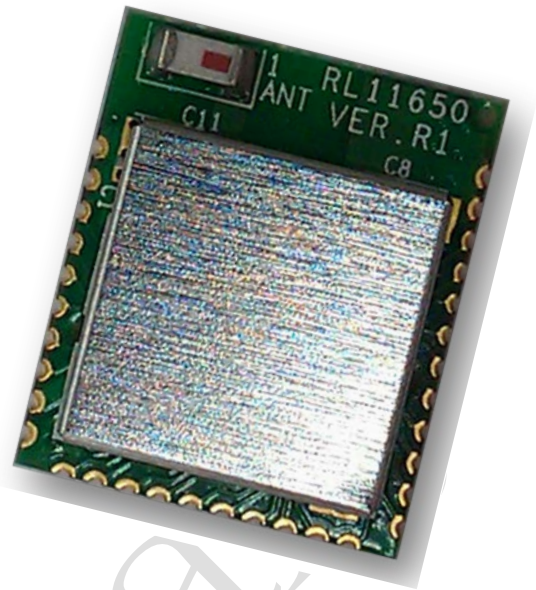


RL-11650

Bluetooth® Low Energy Module



Applications

- Bluetooth Smart applications
- Mobile phone accessories
- Computer peripherals
- CE remote controls for TV, STB and media systems
- Proximity and security alert tags
- Sports- and fitness sensors
- Healthcare and lifestyle sensors
- Game controllers for computers
- Toys and Electronic games
- Domestic/Industrial control and data-acquisition
- Smart RF tags for tracking and social interaction
- Audience response system
- Intelligent domestic appliances

General Features

- FCC and CE pre-qualified ISM 2.4GHz module
- Bluetooth® 4.0 single mode
- NORDIC nRF51822 SoC with 256kB Flash, 16kB RAM
- ARM® Cortex™-M0 32 bit processor with 16 MHz
- Configurable TX Power from -20 to +4 dBm in 4 dB steps
- Up to 8 ADC Channels with resolution up to 10 bits
- Up to 20 General Purpose I/O Pins
- Low Battery Detection
- UART (2 or 4 wire with CTS/RTS, 1200 to 1M baud)
- SPI
- I2C
- Support simple AT commands
- Received Signal Strength Indicator (RSSI) with 1 dBm resolution
- Temperature Sensor with 0.25°C resolution
- Free Apple iOS libraries and reference sample codes

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2013/3/15

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Recommended supply voltage:

| Symbol | Parameter | Min. | Nom. | Max. | Units |
|--------|----------------------------------|------|------|------|-------|
| VDD | Supply voltage, normal mode | 1.8 | 3.0 | 3.6 | V |
| VDD | Supply voltage, Low voltage mode | 1.75 | 1.8 | 1.95 | V |

