C8051F302

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

Analog Peripherals

8-Bit ADC

- ±1 LSB INL; no missing codes
- Programmable throughput up to 500 ksps
- Up to 8 external inputs; programmable as single-ended or differential
- Programmable amplifier gain: 4, 2, 1, 0.5
- V_{REF} from external pin or V_{DD}
- Internal or external start of conversion sources
- Data-dependent windowed interrupt generator
- Built-in temperature sensor (±3 °C)

Comparator

- 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, 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 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 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™ (I2C™ 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

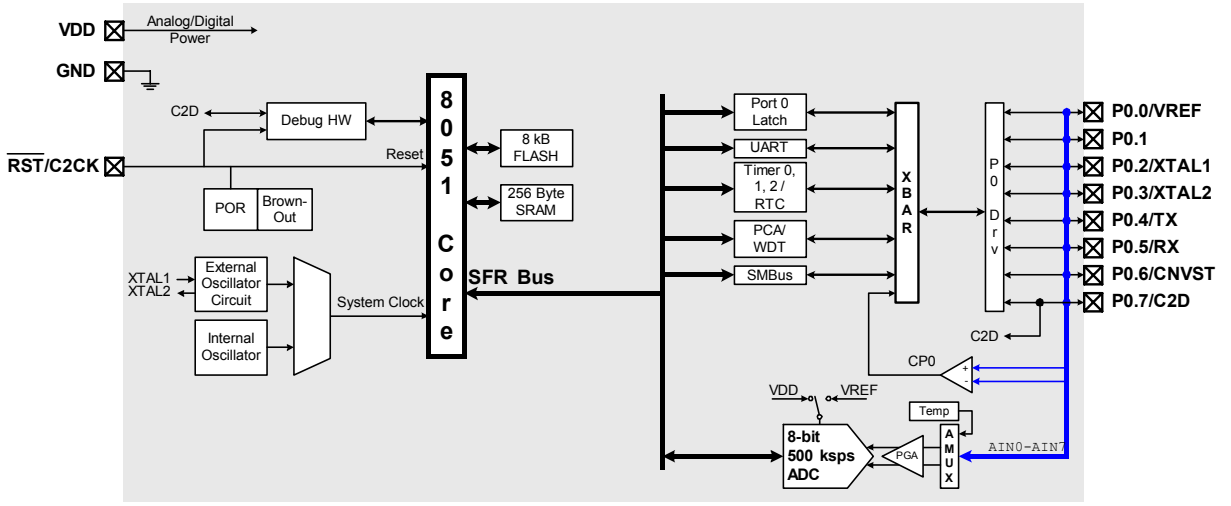
- Internal oscillator: 20 MHz nominal
- External oscillator: Crystal, RC, C, or Clock (1 or 2 Pin Modes)
- Can switch between clock sources on-the-fly

Package

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

Ordering Part Numbers

- Lead-free package: C8051F302-GM
- Standard package: C8051F302

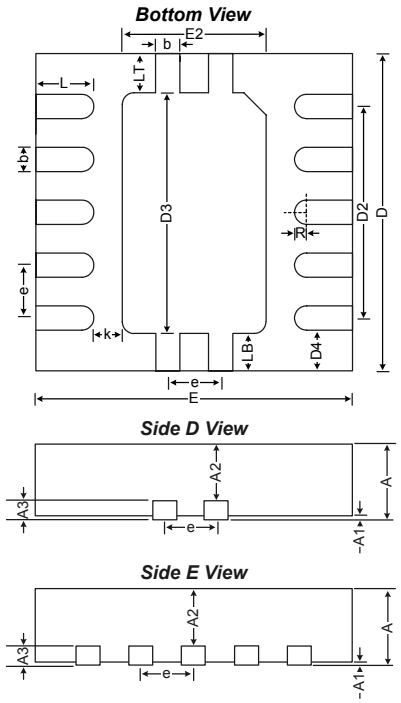


Selected Electrical Specifications

(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 with CPU active	Clock = 25 MHz Clock = 1 MHz Clock = 32 kHz; V_{DD} Monitor Disabled		5.8 0.34 11		mA mA µA
Supply Current (shutdown)	Oscillator off; V_{DD} Monitor Enabled Oscillator off; V_{DD} Monitor Disabled		10 <0.1		µA µA
CPU & DIGITAL I/O PORTS					
Clock Frequency Range		DC		25	MHz
Port Output High Voltage	I_{OH} = -3 mA, Port I/O push-pull	$_{DD}$			V
Port Output Low Voltage	I_{OL} = 8.5 mA	$_{DD}$		0.6	V
Input High Voltage		0.7 x V_{DD}			V
Input Low Voltage				0.3 x V_{DD}	V
INTERNAL OSCILLATOR					
Frequency		15.0	20.0	25.0	MHz
A/D CONVERTER					
Resolution			8		bits
Integral Nonlinearity			±½	±1	LSB
Differential Nonlinearity	Guaranteed Monotonic		±½	±1	LSB
Signal-to-Noise Plus Distortion		49			dB
Throughput Rate				500	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		3.00	
D2	0	2.20	2.25
D3		2.27	
D4		0.386	
E		3.00	
E2		1.36	
e		0.5	
k		0.27	
L	0.45	0.55	0.65
LB		0.36	
LT		0.37	
R	0.09		

C8051F300DK Development Kit