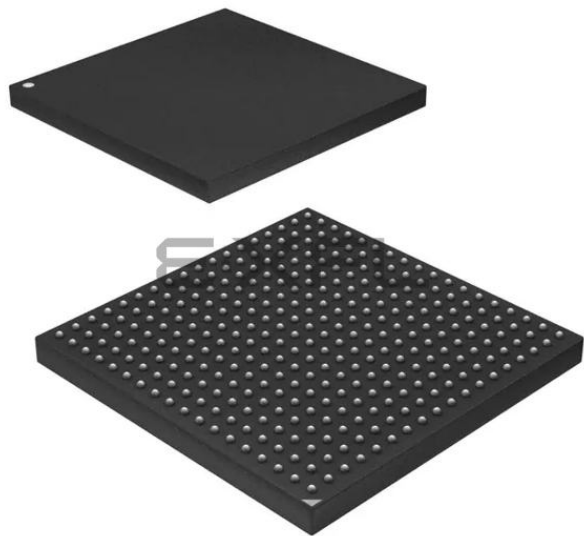




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What is "[Embedded - Microcontrollers](#)"?

"[Embedded - Microcontrollers](#)" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

Applications of "[Embedded - Microcontrollers](#)"

Details

Product Status	Discontinued at Digi-Key
Core Processor	AVR
Core Size	32-Bit Single-Core
Speed	200MHz
Connectivity	EBI/EMI, Ethernet, I ² C, Memory Card, SPI, SSC, UART/USART
Peripherals	AC'97, DMA, I ² S, LCD, POR, PWM, WDT
Number of I/O	146
Program Memory Size	-
Program Memory Type	ROMless
EEPROM Size	-
RAM Size	64K x 8
Voltage - Supply (Vcc/Vdd)	1.08V ~ 3.6V
Data Converters	D/A 2x16b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	324-TFBGA
Supplier Device Package	324-TFBGA (15x15)
Purchase URL	https://www.e-xfl.com/product-detail/microchip-technology/at32ap7200-ctur

Atmel Corporation is a global leader in the design and manufacture of microcontrollers, and complementary products such as capacitive touch sensing ICs, ASICs, nonvolatile memory and radio frequency components. Leveraging one of the industry's broadest intellectual property (IP) technology portfolios, Atmel is able to provide the electronics industry with complete microcontroller-based system solutions focused on consumer, industrial, automotive, security, communications computing markets. By providing tools and support Atmel enables those customers to lead the markets they serve with electronic products that are smaller, smarter, more cost-effective and versatile than ever before.

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Online Product Information

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Table of Contents (Continued)

Automotive Standard Products	30-36
Automotive Control	30-31
<i>Dashboard Dimmer ICs</i>	30
<i>Flasher ICs</i>	30
<i>Lamp-outage Monitoring ICs</i>	30
<i>Long-time Timer ICs</i>	30
<i>Safety</i>	31
<i>Watchdog ICs</i>	31
<i>Wiper and Wash Control ICs</i>	31
Automotive Microcontrollers	32-34
<i>Automotive AVR</i>	32-33
<i>Automotive MARC4 Microcontrollers</i>	34
CAN/VAN Networking	34
LIN Networking	35
Serial EEPROMs	36
Automotive ASSPs	37-44
Broadcast Radio	37
<i>Audio Receiver ICs</i>	37
<i>Digital Audio Broadcasting (DAB) ICs</i>	37
Car Access	38-40
<i>Car Components</i>	38-39
<i>Key Components</i>	40
Drivers/High-Temperature Devices	41-42
<i>High-Temperature Drivers</i>	41
<i>Standard Drivers</i>	41-42
Battery Management Systems	42
<i>Measuring and Monitoring Circuits</i>	42
GPS for Automotive	43
Tire Pressure Monitoring ICs	43-44
<i>LF Antenna Driver IC</i>	43
<i>RF Transmitter</i>	43
<i>Microcontroller Transmitter ICs</i>	43
<i>UHF Receiver/Transceiver ICs</i>	44
<i>UHF Transmitter ICs</i>	44

GPS for Automotive	45
Standard GPS	45

AC/DC Motor/Temperature/Illumination Control ICs	46
Clock and Watch ICs	46
Phase Control ICs	46
Sensor-controlled Timer ICs	46
Zero Crossing Switching IC	46

Table of Contents (Continued)

Communications	63-64
Cellular/Infrastructure ICs.....	63
Private Mobile Radios (PMRs)	63
Corded Phone ICs.....	63
<i>High-end Telephone ICs.....</i>	<i>63</i>
<i>Modular Telephone ICs</i>	<i>63</i>
Cordless Phone ICs.....	63
CT0/900 MHz	63
DECT/DCT RF ICs.....	64
Industrial, Scientific and Medical (ISM).....	64
Smart RF.....	65-67
Z-Link® – 802.15.4/ZigBee Solutions	67

Crypto & Secure Memories	68-69
CryptoMemory® – Embedded (2-wire Interface)	
CryptoMemory – Smart Cards (ISO 7816-3, T = 0)	68
Embedded Crypto Solutions CD	68
Secure Memory – Smart Cards (ISO 7816-3, T = 0).....	69
CryptoCompanion (Host Side Security IC, 2-wire Interface) for	
CryptoMemory and CryptoRF.....	69
Embedded Security	69
Trusted Platform Module (TPM)/PC Security.....	69
RF Identification.....	70-71
RF Identification/Immobilization – 100 - 150 kHz	70-71
Secure Microcontrollers	72-74
Secure Microcontrollers – AT90SC Family.....	72-73
Secure Microcontrollers – AT90M Family	73
Secure Microcontrollers – AT91SC Family.....	73
Secure Microcontrollers – AT91SO Family.....	74
Secure ASSP – AT98SC Family	74
Secure RF Memory	75
CryptoRF (ISO 14443 Type B 13.56 MHz) – Secure RF Memory.....	75
13.56 MHz Reader IC (ISO 14443 Type B, SPI and 2-wire Interface)	75
Smart Card Reader ICs.....	76
Smart Card Reader ICs – Interface.....	76
Smart Card Reader ICs – Ready-to-Use Solutions	76
Product Guide Index	77-82

AVR 8-bit RISC (Continued)

ATmega picoPower AVR Series (Continued)

Part Number	Flash (Kbytes)	EEPROM (Bytes)	RAM (Bytes)	I/O Pins	USI	USART	SPI	TWI	8-bit Timer	16-bit Timer	10-bit ADC	BOD	On-chip Debug.	Self-prog. (S)	Package	VCC	Speed (MHz)	Availability
ATmega329P	32	1K	2K	54	1	1	1+USI	USI	2	1	8	Y	JTAG	S	TQFP, QFN, DIE	2.7-5.5V	0-16	Now
ATmega329PV	32	1K	2K	54	1	1	1+USI	USI	2	1	8	Y	JTAG	S	TQFP, QFN, DIE	1.8-5.5V	0-8	Now
ATmega3250P	32	1K	2K	69	1	1	1+USI	USI	2	1	8	Y	JTAG	S	TQFP, DIE	2.7-5.5V	0-16	Now
ATmega3250PV	32	1K	2K	69	1	1	1+USI	USI	2	1	8	Y	JTAG	S	TQFP, DIE	1.8-5.5V	0-8	Now
ATmega3290P	32	1K	2K	69	1	1	1+USI	USI	2	1	8	Y	JTAG	S	TQFP, DIE	2.7-5.5V	0-16	Now
ATmega3290PV	32	1K	2K	69	1	1	1+USI	USI	2	1	8	Y	JTAG	S	TQFP, DIE	1.8-5.5V	0-8	Now
ATmega328P	32	1K	2K	23	–	1	1+USART	1	2	1	8	Y	debug-WIRE	S	PDIP, TQFP, QFN, DIE	2.7-5.5V	0-20	Now
ATmega328PV	32	1K	2K	23	–	1	1+USART	1	2	1	8	Y	debug-WIRE	S	PDIP, TQFP, QFN, DIE	1.8-5.5V	0-10	Now
ATmega644P	64	2K	4K	32	–	2	1+USART	1	2	1	8	Y	JTAG	S	PDIP, TQFP, QFN, DIE	2.7-5.5V	0-20	Now
ATmega644PV	64	2K	4K	32	–	2	1+USART	1	2	1	8	Y	JTAG	S	PDIP, TQFP, QFN, DIE	1.8-5.5V	0-10	Now
ATmega1284P	128	4K	16K	32	–	2	1+USART	1	1	2	8	Y	JTAG	S	PDIP, TQFP, QFN, DIE	1.8-5.5V	0-20	Sampling
ATAVRDRAGON	Starter Kit Supporting On-chip Debugging and Programming for AVR (AVR Dragon Supports OCD for All AVRs with 32 Kbytes or Less Flash Memory)																	Now
ATAVRISP2	AVRISP Programmer for All AVR ISP Devices																	Now
ATAVRRTOS	AVR Real-time Operating System Development Kit																	Now
ATJTAGICE2	AVR Low-cost In-Circuit Emulator Supporting All AVR with debugWIRE or JTAG Interface																	Now
ATSTK500	STK500 AVR Starter Kit with AVR Studio Interface																	Now
ATSTK501	STK501 Expansion of STK500 to Support 64-pin megaAVR Devices																	Now
ATSTK503	STK503 Expansion of STK500 for 100-pin megaAVR Devices																	Now
ATSTK600	Starter Kit and Development System for AVR and AVR32																	Now

