# CC26xBxB Bluetooth Smart and IoT Module

Features

- Fully compliant to Bluetooth Low Energy 5.0 (CC264BxB / CC264BxB-S) and 4.2 / 4.1 / 4.0 specifications
- High efficiency on-module printed PCB RF antenna (CC26xBPB / CC26xBPB-S)
- Very few external BOM-count to create a fully functional application circuit
- Texas Instrument CC26xx SimpleLink™ Wireless MCU
- 48MHz ARM Cortex-M3 MCU core for applications with 128K flash memory for ISP
- 8-KB SRAM for Cache and 20-KB Ultra-Low Leakage SRAM
- Dedicated ARM Cortex-M0 core, 4KB SRAM, and ROM for RF operations
- Dedicated processor and 2KB SRAM for ultra-low power sensor control
- Coin battery-friendly 1.8-3.8V operation
- Ultra Low power consumption, 6.5mA during Active-TX at 0dBM
- Increased modulation index providing possible range of 100m+ in open area
- Continuous Time Comparator and Ultra-Low Power Analog Comparator
- TRNG and AES-128 encryption for data encryption and authentication
- 4 General-Purpose Timer Modules (8 × 16-Bit or 4 × 32-Bit Timer, PWM Each)
- Programmable UART, SPI, I2S, I2C, and GPIO interface
- 12-Bit ADC, 200-ksamples/s, 8-Channel Analog MUX and battery monitor
- Support for 8 Capacitive Sensing Buttons
- Support user-developed applications and custom profile over GATT
- Integrated RF Shied can models available (CC26xBPB-S / CC26xBNB-S)
- Bluetooth Certification BQB: Available upon request
- Approvals: FCC / IC / CE available upon request
- REACH / RoHS compliant
- Dimensions:
  - 14 x 21.5 x 1.8 mm (CC26xBPB)
  - 14 x 21.5 x 2.6 mm (CC26xBPB-S)
  - 14 x 15 x 1.8 mm (CC26xBNB)
  - 14 x 15 x 2.6 mm (CC26xBNB-S)
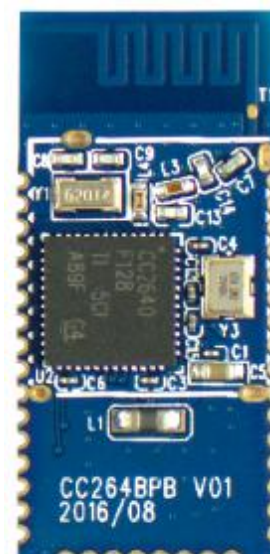
Applications

- Internet of Things (IoT) Device
- iBeacon
- Wireless Keyboard and Mouse
- GamePad and Game Controller
- HID applications
- Mobile phone and tablet accessory
- Medical and healthcare monitor
- Sports and Fitness equipment
- Proximity and Lost-prevention Key Fob
- Smart Wearable
- RC and Interactive Toy
- Home/Building Automation
- Machine-to-Machine data transfer
- Remote Sensor Network
- Wireless Alarm and Security
- Automatic Meter Reading (AMR)
- Electronic Shelf Labeling
- Lighting and HAVC control
- Remote Control and Assisted Living

