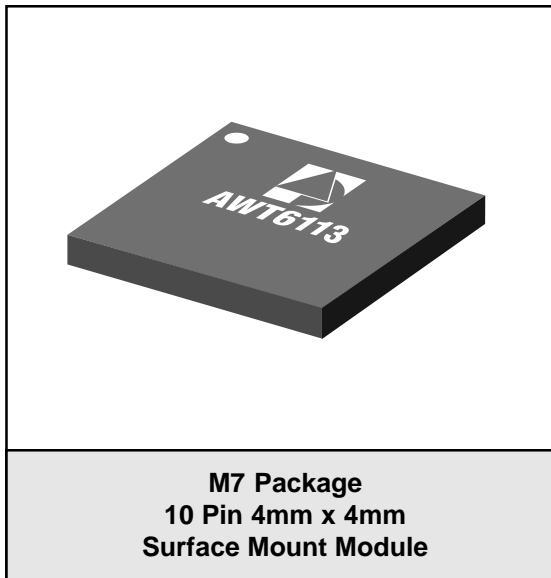


FEATURES

- InGaP HBT Technology
- High Efficiency: 38%
- Low Quiescent Current: 44 mA
- Low Leakage Current in Shutdown Mode: <1 μ A
- Optimized for a 50 Ω System
- Low Profile Surface Mount Package: 1.56mm max
- CDMA 1XRTT Compliant
- CDMA 1xEV-DO Compliant

APPLICATIONS

- PCS CDMA Wireless Handsets
- Dual Band CDMA Wireless Handsets



PRODUCT DESCRIPTION

The AWT6113 is a high power, high efficiency amplifier module for PCS/CDMA wireless handset applications. 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 4mm x 4mm surface mount package incorporates matching networks optimized for output power, efficiency and linearity in a 50 Ω system.

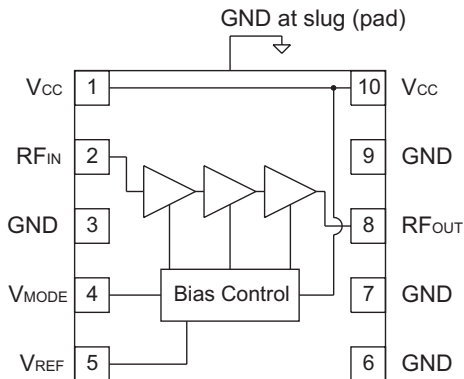


Figure 1: Block Diagram

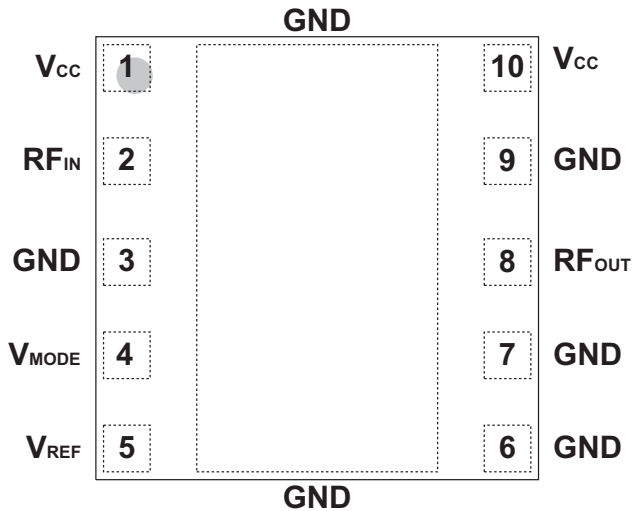


Figure 2: Pinout (X-ray Top View)

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 | +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}) | +28.0 | - | - | dBm | |
| 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.

Table 4: Electrical Specifications - High Bias Mode
($T_C = +25\text{ }^\circ\text{C}$, $V_{CC} = +3.4\text{ V}$, $V_{REF} = +2.85\text{ V}$, $V_{MODE} = 0\text{ V}$, $P_{OUT} = +28\text{ dBm}$, $50\ \Omega$ system)

