AWT6111

Cellular Dual Mode AMPS/CDMA

3.5V/28.5dBm Linear Power Amplifier Module

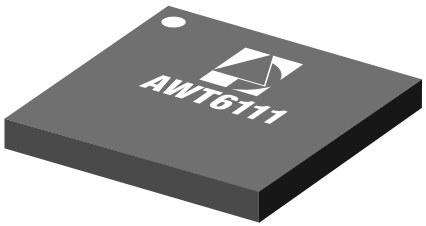
Data Sheet - Rev 2.0

FEATURES

- InGaP HBT Technology
- High Efficiency 47% AMPS
- High Efficiency 37% CDMA
- Low Leakage Current (<5 μA)
- SMT Module Package
- Small Foot Print (6mm x 6mm)
- Low Profile (1.5mm)
- 50 Ω Input and Output Matching
- Low Quiescent Current (Icq = 47 mA Typ)
- Supports Lower Battery Voltage (V_{REF} = 2.75 V min)
- Shut Down and Mode Control
- CDMA 2000 1XRTT Compliant

APPLICATIONS

- 800 MHz Single Mode CDMA Wireless Handsets for China, Korea, and India
- Dual Mode AMPS/CDMA Wireless Handsets



M5 Package
7 Pin 6mm x 6mm
Surface Mount Module

PRODUCT DESCRIPTION

The AWT6111 is a high power, high efficiency amplifier module for Dual Mode CDMA/AMPS wireless handset applications. The device is manufactured on an advanced InGaP HBT MMIC technology offering state-of-the-art reliability, temperature stability and ruggedness. A low power quiescent current mode is digitally controlled to reduce power drain on the system battery. The 6mm x 6mm laminate package is self contained, incorporating 50 Ω input and output matching networks optimized for output power, linearity, and efficiency.

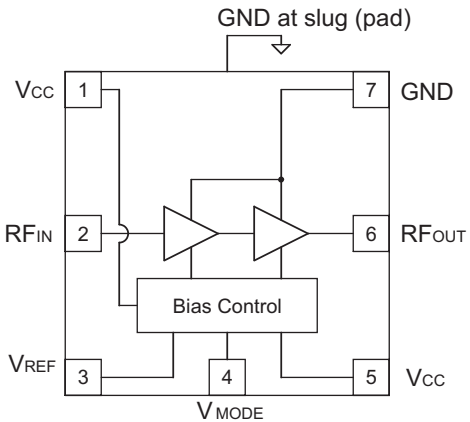


Figure 1: Block Diagram

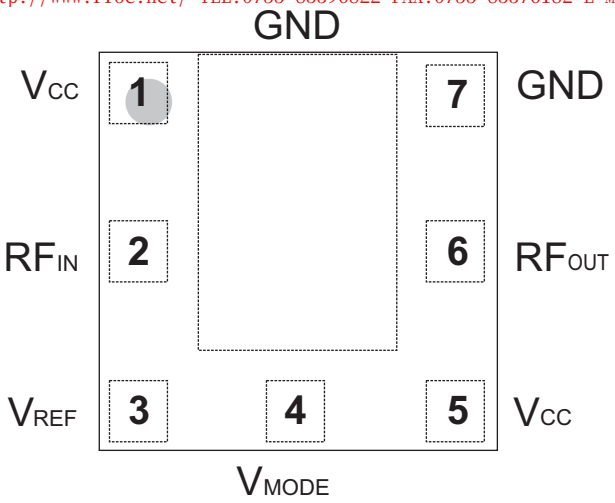


Figure 2: Pinout (X-ray Top View)

Table 1: Pin Description

PIN	NAME	DESCRIPTION
1	V_{CC}	Supply Voltage
2	RF_{IN}	RF Input Signal
3	V_{REF}	Reference Voltage
4	V_{MODE}	Mode Control
5	V_{CC}	Supply Voltage
6	RF_{OUT}	RF Output
7	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)	824	-	849	MHz	
Supply Voltage (V_{CC})	+3.0	+3.5	+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	PA"on" PA"shut down"
RF Output Power (P_{OUT})	- +30 - - -	+31 - +29.0 +28.5 +28.0	- - - - -	dBm	AMPS, V_{CC} =+3.5V AMPS, V_{CC} =+3.0V CDMA, V_{CC} =+3.7V CDMA, V_{CC} =+3.5V CDMA, V_{CC} =+3.2V
Case Temperature (T_C)	-30	-	+110	°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 – AMPS Operation