Note: 1. All ATmega picoPower AVR Series parts are RoHS compliant.

AVR 8-bit RISC (Continued)

CAN AVR™

Part Number	Flash (Kbytes)	EEPROM (Kbytes)	RAM (Kbytes)	I/O Pins	CAN Message Objects	16-bit Timers	8-bit Timers	PWM (Channels)	RTC	SPI	USART	TWI (I2C Compatible)	ISP	10-bit ADC	BOD	WDT	Int. RC	HW MULT	Interrupts	Interrupts Ext.	SPM	VCC	Clock Speed (MHz)	Package	Temperature	Availability
AT90CAN32	32	1	2	53	15	2	2	6+2	1	1	2	1	1	8	1	1	1	1	37	8	1	2.7-5.5V	16	MLF64, TQFP64	-40 to +85°C	Now
AT90CAN64	64	2	4	53	15	2	2	6+2	1	1	2	1	1	8	1	1	1	1	–	–	1	2.7-5.5V	16	TQFP64, MLF64	-40 to +85°C	Now
AT90CAN128	128	4	4	53	15	2	2	6+2	1	1	2	1	1	8	1	1	1	1	37	8	1	2.7-5.5V	16	MLF64, TQFP64	-40 to +85°C	Now
ATAVRDRAGON	Starter Kit Supporting On-chip Debugging and Programming for AVR (AVR Dragon Supports OCD for All AVRs with 32 Kbytes or Less Flash Memory)																									Now
ATAVRISP2	AVRISP Programmer for All AVR ISP Devices																									Now
ATADAPCAN01	Replacement: STK500/501/AT90CAN128 CAN Adapter																									Now
ATDVK90CAN1	DVK90CAN1 Development Kit for AT90CAN Devices																									Now
ATJTAGICE2	AVR Low-cost In-Circuit Emulator Supporting All AVR with debugWIRE or JTAG Interface																									Now
ATSTK500	STK500 AVR Starter Kit with AVR Studio Interface																									Now
ATSTK501	STK501 Expansion of STK500 to Support 64-pin megaAVR Devices																									Now
ATSTK600	Starter Kit and Development System for AVR and AVR32																									Now

Note: 1. All CAN AVR parts are RoHS compliant.

AVR 8-bit RISC (Continued)

Lighting/Power Control AVR

Part Number	Flash (Kbytes)	EEPROM (Bytes)	RAM (Bytes)	I/O Pins	DALI	16-bit Timers	8-bit Timers	PWM (Channels)	RTC	SPI	USART	TWI (I2C-compatible)	ISP	ADC 10-bit (Channels)	BOD	WDT	Int. RC	HW MULT	Interrupts	Interrupts Ext.	SPM	VCC	Clock Speed (MHz)	Package	Temperature	Availability
AT90PWM1	8	512	512	19	–	1	1	7	–	1	–	–	1	8	1	1	1	1	26	4	1	2.7-5.5V	16	SOIC24	–40 to +105°C	Now
AT90PWM2	8	512	512	19	1	1	1	7	1	1	1	–	1	8	1	1	1	1	29	4	1	2.7-5.5V	16	SOIC24	–40 to +105°C	Now
AT90PWM3	8	512	512	27	1	1	1	10	1	1	1	–	1	11	1	1	1	1	29	4	1	2.7-5.5V	16	MLF32, SOIC32	–40 to +105°C	Now
AT90PWM81	8	512	256	16/20	–	1	–	4	–	1	–	–	1	11	1	1	1	1	20	3	1	2.7-5.5V	16	MLF32, SOIC20	–40 to +105/125°C	Now
AT90PWM216	16	512	1024	19	1	1	1	7	1	1	1	–	1	8	1	1	1	1	29	4	1	2.7-5.5V	16	SOIC24	–40 to +105°C	Now
AT90PWM316	16	512	1024	27	1	1	1	10	1	1	1	–	1	11	1	1	1	1	29	4	1	2.7-5.5V	16	MLF32, SOIC32	–40 to +105°C	Now
ATAVRDRAGON	Starter Kit Supporting On-chip Debugging and Programming for AVR (AVR Dragon Supports OCD for All AVRs with 32 Kbytes or Less Flash Memory)																									Now
ATJTAGICE2	AVR Low-cost In-Circuit Emulator Supporting All AVR with debugWIRE or JTAG Interface																									Now
ATAVRFBKIT	DALI Controlled Dimmable Fluorescent Demo Kit for AT90PWM2																									Now
ATAVRISP2	AVRISP Programmer for All AVR ISP Devices																									Now
ATAVRLI100	Fluorescent Dimmable Ballast Evaluation Kit with PWM81																									Now
ATAVRMC100	Brushless DC Motor Control Evaluation Kit																									Now
ATAVRMC200	Asynchronous AC Induction Motor Control Evaluation Kit																									Now
ATAVRMC201	Asynchronous AC Induction Motor for ATAVRMC200 Evaluation Kit																									Now
ATAVRMC300	Low Voltage Motor Control Power Evaluation Board (Max 40V)																									Now
ATAVRMC301	Motor Control Processor Evaluation Board with the Low Cost ATtinyx61																									Now
ATAVRMC303	Motor Control Processor Evaluation Board with the New High Performance XMEGA																									Now
ATAVRMC310	Motor Control Processor Evaluation Board with the ATmega32M1 (with CAN and LIN Interfaces)																									Now
ATAVRMC321	Motor Control Evaluation Kit for Low Cost Applications (MC300+MC301+BLDC Motor)																									Now
ATAVRMC323	Motor Control Evaluation Kit for CPU Intensive Algorithm (MC300+MC303+BLDC Motor)																									Now
ATAVRMC320	Motor Control Evaluation Kit for CAN and LIN Applications (MC300+MC310+BLDC Motor)																									Now
ATSTK500	STK500 AVR Starter Kit with AVR Studio Interface																									Now
ATSTK520	STK520 Expansion for STK500 to Support 90PWM Devices																									Now
ATSTK521	Expansion Board for STK500 to Support 90PWM81 Devices																									Now
ATSTK600	Starter Kit and Development System for AVR and AVR32																									Now
ATSTK600-SOIC	STK600 Add-on to Support the New Devices in SO Packages																									Now

Note: 1. All Lighting/Power Control AVR parts are RoHS compliant.

