

FEATURES

- InGaP HBT Technology
- -47 dBc ACPR @ ± 10 MHz, +27 dBm
- 27 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

APPLICATIONS

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



PRODUCT DESCRIPTION

The AWB7228 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 LTE, WCDMA and HSDPA air interfaces operating in the 2.62 GHz to 2.69 GHz band, the AWB7228 delivers up to +27 dBm of LTE (E-TM1.1) power with an ACPR of -47 dBc. It operates from

a convenient +4.5 V supply and provides 27 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.

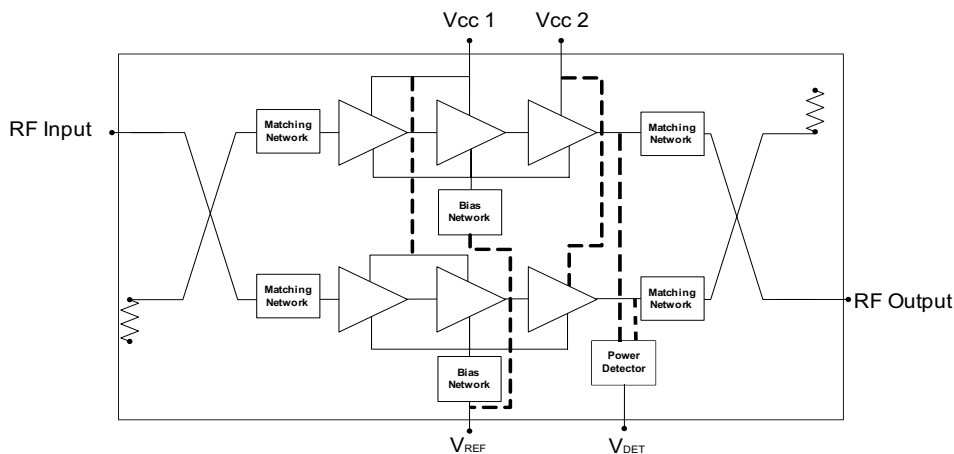


Figure 1: Block Diagram

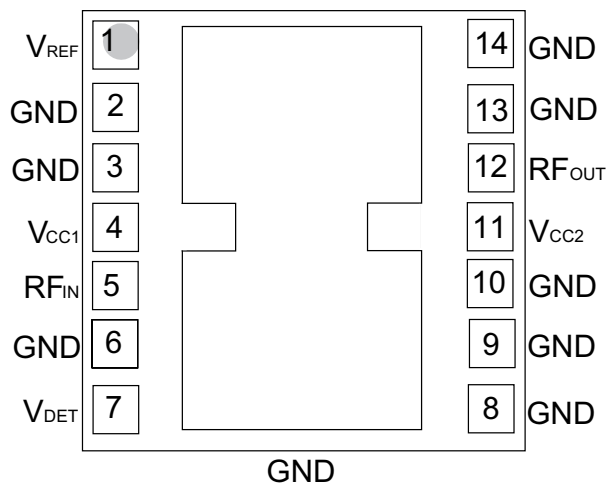


Figure 2: Pinout (X-ray Top View)

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})	-	+30	dBm
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.

Table 3: Operating Ranges

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Operating Frequency (f)	2620	-	2690	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	-	dB	
ACPR ^{(1), (2), (3)} @ 10 MHz @ 20 MHz	- -	-47 -60	- -	dBc	
Power-Added Efficiency ^{(1), (2), (3)}	-	14	-	%	
Thermal Resistance (R _{JC}) ⁽⁴⁾	-	12.5	-	°C/W	Junction to Case
Quiescent Current (I _{cq})	-	275	-	mA	
Reference Current	-	14	-	mA	through V _{REF} pin
Leakage Current	-	3	10	μA	V _{CC} = +5 V, V _{REF} = 0 V
Harmonics 2fo 3fo, 4fo	- -	-40 -55	- -	dBc	
Input Return Loss	-	18	-	dB	
Output Return Loss	-	18	-	dB	
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 2655 MHz.

(2) P_{OUT} = +27 dBm.

(3) E-TM1.1 LTE 10 MHz BW.

(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.

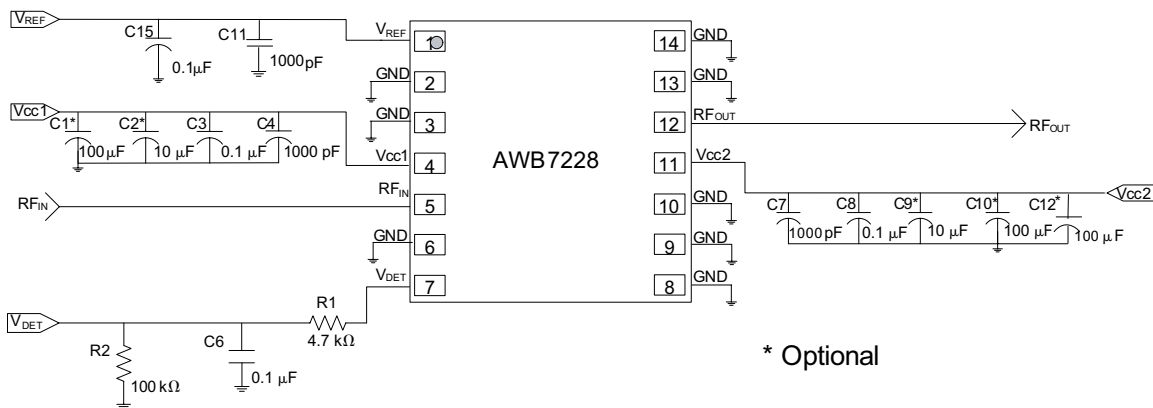
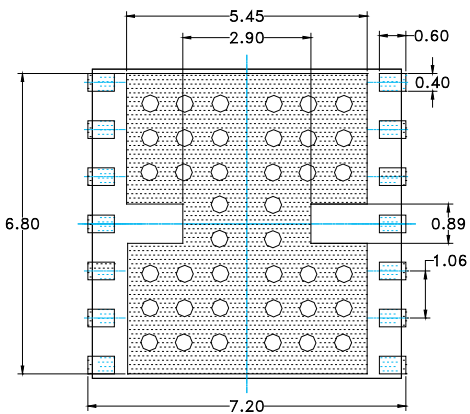


