AWB7124

728 MHz to 768 MHz
Small-Cell Power Amplifier Module

PRELIMINARY DATA SHEET - Rev 1.2

FEATURES

- InGaP HBT Technology
- -47 dBc ACPR @ ± 10 MHz, +24.5 dBm
- 30 dB Gain
- High Efficiency
- Low Transistor Junction Temperature
- Internally matched for a 50 Ω System
- Low Profile Miniature Surface Mount Package; Halogen Free and RoHS Compliant
- Multi-Carrier Capability

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

APPLICATIONS

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

PRODUCT DESCRIPTION

The AWB7124 is a highly linear, fully matched, power amplifier module designed for picocell, femtocell, and customer premises equipment (CPE) applications.Its high power efficiency and low adjacent channel power levels meet the extremely demanding needs of small cell infrastructure architectures. Designed for LTE, WCDMA and HSDPA air interfaces operating in the 728 MHz to 768 MHz band, the AWB7124 delivers up to +24.5 dBm of LTE (E-TM1.1) power with an ACPR of -47 dBc. It operates from a convenient +4.2 V supply and provides 30 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.

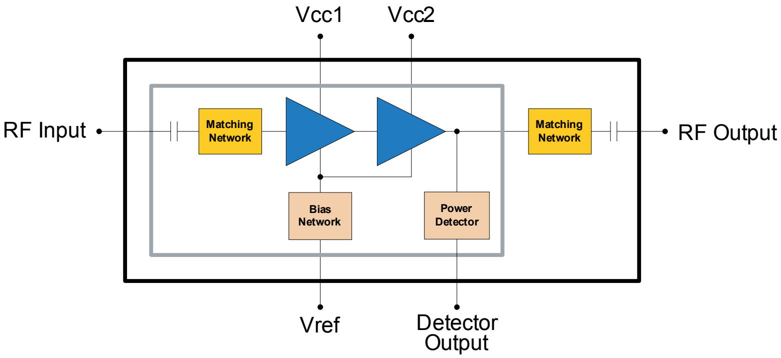


Figure 1: Block Diagram

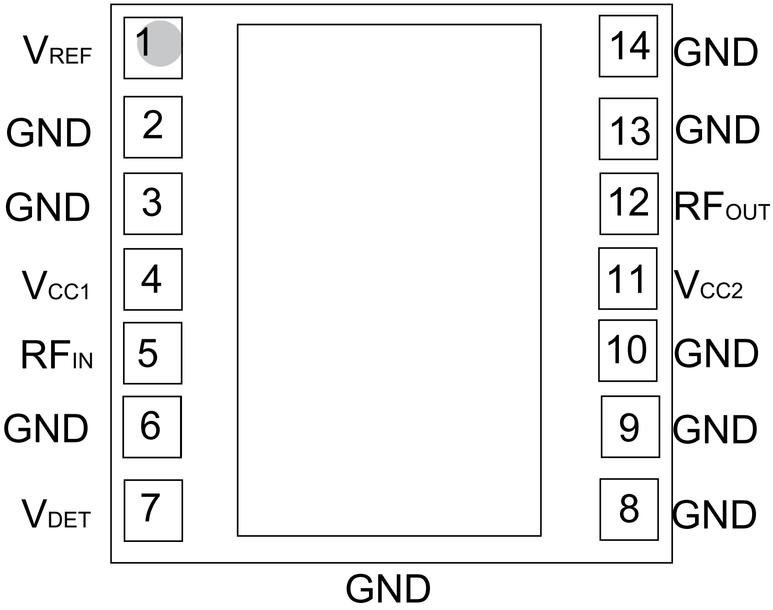


Figure 2: Pinout (X-ray Top View)

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 Voltage
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})	-	+28	dBm, modulated
RF Input Power (P_{IN})	-	+10	dBm, CW
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

Functional operation is not implied under these conditions. Exceeding any one or a combination of the Absolute Maximum Rating Conditions may cause permanent damage to the device. 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)	728	-	768	MHz	
Supply Voltage (V_{CC})	+3.2	+4.2	+4.5	V	
Reference Voltage (V_{REF})	+2.80 0	+2.85 -	+2.90 +0.5	V	PA "on" PA "shut down"
RF Output Power (P_{OUT}) (1)	-	+24.5	-	dBm	
Case Temperature (T_C) (2)	-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.

Notes:
(1) Typ RF Output Power is used during production test.
(2) Case Temperature references the board temperature at the ground paddle on the backside of the package.

