



## AWT6270

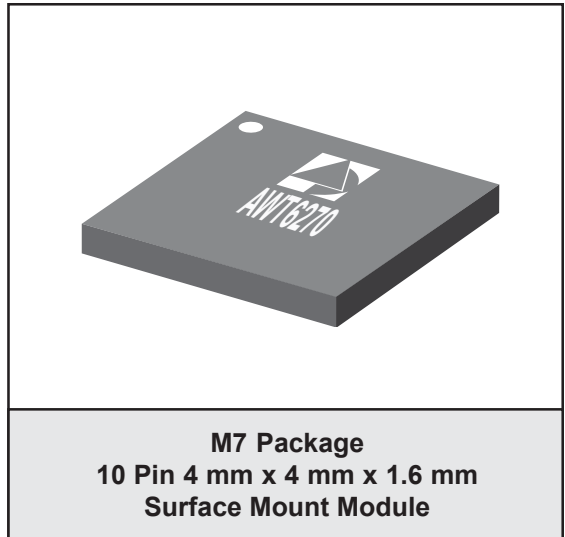
HELP™ 830-840 MHz WCDMA 3.4V/27dBm  
 Linear Power Amplifier Module  
 PRELIMINARY DATA SHEET - Rev 1.5

### FEATURES

- InGaP HBT Technology
- High Efficiency:
  - 44% @  $P_{OUT} = +27$  dBm
  - 21% @  $P_{OUT} = +16$  dBm
  - 15% @  $P_{OUT} = +7$  dBm
- Low Quiescent Current: 16 mA
- Low Leakage Current in Shutdown Mode:  $<1 \mu\text{A}$
- $V_{REF} = +2.85$  V (+2.75 V min over temp)
- Optimized for a 50  $\Omega$  System
- Low Profile Miniature Surface Mount Package: 1.61 mm Max

### APPLICATIONS

- Dual Band WCDMA Wireless Handsets



### PRODUCT DESCRIPTION

The AWT6270 meets the increasing demands for higher output power in UMTS 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 1.6 mm surface mount package incorporates matching networks optimized for output power, efficiency, and linearity in a 50  $\Omega$  system.

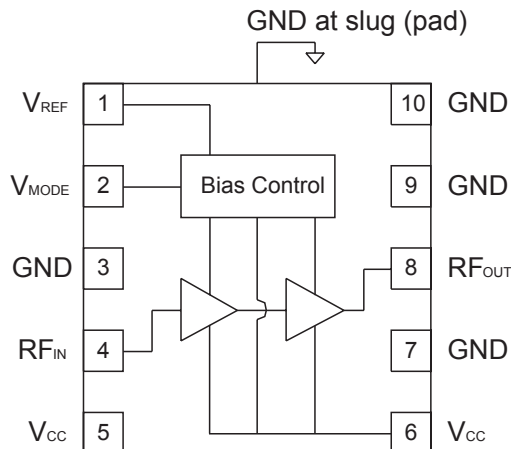


Figure 1: Block Diagram

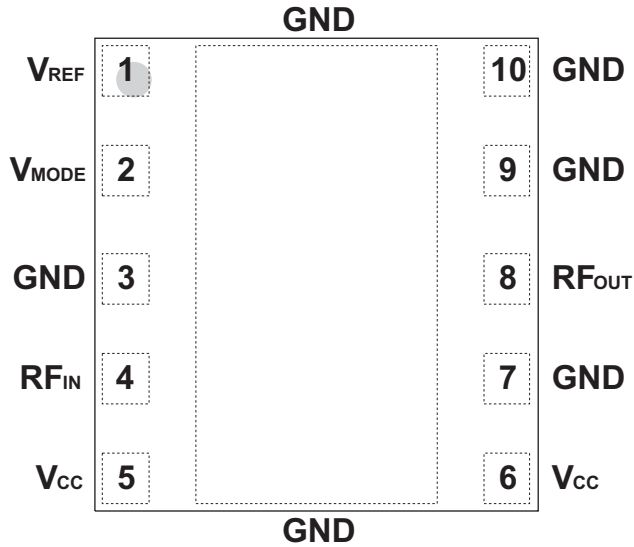


Figure 2: Pinout (X-ray Top View)

