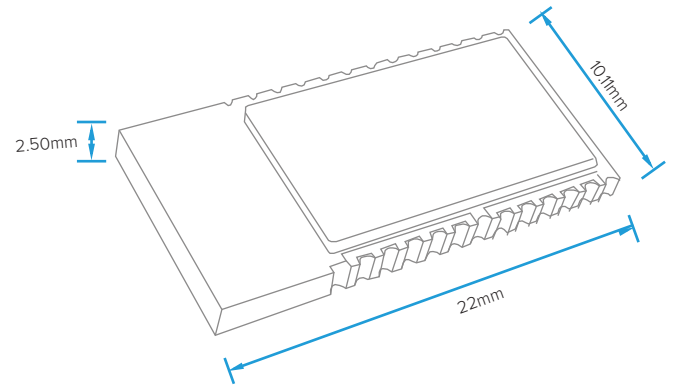
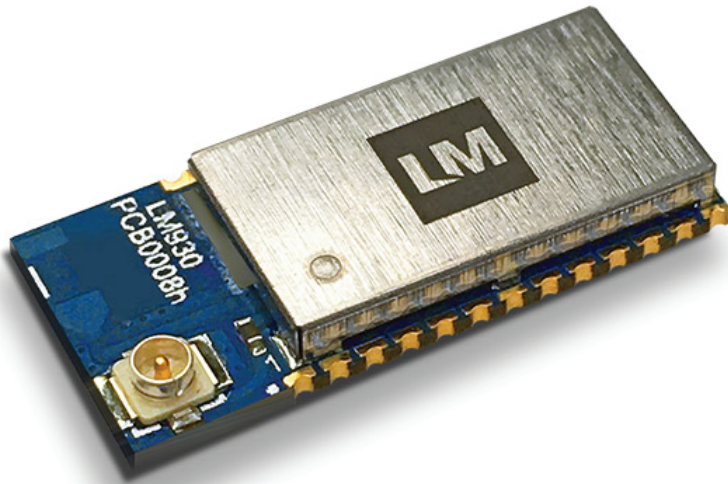


LM930 Bluetooth® low energy Module (with IPEX Connector) Standalone (With Embedded Bluetooth® v4.1 Stack)

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 10.1mm 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	I ² C, 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)

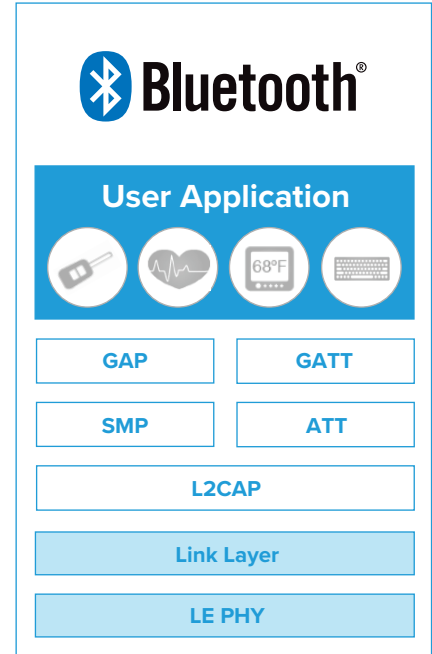
Product
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IoT Applications

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
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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			
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

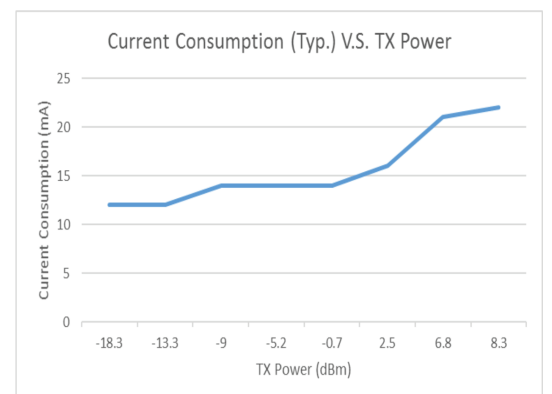
(BLE PRBS9 Channel 2442MHz Package Length 37)

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)

