




BCM–LZ100–AS

Specification



Revision 1.1 –1/12/2024



CONFIDENTIAL INFORMATION

List of Contents

1. General	3
1.1 Overview	3
1.2 Features	4
1.3 Application	4
1.4 Certification Information	4
1.5 Pin Configuration	5
1.6 Device Terminal Functions	6
1.7 Package Dimensions & Land Pattern	7
2. Characteristics	9
2.1 Electrical Characteristics	9
2.2 RF Characteristics	10
2.2.1 2.4GHz Radio.....	10
2.2.2 Transmitter	10
2.2.3 Receiver	10
2.2.4 Test Report	11
2.2.5 Antenna Characteristics	12
3. Terminal Description	13
3.1 UART Interface	13
3.2 SPI Interface (SPI0, SPI1 Two Independent Instances)	13
3.3 I2C Interface (I2c0, I2c1 Two Independent Instances).....	13
3.4 IOMUX	13
3.5 DMIC/AMIC Data Path	13
4. Layout Guide.....	14
4.1 Layout Guide (Internal Antenna)	14
5. Application Schematic.....	15
6. Reflow Temperature Profile	16
7. Package Information	17

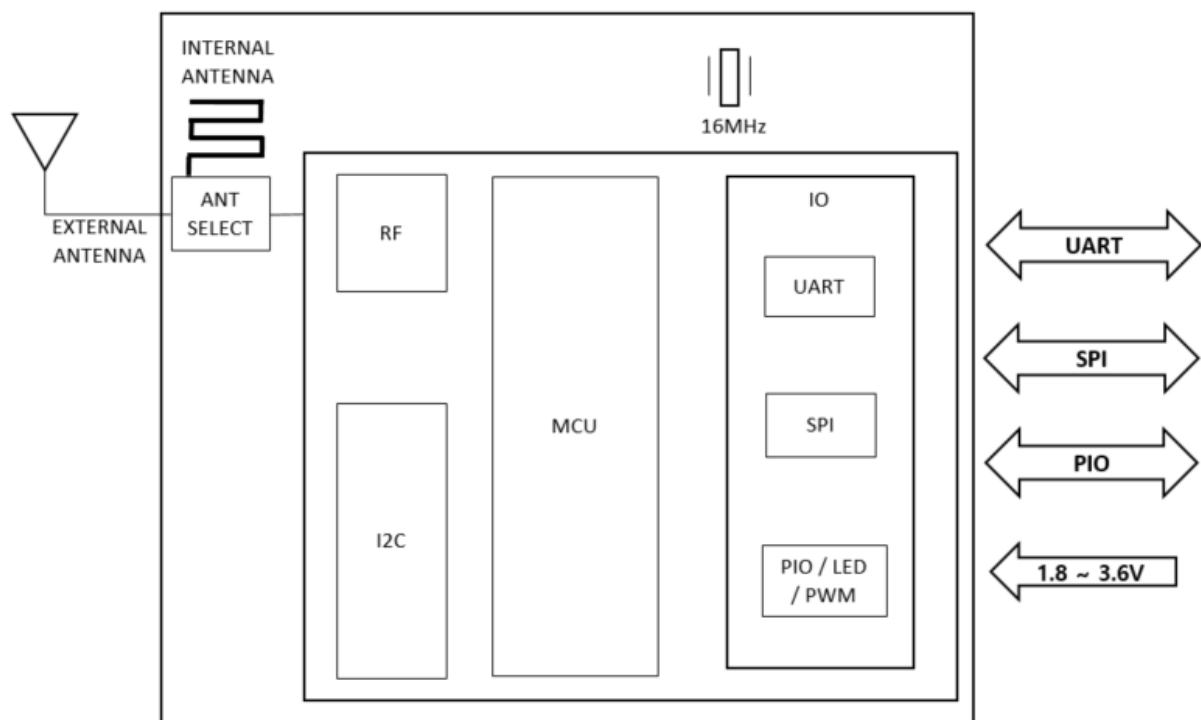
1. General

1.1 Overview

This specification covers Bluetooth module which single IC Bluetooth Low Energy solution; this module provides everything required to create a Bluetooth low energy product with RF, baseband, MCU, qualified Bluetooth v5.2 stack and customer application running.

This Module has deployed LENZE TECH ST17H66B2 chipset.

All detailed specification including pin outs and electrical specification may be changed without notice.



