FSC-WF122

Revision	V1.1.1		
Date	2022-08-25		
Model Name	FSC-WF122		
Product Name	IEEE 802.11a/b/g/n/ac(1T1R) USB2.0 WLAN Module		
Feasycom Approve Field			
Engineer	**QC**	**Sales**	
Can Zhang			
Customer Approve Field			
Engineer	**QC**	**Manufactory**	**Purchasing**

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Revision History

Date	Document Revision	Product Revision	Description
2020/10/14	1.0	V1.0	Initial released
2021/12/21	V1.1	V1.0	Update module picture
2022/08/25	V1.1.1	V1.0	Change the operating temperature: 0ºC to +70 ºC

1. Introduction

1.1 General Description

FSC-WF122 is the module designed by a highly integrated IEEE 802.11a/b/g/n/ac MAC/Baseband/RF WLAN single chip. It combines a WLAN MAC, a 1T1R capable WLAN baseband, modem, and WLAN RF in a single chip. The module provides a complete solution for a high-performance wireless LAN.

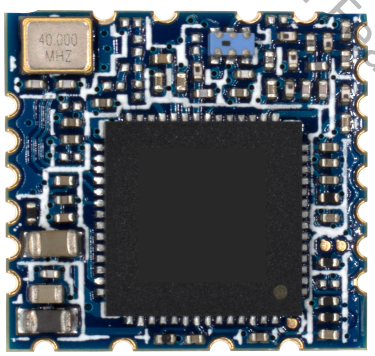

Figure 1 Top View

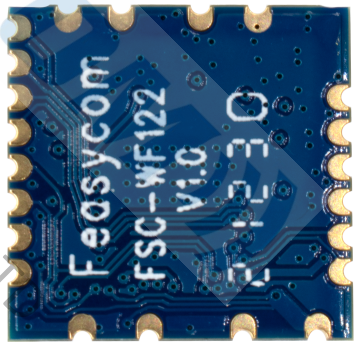

Figure 2 Bottom View

Note: The above pictures are for reference only.

1.2 Features

- Operating Frequencies： 2.412GHz~2.4835GHz /5.18GHz~5.835GHz
- IEEE Standards : IEEE 802.11a/b/g/n/ac
- Wireless data rate can reach up to 433.3Mbps
- Connect to external antenna through the half hole
- Power Supply:3.3V±0.2V

1.3 Applications

- MID
- IP Camera
- STB
- Smart TV
- E-book
- Other devices which need to be supported by wireless network

