AWB7227

2.11-2.17 GHz
Small-Cell Power Amplifier Module

PRELIMINARY DATA SHEET - Rev 1.6

FEATURES

- InGaP HBT Technology
- -50 dBc ACPR @ ±5 MHz, +27 dBm
- 29 dB Gain
- High Efficiency
- Low Transistor Junction Temperature
- Matched for a 50 Ω System
- Low Profile Miniature Surface Mount Package; RoHS Compliant
- Multi-Carrier Capability



M52 Package
14 Pin 7 mm x 7 mm x 1.3 mm
Surface Mount Module

APPLICATIONS

- WCDMA, HSDPA and LTE Air Interfaces
- Picocell, Femtocell, Home Nodes
- Customer Premises Equipment (CPE)
- Data Cards and Terminals

PRODUCT DESCRIPTION

The AWB7227 is a fully matched, Multi-Chip-Module (MCM) designed for picocell, femtocell, and customer premises equipment (CPE) applications. Its high linearity and efficiency meet the extremely demanding needs of small cell infrastructure architectures. Designed for WCDMA, HSDPA, and LTE air interfaces operating in the 2.11 GHz to 2.17 GHz band, the AWB7227 delivers up to +27 dBm of WCDMA (64 DPCH) power with an ACPR better than -50 dBc. It operates from a convenient +4.5 V supply and provides 29 dB of gain. The device is manufactured using an advanced InGaP HBT MMIC technology offering state-of-the-art reliability, temperature stability, and ruggedness. The self-contained 7 mm x 7 mm x 1.3 mm surface mount package incorporates RF matching networks optimized for output power, efficiency, and linearity in a 50 Ω system.

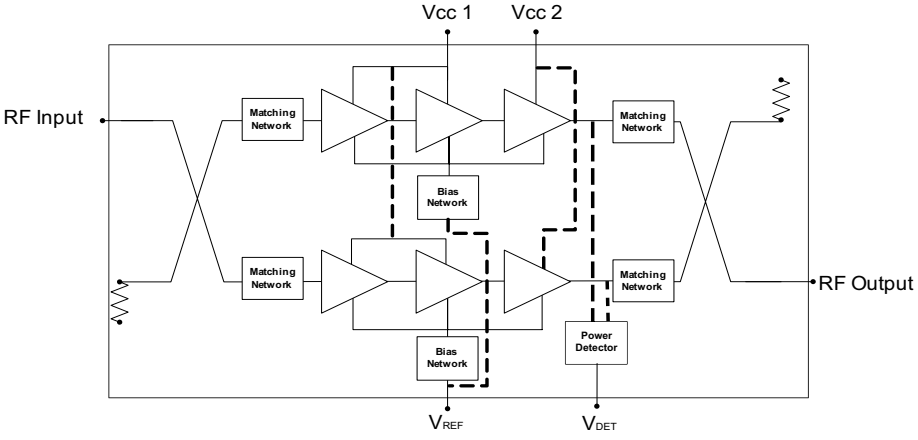


Figure 1: Block Diagram

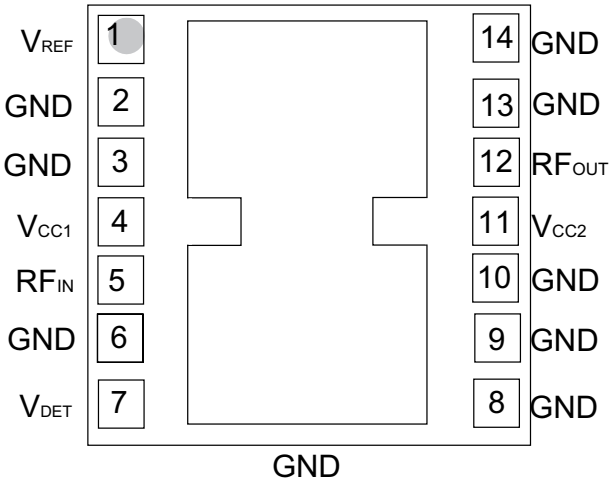


Figure 2: Pinout (X-ray Top View)

