

**FEATURES**

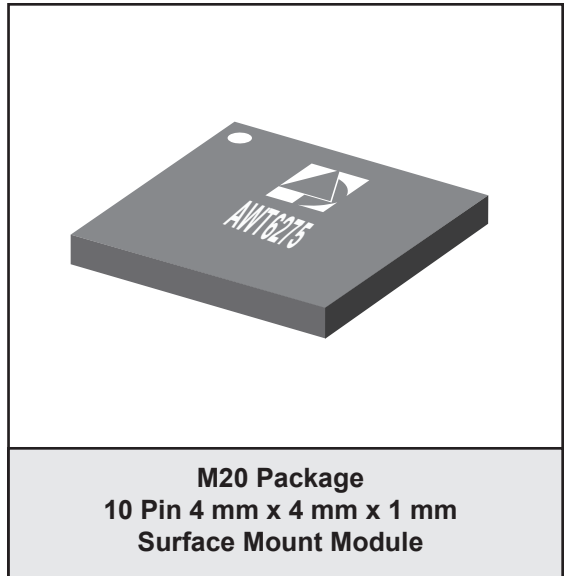
- InGaP HBT Technology
- High Efficiency:
  - 43% @ P<sub>OUT</sub> = +27.5 dBm
  - 21% @ P<sub>OUT</sub> = +16 dBm
  - 15% @ P<sub>OUT</sub> = +7 dBm
- Low Quiescent Current: 16 mA
- Low Leakage Current in Shutdown Mode:<1 mA
- V<sub>REF</sub> = +2.85 V (+2.75 V min over temp)
- Optimized for a 50 Ω System
- Low Profile Miniature Surface Mount Package
- RoHS Compliant Package, 250 °C MSL-3
- HSDPA Capable

**APPLICATIONS**

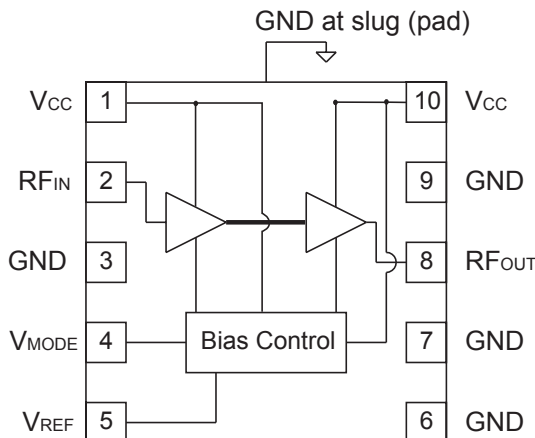
- Dual Band WCDMA Wireless Handsets
- Dual Mode 3GPP Wireless Handsets

**PRODUCT DESCRIPTION**

The AWT6275 meets the increasing demands for higher output power in UMTS handsets. The PA module is optimized for V<sub>REF</sub> = +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 mm surface mount package incorporates matching networks optimized for output power, efficiency, and linearity in a 50 Ω system.



**Figure 1: Block Diagram**

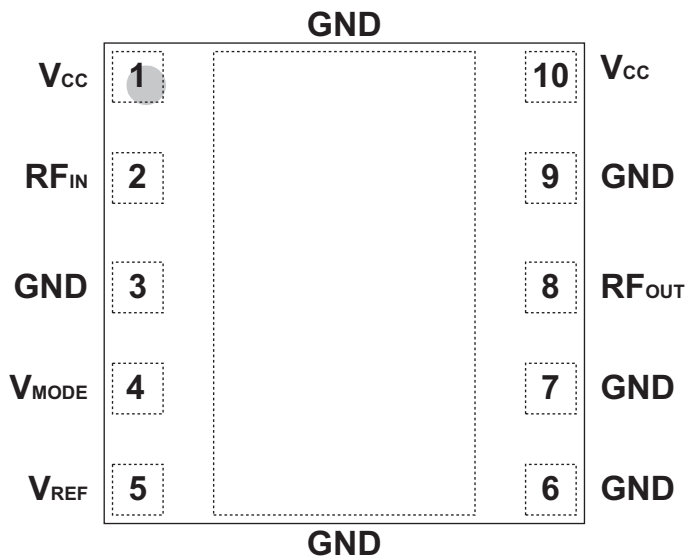


Figure 2: Pinout (X-ray Top View)

