



2.4GHz Single-Port Active Integrated Antenna with LNA and Switch

Description

BHWR250L is a complete RF Front-End solution from BHW's RF Active integrated Antenna (RFAiA™) product family. It integrates a low noise amplifier with ultra-low 1.8dB total noise figure and 13dB gain, a switch path for single-port interface with the transceiver SoC, and a compact antenna with high efficiency and very stable VSWR under various PCB size and housing conditions, all into a compact 16x12mm design. BHWR250L can be easily surface-mounted to the main product board without requiring any additional impedance matching, resulting in significantly simplified RF design and shorter product development cycle.

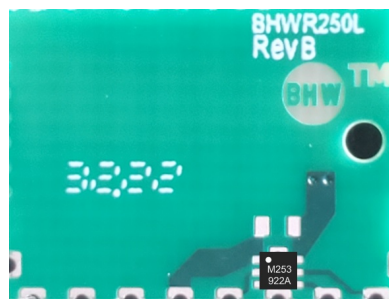
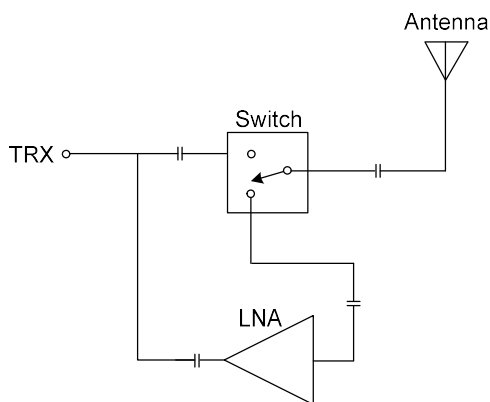
Key Features

- 2.4-2.5GHz Operation Frequency Range
- Operating Voltage: 1.2~4.2V
- Rx Noise Figure: 1.8dB; Gain: 13dB
- LNA Current: 13mA at Vdd=3.3V (Adjustable)
- Tx Insertion Loss: 1.3dB
- Robust ESD Protection
- Minimal and Relaxed RF Design for Main PCB
- Compact 16x12mm footprint for SMT

Key Applications

- IEEE 802.11 WLAN Systems
- IoT Modules including ZigBee/Thread/Matter
- Wireless Audio/Video
- Remote Control
- Generic 2.4GHz TDD Radio Designs

Functional Block and Product Information

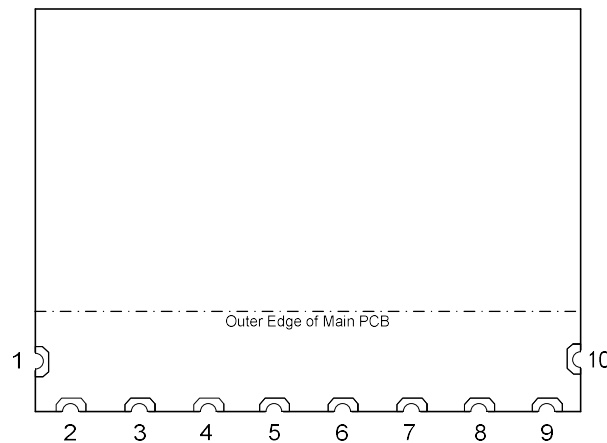


16x12x0.6mm PCB (with BHW M253)



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Pin Assignment and Pin Description



(Top “See-Through” View)

Pin Number	Pin Name	Description
5	RF	RF TRX Port
6	CTX	Logic Control Voltage for Tx
8	VDD	DC Supply Voltage
9	CRX	Logic Control Voltage for Rx
1,2,3,4,7,10	GND	Connect to GND on Main PCB

Absolute Maximum Ratings

Parameter	Rating	Unit
Maximum VDD Supply Voltage	4.5	V
Maximum Control Voltage	3.6	V
Maximum VDD Supply Current	50	mA
Maximum Tx Input Power	+30	dBm
Junction Temperature	+150	°C
Operation Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C
Moisture Sensitivity Level	MSL1	

Note: Do not exceed any single or combination of the above parameters. Sustained operation at or above the Absolute Maximum Ratings may result in permanent damage to the device. Maximum Input Power Rating assumes 50-Ohm load impedance.

**2.4GHz Single-Port Active Integrated Antenna with LNA and Switch****Electrical Specifications****Receive Mode: VDD=3.3V, CRX=3.3V, CTX=0**

Parameter	Condition	Specification			Unit
		Min.	Typ.	Max.	
Operating Frequency		2.4		2.5	GHz
Operating Voltage	VDD	1.2	3.3	3.6	V
Logic Control Voltage	For CRX=High	1.2	3.3	3.6	V
Quiescent Current*	VDD=CRX=3.3V, No RF Input		12*		mA
Shutdown Current	VDD=3.3V, CRX=0			1	uA
Small-Signal Gain	Pin=-30dBm		13		dB
Noise Figure			1.8		dB
Input P1dB	VDD=3.3V		0		dBm
Input VSWR			1.5:1		dB

*LNA current can be further reduced with an external resistor on CRX pin, or using lower voltage for CRX.

