C8051F332

25 MIPS, 4 kB Flash, 10-Bit ADC, 20-Pin Mixed-Signal MCU

Analog Peripherals

10-Bit ADC

- Programmable throughput up to 200 ksps
- Up to 16 external inputs; programmable as single-ended or differential
- Reference from internal V_{REF}, V_{DD}, or external pin
- Internal or external start of conversion sources
- Built-in temperature sensor (±3 °C)

Comparator

- Programmable hysteresis and response time
- Configurable to generate interrupts or reset
- Low current (0.4 µA)

On-Chip Debug

- On-chip debug circuitry facilitates full speed, non-intrusive in-system debug (no emulator required)
- Provides breakpoints, single stepping, watchpoints
- Inspect/modify memory, registers, and stack
- Superior performance to emulation systems using ICE-chips, target pods, and sockets

Supply Voltage: 2.7 to 3.6 V

- Typical operating current: 6.4 mA at 25 MHz
  9 µA at 32 kHz
- Typical stop mode current: <0.1 µA

Temperature Range: –40 to +85 °C

High-Speed 8051 µC Core

- Pipelined instruction architecture; executes 70% of instructions in 1 or 2 system clocks
- Up to 25 MIPS throughput with 25 MHz clock
- Expanded interrupt handler

Memory

- 768 bytes data RAM
- 4 kB Flash; in-system programmable in 512 byte sectors (512 bytes are reserved)

Digital Peripherals

- 17 port I/O; all are 5 V tolerant
- Hardware SMBus™ (I2C™ compatible), SPI™, and UART serial ports available concurrently
- Programmable 16-bit counter/timer array with three capture/compare modules, WDT
- 4 general-purpose 16-bit counter/timers
- Real-time clock mode using PCA or timer and external clock source

Clock Sources

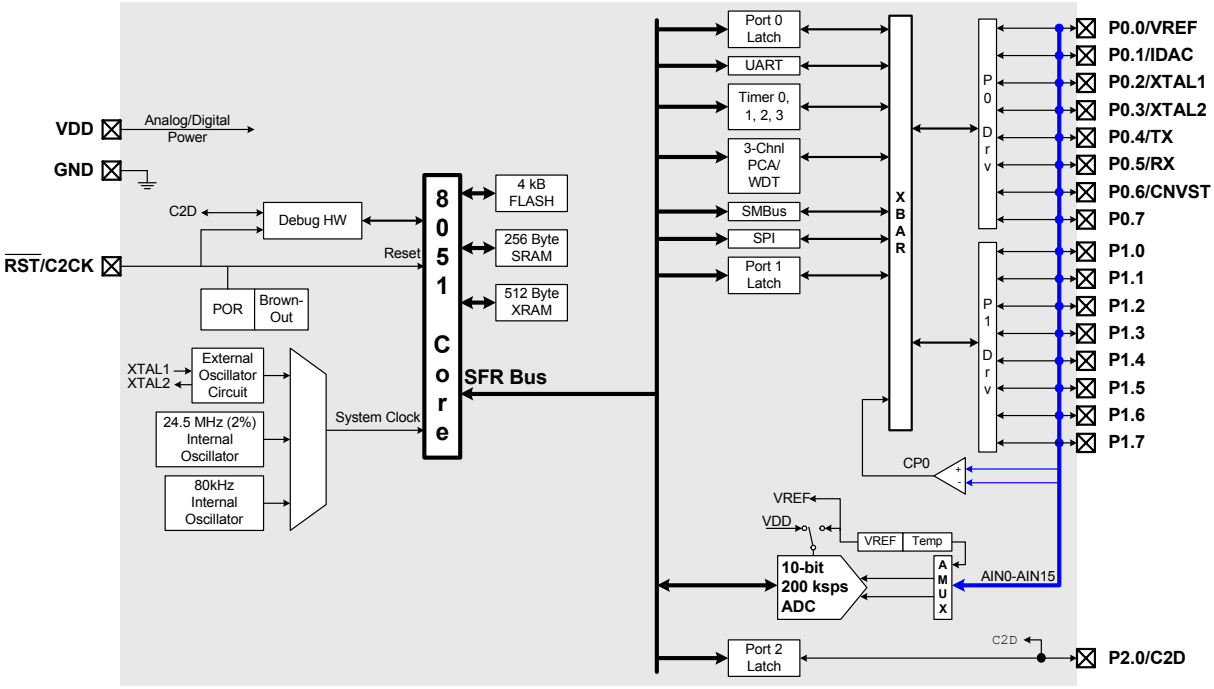
- Two internal oscillators:
  - 24.5 MHz, 2% accuracy supports UART operation
  - 80 kHz low frequency, low-power
- External oscillator: Crystal, RC, C, or Clock (1 or 2 pin modes)
- Can switch between clock sources on-the-fly