(T_C = +25 °C, V_{CC} = +3.5 V, V_{REF} = +2.85 V, V_{MODE} = +2.85 V, P_{OUT} = +31 dBm, 50 Ω system)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain	-	28.5	31	dB	
Gain Variation	-	0.3	1.0	dB	
Power-Added Efficiency	42	47	-	%	
Quiescent Current (Icq)	-	47	58	mA	through V_{CC} pins
Reference Current	-	5	7	mA	through V_{REF} pin
Mode Control Current	-	0.35	0.55	mA	through V_{MODE} pin
Leakage Current	-	<5	-	µA	V_{CC} = +3.5 V, V_{REF} = 0 V, V_{MODE} = 0 V
Noise in Receive Band	-	-135	-133	dBm/Hz	869 MHz to 894 MHz
Harmonics 2fo 3fo	 - -	 -40 -50	 -30 -30	dBc	
Input Impedance	-	-	2:1	VSWR	
Spurious Output Level (all spurious outputs)	-	-	-70	dBc	P_{OUT} ≤+31 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 V P_{IN} = +5 dBm Applies over full operating temperature range

Table 5: Electrical Specifications – CDMA Operation

(T_C = +25 °C, V_{CC} = +3.5 V, V_{REF} = +2.85 V, V_{MODE} = +2.85 V, P_{OUT} = +28.5 dBm, 50 Ω system)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain	-	29	31.5	dB	
Gain Variation	-	0.3	1.0	dB	
Adjacent Channel Power at ±885 kHz offset; Primary Channel BW = 1.23 MHz Adjacent Channel BW = 30 kHz	- - - -	-54 -51 -52 -50	-46.5 -46.0 -46.5 -46.0	dB	P_{OUT} = +16dBm, V_{CC} = +3.5 V P_{OUT} = +29.0dBm, V_{CC} = +3.7 V P_{OUT} = +28.5dBm, V_{CC} = +3.5 V P_{OUT} = +28.0dBm, V_{CC} = +3.2 V
Adjacent Channel Power at ±1.98 MHz offset; Primary Channel BW = 1.23 MHz Adjacent Channel BW = 30 kHz	- - - -	-74 -61 -60 -60	-57 -57 -57 -57	dB	P_{OUT} = +16dBm, V_{CC} = +3.5 V P_{OUT} =+29.0dBm, V_{CC} = +3.7 V P_{OUT} =+28.5dBm, V_{CC} = +3.5 V P_{OUT} =+28.0dBm, V_{CC} = +3.2 V
Power-Added Efficiency	32 6.5	37 7.5	- -	%	+28.5 dBm Output Power +16 dBm Output Power
Quiescent Current (Icq)	-	47	58	mA	through V_{CC} pins
Reference Current	-	5	7	mA	through V_{REF} pin
Mode Control Current	-	0.35	0.55	mA	through V_{MODE} pin
Leakage Current	-	<5	-	µA	
Noise in Receive Band	-	-135	-133	dBm/Hz	869 MHz to 894 MHz
Harmonics 2fo 3fo	- -	-40 -50	-30 -30	dBc	
Input Impedance	-	-	2:1	VSWR	
Spurious Output Level (all spurious outputs)	-	-	-70	dBc	P_{OUT} ≤+29 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 V P_{IN} = +5 dBm Applies over full operating temperature range

PERFORMANCE DATA

Figure 3: Large Signal Gain vs. Freq. CDMA IS-95B (P_{OUT} = +28.5 dBm, V_{CC} = +3.5 V, V_{REF} = +2.85 V, V_{MODE} = +2.85 V)