1.2 Features

- 256KB Flash Memory, 64KB SRAM, 96KB ROM
- Bluetooth® v5.2 specification
- 6dBm Bluetooth low energy maximum transmit output power
- -97dBm Bluetooth low energy receive sensitivity
- Support for Bluetooth v5.2 specification host stack including ATT, GATT, SMP, L2CAP, GAP
- RSSI monitoring for proximity applications
- Programmable general purpose PIO controller
- 12-bit ADC
- 9 General PIOs
- 5 Analogue AIOs
- UART / SPI Interface
- 6-channel PWM
- Wake-up interrupt and watchdog timer
- Competitive Size : 18mm X 10mm X 2.2mm(T) : 22Pin
- Operating temperature : -20℃ ~ +70℃

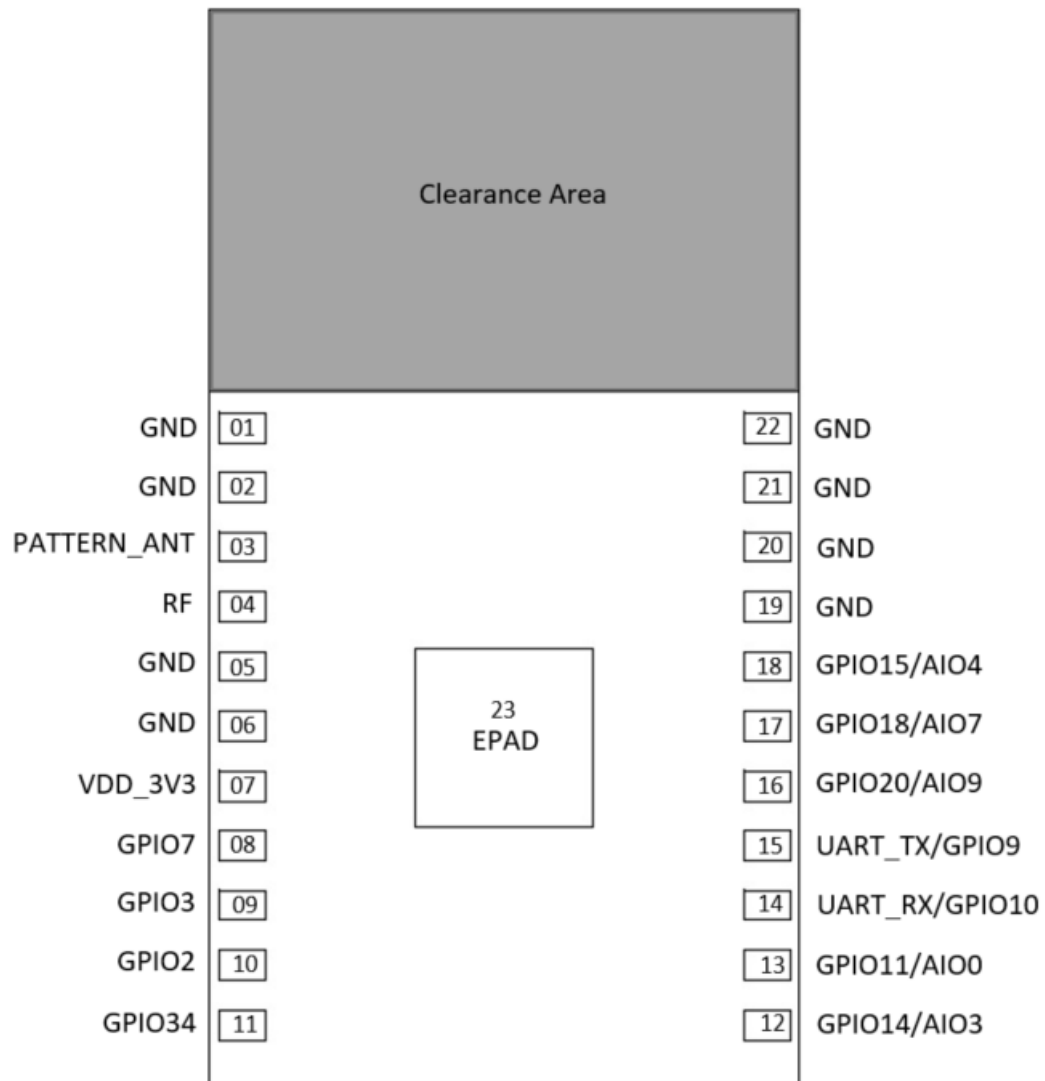
1.3 Application

- 2.4-GHz Bluetooth low energy Systems
- Wearables, Beacons, Home and Building
- Health and Medical
- Industrial and Manufacturing
- PC/Mobile/TV
- Peripherals, Internet of Things (IoT)

