C8051F85x/86x

Low-Cost, 25 MIPS, 8-Bit MCU Family with up to 8 kB of Flash

Memory

- Up to 8 kB flash
- Flash is in-system programmable in 512-Byte sectors
- Up to 512 Bytes RAM (256 + 256)

On-Chip Debug

- On-chip debug circuitry facilitates full speed, non-intrusive in-system debug (no emulator required)
- Provides breakpoints, single stepping, inspect/modify memory and registers

12-Bit Analog-to-Digital Converter

- Up to 16 input channels
- Up to 200 ksps 12-bit mode or 800 ksps 10-bit mode
- Internal VREF or external VREF supported

Internal Low-Power Oscillator

- Calibrated to 24.5 MHz
- Low supply current
- ±2% accuracy over supply and temperature

Internal Low-Frequency Oscillator

- 80 kHz nominal operation
- Low supply current
- Independent clock source for watchdog timer

2 Analog Comparators

- Programmable hysteresis and response time
- Configurable as interrupt or reset source
- Low current

Additional Support Peripherals

- Independent watchdog timer clocked from LFO
- 16-bit CRC engine

High-Speed CIP-51 µC Core

- Efficient, pipelined instruction architecture
- Up to 25 MIPS throughput with 25 MHz clock
- Uses standard 8051 instruction set
- Expanded interrupt handler

General-Purpose I/O

- Up to 18 pins
- 5 V-Tolerant
- Crossbar-enabled

Communication Peripherals

- UART
- I^2C / SMBus™
- SPI™

Timer/Counters and PWM

- 4 General-Purpose 16-bit Timer/Counters
- 16-bit Programmable Counter Array (PCA) with three channels of PWM, capture/compare, or frequency output capability, and hardware kill/safe state capability
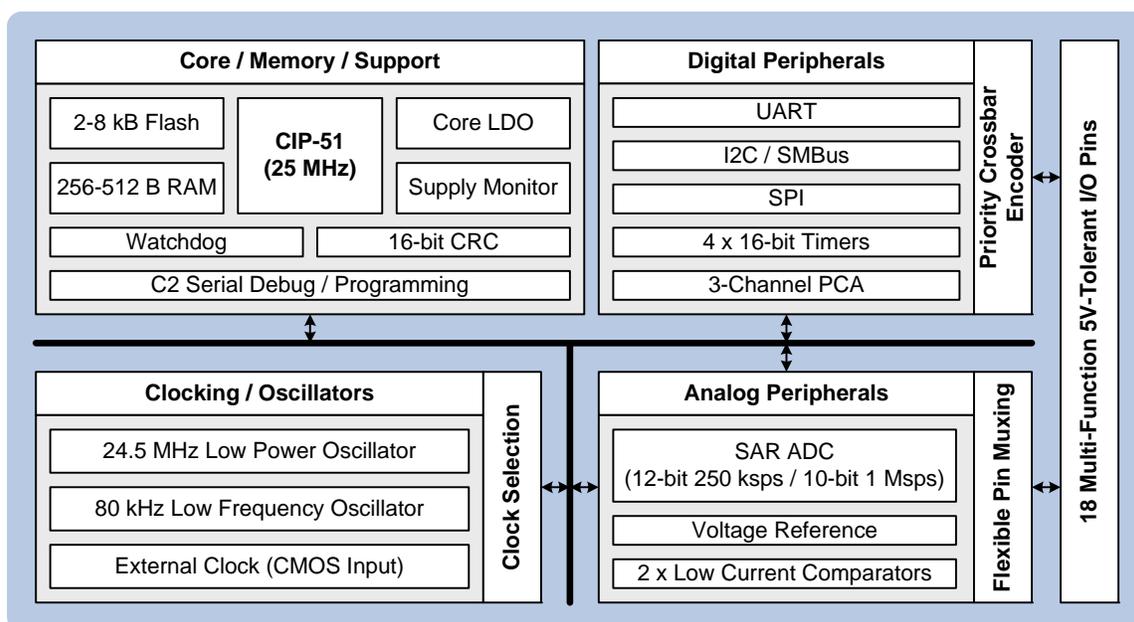
Supply Voltage

