

LM833 WiFi and Bluetooth® 5.2 Dual Mode Combi Module

Host Controller Interface (HCI) with SDIO and UART Interfaces

Revised

30/APR/2021

Draft Datasheet Version

0.2

Ordering Options

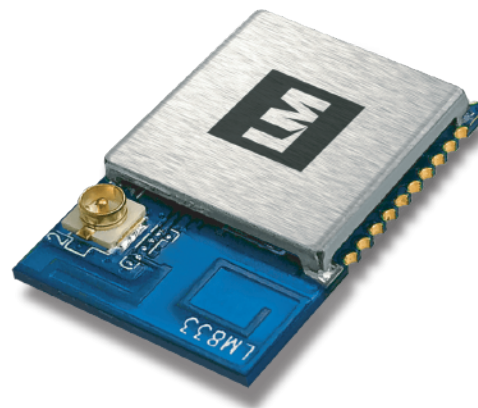
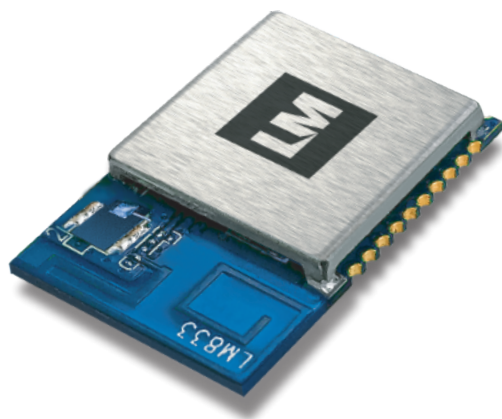
See last page



Linux



Android



Features

- WiFi 802.11 b/g/n
- Bluetooth® v5.2 specification (Dual Mode)
- SDIO v2.0 for WiFi and Bluetooth®
- High Speed UART also available for Bluetooth®
- IPEX Connector or PCB Antenna options
- Full speed Bluetooth® Piconet and Scatternet supported
- Enterprise level security - WPA/WPA2/WPA3 certification for WiFi
- SoftAP (Up to 4 clients)
- 1T1R
- DPP (Device Provisional Protocol) for WiFi Easy Connect™
- Support sophisticated Wi-Fi / BT coexistence mechanism to enhance collection performance
- Supports Bluetooth adaptive power management mechanism
- 19mm x 12mm x 2mm
- SMT Side and Bottom Pads for easy production
- See our website for this products certifications.
- RoHS, REACH and WEEE

Overview

The LM833 module incorporates an intelligent coexistences mechanism for WiFi 802.11 b/g/n via SDIO and Dual Mode Bluetooth® v5.2 via UART. This is ideal for significantly minimising the BoM cost and PCB space.

The LM833 adds updated Bluetooth capabilities, WPA3, DPP for Wi-Fi Easy Connect, enhanced Soft AP and shared SDIO host interface for Wi-Fi + Bluetooth.

This versatile module combines WiFi and Bluetooth® radios, plus an ARM Cortex-M3 microcontroller.

The LM833 utilises a powerful Infineon chipset which enables the LM833 HCI Module to be compatible with the latest Android / Linux platforms.

It's SMT side and bottom pads allow for easy manufacture and placement within your product.

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General Specification

Wireless

Wireless Standard	WiFi: 802.11 b/g/n Bluetooth: v5.2 BR/EDR/LE
Module Type	Host Controller Interface (HCI)
Profiles	TBA
OS Compatibility	Linux, Android and Windows
Security	WiFi: WEP, WPA, WPA2, WPA3, WMM, WMM-PS(U-APSD), WMM-SA, WAPI, AES (Hardware Accelerator), TKIP (host-computed), CKIP (Software Support) Bluetooth: Secure Simple Paring
Network Architecture	WiFi: Ad hoc mode (Peer-to-Peer), Infrastructure mode, Software AP and WiFi Direct Bluetooth: Piconet; Scatternet

Hardware

Chipset	Infineon CYW43439
Antenna	PCB Antenna or IPEX Receptical
Microcontroller (MCU)	ARM Cortex-M3
ROM	640 kB
RAM	512 kB
Interfaces	WiFi: SDIO 2.0 Bluetooth: High Speed UART (Baud rates up to 4 Mbps) SDIO 2.0
Power Supply	1V8-3V3 (VDDIO) and 3V0-4V8 (VBAT)
Crystal Oscillators	26 MHz (Internal) and 32.768 kHz (External - Optional)
Development Kit	LM522



LM833 WiFi and Bluetooth® 5.2 Dual Mode Combi Module

Host Controller Interface (HCI) with SDIO and UART Interfaces

General Specification (Continued)

RF Characteristics

Tx Output Power

WiFi:

17dBm – 802.11b@11Mbps 15dBm – 802.11g@6Mbps 15dBm –
802.11g@54Mbps 13dBm – 802.11n@MCS0_HT20 13dBm –
802.11n@MCS7_HT20

Bluetooth:

Class 1

Rx Sensitivity

WiFi:

-76dBm – 802.11b@11Mbps -65dBm – 802.11g@54Mbps
-64dBm – 802.11n@MCS7_HT20

Bluetooth:

