



LM811 WiFi and Dual Mode Bluetooth® Combination Module

Standalone via USB Interface

Revised

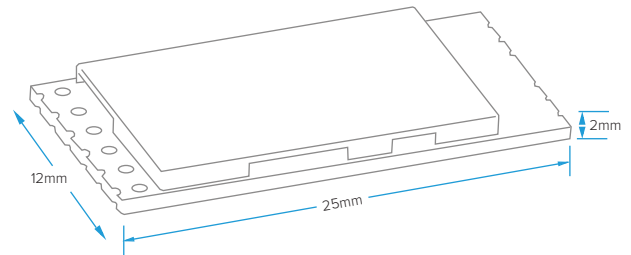
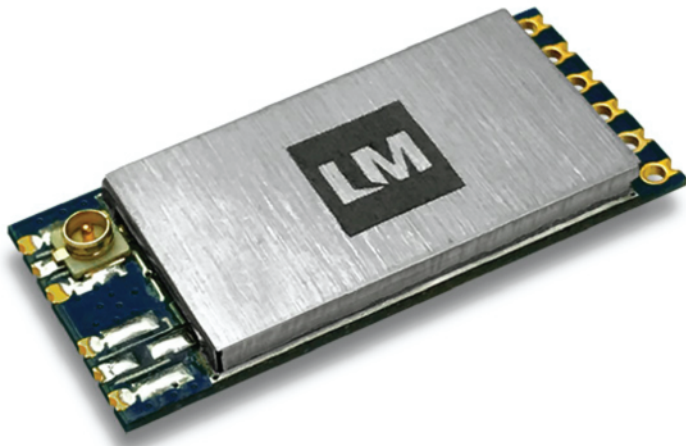
19/FEB/2021

Datasheet Version

1.6

Ordering Options

See last page



- WiFi 802.11 b/g/n
- Bluetooth® v4.0 (Backwards compatible with Bluetooth® v2.0, v2.1 and v3.0)
- WPA, WPA-PSK, WPA2, WPA2 -PSK and WEP (64bit & 128bit) encryption schemes
- Full speed Bluetooth® Piconet and Scatternet supported
- 5V IC Antenna or 3V3 IPEX Connector module options
- USB 2.0
- PCM interface
- Support sophisticated WiFi/Bluetooth® coexistence mechanism to enhance performance
- Support Bluetooth® adaptive power management mechanism
- Linux (Kernel v4.3.6), Android 4.4 and Windows XP – 10 compatible
- 25mm x 12mm x 2mm
- See our website for this products certifications.
- RoHS, REACH and WEEE

Overview

The LM811 combination module offers coexistence for Bluetooth® (Dual Mode) and WiFi operations, allowing the host computer to wirelessly communicate with other Bluetooth® and WiFi enabled devices.

This cost effective module saves valuable PCB space within your product.

The LM811 module fully supports IEEE 802.11b/g/n/d/e/h/i and Bluetooth® v2.0, v2.1, v3.0 and v4.0 standards.

Compatible with Linux (Kernel v4.3.6), Android 4.4 and Windows XP – 10 platforms.

The LM811 module also offers low power consumption and an intelligent coexistence mechanism, ideal for communicating with many wireless devices such as tablets, smart phones and laptops.



TWIN IPEX OPTION
SEE LAST PAGE





LM811 WiFi and Dual Mode Bluetooth® Combination Module

Host Controller Interface (HCI) via USB Interface

General Specification

Wireless

Wireless Standard	WiFi: 802.11 b/g/n Bluetooth®: v2.1+EDR/v3.0+HS/v4.0
Module Type	Standalone or Host Controller Interface (HCI)
OS Compatibility	Linux, Android and Windows XP – 10
Security	WiFi: WPA, WPA-PSK, WPA2, WPA2 -PSK and WEP (64bit & 128bit) Bluetooth®: Simple Paring
Network Architecture	WiFi: Ad hoc mode (Peer-to-Peer) and Infrastructure mode Software AP; WiFi Direct Bluetooth®: Pico Net; Scatter Net

Hardware

Chipset	Realtek
Antenna	Onboard Chip Antenna or IPEX Connector
Interfaces	USB 2.0 PCM

RF Characteristics

Tx Output Power	WiFi: 17dBm – 802.11b@11Mbps 15dBm – 802.11g@6Mbps 14dBm – 802.11g@54Mbps 13dBm – 802.11n@MCS0_HT20 13dBm – 802.11n@MCS7_HT20 13dBm – 802.11n@MCS0_HT40 13dBm – 802.11n@MCS7_HT40 Bluetooth®: Maximum 10dBm
Rx Sensitivity	WiFi: -82dBm – 802.11b@11Mbps -71dBm – 802.11g@54Mbps -67dBm – 802.11n@MCS7_HT20 -64dBm - 802.11n@MCS7_HT40 Bluetooth®: -89dBm@1Mbps -90dBm@2Mbps -83dBm@3Mbps



LM811 WiFi and Dual Mode Bluetooth® Combination Module

Host Controller Interface (HCI) via USB Interface

General Specification (Continued)

RF Characteristics

Range (in open space)

WiFi:

Up to 180m

Bluetooth®:

Up to 10m

Data Transfer Rate

WiFi:

802.11b: 1, 2, 5.5, 11Mbps; 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps;

802.11n MCS0 to 7 for HT20MHz, MCS0 to 7 for HT40MHz

Bluetooth®:

Basic Rate 1Mbps; Enhanced Rate 2, 3Mbps;

High Speed 6, 9, 12, 18, 24, 36, 48, 54Mbps

Frequency

2.4GHz to 2.4835 GHz

Modulation Scheme

WiFi:

802.11b: CCK, DQPSK, DBPSK 802.11g: 64QAM, 16QAM, QPSK,

BPSK 802.11n: 64QAM, 16QAM, QPSK, BPSK

Bluetooth®:

8DPSK, $\pi/4$ DQPSK, GFSKFSK

Spread Spectrum

WiFi:

IEEE 802.11b: DSSS (Direct Sequence Spread Spectrum)

IEEE 802.11g/n: OFDM (Orthogonal Frequency Division Multiplexing)

Bluetooth®:

FHSS (Frequency Hopping Spread Spectrum)

Operating Channel

WiFi (2.4GHz):

11: (Ch. 1-11) – United States 13: (Ch. 1-13) – Europe

14: (Ch. 1-14) – Japan

Bluetooth® (2.4GHz):

Ch. 0 to 78

Physical Characteristics

Operating Temperature

-20°C to +80°C ambient temperature 0 to 95 % (non-condensing)

Storage Temperature

-30°C to +85°C ambient temperature 0 to 95 % (non-condensing)

Dimensions (L x W x H)

25mm x 12mm x 2mm

Weight

1.06g +/- 0.25g tolerance

Certifications

See our website for this products certifications.

Compliance

RoHS, REACH and WEEE

LM811 WiFi and Dual Mode Bluetooth® Combination Module

Host Controller Interface (HCI) via USB Interface

Power Consumption

DC power for 5V

Performance

Description	Typ	Units
Off	10	uA
Unassociated idle	40	mA
Associated idle for 2.4GHz band	70	mA
Data transfer for 2.4GHz	103	mA

Note: Data transfer test using the Linux driver: Linux_v4.3.6_11841.20140714

DC power for 3.3V

Performance

Description	Typ	Units
Off	16	uA
Unassociated idle	90	mA
Associated idle for 2.4GHz band	141 to 440 peak	mA
Data transfer for 2.4GHz	168	mA

Note: Data transfer test using the Linux driver: Linux_v4.3.6_11841.20140714

DC Power Input

Module	Min	Typical	Max	Unit
DC 5V (IC Antenna)	4.75	5	5.25	V
DC 3.3V (IPEX Connector)	3.135	3.3	3.465	V

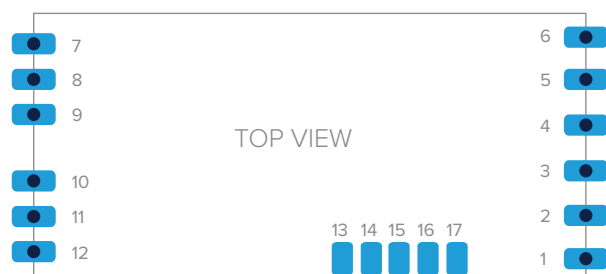
Important: 3.3V IPEX connector products must only use 3.3V
5V IC Antenna products must only use 5V

Warning: Do NOT use the wrong voltage on your module.

LM811 WiFi and Dual Mode Bluetooth® Combination Module

Host Controller Interface (HCI) via USB Interface

Pin Outs (17 PIN Version)



RF Type 1: TWIN IPEX Connector Module (17 PINS)

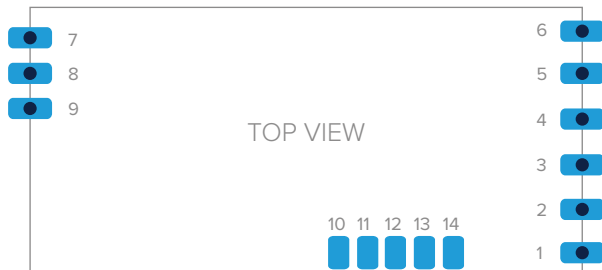
Pin Assignments

Pin	Signal	Type	Description
1	WO-WLAN	Output	Chip Wake Host function
2	GND	Power	Ground
3	USB D+	I/O	USB D+ signal
4	USB D-	I/O	USB D- signal
5	VCC	Power	Supply DC 3.3V for LM811 (IPEX Connector Module) / Supply DC 5V for LM811 (IC Antenna Module)
6	SUSPEND	Input	Host Wake Chip function.
7	GND	Power	Ground
8	ANT	-	WiFi/Bluetooth® RF port (if you are NOT using the IPEX connector)
9	GND	Power	Ground
10	GND	Power	Ground
11	ANT	-	No Connection
12	GND	Power	Ground
13	BT_PCM_IN	Input	PCM data Input. This pin is also shared with GPIO0 and 3DG_SEL_A
14	BT_PCM_OUT	Output	PCM data Output. This pin is also shared with GPIO1 and 3DG_SYNC_A.
15	BT_PCM_SYNK	I/O	PCM frame Synchronization. This pin is also shared with GPIO2.
16	BT_PCM_CLK	I/O	PCM Clock. This pin is also shared with GPIO3.
17	EXT_XIN	-	No Connection

LM811 WiFi and Dual Mode Bluetooth® Combination Module

Host Controller Interface (HCI) via USB Interface

Pin Outs (14 PIN Version)



RF Type 2: IC Antenna or IPEX Connector Module (14 PINS)