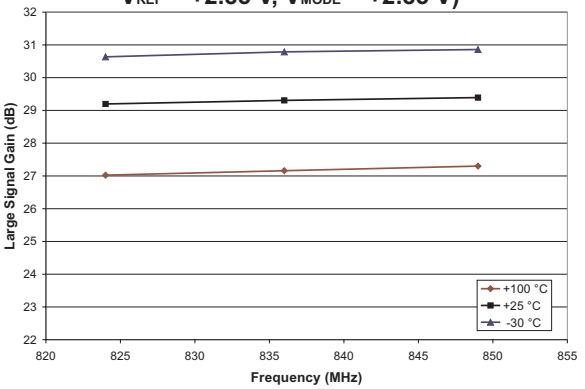


Figure 4: Power Added Efficiency vs. Freq. CDMA IS-95B (P_{OUT} = +28.5 dBm, V_{CC} = +3.5 V, V_{REF} = +2.85 V, V_{MODE} = +2.85 V)

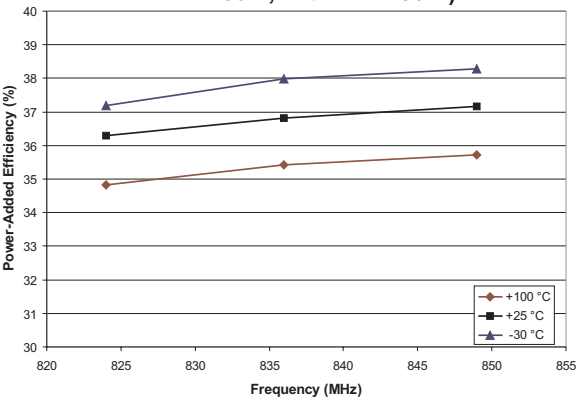


Figure 5: Adjacent Channel Power vs. Freq. CDMA IS-95B (P_{OUT} = +28.5 dBm, V_{CC} = +3.5 V, V_{REF} = +2.85 V, V_{MODE} = +2.85 V, Δf_{ACP} = 885 kHz)

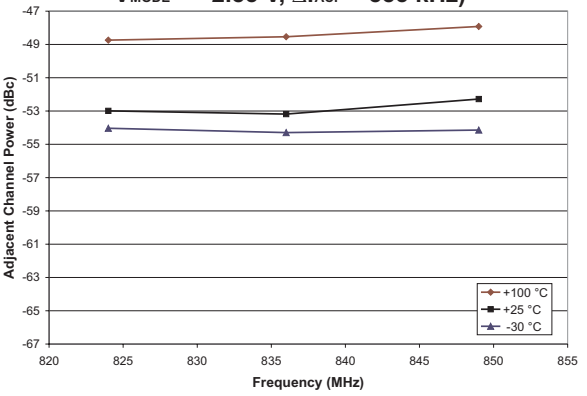


Figure 6: Adjacent Channel Power vs. Freq. CDMA IS-95B (P_{OUT} = +28.5 dBm, V_{CC} = +3.5 V, V_{REF} = +2.85 V, V_{MODE} = +2.85 V, Δf_{ACP} = 1.98 MHz)

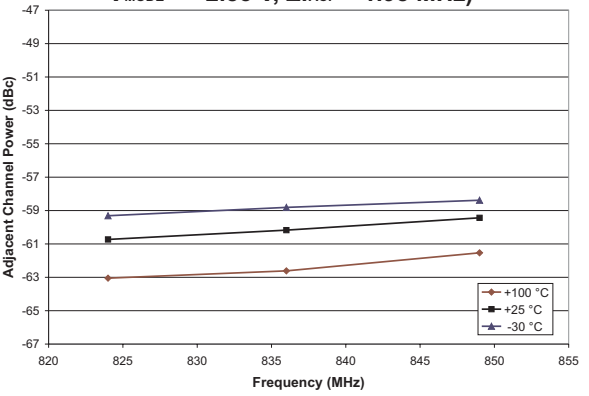


Figure 7: Small Signal Gain vs. Freq. CDMA IS-95B (P_{IN} = -20 dBm, V_{CC} = +3.5 V, V_{REF} = +2.85 V, V_{MODE} = +2.85 V)

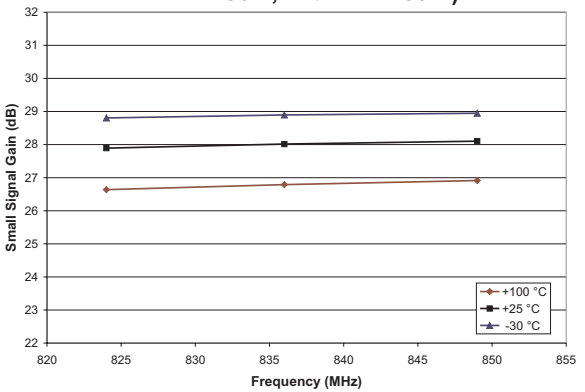


Figure 8: Gain vs. Freq.
CDMA IS-95B
(P_{OUT} = +16 dBm, V_{CC} = +3.5 V, V_{REF} = +2.85 V, V_{MODE} = +2.85 V)