AVR 8-bit RISC (Continued)

USB Controllers AVR

Part Number	Flash (Kbytes)	EEPROM (Bytes)	RAM (Bytes)	I/O Pins	USB Host/OTG	USB DRAM (Bytes)	USB Endpoints	USB Full Speed	USB Low Speed	Timers 16-bit	Timers 8-bit	PWM (Channels)	RTC	SPI	USART	TWI (I2C Compatible)	ISP	ADC 10-bit Channels	BOD	WDT	Int. RC	HW MULT	Interrupts	Interrupts Ext.	SPM	VCC	Clock Speed (MHz)	Package	Temperature	Availability
AT90USB82	8	512	512	22	–	176	4+1	Y	–	1	1	3+1	–	1	1	–	Y	–	Y	Y	Y	–	29	8+2x8	Y	2.7-5.5V	16	MLF32	–40 to +85° C	Now
AT90USB162	16	512	512	22	–	176	4+1	Y	–	1	1	3+1	–	1	1	–	Y	–	Y	Y	Y	–	29	8+2x8	Y	2.7-5.5V	16	TQFP32, MLF32	–40 to +85° C	Now
ATmega16U4	16	1K	1.25K	26	–	832	6+1	Y	Y	2	1	5+3+1	–	1	1	Y	Y	12	Y	Y	Y	Y	38	5+1x8	Y	2.7-5.5V	16	MLF44	–40 to +85° C	4Q2008
ATmega32U4	32	1K	2.5K	26	–	832	6+1	Y	Y	2	1	5+3+1	–	1	1	Y	Y	12	Y	Y	Y	Y	38	5+1x8	Y	2.7-5.5V	16	TQFP44, MLF44	–40 to +85° C	Now
ATmega32U6	32	1K	2.5K	48	–	832	6+1	Y	Y	2	2	6+2	Y	1	1	Y	Y	8	Y	Y	Y	Y	38	5+1x8	Y	2.7-5.5V	16	TQFP64, MLF64	–40 to +85° C	Now
AT90USB646	64	2K	4K	48	–	832	6+1	Y	Y	2	2	6+2	Y	1	1	Y	Y	8	Y	Y	Y	Y	38	8+1x8	Y	2.7-5.5V	16	MLF64	–40 to +85° C	Now
AT90USB647	64	2K	4K	48	1	832	6+1	Y	Y	2	2	6+2	Y	1	1	Y	Y	8	Y	Y	Y	Y	38	8+1x8	Y	2.7-5.5V	16	TQFP32, MLF32	–40 to +85° C	Now
AT90USB1286	128	4K	8K	48	–	832	6+1	Y	Y	2	2	6+2	Y	1	1	Y	Y	8	Y	Y	Y	Y	38	8+1x8	Y	2.7-5.5V	16	TQFP32, MLF32	–40 to +85° C	Now
AT90USB1287	128	4K	8K	48	1	832	6+1	Y	Y	2	2	6+2	Y	1	1	Y	Y	8	Y	Y	Y	Y	38	8+1x8	Y	2.7-5.5V	16	TQFP32, MLF32	–40 to +85° C	Now
ATAVRDRAGON	Starter Kit Supporting On-chip Debugging and Programming for AVR (AVR Dragon Supports OCD for All AVRs with 32 Kbytes or Less Flash Memory)																									Now				
ATJTAGICE2	AVR Low-cost In-Circuit Emulator Supporting All AVR with debugWIRE or JTAG Interface																									Now				
ATAVRISP2	AVRISP Programmer for All AVR ISP Devices																									Now				
AT90USBKEY	Demo Kit for AT90USB Devices																									Now				
ATEVK525	Mass Storage Evaluation Kit for AT90USB Devices (STK525 Add-on)																									Now				
ATJTAGICE2	AVR Low-cost In-Circuit Emulator Supporting All AVR with debugWIRE or JTAG Interface																									Now				
ATSTK500	STK500 AVR Starter Kit with AVR Studio Interface																									Now				
ATSTK520	STK520 Expansion for STK500 to Support 90PWM Devices																									Now				
ATSTK525	STK525 AVR Starter Kit to Support 64-pin AT90USB Devices																									Now				
ATSTK526	STK526 AVR Starter Kit to Support 32-pin AT90USB Devices																									Now				
ATSTK600	Starter Kit and Development System for AVR and AVR32																									Now				

Note: 1. All USB Controllers AVR parts are RoHS compliant.

AVR 8-bit RISC (Continued)

MCU Wireless – 802.15.4/6LoWPAN/ZigBee® Solutions

Part Number	AVR	Radio	Flash (Kbytes)	EEPROM (Kbytes)	RAM (Kbytes)	ISM Band	Sensitivity (dBm)	Output Power (dBm)	VCC	I/Os	Availability
ATmega64RZA	ATmega644	RF230	64	1	4	2.4 GHz	-101	3	1.8-3.6V	32	Now
ATmega64RZAP	ATmega644P	RF230	64	1	4	2.4 GHz	-101	3	1.8-3.6V	32	Now
ATmega128RZA	ATmega1281	RF230	128	4	8	2.4 GHz	-101	3	1.8-3.6V	54	Now
ATmega128RZB	ATmega1280	RF230	128	4	8	2.4 GHz	-101	3	1.8-3.6V	86	Now
ATmega1284RZAP	ATmega1284P	RF230	128	4	16	2.4 GHz	-101	3	1.8-3.6V	32	Now
ATmega256RZA	ATmega2561	RF230	256	4	8	2.4 GHz	-101	3	1.8-3.6V	54	Now
ATmega256RZB	ATmega2560	RF230	256	4	8	2.4 GHz	-101	3	1.8-3.6V	86	Now
ATmega644PR231	ATmega644P	RF231	64	1	4	2.4 GHz	-101	3	1.8-3.6V	32	Now
ATmega1281R231	ATmega1281	RF231	128	4	8	2.4 GHz	-101	3	1.8-3.6V	54	Now
ATmega1280R231	ATmega1280	RF231	128	4	8	2.4 GHz	-101	3	1.8-3.6V	86	Now
ATmega1284PR231	ATmega1284P	RF231	128	4	16	2.4 GHz	-101	3	1.8-3.6V	32	Now
ATmega2561R231	ATmega2561	RF231	256	4	8	2.4 GHz	-101	3	1.8-3.6V	54	Now
ATmega2560R231	ATmega2560	RF231	256	4	8	2.4 GHz	-101	3	1.8-3.6V	86	Now
ATmega644PR212	ATmega644P	RF212	64	1	4	800/900 MHz	-110	10	1.8-3.6V	32	Now
ATmega1281R212	ATmega1281	RF212	128	4	8	800/900 MHz	-110	10	1.8-3.6V	54	Now
ATmega1280R212	ATmega1280	RF212	128	4	8	800/900 MHz	-110	10	1.8-3.6V	86	Now
ATmega1284PR212	ATmega1284P	RF212	128	4	16	800/900 MHz	-110	10	1.8-3.6V	32	Now
ATmega2561R212	ATmega2561	RF212	256	4	8	800/900 MHz	-110	10	1.8-3.6V	54	Now
ATmega2560R212	ATmega2560	RF212	256	4	8	800/900 MHz	-110	10	1.8-3.6V	86	Now
ATAVRZRZEN	2.4 GHz 802.15.4 Evaluation and Starter Kit										Now
ATAVRRAVEN	2.4 GHz 802.15.4 Raven Board										Now
ATAVRZUSBSTICK	2.4 GHz 802.15.4 USB Stick										Now
ATAVRZ600	RF Accessory Kit AT86RF230, AT86RF231, AT86RF212										Now
ATJTAGICE2	AVR Low-cost In-Circuit Emulator Supporting All AVR with debugWIRE or JTAG Interface										Now
ATAVRISP2	AVRISP Programmer for All AVR ISP Devices										Now
ATSTK500	STK500 AVR Starter Kit with AVR Studio Interface										Now
ATSTK600	Starter Kit and Development System for AVR and AVR32										Now

Note: 1. All MCU Wireless parts are RoHS compliant.

