

### 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 ( $\pm 3^\circ\text{C}$ )

#### Comparator

- Programmable hysteresis and response time
- Configurable to generate interrupts or reset
- Low current ( $0.4\ \mu\text{A}$ )

#### 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  $\mu\text{A}$  at 32 kHz
- Typical stop mode current:  $<0.1\ \mu\text{A}$

#### Temperature Range: $-40$ to $+85^\circ\text{C}$

### High-Speed 8051 $\mu\text{C}$ 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

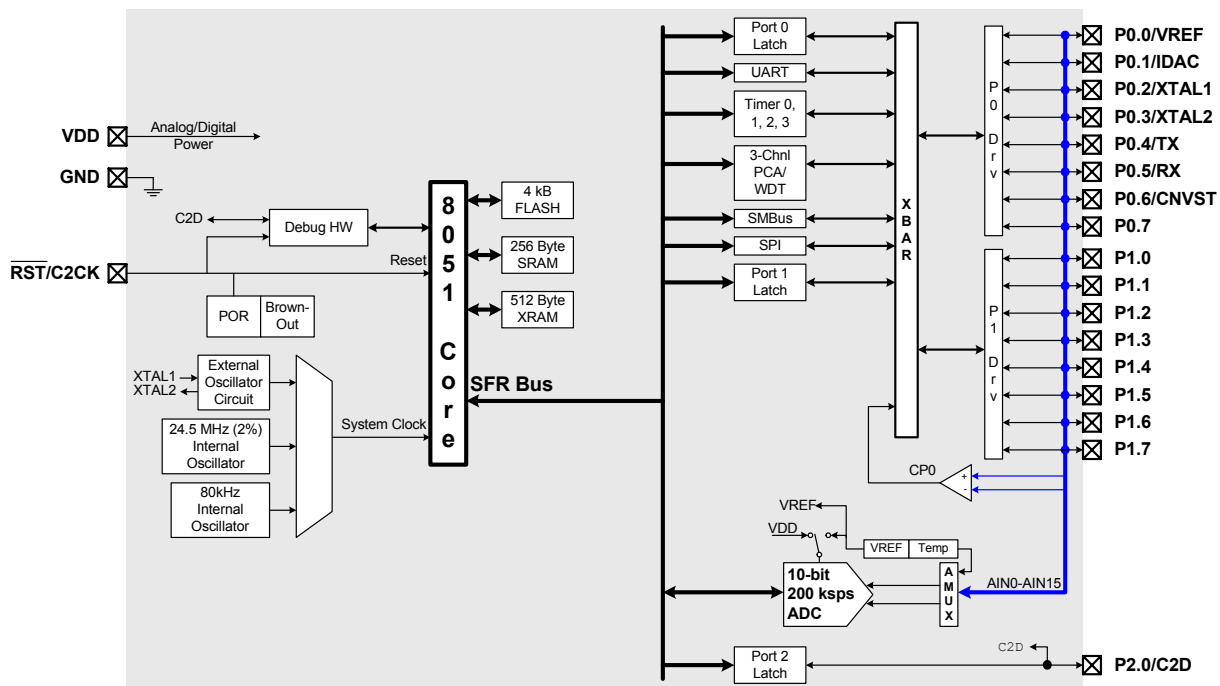
- Two internal oscillators:
  - 24.5 MHz, 2% accuracy supports UART operation
  - 80 kHz low frequency, low-power
- External oscillator: Crystal, RC, C, or Clock (1 or 2 pin modes)
- Can switch between clock sources on-the-fly

### Package

- 20-Pin QFN (lead-free package)

### Ordering Part Numbers

- C8051F332-GM

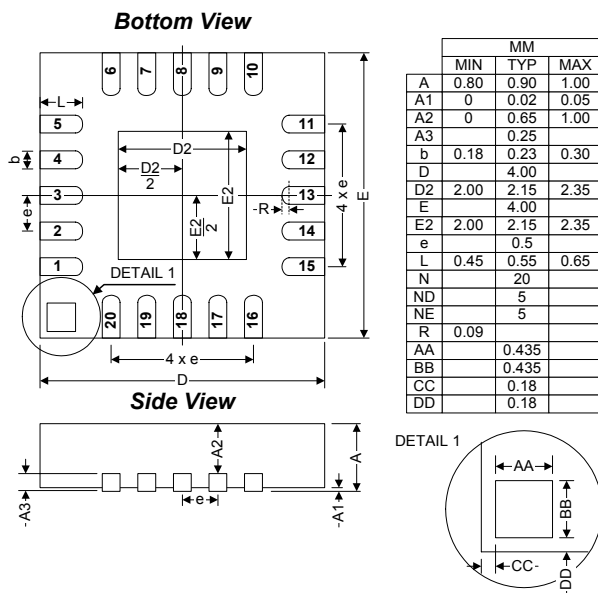


### Selected Electrical Specifications

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

| Parameter   | Conditions                                | Min  | Typ       | Max       | Units   |
|---|---|------|-----------|-----------|---------|
| <b>Global Characteristics</b>   |   |      |           |           |         |
| 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        | —         | $\mu$ A |
|   | Clock = 32 kHz; $V_{DD}$ Monitor Disabled | —    | 9         | —         | $\mu$ A |
| Supply Current (shutdown)   | Oscillator off; $V_{DD}$ Monitor Disabled | —    | <0.1      | —         | $\mu$ A |
| Clock Frequency Range   |   | DC   | —         | 25        | MHz     |
| <b>Internal Oscillators</b>   |   |      |           |           |         |
| Frequency (OSC0)  |   | 24.0 | 24.5      | 25.0      | MHz     |
| Frequency (OSC1)  | See Note                                  | —    | 80        | —         | kHz     |
| <b>A/D Converter</b>  |   |      |           |           |         |
| Resolution  |   |      | 10        |           | bits    |
| Integral Nonlinearity   |   | —    | $\pm 1/2$ | $\pm 1$   | LSB     |
| Differential Nonlinearity   | Guaranteed Monotonic                      | —    | $\pm 1/2$ | $\pm 1$   | LSB     |
| Signal-to-Noise Plus Distortion   |   | 53   | 55.5      | —         | dB      |
| Throughput Rate   |   | —    | —         | 200       | ksps    |
| Input Voltage Range   |   | 0    | —         | $V_{REF}$ | V       |
| <b>Comparator</b>   |   |      |           |           |         |
| Response Time Mode0   | (CP+) – (CP-) = 100 mV                    | —    | 0.1       | —         | $\mu$ s |
| Current Consumption Mode0   |   | —    | 7.6       | —         | $\mu$ A |
| Response Time Mode1   | (CP+) – (CP-) = 100 mV                    | —    | 0.18      | —         | $\mu$ s |
| Current Consumption Mode1   |   | —    | 3.2       | —         | $\mu$ A |
| Response Time Mode2   | (CP+) – (CP-) = 100 mV                    | —    | 0.32      | —         | $\mu$ s |
| Current Consumption Mode2   |   | —    | 1.3       | —         | $\mu$ A |
| Response Time Mode3   | (CP+) – (CP-) = 100 mV                    | —    | 1         | —         | $\mu$ s |
| Current Consumption Mode3   |   | —    | 0.4       | —         | $\mu$ A |
| <b>Note:</b> OSC1 can be calibrated in 2.5% steps using an internal calibration register. |   |      |           |           |         |

### Package Information



### C8051F330DK Development Kit