2. Functional Block Diagram

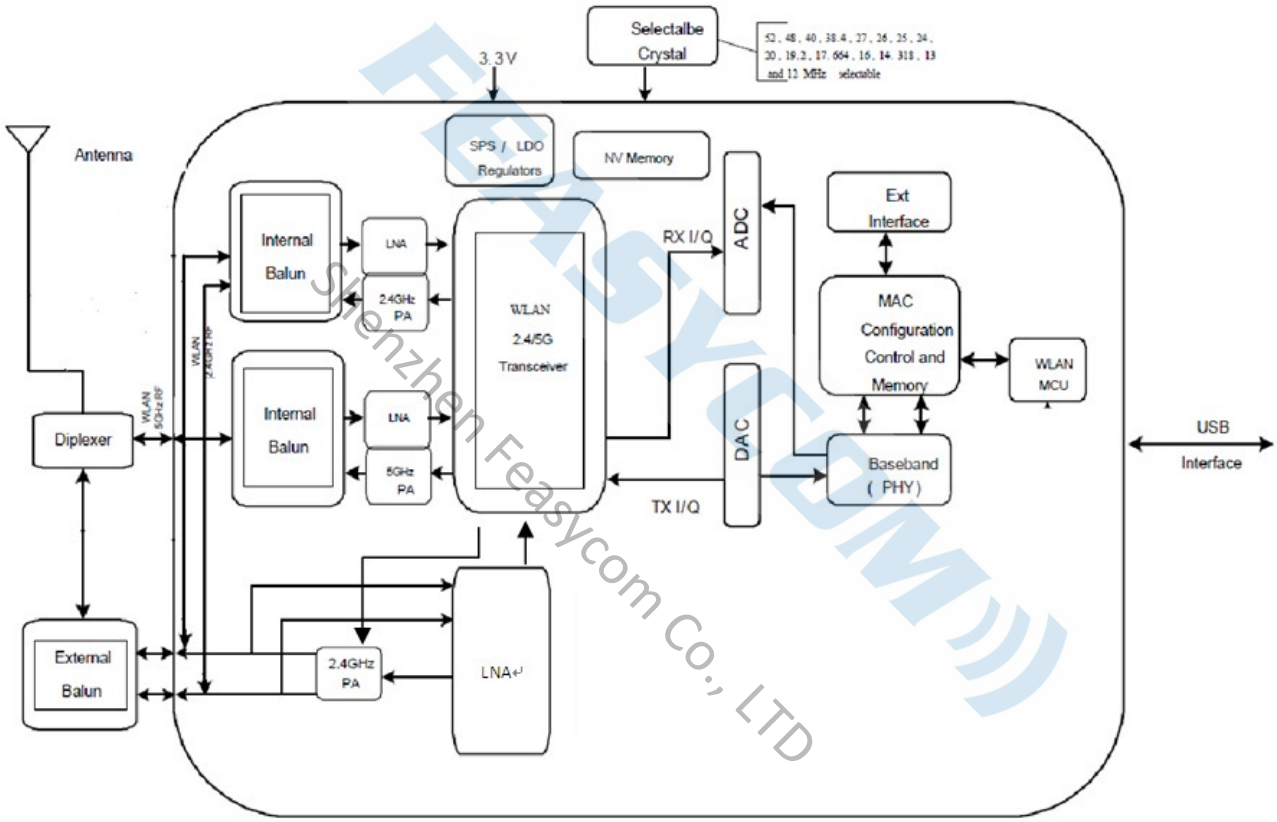

Figure 3 FSC-WF122 block diagram

3. Product Technical Specifications

3.1 General Specifications

Item	Description
Product Name	FSC-WF122
Main Chip	RTL8811CU-CG
Host Interface	USB 2.0
IEEE Standards	IEEE 802.11a/b/g/n/ac

Operating Frequencies	2.412GHz~2.4835GHz /5.18GHz~5.835GHz
Modulation	802.11b: CCK, DQPSK, DBPSK 802.11a/g: 64-QAM,16-QAM, QPSK, BPSK 802.11n: 64-QAM,16-QAM, QPSK, BPSK 802.11ac: 256-QAM, 64-QAM,16-QAM, QPSK, BPSK
Working Mode	Infrastructure, Ad-Hoc
Wireless Data Rate	802.11b: 1, 2, 5.5, 11Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: MCS0~7，HT20 reach up to72.2Mbps, HT40 reach up to150Mbps 802.11ac: MCS0~8，VHT20 reach up to 173.3Mbps, VHT40 reach up to 239Mbps, MCS0~9，VHT80 reach up to 433.3Mbps
Rx Sensitivity	-98dBm (Min)
TX Power	18.5dBm (Max)
Antenna Type	Connect to the external antenna through the half hole
Dimension(L*W*H)	13.0*12.2*1.8mm (LxWxH) Tolerance:+/-0.15mm
Power Supply	3.3V±0.2V
Clock Source	40MHz
Working Temperature	0° C to +70 ° C
Storage Temperature	-40° C to +85° C

3.2 DC Power Consumption

Vcc=5V，Ta = 25 °C，unit: mA				
Supply current	Typ.		Max	
Standby (RF disabled)	111		125	
802.11b	1Mbps		11Mbps	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	322	332	327	352
Rx mode	108	126	107	127
802.11g	6Mbps		54Mbps	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	249	360	225	376
Rx mode	95	142	97	138
802.11n HT20	MCS0		MCS7	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	246	338	196	346
Rx mode	96	144	94	142
802.11n HT40	MCS0		MCS7	

Supply current	Typ.	Max.	Typ.	Max.
TX mode	235	348	197	342
Rx mode	99	140	101	140
802.11a	6Mbps		54Mbps	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	314	388	268	404
Rx mode	101	138	98	144
802.11n HT40(5G)	MCS0		MCS7	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	296	393	226	386
Rx mode	99	140	99	142
802.11ac	MCS0		MCS9	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	261	339	235	363
Rx mode	111	132	112	133

