HISILICON

Hi3861L V100 Low-Power Wi-Fi SoC

Brief Data Sheet

Issue   01

Date   2020-04-30

HiSilicon (Shanghai) Technologies Co., Ltd.

Address: New R&D Center, 49 Wuhe Road, Bantian,

Longgang District,

Shenzhen 518129 P. R. China

Website: http://www.hisilicon.com/en/

Email: support@hisilicon.com

Overview

Hi3861L V100 is a highly integrated 2.4 GHz Wi-Fi SoC that packs the IEEE 802.11b/g/n baseband and RF circuit. The RF circuit consists of the power amplifier (PA), low noise amplifier (LNA), RF balun, antenna switch, and power management module. It supports 20 MHz standard bandwidth and 5 MHz/10 MHz narrow bandwidth, and provides a physical layer rate up to 72.2 Mbit/s. The Hi3861L V100 Wi-Fi baseband supports the orthogonal frequency division multiplexing (OFDM) technology and is backward compatible with the direct sequence spread spectrum (DSSS) and complementary code keying (CCK) technologies, offering various data rates defined in the IEEE 802.11 b/g/n protocol.

Hi3861L V100 integrates a high-performance 32-bit microprocessor, a hardware security engine, and various peripheral interfaces, including the SPI, UART, I²C, PWM, GPIO, and multi-channel ADC. In addition, it provides high-speed SDIO2.0 slave interfaces, with clock frequency up to 50 MHz. Its built-in SRAM and flash can operate independently and even programming is allowed on the flash.

This SoC supports Huawei LiteOS and third-party components and provides an open and easy-to-use development and debugging environment.

The SoC is applicable to IoT low-power intelligent products such as smart home appliances, intelligent lock, low-power cameras, and switch buttons.

Functional Block Diagram
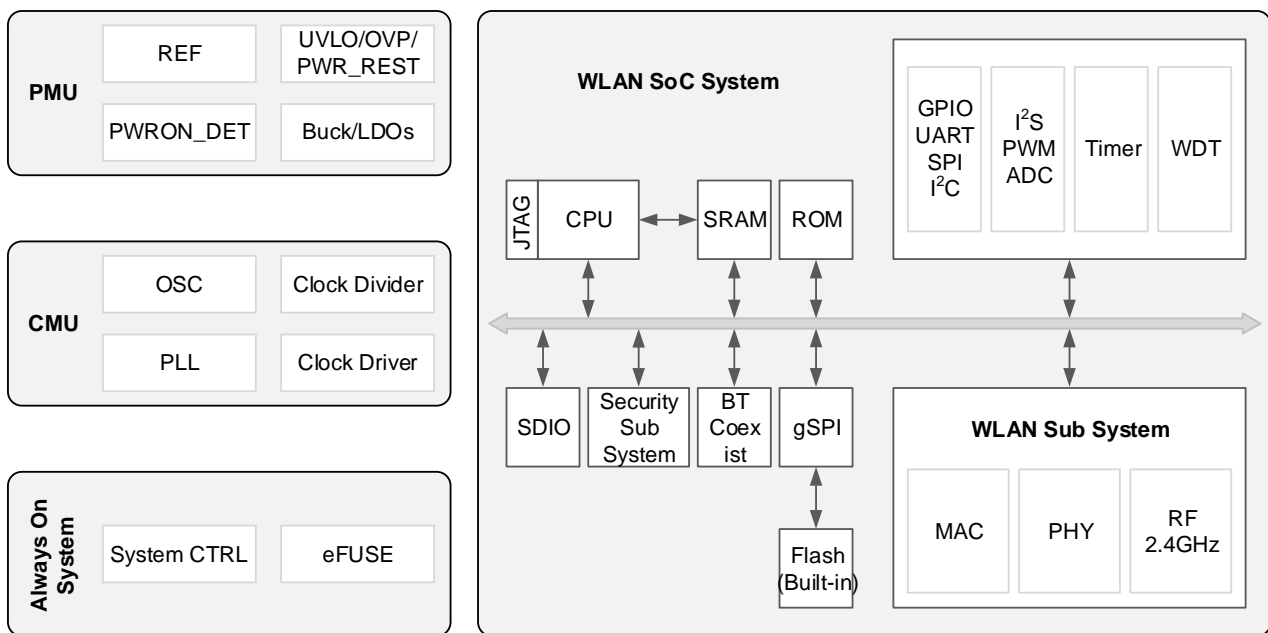
Key Specifications

