AWL5910N

802.11a/n 5 GHz Power Amplifer

Product Definition

ADVANCED PRODUCT INFORMATION - Rev 0.0

FEATURES

- 3% Dynamic EVM @ P_{OUT} = 22 dBm with 802.11n MCS7-HT40 waveform, 5.0 V
- 31 dB of Linear Power Gain @ 5.0 V
- Power Detector with High Accuracy Over 3:1 VSWR
- 1.8 V CMOS Compatible PA Enable Pin
- Single 3.3/5.0 V Supply Voltage
- 50 Ω-Internally Matched RF Ports
- Leadfree and RoHS Compliant
- 4 x 4 x 0.80 mm QFN package

APPLICATIONS

- 802.11a/n WLAN enabled:
  - Access Points
  - Media Gateways
  - Set top boxes
  - Smart TV's

PRODUCT DESCRIPTION

The ANADIGICS AWL5910N WLAN Power Amplifier is an easy to use module that delivers high levels of linearity and efficiency for high data rate applications. Designed for the 5 GHz WLAN standards, it supports IEEE 802.11a/n applications.

Requiring only a single +3 V to +5 V supply and a CMOS compatible 1.8 V enable voltage, the AWL5910N reduces system power consumption by offering a low leakage current while the amplifier is shut down. The detector facilitates accurate power control (+/- 0.5 dB) over varying load conditions (3:1 VSWR). No external circuits are required for RF impedance matching, thus reducing component costs and making it easy to incorporate the device into new designs.

The AWL5910N is manufactured using an advanced InGaP HBT technology that offers state-of-the-art reliability, temperature stability and ruggedness. It is offered in a 4 x 4 x 0.80 mm surface mount package optimized for a 50 Ω system.

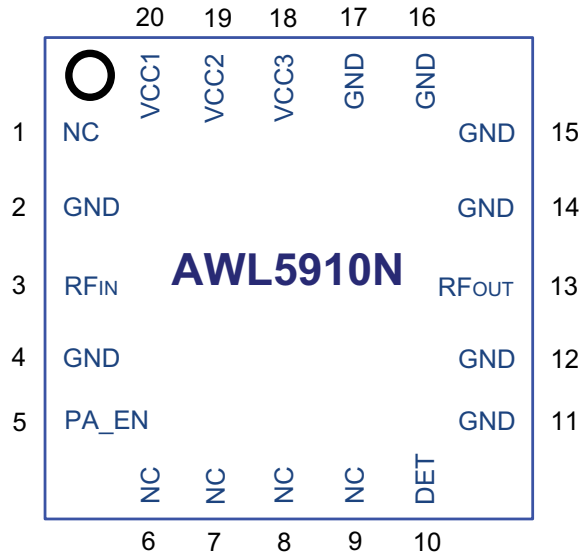


Figure 1: Pinout Diagram

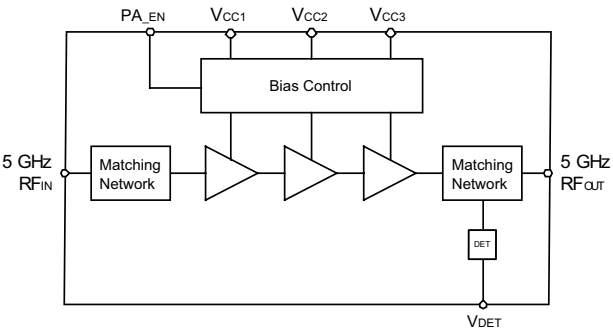


Figure 2: Functional Block Diagram

Table 1: Pin Description

PIN	NAME	DESCRIPTION
1	N/C	No Connection
2	GND	Ground
3	RF_{IN}	Power Amplifier RF input
4	GND	Ground
5	PA_EN	PA Enable Pin
6, 7	N/C	No Connection
8	N/C	No Connection
9	N/C	No Connection
10	DET	Analog Power Detector Output
11, 12	GND	Ground
13	RF_{OUT}	Power Amplifier RF output
14 - 17	GND	Ground
18	VCC3	Third Stage Supply Voltage
19	VCC2	Second Stage Supply Voltage
20	VCC1	First Stage Supply Voltage

ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

PARAMETER	MIN	MAX	UNIT	COMMENTS
DC Power Supply	-	+6.0	V	
PA_EN Voltage	-0.3	+3.6	V	
RF_{IN}, 5 GHz PA	-	+6	dBm	Modulated
Operating Ambient Temperature	-40	+85	°C	
Storage Temperature	-40	+160	°C	
Storage Humidity	-	60	%	
Junction Temperature	-	150	°C	
ESD_{HBM}	1000	-	V	JEDEC JESD22-A114 all pins
MSL Rating	-	MSL-2	-	

Functional operation to the specified performance is not implied under these conditions. Operation of any single parameter in excess of the absolute ratings may cause permanent damage. No damage occurs if one parameter is set at the limit while all other parameters are set within normal operating ranges.

Table 3: Operating Ranges

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Operating Frequency Ranges	4.9	-	5.9	GHz	802.11a/n/ac
DC Power Supply Voltage (V_{CC})	+3.0	+5.0	+5.25	V	With RF applied
Quiescent Current	-	160	-	mA	No RF
Leakage Current	-	15	-	µA	
PA_EN Current	-	100	200	µA	
PA_EN Voltage	1.8	1.8	3.3	V	Control Voltage High
PA_EN Voltage	0	-	0.5	V	Control Voltage Low
Operating Temperature	-40	-	+85	°C	

The device may be operated safely over these conditions; however, parametric performance is guaranteed only over the conditions defined in the electrical specifications.

Table 4: Electrical Specifications - 5 V Operation
(T_C = +25 °C, V_{CC} = +5.0 V, PA_EN = 1.8 V) 802.11n, unless otherwise noted

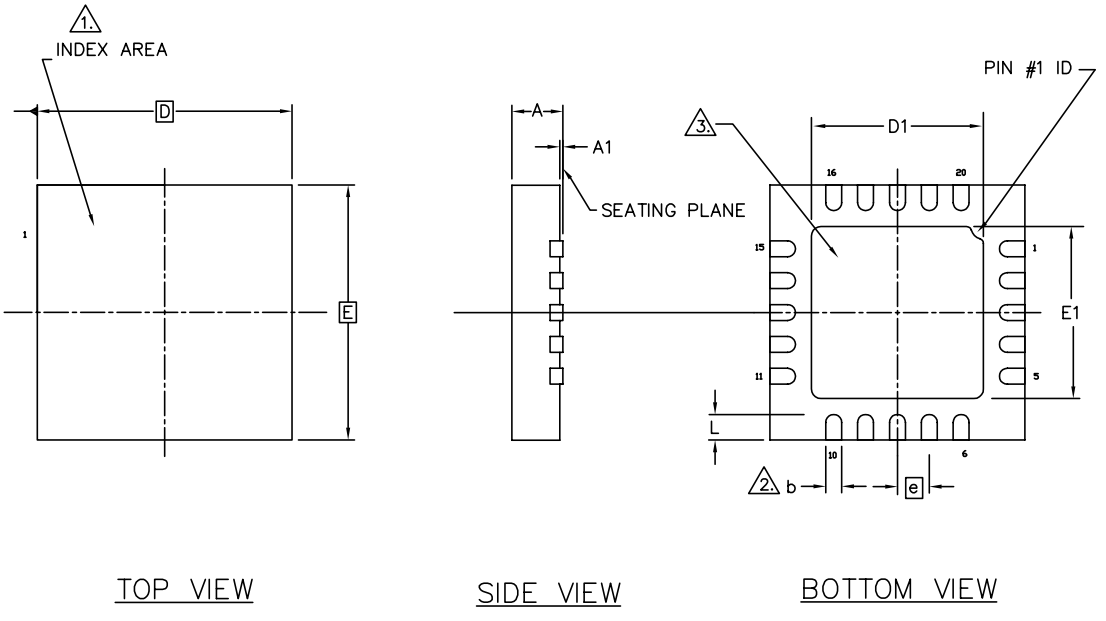
PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Frequency	4.9	-	5.9	GHz	
Error Vector Magnitude (EVM) (1, 2)	22 -	- 270	- -	dB mA	802.11n, MCS7 - HT40, 3%
802.11n Mask	-	26	-	dBm	802.11n MCS0 - HT20
Power Gain	-	31	-	dB	
Gain variation over band	-	+/- 1.0	-	dB	
Gain variation over 80 MHz	-	+/- 0.25	-	dB	
Gain at 3.8 GHz	-	+5	-	dB	P_{IN} = -25 dBm
1 dB output compression point	-	32	-	dBm	P_{IN} = CW
Input Return Loss	-	-10	-	dB	
Output Spurious Levels - Harmonics 2 f_O 3 f_O 4 f_O	 - - -	 -40 -50 -60	 - - -	 dBm/ MHz	For Power levels up to 26 dBm OFDM
Rise/Fall Time	-	0.5	-	µs	Within 0.5 dB of final value
Stability	All non-harmonically related outputs < -50 dBc/100 kHz				P_{OUT} = +24 dBm, V_{CC} = 5 V, 54 Mbps, 64 QAM, VSWR = 6:1, all phases
Ruggedness	No damage				P_{OUT} = +28 dBm, 802.11n, VSWR = 6:1, V_{CC} = 5 V, all phases

