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Flaircomm Microelectronics, Inc.

FLC-BTM069 Datasheet

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1. Introduction

FLC-BTM069 is a fully integrated Bluetooth radio module which integrates RF, Baseband controller, on-board antenna, and connectors. It is a low power and highly economic Bluetooth radio module that allows OEM to add wireless capability to their products.

With FLC's AT+™ programming interfaces, designers can easily customize their applications to support different Bluetooth profiles, such as A2DP 1.2, HFP 1.5, AVRCP 1.5 and etc. The module is designed specifically to meet requirements for consumer applications.

The module is an appropriate product for designers who want to add a fully certified Bluetooth capability to their products.

1.1 Naming Declaration

New Naming	Old Naming
FLC-BTM069CQ2A	NA

Table 1: Naming Declaration

1.2 Block Diagram

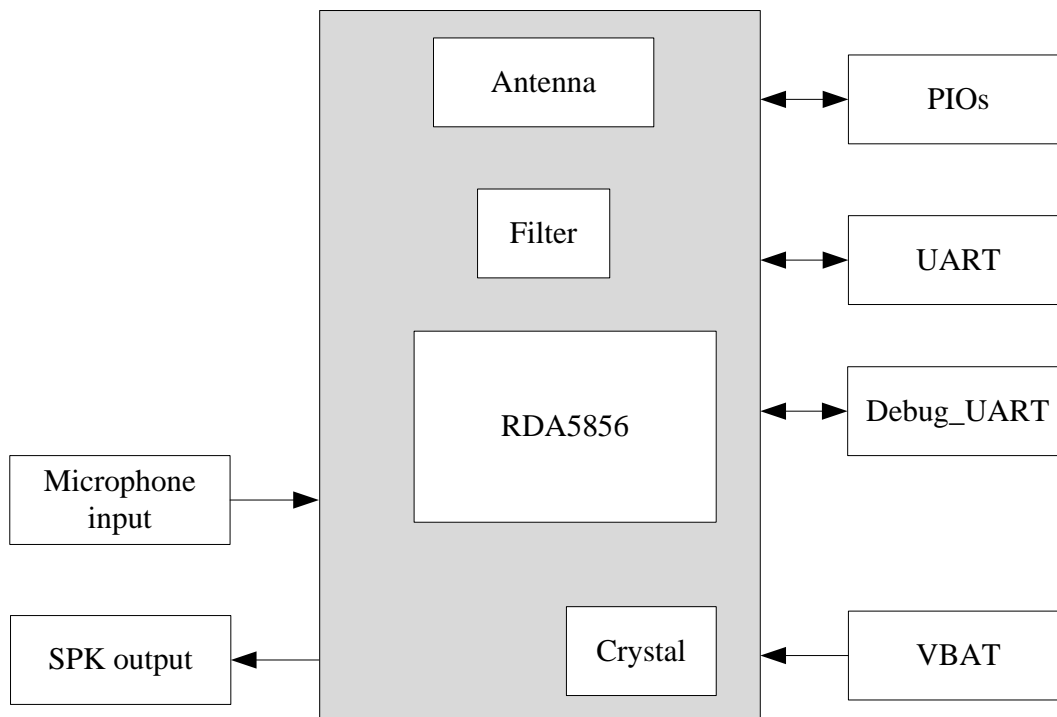


Figure 1: Block Diagram

1.3 Features

- Bluetooth v4.2, BR/EDR and BLE
- UART programming and data interface
- Connectors for easy installation
- RoHS compliant

1.4 Applications

- Bluetooth speakers
- Bluetooth music box
- Bluetooth headset or headphone

2. General Specification

Bluetooth Specification	
Standard	Bluetooth4.2 , BR ,EDR,BLE
Profiles	A2DP 1.2, HFP 1.5,AVRCP 1.5 and etc. detailed profiles depends on the firmware
Frequency Band	2.402G ~ 2.480G
Maximum Data Rate	3Mbps
RF Input Impedance	50 ohms
Baseband Crystal OSC	26MHz
Interface	UART, PIO, Speaker, Microphone
Sensitivity	-93dBm@0.1%BER
RF TX Power	0dBm
Power	
Supply Voltage	4.5V to 5.5V DC
Working Current	42mA @A2DP streaming
Standby Current	2.1mA
Operating Environment	
Temperature	-20°C to +65°C
Certifications	
	-
Environmental	
	RoHS Compliant
Dimension	
Dimension	25.6mm*28.3mm*2.7mm