General Electrical Specification

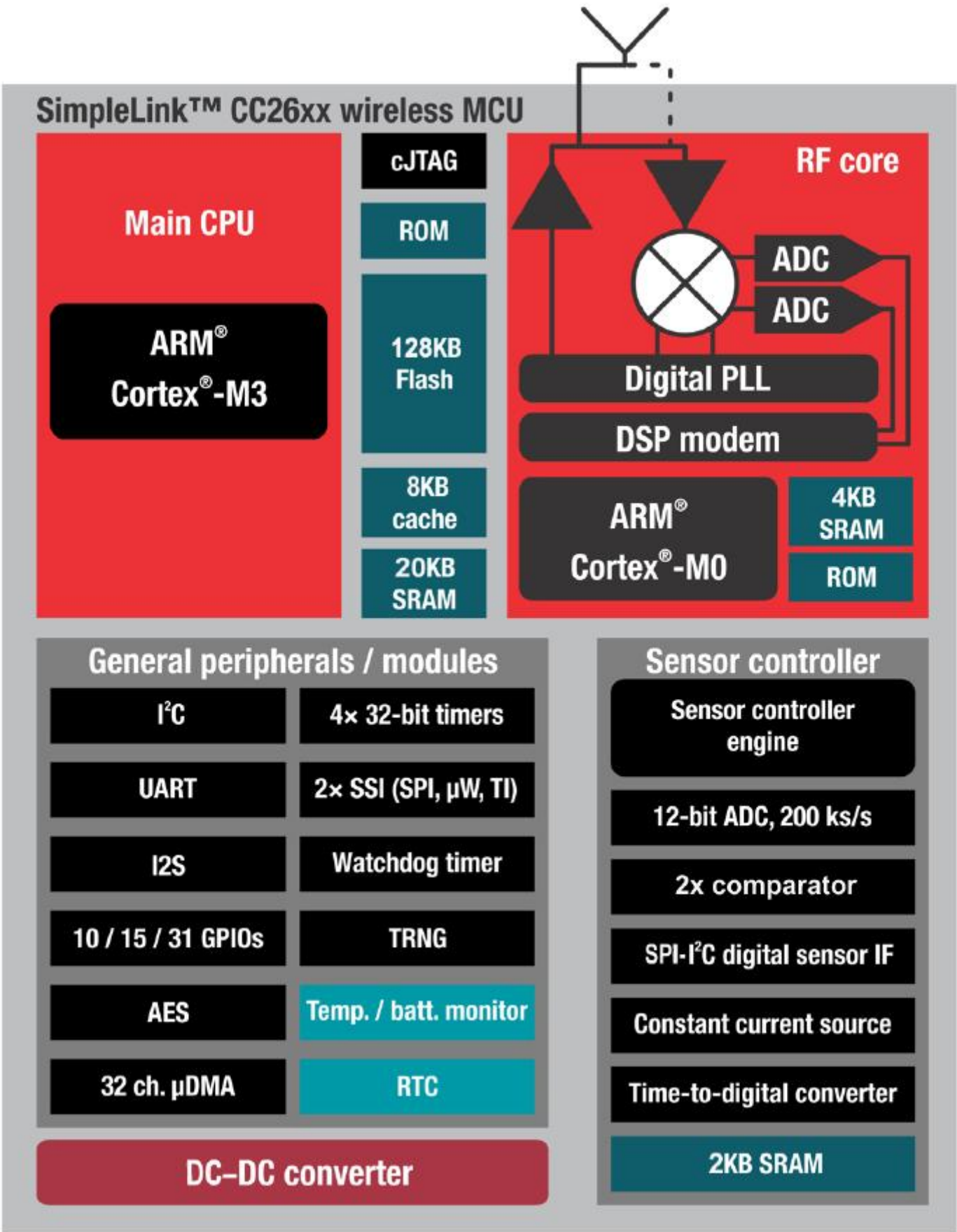| Absolute Maximum Ratings		
Ratings	Min.	Max.
Storage Temperature	-40 ℃	+90 ℃
Supply Voltage VDD	-0.3 V	3.9 V
Recommended Operating Condition		
Operating Condition	Min.	Max.
Operating Temperature range – (C-grade)	-20 ℃	+75 ℃
Operating Temperature range – (I-grade)+	-40 ℃	+85 ℃
Supply Voltage VDD, VDDIO	1.8 V	3.8 V

Parameter	Description	Min.	Typ.	Max.	Units
Operating Frequency		2.4GHz			
Carrier frequency		2379 to 2496 MHz, 1 MHz step 40 channels			
Modulation Method	1Mbps	GFSK, 160/250 KHz deviation			
	2Mbps	GFSK, 320/500 KHz deviation			
Air transmission rate				2	Mbps
RF Output Power		-20	-	3.8	dBm
RX Sensitivity	@0.01% BER		-95.5		dBm
Current Consumption – TX	@ +5dBm	-	9.1	-	mA
Current Consumption – TX	@ 0dBm	-	6.2	-	mA
Current Consumption – RX	Standard	-	5.9	-	mA
Current Consumption – Radio Off	Active	1.6	3.4	-	mA
Current Consumption – Idle	LPM1 Mode	-	0.5	-	mA
Current Consumption – Standby	LPM3 Mode, SRAM/CPU retention and RTC running	-	1	-	uA
Current Consumption – Deep Sleep	LPM4/5 Mode	0.5	0.1	-	uA
Current Consumption – Connected	1 sec Connection Interval, 0dBm		9.8		uA

