

BT Module

User manual

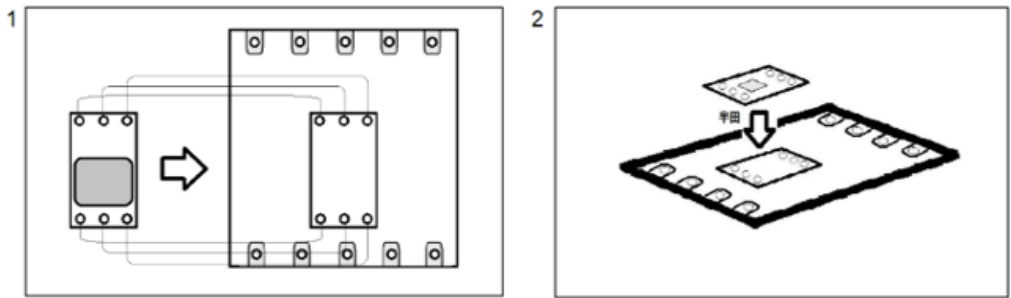
Version 1.0

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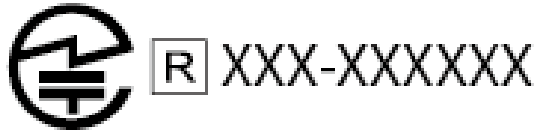
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※本製品を搭載する際に各ピンの説明書をご参照ください。(Page.5-7)

※ Please refer to the manual of each pin when installing this product.



FCC ID: W2Z-03000015

IC:7736B-03000014

BT Module

Description

The BM-8753BFR-F is a highly integrated single-chip Bluetooth 2.1/3.0/4.0/5.1 module with a UART interface. It combines a BT Protocol Stack (LM, LL, L2CAP, GATT, RFCOMM, SPP, and LE), BT Baseband, modem, and BT RF in a module.

The BM-8753BFR-F Bluetooth module complies with Bluetooth core specification v4.0/v5.1, and support dual mode (BR/EDR+Low Energy Controllers). It is compatible with previous versions, including v2.1+EDR. For BR/EDR, it allows one active link in either slave mode or master mode. For Low Energy, it supports multiple states and allows one active link a slave mode. A BR/EDR link and a LE link can be active at the same time.

The system-on-chip architecture design of the module makes a much smaller space and minimal cost and simplifies the whole system design.

Features

- 16x10x1.95mm
18-pin
- Complies with HS-UART with configurable baud rate for Bluetooth
- Compatible with Bluetooth v2.1 and v3.0 systems
- Supports Bluetooth 5.1 Low Energy (BLE)
- HS-UART interface for Bluetooth data

transmission compliant with H4 specification

- Integrated MCU to execute Bluetooth protocol stack
- Supports all packet types in basic rate and enhanced data rate
- Supports legacy pairing and secure simple pairing in BR/EDR and BLE
- Supports Low Power Mode (Sniff mode)
- Bluetooth 5.1 Dual Mode support: Simultaneous BLE and BR/EDR
- Supports multiple Low Energy states
- Supports SPP Profile
- Supports GATT Profile
- RoHS compliant

Application

- Data Transparency

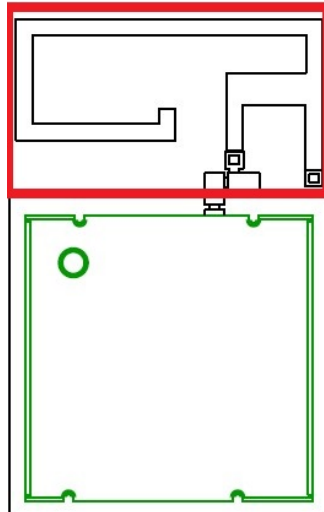
Revision History

Version	Date	Change Description
1.0	12/02/2022	Initial release
1.1	12/09/2022	Addition Pin Definition
1.2	05/12/2023	Change dimension tolerance to +- 0.15mm
1.3	06/12/2023	1. Change transmitter power to 7.5dBm 2. Addition recommend layout footprint

