

### ANALOG PERIPHERALS

#### 24-BIT ADC

- No missing codes
- 0.002% nonlinearity
- Programmable conversion rates up to 1 ksp/s
- 1x to 128x PGA
- 8 input multiplexer
- Built-in temperature sensor

#### Two 8-bit Current DACs

#### Comparator

- Programmable hysteresis and response time
- Configurable as wake-up or reset source
- Low current (0.4  $\mu$ A)

### 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
- Low cost, complete development kit

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

- Typical operating current: 17 mA @ 50 MHz  
16  $\mu$ A @ 32 kHz
- Typical stop mode current: <0.1  $\mu$ A

### HIGH-SPEED 8051 $\mu$ C Core

- Pipelined instruction architecture; executes 70% of instructions in 1 or 2 system clocks
- Up to **50 MIPS** throughput with 50 MHz clock
- Expanded interrupt handler

### MEMORY

- 768 bytes (256 + 512) internal data RAM
- 8 kB Flash; in-system programmable in 512 byte sectors

### DIGITAL PERIPHERALS

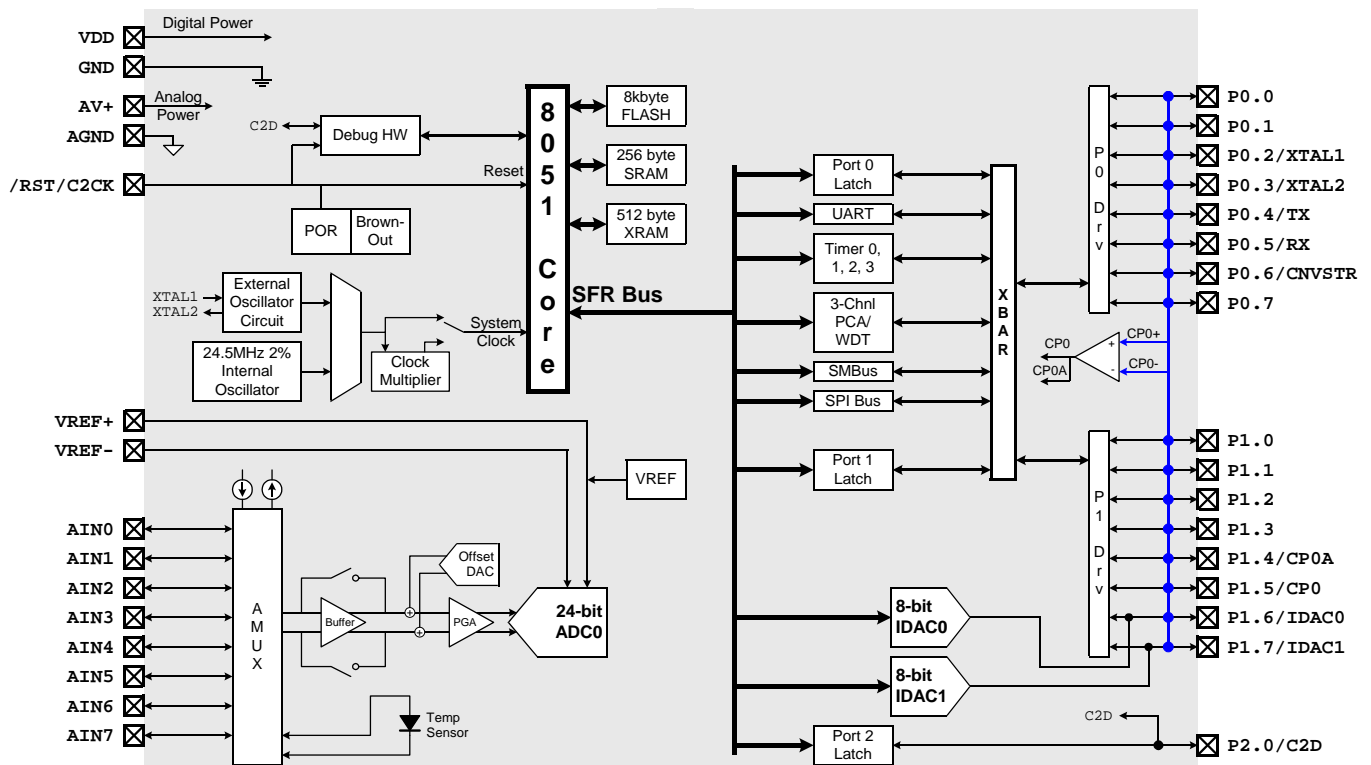
- 17 port I/O; all 5 V tolerant with high sink current
- Enhanced hardware UART, SPI, and SMBus™ serial ports
- Three general purpose 16-bit counter/timers
- 16-bit programmable counter array with three capture/compare modules, WDT
- Real time clock mode using PCA or timer and external clock source

### CLOCK SOURCES

- Internal oscillator: 24.5 MHz, 2% accuracy supports UART operation
- External oscillator: crystal, RC, C, or clock (1 or 2 pin modes)
- 2x clock multiplier to achieve 50 MHz internal clock
- Can switch between clock sources on-the-fly

### 32-Pin LQFP Package

Temperature Range: -40 to +85 °C



### SELECTED ELECTRICAL SPECIFICATIONS

$T_A = -40$  to  $+85$  °C,  $V_{DD} = AV+ = 3.0$  V,  $V_{REF} = 2.5$  V External, PGA Gain = 1x, MDCLK = 2.4567 MHz, Decimation Ratio = 1920 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=50 MHz		17		mA
	Clock=1 MHz		0.5		mA
	Clock=32 kHz; $V_{DD}$ Monitor Enabled		16		$\mu$ A
Supply Current (shutdown)	Oscillator not running; $V_{DD}$ Monitor Disabled		0.1		$\mu$ A
Clock Frequency Range		DC		50	MHz
<b>24-BIT A/D CONVERTER</b>					
Resolution	(no missing codes)		24		bits
Integral Nonlinearity	Single-ended Mode			$\pm 15$	ppm FS
	Differential Mode				
Offset Error			$\pm 5$		ppm
Gain Error			$\pm 0.002$		%
Common Mode Rejection Ratio (CMRR)			110		dB
Power Supply Rejection, DC		80			dB
Power Supply Current			230		$\mu$ A
<b>8-BIT CURRENT-MODE D/A CONVERTERS</b>					
Resolution			8		bits
Integral Nonlinearity			$\pm 0.5$		LSB
Differential Nonlinearity	Guaranteed Monotonic		$\pm 0.5$	$\pm 1$	LSB