-89dBm@1Mbps -90dBm@2Mbps -83dBm@3Mbps

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

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

Bluetooth:

GFSK, $\pi/4$ DPSK, 8DPSK

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





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Host Controller Interface (HCI) with SDIO and UART Interfaces

General Specification (Continued)

Physical Characteristics

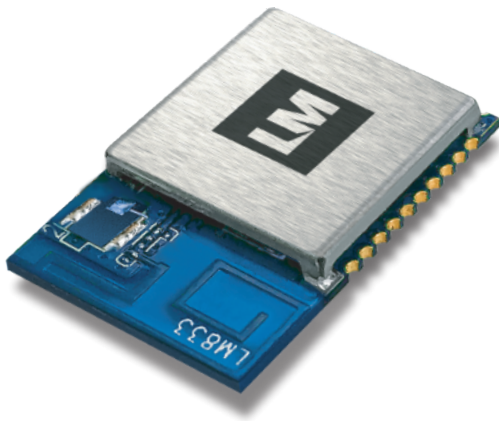
Operating Temperature	-20°C to +60°C ambient temperature 5 to 90 % (non-condensing)
Storage Temperature	-20°C to +70°C ambient temperature 0 to 95 % (non-condensing)
Dimensions (L x W x H)	19mm x 12mm x 2mm
Weight	0.44 g (PCB Antenna Module) and 0.46 g (IPEX Module)
Certifications	See our website for this products certifications
Compliance	RoHS, REACH and WEEE



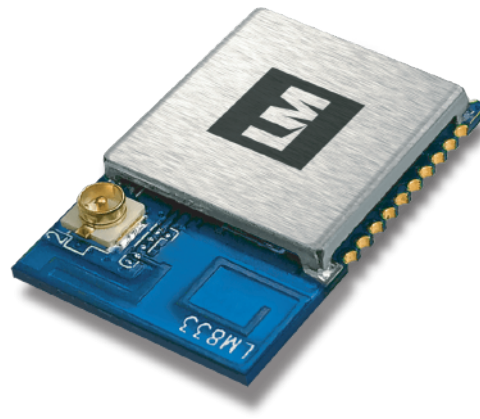
LM833 WiFi and Bluetooth® 5.2 Dual Mode Combi Module

Host Controller Interface (HCI) with SDIO and UART Interfaces

Antenna Options

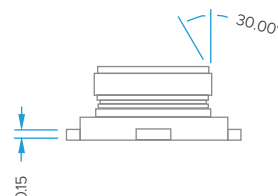
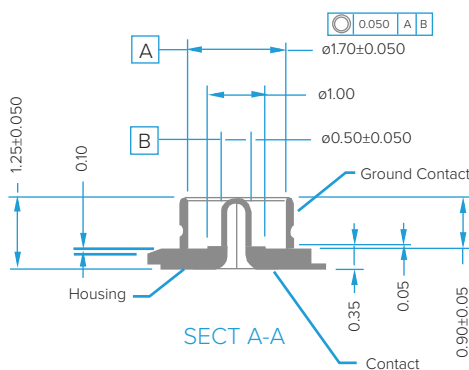
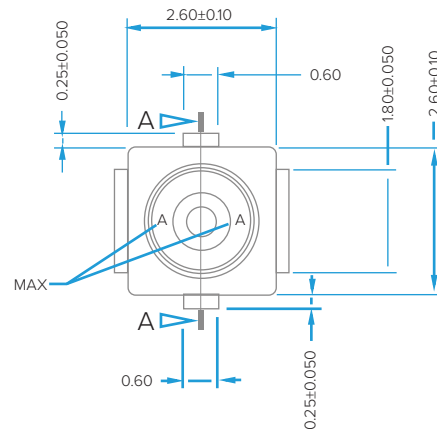
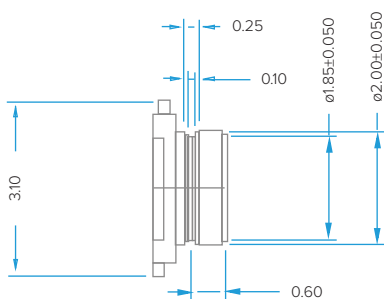


RF Type 1: PCB Antenna Module



RF Type 2: IPEX Connector Module

RF Connector Dimensions



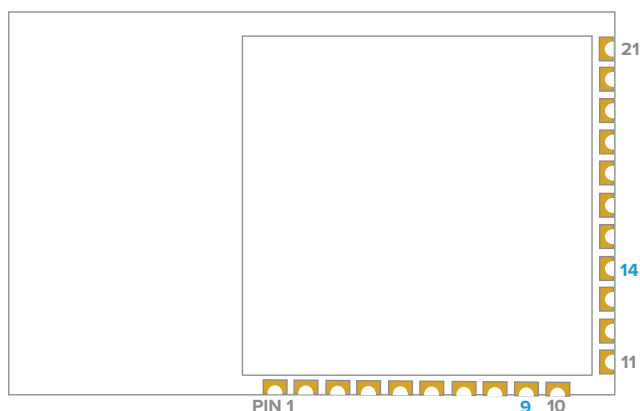
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Host Controller Interface (HCI) with SDIO and UART Interfaces

