



From Zilog's New S3 Family of Microcontrollers: the S3F8S28/24 8-Bit MCUs

Overview

The S3F8S28 and S3F8S24 MCUs are 24- and 20-pin members of Zilog's S3 Family of MCUs which offer a fast and efficient Z8-compatible CPU, 8KB or 4KB of Flash memory, and a wide range of integrated peripherals. The S3 Family CPU features an efficient register-oriented architecture and a sophisticated interrupt controller that allow for fast context switching. Flash memory is CPU-programmable and offers a 128-byte sector size. The internal oscillator is switchable between 8 MHz, 4 MHz, 2 MHz, 1 MHz, and 0.5 MHz for low-power applications. The 13-channel, 12-bit ADC and two 14-bit PWM modules make these devices perfect for small appliance sensing applications such as ceiling fans, smoke detectors, PIR motion detectors, battery chargers, LED lighting control, and oven controllers. Additional features including a UART, I²C master/slave and two 16-bit timers provide functions necessary for system expansion, board-level management and external communications.

Features

- SAM88 Z8-Compatible CPU Core
- Flash Memory
 - 8 KB internal Flash program memory (S3F8S28)
 - 4 KB internal Flash program memory (S3F8S24)
 - Sector size: 128 bytes
 - CPU programmable with LDC instruction
 - Fast 25 μs byte programming time
 - Endurance: 10,000 erase/program cycles
- RAM
 - 272 bytes general-purpose register RAM area
- Instruction Set
 - 78 CISC instructions
 - Idle and Stop instructions for power-down modes
 - LDC for reading and writing to Flash memory
- Interrupts
 - 17 interrupt sources with 8 programmable priorities
- General-Purpose I/O
 - 18/22 programmable GPIO pins
 - Bit-programmable ports
 - Programmable pull-up on each port pin
 - Programmable pull-down on Port 1
- Analog Peripherals
 - 12-bit SAR A/D converter
 - 13 analog inputs
 - Programmable Low-Voltage Reset controller (LVR)
 - 1.9V, 2.3V, 3.0V and 3.9V
 - Programmable Low-Voltage Detector (LVD)
 - 2.1V, 2.5V, 3.2V and 4.1V

ADVANTAGES

- Two 14-bit PWM Timers
- 12-bit SAR ADC with 20 μs Conversion Time
- Full Duplex UART and Master/Slave I²C for External Communications and System Expansion
- Small Flash Sector Size Allows Flash to be used as EEPROM
- Programmable Low Voltage Reset Ensures Stable System Operation

APPLICATIONS

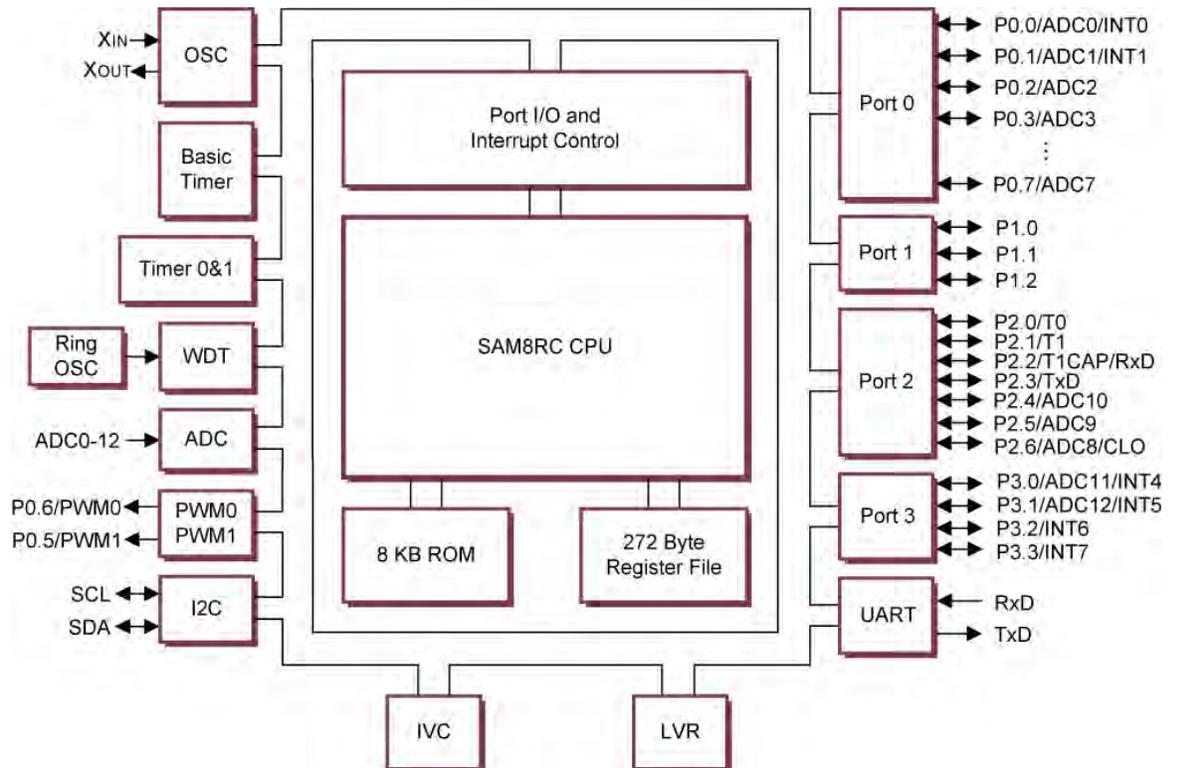
- Fan Control
- Smoke Detectors
- Rice Cookers
- Cordless Tools & Battery Chargers
- PIR Motion Detectors
- Ambient Light Sensors
- Humidity Detectors
- LED Lighting Control
- System Board Management