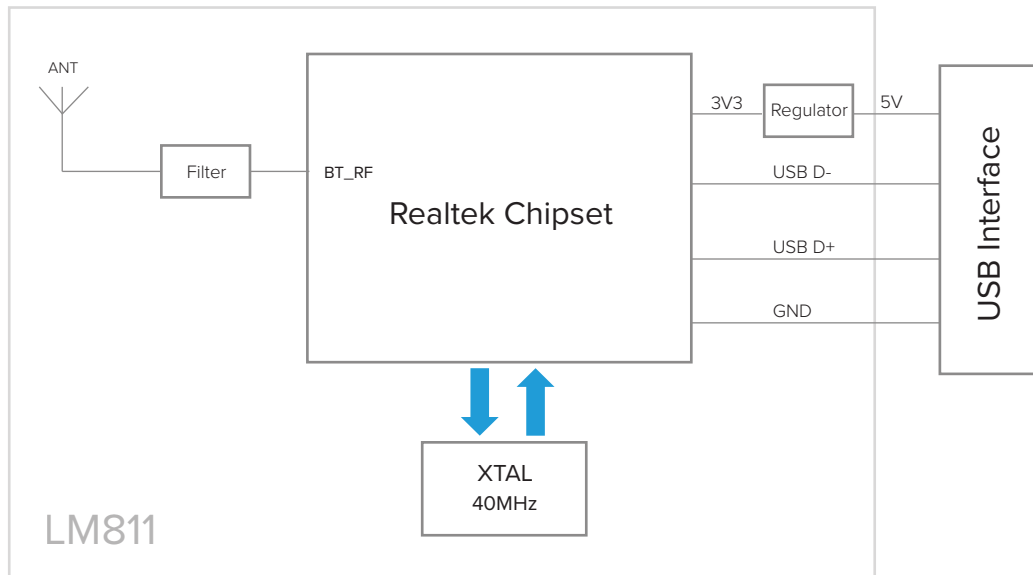
Pin Assignments

Pin	Signal	Type	Description
1	CHIP_WAKE_HOST	Output	Signal from module to wake up host, refer driver source code for details.
2	GND	Power	Ground
3	USB D+	I/O	USB D+ signal
4	USB D-	I/O	USB D- signal
5	VCC	Power	DC 3.3V
6	HOST_WAKE_CHIP	Input	Signal from host to wake up module, refer driver source code for details.
7	GND	Power	Ground
8	ANT	RF	WiFi/Bluetooth® RF port (if you are NOT using the IPEX connector)
9	GND	Power	Ground
10	BT_PCM_IN	Input	PCM data Input. This pin is also shared with GPIO0 and 3DG_SEL_A.
11	BT_PCM_OUT	Output	PCM data Output. This pin is also shared with GPIO1 and 3DG_SYNC_A.
12	BT_PCM_SYNK	I/O	PCM frame Synchronization. This pin is also shared with GPIO2.
13	BT_PCM_CLK	I/O	PCM Clock. This pin is also shared with GPIO3.
14	EXT_XIN	-	NC_ Keep to floating

LM811 WiFi and Dual Mode Bluetooth® Combination Module

Host Controller Interface (HCI) via USB Interface

Module Block Diagram



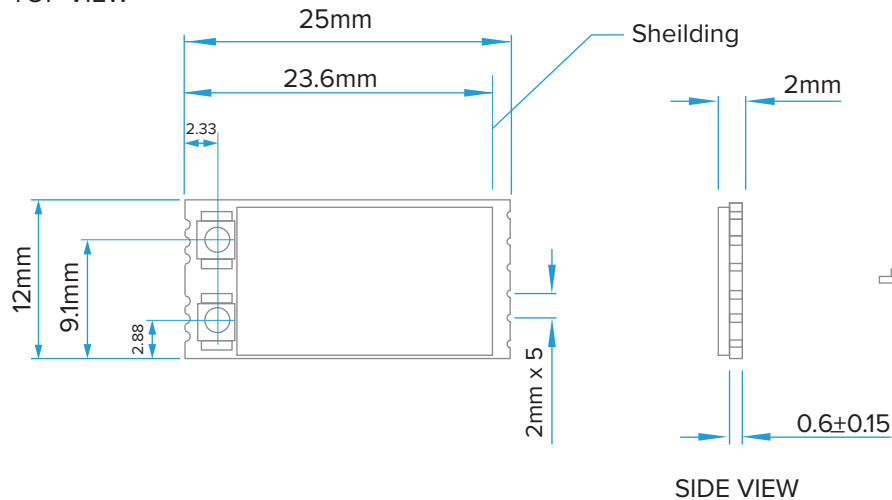
- Note: 3V3 version modules do not include a regulator