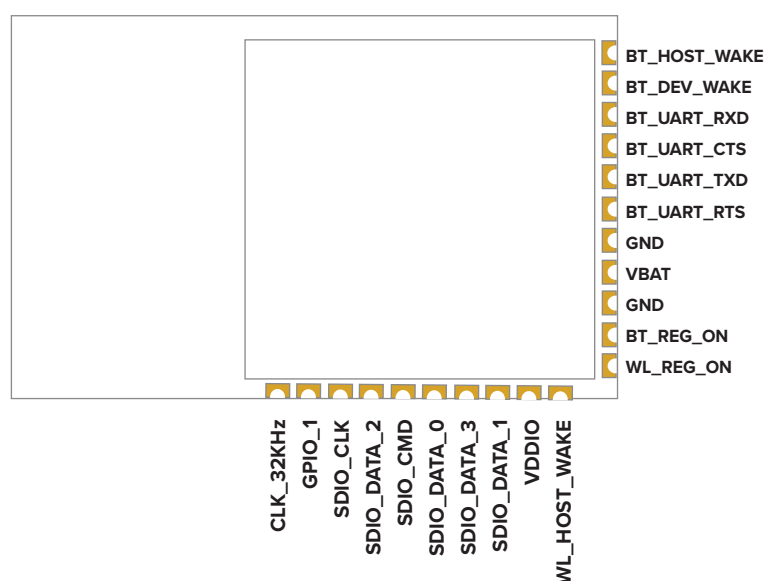
Powering

- The LM833 is powered by pin VBAT and VDDIO. VBAT and VDDIO should not rise faster than 40 μ s. VBAT should be up before or at the same time as VDDIO. VDDIO should not be present first or be held high before VBAT is high.
- Both Wi-Fi and Bluetooth functionality can be enabled and disabled to save on power consumption. When BT_REG_ON is high, Bluetooth functionality is enabled. When WL_REG_ON is high, Wi-Fi functionality is enabled.

Note: For both the WL_REG_ON and BT_REG_ON pins, there should be at least a 10 ms time delay between consecutive toggles (where both signals have been driven low). This is to allow time for the CBUCK regulator to discharge. If this delay is not followed, then there may be a VDDIO in-rush current on the order of 36 mA during the next PMU cold start.



Pin Outs



LM833 WiFi and Bluetooth® 5.2 Dual Mode Combi Module

Host Controller Interface (HCI) with SDIO and UART Interfaces

Pin Assignments

Pin	Signal	Type	Description
1	CLK_32KHz	Input	External sleep clock input (32.768 kHz). If an external 32.768 kHz clock cannot be provided, pull this pin low. However, BLE will be always on and cannot enter deep sleep.
2	GPIO_1	I/O	Programmable GPIO pins
3	SDIO_CLK	Input	SDIO clock input
4	SDIO_DATA_2	I/O	SDIO data line 2. Also used as a strapping option.
5	SDIO_CMD	I/O	SDIO command line
6	SDIO_DATA_0	I/O	SDIO data line 0
7	SDIO_DATA_3	I/O	SDIO data line 3
8	SDIO_DATA_1	I/O	SDIO data line 1
9	VDDIO	Input	VDDIO input supply. Connect to VDDIO.
10	WL_HOST_WAKE	I/O	Programmable GPIO pins. This pin becomes an output pin when it is used as WLAN_HOST_WAKE/out-of-band signal.
11	WL_REG_ON	Input	Used by PMU to power up or power down the internal regulators used by the WiFi section. Also, when deasserted, this pin holds the WiFi section in reset. This pin has an internal 200 kΩ pull-down resistor that is enable by default. It can be disabled through programming.
12	BT_REG_ON	Input	Used by PMU to power up or power down the internal regulators used by the Bluetooth section. Also, when deasserted, this pin holds the Bluetooth section in reset. This pin has an internal 200 kΩ pull-down resistor that is enable by default. It can be disabled through programming.
13	GND	Power	Ground
14	VBAT	Power	VBAT input power supply
15	GND	Power	Ground
16	BT_UART_RTS	Output	UART request-to-send. Active-low request-to-send signal for the HCI UART interface.
17	BT_UART_TXD	Output	UART serial output. Serial data output for the HCI UART interface.
18	BT_UART_CTS	Input	UART clear-to-send. Active-low clear-to-send signal for the HCI UART interface.
19	BT_UART_RXD	Input	UART serial input. Serial data input for the HCI UART interface.
20	BT_DEV_WAKE	I/O	DEV_WAKE or general-purpose I/O signal
21	BT_HOST_WAKE	I/O	HOST_WAKE or general-purpose I/O signal

LM833 WiFi and Bluetooth® 5.2 Dual Mode Combi Module

Host Controller Interface (HCI) with SDIO and UART Interfaces

Recommended Operating Conditions

DC Power Supply	Signal	Minimum	Maximum
Voltage for VBAT	VBAT	3V	4.8V
Voltage for digital I/O	VDDIO	1.71 V	3.63V

