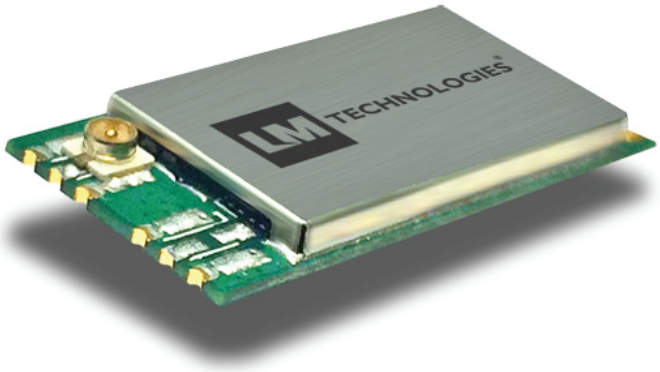
LM811 WiFi and Dual Mode Bluetooth® Combination Module

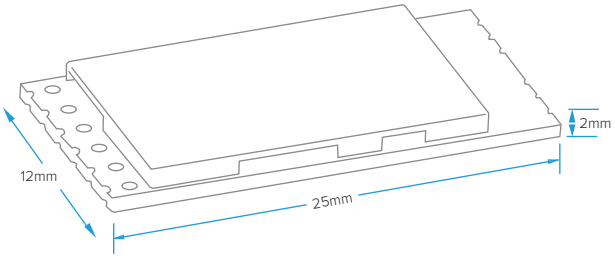
Host Controller Interface (HCI) via USB Interface

Product	LM811
Part No	See Last Page
Revised	15/DEC/2016

Linux · Android · Win XP · Win Vista · Win 7 · Win 8 · Win 10

WiFi® Bluetooth®





Features

- 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 (Full Speed) and 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
- IC, FCC and SIG Certified Solution
- RoHS, REACH and WEEE Compliant Solution

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.

LM811 module fully supports IEEE 802.11b/g/n/d/e/h/i standards 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.

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General Specification

Wireless

Wireless Standard	WiFi: 802.11 b/g/n/d/e/h/i Bluetooth®: v2.1+EDR/v3.0+HS/v4.0
Module Type	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 (Full Speed) and 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

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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, π/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	0°C to +60°C ambient temperature 0 to 95 % (non-condensing)
Storage Temperature	-20°C to +70°C ambient temperature 0 to 95 % (non-condensing)
Dimensions (L x W x H)	25mm x 12mm x 2mm
Weight	0.82 g
Certifications	CE, FCC, IC, TELEC and SIG
Compliance	RoHS, REACH and WEEE

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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	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.

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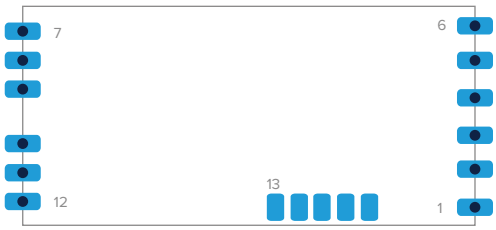
Pin Outs

