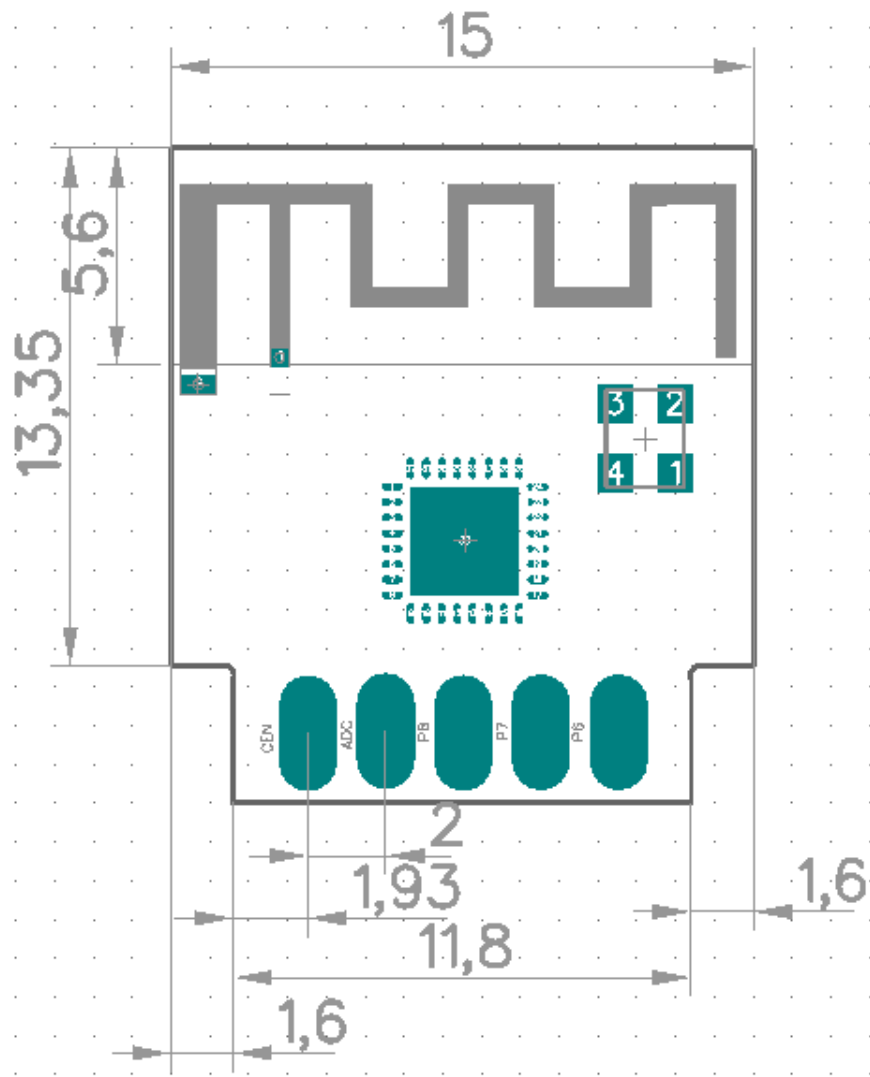# EPI E02

The EPI E02 module features a fully integrated 2.4 GHz radio transceiver and baseband processor for Wi-Fi 802.11b/g/n and Bluetooth® v5.2 IoT applications. It can be used as a stand-alone application-specific communications processor or as a wireless data link in hosted MCU systems where power consumption is critical. It supports flexible memory architecture for storing profiles, stacks and custom application codes and can be updated using Over-The-Air (OTA) technology. The EPI E02 module uses the Beken BK7231N SoC. It is equipped with a powerful 32-bit processor with a clock speed of up to 120 MHz and internal flash memory of 2 MB. EPI E02 can be connected to any external MCU via interface, and to sensors or other devices via GPIO. The transceiver connects directly to the antenna and is fully compatible with Wi-Fi 802.11b/g/n and Bluetooth 5.2 BLE standards. With an integrated antenna switch, RF balun, power amplifier (PA), and low noise amplifier (LNA), the BK7231N enables both Wi-Fi and Bluetooth while minimizing PCB design footprint and external component requirements.