Table 1: Pin Description

PIN	NAME	DESCRIPTION
1	V_{REF}	Reference Voltage
2	GND	Ground
3	GND	Ground
4	V_{CC1}	Supply Voltage
5	RF_{IN}	RF Input
6	GND	Ground
7	V_{DET}	Detector Output
8	GND	Ground
9	GND	Ground
10	GND	Ground
11	V_{CC2}	Supply Voltage
12	RF_{OUT}	RF Output
13	GND	Ground
14	GND	Ground

ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

PARAMETER	MIN	MAX	UNIT
Supply Voltage (V_{CC})	0	+5	V
Reference Voltage (V_{REF})	0	+3.5	V
RF Output Power (P_{OUT})	-	+30	dBm
ESD Rating Human Body Model (1) Charged Device Model (2)	 Class 1C Class IV	 - -	
MSL Rating (3)	4	-	
Junction Temperature (T_j)	-	+150	°C
Storage Temperature (T_{STG})	-40	+150	°C

Stresses in excess of the absolute ratings may cause permanent damage. Functional operation is not implied under these conditions. Exposure to absolute ratings for extended periods of time may adversely affect reliability.

Notes:
(1) JEDEC JS-001-2010.
(2) JEDEC JESD22-C101D.
(3) 260 °C peak reflow.

Table 3: Operating Ranges

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Operating Frequency (f)	2110	-	2170	MHz	
Supply Voltage (V_{CC})	+3.6	+4.5	+4.65	V	
Reference Voltage (V_{REF})	+2.75 0	+2.85 -	+2.95 +0.5	V	PA "on" PA "shut down"
RF Output Power (P_{OUT})	-	+27	-	dBm	
Case Temperature (T_C)	-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
(T_C = +25 °C, V_{CC} = +4.5 V, V_{REF} = +2.85 V, 50 Ω system)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain (2)	27	29	34	dB	2110 - 2170 MHz
ACPR (1), (2), (3) @ 5 MHz @ 10 MHz	 - -	 -50 -63	 -47 -60	dBc	 Res BW 100 kHz Res BW 1 MHz
Power-Added Efficiency (1), (2), (3)	12	14	-	%	
Thermal Resistance (R_{JC}) (4)	-	14	-	°C/W	Junction to Case
Supply Current (1), (2), (3)	-	795	-	mA	total through V_{CC} pins
Quiescent Current (Icq)	230	275	330	mA	
Reference Current	12	14	19	mA	through V_{REF} pin
Leakage Current	-	3	10	µA	V_{CC} = +5 V, V_{REF} = 0 V
Harmonics 2f_O 3f_O, 4f_O	 - -	 -50 -54	 -45 -50	dBc	
Input Return Loss	15	20	-	dB	
Output Return Loss	15	20	-	dBm	
P1dB	-	+34.5	-	dBm	CW tone
Spurious Output Level (all spurious outputs)	-	-	-60	dBc	P_{OUT} ≤ +27 dBm In-band load VSWR < 5:1 Out-of-band load VSWR < 10:1 Applies over all voltage and temperature operating ranges
Load mismatch stress with no permanent degradation or failure	8:1	-	-	VSWR	V_{CC} = +4.5 V, P_{OUT} = +27 dBm Applies over full operating temperature range

Notes:
(1) ACPR and Efficiency measured at 2140 MHz.
(2) P_{OUT} = +27 dBm.
(3) TM1 WCDMA 64 DPCH
(4) Use only V_{CC2} (pin 11) current when calculating device junction temperature.

APPLICATION INFORMATION

To ensure proper performance, refer to all related Application Notes on the ANADIGICS web site: http://www.anadigics.com

Shutdown Mode

The power amplifier may be placed in a shutdown mode by applying logic low levels (see Operating Ranges table) to the V_{REF} voltage.

