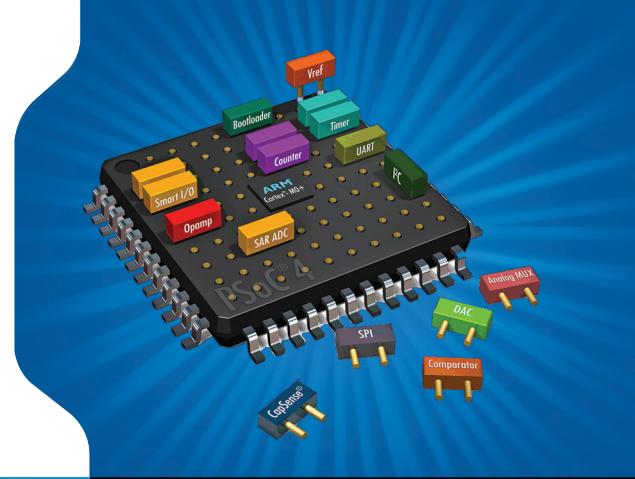CYPRESS
PSoC® 4 S-Series

Replace legacy 8-/16-bit MCUs with an ARM®
Cortex-M0+ and the world's most reliable, lowest-power
capacitive-sensing solution

Cypress solves complex design problems with PSoC 4

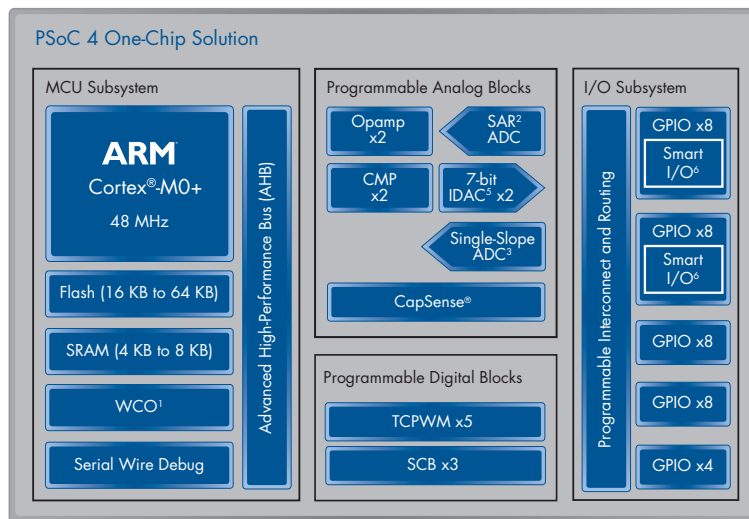PSoC® 4 S-Series expands the portfolio by introducing Cypress's fourth-generation CapSense®, Smart I/Os to implement pin-level digital logic and the 32-bit ARM® Cortex®-M0+ for all your mixed-signal embedded requirements.

Cypress introduces fourth-generation CapSense

PSoC® 4 S-Series delivers robust noise immunity with superior SNR (>300:1), allowing home appliance customers to easily pass IEC 61000 standards. CapSense fourth-generation also implements robust liquid-level sensing solutions with mutual-capacitance sensing support and improving manufacturing robustness with SmartSense™ auto-tuning.

Cypress simplifies low-power system design

PSoC 4 S-Series reduces average power consumption by boosting performance. Processing instructions at more than 2x the rate of legacy 8-bit and 16-bit MCUs the system is allowed to spend more time in sleep modes. CapSense fourth-generation also simplifies low-power system design with a low 3µA average current.

FEATURES

32-BIT MCU SUBSYSTEM:
- **48-MHz ARM® Cortex®-M0+ MCU**
- **Up to 64KB flash and 8KB SRAM**

FOURTH-GENERATION CAPSENSE:
- **Low-power operation (3 µA)**
- **Self- and mutual-capacitance sensing**
- **SNR >300:1 delivers robust noise immunity**
- **Liquid Tolerance SmartSense auto-tuning**

PROGRAMMABLE ANALOG:
- **12-bit, 1-Msps SAR ADC**
- **10-bit, 46.8-Ksps Single-Slope ADC**
- **2x opamps configurable as PGAs, comparators, etc.**
- **2x low-power comparators (CMP)**
- **2x 7-bit IDACs configurable as a single 8-bit IDAC**
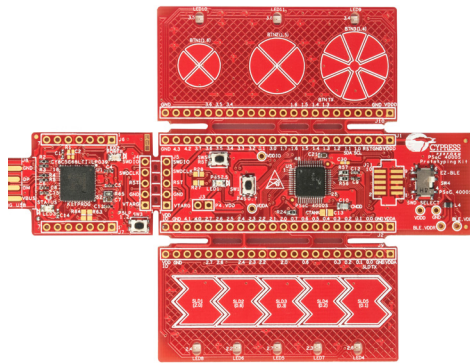
PROGRAMMABLE DIGITAL:
- **Smart I/Os used to implement basic, pin-level digital logic**
- **5x 16-bit Timer, Counter, PWM (TCPWM) blocks**
- **3x serial communication blocks (SCBs) configurable as I²C, SPI or UART**
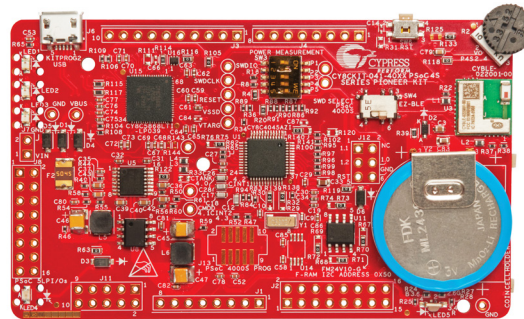
LOW-POWER 1.71V TO 5.5V OPERATION