| PARAMETER | MIN | TYP | MAX | UNIT | COMMENTS |
|--|-------------|------------|------------|---------------|---|
| Gain | 26 | 28 | 30 | dB | |
| Adjacent Channel Power ⁽¹⁾ at ± 1.25 MHz offset Primary Channel BW = 1.23 MHz Adjacent Channel BW = 30 kHz | - | -50 | -47 | dBc | |
| Adjacent Channel Power at ± 2.25 MHz offset Primary Channel BW = 1.23 MHz Adjacent Channel BW = 30 kHz | - | -61 | -57 | dBc | |
| Power-Added Efficiency ⁽¹⁾ | 36.5 | 38 | - | % | |
| Quiescent Current | - | 70 | 90 | mA | |
| Reference Current | - | 6 | 8 | mA | through V_{REF} pin |
| Mode Control Current | - | 0 | - | mA | through V_{MODE} pin |
| Leakage Current | - | <1 | 5 | μA | $V_{CC} = +4.2\text{ V}$, $V_{REF} = 0\text{ V}$ $V_{MODE} = 0\text{ V}$ |
| Noise in Receive Band | - | -135 | -133 | dBm/Hz | 1930 MHz to 1990 MHz |
| Harmonics 2fo 3fo | - - - | -46 -52 | -30 -30 | dBc | |
| Input Impedance | - | - | 2:1 | VSWR | |
| Spurious Output Level (all spurious outputs) | - | - | -65 | dBc | $P_{OUT} \leq +28\text{ dBm}$ In-band load VSWR < 8:1 Out-of-band load VSWR < 8:1 Applies over all voltage and temperature operating ranges |
| Load mismatch stress with no permanent degradation or failure | 8:1 | - | - | VSWR | $V_{CC} = +5.0\text{ V}$, $P_{IN} = +5\text{ dBm}$ Applies over full operating temperature range |

Notes:

(1) PAE and ACP limit applies to 1880 MHz.

Table 5: Electrical Specifications - Low Bias Mode
($T_C = +25\text{ }^\circ\text{C}$, $V_{CC} = +3.4\text{ V}$, $V_{REF} = +2.85\text{ V}$, $V_{MODE} = +2.85\text{ V}$, $P_{OUT} = +16\text{ dBm}$, $50\text{ }\Omega$ system)

| PARAMETER | MIN | TYP | MAX | UNIT | COMMENTS |
|--|-----|-------|------|---------------|--|
| Gain | 23 | 25 | 27 | dB | |
| Adjacent Channel Power at $\pm 1.25\text{ MHz}$ offset Primary Channel BW = 1.23 MHz Adjacent Channel BW = 30 kHz | - | -48.5 | -46 | dBc | |
| Adjacent Channel Power at $\pm 2.25\text{ MHz}$ offset Primary Channel BW = 1.23 MHz Adjacent Channel BW = 30 kHz | - | -66 | -57 | dBc | |
| Power-Added Efficiency | 7.5 | 8.5 | - | % | |
| Quiescent Current | - | 44 | 54 | mA | |
| Reference Current | - | 6 | 8 | mA | through V_{REF} pin |
| Mode Control Current | - | 0.3 | 0.5 | mA | through V_{MODE} pin |
| Leakage Current | - | <1 | 5 | μA | $V_{CC} = +4.2\text{ V}$, $V_{REF} = 0\text{ V}$ $V_{MODE} = 0\text{ V}$ |
| Noise in Receive Band | - | -141 | -139 | dBm/Hz | 1930 MHz to 1990 MHz |
| Harmonics | | | | | |
| 2fo | - | -48 | -30 | dBc | |
| 3fo | - | -52 | -30 | dBc | |
| Input Impedance | - | - | 2:1 | VSWR | |

PERFORMANCE DATA

Figure 3: Large Signal Gain vs. Frequency
+3.4 V Supply, High Bias Mode
 (T_C = +25 °C, V_{CC} = +3.4 V, V_{REF} = +2.85 V,
 V_{MODE} = 0 V, P_{OUT} = +28 dBm)

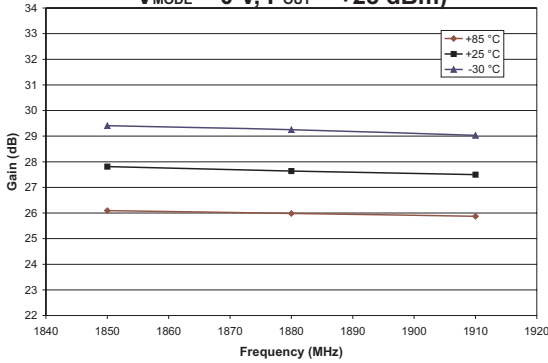


Figure 4: Large Signal Gain vs. Frequency
+3.4 V Supply, Low Bias Mode
 (T_C = +25 °C, V_{CC} = +3.4 V, V_{REF} = +2.85 V,
 V_{MODE} = +2.85 V, P_{OUT} = +16 dBm)

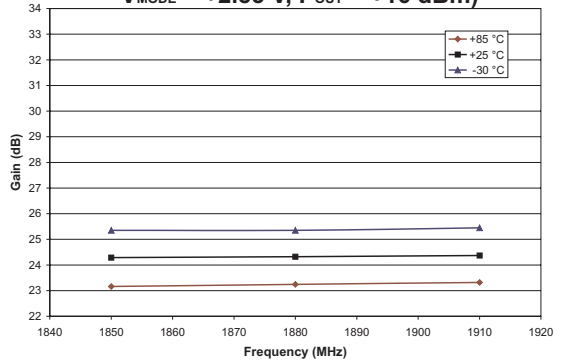


Figure 5: Large Signal Gain vs. Frequency
+4.2 V Supply, High Bias Mode
 (T_C = +25 °C, V_{CC} = +4.2 V, V_{REF} = +2.85 V,
 V_{MODE} = 0 V, P_{OUT} = +28 dBm)