Table 1: Pin Description

PIN	NAME	DESCRIPTION
1	V <sub>CC</sub>	Supply Voltage
2	RF <sub>IN</sub>	RF Input
3	GND	Ground
4	V <sub>MODE</sub>	Mode Control Voltage
5	V <sub>REF</sub>	Reference Voltage
6	GND	Ground
7	GND	Ground
8	RF <sub>OUT</sub>	RF Output
9	GND	Ground
10	V <sub>CC</sub>	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

Table 3: Operating Ranges

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Operating Frequency (f)	1920	-	1980	MHz	
Supply Voltage ( $V_{CC}$ )	+3.2 -	+3.4 +1.5	+4.2 -	V	$P_{OUT} \leq +27.5$ 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 ( $V_{MODE}$ )	+2.3 0	+2.85 -	+3.1 +0.5	V	Low Bias Mode High Bias Mode
RF Output Power ( $P_{OUT}$ )	+27.0 <sup>(1)</sup>	+27.5	-	dBm	
Case Temperature ( $T_C$ )	-20	-	+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**  
**( $T_C = +25\text{ }^\circ\text{C}$ ,  $V_{CC} = +3.4\text{ V}$ ,  $V_{REF} = +2.85\text{ V}$ ,  $50\text{ }\Omega$  system)**

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain	24.5 13.5 12	26.5 15.5 14	29 17.5 16	dB	$P_{OUT} = +27.5\text{ dBm}$ , $V_{MODE} = 0\text{ V}$ $P_{OUT} = +16\text{ dBm}$ , $V_{MODE} = +2.85\text{ V}$ $P_{OUT} = +7\text{ dBm}$ , $V_{CC} = 1.5\text{ V}$ , $V_{MODE} = +2.85\text{ V}$
ACLR1 at 5 MHz offset <sup>(1)</sup>	- - -	-41 -43 -40	-38 -38 -38	dBc	$P_{OUT} = +27.5\text{ dBm}$ , $V_{MODE} = 0\text{ V}$ $P_{OUT} = +16\text{ dBm}$ , $V_{MODE} = +2.85\text{ V}$ $P_{OUT} = +7\text{ dBm}$ , $V_{CC} = 1.5\text{ V}$ , $V_{MODE} = +2.85\text{ V}$
ACLR2 at 10 MHz offset	- - -	-58 -52 -57	-48 -48 -48	dBc	$P_{OUT} = +27.5\text{ dBm}$ , $V_{MODE} = 0\text{ V}$ $P_{OUT} = +16\text{ dBm}$ , $V_{MODE} = +2.85\text{ V}$ $P_{OUT} = +7\text{ dBm}$ , $V_{CC} = 1.5\text{ V}$ , $V_{MODE} = +2.85\text{ V}$
Power-Added Efficiency <sup>(1)</sup>	39 18 12	43 21 15	- - -	%	$P_{OUT} = +27.5\text{ dBm}$ , $V_{MODE} = 0\text{ V}$ $P_{OUT} = +16\text{ dBm}$ , $V_{MODE} = +2.85\text{ V}$ $P_{OUT} = +7\text{ dBm}$ , $V_{CC} = 1.5\text{ V}$ , $V_{MODE} = +2.85\text{ V}$
Quiescent Current (I <sub>q</sub> )	-	16	22	mA	$V_{MODE} = +2.85\text{ V}$ , $V_{CC} = 3.4\text{ V}$
Reference Current	-	3.6	7	mA	through $V_{REF}$ pin
Mode Control Current	-	0.3	1	mA	through $V_{MODE}$ pin, $V_{MODE} = +2.85\text{ V}$
Leakage Current	-	<1	5	$\mu\text{A}$	$V_{CC} = +4.2\text{ V}$ , $V_{REF} = 0\text{ V}$ , $V_{MODE} = 0\text{ V}$
Noise in Receive Band	-	-141	-138	dBm/Hz	2110 MHz to 2170 MHz
Harmonics 2fo 3fo, 4fo	- - -	-45 -50	-40 -45	dBc	$P_{OUT} \leq +27.5\text{ dBm}$
Input Impedance	-	-	2:1	VSWR	
Spurious Output Level (all spurious outputs)	-	-	-70	dBc	$P_{OUT} \leq +27.5\text{ dBm}$ 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 1950 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 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  $V_{MODE}$