Features

- Built in with the low-power 32-bit CPU, which can also function as an application processor

- Working voltage: 3.0 to 3.6V

- The clock rate: 120 MHz

- Peripherals: 5 PWMs and 1 UART

- Wi-Fi connectivity

– 802.11 b/g/n
– Support WEP, WPA / WPA2, WPA / WPA2 PSK (AES), WPA3 security modes
– Channels 1 to 14@2.4 GHz
– Up to +16 dBm output power in 802.11b mode
– Support STA / AP/STA+AP working mode
– Support SmartConfig and AP network configuration manners for Android and iOS devices
– Onboard PCB antenna
– Working temperature: -40°C to 85°C

- Bluetooth connectivity

– Support the Bluetooth LE V5.2
– Support the transmit power of 6 dBm in the Bluetooth mode
– Complete Bluetooth coexistence interface
– Onboard PCB antenna with a gain of 0 dBi

ezlo
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15

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13,35

3 2
4 1

CEN
ADC
P8
P7
P6

2

1,93

11,8

1,6

1,6

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Pin definition

1	+3,3V	P	Power supply
2	P6	I/O	Hardware PWM and correspond to P6 of the IC
3	Gnd	P	Power supply
4	P7	I/O	Hardware PWM and correspond to P7 of the IC
5	RX1	I/O	UART_RX1 default, the MCU serialport should be in low-level or highimpedance state.
6	P8	I/O	Hardware PWM and correspond to P8 of the IC
7	TX	I/O	UART_TX1 , the MCU serialport should be in low-level or high impedance state.
8	ADC	I/O	ADC, which corresponds to P23 of the IC
9	P24	I/O	Hardware PWM and correspond to P24 of the IC
10	CEN	I/O	Reset pin
11	P26	I/O	Hardware PWM and correspond to P26 of the IC
T/P	RX2	I/O	UART_RX2, This pin is not allowed to use
T/P	TX2	I/O	UART_TX2, outputting logs

Wi-Fi RF Specification (RX)

Parameter	Description	Min	Typ	Max	Unit
Frequency Range		2412		2484	MHz
RX Sensitivity 11g @8% PER	1 Mbps		-97		dBm
	2 Mbps		-93		dBm
	5.5 Mbps		-91		dBm
	11 Mbps		-89		dBm
RX Sensitivity 11g @10% PER	6 Mbps		-92		dBm
	9 Mbps		-90		dBm
	12 Mbps		-88		dBm
	18 Mbps		-86		dBm
	24 Mbps		-82		dBm
	36 Mbps		-79		dBm
	48 Mbps		-77		dBm
	54 Mbps		-75		dBm
Receive Sensitivity (11n, 20MHz) @10% PER	MCS=0		-90		dBm
	MCS=1		-88		dBm
	MCS=2		-86		dBm
	MCS=3		-81		dBm
	MCS=4		-79		dBm
	MCS=5		-74		dBm
	MCS=6		-73		dBm
	MCS=7		-71		dBm

Parameter	Description	Min	Typ	Max	Unit
Receive Sensitivity (11n, 40MHz) @10% PER	MCS=0		-88		dBm
	MCS=1		-85		dBm
	MCS=2		-83		dBm
	MCS=3		-78		dBm
	MCS=4		-76		dBm
	MCS=5		-71		dBm
	MCS=6		-70		dBm
	MCS=7		-68		dBm
Maximum Receive Level	802.11b		-10		dBm
	802.11g		-8		dBm
	802.11n		-8		dBm

3 Wi-Fi RF Specification (TX)

Parameter	Condition	Min	Typ	Max	Unit
Frequency Range		2412		2484	MHz
Outout Power	802.11b (11Mbps)		17.0		dBm
	802.11g (54Mbps)		15.0		dBm
	802.11n (MCS7)		14.0		dBm
Outout Power	802.11b (11Mbps)		-15	-10	dB
	802.11g (54Mbps)		-28	-25	dB
	802.11n (MCS7)		-30	-28	dB
	VBAT=3.3V, Ambient temperature=25°C				

Power Consumption

Parameter	Condition	Min	Typ	Max	Unit
Continuous TX	802.11b/11Mbps/17dB,		280		mA
Continuous TX	802.11g/54Mbps/15dB,		250		mA
Continuous TX	802.11n/HT20-MCS7/14dB,		250		mA
RX mode	802.11b/11Mbps/-10dB input		63		mA
RX mode	802.11g/54Mbps/-10dB input		69		mA
RX mode	802.11n/HT20-MCS7/-10dB input		69		mA
Normal Standby	MCU stop; Modem power-off		30		uA
Low-power Standby	MCU stop in low-power mode		10		uA
Deep Sleep	All main logic circuit power-off		5		uA
Shutdown	CEN pin = LOW		1		uA

BLE RF Specification (RX)

Parameter	Condition	Min	Typ	Max	Unit
Frequency Range		2402		2480	MHz
RX Sensitivity			-85		dBm
Maximum Input Level		-10			dBm

BLE RF Specification (TX)

Parameter	Condition	Min	Typ	Max	Unit
Frequency Range		2402		2480	MHz
Maximum Output Power		-20	5	18	dBm
20dB Bandwidth			1		MHz