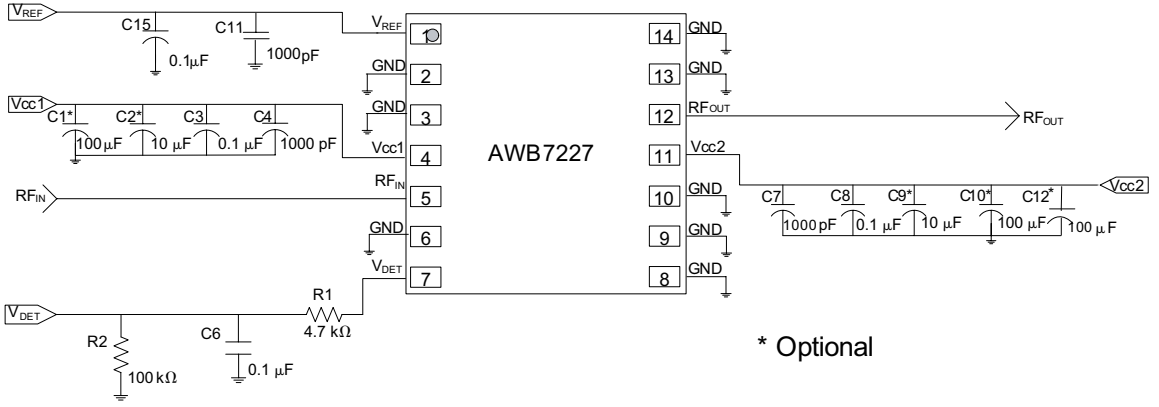
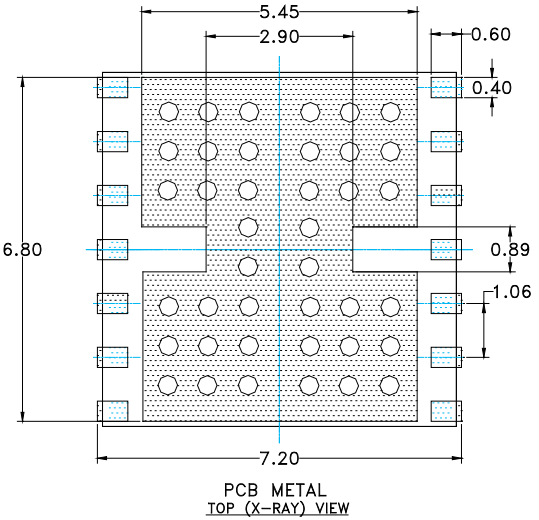


Figure 3: Application Circuit Schematic

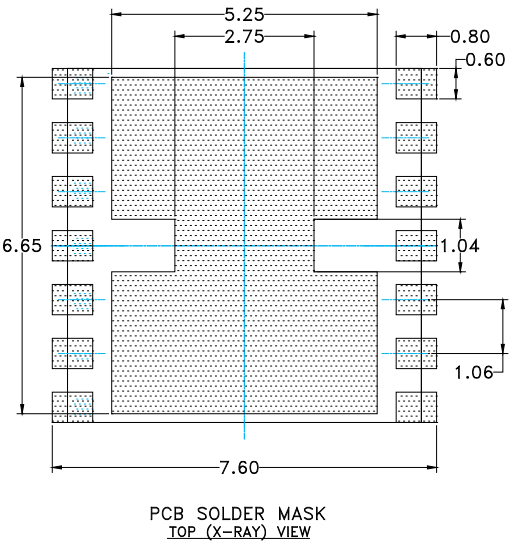


NOTES:

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

(2) DIMENSIONS IN MILLIMETERS.

(3) 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.