* Measurements are for CC264BPA
+ Contact your GT-tronics sales representative for availability

Standard Firmwares Available

- Heart Rate Monitor (HRP)
- Blood Glucose Monitor
- Health Thermometer (HLP)
- Blood Pressure Monitor (BLP)

- DataExchanger (serial data transfer via GATT)
- Smart Lighting Control (GATT)

![GT-TRONICS logo]

Block Diagram

SimpleLink™ CC26xx wireless MCU

Main CPU

ARM® Cortex®-M3

cJTAG
ROM
128KB Flash
8KB cache
20KB SRAM

RF core

ADC
ADC
Digital PLL
DSP modem

ARM® Cortex®-M0

4KB SRAM
ROM

General peripherals / modules

I²C	4× 32-bit timers
UART	2× SSI (SPI, µW, TI)
I2S	Watchdog timer
10 / 15 / 31 GPIOs	TRNG
AES	Temp. / batt. monitor
32 ch. µDMA	RTC

DC–DC converter

Sensor controller

Sensor controller engine

12-bit ADC, 200 ks/s

2x comparator

SPI-I²C digital sensor IF

Constant current source

Time-to-digital converter

2KB SRAM

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Pins Configurations

| PIN	NAME	TYPE	FUNCTION	TYPICAL USAGE[1]
1	GND	Power	Ground	
2	DIO_0	Digital I/O	GPIO with 4mA drive capability	GPIO, Sensor control
3	DIO_1	Digital I/O	GPIO with 4mA drive capability	GPIO, Sensor control
4	DIO_2	Digital I/O	GPIO with 4mA drive capability	GPIO, Sensor control
5	DIO_3	Digital I/O	GPIO with 4mA drive capability	GPIO, Sensor control
6	DIO_4	Digital I/O	GPIO with 4mA drive capability	GPIO, Sensor control
7	DIO_5	Digital I/O	GPIO with 8mA drive capability	GPIO, Sensor control
8	DIO_6	Digital I/O	GPIO with 8mA drive capability	GPIO, Sensor control
9	DIO_7	Digital I/O	GPIO with 8mA drive capability	GPIO, Sensor control
10	GND	Power	Ground	
11	VDD_IO	Power	1.8v to 3.8v GPIO Supply	Connect to VDD
12	DIO_8	Digital I/O	GPIO with 4mA drive capability	GPIO
13	DIO_9	Digital I/O	GPIO with 4mA drive capability	GPIO
14	DIO_10	Digital I/O	GPIO with 4mA drive capability	GPIO
15	DIO_11	Digital I/O	GPIO with 4mA drive capability	GPIO
16	DIO_12	Digital I/O	GPIO with 4mA drive capability	GPIO
17	DIO_13	Digital I/O	GPIO with 4mA drive capability	GPIO
18	DIO_14	Digital I/O	GPIO with 4mA drive capability	GPIO
19	DIO_15	Digital I/O	GPIO with 4mA drive capability	GPIO
20	JTAG_TMSC	Digital I/O	JTAG TMSC	Debug port data
21	JTAG_TCKC	Digital I/O	JTAG TCKC	Debut port clock
22	DIO_16	Digital I/O	GPIO with 8mA drive capability	GPIO, JTAG_TDO
23	DIO_17	Digital I/O	GPIO with 8mA drive capability	GPIO, JTAG_TDI
24	DIO_18	Digital I/O	GPIO with 4mA drive capability	GPIO
25	DIO_19	Digital I/O	GPIO with 4mA drive capability	GPIO
26	DIO_20	Digital I/O	GPIO with 4mA drive capability	GPIO
27	DIO_21	Digital I/O	GPIO with 4mA drive capability	GPIO
28	DIO_22	Digital I/O	GPIO with 4mA drive capability	GPIO
29	RESET_N	Digital Input	Reset, active-low, no internal pullup	Resistor pull up to VDD
30	DIO_23	Digital/Analog I/O	GPIO with 4mA drive capability, analog	GPIO, Sensor control, analog
31	GND	Power	Ground	
32	DIO_24	Digital/Analog I/O	GPIO with 4mA drive capability, analog	GPIO, Sensor control, analog
33	VDD	Power	1.8v to 3.8v main power supply	3.3v power input
34	DIO_25	Digital/Analog I/O	GPIO with 4mA drive capability, analog	GPIO, Sensor control, analog
35	DIO_26	Digital/Analog I/O	GPIO with 4mA drive capability, analog	GPIO, Sensor control, analog
36	DIO_27	Digital/Analog I/O	GPIO with 4mA drive capability, analog	GPIO, Sensor control, analog
37	DIO_28	Digital/Analog I/O	GPIO with 4mA drive capability, analog	GPIO, Sensor control, analog
38	DIO_29	Digital/Analog I/O	GPIO with 4mA drive capability, analog	GPIO, Sensor control, analog
39	DIO_30	Digital/Analog I/O	GPIO with 4mA drive capability, analog	GPIO, Sensor control, analog
40	GND	Power	Ground	

