

LM849 Wi-Fi 6 (802.11ax) and Bluetooth® 5.2 Combo USB Module

WLAN SMT USB Module

Revised 16/JUN/2026

Datasheet Version 1.0

Ordering Options See last page



Features

- Wi-Fi 6 (IEEE 802.11ax) compliant
- 2T2R (2x2) MU-MIMO configuration offers extended bandwidth for reception and throughput
- USB 3.0 interface with USB 2.0 backwards compatibility
- ISM Bands (2.4GHz or 5GHz)
- IEEE support: 802.11b/g/n/a/ac/ax
- Cross Standard Connections
802.11ax connection and/or connected to 802.11a/b/g/n/ac devices
- Two antenna options are available: 2x IPEX, or 2x RF line out
- Theoretical maximum bandwidths
 - 286.8 Mbps using 20MHz
 - 573.5 Mbps using 40MHz
 - 1201 Mbps using 80MHz
- Enhanced BT/Wi-Fi coexistence control to improve transmission quality in different profiles and support for multiple Low Energy positions (Sniff / Sniff Sub-rating)
- Bluetooth® 5.2 dual mode
Support for simultaneous connections over LE and BR/EDR
- Engineered to simplify regional FCC and CE certifications

Overview

The LM849 is a high performance dual band Wi-Fi 6 (IEEE 802.11ax) and Bluetooth 5.2 combo embedded module designed for OEM, industrial, medical, scientific, and commercial wireless applications. The module integrates a complete 2x2 MIMO wireless subsystem supporting operation across both 2.4GHz and 5GHz frequency bands, delivering significantly higher throughput, improved spectrum efficiency, and lower latency compared to previous Wi-Fi 5 generation products.

Alongside next generation Wi-Fi, the LM849 integrates Bluetooth 5.2 to provide a stable, unified wireless interface for industrial applications. The subsystem manages signal power dynamically to maintain connection integrity in RF congested environments. By utilising Isochronous Channels, the module ensures low latency transmission for real time sensor data while optimizing power consumption for connected, battery powered peripherals.

The module incorporates advanced wireless features including OFDMA (Orthogonal Frequency Division Multiple Access), MU-MIMO (Multi-User Multiple Input Multiple Output), 1024-QAM modulation, transmit beamforming, and robust WPA3 security. These technologies ensure that multiple data streams transmit in parallel, maximizing wireless capacity and reducing latency in high density operational environments.

Designed for straightforward embedded integration, the module features a compact surface mount form factor measuring 27mm times 16.5mm x 1.8mm. It utilizes a high-speed host interface compliant with the USB 3.0 specification while remaining fully backward compatible with USB 2.0 architectures. The LM849 is available with dual factory antenna configurations supporting either on-board IPEX micro-coaxial connectors or SMT RF line-out pads. This flexibility offers a highly versatile, dependable connectivity solution for modern IoT frameworks, embedded computing platforms, and intelligent edge devices.

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General Specification

Wireless

Wireless Standards	Wi-Fi: IEEE 802.11a/b/g/n/ac/ax Bluetooth: 2.1+EDR/3.0/4.0/4.2/5.2 - BR/EDR and LE
Module Type	WLAN USB Module with Integrated Bluetooth HCI
OS Compatibility	Linux Kernel 3.13 - 6.6 (Kernel 4.20 + for Wi-Fi 6), Android 8 - 14
Security	Wi-Fi: WPA, WPA2, WPA3-SAE R2, WEP (64bit & 128bit), TKIP, AES, 802.1x Bluetooth: Simple Secure Pairing
Network Architecture	Wi-Fi: Ad hoc mode (Peer-to-Peer) and Infrastructure mode Software AP; WiFi Direct Bluetooth: Pico Net; Scatter Net

Hardware

Chipset	Realtek
Antenna	2 x IPEX Antennas, or 2 x RF Line Out
Interfaces	USB 3.0 / USB 2.0 Compliant (Shared WLAN and Bluetooth HCI Host Bus)

Physical Characteristics

Operating Temperature	-20°C to +70°C ambient temperature 5 to 90 % (non-condensing)
Storage Temperature	-55C to +125°C ambient temperature 5 to 90 % (non-condensing)
Dimensions (L x W x H)	L: 27mm x W: 16.5mm x H: 1.8mm +/- 0.2 tolerance
Weight	1.87g (+/- 0.2g tolerance)
Certifications	FCC / CE. See our website for further updates.
Compliance	RoHS, REACH and WEEE
Power Supply	DC 3.3V
Operating Voltage Range	3.0V (Min) / 3.3V (Typ) / 3.6V (Max)
Peak Current Draw	2A Maximum



