PSF-B85

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Overview

PSF-B85 is an ultra low-power Wi-Fi module designed by ITEAD. The module adopts the highly integrated Wi-Fi chip ESP8285. It features industry's highly competitive compact packaging size and ultra-low power technology. Specially designed for mobile devices and the Internet of Things application, it connects physical devices to Wi-Fi wireless network to make Internet or LAN communications. PSF-B85 has completed self-contained wireless network, with built-in 32-bit kernel processor, on-chip SRAM, it can be used as the main control chip, but also as a WiFi adapter. Simply apply it to other microcontroller-based designs by SPI/SDIO or I2C/UART interface communication.

PSF-B85 supports multiple packaging form. Supports antenna of IPEX connector and stamp hole interface.

PSF-B85 is widely applied to smart power grid, smart transportation, smart home, handheld devices, industrial control, etc.

Tutorial: Using ESP8266/ESP8285 to blink an LED

Go shopping PSF-B85 WiFi Wireless Module(SKU: IM160912001)

Features

- 802.11 b/g/n/d/e/i/k/r
- Support STA/AP/STA+AP mode
- WPA/WPA2 PSK and WP
- Built-in TCP/IP protocol stack, support multi-way TCP Client connection
- Support rich Socket AT commands
- Support UART/GPIO data communication interface
- Built-in 32 bit MCU, also work as application processor
- 3.3V single supply
- Wi-Fi Direct (P2P) support
- Support MIMO 1×1 and 2×1, STBC, A- MPDU and A-MSDU aggregation and 0.4μs guard interval
- WMM power save U-APSD
- Multiple queue management to fully utilize traffic prioritization defined by 802.11e standard.
- Adaptive rate fallback algorithm sets the optimum transmission rate and Tx power based on actual SNR and packet loss information.

Functions

Main functions

The main function of PSF-B85 includes serial transparent transmission, PWM control, GPIO control.

Serial transparent transmission good transmission performance, the maximum transmission rate is 460800bps.

PWM control adjust lighting, adjust led color, adjust motor speed and much more.

GPIO control control switch, relay and more.

Operating Mode

PSF-B85 supports three operating mode:STA/AP/STA+AP.

STA mode: the module connects to Internet via a router, thus mobile phone or computer can remote control devices via Internet.

AP mode: PSF-B85 module worked as a hotspot, which realizes directly communication between the module and phone/ computer, enables wireless LAN control.

STA+AP mode: this is coexistence mode, which can realize seamlessly switch via the Internet control, easy operation.

Applications

Serial to Wi-Fi;

Industrial transparent transmission DTU;

Wi-Fi remote monitoring/control;

Intelligent Toy;

Color LED control;