LM811 WiFi and Dual Mode Bluetooth® Combination Module

Host Controller Interface (HCI) via USB Interface

Physical Dimensions

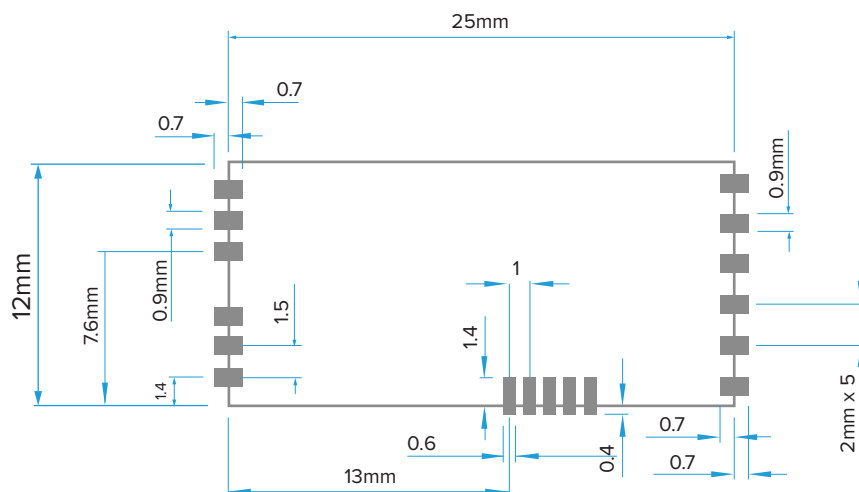
TOP VIEW



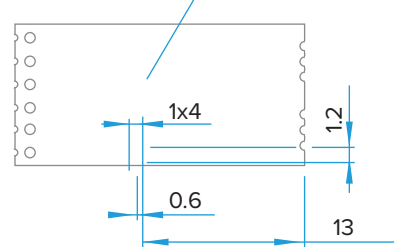
PCB Footprint

The recommended layout pads for LM811 module are shown below.

TOP VIEW



1. PCB 0.8mm
BOTTOM VIEW



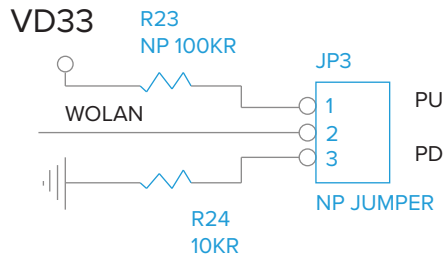
LM811 WiFi and Dual Mode Bluetooth® Combination Module

Host Controller Interface (HCI) via USB Interface

Design-in Guidelines

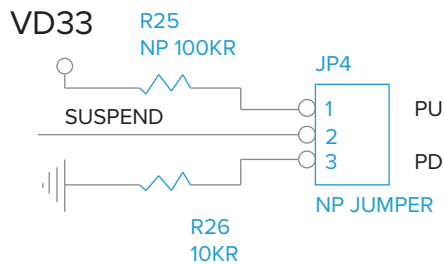
Wake Function - Pin 1

Place WO-WLAN (Chip Wake Host) function.

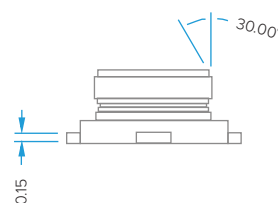
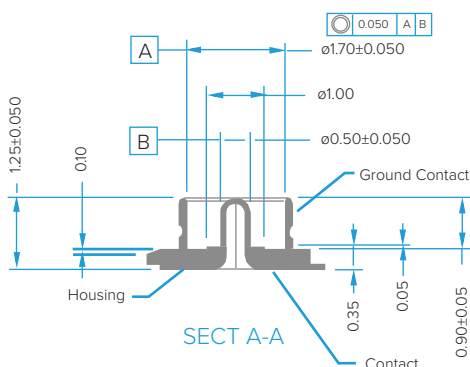
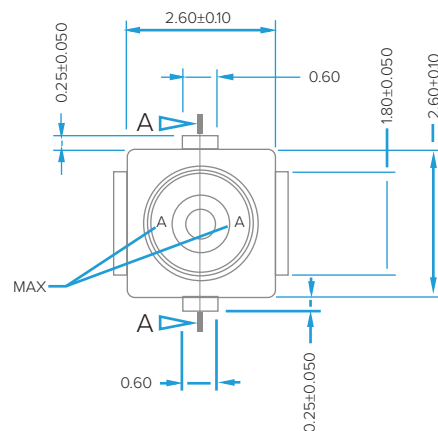
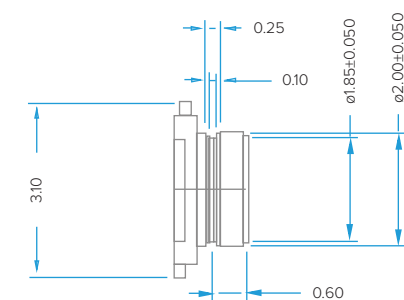


Suspend Function - Pin 6

PIN6. Place SUSPEND (Host Wake Chip)



RF Connector Dimensions



LM811 WiFi and Dual Mode Bluetooth® Combination Module

Host Controller Interface (HCI) via USB Interface

PCB Drying Conditions

Please refer below to the conditions for drying before the solder reflow processes. (Extracted from IPC/JEDEC J-STD-033B.1)

1. If the system PCBA is double side design please reflow the side without this module first.
2. Don't let the solder machine temperature over 250 °C or follow solder paste vender's recommended temperature.
3. The Ramp-up temperature speed is 1~4 °C per second, the Ramp-down temperature speed is 1~4 °C per second.
4. This temperature reflow chart is for reference only, it depends on the manufacturing machine's characters requirement.