Table 4: Electrical Specifications
(T_C = +25 °C, V_{CC} = +4.2 V, V_{REF} = +2.85 V, 50 Ω system)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain (2)	28	30	-	dB	
ACPR (1), (2), (3) @ 10 MHz @ 20 MHz	 - -	 -47 -57	 - -	dBc	
Power-Added Efficiency (1), (2), (3)	-	14.5	-	%	
Thermal Resistance (R_{JC})	-	22.3	-	°C/W	Junction to Case
Quiescent Current (Icq)	-	140	-	mA	
Reference Current	-	5	10	mA	through V_{REF} pin
Leakage Current	-	1.5	5	µA	V_{CC} = +5 V, V_{REF} = 0 V
Harmonics 2fo 3fo, 4fo	 - -	 -30 -50	 - -	dBc	
Input Return Loss	-	10	-	dB	
Spurious Output Level (all spurious outputs)	-	-	-60	dBc	$P_{OUT} \leq$ +24.5 dBm In-band load VSWR < 4:1 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} = +4.2 V, P_{IN} = 0 dBm Applies over full operating temperature range

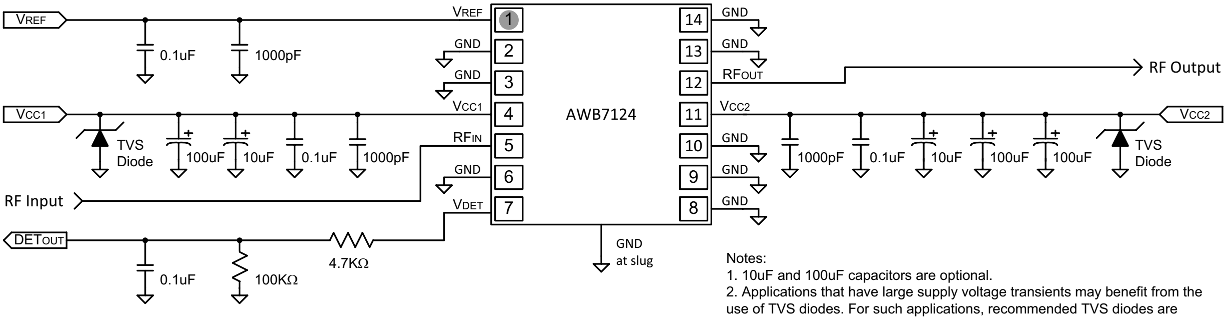
Notes:
(1) ACPR and Efficiency measured at 748 MHz.
(2) P_{OUT} = +24.5 dBm.
(3) LTE E-TM1.1 (10 MHz)

APPLICATION INFORMATION

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

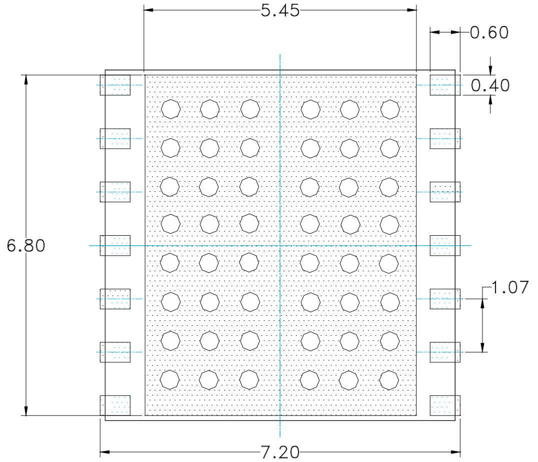
Shutdown Mode

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



Notes:
1. 10uF and 100uF capacitors are optional.
2. Applications that have large supply voltage transients may benefit from the use of TVS diodes. For such applications, recommended TVS diodes are SM05T1G or SMJ5.0A.

