



## AWT6112

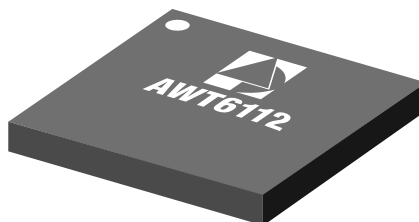
Cellular Dual Mode AMPS/CDMA  
3.4V/28dBm Linear Power Amplifier Module  
ADVANCED PRODUCT INFORMATION - Rev 0.1

### FEATURES

- InGaP HBT Technology
- High Efficiency: 49% AMPS, 38% CDMA
- Low Quiescent Current: 50 mA
- Low Leakage Current in Shutdown Mode:  $<5 \mu\text{A}$
- Optimized for a  $50 \Omega$  System
- Low Profile Miniature Surface Mount Package
- CDMA 1XRTT Compliant
- CDMA 1xEV-DO Compliant

### APPLICATIONS

- Single Mode CDMA Wireless Handsets
- Dual Mode AMPS/CDMA Wireless Handsets



**M7 Package**  
**10 Pin 4mm x 4mm**  
**Surface Mount Module**

### PRODUCT DESCRIPTION

The AWT6112 is a high power, high efficiency amplifier module for dual mode AMPS/CDMA wireless handset applications. The device is manufactured on an advanced InGaP HBT MMIC technology offering state-of-the-art reliability, temperature stability, and ruggedness. Selectable bias modes that optimize efficiency for different

output power levels, and a shutdown mode with low leakage current, serve to increase handset talk and standby time. The self contained 4mm x 4mm surface mount package incorporates matching networks optimized for output power, efficiency and linearity in a  $50 \Omega$  system.

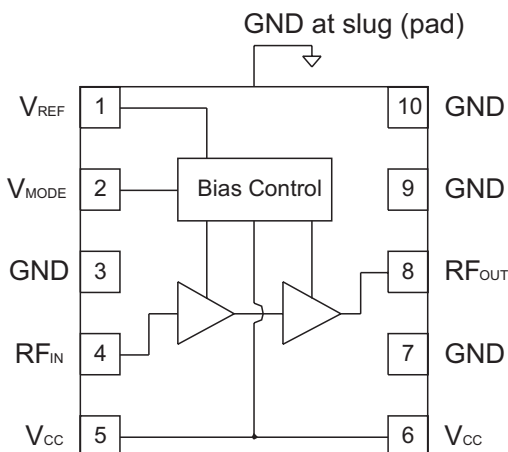


Figure 1: Block Diagram

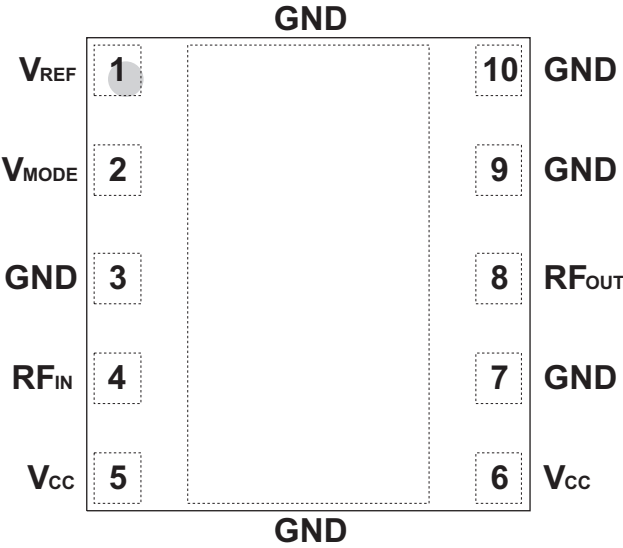


Figure 2: Pinout (X-ray Top View)

Table 1: Pin Description

PIN	NAME	DESCRIPTION
1	V <sub>REF</sub>	Reference Voltage
2	V <sub>MODE</sub>	Mode Control
3	GND	Ground
4	RF <sub>IN</sub>	RF Input
5	V <sub>CC</sub>	Supply Voltage
6	V <sub>CC</sub>	Supply Voltage
7	GND	Ground
8	RF <sub>OUT</sub>	RF Output
9	GND	Ground
10	GND	Ground

## ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

PARAMETER	MIN	MAX	UNIT
Supply Voltage ( $V_{CC}$ )	0	+5	V
Mode Control Voltage ( $V_{MODE}$ )	0	+3.5	V
Reference Voltage ( $V_{REF}$ )	0	+3.5	V
RF Input Power ( $P_{IN}$ )	-	+10	dBm
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)	824	-	849	MHz	
Supply Voltage ( $V_{CC}$ )	+3.0	+3.4	+4.2	V	
Reference Voltage ( $V_{REF}$ )	+2.75 0	+3.0 -	+3.1 +0.5	V	PA "on" PA "shut down"
Mode Control Voltage ( $V_{MODE}$ )	+2.5 0	+3.0 -	+3.1 +0.5	V	Low Bias Mode High Bias Mode
RF Output Power ( $P_{OUT}$ )	- - -	+31.0 +29.0 +28.0	- - -	dBm	AMPS, $V_{CC} = +3.4$ V CDMA, $V_{CC} = +3.7$ V CDMA, $V_{CC} = +3.4$ V
Case Temperature ( $T_C$ )	-30	-	+110	°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 - AMPS Operation**  
**( $T_C = +25\text{ }^\circ\text{C}$ ,  $V_{CC} = +3.4\text{ V}$ ,  $V_{REF} = +3.0\text{ V}$ ,  $V_{MODE} = +3.0\text{ V}$ ,  $P_{OUT} = +31\text{ dBm}$ ,  $50\text{ }\Omega$  system)**

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain	-	28.5	-	dB	
Gain Variation	-	0.5	1.0	dB	
Power-Added Efficiency	-	49	-	%	
Quiescent Current ( $I_{CQ}$ )	-	50	-	mA	
Reference Current	-	6.5	9.0	mA	through $V_{REF}$ pin
Mode Control Current	-	0.35	0.7	mA	through $V_{MODE}$ pin
Leakage Current	-	<5	-	$\mu\text{A}$	$V_{CC} = +3.4\text{ V}$ , $V_{REF} = 0\text{ V}$ , $V_{MODE} = 0\text{ V}$
Noise in Receive Band	-	-135	-	dBm/Hz	869 MHz to 894 MHz
Harmonics 2fo 3fo, 4fo	- - -	-40 -55	-30 -30	dBc	
Input Impedance	-	-	2:1	VSWR	
Spurious Output Level (all spurious outputs)	-	-	-70	dBc	$P_{OUT} \leq +31\text{ dBm}$ In-band load VSWR < 8:1 Out-of-band load VSWR < 8:1 Applies over all voltage and temperature operating ranges
Load mismatch stress with no permanent degradation or failure	8:1	-	-	VSWR	$V_{CC} = +5.0\text{ V}$ $P_{IN} = +5\text{ dBm}$ Applies over full operating temperature range

**Table 5: Electrical Specifications - CDMA Operation**  
**(T<sub>C</sub> = +25 °C, V<sub>CC</sub> = +3.4 V, V<sub>REF</sub> = +3.0 V, 50 Ω system)**

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain	- -	29 26.5	- -	dB	P <sub>OUT</sub> = +28 dBm, V <sub>MODE</sub> = 0 V P <sub>OUT</sub> = +16 dBm, V <sub>MODE</sub> = +3.0 V
Adjacent Channel Power at ±885 kHz offset Primary Channel BW = 1.23 MHz Adjacent Channel BW = 30 kHz	- -	-49 -50	- -	dB	P <sub>OUT</sub> = +28 dBm, V <sub>MODE</sub> = 0 V P <sub>OUT</sub> = +16 dBm, V <sub>MODE</sub> = +3.0 V
Adjacent Channel Power at ±1.98 MHz offset Primary Channel BW = 1.23 MHz Adjacent Channel BW = 30 kHz	- -	-60 -68	- -	dB	P <sub>OUT</sub> = +28 dBm, V <sub>MODE</sub> = 0 V P <sub>OUT</sub> = +16 dBm, V <sub>MODE</sub> = +3.0 V
Power-Added Efficiency	- -	38 8	- -	%	P <sub>OUT</sub> = +28 dBm, V <sub>MODE</sub> = 0 V P <sub>OUT</sub> = +16 dBm, V <sub>MODE</sub> = +3.0 V
Quiescent Current (I <sub>q</sub> )	-	50	-	mA	V <sub>MODE</sub> = +3.0 V
Reference Current	-	6.5	9.0	mA	through V <sub>REF</sub> pin
Mode Control Current	-	0.35	0.7	mA	through V <sub>MODE</sub> pin
Leakage Current	-	<5	-	μA	V <sub>CC</sub> = +3.4 V, V <sub>REF</sub> = 0 V, V <sub>MODE</sub> = 0 V
Noise in Receive Band	-	-135	-	dBm/Hz	869 MHz to 894 MHz
Harmonics 2fo 3fo, 4fo	- -	-40 -55	-30 -30	dBc	
Input Impedance	-	-	2:1	VSWR	
Spurious Output Level (all spurious outputs)	-	-	-70	dBc	P <sub>OUT</sub> ≤ +29 dBm In-band load VSWR < 8:1 Out-of-band load VSWR < 8:1 Applies over all voltage and temperature operating ranges
Load mismatch stress with no permanent degradation or failure	8:1	-	-	VSWR	V <sub>CC</sub> = +5.0 V, P <sub>N</sub> = +5 dBm Applies over full operating temperature range

## 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 a logic low levels (see Operating Ranges table) to both the  $V_{REF}$  and  $V_{MODE}$  voltages.

