AWT6307R

HELP2™ Cellular CDMA 3.4 V/28 dBm
Linear Power Amplifier Module

Data Sheet - Rev 2.2

FEATURES

- InGaP HBT Technology
- High Efficiency:
  - 40 % @ +28 dBm output
  - 21 % @ +16 dBm output
- Low Quiescent Current: 15 mA
- Low Leakage Current in Shutdown Mode: <1 μA
- Internal Voltage Regulation
- Optimized for a 50 Ω System
- Low Profile Surface Mount Package: 1 mm
- CDMA 1XRTT, 1xEV-DO Compliant
- Pinout Enables Easy Phone Board Migration From 4 mm x 4 mm Package
- RoHS Compliant Package, 250 °C MSL-3
- Suitable for BC10 (806-824 MHz) applications

APPLICATIONS

- CDMA/EVDO Cell-band Wireless Handsets and Data Devices

M9 Package
8 Pin 3 mm x 3 mm x 1 mm
Surface Mount Module

PRODUCT DESCRIPTION

The AWT6307R meets the increasing demands for higher efficiency and smaller footprint in CDMA 1X handsets. The package pinout was chosen to enable handset manufacturers to switch from a 4 mm x 4 mm PA module with few layout changes while reducing board area requirements by 44 %. The AWT6307R uses ANADIGICS' exclusive InGaP-Plus™ technology, which combines HBT and pHEMT devices on the same die, to enable state-of-the-art reliability, temperature stability, and ruggedness. The AWT6307R is part of ANADIGICS' High-Efficiency-at-Low-Power (HELP™) family of CDMA power amplifiers, which deliver low quiescent currents and significantly greater efficiency without a costly external DAC or DC-DC converter. Through selectable bias modes, the AWT6307 achieves optimal efficiency across different output power levels, specifically at low- and mid-range power levels where the PA typically operates, thereby dramatically increasing handset talk-time and standby-time. Its built-in voltage regulator eliminates the need for external voltage regulation components. The 3 mm x 3 mm x 1 mm surface mount package incorporates matching networks optimized for output power, efficiency and linearity in a 50 Ω system.

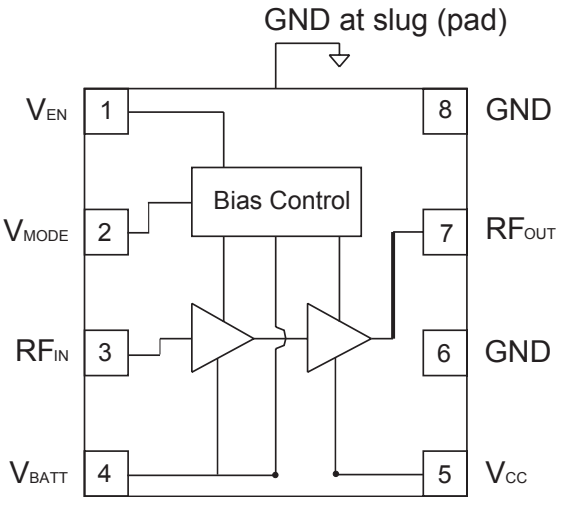


Figure 1: Block Diagram

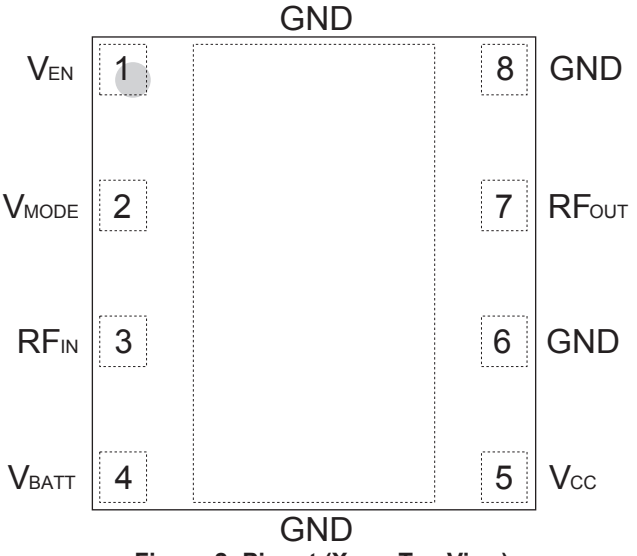


Figure 2: Pinout (X-ray Top View)

