BLM211

Bluetooth Module Data Sheet

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Document Version:	V1.0
Release Date:	Apr 21, 2014

Revision History

Date	Version	Description	Author
2014-04-21	V1.0	**n** First Release	

CONTENT

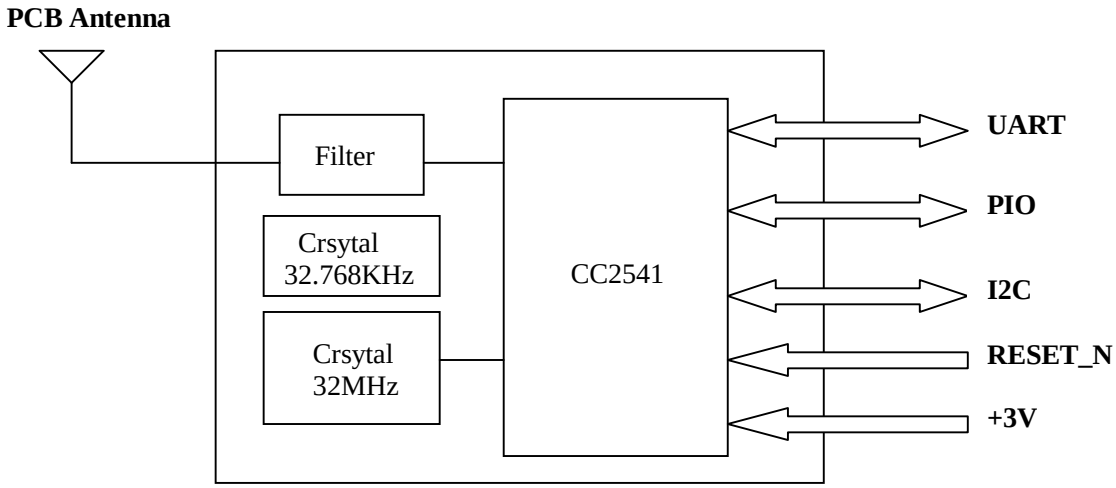
1. INTRODUCTION

The BLM211 Bluetooth® module is a perfect solution for bluetooth low energy single mode application. It can be configured,command and contorlled via simple ASCII string with customer application embeded onto the unit. It is slim and light so the designers can have better flexibilities for the bluetooth low energy product shapes.

The BLM211 Bluetooth® module complies with Bluetooth® specification version 4.0(single mode). It includes integrated software stack,profiles,and AT modem like commands.It supports maximum bluetooth data rates via UART interface and provides PIO,I2C,SPI interface for external hardware requirement.

The detail information of BLM211 Bluetooth® module is presented in this document below.

1.1 Block Diagram



1.2 Features

- ü Small overall dimension(17mm x 15mm x 2.5mm)
- ü Bluetooth specification V4.0(single mode)
- ü Class 2 support
- ü Complete power-optimized stack,includeing contoller and hoset
- ü Embedded *bluetooth* stack protocols and profiles include: GAP, GATT, SMP, ATT, L2CAP
- ü Low power consumption *(19mA TX, 18mA RX, 0.22mA idle mode, and 0.5uA deep sleep timer)*
- ü Secure and robust communication link with billions of unique codes
  - n FHSS (Frequency Hopping Spread Spectrum)
  - n 24 bit CRC Error correction for guaranteed packet delivery
  - n Lead Free design which is compliant with RoHS requirements
- ü Physical connection as SMD type
- ü No radio signal interference, support for 802.11 co-existence

