ANADIGICS

AWT6105

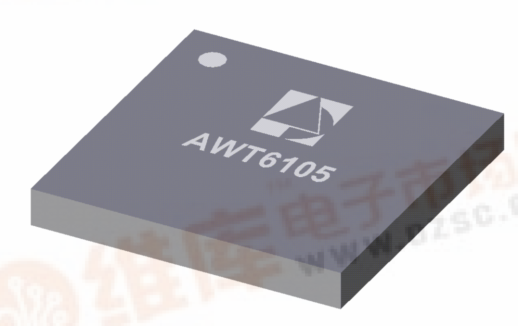
Cellular Dual Mode AMPS/CDMA

3.5V/28.5dBm Linear Power Amplifier Module

PRELIMINARY DATASHEET - Rev 1.2

FEATURES

- InGaP HBT Technology
- High Efficiency 45% AMPS
- High Efficiency 35% CDMA
- Low Leakage Current (<5µA)
- SMT Module Package
- Small Foot Print (6mm x 6mm)
- Low Profile (1.5mm)
- 50 Ω Input and Output Matching
- Low Quiescent Current (I_{cq} = 50mA Typ)
- Shut Down and Mode Control
- CDMA 2000 1XRTT Compliant



M5 Package
6x6mm Module

APPLICATIONS

- Dual Mode AMPS/CDMA Wireless Handsets

PRODUCT DESCRIPTION

The AWT6105 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 50Ω input and output matching networks optimized for output power, linearity, and efficiency.

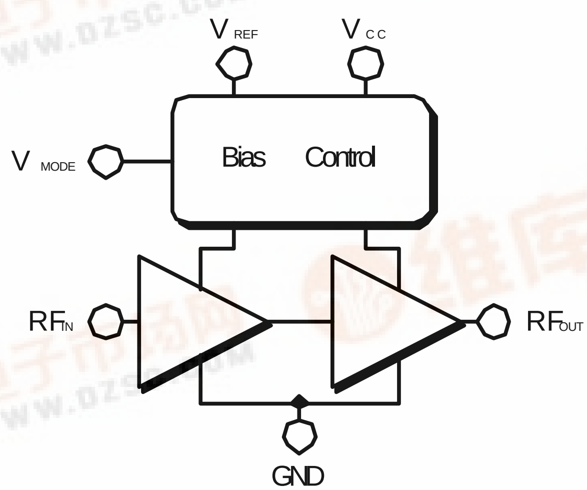


Figure 1: Block Diagram

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})		+5	V
V_{MOD} Voltage (V_{MOD})		+3.5	V
Control Voltage (V_{REF})		+3.5	V
Input Power (RF_{IN})		+10	dBm
Operating Temperature (T_C)	-30	110	°C
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.

Note: Module may withstand all conditions.

Table 3: Electrical Specifications (AMPS 824-849 MHz)

PARAMETER	MIN	TYP	MAX	UNIT
Frequency Range	824		849	MHz
Supply Voltage Range	3.0	3.5	4.2	V
Ref Voltage Range: PA "on"	2.9	3.0	3.1	V
Ref Voltage Range: PA "off"		0	0.5	V
Ref current		5	7	mA
V_{MODE} High Bias		0	0.5	V
V_{MODE} Low Bias	2.5	3	3.1	V
Gain, P_{OUT}= 31 dBm		28	31	dB
Output Power, V_{CC} = 3.5V	31	32		dBm
Output Power, V_{CC} = 3.0V	30			dBm
Input Impedance			2:1	Ratio
Power Added Efficiency P_{OUT} = 31dBm Vcc=3.5V, V_{MODE} = 2.7V		46		%
Icq (V_{MODE}= 2.7V) Low Power Mode		50		mA
Noise at Receiver Band $P_{OUT} \leq$ 31 dBm		-135		dBm/Hz
Leakage Current V_{CC} = 3.5V ; V_{REF}= 0V ; V_{MODE} = 0V		5		μA
Harmonics 2fo, P_{OUT} = 31 dBm		-40	-30	dBc
3fo, P_{OUT} = 31 dBm		-50	-30	dBc
Stability (out of band load VSWR ≤ 8:1) (in band load VSWR ≤ 8:1) Over Temperature and & Voltage			-70	dBc, all spurious $P_{OUT} \leq$ 31dBm
Ruggedness Stress for no permanent degradation or failure, VCC = 5.0 Over Temperature	8:1			Ratio

Note: Unless otherwise specified: V_{cc} = 3.5V, Z_{IN} = Z_{OUT} = 50W System , T_C = 25 °C

Table 4: Bias Control

Bias Mode	V_{MODE}	ICQ TYP	POWER RANGE	P_{OUT} LEVELS	MODE
Low	2.7V	50 mA	All	0-32 dBm	AMPS All Power Levels
Low	2.7V	50 mA	Low	-50 to +20 dBm	CDMA Low Power
High	0V	100 mA	High	20-29 dBm	CDMA High Power

Table 5: Electrical Specifications (CDMA 824-849 MHz)

