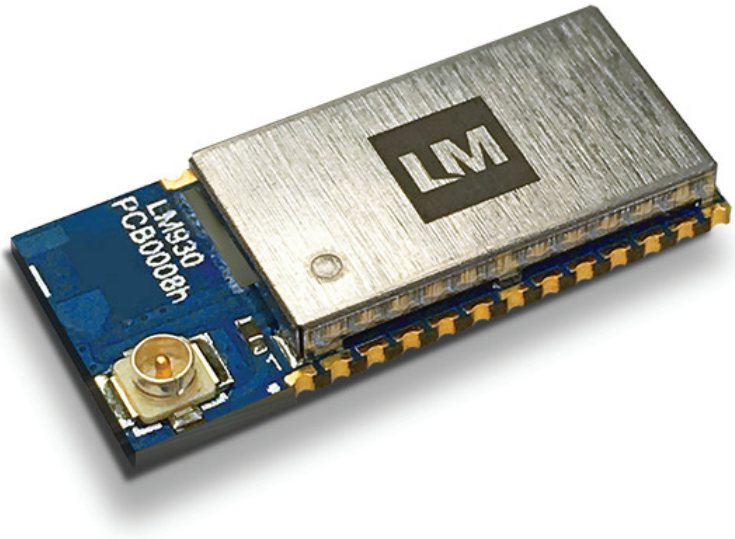
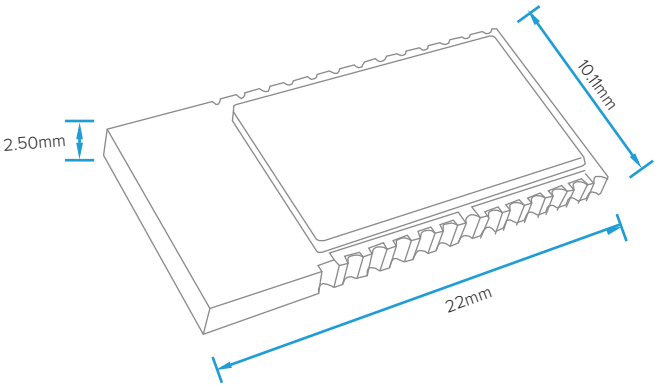
# LM930 Bluetooth® low energy Module (with IPEX Connector)

## Standalone (With Embedded Bluetooth® v4.1 Stack)

| | |
|---|---|
| Product | LM930 |
| Part No | See Last Page |
| Revised | 25/AUG/2017 |




## Features

- Bluetooth® v4.1 specification
- 14 mA Current Consumption (at 0 dBm Tx Output Power)
- IPEX Connector
- 9 dBm Tx Output Power (Max) and -92 dBm Rx Sensitivity
- Over-the-Air Upgrade (OTAU) available
- Application Firmware Support
- IoT Applications available including Serial over GATT, Eddystone™ Beacon and Cloud Sensor & Cloud Collector
- Fully integrated module with no additional components required
- I²C and UART
- 9 digital and 3 analogue I/O (10-bit ADC)
- Wake-up interrupt and Watchdog timer
- 4 PWM channels
- 22mm x 10.11mm x 2.50mm
- SMT Side and Bottom Pads for easy production
- See our website for this products certifications
- RoHS, REACH and WEEE Compliant Solution

## Overview

The LM930 Bluetooth® low energy module is designed for use within embedded systems. It is implemented as a peripheral device within a product, while saving the developer valuable PCB space. The LM930 enables wireless communication with other nearby Bluetooth® low energy devices (e.g. iOS and Android) using a highly power efficient connection. The transmission output power ranges from 0 dBm to 9 dBm and can be configured to provide an extended battery life or a longer communication range.

This single core standalone module combines a Bluetooth® low energy radio using a Bluetooth® v4.1 stack, plus a microcontroller with 512 kB EEPROM for running the application. The LM930 incorporates 27 pin outs including UART and I²C for interfacing with a wide range of peripheral devices like sensors. It's SMT side and bottom pads allow for easy manufacture and placement into your product. Application firmware and configuration settings can be preloaded to the module before supply.

LM offer bespoke integration into your product by supporting your developer. We can also assist in the development of new IoT applications for the module. IoT applications such as Serial over GATT, iBeacon™ and Key Fob (with RGB LED Controller) are available with the module's LM53X development kits. The firmware is customisable to meet your requirements.

The IPEX connector provides the developer with the flexibility to add an antenna that suits the products unique requirements, such as dipole, IC or PCB antenna types. The selected antenna can be placed anywhere on the product, which is useful for avoiding any metallic surfaces of the product housing and a noisy environment of the product's PCB. Depending on the antenna used a longer range, omnidirectional or unidirectional RF signal is produced.

# LM930 Bluetooth® low energy Module (with IPEX Connector)

Standalone (With Embedded Bluetooth® v4.1 Stack)

| | |
|---|---|
| Product | LM930 |
| Part No | See Last Page |

## General Specification

### Wireless

| | |
|---|---|
| Bluetooth® Standard | v4.1 |
| Module Type | Standalone (Embedded Bluetooth® Stack) |
| Profiles | GATT-Based |

### Hardware

| | |
|---|---|
| Chipset | Qualcomm® |
| Antenna | IPEX Connector |
| Microcontroller (MCU) | 16-bit RISC |
| EEPROM Memory | 512 kB |
| RAM | 64 kB |
| Programming Interface | SPI |
| Interfaces | I²C, UART, AIO and PIO |
| Power Supply | 3V3 (3V6 Max) |
| Crystal Oscillators | 32 kHz and 16 MHz |
| Development Kit | LM53X |

