Wireless Technologies

RF Integrated Module

WITECH **MD868N25-1AS**

868 MHz - Narrow Band - 25 mW
Core 1 - Footprint A - SMA RF Port

Rev 1.0 02/13

Witech MD868N25-1AS is a 868 MHz, narrow band 25 mW fully integrated (hardware/firmware) RF module specially suited for OEM integrators who wish a high optimized and completely designed RF platform with true low power and long range features, achieving the fastest time to market and the lowest development risk. The module includes a SMA-type RF Port for greater flexibility in antenna selection, according to the size and performance specifications. This narrow band solution is specially designed for applications requiring ultra-high sensitivity for extreme link-budget, like ultra low power ad-hoc networks with extensive coverage.

General Features

- Fully Integrated RF Module (Hardware/Firmware)
- License Free 868 MHz ISM Band
- Narrow Band for Extreme Link-Budget
- Ultra Low Power Consumption
- Long Range: ≈ 2000 m (line-of-sight)
- Fastest Time to Market, Lowest Development Risk
- Multiple I/O Interfaces and Assembly Options

RF Performance

- Output Frequency Range: 862-870 MHz
- Channel Spacing: 12.5, 25, 50 KHz
- Output Power Range: -20 to 13 dBm
- Antenna Port Connection: SMA Port 50 Ω
- Modulations: GFSK
- Radio Data Rates: 0.1 to 25.0 Kbps
- Sensitivity (BER < 10^{-3})
  - 130 dBm (0.1 Kbps)
  - 121 dBm (1.0 Kbps)
  - 114 dBm (9.6 Kbps)
  - 113 dBm (25.0 Kbps)
- Frequency Stability 2.5 ppm (Temp Compensated)
- Compliant with ETSI EN 300 220 Standard

Power Supply and Consumptions

- Voltage Range: 3 to 6 V
- Internal Ultra Low Power Regulator Included
- Consumptions:
  - Standby 5 µA
  - Peak TX 43 mA
  - Peak RX 26 mA
  - Average <60 µA (RX 1 sec latency, 9.6 Kbps)

Temperature Range

- Storage Temperature: -40º to 85º C
- Operating Temperature: -30º to 75º C

Dimensions

- Size: 40 x 30 x 7.65 mm
- Weight: 6 g

Firmware Stack Options

- Firmware Stack Options Suited for Differents Applications Types
  - WITECH LINK STACK
  - WITECH ULP-NET STACK
  - WITECH METERING STACK
  - WITECH RTLS STACK
  - WITECH DOMO STACK
- Wireless Link/Network Bootloader (WLBOOT/WNBOOT) Included for Complete Remote Firmware Update (Witech Stack and Application)
- Complete and Easy to Use Witech APIs in C Programming Language for all Stack Options:
 - WITECH LINK STACK API
  - WITECH ULP-NET STACK API
  - WITECH METERING STACK API
  - WITECH RTLS STACK API
  - WITECH DOMO STACK API
- For Every Stack, same API for Two Integration Scenarios:
  - Local Integration on Witech CPU
  - External Integration in a Second CPU (USB/Serial interface). Cross-Platform Libraries for:
    - Low Level Integration (ARM, MIPS, MSP430, AVR, COLDFIRE, ...)
    - High Level Integration (Windows, Windows CE/Mobile, Linux, ...)

Applications

- Automatic Meter Reading Networks (AMR) for water, electricity and gas.
- General Purpose Ad-hoc Sensor Networks
- Wireless Domotic Systems
- Industrial Control
- Solar Panel Monitoring Networks
- Marinas Dock Pedestals
- Real Time Location Systems (RTLS)
- Indoor Navegation and Access Control
- Healthcare and Wellness Networks
- Weather Stations
- Watering and Irrigation Control Networks
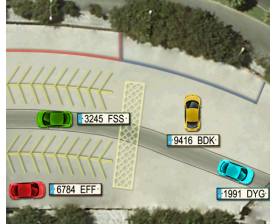
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868 MHz - Narrow Band - 25 mW
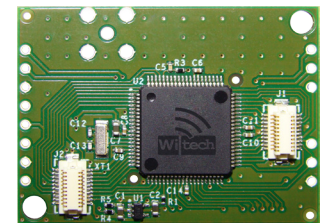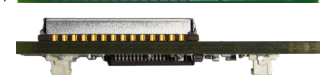**Core 1 - Footprint A - SMA RF Port**

