BLE232SA/UA-A Module Datasheet V1.0

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Contents

Features

- Bluetooth low energy single mode system-on-chip compliant with Bluetooth 5.0 specifications:
  - master, slave and multiple simultaneous roles
  - LE data packet length extension
- Operating supply voltage: from 1.7 to 3.6 V
- Integrated linear regulator and DC-DC step-down converter
- Operating temperature range: -30 °C to 85 °C
- Highperformance, ultra-lowpower Cortex-M0 32-bit based architecture core
- Programmable 256 kB Flash
- 24 kB RAM with retention (two 12 kB banks)
- 1 x UART interface
- 1 x SPI interface
- 2 x I²C interface
- 14, 15 or 26 GPIOs
- 2 x multifunction timer
- 10-bit ADC
- Watchdog and RTC
- DMA controller
- PDM stream processor
- 16 MHz crystal oscillator
- 32 kHz crystal oscillator
- Battery voltage monitor and temperature sensor (at antenna connector)
- Excellent RF link budget (up to 96 dB)
- Accurate RSSI to allow power control 8.3 mA TX current (@ -2 dBm, 3.0 V)
- Down to 1 µA current consumption with active BLE stack (sleep mode)
- Average advertisement current consumption 15.34 µA (advertisement interval 1000 ms), 1 year, 8 months, 19 days with 230 mAh battery(CR2032)
- Average connection current consumption 7.059 µA (connection interval 1000 ms), 3 years, 10 months, 12 days with 230mAhbattery(CR2032)
- ST companion integrated balun/filter chips are available
- Suitable for building applications compliant with the following radio frequency regulations: ETSI EN 300 328, EN 300 440, FCC CFR47 part 15, ARIB STD-T66
- Pre-programmed bootloader via UART
- Up to +8 dBm available output power

Applications

- Watches
- Fitness, wellness and sports
- Consumer medical
- Security/proximity
- Remote control
- Home and industrial automation
- Assisted living
- Mobile phone peripherals
- Lighting PC peripheral

Description

BLE232SA/UA-A series module is designed based on ST company's BlueNRG-2,The BlueNRG-2 is a very low power Bluetooth low energy (BLE5.0) single-mode system-on-chip compliant with Bluetooth specification.

The BlueNRG-2 extends the features of award-winning BlueNRG network processor, enabling the usage of the embedded Cortex M0 for running the user application code.

The BlueNRG-2 includes 256 kB of programming Flash memory, 24 kB of static RAM memory with retention (two 12 kB banks) and SPI, UART, I²C standard communication interface peripherals. It also features multifunction timers, watchdog, RTC and DMA controller.

An ADC is available for interfacing with analog sensors, and for reading the measurement of the integrated battery monitor. A digital filter is available for processing a PDM stream.

The BlueNRG-2 offers the same excellent RF performance of the BlueNRG radio, and the integrated high efficiency DC/DC converter keeps the same ultra-low power characteristics, but the BlueNRG-2 improves the BlueNRG sleep mode current consumption allowing a further increase in the battery lifetime of the applications.

Specifications

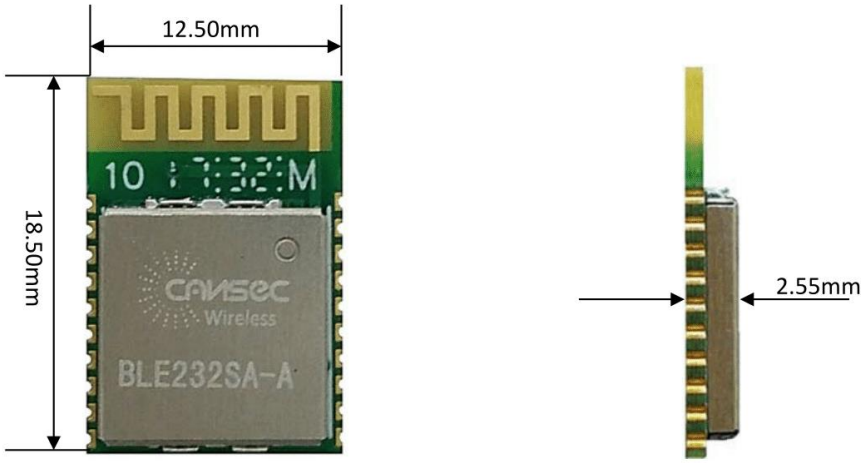
Power consumption when DC-DC converter not active