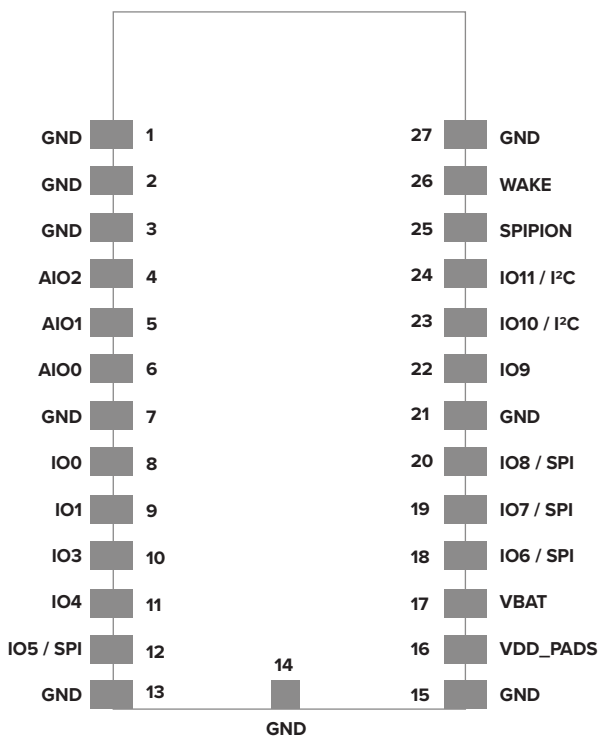
Product
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Powering

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

Pin Out



LM930 Bluetooth® low energy Module (with IPEX Connector)

Standalone (With Embedded Bluetooth® v4.1 Stack)

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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 / I ² C	I/O	Programmable Input Output (PIO) / SDA			VDD
24	IO11 / I ² C	I/O	Programmable Input Output (PIO) / SCL			VDD
25	SPIION	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.

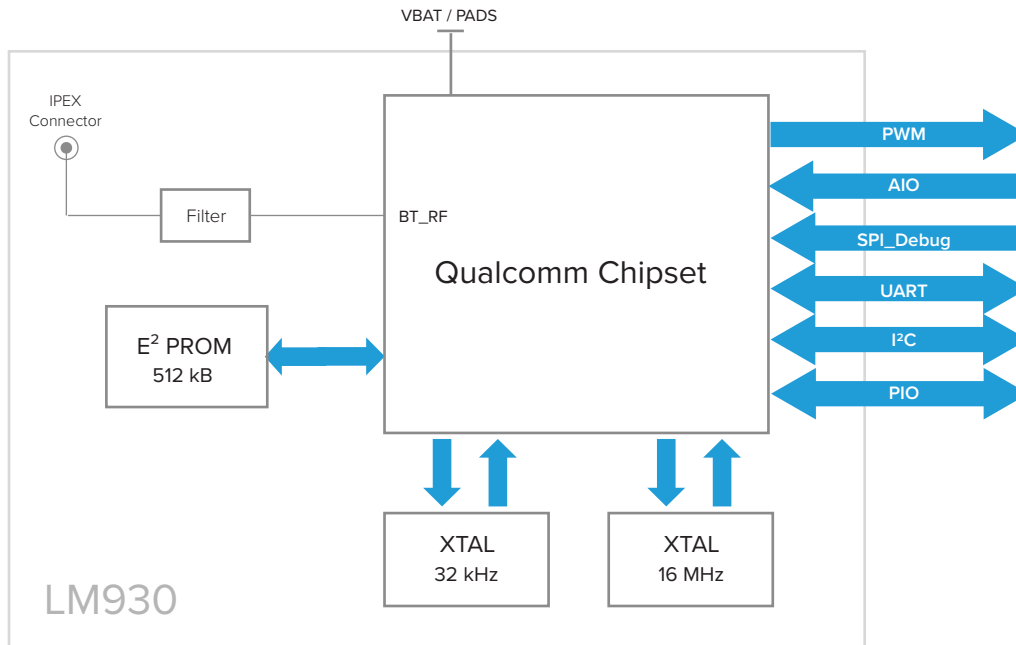
* for PIO at P12, P18, P19 and P20 set P25 to Low.

