CC&C 晶訊科技股份有限公司
CC&C Technologies, Inc.

8F, No. 150, Jian Yi Road, Zhonghe District,
New Taipei City, Taiwan 235, R.O.C.
Tel: 886-2-8226-5088 Fax: 886-2-8226-5077

Product Specifications

WM-8188E
WLAN 11n USB module (1T1R)

Version: 1.4

Manufacturer	CC&C Technologies, Inc.

8F, No. 150, Jian Yi Road, Zhonghe District,
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Revision History

Version	Issue date	Reason for revision
1.0	Oct. 4, 2012	First edition
1.1	Nov.15,2012	Add WM-8188E with shielding cover picture
1.2	Feb.21,2013	Update Operating Temperature, Storage Temperature, Humidity
1.3	Aug.2,2013	Modify Operating Temperature
1.4	Mar.13,2014	Modify Dimension

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Overview

WM-8188E is a WLAN 11n USB module, which fully supports the features and functional compliance of IEEE 802.11n, e and i standards. It supports up to 150Mbps high-speed wireless network connections.

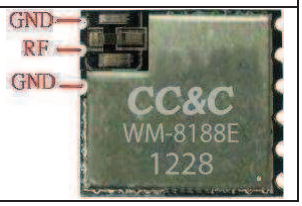
It is designed to provide excellent performance with low power consumption and enhance the advantages of robust system and cost-effective. It is targeted at competitive superior performance, better power management applications.

Features

- Operates in 2.4 GHz frequency bands
- 1x1 MIMO technology improves effective throughput and range over existing 802.11 b/g products
- Data rates: up to 150Mbps
- 802.11e-compatible bursting and I standards
- BPSK, QPSK, 16 QAM, 64 QAM modulation schemes
- WEP, TKIP, and AES, WPA, WPA2 hardware encryption schemes
- Power saving mechanism
- Supports Always On Always Connected (AOAC) on Windows 8

Factory options

- RF connector(type-1), RF pad on module(type-2), RF output on half-hole pin(type-3)
- WPS or PDN control function on half-hole pin 6
- Support LED function
- With or without shielding cover

RF type-1	RF type-2	RF type-3
		

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General Specification

Model Name	WM-8188E
Product Name	WLAN 11n USB module
Standard	802.11b/g/n
Data Transfer Rate	1,2,5.5,6,11,12,18,22,24,30,36,48,54,60,90,120 and maximum of 150Mbps
Modulation Method	BPSK/ QPSK/ 16-QAM/ 64-QAM
Frequency Band	2.4GHz ISM Band
Spread Spectrum	IEEE 802.11b: DSSS (Direct Sequence Spread Spectrum) IEEE 802.11g/n:OFDM (Orthogonal Frequency Division Multiplexing)
RF Output Power (tolerance ± 2dBm)	13 dBm@11n, 15 dBm@11g, 17 dBm@11b
Operation Mode	Ad hoc, Infrastructure
Receiver Sensitivity	11Mbps -80dBm@8%,54Mbps -70dBm@10%,130Mbps -64dBm@10%
LED	Data transmission (factory option)
OS Support	Windows 8, 7, XP /Mac /Linux
Security	WEP, TKIP, AES, WPA, WPA2
Interface	USB 2.0
Power Consumption	RTL8188EUS: DC 3.3V module - Transmit: avg 119 mA; Receive: avg 90 mA
Operating Temperature	-20 ~ 70°C ambient temperature
Storage Temperature	-40 ~ 80°C ambient temperature
Humidity	0 to 95 % maximum (non-condensing)
Dimension	13 x 12 x 2 mm (LxWxH)

DC power input:

Module	Minimum	Typical	Maximum	Unit
DC 3.3V module	3.135	3.3	3.465	V

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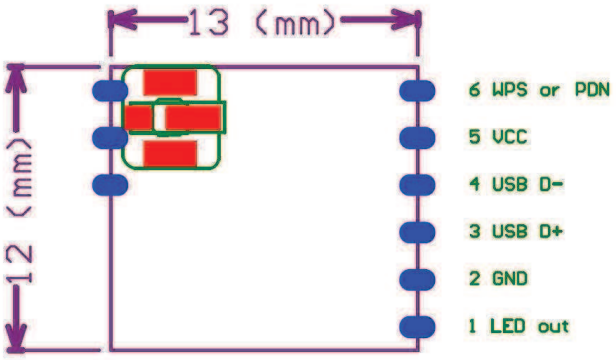
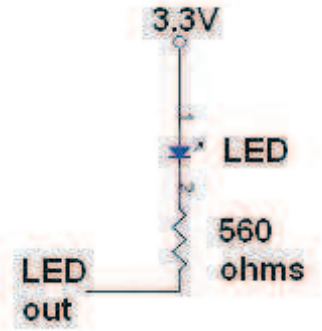
Pin outs:

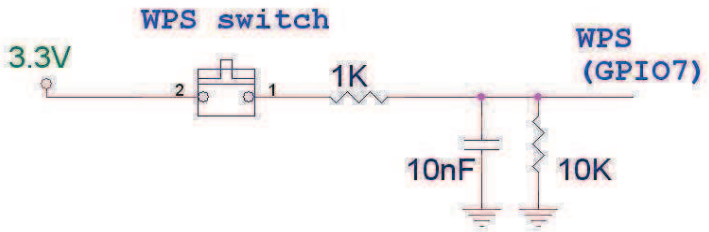


The external circuit for WiFi activity LED display (LED function is a factory option)

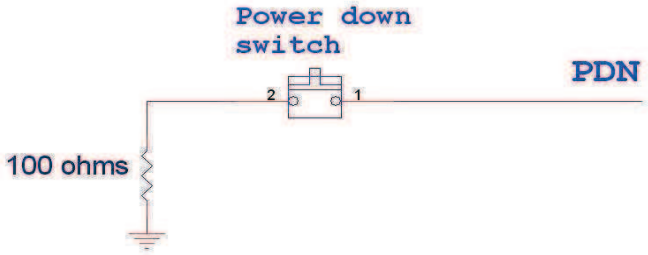


The function of pin 6 is optional to WPS (GPIO7) or power-down (PDN), a factory option.

The external circuit for WPS function input (factory option), uses a tact switch.



The external circuit for power-down function input (factory option), uses a push or toggle switch.



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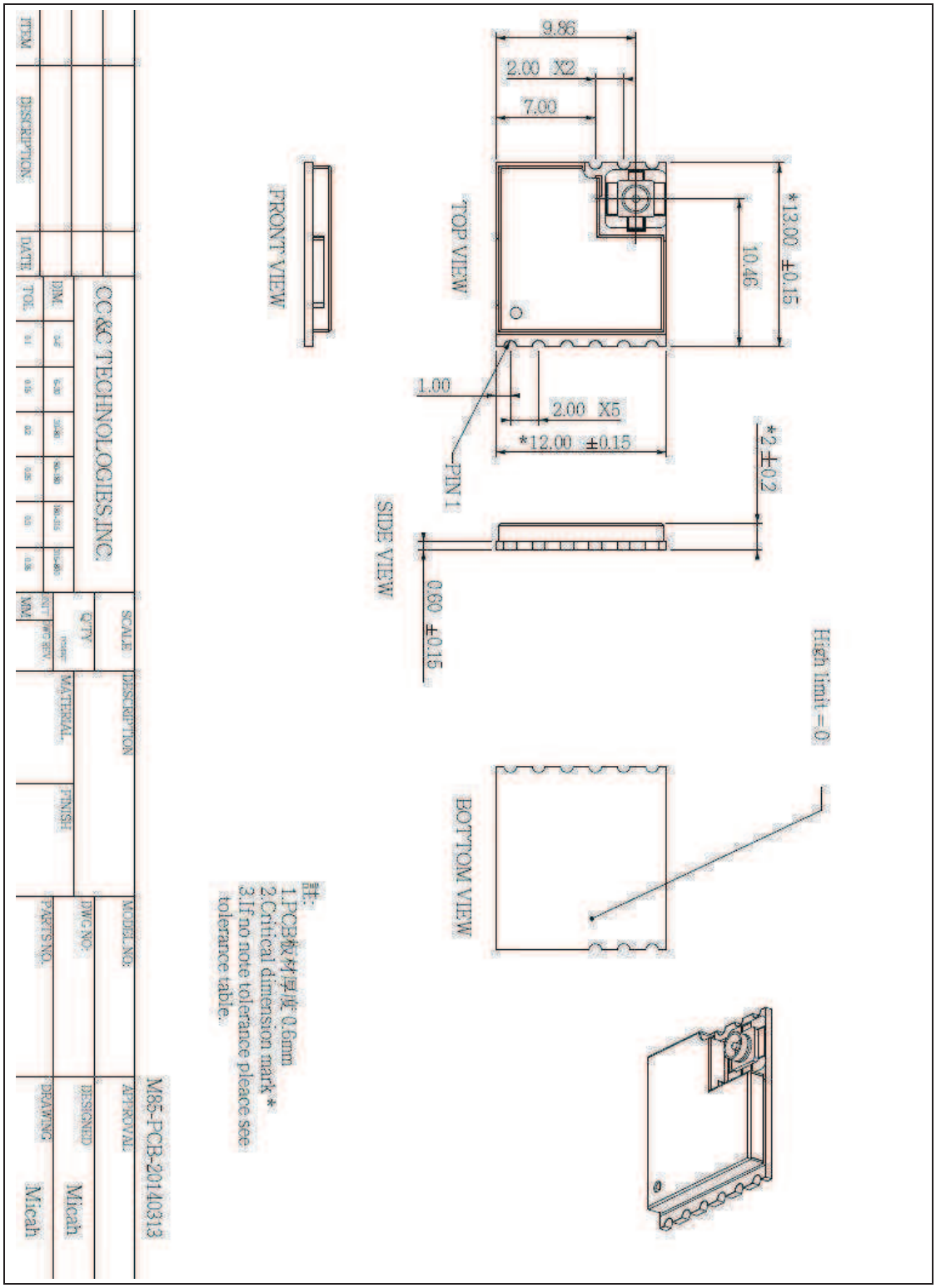
Dimension