8051 Architecture (Continued)

Flash ISP (In-System Programmable) (Continued)

Part Number	Description	Memory Size	RoHS Compliance	Availability
AT89C51RE2	In-System Programmable Microcontroller with 128-Kbyte Flash, 8192-byte RAM, PCA, SPI, 2 UART	128K x 8	Yes	Now
AT89ISP	In-System Programmer for AT89S/AT89LP Series			Now
AT89OCD-01	On Chip Debug Tool for 8051 Flash Microcontrollers: AT89C51RE2 and Derivatives			Now
AT89STK-11	Starter Kit for In-System Programming 8051 Flash Microcontrollers			Now
FLIP	FLexible In-System Programmer – PC-based Software for In-System Programming of C51-based Flash Microcontrollers – Available in Microsoft® Windows® (Support RS-232, CAN, USB Interfaces), Linux (RS-232 Interface)			Now

Flash ISP – Single Cycle Core

Part Number	Description	Memory Size	RoHS Compliance	Availability
AT89LP2052	Single-cycle 8051 Core, In-System Programmable Microcontroller with 2-Kbyte Flash, 256-byte RAM, Analog Comparator	2K x 8	Yes	Now
AT89LP4052	Single-cycle 8051 Core, In-System Programmable Microcontroller with 4-Kbyte Flash, 256-byte RAM, Analog Comparator	4K x 8	Yes	Now
AT89LP213	Single-cycle 8051 Core, In-System Programmable Microcontroller with 2-Kbyte Flash, 128-byte RAM, On-chip Debug, SPI, 14-pin, PWM, Internal RC Oscillator, Analog Comparator	2K x 8	Yes	Now
AT89LP214	Single-cycle 8051 Core, In-System Programmable Microcontroller with 2-Kbyte Flash, 128-byte RAM, On-chip Debug, SPI, 14-pin, UART, Analog Comparator, Internal RC Oscillator	2K x 8	Yes	Now
AT89LP216	Single-cycle 8051 Core, In-System Programmable Microcontroller with 2-Kbyte Flash, 128-byte RAM, On-chip Debug, SPI, 16-pin, UART, PWM, Analog Comparator, Internal RC Oscillator	2K x 8	Yes	Now
AT89LP428	Single-cycle 8051 Core, In-System Programmable Microcontroller with 4-Kbyte Flash, 512-byte Flash Data, 768-byte RAM, On-chip Debug, SPI, 28-/32-pin, UART, PWM, Dual Analog Comparator, Internal RC Oscillator, In-Application Programming	4K x 8	Yes	Now
AT89LP828	Single-cycle 8051 Core, In-System Programmable Microcontroller with 8-Kbyte Flash, 1024-byte Flash Data, 768-byte RAM, On-chip Debug, SPI, 28-/32-pin, UART, PWM, Dual Analog Comparator, Internal RC Oscillator, In-Application Programming	8K x 8	Yes	Now
AT89LP6440	Single-cycle 8051 Core, In-System Programmable Microcontroller with 64-Kbyte Flash, 8-Kbyte Flash Data, 4-Kbyte RAM, On-chip Debug, SPI, TWI, 40-/44-pin, UART, PWM, Dual Analog Comparator, 8-channel/10-bit ADC, Internal RC Oscillator, In-Application Programming, 2.4 V - 3.6V V _{CC} Range	64K x 8	Yes	4Q2008
AT89ISP	In-System Programmer for AT89S/AT89LP Series			Now

Lighting Microcontrollers

Part Number	Description	Program Memory	RoHS Compliance	Availability
AT83EB5114	Microcontroller with 256-byte RAM, 256-byte EEPROM, 10-bit 6-channel ADC, 16-bit Timers, Analog Comparator, RC Oscillator, Amplifier/Rectifier	4-Kbyte ROM	Yes	Now
AT89RFD-10	Non Dimmable Fluorescent Demo Kit for AT8xEB5114			Now

MARC4 4-bit Architecture Microcontrollers (Continued)

4-bit Microcontrollers/MARC4 Family (Continued)

Part Number	Description	Package	RoHS Compliance	Availability
ATAR092	1.8 to 6.2V, Extended Voltage Range with Very Low Current Consumption for IR and RF Remote Control, Security and Wireless Communication Systems, Sleep Current <1 μ A, Watchdog Timer, POR and Brown-out Function, 3 x Multifunction Timer/Counter with Remote Control Carrier Generation and Biphasic, Manchester and Pulse Width Modulator and Demodulator, 4096-byte ROM + 512 Bytes for Test Purposes, 256 Nibbles RAM, I/O 16 Bi-directional Ports Including 4 High-current Outputs, 8-bit Synchronous Serial Interface, Battery Low Detection, Comparator for Zero Cross Detection, 4 Internal, 6 External Interrupts, 32 kHz Quartz Oscillator, 4 MHz Oscillator (Internal RC, External R, Quartz or Ceramic Resonator, External Clock), Operating Temperature Range $T_{AMB} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ (-40°C to $+105^{\circ}\text{C}$) (-40°C to $+125^{\circ}\text{C}$)	SSO20	Pb-free Only	Now
ATAR092-C	See ATAR092, Operating Temperature Range $T_{AMB} = -40^{\circ}\text{C}$ to $+105^{\circ}\text{C}$	SSO20	Pb-free Only	Now
ATAR092-D	See ATAR092, Operating Temperature Range $T_{AMB} = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	SSO20	Pb-free Only	Now
ATAR862x-yyy-TNz3	Complete UHF ASK/FSK Transmitter, ROM Microcontroller and Transmitter PLL T5753 in One IC, Temperature Range: -40°C to $+125^{\circ}\text{C}$, Frequency Range: 310 to 330 MHz	SSO24	Pb-free Only	Now
ATAR862x-yyy-TNz4	Complete UHF ASK/FSK Transmitter, ROM Microcontroller and Transmitter PLL T5754 in One IC, Temperature Range: -40°C to $+125^{\circ}\text{C}$, Frequency Range: 429 to 439 MHz	SSO24	Pb-free Only	Now
ATAR862x-yyy-TNz8	Complete UHF ASK/FSK Transmitter, ROM Microcontroller and Transmitter PLL T5750 in One IC, Temperature Range: -40°C to $+125^{\circ}\text{C}$, Frequency Range: 868 to 928 MHz	SSO24	Pb-free Only	Now
ATAR890	See ATAR090, Additional 512-bit EEPROM (64 Bytes) On-chip, Operating Temperature Range $T_{AMB} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ (-40°C to $+105^{\circ}\text{C}$)	SSO20	Pb-free Only	Now
ATAR890-C	See ATAR090, Additional 512-bit EEPROM (64 Bytes) On-chip, Operating Temperature Range $T_{AMB} = -40^{\circ}\text{C}$ to $+105^{\circ}\text{C}$	SSO20	Pb-free Only	Now
ATAR892	See ATAR092, Additional 512-bit EEPROM (64 Bytes) On-chip, Operating Temperature Range $T_{AMB} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ (-40°C to $+105^{\circ}\text{C}$)	SSO20	Pb-free Only	Now
ATAR892-C	See ATAR092, Additional 512-bit EEPROM (64 Bytes) On-chip, Operating Temperature Range $T_{AMB} = -40^{\circ}\text{C}$ to $+105^{\circ}\text{C}$	SSO20	Pb-free Only	Now
M4EMUX9X	MARC4 Development System for the ATAR090, ATAR092, ATAR892, ATAR890 and ATAR080 Series, Including the Flash Part ATAM893 and the U9280M			Now

Automotive Standard Products (Continued)

Automotive Control (Continued)

Safety

Part Number	Description	Package	RoHS Compliance	Availability
U6813B	Fail-safe IC, Watchdog Timer, Relay Driver, Lamp Driver and Charge Pump	SO16	Pb-free Only	Now
ATA6842	Fail-safe System IC with 4-channel Relay Driver, Power Supply, Watchdog	QFN48	Yes	Now
U6268B	Side Airbag Sensor Dual Interface (Satellite Interface), 50 mA Sensor Supply, Data Transfer by Current Modulation	SO16	Pb-free Only	Now