General Specifications

- 1x1 2.4 GHz frequency band (channels 1−14)
- PHY supporting IEEE 802.11b/g/n
  MAC supporting IEEE802.11 d/e/h/i/k/v/w
- Built-in PA and LNA, integrated with TX/RX switch and balun
- Station (STA) and access point (AP) modes, up to six STA devices allowed for access as an AP
- WFA WPA, WFA WPA2 personal, and WPS2.0
- 2/3/4-line PTA solution with BT and BLE chips coexisting

- Input voltage range: 2.3–3.6 V
  I/O power voltage: 1.8 V or 3.3 V
- RF auto-calibration solution
- External 32 kHz clock input
- Low power consumption:
  Tested at the ambient temperature of 25°C:
  - Ultra deep sleep mode: 3 µA@3.3 V
  Tested in a shielded environment at the ambient temperature of 25°C, with the RX duration of 1 ms, and powered by the buck:
  - DTIM1: 0.97 mA@3.6 V

Low-Power Wi-Fi SoC

- DTIM3: 0.36 mA@3.6 V
- DTIM10: 0.15 mA@3.6 V

PHY Features

- All single-antenna data rates of IEEE802.11b/g/n
- Maximum rate of 72.2 Mbit/s@HT20 MCS7
- Standard 20 MHz bandwidth and 5 MHz/10 MHz narrow bandwidth
- STBC RX
- Short GI

MAC Features

- A-MPDU and A-MSDU
- Blk-ACK
- QoS

CPU Subsystem

- High-performance 32-bit microprocessor with a maximum operating frequency of 160 MHz
- Built-in 352 KB SRAM and 288 KB ROM
- Built-in 2 MB flash memory

Peripheral Interface

- One SDIO interface, two SPI interfaces, two I^2C interfaces, three UART interfaces, 15 GPIO interfaces, seven ADC inputs, six PWM interfaces, one I^2S interface, and external 32 kHz clock (Note: The preceding interfaces are multiplexed.)
- External primary crystal frequency of 40 MHz or 24 MHz

Other Information

- Package: QFN-32, 5 mm x 5 mm
- Operating temperature: –40°C to +85°C (–40°F to 185°F)

Solution Features

Stable and Reliable Communication Capability

- Reliable communication algorithms, including TPC, automatic rate adjustment, and weak interference immunity in complex environments

Flexible Networking

- 256-node mesh networking
- Networking with standard 20 MHz bandwidth and 5 MHz/10 MHz narrow bandwidth

Complete Network Support

- IPv4/IPv6 network
- DHCPv4/DHCPv6 client/server
- DNS client function
- mDNS function
- CoAP/MQTT/HTTP/JSON basic components

Powerful Security Engine

- AES128/256 encryption and decryption algorithms
- HASH-SHA256 and HMAC_SHA256 algorithms
- RSA and ECC signature verification algorithms
- Random number generation, compliant with the FIPS 140-2 random test standard
- TLS/DTLS acceleration
- Built-in eFUSE, supporting secure storage, secure boot, and hardware ID
- Built-in MPU feature for memory isolation

Open OS

- Huawei LiteOS, providing an open, efficient, and secure environment for system development and running
- Low power consumption, small memory, high stability, and high real-time performance
- Flexible protocol support and extension
- Interfaces for secondary development
- Multi-level development interfaces: OS adaptation interfaces, system diagnosis interfaces, link layer interfaces, and network layer interfaces

Low-Power Wi-Fi SoC

Solution Diagram

Service Layer

Interconnecting and Interworking with Huawei HiLink

Customer Applications

Application Layer Protocol

CoAP | MQTT | HTTP

Utilities (**cJson**)

FOTA

LWIP

（TCP/UDP/ARP/ DHCP/DNS/ IPV4/IPV...）

Wi-Fi APIs

Wpa_supplicant

RF Test

Wi-Fi Mesh | Wi-Fi Any

WLAN Driver

BSP Driver

SDIO | GPIO | UART | I^{2}C | I^{2}S | PWM | ...

LiteOS

E2E Security

Transmission DTLS/TLS

Encryption Algorithms AES/RSA/SHA/ Chacha20

Secure Storage

Memory Isolation

Secure Upgrade

Secure Startup