



ANALOG PERIPHERALS

10-BIT ADC

- ± 1 LSB INL; No Missing Codes
- Programmable Throughput up to 200ksps
- Up to 13 External Inputs; Programmable as Single-Ended or Differential
- Built-in Temperature Sensor ($\pm 3^\circ\text{C}$)

Two Comparators

Internal Voltage Reference – 2.4V

POR/Brown-Out Detector

USB FUNCTION CONTROLLER

- USB Specification 2.0 Compliant
- Full-Speed (12 Mbps) or Low-Speed (1.5Mbps) Operation
- Integrated Clock Recovery; No External Crystal Required for either Full-Speed or Low-Speed Operation
- Supports Eight Flexible Endpoints
- Dedicated 1k Byte USB Buffer Memory
- Integrated Transceiver; No External Resistors Required

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, Registers, and USB Memory
- Superior Performance to Emulation Systems Using ICE-Chips, Target Pods, and Sockets

Temperature Range: 0°C to 70°C

HIGH SPEED 8051 μC Core

- Pipelined Instruction Architecture; Executes 70% of Instructions in 1 or 2 System Clocks
- Up to 25MIPS Throughput with 25MHz Clock
- Expanded Interrupt Handler

MEMORY

- 1280 Bytes Internal Data RAM (256 + 1K)
- 16k Bytes In-System Programmable FLASH Program Memory

DIGITAL PERIPHERALS

- 21 Port I/O; All 5V tolerant with High Sink Current
- Hardware Enhanced UART, SPI™ and SMBus™ Serial Ports
- Four General Purpose 16-Bit Counter/Timers
- 16-bit Programmable Counter Array with Five Capture/Compare Modules

CLOCK SOURCES

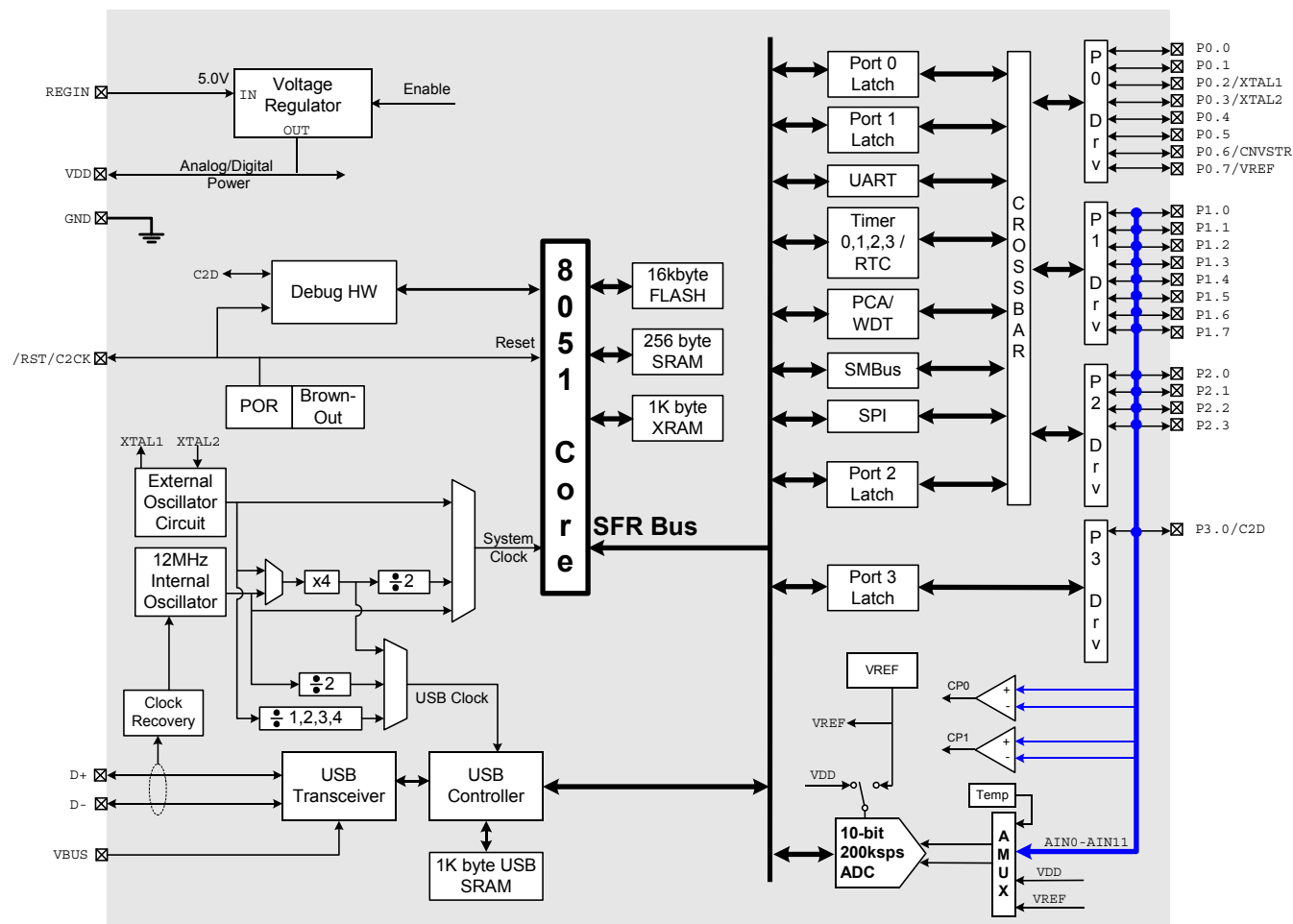
- Internal Oscillator: 0.25% Accuracy with Clock Recovery enabled. Supports all USB and UART Modes
- External Oscillator: Crystal, RC, C, or Clock
- On-Chip Clock Multiplier for USB Controller

