

FEATURES

- Supports emerging 802.11ac high-data rate standard
- 2.0% Dynamic EVM @ $P_{OUT} = 19.5$ dBm with 802.11ac MCS9-HT80 waveform, 5.0 V
- 30 dB of Linear Power Gain @ 5.0 V
- High Accuracy Integrated Power Detector
- 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/ac WLAN enabled:
 - Access Points
 - Media Gateways
 - Set top boxes
 - Smart TV's

PRODUCT DESCRIPTION

The ANADIGICS AWL5905 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/ac applications.

Requiring only a single +3 V to +5 V supply and a CMOS compatible 1.8 V enable voltage, the AWL5905 reduces system power consumption by offering a low leakage current while the amplifier is shut down. The integrated high directivity coupler/detector facilitates accurate power control over varying load conditions. 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 AWL5905 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 module optimized for a 50 Ω system.

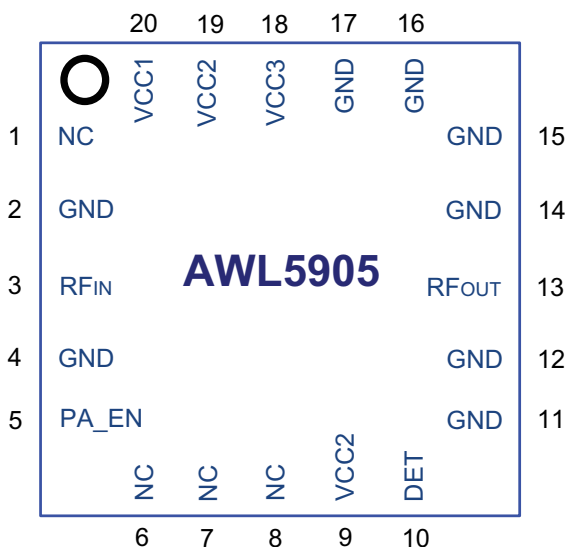


Figure 1: Pinout Diagram

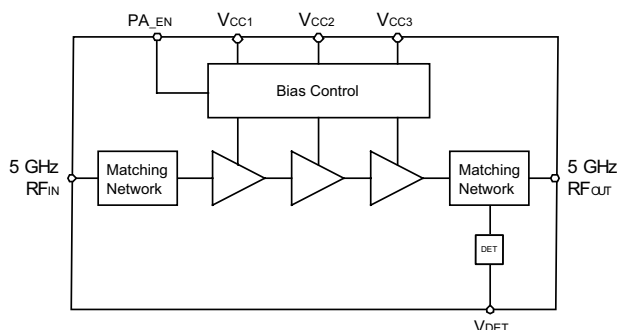


Figure 2: Functional Block Diagram

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, 8	N/C	No Connection
9	VCC2	Second Stage Supply Voltage
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	-	+5.5	V	
PA_EN Voltage	-0.3	+3.6	V	
RFin, 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-1	-	@ 260° C

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	100	145	200	mA	No RF
Leakage Current	-	5	14	μA	
PA_EN Current	9	20	36	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) 802.11ac MCS9 - HT80, unless otherwise noted

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Frequency	4.9	-	5.9	GHz	
Error Vector Magnitude (EVM) ^(1, 2)	-	-35	-	dB	17 dBm, 802.11ac, MCS9 - HT80
	-	210	-	mA	
	-	-34	-	dB	19.5 dBm, 802.11ac, MCS9 - HT80
	-	240	-	mA	
	-	-31	-	dB	21 dBm, 802.11n, MCS7 - HT40
	-	270	-	mA	
802.11n Mask	23	24	-	dBm	802.11n MCS0 - HT20
Power Gain	-	30	-	dB	
Gain variation over band	-	+/- 1.0	-	dB	
Gain variation over 80 MHz	-	+/- 0.25	-	dB	
1 dB output compression point	-	27	-	dBm	P _{IN} = CW
Input Return Loss	-	-11	-	dB	
Output Spurious Levels - Harmonics					
2 f _o	-	-30	-	dBm/	For Power levels up to 24 dBm OFDM
3 f _o	-	-35	-	MHz	
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} = +22 dBm, V _{CC} = 5 V, VSWR = 6:1, all phases, CW
Ruggedness	No damage				P _{IN} = +12 dBm, V _{CC} = 5 V, VSWR = 6:1, all phases, CW

Notes:

(1) EVM includes system noise floor of 0.8% (-42 dB).

