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MODULE – PTEP2XXXBTV1



This datasheet is dedicated for
Plexilent BLE module PTEP2XXXBTV1 : Version 1

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CONTENT

1. Overview	1
1.1 Features	1
1.2 Applications	1
2. Module Interfaces	2
2.1 Dimensions and Footprint	2
2.2 Pin definition	3
3. Electrical parameters	4
3.1 Absolute Electrical parameters	4
3.2 Electrical conditions	4
4. RF Features	4
4.1 Basic RF Features	4
4.2 RF Output Power	5
4.3 RF RX sensitivity	5
5. Antenna	5
5.1 Antenna type	5
5.2 Antenna interference reduction	5
6. SPQ and packaging information	6
7. Annexure	7

The PTEP2XXXBTV1 is a Plexilent-developed Bluetooth low energy (BLE) and 2.4 GHz multi-standard wireless SoC solution with internal flash and is completely RoHS-compliant and 100% lead (Pb)-free is well suited for connected lighting and automation solutions.

This includes a full range of on-chip peripherals for interfacing, making it an ideal solution for low-cost IoT (Internet of Things) and 2.4 GHz devices.

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 PTEP2XXXBTV1 integrates a power-balanced 32-bit MCU, BLE/2.4GHz Radio, 16kB SRAM, 128kB internal Flash, 14bit ADC, 6-channel PWM (Continuous, Counting, IR,IR FIFO,IRDMA) 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: Six 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: – 97 dBm at 1 Mbit/s, -93 dbm at 2Mbits/s.
- Embedded advanced encryption standard (AES) hardware encryption.
- Onboard PCB antenna with 2.5 dbi gain
- Operating temperature range: -40°C ~ +85°C

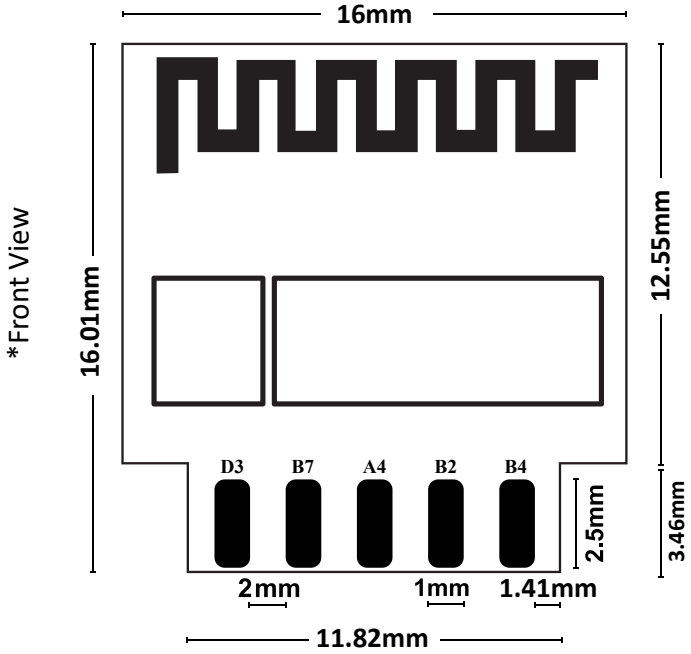
1.2 Applications

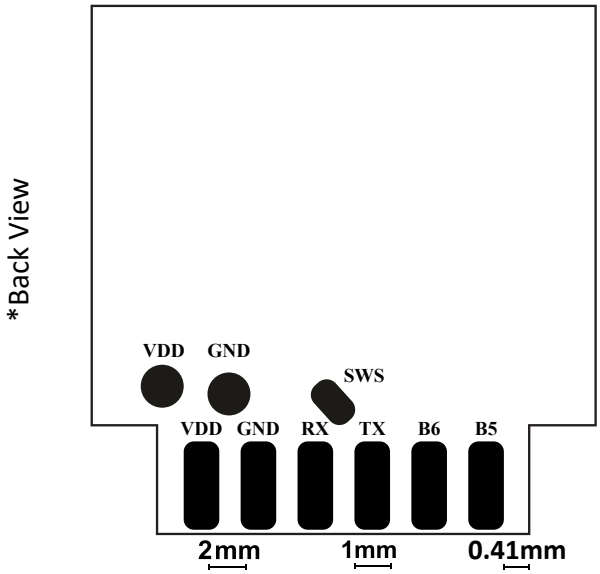
- Smart Led Lights
- Smart Households
- Smart Low-Power Sensors
- Rf Remote Control
- Appliances