LM930 Bluetooth® low energy Module (with IPEX Connector)
 Standalone (With Embedded Bluetooth® v4.1 Stack)

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Module Block Diagram



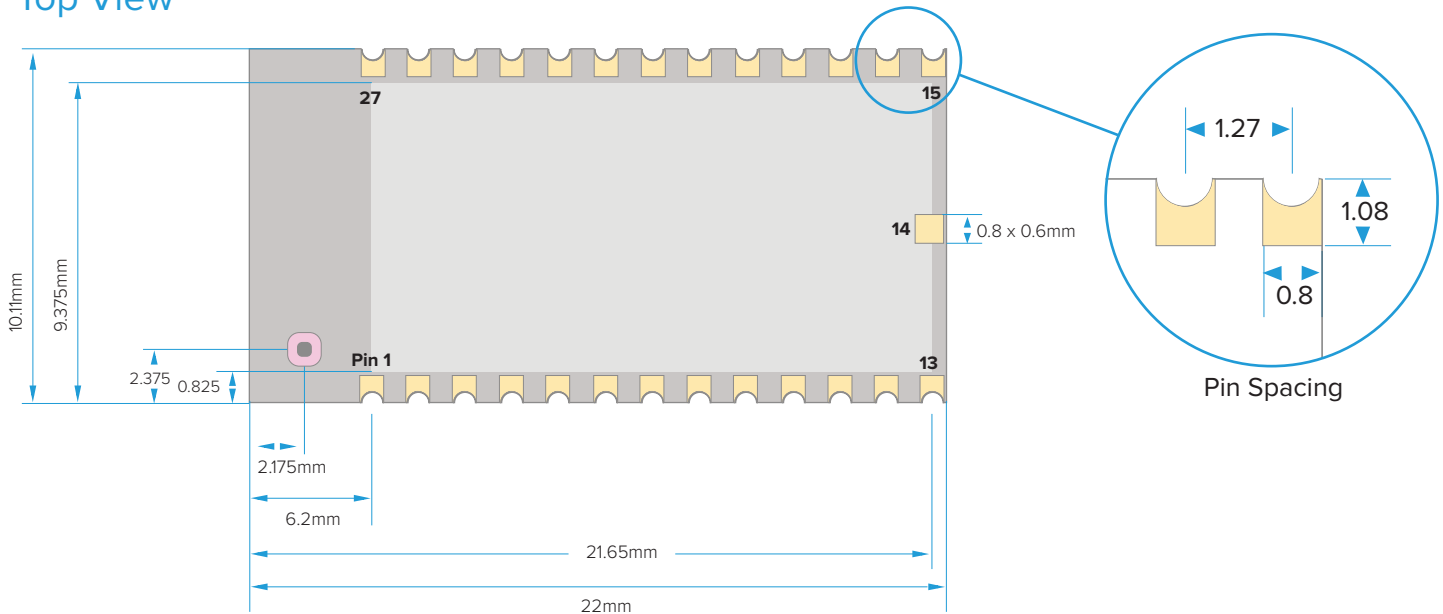
LM930 Bluetooth® low energy Module (with IPEX Connector)
 Standalone (With Embedded Bluetooth® v4.1 Stack)

Product
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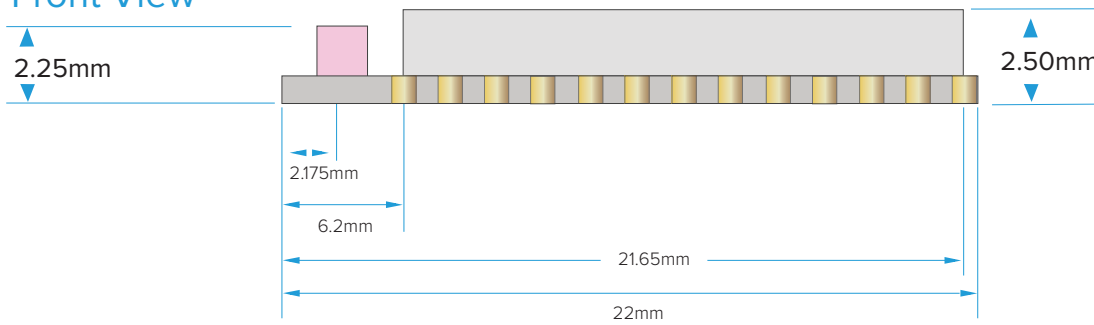
LM930
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Physical Dimensions

