

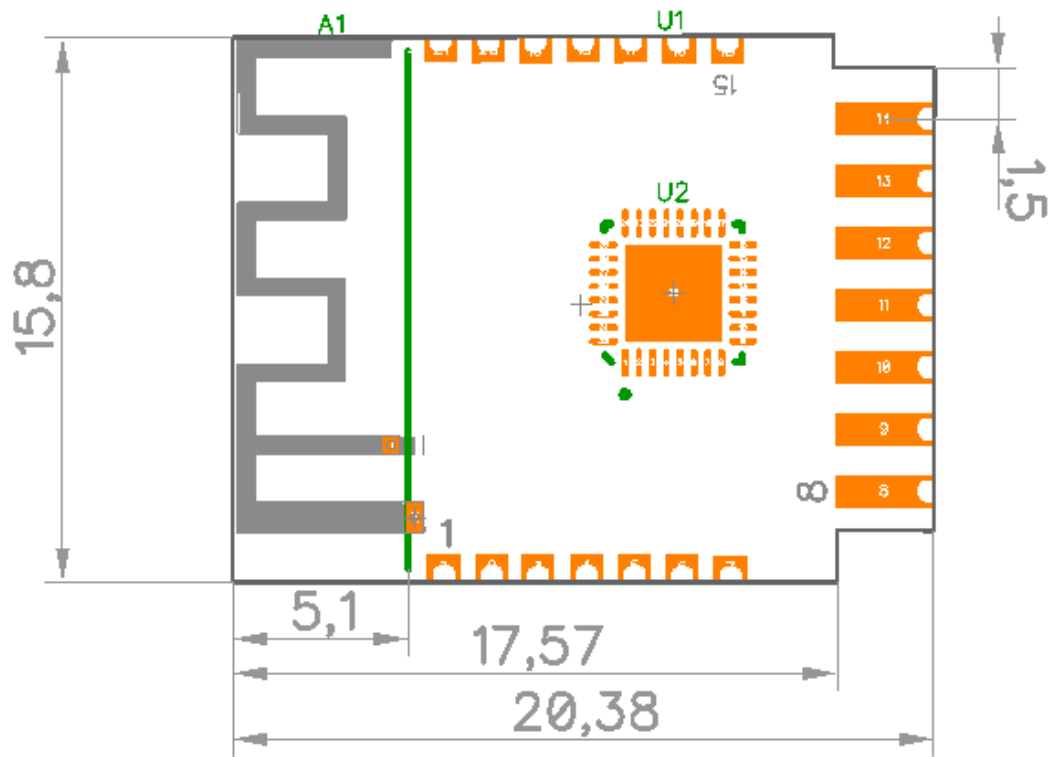


EPI E03

The EPI E03 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 E03 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 E03 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



Pin definition

Pin N	Symbol	I/O type	Function
1	P14	P	Common GPIO, which can be reused as SPI_SCK (Correspond to Pin11 of the IC)
2	P16	I/O	Common GPIO, which can be reused as SPI_MOSI (Correspond to Pin12 of the IC)
3	P20	P	Common GPIO (Correspond to Pin20 of the IC)
4	P22	I/O	Common GPIO (Correspond to Pin18 of the IC)
5	ADC	I/O	ADC, which corresponds to P23 on the internal IC (Correspond to Pin17 of the IC)
6	RX2	I/O	UART2 RX, which corresponds to P1 on the internal IC. (Correspond to Pin28 of the IC)
7	TX2	I/O	UART2 TX, which is used for outputting logs and corresponds to P0 of the internal IC (Correspond to Pin29 of the IC)
8	P8	I/O	Support hardware PWM (Correspond to Pin24 of the IC)
9	P7	I/O	Support hardware PWM (Correspond to Pin23 of the IC)
10	P6	I/O	Support hardware PWM (Correspond to Pin22 of the IC)
11	P26	I/O	Support hardware PWM (Correspond to Pin15 of the IC)
12	P24	I/O	Support hardware PWM (Correspond to Pin16 of the IC)
13	GND	I/O	Power supply reference ground
14	3V3	I/O	Power supply 3V3
15	TX1	I/O	UART1 TX, which is used for transmitting user data and corresponds to Pin27 of the IC. For the MCU solution, please refer to CBx Module
16	RX1	I/O	UART1 RX, which is used for receiving user data and corresponds to Pin26 of the IC. For the MCU solution please refer to CBx Module
17	P28	I/O	Common GPIO (Correspond to Pin10 of the IC)
18	CEN	I/O	Reset pin, low active (internally pulled high), compatible with other modules (Correspond to Pin21 of the IC)
19	P9	I/O	Common GPIO (Correspond to Pin25 of the IC)

20	P17	I/O	Common GPIO, which can be reused as SPI_MISO (Correspond to Pin14 of the IC)
21	P15	I/O	Common GPIO, which can be reused as SPI_CS (Correspond to Pin13 of the IC)
22	CSN	I/O	Mode selection pin. If it is connected to the ground before being powered on, enter the firmware test mode. If it is not connected or connected to VCC before being powered on, enter the firmware application mode. Correspond to Pin19 on the internal IC.

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		µA
Low-power Standby	MCU stop in low-power mode		10		µA
Deep Sleep	All main logic circuit power-off		5		µA
Shutdown	CEN pin = LOW		1		µA

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