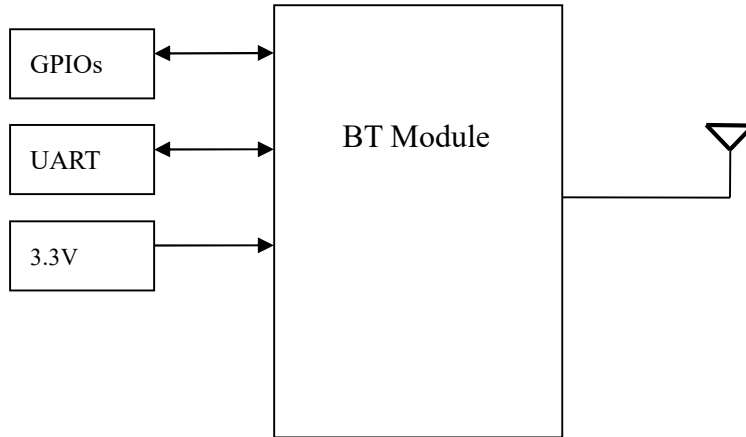
Note : All electrical and mechanical specifications may be changed by CC&C Technologies, Inc. without notice.

Factory options

- RF output by PCB Antenna(RF type-1)

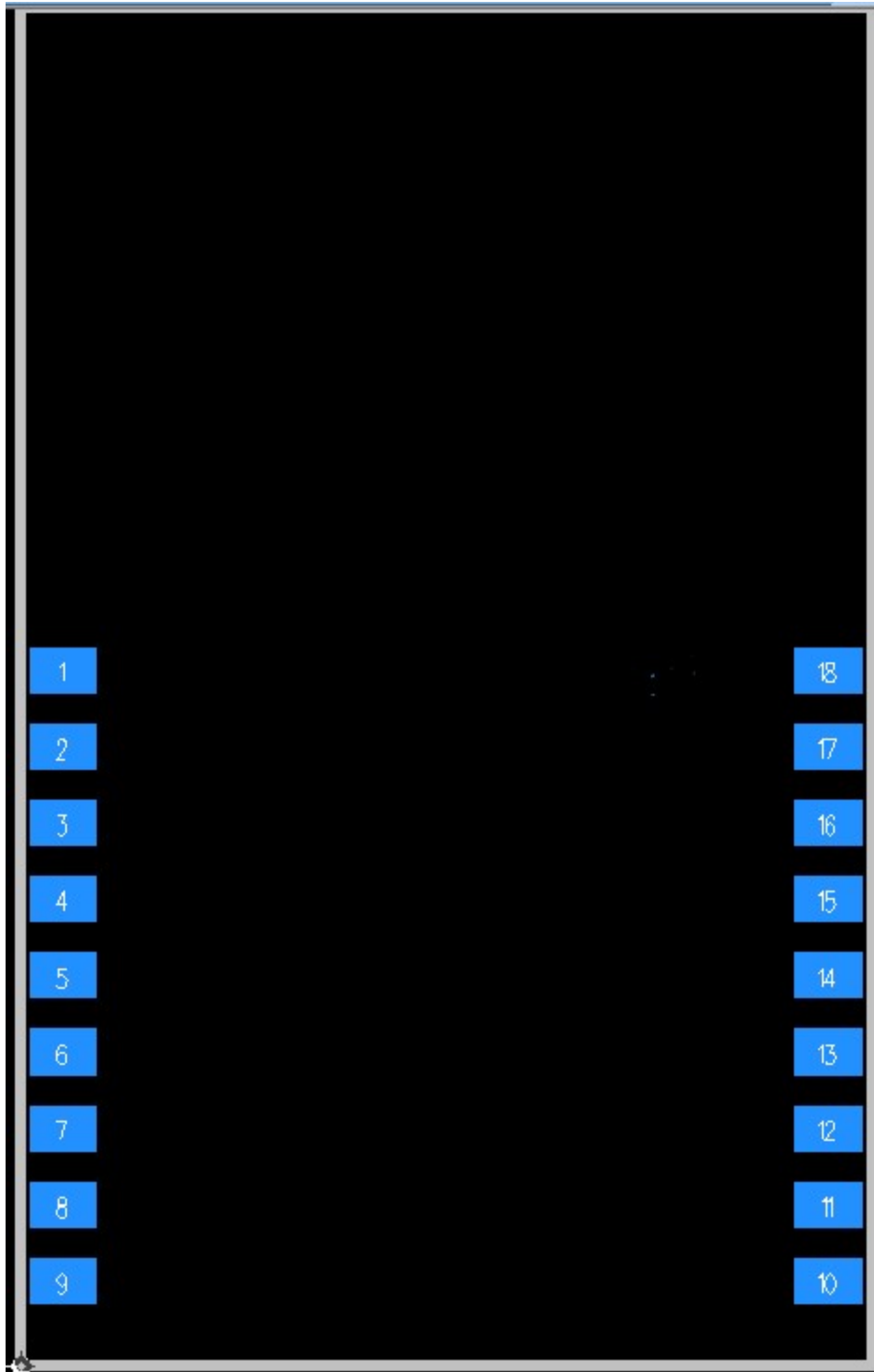


Functional Block Diagram



Block Diagram

Pin Assignment (Top view)



Pin Definition

Pin	Pin Name	Pad Type	Description
1	RF	A	RF output external Antenna (Type 2)
2	GND	Ground	
3	P1_0	IO PU	Programmable GPIO <ul style="list-style-type: none"> ● Configurable pull high/low state ● LDO_HV33 power domain
4	P1_1	IO PU	Programmable GPIO <ul style="list-style-type: none"> ● Configurable pull high/low state ● LDO_HV33 power domain
5	P3_0/RX	IO PU	Programmable GPIO <ul style="list-style-type: none"> ● Configurable pull high/low state ● LDO_HV33 power domain ● UART_RX for flash memory programming
6	P3_1/TX	IO PU	Programmable GPIO <ul style="list-style-type: none"> ● Configurable pull high/low state ● LDO_HV33 power domain ● UART_TX for flash memory programming
7	MFB	I_PU	Multi-function button input with internal pull high, low active with at least 3ms low
8	VD33	PI	Supply input 3.3V power
9	GND	Ground	
10	GND	Ground	
11	HW_RST_N	I_PU	System reset input with internal pull high, low active with a least 8ms low to trigger system reset
12	LDO_AUX	PO	Programmable linear regulator output for I/O