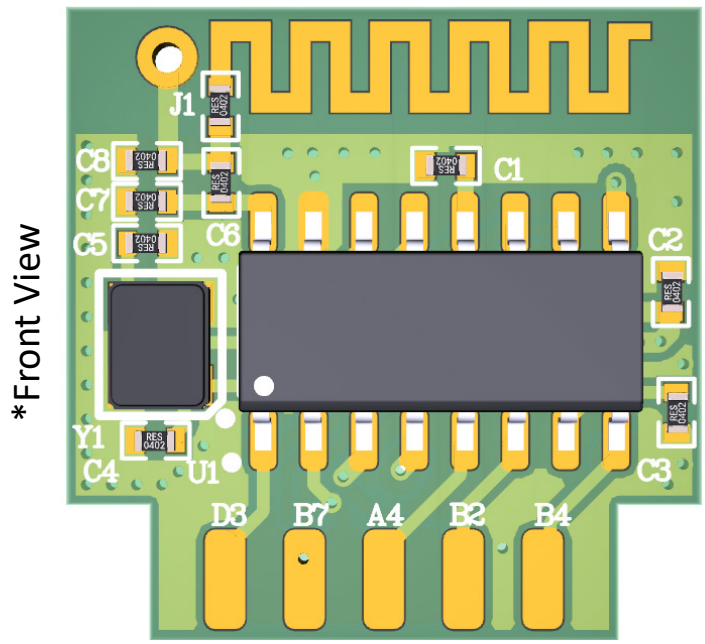
2 Module Interfaces

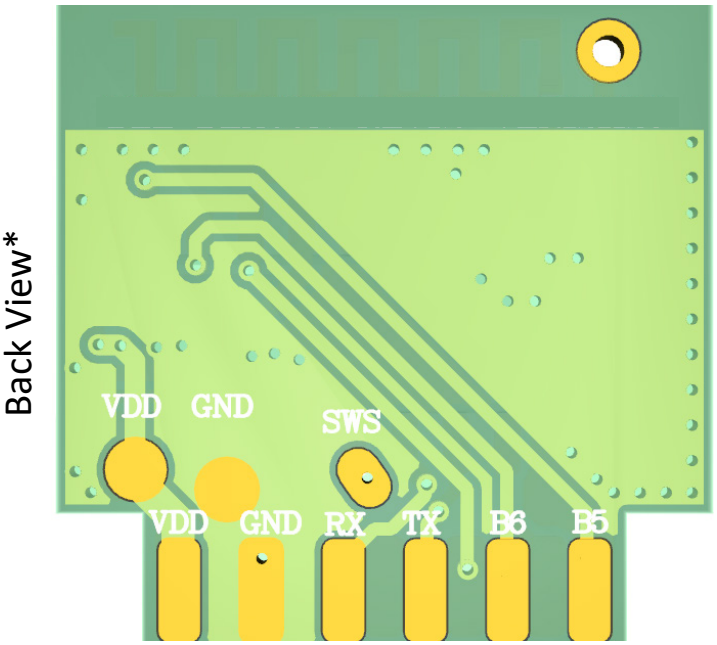
2.1 Dimensions and Footprint

The PTEP2XXXBTV1 dimensions (H x W x L) are 2 mm x 16 mm x 16.08 mm.
The PCB thickness is 1 ±0.1 mm. The PTEP2XXXBTV1 pins are shown below:









2.2 Pin Definition

The following table shows definitions of pins:

Pin No.	Symbols	I/O type	Function
1	PD3	I/O	GPIO
2	PB7	I/O	GPIO
3	PA4	I/O	I/O pin programmed to drive RED LED as PWM Output
4	PB2	I/O	I/O pin programmed to drive GREEN LED as PWM Output
5	PB4	I/O	I/O pin programmed to drive BLUE LED as PWM Output
6	PB5	I/O	I/O pin programmed to drive WHITE LED as PWM Output
7	PB6	I/O	I/O pin programmed to drive WARM WHITE LED as PWM Output
8	TX(PD6)	I/O	Serial Interface Transmitting pin (UART TX)
9	RX(PA0)	I/O	Serial Interface receiving pin (UART RX)
10	VDD	P	Power Supply Pin (3.3V)
11	GND	P	Power Supply Reference to Ground Pin
12	SWS	I	Single Wire Slave used for Programming