1.4 Certification Information

- KC : R-C-BC0-BCM-LZ100-AS
- TELEC : 216-230009
- IC : 8738A-BCMLZ100AS
- CE : 23021552-1

1.5 Pin Configuration

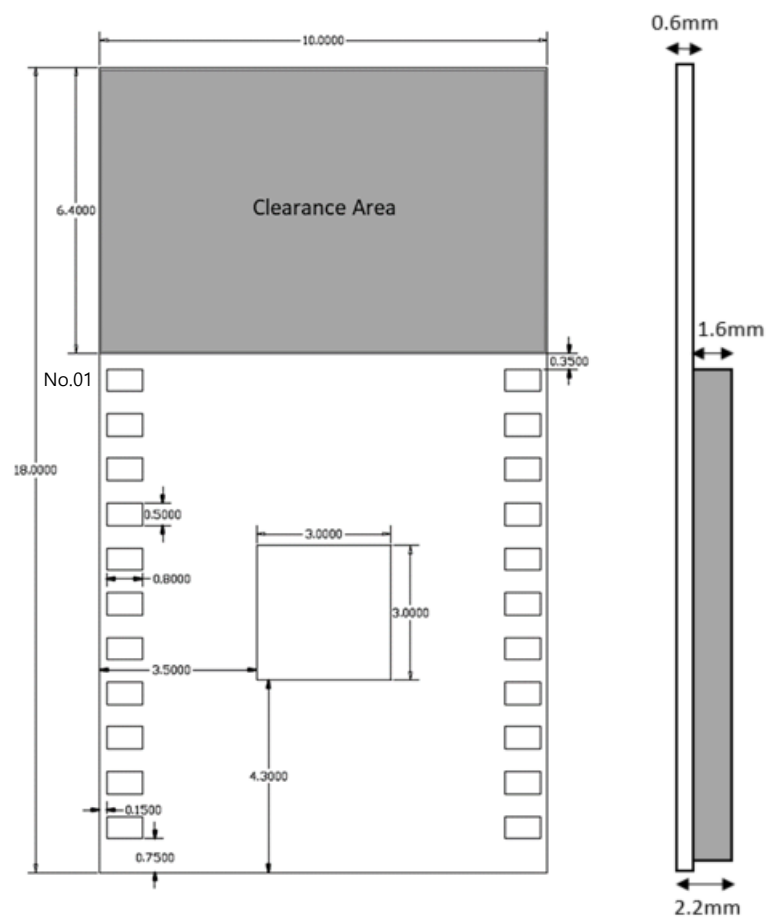


Pin Configuration (TOP VIEW)

