ANADIGICS

AWB7230

3.40 GHz to 3.80 GHz
Small-Cell Power Amplifier Module
PRELIMINARY DATA SHEET - Rev 1.4

FEATURES

- InGaP HBT Technology
- 2.5% EVM @ +29 dBm (OFDMA)
- 31 dB Gain
- Integrated Step Attenuator
- Integrated Output Power Detector
- High Efficiency
- Low Transistor Junction Temperature
- Matched for a 50 Ω System
- Low Profile Miniature Surface Mount Package; RoHS Compliant

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

APPLICATIONS

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

PRODUCT DESCRIPTION

The AWB7230 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 WiMAX and LTE air interfaces operating in the 3.40 GHz to 3.80 GHz band, the AWB7230 delivers up to +29 dBm of WiMAX power with exceptionally low EVM. It operates from a convenient +4.5 V supply and provides 31 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.

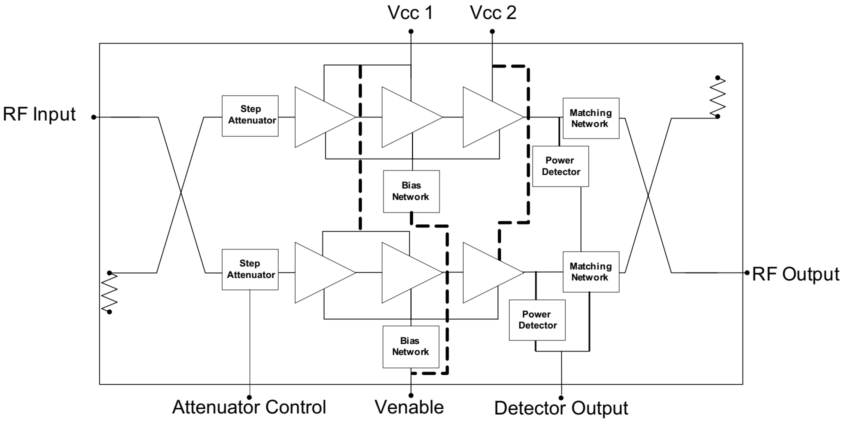


Figure 1: Block Diagram

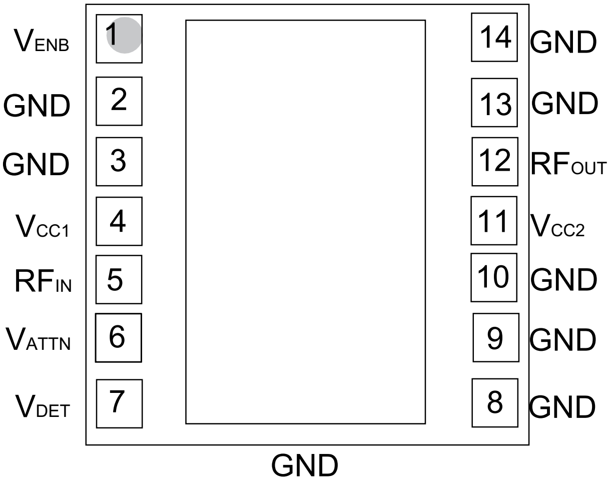


Figure 2: Pinout (X-ray Top View)