SDIO Interface I/O Pins

VDDIO_SD = 1V8	Signal	Minimum	Maximum
Input high voltage	VIH	1.27V	
Input low voltage	VIL		0.58V
Output high voltage (at 2mA)	VOH	1.40V	
Output low voltage (at 2mA)	VOL		0.45V
VDDIO_SD = 3V3	Signal	Minimum	Maximum
Input high voltage	VIH	0.625V x VDDIO	
Input low voltage	VIL		0.25V x VDDIO
Output high voltage (at 2mA)	VOH	0.75V x VDDIO	
Output low voltage (at 2mA)	VOL		0.125V x VDDIO

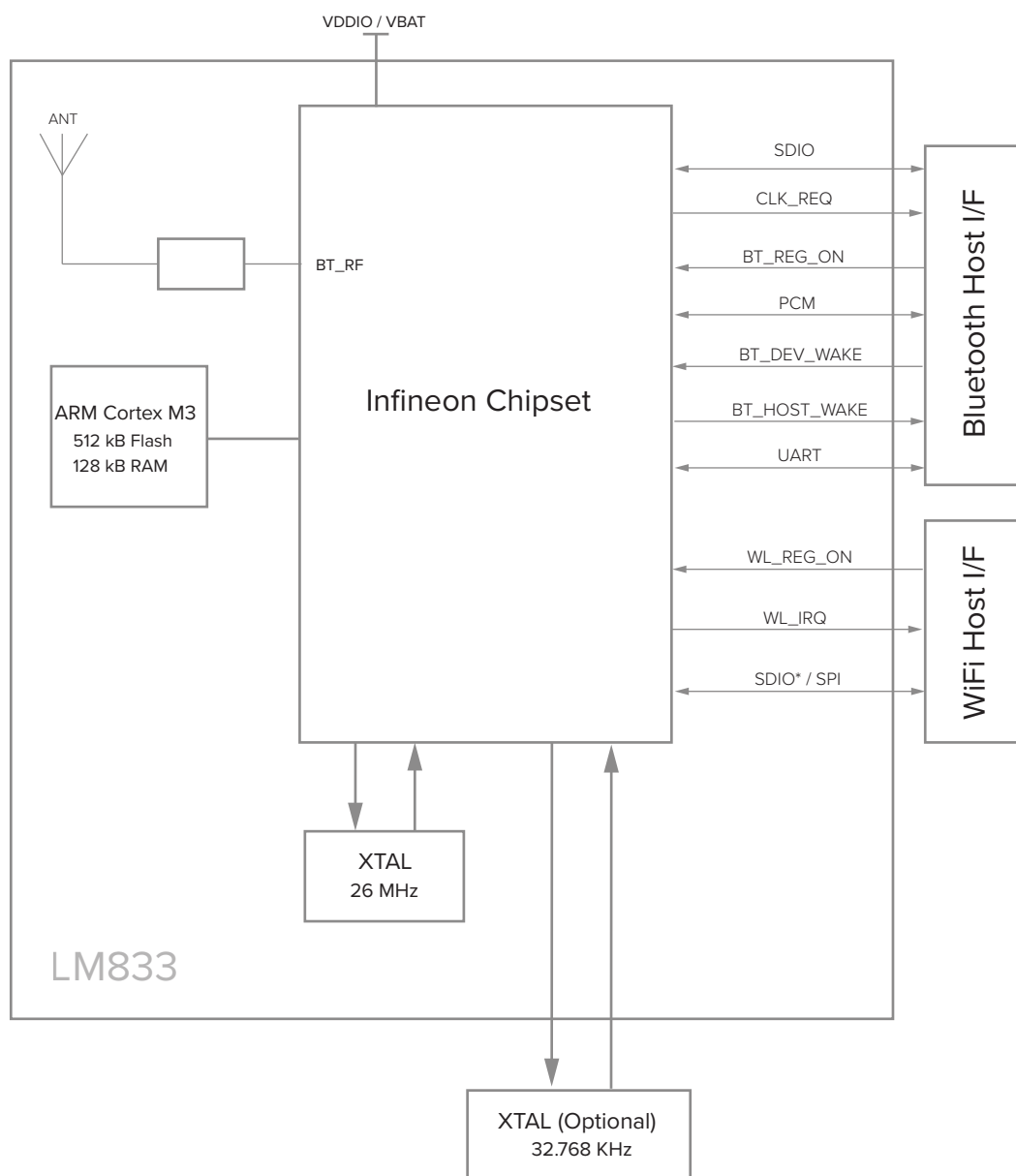
Other Digital I/O Pins

VDDIO = 1V8	Signal	Minimum	Maximum
Input high voltage	VIH	0.65V x VDDIO	
Input low voltage	VIL		0.35V x VDDIO
Output high voltage (at 2mA)	VOH	VDDIO - 0.45V	
Output low voltage (at 2mA)	VOL		0.45V
VDDIO = 3V3	Signal	Minimum	Maximum
Input high voltage	VIH	2V	
Input low voltage	VIL		0.8V
Output high voltage (at 2mA)	VOH	VDDIO - 0.4V	
Output low voltage (at 2mA)	VOL		0.4V