Bake @ 125 °C

Exceeding floor Life by
> 72h

9 hours

Exceeding floor Life by
≤ 72h

7 hours

Bake @ 90 °C

Exceeding floor Life by
> 72h

33 hours

Exceeding floor Life by
≤ 72h

23 hours

Bake @ 40 °C

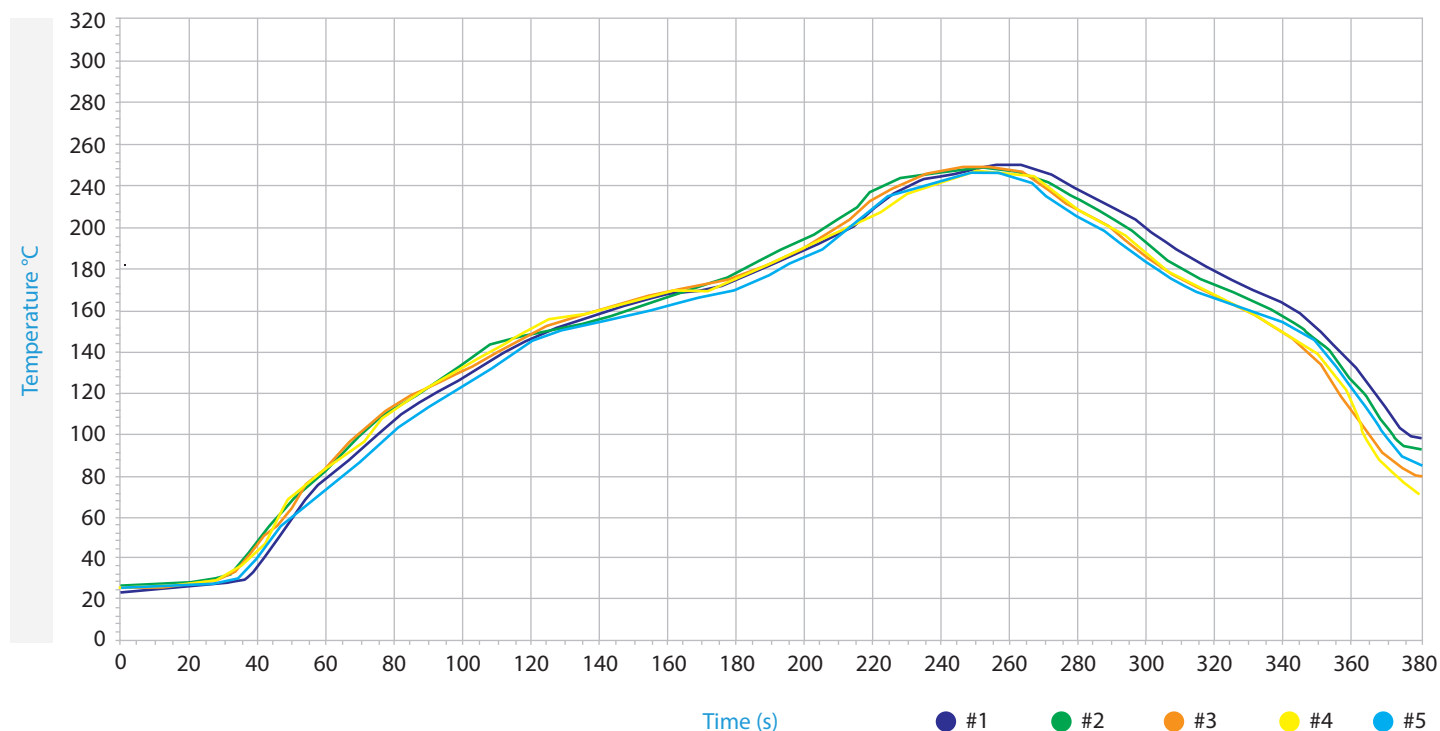
Exceeding floor Life by
> 72h

13 days

Exceeding floor Life by
≤ 72h

9 days

Soldering Reflow Chart



Name	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8
Max	180.0	180.0	170.0	170.0	180.0	210.0	260.0	245.0
Min	180.0	180.0	170.0	170.0	180.0	210.0	260.0	245.0
Length	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

