

FEATURES

- InGaP HBT Technology
- High Efficiency:
39 % @ +28 dBm output
- Zero Quiescent Current in Switch Mode
- Internal Voltage Regulation
- Optimized for a 50 Ω System
- Low Profile Surface Mount Package: 1 mm
- CDMA 1XRTT, 1xEV-DO Compliant
- RoHS Compliant Package, 250 °C MSL-3
- Suitable for BC10 (806-824 MHz) Applications band

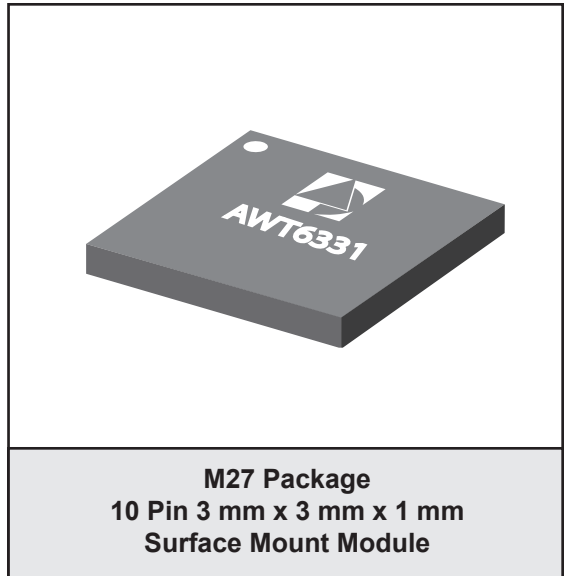
APPLICATIONS

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

PRODUCT DESCRIPTION

The AWT6331 is a new product in the revolutionary ZeroIC™ PA family. The AWT6331 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 AWT6331 has a unique architecture with two RF inputs. One input drives the power amplifier while the other input drives an RF switch that bypasses the power amplifier, going directly to the RF output. The mode control logic selects the PA or the RF switch. In



RF switch mode, current consumption is less than 10 μ A, reducing the average current consumption 70% more than a HELP2™ PA over the CDG profile. Its integrated voltage regulator eliminates the need for external components further reducing size and BOM cost. 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.

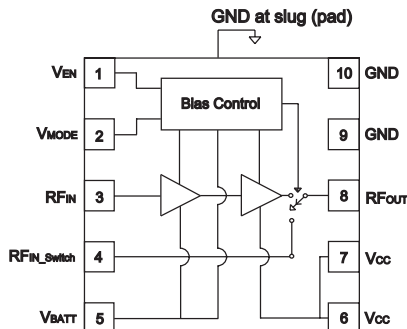


Figure 1: Block Diagram

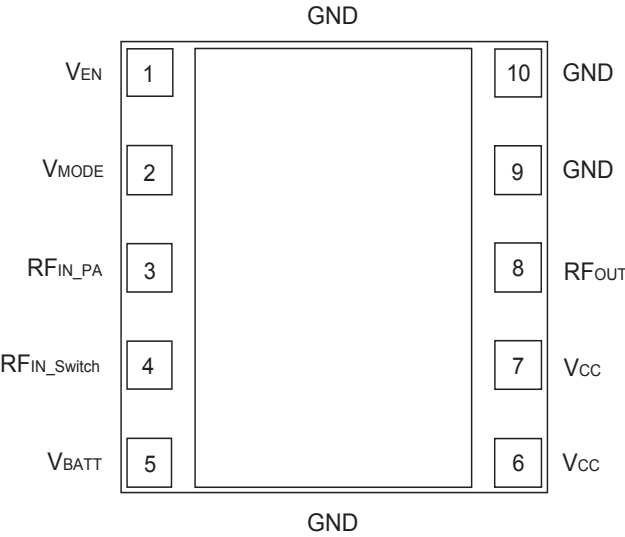


Figure 2: Pinout (X-ray Top View)

