



SILICON LABORATORIES

# C8051F351

## 50 MIPS, 8 kB Flash, 24-Bit ADC, 28-Pin Mixed-Signal MCU

### Analog Peripherals

#### 24-Bit ADC

- 0.0015% nonlinearity
- Programmable throughput up to 1 ksp/s
- 8 external inputs; programmable as single-ended or differential
- Programmable amplifier gain: 128, 64, 32, 16, 8, 4, 2, 1
- Data-dependent windowed interrupt generator
- Built-in temperature sensor ( $\pm 3^\circ\text{C}$ )

#### Two 8-Bit Current DACs

#### Comparator

- 16 Programmable hysteresis values and response time
- Configurable to generate interrupts or reset
- Low current (0.4  $\mu\text{A}$ )

#### Internal Voltage Reference

#### V<sub>DD</sub> 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, watchpoints
- Inspect/modify memory, registers, and stack
- Superior performance to emulation systems using ICE-chips, target pods, and sockets

#### Supply Voltage: 2.7 to 3.6 V

- Typical operating current: 17 mA at 50 MHz  
16  $\mu\text{A}$  at 32 kHz
- Typical stop mode current: <0.1  $\mu\text{A}$

#### Temperature Range: -40 to +85 °C

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

- Pipelined instruction architecture; executes 70% of instructions in 1 or 2 system clocks
- Up to 50 MIPS throughput with 50 MHz clock
- Expanded interrupt handler

### Memory

- 768 bytes data RAM
- 8 kB Flash; in-system programmable in 512 byte sectors (512 bytes are reserved)

### Digital Peripherals

- 17 port I/O; all 5 V tolerant
- Hardware SMBus™ (I2C™ compatible), SPI™, and UART serial ports available concurrently
- 16-bit programmable counter array with three capture/compare modules, WDT
- 4 general-purpose 16-bit counter/timers
- Realtime clock mode using PCA or timer and external clock source

### Clock Sources

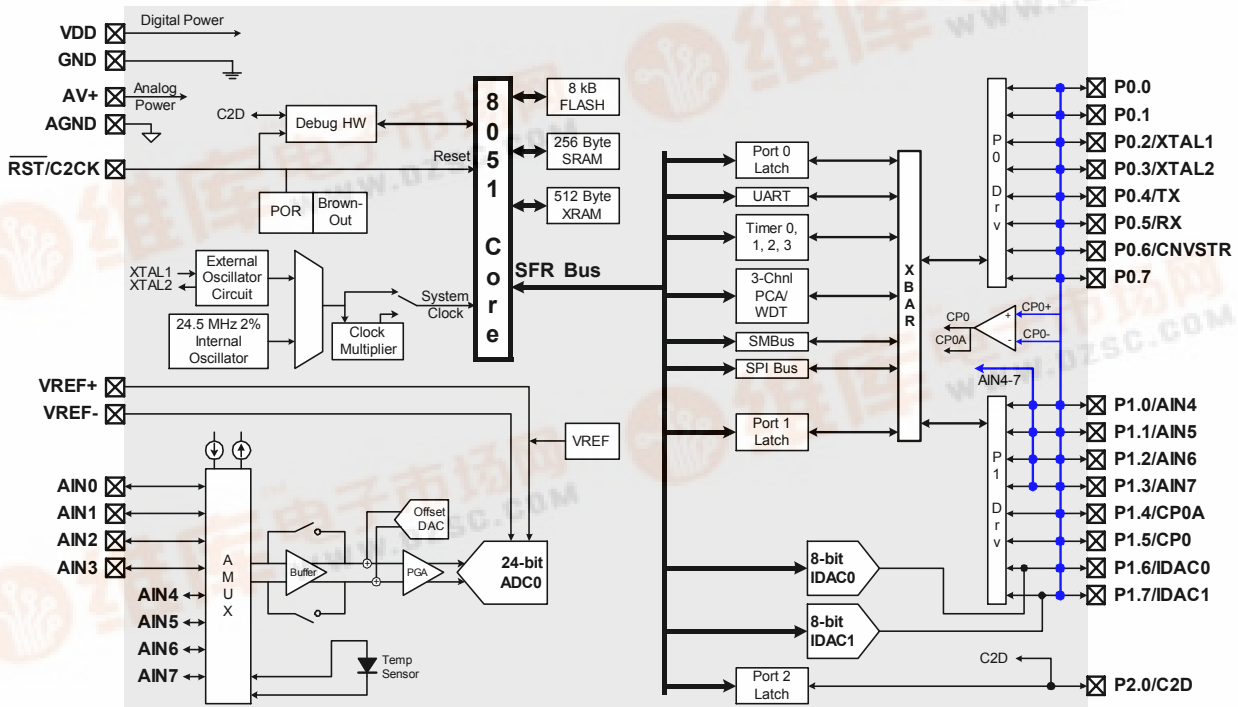
- Internal oscillator: 24.5 MHz, 2% accuracy supports UART operation
- External oscillator: Crystal, RC, C, or clock (1 or 2 pin modes)
- 2x clock multiplier to achieve 50 MHz internal clock
- Can switch between clock sources on-the-fly

