MODULE Datasheet

DS-BC501HZ-01-26P

V1.0

2025/03/01

Table of Contents

Features

1.1 Overview

The BC501HZ-01-26P module is based on the Beken BK3432 chip. The BK3432 chip is a highly integrated Bluetooth 5.0 dual mode data SoC with a 2 Mbps data rate supported. It integrates a high-performance RF transceiver, baseband, MCU, rich feature peripheral units, programmable protocol, and profile to support Bluetooth classic and low-energy applications. The Flash program memory makes it suitable for customized applications.

The BK3432 is designed with advanced technology processes and integrated with a switch DCDC regulator, which has ultra-low power consumption and ultra-low leakage power. The embedded high-order interference suppression filter and fast automatic gain control logic make it work well in high-interference environments.

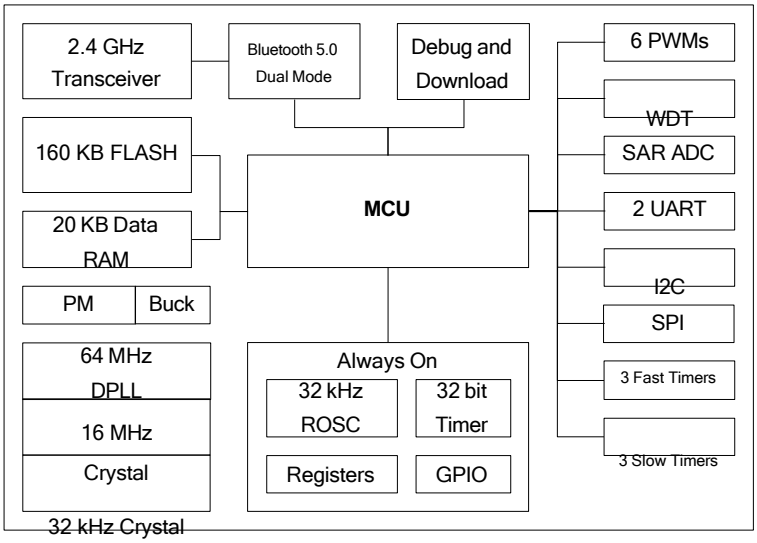


Figure 1 BK3432 Block Diagram

1.2 Features

- Bluetooth® SIG Bluetooth Dual Mode 5.0 compliant
- Low-power 2.4GHz Transceiver
- MCU integrated
- 160 KB programmable Flash for Program and 20 KB RAM for Data
- Program code read protection
- Operation voltage from 2.0 V to 3.6 V

- Clock
  - 16 MHz crystal reference clock
  - 64 MHz digital PLL clock
  - 32 kHz ring oscillator
  - External 32 kHz crystal oscillator
  - MCU can run with any clock source with internal frequency divider
- Interface and peripheral units
  - JTAG, I2C, SPI interface
  - Two UART interface
  - Multi-channels PWM output
  - On-chip 10 bit general ADC
  - GPIO with multiplexed interface functions
  - True random number generator

Electrical Specifications

2.1 DC Characteristics

Name	Parameter (Condition)	Min	Typical	Max	Unit	Comment
	Operating Condition					
VCC	Voltage	2.0	3.0	3.6	V	
TEMP	Temperature	-40	+27	+125	ºC	
	Digital input Pin					
VIH	High level	VCC-0.3		VCC+0.3	V	
VIL	Low level	VSS		VSS+0.3	V	
	Digital output Pin					
VOH	High level (IOH=-0.25mA)	VCC- 0.3		VCC	V	
VOL	Low level(IOL=0.25mA)	VSS		VSS+0.3	V	
	Normal condition					
IVDD	Deep sleep		0.5		uA	
IVDD	Sleep current (RF OFF, 32 kHz clock, DIG Retention)		1.8		uA	
IVDD	Active RX (3.3 V)		5.1		mA	With DCDC regulator
IVDD	Active TX @ -1 dBm (3.3 V)		4.8		mA	With DCDC regulator
	Normal RF condition					
FOP	Operating frequency	2400		2480	MHz	
FXTAL	Crystal frequency		16		MHz	
RFSK	Air data rate		1	2	Mbps	
	Transmitter (1 Mbps mode)					
PRF	Output power	-20	-1	+4	dBm	

