

# C8051F044

## 25 MIPS, 64 kB Flash, 10-Bit ADC, 100-Pin Mixed-Signal MCU



### Analog Peripherals

#### 10-Bit ADC

- $\pm 1$  LSB INL; guaranteed monotonic
- Programmable throughput up to 100 ksp/s
- 13 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

- 60 V common mode input range
- Offset adjust from  $-60$  to  $+60$  V
- 16 gain settings from 0.05 to 16

#### Three Comparators

#### Internal Voltage Reference

#### Precision $V_{DD}$ 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

#### Supply Voltage: 2.7 to 3.6 V

- Typical operating current: 10 mA at 25 MHz
- Multiple power saving sleep and shutdown modes

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

### High-Speed 8051 $\mu\text{C}$ 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

- 4352 bytes data RAM
- 64 kB Flash; in-system programmable in 512-byte sectors (512 bytes are reserved)
- External parallel 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 5 V tolerant
- Hardware SMBus™ (I2C™ compatible), SPI™, and two UART serial ports available concurrently
- Programmable 16-bit counter array with 6 capture/compare modules
- 5 general-purpose 16-bit counter/timers
- Dedicated watchdog timer; bidirectional reset
- Real-time clock mode using timer 3 or PCA

### Clock Sources

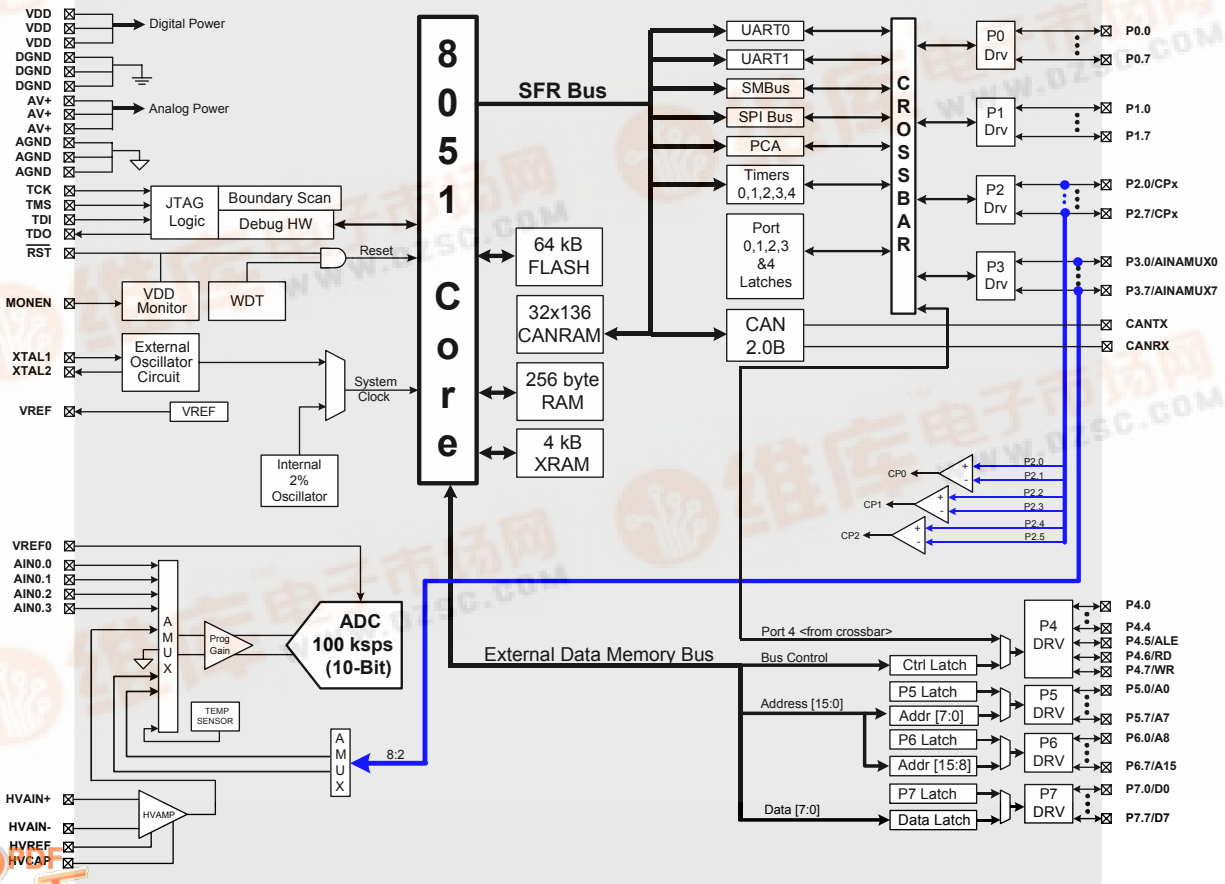
- Internal programmable 2% oscillator: up to 25 MHz
- External oscillator: Crystal, RC, C, or Clock

### Package

- 100-pin TQFP (standard lead and lead-free packages)

### Ordering Part Numbers

- Lead-free package: C8051F044-GQ
- Standard package: C8051F044





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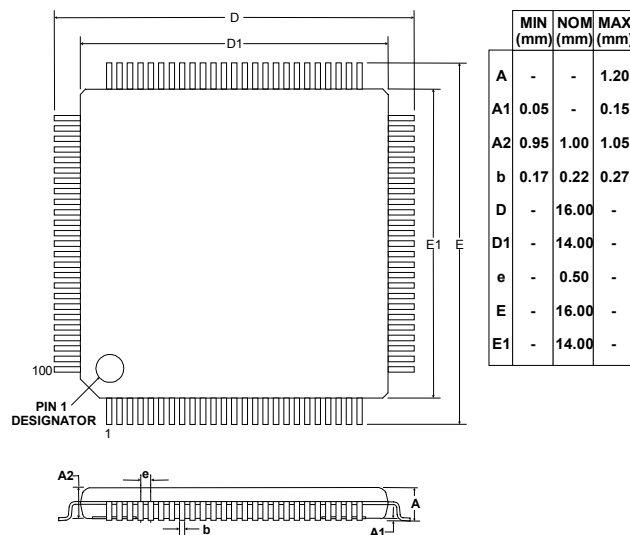
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### Selected Electrical Specifications

( $T_A = -40$  to  $+85$  °C,  $V_{DD} = 2.7$  V unless otherwise specified)

Parameter	Conditions	Min	Typ	Max	Units
<b>Global Characteristics</b>					
Supply Voltage		2.7	—	3.6	V
Supply Current with CPU active	Clock = 25 MHz	—	10	—	mA
	Clock = 1 MHz		0.5		mA
	Clock = 32 kHz; $V_{DD}$ Monitor Enabled		20		$\mu$ A
Supply Current (shutdown)	Oscillator off; $V_{DD}$ Monitor Disabled	—	0.1	—	$\mu$ A
Clock Frequency Range		DC	—	25	MHz
<b>A/D Converter</b>					
Resolution		—	10	—	bits
Integral Nonlinearity		—	—	$\pm 1$	LSB
Differential Nonlinearity	Guaranteed Monotonic			$\pm 1$	LSB
Signal-to-Noise Plus Distortion		59	—	—	dB
Throughput Rate		—	—	100	ksps
Input Voltage Range		0	—	VREF	V
<b>Comparators</b>					
Supply Current	(each Comparator)	—	1.5	—	$\mu$ A
Response Time	(CP+ – CP-) = 100 mV	—	4	—	$\mu$ s

### Package Information



### C8051F040DK Development Kit