### RF Characteristics

| | |
|---|---|
| Tx Output Power | 0 dBm to 9 dBm |
| Rx Sensitivity | -92 dBm (Typical) |
| Current Consumption (Cont.Tx) | 14 mA (at 0 dBm), 15.9 mA (at 3 dBm) and <25 mA (at 9 dBm) |
| Current Consumption (Cont.Rx) | 22 mA (Typical) |
| Range (in open space) | 110m + (with a 2 dBi antenna) |
| Data Rate | Up to 1 Mbps |
| Frequency | 2.4 GHz to 2.485 GHz |

### Physical Characteristics

| | |
|---|---|
| Operating Temperature | -30°C to +85°C |
| Dimensions (L x W x H) | 22mm x 10.11mm x 2.50mm |
| Weight | 0.82g |
| Certifications | See our website for this products certifications |
| Compliance | RoHS, REACH and WEEE Compliant Solution |

# LM930 Bluetooth® low energy Module (with IPEX Connector)

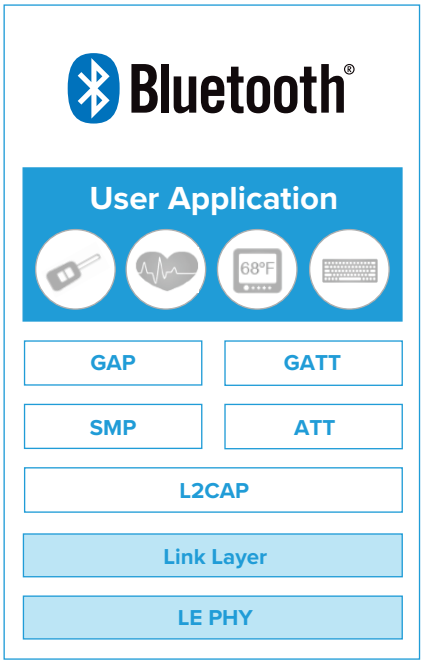
Standalone (With Embedded Bluetooth® v4.1 Stack)

| | |
|---|---|
| Product | LM930 |
| Part No | See Last Page |

## IoT Applications

The LM930 standalone module is capable of running your Bluetooth® low energy application. Requiring no external hardware and supports a wide range of applications such as:

- Alert Tag
- Automotive Key Fob
- Beacon
- Blood Pressure Sensor
- Cycling Speed and Cadence Sensor
- Environment Sensor
- Health Thermometer
- Heart Rate Sensor
- Keyboard & Mouse
- Multifunction Steering Wheel
- Security Tag
- Serial Communication
- Time Client
- Temperature and Pressure
- Weight Scale




LM Technologies offer application support, including assisting the developer and creating new applications. LM provide firmware that can be customised to your specification.

Firmware available:

- Cloud Sensor
- Cloud Collector
- Eddystone™ Beacon
- URL Beacon
- iBeacon™
- Serial Server
- Console
- Key Fob (with RGB LED Controller)

# LM930 Bluetooth® low energy Module (with IPEX Connector)

Standalone (With Embedded Bluetooth® v4.1 Stack)

| | |
|---|---|
| Product | LM930 |
| Part No | See Last Page |

## Radio Frequency Characteristics

### Transmit Power Measurements

#### Crystal Trim

| Specification | Measurement | Unit |
|---|---|---|
| Frequency Offset ±1KHz | 0.75KHz | KHz |
| Trim Value | 18 | - |

#### Output Power

| Specification | | | Measurement | | | | | | Unit |
|---|---|---|---|---|---|---|---|---|---|
| | | | 2402MHz (CH0*) | | 2442MHz (CH20*) | | 2480MHz (CH39*) | | |
| | Ppk | Pav | Pav | Ppk | Pav | Ppk | Pav | Ppk | |
| Low Energy | <Pav +3 dBm | -20 dBm<Pave<10dBm | 7.6 | 8 | 8.0 | 8.4 | 8.9 | 9.1 | dBm |

### Receive Measurements

#### Limitation Sensitivity

| Specification | | Measurement | | | Unit |
|---|---|---|---|---|---|
| | | 2402MHz (CH0*) | 2442MHz (CH20*) | 2480MHz (CH39*) | |
| Low Energy | BER≤30.8% for receiving power is -70 dBm or better. | -93 | -92 | -93 | dBm |

#### Maximum Input Level

| Specification | | Measurement | | | Unit |
|---|---|---|---|---|---|
| | | 2402MHz (CH0*) | 2442MHz (CH20*) | 2480MHz (CH39*) | |
| Low Energy | PER≤30.8% for receiving power is -10 dBm or better. | 0 | 0 | 0 | % |

## Current Consumption Test

### Test Condition

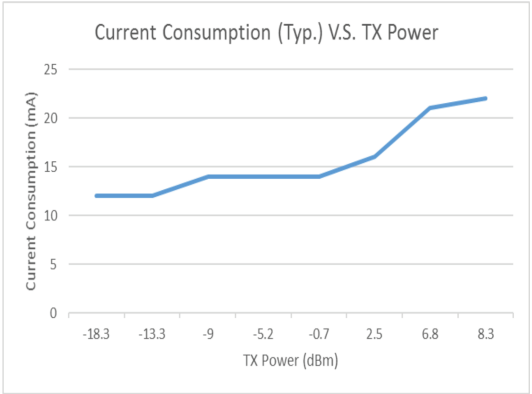
(BLE PRBS9 Channel 2442MHz Package Length 37)

Continuous Tx: 14 mA (at 0 dBm), 15.9mA (at 3dBm) and <25 mA (at 9dBm)

Continuous Rx: 22 mA (typ.

Power boot up: 3 mA (typ.)