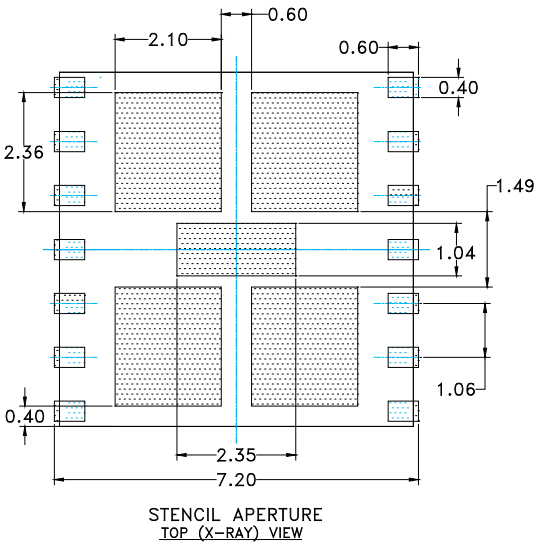
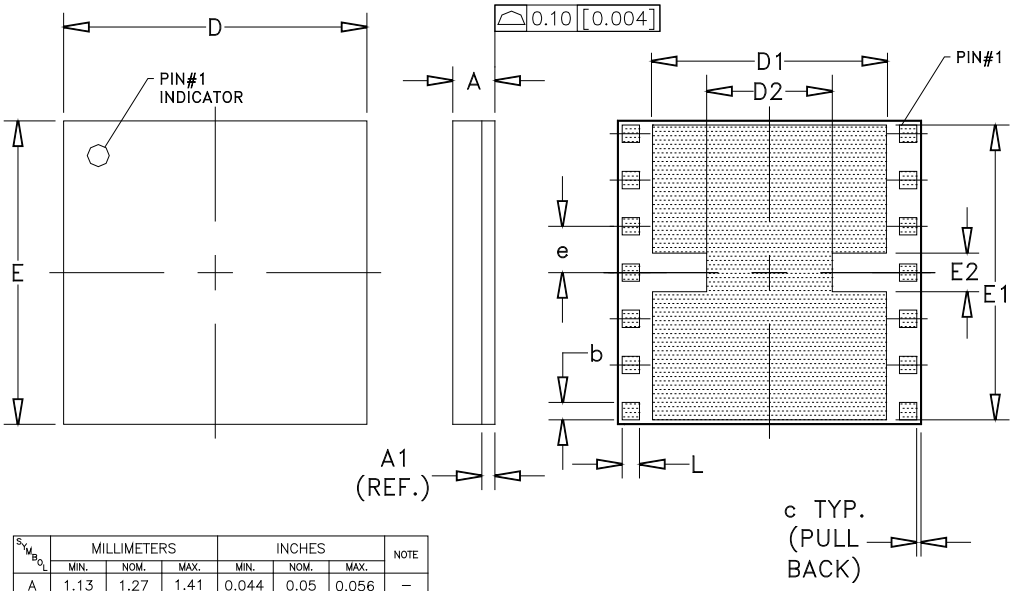


Figure 4: PCB Footprint

PACKAGE OUTLINE



SYMBOL	MILLIMETERS			INCHES			NOTE
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
A	1.13	1.27	1.41	0.044	0.05	0.056	–
A1	0.27 (REF)			0.011 (REF)			–
b	0.387	0.400	0.413	0.0152	0.0157	0.0162	14X
c	–	0.10	–	–	0.004	–	–
D	6.88	7.00	7.12	0.270	0.275	0.280	–
D1	5.30	5.45	5.60	0.208	0.214	0.220	–
D2	2.87	2.90	2.93	0.113	0.114	0.115	
E	6.88	7.00	7.12	0.270	0.275	0.280	–
E1	6.78	6.80	6.82	0.266	0.267	0.268	–
E2	0.86	0.89	0.92	0.034	0.035	0.036	
e	1.07			0.0421			6X
L	0.387	0.400	0.413	0.0152	0.0157	0.0162	14X

NOTES:

1. CONTROLLING DIMENSIONS: MILLIMETERS
2. UNLESS SPECIFIED TOLERANCE=±0.076[0.003].
3. PADS (INCLUDING CENTER) SHOWN UNIFORM SIZE FOR REFERENCE ONLY. ACTUAL PAD SIZE AND LOCATION WILL VARY WITHIN MIN. AND MAX. DIMENSIONS ACCORDING TO SPECIFIC LAMINATE DESIGN.

