

## ANALOG PERIPHERALS

### 12-bit ADC

- $\pm 1$ LSB INL; Guaranteed Monotonic
- Programmable Throughput up to 100ksps
- 12 External Inputs; Programmable as Single-Ended or Differential
- Programmable Amplifier Gain: 16, 8, 4, 2, 1, 0.5
- Data Dependent Windowed Interrupt Generator
- Built-in Temperature Sensor ( $\pm 3^\circ\text{C}$ )

### High-Voltage Differential Amplifier

- 60V Common Mode Input Range
- Offset Adjust from  $-60\text{V}$  to  $+60\text{V}$
- 16 Gain Settings from 0.05 to 16

### 8-bit ADC

- Programmable Throughput up to 500ksps
- 8 External Inputs; Programmable as Single-Ended or Differential
- Programmable Amplifier Gain: 4, 2, 1, 0.5

### Two 12-bit DACs

### Three Comparators

### Internal Voltage Reference

### Precision VDD Monitor/Brown-out Detector

## ON-CHIP JTAG DEBUG & BOUNDARY SCAN

- On-Chip Debug Circuitry Facilitates Full Speed, Non-Intrusive In-System Debug (No Emulator Required!)
- Provides Breakpoints, Single Stepping, Watchpoints, Stack Monitor, Program Trace Memory
- Inspect/Modify Memory and Registers
- Superior Performance to Emulation Systems Using ICE-Chips, Target Pods, and Sockets
- IEEE1149.1 Compliant Boundary Scan

## HIGH SPEED 8051 $\mu\text{C}$ CORE

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

## MEMORY

- 4352 Bytes Internal Data RAM (256 + 4k)
- 64k Bytes In-System Programmable FLASH Program Memory
- External 64k Byte Data Memory Interface

## CAN Bus 2.0B

- 32 Message Objects
- "Mailbox" implementation only interrupts CPU when needed

## DIGITAL PERIPHERALS

- 64 Port I/O; All are 5V tolerant
- Hardware SMBus™ (I2C™ Compatible), SPI™, and Two UART Serial Ports Available Concurrently
- Programmable 16-bit Counter Array with 6 Capture/Compare Modules
- Five General Purpose 16-bit Counter/Timers
- Dedicated Watch-Dog Timer; Bi-directional Reset

