AWT6251

PCS/WCDMA 3.4V/27.5 dBm
Linear Power Amplifier Module

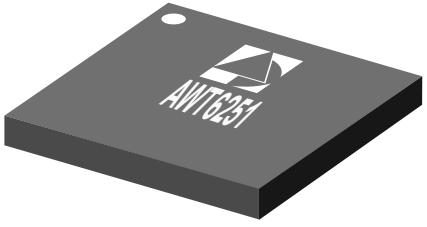
PRELIMINARY DATA SHEET - Rev 1.3

FEATURES

- InGaP HBT Technology
- High Efficiency: 38%
- Low Quiescent Current: 50 mA
- Low Leakage Current in Shutdown Mode: <1 μA
- V_{REF} = +2.85 V (+2.75 V min over temp)
- Optimized for a 50 Ω System
- Low Profile Miniature Surface Mount Package: 1.56 mm Max
- RoHS Compliant Package Option, 250 °C MSL-3

APPLICATIONS

- Dual Mode 3GPP Wireless Handsets



M7 Package
10 Pin 4 mm x 4 mm x 1.5 mm
Surface Mount Module

PRODUCT DESCRIPTION

The AWT6251 meets the increasing demands for higher output power in 3GPP handsets. The PA module is optimized for V_{REF} = +2.85 V, a requirement for compatibility with the Qualcomm® 6250 chipset. 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, increase handset talk and standby time. The self-contained 4 mm x 4 mm x 1.5 mm surface mount package incorporates matching networks optimized for output power, efficiency, and linearity in a 50 Ω system.

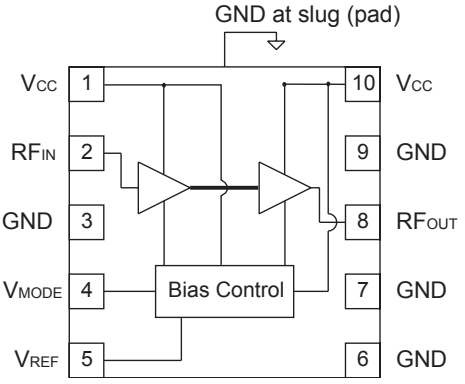


Figure 1: Block Diagram

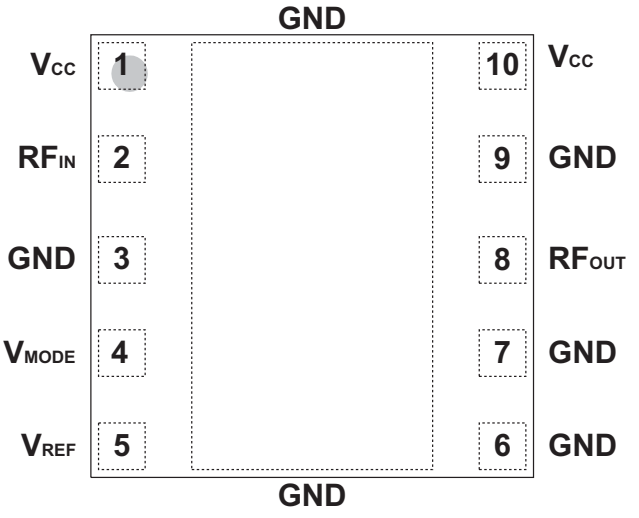


Figure 2: Pinout (X-ray Top View)

Table 1: Pin Description

PIN	NAME	DESCRIPTION
1	V_{CC}	Supply Voltage
2	RF_{IN}	RF Input
3	GND	Ground
4	V_{MODE}	Mode Control Voltage
5	V_{REF}	Reference Voltage
6	GND	Ground
7	GND	Ground
8	RF_{OUT}	RF Output
9	GND	Ground
10	V_{CC}	Supply Voltage

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)	1850	-	1910	MHz	
Supply Voltage (V_{CC})	+3.2 -	+3.4 +1.5	+4.2 -	V	P_{OUT} ≤ +27.5 dBm P_{OUT} ≤ +16 dBm
Reference Voltage (V_{REF})	+2.75 0	+2.85 -	+2.95 +0.5	V	PA "on" PA "shut down"
Mode Control Voltage (V_{MODE})	+2.5 0	+2.8 -	+3.1 +0.5	V	Low Bias Mode High Bias Mode
RF Output Power (P_{OUT})	+27.0 (1)	+27.5	-	dBm	
Case Temperature (T_C)	-10	-	+90	°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 and T_C = +90 °C, P_{OUT} is derated by 0.5 dB.

