

FEATURES

- InGaP HBT Technology
- 30 dB Gain
- < 3 % EVM at +22 dBm (+3.3 V Supply)
- 4 % EVM at +23 dBm (+3.3 V Supply)
- < 3 % EVM at +23 dBm (+4.2 V Supply)
- 4 % EVM at +24 dBm (+4.2 V Supply)
- High Efficiency
- Integrated 25 dB Attenuator
- Integrated Output Power Detector
- 50 Ω Matched RF Ports for Reduced External Component Count
- 4.5 mm x 4.5 mm x 1.0 mm Surface Mount Module, Materials Set Consistent with RoHS Directives

APPLICATIONS

- WiMAX Tranceivers That Support the IEEE 802.16d-2004, IEEE 802.16e-2005, and the ETSI EN301-021 Wireless standards

PRODUCT DESCRIPTION

The ANADIGICS AWM6433 WiMAX Power Amplifier is a high performance device that delivers exceptional linearity and efficiency at high levels of output power. Designed for portable or mobile applications in the 3.4-3.6 GHz band, it supports the IEEE 802.16e-2005 wireless standard, as well as the IEEE 802.16d-2004 and ETSI EN301-021 standards.

The device requires only a nominal +3.3 V supply and a low-current bias input. An increase in supply voltage



produces an increase in the maximum linear output power. The integrated detector can be used to monitor output power, and the integrated 25 dB step attenuator enables gain control. No external circuits are required for biasing or RF impedance matching, thus reducing external component costs and facilitating circuit board designs.

The AWM6433 is manufactured using advanced InGaP HBT technology that offers state-of-the-art reliability, temperature stability, and ruggedness. It is offered in a 4.5 mm x 4.5 mm x 1.0 mm surface mount module optimized for use in a 50 Ω system.

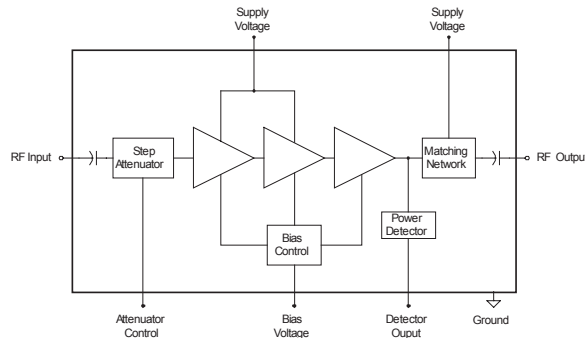


Figure 1: Functional Block Diagram

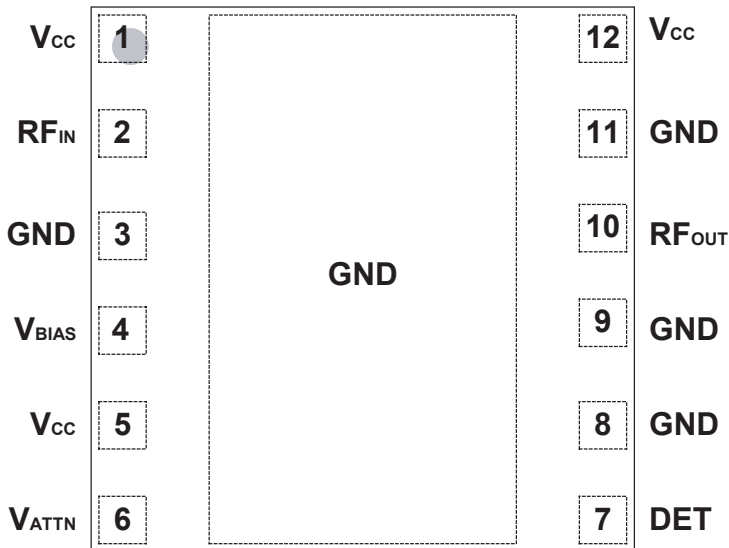


Figure 2: Pinout (X-ray Top View)

