PP)
U2270B	100 – 150 kHz	Manchester/ Bi-phase	Read/Write Base Station IC	SO16

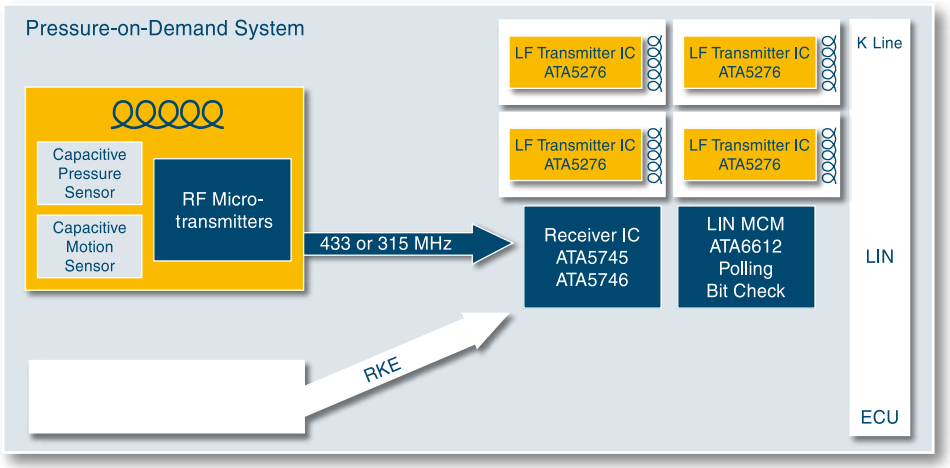
** BPLM = Binary Pulse Length Modulation ** QPLM = Quad Pulse Length Modulation*

Tire Pressure Monitoring

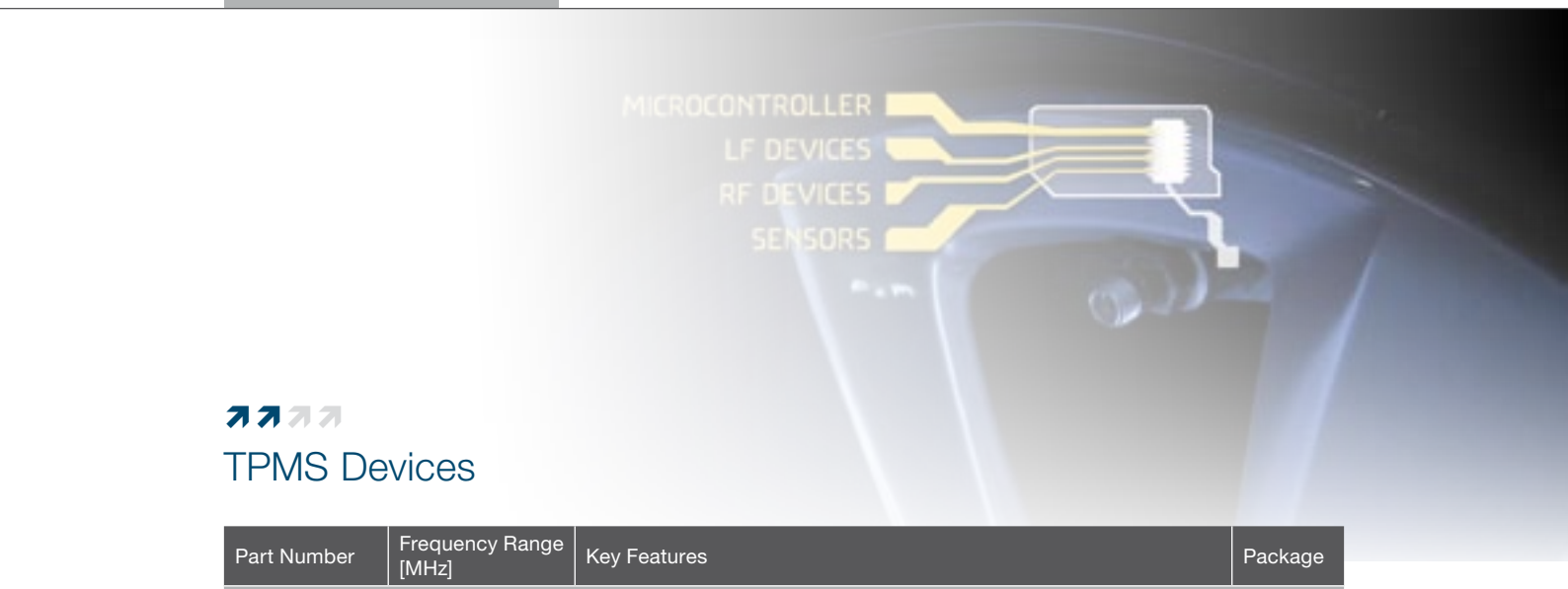
Atmel offers highly integrated circuits for battery-powered sensor-gauge and base-station applications in tire pressure monitoring systems (TPMS). The TPMS product portfolio includes a low-power Flash-microcontroller RF-transmitter IC family to be used together with separate capacitive pressure or motion sensors, plus a broad range of stand-alone RF-transmitter and LF-receiver ICs that can be combined with a separate microcontroller or smart sensor devices. These TPMS ICs are suitable for temperatures up to 125°C/257°F (extended storage temperatures up to 175°C/347°F), and they provide outstanding low current consumption that helps the sensor gauges to reach a lifetime of 10 years.