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 Power 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  $< \sim 7$  dBm, the  $V_{CC}$  can be switched to 1.5 V (Low Bias Mode is also used for  $P_{OUT}$  range).

Table 6: Bias Control

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

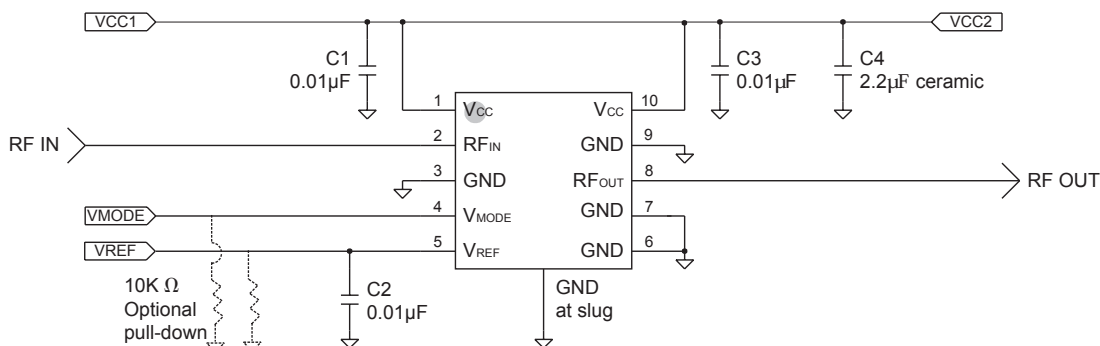
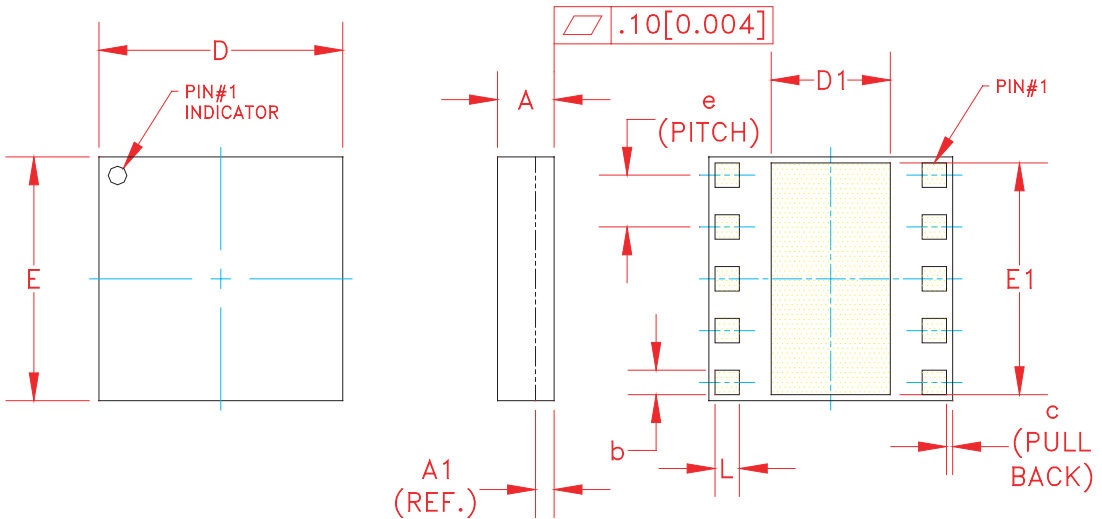


