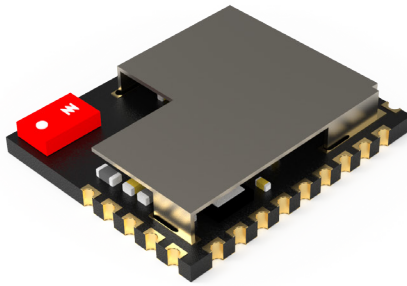


celium devices



BE62S

Standalone, High performance Bluetooth 5.0 Engines

DATASHEET

REV01

Document information

Product family	BE
Product name	BE62S
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Product Name	Ext. Number	Firmware Version	Status
BE62S	Nil	v1.0	Initial production

Document history

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Contents

1. Overview	4
2. Key features	4
3. Applications	4
4. Block diagram	5
4.1 BE62S.....	5
5. Specifications	5
5.1 Specifications table	5
5.2 Radio specifications	6
5.3 Power specifications	6
6. Pin assignment	7
6.1 Pin diagram	7
6.2 Pin description table	8
7. Reference circuit	9
8. Operating conditions	10
9. Physical dimensions	11
9.1 Module dimensions	12
9.2 PCB footprint	12
10. Module placement	12
11. Reflow profile	13
12. Ordering information	14
13. Additional resources	15
14. Contact information	16
15. Appendix	16

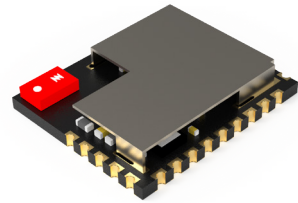
BE62S

High performance, Ultra compact, Low power, Long range BLE 5.0 modules

1. Overview

BE62S is a high performance, super efficient BLE 5.0 module, targeted for MESH and Automotive applications where highly reliable wireless connection, low power consumption and ease of integration are the key requirements.

BE62S modules are ideal for battery operated applications that require medium to long range connectivity. BE62S modules features a high performance integrated chip antenna and AECQ compliant sub components.



2. Key features

Protocols	v5.0, BLE MESH, BLE LE PHY	Role	Broadcaster, Observer, Central and Peripheral
Processor	ARM Cortex-M4 @ 40 MHz with FPU	Form factor	11.5 mm x 13.5 mm x 2.2 mm
RAM	160 KB	Footprint	Castellations 23
ROM	384 KB	Firmware	Celium Connectivity / Open core
FLASH	512 KB	Max. Range	Subject to Testing*
Crystals	40 MHz		
Antenna	PCB chip		