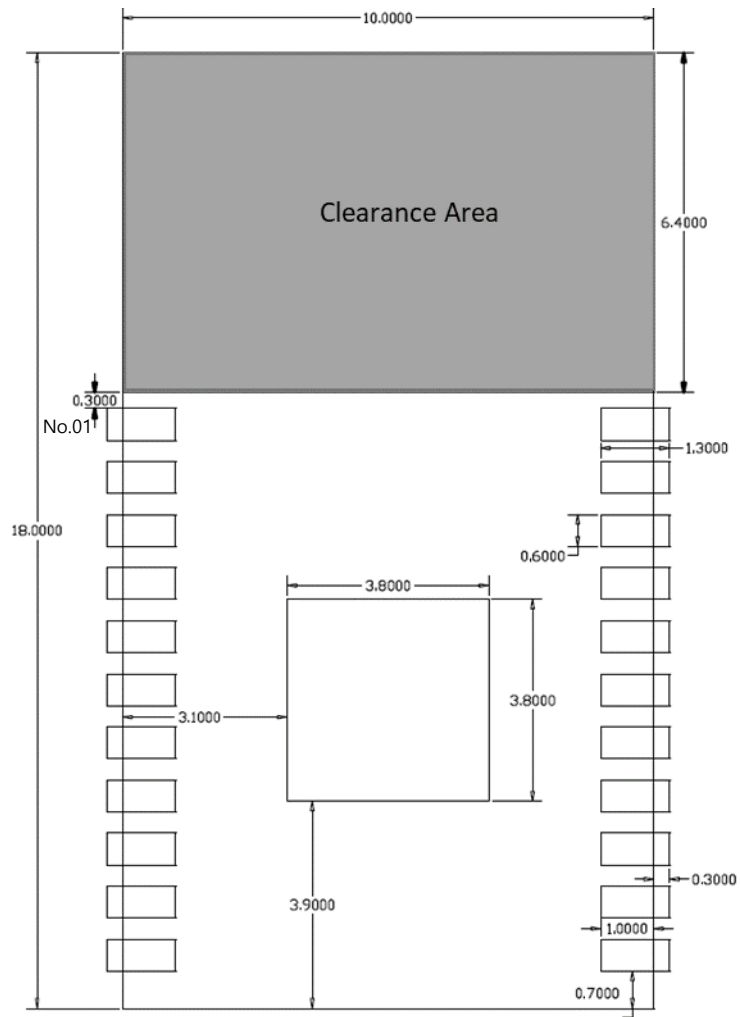
1.6 Device Terminal Functions

Pin No.	Pin Name	Pin Function	Description
01	GND	GROUND	Ground Pin
02	GND	GROUND	Ground Pin
03	PATTERN_ANT	INTERNAL ANTENNA	If want to use Internal Antenna, Connect Pin03 and Pin04
04	RF	RF PAD	use External Antenna
05	GND	GROUND	Ground Pin
06	GND	GROUND	Ground Pin
07	VDD_3V3	POWER	Power Supply Pin
08	GPIO7	GPIO	General purpose I/O pin.
09	GPIO3	GPIO	General purpose I/O pin.
10	GPIO2	GPIO	General purpose I/O pin.
11	GPIO4	GPIO	General purpose I/O pin.
12	GPIO14	GPIO	General purpose I/O pin.
	AIO3	ANALOG I/O	Analogue Programmable I/O pin
13	GPIO11	GPIO	General purpose I/O pin.
	AIO0	ANALOG I/O	Analogue Programmable I/O pin
14	UART_RX		UART RX
	GPIO10	GPIO	General purpose I/O pin.
15	UART_TX		UART TX
	GPIO9	GPIO	General purpose I/O pin.
16	GPIO20	GPIO	General purpose I/O pin.
	AIO9	ANALOG I/O	Analogue Programmable I/O pin or PGA positive input
17	GPIO18	GPIO	General purpose I/O pin.
	AIO7	ANALOG I/O	Analogue Programmable I/O pin or PGA negative input
18	GPIO15	GPIO	General purpose I/O pin.
	AIO4	ANALOG I/O	Analogue Programmable I/O pin or micbias output
19	GND	GROUND	Ground Pin
20	GND	GROUND	Ground Pin
21	GND	GROUND	Ground Pin
22	GND	GROUND	Ground Pin
23	EPAD	GROUND	Ground Pin

1.7 Package Dimensions & Land Pattern



Package Dimensions (TOP VIEW)



Land Pattern (TOP VIEW)

2. Characteristics

2.1 Electrical Characteristics

■ Absolute Maximum Ratings

Rating	Min	Max	Unit
Storage Temperature range	-40	85	°C
Supply (VCC) voltage	VSS-0.3	3.6	V
I/O pin voltage	VSS-0.3	VDD+0.3	V

■ Recommended Operating Conditions

Operating Condition	Min	TYP	Max	Unit
Operating temperature range	-20	-	70	°C
Supply (VCC) voltage	1.8	-	3.6	V

■ DC Characteristics

PARAMETER	Min	TYP	Max	Unit
Logic-0 input voltage			0.5	V
Logic-1 input voltage	2.4			V
Logic-0 input current	-50		50	nA
Logic-1 input current	-50		50	nA
Logic-0 output voltage, 10-mA pins			0.5	V
Logic-1 output voltage, 10-mA pins	2.5			V

2.2 RF Characteristics

The 2.4 GHz RF transceiver is designed to operate in the worldwide ISM frequency band at 2.4 to 2.483GHz. Radio modulation modes and configurable packet structure make the transceiver interoperable with Bluetooth® low energy (BLE) protocol implementations.