Table 2: General Specification

3. Pin Definition

3.1 Pin Configuration

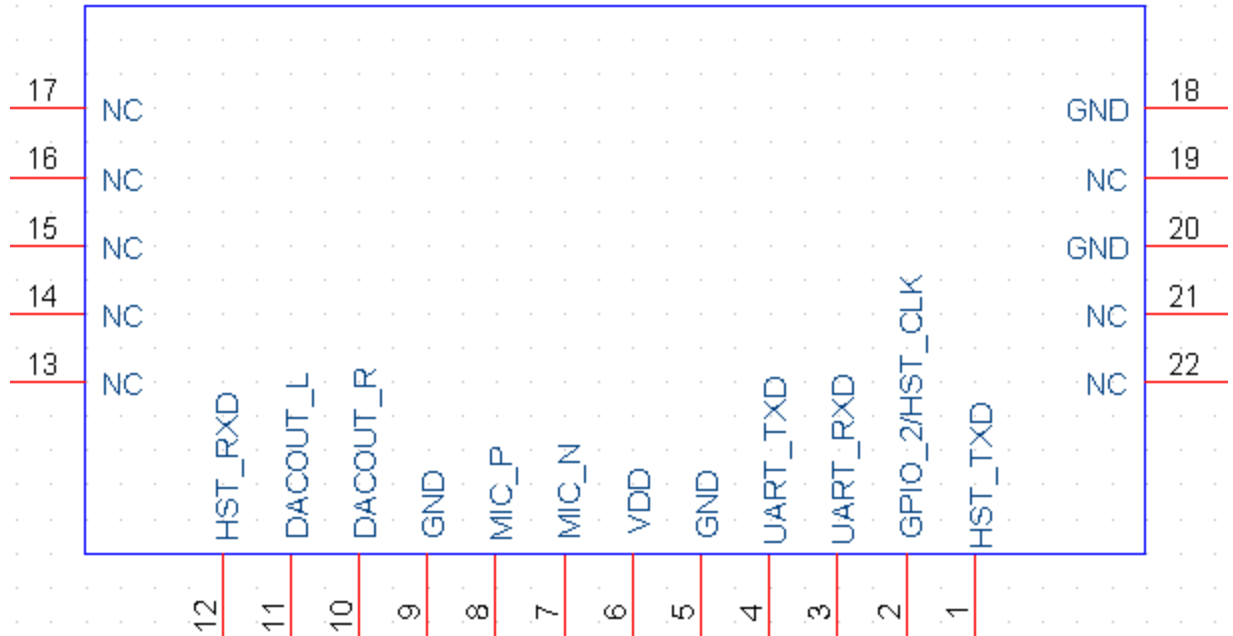


Figure 2: Pin Configuration

3.2 Pin Definition

Pin	Symbol	I/O Type	Description
1	HST_TXD	I/O	Debug Host RXD
			General purpose input/out
			GPIO interrupt input 0
2	GPIO_1/HST_CLK	I/O	Debug Host Clock
			General purpose input/output
			GPIO interrupt input 2
3	UART_RXD	I/O	General purpose input/output
			UART RXD
4	UART_TXD	I/O	General purpose input/output

			UART TXD
5	GND	Ground	Ground
6	VDD	POWER	Module power supply
7	MIC_N	A,I	Microphone input negative
8	MIC_P	A,I	Microphone input positive
9	GND	Ground	Ground
10	DACOUT_R	A,O	DAC output right
11	DACOUT_L	A,O	DAC output left
12	HST_RXD	I/O	Debug Host RXD
			General purpose input/output
			GPIO interrupt input 1
13~17	NC	Not connected	Not connected
18	GND	Ground	Ground
19	NC	Not connected	Not connected
20	GND	Ground	Ground
21	NC	Not connected	Not connected
22	NC	Not connected	Not connected

Table 3: Pin Definition

4. Physical Interfaces

4.1 Power Supply

Ranging from 4.5V to 5.5V, VDD is a wide range power supply for Bluetooth applications. Warning: If the power supply is out of the defined range, the module could be damaged.

4.2 General Purpose Digital IO

The module pre-defines three general purpose digital IOs for HST_TXD, GPIO/HST_CLK and HST_RXD. However, all these IOs can be reprogramming for different purposes.