The TPMS portfolio also includes an innovative transparent RF receiver IC family with very fast switching times between RKE and TPMS signals. These ICs are capable of covering all physical functions needed in combined TPMS/RKE systems. The polling mode and bit-check functions are carried out by the firmware in a separate microcontroller device, such as Atmel's LIN multi-chip module ATA6612 with integrated AVR.





A POD system is a master/slave system. In addition to direct TPMS systems, it includes a 125-kHz built-in channel for waking up sensor modules in defined duty cycles. Such systems remarkably increase the flexibility of wheel initialization when changing tires by reprogramming the memory. Also, POD systems enable auto-location functionality, i.e., they display the precise location of a deflated wheel.



TPMS Devices

Part Number	Frequency Range [MHz]	Key Features	Package
UHF Transmitter ICs			
ATA5749	315/433	ASK/FSK, Fully Programmable by the Microcontroller, Single-board Design for Both Frequencies with Single 13 MHz Crystal Type, From 1.9V	TSSOP10
ATA5756 ATA5757	315 433	ASK/FSK UHF TPMS Transmitter ICs with Low Settling Time and Active Current Consumption	TSSOP10
UHF Receiver ICs			
ATA5723	315	UHF Remote Control Receiver, 300 kHz Bandwidth RSSI Pin Compatible to ATA5724, ATA5728	SSO20
ATA5724	433	UHF Remote Control Receiver, 300 kHz Bandwidth, RSSI Pin Compatible to ATA5723, ATA5728	SSO20
ATA5728	868	UHF Remote Control Receiver, 600 kHz Bandwidth, RSSI Pin Compatible to ATA5723, ATA5724	SSO20
ATA5745 ATA5746	433 315	Transparent UHF Receiver IC with Fast RKE/TPMS Switching Rate, Suited to 1 to 20 Kbits/s Manchester FSK with 4 Programmable Bit-rate Ranges, High FSK Sensitivity (–114 dBm at 2.4 Kbits/s), High Blocking Capability	QFN24
ATA5811 ATA5812	433 315	Fast Switching Rate between TPMS and RKE Receive Modes	QFN48
LF Antenna Driver ICs			
ATA5276	125 kHz	1.5-APP Antenna Driver IC with Frequency Self-tuning to the LF Antenna Resonance Frequency and Built-in Diagnosis Function	QFN20

Serial EEPROMs

Atmel's serial EEPROM automotive-grade products were first introduced to the electronics industry in 1996. Over the years, Atmel has integrated rigorous Quality and Reliability systems into every step of the automotive manufacturing flow, while continuing to provide highly competitive solutions and keep pace with customers' demand. This enables Atmel to maintain premier quality and delivery standards mandated by international automotive customers. Within its extensive product portfolio, Atmel offers automotive-grade serial products in 2-wire, 3-wire, and SPI bus protocols in SOIC, TSSOP, and PDIP packages, all available in environmentally-friendly "green" versions.

