

### Analog Peripherals

#### 10-Bit ADC

- $\pm 1$  LSB INL; no missing codes
- Programmable throughput up to 200 ksp/s
- Up to 21 external inputs; programmable as single-ended or differential
- Data-dependent windowed interrupt generator
- Built-in temperature sensor ( $\pm 3$  °C)

#### Two Comparators

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

#### POR/Brown-out Detector

#### 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
- Superior performance to emulation systems using ICE-chips, target pods, and sockets

#### Supply Voltage: 2.7 to 3.6 V

- Typical Operating Current: 7 mA at 25 MHz  
15  $\mu$ A at 32 kHz
- Typical Stop Mode Current: <0.1  $\mu$ A

### High-Speed 8051 $\mu$ C Core

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

### Memory

- 1280 bytes data RAM
- 16 kB Flash; in-system programmable in 512-byte sectors (512 bytes are reserved)

### Digital Peripherals

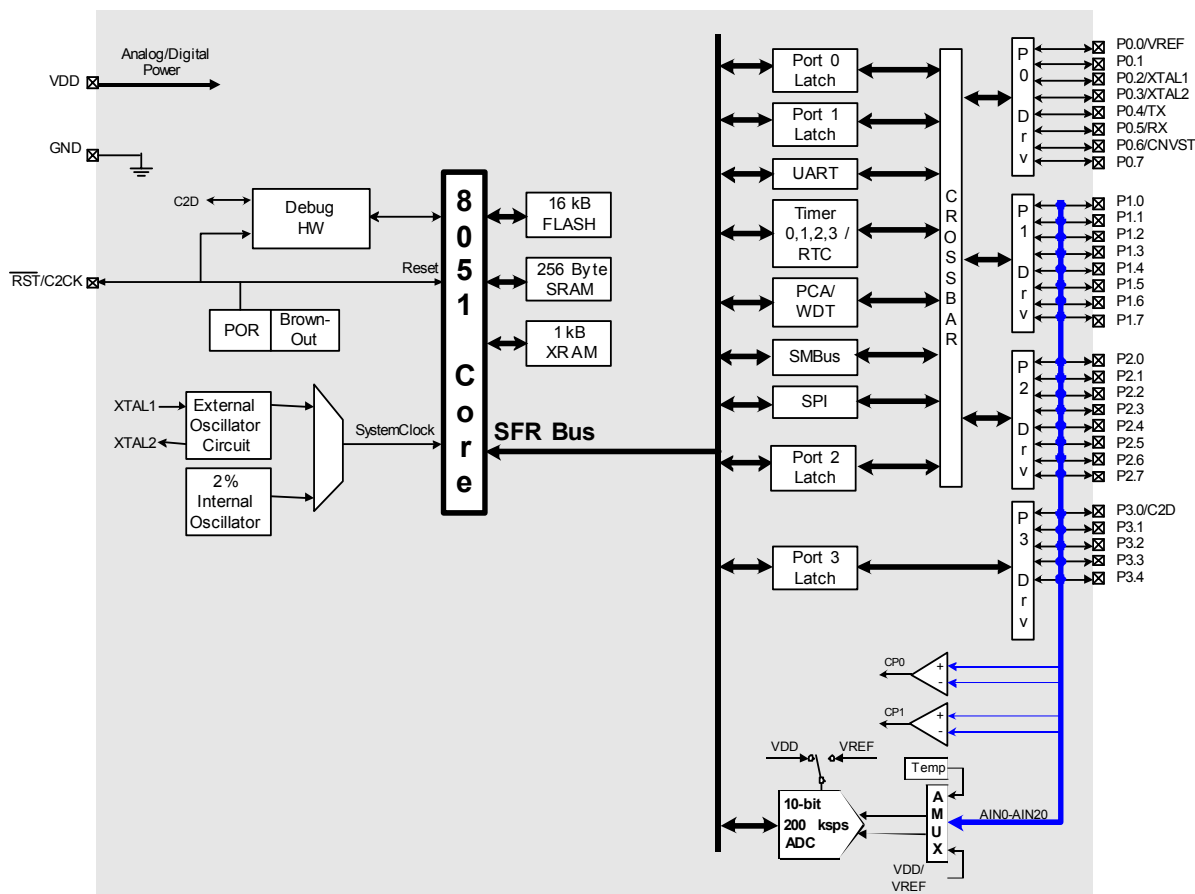
- 29 port I/O; all are 5 V tolerant
- Hardware SMBus™ (I2C™ compatible), SPI™, and UART serial ports available concurrently
- Programmable 16-bit counter/timer array with five capture/compare modules, WDT
- 4 general-purpose 16-bit counter/timers
- Realtime clock mode using timer or PCA