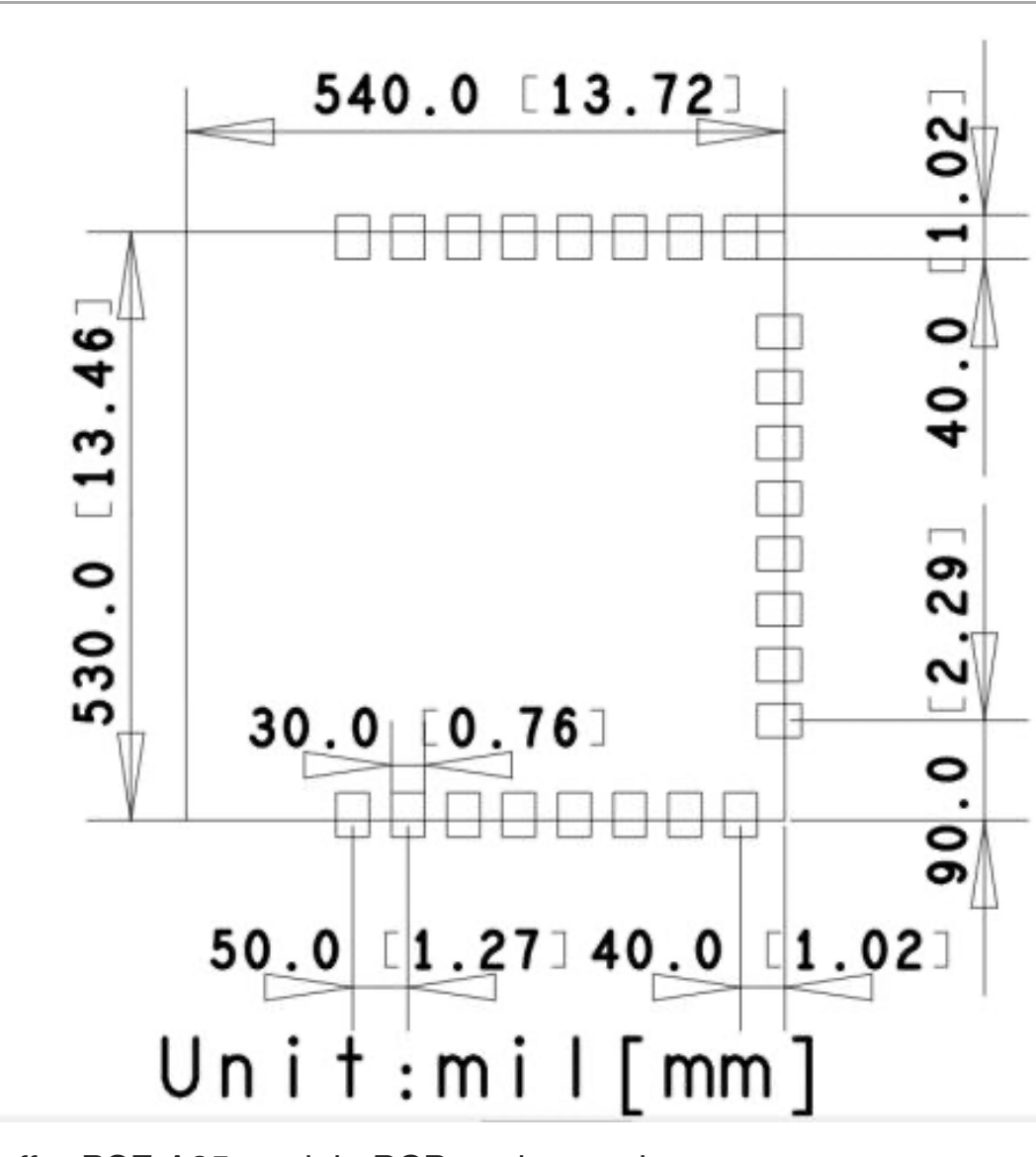
Firefighting and security integrated intelligence management;

Intelligent card terminals, wireless POS machines, Wi-Fi cameras, hand-held devices, etc.