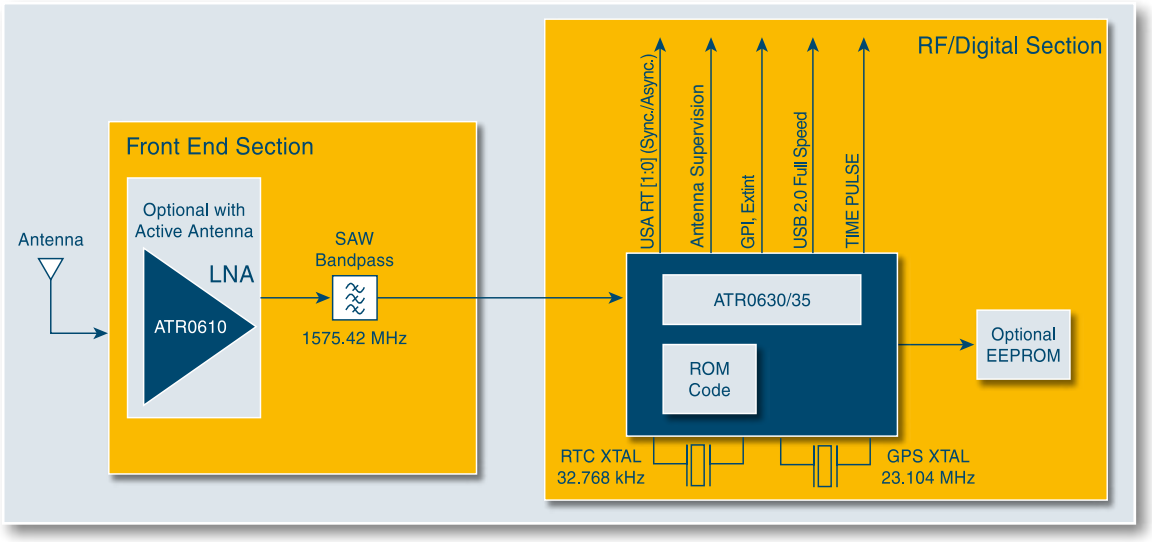
Safety	2-wire Bus	3-wire Bus	SPI Bus
Airbags		AT93C46DN-SP25-T	AT25020AN-10SQ-2.7
		AT93C56A-10SQ-2.7	AT25040AN-10SQ-2.7
		AT93C66A-10SQ-2.7	AT25080AN-10SQ-2.7
		AT93C86A-10SQ-2.7	AT25160AN-10SQ-2.7
			AT25320AN-10SQ-2.7
			AT25640AN-10SQ-2.7
			AT25128AN-10SQ-2.7
			AT25256AN-10SQ-2.7
Anti-lock Brake System	AT24C02BN-SP25-T	AT93C46DN-SP25-T	AT25040AN-10SQ-2.7
	AT24C04BN-SP25-T		AT25080AN-10SQ-2.7
		AT93C56A-10SQ-2.7	AT25160AN-10SQ-2.7
		AT93C66A-10SQ-2.7	AT25320AN-10SQ-2.7
		AT93C86A-10SQ-2.7	AT25640AN-10SQ-2.7
			AT25128AN-10SQ-2.7
			AT25256AN-10SQ-2.7
Engine Control		AT93C56A-10SQ-2.7	AT25040AN-10SQ-2.7
		AT93C66A-10SQ-2.7	AT25080AN-10SQ-2.7
		AT93C86A-10SQ-2.7	AT25160AN-10SQ-2.7
			AT25128AN-10SQ-2.7
			AT25256AN-10SQ-2.7
TPMS System	AT24C01BN-SP25-T	AT93C46DN-SP25-T	AT25010AN-10SQ-2.7
	AT24C02BN-SP25-T	AT93C56A-10SQ-2.7	AT25020AN-10SQ-2.7
	AT24C04BN-SP25-T	AT93C66A-10SQ-2.7	AT25040AN-10SQ-2.7
	AT24C08BN-SP25-T	AT93C86A-10SQ-2.7	
	AT24C16AN-10SQ-2.7		
Accessories	**2-wire Bus**	**3-wire Bus**	**SPI Bus**
Audio	AT24C08BN-SP25-T	AT93C46DN-SP25-T	
	AT24C16AN-10SQ-2.7		
	AT24C32AN-10SQ-2.7	AT93C56A-10SQ-2.7	
	AT24C64AN-10SQ-2.7	AT93C66A-10SQ-2.7	
		AT93C86A-10SQ-2.7	
Dashboard	AT24C01BN-SP25-T	AT93C46DN-SP25-T	AT25020AN-10SQ-2.7
	AT24C02BN-SP25-T		AT25040AN-10SQ-2.7
	AT24C04BN-SP25-T	AT93C56A-10SQ-2.7	AT25080AN-10SQ-2.7
	AT24C08BN-SP25-T	AT93C66A-10SQ-2.7	AT25128AN-10SQ-2.7
	AT24C16AN-10SQ-2.7	AT93C86A-10SQ-2.7	AT25160AN-10SQ-2.7
Driver Information	AT24C01BN-SP25-T	AT93C46DN-SP25-T	AT25010AN-10SQ-2.7
	AT24C02BN-SP25-T	AT93C56A-10SQ-2.7	AT25020AN-10SQ-2.7
	AT24C04BN-SP25-T	AT93C66A-10SQ-2.7	AT25040AN-10SQ-2.7
	AT24C08BN-SP25-T	AT93C86A-10SQ-2.7	AT25080AN-10SQ-2.7
	AT24C16AN-10SQ-2.7		AT25160AN-10SQ-2.7
TPMS System	AT24C08BN-SP25-T	AT93C46DN-SP25-T	AT25080AN-10SQ-2.7
	AT24C16AN-10SQ-2.7	AT93C56A-10SQ-2.7	AT25160AN-10SQ-2.7
	AT24C32AN-10SQ-2.7	AT93C66A-10SQ-2.7	AT25320AN-10SQ-2.7
	AT24C64AN-10SQ-2.7	AT93C86A-10SQ-2.7	AT25640AN-10SQ-2.7
	AT24C128N-10SQ-2.7		AT25128AN-10SQ-2.7
	AT24C256N-10SQ-2.7		AT25256AN-10SQ-2.7