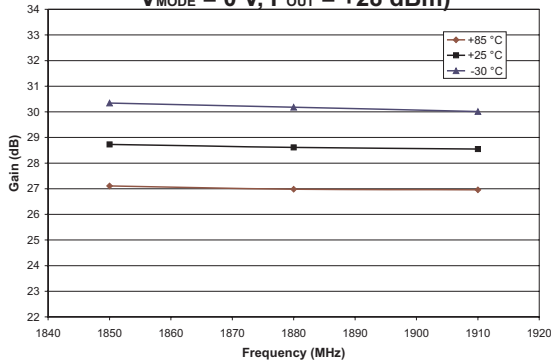


Figure 6: Large Signal Gain vs. Frequency
+4.2 V Supply, Low Bias Mode
 (T_C = +25 °C, V_{CC} = +4.2 V, V_{REF} = +2.85 V,
 V_{MODE} = +2.85 V, P_{OUT} = +16 dBm)

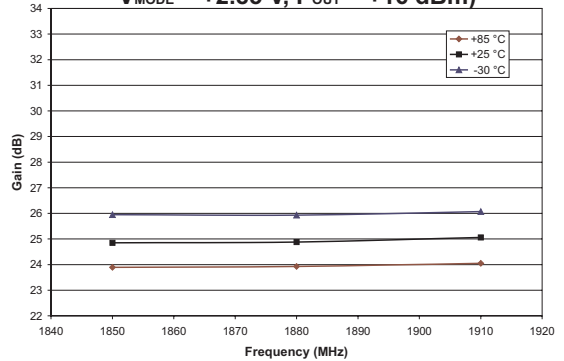


Figure 7: Large Signal Gain vs. Frequency
+3.2 V Supply, High Bias Mode
 (T_C = +25 °C, V_{CC} = +3.2 V, V_{REF} = +2.85 V,
 V_{MODE} = 0 V, P_{OUT} = +28 dBm)

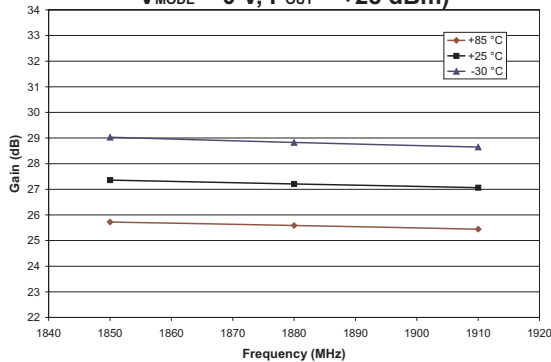


Figure 8: Large Signal Gain vs. Frequency
+3.2 V Supply, Low Bias Mode
 (T_C = +25 °C, V_{CC} = +3.2 V, V_{REF} = +2.85 V,
 V_{MODE} = +2.85 V, P_{OUT} = +16 dBm)

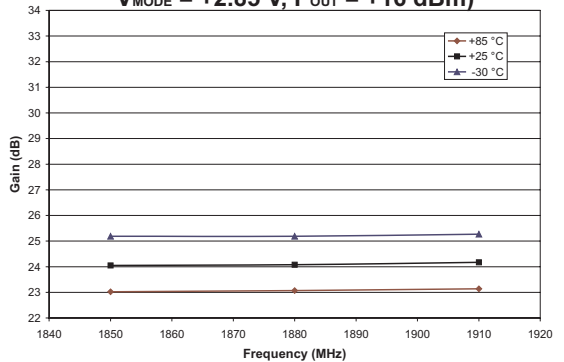


Figure 9: PAE vs. Frequency
+3.4 V Supply, High Bias Mode
 (T_C = +25 °C, V_{CC} = +3.4 V, V_{REF} = +2.85 V,
 V_{MODE} = 0 V, P_{OUT} = +28 dBm)

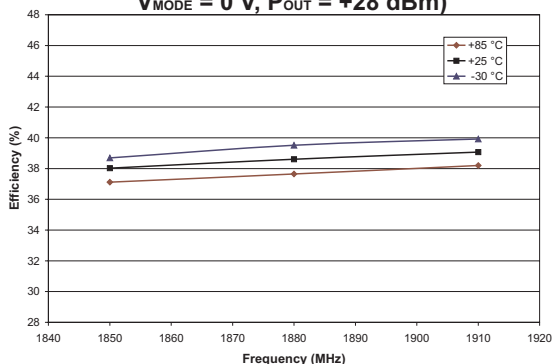


Figure 10: PAE vs. Frequency
+3.4 V Supply, Low Bias Mode
 (T_C = +25 °C, V_{CC} = +3.4 V, V_{REF} = +2.85 V,
 V_{MODE} = +2.85 V, P_{OUT} = +16 dBm)