※ *Some features are optional for customization on demand.*

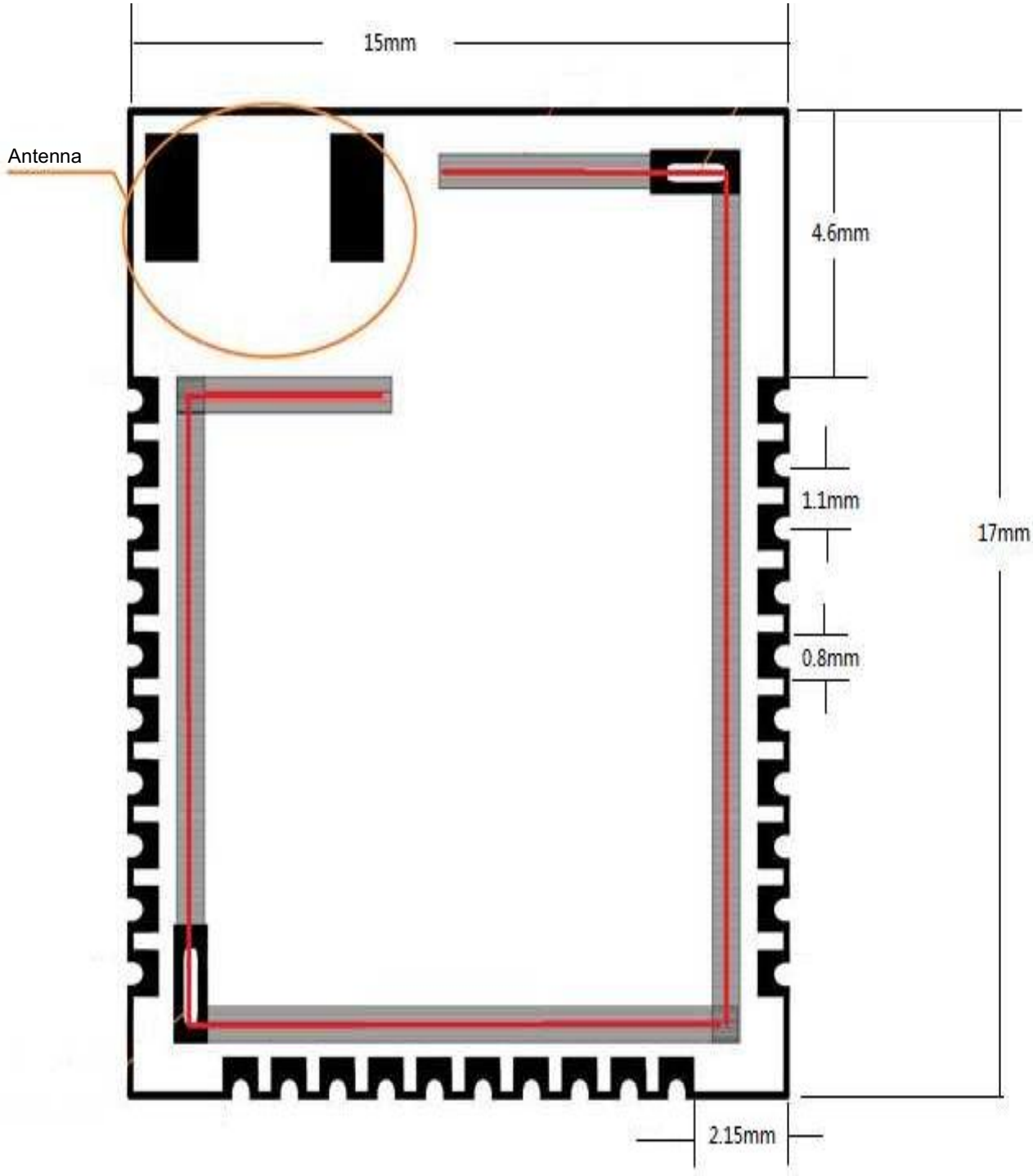
1.3 Application

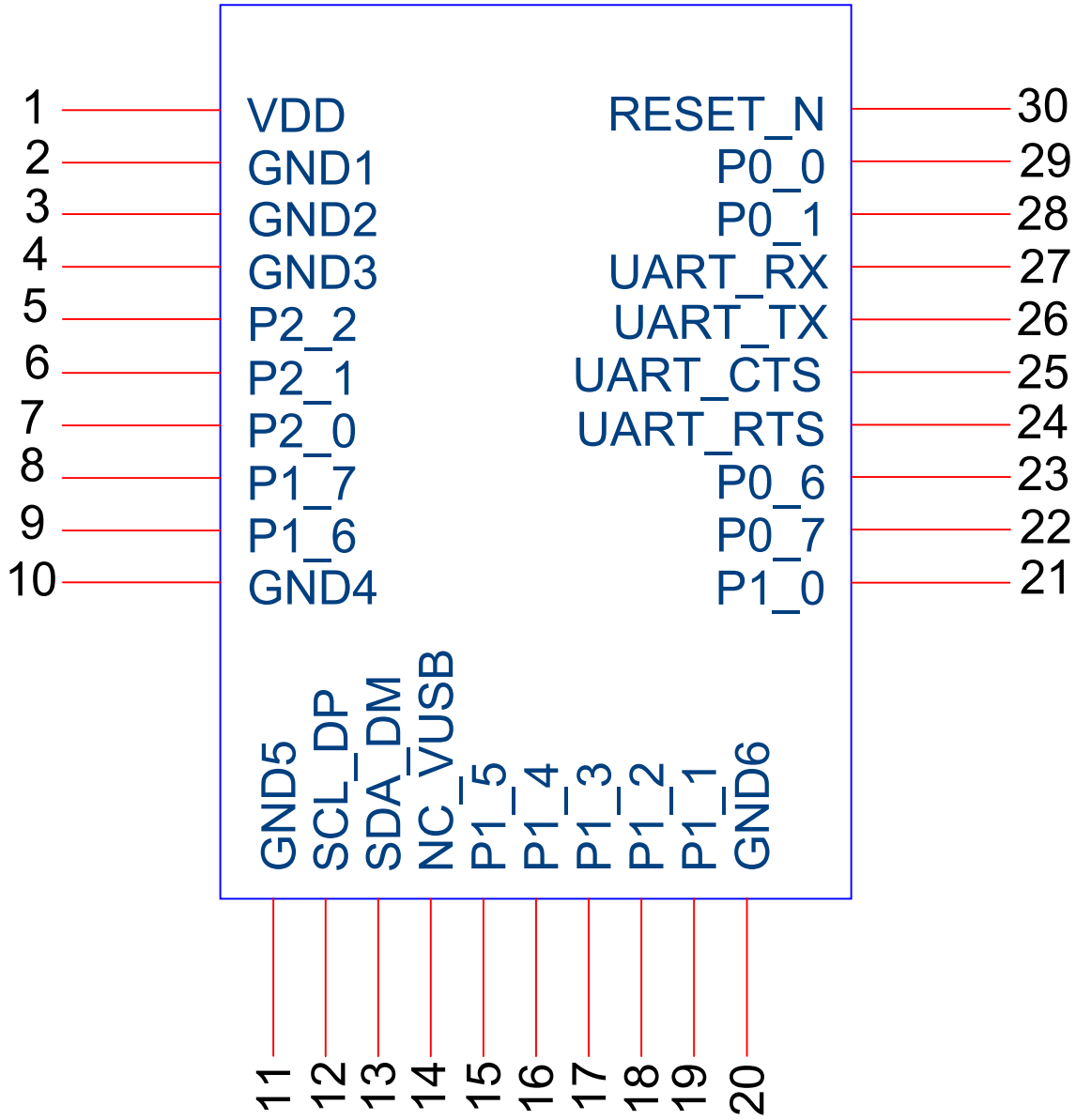
- ü 2.4-GHz Bluetooth low energy Systems
- ü Human-interface devices (Keyboard, Mouse,Portable Devices, Remote Control)
- ü Sports and fitness devices (Heart rate monitor,Foot pod,Cycle speed/power/cadence)
- ü Mobile Phone Accessories
- ü Health devices (Glucose meter)

2. GENERAL SPECIFICATION

General Specification	
Chip Set	TI CC2541
Module ID	BLM211
BT Standard	Bluetooth® V4.0 specification(single mode)
Frequency Band	2.402GHz~2.480GHz ISM Band
Modulation	GFSK, 250 KHz deviation
Number of channels	40 channels for Bluetooth Low Energy
Output Power(Class II)	0dBm
Receive sensitivity	-90dBm @ 0.1%
Baseband Crystal OSC	32MHz,32.768KHz
RF Input Impedance	50 ohms
Host Interface	ı UART ı I2C ı PIO
Temperature	-40ºC to +85ºC

3. PHYSICAL CHARACTERISTIC




1
2
3
4
5
6
7
8
9
10
VDD
GND1
GND2
GND3
P2_2
P2_1
P2_0
P1_7
P1_6
GND4
RESET_N
P0_0
P0_1
UART_RX
UART_TX
UART_CTS
UART_RTS
P0_6
P0_7
P1_0
30
29
28
27
26
25
24
23
22
21
GND5
SCL_DP
SDA_DM
NC_VUSB
P1_5
P1_4
P1_3
P1_2
P1_1
GND6
11
12
13
14
15
16
17
18
19
20