Subject to change without notice

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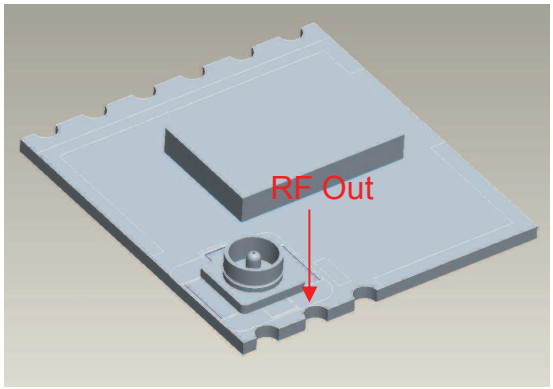
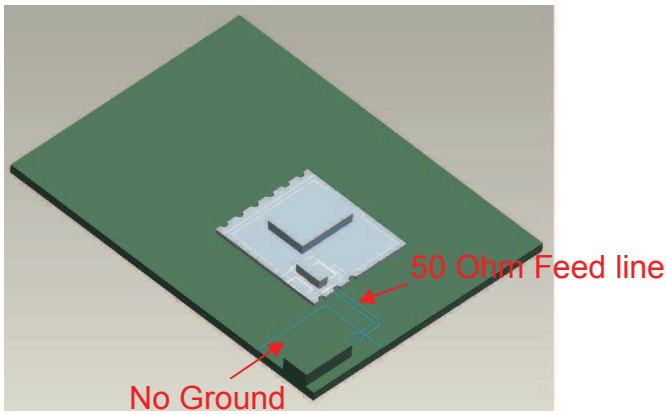
Placement Notice

- In order to get a better RF performance, please don't put any trace or copper plane under the test ring of the module.

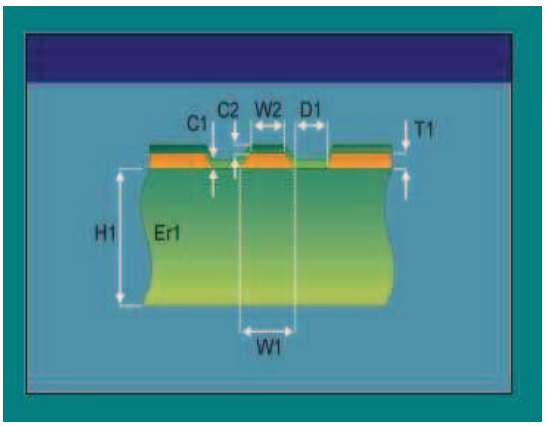
- RF out

  This RF out pin, it needs the input impedance of 50 Ohm





50 Ohm Feed line:



H1: 20 ~ 60 mil
Er1: 4.2
W1: 20 mil
W2: 20 mil
D1: 5 mil
C1: 0.7 mil
C2: 0.7 mil
T1: 1.4 mil (1 oz)
Impedance: 51 ~ 53 Ohm

