MINEWSEMI

BLE Module

MS88SFA

DateSheet

V 1.1.0

Applicable Product Model
MS88SFA-nRF52840

Version Note

Version	Details	Contributor(s)	Date	Notes
1.0.0	First edit	Coral/lda	2023.02.15	
1.1.0	Layout Changes	Michelle	2023.10.07	

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MS88SFA-nRF52840

High sensitivity, ultra-low power, PCB/IPEX(MHF 5) selectable, multi-protocol Bluetooth 5.4 PA module

PCB/IPEX

The MS88SFA is a BLE 5.4 PA/LNA module based on the highly flexible, ultra-low power nRF52840 SoC. Its powerful 32-bit ARM CortexTM M4F CPU, 1MB flash , 256 kB RAM and integrated 2.4 GH transceiver provide a perfect solution for Bluetooth connectivity. nRF52840 can support protocols such as ANT, BLE, BLE MESH, ZIGBEE and THREAD. Built-in PA/LNA, communication distance up to 600m at 1Mbps rate.

■ Features

- Bluetooth 5.4
- Built-in PA/LNA
- Power up to Maximum+20dbm
- PCB antenna and IPEX mount optional
- Communication distance up to 600m at 1Mbps rate
- Support ANT, BLE, BLE MESH, ZIGBEE and THREAD protocols, etc.

■ Application

Smart Buildings

Consumer Electronics

Smart Healthcare

Security Equipment

Automotive Devices

Smart Agriculture

■ Key parameter

Chip Model	nRF52840	**Antenna**	PCB/IPEX(MHF 5)
Module Size	23.2×17.4×2mm	**GPIO**	29
Flash	1M	**RAM**	256KB
Receiving Sensitivity	-96dBm	**Transmission Power**	~ +20dBm

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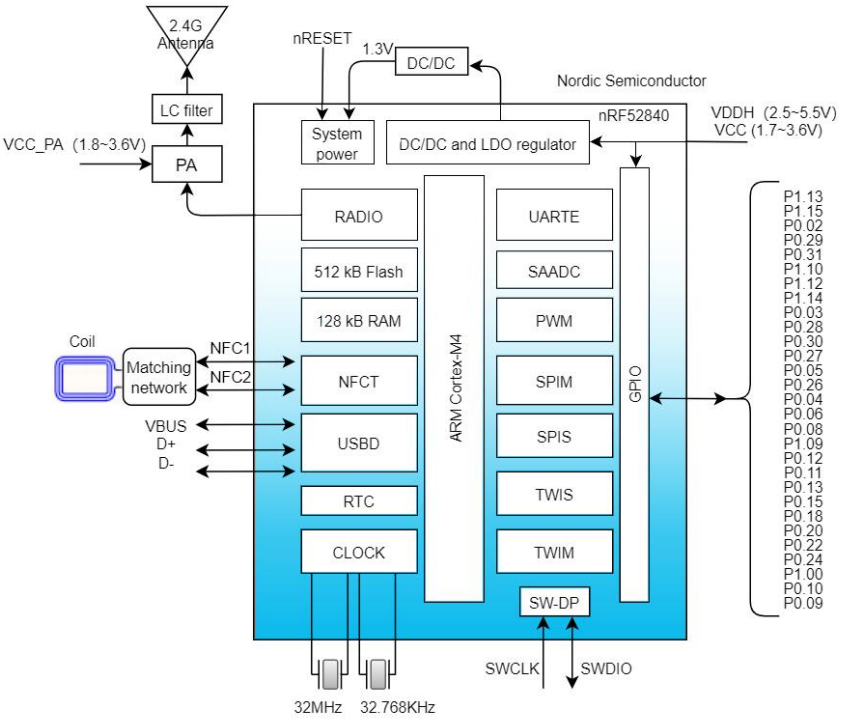
1 Block Diagram



2 Electrical Specification

Parameter	Values	Notes
Working Voltage	1.7V-5.5V	To ensure RF work, supply voltage suggest not lower than 3V
Working Temperature	-40℃~+85℃	Storage temperature is -40℃~+125℃
Transmission Power	~ +20dBm	Configurable
Module Dimension	23.2*17.4*2mm	
Quantity of IO Port	29	