Figure



# LM930 Bluetooth® low energy Module (with IPEX Connector)

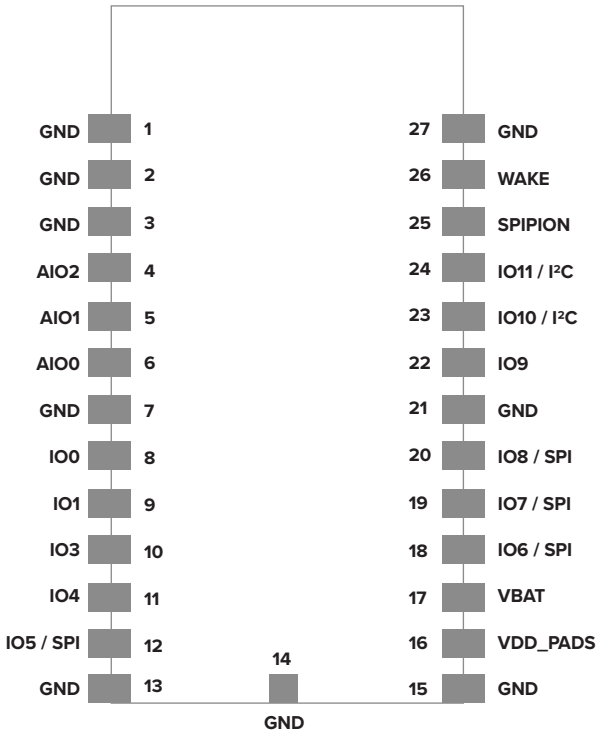
Standalone (With Embedded Bluetooth® v4.1 Stack)

Product LM930
Part No See Last Page

## Powering

Use VDD_PADS (Pin 16) or VBAT (Pin 17) to power the module.

## Pin Out





+44(0) 207 428 2647 | sales@lm-technologies.com

# LM930 Bluetooth® low energy Module (with IPEX Connector)

Standalone (With Embedded Bluetooth® v4.1 Stack)

Product LM930
Part No See Last Page

## Pin Assignments

| Pin | Name | Type | Description | Min | Typical | Max |
|---|---|---|---|---|---|---|
| 1 | GND | Ground | Common Ground | | 0V | |
| 2 | GND | Ground | Common Ground | | 0V | |
| 3 | GND | Ground | Common Ground | | 0V | |
| 4 | AIO2 | Input | Analogue Input | | | VDD |
| 5 | AIO1 | Input | Analogue Input | | | VDD |
| 6 | AIO0 | Input | Analogue Input | | | VDD |
| 7 | GND | Ground | Common Ground | | 0V | |
| 8 | IO0 | I/O | UART TX | | | VDD |
| 9 | IO1 | I/O | UART RX | | | VDD |
| 10 | IO3 | I/O | Programmable Input Output (PIO) | | | VDD |
| 11 | IO4 | I/O | Programmable Input Output (PIO) | | | VDD |
| 12* | IO5 / SPI | I/O | Programmable Input Output (PIO) / DEBUG_CLK | | | VDD |
| 13 | GND | Ground | Common Ground | | 0V | |
| 14 | GND | Ground | Common Ground | | 0V | |
| 15 | GND | Ground | Common Ground | | 0V | |
| 16 | VDD_PADS | Power | Positive supply for all digital and analogue I/O Pins | 1V2 | 3V3 | 3V6 |
| 17 | VBAT | Power | Module battery power supply DC | 1V8 | 3V3 | 3V6 |
| 18* | IO6 / SPI | I/O | Programmable Input Output (PIO) / DEBUG_CS# | | | VDD |
| 19* | IO7 / SPI | I/O | Programmable Input Output (PIO) / DEBUG_MOSI | | | VDD |
| 20* | IO8 / SPI | I/O | Programmable Input Output (PIO) / DEBUG_MISO | | | VDD |
| 21 | GND | Ground | Common Ground | | 0V | |
| 22 | IO9 | I/O | Programmable Input Output (PIO) | | | VDD |
| 23 | IO10 / I²C | I/O | Programmable Input Output (PIO) / SDA | | | VDD |
| 24 | IO11 / I²C | I/O | Programmable Input Output (PIO) / SCL | | | VDD |
| 25 | SPIPION | Input | High to enable the SPI debug interface, Low to enable PIO | | | VDD |
| 26 | WAKE | Input | Toggle to wake from Dormant Mode | | | VDD_BAT |
| 27 | GND | Ground | Common Ground | | 0V | |

* for SPI at P12, P18, P19 and P20 set P25 to High.

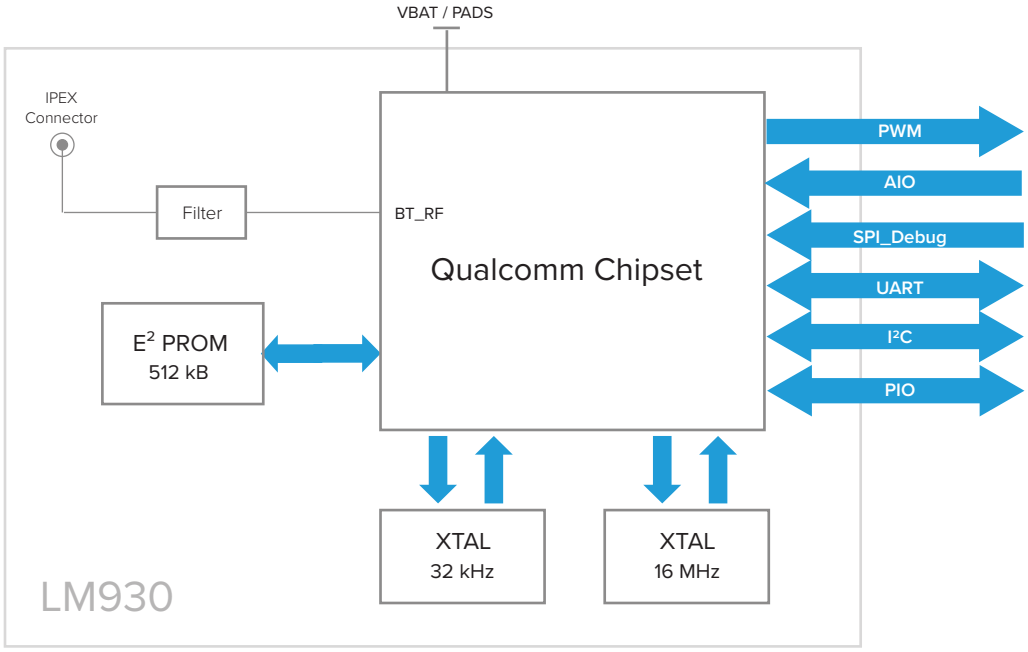
* for PIO at P12, P18, P19 and P20 set P25 to Low.