13	MODE	IO PU	Programmable GPIO <ul style="list-style-type: none"> ● Configurable pull high/low state ● LDO_AUX power domain HCI mode selection H: APP mode L: HCI mode
14	P2_1	IO	Programmable GPIO <ul style="list-style-type: none"> ● Configurable pull high/low state ● LDO_AUX power domain
15	P2_2	IO	Programmable GPIO

			<ul style="list-style-type: none"> ● Configurable pull high/low state ● LDO_AUX power domain
16	P0_0/ADC_0	IO IO A	Programmable GPIO <ul style="list-style-type: none"> ● Programmable as ADC input pin ● Configurable pull high/low state ● LDO_AUX power domain
17	P0_1/ADC_1	IO IO A	Programmable GPIO <ul style="list-style-type: none"> ● Programmable as ADC input pin ● Configurable pull high/low state ● LDO_AUX power domain
18	GND	Ground	

Pad Type	Definition
A	Analog
IO	Bidirectional digital pad
IO PU	Bidirectional digital pad with pull high resistor inside when input mode
IO A	Bidirectional digital pad and programmable ADC
PO	Power output
PI	Power input
I PU	Input with internal pull high inside

SPECIFICATION

Product Name	BT Module
Model Number	BM-8753BFR-F
Operating Frequency	2402~2480 MHz
Transmitter power	7.5dBm
Receiver sensitivity	≤ -70dBm

Power Voltage Range

Symbol	Description	Min.	Typ.	Max.	Units
VD33	3.3V Supply Voltage	2.8	3.3	4.35	V
	Operating Temperature	0	25	60	°C