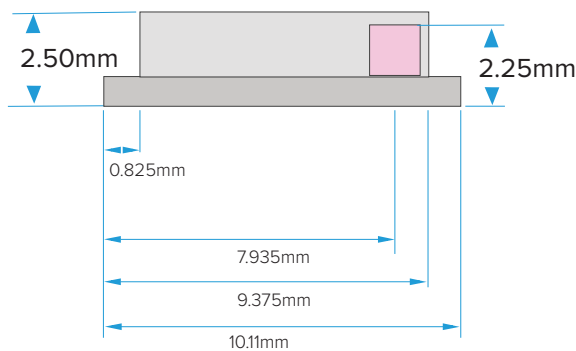
Top View



Front View



Side View

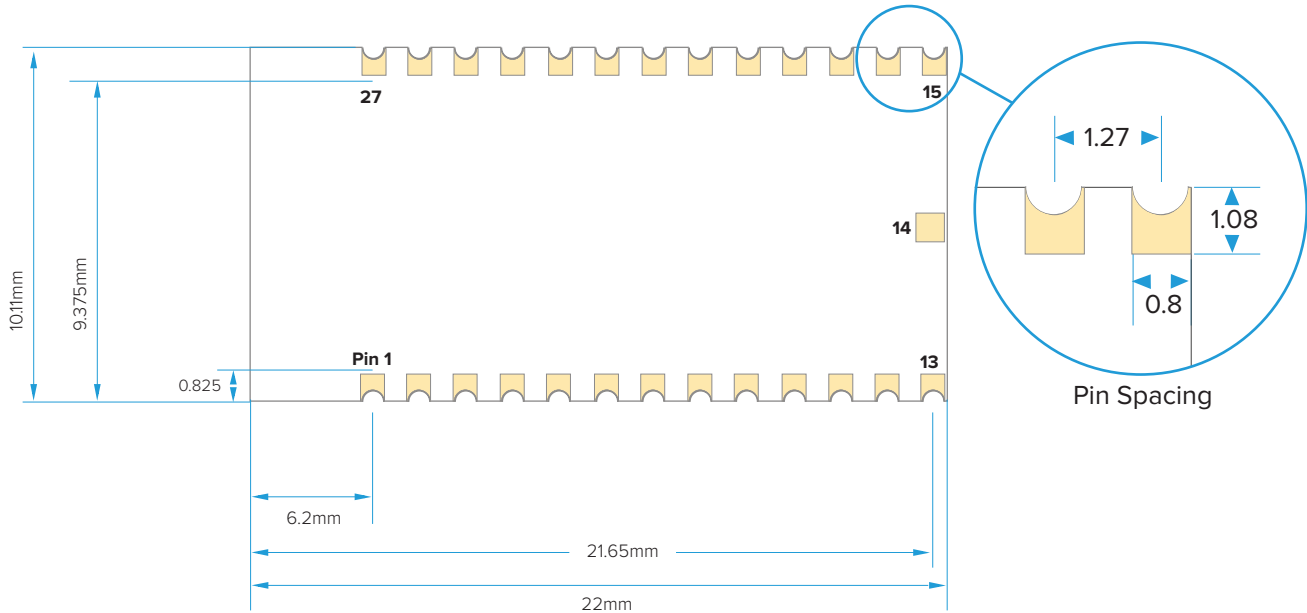


LM930 Bluetooth® low energy Module (with IPEX Connector)
 Standalone (With Embedded Bluetooth® v4.1 Stack)

