C8051F311

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 17 external inputs; programmable as single-ended or differential
- Data-dependent windowed interrupt generator
- Built-in temperature sensor (±3 °C)

Two Comparators
- Programmable hysteresis and response time
- Configurable to generate interrupts or reset
- Low current (0.4 µA)

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 µA at 32 kHz
- Typical Stop Mode Current: <0.1 µA

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 system clock
- Expanded interrupt handler

Memory
- 1280 bytes internal data RAM (256 + 1 k)
- 16 kB Flash; in-system programmable in 512-byte sectors (512 bytes are reserved)

Digital Peripherals
- 25 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
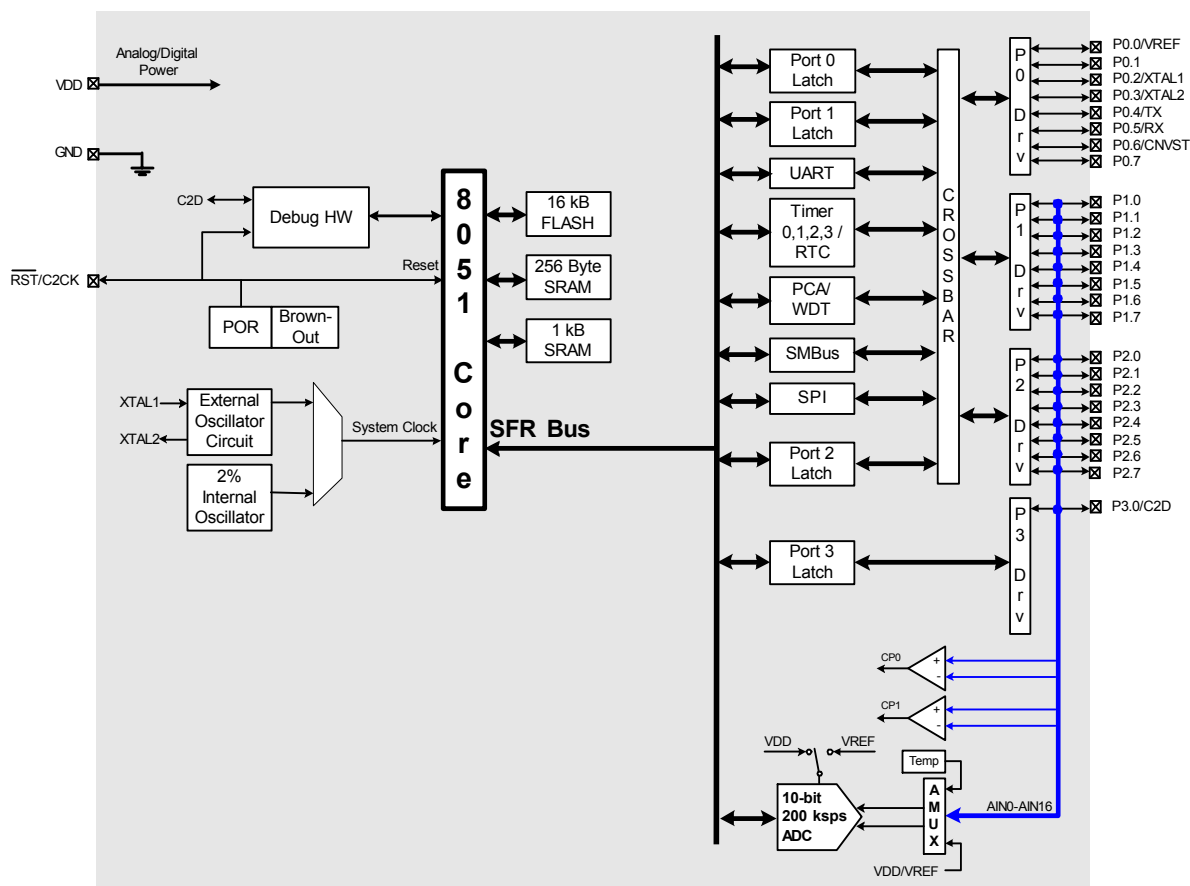
Clock Sources
- Internal oscillator: 24.5 MHz, 2% accuracy supports UART operation
- External oscillator: Crystal, RC, C, or Clock (1 or 2 pin modes)
- Can switch between clock sources on-the-fly

Package
- 28-pin QFN (standard lead and lead-free packages)

Ordering Part Numbers
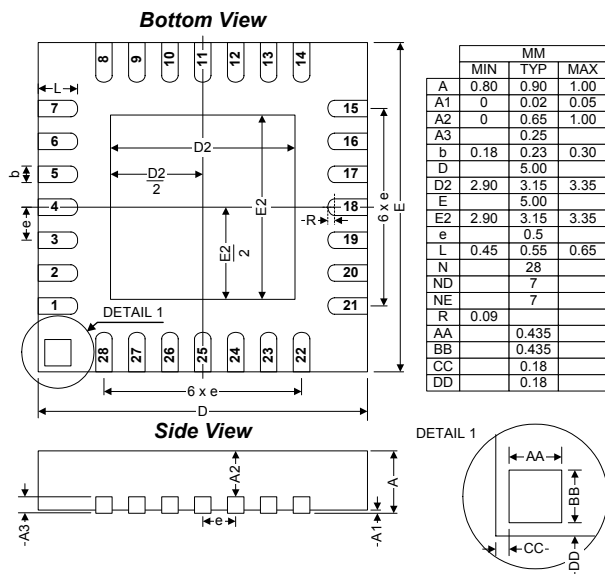- Lead-free package: C8051F311-GM
- Standard package: C8051F311

Selected Electrical Specifications

(T_A = –40 to +85 C°, VDD = 2.7 V unless otherwise specified)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
GLOBAL CHARACTERISTICS					
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	Oscillator off; V_{DD} Monitor Enabled		10		µA
(shutdown)	Oscillator off; V_{DD} Monitor Disabled		<0.1		µA
Clock Frequency Range		DC		25	MHz
INTERNAL OSCILLATOR					
Frequency		24.0	24.5	25.0	MHz
A/D CONVERTER					
Resolution			10		bits
Integral Nonlinearity				±1	LSB
Differential Nonlinearity	Guaranteed Monotonic			±1	LSB
Signal-to-Noise Plus Distortion		53			dB
Throughput Rate				200	ksps
COMPARATORS					
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

Bottom View

	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	

Side View

DETAIL 1

C8051F310DK Development Kit