Table 1: Pin Description

PIN	NAME	DESCRIPTION
1	V _{CC}	Supply Voltage
2	RF _{IN}	RF Input
3	GND	Ground
4	V _{BIAS}	Bias/Shutdown
5	V _{CC}	Supply Voltage
6	V _{ATTN}	Attenuator Control
7	DET	Detector Output
8	GND	Ground
9	GND	Ground
10	RF _{OUT}	RF Output
11	GND	Ground
12	V _{CC}	Supply Voltage

ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

PARAMETER	MIN	MAX	UNIT	COMMENTS
Supply Voltage (V_{CC})	0	+5.0	V	
Bias Voltage (V_{BIAS})	0	+3.0	V	
Attenuator Control Voltage (V_{ATTN})	0	+3.7	V	
RF Input Power	-	0	dBm	OFDM modulated signal
ESD Rating Human Body Model Charged Device Model	TBD TBD	- -	V	
MSL Level	TBD	-	-	
Storage Temperature	-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)	3400	-	3600	MHz	
Supply Voltage (V_{CC})	+2.9	+3.3	+4.2	V	
Bias Voltage (V_{BIAS})	+2.80 0	+2.85 -	+2.90 +0.7	V	PA "on" PA "shut down"
Attenuator Control Voltage (V_{ATTN}) Logic High Logic Low	+2.3 0	- -	+3.7 +0.7	V	Attenuator enabled Nominal gain
RF Output Power (P_{OUT})	-	+23	-	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
 ($T_c = +25\text{ }^\circ\text{C}$, $V_{CC} = +3.3\text{ V}$, $V_{BIAS} = +2.85\text{ V}$, $f = 3.6\text{ GHz}$, $50\ \Omega$ system)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain	-	31	-	dB	
Attenuator Step	-	25	-	dB	
Output Power Meets Spectrum Mask	-	+24	-	dBm	ETSI EN301-021 Type G
EVM	- -	2.8 4	3.2 -	%	at +22 dBm P_{OUT} at +23 dBm P_{OUT}
Output P1dB	-	+29	-	dBm	CW
Output IP3	-	+40	-	dBm	two CW tones, +19 dBm output per tone
Harmonics	-	-30	-	dBc	at +24 dBm P_{OUT}
Power-Added Efficiency	-	23	-	%	at +24 dBm P_{OUT}
Power Detector Voltage at +24 dBm P_{OUT} at +14 dBm P_{OUT}	- -	+2.15 +0.85	- -	V	High impedance load
Quiescent Current	-	135	-	mA	
Current Consumption V_{CC} V_{CC} V_{BIAS} V_{ATTN}	- - - -	280 325 6.5 0.2	- - 8.0 1.0	mA	at +22 dBm P_{OUT} at +24 dBm P_{OUT} Logic High = +3.3 V
Leakage Current ⁽²⁾	-	1.7	3.0	mA	PA shut down ($V_{BIAS} = 0V$) See figure 7 Application Circuit.

Notes:

1. All RF measurements performed with an 802.11g 54 Mbps OFDM signal unless otherwise noted.

(2) Lower leakage current may be obtained by using an alternate application circuit. Please refer to the ANADIGICS application note titled, "AWM6423 Reduced leakage current in Off State."

PERFORMANCE DATA

Figure 3: Gain vs. Output Power
($T_C = +25\text{ }^\circ\text{C}$, $V_{CC} = +3.3\text{ V}$, $V_{BIAS} = +2.85\text{ V}$,
54 Mbps OFDM Modulation)