4.3 Serial Interfaces

4.3.1 UART

This is a standard UART interface for communicating with other serial devices. The UART interface provides a simple mechanism for communicating with other serial devices using the RS232 protocol.

When the module is connected to another digital device, UART_RX and UART_TX transfer data between the two devices. When connecting the module to a host, please make sure to follow **Figure 3**.

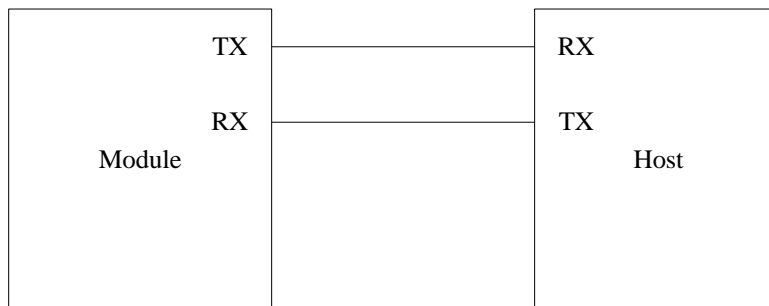


Figure 3: UART Connection

5. Electrical Characteristic

5.1 Absolute Maximum Rating

Rating	Min	Max	Unit
Operating Temperature	-20	+65	°C
VDD Voltage	-0.4	+6	V
UART_TXD/UART_RXD Voltage/IO	-0.4	+3.6	V

Table 4: Absolute Maximum Rating

5.2 Recommended Operating Conditions

Operating Condition	Min	Typical		
Operating Temperature Range	-20	--	+65	°C
VDD Voltage	+4.5	+5.0	+5.5	V
I/O	--	3.3	--	V

Table 5: Recommended Operating Conditions

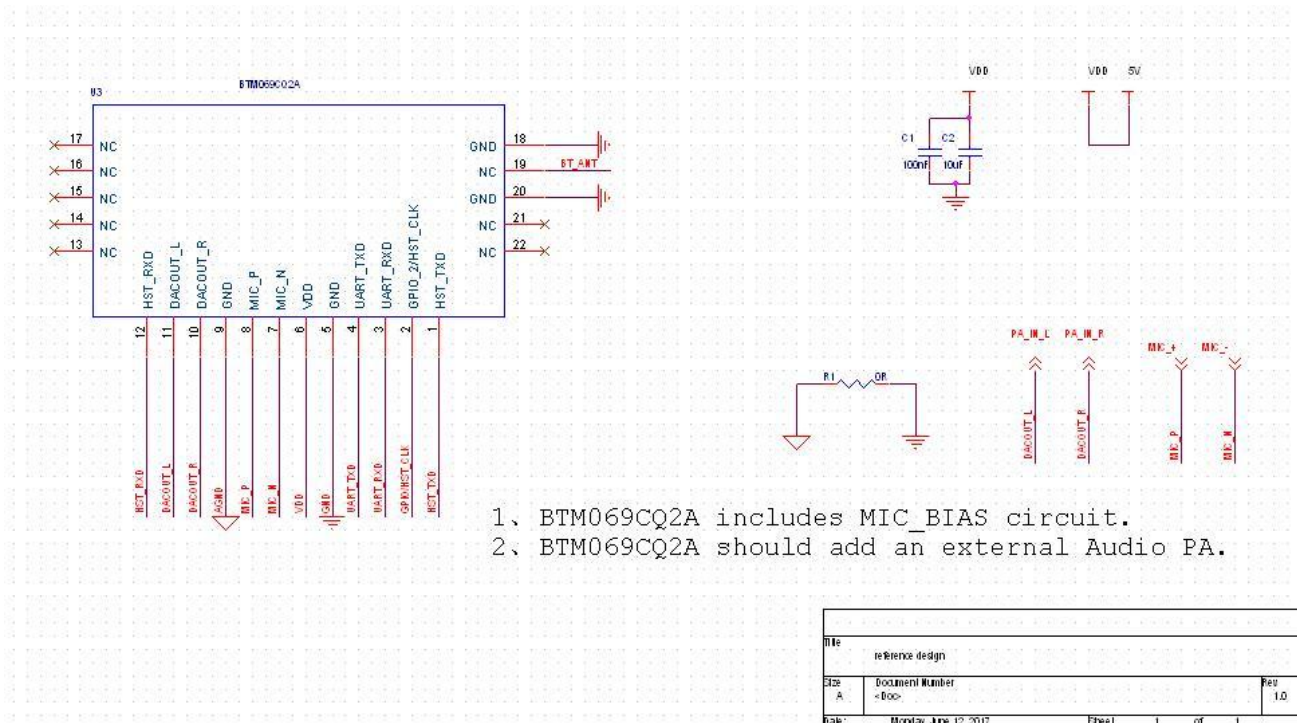
5.3 Input/output Terminal Characteristics