Notes:
(1) EVM includes system noise floor of 0.8% (-42 dB).
(2) P_{OUT} degraded from 4.9 - 5.15 GHz.

Table 5: Electrical Specifications - 5 GHz TX Mode Power Detector
(T_C = +25 °C, V_{CC} = +5.0 V, PA_EN = 1.8 V)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Detector Voltage	- - - -	260 550 780 900	- - - -	mV	P_{OUT} = 0 dBm P_{OUT} = 14 dBm P_{OUT} = 20 dBm P_{OUT} = 23 dBm
Total Internal Load Impedance	-	20	-	kΩ	Off State
Output Impedance	-	100	-	Ω	On State
Load Accuracy	-	+/- 0.5	-	dB	Ouput Power variation at 3:1 VSWR all phases
Detector Bandwidth	-	10	-	MHz	Can be adjusted lower with external R and shunt C components

PACKAGE OUTLINE



SYMBOL	DIMENSIONS—MM			NOTE
	MIN.	NOM.	MAX.	
A	0.70	0.75	0.80	
A1	0.00	0.02	0.05	
b	0.18	0.25	0.30	
D	3.95	4.00	4.05	
D1	2.55	2.70	2.80	
E	3.95	4.00	4.05	
E1	2.55	2.70	2.80	
e	0.50 BSC			
L	0.30	0.40	0.50	

NOTES :

1. TERMINAL #1 IDENTIFIER AND PAD NUMBERING CONVENTION SHALL CONFORM TO JESD 95–1 SPP–012.
2. DIMENSION b APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30mm FROM TERMINAL TIP.
3. BILATERAL COPLANARITY ZONE APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