UP TO 36 PROGRAMMABLE GPIO PINS
- **48-pin TQFP, 40-pin QFN, 32-pin QFN, and 35-ball WLCSP packages**

PSoC 4 One-Chip Solution

MCU Subsystem

ARM
Cortex®-M0+
48 MHz

Flash (16 KB to 64 KB)

SRAM (4 KB to 8 KB)

WCO¹

Serial Wire Debug

Advanced High-Performance Bus (AHB)

Programmable Analog Blocks

Opamp x2 — SAR² ADC

CMP x2 — 7-bit IDAC⁵ x2

Single-Slope ADC³

CapSense®

Programmable Digital Blocks

TCPWM x5

SCB x3

I/O Subsystem

Programmable Interconnect and Routing

GPIO x8
Smart I/O⁶

GPIO x8
Smart I/O⁶

GPIO x8

GPIO x8

GPIO x4

¹ Watch crystal oscillator
² Successive approximation register
³ A simple ADC used to measure slow-moving signals
⁴ Programmable gain amplifier
⁵ Current output digital-to-analog converter
⁶ Embedded programmable digital logic in the I/O subsystem

PSoC 4 S-Series Block Diagram

CYPRESS®
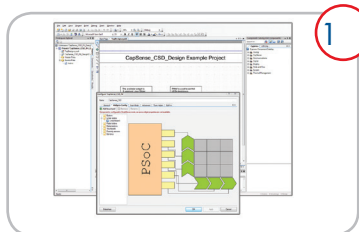PERFORM

CY8CKIT-145 PSoC 4 S-SERIES PROTOTYPING KIT

This low-cost kit features a full-featured programmer debugger with a PSoC 4000S device and two snap-away boards enabled for mutual and self-capacitance CapSense designs.

CY8CKIT-041-40XX PSoC 4 S-SERIES PIONEER KIT

This kit features a PSoC 4000S device with a CapSense trackpad, buttons, and a proximity loop. The board includes an on-board 1Mbit F-RAM, an EZ-BLE™ PRoC™ module, and a rechargeable coin-cell battery.

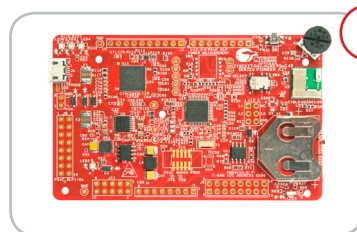| MPN	Max CPU Speed (MHz)	Flash (KB)	SAR ADC[1]	Single-Slope ADC[2]	CapSense[3]	Opamps	CMP[4]	Smart I/O[5]	SCB[6]	TCPWM[7]	Package
CY8C4024LQI-S401	24	16	-	-	-	-	2	8	2	5	24-QFN
CY8C4024FNI-S412	24	16	-	46.8 Ksps	√	-	2	8	2	5	25-WLCSP
CY8C4025LQI-S412	24	32	-	46.8 Ksps	√	-	2	16	2	5	32-QFN
CY8C4045AZI-S413	48	32	-	46.8 Ksps	√	-	2	16	2	5	48-TQFP
CY8C4124LQI-S412	24	16	-	46.8 Ksps	√	2	2	16	2	5	32-QFN
CY8C4125LQI-S423	24	32	806 Ksps	-	-	2	2	16	2	5	40-QFN
CY8C4146FNI-S423	48	64	1 Msps	-	-	2	2	16	3	5	35-WLCP
CY8C4146AZI-S433	48	64	1 Msps	46.8 Ksps	√	2	2	16	3	5	48-TQFP

This table shows a subset of PSoC 4 S-Series part numbers. Refer to the PSoC 4 S-Series datasheet for the complete list of part numbers.

GET STARTED NOW

1

Download the PSoC Creator Integrated Design Environment
www.cypress.com/Creator

2

Buy the PSoC 4 S-Series Pioneer Kit (CY8CKIT-041)
www.cypress.com/CY8CKIT-041

3

Download the Getting Started App Note
www.cypress.com/go/AN79953

4

Register for a free PSoC 4 workshop in your area
www.cypress.com/workshops

Cypress Semiconductor Corporation
198 Champion Court, San Jose CA 95134
phone +1 408.943.2600 fax +1 408.943.6848
toll free +1 800.858.1810 (U.S. only) Press "1" to reach your local sales representative

CYPRESS
PERFORM