5.3.1 Audio Characteristics

Parameter	Min	Typical	Max	Unit
SNR	-	-85.5	-	dB
THD	-	93.5	-	dB
Output Voltage	-	598	-	mV rms

Table 6: Speaker Output

6. Reference Design



1. BTM069CQ2A includes MIC_BIAS circuit.
2. BTM069CQ2A should add an external Audio PA.

Figure 4: Reference Design

8. Recommended PCB Layout and Mounting Pattern

A very important factor in achieving maximum Bluetooth performance is the placement of a module with on-board antenna designs onto the carrier board and corresponding PCB layout. There should be no any trace, ground and vias in the area of the carrier board underneath the module's on-board antenna section as indicated in **Figure 6**. Antenna portion of the module must be placed at least 15mm away from any metal part and the antenna should not be covered by any piece of metal. The antenna of the module **MUST** be kept as far from potential noise sources as possible and special care must also be taken with placing the module in proximity to circuitry that can emit heat. The RF part of the module is very sensitive to temperature and sudden changes can have an adverse impact on performance.

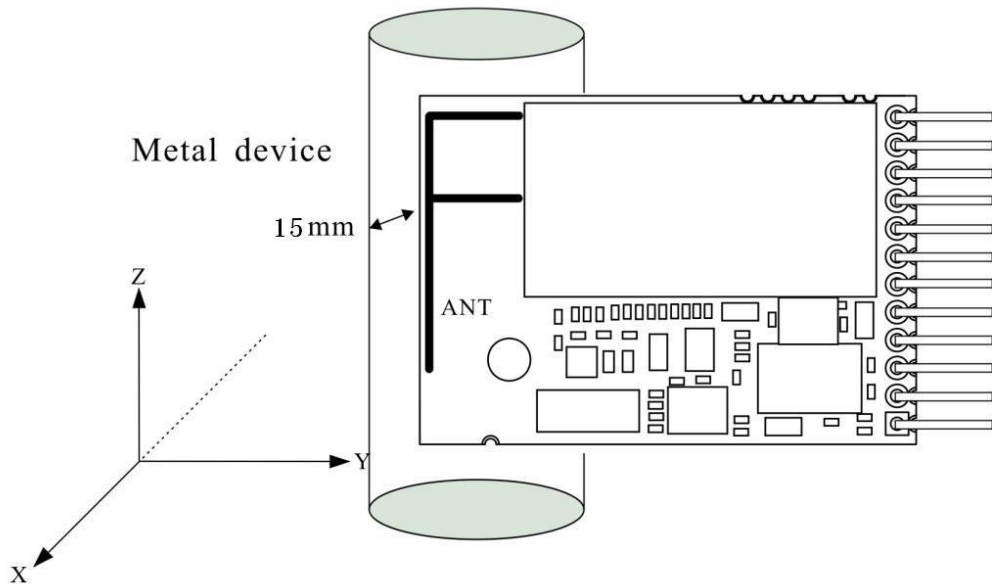


Figure 6: Leave 15mm Clearance Space from the Module Built-in Antenna

9. Recommended 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.

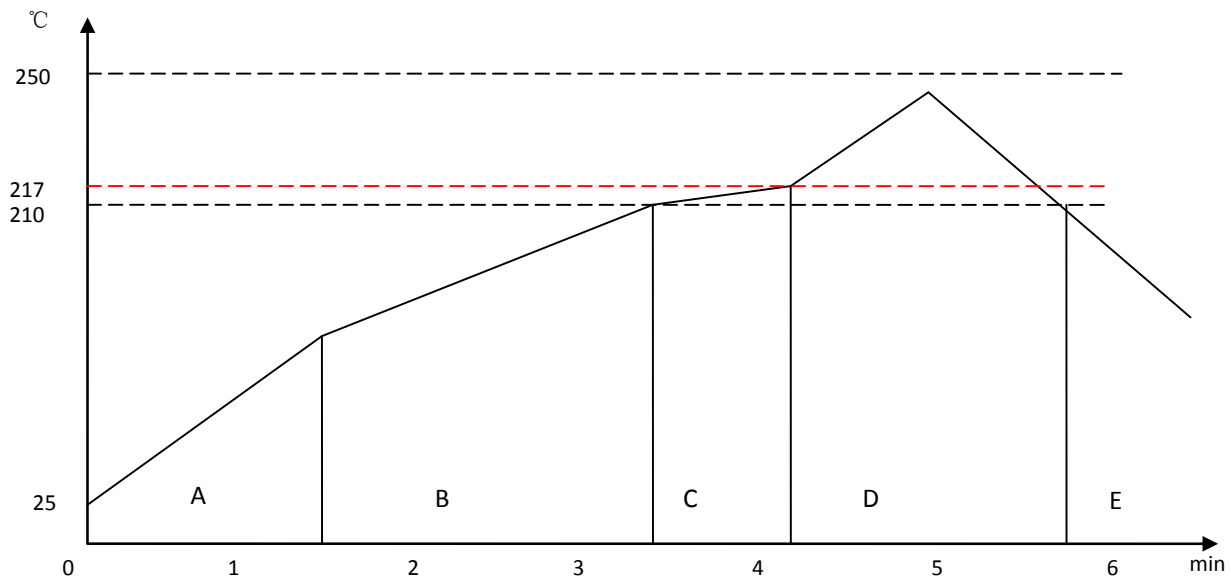


Figure 7: Recommended Reflow Profile

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 (T_p) 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 rate should be fast, to keep the solder grains small which will give a longerlasting joint. **Typical cooling rate should be 4 °C.**