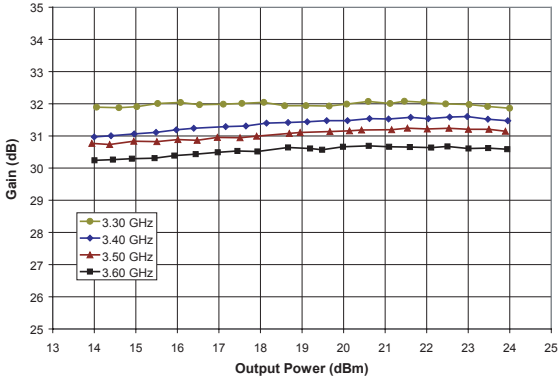


Figure 4: Uncorrected EVM vs. Output Power
($T_C = +25\text{ }^\circ\text{C}$, $V_{CC} = +3.3\text{ V}$, $V_{BIAS} = +2.85\text{ V}$, 54 Mbps
OFDM Modulation, system EVM approx. 0.8 %)

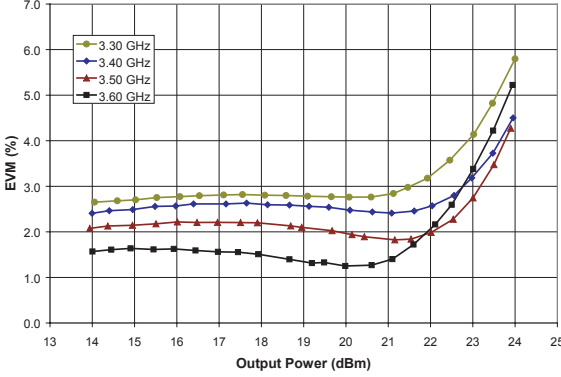


Figure 5: Supply Current vs. Output Power
($T_C = +25\text{ }^\circ\text{C}$, $V_{CC} = +3.3\text{ V}$, $V_{BIAS} = +2.85\text{ V}$,
54 Mbps OFDM Modulation)

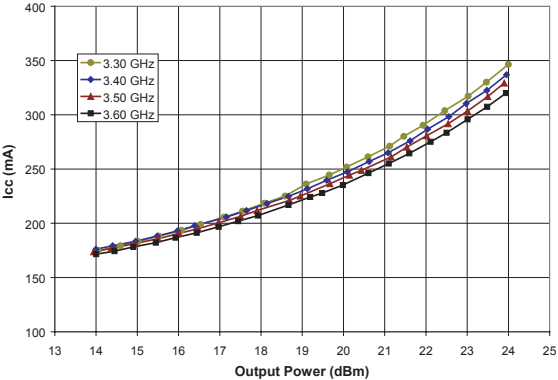
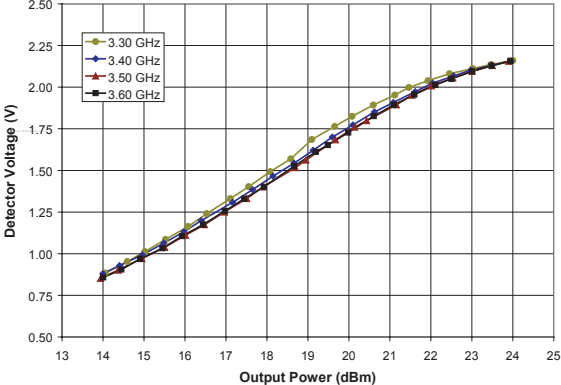


Figure 6: Detector Voltage vs. Output Power
($T_C = +25\text{ }^\circ\text{C}$, $V_{CC} = +3.3\text{ V}$, $V_{BIAS} = +2.85\text{ V}$,
54 Mbps OFDM Modulation)



APPLICATION INFORMATION

Transmit Disable and Attenuator Control

The power amplifier is disabled by setting V_{BIAS} below +0.7 V. The step attenuator is enabled by applying a logic high to V_{ATTN} ; the PA exhibits nominal gain when a logic low is applied to V_{ATTN} .