Note:

1. Typical usage is firmware dependent. Please check with standard firmware application note or your firmware designer for the actual pin definition.
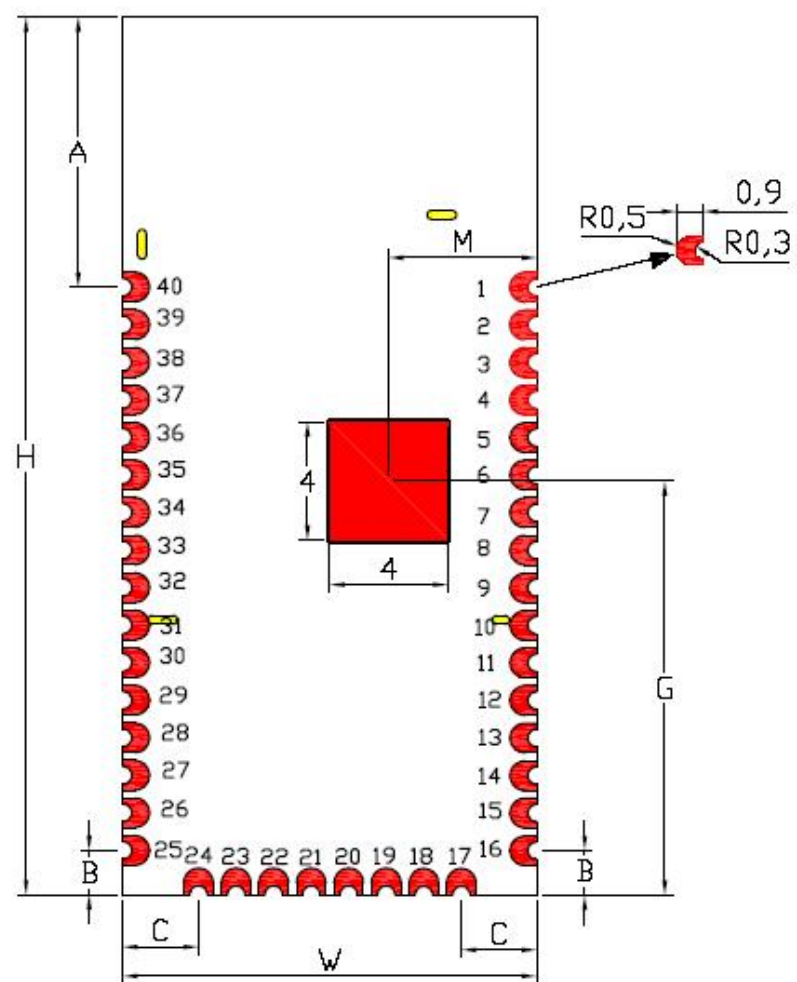
Module Outline