10. Ordering Information

10.1 Product Packaging Information

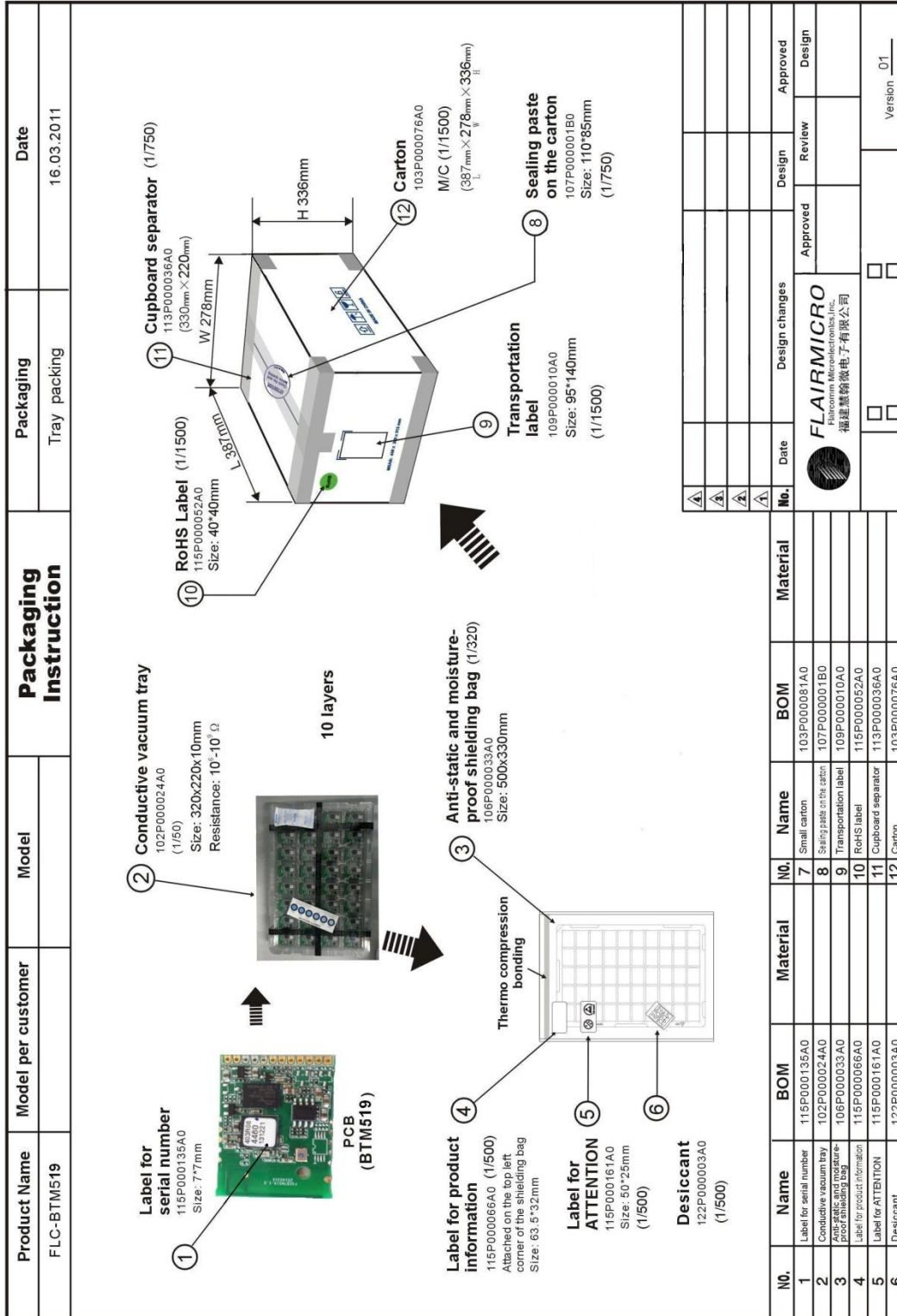


Figure 8: Product Packaging Information

10.2 Ordering information

FLC-BTM069XYZA

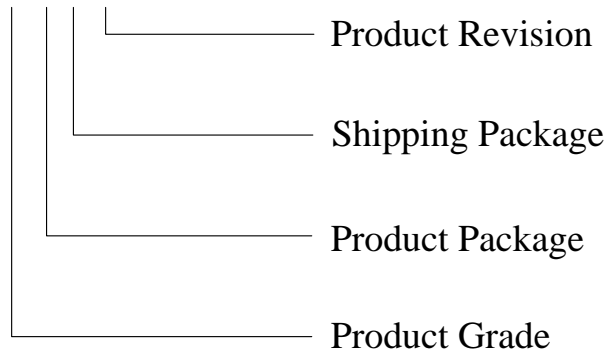


Figure 9: Ordering Information

10.2.1 Product Revision

Product Revision	Description	Availability
A	With an internal antenna	Yes
B	—	No

Table 7: Product Revision

10.2.2 Shipping Package

Shipping Package	Description	Quantity	Availability
0	Foam Tray	—	No
1	Plastic Tray	32*10*3=960	Yes
2	Tape	—	No

Table 8: Shipping Package