2.2 RF Characteristics

PBW	Modulation 20 dB bandwidth			1	MHz	
PRF1	Out of band emission 2 MHz		-53		dB	

PRF2	Out of band emission 3 MHz		-58		dB	
Dev	Transmit FM deviation	115	250	300	kHz	
Drift	Transmit drift in any position			400	Hz/us	
	Receiver BLE Mode （Classic Mode is to be provided）					
Max Input	1 E-3 BER		-10		dBm	
RXSENS	1 E-3 BER sensitivity		-96	-97	dBm	
Intermodulation	Pin=-64 dBm; Punwant=- 50 dBm; f0=2f1-f2, f2- f1=3 MHz or 4 MHz or 5 MHz		-25	-22	dBm	
C/ICO	Co-channel C/I		7		dB	
C/I1ST	ACS C/I 1MHz	-9		-6	dB	
C/I2ND	ACS C/I 2MHz		-44		dB	
C/I3RD	ACS C/I 3MHz		-50		dB	
C/I1STI	ACS C/I Image channel		-25		dB	
C/I2NDI	ACS C/I 1 MHz	-35		dB		
Block	Block @ 2399,and 2484		-15		dBm	
Block	Block @ 2 GHz and 3 GHz		-15		dBm	
Leakage	Leakage @ < 1GHz		-71		dBm	
Leakage	Leakage @ >1GHz		-56		dBm	

AT Commands

directives	Response Data	Feature description
AT+GVER	See:1.0	Obtain the software version number
AT+REST\r\n	REST	reposition
AT+SNAM+Name\r\n	SNAM: Bluetooth name	Set the Bluetooth name
AT+GNAM\r\n	GNAM: Bluetooth name	Get the Bluetooth name
AT+GADI\r\n	GADI: Minimum Broadcast Interval, Maximum Wide Broadcast interval	Get the broadcast interval
AT+ SADI+ Minimum Broadcast Interval, Maximum Broadcast Interval\r\n (Examples: AT+SADI+0800,0800）	SADI: Minimum Broadcast Interval, Maximum Broadcast Interval	Set the broadcast interval
AT+ GCPU\r\n	GCPU: Update Parameters, Minimum Connection Interval, Maximum Connection Interval, Connection Latent, The connection timed out	Get the connection interval
AT+ SCPU+ update parameter flag, Minimum Connection Interval, Maximum Connection Interval, Connection Latent, Connection Timeout\r\n (Example: AT+SCPU+1,0008,0010,0000, 0 600）	SCMA: Update Parameters, Minimum Connection Interval, Maximum Connection Interval, Connection Latent, Connection Timeout	Set the connection interval
AT+GADD	GADD: Bluetooth address	Get a Bluetooth address
AT+ GURT\r\n	GURT: Baud Rate	Get the baud rate
AT+ SURT+baud rate\r\n	SURT: baud rate	Set the baud rate

Pin Configuration

The pin configuration of the module is as below:

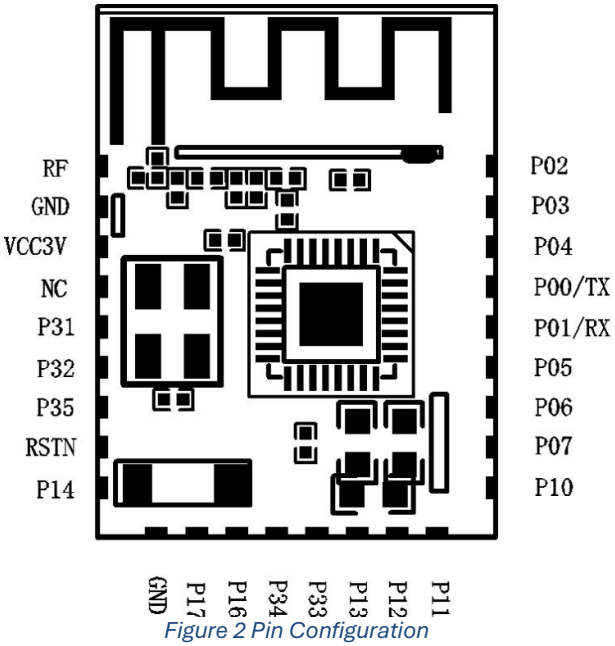


Figure 2 Pin Configuration

Foot position	The name of the symbol	I/O	Description of the function
Pin	Symb	I/O	Description
1	RF	RF	RF signal port/NC
2	GND	GND	GND
3	VCC3V	Analog	Power, 3 V
4	NC	NC	NC
5	P31	Digital I/O	General purpose IO/ADC1
6	P32	Digital I/O	General purpose IO/ADC2
7	P35	Digital I/O	General purpose IO/ADC5
8	RSTN	Analog	Active low pin reset
9	P14	Digital I/O	General purpose IO/PMW4
10	GND	GND	GND
11	P17	Digital I/O	General purpose IO//UART2_RXD
12	P16	Digital I/O	General purpose IO/UART2_TXD
13	P34	Digital I/O	General purpose IO/ADC4
14	P33	Digital I/O	General purpose IO
15	P13	Digital I/O	General purpose IO/PWM3