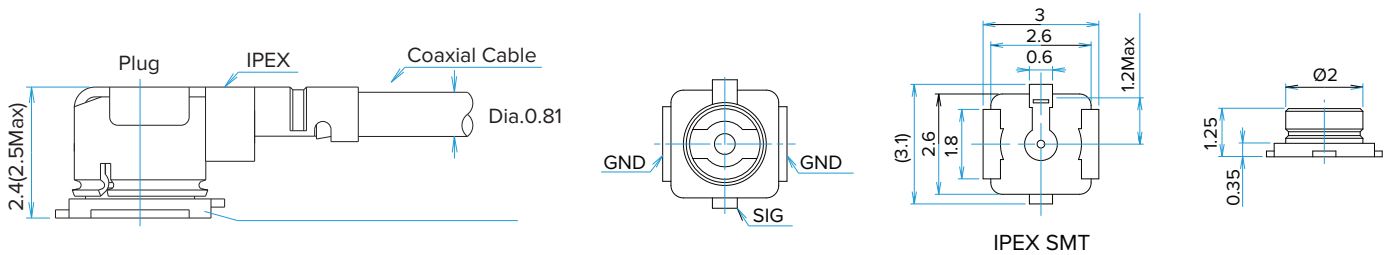
Product
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PCB Footprint



IPEX Connector



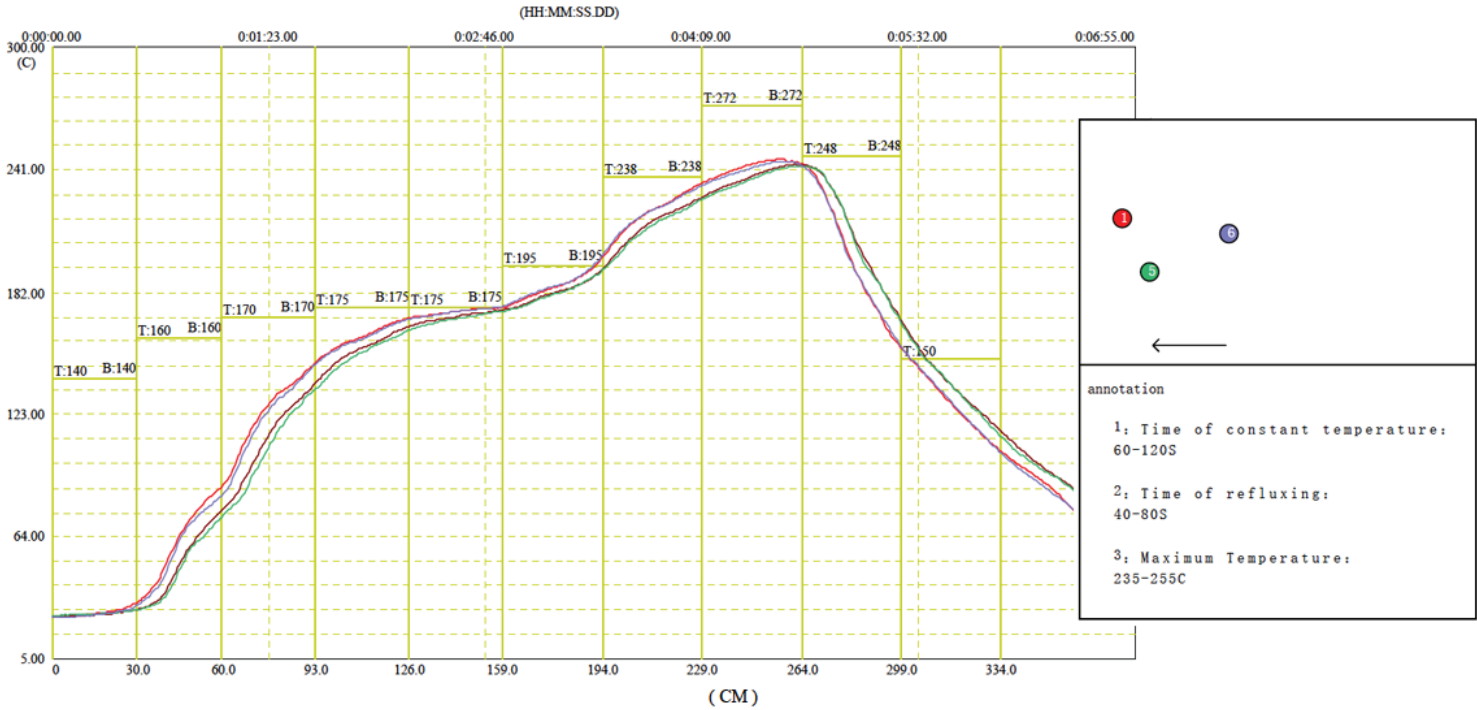


LM930 Bluetooth® low energy Module (with IPEX Connector) Standalone (With Embedded Bluetooth® v4.1 Stack)