CC26xBPB / CC26xBPB-S Module Outline
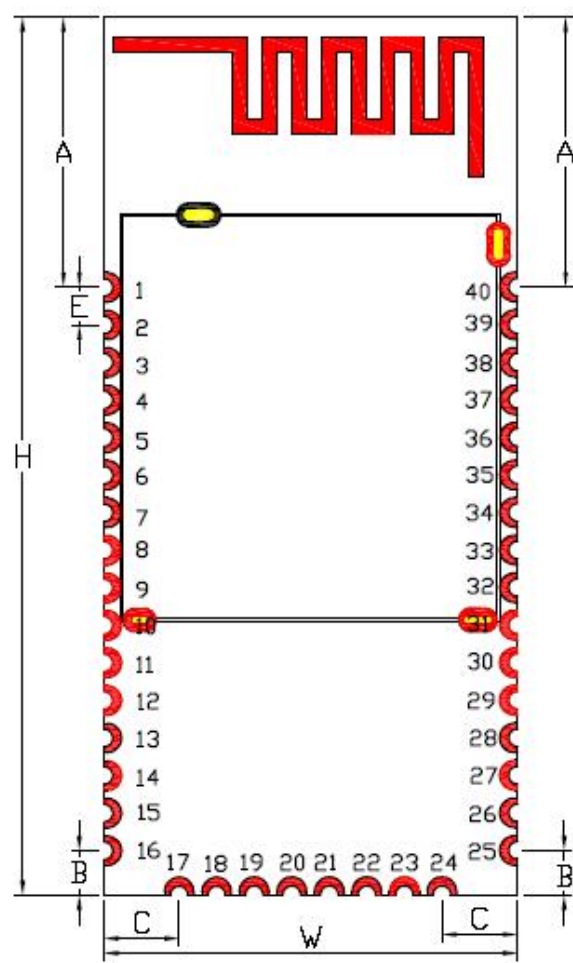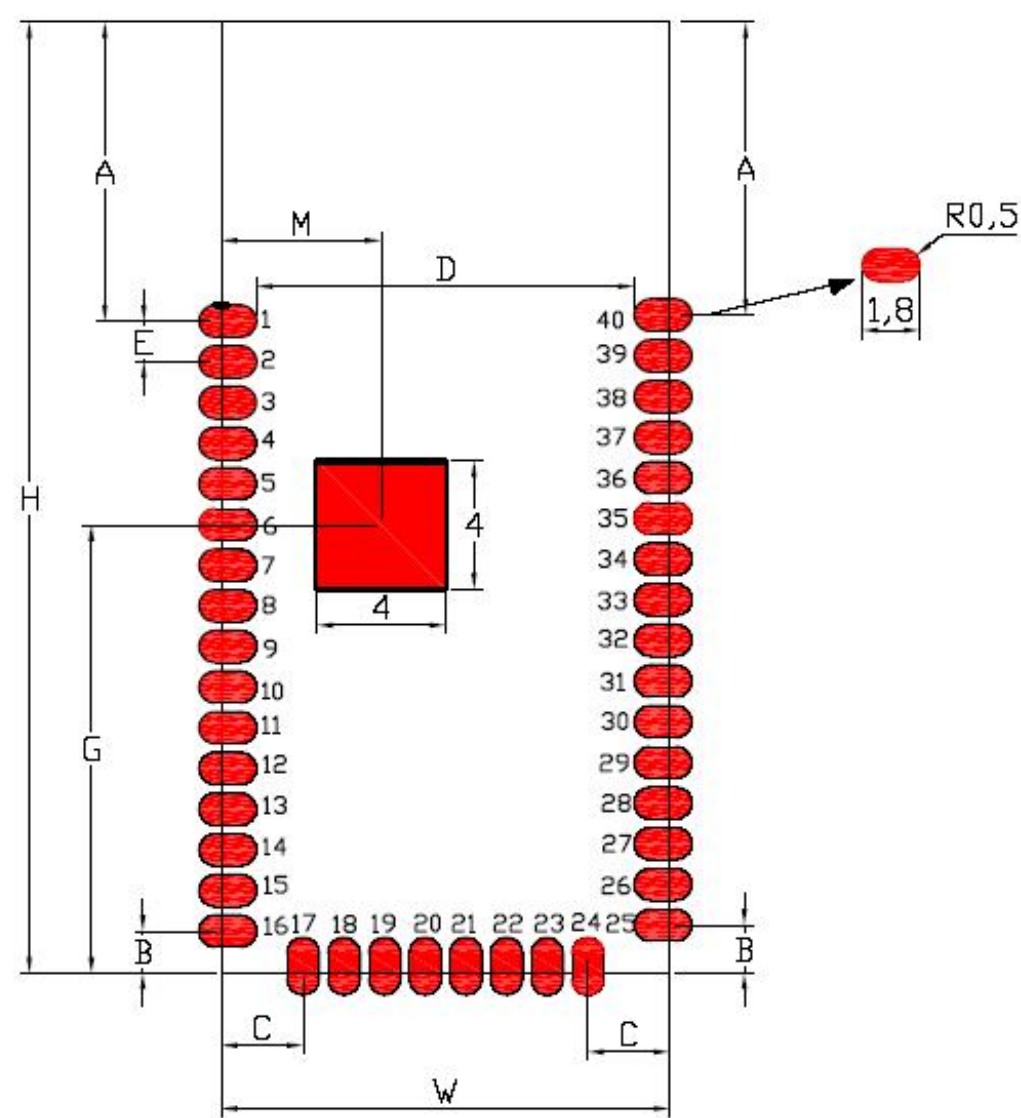
Top View   Bottom View