(2) P_{OUT} degraded from 4.9 - 5.15 GHz.

APPLICATION CIRCUIT

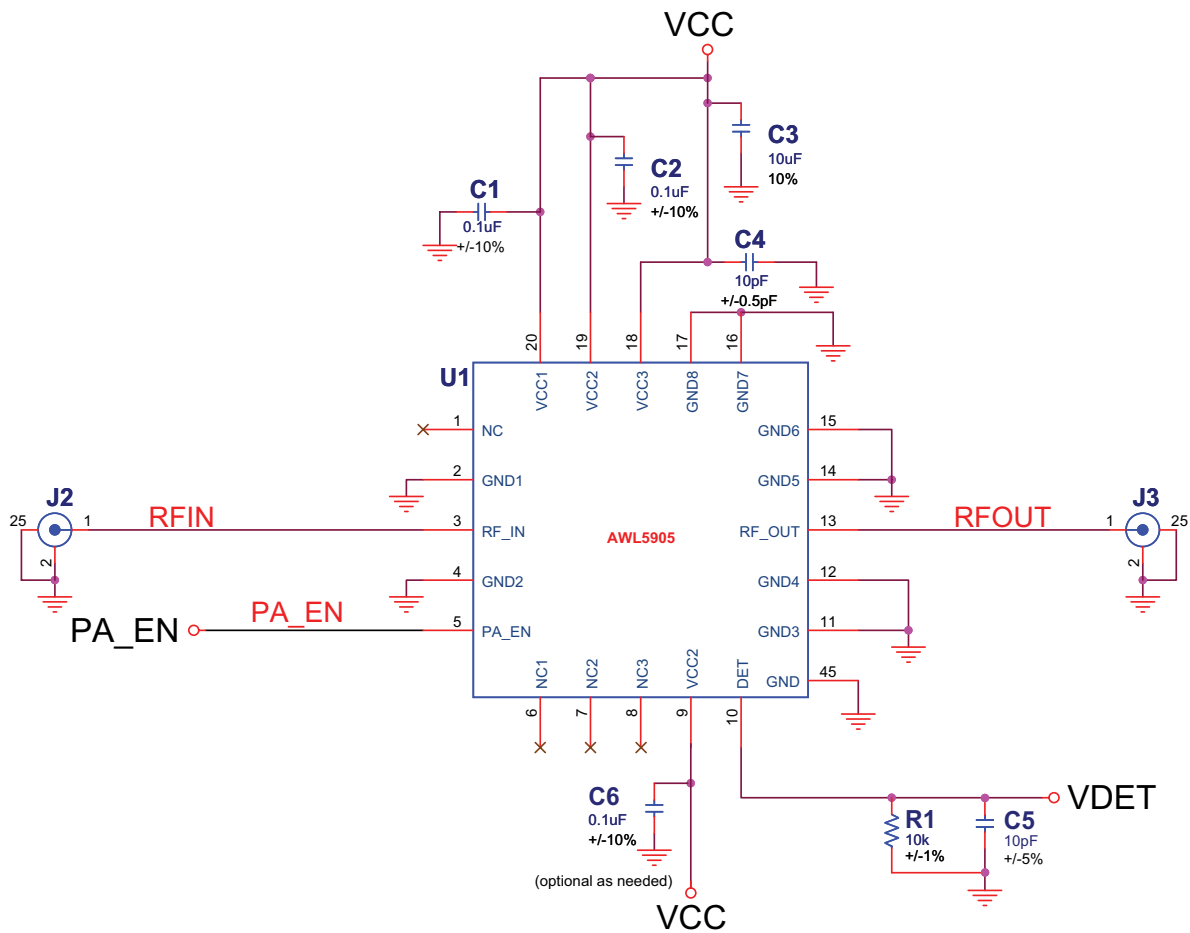
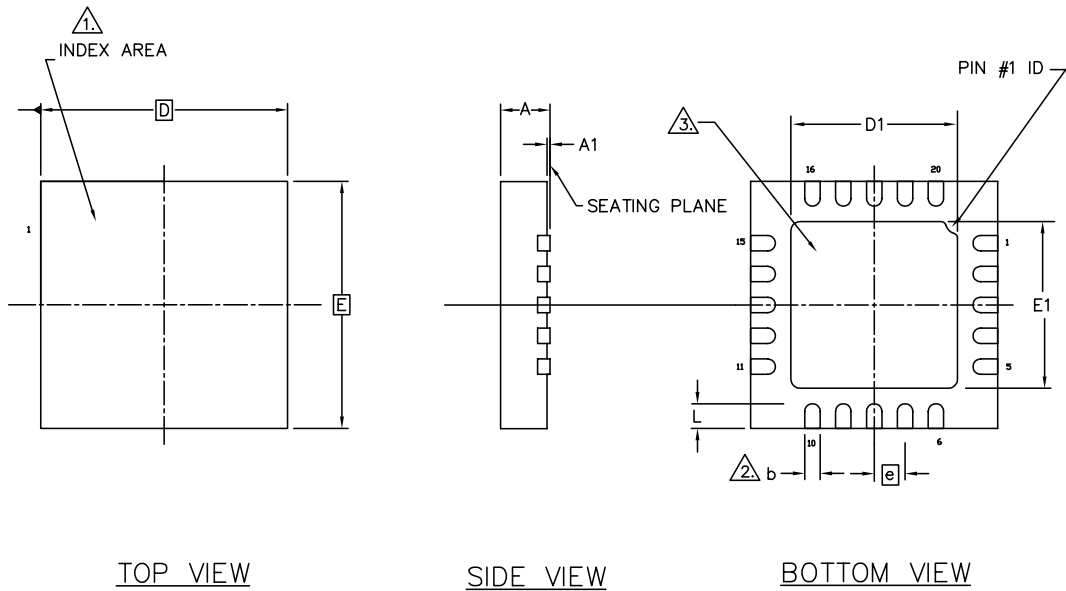