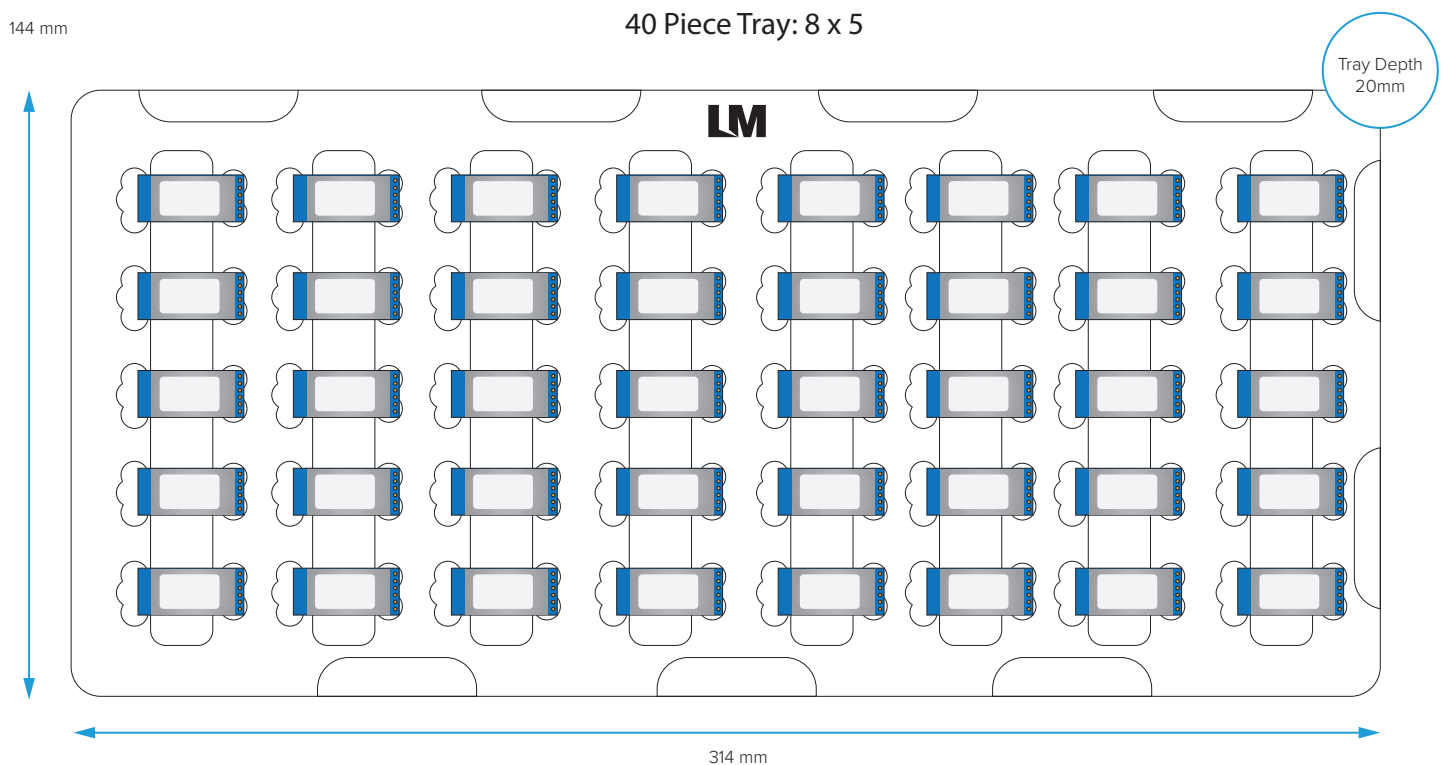
Probe	Liquidus Line		Maximum / Minimum		Slope	
	Rising 110.00-190.00	Above 230.0	Max	Min	Positive	Negative
#1	119.00	47.50	245.50	27.30	2.56	-1.69
#2	116.50	49.00	247.10	27.70	2.69	-1.60
#3	116.00	46.50	245.80	29.30	2.04	-1.57
#4	117.00	46.50	244.90	29.20	2.60	-1.31
#5	119.50	50.00	248.10	29.60	2.44	-1.64

LM811 WiFi and Dual Mode Bluetooth® Combination Module

Host Controller Interface (HCI) via USB Interface

Tray Packaging

Tray Dimensions



Quantities

- 40 modules per Tray
- 3 Trays per Inner Box
- 120 modules per Inner Box
- 8 Inner Boxes per Outer Carton
- 960 modules per Outer Carton

Notes

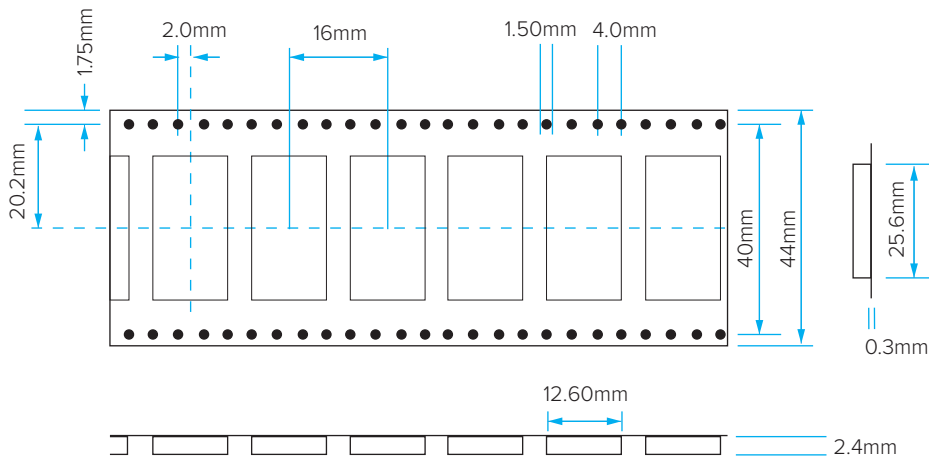
- Anti-Static PS Tray, Black.
- Material Thickness: 1mm
- Height of Tray: 20mm
- Carton Dimensions (L x W x H):
340mm x 290mm x 385mm