Table 1: Pin Description

PIN	NAME	DESCRIPTION
1	V_{EN}	PA Enable Voltage
2	V_{MODE}	Mode Control
3	RF_{IN}	RF Input
4	V_{BATT}	Battery Voltage
5	V_{CC}	Supply Voltage
6	GND	Ground
7	RF_{OUT}	RF Output
8	GND	Ground

ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

PARAMETER	MIN	MAX	UNIT
Supply Voltage (V_{CC} and V_{BATT})	0	+5	V
Mode Control Voltage (V_{MODE})	0	+3.5	V
Enable Voltage (V_{EN})	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} and V_{BATT})	+3.2	+3.4	+4.2	V	
Enable Voltage (V_{EN})	+2.2 0	+2.4 -	+3.1 +0.5	V	PA "on" PA "shut down"
Mode Control Voltage (V_{MODE})	+1.6 0	+2.4 -	+3.1 +0.5	V	Low Bias Mode High Bias Mode
RF Output Power (P_{OUT})	27.5(1)	28.0	-	dBm	CDMA
Case Temperature (T_C)	-30	-	+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) For operation at V_{CC} = +3.2 V, P_{OUT} is derated by 0.5 dB.

Table 4: Electrical Specifications - CDMA Operation
(T_C = +25 °C, V_{BATT} = V_{CC} = +3.4 V, V_{EN} = +2.4 V, 50 Ω system, IS-95 uplink waveform)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain	25 15 16	27 17 17.5	30 19 20	dB	P_{OUT} = +28 dBm, V_{MODE} = 0 V P_{OUT} = +16 dBm, V_{MODE} = +2.4 V P_{OUT} = +17 dBm, V_{MODE} = +2.4 V, V_{CC} = +3.7 V
Adjacent Channel Power at ±885 kHz offset (1) Primary Channel BW = 1.23 MHZ Adjacent Channel BW = 30 kHz	- - -	-50 -57 -55	-47 -47 -47	dBc	P_{OUT} = +28 dBm, V_{MODE} = 0 V P_{OUT} = +16 dBm, V_{MODE} = +2.4 V P_{OUT} = +17 dBm, V_{MODE} = +2.4 V, V_{CC} = +3.7 V
Adjacent Channel Power at ±1.98 MHz offset (1) Primary Channel BW = 1.23 MHZ Adjacent Channel BW = 30 kHz	- -	-63 -61	-57 -57	dBc	P_{OUT} = +28 dBm, V_{MODE} = 0 V P_{OUT} = +16 dBm, V_{MODE} = +2.4 V
Power-Added Efficiency (1)	37 17	40 21	- -	%	P_{OUT} = +28 dBm, V_{MODE} = 0 V P_{OUT} = +16 dBm, V_{MODE} = +2.4 V
Quiescent Current (Icq)	-	15	20	mA	V_{MODE} = +2.4 V, Low Bias
Enable Current	-	0.4	0.8	mA	through V_{EN} pin, V_{MODE} = +2.4 V
Battery Current	-	2.5	5	mA	through V_{BATT} pin, V_{MODE} = +2.4 V
Mode Control Current	-	0.5	0.8	mA	through V_{MODE} pin, V_{MODE} = +2.4 V
Leakage Current	-	<1	5	μA	V_{CC} = +4.2 V, V_{EN} = 0 V, V_{MODE} = 0 V
Noise in Receive Band	-	-133	-131	dBm/Hz	869 MHz to 894 MHz
Harmonics 2fo 3fo, 4fo	- -	-42 -50	-30 -30	dBc	
Input Impedance	-	-	2:1	VSWR	
Spurious Output Level (all spurious outputs)	-	-	-65	dBc	$P_{OUT} \leq$ +28 dBm In-band Load VSWR < 5:1 Out-of-band Load VSWR < 10:1 Applies over all operating conditions
Load mismatch stress with no permanent degradation or failure	8:1	-	-	VSWR	Applies over all operating conditions

Notes:
(1) PAE and ACP limit applies at 836.5 MHz.