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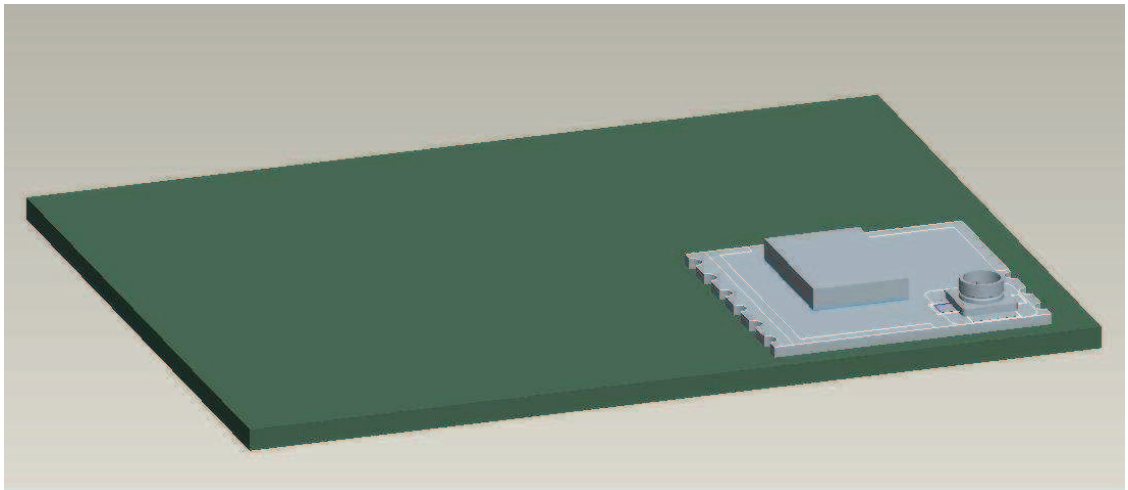
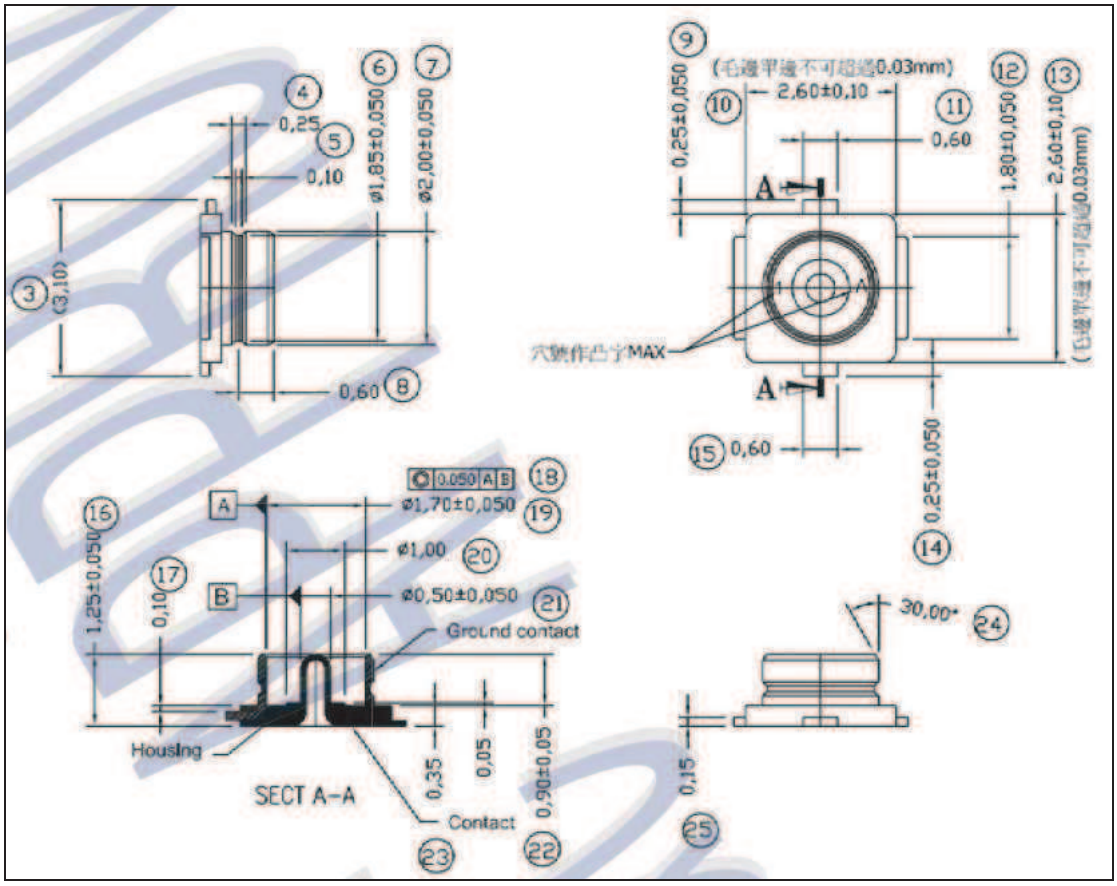
■ RF connector



RF connector dimensions (unit: mm)



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WM-8188E module adopted with RTL8188EUS chip, and its power consumption and temperature measured are shown below.