Figure 3: Application Circuit Schematic



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.

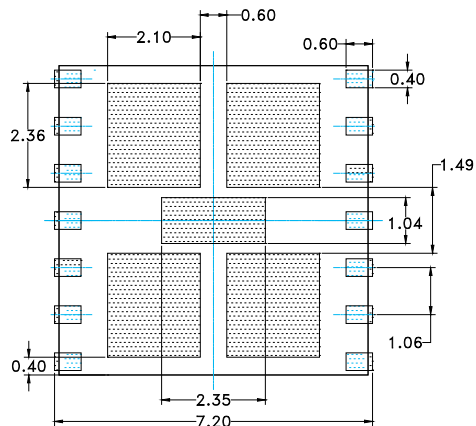
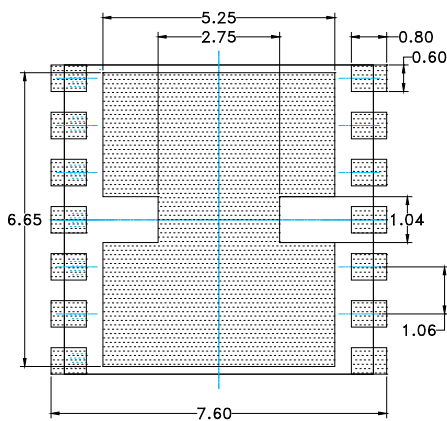
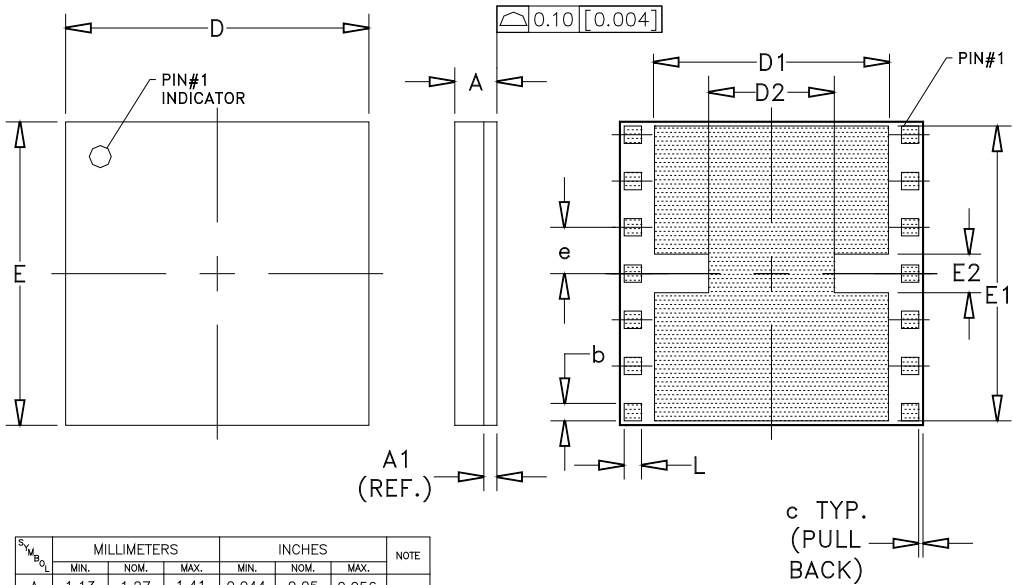


Figure 4: PCB Footprint

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

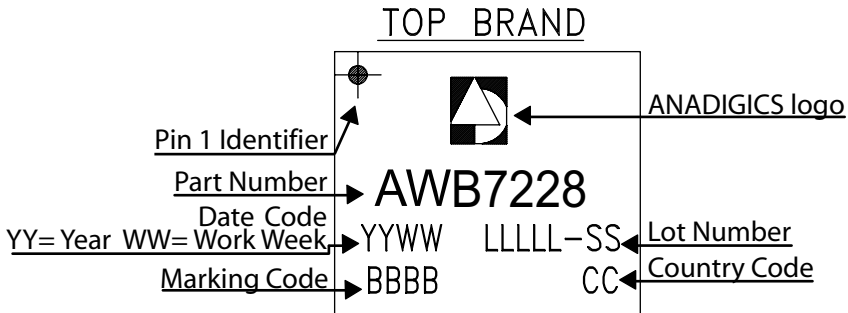


Figure 6: Branding Specification



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WARNING

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