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General Specification (Continued)

RF Characteristics

Data Transfer Rate	Wi-Fi: 802.11b: 11, 5.5, 2, 1 Mbps 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11n: MCS0 ~ 15 802.11ac: MCS0 to 8 for HT20MHz, MCS0 to 9 for HT40MHz, NSS1 MCS0 to 9 for VHT80MH 802.11ax: HE0 ~ 11 Bluetooth: Basic Rate: 1Mbps Enhanced Data Rate: 2Mbps / 3Mbps Low Energy: LE 1M: 1Mbps LE Coded S=8: 125kbps, LE Coded S=2: 500kbps, LE 2M: 2Mbps
Frequency	2.4GHz and 5GHz ISM Band
Modulation Method	Wi-Fi: CCK, DQPSK, DBPSK, BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM Bluetooth: 8DPSK, $\pi/4$ DQPSK, GFSK
Spread Spectrum	Wi-Fi: IEEE 802.11b: CCK (Complementary Code Keying) IEEE 802.11g/n/a/ac/ax: OFDM (Orthogonal Frequency Division Multiplexing) Bluetooth: FHSS (Frequency Hopping Spread Spectrum)
Operating Channel	Wi-Fi (5GHz): U-NII-1 (Band 1): 5180 ~ 5240MHz (Channels 36, 40, 44, 48) U-NII-3 (Band 4): 5745 ~ 5825MHz (Channels 149, 153, 157, 161, 165) Wi-Fi (2.4GHz): 11: (Ch. 1-11) – US (United States) 13: (Ch. 1-13) – ETSI 14: (Ch. 1-14) – TELEC (Factory Option) Bluetooth (2.4GHz): Ch. 0 to 78



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General Specification (Continued)

RF Characteristics

Tx Output Power (Typical)

Wi-Fi:

18dBm, EVM< 8% – 802.11b@CCK 11Mbps

17dBm, EVM< -25dB – 802.11g@OFDM 54Mbps

16dBm, EVM< -28dB – 802.11n@MCS7_HT20

16dBm, EVM< -28dB – 802.11n@MCS7_HT40

16dBm, EVM< -25dB – 802.11a@OFDM 54Mbps

14dBm, EVM< -32dB – 802.11ac@NSS1 MCS9_BW80

13dBm, EVM ≤ -35dB – 802.11ax@MCS11_HE40

13dBm, EVM ≤ -35dB – 802.11ax@MCS11_HE80

Bluetooth:

Class 1

Rx Sensitivity (Typical)

Wi-Fi:

<-86dBm – 802.11b@11Mbps

<-72dBm – 802.11a/g@54Mbps

<-61dBm – 802.11n_HT40@MCS7

<-58dBm – 802.11ac@MCS9_VHT80

<-56dBm – 802.11ax@MCS11_HE80

Bluetooth:

<-85dBm – Basic Rate @ 1Mbps

<-80dBm – Enhanced Data Rate @ 2-3Mbps

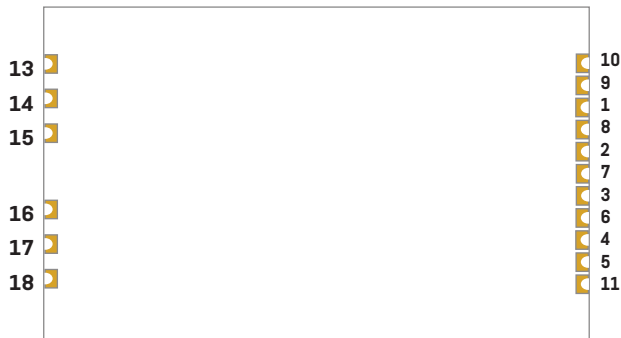
<-85dBm – Low Energy @ 2Mbps



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Pin Outs



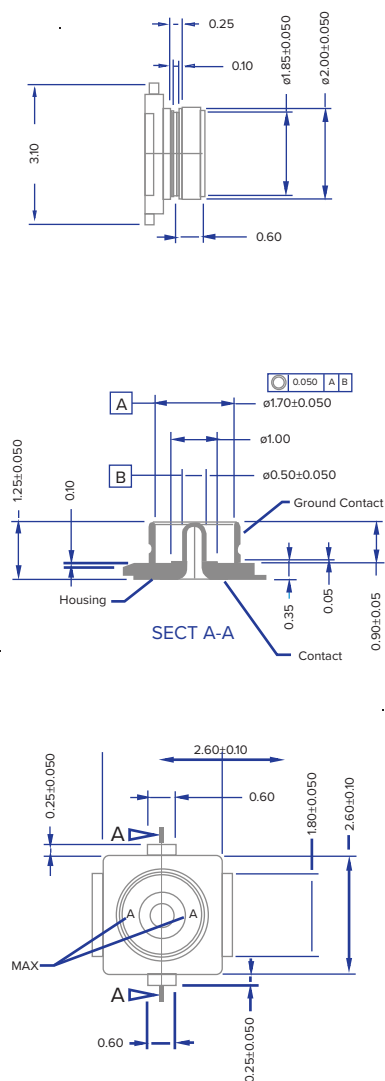
Pin Assignments

Pin	Signal	Type	Description
1	VDD	Power	DC 3.3V Supply Input
2	HSDM	I/O	USB 2.0 Differential Data Pair (DM)
3	HSDP	I/O	USB 2.0 Differential Data Pair (DP)
4	GND	Ground	Ground
5	HSOP	I/O	USB 3.0 Transmit Differential Pair (TX-)
6	HSOP	I/O	USB 3.0 Transmit Differential Pair (TX+)
7	GND	Ground	Ground
8	HSIN	I/O	USB 3.0 Receive Differential Pair (RX-)
9	HSIP	I/O	USB 3.0 Receive Differential Pair (RX+)
10	WPS	GPIO	General Purpose Input / Output Pin. Shared with WPS Function
11	LED_WL	NA	NA
13	GND	Ground	Ground
14	RF_S1	RF	WLAN / BT RF Port 1 (Used when RF line-out option is selected)
15	GND	Ground	Ground
16	GND	Ground	Ground
17	RF_S0	RF	WLAN RF Port 0 (Used when RF line-out option is selected)
18	GND	Ground	Ground

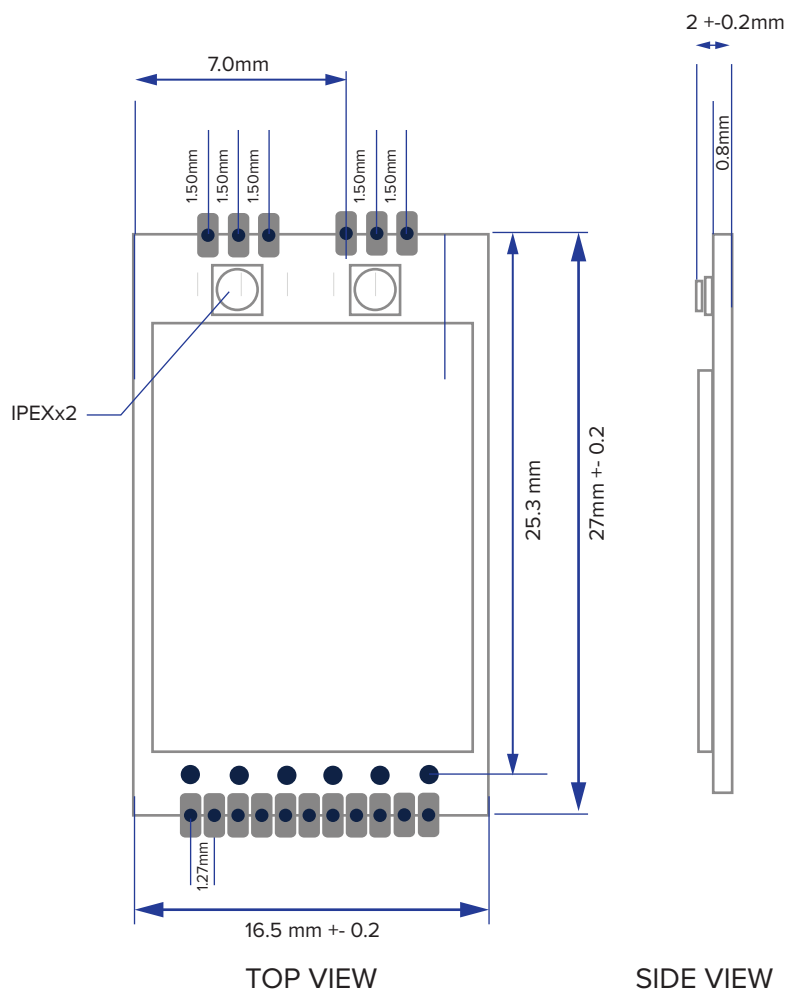
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IPEX Connector Dimensions