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Host Controller Interface (HCI) with SDIO and UART Interfaces

Module Block Diagram

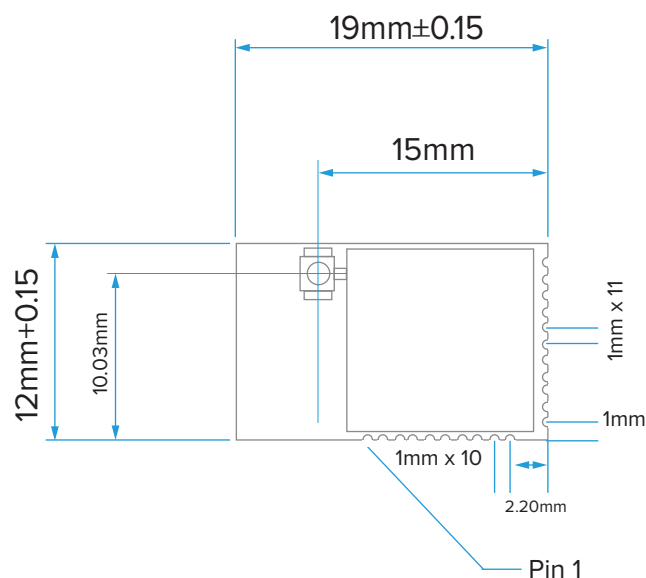


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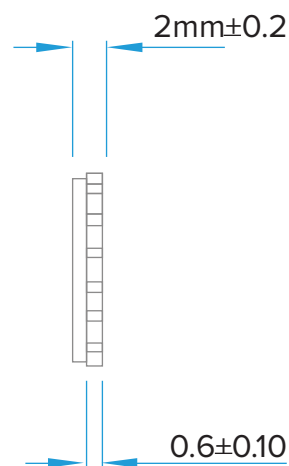
Host Controller Interface (HCI) with SDIO and UART Interfaces

Physical Dimensions

TOP VIEW

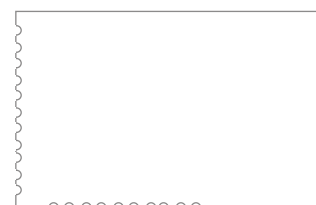
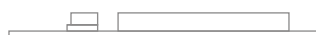


Shielding



SIDE VIEW

FRONT VIEW

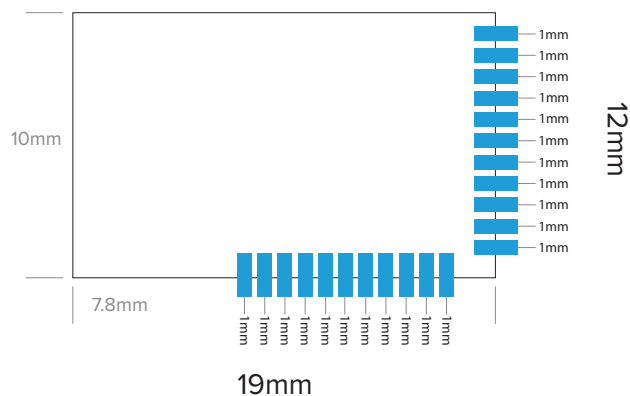


BOTTOM VIEW

PCB Footprint

The recommended layout pads for LM833 module are shown below.

TOP VIEW



LM833 WiFi and Bluetooth® 5.2 Dual Mode Combi Module

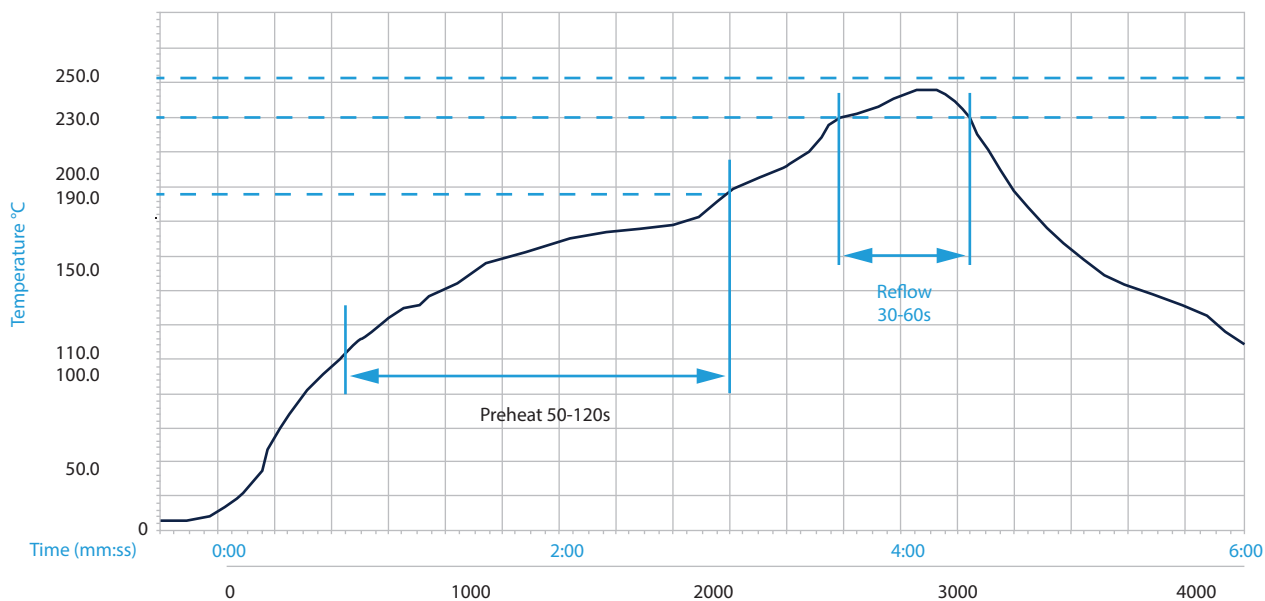
Host Controller Interface (HCI) with SDIO and UART Interfaces

