



From Zilog's New S3 Family of Microcontrollers: the S3F94C8/C4 8-Bit MCUs

Overview

The S3F94C8 and S3F94C4 MCUs are 16- and 20-pin members of Zilog's S3 Family of Microcontrollers which offer a fast and efficient Z8-compatible CPU, 4KB or 8KB 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 allowing for fast context-switching. The Flash memory is CPU-programmable, and has a 128-byte sector size. The internal oscillator is switchable between 3.2 MHz and 0.5 MHz for low-power applications. A 14-bit PWM and 10-bit ADC make these devices ideal for Small Home Appliance applications, while the wide 1.8V to 5.5V operating voltage range and internal programmable Low Voltage Reset suit small battery-powered applications.

Features

ADVANTAGES

- 14-bit PWM to control heater power or motor speed
- 10-bit ADC for temperature, current, or voltage measurement
- Small Flash sector size allows Flash to be used as EEPROM
- Programmable Low Voltage Reset ensures stable system operation
- Small package size minimizes PCB footprint

APPLICATIONS

- Induction Heaters
- Air Conditioners
- Small Kitchen/Home Appliances:
 - Boilers
 - Microwave Ovens
 - Rice Cookers
 - Pressure Cookers
 - Vacuum Cleaners

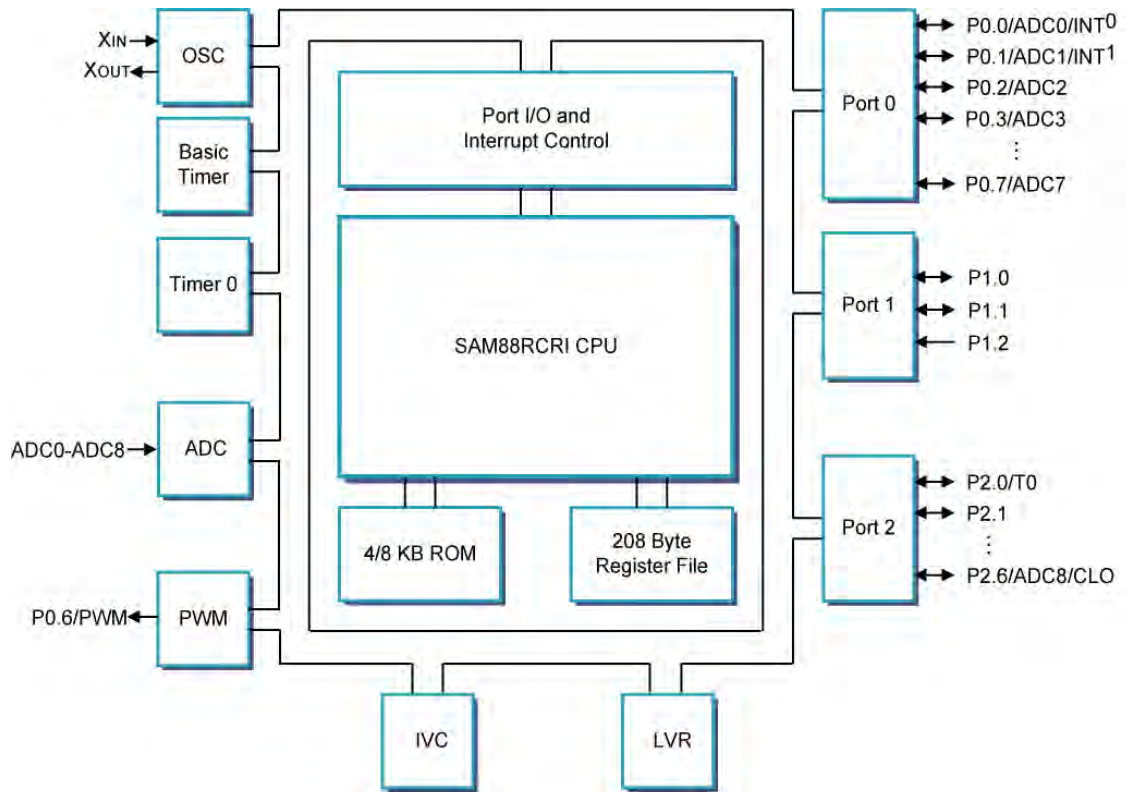
- SAM86 Z8-Compatible CPU Core
- Flash Memory
 - 8 KB internal Flash program memory (S3F94C8)
 - 4 KB internal Flash program memory (S3F94C4)
 - Sector size: 128 bytes
 - CPU programmable with LDC instruction
 - Fast 25 μ s byte programming time
 - Endurance: 10,000 erase/program cycles
 - 10 years data retention
- RAM
 - 208-byte general-purpose register area
- Instruction Set
 - 41 CISC instructions
 - Idle and Stop instructions for power-down modes
 - LDC for reading and writing Flash memory
- Interrupts
 - 4 interrupt sources (2 external interrupts and 2 internal interrupts)
- General-Purpose I/O
 - 14 programmable GPIO pins (16-pin packages)
 - 18 programmable GPIO pins (20-pin packages)
 - Bit-programmable ports
 - Programmable pull-up, pull-down (Port 1), open drain (Ports 1 and 2)
- Clock Sources
 - Internal oscillator: 3.2 MHz or 0.5 MHz
 - External RC oscillator: 4 MHz max.
 - External crystal oscillator: 10 MHz max.