PARAMETER	MIN	TYP	MAX	UNIT
Frequency Range	824		849	MHz
Supply Voltage Range	3.0	3.5	4.2	V
Ref Voltage Range:PA "on"	2.9	3.0	3.1	V
Ref Voltage Range:PA "off"		0	0.5	V
Ref current		5	7	mA
V_{MODE} High Bias		0	0.5	V
V_{MODE} Low Bias	2.5	3	3.1	V
Gain, P_{OUT}= 28.5 dBm		28	31.5	dB
Output Power, V_{CC} = 3.5V	28	28.5		dBm
Output Power, V_{CC} = 3.0V	27	27.5		dBm
Input VSWR			2:1	Ratio
Power Added Efficiency P_{OUT} = 28.5 dBm		35		%
Power Added Efficiency V_{MODE} = 2.7V P_{OUT} = 16 dBm, Low Power Mode	6	7		%
Icq (V_{MODE} = 2.7V) Low Power Mode		50		mA
Linearity (P_{OUT} avg. = 28.5 dBm) & V_{CC}=3.5V				
Adjacent Channel Power Rejection @ ±885 KHz offset , Primary Channel Bandwidth=1.23 MHz , Adjacent Channel Bandwidth=30KHz , $P_{OUT} \leq$ 28.5dBm		-48	-46	dBc
Adjacent Channel Power Rejection @ ±1.98 MHz offset , Primary Channel Bandwidth=1.23 MHz , Adjacent Channel Bandwidth=30KHz, $P_{OUT} \leq$ 28.5dBm		-59	-57	dBc
Noise at Receiver Band $P_{OUT} \leq$ 28.5 dBm		-135		dBm/Hz
Harmonics 2fo, P_{OUT} = 28.5 dBm		-40	-30	dBc
3fo, P_{OUT} = 28.5 dBm		-40	-30	dBc
Stability (out of band load VSWR <8:1) (in band load VSWR <8:1)			-70	dBc, all spurious $P_{OUT} \leq$ 29dBm
Ruggedness Stress for no permanent degradation or failure, V_{CC} = 5.0V, Over Temperature	8:1			Ratio

Note: (Unless otherwise specified: V_{cc} = 3.5V, $Z_{IN} = Z_{OUT}$ = 50W System, T_C = 25 °C)

