

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

Analog Peripherals 12-Bit ADC

- ±1 LSB INL; no missing codes
- Programmable throughput up to 100 ksps
- 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 (±3 °C)

8-Bit ADC

- ±1 LSB INL; no missing codes
- Programmable throughput up to 500 ksps
- 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

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
- 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
- 22 vectored interrupt sources

Memory

- 4352 bytes data RAM
- 64 kB Flash; in-system programmable in 512-byte sectors (512 bytes are reserved)
- External parallel data memory interface

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/timer array with 5 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

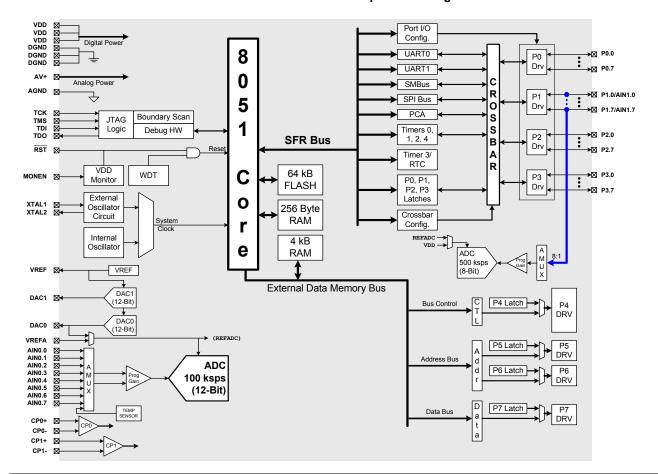
- Internal programmable oscillator: 2–16 MHz
- External oscillator: Crystal, RC, C, or Clock
- Can switch between clock sources on-the-fly

Supply Voltage: 2.7 to 3.6 V

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

64-Pin TQFP

Temperature Range: -40 to +85 °C



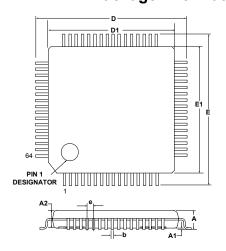
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Selected Electrical Specifications

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

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
GLOBAL CHARACTERIS	TICS				
Digital Supply Voltage		2.7		3.6	V
Digital Supply Current	Clock = 25 MHz		10		mA
with CPU active	Clock = 1 MHz		0.8		mA
$(V_{DD} = 2.7 \text{ V})$	Clock = 32 kHz; V _{DD} Monitor Disabled		20		μA
Digital Supply Current (shutdown)	Oscillator not running; V _{DD} Monitor Enabled		10		μΑ
	Oscillator not running; V _{DD} Monitor Disabled		0.1		μΑ
Digital Supply RAM Data			1.5		V
Retention Voltage					
CPU & DIGITAL I/O PORT	S				
Clock Frequency Range		DC		25	MHz
Port Output High Voltage	I _{OH} = –3 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
A/D CONVERTER					
Resolution			12		bits
Integral Nonlinearity				±1	LSB
Differential Nonlinearity	Guaranteed Monotonic			±1	LSB
Signal-to-Noise Plus Distortion		66			dB
Throughput Rate				100	ksps
Input Voltage Range		0		V_{REF}	V
COMPARATORS					
Response Time	(CP+) – (CP-) = 100 mV		4		μs
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



		NOM (mm)	
Α	-	-	1.20
A 1	0.05	-	0.15
A 2	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	-

C8051F020DK Development Kit