Features (continued)

- Digital Peripherals
 - One 16-bit timer that can be used as two separate 8-bit timers
 - One 16-bit timer with input capture
 - 2-channel PWM with 3 selectable resolutions:
 - 8-bit PWM: 6-bit base + 2-bit extension
 - 12-bit PWM: 6-bit base + 6-bit extension
 - 14-bit PWM: 8-bit base + 6-bit extension
 - Watchdog timer with low-power ring oscillator
 - Master/slave I²C
 - Full-duplex UARTs with independent BRGs
- Clock Sources
 - Internal oscillator: 8 MHz, 4 MHz, 3.2 MHz, 2 MHz, 1 MHz or 0.5 MHz
 - External RC oscillator: 4 MHz max. (capacitor is integrated on chip)
 - External crystal oscillator: 12 MHz max.
 - Low power ring oscillator: 32 kHz

ADVANTAGES

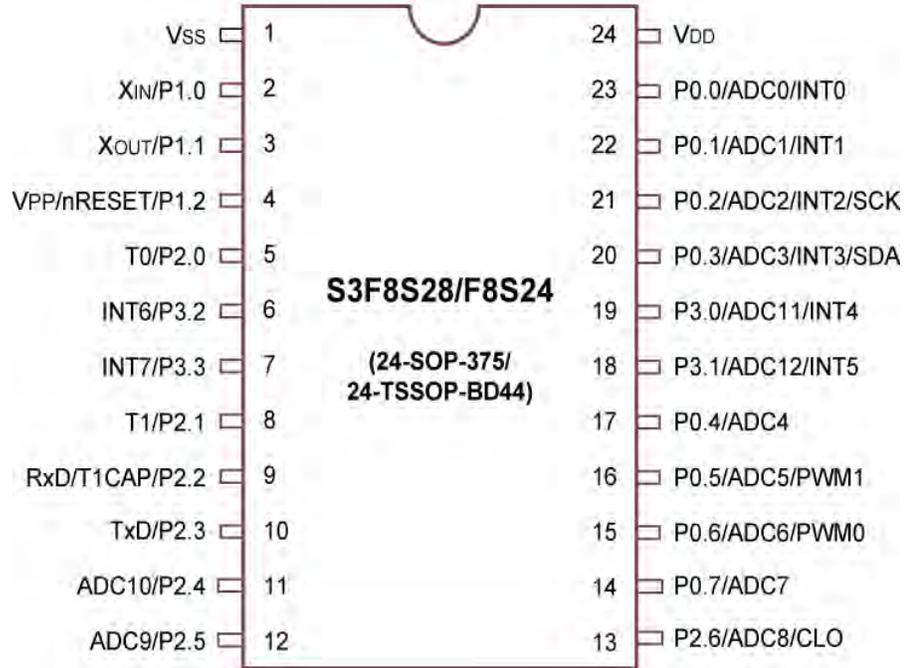
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Block Diagram**S3F8S28/24 Block Diagram**