Watchdog ICs

Part Number	Description	Package	RoHS Compliance	Availability
ATA6025	Watchdog IC with Fail-safe Output, Voltage Monitors, Low-power Consumption in Standby Mode	SO8	Pb-free Only	Now
ATA6020N	Watchdog IC, μ P Based, Programmable Via Metal Mask (Based on the ATAR080 Microcontroller)	SO20	Pb-free Only	Now
U5020M	Watchdog Timer, Active and Sleep Mode, 6 Wake-up Inputs, Enable Output	SO16	Pb-free Only	Now
U5021M	Watchdog Timer, Active and Sleep Mode, 1 Wake-up Input, Enable Output	SO8	Pb-free Only	Now

Wiper and Wash Control ICs

Part Number	Description	Package	RoHS Compliance	Availability
U641B	Wipe/Wash Control with Prewash Delay, INT/WIWA Switches to V_{BATT}	DIP8, SO8	Pb-free Only	Now
U642B	Wipe/Wash Control without Prewash Delay, INT/WIWA Switches to V_{BATT}	DIP8, SO8	Pb-free Only	Now

Automotive ASSPs (Continued)

Car Access (Continued)

Car Components (Continued)

Part Number	Description	Package	RoHS Compliance	Availability
ATA5812	UHF Transceiver for ASK and FSK Systems, 315 MHz	QFN48	Yes	Now
ATA5823	UHF Transceiver for ASK and FSK Systems, 315 MHz, Full Duplex	QFN48	Yes	Now
ATA5824	UHF Transceiver for ASK and FSK Systems, 433 to 435 MHz or 868 to 870 MHz, Full Duplex	QFN48	Yes	Now
U2270B	Read/Write Base Station IC, 100 to 150 kHz Carrier Frequency, Amplitude Modulation Typically Up to 5-Kbaud, Manchester/Biphase RF/32, RF/64, RF/128	SO16	Pb-free Only	Now
ATA5723-DK	Receiver Board ATA5723, 315 MHz, no SAW Filter			Now
ATA5724-DK	Receiver Board ATA5724, 433 MHz, no SAW Filter			Now
ATA5728-DK	Receiver Board ATA5728, 868 MHz, no SAW Filter			Now
ATAB5278	Evaluation Board, LF Antenna Driver, Preferred for Passive Entry Systems			Now
ATAB5760-N	Receiver Board ATA5760N, 868.3 MHz, No SAW Filter			Now
ATAB5760-S	Receiver Board ATA5760N, 868.3 MHz, SAW Filter			Now
ATAB5761-N	Receiver Board ATA5761N, 915 MHz, No SAW Filter			Now
ATAB5744-N3	Receiver Board ATA5744N, 315 MHz, No SAW Filter			Now
ATAB5744-S3	Receiver Board ATA5744N, 315 MHz, SAW Filter			Now
ATAB5744-N4	Receiver Board ATA5744N, 433.92 MHz, No SAW Filter			Now
ATAB5744-S4	Receiver Board ATA5744N, 433.93 MHz, SAW Filter			Now
ATAB5812-3-B	UHF ASK/FSK Transceiver Basestation Board for 315 MHz			Now
ATAB5811-4-B	UHF ASK/FSK Transceiver Basestation Board for 433.92 MHz			Now
ATAB5811-8-B	UHF ASK/FSK Transceiver Basestation Board for 868.3 MHz			Now
ATAB5823-3-B	UHF ASK/FSK Transceiver Basestation Board for 315 MHz			Now
ATAB5824-4-B	UHF ASK/FSK Transceiver Basestation Board for 433.92 MHz			Now
ATAB5824-8-B	UHF ASK/FSK Transceiver Basestation Board for 868.3 MHz			Now
ATAB-LFMB78	LF Mainboard with AVR for ATAB5278			Now
ATAB5279	Evaluation Board for Six-fold LF Antenna Driver, Preferred for Passive Entry Systems			Now
ATAB-LF-MB-79	LF Mainboard with AVR for ATAB5279			Now
ATAKSTK511-8	AVR-based RF Starter Kit for 868 MHz			Now
ATAKSTK511-9	AVR-based RF Starter Kit for 915 MHz			Now
ATAKSTK512-3	Remote Access Control Kit for Uni-directional Communication at 315 MHz			Now
ATAKSTK512-4	Remote Access Control Kit for Uni-directional Communication at 433 MHz			Now
ATAB-LFTX-MOD1	Antenna Module for LF TX Systems			Now
ATAB-RFMB	RF Mainboard with AVR and Interface			Now
ATAB-SPI-LPT	SPI to Parallel Port (LPT) Interface Board for TRX Basestation Boards			Now
TMEB8704	LF RFID IDIC® Evaluation Kit for U2270B and TK5561			Now

Note: 1. For dedicated microcontrollers, see Automotive 4-bit microcontrollers

Military & Avionics ASICs and FPGAs

Part Number	Description	RoHS Compliance	Availability
MH1	0.35 Micron 1.6M Used Gates Sea of Gates/Embedded Arrays	Plastic Package	Now
ATC18M	0.18 Micron 5.5M Gates Cell-based	Plastic Package	Now
AT40KAL040	FPGA 40K ASIC Gates and 18-Kbit SRAM	Yes	Now
SERVICE	FPGA to ASIC Conversion	Plastic Package	Now

Space Radiation Tolerant/Hard ASICs and FPGAs

Part Number	Description	RoHS Compliance	Availability
MH1RT	Rad Hard 0.35 Micron 1.6M Used Gates Sea of Gates/Embedded Gates	Yes (Except for MCGA Package)	Now
ATC18RHA	Rad Hard 0.18 Micron 5.5M Gates Cell-based	Yes (Except for MCGA Package)	Now
AT40KEL040	Rad Hard FPGA 40K ASIC Gates and 18-Kbit SRAM	Yes	Now
ATF280E	Rad Hard FPGA 280K ASIC Gates and 115-Kbit SRAM	Yes (Except for MCGA Package)	1Q2009
SERVICE	FPGA to ASIC Conversion	Yes	Now

Space Radiation Tolerant/Hard Communication ICs

Part Number	Description	RoHS Compliance	Availability
29C516E	Rad Tolerant 16-bit Flow through EDAC Error Detection and Correction Unit	Yes	Now
T7906E	Rad Tolerant Single Point-to-Point IEEE® 1355 High-speed Controller (SMCS Lite)	Yes	Now
TSS901E	Rad Tolerant Triple Point-to-Point IEEE1355 High-speed Controller (SMCS)	Yes	Now
AT7908E	Rad Hard CAN Controller	Yes	Now
AT7909E	Single Chip TeleMetry and TeleCommand (SCTMTC)	Yes	Now
AT7910E	SpaceWire Router	Yes	Now
AT7911E	Triple SpaceWire links High Speed Controller (SMCS332SPW)	Yes	Now
AT7912E	Single SpaceWire links High Speed Controller (SMCS116SPW)	Yes	Now
AT7913E	SpaceWire Remote Terminal Controller	Yes	4Q2008