Table 4: Electrical Specifications
(T_C = +25 °C, V_{CC} = +3.4 V, V_{REF} = +2.85 V, 50 Ω system)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain	24.5 22 17	26 23.5 20	29 27 23	dB	P_{OUT} = +27.5 dBm, V_{MODE} = 0 V P_{OUT} = +16 dBm, V_{MODE} = +2.85 V P_{OUT} = +16 dBm, V_{CC} = 1.5 V, V_{MODE} = +2.85 V
ACLR1 at 5 MHz offset	- - -	-43 -40 -42	-38 -38 -38	dBc	P_{OUT} = +27.5 dBm, V_{MODE} = 0 V P_{OUT} = +16 dBm, V_{MODE} = +2.85 V P_{OUT} = +16 dBm, V_{CC} = 1.5 V, V_{MODE} = +2.85 V
ACLR2 at 10 MHz offset	- - -	-61 -63 -60	-48 -48 -48	dBc	P_{OUT} = +27.5 dBm, V_{MODE} = 0 V P_{OUT} = +16 dBm, V_{MODE} = +2.85 V P_{OUT} = +16 dBm, V_{CC} = 1.5 V, V_{MODE} = +2.85 V
Power-Added Efficiency	35.5 8 19	38 9 21	- - -	%	P_{OUT} = +27.5 dBm, V_{MODE} = 0 V P_{OUT} = +16 dBm, V_{MODE} = +2.85 V P_{OUT} = +16 dBm, V_{CC} = 1.5 V, V_{MODE} = +2.85 V
Quiescent Current (Icq)	- -	53 49	68 65	mA	V_{MODE} = +2.85 V, V_{CC} = +3.4 V V_{MODE} = +2.85 V, V_{CC} = +1.5 V
Reference Current	-	3.5	5	mA	through V_{REF} pin
Mode Control Current	-	0.3	0.5	mA	through V_{MODE} pin, V_{MODE} = +2.85 V
Leakage Current	-	<1	5	µA	V_{CC} = +4.2 V, V_{REF} = 0 V, V_{MODE} = 0 V
Noise in Receive Band	-	-138	-136	dBm/Hz	1930 MHz to 1990 MHz
Harmonics 2fo 3fo, 4fo	- -	-45 -55	-30 -30	dBc	P_{OUT} ≤ +27.5 dBm, V_{MODE} = 0 V
Input Impedance	-	-	2:1	VSWR	
Spurious Output Level (all spurious outputs)	-	-	-70	dBc	P_{OUT} ≤ +27.5 dBm In-band load VSWR < 5:1 Out-of-band load VSWR < 10:1 Applies over all voltage and temperature operating ranges
Load mismatch stress with no permanent degradation or failure	10:1	-	-	VSWR	Applies over full operating range

Notes:
1. ACLR and Efficiency are measured at 1850 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 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	BIAS MODE	V_{REF}	V_{MODE}	V_{CC}
CDMA - low power	≤+16dBm	Low	+2.85 V	+2.85 V	≥ +1.5
CDMA - high power	>+16 dBm	High	+2.85 V	0 V	+3.4
Shutdown	-	Shutdown	0 V	0 V	-