Physical Dimensions / PCB Footprint



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WLAN SMT USB Module

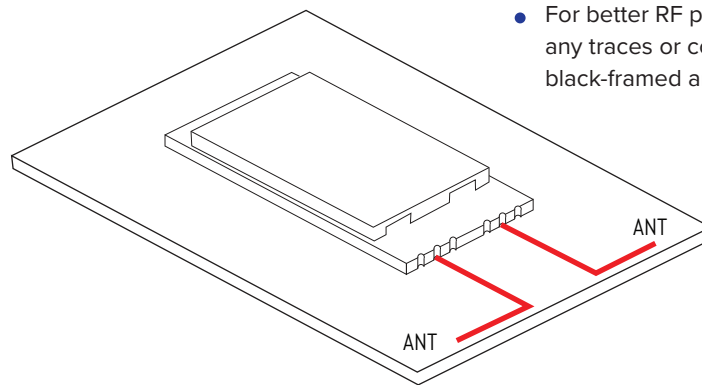
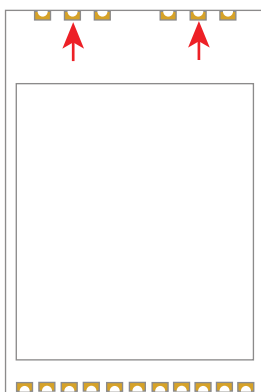
Antenna Output Options

RF output is offered as either 2x IPEX or 2x Half Hole Terminal.

Neither of these modules includes an antenna. For certification purposes, they have been tested and certified using a IPEX cable connected to a 3dBi SMA Antenna. This allows your design to use any antenna with a maximum gain of 3 dBi. If an antenna with a gain above 3 dBi is used, our certification will no longer be valid and additional certification may be required.

We also offer free design-in support to help ensure the module and antenna are correctly integrated into your product.

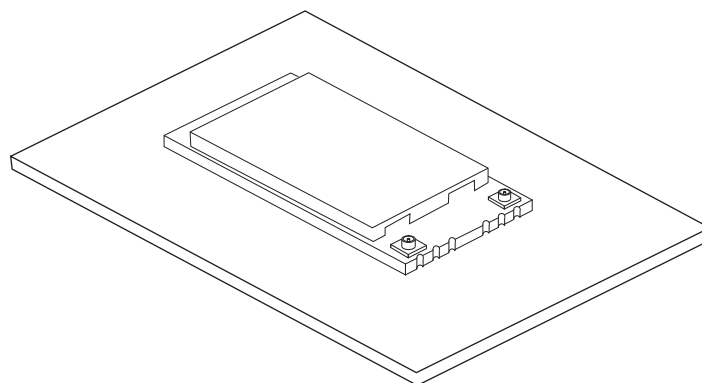
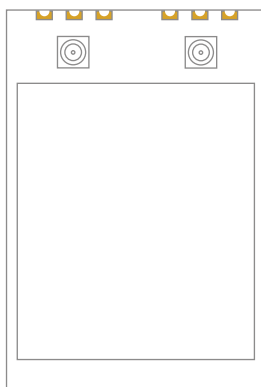
RF Line Out Option



- For better RF performance, please avoid placing any traces or copper planes underneath the black-framed area of the module

- For optimum RF performance, the feed line from the RF output pin to the antenna should be designed with a 50-ohm impedance