### Package

- 28-pin QFN (lead-free package)

### Ordering Part Numbers

- C8051F351-GM

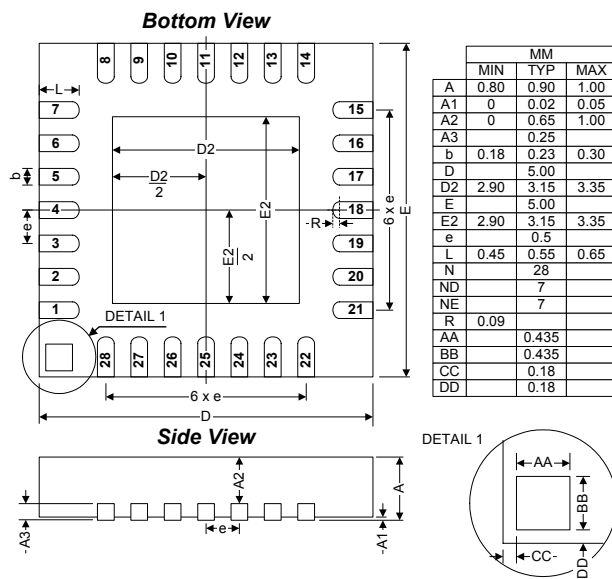


### Selected Electrical Specifications

( $T_A = -40$  to  $+85$  °C,  $V_{DD} = AV+ = 3.0$  V,  $V_{REF} = 2.5$  V External, PGA Gain = 1x, MDCLK = 2.4567 MHz, Decimation Ratio = 1920 unless otherwise specified)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
<b>GLOBAL CHARACTERISTICS</b>					
Supply Voltage		2.7		3.6	V
Supply Current (CPU active)	Clock = 50 MHz		17		mA
	Clock = 1 MHz		0.5		mA
	Clock = 32 kHz; $V_{DD}$ Monitor Enabled		16		$\mu$ A
Supply Current (shutdown)	Oscillator not running; $V_{DD}$ Monitor Disabled		0.1		$\mu$ A
Clock Frequency Range		DC		50	MHz
<b>24-BIT A/D CONVERTER</b>					
Resolution	(no missing codes)		24		bits
Integral Nonlinearity	Single-ended Mode			$\pm 15$	ppm FS
	Differential Mode				
Offset Error			$\pm 5$		ppm
Gain Error			$\pm 0.002$		%
Common Mode Rejection Ratio (CMRR)			110		dB
Power Supply Rejection, DC		80			dB
Power Supply Current			230		$\mu$ A
<b>8-BIT CURRENT-MODE D/A CONVERTERS</b>					
Resolution			8		bits
Integral Nonlinearity			$\pm 0.5$		LSB
Differential Nonlinearity	Guaranteed Monotonic		$\pm 0.5$	$\pm 1$	LSB

### Package Information



### C8051F350DK Development Kit