WM-8188E with RTL8188EUS chip (3.3V)

Power consumption (mA)	Max	Avg
1. Discover WiFi AP	74	73
2. Associated with WiFi AP	79	78
3. Transmite file (TX)	128	119
4. Receive file (RX)	96	90
5. Tx + RX	115	108
6. Disable RF by software	19	19
7. Shutdown device by software	1	1
8. Power state S3	1	1
9. Power state S4	1	1
10. Power state S5	0	0
Module temperature (°C)	RTL8188EUS surface	
1. Discover WiFi AP	41.8	
2. Associated with WiFi AP	42.1	
3. Transmite file (TX)	50.1	
4. Receive file (RX)	45.6	
5. Tx + RX	55.1	
6. Disable RF by software	30.8	
7. Shutdown device by software	25.3	
8. Power state S3	25.1	
9. Power state S4	25.4	
10. Power state S5	25	

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WM-8188E module with RTL8188EUS chip, DC3.3V input:

With Shielding Cover

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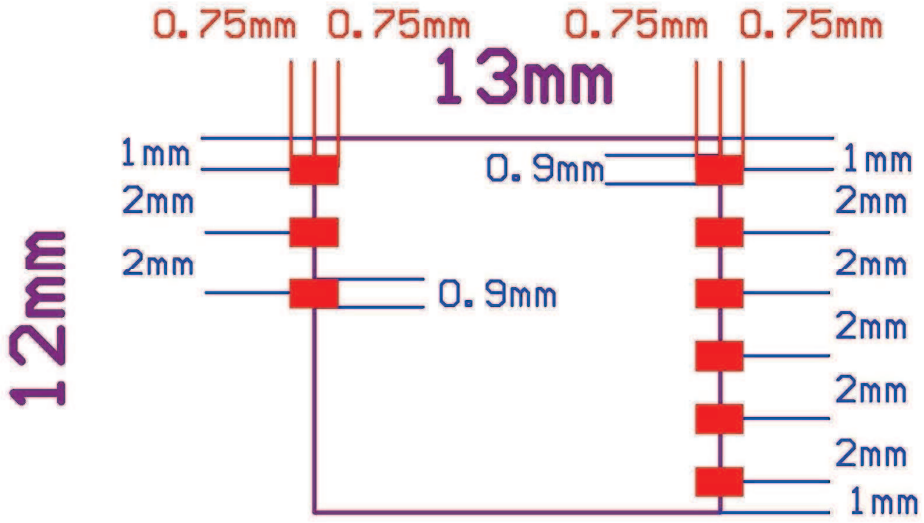
PCB Layout footprint

