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### What is "[Embedded - Microcontrollers](#)"?

"[Embedded - Microcontrollers](#)" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

### Applications of "[Embedded - Microcontrollers](#)"

#### Details

Product Status	Obsolete
Core Processor	8051
Core Size	8-Bit
Speed	25MHz
Connectivity	SPI, UART/USART
Peripherals	Brown-out Detect/Reset, POR, PWM, Temp Sensor, WDT
Number of I/O	16
Program Memory Size	8KB (8K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	256 x 8
Voltage - Supply (Vcc/Vdd)	2V ~ 5.25V
Data Converters	A/D 16x12b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 125°C (TA)
Mounting Type	Surface Mount
Package / Case	20-VFQFN Exposed Pad
Supplier Device Package	20-QFN (4x4)
Purchase URL	<a href="https://www.e-xfl.com/product-detail/silicon-labs/c8051f531-im">https://www.e-xfl.com/product-detail/silicon-labs/c8051f531-im</a>

### Analog Peripherals

#### 12-Bit ADC, 5 V input signal; up to 16 external inputs

- $\pm 1$  LSB INL; guaranteed monotonic
- Programmable throughput up to 200 ksp/s
- Data-dependent windowed interrupt generator
- Programmable gain maximizes input signal span

#### Built-in Temperature Sensor ( $\pm 3$ °C)

#### One Comparator

#### Internal Voltage Reference

#### Precision $V_{DD}$ Monitor/Brown-out Detector

#### On-Chip Debug

- On-chip debug circuitry facilitates full speed, non-intrusive in-system debug (no emulator required)
- Provides breakpoints, single stepping, watch-points
- Inspect/modify memory, registers, and stack
- Superior performance to emulation systems using ICE-chips, target pods, and sockets

#### Supply Voltage: 2.7 to 5.25 V

- Typical operating current: 7 mA at 25 MHz at 5.0 V
- Multiple power saving sleep and shutdown modes

#### Temperature Range: -40 to +125 °C

### High-Speed 8051 $\mu$ 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

- 8 kB Flash; in-system programmable; flexible security features
- 256 bytes data RAM

### Digital Peripherals

- Up to 16 digital I/O; all are 5 V push-pull
- Programmable 16-bit counter array with three capture/compare modules
- Three general-purpose 16-bit counter/timers
- Dedicated watchdog timer; bidirectional reset
- Real-time clock mode using timer 3 or PCA

### Clock Sources

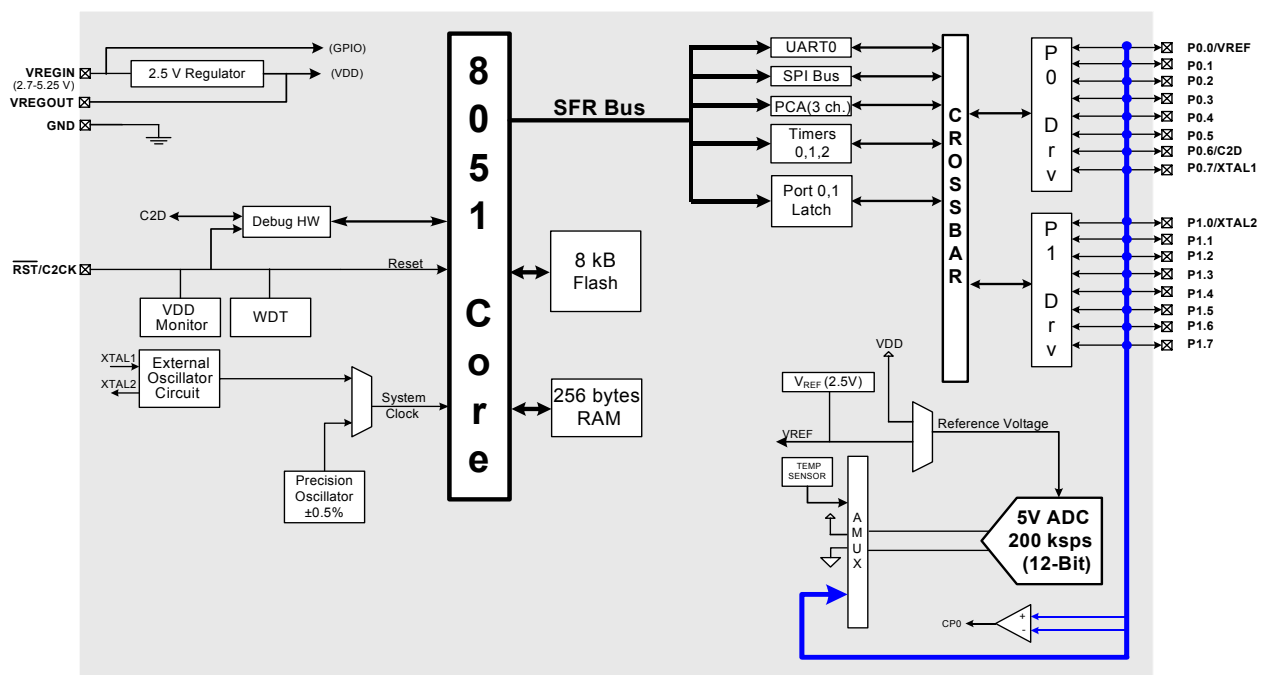
- High-precision internal programmable oscillator up to 25 MHz
- External oscillator: Crystal, RC, C, or Clock