Main Technical Specifications

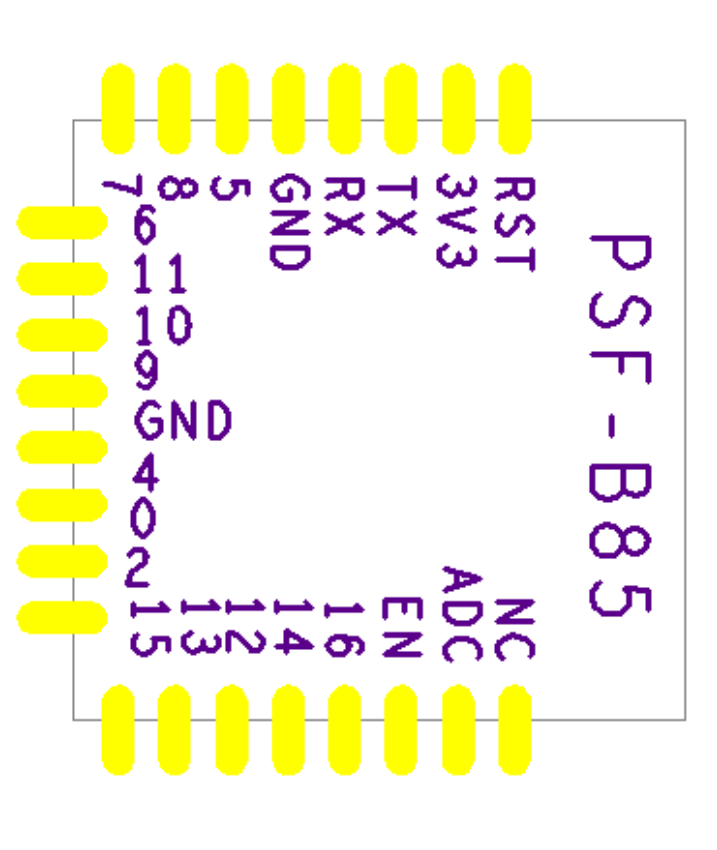
Module	Type	PSF-B85
	Chip	ESP8285
Wi-Fi	Wireless Standard	IEEE 802.11b/g/n/d/e/i/k/r
	Frequency Range	2.412GHz-2.484GHz
	Tx Power	802.11b: +20 +/-2dBm (@11Mbps)
		802.11g: +17 +/-2dBm (@54Mbps)
		802.11n: +14 +/-2dBm (@HT20, MCS7)
	Rx Sensitivity	802.11b: -91 dBm (@11Mbps ,CCK)
		802.11g: -75 dBm (@54Mbps, OFDM)
		802.11n: -72 dBm (MCS7)
	Connector	External：stamp hole interface
		External：I-PEX connector
Hardware	Peripheral Interface	UART，IIC，PWM，GPIO，ADC
	Operating Voltage	3.3V
	GPIO Drive capability	Max：12mA
	Operating Current	Continue sending=>Average value：~70mA, Peak value: 200mA Normal mode=> Average value: ~12mA, Peak value: 200mA Standby：<200uA
	Operating Temperature Range	-40°C~125°C
	Storage Temperature Range	Temp.：<40°C, Relative humidity：<90%R.H.
	Size	13.5mm*13.7mm*1mm；
Serial transparent transmission	Transmission rate	110-921600bps
	TCP Client	5
Software	Wireless network types	STA/AP/STA+AP
	Security	WEP/WPA-PSK/WPA2-PSK
	Encryption	WEP64/WEP128/TKIP/AES
	Firmware Upgrade	UART Download / OTA (via network)
	Network Protocols	IPv4, TCP/UDP/FTP/HTTP

Hardware



We can offer PSF-A85 module PCB package, please contact customer service if you need;

Pin Definitions



PIN	Function	Description
1	ANT	WiFi Antenna
2	ADC	ADC, input range: 0V-1V；
3	EN	Chip enable terminal. Active high: chip works normally; Active low: chip close, very small current.
4	GPIO16	GPIO16
5	GPIO14	GPIO14; HSPI_CLK
6	GPIO12	GPIO12; HSPI_MISO
7	GPIO13	GPIO13; HSPI_MOSI; UART0_CTS
8	GPIO15	GPIO15; HSPI_CS; UART0_RTS
9	GPIO2	Also used as a programming flash UART1_TX；GPIO2
10	GPIO0	GPIO0; SPI_CS2
11	GPIO4	GPIO4
12	GND	GND
13	GPIO9	PIHD；HSPIHD；GPIO9
14	GPIO10	SPIWP；HSPIWP；GPIO10
15	GPIO11	SPI_CS0；GPIO11
16	GPIO6	SPI_CLK；GPIO6
17	GPIO7	SPI_MSIO；GPIO7
18	GPIO8	SPI_MOSI；GPIO8
19	GPIO5	GPIO5
20	GND	GND
21	RX	Also used as a programming flash UART Rx；GPIO3
22	TX	Also used as a programming flash UART Tx ；GPIO1；SPI_CS1
23	3V3	Power supply
24	RESET	External reset（low active）

IO definition for 4 Channel Model:

PIN	Function	Description
1	GPIO0	Channel 0 switch button, low active Configure (E_FW) button: press and hold for 5s to enter configuration mode; Press it to work as a switch button
2	GPIO12	Channel 0 (Relay 0) relay switch
7	GPIO9	Channel 1 switch button, low active
8	GPIO5	Channel 1 (Relay 1) relay switch
9	GPIO10	Channel 2 switch button, low active
10	GPIO4	Channel 2 (Relay 2) relay switch
11	GPIO14	Channel 3 switch button, low active
12	GPIO15	Channel 3 (Relay 3) relay switch Require a pull down (1 ~ 10K) resistance to GND
13	GPIO13	WiFi status indicator, an LED lamp in series with a current limiting resistor to VCC

Power Consumption

The following data are conducted at 25°temperature with 3.3V power supply.

1. All measurements were performed at the antenna interface.

2. All transmitted data are conducted based on a 90% duty cycle, continuous transmission mode.

Mode	Typical	Unit
Transmit 802.11b，CCK 1Mbps，Pout=+19.5dBm	215	mA
Transmit 802.11b，CCK 11Mbps，Pout=+18.5dBm	197	mA
Transmit 802.11g，OFDM54 Mbps，Pout=+16dBm	145	mA
Transmi t802.11n，MCS7，Pout=+14dBm	135	mA
Transmit 802.11b, 1024-byte packet length, -80dBm	100	mA
Transmit 802.11g, 1024-byte packet length, -70dBm	100	mA
Transmit 802.11n, 1024-byte packet length, -65dBm	102	mA
System Standby mode	70	mA
Power off	0.5	μA

Wi-Fi Radio Characteristics

The following data are from tests conducted at room temperature with 3.3V power supply.

Note：

1. 72.2Mbps is measured under 802.11n mode, MCS = 7, GI = 200uS;