RF Type 1: IPEX Connector Module

RF Type 2: IC Antenna Module



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

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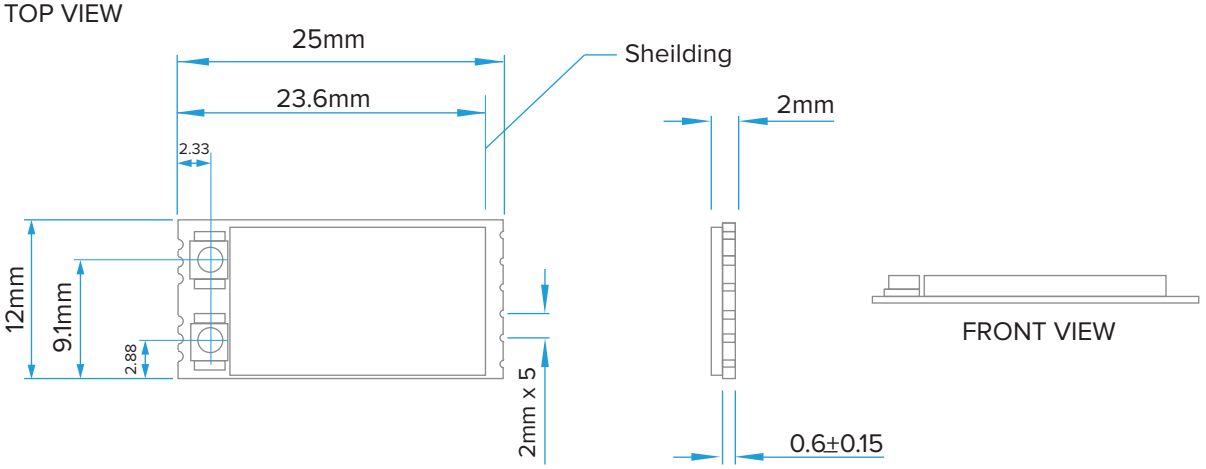
Physical Dimensions

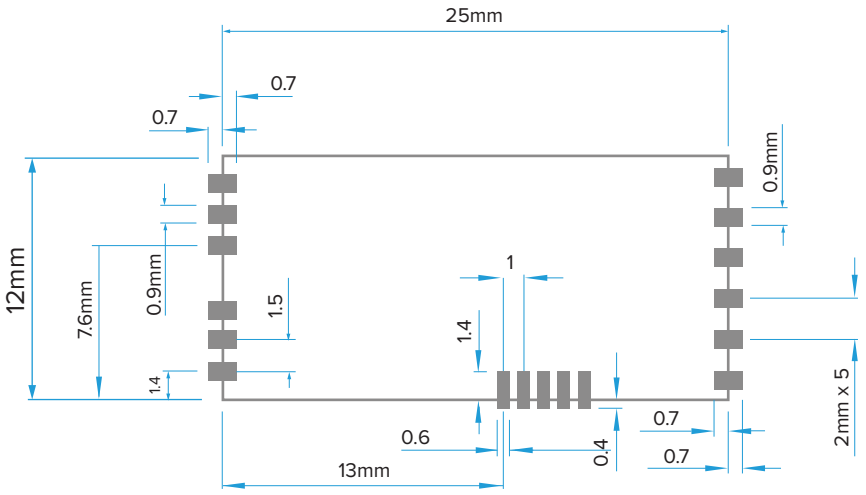
TOP VIEW



PCB Footprint

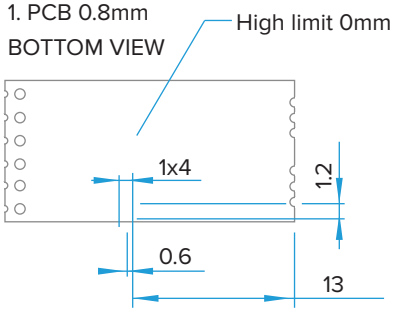
The recommended layout pads for LM811 module are shown below.

TOP VIEW



1. PCB 0.8mm

BOTTOM VIEW



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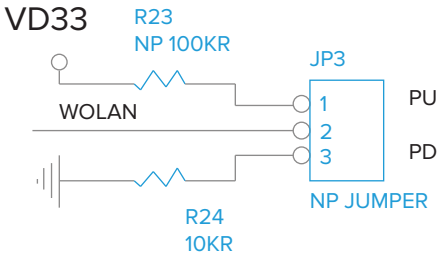
Design-in Guidelines

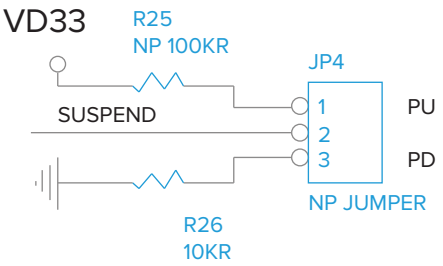
Wake Function - Pin 1

Place WO-WLAN (Chip Wake Host) function.