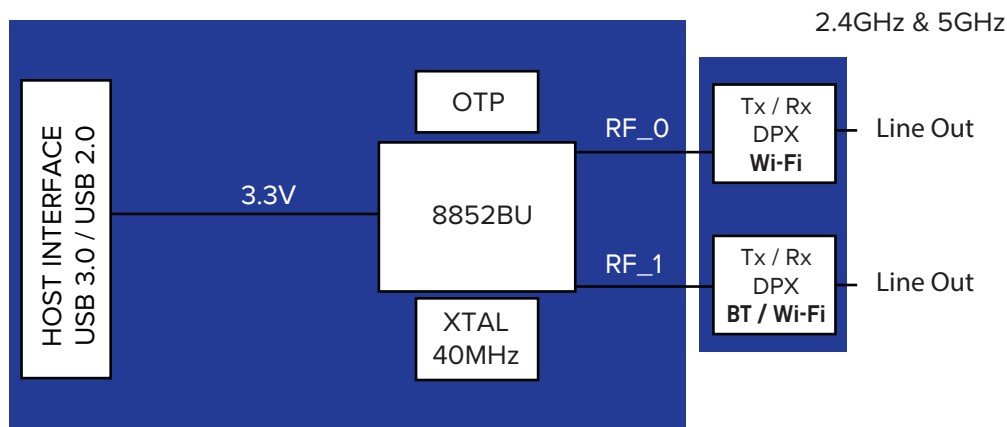
2 x IPEX Option



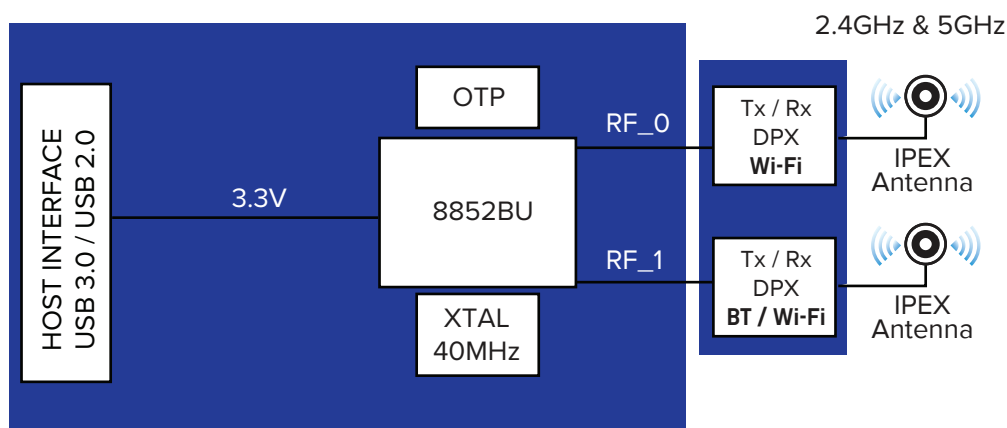
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XCVR Block Diagram (2 x RF Half Hole Line Out)



XCVR Block Diagram (2 x IPEX Antennas)



Note: The diagram above reflects the primary 11-Half Hole pad configuration, which supports full dual-mode (USB 3.0 / USB 2.0) interface functionality. Alternative 4-Pin Header configurations are available as a factory option upon customer request and are restricted to USB 2.0 operation only.

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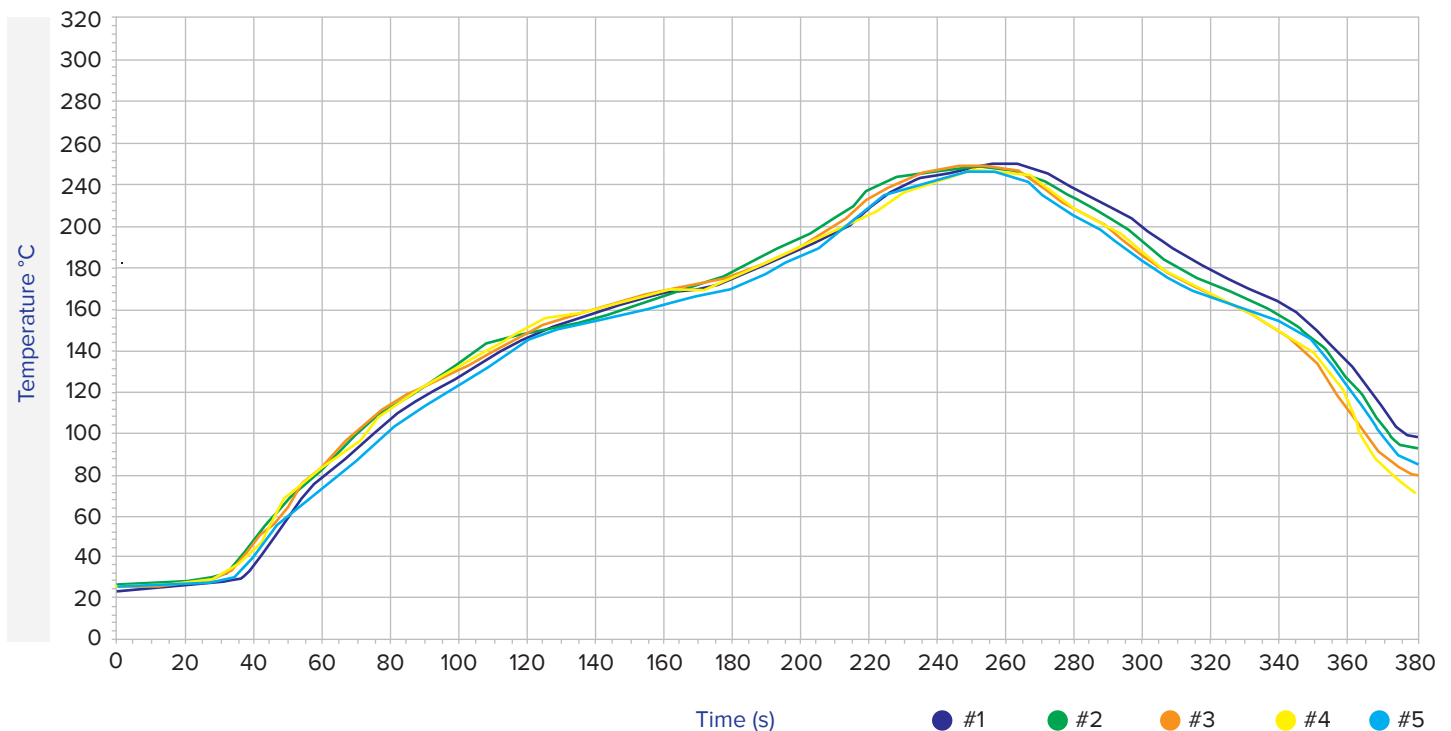
PCB Drying Conditions