Note:

1. **P** signifies a power supply pin, **I/O** represents an input/output pin.
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	3.6	V

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

4 RF features

4.1 Basic RF features

Parameter	Description
Frequency band	2.4GHz ISM band
Wireless standard	Bluetooth LE 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	-45	10	+10.5	dBm
20 dB modulation signal bandwidth (1 Mbit/s)	-	1400	-	KHz
20 dB modulation signal bandwidth (2 Mbit/s)	-	2500	-	KHz

4.3 RF RX Sensitivity

Parameter	Minimum Value	Typical value	Maximum Value	Unit
RX sensitivity 1Mbps	-	-97	-	dBm
RX sensitivity 2Mbps	-	-93	-	dBm
Frequency offset 1Mbps	-250	-	+300	KHz
Frequency offset 2Mbps	-300	-	+200	KHz
Co-channel interference suppression	-	-10	-	dB

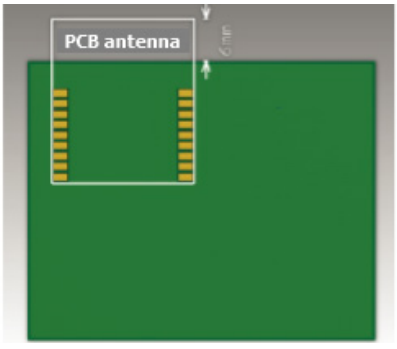
5 Antenna

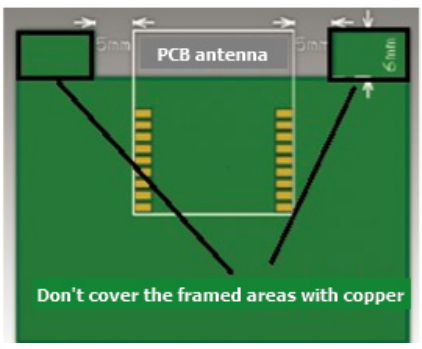
5.1 Antenna Type

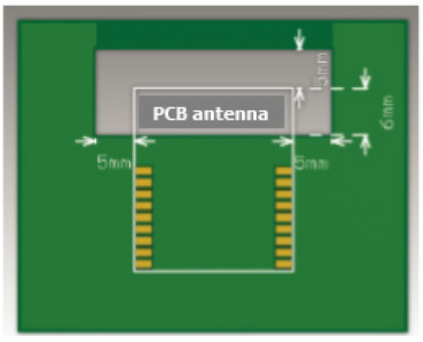
PTEP2XXXBTV1 uses an onboard PCB antenna with a gain of 2.5dBi.

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
PTEP21XBTV1	-40°C ~ 85°C	Dimmable Modules (1CH)	PTEP21ABTV1	1000
PTEP22XBTV1	-40°C ~ 85°C	CCT Tunables & Dimmable Modules (CCT)	PTEP22ABTV1	1000
PTEP23XBTV1	-40°C ~ 85°C	RGB Tunables & Dimmable Modules (RGB)	PTEP23ABTV1	1000
PTEP24XBTV1	-40°C ~ 85°C	RGB WW Tunables & Dimmable Modules (4CHWW)	PTEP24ABTV1	1000
PTEP25XBTV1	-40°C ~ 85°C	RGBCW Tunables & Dimmable Modules (4CHCW)	PTEP25ABTV1	1000
PTEP26XBTV1	-40°C ~ 85°C	RGBCWWW Tunables & Dimmable Modules (RGBCW)	PTEP26ABTV1	1000
PTEP27XBTV1	-40°C ~ 85°C	Isolated CCT Tunables & Dimmable Modules (CCTI)	PTEP27ABTV1	1000
PTEP28XBTV1	-40°C ~ 85°C	Dimmable Modules For Fan (FAN)	PTEP28ABTV1	1000

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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