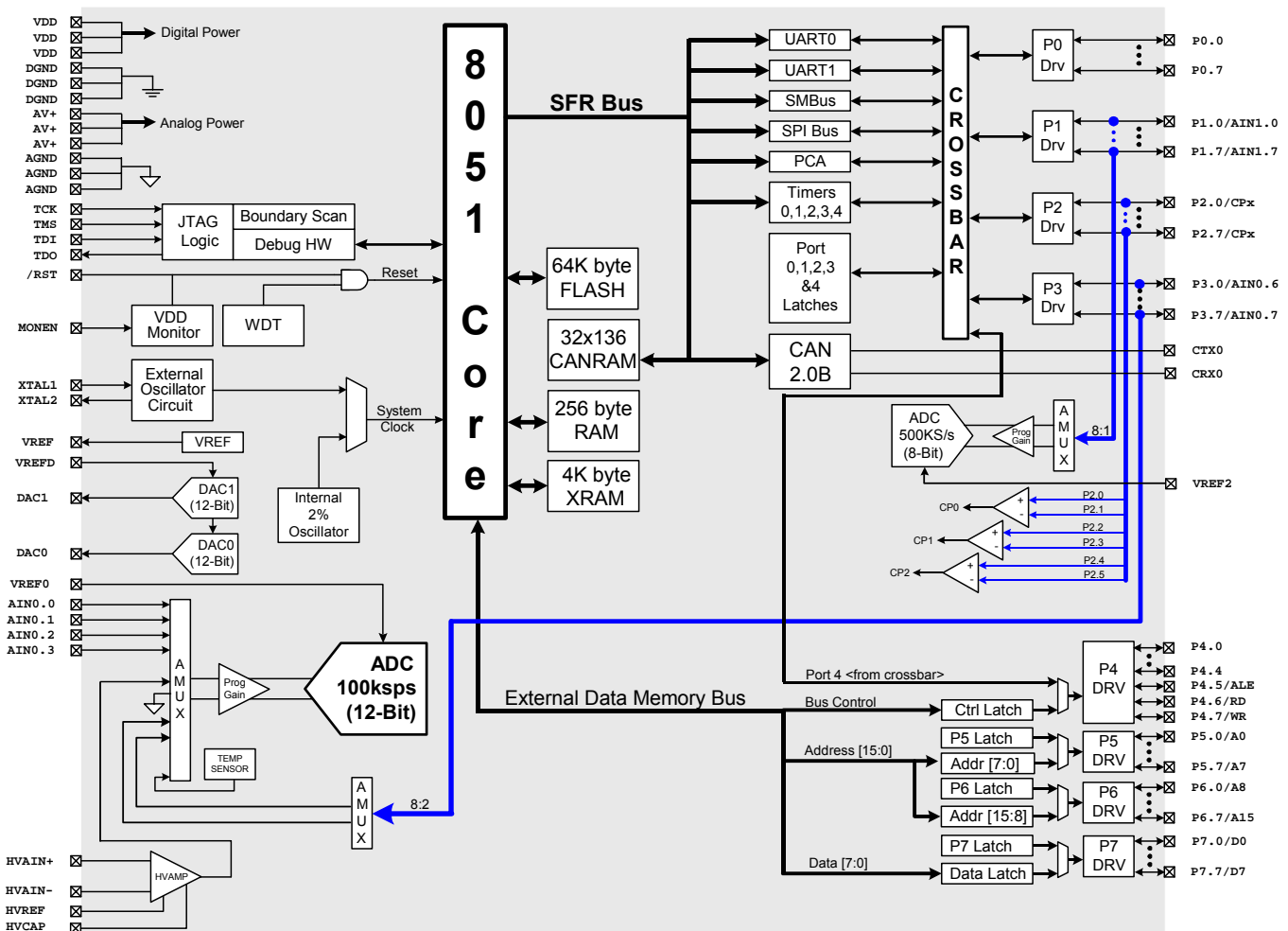
## CLOCK SOURCES

- Internal Programmable 2% Oscillator: Up to 25MHz
- External Oscillator: Crystal, RC, C, or Clock
- Real-Time Clock Mode using Timer 3 or PCA

## SUPPLY VOLTAGE ..... 2.7V to 3.6V

- Typical Operating Current: 10mA @ 25MHz
- Multiple Power Saving Sleep and Shutdown Modes

## 100-Pin TQFP; Temp Range $-40^\circ\text{C}$ to $+85^\circ\text{C}$



**SELECTED ELECTRICAL SPECIFICATIONS** T<sub>A</sub> = -40°C to +85°C, V<sub>DD</sub> = 2.7V unless otherwise specified.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
<b>GLOBAL CHARACTERISTICS</b>					
Supply Voltage		2.7		3.6	V
Supply Current (CPU active)	Clock=25MHz		10		mA
	Clock=1MHz		0.5		mA
	Clock=32kHz; VDD Monitor Enabled		20		μA
Supply Current (shutdown)	Oscillator not running; VDD Monitor Disabled		0.1		μA
Clock Frequency Range		DC		25	MHz
<b>A/D CONVERTER</b>					
Resolution			12		bits
Integral Nonlinearity				± 1	LSB
Differential Nonlinearity	Guaranteed Monotonic			± 1	LSB
Signal-to-Noise Plus Distortion		66	69		dB
Throughput Rate				100	ksp/s
Input Voltage Range		0		VREF	V
<b>D/A CONVERTERS</b>					
Resolution			12		LSB
Differential Nonlinearity				± 1	LSB
Output Settling Time			10		μs
<b>COMPARATORS</b>					
Supply Current	(each Comparator)		1.5		μA
Response Time	CP+ - CP-  = 100mV		4		μs