Table 1: Pin Description

PIN	NAME	DESCRIPTION
1	$V_{REF}$	Reference Voltage
2	$V_{MODE}$	Mode Control
3	GND	Ground
4	$RF_{IN}$	RF Input
5	$V_{CC}$	Supply Voltage
6	$V_{CC}$	Supply Voltage
7	GND	Ground
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 ( $V_{CC}$ )	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)	830	-	840	MHz	
Supply Voltage ( $V_{CC}$ )	+3.2 -	+3.4 +1.5	+4.2 -	V	$P_{OUT} \leq +27$ dBm $P_{OUT} \leq 7$ 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	+2.85 -	+3.1 +0.5	V	Low Bias Mode High Bias Mode
RF Output Power ( $P_{OUT}$ )	+26.5 <sup>(1)</sup>	+27	-	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,  $P_{OUT}$  is derated by 0.5 dB.

**Table 4: Electrical Specifications**  
**(T<sub>C</sub> = +25 °C, V<sub>CC</sub> = +3.4 V, V<sub>REF</sub> = +2.85 V, 50 Ω system)**

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain	25 14 13	27 16 15	29 18 17	dB	P <sub>OUT</sub> = +27 dBm, V <sub>MODE</sub> = 0 V P <sub>OUT</sub> = +16 dBm, V <sub>MODE</sub> = +2.85 V P <sub>OUT</sub> = +7 dBm, V <sub>CC</sub> = 1.5 V, V <sub>MODE</sub> = +2.85 V
ACLR1 at 5 MHz offset <sup>(1)</sup>	- - -	-41 -44 -43	-38 -38 -38	dBc	P <sub>OUT</sub> = +27 dBm, V <sub>MODE</sub> = 0 V P <sub>OUT</sub> = +16 dBm, V <sub>MODE</sub> = +2.85 V P <sub>OUT</sub> = +7 dBm, V <sub>CC</sub> = 1.5 V, V <sub>MODE</sub> = +2.85 V
ACLR2 at 10 MHz offset	- - -	-60 -54 -53	-48 -48 -48	dBc	P <sub>OUT</sub> = +27 dBm, V <sub>MODE</sub> = 0 V P <sub>OUT</sub> = +16 dBm, V <sub>MODE</sub> = +2.85 V P <sub>OUT</sub> = +7 dBm, V <sub>CC</sub> = 1.5 V, V <sub>MODE</sub> = +2.85 V
Power-Added Efficiency <sup>(1)</sup>	41 18 12	44 21 15	- - -	%	P <sub>OUT</sub> = +27 dBm, V <sub>MODE</sub> = 0 V P <sub>OUT</sub> = +16 dBm, V <sub>MODE</sub> = +2.85 V P <sub>OUT</sub> = +7 dBm, V <sub>CC</sub> = 1.5 V, V <sub>MODE</sub> = +2.85 V
Quiescent Current (I <sub>q</sub> )	-	16	22	mA	V <sub>MODE</sub> = +2.85 V, V <sub>CC</sub> = 3.4 V
Reference Current	-	3.8	5	mA	through V <sub>REF</sub> pin
Mode Control Current	-	0.7	1	mA	through V <sub>MODE</sub> pin, V <sub>MODE</sub> = +2.85 V
Leakage Current	-	<1	5	μA	V <sub>CC</sub> = +4.2 V, V <sub>REF</sub> = 0 V, V <sub>MODE</sub> = 0 V
Noise in Receive Band	- -	-136.5 -143	-135 -141	dBm/Hz	875 MHz to 885 MHz P <sub>OUT</sub> = +27 dBm, V <sub>MODE</sub> = 0 V 875 MHz to 885 MHz P <sub>OUT</sub> = +16 dBm, V <sub>MODE</sub> = +2.85 V
Harmonics 2fo 3fo, 4fo	- -	-45 -50	-30 -30	dBc	
Input Impedance	-	-	2:1	VSWR	
Spurious Output Level (all spurious outputs)	-	-	-70	dBc	P <sub>OUT</sub> ≤ +27 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 full operating range

Notes:

(1) ACLR and Efficiency measured at 835 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**

