ATtiny424/426/427
ATtiny824/826/827

tinyAVR® 2 Family

Introduction

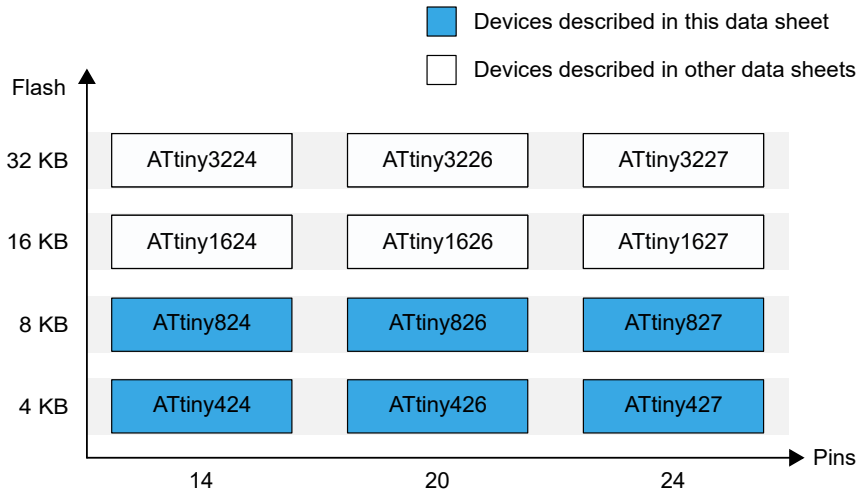
The ATtiny424/426/427 and ATtiny824/826/827 microcontrollers of the tinyAVR® 2 family are using the AVR® CPU with hardware multiplier, running at up to 20 MHz, with 4/8 KB Flash, 512B/1 KB of SRAM, and 128B of EEPROM available in a 14-, 20-, and 24-pin package. The family uses the latest technologies from Microchip with a flexible and low-power architecture, including an Event System, advanced digital peripherals, and accurate analog features such as a 12-bit differential ADC with Programmable Gain Amplifier (PGA).

tinyAVR® 2 Family Overview

The figure below shows the tinyAVR® 2 family 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

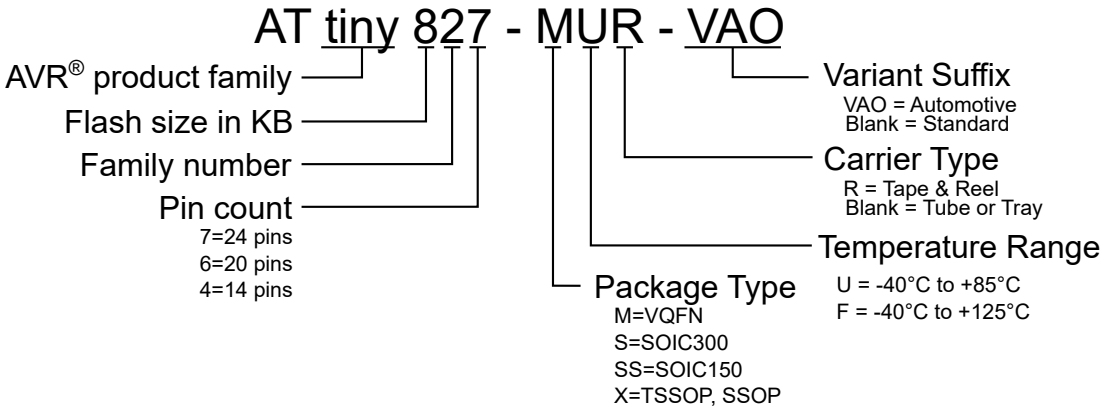
Figure 1. tinyAVR® 2 Family Overview



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

The name of a device in the tinyAVR® 2 family is decoded as follows:

Figure 2. tinyAVR® 2 Family Device Designations



Note: The Tape & Reel identifier only appears in the catalog part number description. Use this identifier for ordering purposes. Check with your Microchip Sales Office for package availability with the Tape and Reel option.

Note: The VAO variants have been designed, manufactured, tested, and qualified per AEC-Q100 requirements for automotive applications. These products may use a different package than non-VAO parts and have additional specifications in their Electrical Characteristics.

Memory Overview

The following table shows the memory overview of the entire family, but further documentation describes only the ATtiny424/426/427 and ATtiny824/826/827 devices.

