## Analog Peripherals

## Comparator

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

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, 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: 5.8 mA at 25 MHz
$11 \mu \mathrm{~A}$ at 32 kHz
- Typical stop mode current: $<0.1 \mu \mathrm{~A}$

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

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

- 256 bytes data RAM
- 8 kB Flash; in-system programmable in 512 byte sectors ( 512 bytes are reserved)
Digital Peripherals
- 8 port I/O; all are 5 V tolerant
- Enhanced Hardware SMBus ${ }^{\text {TM }}$ (I2C ${ }^{\text {TM }}$ compatible) and UART serial ports
- Programmable 16-bit counter/timer array with three capture/compare modules, WDT
- 3 general-purpose 16-bit counter/timers
- Dedicated watchdog timer; bidirectional reset
- Real-time clock mode using PCA or timer and external clock source


## Clock Sources

- Internal oscillator: $25 \mathrm{MHz}, 2 \%$ accuracy supports UART operation
- External oscillator: Crystal, RC, C, or Clock (1 or 2 pin modes)
- Can switch between clock sources on-the-fly


## Package

- 11-pin MLP (Standard Lead and Lead-free packages)

Ordering Part Numbers

- Lead-free package: C8051F301-GM
- Standard package: C8051F301


C8051F301

## 25 MIPS, 8 kB Flash, 11-Pin Mixed-Signal MCU

## Selected Electrical Specifications

( $\mathrm{T}_{\mathrm{A}}=-40$ to $+85 \mathrm{C}^{\circ}, \mathrm{VDD}=2.7 \mathrm{~V}$ unless otherwise specified)

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
| :---: | :---: | :---: | :---: | :---: | :---: |
| GLOBAL CHARACTERISTICS |  |  |  |  |  |
| Supply Voltage |  | 2.7 |  | 3.6 | V |
| Supply Current with CPU active | $\begin{aligned} & \text { Clock }=25 \mathrm{MHz} \\ & \text { Clock }=1 \mathrm{MHz} \\ & \text { Clock }=32 \mathrm{kHz} \text {, VDD Monitor Disabled } \end{aligned}$ |  | $\begin{gathered} 5.8 \\ 0.34 \\ 11 \end{gathered}$ |  | $\begin{aligned} & \mathrm{mA} \\ & \mathrm{~mA} \\ & \mu \mathrm{~A} \end{aligned}$ |
| Supply Current (shutdown) | Oscillator off; VDD Monitor Enabled Oscillator off; $V_{D D}$ Monitor Disabled |  | $\begin{gathered} 10 \\ <0.1 \end{gathered}$ |  | $\mu \mathrm{A}$ $\mu \mathrm{A}$ |
| CPU \& DIGITAL I/O PORTS |  |  |  |  |  |
| Clock Frequency Range |  | DC |  | 25 | MHz |
| Port Output High Voltage | $\mathrm{I}_{\text {OH }}=-3 \mathrm{~mA}$, Port I/O push-pull | $V_{D D}-0.7$ |  |  | V |
| Port Output Low Voltage | $\mathrm{loL}=8.5 \mathrm{~mA}$ |  |  | 0.6 | V |
| Input High Voltage |  | $0.7 \times$ VDD |  |  | V |
| Input Low Voltage |  |  |  | $0.3 \times \mathrm{V}_{\mathrm{DD}}$ | V |
| INTERNAL OSCILLATOR |  |  |  |  |  |
| Frequency |  | 24.0 | 24.5 | 25.0 | MHz |
| COMPARATOR |  |  |  |  |  |
| Response Time Mode0 | $(\mathrm{CP}+$ ) - (CP-) $=100 \mathrm{mV}$ |  | 0.1 |  | $\mu \mathrm{s}$ |
| Current Consumption Mode0 |  |  | 7.6 |  | $\mu \mathrm{A}$ |
| Response Time Mode1 | $(\mathrm{CP}+$ ) - (CP-) $=100 \mathrm{mV}$ |  | 0.18 |  | $\mu \mathrm{s}$ |
| Current Consumption Mode1 |  |  | 3.2 |  | $\mu \mathrm{A}$ |
| Response Time Mode2 | $(\mathrm{CP}+$ ) - (CP-) $=100 \mathrm{mV}$ |  | 0.32 |  | Hs |
| Current Consumption Mode2 |  |  | 1.3 |  | $\mu \mathrm{A}$ |
| Response Time Mode3 | $(\mathrm{CP}+$ )-(CP-) $=100 \mathrm{mV}$ |  | 1 |  | $\mu \mathrm{s}$ |
| Current Consumption Mode3 |  |  | 0.4 |  | $\mu \mathrm{A}$ |



C8051F300DK Development Kit