Table 1: Pin Description

PIN	NAME	DESCRIPTION
1	V_{ENB}	PA Enable Voltage
2	GND	Ground
3	GND	Ground
4	V_{CC1}	Supply Voltage
5	RF_{IN}	RF Input
6	V_{ATTN}	Attenuator Control
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
Enable Voltage (V_{ENB})	0	+3.2	V
Attenuator Control Voltage (V_{ATTN})	0	+3.7	V
RF Output Power (P_{OUT})	-	+32	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)	3400	-	3800	MHz	
Supply Voltage (V_{CC})	+3.3	+4.5	+4.65	V	
Enable Voltage (V_{ENB})	+2.7 0	+2.85 -	+3.1 +0.5	V	PA "on" PA "shut down"
Attenuator Control Voltage (V_{ATTN}) Logic High Logic Low	 +2.3 0	 - -	 +3.7 +0.7	 V V	 Attenuator Enabled Attenuator Disabled
RF Output Power (P_{OUT})	-	+29	-	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 - 16 QAM P_{USC} Zone
(T_C = +25 °C, V_{CC} = +4.5 V, V_{ENB} = +2.85 V, 50 Ω system)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain (2)	27	31	37	dB	
Attenuation	17	19	24	dB	V_{ATTN} = 2.5 V
Spectrum Mask (1), (2) @ offset A @ offset B @ offset C @ offset D	- - - -	- - - -	-51.37 -40.5 -50.5 -50.5	dBc	10 MHz Channel Bandwidth WiMAX Forum Band Class 5C MMRT
Power-Added Efficiency (1), (2)	14	16	-	%	
Thermal Resistance (R_{JC}) (3)	-	13	-	°C/W	Junction to Case
Collector Current (I_{CC}) (1), (2)	900	1080	1200	mA	total through V_{CC} pins
EVM (2)	-	2.5	3.5	%	
Power Detector Output @ 29 dBm	-	1.5	-	V	RL (Load Resistor) = 100K Ω
Quiescent Current (Icq)	250	350	400	mA	
V_{ENB} Current	-	0.6	2	mA	through V_{ENB} pin
Leakage Current	-	500	-	µA	V_{CC} = +4.5 V, V_{REF} = 0 V
Harmonics (2) $2f_O$, $4f_O$ $3f_O$	- -	-50 -55	-45 -50	dBc	
Input Return Loss	-	-15	-9	dB	
Spurious Output Level (2) (all spurious outputs)	-	-	-60	dBc	P_{OUT} ≤ +29 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} = +29 dBm Applies over full operating temperature range

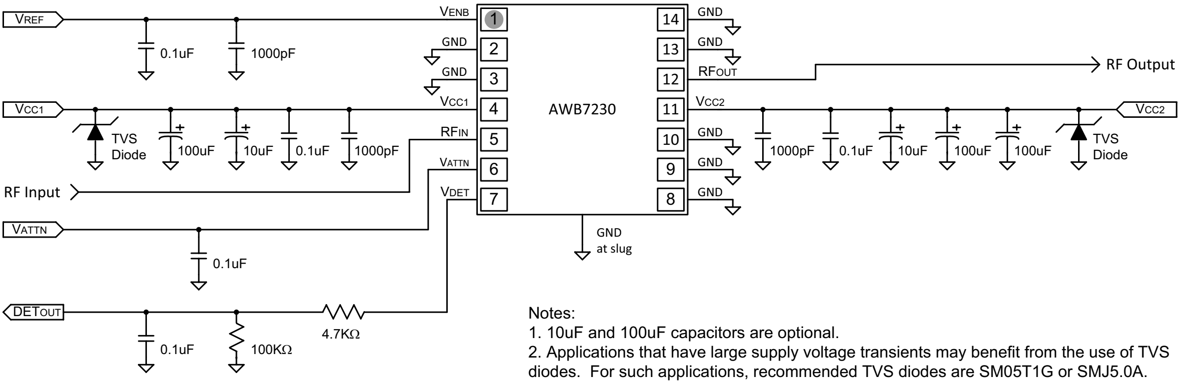
Notes:
(1) Spectrum Mask and Efficiency measured at 3600 MHz.
(2) P_{OUT} = +29 dBm.
(3) Use only V_{CC2} (pin 11) current when calculating device junction temperature.

