

ATmega4808/4809 Data Sheet

Introduction

The ATmega4808/4809 microcontrollers are part of the megaAVR® 0-series, which uses the AVR® processor with hardware multiplier running at up to 20 MHz, and offers a wide range of Flash sizes up to 48 KB, up to 6 KB of SRAM, and 256 bytes of EEPROM in 28-, 32-, 40-, or 48-pin packages. The series uses the latest technologies from Microchip with a flexible and low-power architecture, including Event System and SleepWalking, accurate analog features, and advanced peripherals.

The devices described in this data sheet offer 48 KB in a 28/32/40/48-pin package.



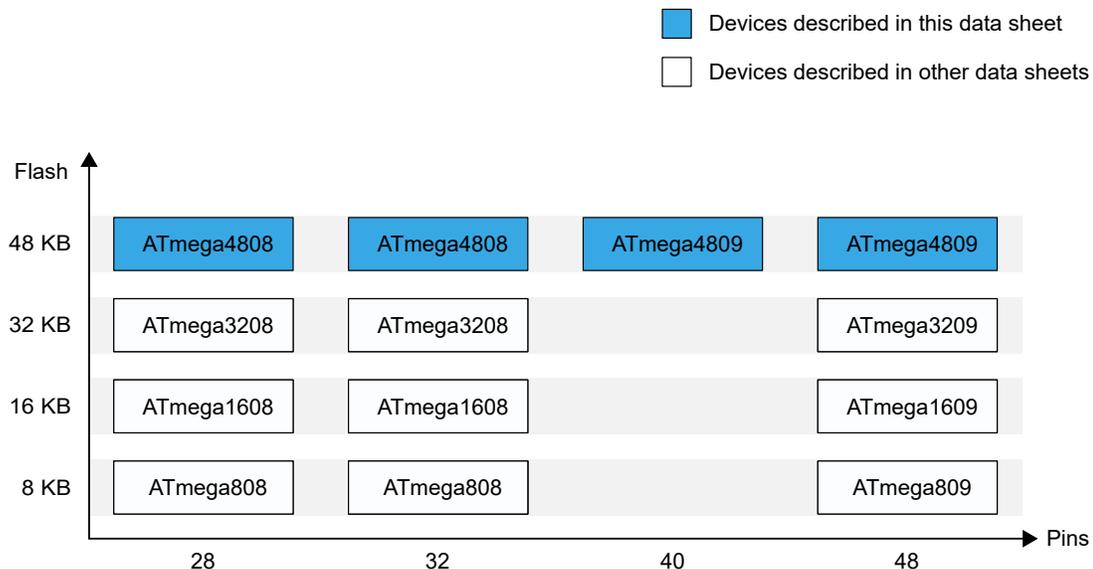
Important: The 40-pin version of the ATmega4809 is using the die of the 48-pin ATmega4809 but offers fewer connected pads. For this reason, the pins PB[5:0] and PC[7:6] must be disabled (INPUT_DISABLE) or enable pull-ups (PULLUPEN).

megaAVR® 0-series Overview

The figure below shows the megaAVR® 0-series devices, laying out pin count variants and memory sizes:

- Vertical migration is possible without code modification, as these devices are fully pin and feature compatible
- Horizontal migration to the left reduces the pin count and, therefore, the available features

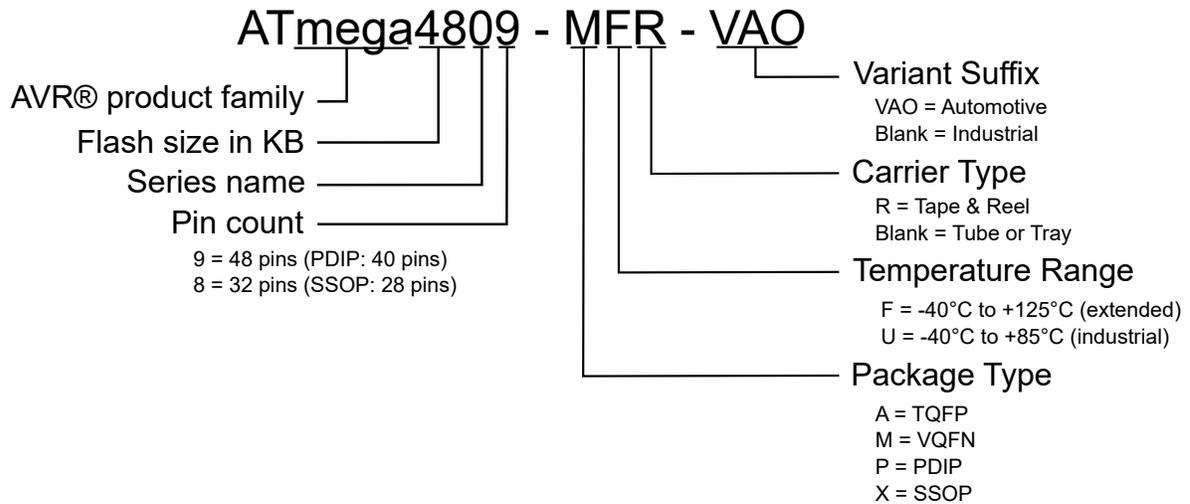
Figure 1. megaAVR® 0-series Overview



Devices with different Flash memory sizes typically also have different SRAM and EEPROM.