Parameter		Min	Typ	Max	Unit
Operating Voltage		1.7	-	3.6	V
Operating Temperature		-30	-	85	℃
Current Consumption	Reset	-	5	-	nA
	Standby	-	500	-	nA
	Transmit Mode (8dBm)	-	15.1	-	mA
TX Power		-	-	8	dBm
RX Sensitivity		-	-	-88	dBm

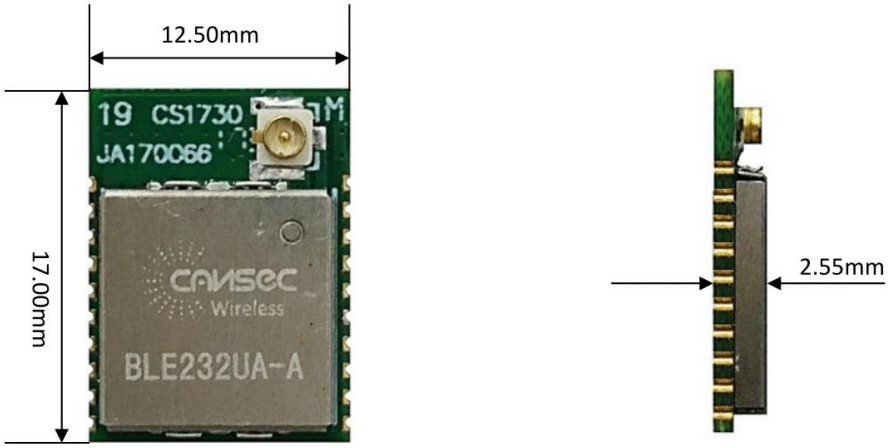
Mechanical Drawing

Tolerance: ±0.2mm

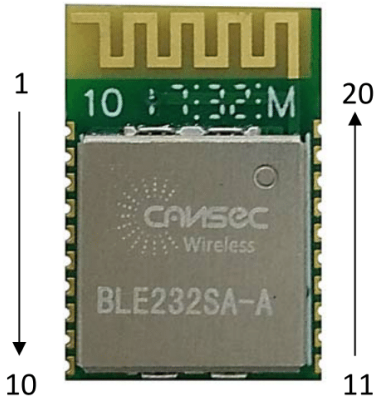
BLE232SA-A:



BLE232UA-A:

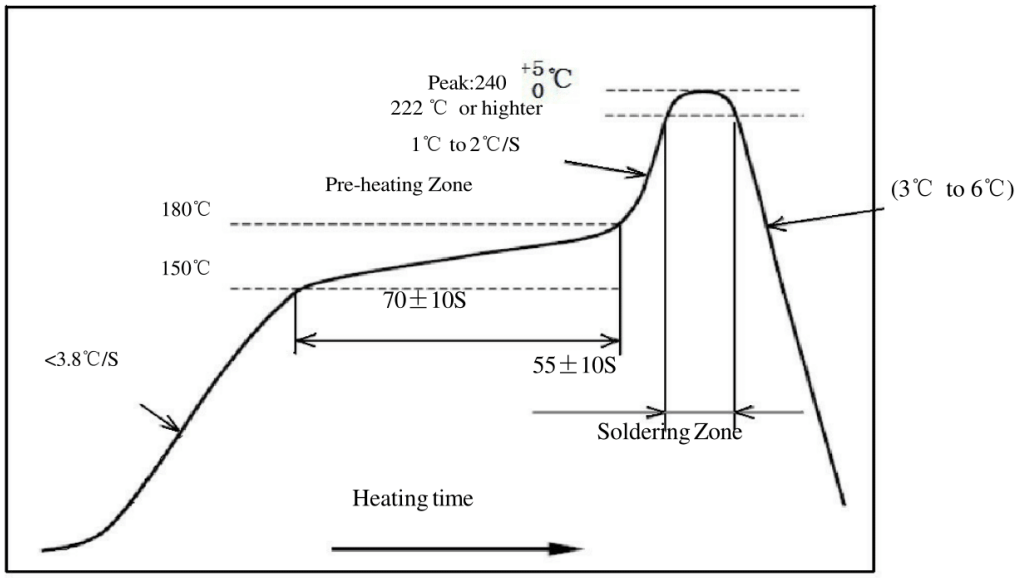


Terminal Description



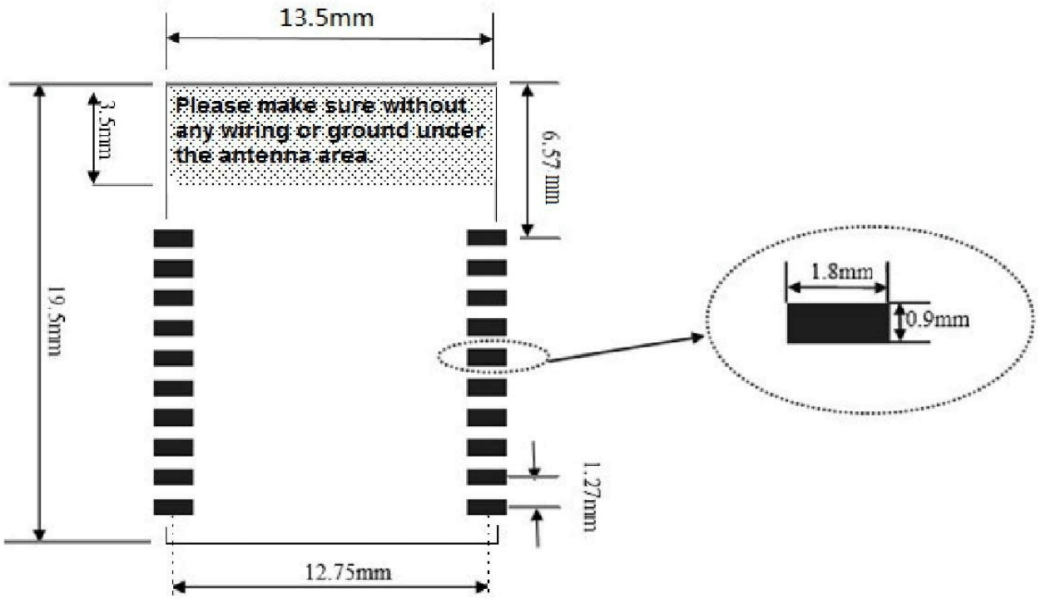
Pad Number	Name	Pin Type	Description
1	RESET_N	I	System reset
2	DIO13	I/O	General purpose digital I/O
3	DIO12	I/O	General purpose digital I/O
4	GND	Ground Pin	Connect to GND
5	VCC	POWER	Battery voltage input
6	DIO11	I/O	General purpose digital I/O
7	DIO10	I/O	General purpose digital I/O
8	DIO9	I/O	General purpose digital I/O
9	DIO8	I/O	General purpose digital I/O
10	DIO7/BOOT	I/O	Bootloader pin/ General purpose digital
11	DIO6	I/O	General purpose digital I/O
12	DIO5	I/O	General purpose digital I/O
13	DIO4	I/O	General purpose digital I/O
14	DIO3	I/O	General purpose digital I/O
15	DIO2	I/O	General purpose digital I/O
16	DIO1	I/O	General purpose digital I/O
17	DIO0	I/O	General purpose digital I/O
18	ANATEST0/DIO14	I/O	Analog output/ General purpose digital
19	ADC1	I	ADC input 1
20	ADC2	I	ADC input 2

Recommended Reflow Profile for Lead Free Solder



Recommended PCB Layout for Package

BLE232SA-A:



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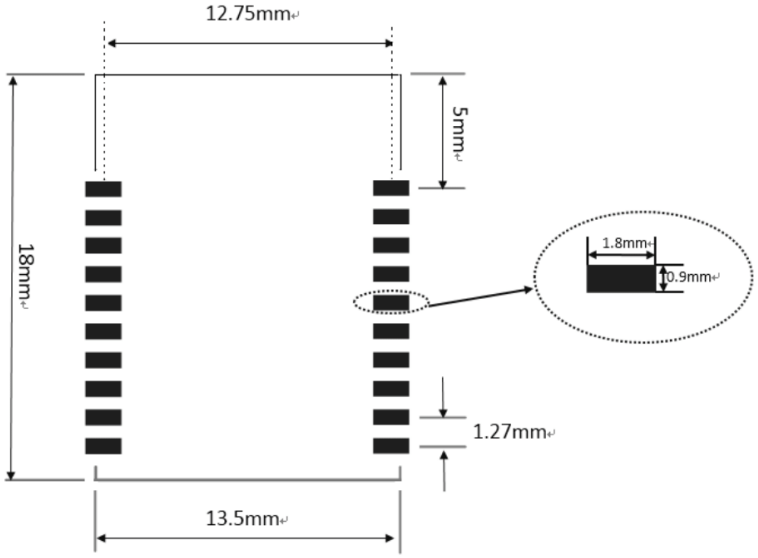

Contact details

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