# C8051F131

## 100 MIPS, 128 kB Flash, 10-Bit ADC, 64-Pin Mixed-Signal MCU

### Analog Peripherals

**10-Bit ADC**

- ±1 LSB INL; no missing codes
- Programmable throughput up to 100 ksps
- 8 external inputs; programmable as single-ended or differential
- Programmable amplifier gain: 16, 8, 4, 2, 1, 0.5
- Data-dependent windowed interrupt generator
- Built-in temperature sensor (±3 °C)

**Two Comparators**

**Internal Voltage Reference**

**$V_{DD}$ Monitor/Brown-out Detector**

### On-Chip JTAG Debug & Boundary Scan

- On-chip debug circuitry facilitates full speed, non-intrusive in-system debug (no emulator required)
- Provides breakpoints, single stepping, watchpoints, stack monitor
- Inspect/modify memory and registers
- Superior performance to emulation systems using ICE-chips, target pods, and sockets
- IEEE1149.1 compliant boundary scan

### High-Speed 8051 µC Core

- Pipelined instruction architecture; executes 70% of instructions in 1 or 2 system clocks
- Up to 100 MIPS throughput with 100 MHz system clock
- 16 x 16 multiply/accumulate engine (2-cycle)

### Memory

- 8448 bytes data RAM
- 128 kB Flash; in-system programmable in 1024-byte sectors (1024 bytes are reserved)
- External parallel data memory interface

### Digital Peripherals

- 32 port I/O; all are 5 V tolerant
- Hardware SMBus™ (I2C™ Compatible), SPI™, and two UART serial ports available concurrently
- Programmable 16-bit counter/timer array with six capture/compare modules
- 5 general-purpose 16-bit counter/timers
- Dedicated watchdog timer; bidirectional reset
- Real-time clock mode using Timer 3 or PCA

### Clock Sources

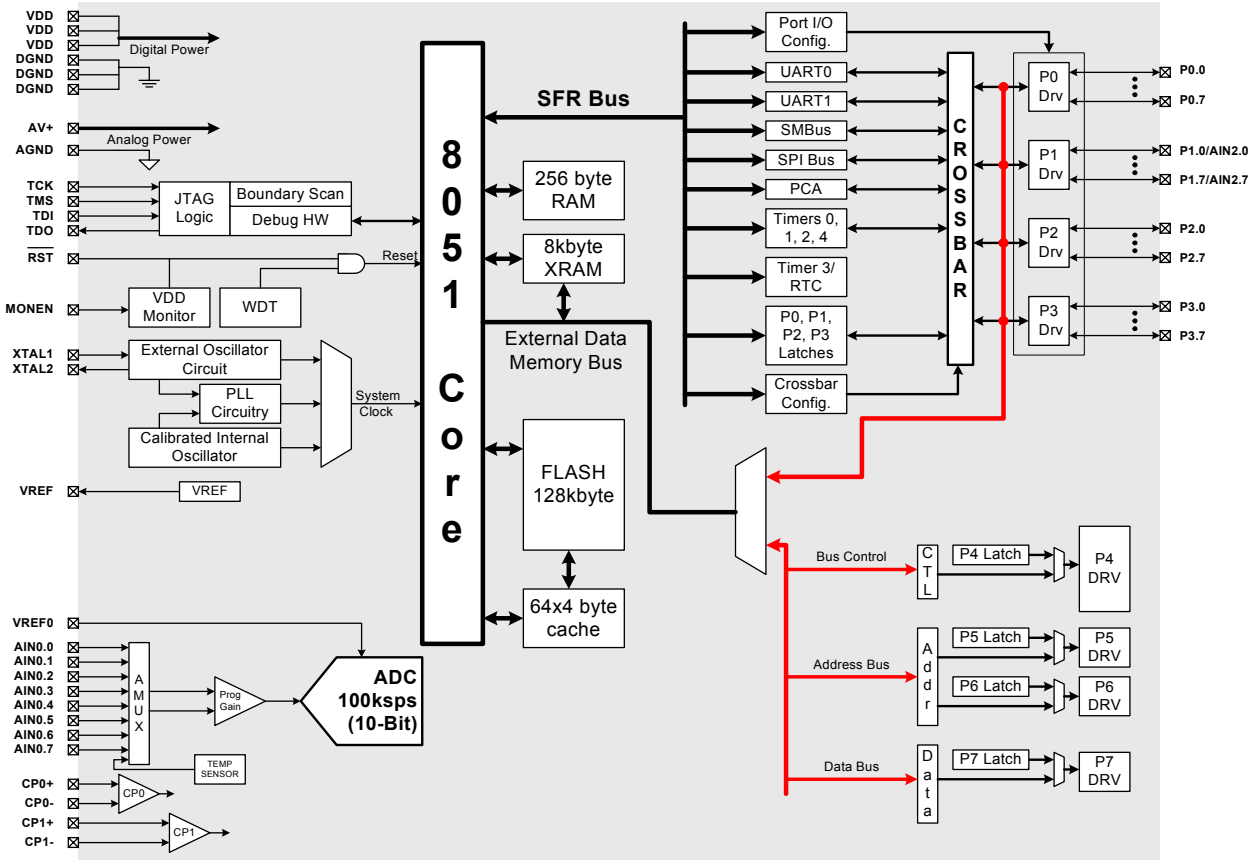
- Internal oscillator: 24.5 MHz, 2% accuracy supports UART operation
- On-chip programmable PLL: up to 100 MHz
- External oscillator: Crystal, RC, C, or Clock