Figure 3: Application Circuit Schematic



PCB METAL
TOP (X-RAY) VIEW

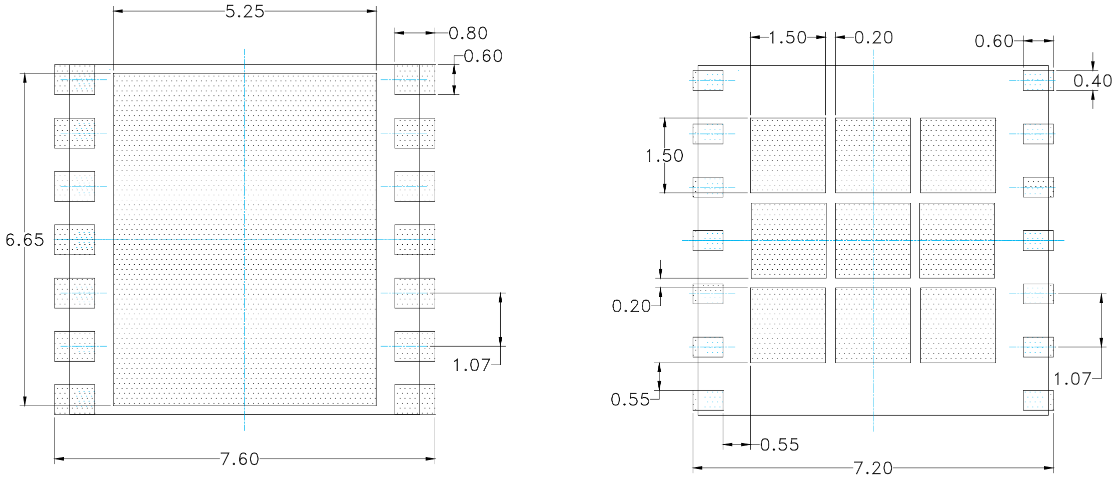
ONLY PACKAGE I/O's AND
GROUND REQUIREMENTS
SHOWN.

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.

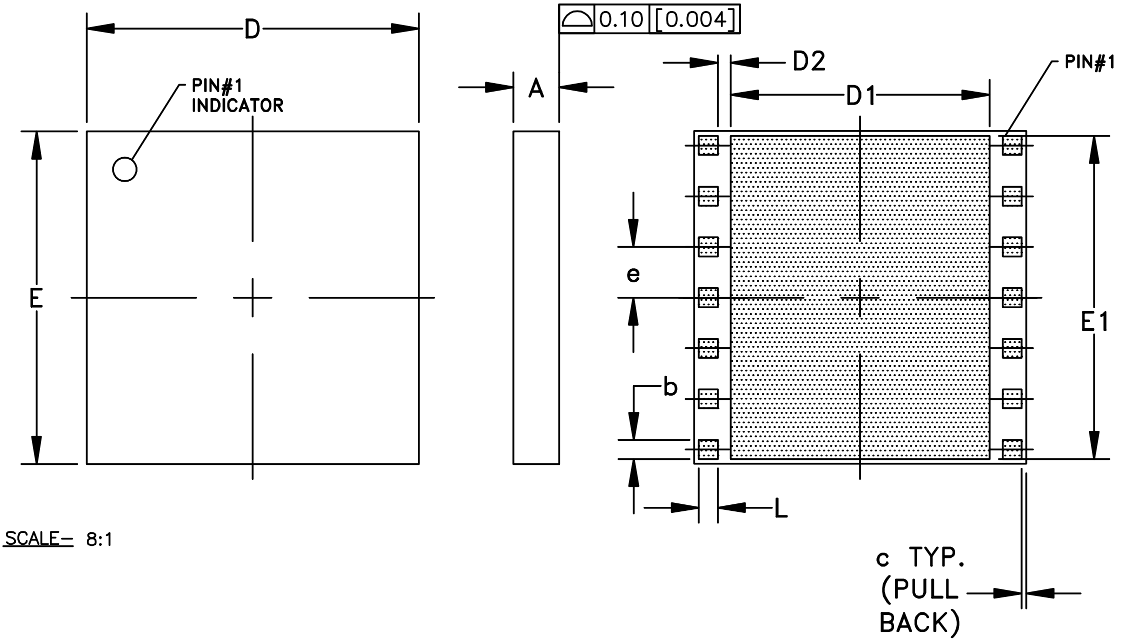


PCB SOLDER MASK
TOP (X-RAY) VIEW

STENCIL APERTURE
TOP (X-RAY) VIEW

Figure 4: PCB Footprint

PACKAGE OUTLINE



SYMBOL	MILLIMETERS			INCHES			NOTE
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
A	1.22	1.32	1.42	0.048	0.052	0.056	–
b	0.375	0.400	0.425	0.0148	0.0157	0.0167	14X
c	–	0.10	–	–	0.004	–	–
D	6.90	7.00	7.10	0.272	0.276	0.280	–
D1	–	5.45	–	–	0.215	–	–
D2	–	0.275	–	–	0.0108	–	–
E	6.90	7.00	7.10	0.272	0.276	0.280	–
E1	–	6.80	–	–	0.268	–	–
e	–	1.067	–	–	0.0420	–	6X
L	0.375	0.400	0.425	0.0148	0.0157	0.0167	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: Package Outline - 14 Pin 7 mm x 7 mm x 1.3 mm Surface Mount Module