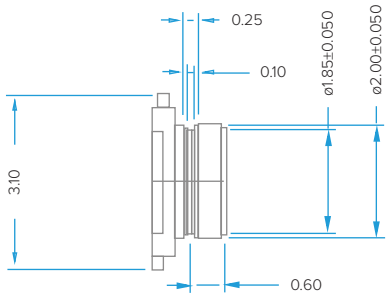


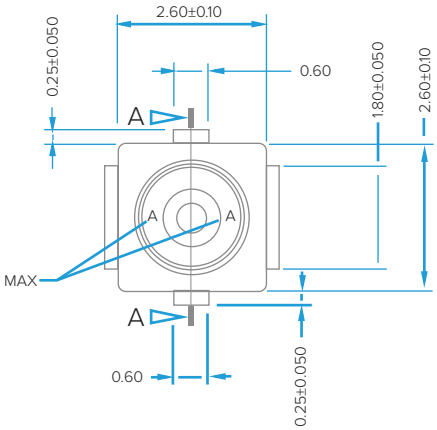
Supend Function - Pin 6

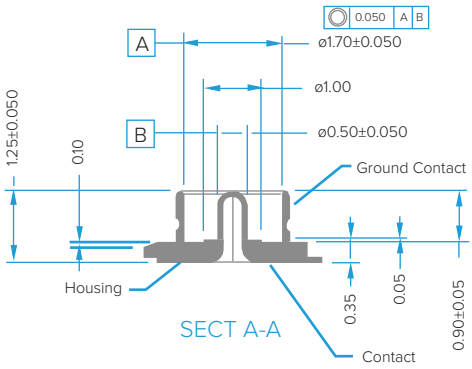
PIN6. Place SUSPEND (Host Wake Chip)

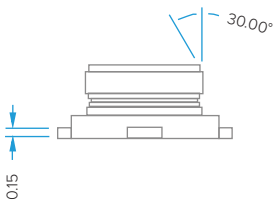


RF Connector Dimensions









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PCB Drying Conditions

This module is MSL-3 surface mount device; please refer below conditions for drying before solder reflow processes.

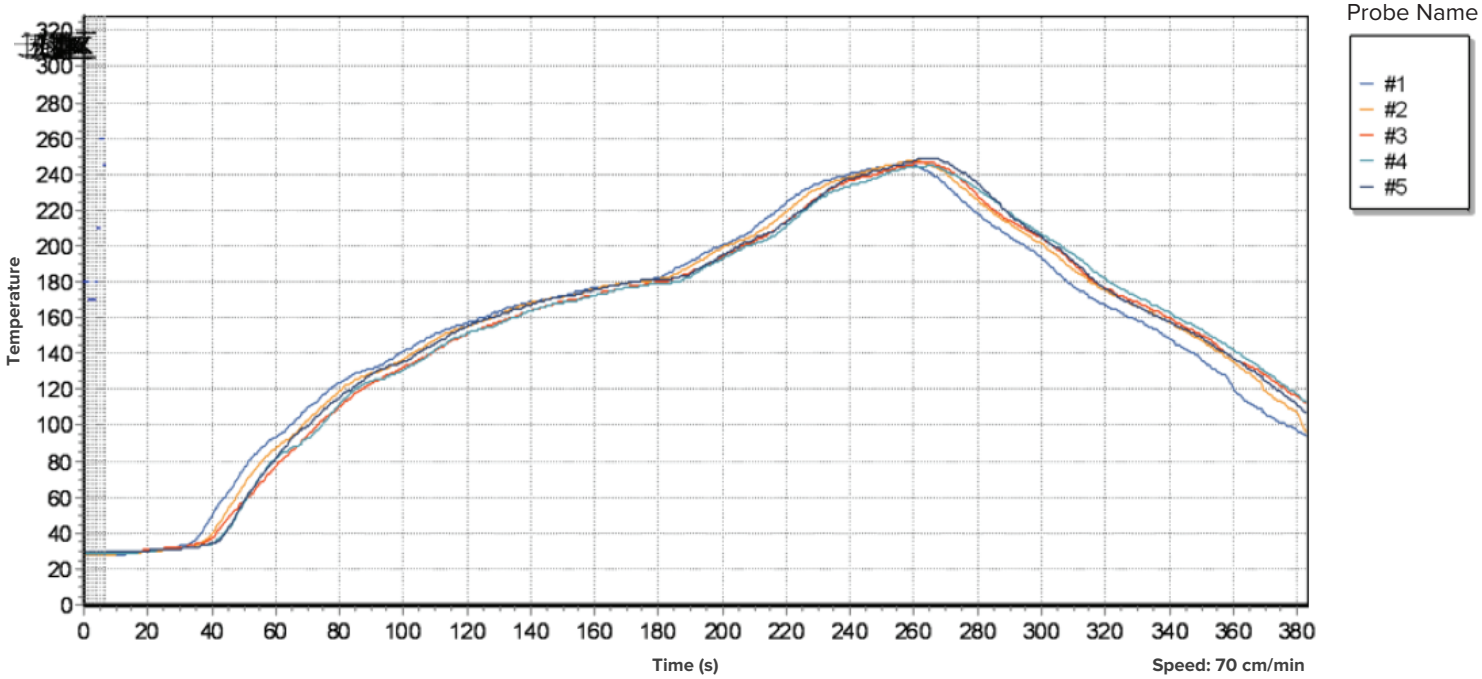
If your PCB was baked at the below temperatures you need to follow the below guidelines