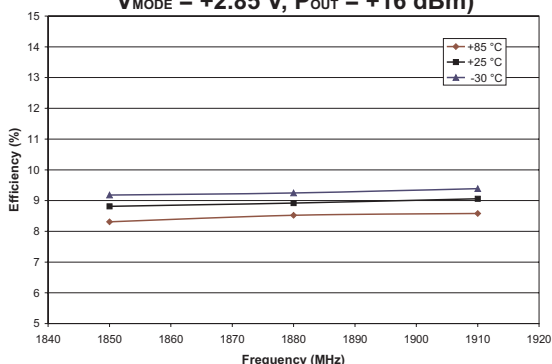


Figure 11: PAE vs. Frequency
+4.2 V Supply, High Bias Mode
 (T_C = +25 °C, V_{CC} = +4.2 V, V_{REF} = +2.85 V,
 V_{MODE} = 0 V, P_{OUT} = +28 dBm)

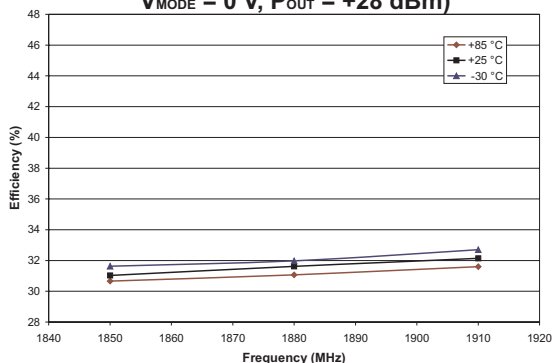


Figure 12: PAE vs. Frequency
+4.2 V Supply, Low Bias Mode
 (T_C = +25 °C, V_{CC} = +4.2 V, V_{REF} = +2.85 V,
 V_{MODE} = +2.85 V, P_{OUT} = +16 dBm)

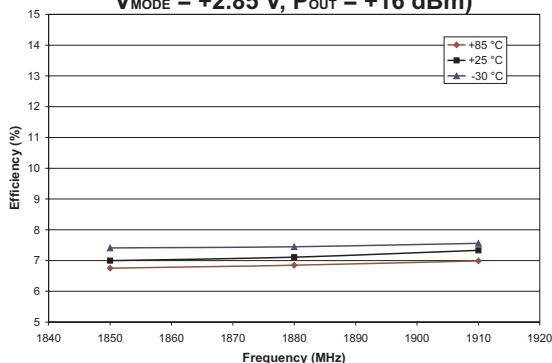


Figure 13: PAE vs. Frequency
+3.2 V Supply, High Bias Mode
 (T_C = +25 °C, V_{CC} = +3.2 V, V_{REF} = +2.85 V,
 V_{MODE} = 0 V, P_{OUT} = +28 dBm)

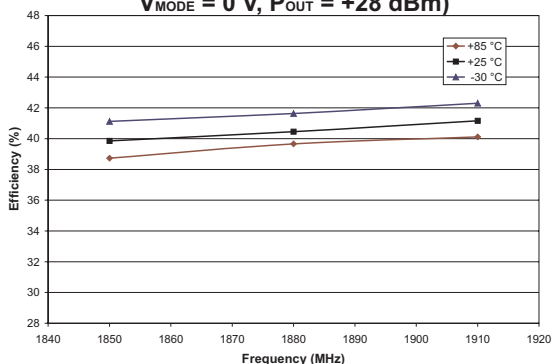


Figure 14: PAE vs. Frequency
+3.2 V Supply, Low Bias Mode
 (T_C = +25 °C, V_{CC} = +3.2 V, V_{REF} = +2.85 V,
 V_{MODE} = +2.85 V, P_{OUT} = +16 dBm)

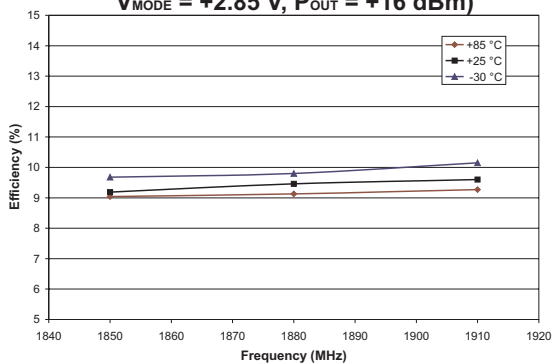


Figure 15: ACP1 vs. Frequency
+3.4 V Supply, High Bias Mode
 (T_C = +25 °C, V_{CC} = +3.4 V, V_{REF} = +2.85 V,
 V_{MODE} = 0 V, Δf_{ACP} = 1.25 MHz, P_{OUT} = +28 dBm)

