

## ANALOG PERIPHERALS

### 12-bit ADC

- $\pm 1$ LSB INL
- Programmable Throughput up to 100ksp/s
- 8 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 ( $\pm 3^\circ\text{C}$ )

### 8-bit ADC

- Programmable Throughput up to 500ksp/s
- 8 External Inputs
- Programmable Amplifier Gain: 4, 2, 1, 0.5

### Two 12-bit DACs

- Can Synchronize Outputs to Timers for Jitter-Free Waveform Generation

### Two 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
- Inspect/Modify Memory and Registers
- Superior Performance to Emulation Systems Using ICE-Chips, Target Pods, and Sockets
- IEEE1149.1 Compliant Boundary Scan
- Low Cost, **Complete** Development Kit

## 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
- 22 Vectored Interrupt Sources

## MEMORY

- 4352 Bytes Internal Data RAM (256 + 4k)
- 64k Bytes In-System Programmable FLASH Program Memory
- External Parallel Data Memory Interface – up to 5Mbytes/sec

## 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/Timer Array with 5 Capture/Compare Modules
- 5 General Purpose 16-bit Counter/Timers
- Dedicated Watch-Dog Timer; Bi-directional Reset

## CLOCK SOURCES

- Internal Programmable Oscillator: 2-to-16MHz
- External Oscillator: Crystal, RC, C, or Clock
- Real-Time Clock Mode using Timer 3 or PCA