Figure 3: Application Circuit

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

TOP BRAND

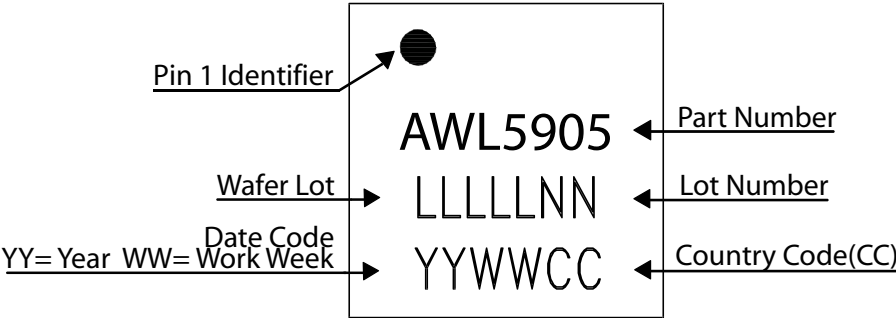


Figure 5: Branding Specification

NOTES:

(1) OUTLINE DRAWING REFERENCE:
P8002541

(2) UNLESS SPECIFIED DIMENSIONS
ARE SYMMETRICAL ABOUT CENTER
LINES SHOWN.

(3) DIMENSIONS IN MILLIMETERS.

(4) VIAS SHOWN IN PCB METAL VIEW
ARE FOR REFERENCE ONLY.
NUMBER & SIZE OF THERMAL VIAS
REQUIRED DEPENDENT ON HEAT
DISSIPATION REQUIREMENT AND THE
PCB PROCESS CAPABILITY.