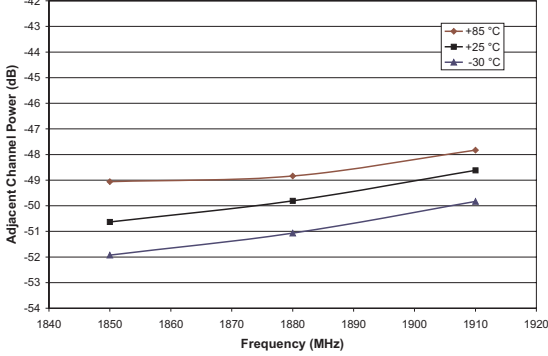


Figure 16: ACP1 vs. Frequency
+3.4 V Supply, Low Bias Mode
 (T_C = +25 °C, V_{CC} = +3.4 V, V_{REF} = +2.85 V,
 V_{MODE} = +2.85 V, Δf_{ACP} = 1.25 MHz, P_{OUT} = +16 dBm)

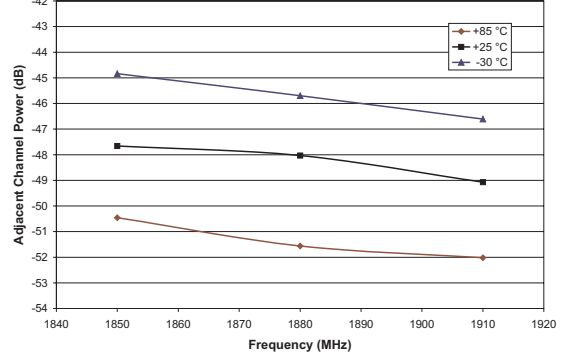


Figure 17: ACP1 vs. Frequency
+4.2 V Supply, High Bias Mode
 (T_C = +25 °C, V_{CC} = +4.2 V, V_{REF} = +2.85 V,
 V_{MODE} = 0 V, Δf_{ACP} = 1.25 MHz, P_{OUT} = +28 dBm)

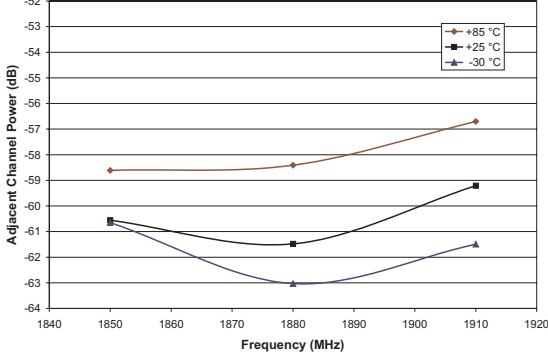


Figure 18: ACP1 vs. Frequency
+4.2 V Supply, Low Bias Mode
 (T_C = +25 °C, V_{CC} = +4.2 V, V_{REF} = +2.85 V,
 V_{MODE} = +2.85 V, Δf_{ACP} = 1.25 MHz, P_{OUT} = +16 dBm)

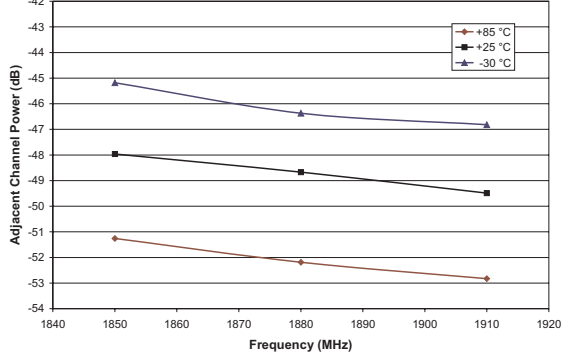


Figure 19: ACP1 vs. Frequency
+3.2 V Supply, High Bias Mode
 (T_C = +25 °C, V_{CC} = +3.2 V, V_{REF} = +2.85 V,
 V_{MODE} = 0 V, Δf_{ACP} = 1.25 MHz, P_{OUT} = +28 dBm)

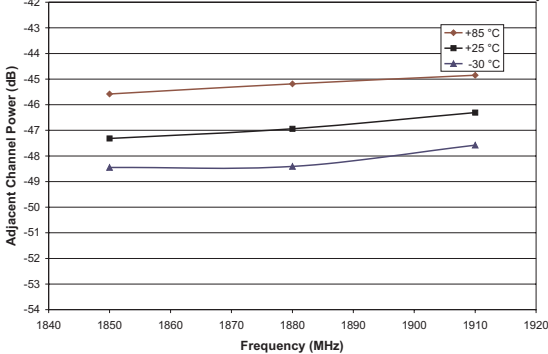


Figure 20: ACP1 vs. Frequency
+3.2 V Supply, Low Bias Mode
 (T_C = +25 °C, V_{CC} = +3.2 V, V_{REF} = +2.85 V,
 V_{MODE} = +2.85 V, Δf_{ACP} = 1.25 MHz, P_{OUT} = +16 dBm)