APPLICATION INFORMATION

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

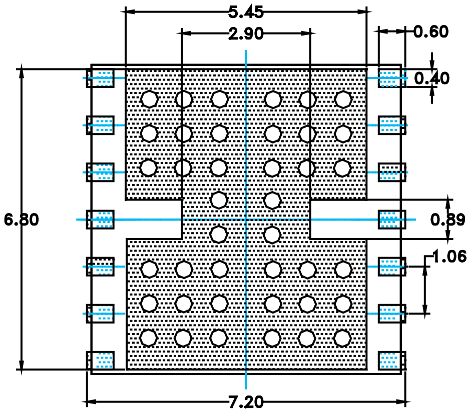
Shutdown Mode

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

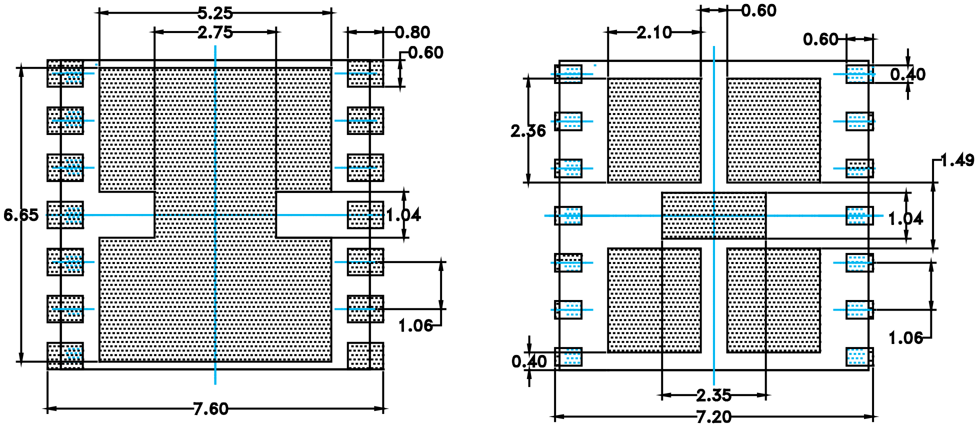
ONLY PACKAGE I/O's AND
GROUND REQUIREMENTS
SHOWN.

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.

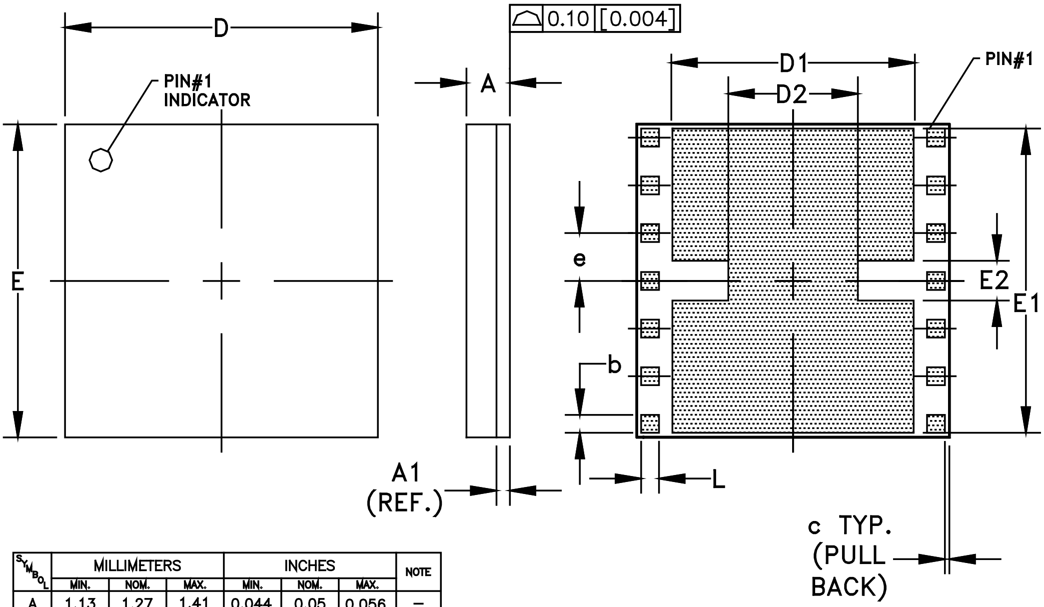


PCB SOLDER MASK
TOP (X-RAY) VIEW

STENCIL APERTURE
TOP (X-RAY) VIEW

Figure 4: PCB Footprint

PACKAGE OUTLINE



SYMBOL	MILLIMETERS			INCHES			NOTE
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
A	1.13	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: 14 Pin 7 mm x 7 mm x 1.3 mm Surface Mount Module Package