Digital logic characteristics

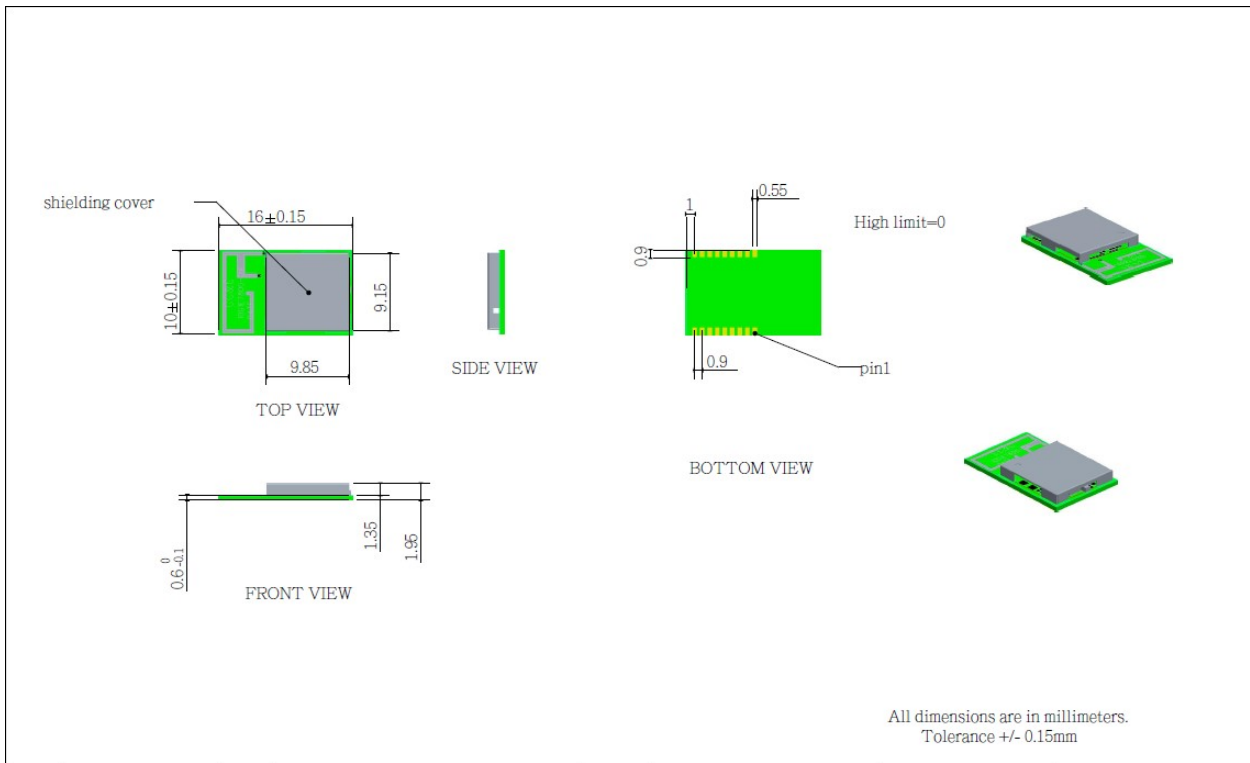
Item	Min.	Typ.	Max.	Unit
Input low voltage (Vil)	-0.4	-	0.4	V
Input high voltage (Vih)	0.7xVDDIO	-	VDDIO+0.4	V
Output low voltage (VDDIO=1.8V)	-	-	0.2	V
Output high voltage (VDDIO=1.8V)	VDDIO-0.2	-	-	V
Output low voltage (VDDIO=3V)	-	-	0.4	V
Output high voltage (VDDIO=3V)	VDDIO-0.4	-	-	V

VDDIO is LDO_AUX or LDO_HV33, GPIO power domain, check the pin description.