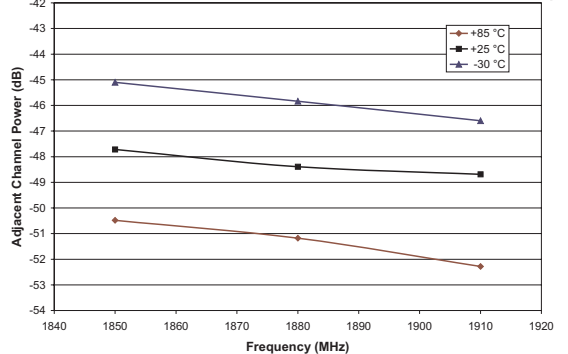


Figure 21: ACP2 vs. Frequency
+3.4 V Supply, High Bias Mode
 (T_C = +25 °C, V_{CC} = +3.4 V, V_{REF} = +2.85 V,
 V_{MODE} = 0 V, Δf_{ACP} = 2.25 MHz, P_{OUT} = +28 dBm)

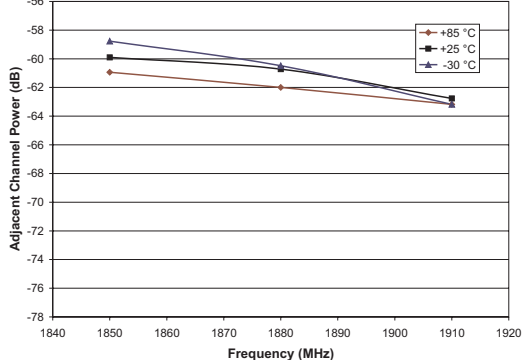


Figure 22: ACP2 vs. Frequency
+3.4 V Supply, Low Bias Mode
 (T_C = +25 °C, V_{CC} = +3.4 V, V_{REF} = +2.85 V,
 V_{MODE} = +2.85 V, Δf_{ACP} = 2.25 MHz, P_{OUT} = +16 dBm)

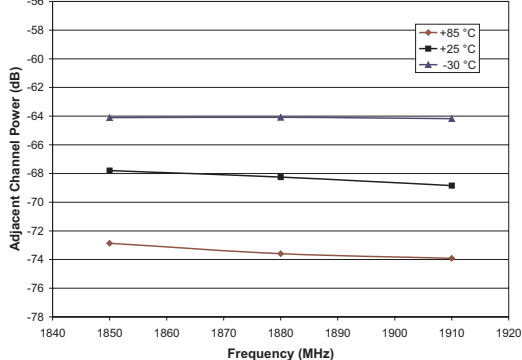


Figure 23: ACP2 vs. Frequency
+4.2 V Supply, High Bias Mode
 (T_C = +25 °C, V_{CC} = +4.2 V, V_{REF} = +2.85 V,
 V_{MODE} = 0 V, Δf_{ACP} = 2.25 MHz, P_{OUT} = +28 dBm)

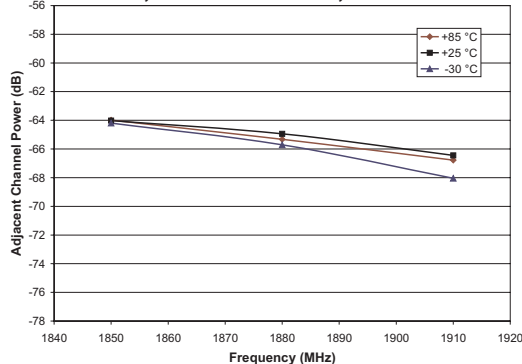


Figure 24: ACP2 vs. Frequency
+4.2 V Supply, Low Bias Mode
 (T_C = +25 °C, V_{CC} = +4.2 V, V_{REF} = +2.85 V,
 V_{MODE} = +2.85 V, Δf_{ACP} = 2.25 MHz, P_{OUT} = +16 dBm)

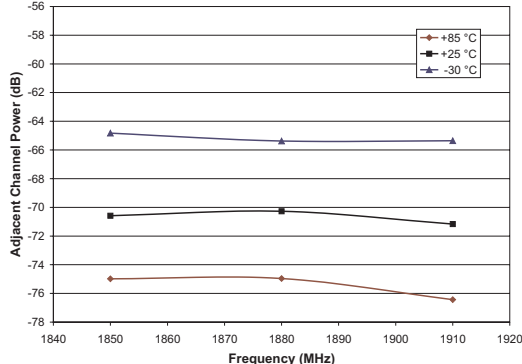


Figure 25: ACP2 vs. Frequency
+3.2 V Supply, High Bias Mode
 (T_C = +25 °C, V_{CC} = +3.2 V, V_{REF} = +2.85 V,
 V_{MODE} = 0 V, Δf_{ACP} = 2.25 MHz, P_{OUT} = +28 dBm)