Table 1: Pin Description

PIN	NAME	DESCRIPTION
1	V _{EN}	PA Enable Voltage
2	V _{MODE}	Mode Control
3	RF _{IN_PA}	RF Input to PA
4	RF _{IN_SWITCH}	RF Input to Switch
5	V _{BATT}	Battery Voltage
6	V _{CC}	Supply Voltage
7	V _{CC}	Supply Voltage
8	RF _{OUT}	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} 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}) to PA	-	+10	dBm
RF Input Power (P_{IN}) to Switch	-	+20	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", Switch "on" PA "shut down"
Mode Control Voltage (V_{MODE})	+2.2 0	+2.4 -	+3.1 +0.5	V	PA Mode Switch 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 (IS-95 Modulation)
(T_C = +25 °C, V_{BATT} = V_{CC} = +3.4 V, V_{EN} = +2.4 V, 50 Ω system)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain Insertion Loss	25 -	28 0.7	30.5 1.5	dB	P _{OUT} = +28 dBm, V _{MODE} = +2.4 V V _{MODE} = 0 V
Adjacent Channel Power at ±885 kHz offset ⁽¹⁾ Primary Channel BW = 1.23 MHz Adjacent Channel BW = 30 kHz	- -	-50 -70	-46.5 -	dBc	P _{OUT} = +28 dBm, V _{MODE} = +2.4 V V _{MODE} = 0 V
Adjacent Channel Power at ±1.98 MHz offset ⁽¹⁾ Primary Channel BW = 1.23 MHz Adjacent Channel BW = 30 kHz	- -	-58.5 -70	-56 -	dBc	P _{OUT} = +28 dBm, V _{MODE} = +2.4 V V _{MODE} = 0 V
Isolation	32	40	-	dB	RF _{OUT} to RF _{IN_SWITCH} , V _{MODE} = +2.4 V, PA "on"
Power-Added Efficiency ⁽¹⁾	36	39	-	%	P _{OUT} = +28 dBm, V _{MODE} = +2.4 V
Enable Current	-	<0.1	0.25	mA	through V _{EN} pin, V _{EN} = +2.4 V
Mode Control Current	-	<0.01	0.1	mA	through V _{MODE} pin, V _{MODE} = +2.4 V
Leakage Current	-	<10	15	μA	V _{CC} = +4.2 V, V _{EN} = 0 V, V _{MODE} = 0 V or +2.4 V
	-	<10	18		V _{CC} = +4.2 V, V _{EN} = +2.4 V, V _{MODE} = 0 V, Switch Mode
Noise in Receive Band	-	-135	-133	dBm/Hz	869 MHz to 894 MHz
Harmonics 2fo 3fo, 4fo	- -	-40 -45	-30 -30	dBc	CW Measurement
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	8:1	-	-	VSWR	Applies over all operating conditions

Notes:

(1) PAE and ACP limit applies at 836.5 MHz (IS-95 modulation).

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_{EN} and V_{MODE} voltages.

Power Modes

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

Table 5: Power Control

APPLICATION	P _{OUT} LEVELS	POWER MODE	V _{EN}	V _{MODE}
CDMA - Switch Bypass	-*	Low	+2.4 V	0 V
Shutdown	-*	Low	0 V	+2.4 V
CDMA - PA	All	High	+2.4 V	+2.4 V
Shutdown	-	Shutdown	0 V	0 V

*Dependent upon typical output power from Transceiver and phone design.