3.1 Pin Description

Pin#	Pin Name	Pin Type	Description
1	VDD	Power (digital)	+3V3 digital power-supply connection
2	GND1	Ground	The ground pad must be connected to a solid ground plane.
3	GND2	Ground	The ground pad must be connected to a solid ground plane.
4	GND3	Ground	The ground pad must be connected to a solid ground plane.
5	P2_2	Digital I/O	Port 2.2
6	P2_1	Digital I/O	Port 2.1
7	P2_0	Digital I/O	Port 2.0
8	P1_7	Digital I/O	Port 1.7
9	P1_6	Digital I/O	Port 1.6
10	GND4	Ground	The ground pad must be connected to a solid ground plane.
11	GND5	Ground	The ground pad must be connected to a solid ground plane.
12	SCL_DP	I^2C clock or digital I/O	Can be used as I^2C clock pin or digital I/O. Leave floating if not used. If grounded disable pull up
13	SDA_DM	I^2C clock or digital I/O	Can be used as I^2C data pin or digital I/O. Leave floating if not used. If grounded disable pull up
14	NC_VUSB	NC	NC
15	P1_5	Digital I/O	Port 1.5
16	P1_4	Digital I/O	Port 1.4
17	P1_3	Digital I/O	Port 1.3
18	P1_2	Digital I/O	Port 1.2
19	P1_1	Digital I/O	Port 1.1
20	GND6	Ground	The ground pad must be connected to a solid ground plane.
21	P1_0	Digital I/O	Port 1.0
22	P07	Digital I/O	Port 0.7
23	P0_6	Digital I/O	Port 0.6

24	P0_5	Digital I/O	Port 0.5
25	P0_4	Digital I/O	Port 0.4
26	UART_TX	Digital I/O	Port 0.3
27	UART_RX	Digital I/O	Port 0.2
28	P0_1	Digital I/O	Port 0.1
28	P0_0	Digital I/O	Port 0.0
30	RESET_N	Digital input	Reset,active-low

4. PHYSICAL INTERFACE

4.1 Power Supply

The transient response of the regulator is important. If the power rails of the module are supplied from an external voltage source, the transient response of any regulator.

4.2 Reset

- The module is reset from several sources:
  - RESET_N pin
  - Power on reset

The Reset pin is an active low reset and is internally filtered using the internal low frequency clock oscillator.

4.3 General Purpose Digital IO

There are nine general purpose digital IOs defined in the module. It can configure whether peripheral modules control certain pins or whether they are under software control, and if so, whether each pin is configured
as an input or output and if a pullup or pulldown resistor in the pad is connected. Each peripheral that connectsto the I/O pins can choose between two different I/O pin locations to ensure flexibility in various applications.

4.4 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.

4.5 I2C

Any three PIOs can be used as a master I2C interface by configuring the hardware bit serialiser with suitable firmware. The strong pull-ups in the PIO pads eliminate the need for external pull-up resistors.

5. ELECTRICAL CHARACTERISTIC

5.1 Absolute Maximum Ratings

Description		Min	Max	Unit
Supply voltage	All supply pins	-0.3	3.9	V
Voltage on any digital pin		-0.5	VDD+0.3<=3.9	V
Storage temperature range		-40	125	ºC

Table 1

5.2 Recommended Operating Conditions

Description	Min.	Typ.	Max.	Unit
+3V pin operating supply	2.0	3.3	3.6	V
Operating temperature	-40	25	85	ºC