2.2.1 2.4GHz Radio

- General modulation format
 - FSK (configurable modulation index) with configurable Gaussian Filter Shaping
 - OQPSK with half-sine shaping
 - On-air data rates
 - 125kbps/250kbps/500kbps/1Mbps/2Mbps
- RSSI function (1 dB resolution, ± 2 dB accuracy)
- Embedded RF balun
- Integrated frac-N synthesizer with phase modulation

2.2.2 Transmitter

Parameter	Test Condition	MIN	TYP	MAX	UNIT	Accuracy
Output Power	Power Level Max		3		dBm	± 3

* Chipset Reference Characteristics

2.2.3 Receiver

Parameter	Test Condition	MIN	TYP	MAX	UNIT
Receiver Sensitivity	125kbps GFSK		-103		dBm
Receiver Sensitivity	500kbps GFSK		-98		dBm
Receiver Sensitivity	1Mbps BLE		-97		dBm
Receiver Sensitivity	2Mbps BLE		-94		dBm

* Chipset Reference Characteristics

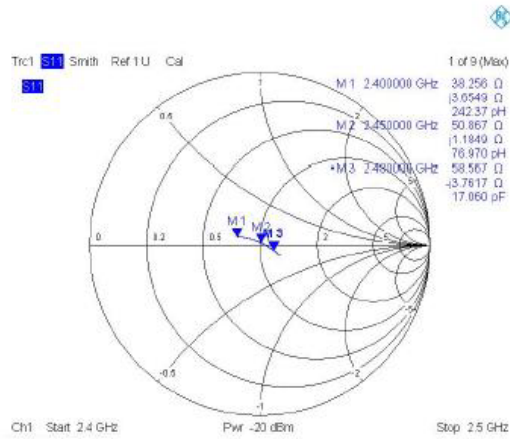
2.2.4 Test Report

RF Characteristics	Bluetooth Specification	0CH	19CH	39CH	UNIT
Output Power (TP/TRM-LE/CA/BV-01-C)	-20.00dBm ~ 10dBm	3.5	3.48	2.85	dBm
In-band emissions (TP/TRM-LE/CA/BV-03-C)	(f1) ≤ -20dBm				
	(f2) ≤ -30dBm				
	-30dBm ≤ P(f3) ≤ -20dBm				
Modulation Characteristics (TP/TRM-LE/CA/BV-05-C)	225.0KHz ≤ df1_avg ≤ 275.0KHz	243.0	244.5	247.8	kHz
	df2_pass_rate ≥ 99.90%	100	100	100	%
	df2/df1 ≥ 0.80	0.96	0.97	0.96	
Carrier frequency offset and drift (TP/TRM-LE/CA/BV-06-C)	fTX-f[n] ≤ 150.0KHz	23.1	22.5	23.0	kHzs
	f[0]-f[n] ≤ 50.0KHz	8.6	-7.7	-7.9	
	f[1]-f[0] ≤ 23.0KHz	2.7	-7.3	4.5	
	f[n]-f[n-5] ≤ 20.0KHz	-8.1	8.7	9.2	
Receiver sensitivity (TP/RCV-LE/CA/BV-01-C)	PER < 30.80%	3.000	3.067	3.267	%
	≤ -90dBm	95.0			dBm
PER Report Integrity (TP/RCV-LE/CA/BV-07-C)	50.00% ≤ PER ≤ 65.40%	50.067	50.000	50.000	%