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

1. If the system PCBA is a double-sided design, please reflow the side without this module first.
2. Do not allow the soldering machine temperature to exceed 250°C. Alternatively, follow the temperature profile recommended by the solder paste vendor.
3. The ramp-up temperature rate should be 1–4°C per second, and the ramp-down temperature rate should also be 1–4°C per second.
4. The reflow temperature profile shown is for reference only. The final profile should be adjusted according to the requirements and characteristics of the manufacturing equipment.

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 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

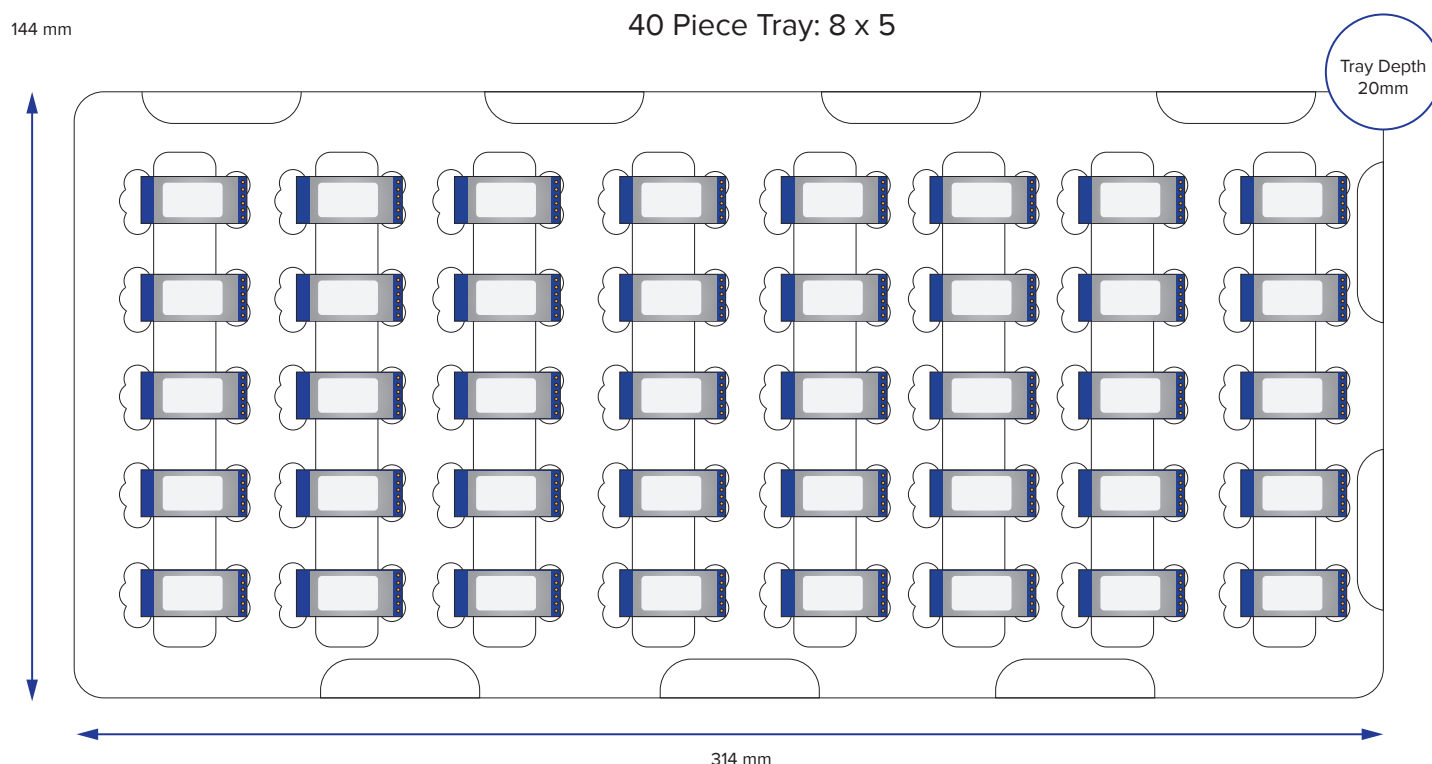
Probe	Liquidus Line		Maximum / Minimum		Slope	
	Rising 110.00-190.00	Above 230.0	Max	Min	Positive	Negative
● #1	119.00	47.50	245.50	27.30	2.56	-1.69
● #2	116.50	49.00	247.10	27.70	2.69	-1.60
● #3	116.00	46.50	245.80	29.30	2.04	-1.57
● #4	117.00	46.50	244.90	29.20	2.60	-1.31
● #5	119.50	50.00	248.10	29.60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

