

FEATURES

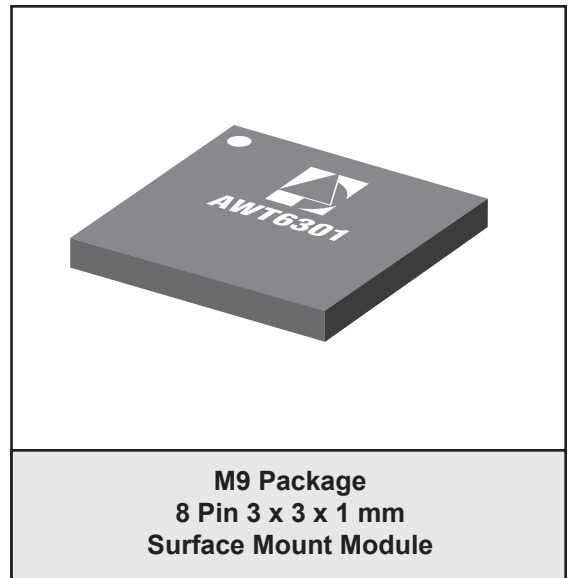
- InGaP HBT Technology
- High Efficiency:
40%, $V_{MODE} = 0\text{ V}$
41%, $V_{MODE} = +2.85\text{ V}$ (no mode switching)
- Low Quiescent Current: 50 mA
- Low Leakage Current in Shutdown Mode: $<1\text{ }\mu\text{A}$
- $V_{REF} = +2.85\text{ V}$ (+2.75 V Min Over Temp.)
- Optimized for a $50\text{ }\Omega$ System
- Low Profile Surface Mount Package: 1.1mm
- 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

APPLICATIONS

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

PRODUCT DESCRIPTION

The AWT6301R meets the increasing demands for higher efficiency and linearity in CDMA1X handsets. The package pinout was chosen to enable handset manufacturers to switch from a 4mm x 4mm PA module with very few layout changes to the phone board. 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 3 mm x 3 mm x 1 mm surface mount package incorporates matching networks optimized for output power, efficiency and linearity in a $50\text{ }\Omega$ system.

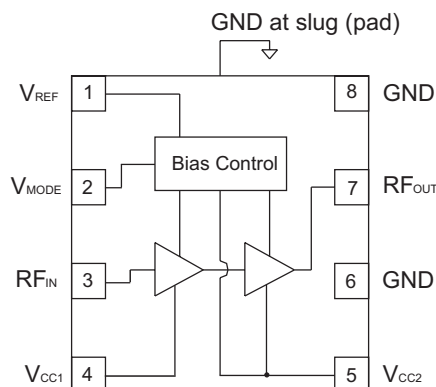


Figure 1: Block Diagram

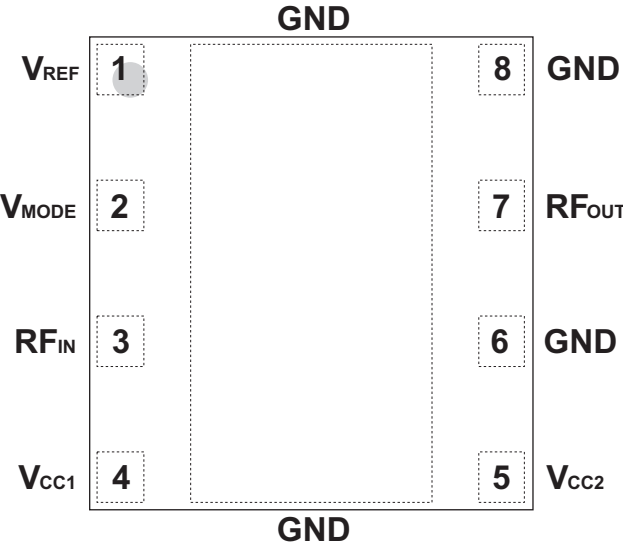


Figure 2: Pinout (X-ray Top View)

