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BLE MESH MODULE – PT825XXBTV3



This datasheet is dedicated for
Plexilent BLE module PT825XXBTV3 : Version 1

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The PT825XXBTV3 is Plexilent developed module based on Bluetooth LE SoC solution with internal flash and is completely RoHS compliant and 100% lead (Pb)-free, and is well suited for connected lighting and automation solutions. It consists of a highly integrated Bluetooth chip and several peripheral components, with an embedded Bluetooth network protocol stack and rich library functions.

1 Overview

The PT825XXBTV3 integrates a power-balanced 32-bit MCU, BLE/2.4GHz Radio, 48kB SRAM, 512kB internal Flash, 14bit ADC, 9-channel PWM (1-channel IR/IR FIFO/IR DMA FIFO) and flexible GPIO interfaces.-

1.1 Features

Embedded low-power 32-bit MCU, which can also function as an application processor.

- Clock rate: 48 MHz
- Operating voltage: 1.8 V to 3.6 V (Under 1.8 V to 2.7 V, the module can start but the RF performance is not guaranteed. Under 2.8 V to 3.6 V, the module performance is normal.)
- Peripherals: Nine pulse width modulation (PWM) interfaces.
- Bluetooth RF features
  - Bluetooth LE 5.0
  - Up to 2 Mbit/s RF data rate
  - TX power: -45 to +10 dBm
  - RX sensitivity: –94.5 dBm at 1 Mbit/s
- Embedded advanced encryption standard (AES) hardware encryption.
- Onboard PCB antenna with 2.5 dbi gain
- Operating temperature range: –40°C to +125°C

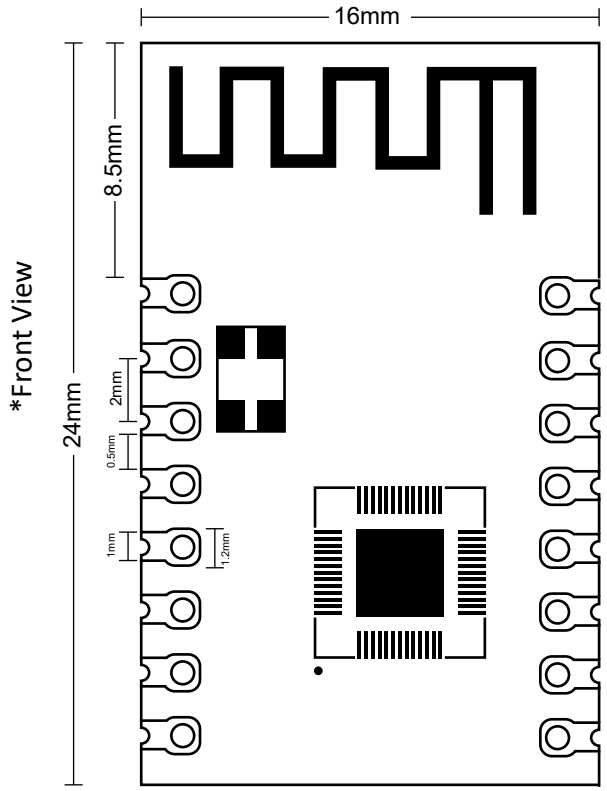
1.2 Applications

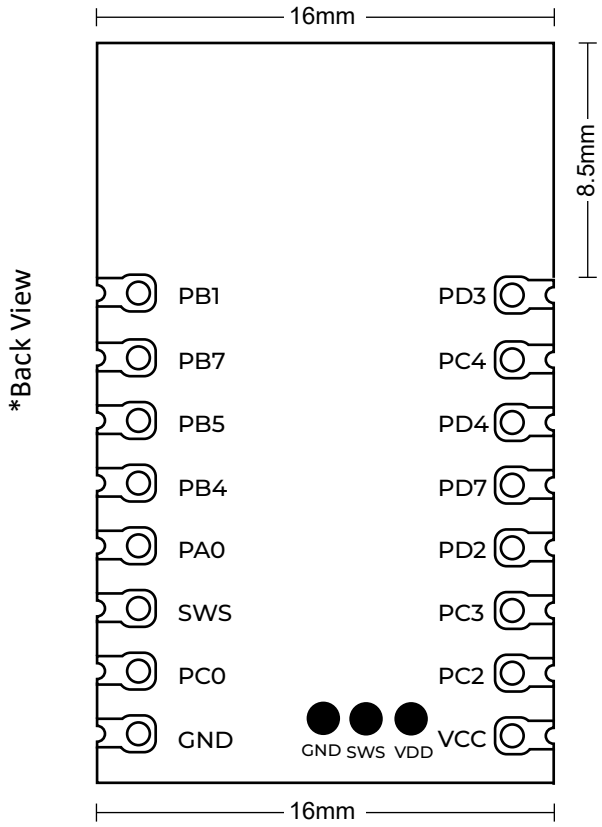
- Smart Led Lights
- Smart Households
- Smart Low-Power Sensors
- Appliances