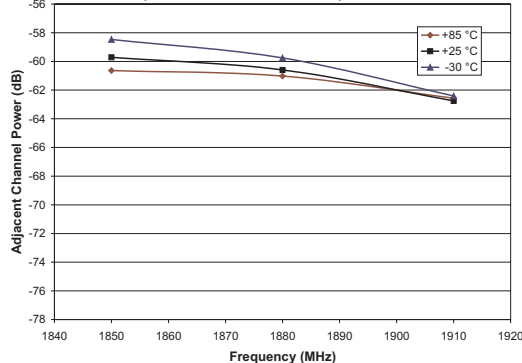
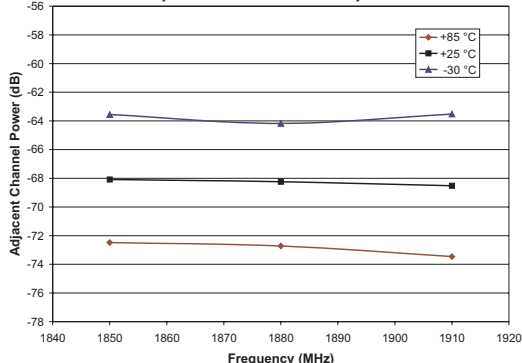


Figure 26: ACP2 vs. Frequency
+3.2 V Supply, Low Bias Mode
 (T_C = +25 °C, V_{CC} = +3.2 V, V_{REF} = +2.85 V,
 V_{MODE} = +2.85 V, Δf_{ACP} = 2.25 MHz, P_{OUT} = +16 dBm)



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 6: Bias Control

| APPLICATION | P _{OUT} LEVELS | BIAS MODE | V _{REF} | V _{MODE} |
|-------------------|-------------------------|-----------|------------------|-------------------|
| CDMA - low power | ≤+16 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 |

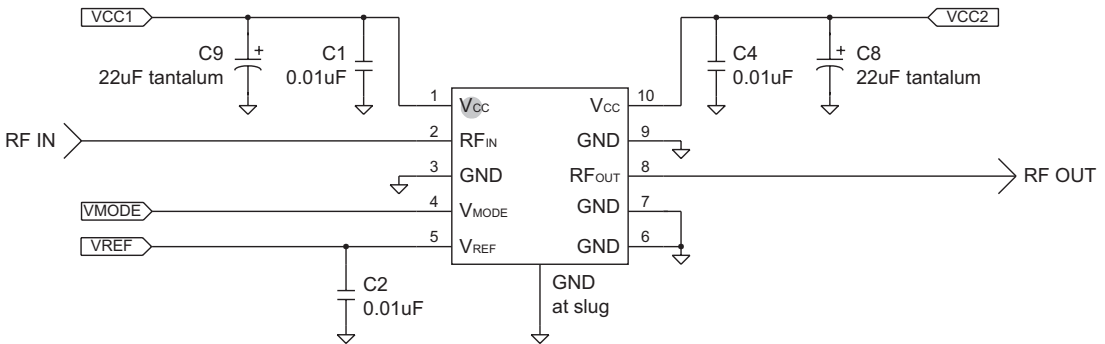
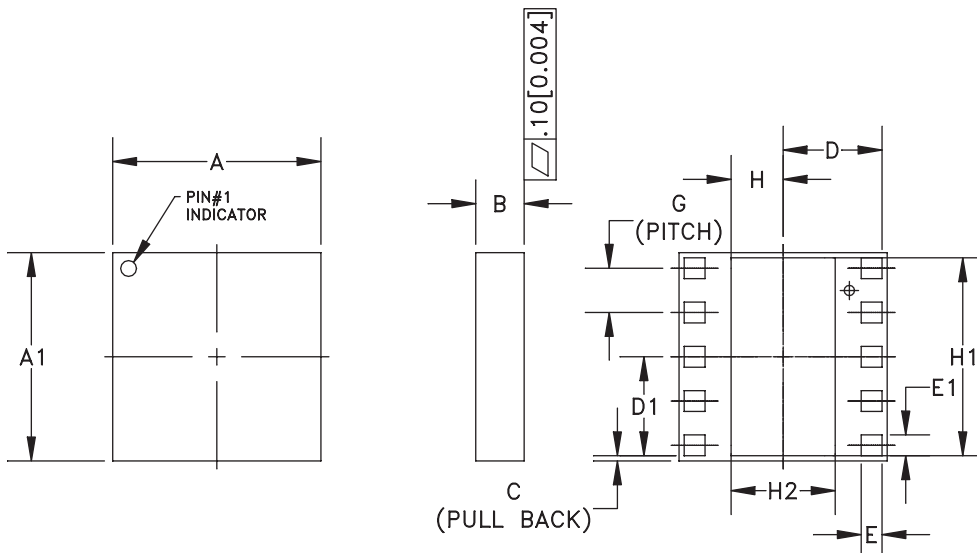