- 2.2 to 3.6 V

Package Options

- 16-pin SOIC
- 20-pin QFN, 3 x 3 mm
- 24-pin QSOP
- Available in die form
- Qualified to AEC-Q100 Standards

Temperature Ranges:

- –40 to +125 °C (-Ix) and –40 to +85 °C (-Gx)

Selected Electrical Specifications

(At 25 °C)

Parameter	Conditions	Min	Typ	Max	Units
Supply Voltage (VDD)		2.2		3.6	V
Supply Current with CPU Active	Clock = 24.5 MHz ±2% Internal Precision Oscillator	—	4.45	—	mA
Supply Current (Idle Mode)	Clock = 24.5 MHz Core Halted Peripherals Running	—	2.05	—	mA
Supply Current (Stop Mode)	Internal LDO Off	—	0.2	—	µA
Clock Frequency Range		DC	—	25	MHz
Internal Oscillator					
Frequency	Precision Oscillator	24	24.5	25	MHz
	Low-Frequency Oscillator	75	80	85	kHz
A/D Converter					
Resolution		—	—	12/10	bits
Throughput Rate		—	—	200/800	ksps
Internal Voltage Reference	1.65 V Setting	1.62	1.65	1.68	V
	2.4 V Setting	2.35	2.4	2.45	V
External Voltage Reference		1	—	VDD	V
Comparator					
Response Time Mode 0	(CP+) – (CP–) = 100 mV	—	100	—	nsec
Current Consumption Mode 0		—	25	—	µA
Response Time Mode 3	(CP+) – (CP–) = 100 mV	—	1.5	—	µsec
Current Consumption Mode 3		—	0.5	—	µA

C8051F85x/6x Product Selection Guide

Ordering Part Number	Flash Memory (kB)	RAM (Bytes)	Digital Port I/Os (Total)	Number of ADC0 Channels	I/O with Comparator 0/1 Inputs	Pb-free (RoHS Compliant)	AEC-Q100 Qualified	Temperature Range*	Package
C8051F850-B-GM	8	512	16	15	15	✓	✓	-40 to 85 °C	QFN-20
C8051F850-B-GU	8	512	18	16	16	✓	✓	-40 to 85 °C	QSOP-24
C8051F851-B-GM	4	512	16	15	15	✓	✓	-40 to 85 °C	QFN-20
C8051F851-B-GU	4	512	18	16	16	✓	✓	-40 to 85 °C	QSOP-24
C8051F852-B-GM	2	256	16	15	15	✓	✓	-40 to 85 °C	QFN-20
C8051F852-B-GU	2	256	18	16	16	✓	✓	-40 to 85 °C	QSOP-24
C8051F853-B-GM	8	512	16	—	15	✓	✓	-40 to 85 °C	QFN-20
C8051F853-B-GU	8	512	18	—	16	✓	✓	-40 to 85 °C	QSOP-24
C8051F854-B-GM	4	512	16	—	15	✓	✓	-40 to 85 °C	QFN-20
C8051F854-B-GU	4	512	18	—	16	✓	✓	-40 to 85 °C	QSOP-24
C8051F855-B-GM	2	256	16	—	15	✓	✓	-40 to 85 °C	QFN-20
C8051F855-B-GU	2	256	18	—	16	✓	✓	–40 to 85 °C	QSOP-24
C8051F860-B-GS	8	512	13	12	12	✓	✓	–40 to 85 °C	SOIC-16
C8051F861-B-GS	4	512	13	12	12	✓	✓	–40 to 85 °C	SOIC-16
C8051F862-B-GS	2	256	13	12	12	✓	✓	–40 to 85 °C	SOIC-16
C8051F863-B-GS	8	512	13	—	12	✓	✓	–40 to 85 °C	SOIC-16
C8051F864-B-GS	4	512	13	—	12	✓	✓	–40 to 85 °C	SOIC-16
C8051F865-B-GS	2	256	13	—	12	✓	✓	–40 to 85 °C	SOIC-16

*Note: -IM, -IU and -IS extended temperature range devices (-40 to 125 °C) available in Q4 2013.

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