

Document	Part Number	Revision	Date
Specification	FEM02400250ZBS22A	A	25-Mar-2022

Part Number: FEM02400250ZBS22A

Description

FEM02400250ZBS22A is an RF front-end single-chip integrated RF function used in IEEE 802.15.4/ZigBee, Bluetooth 2.4GHz ISM band wireless sensor network and other wireless systems.

As a single-chip device implemented by a CMOS process with RF and power integrated inside, the amplifier (PA) and low-noise amplifier (LNA) are controlled on/off using a control circuit.

Existing applications of the FEM02400250ZBS22A include mainly industrial control automation, intelligent home and RF4CE compliant RF systems.

Because of the chip's very good performance, high sensitivity and efficiency, low noise, small size and low cost of the FEM02400250ZBS22A, it is suitable for narrowband applications within the ISM frequency bandwidth.

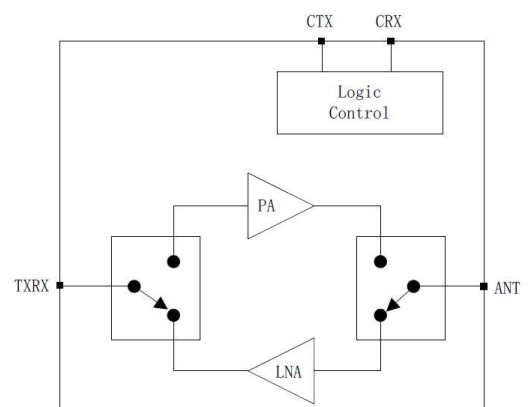
Feature

- 2.4GHz high-power single-chip RF front-end integrated chip
- Input and output ports are matched to 50-Ohm
- Integrated +22.5dBm output power amplifier (PA)
- Integrated 3.2dB noise figure low noise amplifier (LNA)
- Transmit/receive switch switching circuit
- ESD protection circuit for all ports
- Integrate all on-chip termination

Applications

- ZigBee and its related applications
- Bluetooth and related applications
- Smart home and industrial automation
- ZigBee smart power solution
- RF4CE remote control
- Customized 2.4 GHz RF system

Function Block Diagram





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Specification	FEM02400250ZBS22A	A	25-Mar-2022

Absolute Maximum Value

Parameter	Symbol	Specification			Unit
		Min.	Typ.	Max.	
Supply Voltage at Pin VCC	VDD	0	-	4	V
Voltage at Pin EN	VEN	0	-	3.6	V
Current into Pin VDD ¹⁾	I _{DD}	-	-	350	mA
Sleep current consumption	I _{SLP}			0.5	uA
RF Input Power	P _{IN}	-	-	5	dBm
ESD	HBM	-		4000	V
Junction Temperature	T _J	-	-	150	°C

1) When the transmit control pin TXEN is high

Recommend Operating Condition

Parameter	Pin Name	Conditions	Specification			Unit
			Min.	Typ.	Max.	
Supply Voltage	V _{DD}		3	3.3	3.6	V
Control Voltage High	V _H		1.2		VDD	V
Control Voltage Low	V _L		0		0.3	V
Operating Temperature	T _{OPR}		-40	25	+125	°C

Logic Ture Table

Parameter	TXEN	RXEN
TX path On	1	x
Rx path On	0	1
Chip Off state	0	0

"1" means control pin high state (> 1.2 V)

"0" means control pin low state (< 0.3 V)

"X" means the state is optional: "1" or "0" can be



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Tx Electrical Specifications (VDD=3.3V, 25 °C, Freq=2.4GHz-2.5GHz)

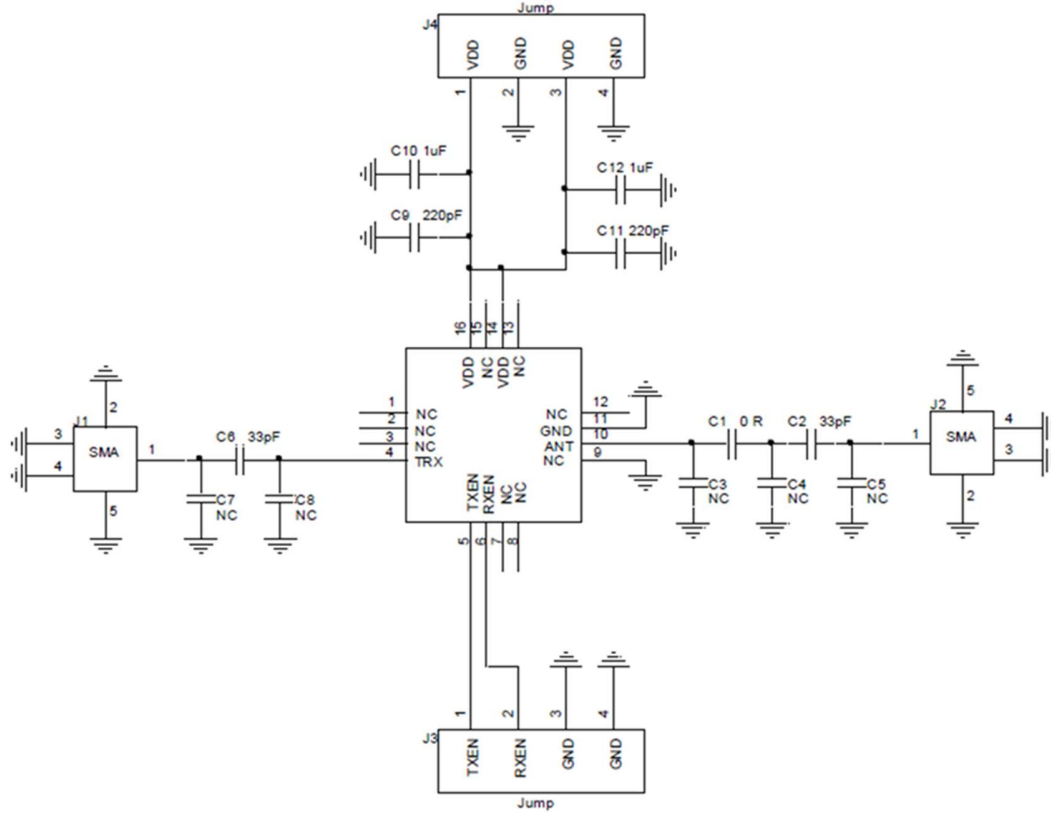
Parameter	Specification			Unit	Conditions
	Min.	Typ.	Max.		
Frequency Range	2.4		2.5	GHz	
Gain		24		dB	
Quiescent operating current		22		mA	Output Power=20dBm
Saturation output power		22.5		dBm	
transmit high power current		100		mA	
Input return loss		-10		dB	
Output return loss		-6		dB	
Input/Output Impedance	50			Ohm	single-ended input/output
2 nd order harmonics		-10		dBm/MHz	Output Power=20dBm
3 rd order harmonics		-20		dBm/MHz	Output Power=20dBm
Load standing wave stability		6:1			Output Power=20dBm
Load standing wave robustness	No damage				Output Power=20dBm