3. Applications

MESH Lighting

Vehicle telematics

Automotive

MESH Sensor networks

Industrial IoT

4. Block diagram

4.1 BE62S

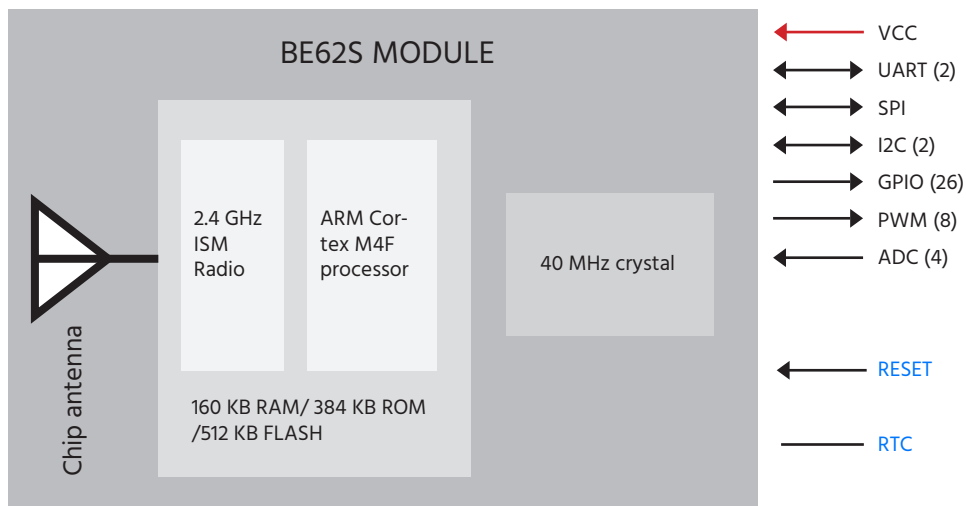


Figure 4.1: Block diagram

5. Specifications

5.1 Specification table

		BE62S - X	BE62S - AT
INTERFACES	UART (User/Log)	2/1	•
	PWM	5	-
	ADC (Channels)	6	-
	GPIO	16	-
	SPI (Master and slave)	2/1	-
	I2C (Master and slave - 7 Bits and 10 Bits Adress modes support)	2/2	-
	I2S (master/Slave)	2/2	-
	PDM	1	-
	DMA (Channels)	6	-
	IR Controller	•	-
PERIPHERALS	RTC	1	-
	32 Bit timer with counter	6	-
RADIO	Bluetooth qualification	v5.0	v5.0
	Max transmission current @ 0 dBm (mA)	7.9	7.9
	Max receiver current @ 0 dBm (mA)	7.3	7.3
	Receiver sensitivity (dBm)	-97	-97

Table 5.1: Specifications table

5.2 Radio specifications

RX Performance

- Reception sensitivity @ -97 dBm
- Max. input level @ -1 dBm

TX Performance

- Max Output power @ 7.5 dBm
- Adjacent channel power ration +-2 MHz @ -20 dBm

5.3 Power specifications

Low Power Mode

- VBAT = 3V, VDDIO=3V, Ambient temp: 25C

Power mode	Always ON Registers	32K XTAL	Retension SRAM	CPU	Wakeup Method	Current Consumption (Typical)
Power Down	ON	OFF	OFF	OFF	Wake up by GPIO	450 nA
Deep LPS	ON	ON	Retention	OFF	Wake up by GPIO, Timer	2.5 uA (with 160K SRAM in retention state)

Active Mode

- VBAT = 3V, VDDIO=3V, Ambient temp: 25C

Power mode	Current Consumption (Typical)
Active RX mode	7.3 mA
Active TX mode (TX @ 0 dBm)	7.9 mA
Active TX mode (TX @ 4 dBm)	9.6 mA
Active TX mode (TX @ 7.5 dBm)	11.3 mA