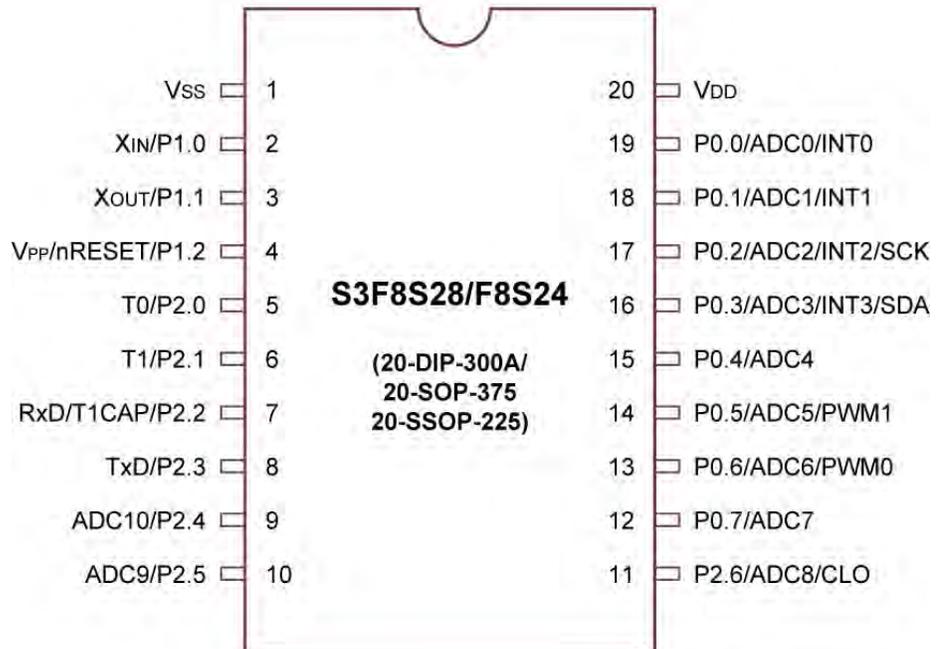
Pin Signals

APPLICATIONS

- Smoke Detectors
- Rice Cookers
- Cordless Tools & Battery Chargers
- PIR Motion Detectors
- Ambient Light Sensors
- Bathroom Fan Controller & Humidity Detectors
- LED Lighting Control
- System Board Management



S3F8S28 24-Pin SOP/TSSOP Package



S3F8S28 20-Pin DIP/SOP/SSOP Package

Operating Characteristics

- Operating Voltage Range
 - 1.8V to 5.5V up to 4 MHz (LVR disabled)
 - 2.7V to 5.5V up to 12 MHz
- Operating Temperature Range: -40°C to 85°C

Development Tools

A complete line of development tools are available for Zilog's S3 Microcontroller Family. The development environment is composed of your application board, a target board, an emulator, and a host PC running the IDE. Production programmers are also available from third party sources. Zilog's in-circuit emulator solution provides a wide range of capabilities and prices to suite most budgets and system complexities.

In-Circuit Emulators that support the S3 Family

- OpenICE-i500
- OpenICE-i2000
- SmartKit SK-1200

Target Boards for the S3F8S28 and S3F8S24 MCUs

- TB8S19, TB8S28 and TB8S39

Programmers

- SPW-uni: single-device programmer
- GW-uni: 8-device gang programmer
- AS-pro

Development Tools Suppliers

Please contact your local [Zilog Sales Office](#), or contact your [Third Party Tools supplier](#) directly.

Ordering Information

Order your S3 Family parts from your local Zilog distributor using the part numbers listed below. For more information, or to download product collateral and software, please visit us at www.zilog.com.

Part Number	Package Type	Flash Program Memory	GPIO
S3F8S28XZZ-SM98	24-Pin SOP	8 KB	22
S3F8S28XZZ-RM98	24-Pin TSSOP	8 KB	22
S3F8S28XZZ-DK98	20-Pin DIP	8 KB	18
S3F8S28XZZ-SK98	20-Pin SOP	8 KB	18
S3F8S28XZZ-VK98	20-Pin SSOP	8 KB	18
S3F8S24XZZ-DK94	20-Pin DIP	4 KB	18
S3F8S24XZZ-SK94	20-Pin SOP	4 KB	18
S3F8S24XZZ-VK94	20-Pin SSOP	4 KB	18

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