Symbol	Milimeter
A	9.15
B	1.50
C	2.55
E	1.27
G	14.00
H	29.70
M	5.00
W	14.00

* +/- 0.1mm or 1.5% whichever is greater for all module dimensions measurements.

Recommended PCB Land Patterns
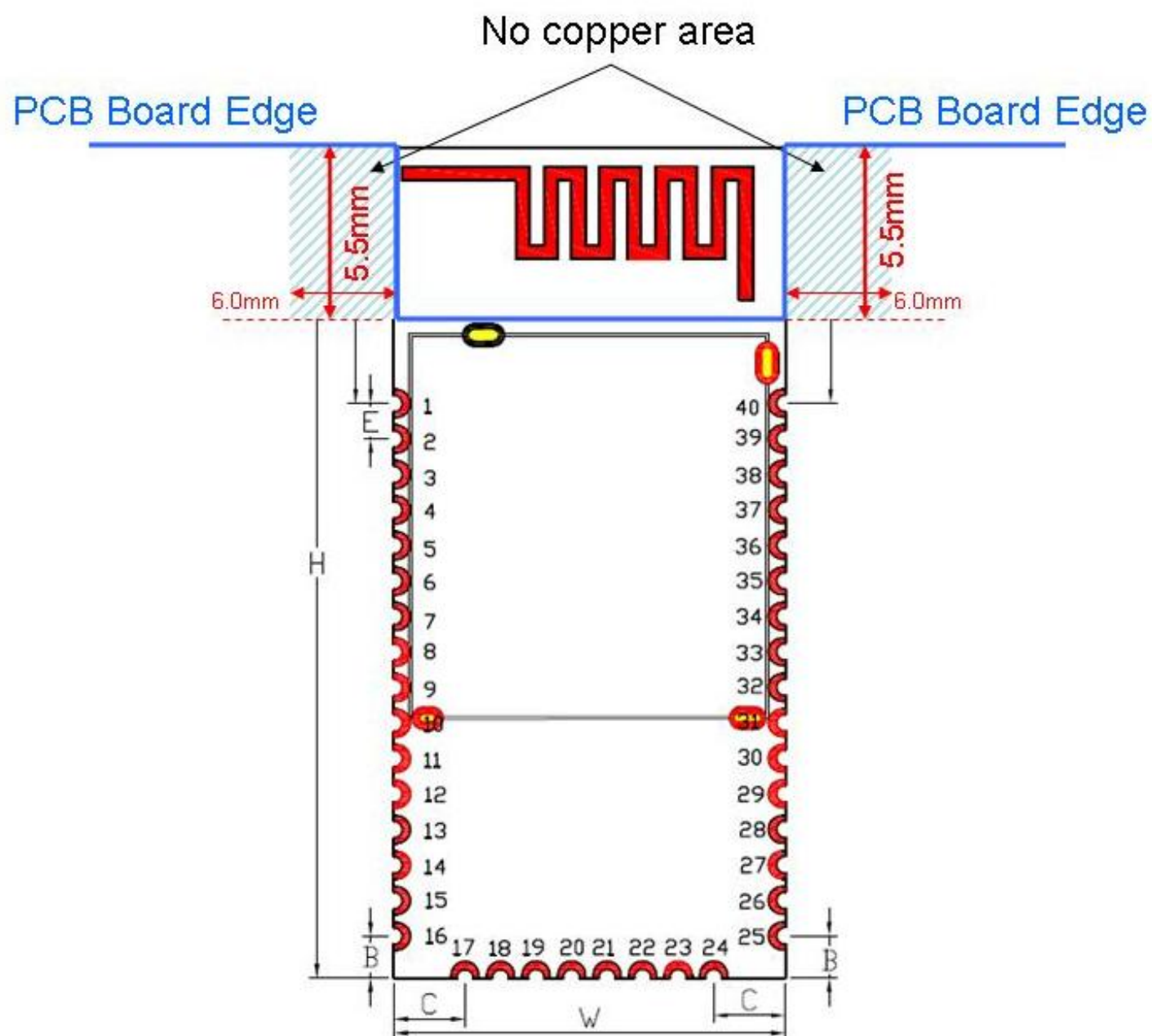
CC26xBPB / CC26xBPB-S Recommended Land Pattern
(Top View)