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Soldering Reflow Chart



	Preheat zone slope		Immersion time 150 to 180°C		Refluxing time 220°C		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%

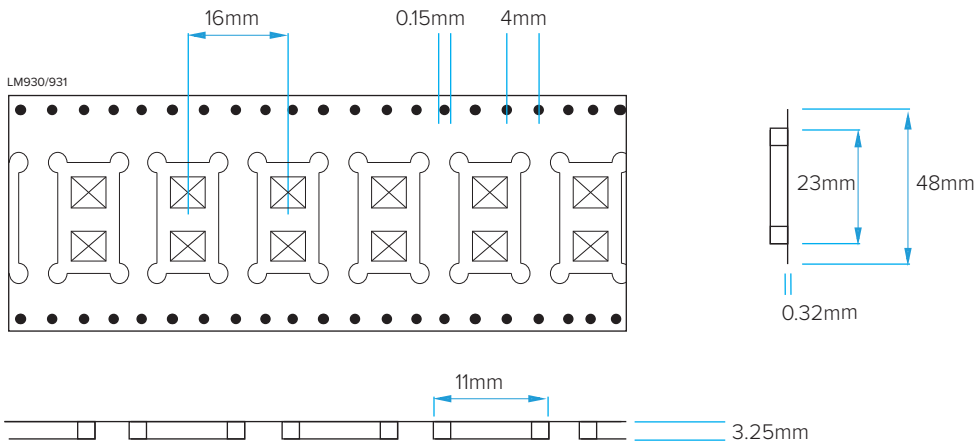
LM930 Bluetooth® low energy Module (with IPEX Connector)
 Standalone (With Embedded Bluetooth® v4.1 Stack)

Product
 Part No

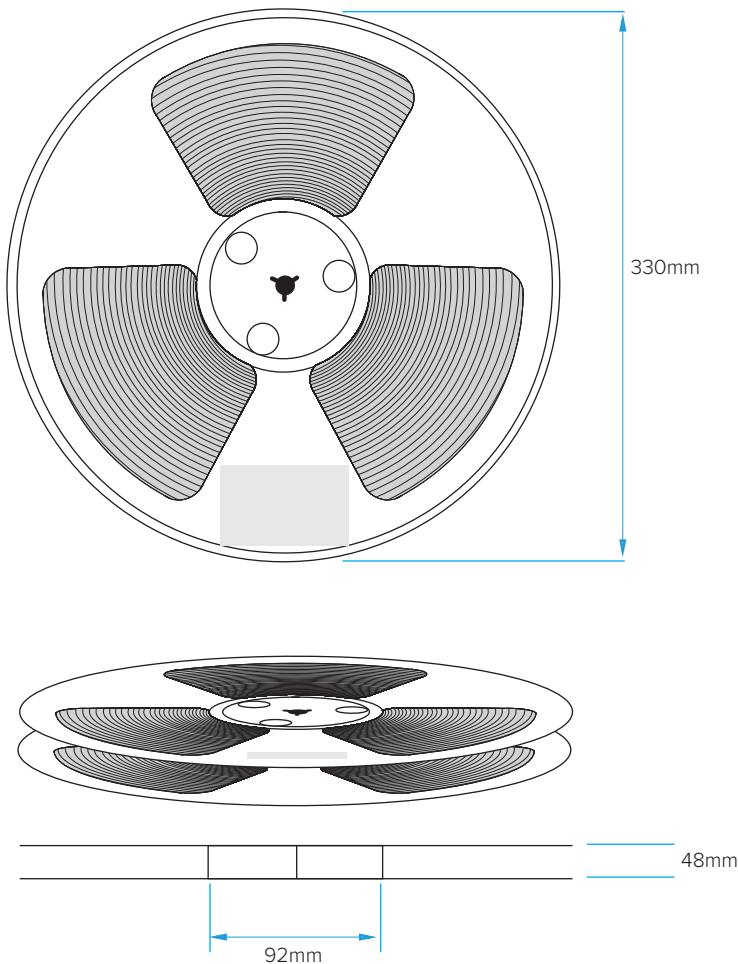
LM930
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Tape and Reel Packaging