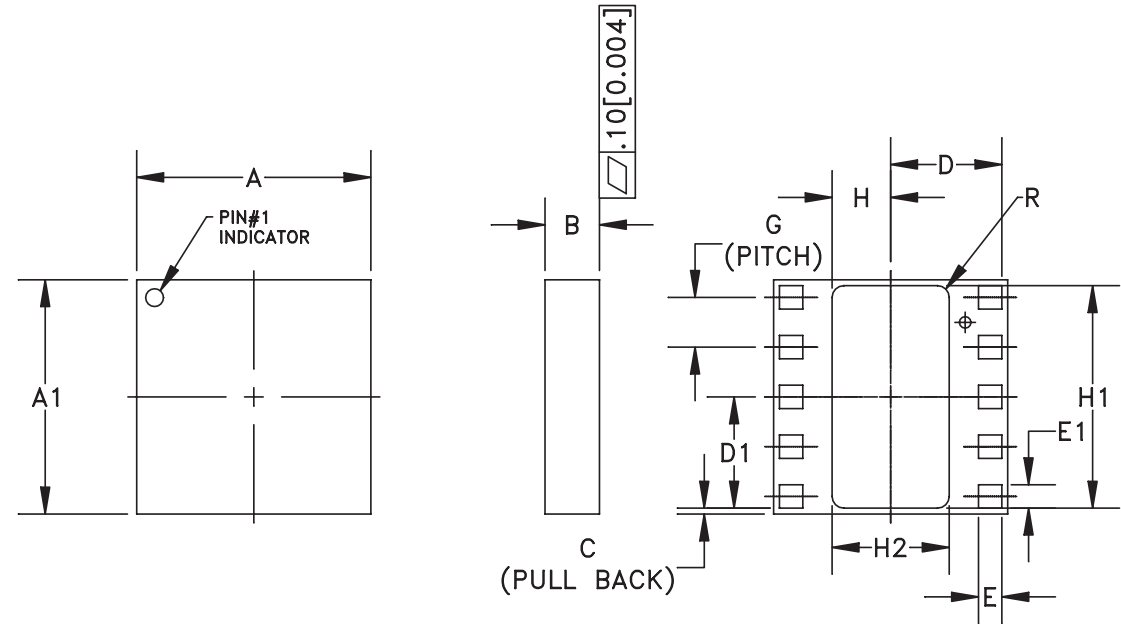
### Bias Modes

The power amplifier may be placed in either a Low Bias mode or a High Bias mode by applying the appropriate logic level (see Operating Ranges table) to the  $V_{MODE}$  voltage. The Bias Control table lists the recommended modes of operation for various applications.

**Table 6: Bias Control**

APPLICATION	$P_{OUT}$ LEVELS	BIAS MODE	$V_{REF}$	$V_{MODE}$
AMPS	(all)	Low	+3.0 V	+3.0 V
CDMA - low power	$\leq +16$ dBm	Low	+3.0 V	+3.0 V
CDMA - high power	$> +16$ dBm	High	+3.0 V	0 V
Shutdown	-	Shutdown	0 V	0 V

PACKAGE OUTLINE



S W B Q	MILLIMETERS			INCHES			NOTE
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
A	3.88	4.00	4.12	0.152	0.157	0.162	—
A1	3.88	4.00	4.12	0.152	0.157	0.162	—
B	1.30	1.55	1.70	0.051	0.061	0.067	3
C	—	0.10	—	—	0.004	—	—
D	—	1.90	—	—	0.075	—	—
D1	—	1.90	—	—	0.075	—	—
E	0.35	0.40	0.45	0.013	0.015	0.017	—
E1	0.35	0.40	0.45	0.013	0.015	0.017	—
G	0.85 BSC			0.033 BSC			—
H	—	1.00	—	—	0.039	—	—
H1	—	3.80	—	—	0.149	—	—
H2	—	2.00	—	—	0.078	—	—
R	—	0.20	—	—	0.007	—	—

NOTES:

1. CONTROLLING DIMENSIONS: MILLIMETERS
2. UNLESS SPECIFIED TOLERANCE=±0.076[0.003].
3. REFERENCE ONLY.

Figure 3: M7 Package Outline - 10 Pin 4mm x 4mm Surface Mount Module

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