Transmit Mode: VDD=3.3V, CTX=3.3V, CRX=0

Parameter	Condition	Specification			Unit
		Min.	Typ.	Max.	
Operating Frequency		2.4		2.5	GHz
Operating Voltage	VDD	1.2	3.3	3.6	V
Logic Control Voltage	For CTX=High	1.2	3.3	3.6	V
Insertion Loss			1.3		dB
Input VSWR			1.7:1		dB



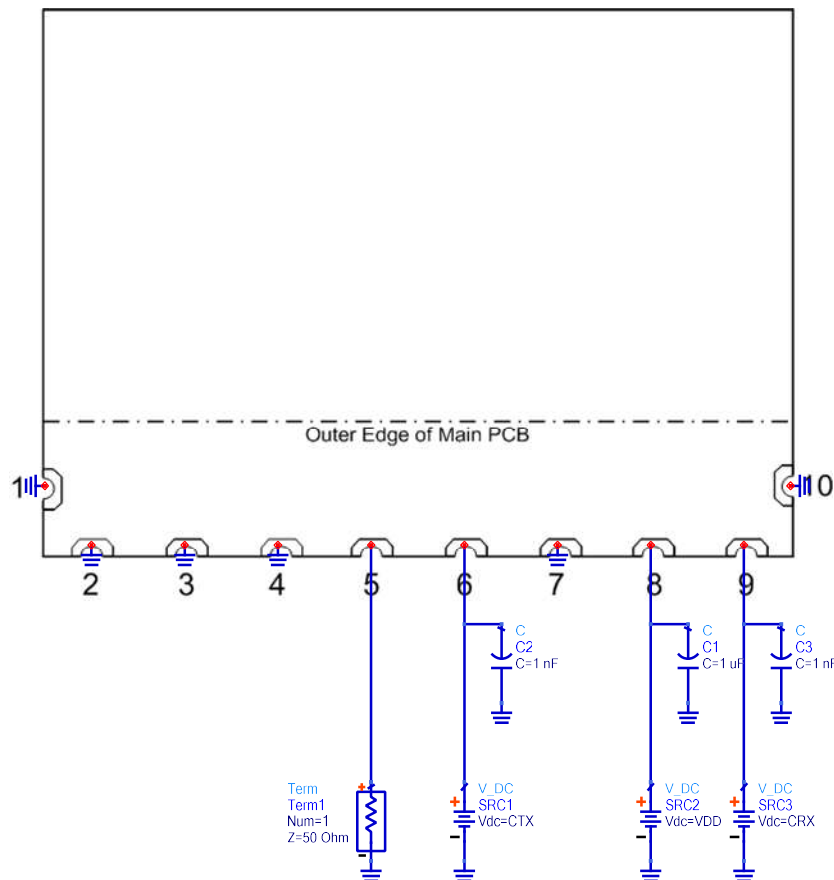
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Transmit/Receive Control

CTX	CRX	Mode of Operation
0	0	All Off
1	0	Transmit (By-Pass)
0	1	Receive (LNA On)

Application Schematic

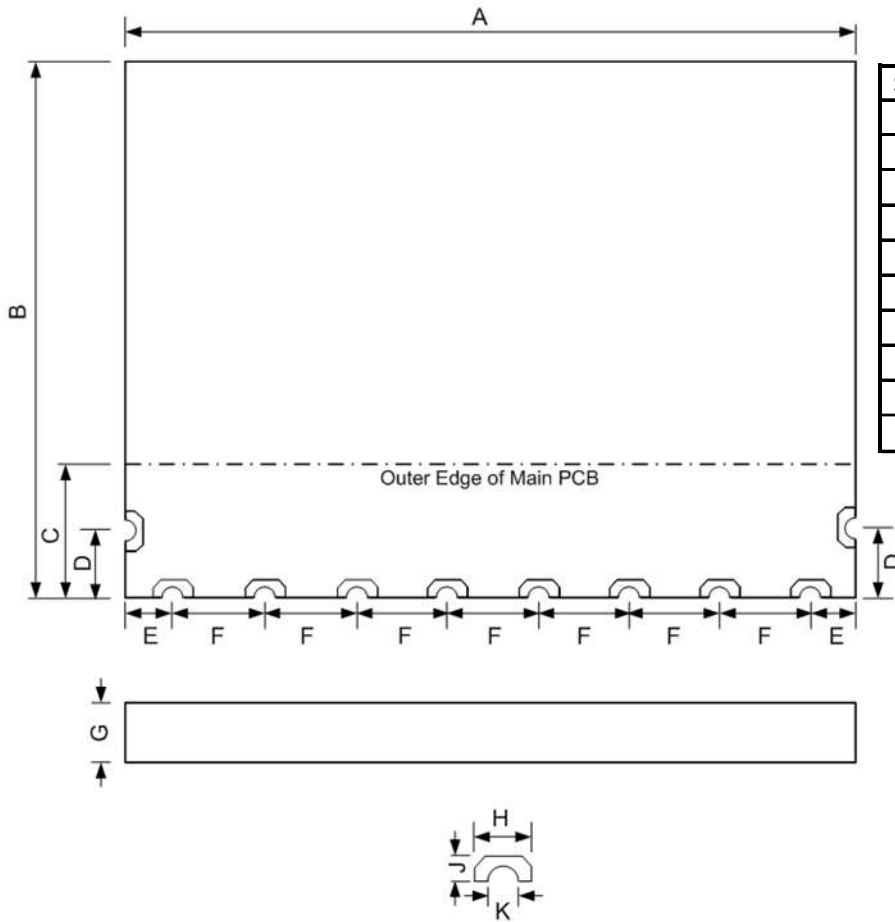
(Refer to BHW AppNote #020 for Details)





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Mechanical Specifications



Symbol	Min. (mm)	Typ. (mm)	Max. (mm)
A	15.9	16	16.1
B	11.9	12	12.1
C	2.9	3	3.1
D	1.4	1.5	1.6
E	0.9	1	1.1
F	1.9	2	2.1
G	0.65	0.7	0.75
H	0.95	1	1.05
J	0.45	0.5	0.55
K	0.55	0.6	0.65