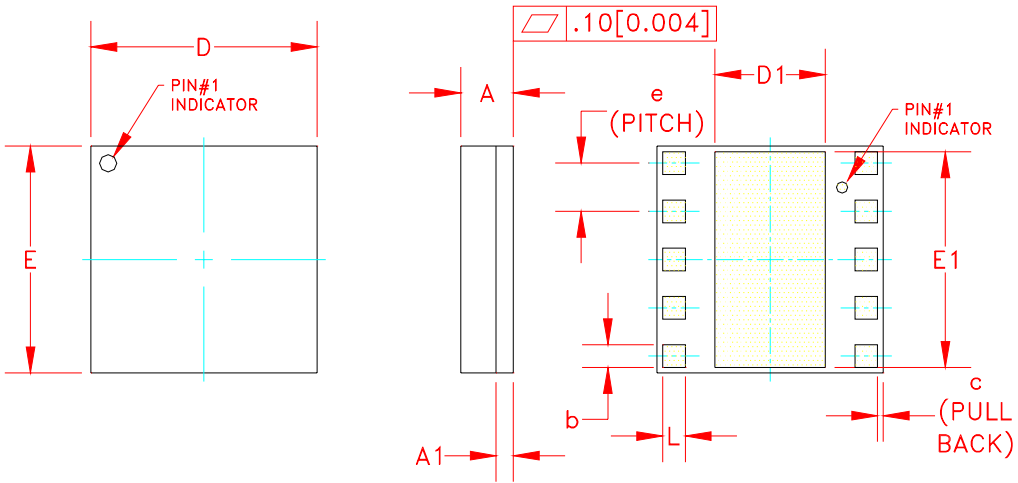
The power amplifier may be placed in either a Low Bias mode or a High Bias mode by applying the

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.

Three operating modes are recommended to optimize current consumption. High Bias/High  $V_{CC}$  operating mode is for  $P_{OUT}$  levels  $\geq 16$  dBm. At  $\sim 16$ dBm - 7 dBm, the PA should be "Mode Switched" to Low Bias Mode. For  $P_{OUT}$  levels  $\leq \sim 7$  dBm, the  $V_{CC}$  can be switched to 1.5 V (Low Bias Mode is also used for this  $P_{OUT}$  range).

**Table 5: Bias Control**

<b>APPLICATION</b>	<b><math>P_{OUT}</math> LEVELS</b>	<b>BIAS MODE</b>	<b><math>V_{REF}</math></b>	<b><math>V_{MODE}</math></b>	<b><math>V_{CC}</math></b>
CDMA - low power	$\leq +7$ dBm	Low	+2.85 V	+2.85 V	$\geq +1.5$
CDMA - med power	$7 \leq P_{OUT} \leq +16$ dBm	Low	+2.85 V	+2.85 V	+3.4
CDMA - high power	$> +16$ dBm	High	+2.85 V	0 V	+3.4
Shutdown	-	Shutdown	0 V	0 V	-

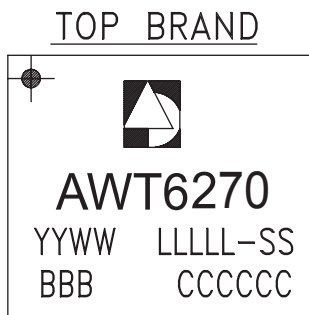


S <sub>MBO</sub> L	MILLIMETERS			INCHES			NOTE
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
A	1.31	1.46	1.61	0.051	0.057	0.063	—
A1	—	0.35	—	—	0.014	—	—
b	0.35	—	0.60	0.013	—	0.024	3
c	—	0.10	—	—	0.004	—	—
D	3.88	4.00	4.12	0.152	0.157	0.162	—
D1	1.90	—	2.20	0.075	—	0.086	—
E	3.88	4.00	4.12	0.152	0.157	0.162	—
E1	3.75	—	3.85	0.148	—	0.152	—
e	—	0.85	—	—	0.033	—	3
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.

**Figure 4: M7 Package Outline - 10 Pin 4 mm x 4 mm x 1.6 mm Surface Mount Module**



**NOTES:**

1. ANADIGICS LOGO SIZE: X=0.040±0.010 Y=0.048±0.010
2. PART # AWT6270
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: CCCCC
8. TYPE : ELITE  
SIZE : AS LARGE AS POSSIBLE  
LASER MARKED

**Figure 5: Branding Specification**



**ORDERING INFORMATION**

ORDER NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AWT6270M7P8	-10 °C to +90 °C	10 Pin 4 mm x 4 mm x 1.6 mm Surface Mount Module	Tape and Reel, 2500 pieces per Reel

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