LM811 WiFi and Dual Mode Bluetooth® Combination Module

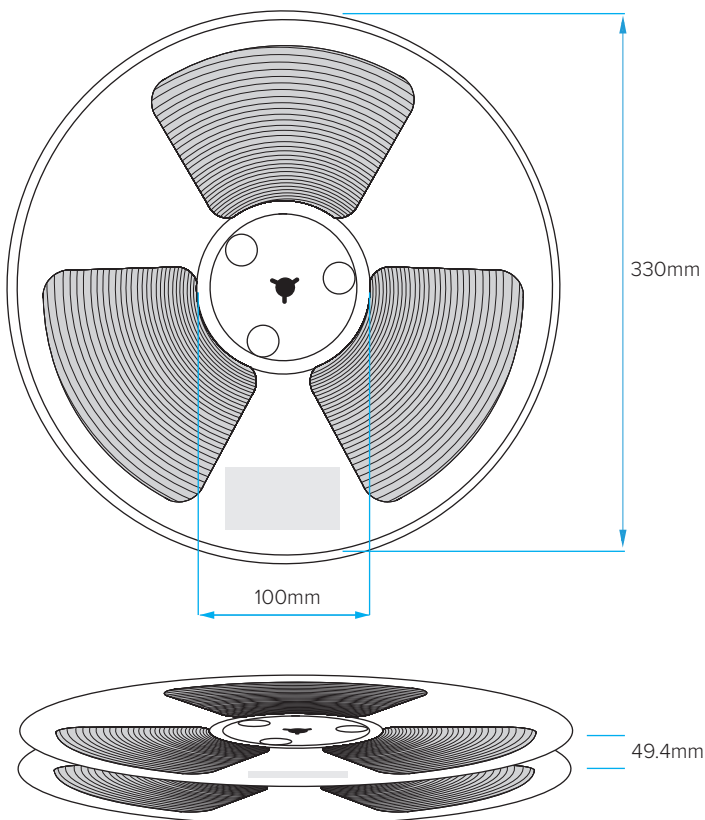
Host Controller Interface (HCI) via USB Interface

Tape and Reel Packaging

Tape Dimensions



Reel Dimensions



Quantities

- 1500 modules per Tape & Reel
- 1 Tape & Reel per Inner Box
- 5 Inner Boxes per Outer Carton
- 7500 modules per Outer Carton

Notes

- Inner Box Dimensions (L x W x H):
360mm x 360mm x 60mm
- Outer Carton Dimensions (L x W x H):
395mm x 360mm x 305mm

LM811 WiFi and Dual Mode Bluetooth® Combination Module

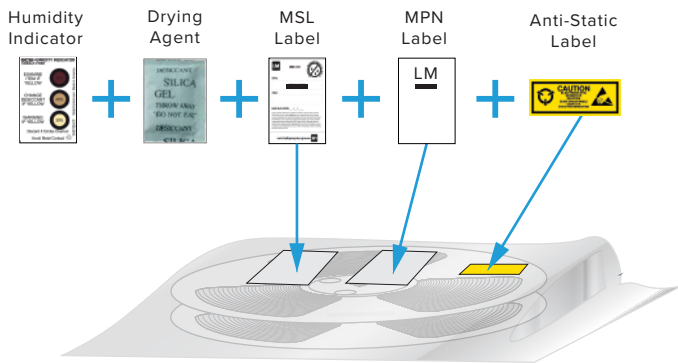
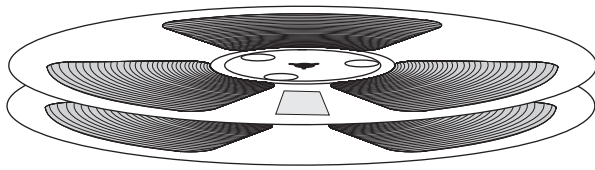
Host Controller Interface (HCI) via USB Interface

Packaging for Tape & Reel / Tray

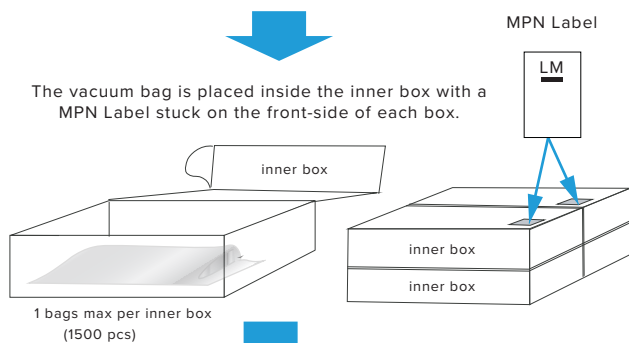
The Tape & Reel / Tray are inserted into an anti-static vacuum bag with a Humidity Indicator Card and Drying Agent. On the outside of the vacuum bag are MSL (Moisture Sensitivity Levels), MPN and an Anti-Static Labels.

Tape & Reel

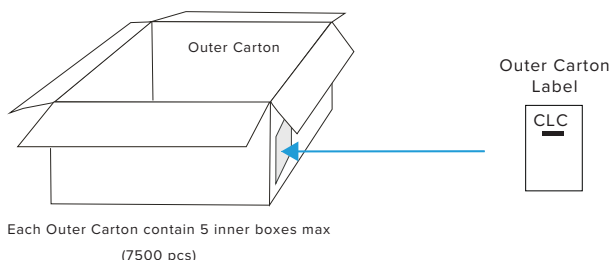
Reels are placed within a vacuum bag.



Vacuum bag.



