Morse Micro

MM6102

Datasheet

Product Overview

Morse Micro provides a complete Wi-Fi HaLow connectivity solution. The MM6102 SoC is a single-chip solution, including Radio, PHY, and MAC sections designed in compliance with the IEEE 802.11ah standard, supporting data rates up to 2.1 Mbps. The standard provides for operation in the sub 1GHz license exempt RF bands[1]. The Radio in the MM6102 supports programmable operation in these bands, worldwide, between 700MHz and 950MHz.

The MM6102 has been designed for a simplified Wi-Fi HaLow connection to an external host for applications in which a customer wants to merely replace their prior RF technology with a Wi-Fi HaLow connection.

The RF interface for the MM6102 includes the option to use either the on-chip amplification for typical low-power, low-cost devices, or in conjunction with an external PCB mount power amplifier for Ultra-Long-Reach applications.

The RF receiver features an ultra-high linearity LNA, making the use of external filters unnecessary in many applications.

Security features required for Wi-Fi HaLow product certifications are supported by MM6102.

Battery-operated applications are supported by a combination of features in the MM6102. The IEEE 802.11ah standard provides for extended sleep times of battery-operated STA client devices, with longer durations than other prior IEEE 802.11a/b/g/n/ac generations.

[1] These are typically the unlicensed Industrial Science and Medical (ISM) bands in ITU Region 2 (USA, Canada, South America etc) and are also available in other countries usually with class license requirements.

Contents

1. Product Overview

1.1. Features

- Single Chip Wi-Fi HaLow Transceiver for Low-Power, Long-Reach IoT Applications
- Single-stream max data rate of 2.1 Mbps (MCS=2, QPSK, 2MHz channel, 4 uSec GI)
- Radio supporting worldwide Sub 1GHz frequency bands
  - Frequency Range: 700-950 MHz
  - Channel width options of 1/2 MHz
  - Receive sensitivity: -110dBm
  - Max output power: 8 dBm802.11ah OFDM PHY supporting future WFA HaLow certification
  - BPSK & QPSK Modulation
  - Automatic frequency & gain control
  - Packet detect & channel equalization
  - FEC coding & decoding
  - Supports MCS 0-2 and MCS 10
  - Supports 1 MHz duplicate mode
- 802.11ah MAC supporting future WFA HaLow certification
  - Support for Station (STA) and AP roles
  - Listen-Before-Talk (LBT) access with energy detect
  - 802.11 power save
  - 802.11 fragmentation and defragmentation
  - Power-Saving Target Wake Time (TWT) support for long battery life
  - Automatic and manual MCS rate selection
- SDIO 2.0 compliant slave interface
  - SDIO 2.0 Default Speed (DS) at 25MHz for 12.5MB/s
  - SDIO 2.0 High Speed (HS) at 50MHz max for 25MB/s
  - Support for both 1-bit and 4-bit data mode
  - Support for SPI mode operation
- Power Management Unit (PMU) for various modes of operation
  - Power-down (interrupt driven wake)
  - Hibernate mode (internal / external wake)
  - Target Wake Time mode
  - Active Receive / Transmit mode
  - Integrated DC-DC converter supports a wide range of supply voltages, from 1.7V to 3.
- RF Interface
  - On-chip 8dBm Power Amplifier (PA) with option to use external PA
  - Integrated LNA with option to use an external LNA or Front End Module (FEM)
- Wide spectrum of Security features
  - AES encryption engine
  - Hardware support for SHA1 and SHA2 hash functions (SHA-256, SHA-384, SHA-512)
  - WPA3 including protected management frames (PMF)
  - Opportunistic Wireless Encryption (OWE)