Internal Low Drop Linear Regulator – LDO_AUX

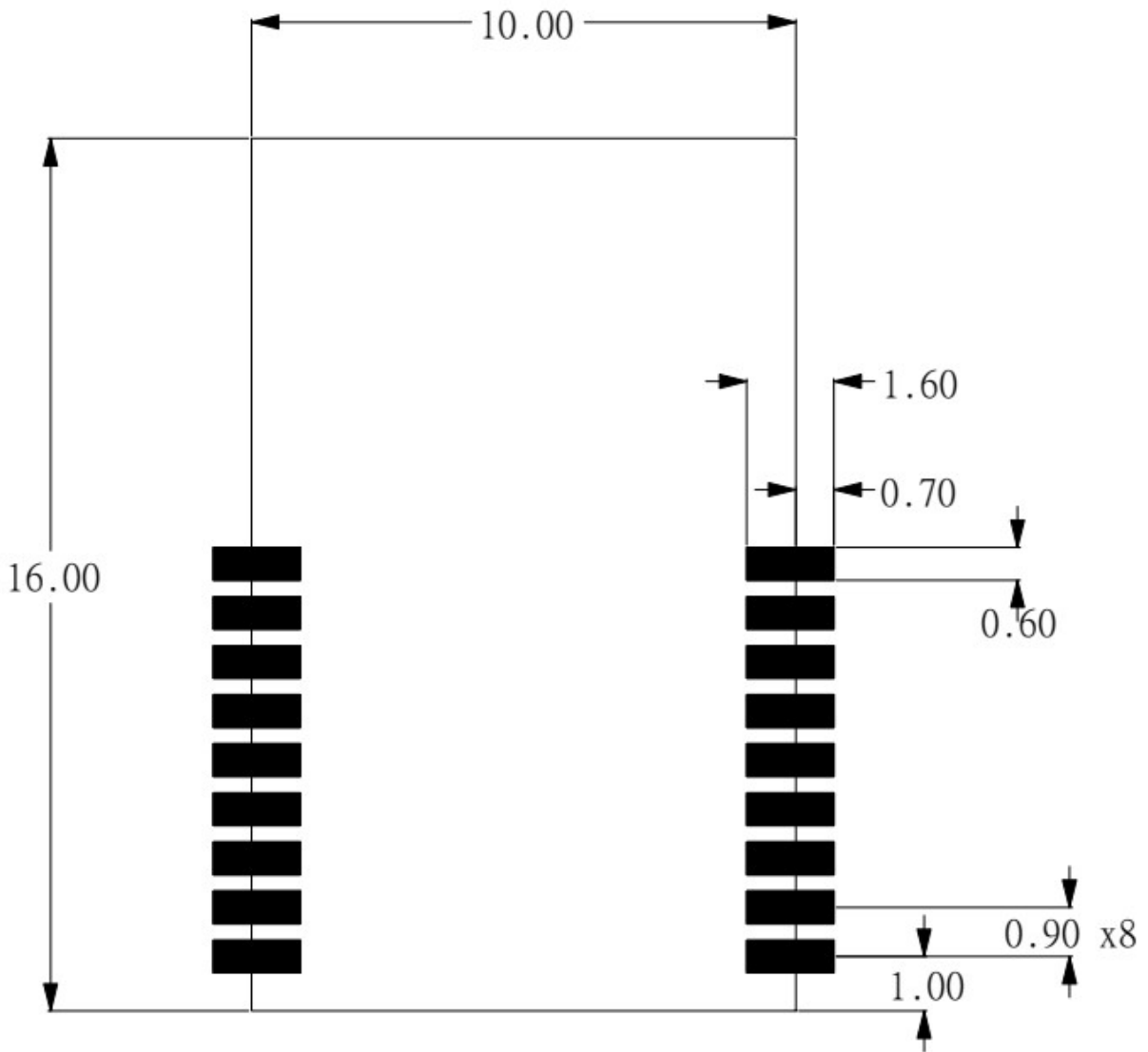
Item	Min.	Typ.	Max.	Unit
Output voltage	1.8	-	3.6	V
Output current	-	-	100	mA