2. Maximum output power can be + 19.5dBm in 802.11b mode;

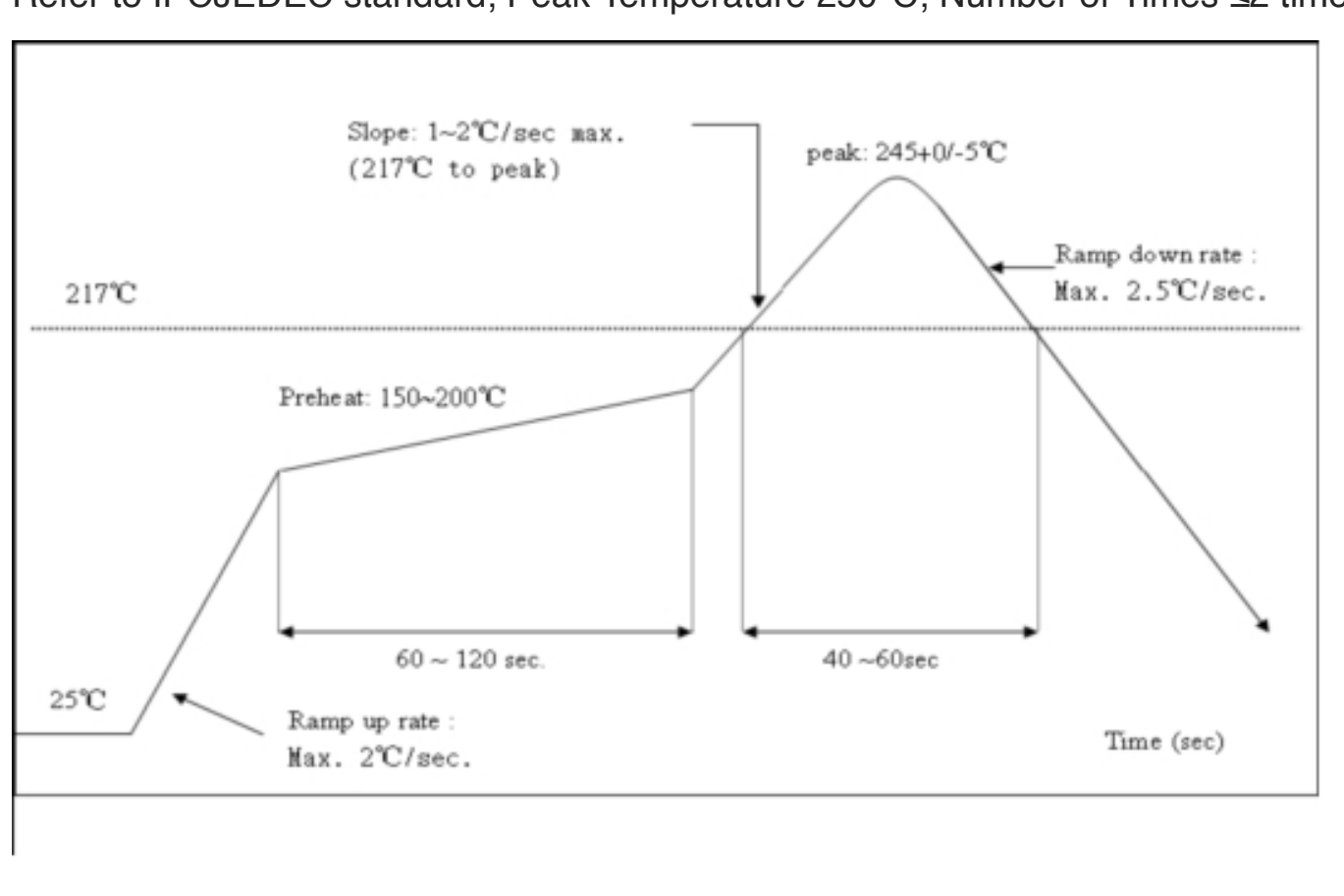
Parameters	Min	Typical	Max	Unit
Input frequency	2412	-	2484	MHz
Input impedance	-	50		Ω
Input reflection	-	-	-10	dB
Output power of PA for 72.2 Mbp	14	15	16	dBm
Output power of PA for 802.11b	17.5	18.5	19.5	dBm
Sensitivity				
CCK 1Mbps	-	-98	-	dBm
CCK 11Mbps	-	-91	-	dBm
6Mbps(1/2BPSK)	-	-93	-	dBm
54Mbps(3/4 64-QAM)	-	-75	-	dBm
HT20，MCS7（65Mbps，72.2Mbps）	-	-71	-	dBm
Adjacent Channel Rejection				
OFDM，6Mbps	-	37	-	dB
OFDM，54Mbps	-	21	-	dB
HT20，MCS0	-	37	-	dB
HT20，MCS7	-	20	-	dB

WiFi Antenna

PSF-B85 has onboard ceramic antenna, users can directly use, no need to design again. Please do not rub copper or connect wire below the antenna.

Recommended Temperature Graph

Refer to IPCJEDEC standard; Peak Temperature 250°C; Number of Times ≤2 times;



Related Terminologies

Abbreviation	Description
WiFi	Wireless Fidelity
UART	Universal Asynchronous Receiver & Transmitter
DTIM	Delivery Traffic Indication Message
SOC	System On a Chip
P2P	Point to Point
TCP	Transmission Control Protocol
IP	Internet Protocol
STBC	Space-Time Block Coding
MIMO	Multiple Input Multiple Output
MPDU	MAC Protocol Data Unit
MSDU	MAC Server Data Unit
IEEE	Institute Of Electrical And Electronics Engineers
bps	Bits Per Second
CCK	Corporate Control Key
DQPSK	Differential Quadrature Phase Shift Keying
DBPSK	Differential Binary Phase Shift Keying
QAM	Quadrature Amplitude Modulation
OFDM	Orthogonal Frequency Division Multiplexing
WPA	Wi-Fi Protected Access
WPS	Wi-Fi Protected Setup
TKIP	Temporal Key Integrity Protocol
WAPI	Wlan Authentication And Privacy Infrastructure
WEP	Wired Equivalent Privacy
CRC	Cyclic Redundancy Check

Download

PSF-B85 Schmatic

PSF-B85 VIEW

PSF-B85 dimension

ESP8285 Datasheet V1.4 EN

ESP8285 Datasheet V1.4 CN