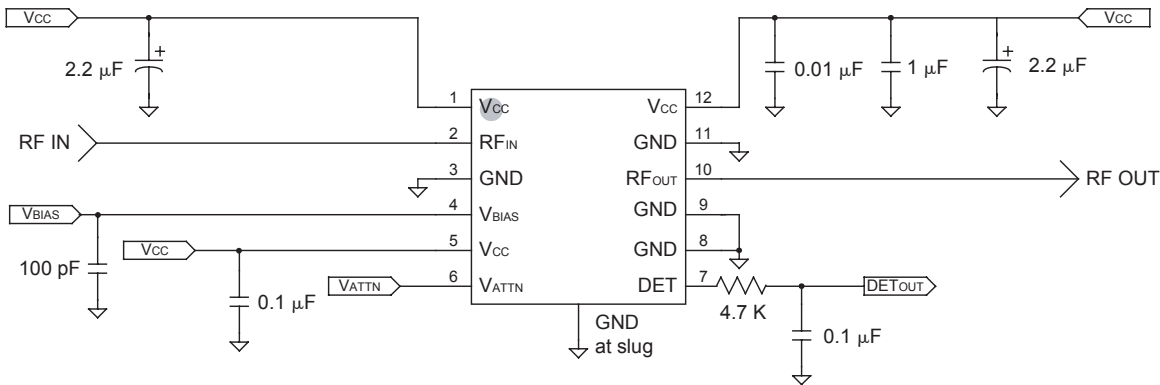
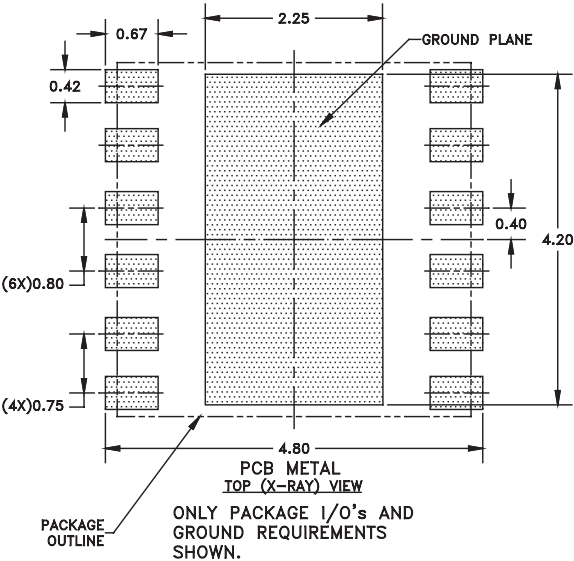


Figure 7: Application Circuit



- NOTES:
- (1) UNLESS SPECIFIED DIMENSIONS ARE SYMMETRICAL ABOUT CENTER LINES SHOWN.
 - (2) DIMENSIONS IN MILLIMETERS.