Module dimension



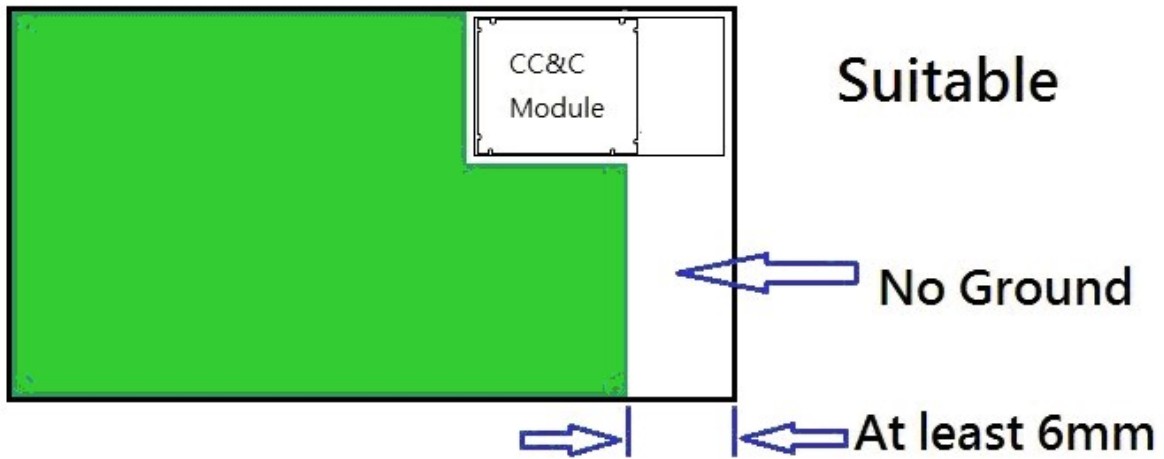
		CC & C TECHNOLOGIES, INC.								SCALE	DESCRIPTION E78		MODEL NO.	APPROVAL		
										QTY			DWG NO.	DESIGNED	jeff	
ITEM	DESCRIPTION	DATE	TOL	0-6	6-30	30-80	80-180	180-315	315-800	UNIT MM	DWG REV.	MATERIAL PCS/SET	FINISH	PARTS NO.	DRAWING	jeff

Recommend layout footprint

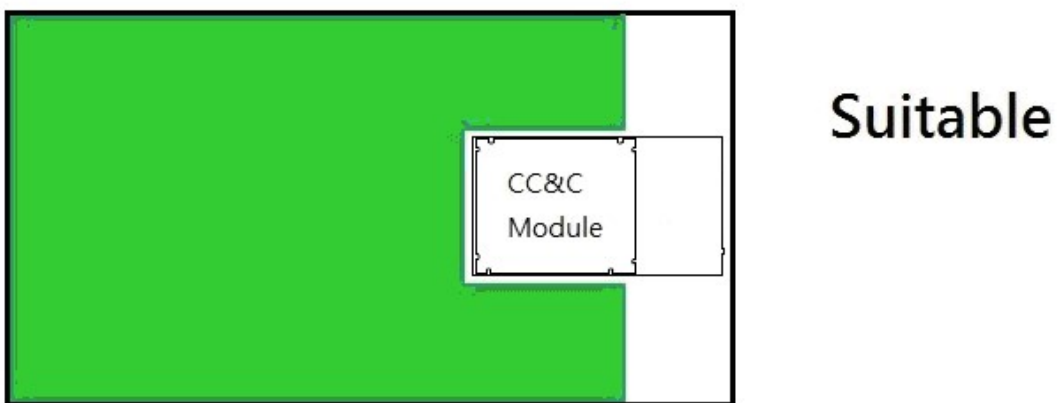


Placement Guideline

It is recommended that module be placed on the corner of the main board or near the edge as shown below.