### Clock Sources

- Internal oscillator: 24.5 MHz, 2% accuracy supports UART operation
- External oscillator: Crystal, RC, C, or Clock (1 or 2 pin modes)
- Can switch between clock sources on-the-fly

### 32-Pin LQFP

Temperature Range: -40 to +85 °C

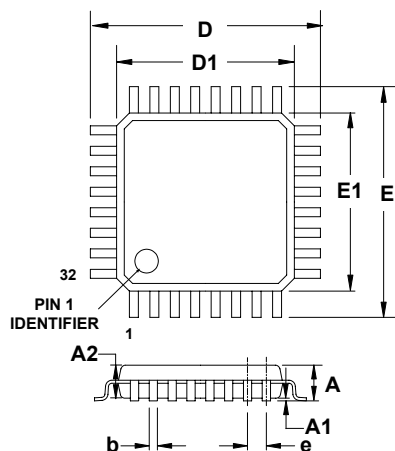


### Selected Electrical Specifications

( $T_A = -40$  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                  | Clock = 25 MHz                            |      | 7    |      | mA    |
|                                 | Clock = 1 MHz                             |      | 0.5  |      | mA    |
|                                 | Clock = 32 kHz; $V_{DD}$ Monitor Disabled |      | 15   |      | μA    |
| Supply Current (shutdown)       | Oscillator off; $V_{DD}$ Monitor Enabled  |      | 10   |      | μA    |
|                                 | Oscillator off; $V_{DD}$ Monitor Disabled |      | <0.1 |      | μA    |
| Clock Frequency Range           |                                           | DC   |      | 25   | MHz   |
| <b>INTERNAL OSCILLATOR</b>      |                                           |      |      |      |       |
| Frequency                       |                                           | 24.0 | 24.5 | 25.0 | MHz   |
| <b>A/D CONVERTER</b>            |                                           |      |      |      |       |
| Resolution                      |                                           |      | 10   |      | bits  |
| Integral Nonlinearity           |                                           |      |      | ±1   | LSB   |
| Differential Nonlinearity       | Guaranteed Monotonic                      |      |      | ±1   | LSB   |
| Signal-to-Noise Plus Distortion |                                           | 53   |      |      | dB    |
| Throughput Rate                 |                                           |      |      | 200  | ksps  |
| <b>COMPARATORS</b>              |                                           |      |      |      |       |
| Mode0 Response Time             | (CP+) – (CP-) = 100 mV                    |      | 0.10 |      | μs    |
| Mode0 Supply Current            |                                           |      | 7.6  |      | μA    |
| Mode1 Response Time             | (CP+) – (CP-) = 100 mV                    |      | 0.18 |      | μs    |
| Mode1 Supply Current            |                                           |      | 3.2  |      | μA    |
| Mode2 Response Time             | (CP+) – (CP-) = 100 mV                    |      | 0.32 |      | μs    |
| Mode2 Supply Current            |                                           |      | 1.3  |      | μA    |
| Mode3 Response Time             | (CP+) – (CP-) = 100 mV                    |      | 1.0  |      | μs    |
| Mode3 Supply Current            |                                           |      | 0.40 |      | μA    |

### Package Information



|    | MIN (mm) | NOM (mm) | MAX (mm) |
|----|----------|----------|----------|
| A  | -        | -        | 1.60     |
| A1 | 0.05     | -        | 0.15     |
| A2 | 1.35     | 1.40     | 1.45     |
| b  | 0.30     | 0.37     | 0.45     |
| D  | -        | 9.00     | -        |
| D1 | -        | 7.00     | -        |
| e  | -        | 0.80     | -        |
| E  | -        | 9.00     | -        |
| E1 | -        | 7.00     | -        |

### C8051F310DK Development Kit