PCB Drying Conditions

Please refer below to the conditions for drying before the solder reflow processes. (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

Soldering and Reflow Chart



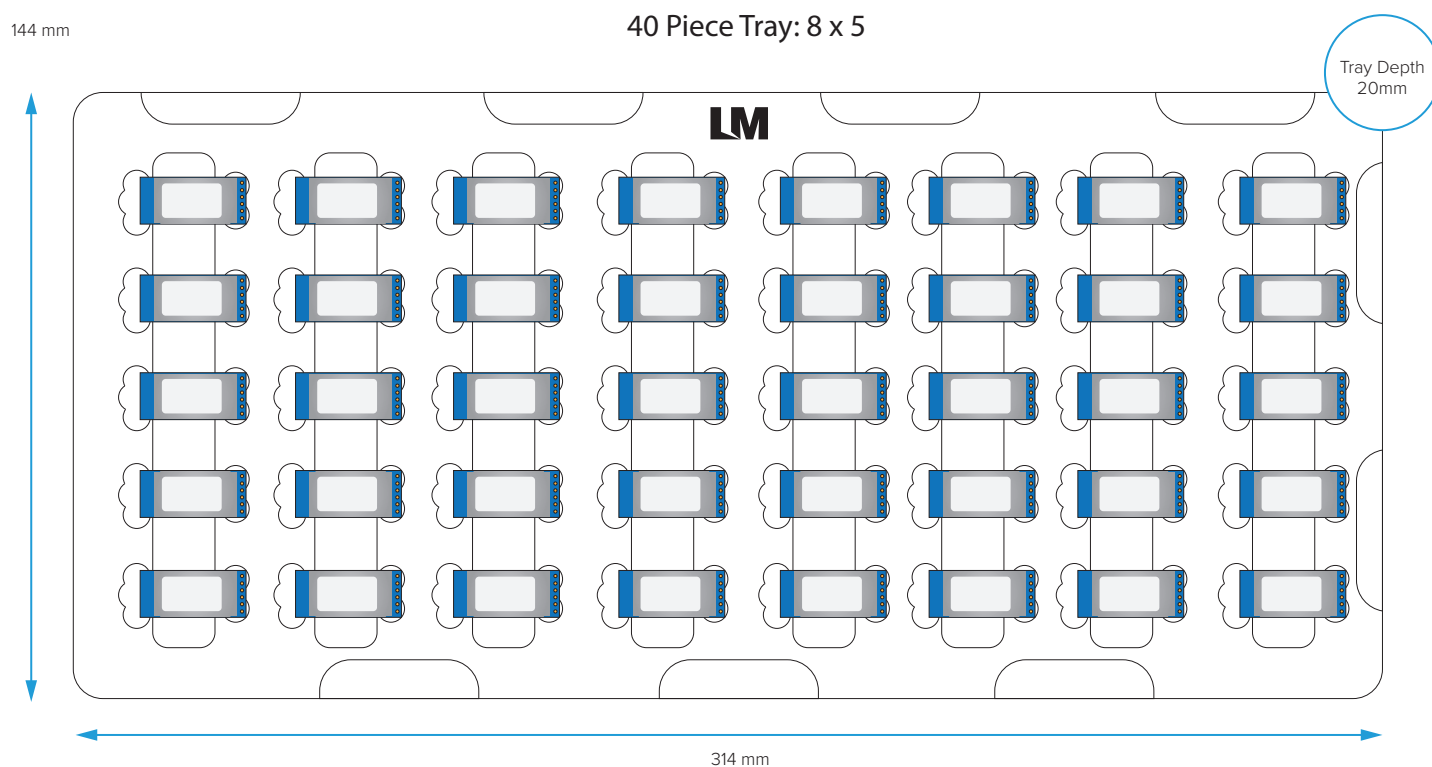
1. If the system PCBA is double side design please reflow the side without this module first.
2. Don't let the solder machine temperature over 250° or follow solder paste vender's recommended temperature.
3. The Ramp-up temperature speed is 1~4 °C per second, the Ramp-down temperature speed is 1~4 °C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