Table 1: Pin Description

PIN	NAME	DESCRIPTION
1	V _{REF}	Reference Voltage
2	V _{MODE}	Mode Control
3	RF _{IN}	RF Input
4	V _{CC1}	Supply Voltage
5	V _{CC2}	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}) With RF Drive DC Only	0 0	+5 +8	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})	+3.2	+3.4	+4.2	V	
Reference Voltage (V_{REF})	+2.75 0	+2.85 -	+3.1 +0.5	V	PA "on" PA "shut down"
Mode Control Voltage (V_{MODE})	+2.5 0	+2.85 -	+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 with mode switching
(T_C = +25 °C, V_{CC} = +3.4 V, V_{REF} = +2.85 V, 50 Ω system)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain	25 24	27.5 26.5	30 28	dB	P _{OUT} = +28 dBm, V _{MODE} = 0 V P _{OUT} = +16 dBm, V _{MODE} = +2.85 V
Adjacent Channel Power at ± 885 kHz offset ⁽¹⁾ Primary Channel BW = 1.23 MHz Adjacent Channel BW = 30 kHz	- -	-50 -51	-47 -47	dBc	P _{OUT} = +28 dBm, V _{MODE} = 0 V P _{OUT} = +16 dBm, V _{MODE} = +2.85 V
Adjacent Channel Power at ± 1.98 MHz offset ⁽¹⁾ Primary Channel BW = 1.23 MHz Adjacent Channel BW = 30 kHz	- -	-63 -65	-57 -57	dBc	P _{OUT} = +28 dBm, V _{MODE} = 0 V P _{OUT} = +16 dBm, V _{MODE} = +2.85 V
Power-Added Efficiency ⁽¹⁾	37 8	40 9	- -	%	P _{OUT} = +28 dBm, V _{MODE} = 0 V P _{OUT} = +16 dBm, V _{MODE} = +2.85 V
Quiescent Current (I _{cq})	-	50	70	mA	V _{MODE} = +2.85 V, Low Bias
Reference Current	-	1.5	3	mA	through V _{REF} pin
Mode Control Current	-	0.3	1.0	mA	through V _{MODE} pin
Leakage Current	-	<1	5	μA	V _{CC} = +4.2 V, V _{REF} = 0 V, V _{MODE} = 0 V
Noise in Receive Band	-	-133	-131	dBm/Hz	869 MHz to 894 MHz
Harmonics 2fo 3fo, 4fo	- -	-35 -50	-30 -30	dBc	
Input Impedance	-	-	2:1	VSWR	
Spurious Output Level (all spurious outputs)	-	-	-65	dBc	P _{OUT} ≤ +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	10:1	-	-	VSWR	Applies over all operating conditions

Notes:

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

Table 5: Electrical Specifications - CDMA Operation in Low Power Mode
(T_c = +25 °C, V_{CC} = +3.4 V, V_{REF} = +2.85 V, V_{MODE} = +2.85 V, 50 Ω system)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain	24 24	27.0 26.5	29 28	dB	P _{OUT} = +28 dBm P _{OUT} = +16 dBm
Adjacent Channel Power at ± 885 kHz offset ⁽¹⁾ Primary Channel BW = 1.23 MHZ Adjacent Channel BW = 30 kHz	- -	-50 -51	-47 -47	dBc	P _{OUT} = +28 dBm P _{OUT} = +16 dBm
Adjacent Channel Power at ± 1.98 MHz offset ⁽¹⁾ Primary Channel BW = 1.23 MHZ Adjacent Channel BW = 30 kHz	- -	-61 -65	-57 -57	dBc	P _{OUT} = +28 dBm P _{OUT} = +16 dBm
Power-Added Efficiency ⁽¹⁾	37 8	41 9	- -	%	P _{OUT} = +28 dBm P _{OUT} = +16 dBm
Quiescent Current (I _q)	-	50	70	mA	V _{MODE} = +2.85 V, Low Bias
Reference Current	-	1.5	3	mA	through V _{REF} pin
Mode Control Current	-	0.3	1.0	mA	through V _{MODE} pin
Leakage Current	-	<1	5	μA	V _{CC} = +4.2 V, V _{REF} = 0 V, V _{MODE} = 0 V
Noise in Receive Band	-	-133	-131	dBm/Hz	869 MHz to 894 MHz
Harmonics 2fo 3fo, 4fo	- -	-35 -50	-30 -30	dBc	
Input Impedance	-	-	2:1	VSWR	
Spurious Output Level (all spurious outputs)	-	-	-65	dBc	P _{OUT} ≤ +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	10:1	-	-	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