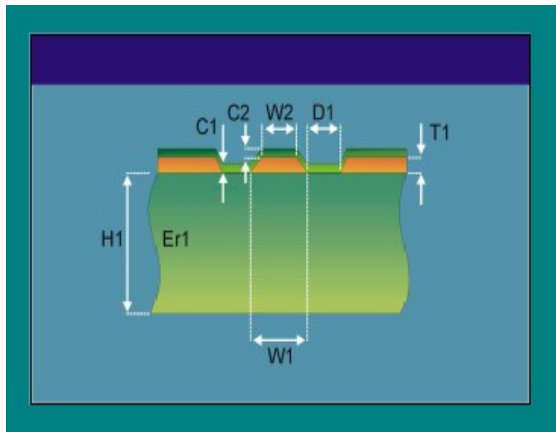


On the corner



Near the edge

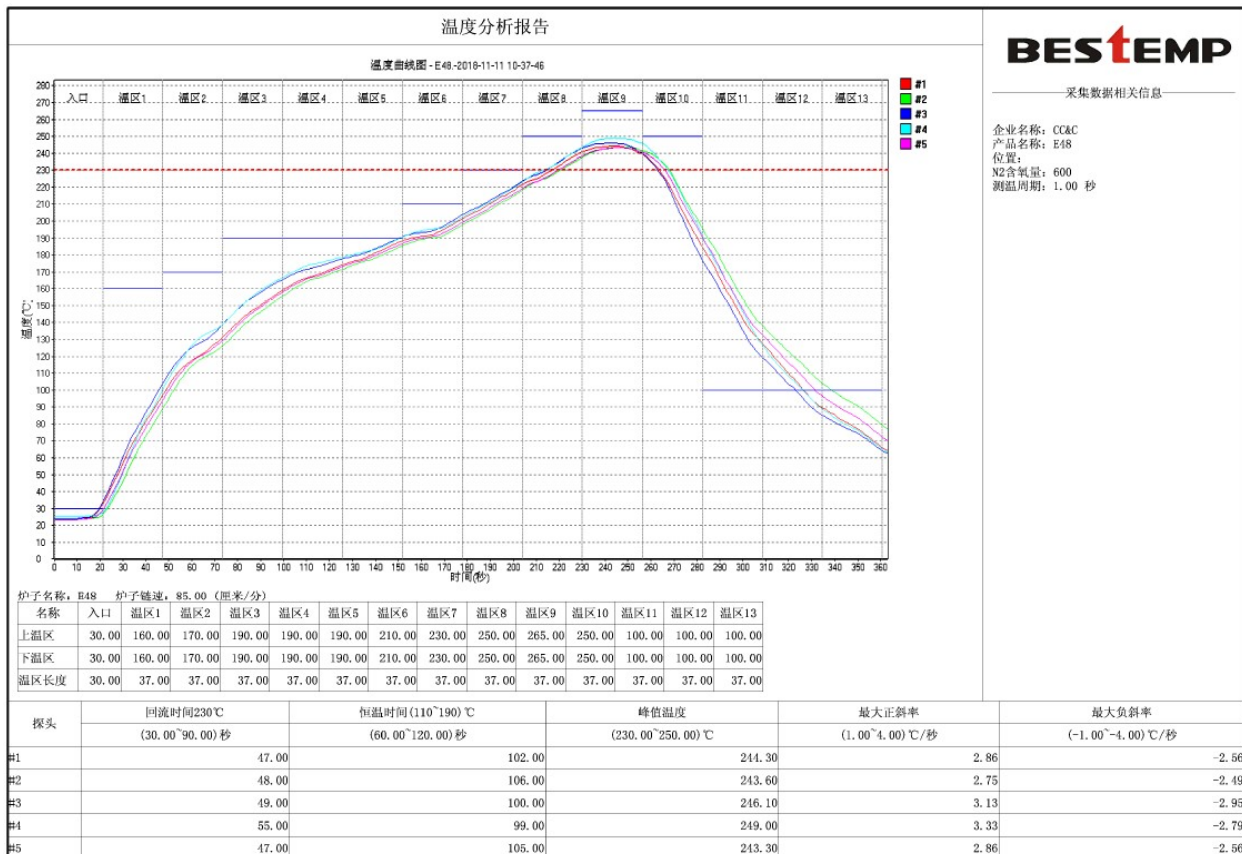
50 Ohm Feed Line:



- H1: 30 ~ 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

Reference – Temperature Reflow Chart



Reflow Notice:

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 °C or follow solder paste vendors'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.

This module is 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

Federal Communication Commission Interference Statement

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.

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.

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.

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.

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

- 1) 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 cannot 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 cannot 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

The product can be kept as far as possible from the user body or set the device to lower output power if such function is available. The final end product must be labeled in a visible area with the following: “Contains FCC ID:W2Z-03000015”.

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.

Canada - Innovation, Science and Economic Development (ISED)

This device complies with ISED's licence-exempt RSSs. 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.

Le présent appareil est conforme aux CNR d'ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée 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.

Radiation Exposure Statement:

This equipment complies with ISED 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 ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

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

1) 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) 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

The product can be kept as far as possible from the user body or set the device to lower output power if such function is available. The final end product must be labeled in a visible area with the following: "Contains IC: 7736B-03000014".

Plaque signalétique du produit final

L'appareil peut être conservé aussi loin que possible du corps de l'utilisateur ou que le dispositif est réglé sur la puissance de sortie la plus faible si une telle fonction est disponible. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC:7736B-03000014".

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.