The name of a device in the megaAVR 0-series is decoded as follows:

Figure 2. megaAVR® Device Designations



Memory Overview

Table 1. Memory Overview

Memory Type	ATmega808, ATmega809	ATmega1608, ATmega1609	ATmega3208, ATmega3209	ATmega4808, ATmega4809
Flash	8 KB	16 KB	32 KB	48 KB
SRAM	1 KB	2 KB	4 KB	6 KB
EEPROM	256B	256B	256B	256B
User row	32B	32B	64B	64B

Peripheral Overview

Table 2. Peripheral Overview

Feature	ATmega808 ATmega1608 ATmega3208 ATmega4808	ATmega808 ATmega1608 ATmega3208 ATmega4808	ATmega4809	ATmega809 ATmega1609 ATmega3209 ATmega4809
Pins	28	32	40	48
Max. frequency (MHz)	20	20	20	20
16-bit Timer/Counter type A (TCA)	1	1	1	1
16-bit Timer/Counter type B (TCB)	3	3	4	4
12-bit Timer/Counter type D (TCD)	-	-	-	-
Real-Time Counter (RTC)	1	1	1	1

.....continued

Feature	ATmega808 ATmega1608 ATmega3208 ATmega4808	ATmega808 ATmega1608 ATmega3208 ATmega4808	ATmega4809	ATmega809 ATmega1609 ATmega3209 ATmega4809
Pins	28	32	40	48
USART	3	3	4	4
SPI	1	1	1	1
TWI (I ² C)	1 ⁽¹⁾	1 ⁽¹⁾	1 ⁽¹⁾	1 ⁽¹⁾
ADC (channels)	1 (8)	1 (12)	1 (16)	1 (16)
DAC (outputs)	-	-	-	-
AC (inputs)	1 (4p/3n)	1 (4p/3n)	1 (4p/3n)	1 (4p/3n)
Peripheral Touch Controller (PTC) (self-cap/mutual cap channels)	-	-	-	-
Custom Logic (LUTs)	1 (4)	1 (4)	1 (4)	1 (4)
Window Watchdog	1	1	1	1
Event System channels	6	6	8	8
General purpose I/O	23	27	33	41
PORT	PA[0:7], PC[0:3], PD[0:7], PF[0,1,6]	PA[0:7], PC[0:3], PD[0:7], PF[0:6]	PA[0:7], PC[0:5], PD[0:7], PE[0:3], PF[0:6]	PA[0:7], PB[0:5], PC[0:7], PD[0:7], PE[0:3], PF[0:6]
Asynchronous external interrupts	6	7	8	10
CRCSCAN	1	1	1	1
Unified Program and Debug Interface (UPDI) activated by dedicated pin	1	1	1	1

1. TWI can operate as host and client at the same time on different pins.

Features

- AVR® CPU:
 - Single-cycle I/O access
 - Two-level interrupt controller
 - Two-cycle hardware multiplier
- Memories:
 - 48 KB In-system self-programmable Flash memory
 - 256B EEPROM
 - 6 KB SRAM
 - Write/Erase endurance:
 - Flash 10,000 cycles
 - EEPROM 100,000 cycles
 - Data retention: 40 years at 55°C
- System:
 - Power-on Reset (POR) circuit
 - Brown-out Detector (BOD)
 - Clock options:
 - 16/20 MHz low-power internal oscillator
 - 32.768 kHz Ultra Low-Power (ULP) internal oscillator
 - 32.768 kHz external crystal oscillator
 - External clock input
 - Single-pin Unified Program Debug Interface (UPDI)
 - Three sleep modes:
 - Idle with all peripherals running for immediate wake-up
 - Standby
 - Configurable operation of selected peripherals
 - SleepWalking peripherals
 - Power-Down with limited wake-up functionality
- Peripherals:
 - One 16-bit Timer/Counter type A (TCA) with a dedicated period register and three compare channels
 - Up to four 16-bit Timer/Counters type B (TCB) with input capture
 - One 16-bit Real-Time Counter (RTC) running from an external crystal or an internal RC oscillator
 - Up to four USARTs with fractional baud rate generator, auto-baud, and start-of-frame detection
 - Host/client Serial Peripheral Interface (SPI)
 - Host/client TWI with dual address match
 - Can operate simultaneously as host and client
 - Standard mode (Sm, 100 kHz)
 - Fast mode (Fm, 400 kHz)
 - Fast mode plus (Fm+, 1 MHz)
 - Event System for core independent and predictable inter-peripheral signaling
 - Configurable Custom Logic (CCL) with up to four programmable Look-up Tables (LUT)
 - One Analog Comparator (AC) with a scalable reference input
 - One 10-bit 150 kbps Analog-to-Digital Converter (ADC)
 - Five selectable internal voltage references: 0.55V, 1.1V, 1.5V, 2.5V, and 4.3V
 - CRC code memory scan hardware
 - Optional automatic CRC scan before code execution is allowed
 - Watchdog Timer (WDT) with Window mode, with a separate on-chip oscillator
 - External interrupt on all general purpose pins

- I/O and Packages:
 - Up to 41 programmable I/O lines
 - 28-pin SSOP
 - 32-pin VQFN 5x5 and TQFP 7x7
 - 40-pin PDIP
 - 48-pin VQFN 6x6 and TQFP 7x7
- Temperature Ranges:
 - Industrial: -40°C to +85°C
 - Extended: -40°C to +125°C
- Speed Grades -40°C to +105°C:
 - 0-5 MHz @ 1.8V – 5.5V
 - 0-10 MHz @ 2.7V – 5.5V
 - 0-20 MHz @ 4.5V – 5.5V
- Speed Grades +105°C to +125°C:
 - 0-8 MHz @ 2.7V - 5.5V
 - 0-16 MHz @ 4.5V - 5.5V
- Speed Grades -40°C to +125°C - Automotive Range Parts (-VAO):
 - 0-8 MHz @ 2.7V - 5.5V
 - 0-16 MHz @ 4.5V - 5.5V
- VAO variants available: Designed, manufactured, tested, and qualified per the AEC-Q100 requirements for automotive applications.