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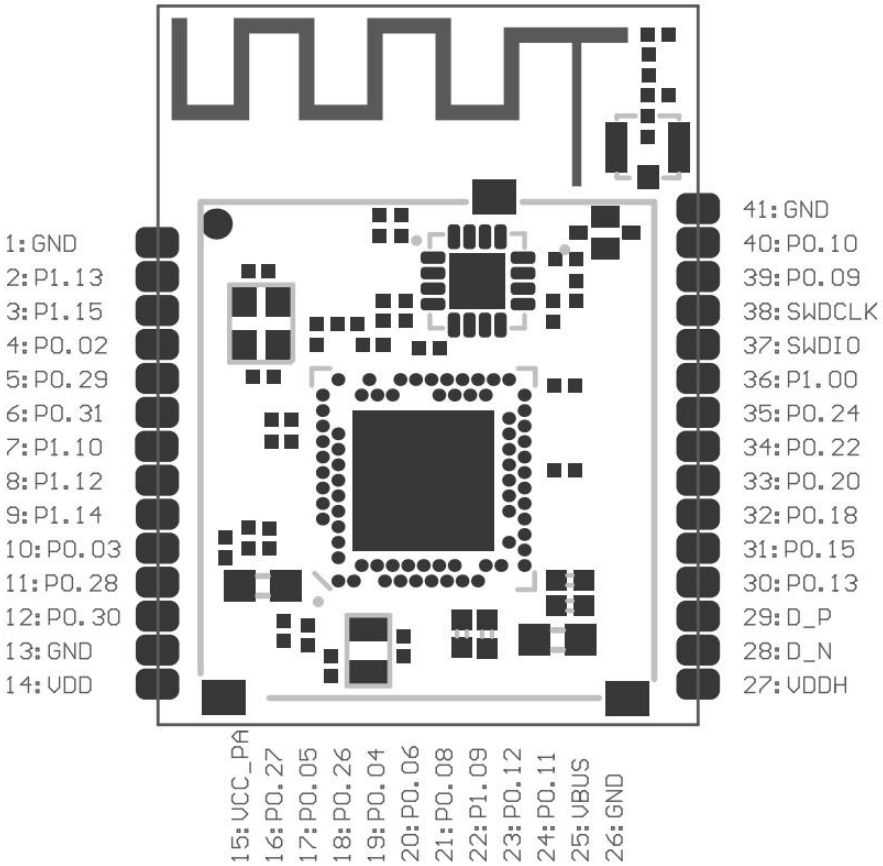
3 Pin Description



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4 Pin Definition

Pin Number	Symbol	Type	Definition
14	VDD	Power source	Power supply: 1.7V-3.6V, short-circuit VDD and VDDH to use the pin to supply power
27	VDDH	Power source	Power supply: 2.5V-5.5V; When supply 5V electricity, use this pin to supply power, not connect VDD pin.
1/13/26/41	GND	Ground	Ground
37/38	SWCLK/ SWDIO	Debug	Debug, when debuging only need to connect power supply pin, ground and these 2 pins.
2-12/16-24/ 30-36/39-40	P0.02-P0.31 P1.00-P1.09	I/O	I0 port for general purpose
25	VBUS	Power source for USB port	5V input current for USB 3.3V modulator Need to supply 5V current and short-circuit this pin with VDDH When use USB port
15	VCC_PA	PA supply power pin	Must provide electricity of 2.7-3.6V stably, 1.7V-3.6V chip voltage, this pin can be shorted to VDD/VDDH
29	D+	Digital interfaces	USB D+
28	D-	Digital interfaces	USB D-