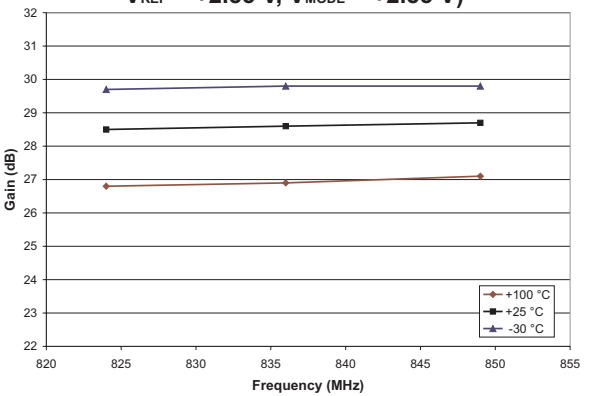


Figure 9: Power-Added Efficiency vs. Freq.
CDMA IS-95B
(P_{OUT} = +16 dBm, V_{CC} = +3.5 V, V_{REF} = +2.85 V, V_{MODE} = +2.85 V)

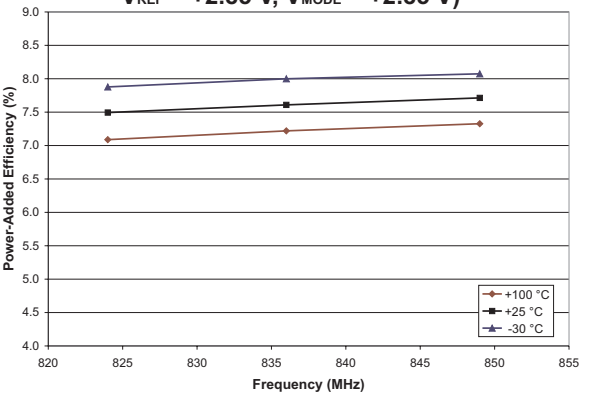


Figure 10: Adjacent Channel Power vs. Freq.
CDMA IS-95B
(P_{OUT} = +16 dBm, V_{CC} = +3.5 V, V_{REF} = +2.85 V, V_{MODE} = +2.85 V Δf_{ACP} = 885 kHz)

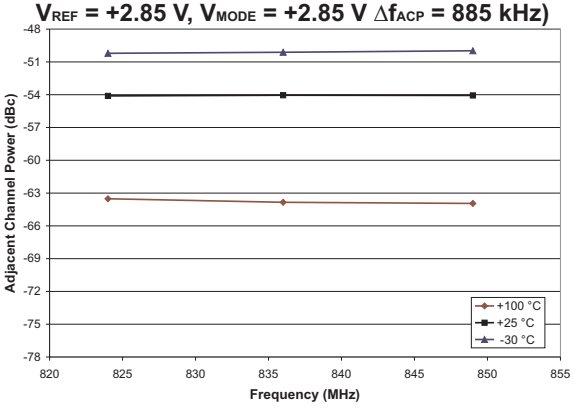


Figure 11: Adjacent Channel Power vs. Freq.
CDMA IS-95B
(P_{OUT} = +16 dBm, V_{CC} = +3.5 V, V_{REF} = +2.85 V, V_{MODE} = +2.85 V Δf_{ACP} = 1.98 MHz)

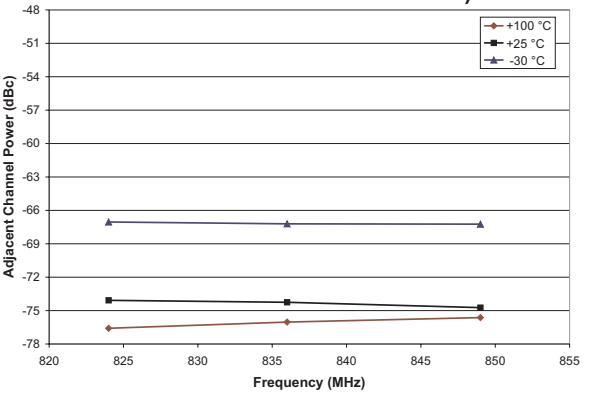


Figure 12: Large Signal Gain vs. Freq.
AMPS
(P_{OUT} = +31.0 dBm, V_{CC} = +3.5 V, V_{REF} = +2.85 V, V_{MODE} = +2.85 V)