(extracted from IPC/JEDEC J-STD-033B.1)

Bake @ 125 °C		Bake @ 90 °C		Bake @ 40 °C	
Exceeding floor Life By > 72h	Exceeding floor Life By ≤ 72h	Exceeding floor Life By > 72h	Exceeding floor Life By ≤ 72h	Exceeding floor Life By > 72h	Exceeding floor Life By ≤ 72h
9 hours	7 hours	33 hours	23 hours	13 days	9 days

Temperature Analysis Report

Temperature Curve 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

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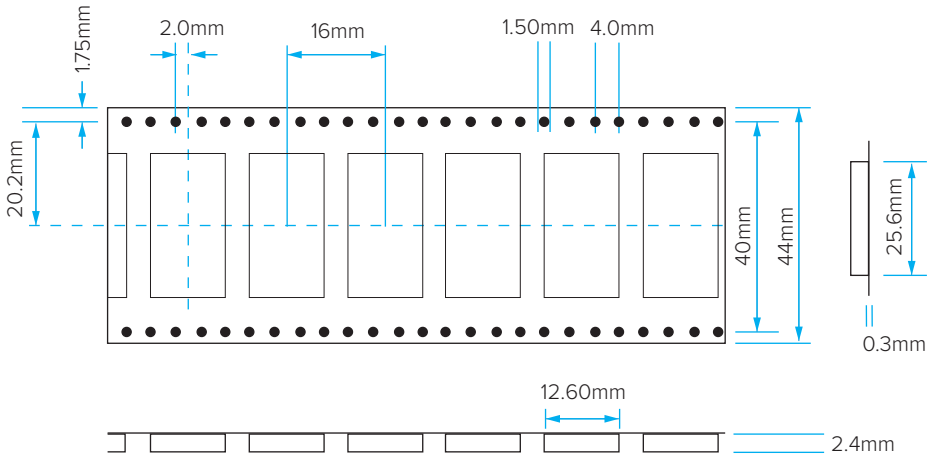
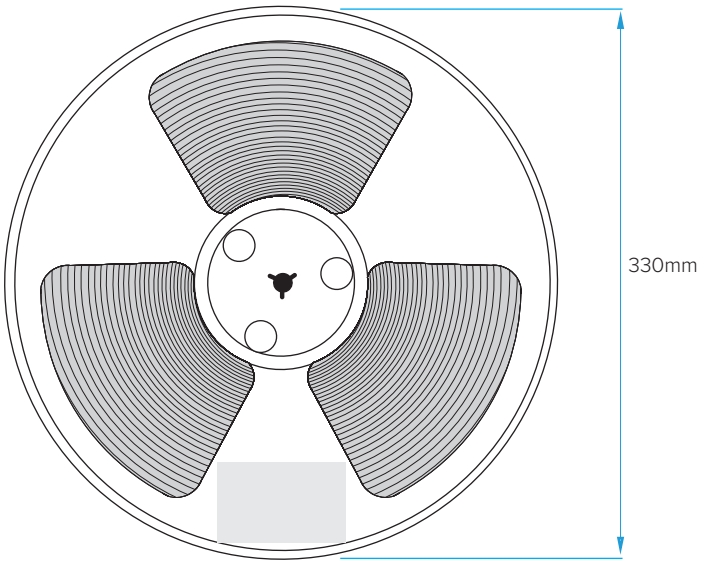
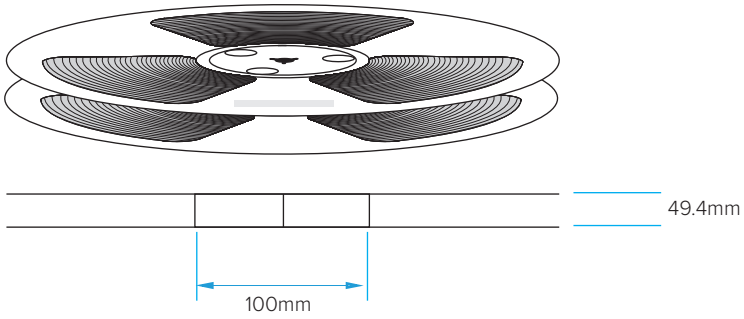