### Supply Voltage: 3.0 to 3.6 V

- Typical operating current: 50 mA at 100 MHz
- Typical stop mode current: 0.4 µA

### 64-Pin TQFP

### Temperature Range: –40 to +85 °C

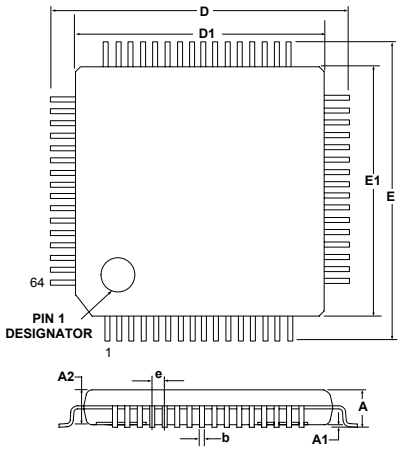


## Selected Electrical Specifications

($T_A$ = –40 to +85 C°, $V_{DD}$ = 3.0 V unless otherwise specified)

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|
| **GLOBAL CHARACTERISTICS** | | | | | |
| Supply Voltage | | 3.0 | — | 3.6 | V |
| Supply Current (CPU active) | Clock = 100 MHz<br>Clock = 1 MHz<br>Clock = 32 kHz | —<br>—<br>— | 50<br>0.6<br>16 | —<br>—<br>— | mA<br>mA<br>µA |
| Supply Current (shutdown) | Oscillator off; $V_{DD}$ Monitor Enabled<br>Oscillator off; $V_{DD}$ Monitor Disabled | —<br>— | 10<br>0.4 | —<br>— | µA<br>µA |
| Clock Frequency Range | | DC | — | 100 | MHz |
| **INTERNAL CLOCKS** | | | | | |
| Oscillator Frequency | | 24.0 | 24.5 | 25.0 | MHz |
| PLL Frequency | | — | — | 100 | MHz |
| **A/D CONVERTER** | | | | | |
| Resolution | | | 10 | | bits |
| Integral Nonlinearity | | — | — | ±1 | LSB |
| Differential Nonlinearity | Guaranteed Monotonic | — | — | ±1 | LSB |
| Signal-to-Noise Plus Distortion | | 59 | — | — | dB |
| Throughput Rate | | — | — | 100 | ksps |

## Package Information




| | MIN (mm) | NOM (mm) | MAX (mm) |
|---|---|---|---|
| A | - | - | 1.20 |
| A1 | 0.05 | - | 0.15 |
| A2 | 0.95 | - | 1.05 |
| b | 0.17 | 0.22 | 0.27 |
| D | - | 12.00 | - |
| D1 | - | 10.00 | - |
| e | - | 0.50 | - |
| E | - | 12.00 | - |
| E1 | - | 10.00 | - |

## C8051F120DK Development Kit