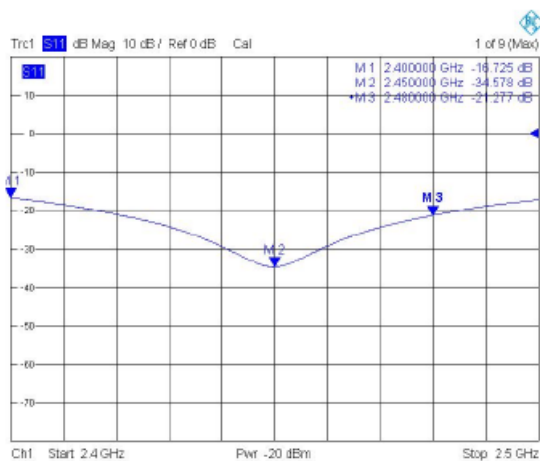
* Chipset Reference Characteristics

2.2.5 Antenna Characteristics

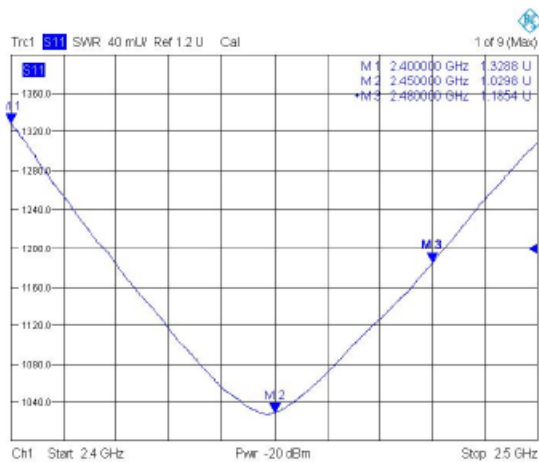
■ Smith chart



■ S-parameter



■ Antenna SWR



■ Performance

- Directivity 2.21 dB
- Gain 1.95 dBi
- Maximum intensity 0.125 W/Steradian

3. Terminal Description

3.1 UART Interface

BCM-LZ100-AS UART interface provides a simple mechanism for communicating with other serial devices using the RS232 protocol.

The 2 signals implement the UART function, UART_TX and UART_RX. When BCM-LZ100-AS is connected to another digital device, UART_RX and UART_TX transfer data between the 2 devices

- UART Baud Rate
 - Min. 9,600bps / Nor. 115,200bps / Max 1Mbps

3.2 SPI Interface (SPI0, SPI1 Two Independent Instances)

BCM-LZ100-AS provides a debug SPI interface for programming

The SPI interface supports 3 serial synchronous protocols which are SPI, SSP and Microwire serial protocols. SPI wrapper contains one SPI master and one SPI slave. They are logically exclusive. Only one block is alive at a time. The operation mode for master mode and slave mode is controlled by PERI_MASTER_SELECT Register in COM block.

3.3 I2C Interface (I2c0, I2c1 Two Independent Instances)

This I2C block support 100Khz, and 400Khz modes. It also supports 7-bit address and 10-bit address. It has built-in configurable spike suppression function for both lines.

3.4 IOMUX

The IOMUX provides a flexible I/O configuration, as the ports of most of the peripherals can be configured and mapped to any of the physical I/O pads (I/O at die boundary). These peripheral modules include I2C 0-1, UART0-1, PWM 0-5, SPI 0-1, Quadrature Decoder etc. However for other specific purpose peripherals, their IOs mappings are fixed when they are enabled. These specific purpose peripherals include JTAG, analog_ios, GPIOs and key scan.

3.5 DMIC/AMIC Data Path

The voice in interface supports one analog MIC (SAR-ADC) and two digital MIC (L+R), different output sample rate (64KHz, 32KHz, 16KHz and 8KHz), and different voice compress algorithm. For the Digital MIC, PDM signal is sampled at 1.28MHz(4x320KHz). L channel is sampled at raising edge, R channel is sampled at falling edge. For PCM-LOG and CVDS, output data rate is 64Kbps (8KHz x 8bit).