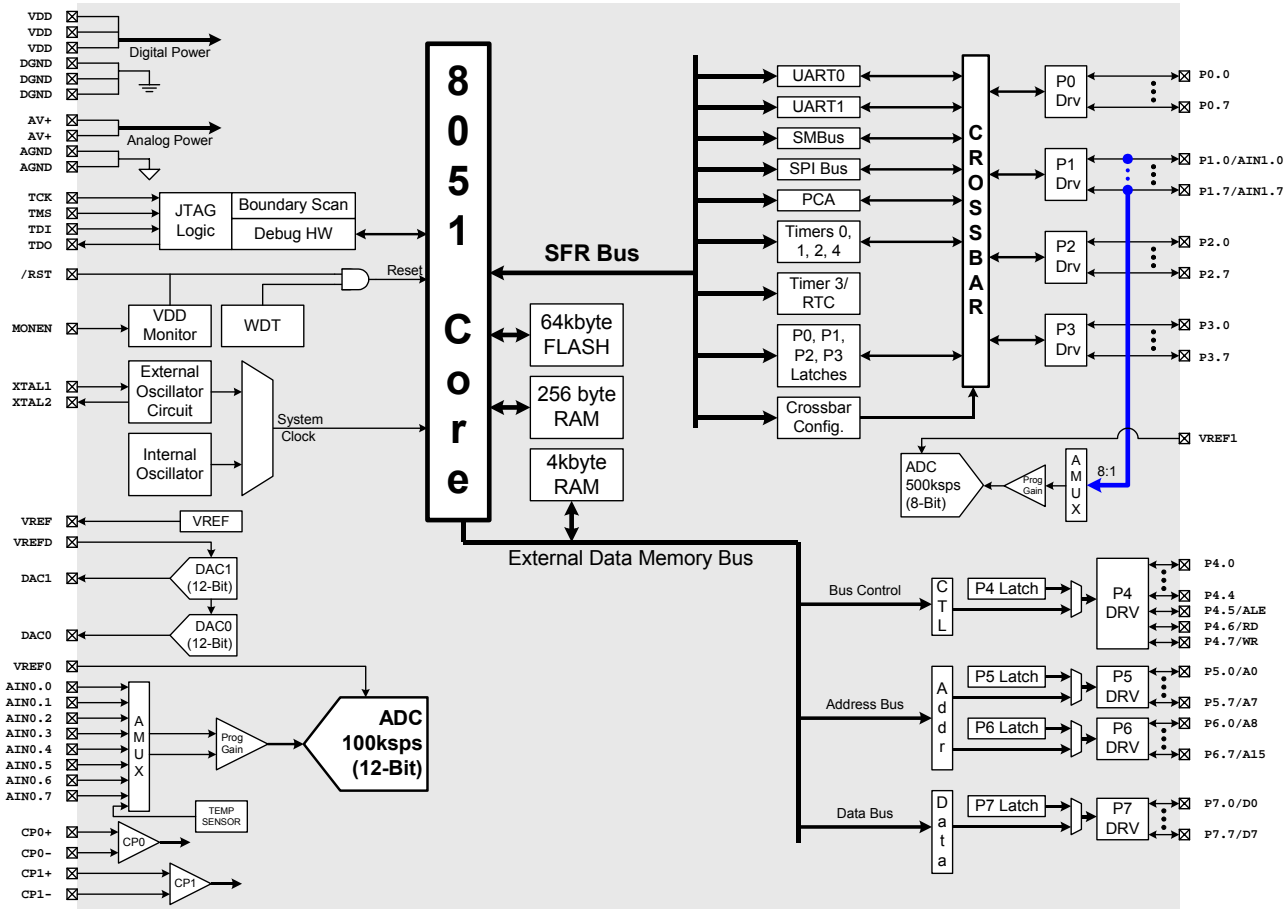
## SUPPLY VOLTAGE .....2.7V to 3.6V

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

## 100-Pin TQFP

## Temperature Range: $-40^\circ\text{C}$ to $+85^\circ\text{C}$

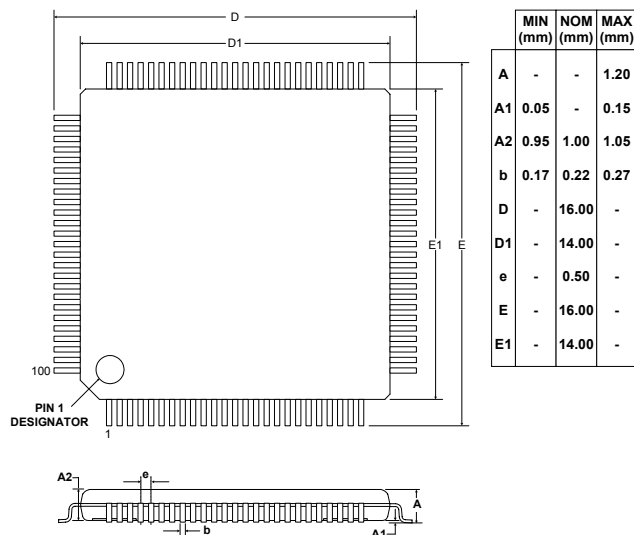
SMBus is a trademark of Intel Corp.; I2C is a trademark of Philips Semi.; SPI is a trademark of Motorola, Inc.



**SELECTED ELECTRICAL SPECIFICATIONS**  $T_A = -40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  unless otherwise specified.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
<b>GLOBAL CHARACTERISTICS</b>					
Digital Supply Voltage		2.7		3.6	V
Digital Supply Current with CPU active (VDD=2.7V)	Clock=25MHz Clock=1MHz Clock=32kHz; VDD Monitor Disabled		10 0.4 20		mA mA $\mu\text{A}$
Digital Supply Current (shutdown)	Oscillator not running; VDD Monitor Enabled Oscillator not running; VDD Monitor Disabled		10 0.1		$\mu\text{A}$ $\mu\text{A}$
<b>CPU &amp; DIGITAL I/O PORTS</b>					
Clock Frequency Range		DC		25	MHz
Port Output High Voltage	$I_{OH} = -3\text{mA}$ , Port I/O push-pull	$V_{DD} - 0.7$			V
Port Output Low Voltage	$I_{OL} = 8.5\text{mA}$			0.6	V
Input High Voltage		$0.7 \times V_{DD}$			V
Input Low Voltage				$0.3 \times V_{DD}$	V
<b>A/D CONVERTER</b>					
Resolution			12		bits
Integral Nonlinearity				$\pm 1$	LSB
Differential Nonlinearity	Guaranteed Monotonic			$\pm 1$	LSB
Signal-to-Noise Plus Distortion		66			dB
Throughput Rate				100	ksps
Input Voltage Range		0		$V_{REF}$	V
<b>D/A CONVERTERS</b>					
Resolution			12		bits
Differential Nonlinearity	Guaranteed Monotonic			$\pm 1$	LSB
Output Settling Time			10		$\mu\text{s}$
<b>COMPARATORS</b>					
Supply Current	(each Comparator, $V_{DD} = 2.7\text{V}$ )		1.3		$\mu\text{A}$
Response Time	$ CP+ - CP-  = 100\text{mV}$		4		$\mu\text{s}$
Input Voltage Range		-0.25		$V_{DD} + 0.25$	V
Input Bias Current		-5	0.001	+5	nA
Input Offset Voltage		-10		+10	mV

**PACKAGE INFORMATION**



**C8051F020DK DEVELOPMENT KIT**