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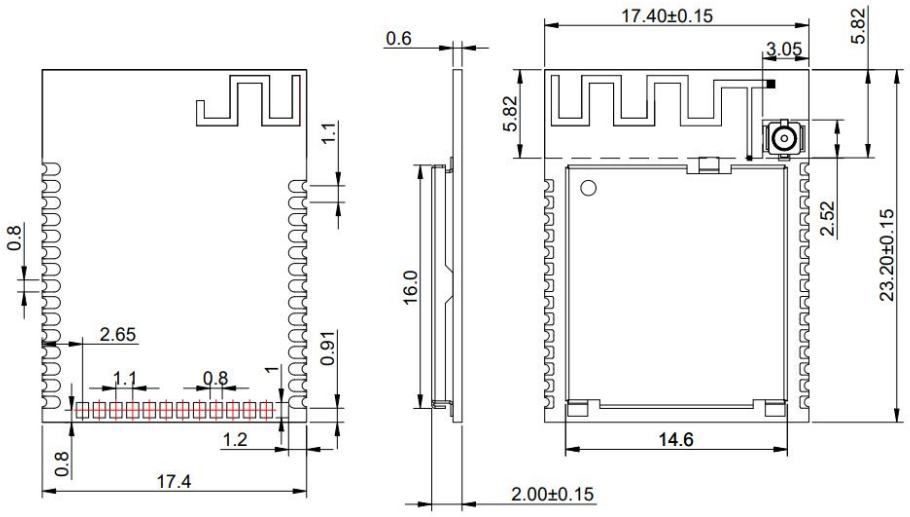
5 Mechanical Drawing



*（Default unit：mm　　Default tolerance：±0.1）

Notice：The recommended pad size is 1.8*0.8mm with a pad extension of 0.5mm

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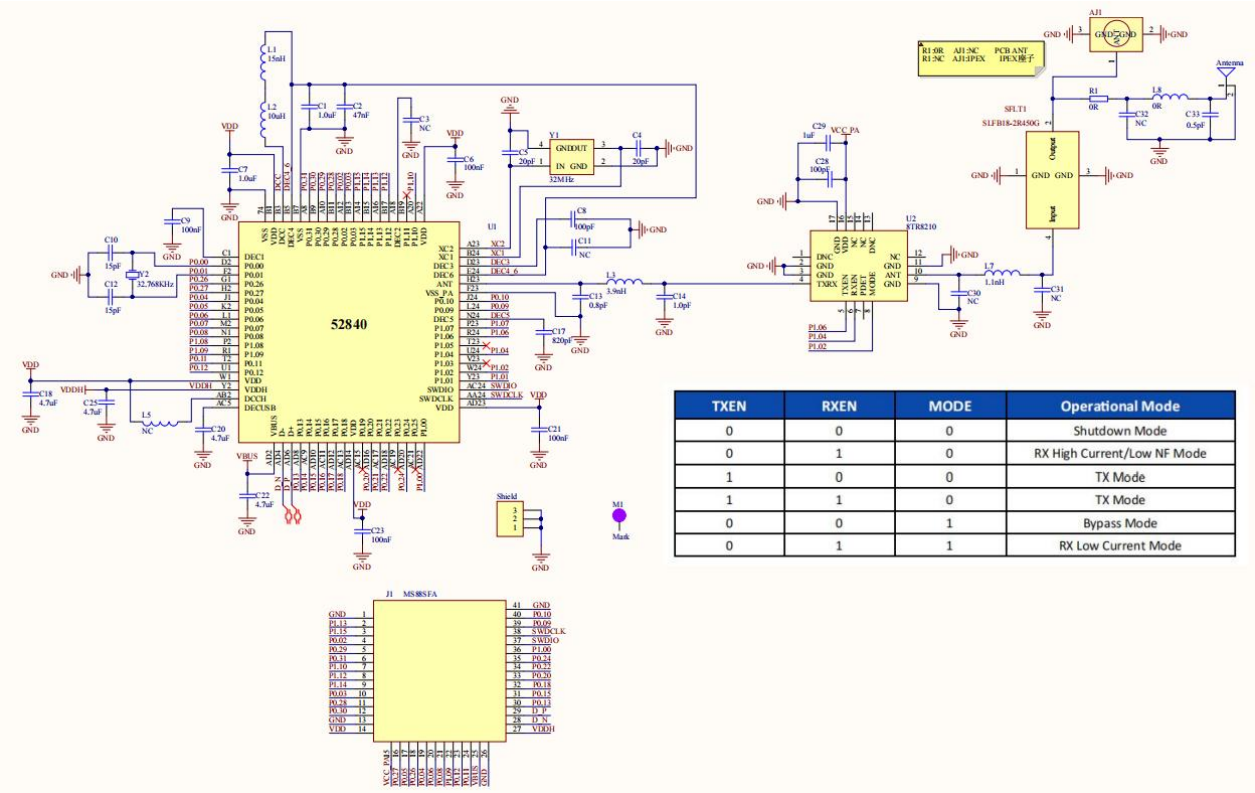
6 Electrical Schematic



TXEN	RXEN	MODE	Operational Mode
0	0	0	Shutdown Mode
0	1	0	RX High Current/Low NF Mode
1	0	0	TX Mode
1	1	0	TX Mode
0	0	1	Bypass Mode
0	1	1	RX Low Current Mode

Notice：Before placing an order, please confirm the specific configuration required with the salesperson.