### Packages

- 20-Pin TSSOP and 20-Pin QFN (4x4 mm)

### Ordering Part Numbers

- C8051F531-IT (TSSOP)
- C8051F531-IM (QFN)

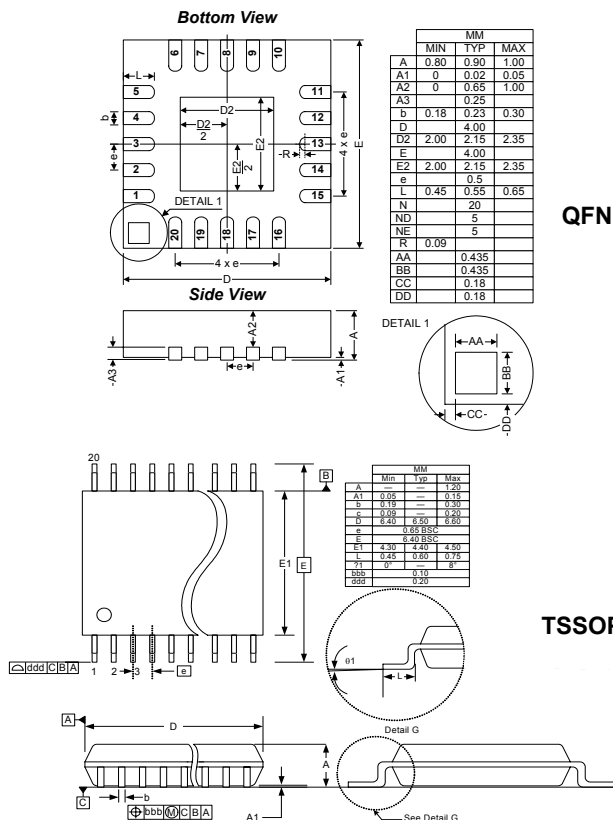


### Selected Electrical Specifications

( $T_A = -40$  to  $+125$  °C,  $V_{REGIN} = 2.7$  V unless otherwise specified)

Parameter	Conditions	Min	Typ	Max	Units
<b>Global Characteristics</b>					
Supply Voltage ( $V_{REGIN}$ )		2.7	—	5.25	V
Supply Current (CPU active) $V_{REGIN} = 2.7$ – $5.0$ V	Clock = 25 MHz	—	7	—	mA
	Clock = 1 MHz	—	0.8	—	mA
	Clock = 32 kHz; $V_{DD}$ monitor enabled	—	33	—	μA
Supply Current (shutdown)	Oscillator not running; $V_{DD}$ monitor disabled	—	0.2	—	μA
Clock Frequency Range		dc	—	25	MHz
<b>A/D Converter</b>					
Resolution			12		bits
Integral Nonlinearity		—	—	±1	LSB
Differential Nonlinearity	Guaranteed monotonic	—	—	±1	LSB
Signal-to-Noise Plus Distortion		—	68	—	dB
Throughput Rate		—	—	200	ksps
Input Voltage Range		0	—	$V_{REF}$	V
<b>Flash</b>					
Endurance		40K	150K	—	E/W cycles
Erase Cycle Time		10	12	14	ms
Write Cycle Time		40	50	60	μs

### Package Information



### C8051F530DK Development Kit