EPROM Standard Products – Industrial OTP EPROMs

Part Number	Density	Organization	VCC (V)	Speed (ns)	Package
AT27BV256	256-Kbit	x8	2.7 - 3.6	70	PLCC (32), TSOP (28)
AT27LV256A	256-Kbit	x8	3.0 - 3.6	55, 90	PLCC (32), TSOP (28)
AT27C256R	256-Kbit	x8	4.5 - 5.5	45, 70	PLCC (32), PDIP (28), TSOP (28)
AT27BV512	512-Kbit	x8	2.7 - 3.6	70	PLCC (32), TSOP (28)
AT27LV512A	512-Kbit	x8	3.0 - 3.6	90	PLCC (32), TSOP (28)
AT27C512R	512-Kbit	x8	4.5 - 5.5	45, 70	PLCC (32), PDIP (28), TSOP (28)
AT27C516	512-Kbit	x16	4.5 - 5.5	45	PLCC (44)
AT27BV010	1-Mbit	x8	2.7 - 3.6	90	PLCC (32), TSOP (32)
AT27BV1024	1-Mbit	x16	2.7 - 3.6	90, 120	PLCC (44)
AT27LV010A	1-Mbit	x8	3.0 - 3.6	70	PLCC (32), TSOP (32)
AT27C010	1-Mbit	x8	4.5 - 5.5	45, 70	PLCC (32), PDIP (32), TSOP (32)
AT27C1024	1-Mbit	x16	4.5 - 5.5	45, 70	PLCC (44), PDIP (40)
AT27BV020	2-Mbit	x8	2.7 - 3.6	90	PLCC (32), TSOP (32)
AT27LV020A	2-Mbit	x8	3.0 - 3.6	120	PLCC (32), TSOP (32)
AT27C020	2-Mbit	x8	4.5 - 5.5	55, 90	PLCC (32), PDIP (32), TSOP (32)
AT27C2048	2-Mbit	x16	4.5 - 5.5	55, 90	PLCC (44), PDIP (40)
AT27BV040	4-Mbit	x8	2.7 - 3.6	120	PLCC (32)
AT27LV040A	4-Mbit	x8	3.0 - 3.6	90	PLCC (32), TSOP (32)
AT27C040	4-Mbit	x8	4.5 - 5.5	70, 90	PLCC (32), PDIP (32), TSOP (32)
AT27C4096	4-Mbit	x16	4.5 - 5.5	55, 90	PLCC (44), PDIP (40)
AT27C080	8-Mbit	x8	4.5 - 5.5	90	PLCC (32), PDIP (32), TSOP (32)

All Industrial OTP EPROMs Parts are RoHS Compliant.

Serial EEPROMs Standard Products (Continued)

Part Number	Density (Kbits)	Organization	VCC (V)	Max Speed (MHz)	Package	Comments	Availability
AT25040A	4	512 x 8	1.8, 2.7	20	PDIP, SOIC, TSSOP, dBG2, DFN (MAP), XDFN*, Die/Wafer	SPI Mode 0 and 3, SW/HW Write Protect	Now
AT25040B	4	512 x 8	1.8	20	PDIP, SOIC, TSSOP, dBG2, DFN (MAP), XDFN*, Die/Wafer	SPI Mode 0 and 3, SW/HW Write Protect	2Q2009 (Replaces AT25040A)
AT25080A	8	1024 x 8	1.8, 2.7	20	PDIP, SOIC, TSSOP, dBG2, DFN (MAP), Die/Wafer	SPI Mode 0 and 3, SW/HW Write Protect	Now
AT25080B	8	1024 x 8	1.8	20	PDIP, SOIC, TSSOP, dBG2, DFN (MAP), XDFN*, Die/Wafer	SPI Mode 0 and 3, SW/HW Write Protect	4Q2008 (Replaces AT25080A)
AT25160A	16	2048 x 8	1.8, 2.7	20	PDIP, SOIC, TSSOP, dBG2, DFN (MAP), XDFN, Die/Wafer	SPI Mode 0 and 3, SW/HW Write Protect	Now
AT25160B	16	2048 x 8	1.8	20	PDIP, SOIC, TSSOP, dBG2, DFN (MAP), XDFN, Die/Wafer	SPI Mode 0 and 3, SW/HW Write Protect	4Q2008 (Replaces AT25160A)
AT25320A	32	4096 x 8	1.8, 2.7	20	PDIP, SOIC, TSSOP, dBG2, DFN (MAP), Die/Wafer	SPI Mode 0 and 3, SW/HW Write Protect	Now
AT25320B	32	4096 x 8	1.8	20	PDIP, SOIC, TSSOP, dBG2, DFN (MAP), XDFN*, Die/Wafer	SPI Mode 0 and 3, SW/HW Write Protect	1Q2009 (Replaces AT25320A)
AT25640A	64	8192 x 8	1.8, 2.7	20	PDIP, SOIC, TSSOP, dBG2, DFN (MAP), Die/Wafer	SPI Mode 0 and 3, SW/HW Write Protect	Now
AT25640B	64	8192 x 8	1.8	20	PDIP, SOIC, TSSOP, dBG2, DFN (MAP), XDFN*, Die/Wafer	SPI Mode 0 and 3, SW/HW Write Protect	1Q2009 (Replaces AT25640A)
AT25128A	128	16384 x 8	1.8, 2.7	20	PDIP, SOIC, TSSOP, DFN (SAP), Die/Wafer	SPI Mode 0 and 3, SW/HW Write Protect	Now
AT25128B	128	16384 x 8	1.8	20	PDIP, SOIC, TSSOP, dBG2, DFN (SAP), Die/Wafer	SPI Mode 0 and 3, SW/HW Write Protect	2Q2009 (Replaces AT25128A)
AT25256A	256	32768 x 8	1.8, 2.7	20	PDIP, SOIC, TSSOP, DFN (SAP), Die/Wafer	SPI Mode 0 and 3, SW/HW Write Protect	Now (Replaces AT25HP256)
AT25256B	256	32768 x 8	1.8	20	PDIP, SOIC, TSSOP, dBG2, DFN (SAP), Die/Wafer	SPI Mode 0 and 3, SW/HW Write Protect	2Q2009 (Replaces AT25256A)
AT25512	512	65536 x 8	1.8	20	SOIC, TSOP, dBG2, DFN, Die/Wafer	SPI Mode 0 and 3, SW/HW Write Protect	Now (Replaces AT25HP512)
AT93C46D	1	64 x 16/ 128 x 8	1.8	2	PDIP, SOIC, TSSOP, dBG2, DFN (MAP), XDFN*, Die/Wafer	x8 or x16 Organization	Replaces AT93C46
AT93C46E	1	64 x 16	1.8	2	PDIP, SOIC, TSSOP	x16 Organization	Replaces AT93C46A
AT93C56A	2	128 x 16/ 256 x 8	1.8, 2.7	2	PDIP, SOIC, TSSOP, dBG2, DFN (MAP), Die/Wafer	x8 or x16 Organization with Sequential Read	Now
AT93C66A	4	256 x 16/ 512 x 8	1.8, 2.7	2	PDIP, SOIC, TSSOP, dBG2, DFN (MAP), Die/Wafer	x8 or x16 Organization with Sequential Read	Now
AT93C86A	16	1024 x 16/ 2048 x 8	1.8, 2.7	2	PDIP, SOIC, TSSOP, DFN (MAP), Die/Wafer	x8 or x16 Organization with Sequential Read	Now

* Available on Request

All Serial EEPROMs Parts are RoHS Compliant.

FPGA Configuration Memory (Continued)

FPGA Serial Configuration EEPROM (Continued)

Part Number	Description	Memory Size	RoHS Compliance	Availability
AT17N256	256-Kbit FPGA Configuration Memory	262,144 x 1	No	Now
AT17N512	512-Kbit FPGA Configuration Memory	524,288 x 1	No	Now
AT17N010	1-Mbit FPGA Configuration Memory	1,048,576 x 1	No	Now
AT17N002	2-Mbit FPGA Configuration Memory	2,097,152 x 1	No	Now
AT17N040	4-Mbit FPGA Configuration Memory	4,194,304 x 1	No	Now
AT17F040	4-Mbit FPGA Configuration Flash	4,194,304 x 1	Yes	Now
AT17F040A	4-Mbit FPGA Configuration Flash, Altera Pinout	4,194,304 x 1	Yes	Now
AT17F080	8-Mbit FPGA Configuration Flash	8,388,608 x 1	Yes	Now
AT17F080A	8-Mbit FPGA Configuration Flash, Altera Pinout	8,388,608 x 1	Yes	Now
AT17F16	16-Mbit FPGA Configuration Flash	16,777,216 x 1	Yes	Now
AT17F16A	16-Mbit FPGA Configuration Flash, Altera Pinout	16,777,216 x 1	Yes	Now
AT17F32	32-Mbit FPGA Configuration Flash	33,554,432 x 1	Yes	Now
AT17F32A	32-Mbit FPGA Configuration Flash, Altera Pinout	33,554,432 x 1	Yes	Now
AT18F010	1-Mbit FPGA Configuration Flash with ISP, Pin Compatible with Xilinx Platform Flash	1,048,576 x 1	Yes	Now
AT18F002	2-Mbit FPGA Configuration Flash with ISP, Pin Compatible with Xilinx Platform Flash	2,097,152 x 1	Yes	Now
AT18F040	4-Mbit FPGA Configuration Flash with ISP, Pin Compatible with Xilinx Platform Flash	4,194,304 x 1	Yes	Now
AT18F080	8-Mbit FPGA Configuration Flash with ISP, Pin Compatible with Xilinx Platform Flash	7,340,032 x 1	Yes	Now
ATDH2200E	Configurator Programming Kit, CPS ISP Software, 8-lead LAP and 20 PLCC Adapter			Now
AT18F-DK3	Configurator Programming Kit for AT18F Family			Now
ATDH1151VPC	ISP Cable for AT18F with Converter			Now
ATF15XXDK3-SAX20	20-lead TSSOP Adapter with AT18F Converter to Be Used with ATF15XX-DK3 Kit			Now
ATDH2221	20-lead SOIC (8-lead DIP Adapter)			Now
ATDH2222	20-lead PLCC (8-lead DIP Adapter)			Now
ATDH2223	8-lead SOIC (8-lead DIP Adapter)			Now
ATDH2224	44-lead PQFP (8-lead DIP Adapter)			Now
ATDH2225	ISP Download Cable			Now
ATDH2226A	32-lead PQFP (8-lead DIP Adapter), Altera Pinout			Now
ATDH2227	44-lead PLCC (8-lead DIP Adapter)			Now
ATDH2227A	44-lead PLCC (8-lead DIP Adapter), Altera Pinout			Now
ATDH2228	8-lead LAP (8-lead DIP Adapter)			Now