PERFORMANCE DATA

Figure 2

IS-95 Gain & Eff. versus Pout @ 836.5 MHz
Vcc: 3.0V, Vref: 3.0V, Vmode: 2.7V

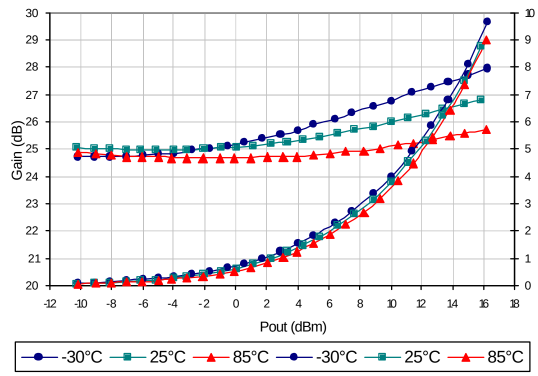


Figure 3

IS-95 Gain & Eff. versus Pout @ 836.5 MHz
Vcc: 3.0V, Vref: 3.0V, Vmode: 0.0V

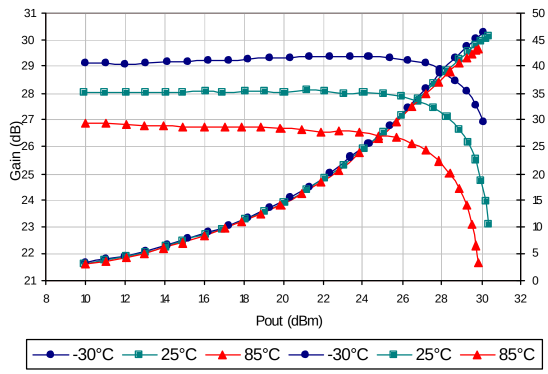


Figure 4

IS-95 Gain & Eff. versus Pout @ 836.5 MHz
Vcc: 3.5V, Vref: 3.0V, Vmode: 2.7V

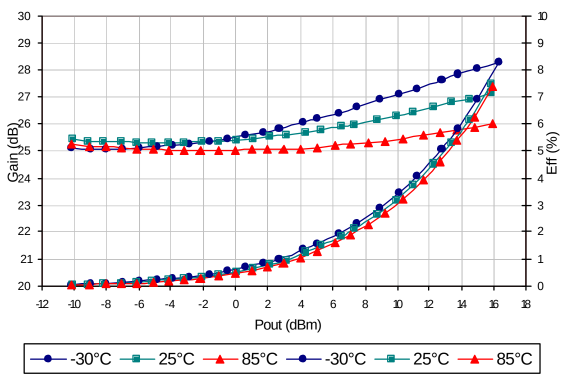


Figure 5

IS-95 Gain & Eff. versus Pout @ 836.5 MHz
Vcc: 3.5V, Vref: 3.0V, Vmode: 0.0V

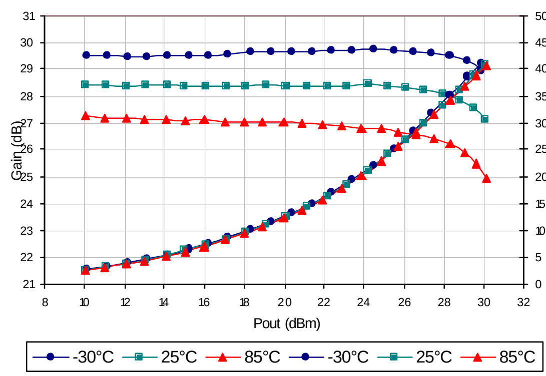


Figure 6

IS-95 Gain & Eff. versus Pout @ 836.5 MHz
Vcc: 4.2V, Vref: 3.0V, Vmode: 2.7V

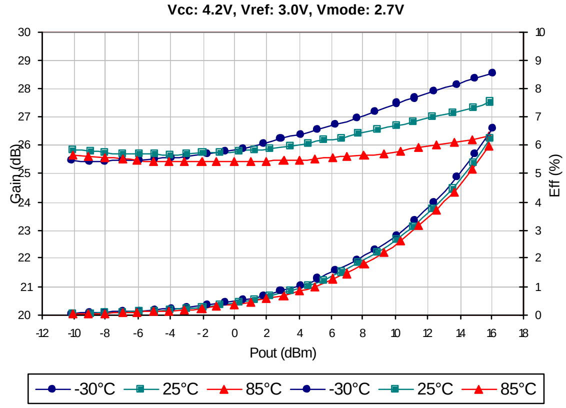


Figure 7

IS-95 Gain & Eff. versus Pout @ 836.5 MHz
Vcc: 4.2V, Vref: 3.0V, Vmode: 0.0V

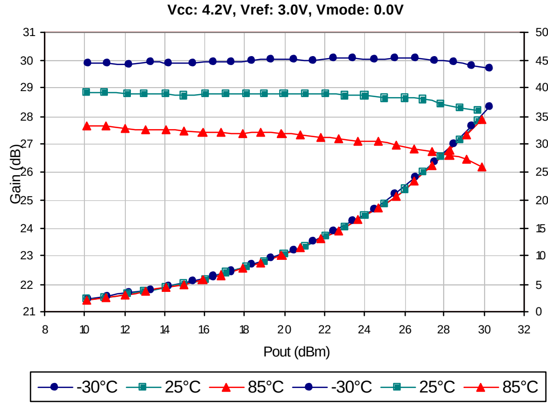


Figure 8

ACPR versus Pout @ 836.5 MHz
Vcc: 3.0V, Vref: 3.0V, Vmode: 2.7V, ACPR: .885 MHz

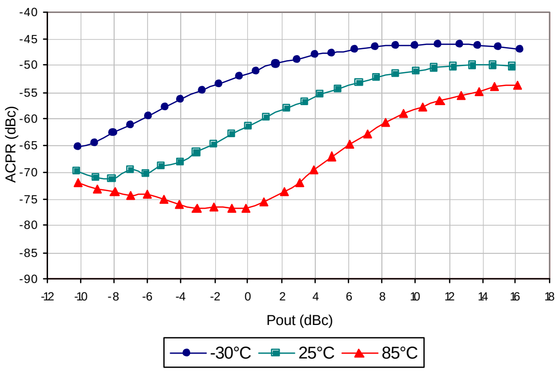


Figure 9

ACPR versus Pout @ 836.5 MHz
Vcc: 3.0V, Vref: 3.0V, Vmode: 2.7V, ACPR: 1.98 MHz

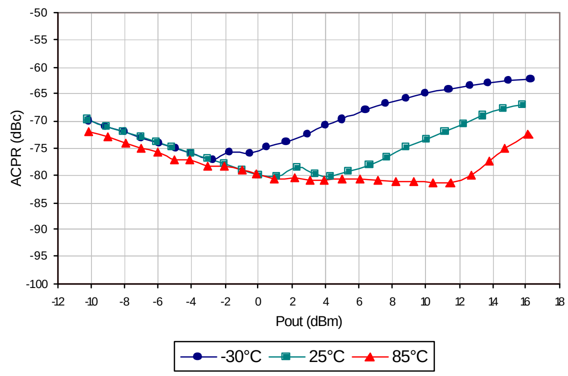


Figure 10

ACPR versus Pout @ 836.5 MHz
Vcc: 3.0V, Vref: 3.0V, Vmode: 0.0V, ACPR: .885 MHz

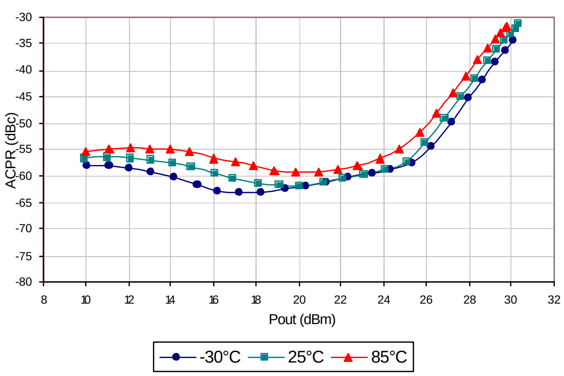


Figure 11