(5) RECOMMENDED STENCIL THICKNESS:
APPROX. 0.125mm (5 Mils)

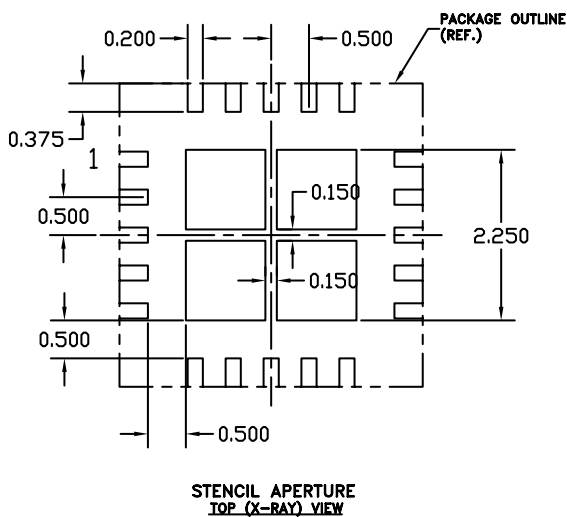
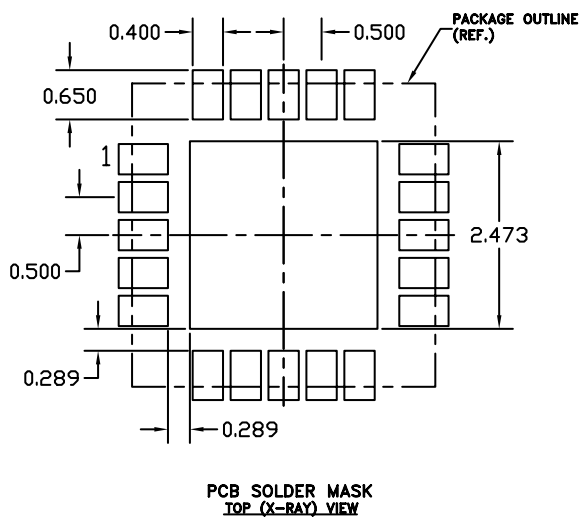
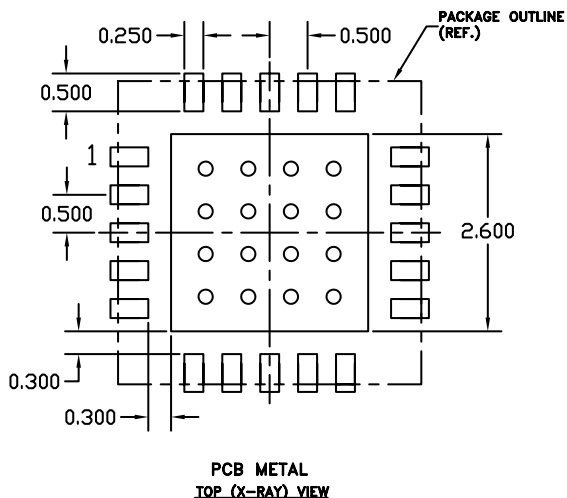
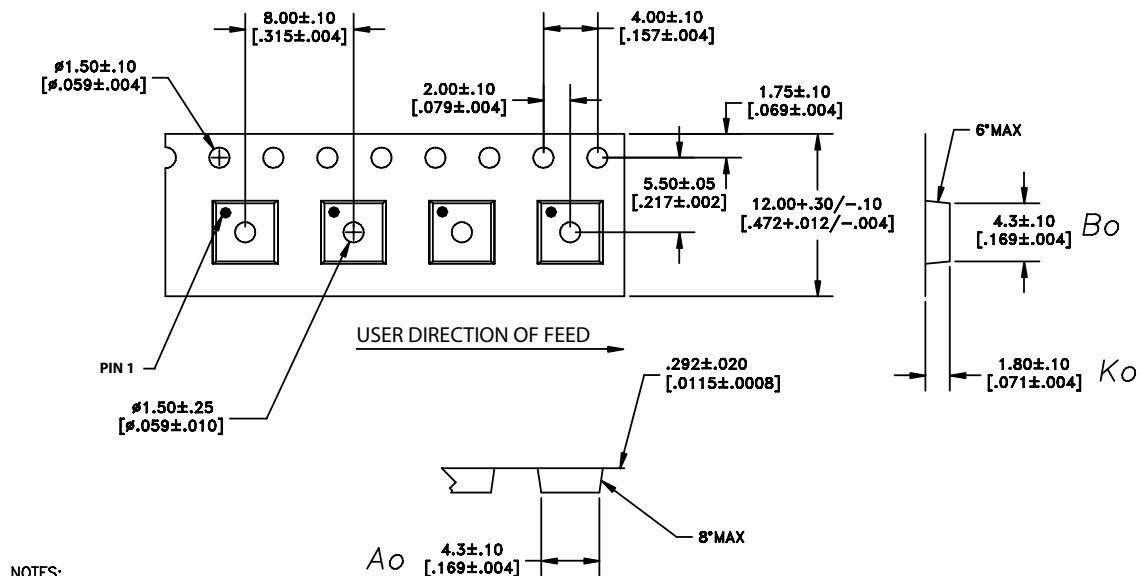