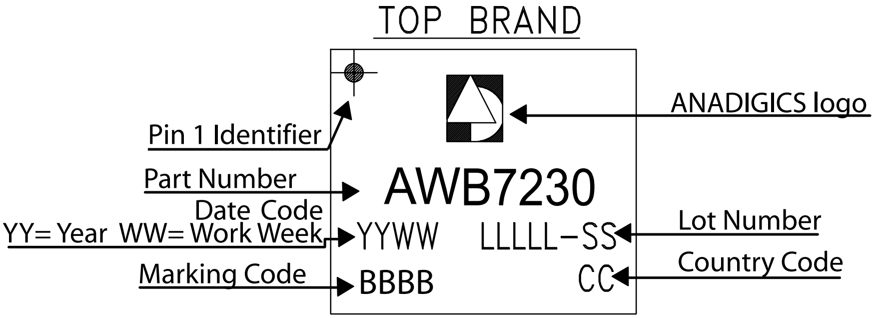


Figure 6: Branding Specification

COMPONENT PACKAGING

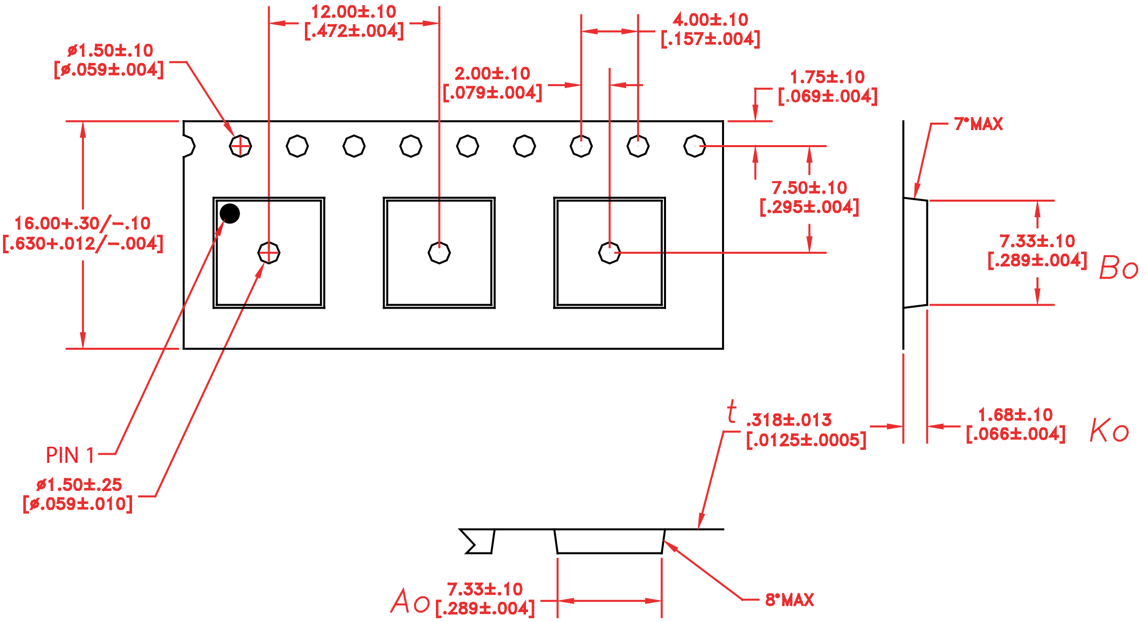


Figure 7: Tape & Reel Packaging

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
AWB7230P8	-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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WARNING

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