ACPR versus Pout @ 836.5 MHz
Vcc: 3.0V, Vref: 3.0V, Vmode: 0.0V, ACPR: 1.98 MHz

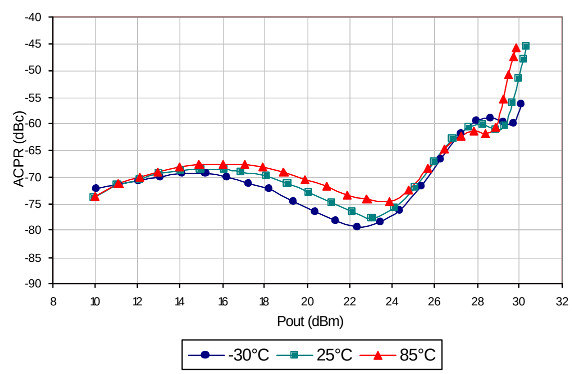


Figure 12

ACPR versus Pout @ 836.5 MHz
Vcc: 3.5V, Vref: 3.0V, Vmode: 2.7V, ACPR: .885 MHz

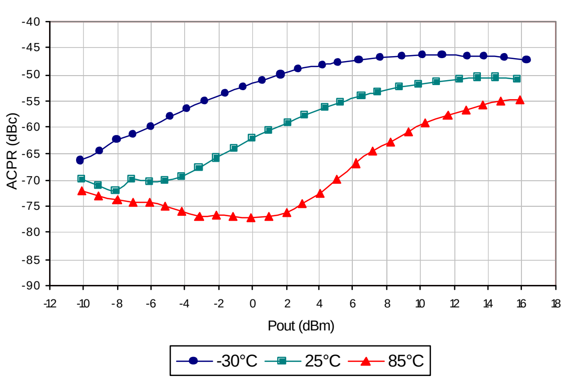


Figure 13

ACPR versus Pout @ 836.5 MHz
Vcc: 3.5V, Vref: 3.0V, Vmode: 2.7V, ACPR: 1.98 MHz

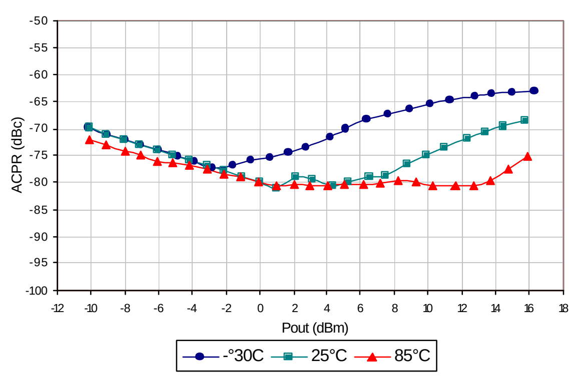


Figure 14

ACPR versus Pout @ 836.5 MHz
Vcc: 3.5V, Vref: 3.0V, Vmode: 0.0V, ACPR: .885 MHz

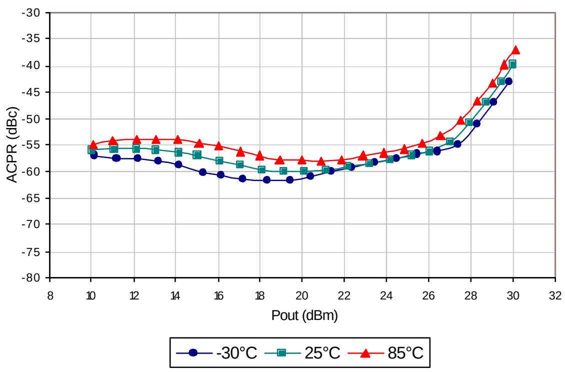


Figure 15

ACPR versus Pout @ 836.5 MHz
Vcc: 3.5V, Vref: 3.0V, Vmode: 0.0V, ACPR: 1.98 MHz

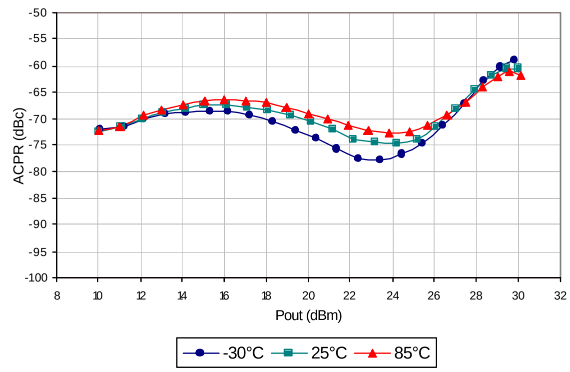


Figure 16

ACPR versus Pout @ 836.5 MHz
Vcc: 4.2V, Vref: 3.0V, Vmode: 2.7V, ACPR: .885 MHz

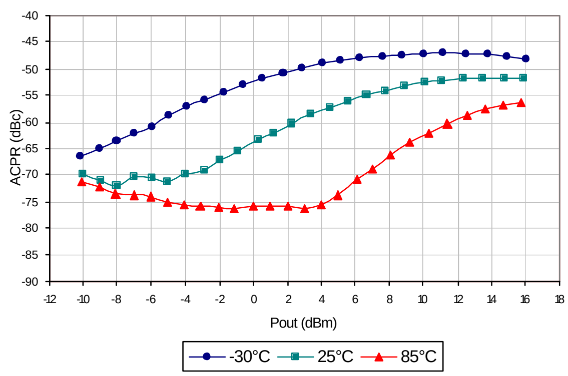


Figure 17

ACPR versus Pout @ 836.5 MHz
Vcc: 4.2V, Vref: 3.0V, Vmode: 2.7V, ACPR: 1.98 MHz

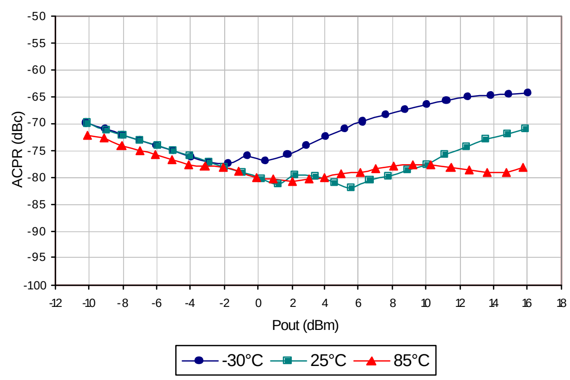


Figure 18

ACPR versus Pout @ 836.5 MHz
Vcc: 4.2V, Vref: 3.0V, Vmode: 0.0V, ACPR: .885 MHz

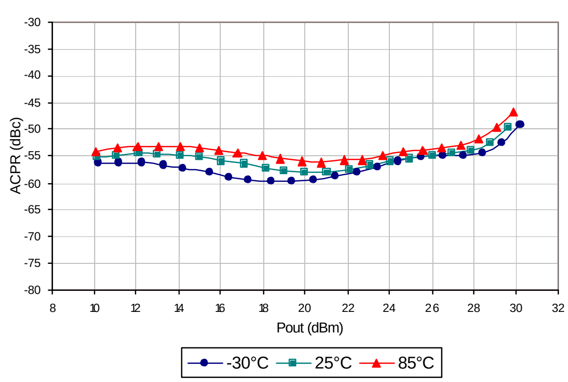
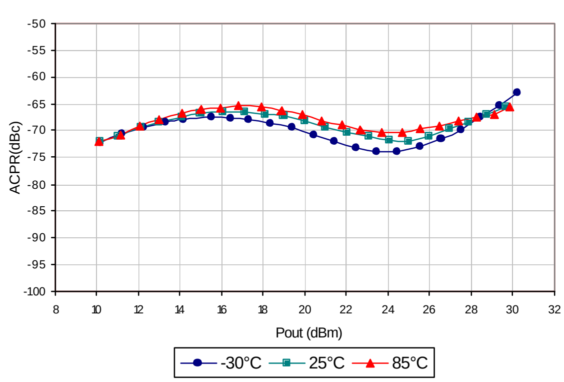


Figure 19

ACPR versus Pout @ 836.5 MHz
Vcc: 4.2V, Vref: 3.0V, Vmode: 0.0V, ACPR: 1.98 MHz



AMPS MODE:

Figure 20

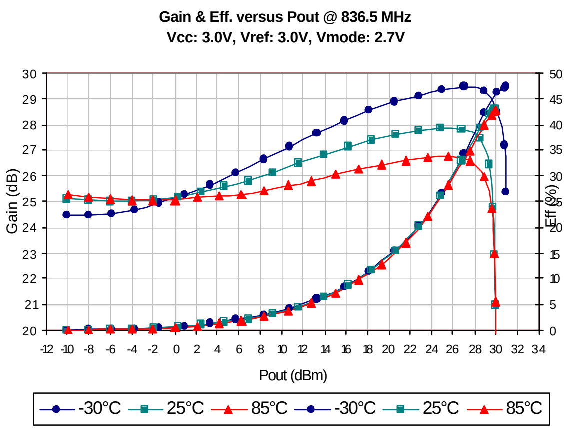


Figure 21

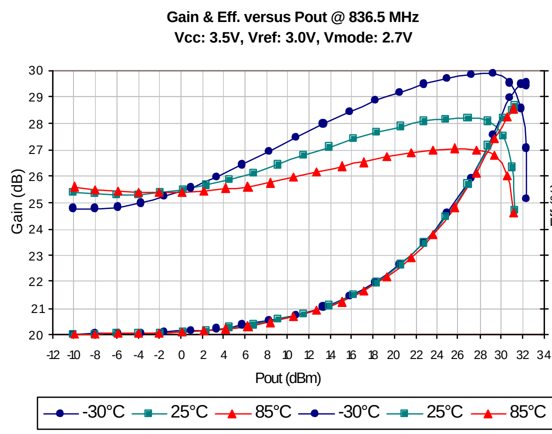


Figure 22

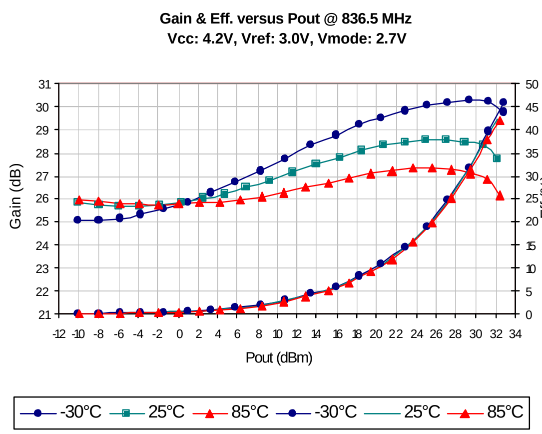


Figure 23

IS-98D Gain & Eff. versus Pout @ 836.5 MHz
Vcc: 3.0V, Vref: 3.0V, Vmode: 2.7V

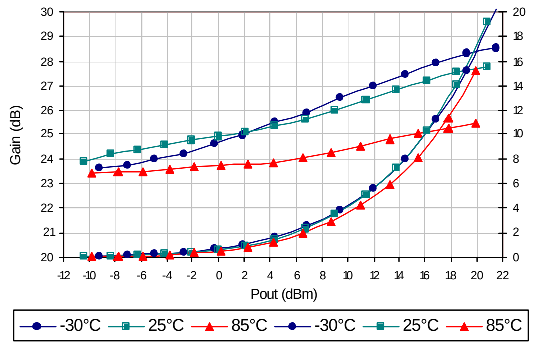


Figure 24

IS-98D Gain & Eff. versus Pout @ 836.5 MHz
Vcc: 3.0V, Vref: 3.0V, Vmode: 0.0V

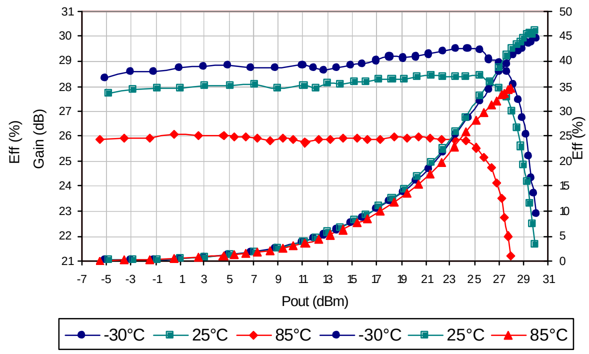


Figure 25

IS-98D Gain & Eff. versus Pout @ 836.5 MHz
Vcc: 3.5V, Vref: 3.0V, Vmode: 2.7V

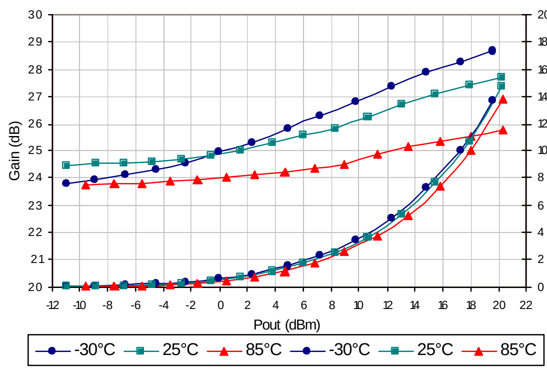


Figure 26

IS-98D Gain & Eff. versus Pout @ 836.5 MHz