APPLICATION INFORMATION

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

Shutdown Mode

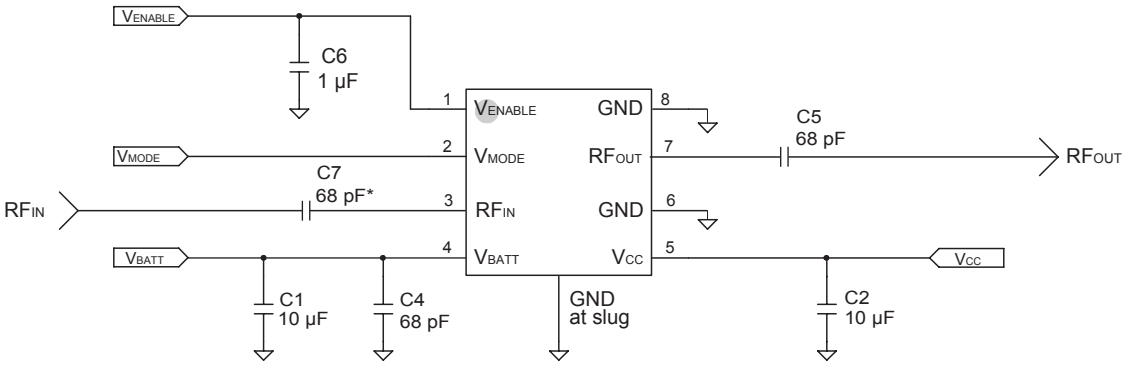
The power amplifier may be placed in a shutdown mode by applying a logic low levels (see Operating Ranges table) to both the V_{REF} and V_{MODE} voltages.

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 5: Bias Control

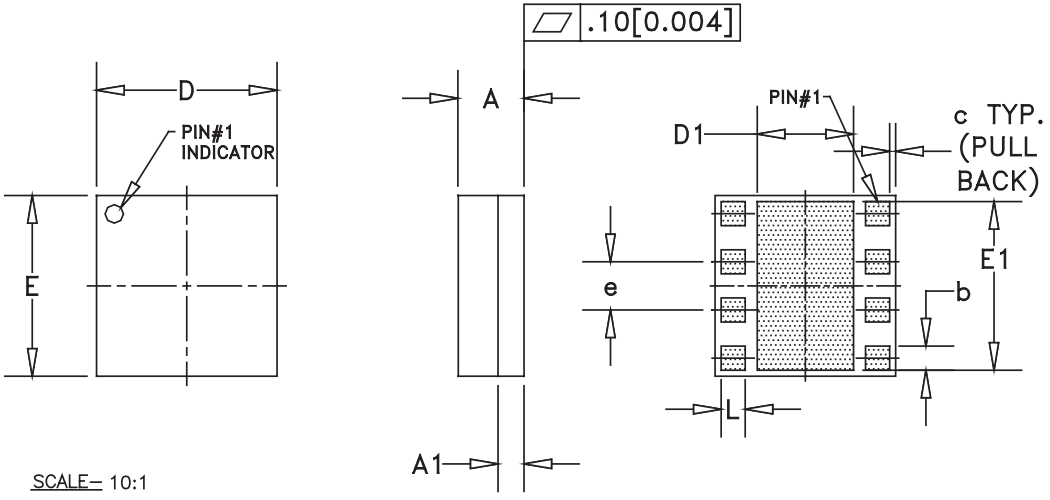
APPLICATION	P_{OUT} LEVELS	LOGIC	V_{EN}	V_{MODE}
CDMA - low power	≤+16dBm	Low	+2.4 V	+2.4 V
CDMA - high power	>+16 dBm	High	+2.4 V	0 V
Shutdown	-	Shutdown	0 V	0 V



Note:
* This capacitor is only needed if a DC voltage is present on the RF input pin

Figure 3: Application Circuit

PACKAGE OUTLINE



SYMBOL	MILLIMETERS			INCHES			NOTE
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
A	0.90	1.00	1.10	0.035	0.039	0.043	–
A1	–	0.35	–	–	0.013	–	–
b	0.35	–	0.60	0.013	–	0.024	3
c	–	0.10	–	–	0.004	–	–
D	2.88	3.00	3.12	0.113	0.118	0.123	–
D1	1.20	–	1.50	0.047	–	0.060	3
E	2.88	3.00	3.12	0.113	0.118	0.123	–
E1	2.75	–	2.85	0.108	–	0.112	3
e	0.80 BSC			0.0315 BSC			–
L	0.35	–	0.60	0.013	–	0.024	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. UNLESS SPECIFIED DIMENSIONS ARE SYMMETRICAL ABOUT CENTER LINES SHOWN.

