Si103x

Ultra Low Power, 128/64/32/16 kB MCU with Integrated 240–960 MHz EZRadioPRO® Transceiver

Ultra-Low Power @ 3.6 V

- 110 µA/MHz IBAT; DC-DC enabled
- 110 nA sleep current with data retention; POR monitor enabled
- 400 nA sleep current with smaRTClock (internal LFO)
- 700 nA sleep current with smaRTClock (external XTAL)
- 2 µs wake-up from any sleep mode

12-Bit; 16 ch. Analog to Digital Converter

- Up to 75 ksps 12-bit mode or 300 ksps 10-bit mode
- External pin or internal VREF (no external capacitor required)
- On-chip PGA allows measuring voltages up to twice the reference voltage
- Autonomous burst mode with 16-bit automatic averaging accumulator
- Integrated temperature sensor

Two Low Current Comparators

- Programmable hysteresis and response time
- Configurable as interrupt or reset source

Internal 6-Bit Current Reference

- Up to ±500 µA; source and sink capability
- Enhanced resolution via PWM interpolation

Metering-Specific Peripherals

- DC-DC buck converter allows dynamic voltage scaling for maximum efficiency (250 mW output)
- Sleep-mode pulse accumulator with programmable switch de-bounce and pull-up control interfaces directly to metering sensor
- Dedicated Packet Processing Engine (DPPE) includes hardware AES, DMA, CRC, and encoding blocks for acceleration of wireless protocols
- Manchester and 3 out of 6 encoder hardware for power efficient implementation of the wireless M-bus specification

EZRadioPRO® Transceiver

- Frequency range = 240–960 MHz
- Sensitivity = –121 dBm
- FSK, GFSK, and OOK modulation
- Max output power = +20 dBm (Si1020/1/2/3), +13 dBm (Si1024/25/26/27)
- RF power consumption
  - 18.5 mA receive
  - 18 mA @ +1 dBm transmit
  - 30 mA @ +13 dBm transmit
  - 85 mA @ +20 dBm transmit
  - Data rate = 0.123 to 256 kbps
  - Auto-frequency calibration (AFC)
  - Antenna diversity and transmit/receive switch control
  - Programmable packet handler
  - TX and RX 64-byte FIFOs
  - Frequency hopping capability
  - On-chip crystal tuning

High-Speed 8051 µC Core

- Pipelined instruction architecture; executes 70% of instructions in 1 or 2 system clocks

Memory

- Up to 128 kB Flash; In-system programmable; Full read/write/erase functionality over the entire supply range
- Up to 8 kB data retention RAM

Digital Peripherals

- 53 port I/O; All 5 V tolerant with high sink current and programmable drive strength
- Hardware SMBus™ (I2C™ compatible), 2 x SPI™, and UART serial ports available concurrently
- Four general-purpose 16-bit counter/timers
- Programmable 16-bit counter/timer array with six capture/compare modules and watchdog timer

Clock Sources

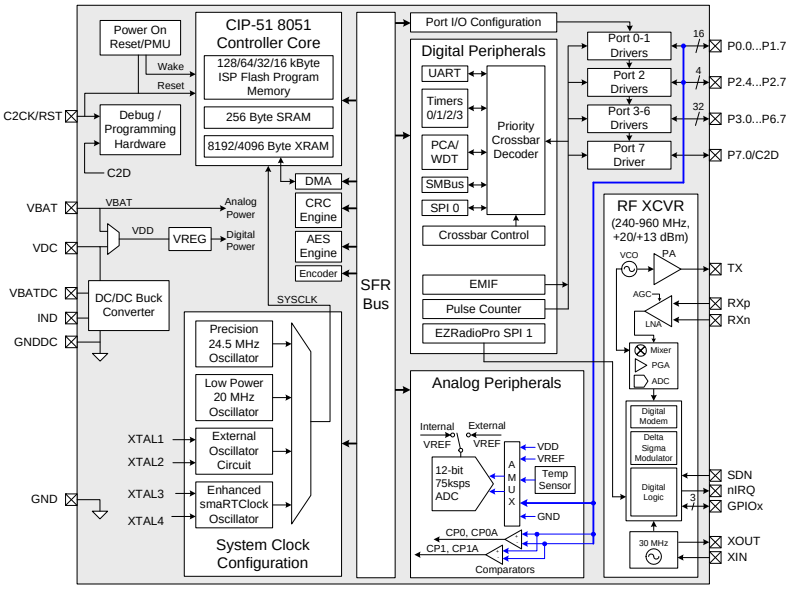
- Precision internal oscillators: 24.5 MHz with ±2% accuracy supports UART operation; spread-spectrum mode for reduced EMI
- Low power internal oscillator: 20 MHz
- External oscillator: Crystal, RC, C, CMOS clock
- smaRTClock oscillator: 32.768 kHz crystal or 16.4 kHz internal LFO with three independent alarms

On-Chip Debug

- On-chip debug circuitry facilitates full speed, non-intrusive in-system debug (no emulator required)
- Provides 4 breakpoints, single stepping

Packages

- –85 pin LGA (6 x 8 mm)



Selected Electrical Specifications

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Active mode current	IBAT	VBAT = 3.6 V, F = 20 MHz	—	110	—	uA/MHz
Active mode current	IBAT	F = 20 MHz LFO; DC-DC enabled executing code from FLASH; PCLKACT=0x00; VBAT=3.6V)	—	2.2	—	mA
Sleep mode current	IDD	Sleep Mode, SmaRT-Clock running, internal LFO; 3.6 V	—	0.4	—	uA
Sleep mode current	IDD	Sleep Mode, SmaRTClock running, 32.768 kHz crystal; 3.6 V	—	0.7	—	uA
Buck regulator efficiency		3.6 V input voltage	—	80	—	%
Supply input voltage	VBAT		1.8	3.6	3.8	V

Product Family

Part Number	Memory (Flash/ RAM)	TX Output Power (dBm)	I/O	Package (mm)
Si1030-A-GM	128 kB/8 kB	20	53	LGA85 (6x8)
Si1031-A-GM	64 kB/8 kB	20	53	LGA85 (6x8)
Si1032-A-GM	32 kB/8 kB	20	53	LGA85 (6x8)
Si1033-A-GM	16 kB/4 kB	20	53	LGA85 (6x8)
Si1034-A-GM	128 kB/8 kB	13	53	LGA85 (6x8)
Si1035-A-GM	64 kB/8 kB	13	53	LGA85 (6x8)
Si1036-A-GM	32 kB/8 kB	13	53	LGA85 (6x8)
Si1037-A-GM	16 kB/4 kB	13	53	LGA85 (6x8)