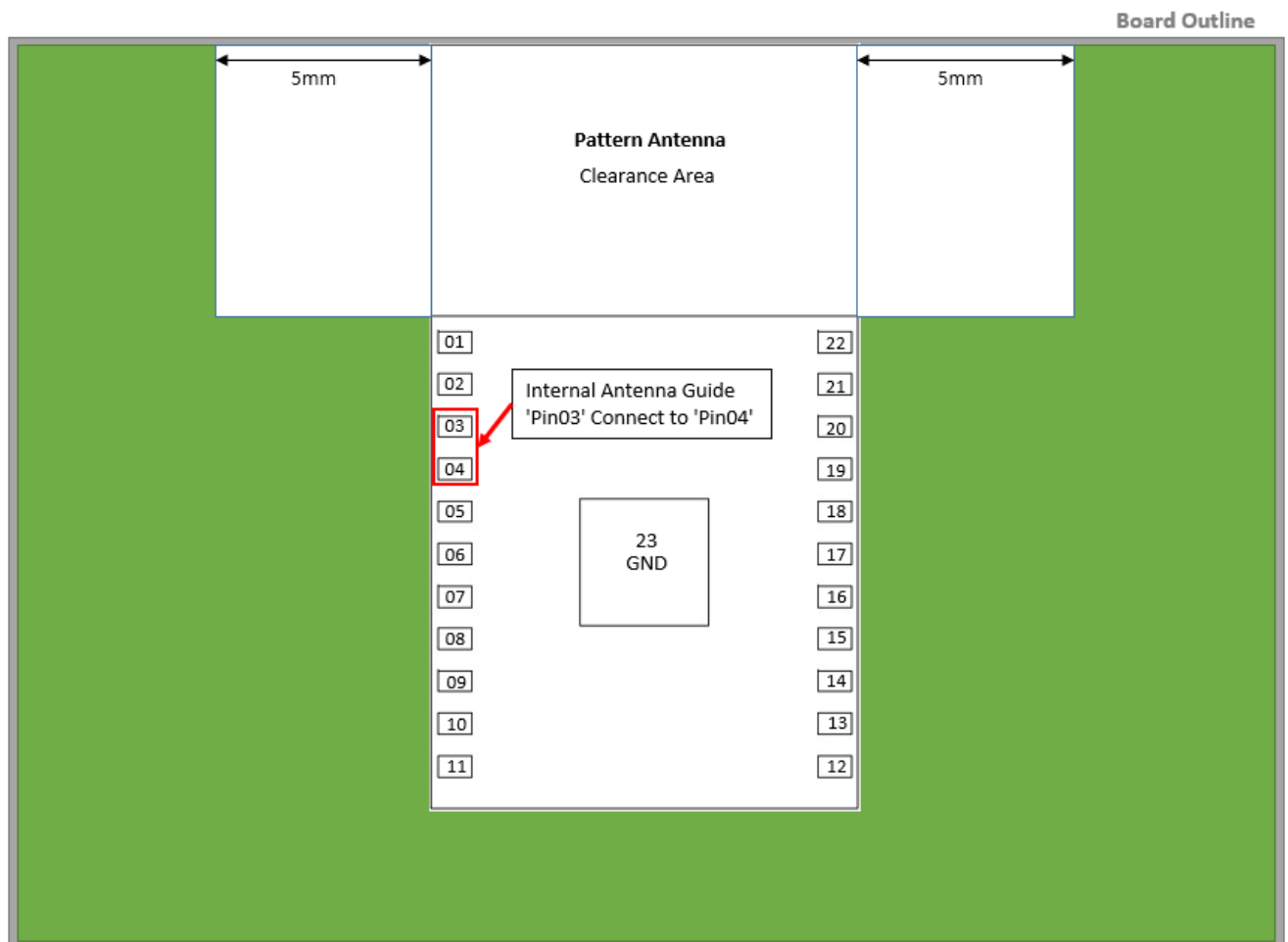
4. Layout Guide

4.1 Layout Guide (Internal Antenna)

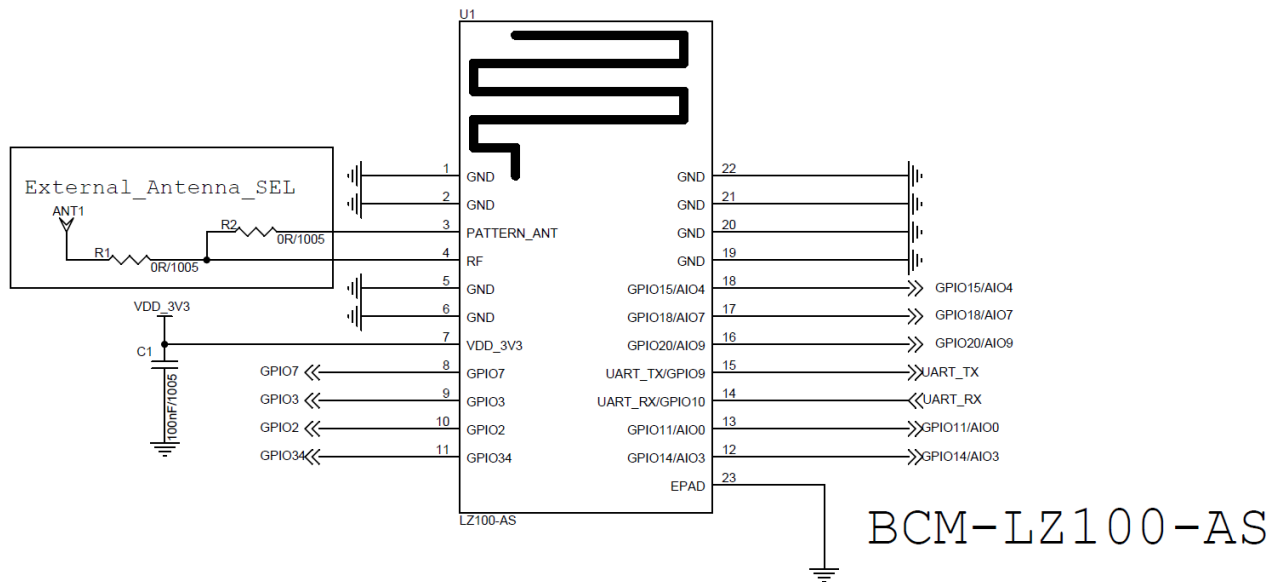
For optimal performance of the antenna place the module at the outside of the PCB