LM833 WiFi and Bluetooth® 5.2 Dual Mode Combi Module

Host Controller Interface (HCI) with SDIO and UART Interfaces

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

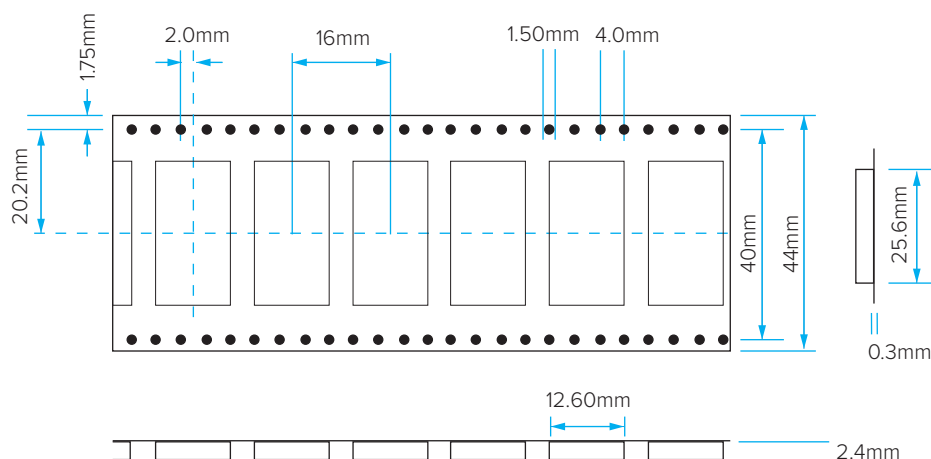
- Anti-Static PS Tray, Black.
- Material Thickness: 1mm
- Height of Tray: 20mm
- Carton Dimensions (L x W x H):
340mm x 290mm x 385mm

LM833 WiFi and Bluetooth® 5.2 Dual Mode Combi Module

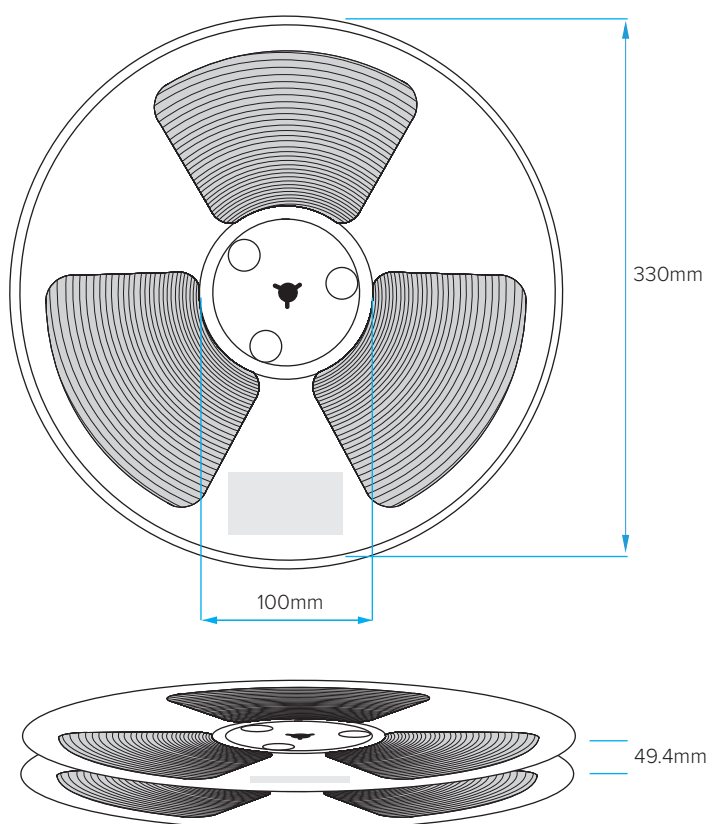
Host Controller Interface (HCI) with SDIO and UART Interfaces