Features (continued)

- **Peripherals**
 - 1-channel high-speed 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
 - One 8-bit basic timer for watchdog timer function
 - One 8-bit timer/counter with time interval modes
 - 10-bit A/D Converter
 - Nine analog input pins (maximum)
 - Programmable Low Voltage Reset controller (LVR)
 - 1.9, 2.3, 3.0, 3.6, and 3.9V

ADVANTAGES

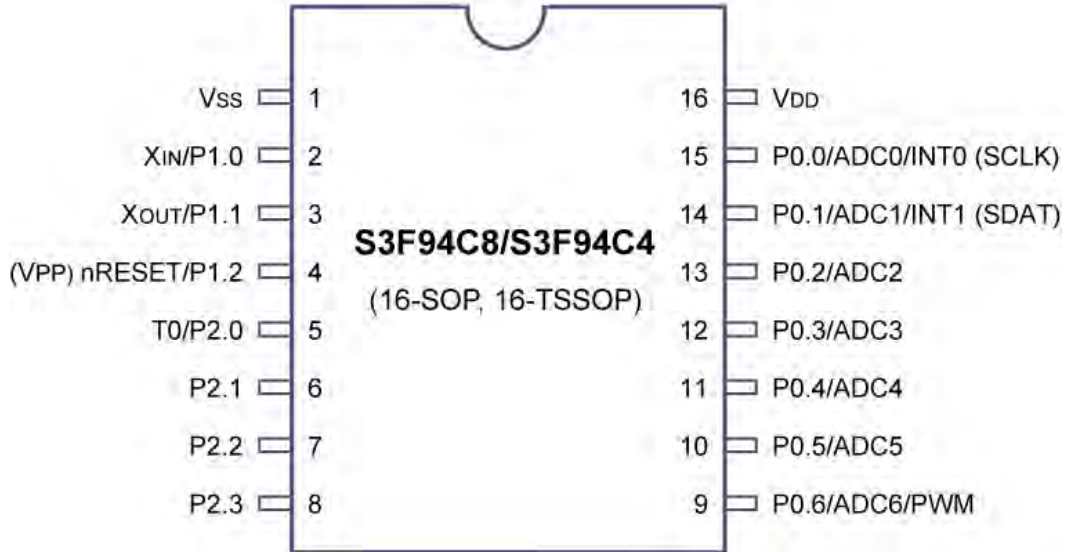
- 14-bit PWM to control heater power or motor speed
- 10-bit ADC for temperature, current, or voltage measurement
- Small Flash sector size allows Flash to be used as EEPROM
- Programmable Low Voltage Reset ensures stable system operation
- Small package size minimizes PCB footprint