6. Pin assignment

6.1 Pin diagram

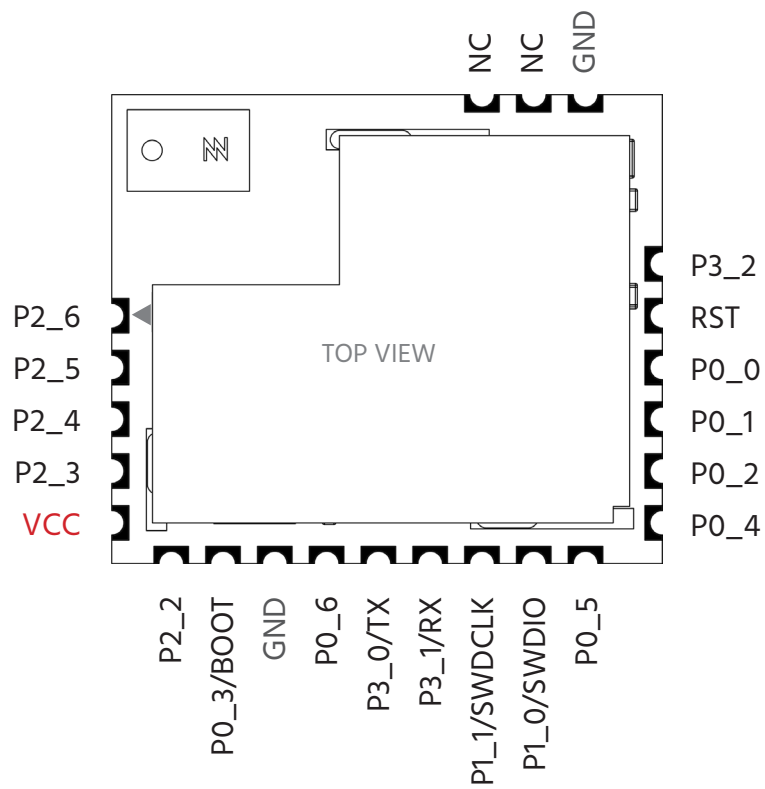


Figure 6.1: BE62S Pin diagram

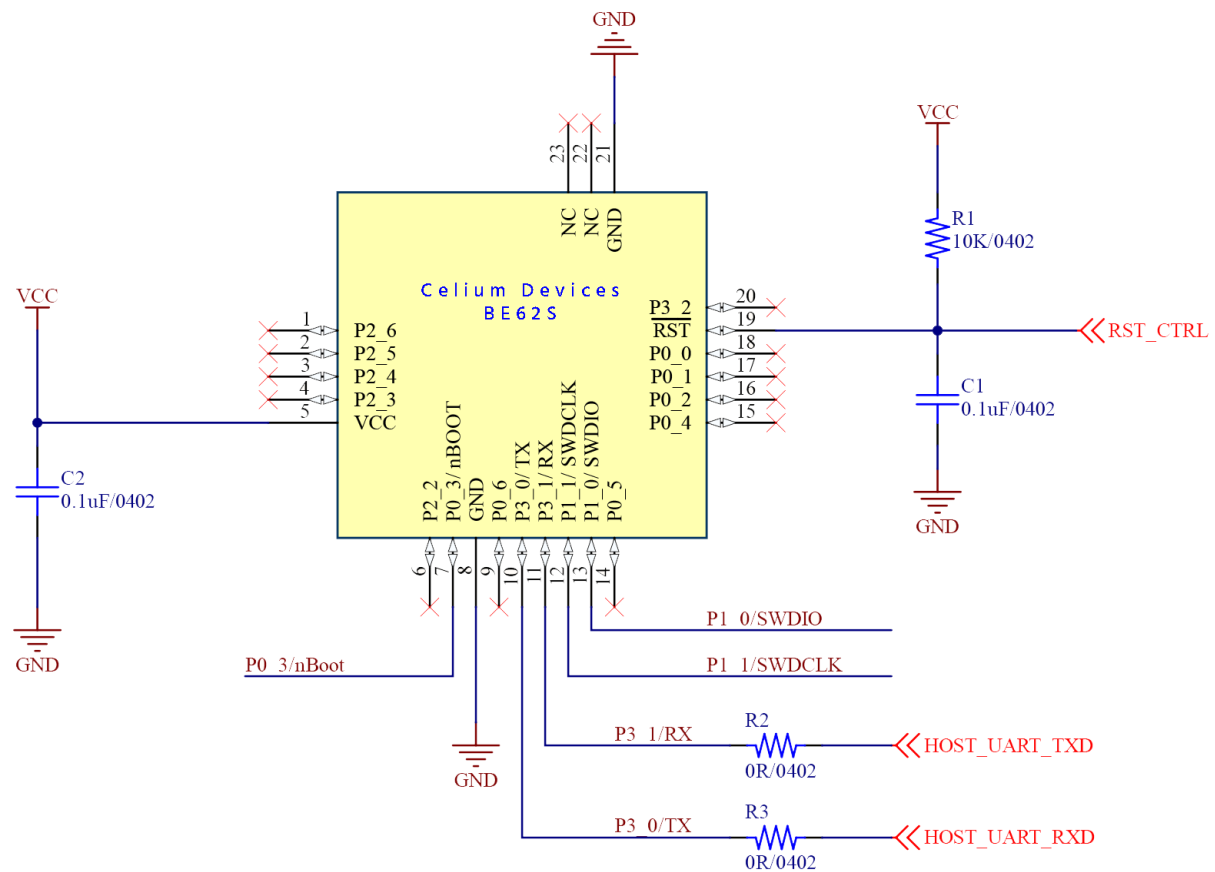
6.2 Pin description

Pin No.	Pin name	Description
1	P2_6	AUXADC IN6 / General Purpose IO
2	P2_5	AUXADC IN5 / General Purpose IO
3	P2_4	AUXADC IN4 / General Purpose IO
4	P2_3	AUXADC IN3 / General Purpose IO
5	VCC	3V3 Supply
6	P2_2	AUXADC IN2 / General Purpose IO
7	P0_3/BOOT	Internally pulled up. Pull down to put the module in Boot Mode.
8	GND	Ground
9	P0_6	General Purpose IO
10	P3_0/TX	UART TX / In Boot mode, can be used to program the module
11	P3_1/RX	UART RX / In Boot mode, can be used to program the module
12	P1_1/SWDCLK	General Purpose IO / Serial Wire Debug CLK
13	P1_0/SWDIO	General Purpose IO / Serial Wire Debug IO
14	P0_5	General Purpose IO
15	P0_4	General Purpose IO
16	P0_2	General Purpose IO
17	P0_1	General Purpose IO
18	P0_0	General Purpose IO
19	RST	Hardware reset pin. Active Low
20	P3_2	General Purpose IO
21	GND	Ground
22	NC	NC
23	NC	NC

Table 6.2: BE62S Pin description

7. Reference design

Figure 7.0 illustrates the reference schematic of the power supply design implemented for BE62S module.



>> P0_3/nBoot is internally pulled up

>> Pull down P0_3/nBoot and reset the module to put module in BOOT Mode

Figure 7.0: BE62S Reference design

8. Operating conditions

This section provides an overview of the operating and storage conditions of BE62S module.

Operating temperature	-40 C to 105 C
Storage temperature	-40 C to 125 C
Operating supply voltage	1.8 V to 3.6 V