Vcc: 3.5V, Vref: 3.0V, Vmode: 0.0V

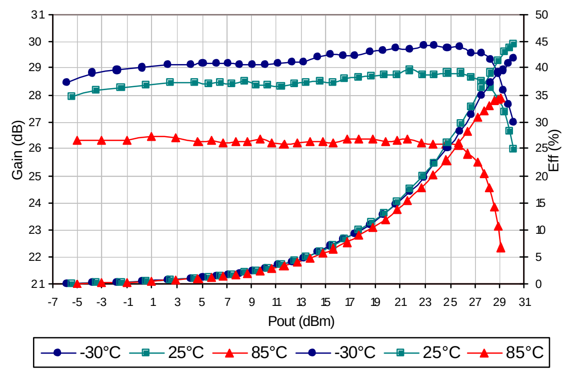


Figure 27

IS-98D Gain & Eff. versus Pout @ 836.5 MHz
Vcc: 4.2V, Vref: 3.0V, Vmode: 2.7V

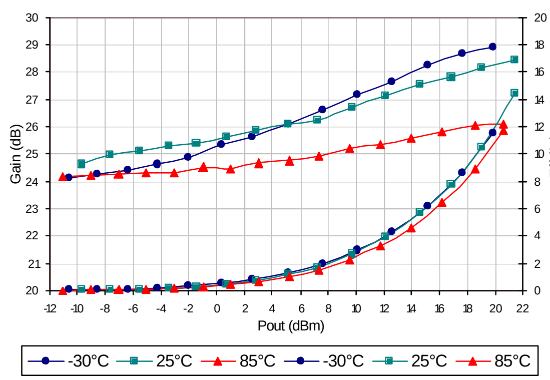


Figure 28

IS-98D Gain & Eff. versus Pout @ 836.5 MHz
Vcc: 4.2V, Vref: 3.0V, Vmode: 0.0V

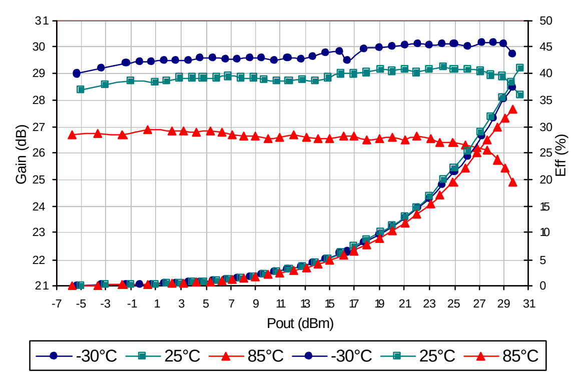


Figure 29

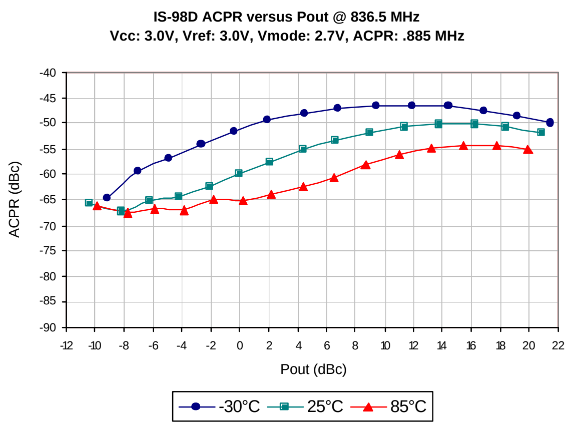


Figure 30

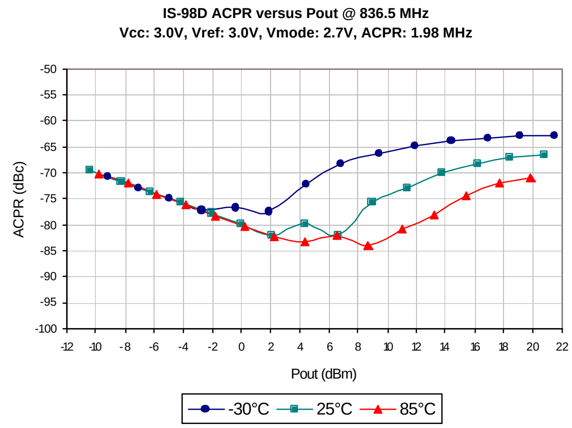


Figure 31

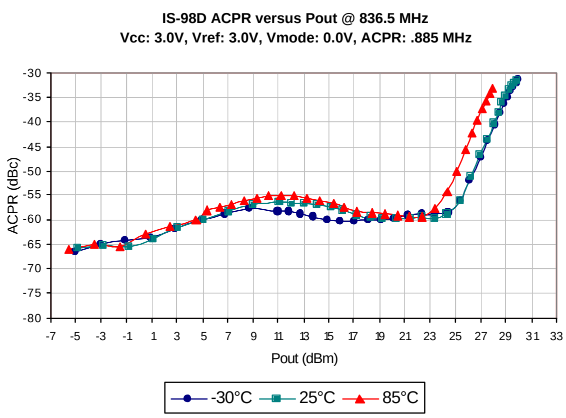


Figure 32

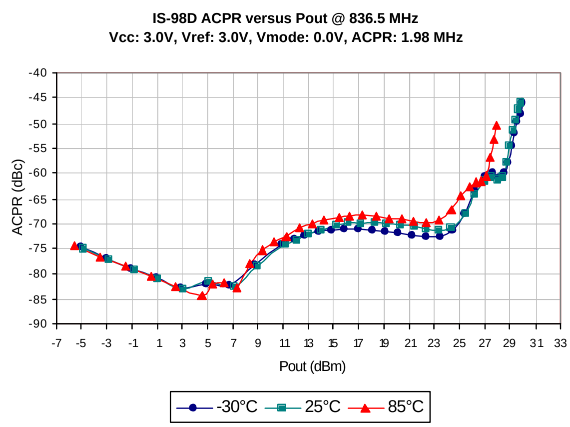


Figure 33

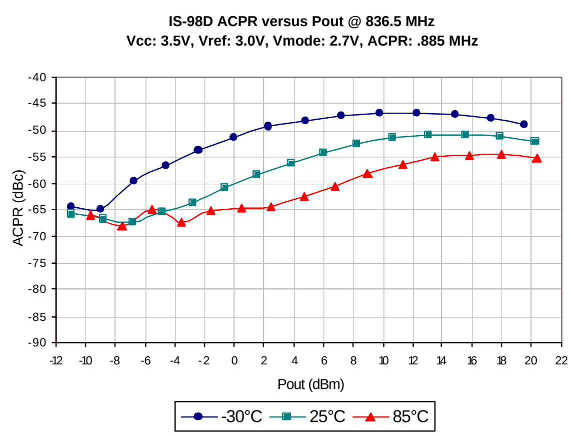


Figure 34