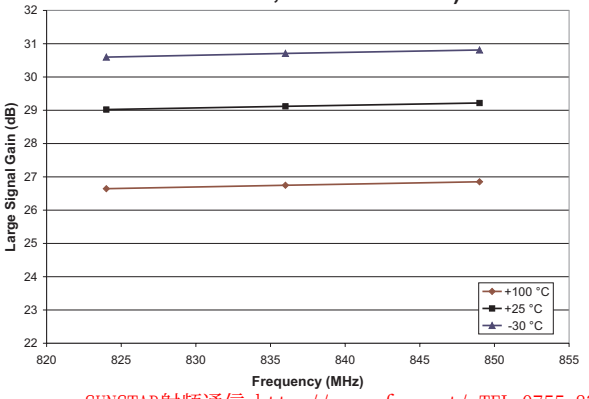
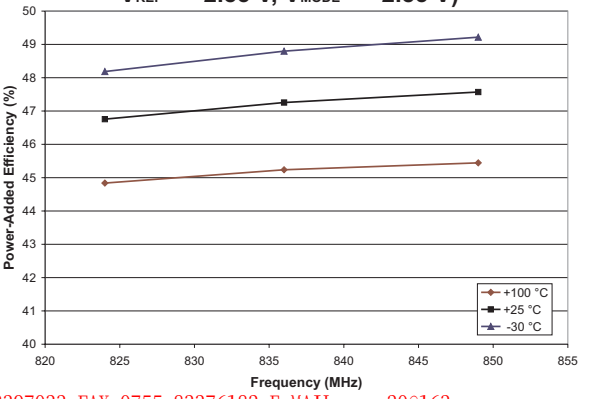


Figure 13: Power-Added Efficiency vs. Freq.
AMPS
(P_{OUT} = +31.0 dBm, V_{CC} = +3.5 V, V_{REF} = +2.85 V, V_{MODE} = +2.85 V)



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.

High Bias Mode

The power amplifier may be placed in a high bias mode by applying a logic low level (see Operating Ranges table) to the V_{MODE} voltage. Operating the amplifier in high bias mode will result in an approximately 3 dB improvement in the adjacent channel power rejection at the 1.98 MHz offset and no significant change at the 885 kHz offset.