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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

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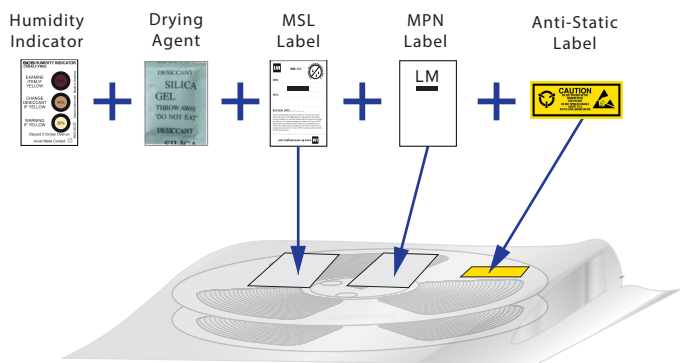
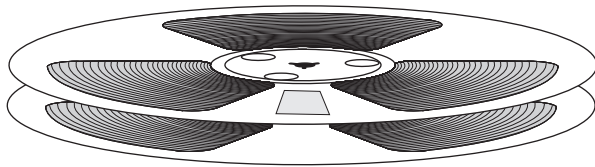
Packaging for Tape & Reel / Tray

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

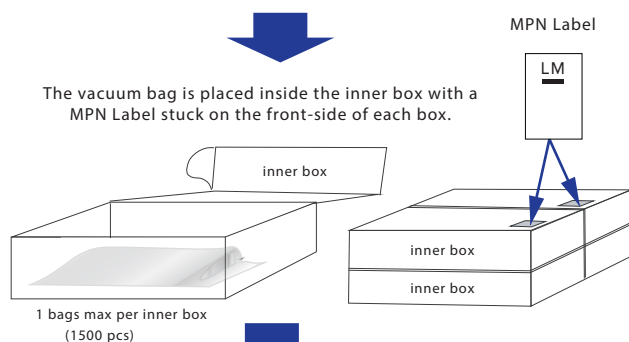
On the outside of the vacuum bag are MSL (Moisture Sensitivity Levels), MPN and an Anti-Static Labels.

Tape & Reel

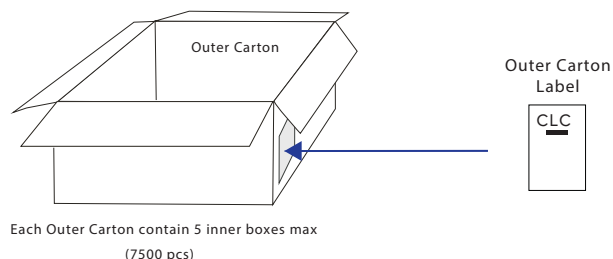
Reels are placed within a vacuum bag.



