C8051F321

USB, 25 MIPS, 16 kB Flash, 10-Bit ADC, 28-Pin Mixed-Signal MCU

Analog Peripherals

10-Bit ADC

- ±1 LSB INL; no missing codes
- Programmable throughput up to 200 ksps
- Up to 13 external inputs; programmable as single-ended or differential
- Built-in temperature sensor (±3 °C)

Two Comparators
Internal Voltage Reference: 2.4 V
POR/Brown-out Detector

USB Function Controller

- USB specification 2.0 compliant
- Full-speed (12 Mbps) or low-speed (1.5 Mbps) operation
- Integrated clock recovery; no external crystal required for either full-speed or low-speed operation
- Supports eight flexible endpoints
- Dedicated 1 kB 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

Operating Voltage: 2.7 to 5.25 V
Temperature Range: –40 to +85 °C

High-Speed 8051 µC 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

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

Digital Peripherals

- 21 port I/O; all are 5 V tolerant
- Hardware SMBus™ (I^2C™ compatible), SPI™, and UART serial ports available concurrently
- Programmable 16-bit counter/timer array with five capture/compare modules
- 4 general-purpose 16-bit counter/timers

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

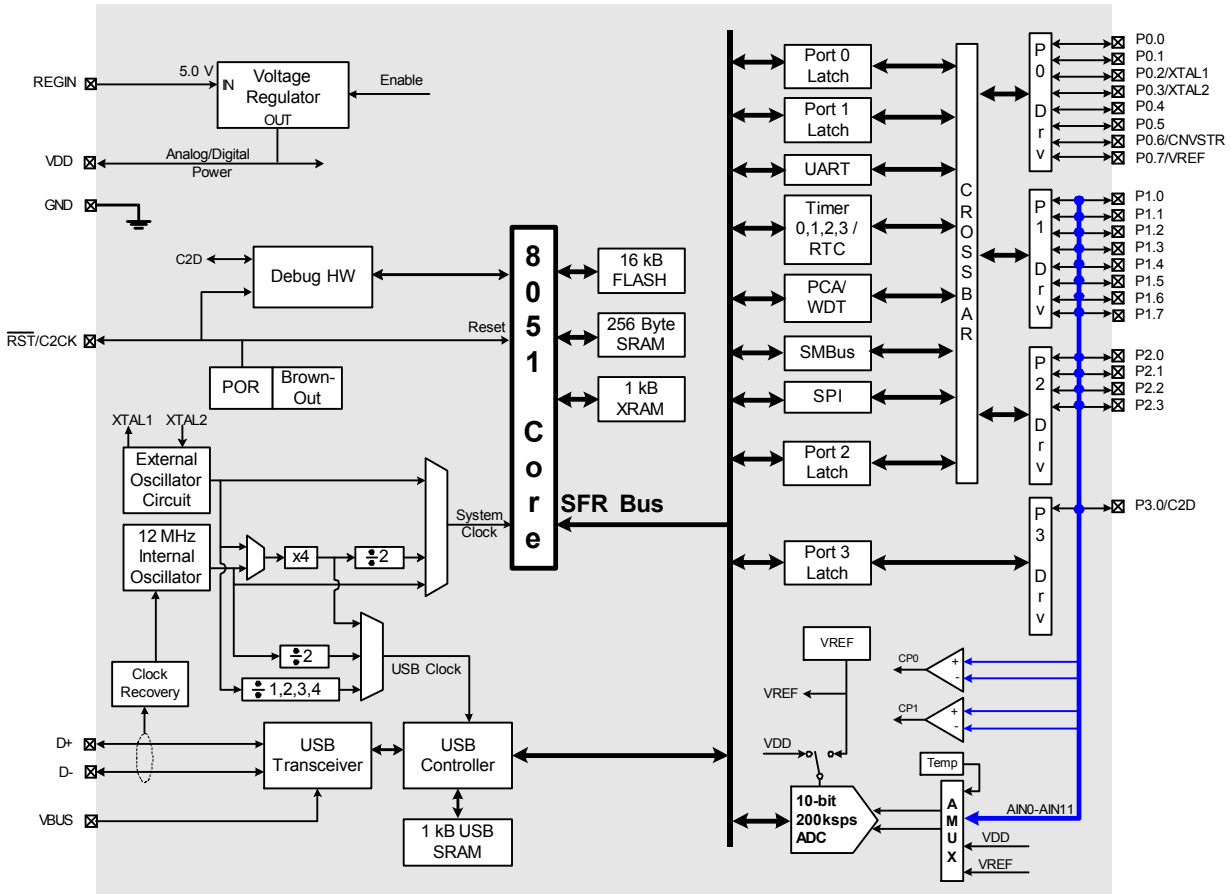
- On-chip voltage regulator supports USB bus-powered operation
- Regulator bypass mode supports USB self-powered operation