Symbol	Milimeter
A	9.15
B	1.50
C	2.55
D	11.8
E	1.27
G	14.00
H	29.70
M	5.00
W	14.00

* +/- 0.1mm or 1.5% whichever is greater for all module dimensions measurements.
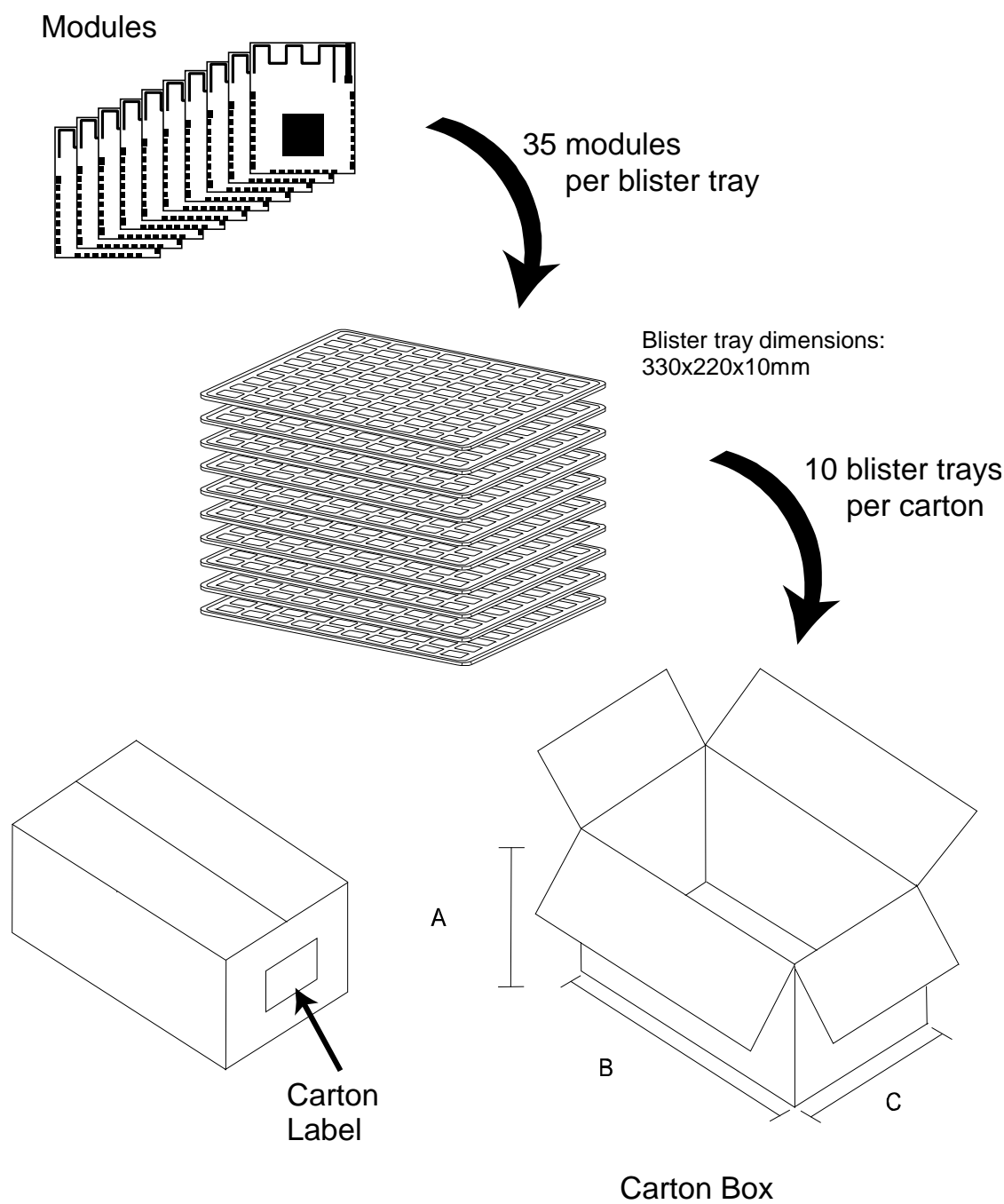
PCB Design Guidelines