1.2. Applications

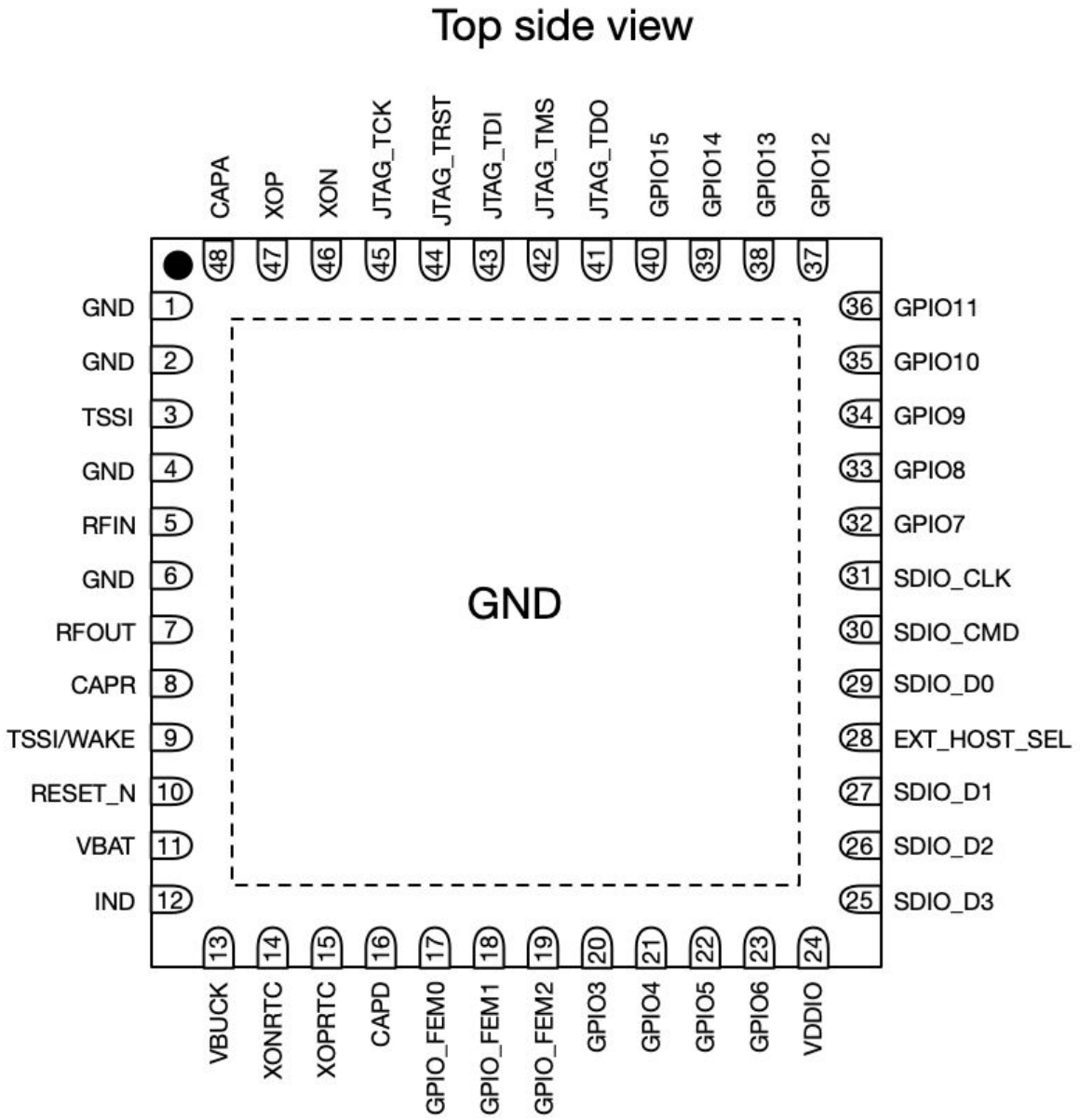
For Internet of Things (IoT) and Machine-to-Machine (M2M) applications such as:

- Surveillance Cameras and Sensors
- Cloud Connectivity
- Low-power Sensor Networks
- Building Automation Systems (BAS)
- Asset Tracking and Management
- Machine Performance Monitors and Sensors
- Building Access Control & Security
- Drone Video and Navigation Communications
- Connected Toys and Games
- Rural Internet Access
- Agricultural and Farm Networks
- Utility Smart Meter and Intelligent Grid
- Proximity Sensors
- Industrial Automation Controls
- Smart Home Automation
- EV Car Chargers
- Appliances
- Construction Site Connectivity
- Smart Signs and Kiosks
- Retail Point-of-Sale Terminals
- Vehicle-to-Vehicle Communications
- IP Sensor Networks
- Biometric IDs and Keypads
- Warehouse Connectivity
- Intelligent Lighting Controls
- BT/ZigBee(™)/Z-Wave(™) to Wi-Fi HaLow Gateways
- Wi-Fi to Wi-Fi HaLow Bridges
- Wi-Fi HaLow Client Adapters/Dongles
- Smart City Network

2. Pin Descriptions

The MM6102 device has 48-pins, which are described in this section.
The following illustration shows the top view of the MM6102 pin Diagram.

Figure 1: Pin Diagram



Morse Micro
reaching farther™

Morse Micro Pty. Ltd. Corporate Headquarters
Level 2, 63 Foveaux Street, Surry Hills, NSW
2010, AUSTRALIA

Morse Micro – USA
200 Spectrum Drive, Suite 4067, Irvine, CA
92618, UNITED STATES

Morse Micro – China
77 Xueyuan lu Hangzhou,
33 CHINA

USA: +1.949.501.7080
Australia: +61.02.905.45922
China: +86.571.229.30277
Email: sales@morsemicro.com
www.morsemicro.com

About Morse Micro

Morse Micro is producing IEEE 802.11ah / Wi-Fi HaLow solutions for Internet of Things (IOT) - based on a newly certified Wi-Fi standard called HaLow.
Morse Micro is a VC-backed Startup headquartered in Sydney, Australia
Learn more at www.morsemicro.com