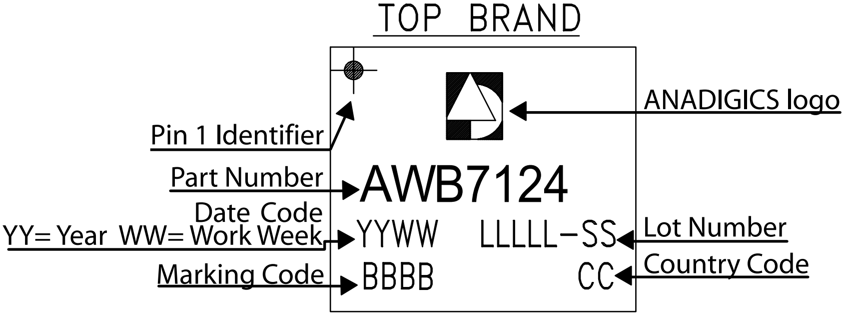


Figure 6: Branding Specification

COMPONENT PACKAGING

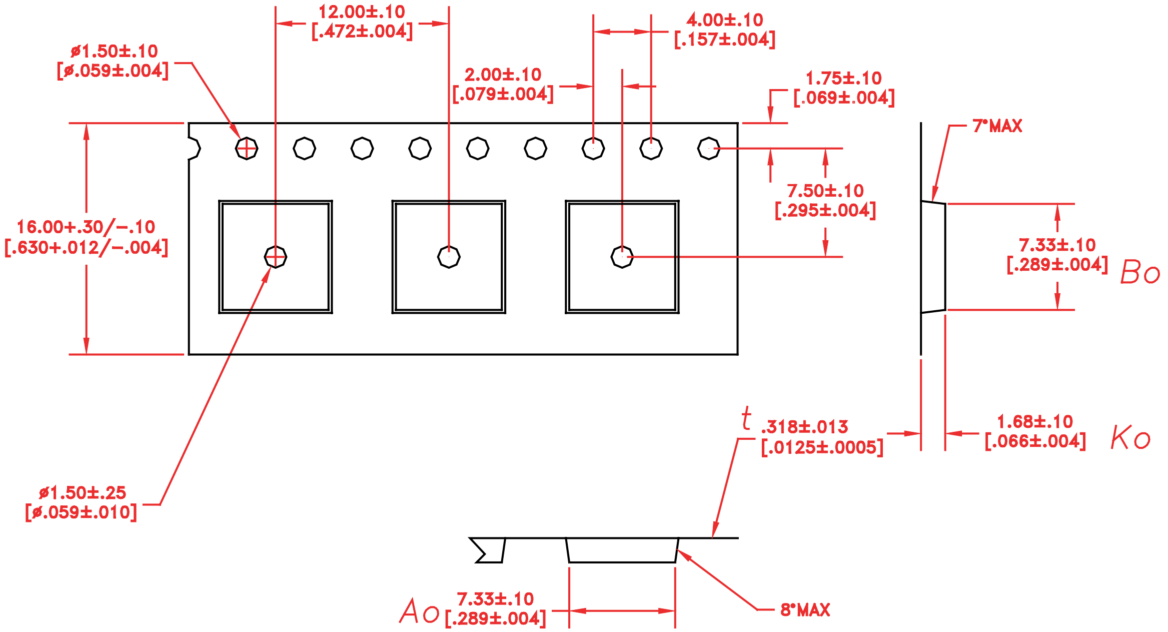


Figure 7: Tape & Reel Packaging

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"

ORDERING INFORMATION

ORDER NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AWB7124P7	-40 °C to +85 °C	Halogen Free RoHS-compliant 14 Pin 7 mm x 7 mm x 1.3 mm Surface Mount Module	Loose in Bag
AWB7124P8	-40 °C to +85 °C	Halogen Free RoHS-compliant 14 Pin 7 mm x 7 mm x 1.3 mm Surface Mount Module	Tape and Reel, 2500 pieces per Reel
AWB7124P9	-40 °C to +85 °C	Halogen Free RoHS-compliant 14 Pin 7 mm x 7 mm x 1.3 mm Surface Mount Module	Partial Reel

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