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

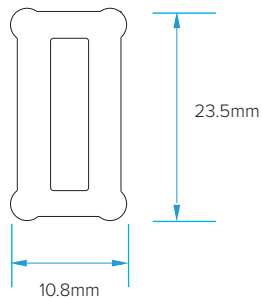
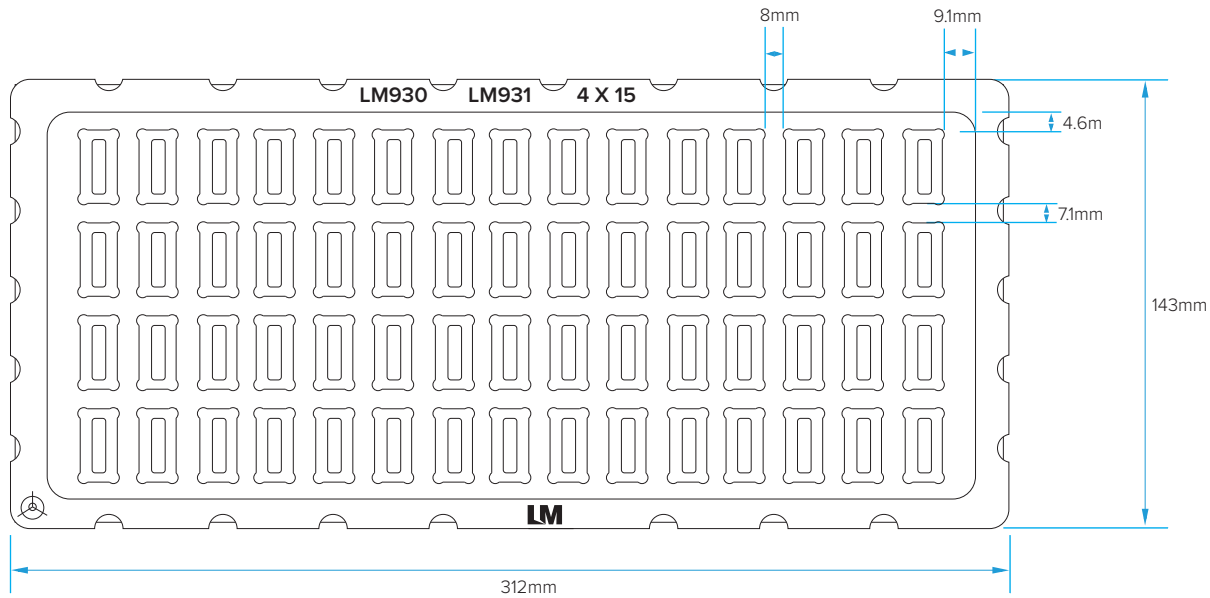
LM930 Bluetooth® low energy Module (with IPEX Connector)
 Standalone (With Embedded Bluetooth® v4.1 Stack)

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Tray Packaging

Tray Dimensions



Notes

- Anti-Static PS Tray, Black .
- Electrical Resistance: $1\text{ M}\Omega < R < 100\text{ M}\Omega$.
- Thickness: $T = 0.8\text{ mm}$
- Carton Dimensions (L x W x H):
 $360\text{mm} \times 325\text{mm} \times 160\text{mm}$

Quantities

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

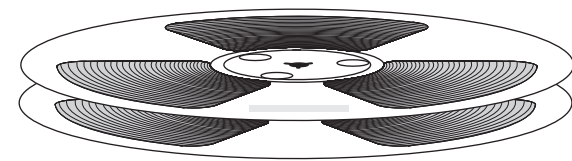
LM930 Bluetooth® low energy Module (with IPEX Connector)
 Standalone (With Embedded Bluetooth® v4.1 Stack)

Product
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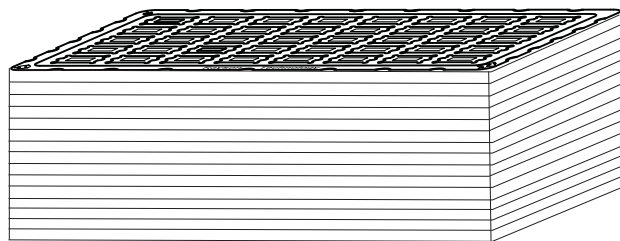
LM930
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Packaging for Tape & Reel / Tray