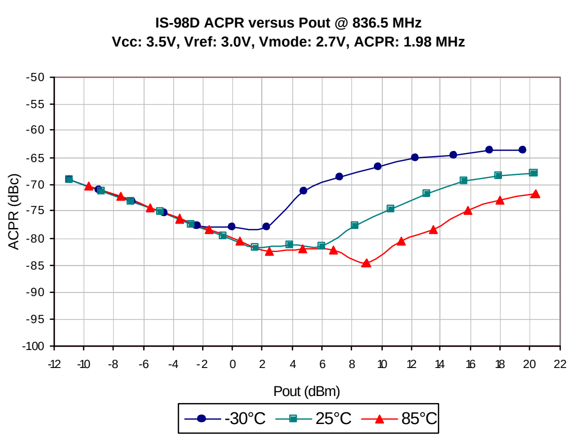


Figure 35

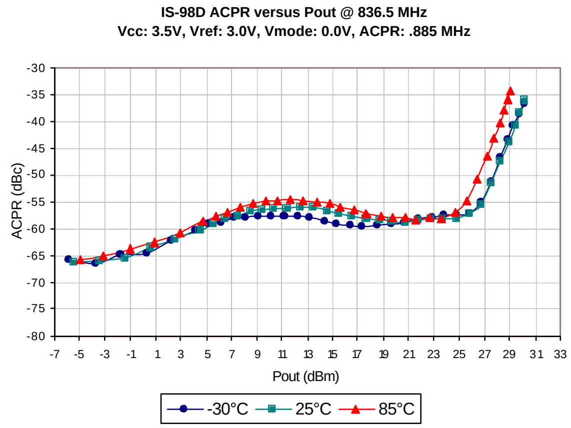


Figure 36

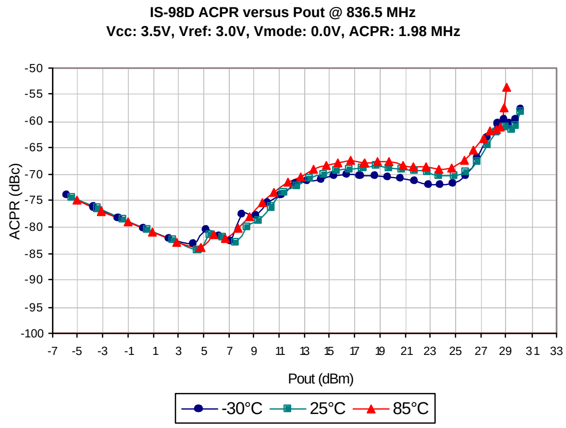


Figure 37

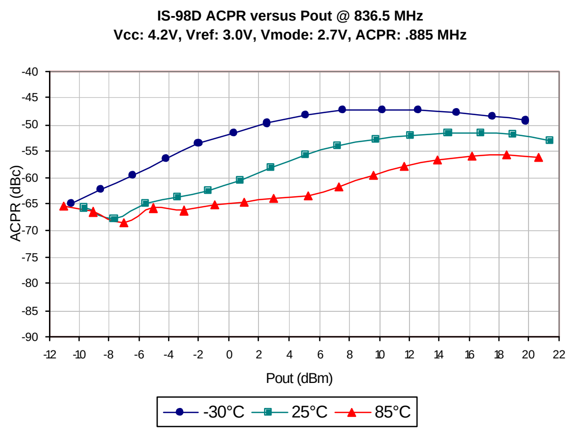


Figure 38

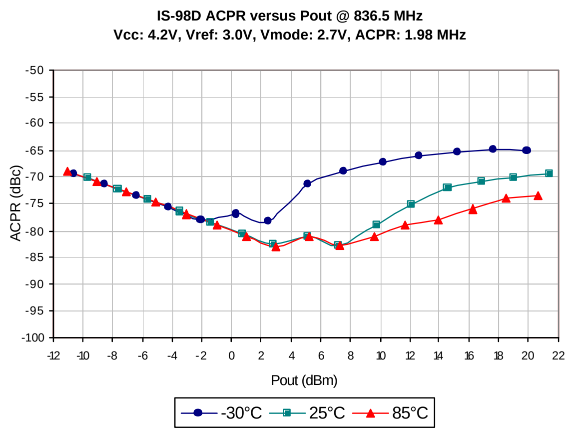


Figure 39

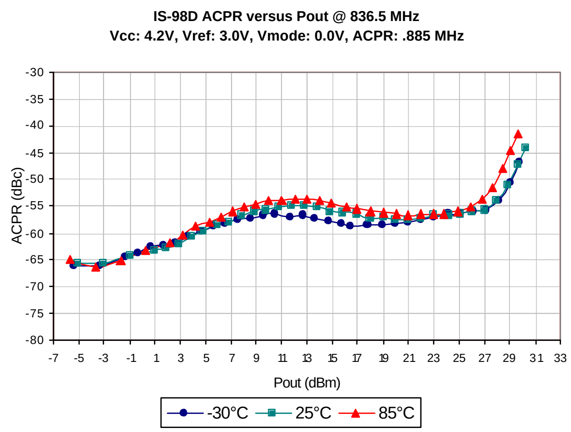
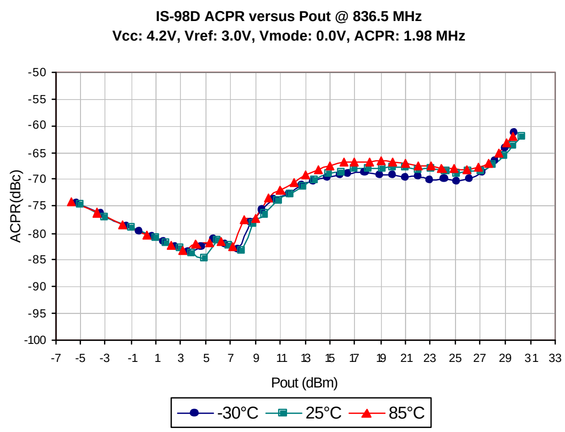
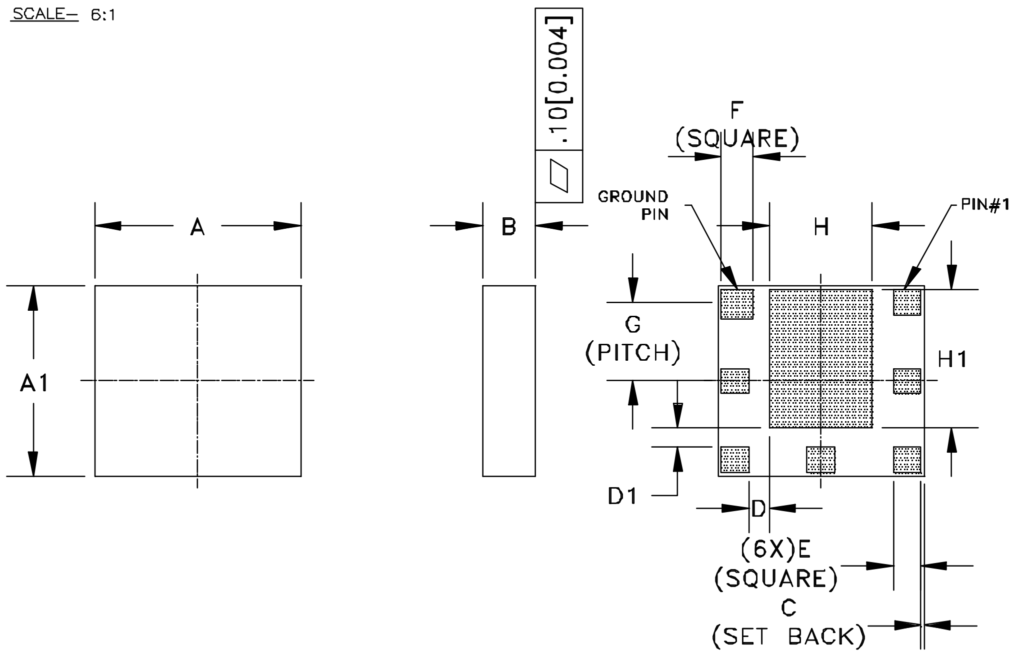


Figure 40



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	1.50	1.70	0.051	0.059	0.067	–
C	0.05	–	–	0 002	–	–	–
D	–	0.60	–	–	0.024	–	3
D1	–	0.60	–	–	0.024	–	3
E	–	0.81	–	–	0.032	–	3
F	–	0.89	–	–	0.035	–	3
G	2.5 BSC			0.098 BSC			3
H	–	3.00	–	–	0.118	–	3