3.3 WiFi RF Specification

TX Power	2.4G: 802.11b:17±1.5dBm 802.11g/11n-HT20:15±1.5dBm 802.11n -HT40:14±1.5dBm 5G: 802.11a/11n-HT20:14±1.5dBm 802.11n-HT40:13±1.5dBm 802.11ac-VHT80:12±1.5dBm
TX Constellation Error(EVM)	2.4G: 802.11b: <-18dB@11Mbps 802.11g: <-25dB@54Mbps 802.11n-HT20: <-28dB@72.2Mbps 802.11n-HT40: <-28dB@150Mbps 5G: 802.11a: <-25dB@54Mbps 802.11n-HT20: <-28dB@72.2Mbps 802.11n-HT40: <-28dB@150Mbps 802.11ac-VHT80: <-32dB@433Mbps
Receiver Minimum Input Sensitivity@PER	1Mbps: -94dBm@PER<8%; 11Mbps: -86dBm@PER<8%; 54Mbps: -72dBm@PER<10%;

	150Mbps: -65dBm@PER<10%; 433Mbps: -55dBm@PER<10%;

RF Test Report										
2.4G										
Mode	Rate(Mbps)	Power(dBm)			EVM(dB)			Sensitivity(dBm)		
		CH1	CH7	CH13	CH1	CH7	CH13	CH1	CH7	CH13
11b	1	17.19	17.02	16.83	-37.32	-35.86	-36.88	-98.0	-98.0	-98.0
	11	17.22	17.35	17.25	-27.23	-26.99	-25.33	-88.0	-88.5	-88.5
11g	9	16.54	16.64	16.25	-26.16	-28.17	-30.06	-91.0	-91.0	-91.0
	54	14.80	14.93	14.86	-32.14	-33.31	-33.77	-74.5	-75.0	-75.0
Mode	Rate(Mbps)	Power(dBm)			EVM(dB)			Sensitivity(dBm)		
		CH3	CH7	CH11	CH3	CH7	CH11	CH3	CH7	CH11
11n HT40	MCS0	15.99	15.72	15.93	-29.74	-30.33	-30.64	-88.0	-88.0	-88.0
	MCS7	13.94	13.81	13.75	-33.01	-34.19	-34.43	-69.0	-69.0	-69.0

RF Test Report												
5G												
Mode	Rate (Mbps)	Power(dBm)				EVM(dB)				Sensitivity(dBm)			
		CH 36	CH 100	CH 140	CH 161	CH 36	CH100	CH140	CH161	CH 36	CH 100	CH 140	CH 161
11a	9	15.28	15.33	16.22	16.36	-29.42	-22.37	-24.10	-24.93	-90	-90	-90	-90
	54	13.84	14.14	14.14	13.59	-32.82	-27.82	-30.43	-30.92	-73	-73	-73	-73
Mode	Rate (Mbps)	Power(dBm)				EVM(dB)				Sensitivity(dBm)			
		CH 38	CH 102	CH 142	CH 159	CH 38	CH102	CH142	CH159	CH 38	CH 102	CH 142	CH 159
11n HT40	MCS0	14.37	14.36	15.31	14.03	-32.55	-25.47	-24.89	-29.87	-88	-87	-87	-87
	MCS7	13.02	13.02	13.49	13.05	-33.79	-31.87	-31.08	-32.68	-69	-69	-69	-69
Mode	Rate (Mbps)	Power(dBm)				EVM(dB)				Sensitivity(dBm)			
		CH 42	CH 106	CH 138	CH 155	CH 42	CH106	CH138	CH155	CH 42	CH 106	CH 138	CH 155
11ac VHT80	MCS0	13.67	13.48	13.32	13.67	-27.71	-27.64	-28.39	-28.33	-83	-83	-83	-83
	MCS9	12.62	12.22	12.14	12.62	-35.50	-32.91	-36.04	-35.52	-58	-58	-58	-58

ESD CAUTION: Although this module is designed to be as robust as possible, Electrostatic Discharge (ESD) can damage this module. It must be protected from ESD at all times and handled under the protection of ESD.