# LM930 Bluetooth® low energy Module (with IPEX Connector)

Standalone (With Embedded Bluetooth® v4.1 Stack)

| | |
|---|---|
| Product | LM930 |
| Part No | See Last Page |

## Module Block Diagram



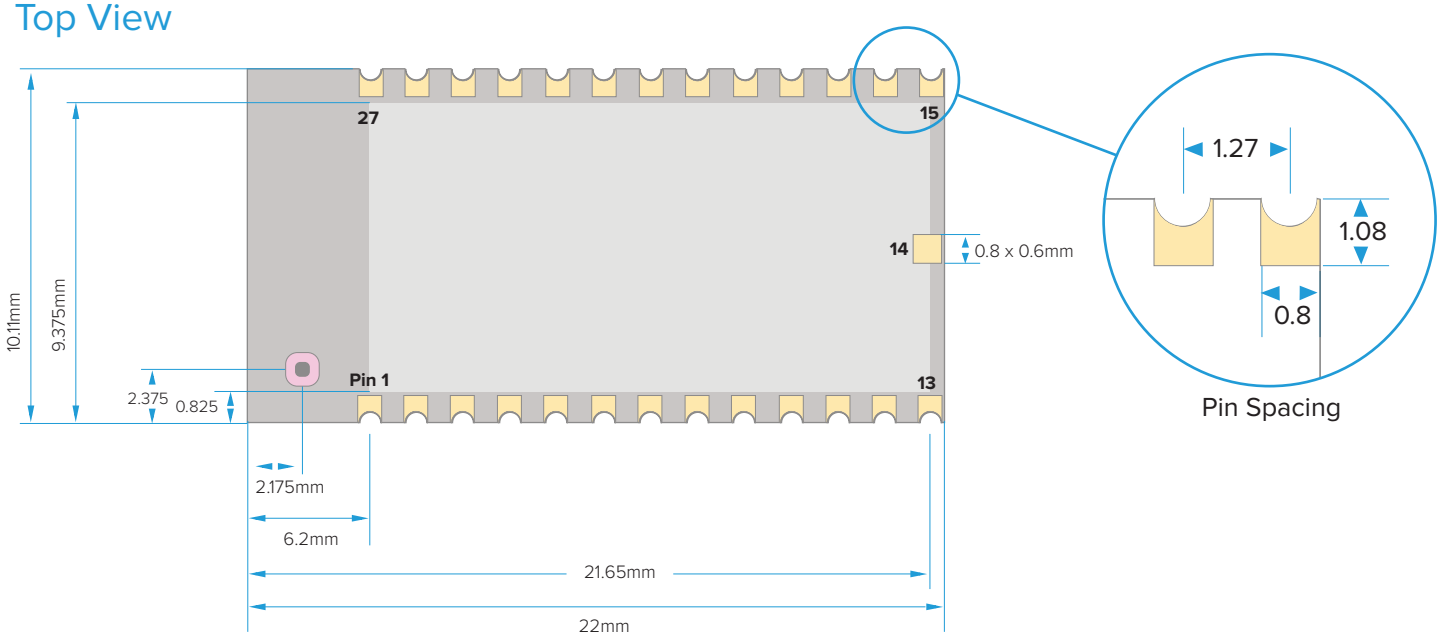
# LM930 Bluetooth® low energy Module (with IPEX Connector)

Standalone (With Embedded Bluetooth® v4.1 Stack)

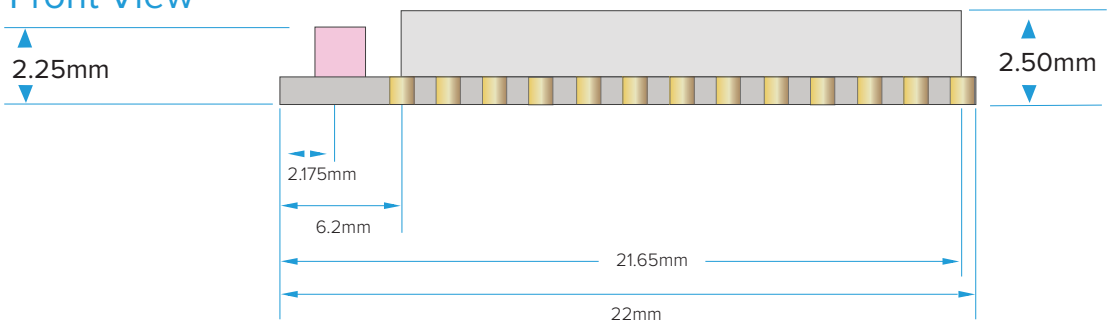
| | |
|---|---|
| Product | LM930 |
| Part No | See Last Page |