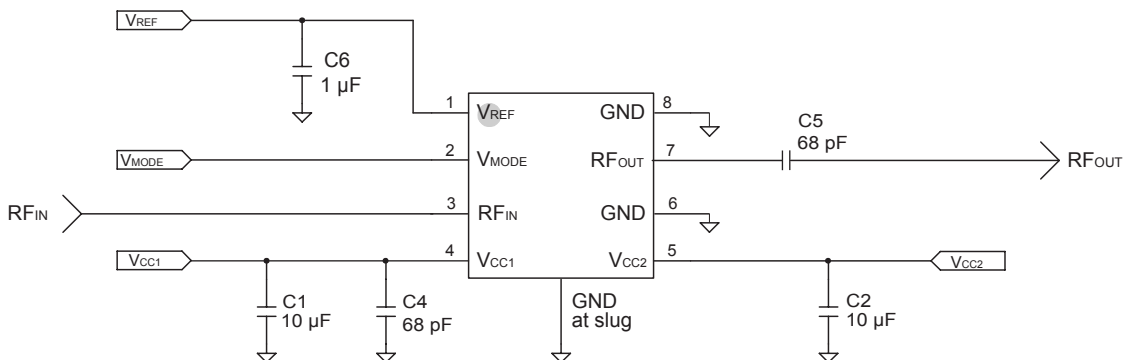
The power amplifier may be placed in a shutdown mode by applying a logic low levels (see Operating Ranges table) to both the V_{REF} and V_{MODE} voltages.

Bias Modes

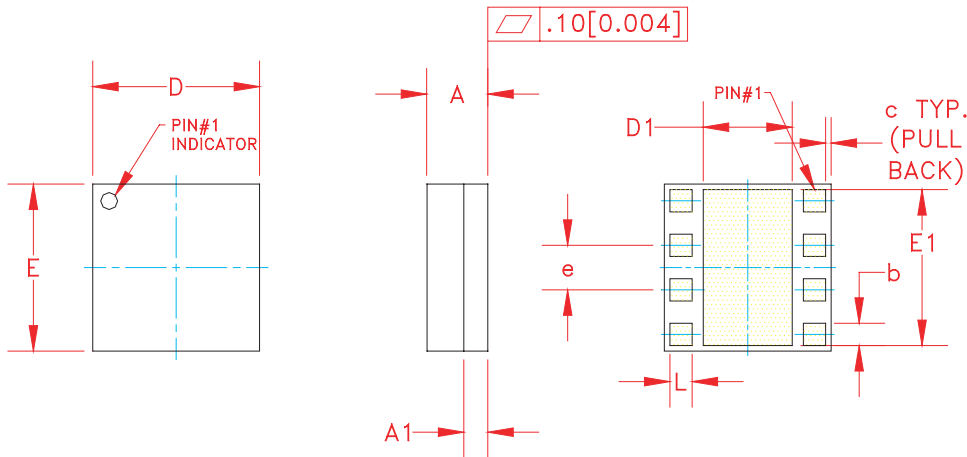
The power amplifier may be placed in either a Low Bias mode or a High Bias mode by applying the appropriate logic level (see Operating Ranges table) to the V_{MODE} voltage. The Bias Control table lists the recommended modes of operation for various applications.

Table 8: Bias Control

APPLICATION	P _{OUT} LEVELS	BIAS MODE	V _{REF}	V _{MODE}
AMPS	(all)	High	+2.85 V	0 V
CDMA - low power	≤+28 dBm	Low	+2.85 V	+2.85 V
CDMA - high power	>+16 dBm	High	+2.85 V	0 V
Shutdown	-	Shutdown	0 V	0 V

**Figure 3: Application Circuit**

PACKAGE OUTLINE



SYMBOL	MILLIMETERS			INCHES			NOTE
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
A	1.07	1.17	1.27	0.042	0.046	0.05	—
A1	—	0.51	—	—	0.020	—	—
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



NOTES:

1. ANADIGICS LOGO SIZE: NONE
2. PART NUMBER: FOUR DIGIT NUMERICAL
3. WAFER LOT NUMBER: LLLLL = 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



1. MATERIAL: 3000 (CARBON FILLED POLYCARBONATE)
100% RECYCLABLE.

DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994

Figure 6: Tape & Reel Packaging

Table 9: 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
AWT6301RM9Q7	-30 °C to +85 °C	8 Pin 3 mm x 3 mm x 1 mm Surface Mount Module	Tape and Reel, 2500 pieces per Reel

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