Figure 5: M52 Package Outline - 14 Pin 7 mm x 7 mm x 1.3 mm Surface Mount Module

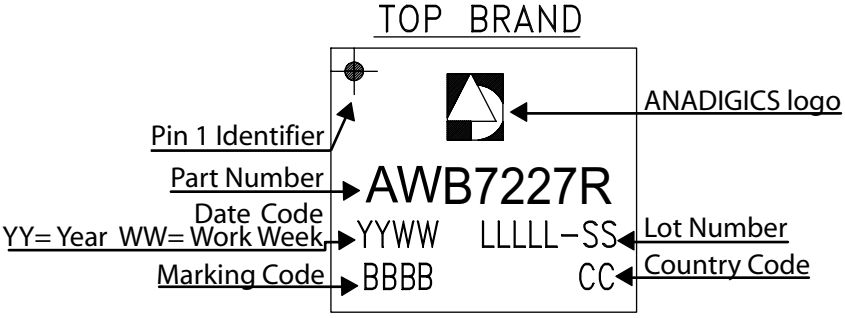


Figure 6: Branding Specification

COMPONENT PACKAGING

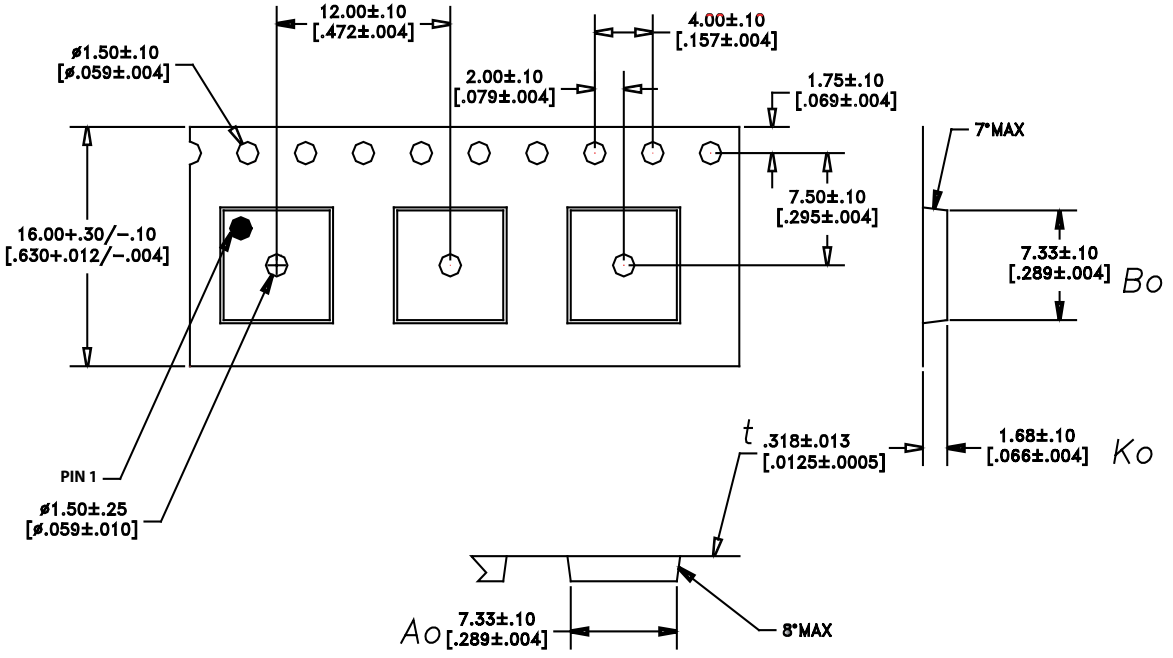


Figure 7: Tape & Reel Packaging

Table 5: Tape & Reel Dimensions

PACKAGE TYPE	TAPE WIDTH	POCKET PITCH	REEL CAPACITY	MAX REEL DIA
7 mm x 7 mm x 1.3 mm	16 mm	12 mm	2500	13"

ORDER NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AWB7227RM52P8	-40 °C to +85 °C	RoHS-compliant 14 Pin 7 mm x 7 mm x 1.3 mm Surface Mount Module	Tape and Reel, 2500 pieces per Reel

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