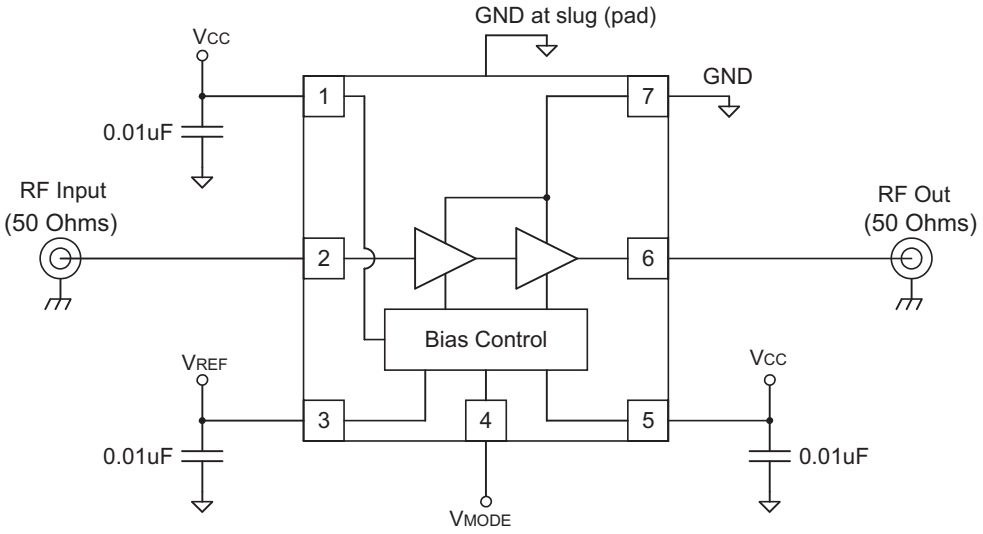
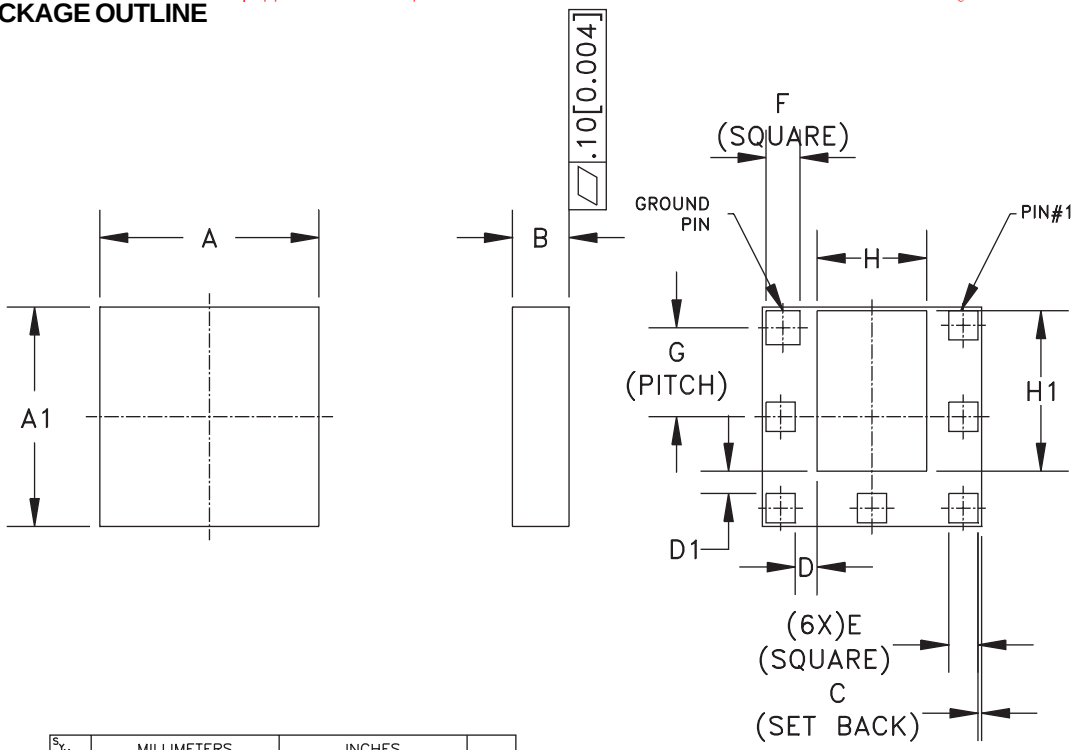


Figure 14: Application Circuit Schematic

PACKAGE OUTLINE

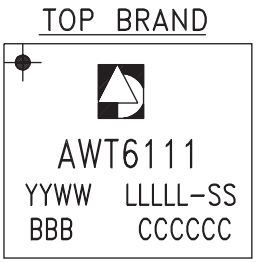


SYMBOL	MILLIMETERS			INCHES			NOTE
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
A	5.88	6.00	6.12	0.231	0.236	0.241	–
A1	5.88	6.00	6.12	0.231	0.236	0.241	–
B	1.30	1.55	1.70	0.051	0.061	0.067	–
C	–	0.10	–	–	0.004	–	–
D	–	0.60	–	–	0.024	–	–
D1	–	0.60	–	–	0.024	–	–
E	–	0.81	–	–	0.032	–	–
F	–	0.89	–	–	0.035	–	–
G	2.50 BSC			0.098 BSC			3
H	–	3.00	–	–	0.118	–	–
H1	–	4.39	–	–	0.173	–	–

NOTES:

1. CONTROLLING DIMENSIONS: MILLIMETERS
2. UNLESS SPECIFIED TOLERANCE=±0.076[0.003].
3. REFERENCE ONLY.

Figure 15: M5 Package Outline - 7 Pin 6mm x 6mm Surface Mount Module (Low Band)