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Internal CPU: Witech Core 1

- Flash based Ultra Low Power Microcontroller
- 16-Bit RISC Architecture
- 2.2V to 3.6V Operation
- Max Frequency: 25 MHz
- Ultra Low Power Consumption:
  - 0.1 µA RAM retention
  - 2.5 µA RTC operative
  - 165 µA/MIPS in active state
- Wake-up from Standby Mode < 5 µs
- Flash Options: up to 256 KBytes
- RAM Options: 16 KBytes
- Integated LDO, Monitoring and Brownout
- Integrated Peripherals
  - 3 16-Bit Timers, 15 Cap/Comp Channels
  - Up to 4 Serial Modules (UART/SPI/I2C/IRDA)
  - RTC
  - ADC (12-Bit, 16 Channels)
  - DMA (3 Channels)
  - Hardware Multiplier (32-Bit)
  - External Interrupt Inputs (up to 16)
  - Embedded Emulation Module (JTAG/SBW)

Support for Witech Devices

- HW Design Support
- FW/SW Design Support
  - HW Abstraction Layers (CPU and Peripherals)
  - Libraries for Peripherals and Basic Utilities
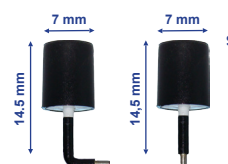 - Tutorials and Examples

Assembly Options and Accessories

- SMD Assembly Option (Full Interface)
  - 40 (2 x 20) pins Interface (HIROSE DF-12 Series)
  - 3 Stacking Heighs: 3.5, 4 or 5 mm
  - Vin, 3V, GND and 34 Input/Output Ports
- Through-Hole Assembly Option (Basic Interface)
  - 14 (8+3+3) pins Interface (2.54 mm)
  - Standard 2.54 mm Cables, Headers and Sockets
  - Vin, 3V, GND, SBW, 8 E/S (UART, SPI, I2C, ADC, INT)
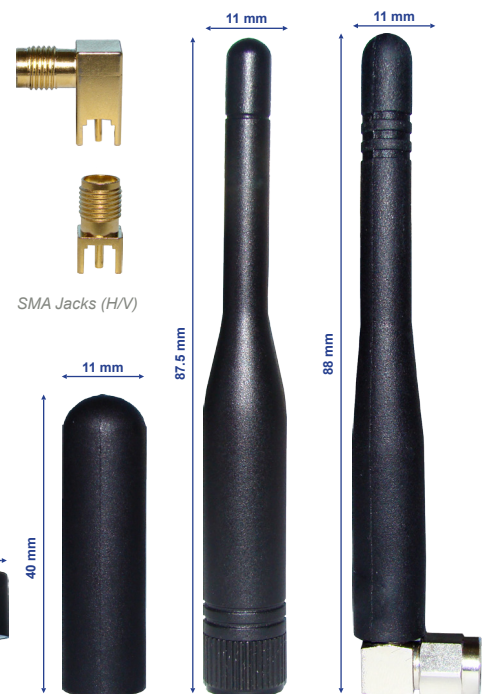- Multiple Antenna Options

Note: All Images on this Page are Actual Size

SMA Jacks (H/V)

SH 3.5 mm **SH 4 mm** **SH 5 mm**

Matting Connectors (3 Stacking Heighs)
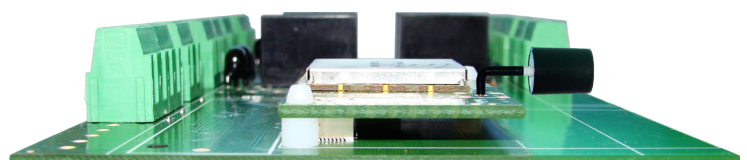
SH 3.5 mm **SH 5 mm**

Plastic Support Spacers

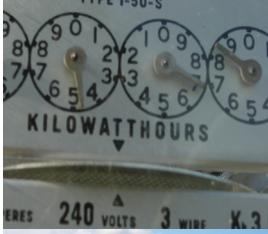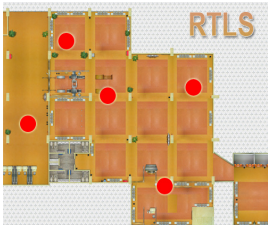*PCB Mount Helical Antennas*

Whip Style Antennas

SMD Assembly Example With Plastic Spacer (Lateral View)

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FIRMWARE STACK OPTIONS

Witech Link Stack

- Data Interleaving, Data Whitening
- Forward Error Correction (FEC/BCH)
- Automatic Frequency Control (AFC)
- Frequency Hopping Spread Spectrum (FHSS)
- Encryption (AES 128)
- Quality of Service Management (RSSI)
- Output Power Control, Power Amplifier Ramping
- Automatic Sensitivity Control
- Comunications Features
  - Point to point, Multicast, Broadcast, Mutihop
  - Asynchronous/Synchronous
  - Connection-Based/Connection-Less
  - ACK/NACK
  - CS/LBT (Carrier Sense/Listen Before Talk)

WITECH LINK STACK

USR APP (User application)	WLBOOT (Wireless Link Bootloader)
WITECH LiNK API	
LiNK (Link Layer, MAC)	
PHY (Physical Layer)	