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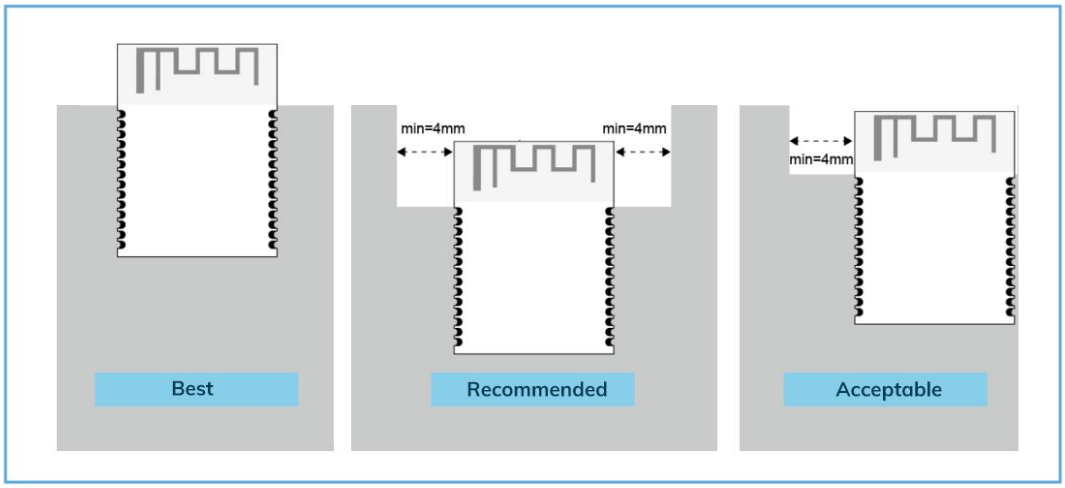
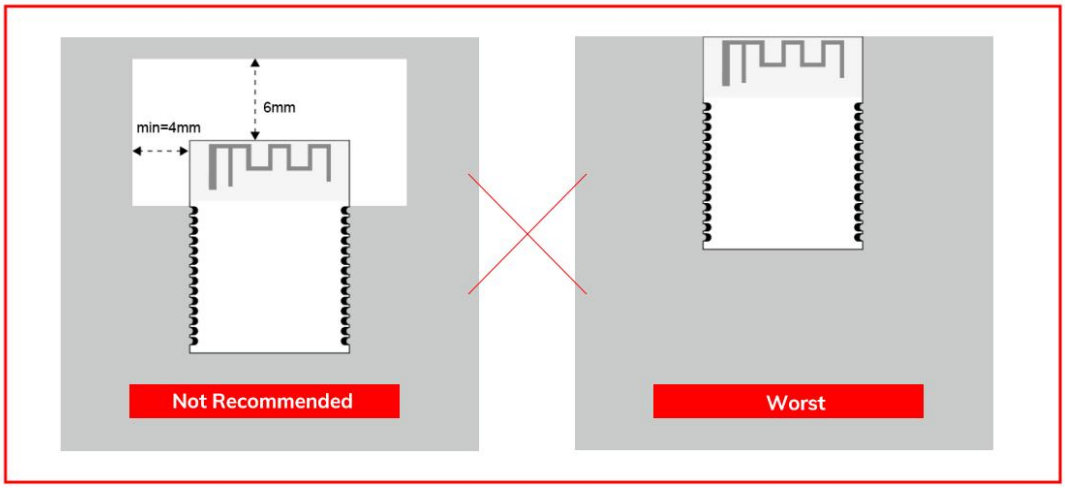
7 PCB Layout

Module antenna area couldn't have GND plane or metal cross line, couldn't place components nearby. It is better to make hollow out or clearance treatment or place it on the edge of PCB board.

Notice: Refer to examples as below, and highly suggest to use the first design and the adjustment of modules antenna design according to the first wiring.