Table 1. Memory Overview

Device	ATtiny424 ATtiny426 ATtiny427	ATtiny824 ATtiny826 ATtiny827	ATtiny1624 ATtiny1626 ATtiny1627	ATtiny3224 ATtiny3226 ATtiny3227
Flash Memory	4 KB	8 KB	16 KB	32 KB
SRAM	512B	1 KB	2 KB	3 KB
EEPROM	128B	128B	256B	256B
User Row	32B	32B	32B	32B

Peripheral Overview

Table 2. Peripheral Overview

Device	ATtiny424 ATtiny824	ATtiny426 ATtiny826	ATtiny427 ATtiny827
Pins	14	20	24
Package	SOIC, TSSOP	SOIC, SSOP,VQFN	VQFN
Maximum frequency (MHz)	20	20	20
General purpose I/O	12	18	22
PORT	PA[7:0] PB[3:0]	PA[7:0] PB[5:0] PC[3:0]	PA[7:0] PB[7:0] PC[5:0]

.....continued			
Device	**ATtiny424 ATtiny824**	**ATtiny426 ATtiny826**	**ATtiny427 ATtiny827**
External interrupts	12	18	22
Event system channels	6	6	6
CCL LUTs	4	4	4
Real-Time Counter (RTC)	1	1	1
16-bit Timer/Counter type A (TCA)	1	1	1
16-bit Timer/Counter type B (TCB)	2	2	2
12-bit Timer/Counter type D (TCD)	-	-	-
USART/SPI host	2	2	2
SPI	1	1	1
TWI (I^2C)	1	1	1
ADC (channels)	1 (9)	1 (15)	1 (15)
DAC	-	-	-
Analog Comparators (inputs)	1 (2p/2n)	1 (3p/3n)	1 (4p/3n)
Peripheral Touch Controller (PTC) (self cap/mutual cap channels)	-	-	-
Unified Program and Debug Interface (UPDI) activated by shared pin using high-voltage signal or fuse override	1	1	1

Features

- High-Performance Low-Power AVR® CPU
  - Running at up to 20 MHz
  - Single-cycle I/O access
  - Two-level interrupt controller with vectored interrupts
  - Two-cycle hardware multiplier
  - Supply voltage range: 1.8V to 5.5V
- Memories
  - 4/8 KB In-System self-programmable Flash memory
  - 512B/1 KB SRAM
  - 128B EEPROM
  - 32B of user row in nonvolatile memory that can keep data during chip-erase and be programmed while the device is locked
  - Write/erase endurance
    - Flash 10,000 cycles
    - EEPROM 100,000 cycles
  - Data retention: 40 years at 55°C
- System
  - Power-on Reset (POR)
  - Brown-out Detection (BOD)
  - Clock options
    - Lockable 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 and Debug Interface (UPDI)
  - Three sleep modes
    - Idle with all peripherals running and immediate wake-up time
    - Standby with configurable operation of selected peripherals
    - Power-Down with full data retention
- Peripherals
  - One 16-bit Timer/Counter type A (TCA) with a dedicated period register and three PWM channels
  - Two 16-bit Timer/Counters type B (TCB) with input capture and simple PWM functionality
  - One 16-bit Real-Time Counter (RTC) running from external 32.768 kHz crystal or internal 32.768 kHz ULP oscillator
  - Two Universal Synchronous Asynchronous Receiver Transmitters (USART) with fractional baud rate generator, auto-baud, and start-of-frame detection
  - Host/Client Serial Peripheral Interface (SPI)
  - Host/Client Two-Wire Interface (TWI) with dual address match
    - Standard mode (Sm, 100 kHz)
    - Fast mode (Fm, 400 kHz)
    - Fast mode plus (Fm+, 1 MHz)
  - Event System for CPU independent and predictable inter-peripheral signaling
  - Configurable Custom Logic (CCL) with four programmable Look-Up Tables (LUT)
  - One Analog Comparator (AC) with scalable reference input
  - One 12-bit differential 375 ksps Analog-to-Digital Converter (ADC) with Programmable Gain Amplifier (PGA) and up to 15 input channels
  - Multiple internal voltage references
    - 1.024V

        - 2.048V
        - 2.500V
        - 4.096V
        - VDD
    - Automated Cyclic Redundancy Check (CRC) flash memory scan
    - 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 22 programmable I/O pins
    - 14-pin
        - SOIC
        - TSSOP
    - 20-pin
        - SOIC
        - SSOP
        - VQFN 3x3 mm
    - 24-pin
        - VQFN 4x4 mm
- Temperature Ranges
    - -40°C to 85°C (industrial)
    - -40°C to 125°C (extended)
- Speed Grades (-40°C to 85°C)
    - 0-5 MHz @ 1.8V – 5.5V
    - 0-10 MHz @ 2.7V – 5.5V
    - 0-20 MHz @ 4.5V – 5.5V
- Speed Grades (-40°C to 125°C)
    - 0-8 MHz @ 2.7V - 5.5V
    - 0-16 MHz @ 4.5V - 5.5V
- VAO variants available: Designed, manufactured, tested, and qualified in accordance with AEC-Q100 requirements for automotive applications.