Table 1. Supply voltage

Pin placement

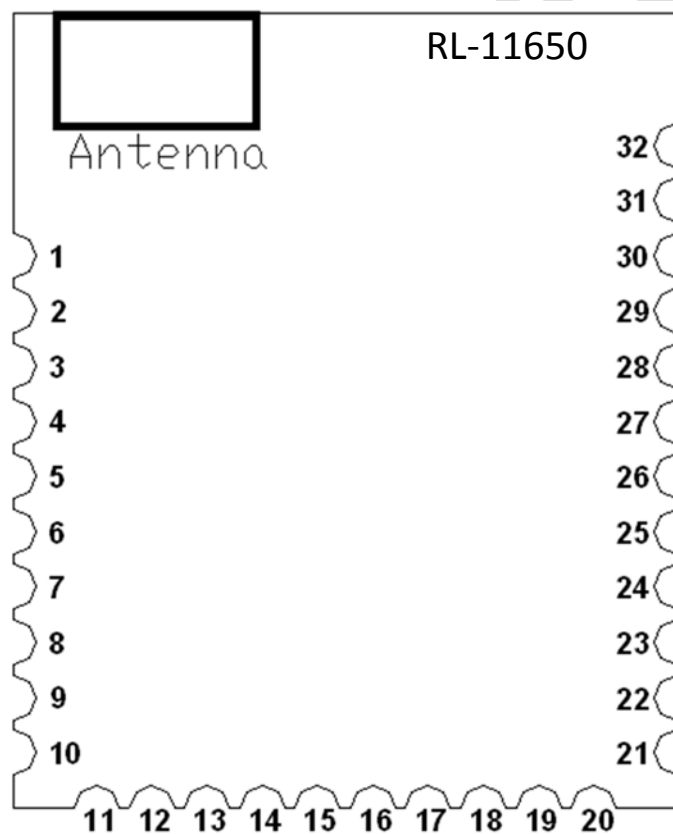


Figure 1. Pin placement

Pin assignment

| Pin number | Pin name | Pin function | Default Setting |
|---|------------------|--|--------------------------------|
| 1 | GND | Power | Ground |
| 2 | GND | Power | Ground |
| 3 | P0.24 | IO17:Input/Output/Disable | Disable |
| 4 | P0.25 | IO18:Input/Output/Disable | Disable |
| 5 | P0.26 | IO19:Input/Output/ADC Input0/Disable | Disable |
| 6 | P0.27 | IO20:Input/Output/ADC Input1/Disable | Disable |
| 7 | P0.28 | IO21:Input/Output/Disable | Output(Link_Status_Led) |
| 8 | P0.29 | IO22:Input/Output/Disable | Disable |
| 9 | VDD | Power | Power supply |
| 10 | GND | Power | Ground |
| 11 | P0.30 | IO23:Input/Output/Disable | Disable |
| 12 | P0.00/AREF0 | IO0:Input/Output/ ADC reference voltage /Disable | Disable |
| 13 | P0.01/AIN2 | IO1:Input/Output/ADC Input2/Disable | Disable |
| 14 | P0.02/AIN3 | IO2:Input/Output/ADC Input3/Disable | Disable |
| 15 | P0.03/AIN4 | IO3:Input/Output/ADC Input4/Disable | Disable |
| 16 | P0.04/AIN5 | IO4:Input/Output/ADC Input5/Disable | Disable |
| 17 | P0.05/AIN6 | IO5:Input/Output/ADC Input6/Disable | Disable |
| 18 | P0.06/AIN7 | IO6:Input/Output/ADC Input7/Disable | Disable |
| 19 | P0.07 | IO7:Input/Output/Disable | Disable |
| 20 | P0.08 | IO8:Input/Output/Disable | Disable |
| 21 | P0.09 (UART-TXD) | IO9:Input/Output/Disable/ Uart Tx | Uart Tx |
| 22 | P0.10(UART-RXD) | IO10:Input/Output/Disable/Uart Rx | Uart Rx |
| 23 | P0.11(UART-CTS) | IO11:Input/Output/Disable/Uart CTS | Disable |
| 24 | P0.12(UART-RTS) | IO12:Input/Output/Disable/Uart RTS | Disable |
| 25 | P0.13 | IO13:Input/Output/Disable | Disable |
| 26 | P0.14 | IO14:Input/Output/Disable | Disable |
| 27 | P0.15 | IO15:Input/Output/Disable | Disable |
| 28 | P0.16 | IO16:Input/Output/Disable | Disable |
| 29 | SWDIO /nRESET | programming pin1/ nRESET | programming pin1/ nRESET |
| 30 | SWCLK | programming pin2 | programming pin2 |
| 31 | GND | Power | Ground |
| 32 | GND | Power | Ground |
| POF function: Disable/Enable(2.1/2.3/2.5/2.7 V) ; Programming Port: VDD,GND,Prog1,Prog2 | | | |

Table 2. Pin assignment

Layout drawing

Size: **15x18x3.1mm** (Including RF Shield Cover, Height Tolerance +/-0.1mm)