## Physical Dimensions

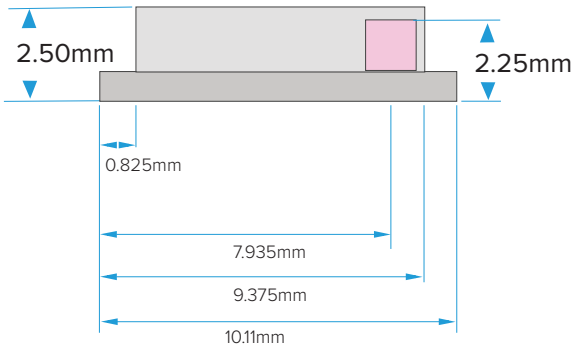
### Top View




### Front View




### Side View

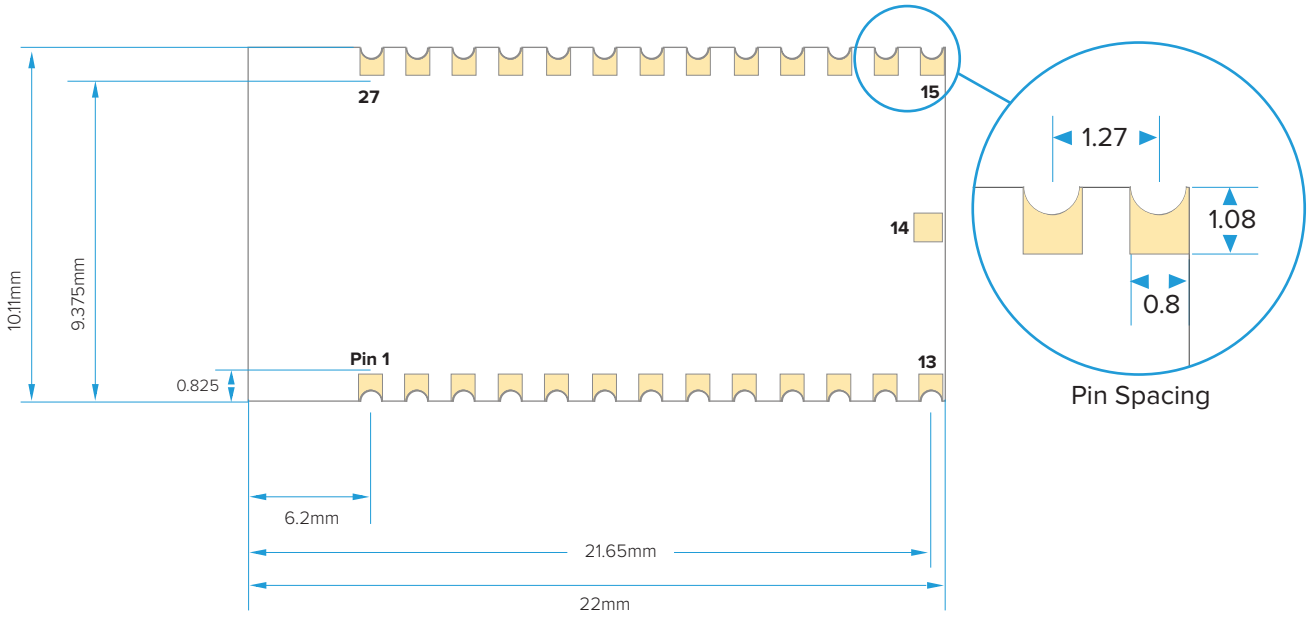


# LM930 Bluetooth® low energy Module (with IPEX Connector)

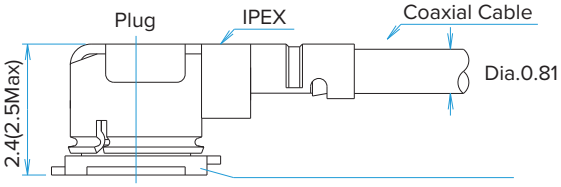
Standalone (With Embedded Bluetooth® v4.1 Stack)

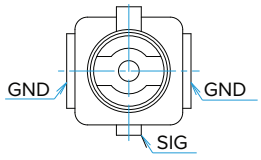
| | |
|---|---|
| Product | LM930 |
| Part No | See Last Page |