Table 8.0: Operating conditions

9. Physical dimensions

9.1 Module dimensions

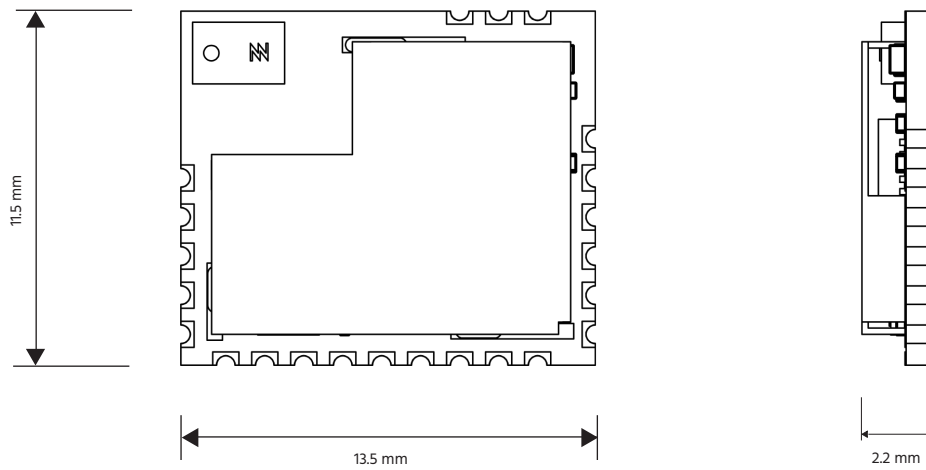


Figure 9.1: BE62S dimensions

9.2 PCB Footprint

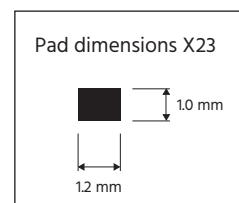
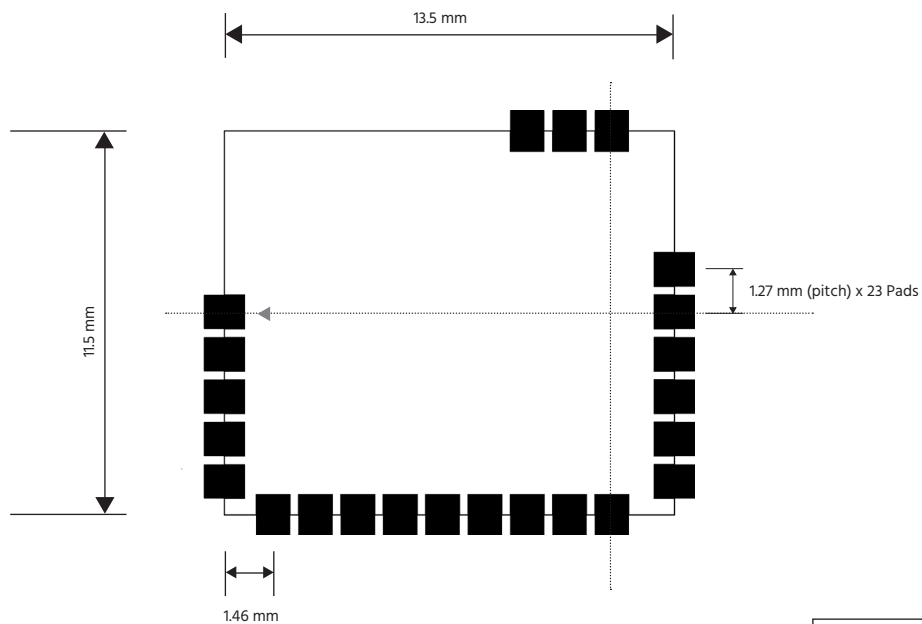


Figure 9.2: BE62S PCB Footprint

10. Module placement

Any wireless systems require proper placement on host PCBs for optimum RF performance. For BE62S module, we recommend that the area underneath the antenna on host PCB should not contain any copper on the top, inner and bottom layers. The module should be placed in such way that it should be away for at-least 3 mm from any metals, electrolytic capacitors, inductors and other RF systems.

Recommended placements for optimum placements are shown below.