Note: The plastic packaging tray is for shipping only. It is NOT suggested to be used in SMT process. A picture of the shipping package is shown below.

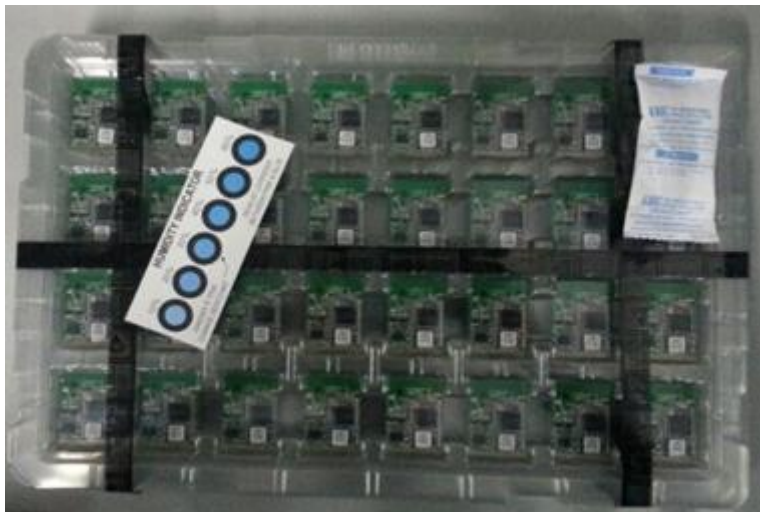


Figure 10: Shipping Package Information

10.2.3 Product Package

Product Package	Description	Availability
Q	QFN	Yes
L	LGA	No
B	BGA	No
C	Connector	No

Table 9: Product Package

10.2.4 Product Grade

Product Grade	Description	Availability
C	Consumer	Yes
I	Industrial	No
V	Automobile After-Market	No
A	Automobile Before-Market	No

Table 10: Product Grade