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Layout notes：

1) Preferred Module antenna area completely clearance and not be prevented by metals, otherwise it will influence antenna's effect (as above DWG. indication).
2) Cover the external part of module antenna area with copper as far as possible to reduce the main board's signal cable and other disturbing.
3) It is preferred to have a clearance area of 4 square meter or more area around the module antenna (including the shell) to reduce the influence to antenna.
4) Device should be grounded well to reduce the parasitic inductance.
5) Do not cover copper under module's antenna in order to avoid affect signal radiation or lead to transmission distance affected.
6) Antenna should keep far from other circuits to prevent radiation efficiency reduction or affects the normal operation of other lines.
7) Module should be placed on edge of circuit board and keep a distance away from other circuits.
8) Suggesting to use magnetic beads to insulate module's access power supply.

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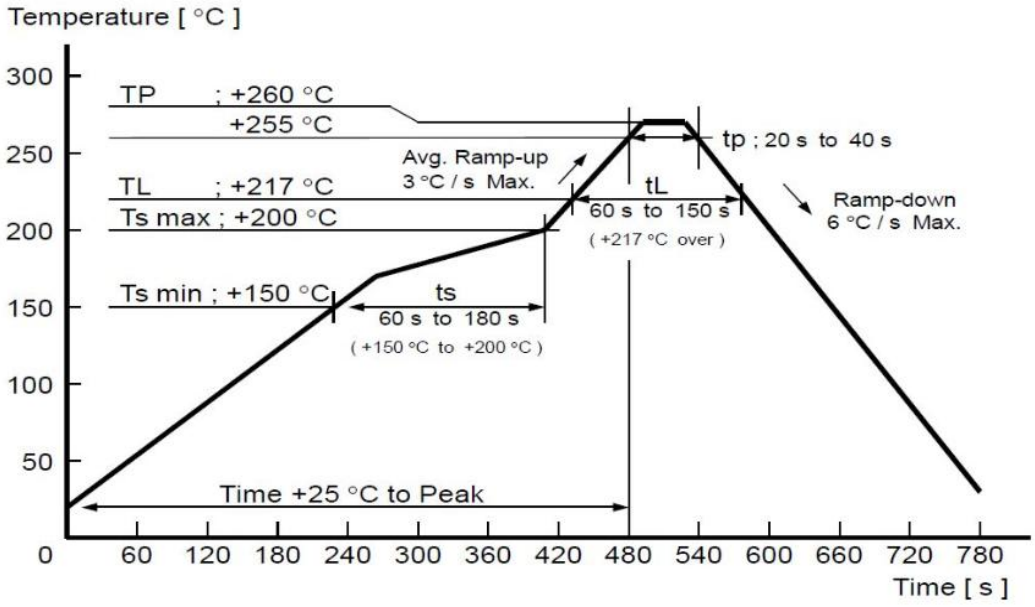
8 Reflow and Soldering

1) Do SMT according to above reflow oven temperature deal curve. Max. Temperature is 260℃;

   Refer to IPC/JEDEC standard；Peak TEMP<260℃；Times：≤2 times，suggest only do once reflow soldering on module surface in case of SMT double pad involved. Contact us if special crafts involved.



2) Suggesting to make 0.2mm thickness of module SMT for partial ladder steel mesh, then make the opening extend 0.8mm

3) After unsealing, it cannot be used up at one time, should be vacuumed for storage, couldn't be exposed in the air for long time. Please avoid getting damp and soldering-pan oxidizing. If there are 7 to 30 days interval before using online SMT, suggest to bake at 65-70 ℃ for 24 hours without disassembling the tape.

4) Before using SMT, please adopt ESD protection measure.