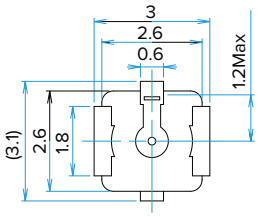
## PCB Footprint



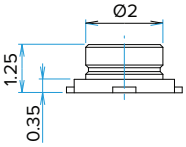

## IPEX Connector




IPEX SMT





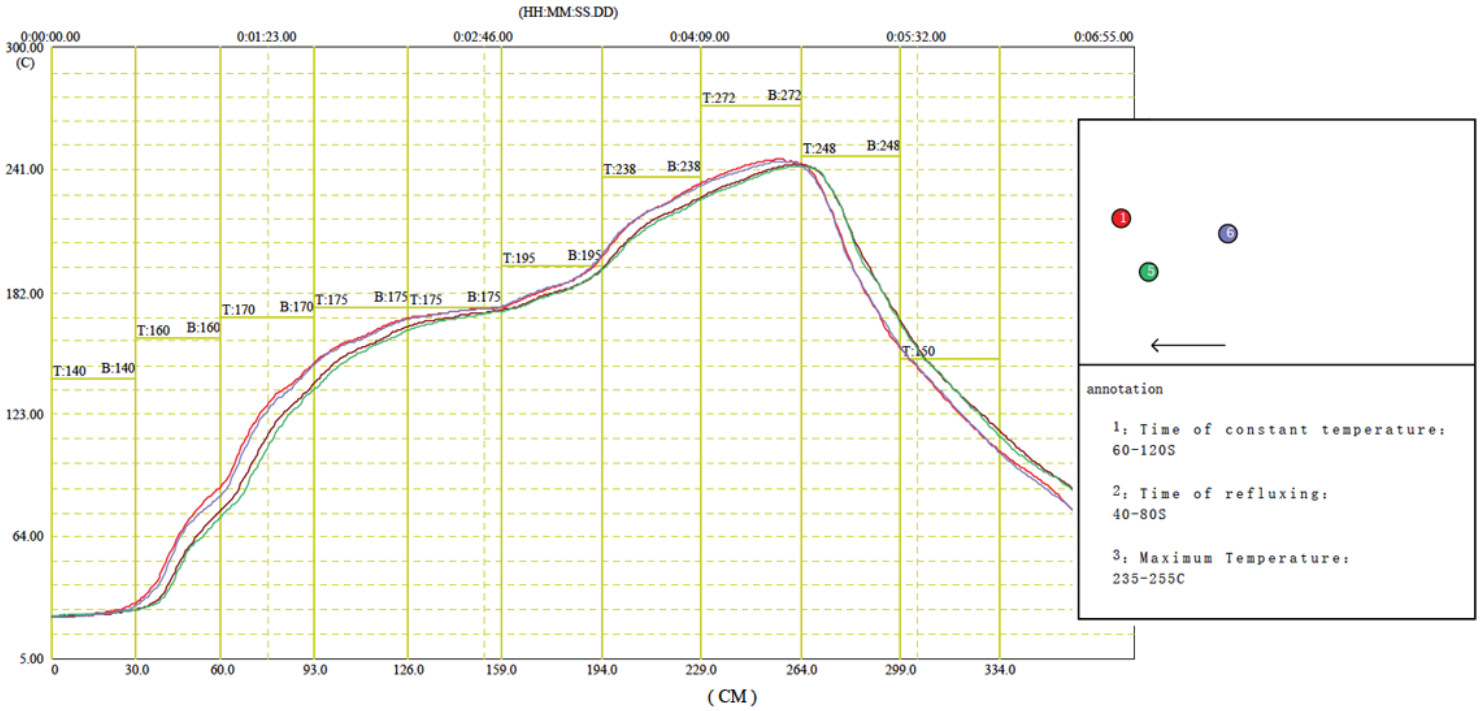
+44(0) 207 428 2647 | sales@lm-technologies.com

# LM930 Bluetooth® low energy Module (with IPEX Connector)

Standalone (With Embedded Bluetooth® v4.1 Stack)

Product LM930
Part No See Last Page

## Soldering Reflow Chart




| | Preheat zone slope | | Immersion time 150 to 180℃ | | Refluxing time 220℃ | | Maximum Temperature | | cooling zone slope | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2.80 | 80.00% | 80.00 | -50.00% | 72.50 | 62.50% | 246.5 | 43.33% | -2.75 | -10.00% |
| | 2.50 | 50.00% | 76.00 | -60.00% | 68.00 | 40.00% | 244.0 | 26.67% | -2.33 | -26.67% |
| | 2.50 | 50.00% | 75.00 | -62.50% | 65.50 | 27.50% | 243.0 | 20.00% | -2.36 | -25.45% |
| | 2.70 | 70.00% | 77.00 | -57.50% | 72.50 | 62.50% | 245.4 | 36.00% | -2.57 | -17.33% |

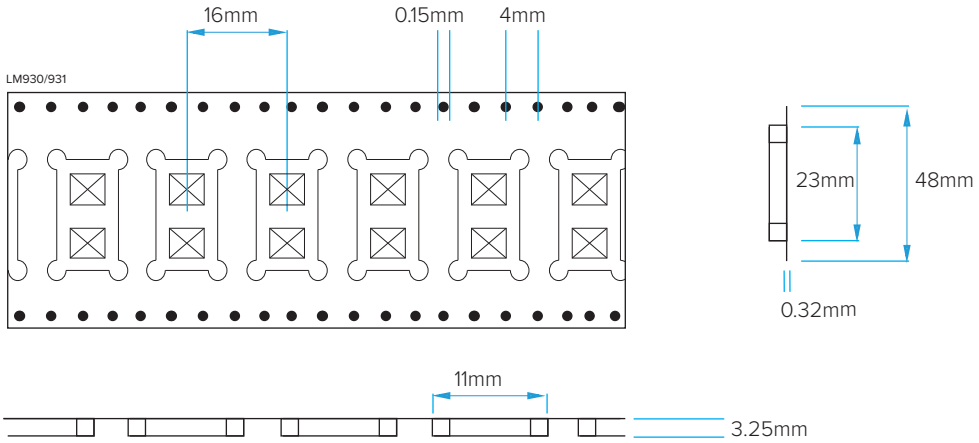
# LM930 Bluetooth® low energy Module (with IPEX Connector)

Standalone (With Embedded Bluetooth® v4.1 Stack)

