

# 25 MIPS, 2 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<sub>RFF</sub>, V<sub>DD</sub>, 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</li>

### 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
- 2 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**

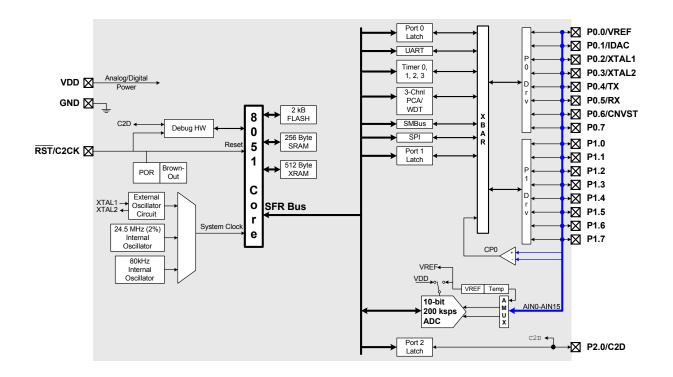
- Two internal oscillators:
  - -24.5 MHz, 2% accuracy supports UART operation
  - -80 kHz low frequency, low-power
- External oscillator: Crystal, RC, C, or Clock (1 or 2 pin modes)
- Can switch between clock sources on-the-fly

#### **Package**

- 20-Pin QFN (lead-free package)

## **Ordering Part Numbers**

- C8051F334-GM





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## **Selected Electrical Specifications**

 $(T_A = -40 \text{ to } +85 \text{ C}^\circ, V_{DD} = 2.7 \text{ V} \text{ unless otherwise specified})$ 

Parameter	Conditions	Min	Тур	Max	Units
Global Characteristics					
Supply Voltage		2.7		3.6	V
	Clock = 25 MHz		6.4	_	mA
Supply Current with	Clock = 1 MHz	_	0.36	_	mA
CPU active	Clock = 80 kHz; VDD Monitor Disabled Clock = 32 kHz;	_	20	_	μA
	V <sub>DD</sub> Monitor Disabled		9		μA
Supply Current (shutdown)	Oscillator off; V <sub>DD</sub> 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	_	иA

# **Package Information**

#### **Bottom View** MIN TYP MAX 0.80 5 b D D2 E E2 <u>₽</u> 4 -R**≯** -2.00 2.35 2 14 0.5 e L N ND NE R AA BB 0.65 15 DETAIL 1 0.09 0.435 CC 0.18 Side View 0.18 DETAIL 1 ¥-BB⊥

# C8051F330DK Development Kit