16	P12	Digital I/O	General purpose IO/PWM2
17	P11	Digital I/O	General purpose IO/PWM1
18	P10	Digital I/O	General purpose IO/PWM0
19	P07	Digital I/O	General purpose IO/PWM5
20	P06	Digital I/O	General purpose IO/PMW4
21	P05	Digital I/O	General purpose IO
22	P01/RX	Digital I/O	GPIO1/UART1_RXD
23	P00/TX	Digital I/O	GPIO0/UART1_TXD
24	P04	Digital I/O	General purpose IO
25	P03	Digital I/O	General purpose IO/SDA

Appearance size

The dimensions of the module are as below:

Module dimensions: 16.80mm ± 0.2mm(L) x 12.60 ± 0.2mm(W) x 2.4 ± 0.2mm (H)

PCB Thickness: 0.8mm (± 0.1mm)

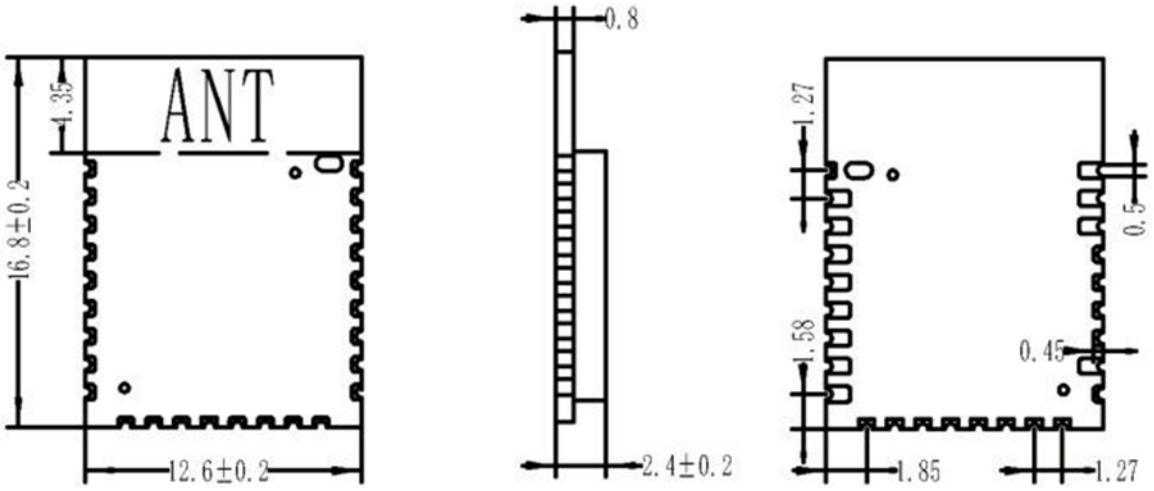
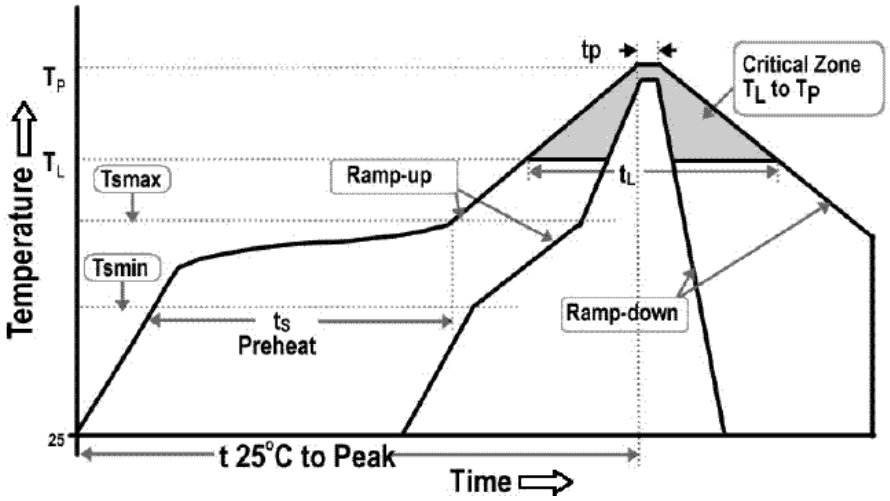


Figure 3 Module Dimensions

Solder Reflow Profile



Profile Feature		Specification
Average Ramp-Up Rate (tsmax to tp)		3 °C/second max.
Pre_heat	Temperature Min (Tsmin)	150 °C
	Temperature Max (Tsmax)	200 °C
	Time (ts)	60-180 seconds
Time Maintained above	Temperature (TL)	217 °C
	Time (tL)	60-150 seconds
Peak/Classification Temperature (Tp)		260 °C
Time within 5 °C of Actual Peak Temperature (tp)		20-40 seconds
Ramp-Down Rate		6 °C/second max.
Time 25 °C to Peak Temperature		8 minutes max.

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