

Description

The Atmel® | SMART™ SAM G51 series is a member of a family of Flash microcontrollers based on the high-performance 32-bit ARM® Cortex®-M4 RISC processor with Floating Point Unit. It operates at a maximum speed of 48 MHz and features up to 256 Kbytes of Flash and up to 64 Kbytes of SRAM. The peripheral set includes one USART, two UARTs, two I²C-bus interfaces (TWI), one high-speed TWI, up to two SPIs, one three-channel general-purpose 16-bit timer (TC), one RTT and one 8-channel 12-bit ADC.

The Atmel | SMART SAM G51 devices have two software-selectable low-power modes: Sleep and Wait. In Sleep mode, the processor is stopped while all other functions can be kept running. In Wait mode, all clocks and functions are stopped.

The Event System allows peripherals to receive, react to and send events in Active and Sleep modes without processor intervention.

A general-purpose microcontroller with the best ratio in terms of reduced power consumption, processing power and peripheral set, the SAM G51 series sustains a wide range of applications including consumer, industrial control, and PC peripherals.

The device operates from 1.7V to 2.0V and is available in a 49-ball WLCSP package and a 100-lead LQFP package.

Features

- Core
 - ARM Cortex-M4 up to 48 MHz
 - Memory Protection Unit (MPU)
 - DSP Instructions
 - Floating Point Unit (FPU)
 - Thumb[®]-2 instruction set
- Memories
 - 256 Kbytes embedded Flash
 - 64 Kbytes embedded SRAM
- System
 - Embedded voltage regulator for single-supply operation
 - Power-on reset (POR) and Watchdog for safe operation
 - Quartz or ceramic resonator oscillators: 3 to 20 MHz power with failure detection and 32.768 kHz for RTT or device clock
 - High-precision 8/16/24 MHz factory-trimmed internal RC oscillator. In-application trimming access for frequency adjustment
 - Slow clock internal RC oscillator as permanent low-power mode device clock
 - PLL range from 24 MHz to 48 MHz for device clock
 - Up to 18 Peripheral DMA Controller (PDC) channels
 - Eight 32-bit General-Purpose Backup Registers (GPBR)
 - 16 external interrupt lines
- Power consumption in active mode
 - 103 μ A/MHz running Fibonacci on SRAM
- Low-power modes (typical value)
 - Wait mode 6.8 μ A
 - Wake-up time from wait mode to active mode: 3.2 μ s
- Peripherals
 - One USART with SPI Mode
 - Two 2-wire UARTs
 - Three Two-Wire Interface (TWI) modules featuring two fast mode TWI masters and one high-speed TWI slave
 - One fast SPI at up to 24 Mbit/s
 - One three-channel 16-bit Timer/Counter (TC) with capture, waveform, compare and PWM modes
 - One 32-bit Real-time Timer (RTT)
 - One Real-time Clock (RTC)
- I/Os
 - Up to 38 I/O lines with external interrupt capability (edge or level sensitivity), debouncing, glitch filtering and on-die Series Resistor Termination. Individually Programmable Open-drain, Pull-up and pull-down resistor and Synchronous Output
 - Two up to 25-bit PIO Controllers
- Analog
 - One 8-channel 12-bit ADC, up to 600 ksp/s

- Package
 - 49-ball WLCSP
 - 100-lead LQFP
- Industrial operating temperature range (-40 °C to +85 °C)

37. Ordering Information

Table 37-1. Ordering Codes for SAM G51 Devices

Ordering Code	MRL	Flash (Kbytes)	Package	Carrier Type	Package Type	Temperature Operating Range
SAMG51G18A-UUT	A	256	WLCSP49	Tape and Reel	Green	Industrial -40°C to 85°C
SAMG51N18A-AU	A	256	LQFP100	Tray	Green	Industrial -40°C to 85°C