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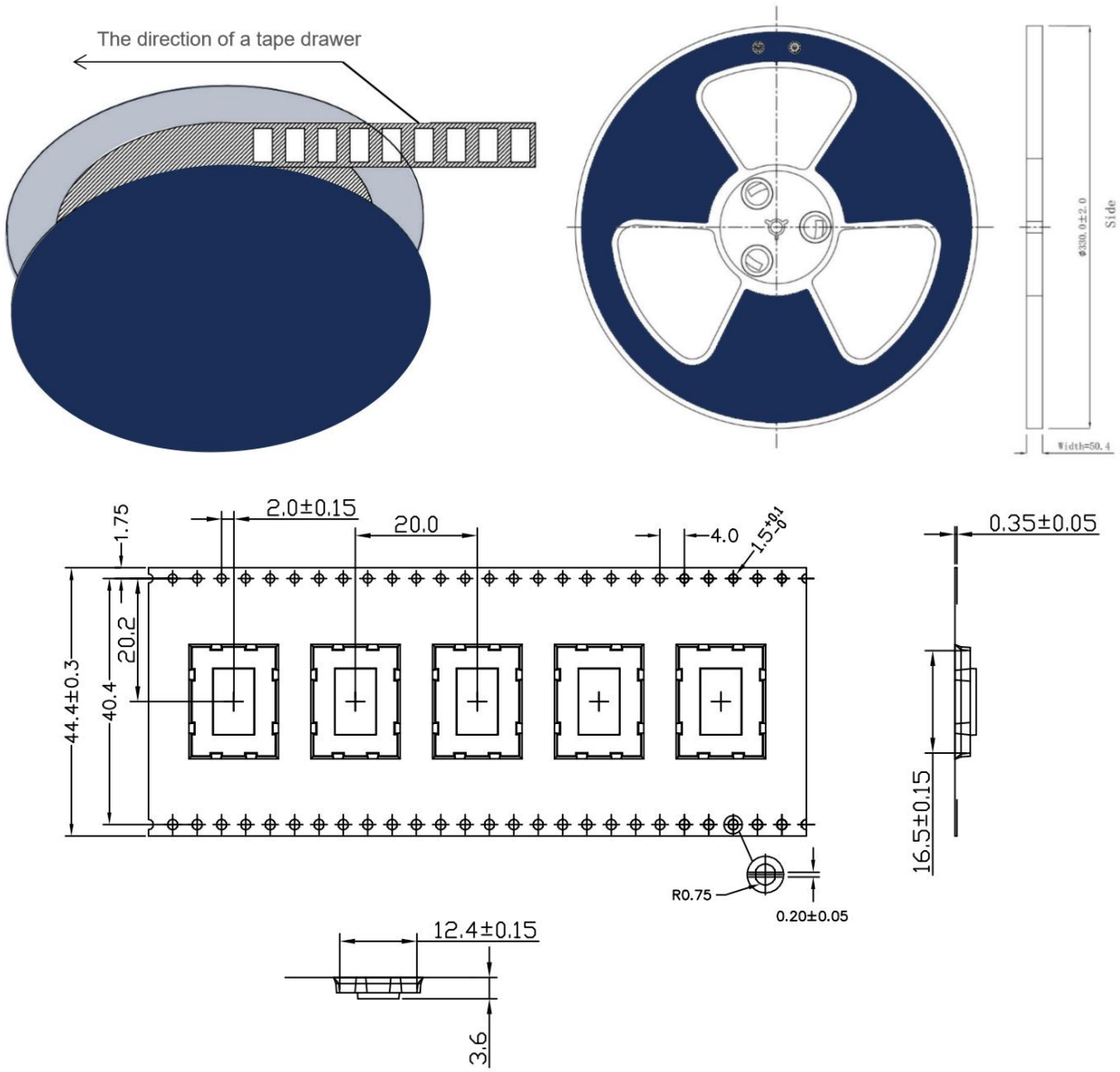
9 Package Information



*（Default unit：mm　　Default tolerance：±0.1）

Packing detail	Specification	Net weight	Gross weight	Dimension
Quantity	650PCS	780g	1520g	W: 44mm,T:0.35mm

*** Note:** Default weight tolerance all are within 10g（except the special notes)

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Quality

Cognizant of our commitment to quality, we operate our own factory equipped with state-of-the-art production facilities and a meticulous quality management system. We hold certifications for ISO9001, ISO14001, ISO27001, OHSA18001, BSCI.

Every product undergoes stringent testing, including transmit power, sensitivity, power consumption, stability, and aging tests. Our fully automated module production line is now in full operation, boasting a production capacity in the millions, capable of meeting high-volume production demands.

Contact Us

Shenzhen Minewsemi Co., Ltd. is committed to swiftly delivering top-quality connectivity modules to our customers. For assistance and support, please feel free to contact our relevant personnel, or contact us as follows:

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Related documents: Chip specification

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