Package

- 28-pin QFN (lead-free package)

Ordering Part Number

- C8051F321-GM

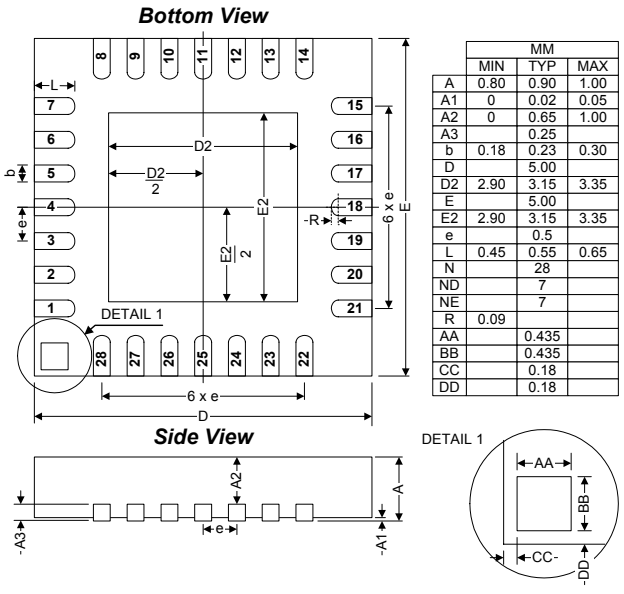


Selected Electrical Specifications

(T_A = 0 to +70 C°, VREG = 5.0 V unless otherwise specified)

Parameter	Conditions	Min	Typ	Max	Units
Global Characteristics					
Regulator Input Voltage (REGIN)		4.0	—	5.25	V
V_{DD} (VREG Output)		3.0	3.3	3.6	V
V_{REG} Bias Current	V_{REG} Enabled	—	70	—	µA
Supply Current with CPU and USB active	CPU Clock = 24 MHz, USB Clock = 48 MHz CPU Clock = 12 MHz, USB Clock = 6 MHz	—	18 9	—	mA mA
Supply Current (suspend mode, Oscillator off)	V_{DD} Monitor Enabled; V_{REG} Disabled V_{DD} Monitor Disabled; V_{REG} Disabled	—	30 <0.1	—	µA µA
CPU System Clock Range		DC	—	25	MHz
Internal Oscillator & Clocks					
Frequency	Clock Recovery Enabled Clock Recovery Disabled	11.97 11.82	12.0 12.0	12.03 12.18	MHz MHz
USB Clock	Full-Speed Operation Low-Speed Operation	47.88 5.91	48.0 6.0	48.12 6.09	MHz MHz
A/D Converter					
Resolution			10		bits
Integral Nonlinearity		—	±½	±1	LSB
Differential Nonlinearity	Guaranteed Monotonic	—	±½	±1	LSB
Signal-to-Noise Plus Distortion		53	—	—	dB
Throughput Rate		—	—	200	ksps
Input Voltage Range		0	—	V_{REF}	V
Comparator					
Response Time Mode0	(CP+) – (CP-) = 100 mV	—	0.1	—	µs
Current Consumption Mode0		—	7.6	—	µA
Response Time Mode1	(CP+) – (CP-) = 100 mV	—	0.18	—	µs
Current Consumption Mode1		—	3.2	—	µA
Response Time Mode2	(CP+) – (CP-) = 100 mV	—	0.32	—	µs
Current Consumption Mode2		—	1.3	—	µA
Response Time Mode3	(CP+) – (CP-) = 100 mV	—	1	—	µs
Current Consumption Mode3		—	0.4	—	µA

Package Information



	MM		
	MIN	TYP	MAX
A	0.80	0.90	1.00
A1	0	0.02	0.05
A2	0	0.65	1.00
A3		0.25	
b	0.18	0.23	0.30
D		5.00	
D2	2.90	3.15	3.35
E		5.00	
E2	2.90	3.15	3.35
e		0.5	
L	0.45	0.55	0.65
N		28	
ND		7	
NE		7	
R	0.09		
AA		0.435	
BB		0.435	
CC		0.18	
DD		0.18	

C8051F320DK Development Kit