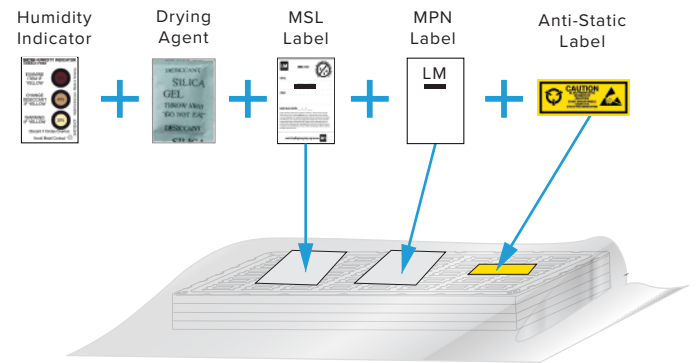
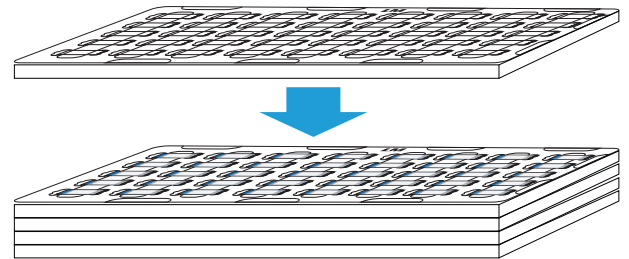
1 bags max per inner box
(1500 pcs)



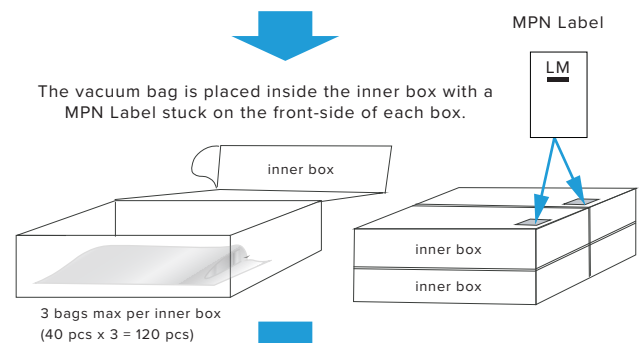
Each Outer Carton contain 5 inner boxes max
(7500 pcs)

Tray

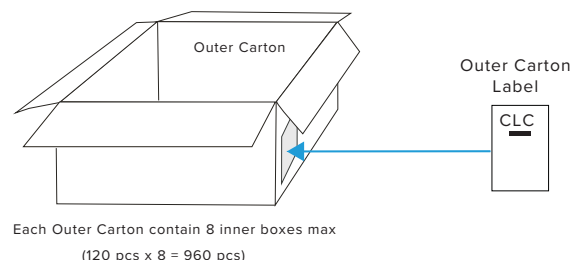
Trays are stacked with an empty tray on the top and placed within a vacuum bag.



Vacuum bag.



3 bags max per inner box
(40 pcs x 3 = 120 pcs)



Each Outer Carton contain 8 inner boxes max
(120 pcs x 8 = 960 pcs)



LM811 WiFi and Dual Mode Bluetooth® Combination Module

Host Controller Interface (HCI) via USB Interface

Datasheet Version Notes

v1.0	11 JAN 2018	Added version notes to datasheet.
v1.1	14 FEB 2018	Removed WiFi 802.11 d/e/h/l
v1.2	13 MAR 2018	MSL Description text improvement in the PCB Drying Conditions section.
v1.3	04 JUL 2018	MSL Description text improvement in the PCB Drying Conditions section. Packing information addition.
v1.4	08 AUG 2019	Adjustment to page 4 figures.
v1.5	30 JAN 2020	Revisions to Packaging Options page
v1.6	19 FEB 2021	Datasheet branding update.



LM811 WiFi and Dual Mode Bluetooth® Combination Module

Host Controller Interface (HCI) via USB Interface

Ordering Options

RF Country Bands

Our default radio region is ETSI. Unless specified otherwise, units will be shipped using the ETSI radio bands.

When ordering units for use with the US region, include US at the end of the part number as shown here. e.g.: **811-XXXX US**



811-0452
811-0452 US

5 VOLT

5V Module with IC Antenna

MOD SMT HCI 802.11n BT4.0 -20c 5V IC ANT D-Type PCS

ETSI
US

811-0450
811-0450 US

5V Module with IC Antenna

MOD SMT HCI 802.11n BT4.0 -20c 5V IC ANT D-Type TRAY

ETSI
US

811-0455
811-0455 US

5V Module with IC Antenna

MOD SMT HCI 802.11n BT4.0 -20c 5V IC ANT D-Type T&R

ETSI
US



811-0451
811-0451 US

5V Module with IPEX Connector

MOD SMT HCI 802.11n BT4.0 -20c 5V IPEX D-Type PCS

ETSI
US

811-0453
811-0453 US

5V Module with IPEX Connector

MOD SMT HCI 802.11n BT4.0 -20c 5V IPEX D-Type TRAY

ETSI
US

811-0454
811-0454 US

5V Module with IPEX Connector

MOD SMT HCI 802.11n BT4.0 -20c 5V IPEX D-Type T&R

ETSI
US

3.3 VOLT

Same Size PCB - but different layout, with two pads for TWIN IPEX option.

811-0471
811-0471 US

3.3V Module with IPEX Connector

MOD SMT HCI 802.11n BT4.0 -20c 3.3V IPEX PCS

ETSI
US

811-0461
811-0461 US

3.3V Module with IPEX Connector

MOD SMT HCI 802.11n BT4.0 -20c 3.3V IPEX TRAY

ETSI
US

811-0467
811-0467 US

3.3V Module with IPEX Connector

MOD SMT HCI 802.11n BT4.0 -20c 3.3V IPEX T&R

ETSI
US



- Product User Guides, Manuals and Configuration Software can be downloaded via our website - <http://www.lm-technologies.com/downloads>