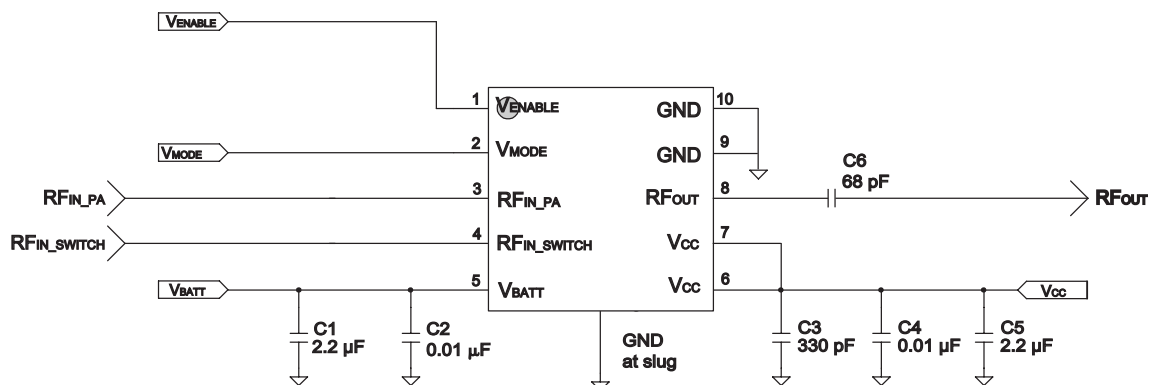
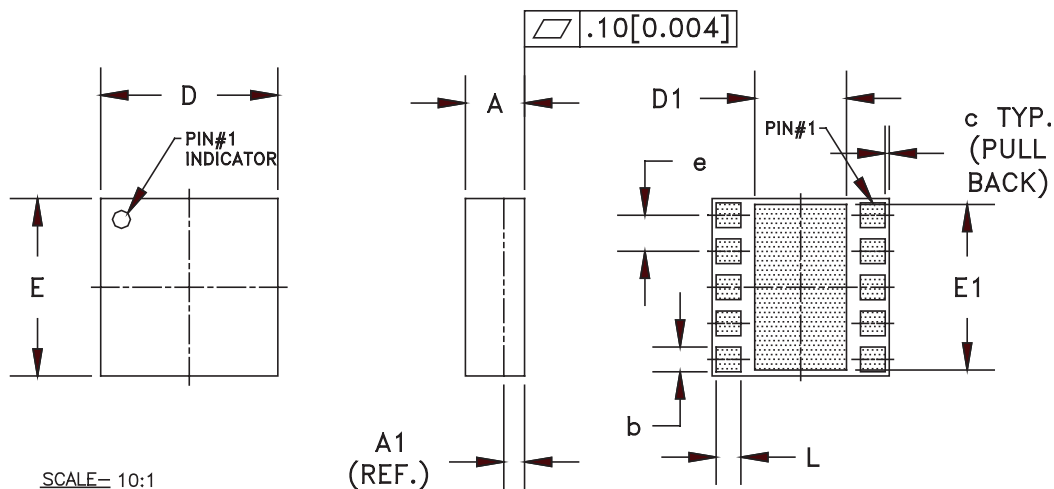


Figure 3: Application Circuit

PACKAGE OUTLINE



SWOL	MILLIMETERS			INCHES			NOTE
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
A	0.91	1.01	1.11	0.035	0.039	0.043	—
A1	0.35 (REF.)			0.014 (REF.)			—
b	0.33	—	0.52	0.013	—	0.020	3
c	—	0.10	—	—	0.004	—	—
D	2.88	3.00	3.12	0.113	0.118	0.123	—
D1	1.57	—	1.82	0.062	—	0.072	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	0.61			0.024			3
L	0.33	—	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. UNLESS SPECIFIED DIMENSIONS ARE SYMMETRICAL ABOUT CENTER LINES SHOWN.

Figure 4: M27 Package Outline - 10 Pin 3 mm x 3 mm x 1 mm Surface Mount Module

TOP BRAND

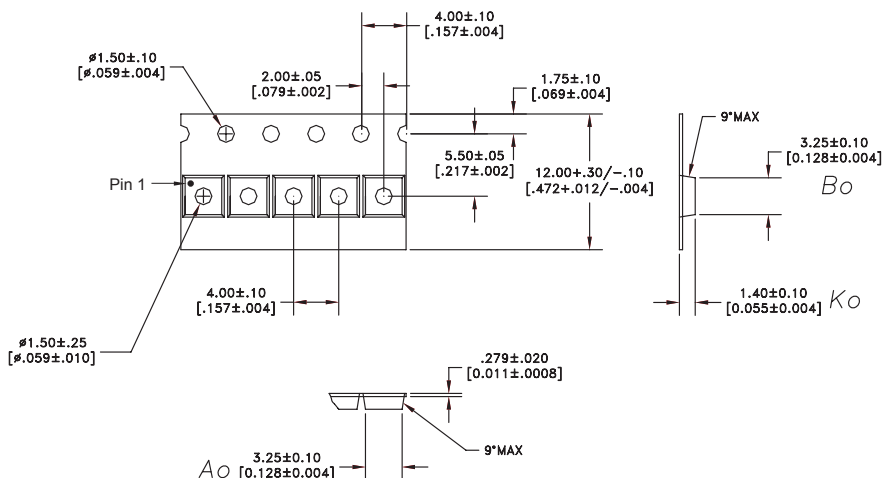


NOTES:

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



NOTES:

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

DIMENSIONS ARE IN MILLIMETERS [INCHES]

DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994

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
AWT6331RM27Q7	-30 °C to +85 °C	RoHS Compliant 10 Pin 3 mm x 3 mm x 1 mm Surface Mount Module	Tape and Reel, 2500 pieces per Reel
AWT6331RM27P9	-30 °C to +85 °C	RoHS Compliant 10 Pin 3 mm x 3 mm x 1 mm Surface Mount Module	Partial Tape and Reel

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