Package

- 20-Pin QFN (lead-free package)

Ordering Part Numbers

- C8051F332-GM



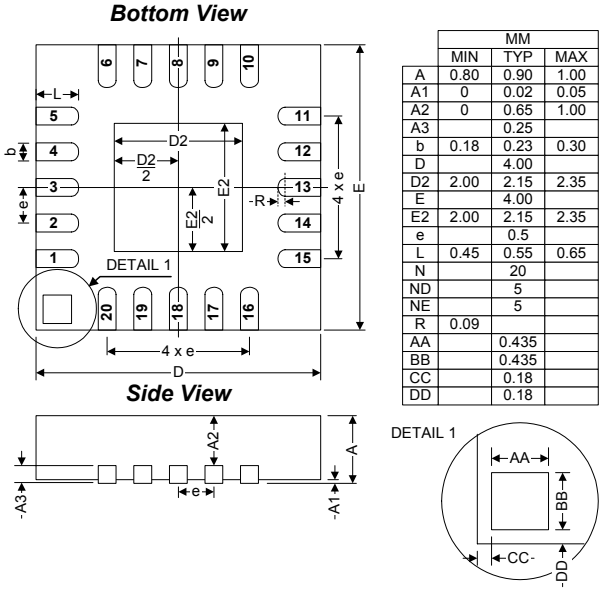
Selected Electrical Specifications

(T_A = –40 to +85 C°, V_{DD} = 2.7 V unless otherwise specified)

Parameter	Conditions	Min	Typ	Max	Units
Global Characteristics					
Supply Voltage		2.7		3.6	V
Supply Current with CPU active	Clock = 25 MHz	—	6.4	—	mA
	Clock = 1 MHz	—	0.36	—	mA
	Clock = 80 kHz; V_{DD} Monitor Disabled	—	20	—	µA
	Clock = 32 kHz; V_{DD} Monitor Disabled	—	9	—	µA
Supply Current (shutdown)	Oscillator off; V_{DD} Monitor Disabled	—	<0.1	—	µA
Clock Frequency Range		DC	—	25	MHz
Internal Oscillators					
Frequency (OSC0)		24.0	24.5	25.0	MHz
Frequency (OSC1)	See Note	—	80	—	kHz
A/D Converter					
Resolution			10		bits
Integral Nonlinearity		—	±1/2	±1	LSB
Differential Nonlinearity	Guaranteed Monotonic	—	±1/2	±1	LSB
Signal-to-Noise Plus Distortion		53	55.5	—	dB
Throughput Rate		—	—	200	ksps
Input Voltage Range		0	—	V_{REF}	V
Comparator					
Response Time Mode0	(CP+) – (CP-) = 100 mV	—	0.1	—	µs
Current Consumption Mode0		—	7.6	—	µA
Response Time Mode1	(CP+) – (CP-) = 100 mV	—	0.18	—	µs
Current Consumption Mode1		—	3.2	—	µA
Response Time Mode2	(CP+) – (CP-) = 100 mV	—	0.32	—	µs
Current Consumption Mode2		—	1.3	—	µA
Response Time Mode3	(CP+) – (CP-) = 100 mV	—	1	—	µs
Current Consumption Mode3		—	0.4	—	µA

Note: OSC1 can be calibrated in 2.5% steps using an internal calibration register.

Package Information



	MM		
	MIN	TYP	MAX
A	0.80	0.90	1.00
A1	0	0.02	0.05
A2	0	0.65	1.00
A3		0.25	
b	0.18	0.23	0.30
D		4.00	
D2	2.00	2.15	2.35
E		4.00	
E2	2.00	2.15	2.35
e		0.5	
L	0.45	0.55	0.65
N		20	
ND		5	
NE		5	
R	0.09		
AA		0.435	
BB		0.435	
CC		0.18	
DD		0.18	

C8051F330DK Development Kit