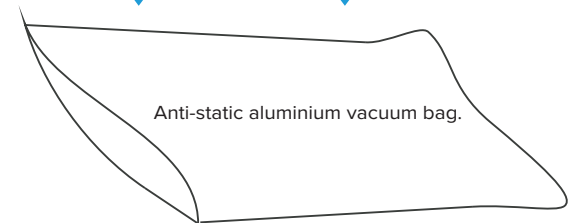
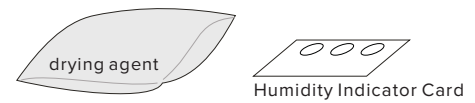
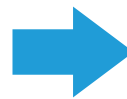
The trays/reels are stacked and inserted into an anti-static vacuum bag, with the anti-static, model name and moisture sensitive labels affixed.



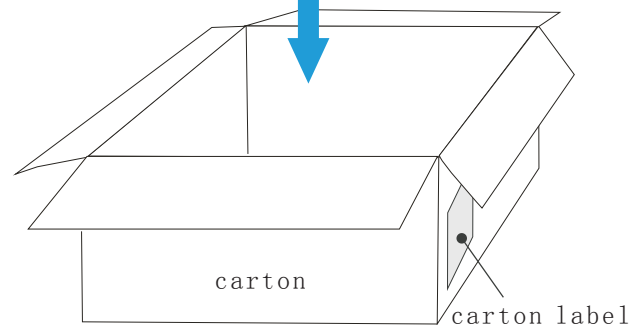
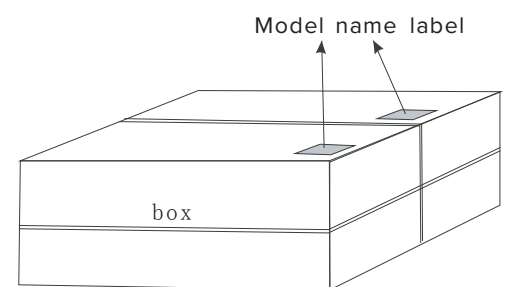
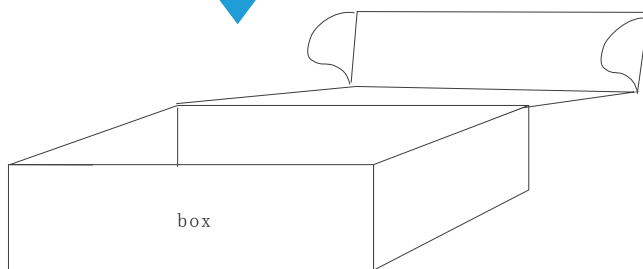
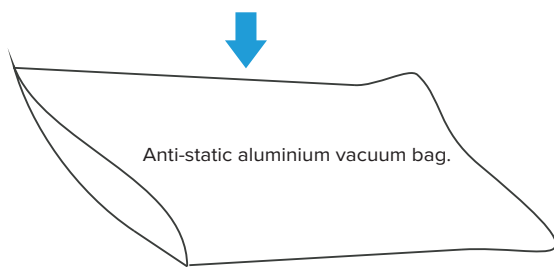
Reels are place within a vacuum bag.



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.

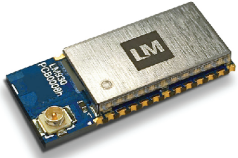


LM930 Bluetooth® low energy Module (with IPEX Connector) Standalone (With Embedded Bluetooth® v4.1 Stack)

Product
Part No

LM930
See Below

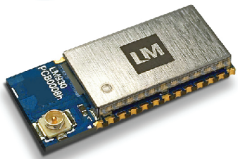
LM930 Packaging Options



930-0634

LM930 Module

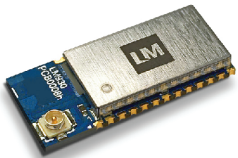
1 x LM930 SMT Plug & Play IPEX Connector Module
Retail Pack (RP)



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