Figure 4: M9 Package Outline - 8 Pin 3 mm x 3 mm x 1 mm Surface Mount Module

TOP BRAND

6307R
LLLLNN
BBBBCC

NOTES:

1. ANADIGICS LOGO SIZE: NONE
2. PART NUMBER: FOUR DIGIT NUMERICAL
3. WAFER LOT NUMBER: LLLL = LOT NUMBER
   NN = WAFER I.D.
4. PIN 1 INDICATOR: LASER DOT
5. B.O.M. # BBBB
6. COUNTRY CODE: CC = TH–for–THAILAND, TW–for–TAIWAN
   CC = PH–for–PHILIPPINES, CH–for–CHINA
7. TYPE : ARIAL
   SIZE : 1.5–POINT
   COLOR : LASER

Figure 5: Branding Specification

COMPONENT PACKAGING

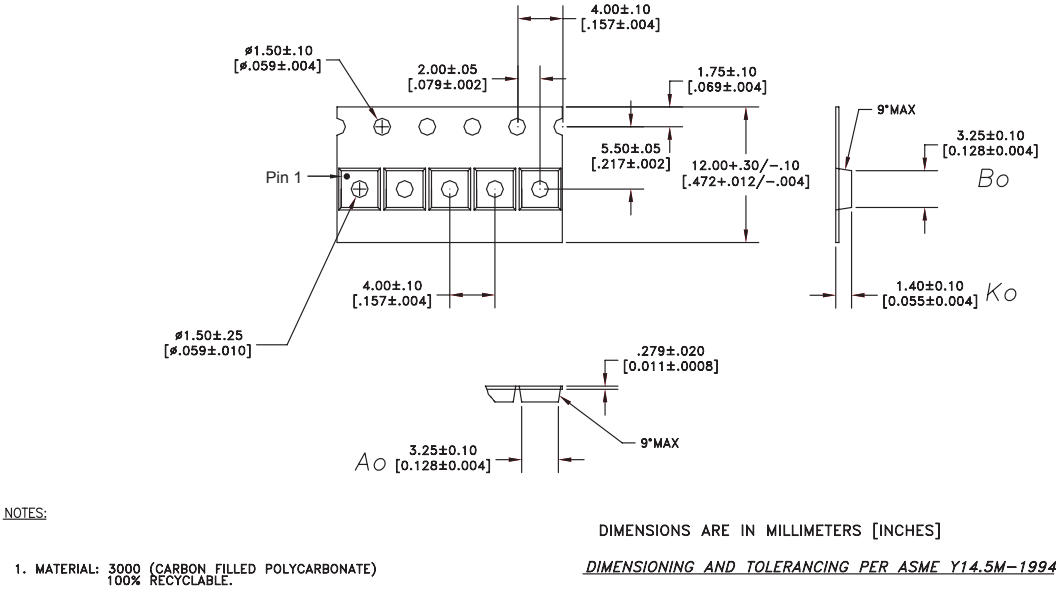


Figure 6: Tape & Reel Packaging

Table 6: Tape & Reel Dimensions

PACKAGE TYPE	TAPE WIDTH	POCKET PITCH	REEL CAPACITY	MAX REEL DIA
3 mm x 3 mm x 1 mm	12 mm	4 mm	2500	7"

ORDERING INFORMATION

ORDER NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AWT6307RM9Q7	-30 °C to +85 °C	RoHS Compliant 8 Pin 3 mm x 3 mm x 1 mm Surface Mount Module	Tape and Reel, 2500 pieces per Reel

ANADIGICS, Inc.
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