Car Infotainment / Telematics

GPS/Navigation

Atmel's ANTARIS® chipset includes an RF receiver IC, a baseband IC, and an LNA. The 16-channel GPS receiver features excellent navigation accuracy along with maximum sensitivity, very fast time-to-first-fix, and extremely low power consumption (60 mW). Like its predecessor, the new-generation ANTARIS4 engine features full support of WAAS, EGNOS, and MSAS satellites.

- 16-Channel GPS Receiver (RoHS Compliant)
- Excellent Navigation Accuracy Along with Maximum Sensitivity
- Fast Time-to-First-Fix
- High Immunity to RF Interference
- Extremely Low Power Consumption (62 mW for the Chipset at 1 Fix per Second)
- Significantly Reduced Bill of Materials (BOM) and System Costs, No Flash Needed Due to Highly Configurable ROM-Based Software
- Integrated USART and USB 2.0 Interface



GPS Devices

Part No.	Description	Package
ATR0601	ANTARIS4 GPS RF Receiver, Single IF Front End Concept, Very Low Power, Immune Against RF Interference	QFN24 (4 mm × 4 mm)
ATR0610	ANTARIS GPS LNA with Integrated Power-up Control and Output Matching (NF Min <1.6 dB)	PLLP (1.6 mm × 2 mm)
ATR0621P1	ANTARIS4 GPS 16-channel Baseband Processsor, ARM7TDMI®, RAM, ROM V5, up to –158 dBm Sensitivity with External Software, Low Power	BGA100 (9 mm × 9 mm)
ATR0622P1	ANTARIS4 GPS 16-channel Baseband Processsor, ARM7TDMI, RAM, ROM V5, up to –150 dBm Sensitivity, Low Power	QFN56 (8 mm × 8 mm)
ATR0625P1	ANTARIS4 GPS 16-channel Baseband Processsor, ARM7TDMI, RAM, SuperSense ROM V5, up to –158 dBm Sensitivity, Low Power	QFN56 (8 mm × 8 mm)
ATR0630P1	ANTARIS4 Single-chip Device, 16-channel GPS Engine, RF Receiver, Baseband Processsor, ARM7TDMI®, RAM, ROM V5, up to –150 dBm Sensitivity, Low Power	BGA96
ATR0635P1	ANTARIS4 Single-chip Device, 16-channel GPS Engine, RF Receiver, Baseband Processsor, ARM7TDMI, RAM, SuperSense ROM V5, up to –158 dBm Sensitivity, Low Power	BGA96

Car Radio

Atmel has over 30 years experience in designing broadcast radio solutions. The company's in-depth know-how and high quality standards (ISO9001 and ISO16949) enable the specific quality and performance requirements of the car radio market.
Atmel provides high-end AM/FM frontend ICs, which are also capable to address HD Radio, DRM, DRM+, as well as highly integrated active antenna solutions. Several renowned product generations have been launched in the past. Today, Atmel is a supplier offering IC solutions with maximum performance, flexibility and integration level for the rapidly expanding AM/FM active antenna market. Atmel's antenna devices can be used in any antenna, no matter if pole, shark fin, short pole or glass/window antenna.

Car Radio Devices

Tuner Front-end ICs

Part Number	Description	Package
ATR4256	Frequency Synthesizer for Radio Receivers	SSO20
ATR4258	AM/FM Car Radio Receiver for a Global Reception Concept	SSO44
T4260	AM/FM Tuner Front End for Digital Radio Solutions	SSO44
ATR4262N1	Highly Flexible Multi-standard Broadcast Radio Front-end IC for AM/FM/DRM/HD Radio, World Tuner Concept Incl. Weather Band, Image Rejection Mixer, Flexible and Economic Filter Concept, Features Double Tuner Application, Automotive Version	QFN48

Active Antenna ICs

Part Number	Description	Package
ATR4251	Low-noise AM/FM Antenna Amplifier with AGC Function at AM and FM, and Large AM Frequency Range	SSO20 QFN24
ATR4252	All-in-one IC Solution for Active Antennas	QFN28

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