Figure 3: Package Outline - 20 Pin, 4 x 4 x 0.80 mm QFN

APPLICATION CIRCUIT

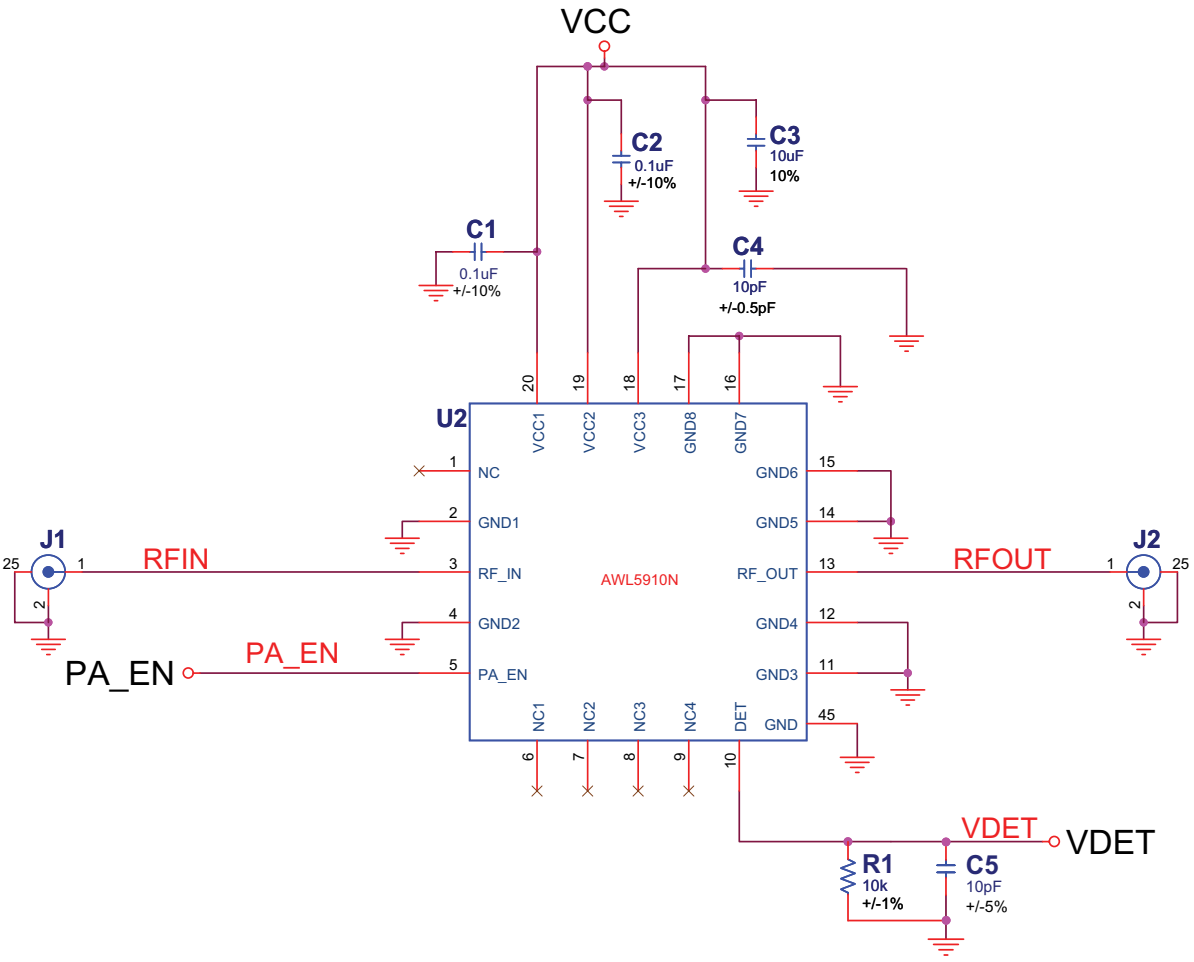


Figure 4: Application Circuit

ORDERING INFORMATION

ORDER NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AWL5910NP7	-40 °C to +85 °C	20 pin, 4 x 4 x 0.80 mm Surface Mount Module	Bags
AWL5910NP8	-40 °C to +85 °C	20 pin, 4 x 4 x 0.80 mm Surface Mount Module	2500 piece T/R
AWL5910NP9	-40 °C to +85 °C	20 pin, 4 x 4 x 0.80 mm Surface Mount Module	Partial Reel
EVB5910N	-40 °C to +85 °C	Evaluation Board	Evaluation Board

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