Tape and Reel Packaging

Tape Dimensions



Reel Dimensions





Notes

- Carton Dimensions (L x W x H): 395mm x 360mm x 305mm

Quantities

- 1500 modules per Tape
- 5 Boxes per Carton
- 7500 modules per carton

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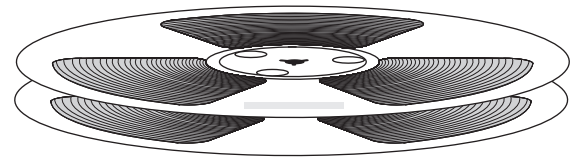
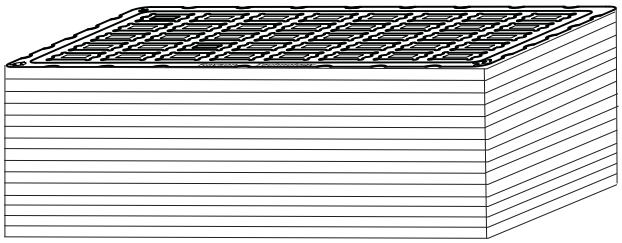
Packaging for Tape & Reel / Tray

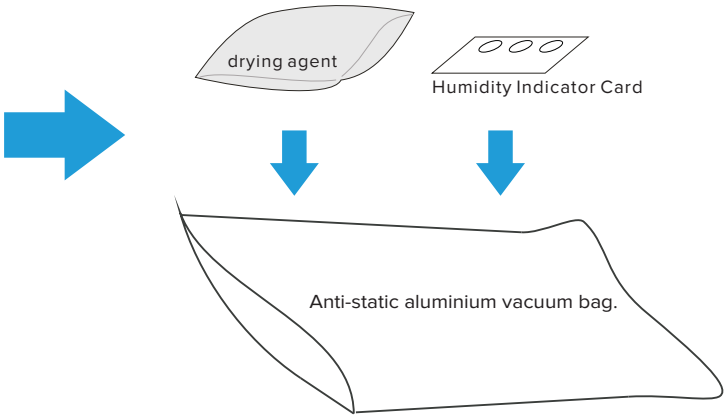
The trays/reels are stacked and inserted into an anti-static vacuum bag and the Anti-Static Label, Model Name Label and Moisture Sensitive Labels stuck on.