Block Diagram**S3F94C8/S3F94C4 Block Diagram**

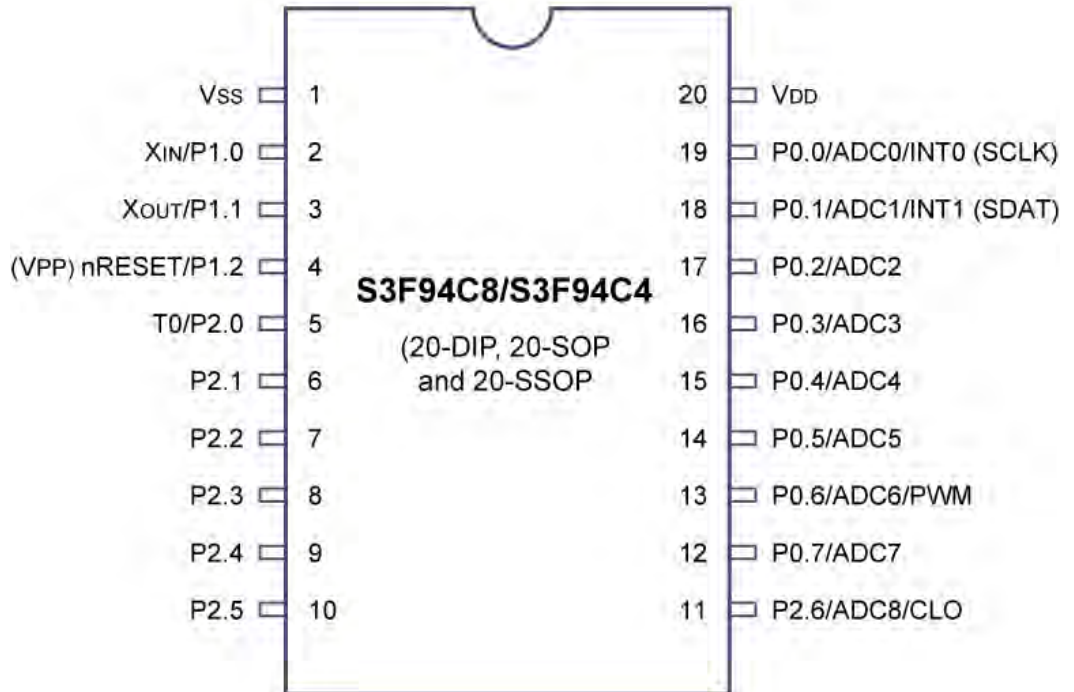
Pin Signals

APPLICATIONS

- Induction Heaters
- Air Conditioners
- Small Kitchen/Home Appliances:
 - Boilers
 - Microwave Ovens
 - Rice Cookers
 - Pressure Cookers
 - Vacuum Cleaners



S3F94C8/S3F94C4 16-Pin SOP/TSSOP Pin Assignments



S3F94C8/S3F94C4 20-Pin DIP/SOP/SSOP Pin Assignments

Operating Characteristics

- Oscillation Frequency
 - 0.4 MHz to 10 MHz external crystal oscillator
 - Typical 4 MHz external RC oscillator
 - Internal RC: 0.5 MHz, 3.2 MHz, both typical, in VDD = 5V
- Operating Voltage Range
 - 1.8V to 5.5V at 0.4–4 MHz (LVR disable)
 - LVR to 5.5V at 0.4–4 MHz (LVR enable)
 - 2.7V to 5.5V at 0.4–10 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 S3F94C8 and S3F94C4 MCUs

- TB94C8 and TB94C4

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	Internal Oscillator
S3F94C4EZZ-RH94	16-Pin TSSOP	4 KB	14	3.2/0.5 MHz \pm 3%
S3F94C4EZZ-DK94	20-Pin DIP	4 KB	18	3.2/0.5 MHz \pm 3%
S3F94C4EZZ-SK94	20-Pin SOP	4 KB	18	3.2/0.5 MHz \pm 3%
S3F94C4EZZ-VK94	20-Pin SSOP	4 KB	18	3.2/0.5 MHz \pm 3%
S3F94C8EZZ-RH98	16-Pin TSSOP	8 KB	14	3.2/0.5 MHz \pm 3%
S3F94C8EZZ-DK98	20-Pin DIP	8 KB	18	3.2/0.5 MHz \pm 3%
S3F94C8EZZ-SK98	20-Pin SOP	8 KB	18	3.2/0.5 MHz \pm 3%
S3F94C8EZZ-VK98	20-Pin SSOP	8 KB	18	3.2/0.5 MHz \pm 3%
S3F94C8EZZ-C0C8	20-Pin BIZ	8 KB	18	3.2/0.5 MHz \pm 3%
S3F94C4XZZ-DK94	20-Pin DIP	4 KB	18	3.2/0.5 MHz \pm 1%
S3F94C4XZZ-SK94	20-Pin SOP	4 KB	18	3.2/0.5 MHz \pm 1%
S3F94C8XZZ-DK98	20-Pin DIP	8 KB	18	3.2/0.5 MHz \pm 1%
S3F94C8XZZ-SK98	20-Pin SOP	8 KB	18	3.2/0.5 MHz \pm 1%

Warning: DO NOT USE THIS PRODUCT IN LIFE SUPPORT SYSTEMS.**LIFE SUPPORT POLICY**

ZILOG'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS PRIOR WRITTEN APPROVAL OF THE PRESIDENT AND GENERAL COUNSEL OF ZILOG CORPORATION.

As used herein

Life support devices or systems are devices which (a) are intended for surgical implant into the body, or (b) support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in a significant injury to the user. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system or to affect its safety or effectiveness.

Document Disclaimer

©2013 Zilog, Inc. All rights reserved. Information in this publication concerning the devices, applications, or technology described is intended to suggest possible uses and may be superseded. ZILOG, INC. DOES NOT ASSUME LIABILITY FOR OR PROVIDE A REPRESENTATION OF ACCURACY OF THE INFORMATION, DEVICES, OR TECHNOLOGY DESCRIBED IN THIS DOCUMENT. ZILOG ALSO DOES NOT ASSUME LIABILITY FOR INTELLECTUAL PROPERTY INFRINGEMENT RELATED IN ANY MANNER TO USE OF INFORMATION, DEVICES, OR TECHNOLOGY DESCRIBED HEREIN OR OTHERWISE. The information contained within this document has been verified according to the general principles of electrical and mechanical engineering.

Z8 is a trademark or registered trademark of Zilog, Inc. All other product or service names are the property of their respective owners.

zilog[®]

Embedded in Life

An  IXYS Company

WWW.ZILOG.COM | 408-457-9000

Zilog and the Zilog logo are registered trademarks of Zilog, Inc. in the United States and in other countries.