NOTES:

1. ANADIGICS LOGO SIZE:	X=0.080±0.010 Y=0.095±0.010
2. PART #:	AWT6111
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 COLOR : WHITE or SILVER	

Figure 16: Branding Specification

COMPONENT PACKAGING

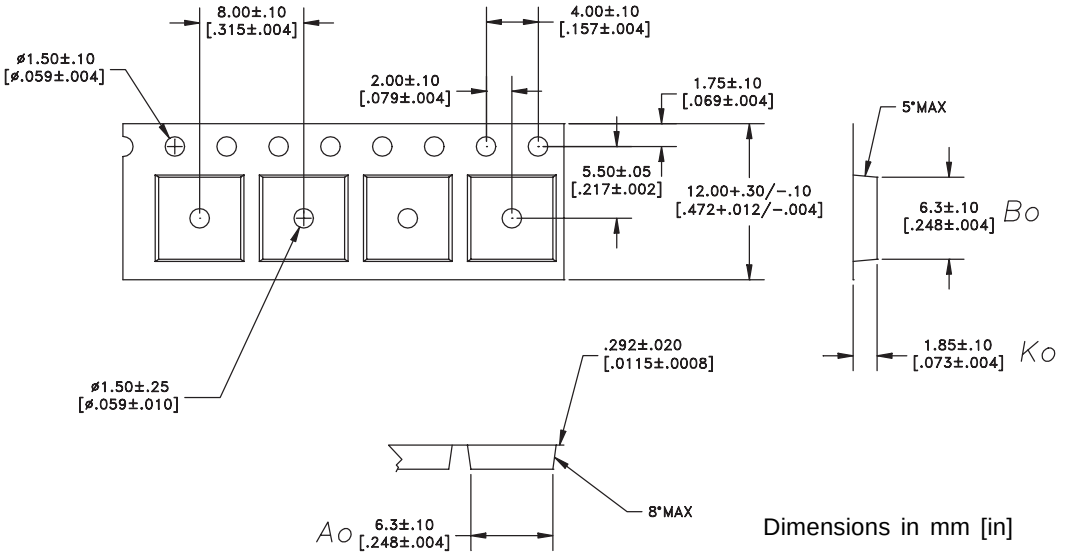


Figure 17: Tape & Reel Packaging

Table 6: Tape & Reel Dimensions

PACKAGE TYPE	TAPE WIDTH	POCKET PITCH	REEL CAPACITY	MAX REEL DIA
6mm X 6mm	12mm	8mm	2500	13"

NOTES

ORDERING INFORMATION

ORDER NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AWT6111M5P8	-30 °C to +110 °C	7 Pin 6mm x 6mm Surface Mount Module	Tape and Reel, 2500 pieces per Reel

ANADIGICS, Inc.
141 Mount Bethel Road
Warren, New Jersey 07059, U.S.A.
Tel: +1 (908) 668-5000
Fax: +1 (908) 668-5132

URL: http://www.anadigics.com
E-mail: Mktg@anadigics.com

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微波光电部专业代理经销高频、微波、光纤、光电元器件、组件、部件、模块、整机；电磁兼容元器件、材料、设备；微波 CAD、EDA 软件、开发测试仿真工具；微波、光纤仪器仪表。欢迎国外高科技微波、光纤厂商将优秀产品介绍到中国、共同开拓市场。长期大量现货专业批发高频、微波、卫星、光纤、电视、CATV 器件： 晶振、VCO、连接器、PIN 开关、变容二极管、开关二极管、低噪晶体管、功率电阻及电容、放大器、功率管、MMIC、混频器、耦合器、功分器、振荡器、合成器、衰减器、滤波器、隔离器、环行器、移相器、调制解调器；光电子元器件和组件：红外发射管、红外接收管、光电开关、光敏管、发光二极管和发光二极管组件、半导体激光二极管和激光器组件、光电探测器和光接收组件、光发射接收模块、光纤激光器和光放大器、光调制器、光开关、DWDM 用光发射和接收器件、用户接入系统光光收发器件与模块、光纤连接器、光纤跳线/尾纤、光衰减器、光纤适 配器、光隔离器、光耦合器、光环行器、光复用器/转换器；无线收发芯片和模组、蓝牙芯片和模组。

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