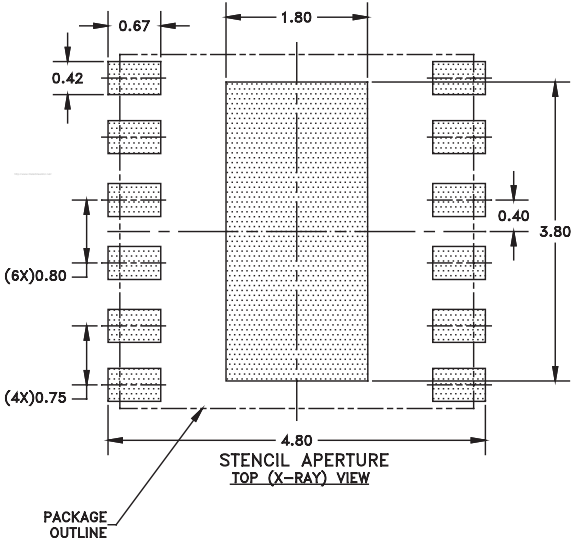
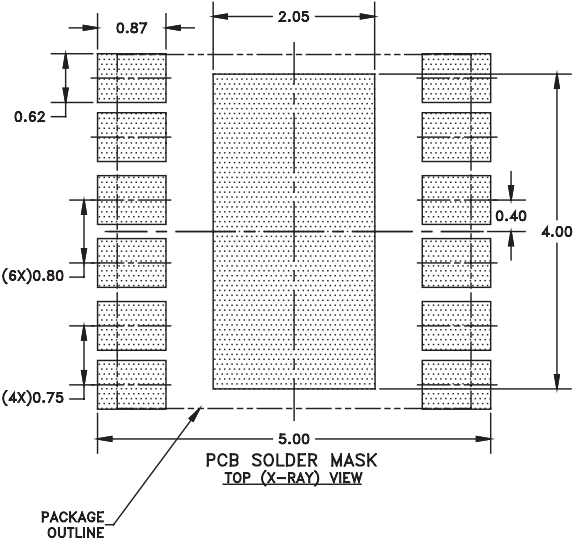
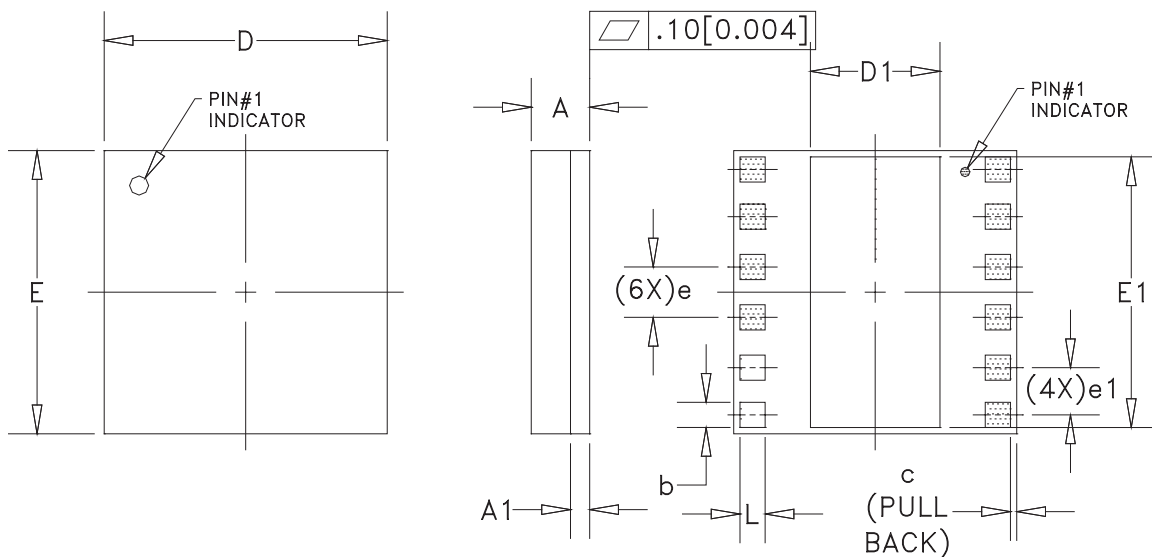


Figure 8: Land Pattern

PACKAGE OUTLINE



S _N B _{OL}	MILLIMETERS			INCHES			NOTE
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
A	0.88	0.98	1.08	0.034	0.038	0.042	—
A1	—	0.32	—	—	0.013	—	—
b	0.32	—	0.52	0.013	—	0.020	3
c	—	0.10	—	—	0.004	—	—
D	4.38	4.50	4.62	0.172	0.177	0.182	—
D1	1.97	—	2.13	0.078	—	0.084	—
E	4.38	4.50	4.62	0.172	0.177	0.182	—
E1	4.22	—	4.38	0.166	—	0.172	—
e	—	0.80	—	—	0.032	—	3
e1	—	0.75	—	—	0.030	—	3,4
L	0.32	—	0.52	0.013	—	0.020	3

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.
4. DIMENSION e1 FOUR CORNERS.

Figure 9: M35 Package Outline - 12 Pin 4.5 mm x 4.5 mm x 1.0 mm Surface Mount Module

ORDERING INFORMATION

ORDER NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AWM6433RM35P8	-40 °C to +85 °C	12 Pin 4.5 mm x 4.5 mm x 1.0 mm Surface Mount Module	2,500 piece Tape and Reel

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WARNING

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