H1	–	4.39	–	–	0 173	–	3

NOTES:

1. CONTROLLING DIMENSIONS: MILLIMETERS
2. UNLESS SPECIFIED TOLERANCE=±0.05[0.003].
3. FOR REFERENCE ONLY.

Figure 41: Package Outline Drawing (Low Band M5)

COMPONENT PACKAGING

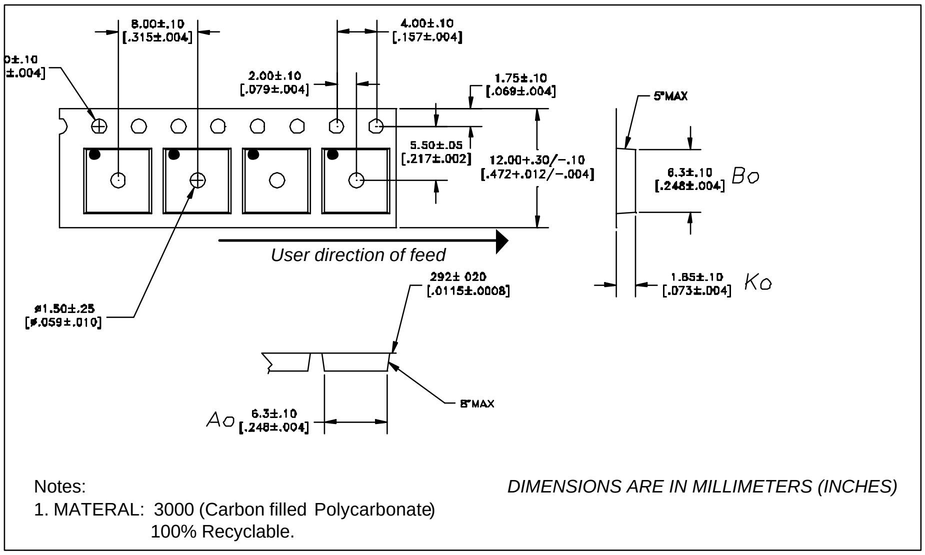


Figure 42: Tape & Reel Packing Specifications

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

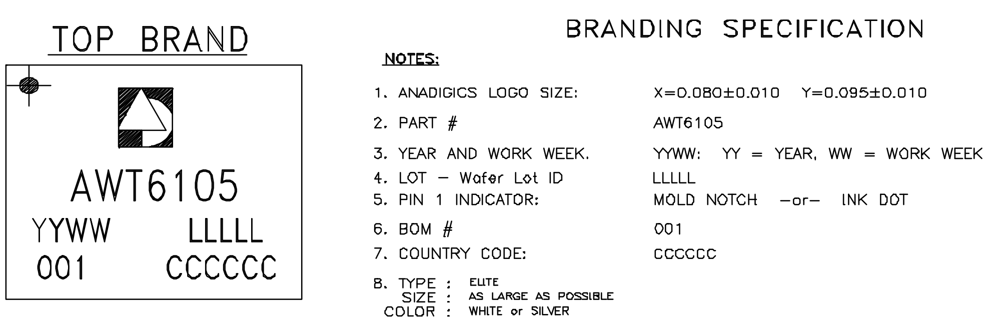


Figure 43: Branding Specification

NOTES

NOTES

ORDERING INFORMATION

ORDER NUMBER	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AWT6105M5	M5	6x6 Module Package

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