

## 25 MIPS, 64 kB Flash, 12-Bit ADC, 64-Pin Mixed-Signal MCU

## **Analog Peripherals**

#### 12-Bit ADC

- ±1 LSB INL; guaranteed monotonic
- Programmable throughput up to 100 ksps
- 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 (±3 °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

#### 8-Bit ADC

- Programmable throughput up to 500 ksps
- 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 V<sub>DD</sub> 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 µC 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**

- 32 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**

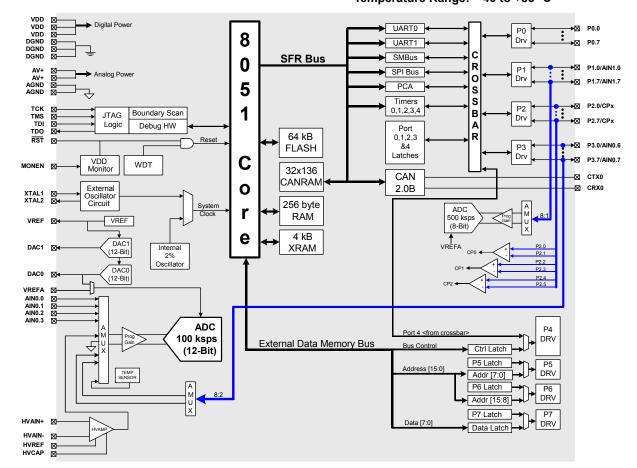
- Internal programmable 2% oscillator: up to 25 MHz
- External oscillator: Crystal, RC, C, or Clock

#### Supply Voltage: 2.7 to 3.6 V

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

#### 64-Pin TQFP

- Temperature Range: -40 to +85 °C



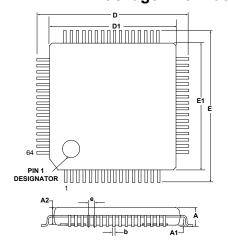
# 25 MIPS, 64 kB Flash, 12-Bit ADC, 64-Pin Mixed-Signal MCU

## **Selected Electrical Specifications**

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

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

## **Package Information**



		NOM (mm)	
A	-	-	1.20
<b>A</b> 1	0.05	-	0.15
A2	0.95	-	1.05
b	0.17	0.22	0.27
D	-	12.00	-
D1	-	10.00	-
е	-	0.50	-
E	-	12.00	-
E1	-	10.00	-

# C8051F040DK Development Kit