Vacuum bag.



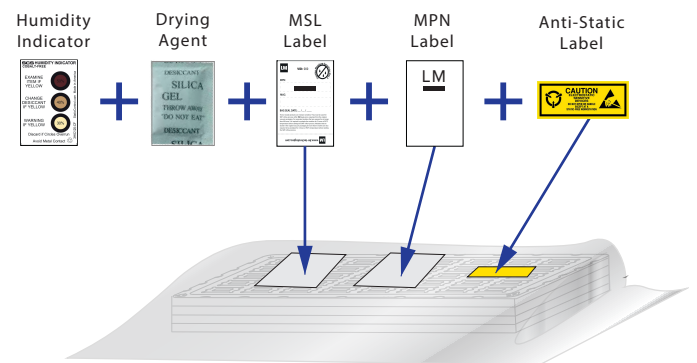
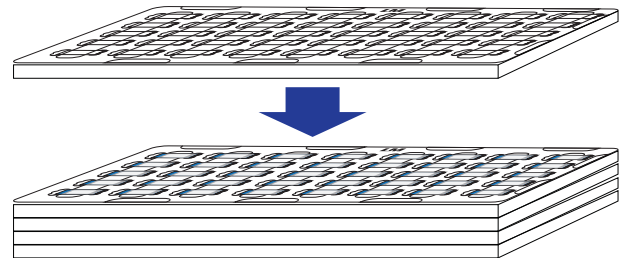
1 bags max per inner box
(1500 pcs)



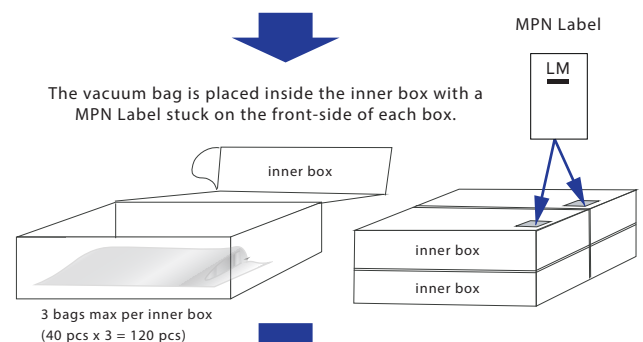
Each Outer Carton contain 5 inner boxes max
(7500 pcs)

Tray

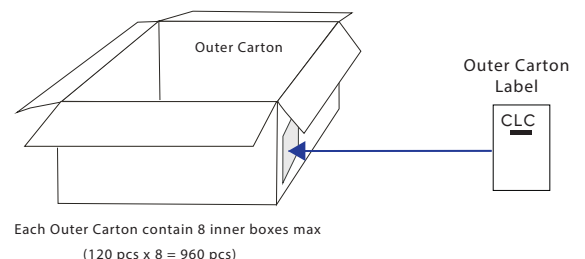
Trays are stacked with an empty tray on the top and placed within a vacuum bag.



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)

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Datasheet Version Notes

v1.0 16 JUN 2026 Initial release.

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Ordering Options

MFT Part No.	Product Description	Invoice Description	RF Bands	Packaging
849-8490	MOD 802.11ax BT5.2 USB 2T2R IPEX TRAY		ETSI	TRAY
849-8491	MOD 802.11ax BT5.2 USB 2T2R IPEX TRAY		US	TRAY
849-8492	MOD 802.11ax BT5.2 USB 2T2R IPEX T&R		ETSI	T&R
849-8493	MOD 802.11ax BT5.2 USB 2T2R IPEX T&R		US	T&R
849-8494	MOD 802.11ax BT5.2 USB 2T2R RF_LINE TRAY		ETSI	TRAY
849-8495	MOD 802.11ax BT5.2 USB 2T2R RF_LINE TRAY		US	TRAY
849-8496	MOD 802.11ax BT5.2 USB 2T2R RF_LINE T&R		ETSI	T&R
849-8497	MOD 802.11ax BT5.2 USB 2T2R RF_LINE T&R		US	T&R

- See LM240 IPEX Cable for SMA Antennas - <https://www.lm-technologies.com/product/ipex-to-rp-sma-male-jack-cable-100mm-lm240/>
- Product User Guides, Manuals and Configuration Software can be downloaded via our website - <http://www.lm-technologies.com/downloads>