Description

Silicon Laboratories' Si106x and Si108x Wireless MCUs combine high-performance wireless connectivity and ultra-low power microcontroller processing into a small 5x6 mm form factor. Support for all major frequency bands in the 142 to 1050 MHz range is provided including an integrated advanced packet handling engine and the ability to realize a link budget of up to 146 dB. The devices have been optimized to minimize energy consumption for battery-backed applications by minimizing TX, RX, active, and sleep mode current as well as supporting fast wake-up times. The Si106x and Si108x Wireless MCUs are available in a pin-compatible family of devices that scales from 8 to 64 kB of flash and provides a robust set of analog and digital peripherals including an ADC, dual comparators, timers, and GPIO. These Wireless MCUs are compliant with IEEE 802.15.4g and support worldwide regulatory standards including FCC, ETSI, and ARIB.

Features

Ultra-low power 8051 µC Core

- 25 MHz, single-cycle 8051 compatible CPU
  - 25 MIPS peak throughput with 25 MHz clock
- Industry's lowest active and sleep currents
- 160 µA/MHz: active mode
- 50 nA sleep with brownout detectors enabled
- 600 nA sleep w/internal RTC
- 2 µs wake-up time
- On-chip debug

Memory

- Up to 64 kB of flash and 4 kB of RAM

Peripherals

- 10-bit analog-to-digital converter
  - Temperature sensor
- Dual comparators
- 11 general purpose I/O
  - UART, SPI, I^{2}C
- Four general purpose 16-bit counter/timers
- Precision internal oscillators
  - 24.5 MHz with ±2% accuracy
  - Low power 20 MHz internal oscillator
- External oscillator: crystal, RC, C, CMOS clock
- RTC: 32.768 kHz crystal or self-oscillate

Transceiver Features

- Data rate up to 1 Mbps
- 142–1050 MHz frequency range
- On-chip crystal tuning
- −126 dBm receive sensitivity @ 500 bps, GFSK
- Modulation: OOK, (G)FSK, and 4(G)FSK
- Up to +20 dBm output power
- Low power consumption
  - 10.7 mA RX
  - 18 mA TX at +10 dBm
  - 30 nA shutdown, 50 nA standby
  - Fast wake and hop times
- Excellent selectivity performance
  - 60 dB adjacent channel
  - 73 dB blocking at 1 MHz
- Antenna diversity and T/R switch control
- Highly configurable packet handler
- TX and RX 64 byte FIFOs
- Auto frequency control (AFC)
- Automatic gain control (AGC)
- IEEE 802.15.4g compliant

System

- Supply voltage: 1.8 to 3.6 V
  - 0.9–3.6V operation with built-in dc–dc converter
  - Brownout detectors cover sleep and active modes
- Low battery detector
- Low BOM count
- 5x6 36-pin QFN package

Applications

- Home automation
- Home security
- Remote control
- Garage door openers
- Remote keyless Entry
- Home health care
- Smart metering
- Building Lighting control
- Building HVAC control
- Fire and Security monitoring
- Security and Access control
- Telemetry
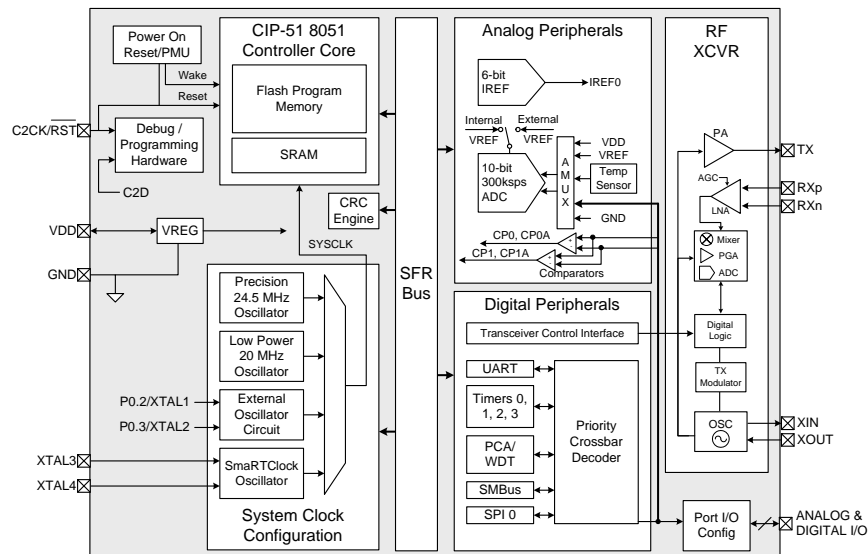
Si106x/Si108x Family Selector Guide

Orderable Part Number	Radio	Flash	RAM	Frequency 142–175 MHz	Frequency 283–350 MHz	Frequency 425–525 MHz	Frequency 850–960 MHz	Frequency 960–1050 MHz	Max Output Power	Max Data Rate	Sensitivity Max	Sensitivity 40 kbps, GFSK	Advanced Features*
Si1060	EZRadioPRO	64 kB	4 kB	✓	✓	✓	✓	✓	+20 dBm	1 Mbps	–126 dBm	–110 dBm	Yes
Si1061	EZRadioPRO	32 kB	4 kB	✓	✓	✓	✓	✓	+20 dBm	1 Mbps	–126 dBm	–110 dBm	Yes
Si1062	EZRadioPRO	64 kB	4 kB	✓	✓	✓	✓	✓	+13 dBm	1 Mbps	–126 dBm	–110 dBm	Yes
Si1063	EZRadioPRO	32 kB	4 kB	✓	✓	✓	✓	✓	+13 dBm	1 Mbps	–126 dBm	–110 dBm	Yes
Si1064	EZRadio	64 kB	4 kB		✓	✓	✓		+13 dBm	500 kBps	–116 dBm	–108 dBm	No
Si1065	EZRadio	32 kB	4 kB		✓	✓	✓		+13 dBm	500 kBps	–116 dBm	–108 dBm	No
Si1080	EZRadioPRO	16 kB	768 bytes	✓	✓	✓	✓	✓	+20 dBm	1 Mbps	–126 dBm	–110 dBm	Yes
Si1081	EZRadioPRO	8 kB	768 bytes	✓	✓	✓	✓	✓	+20 dBm	1 Mbps	–126 dBm	–110 dBm	Yes
Si1082	EZRadioPRO	16 kB	768 bytes	✓	✓	✓	✓	✓	+13 dBm	1 Mbps	–126 dBm	–110 dBm	Yes
Si1083	EZRadioPRO	8 kB	768 bytes	✓	✓	✓	✓	✓	+13 dBm	1 Mbps	–126 dBm	–110 dBm	Yes
Si1084	EZRadio	16 kB	768 bytes		✓	✓	✓		+13 dBm	500 kBps	–116 dBm	–108 dBm	No
Si1085	EZRadio	8 kB	768 bytes		✓	✓	✓		+13 dBm	500 kBps	–116 dBm	–108 dBm	No

*Note: Advanced features include antenna diversity, narrowband support and autonomous low-duty cycle support. For a complete list, refer to the data sheet.

Development Kits

Orderable Part Number	Flash/RAM	Frequency	Output Power
1060-490-DK	64 kB/4 kB	490 MHz	+20 dBm
1062-868-DK	64 kB/4 kB	868 MHz	+13 dBm
1060-915-DK	64 kB/4 kB	915 MHz	+20 dBm
1064-434-DK	64 kB/4 kB	434 MHz	+13 dBm
1064-868-DK	64 kB/4 kB	868 MHz	+13 dBm
1064-915-DK	64 kB/4 kB	915 MHz	+13 dBm

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