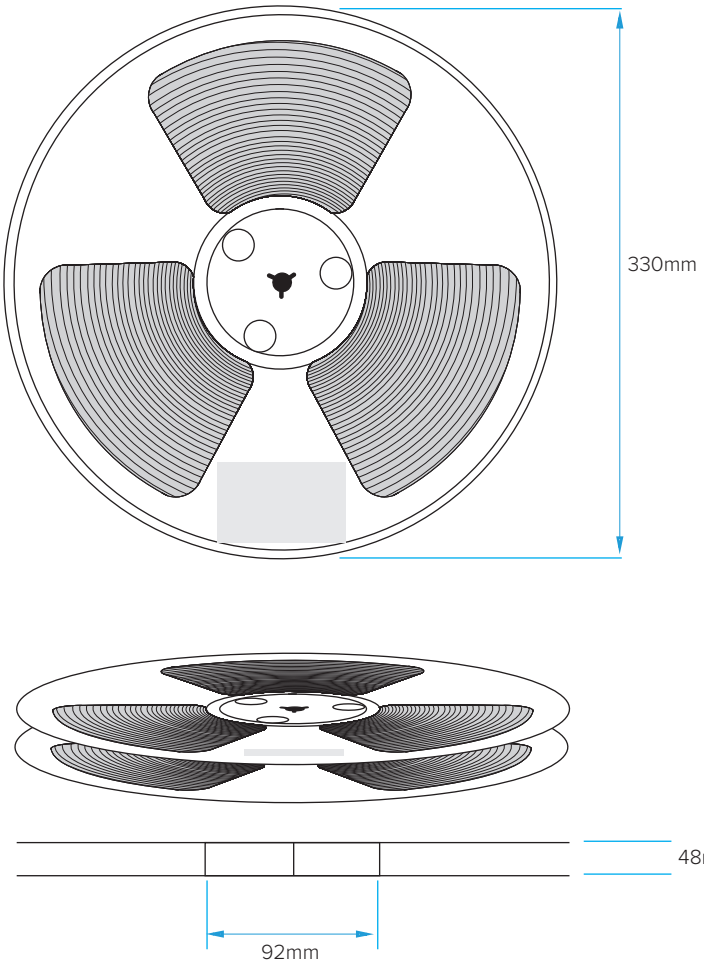
| | |
|---|---|
| Product | LM930 |
| Part No | See Last Page |

## Tape and Reel Packaging

### Tape Dimensions




### Reel Dimensions




#### Notes

- Carton Dimensions (L x W x H): 360mm x 290mm x 370mm

#### Quantities

- 1250 modules per Tape
- 4 Boxes per Carton
- 5000 modules per Carton

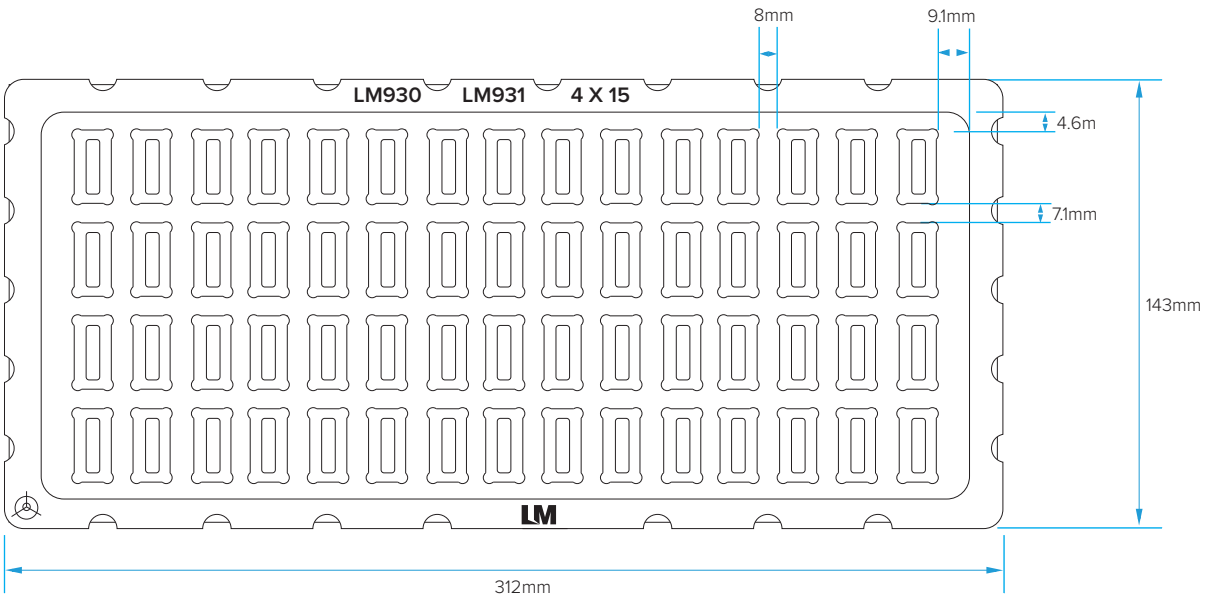
# LM930 Bluetooth® low energy Module (with IPEX Connector)

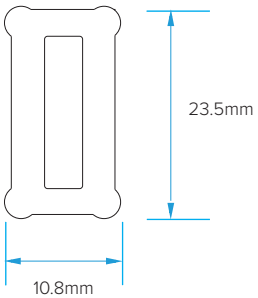
Standalone (With Embedded Bluetooth® v4.1 Stack)

| | |
|---|---|
| Product | LM930 |
| Part No | See Last Page |

## Tray Packaging

### Tray Dimensions




### Notes

- Anti-Static PS Tray, Black .
- Electrical Resistance: 1 MΩ< R< 100MΩ .
- Thickness: T= 0.8 mm
- Carton Dimensions (L x W x H):
  360mm x 325mm x 160mm

### Quantities

- 60 modules per Tray
- 600 modules per Box
- 4 Boxes per Carton
- 2400 modules per Carton

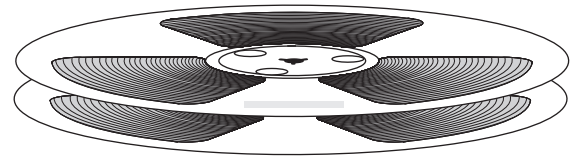
# LM930 Bluetooth® low energy Module (with IPEX Connector)

Standalone (With Embedded Bluetooth® v4.1 Stack)