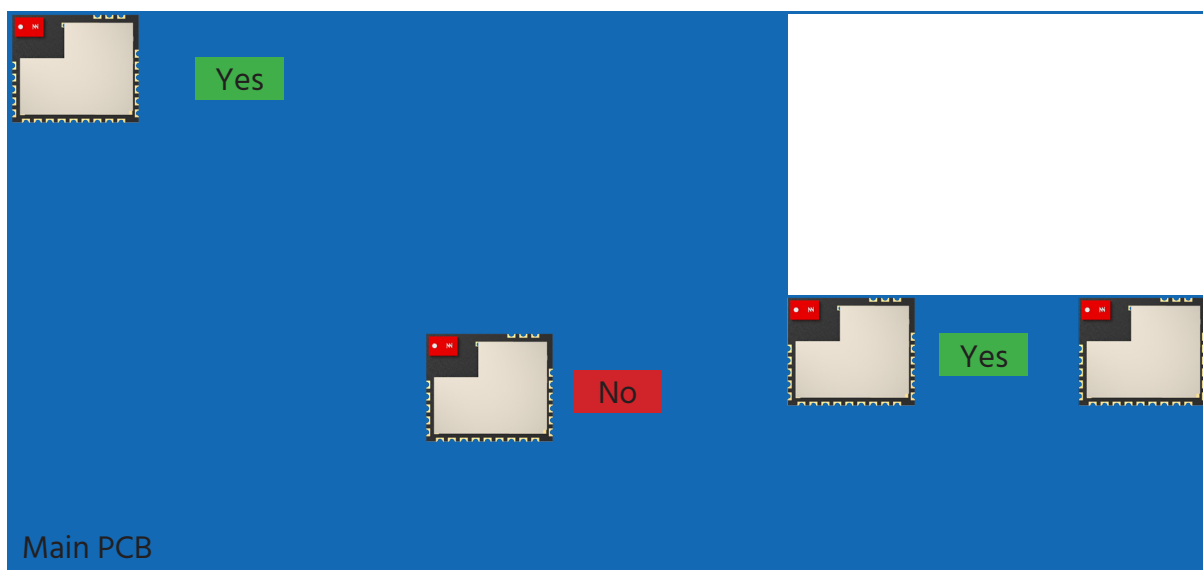


Figure 10.0: Recommended module placement

11. Reflow profile

BE62S is highly recommended to be assembled using a standard lead-free reflow profile, IPC/JEDEC J-STD-020. It can be soldered to host PCB by using the standard leaded and lead-free solder reflow profile as per below details.

Profile feature	Pb-Free assembly
Avg ramp up rate ($T_{s_{max}}$ to T_p)	3°C/second max
Preheat:	
- Temperature Min ($T_{s_{min}}$)	150°C
- Temperature Max ($T_{s_{max}}$)	200°C
- Time ($T_{s_{min}}$ to $T_{s_{max}}$) (ts)	60 - 180 sec
Time maintained above:	
- Temperature (T)	217 °C
- Time (t)	60 - 150 sec
Peak temperature (T_p)	260 +5 °C
Time within 5°C of actual peak temperature (t_p) ²	20 - 40 seconds
Ramp-down rate	6°C/second max
Time - 25°C to peak temperature	8 minutes max

Table 11.0: Pb-free reflow profile

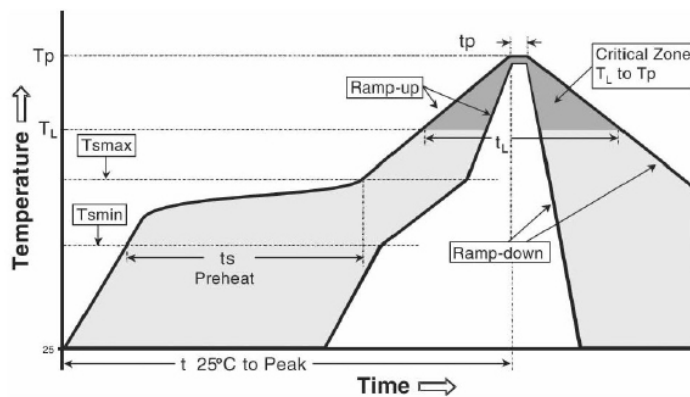


Figure 11.0: Pb-free reflow profile

Note 1: All temperatures refer to topside of the package, measured on the package body surface.
 Note 2: Time within 5 °C of actual peak temperature (t_p) specified for the reflow profiles is a “supplier” minimum and “user” maximum.

12. Ordering information

Table below provides the ordering information for the BE62S module.

Sl. No	Device	Description	Version	Shield	Antenna	Ordering Number
1	BE62S	High performance, standalone , Long range Bluetooth 5 engine without firmware	Open core	Yes	Integrated chip	BE62S-C
2	BE62S	High performance, standalone , Long range Bluetooth 5 engine with firmware	Celium connectivity firmware	Yes	Integrated chip	BE62S-C/AT

Mail us at sales@celium.world for the latest pricing and distributor information.

Table 12.0 : Ordering information

13. Additional resources

1. BE62S product brief : Product brief for the BE62S module for getting started*
2. BE62S Serial command : Firmware release document for Serial-Command*

14. Contact information

Worldwide Sales and Support

For general support	support@celium.world
For technical support	technical@celium.world
For sales	sales@celium.world

15. Appendix

15.1 Document history

REV01

Initial release of datasheet - Date 08-09-2021