Figure 27: Application Circuit Schematic

PACKAGE OUTLINE



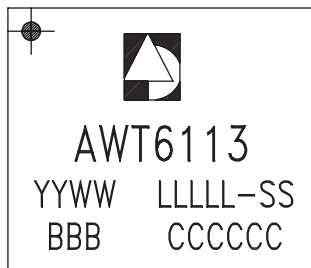
| SYMBOL | MILLIMETERS | | | INCHES | | | NOTE |
|--------|-------------|------|------|-----------|-------|-------|------|
| | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. | |
| A | 3.88 | 4.00 | 4.12 | 0.152 | 0.157 | 0.162 | - |
| A1 | 3.88 | 4.00 | 4.12 | 0.152 | 0.157 | 0.162 | - |
| B | 1.26 | 1.41 | 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].

Figure 28: M7 Package Outline - 10 Pin 4mm x 4mm Surface Mount Module

TOP BRAND

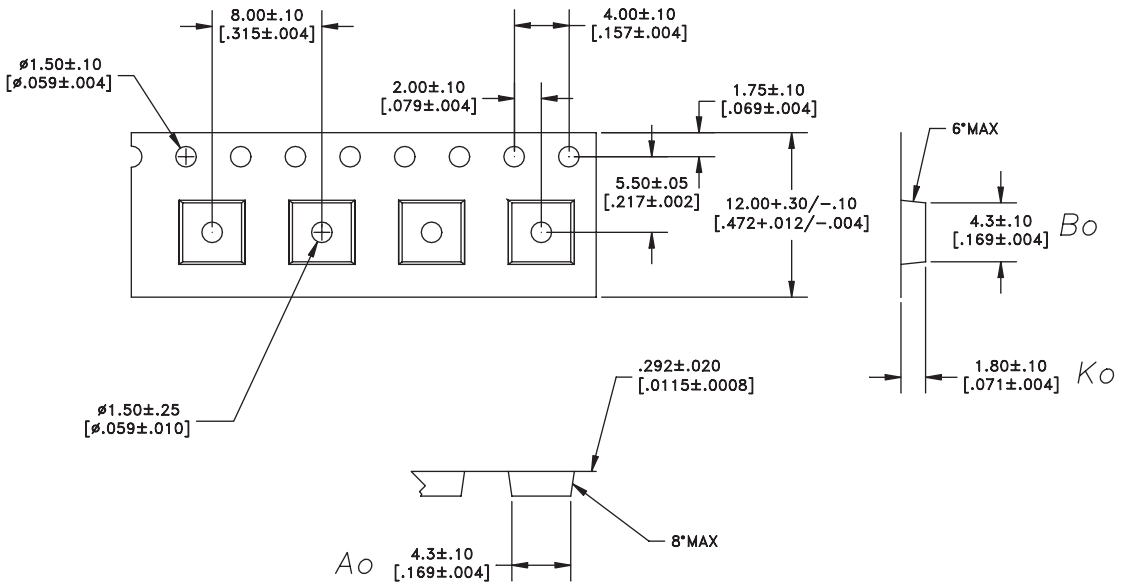


NOTES:

1. ANADIGICS LOGO SIZE: X=0.040±0.010 Y=0.048±0.010
2. PART # AWT6113
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
WHITE or SILVER

Figure 29: Branding Specification

COMPONENT PACKAGING



DIMENSIONS ARE IN MILLIMETERS [INCHES]
STANDARD TOLERANCES

Figure 30: Tape & Reel Packaging

Table 7: Tape & Reel Dimensions

| PACKAGE TYPE | TAPE WIDTH | POCKET PITCH | REEL CAPACITY | MAX REEL DIA |
|--------------|------------|--------------|---------------|--------------|
| 4mm X 4mm | 12mm | 8mm | 2500 | 13" |

NOTES

AWT6113

NOTES

NOTES

ORDERING INFORMATION

| ORDER NUMBER | TEMPERATURE RANGE | PACKAGE DESCRIPTION | COMPONENT PACKAGING |
|--------------|-------------------|---|-------------------------------------|
| AWT6113M7P8 | -30 °C to +110 °C | 10 Pin 4mm x 4mm Surface Mount Module | Tape and Reel, 2500 pieces per Reel |

**ANADIGICS, Inc.**

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Fax: +1 (908) 668-5132

URL: <http://www.anadigics.com>

E-mail: Mktg@anadigics.com

IMPORTANT NOTICE

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WARNING

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