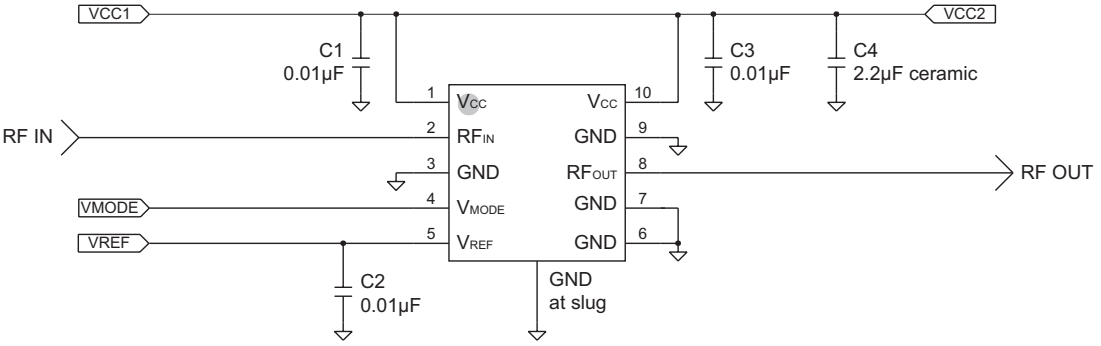
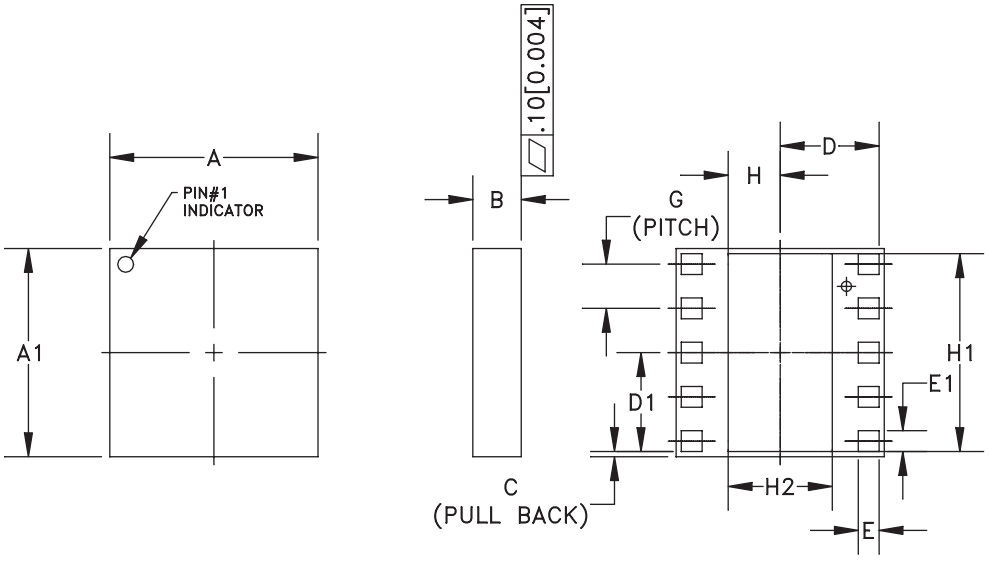


Figure 3: Application Circuit Schematic

PACKAGE OUTLINE

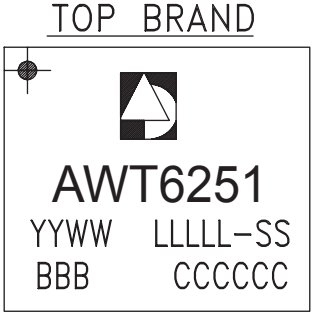


SYMBOL	MILLIMETERS			INCHES			NOTE
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
A	3.88	4.00	4.12	0.152	0.157	0.162	–
A1	3.88	4.00	4.12	0.152	0.157	0.162	–
B	1.26	1.41	1.56	0.049	0.055	0.061	–
C	–	0.10	–	–	0.004	–	–
D	–	1.90	–	–	0.075	–	–
D1	–	1.90	–	–	0.075	–	–
E	0.35	0.40	0.45	0.013	0.015	0.017	–
E1	0.35	0.40	0.45	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	–	–

NOTES:

1. CONTROLLING DIMENSIONS: MILLIMETERS
2. UNLESS SPECIFIED TOLERANCE=±0.076[0.003].
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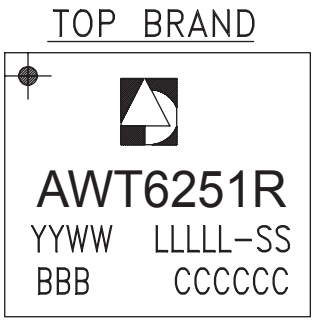
Figure 4: M7 Package Outline - 10 Pin 4 mm x 4 mm x 1.5 mm Surface Mount Module



NOTES:

1. ANADIGICS LOGO SIZE:	X=0.040±0.010 Y=0.048±0.010
2. PART #	AWT6251
3. YEAR AND WORK WEEK:	YYWW: YY = YEAR, WW = WORK WEEK
4. LOT – WAFER I.D.:	LLLLL – SS = WAFER/LOT I.D.
5. PIN 1 INDICATOR:	MOLD NOTCH –or– INK DOT
6. BOM #	BBB
7. COUNTRY CODE:	CCCCCC
8. TYPE : ELITE SIZE : AS LARGE AS POSSIBLE LASER MARKED	

Figure 5: Branding Specification



NOTES:

1. ANADIGICS LOGO SIZE:	X=0.040±0.010 Y=0.048±0.010
2. PART #	AWT6251R
3. YEAR AND WORK WEEK:	YYWW: YY = YEAR, WW = WORK WEEK
4. LOT – WAFER I.D.:	LLLLL – SS = WAFER/LOT I.D.
5. PIN 1 INDICATOR:	MOLD NOTCH –or– INK DOT
6. BOM #	BBB
7. COUNTRY CODE:	CCCCCC
8. TYPE : ELITE SIZE : AS LARGE AS POSSIBLE LASER MARKED	

Figure 6: Branding Specification - RoHS Compliant Package

COMPONENT PACKAGING

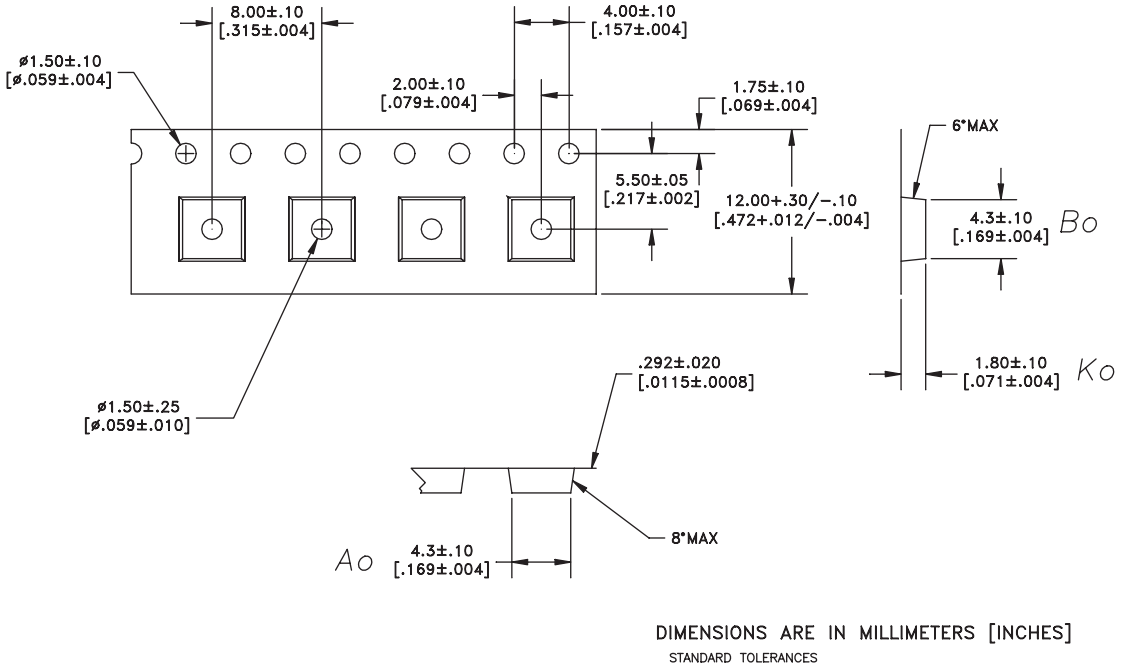


Figure 7: Tape & Reel Packaging

Table 6: Tape & Reel Dimensions

PACKAGE TYPE	TAPE WIDTH	POCKET PITCH	REEL CAPACITY	MAX REEL DIA
4 mm x 4 mm x 1.5 mm	12 mm	8 mm	2500	13"

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ORDERING INFORMATION

ORDER NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AWT6251M7P8	-10 °C to +90 °C	10 Pin 4 mm x 4 mm x 1.5 mm Surface Mount Module	Tape and Reel, 2500 pieces per Reel
AWT6251RM7P8	-10 °C to +90 °C	RoHS Compliant 10 Pin 4 mm x 4 mm x 1.5 mm Surface Mount Module	Tape and Reel, 2500 pieces per Reel

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