Communications (Continued)

DECT/DCT RF ICs

Part Number	Description	Package	RoHS Compliance	Availability
ATR2806	2.4 GHz Transceiver, Low IF Architecture, VCO and Voltage Regulator On-chip	QFN32	Yes	Now
ATR2807	3.3 GHz VCO/PLL, Voltage Regulator	QFN32	Yes	Now
ATR2808	2.9 GHz Transceiver, Non-blind-slot Operation, VCO and Voltage Regulator On-chip, Open Loop Modulation	QFN48	Yes	Now
ATR2809	5.8 GHz Down-conversion Triple-balanced Mixer with High LO Rejection	QFN16	Yes	Now
ATR2820	5.8 GHz Transceiver, Low IF Architecture, VCO and Voltage Regulator On-chip	QFN32	Yes	Now
ATR7035	5.8 GHz PA with 27 dBm Output Power	QFN16	Yes	Now
ATR7039	Up-converting Mixer with Buffer Amplifier for 5.8 GHz Applications	QFN16	Yes	Now
ATR7040	5.8 GHz PA with 25 dBm Output Power	QFN16	Yes	Now
T2803	2.4 GHz Transceiver, Non-blind-slot Operation, VCO and Voltage Regulator On-chip, Open Loop Modulation, Wide Band 2.4 GHz TRX	QFN48	Yes	Now
T7024	DECT/DCT 2.4 GHz Tx/Rx Front End IC	PSSO20, QFN20	Yes	Now
T7026	2.4 GHz LNA/PA	QFN20	Yes	Now

Industrial, Scientific and Medical (ISM)

Part Number	Description	Package	RoHS Compliance	Availability
T7024	ISM 2.4 GHz Tx/Rx Front End, $P_{OUT} = 23$ dBm, NF = 2 dBm	PSSO20, QFN20	Yes	Now
ATR2406	Single-chip RF Transceiver, 2.400-2.483 GHz ISM Band, 3 dBm Output Power, 93 dBm Receiver Sensitivity, Fully Integrated Design, No External SAW Filter Needed, Digital Baseband Interface for Easy Interconnection to 8-bit AVR Flash Microcontrollers, 32-pin QFN (5 x 5 x 0.9 mm)	QFN32	Yes	Now

Product Guide Index

0.09 μm	29	AT24C1024B	55	AT27BV256	51	AT32AP7200	16
0.13 μm	29	AT24C128	36, 54	AT27BV512	51	AT32UC3A0128	17
0.15 μm	29	AT24C128B	55	AT27C010	51	AT32UC3A0256	17
0.18 μm	29	AT24C16A	36, 54	AT27C020	51	AT32UC3A0512	17
0.35 μm	29	AT24C16B	55	AT27C040	51	AT32UC3A1128	17
29C516E	47	AT24C256	36, 54	AT27C080	51	AT32UC3A1256	17
5962-38267	53	AT24C256B	55	AT27C1024	51	AT32UC3A1512	17
5962-07201	61	AT24C32A	36, 54	AT27C2048	51	AT32UC3B0128	17
5962-88525	53	AT24C32C	55	AT27C256R	51	AT32UC3B0256	17
5962-88634	53	AT24C512B	55	AT27C4096	51	AT32UC3B064	17
5962-89841	61	AT24C64A	36, 54	AT27C512R	51	AT32UC3B1128	17
80C32E	48	AT24C64B	55	AT27C516	51	AT32UC3B1256	17
		AT24C64C	55	AT27LV010A	51	AT32UC3B164	17
		AT24HC02B	55	AT27LV020A	51	AT34C02C	36, 54, 55
		AT24HC04B	55	AT27LV040A	51	AT40K05	59
Analog Cells	29	AT25010A	36, 54, 55	AT27LV256A	51	AT40K05AL	59
ARM Peripherals	29	AT25010B	55	AT27LV512A	51	AT40K10	59
ARM System Bus Peripherals	29	AT25020A	36, 54, 55	AT28BV256	53	AT40K10AL	59
AT17F040	60	AT25020B	55	AT28BV256-DWF	53	AT40K20	59
AT17F040A	60	AT25040A	36, 54, 56	AT28BV64B	53	AT40K20AL	59
AT17F080	60	AT25040B	56	AT28BV64B-DWF	53	AT40K40	59
AT17F080A	60	AT25080A	36, 54, 56	AT28C010	53	AT40K40AL	59
AT17F16	60	AT25080B	56	AT28C010-12DK	48	AT40KAL040	47
AT17F16A	60	AT25128A	36, 54, 56	AT28C010-DFWM	53	AT40KEL040	47
AT17F32	60	AT25128B	56	AT28C010E	53	AT42QT1060	27
AT17F32A	60	AT25160A	36, 54, 56	AT28C256	53	AT42QT2160	27
AT17LV002	59	AT25160B	56	AT28C256-DFWM	53	AT42QT4120	28
AT17LV002A	59	AT25256A	36, 54, 56	AT28C256E	53	AT42QT4160	28
AT17LV010	59	AT25256B	56	AT28C256F	53	AT42QT5320	28
AT17LV010-10DP	48	AT25320A	36, 54, 56	AT28C64B	53	AT42QT5480	28
AT17LV010A	59	AT25320B	56	AT28C64B-DWF	53	AT45DB011D	57
AT17LV040	59	AT25512	56	AT28HC256	53	AT45DB021D	57
AT17LV128	59	AT25640A	36, 54, 56	AT28HC256-DFWM	53	AT45DB041D	57
AT17LV256	59	AT25640B	56	AT28HC256E	53	AT45DB041D-2.5	57
AT17LV512	59	AT25DF021	57	AT28HC256F	53	AT45DB081D	57
AT17LV512A	59	AT25DF041A	57	AT28HC64B	53	AT45DB081D-2.5	57
AT17LV65	59	AT25DF081	57	AT28HC64B-DWF	53	AT45DB161D	57
AT17N002	60	AT25DF161	57	AT28LV010	53	AT45DB161D-2.5	57
AT17N010	60	AT25DF321	57	AT29BV010A	52	AT45DB321D	57
AT17N040	60	AT25DF321A	57	AT29BV020	52	AT45DB642D	57
AT17N256	60	AT25DF641	57	AT29BV040A	52	AT45DCB002D	57
AT17N512	60	AT25F2048	57	AT29C010A	52	AT45DCB004D	57
AT18F002	60	AT25F512A	57	AT29C020	52	AT45DCB008D	57
AT18F010	60	AT25F512B	57	AT29C040A	52	AT49BV040B	52
AT18F040	60	AT25FS010	57	AT29C512	52	AT49BV160D(T)	52
AT18F080	60	AT26DF081A	57	AT29LV020	52	AT49BV160S(T)	52
AT18F-DK3	60	AT26DF161A	57	AT29LV040A	52	AT49BV163D(T)	52
AT24C01B	36, 54, 55	AT27BV010	51	AT29LV512	52	AT49BV320D(T)	52
AT24C02B	36, 54, 55	AT27BV020	51	AT32AP7000	16	AT49BV320S(T)	52
AT24C04B	36, 54, 55	AT27BV040	51	AT32AP7001	16	AT49BV322D(T)	52
AT24C08B	36, 54, 55	AT27BV1024	51	AT32AP7002	16	AT49BV640D(T)	52