Table 2

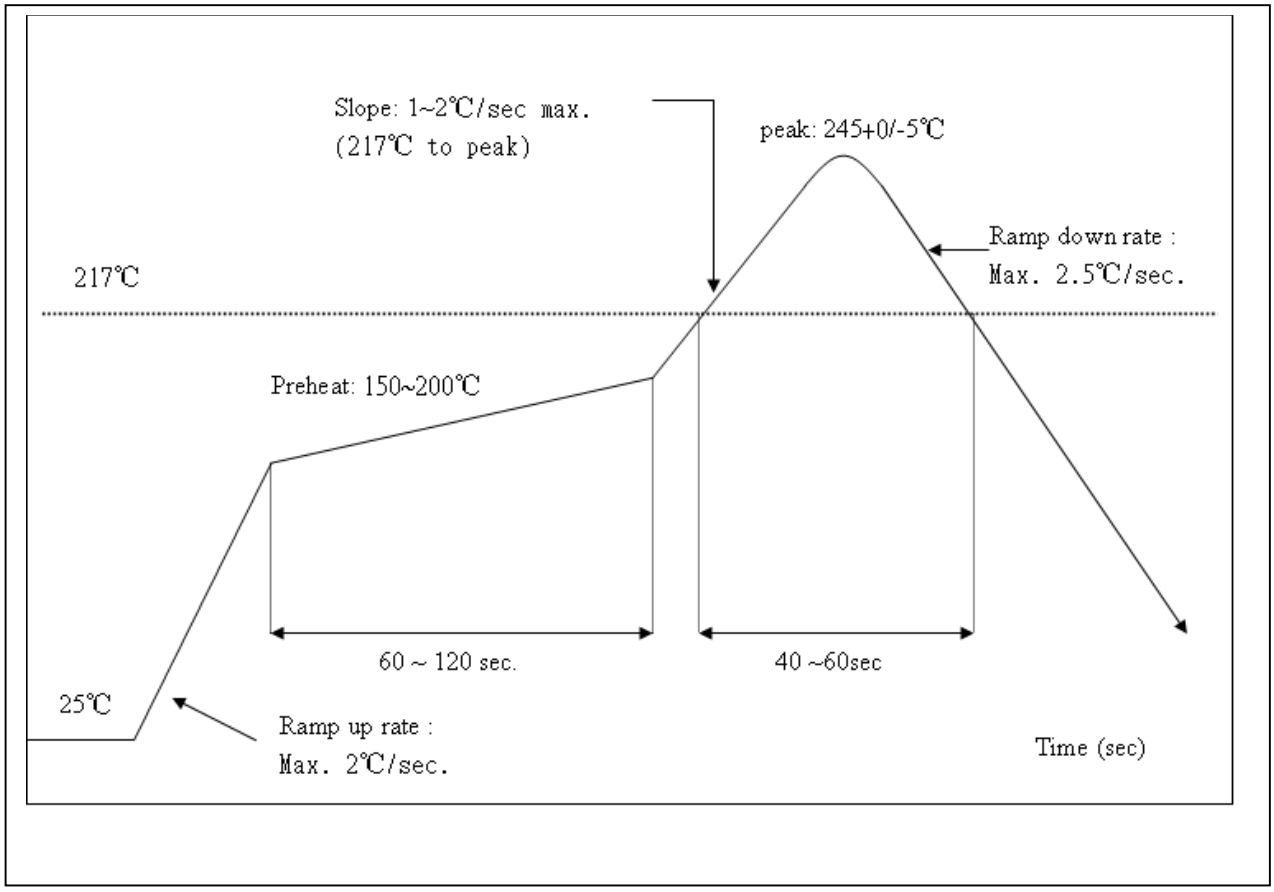
5.3 Power consumptions

Test conditions: T_A = 25°C, VDD = 3 V and f_c = 2440 MHz,
1 Mbsp, GFSK, 250-kHz deviation, Bluetooth™ low energy Mode, 1% BER(1)

Description	Min	Type	Max	Unit
RX mode, standard mode, no peripherals active		14.7		mA
RX mode, high-gain mode, no peripherals active		16.7		mA
TX mode, –20 dBm output power, no peripherals active		13.1		mA
TX mode, 0 dBm output power, no peripherals active		14.3		mA

6. RECOMMENDED TEMPERATURE REFLOW PROFILE

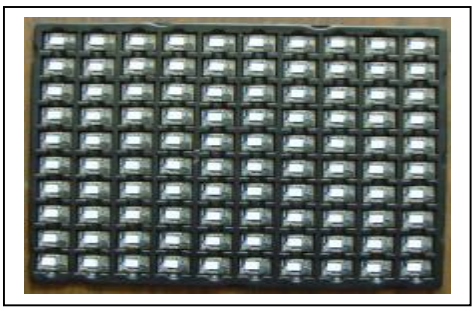
The soldering profile depends on various parameters necessitating a set up for each application. The data here is given only for guidance on solder reflow.
Peak Temperature : <250°C
Number of Times : _2 times



7. PACKAGING INFORMATION

1. BLUETOOTH® Module: BLM211

2. Assembly



3. Dimension