VOLTAGE REGULATOR

- On-Chip Voltage Regulator Supports USB Bus-Powered Operation
- Regulator Bypass Mode Supports USB Self-Powered Operation

VOLTAGE REGULATOR INPUT..... 4.0V to 5.25V

28-Pin MLP Package – 5mm x 5mm





C8051F321

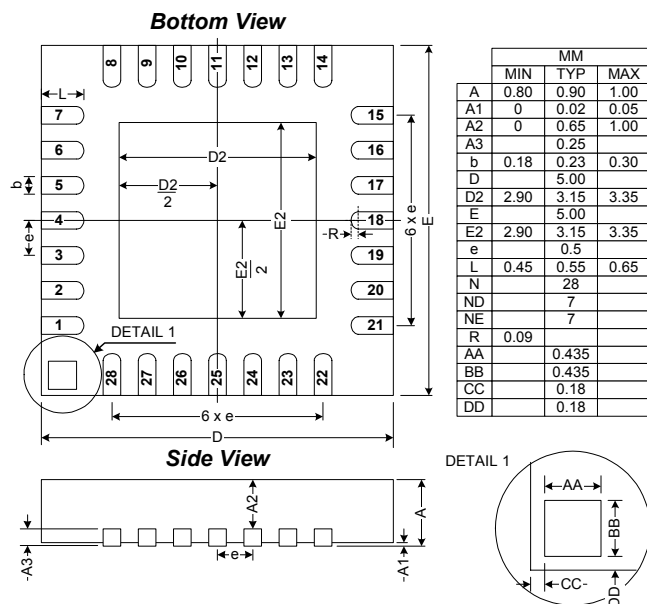
USB Mixed-Signal 16KB FLASH MCU

PRELIMINARY

SELECTED ELECTRICAL SPECIFICATIONS $T_A = 0^{\circ}\text{C}$ to $+70^{\circ}\text{C}$, $V_{REG} = 5.0\text{V}$ unless otherwise specified.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
GLOBAL CHARACTERISTICS					
Regulator Input Voltage (REGIN)		4.0		5.25	V
VDD (VREG Output)		3.0	3.3	3.6	V
VREG Bias Current	VREG Enabled		70		μA
Supply Current with CPU and USB active	CPU Clock=24MHz, USB Clock=48MHz		18		mA
	CPU Clock=12MHz, USB Clock=6MHz		9		mA
Supply Current (suspend mode, Oscillator off)	VDD Monitor Enabled; VREG Disabled		20		μA
	VDD Monitor Disabled; VREG Disabled		<0.1		μA
CPU System Clock Range		DC		25	MHz
INTERNAL OSCILLATOR & CLOCKS					
Frequency	Clock Recovery Enabled	11.97	12.0	12.03	MHz
	Clock Recovery Disabled	11.82	12.0	12.18	MHz
USB Clock	Full-Speed Operation	47.88	48.0	48.12	MHz
	Low-Speed Operation	5.91	6.0	6.09	MHz
A/D CONVERTER					
Resolution			10		bits
Integral Nonlinearity			$\pm \frac{1}{2}$	± 1	LSB
Differential Nonlinearity	Guaranteed Monotonic		$\pm \frac{1}{2}$	± 1	LSB
Signal-to-Noise Plus Distortion		53			dB
Throughput Rate				200	ksps
Input Voltage Range		0		VREF	V
COMPARATOR					
Response Time Mode0	$(CP+) - (CP-) = 100\text{mV}$		0.1		μs
Current Consumption Mode0			7.6		μA
Response Time Mode1	$(CP+) - (CP-) = 100\text{mV}$		0.18		μs
Current Consumption Mode1			3.2		μA
Response Time Mode2	$(CP+) - (CP-) = 100\text{mV}$		0.32		μs
Current Consumption Mode2			1.3		μA
Response Time Mode3	$(CP+) - (CP-) = 100\text{mV}$		1		μs
Current Consumption Mode3			0.4		μA

PACKAGE INFORMATION



C8051F320DK DEVELOPMENT KIT