Product Guide Index (Continued)

ATA6832.....	41	ATAB5761-N.....	39, 67	ATAR892.....	25	ATDVK90CAN1.....	8, 9, 33
ATA6832-DK.....	41	ATAB5811-4-B.....	39, 44	ATAR892-C.....	25	ATEVK1100.....	17
ATA6833.....	41	ATAB5811-8-B.....	39, 44	ATAVRAUTO102.....	8, 33	ATEVK1101.....	17
ATA6833-DK1.....	41, 42	ATAB5812-3-B.....	39, 44	ATAVRAUTOEK1.....	8, 33	ATEVK525.....	13
ATA6833-DK2.....	41, 42	ATAB5823-3-B.....	39, 44	ATAVRBC100.....	12	ATF1500A(L).....	61
ATA6834.....	41	ATAB5824-4-B.....	39, 44	ATAVRBFLY.....	2, 10	ATF1502AS(L).....	61
ATA6834-DK1.....	41	ATAB5824-8-B.....	39, 44	ATAVRDRAGON 2, 4, 6, 8, 9, 10, 11, 12, 13, 33		ATF1502ASV.....	61
ATA6836.....	41	ATAB6816.....	42	ATAVRFBKIT.....	11	ATF1502BE.....	61
ATA6837.....	41	ATAB6817.....	42	ATAVRISP2. 2, 4, 6, 8, 9, 10, 11, 12, 13, 14, 15, 33		ATF1504AS(L).....	61
ATA6838.....	41	ATAB6818.....	42	ATAVRLI100.....	11	ATF1504ASV(L).....	61
ATA6839.....	41	ATAB6819.....	42	ATAVRMC100.....	11	ATF1504BE.....	61
ATA6842.....	31	ATAB8401.....	67	ATAVRMC200.....	11	ATF1508AS(L).....	61
ATA6870.....	42	ATAB8402.....	67	ATAVRMC201.....	11	ATF1508ASV(L).....	61
ATA6871.....	42	ATAB8403-8.....	67	ATAVRMC300.....	11	ATF1508BE.....	61
ATA8201.....	65	ATAB8403-9.....	67	ATAVRMC301.....	11	ATF1508RE.....	61
ATA8201-EK.....	66	ATAB-LFMB76.....	43	ATAVRMC303.....	11	ATF15xx-DK3.....	62
ATA8202.....	65	ATAB-LFMB78.....	39	ATAVRMC310.....	11	ATF15xxDK3-SAA100.....	62
ATA8202-EK.....	66	ATAB-LF-MB-79.....	39	ATAVRMC320.....	11	ATF15xxDK3-SAA128.....	62
ATA8401.....	65	ATAB-LFTX-MOD1.....	39, 43	ATAVRMC321.....	11	ATF15xxDK3-SAJ44.....	62
ATA8402.....	65	ATAB-RFMB.....	39, 66	ATAVRMC323.....	11	ATF15xxDK3-SAJ84.....	62
ATA8403.....	65	ATAB-SPI-LPT.....	39, 44, 66	ATAVRMC323.....	11	ATF15XXDK3-SAX20.....	60
ATAB5276.....	43	ATAB-STK-F.....	44	ATAVRRAVEN.....	15	ATF16LV8C.....	61
ATAB5278.....	39	ATADAPCAN01.....	9	ATAVRRTOS.....	2, 4	ATF16V8B.....	61
ATAB5279.....	39	ATAK2270.....	71	ATAVRRZ600.....	15	ATF16V8BQ(L).....	61
ATAB5423-3-B.....	66	ATAK2270UG.....	71	ATAVRRZRAVEN.....	15	ATF16V8C.....	61
ATAB5423-3-WB.....	66	ATAKSTK511-8.....	39, 40, 66	ATAVRRZUSBSTICK.....	15	ATF16V8CZ.....	61
ATAB5428-4-B.....	66	ATAKSTK511-9.....	39, 40, 66	ATAVRSB100.....	12	ATF20V8B.....	61
ATAB5428-4-WB.....	66	ATAKSTK512-3.....	39, 40, 66	ATC18M.....	47	ATF20V8BQ(L).....	61
ATAB5428-8-B.....	66	ATAKSTK512-4.....	39, 40, 66	ATC18RHA.....	47	ATF22LV10C.....	61
ATAB5428-8-WB.....	66	ATAM862.....	34	ATDH1150VPC.....	62	ATF22LV10CQZ.....	61
ATAB5429-9-B.....	66	ATAM862x.....	34	ATDH1151VPC.....	60	ATF22LV10CZ.....	61
ATAB5429-9-WB.....	66	ATAM862x-TNz3.....	24, 34, 65	ATDH2200E.....	60	ATF22V10B.....	61
ATAB5570.....	71	ATAM862x-TNz4.....	24, 34, 65	ATDH2221.....	60	ATF22V10C.....	61
ATAB5743P3-S3.....	66	ATAM862x-TNz8.....	24, 34, 65	ATDH2222.....	60	ATF22V10CQ(Z).....	61
ATAB5743P3-S4.....	66	ATAM893 (MTP Version).....	24	ATDH2223.....	60	ATF22V10CZ.....	61
ATAB5743P6-S3.....	66	ATAM893-D (MTP Version)....	24	ATDH2224.....	60	ATF2500C.....	61
ATAB5743P6-S4.....	66	ATAM894 (MTP Version).....	24	ATDH2225.....	60, 62	ATF280E.....	47
ATAB5744-N3.....	39, 66	ATAR080.....	24	ATDH2226A.....	60	ATF750C(L).....	61
ATAB5744-N4.....	39, 66	ATAR080-D.....	24	ATDH2227.....	60	ATF750LVC.....	61
ATAB5744-S3.....	39, 66	ATAR090.....	24	ATDH2227A.....	60	ATJTAGICE2 2, 4, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 33	
ATAB5744-S4.....	39, 66	ATAR090-C.....	24	ATDH2228.....	60	ATmega649.....	10
ATAB5749-3.....	40	ATAR090-D.....	24	ATDH40D100.....	59	ATmega128.....	2
ATAB5749-4.....	40	ATAR092.....	25	ATDH40D144.....	59	ATmega1280.....	2
ATAB5750-8.....	40, 67	ATAR092-C.....	25	ATDH40D208.....	59	ATmega1280R212.....	15
ATAB5750-9.....	40, 67	ATAR092-D.....	25	ATDH40D84.....	59	ATmega1280R231.....	15
ATAB5753.....	40, 67	ATAR862.....	34	ATDH40M.....	59	ATmega1280V.....	2
ATAB5754.....	40, 67	ATAR862x-yyy-TNz3. 25, 34, 65		ATDH94DNG.....	62	ATmega1281.....	2
ATAB5756.....	40, 44	ATAR862x-yyy-TNz4. 25, 34, 65		ATDS1000PC.....	62	ATmega1281R212.....	15
ATAB5757.....	40, 44	ATAR862x-yyy-TNz8. 25, 34, 65		ATDS1500PC.....	62	ATmega1281R231.....	15
ATAB5760-N.....	39, 67	ATAR890.....	25	ATDS15xxKSW1.....	62	ATmega1281V.....	2
ATAB5760-S.....	39, 67	ATAR890-C.....	25	ATDS94KSW1.....	62	ATmega1284P.....	4

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