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

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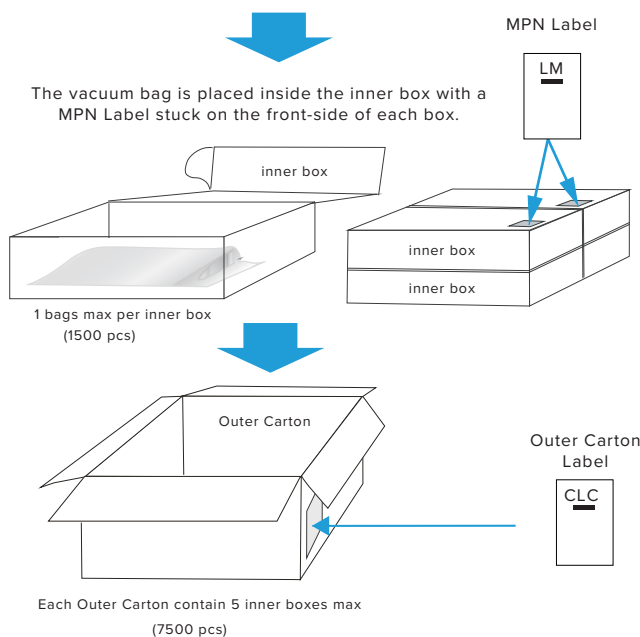
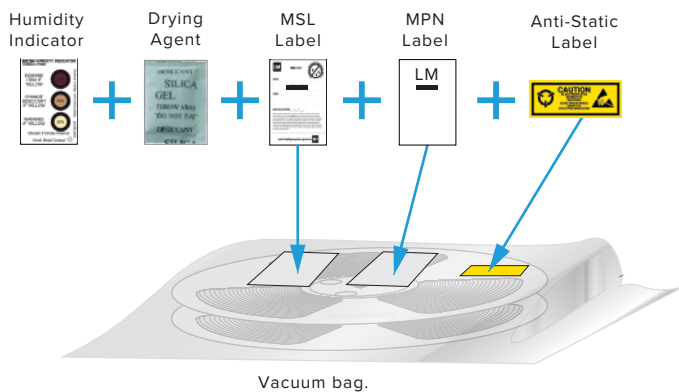
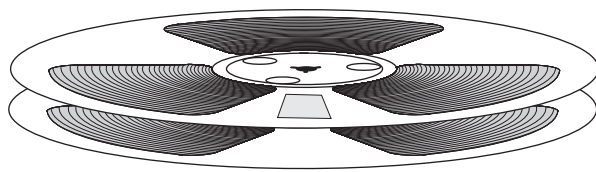
Packaging for Tape & Reel / Tray

The Tape & Reel / Tray are inserted into an anti-static vacuum bag with a Humidity Indicator Card and Drying Agent.

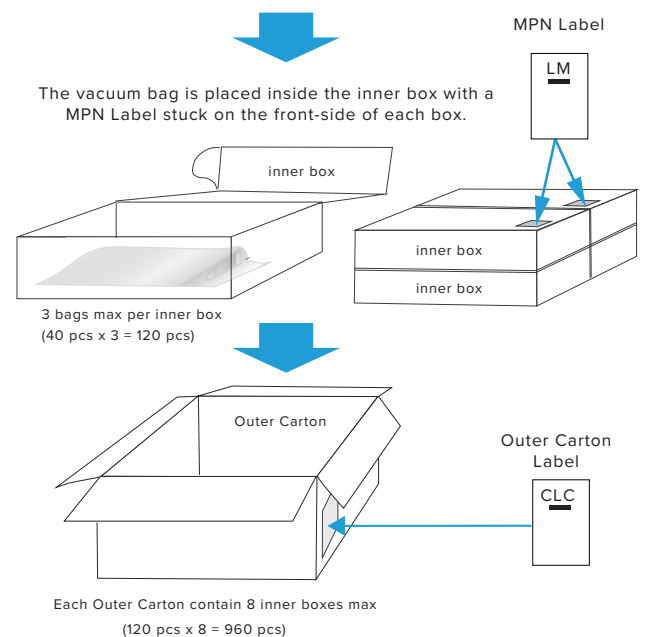
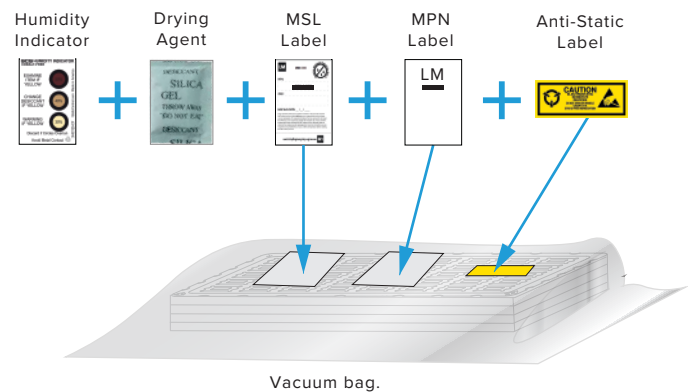
On the outside of the vacuum bag are MSL (Moisture Sensitivity Levels), MPN and an Anti-Static Labels.

Tape & Reel

Reels are placed within a vacuum bag.



Tray





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Datasheet Version Notes

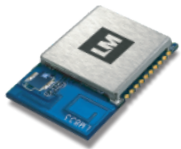
v0.1	22 MAR 2021	Draft Version Only.
v0.2	30 APR 2021	Draft Version Only.



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Host Controller Interface (HCI) with SDIO and UART Interfaces

Ordering Options



833-0478-000	MOD SDIO Wi-Fi + BT5.2 ROM 3-4.8v PCB ANT -20c SP
833-0478-001	MOD SDIO Wi-Fi + BT5.2 ROM 3-4.8v PCB ANT -20c TRAY
833-0478-002	MOD SDIO Wi-Fi + BT5.2 ROM 3-4.8v PCB ANT -20c T&R



833-0479-000	MOD SDIO Wi-Fi + BT5.2 ROM 3-4.8v IPEX -20c SP
833-0479-001	MOD SDIO Wi-Fi + BT5.2 ROM 3-4.8v IPEX -20c TRAY
833-0479-002	MOD SDIO Wi-Fi + BT5.2 ROM 3-4.8v IPEX -20c T&R

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