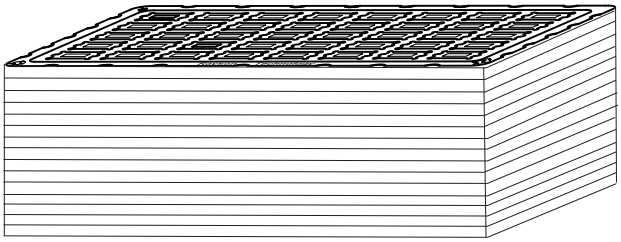
Product LM930
Part No See Last Page

## Packaging for Tape & Reel / Tray

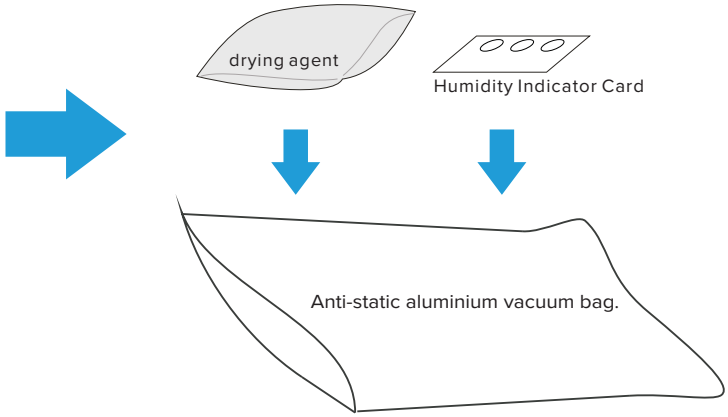
The trays/reels are stacked and inserted into an anti-static vacuum bag, with the anti-static, model name and moisture sensitive labels affixed.



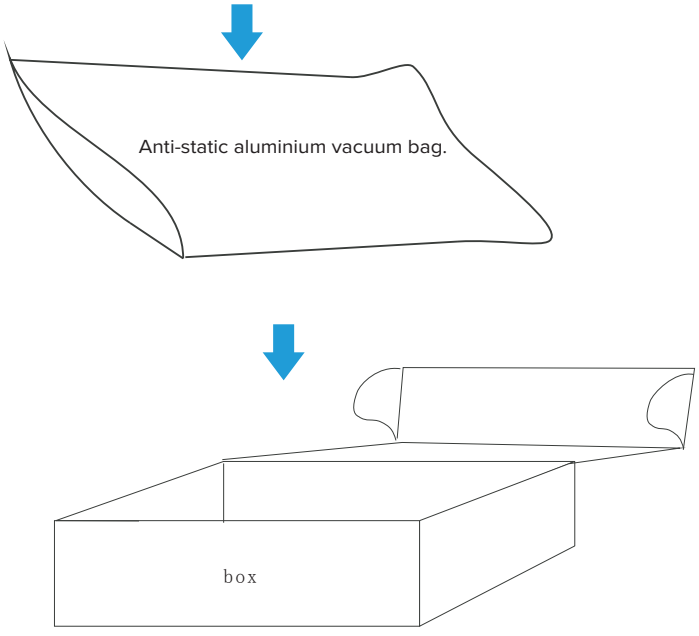
Reels are place within a vacuum bag.

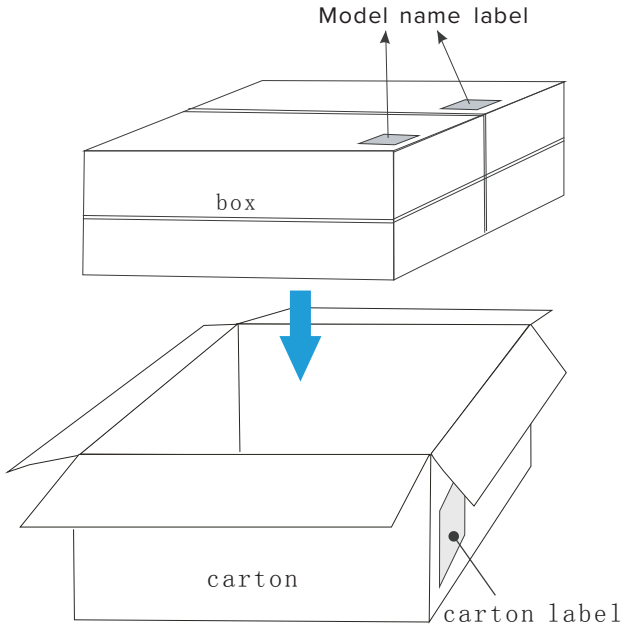


Trays are stacked up with an empty tray on the top.




The vacuum bag is placed inside the box and a model name label affixed on the front-side of each box.



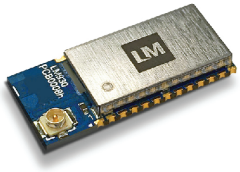

Each carton contains 4 boxes.

# LM930 Bluetooth® low energy Module (with IPEX Connector)

Standalone (With Embedded Bluetooth® v4.1 Stack)

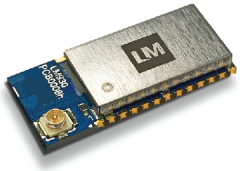
| | |
|---|---|
| Product | LM930 |
| Part No | See Below |

## LM930 Packaging Options



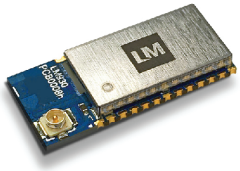
930-0634

**LM930 Module**
1 x LM930 SMT Plug & Play IPEX Connector Module
Retail Pack (RP)



930-0635

**LM930 Module**
1 x LM930 SMT Plug & Play IPEX Connector Module
Tray



930-0633

**LM930 Module**
1 x LM930 SMT Plug & Play IPEX Connector Module
Tape & Reel

# X-ON Electronics

Largest Supplier of Electrical and Electronic Components

***Click to view similar products for*** LM Technologies ***manufacturer:***

Other Similar products are found below :

LM400 LM832-0476 LM910-0630 LM930-0635 LM931-0552 LM506 LM1010-0970 530-0653 530-0654 LM254 LM780 LM252 LM072-3115 LM253 LM251 LM822-1459