Figure 3: Application Circuit

PACKAGE OUTLINE



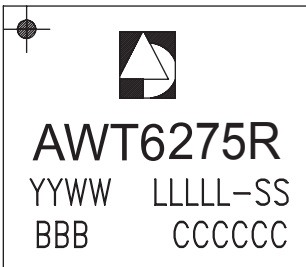
	MILLIMETERS			INCHES			NOTE
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
A	0.88	0.98	1.08	0.034	0.038	0.042	-
A1	0.32 (REF.)			0.0125 (REF.)			-
b	0.35	-	0.60	0.013	-	0.024	3
c	-	0.10	-	-	0.004	-	-
D	3.88	4.00	4.12	0.152	0.157	0.162	-
D1	1.90	-	2.25	0.075	-	0.088	-
E	3.88	4.00	4.12	0.152	0.157	0.162	-
E1	3.75	-	3.85	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= $\pm 0.076 [0.003]$ .
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: Package Outline - 10 Pin 4 mm x 4 mm x 1 mm Surface Mount Module

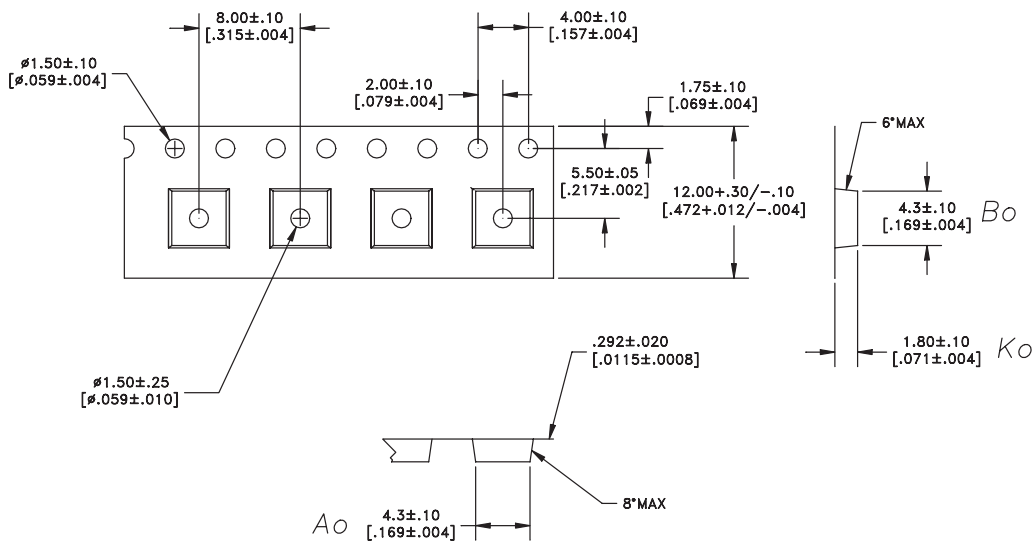
TOP BRAND



NOTES:

1. ANADIGICS LOGO SIZE: X=0.040 $\pm$ 0.010 Y=0.048 $\pm$ 0.010
2. PART # AWT6275R
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



DIMENSIONS ARE IN MILLIMETERS [INCHES]  
STANDARD TOLERANCES

Figure 6: 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 mm	12 mm	8 mm	2500	13"

**ORDERING INFORMATION**

<b>ORDER NUMBER</b>	<b>TEMPERATURE RANGE</b>	<b>PACKAGE DESCRIPTION</b>	<b>COMPONENT PACKAGING</b>
AWT6275RM20P8	-20 °C to +90 °C	RoHS Compliant 10 Pin 4 mm x 4 mm x 1 mm Surface Mount Module	Tape and Reel, 2500 pieces per Reel
AWT6275RM20P9	-20 °C to +90 °C	RoHS Compliant 10 Pin 4 mm x 4 mm x 1 mm Surface Mount Module	Partial Tape and Reel

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