Witech ULP-NET Stack

- Witech Link Stack + ULP-NET Layer
- True Ultra Low Power Ad-hoc Network
- Star, Tree or Mesh Network
- Full Mesh or Partial Mesh (Centralized)
- Dynamic Topology and Routing
- No different logical Devices (Planning Exempt, all Nodes are Routers and Endpoints)

WITECH ULP-NET STACK

USR APP (User application)	WNBOOT (Wireless Network Bootloader)
WITECH ULP-NET API	
ULP-NET (Ultra Low Power Network Layer)	
LiNK (Link Layer, MAC)	
PHY (Physical Layer)	

Witech Metering Stack

- Witech ULP-NET Stack + Metering Application Layer
- Fast Time to Market Solution for Complex Ultra Low Power Metering Network Systems
- Multiple Meter Interface Options:
  - Pulse Meters (up to 4 Meters per Node)
  - Bus Meters (Modbus, M-bus, CzBus, ...)
  - Serial (UART/SPI/I2C) for General Purpose
- Powerful Programming of Meter Readings
- Automatic Leak Detection, Anomalous Consumptions, Special Monitorig intervals, ...
- Remote Actuation Features: Supply Cutt off, Alarms Signaling, Redundancy Management
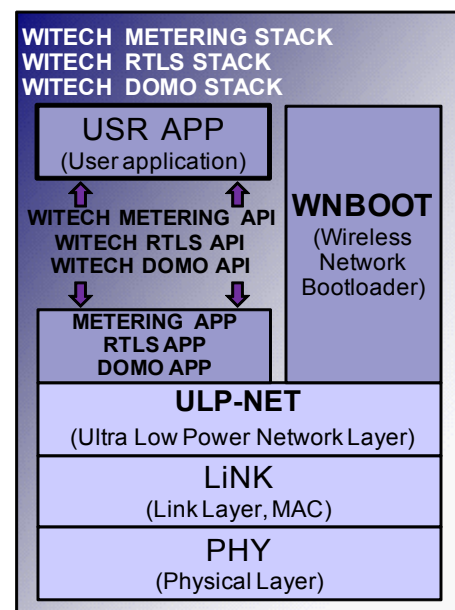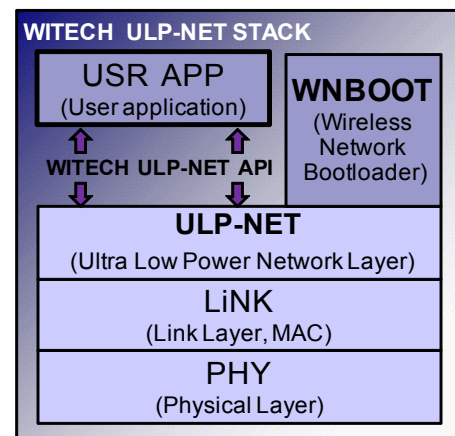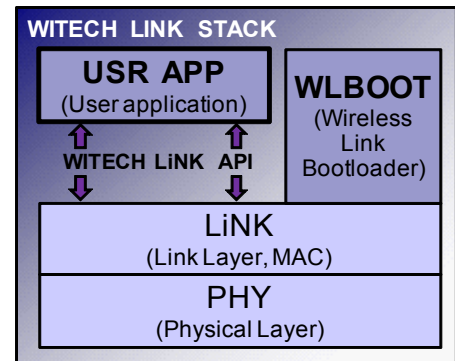- Prepaid Management, Simple and Mixed

Witech RTLS Stack

- Witech ULP-NET Stack + RTLS Application Layer
- Fast Time to Market Solution for Complex Ultra Low Power Real Time Location Network Systems
- Types of devices: Active Tags, Beacon nodes and Dongle Nodes
- Optimal Solution for Indoor Location and Navegation
- High Level Utilities for Access Control

Witech DOMO Stack

- Witech ULP-NET Stack + DOMO Application Layer
- Fast Time to Market Solution for Complex Ultra Low Power Domotic Network Systems
- Types of devices: General purpose Analog and Digital Input/Output Devices, and Specific Devices (Light Control, Climate Control, Shutter and Blind Control, Dongle, ...)
- High Level Utilities: Scenarios, Programming, ReStart, ...

WITECH METERING STACK
WITECH RTLS STACK
WITECH DOMO STACK

USR APP (User application)	WNBOOT (Wireless Network Bootloader)
WITECH METERING API WITECH RTLS API WITECH DOMO API	
METERING APP RTLS APP DOMO APP	
ULP-NET (Ultra Low Power Network Layer)	
LiNK (Link Layer, MAC)	
PHY (Physical Layer)	

Ultra Low Power High Performance Radio Modules for Easy Integration

www.witechradio.com