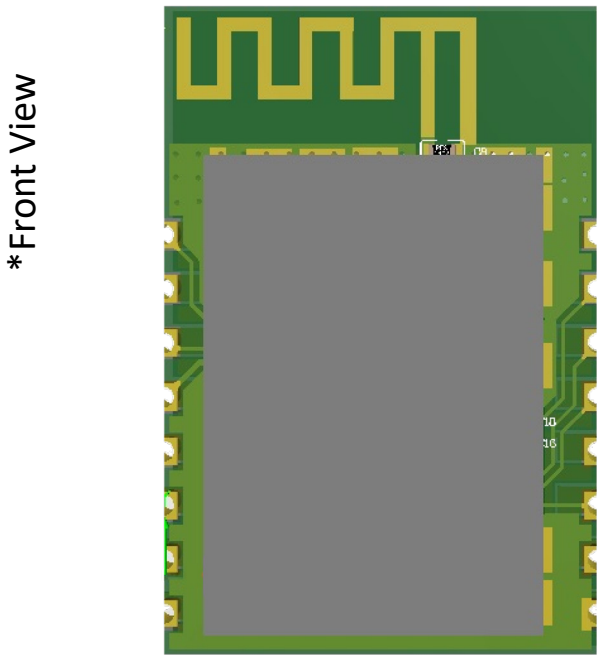
2 Module Interfaces

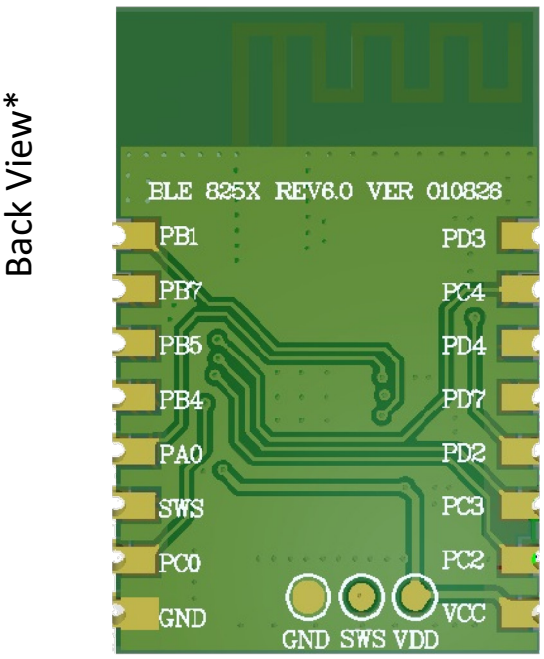
2.1 Dimensions and Footprint

The PT825XXBTV3 dimensions (H x W x D) are 3.3±0.15 mm x 16±0.35 mm x 24±0.35 mm.
The PCB thickness is 0.8 ±0.1 mm. The PT825XXBTV3 pins are shown below:









2.2 Pin Definition

The following table shows definitions of pins:

Pin No.	Symbols	I/O type	Function
1	PC4	I/O	I/O used for PWM Output, 12-bit ADC
2	PC3	I/O	I/O used for PWM Output
3	PC2	I/O	I/O used for PWM Output
4	PC0	I/O	GPIO
5	GND	P	Power Supply Reference to Ground Pin
6	VDD	P	Power Supply Pin (3.3V)
7	PB7	I/O	Serial Interface receiving pin (UART RX), SPI_DO
8	PB5	I/O	I/O used for PWM Output
9	PB4	I/O	I/O used for PWM Output
10	PD2	I/O	I/O used for PWM Output
11	PD3	I/O	I/O used for PWM Output
12	PD4	I/O	I/O used for PWM Output
13	PD7	I/O	I/O pin, SPI_CK
14	PA0	I/O	GPIO
15	SWS	I	Single Wire Slave used for Programming
16	PB1	I/O	Serial Interface transmitting pin (UART TX)

Note:

1. P signifies a power supply pin, I/O represents an input/output pin, and AI indicates analog input pins.
2. If you have any particular needs for controlling light colors via PWM outputs, please contact the business personnel at Plexilent.
3. Provision for programming the modules (SWS Pin) are kept on the back side of the module.