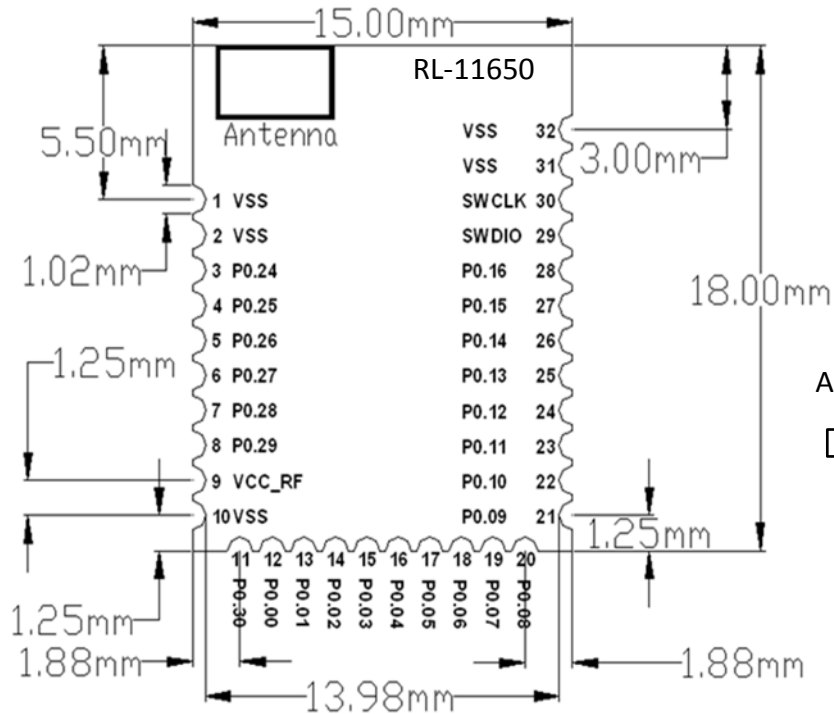


Figure 2. Layout drawing-top view



Figure3. Layout drawing –side view

Application PCB layout guidelines

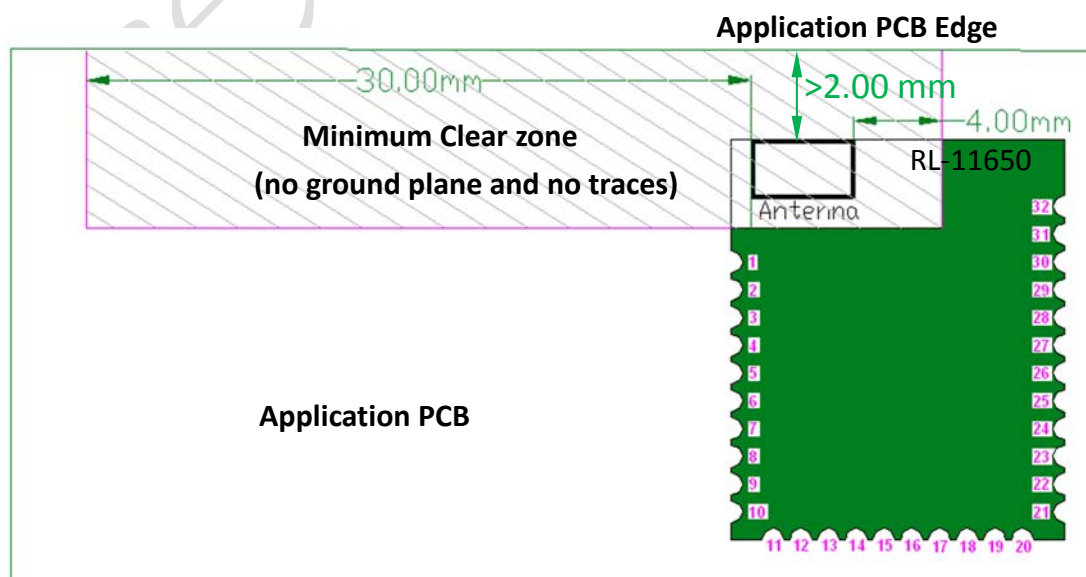


Figure 4. Top view

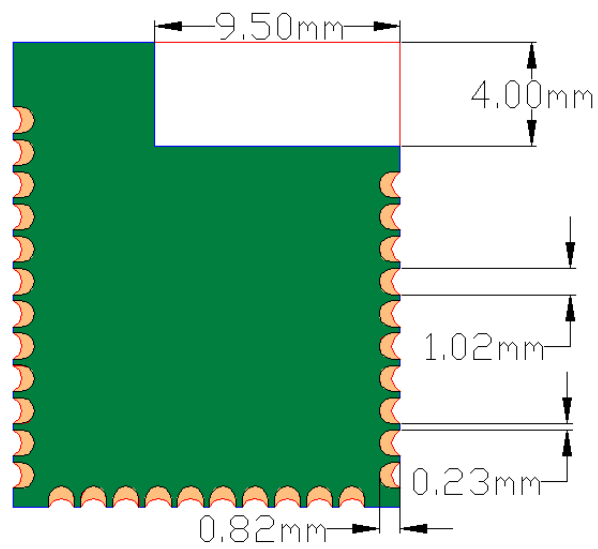


Figure5. Bottom view

UART reference circuit design

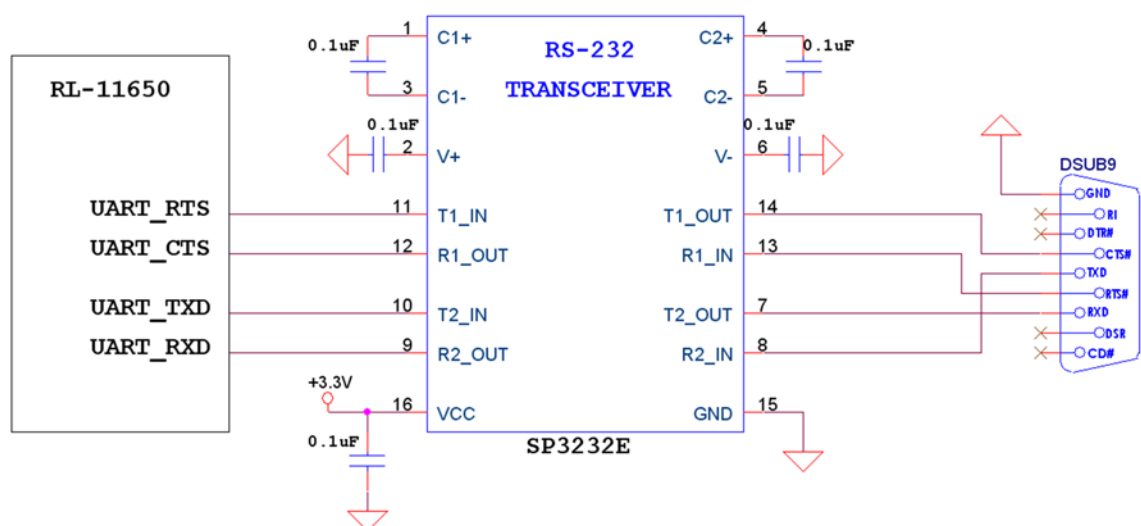


Figure 6. UART reference circuit design

Programming port reference circuit design

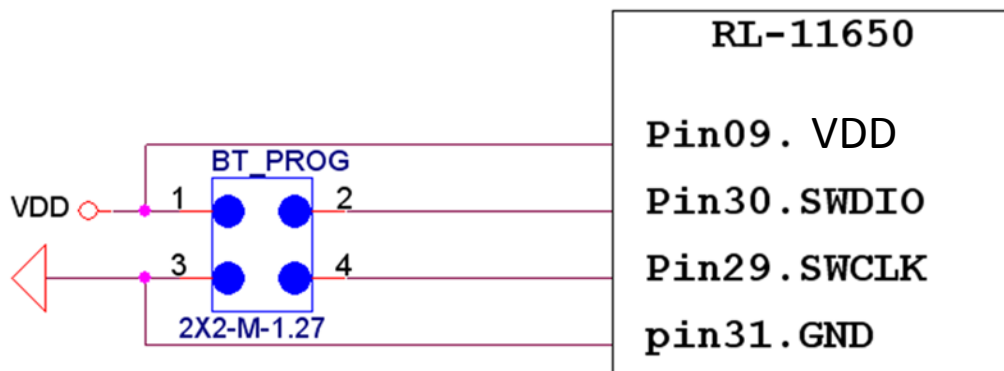


Figure 7. Programming port reference circuit design

Remarks: BT_PROG: 2*2, 1.27 mm pitch male connector.

Buzzer reference circuit design

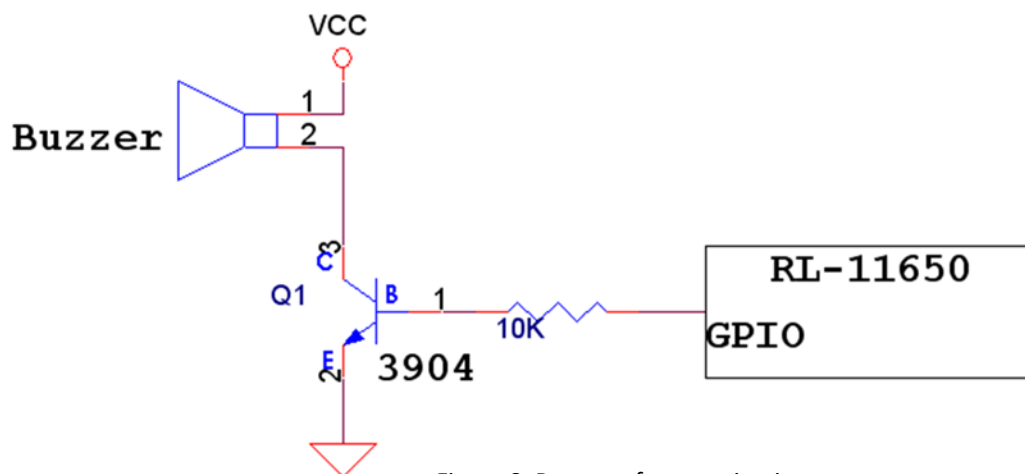


Figure 8. Buzzer reference circuit

Federal Communication Commission Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:

The product comply with the FCC portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body or set the device to lower output power if such function is available.

This device is intended only for OEM integrators under the following conditions:

The transmitter module may not be co-located with any other transmitter or antenna.

As long as conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain

laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

The final end product must be labeled in a visible area with the following: “Contains FCC ID: S39RL11650. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.