Rx Electrical Specifications (VDD=3.3V, 25 °C, Freq=2.4GHz-2.5GHz)

Parameter	Specification			Unit	Conditions
	Min.	Typ.	Max.		
Frequency Range	2.4		2.5	GHz	
Small Signal Gain		15		dB	
Noise Figure		3.2		dB	
P1dV		-8		dBm	
Input Return Loss		-10		dB	
Output Return Loss		-12		dB	
Quiescent operating current		9		mA	

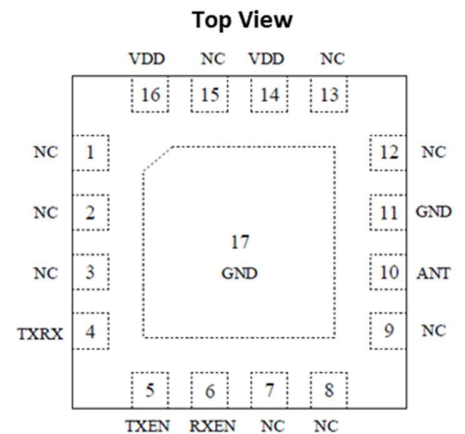
Document	Part Number	Revision	Date
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Reference Design



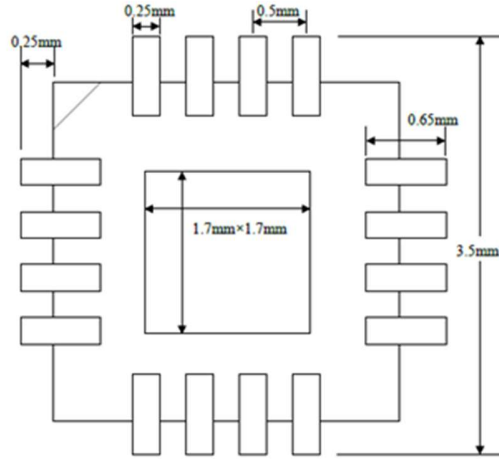
PIN Names and Signal Descriptions

Pin No.	Name	Description
0	GND	GND pad
1	GND	GND pad
2	GND	GND pad
3	TRX	TRX pad
4	GND	GND pad
5	ENT	Enable of TX
6	ENR	Enable of RX

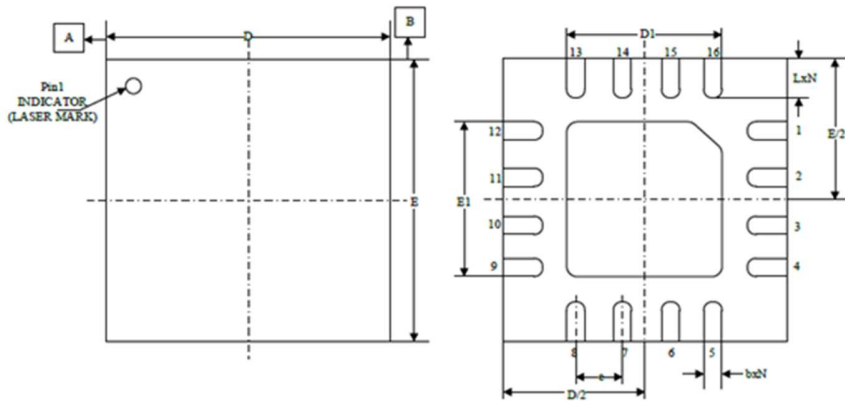


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Package Information



PCB Land Pattern



Unit (mm)

Symbol	Min.	Typ.	Max.
A	0.7	0.75	0.8
A1	0.0	0.02	0.05
A2		0.2	
B	0.18	0.25	0.3
D	2.9	3.0	3.1
D1	1.55	1.7	1.8

Symbol	Min.	Typ.	Max.
E	2.9	3.0	3.1
E1	1.55	1.7	1.8
E		0.5BSC	
L	0.3	0.4	0.5
N		16	



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Revision History

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A	Initial Release	25-Mar-2022