3 Electrical Parameters

3.1 Absolute Electrical Parameters

Parameter	Description	Minimum Value	Maximum Value	Unit
Ts	Storage temperature	-65	150	°C
VCC	Power supply voltage	1.8	3.9	V
ESD voltage (human body model)	TAMB-25°C	-	2	KV
ESD voltage (human body model)	TAMB-25°C	-	0.5	KV

3.2 Electrical Conditions

Parameter	Description	Minimum Value	Typical value	Maximum Value	Unit
Ts	Operating temperature	-40	-	85	°C
VCC	Working voltage	2.8	3.3	3.6	V
VIL	I/O low-level input	VSS	-	0.3	V
VIH	I/O low-level input	0.7	-	VCC	V
VOL	I/O low-level input	VSS	-	0.1	V
VOH	I/O high-level output	0.9	-	VCC	V

3.3 Power consumption during work

Parameter	Condition	Typical value	Unit
TX current	Constant transmission, 10dBm output power	23	mA
RX current	Constant receiving	6.3	mA
Deep Sleep Current	Deep sleep mode 1 (16 KB RAM is reserved.)	1.2	μA

4 RF features

4.1 Basic RF features

Parameter	Description
Frequency band	2.4GHz ISM band
Wireless standard	Bluetooth LE 4.2/5.0
Data transmission rate	1 Mbps, 2 Mbps
Antenna type	Onboard PCB antenna

4.2 RF Output Power

Parameter	Minimum Value	Typical value	Maximum Value	Unit
Average RF output power	-22	10	10.5	dBm
20 dB modulation signal bandwidth (1 Mbit/s)	-	2500	-	KHz
20 dB modulation signal bandwidth (2 Mbit/s)	-	1400	-	KHz

4.3 RF RX Sensitivity

Parameter	Minimum Value	Typical value	Maximum Value	Unit
RX sensitivity 1Mbps	-	-94.5	-	dBm
RX sensitivity 2Mbps	-	-91	-	dBm
Frequency offset 1Mbps	-250	-	+300	KHz
Frequency offset 2Mbps	-300	-	+200	KHz
Co-channel interference suppression	i -	-10	-	dB

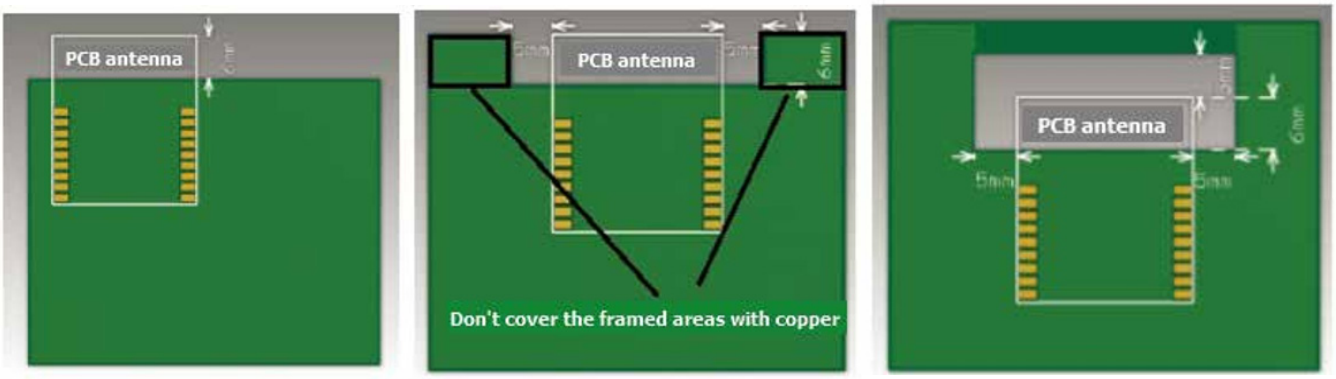
5 Antenna

5.1 Antenna Type

PT825XXBTV3 uses an onboard PCB antenna with a gain of 2.5 dBi.

5.2 Antenna Interference Reduction

For optimal RF performance, it is advisable to keep the antenna at a minimum distance of 15 mm from other metal components. Presence of metal objects in close proximity to the antenna may significantly diminish wireless signal strength, ultimately impacting the RF performance. Therefore, when creating a final product, sufficient space must be allocated for the antenna.



6. SPQ and Packaging Information

Product Series	Temperature Range	Production Description	Product Part No.	Standard Packaging Quantity
PT825XXBTV3	-40°C ~ 85°C	Touch Panel Modules	PT8251ABTV3	1000
	-40°C ~ 105°C		PT8251BBTV3	
	-40°C ~ 125°C		PT8251CBTV3	

IMPORTANT NOTICE
• Based on security issues, please ensure that the positive pole of the power in the product don't contact with the machine of metal material directly, or use the insulating materials for isolation, avoid short circuit and dangerous in the assembly of the product.
• Avoid twisting, bending, strong collision and falling damage in the assembly of this product.
Please take care about ESD every time.
• Packaging Type : Tape Reel

7. ANNEXURE

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