Do not place any metal (traces, components, battery etc.) within the clearance area of the antenna. Connect all the GND pins directly to a solid GND plane. Place the GND vias as close to the GND pins as possible. Use good layout practices to avoid any excessive noise coupling to signal lines or supply voltage lines. Avoid placing plastic or any other dielectric material closer than 5 mm from the antenna. Any dielectric closer than 5 mm from the antenna will detune the antenna to lower frequencies.

Keep out minimum 5mm empty from the antenna.



5. Application Schematic



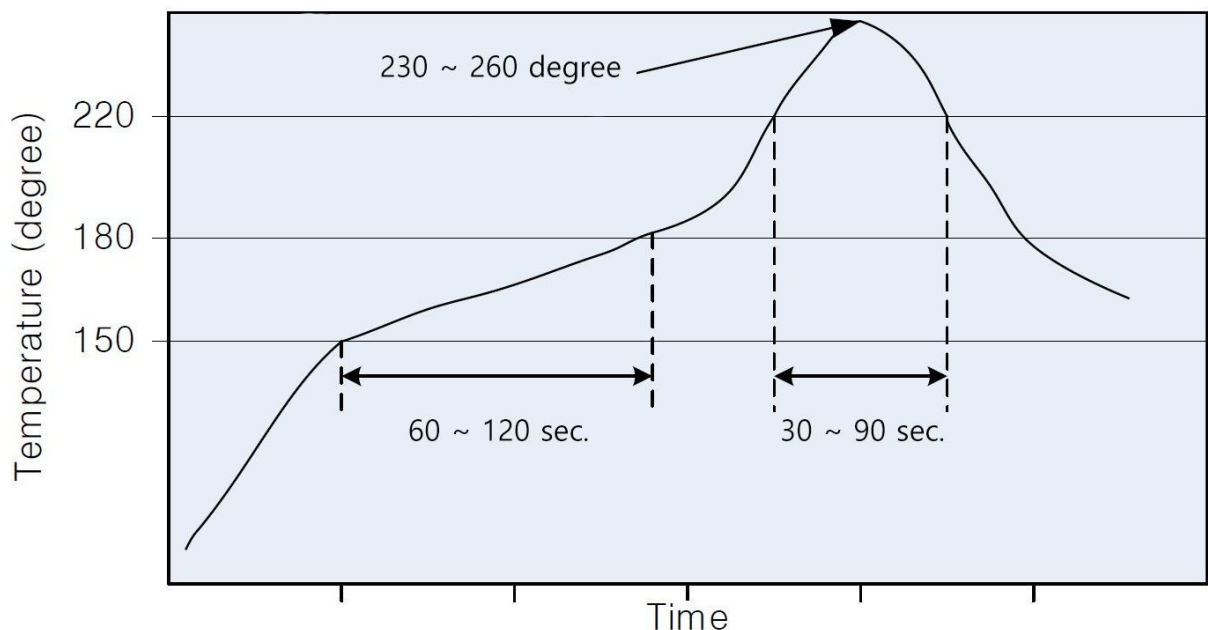
6. Reflow Temperature Profile

Recommended solder reflow profile are shown in below and follow the lead-free profile I accordance with JEDEC Std 20C.

Table lists the critical reflow temperatures.

Flux residue remaining from board assembly can contribute to lectrochemical migration over time. This depends on number of factors, including flux type, amount of flux residue remaining after reflow, and stress conditions during product use, such as temperature, humidity, and potential difference between pins.

Care should be taken in selecting production board/module assembly processes and materials, taking into account these factors.



Process Step	Lead-Free Solder
Ramp rate	3°C/sec
Preheat	Max. 150°C to 180°C, 60 to 120 sec
Time above liquidus	+220°C 30 to 90 sec
Peak temperature	+255°C ±5°C
Time within 5°C of peak temperature	10 to 20 sec
Ramp-down rate	6°C/sec max

7. Package Information