1. Solid (low impedance) ground plane connection to the ground of the module's power source (e.g. 3.3v LDO) underneath the module (i.e. top layer of your main pcb).

2. Prefer to locate module's antenna off the board so that nothing is underneath the antenna area.

3. 10uF + 100nF decoupling caps placed close to VDDS, and 100nF decoupling cap placed close to VDDIO.

4. Add 10K pull high to VDDIO and 100nF cap decoupling to ground for RESET_N input unless this pin is controlled by your host system.

Antenna Clearance

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Packing Information

Modules

35 modules
per blister tray

Blister tray dimensions:
330x220x10mm

10 blister trays
per carton

A

B

C

Carton
Label

Carton Box

Model	A	B	C	Units	Quantity per Carton	GW / NW
CC26xBPB	11	30	26.5	cm	350 pcs	1.1 / 0.8 kg
CC26xBPB-S	11	30	26.5	cm	350 pcs	1.4 / 1.1 kg

* +/- 1cm / 0.1kg, or 5% whichever is greater for all packaging measurements.

Precautions

- **Storage Condition**

    This product should be stored without opening the packing, and under temperature 0-60 °C and humidity 30-70% RH. It should be used within 15 months after reception.

- **ElectroStatic Discharge (ESD)**

    This product is sensitive to ElectroStatic Discharge (ESD). Observe precautions for handling electrostatic sensitive devices. Such precautions are described in the ANSI/ESD S20.20, IEC/ST61340-5, JESD625-A or equivalent standards.

- **Module Reflow Installation**

For RoHS/Pb-free applications, Sn96.5/Ag3.0/Cu0.5 solder is recommended.

Profile Feature	Recommended Parameters
Ramp-up rate before liquidous	< 2°C / second
Preheat	150-200°C 60-90 seconds
Maximum time at liquidous	40 – 80 seconds
Maximum peak temperature	230° - 240°C (below 250°C)
Ramp-down rate	< 6°C / second

Ordering Information

Part Number	FW Code Available	Description
CC264BPB	Please check with your sales rep	CC2640R2F 7x7 with integrated PCB antenna
CC264BPB-S		CC2640R2F 7x7 with integrated PCB antenna and shield can
CC265BPB		CC2650F128 7x7with integrated PCB antenna
CC265BPB-S		CC2650F128 7x7with integrated PCB antenna and shield can
CC264BPB-P5	N/A	CC2640R2F 7x7 with integrated PCB antenna (5-pack)
CC264BPB-S5	N/A	CC2640R2F 7x7 with integrated PCB antenna and shield can (5-pack)
CC265BPB-P5	N/A	CC2650F128 7x7with integrated PCB antenna (5-pack)
CC265BPB-S5	N/A	CC2650F128 7x7with integrated PCB antenna and shield can (5-pack)

Revision History

Rev.	Date	Description	By
01	2016-08-23	Initial release	Jxwang / Paul
02	2017-01-18	Added ordering information.	Dennis
09	2017-07-27	Added new part numbers for multi-pack	Dominic