Figure 6: Recommended PCB Layout Information

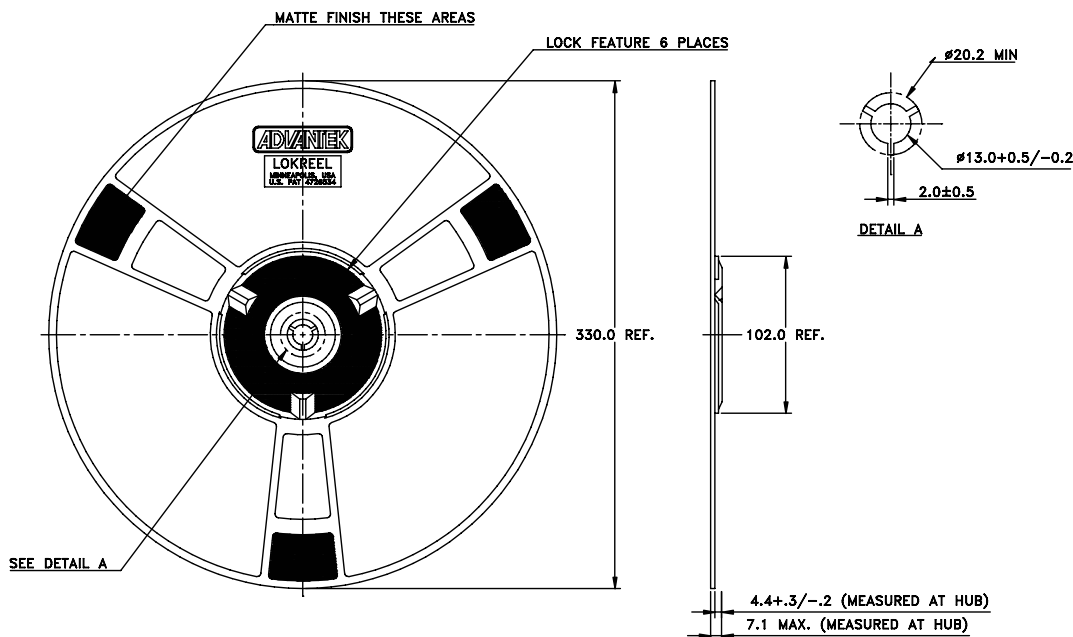


NOTES:

1. MATERIAL: 3000 (CARBON FILLED POLYCARBONATE)
100% RECYCLABLE.

DIMENSIONING AND TOLERANCING PER ASME Y14.5M

Figure 7: Carrier Tape



NOTES:

1. SURFACE RESISTIVITY: $\leq 10^8$ ohms/square ASTM D-257
MATERIAL: HIGH IMPACT POLYSTYRENE
SHELF LIFE: INDEFINITE
COLOR: BLACK

DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994

Figure 8: Reel

ORDERING INFORMATION

ORDER NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AWL5905P7	-40 °C to +85 °C	20 pin, 4 x 4 x 0.80 mm Surface Mount Module	Bags
AWL5905P8	-40 °C to +85 °C	20 pin, 4 x 4 x 0.80 mm Surface Mount Module	2500 piece T/R
AWL5905P9	-40 °C to +85 °C	20 pin, 4 x 4 x 0.80 mm Surface Mount Module	Partial Reel
EVB5905	-40 °C to +85 °C	Evaluation Board	Evaluation Board

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