1. The recommended layout pads for WM-8188E module are shown below. (module top view)



All dimensions are in millimeters.
Tolerance: +- 0.05mm

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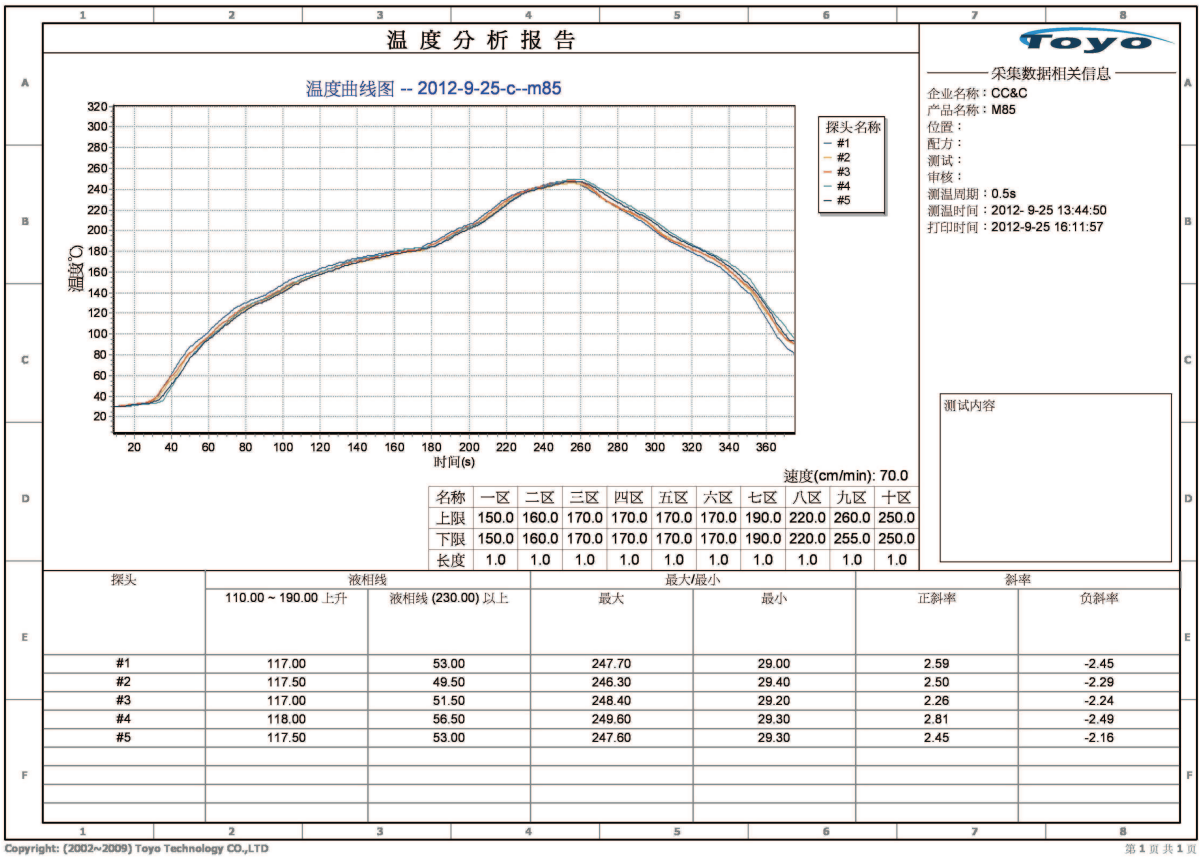
Reference Temperature Reflow Chart



名称	一区	二区	三区	四区	五区	六区	七区	八区	九区	十区
上限	150.0	160.0	170.0	170.0	170.0	170.0	190.0	220.0	260.0	250.0
下限	150.0	160.0	170.0	170.0	170.0	170.0	190.0	220.0	255.0	250.0
长度	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

探头	液相线		最大/最小		斜率	
	110.00 ~ 190.00 上升	液相线 (230.00) 以上	最大	最小	正斜率	负斜率
#1	117.00	53.00	247.70	29.00	2.59	-2.45
#2	117.50	49.50	246.30	29.40	2.50	-2.29
#3	117.00	51.50	248.40	29.20	2.26	-2.24
#4	118.00	56.50	249.60	29.30	2.81	-2.49
#5	117.50	53.00	247.60	29.30	2.45	-2.16

Note:

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 manufaturing machine's characters requirement.

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

Warning

FCC

General

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

15b

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FOR MOBILE DEVICE USAGE

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

module

This device is intended only for OEM integrators under the following conditions:

1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: UTBWM8188E". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

Warning

IC

RSS-210

This device complies with RSS-210 of the Industry Canada Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Ce dispositif est conforme à la norme CNR-210 d'Industrie Canada applicable aux appareils radio exempts de licence. Son fonctionnement est sujet aux deux conditions suivantes: (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

FOR MOBILE DEVICE USAGE

Radiation Exposure Statement:

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre corps.

module

This device is intended only for OEM integrators under the following conditions: (For module device use)

1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and

2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any

additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes: (Pour utilisation de dispositif module)

1) L'antenne doit être installée de telle sorte qu'une distance de 20 cm est respectée entre l'antenne et les utilisateurs, et
2) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 2 conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

IMPORTANT NOTE:

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

NOTE IMPORTANTE:

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains IC: 12629A-WM8188E ”.

Plaque signalétique du produit final

Ce module émetteur est autorisé uniquement pour une utilisation dans un dispositif où l'antenne peut être installée de telle sorte qu'une distance de 20cm peut être maintenue entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 12629A-WM8188E ".

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.
The end user manual shall include all required regulatory information/warning as show in this manual.

Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.
Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.