4. Pin Assignments

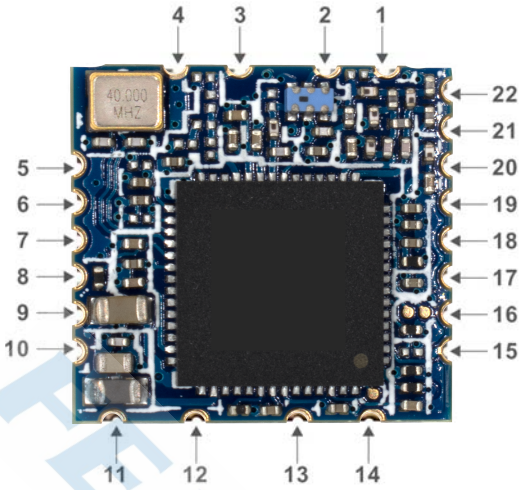

Figure 4 Pin Assignments (Top view)

The following signal type codes are used in the tables:

I:Input O:Output

O/D: Open Drain P:Power Pin

PIN	Function	Type	Description
1	GND	P	Ground
2	RF_0	I/O	2G/5G WIFI ANT
3	NC	--	No connection(floating)
4	GND	P	Ground
5	NC	--	No connection(floating)
6	NC	--	No connection(floating)
7	NC	--	No connection(floating)
8	NC	--	No connection(floating)
9	NC	--	No connection(floating)
10	NC	--	No connection(floating)
11	VIN	P	VDD 3.3V Power Supply
12	USB_DM	I/O	USB Transmitter/Receiver Differential Pair
13	USB_DP	I/O	USB Transmitter/Receiver Differential Pair
14	GND	P	ground
15	3DD_SYNC	I/O	PCM_OUT/GPIO1
16	WL_DIS	I	WIFI DISABLE （Low potential）
17	NC	--	No connection(floating)
18	CHIP_EN	I	High asserting for use/ Low asserting reset

19	HST_WAKE_WL	I	HOST to wake up WIFI
20	WL_WAKE_HST	O	WIFI to wake up HOST
21	WPS	I	WPS Switch
22	LED	I	External LED Control

5. Application Information

5.1 Typical Application Circuit

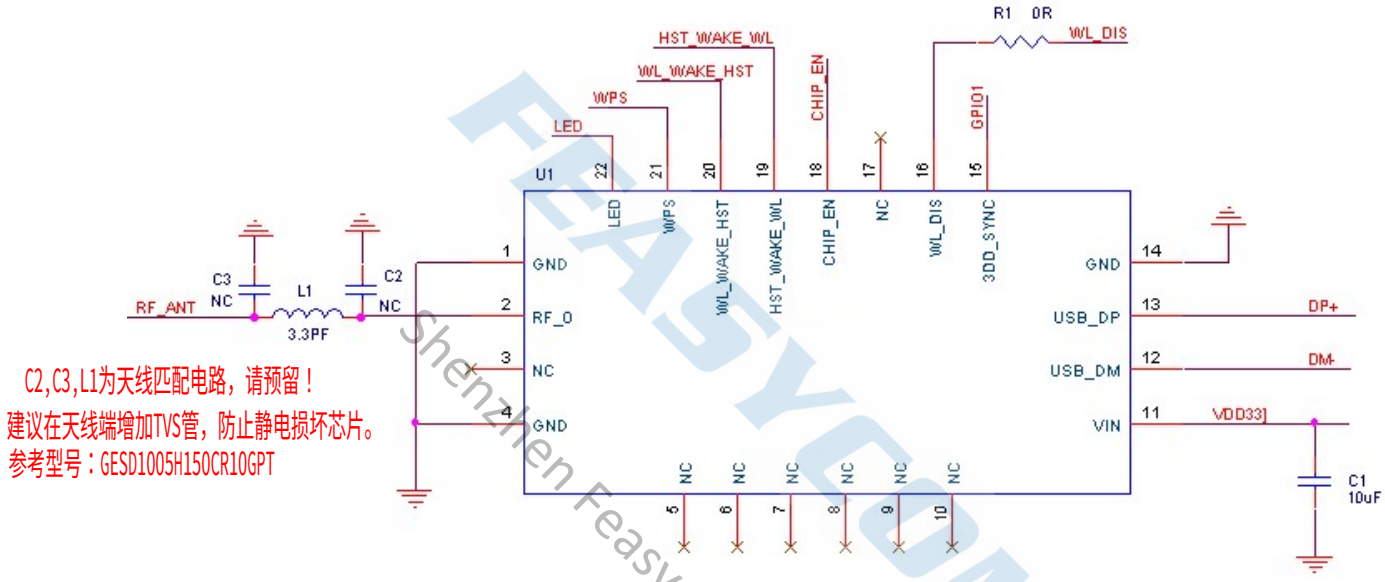

Figure 5

NOTE:

a. RF trace need to keep 50 ohm impedance
b. USB differential pair need to keep 90ohm impedance.
c. C1 10uF closed to Module pin 11
d. Reserved 0R between Module pin 16 and Host
e. LED active low.

6. Mechanical Specifications

Module dimension: Typical (L*W * H): 13.0mm*12.2mm*1.8mm Tolerance : +/-0.15mm

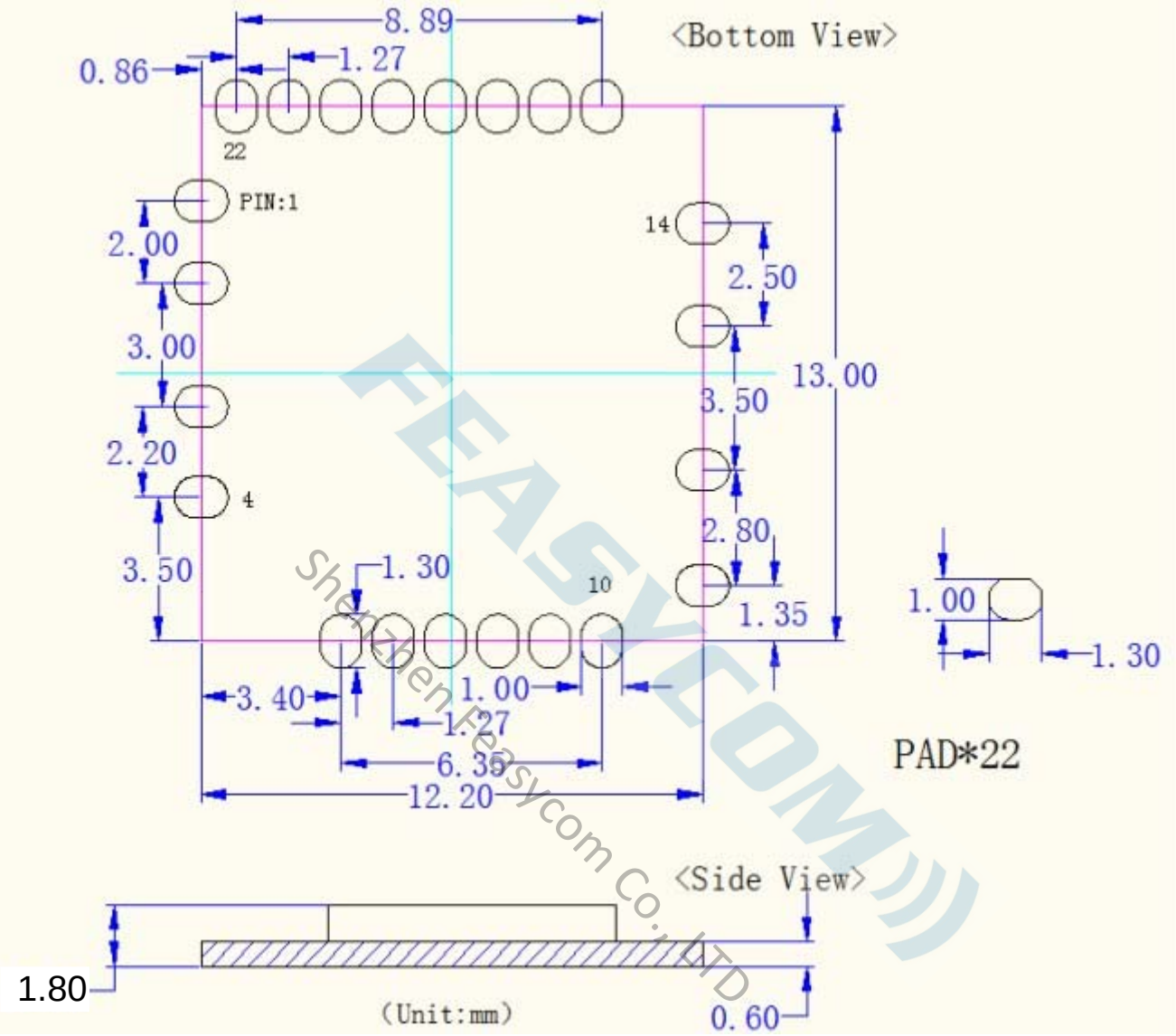

Figure 6 Module dimension

7. Others

7.1 Package Information

Figure 7 Package Information

7.2 Storage Temperature and Humidity

1. Storage Condition: Moisture barrier bag must be stored under 30℃, humidity under 85% RH.
   The calculated shelf life for the dry packed product shall be a 12 months from the bag seal date.
   Humidity indicator cards must be blue, <30%.
2. Products require baking before mounting if humidity indicator cards reads > 30% temp < 30℃,
   humidity < 70% RH, over 96 hours.
   Baking condition: 125℃, 12 hours.
   Baking times: 1 time.

8. Typical Solder Reflow Profile

The soldering profile depends on various parameters necessitating a set up for each application. The data here is given only for guidance on solder reflow.

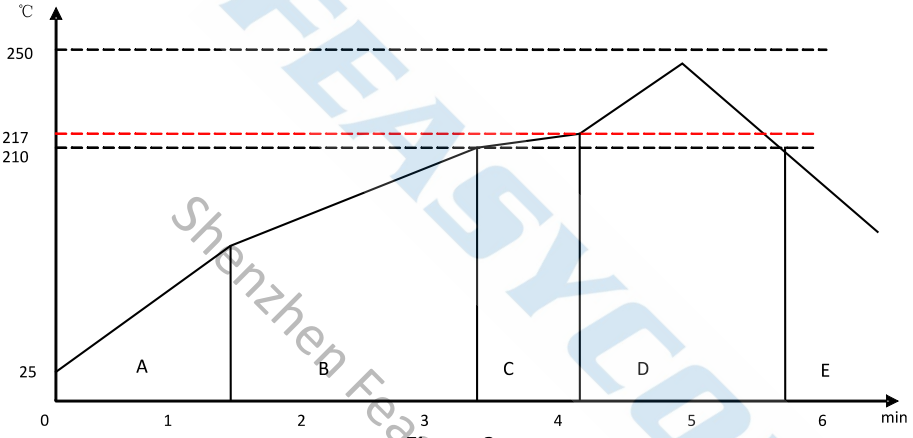

Figure 8

Pre-heat zone (A) — This zone raises the temperature at a controlled rate, **typically 0.5 – 2 °C/s**. The purpose of this zone is to preheat the PCB board and components to 120 ~ 150 °C. This stage is required to distribute the heat uniformly to the PCB board and completely remove solvent to reduce the heat shock to components.

Equilibrium Zone 1 (B) — In this stage the flux becomes soft and uniformly encapsulates solder particles and spread over PCB board, preventing them from being re-oxidized. Also with elevation of temperature and liquefaction of flux, each activator and rosin get activated and start eliminating oxide film formed on the surface of each solder particle and PCB board. **The temperature is recommended to be 150° to 210° for 60 to 120 second for this zone.**

Equilibrium Zone 2 (C) (optional) — In order to resolve the upright component issue, it is recommended to keep the temperature in 210 – 217 ° for about 20 to 30 second.

Reflow Zone (D) — The profile in the figure is designed for Sn/Ag3.0/Cu0.5. It can be a reference for other lead-free solder. The peak temperature should be high enough to achieve good wetting but not so high as to cause component discoloration or damage. Excessive soldering time can lead to intermetallic growth which can result in a brittle joint. The recommended peak temperature (Tp) is 230 ~ 250 °C. The soldering time should be 30 to 90 second when the temperature is above 217 °C.

Cooling Zone (E) — The cooling ate should be fast, to keep the solder grains small which

Cooling Zone (E) — The cooling ate should be fast, to keep the solder grains small which will give a longer lasting joint. **Typical cooling rate should be 4 °C.**