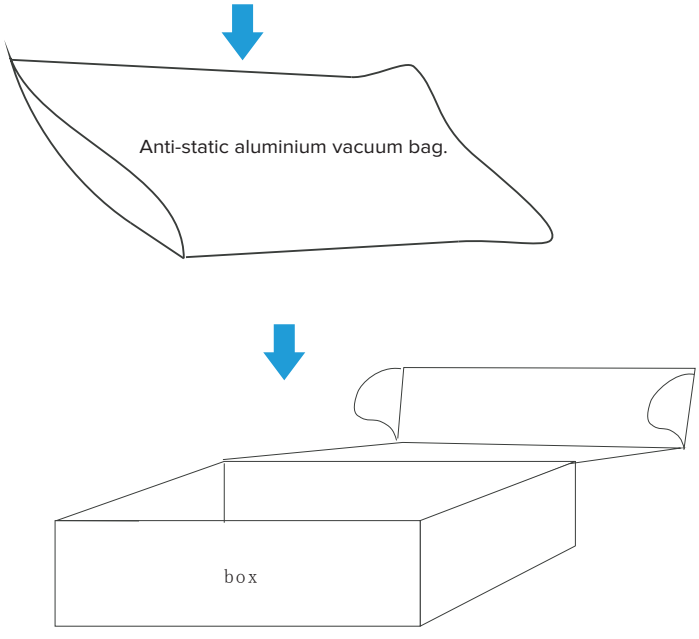
Reels are place within a vacuum bag.

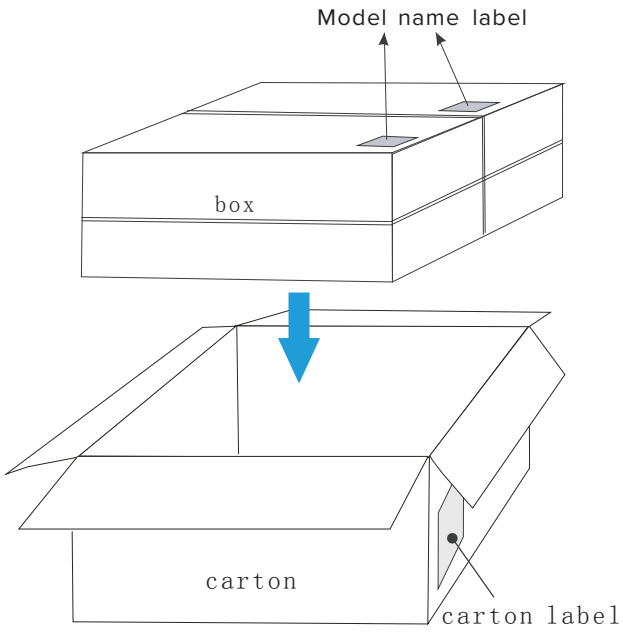


Trays are stacked up with an empty tray on the top.



The vacuum bag is placed inside the box and a Model Name Label stuck on the front-side of each box.





Each carton contains 4 boxes.

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LM811 Packaging Options

811-0461

3.3V Module with IPEX Connector
1 x LM811 SMT HCI 802.11n BT4.0 150Mbps USB 3.3V IPEX Module
Tray

811-0467

3.3V Module with IPEX Connector
1 x LM811 SMT HCI 802.11n BT4.0 150Mbps USB 3.3V IPEX Module
Tape & Reel

811-0465

5V Module with IC Antenna
1 x LM811 SMT HCI 802.11n BT4.0 150Mbps USB 5V IC ANT Module
Tray

811-0450

5V Module with IC Antenna
1 x LM811 SMT HCI 802.11n BT4.0 150Mbps USB 5V IC ANT Module
Tape & Reel

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