CHP1237

KPCS CDMA
InGaP HBT Amplifier Module

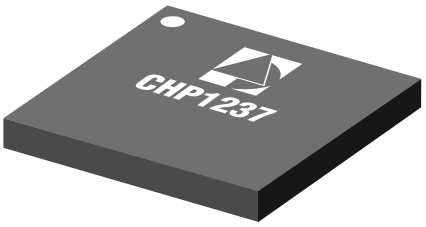
PRELIMINARY DATA SHEET - Rev 1.5

FEATURES

- Small Profile (3 x 3 x 1 mm)
- PFT™ 50 Ω Matched Module
- High Linearity of -50 dBc
- High PAE of 39%
- InGaP HBT Technology
- Low Quiescent Current of 55 mA
- Single Positive Supply Voltage

APPLICATIONS

- Korean PCS CDMA handsets



M12 Package
9 Pin 3 x 3 x 1 mm
Surface Mount Module

PRODUCT DESCRIPTION

CHP1237 is an InGaP HBT amplifier module offering high performance for PCS CDMA wireless handsets. It consists of a two-stage amplifier, 50 Ω matching network for both input and output, and a bias control circuit. It is packaged in a 3 x 3 x 1 mm package using proprietary Passive-Free Technology (PFT)™. The package provides excellent electrical stability and low thermal resistance.

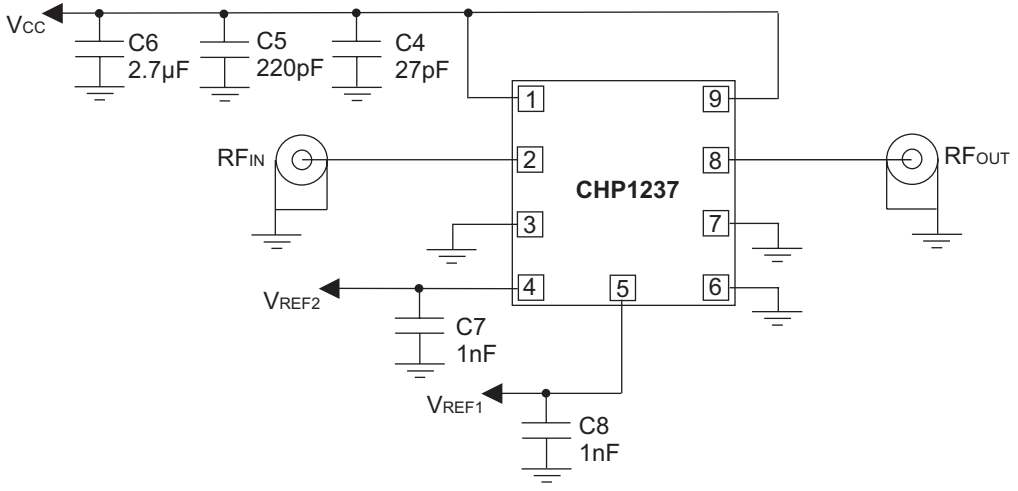


Figure 1: Block Diagram

Table 1: Pad Description

PIN	NAME	DESCRIPTION
1	V_{CC}	Supply Voltage
2	RF_{IN}	RF Input Signal
3	GND	Ground
4	V_{REF2}	Reference Voltage
5	V_{REF1}	Reference Voltage
6	GND	Ground
7	GND	Ground
8	RF_{OUT}	RF Output
9	V_{CC}	Supply Voltage

ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

PARAMETER	MIN	MAX	UNIT	COMMENTS
RF Input Power (P_{IN})	-	10	dBm	
Supply Voltage (V_{CC})	-	6	V	
Reference Voltage 1 (V_{REF1})	-	3.4	V	
Reference Voltage 2 (V_{REF2})	-	3.4	V	
Case Operating Temperature (T_C)	- 30	100	°C	
Storage Temperature (T_{STG})	- 55	125	°C	
Soldering Temperature (T_S)	-	240	°C	5 seconds

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
Operating Frequency (f)	1750	-	1780	MHz
Supply Voltage (V_{CC})	+3.2	+3.4	+4.2	V
Reference Voltage 1 (V_{REF1})	+2.95	+3.00	+3.05	V
Reference Voltage 2 (V_{REF2})	+2.95	+3.00	+3.05	V
Operating Temperature (T_C)	-30	+25	+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
(T_C = +25 °C, fo = 1765 MHz, V_{CC} = 3.4 V, V_{REF1} = 3.0 V, V_{REF2} = 3.0 V, (unless otherwise specified))

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain					
G	24	26.5	28	dB	Po = 16 dBm
Gh	25.5	27.5	29.5		Po = 28 dBm
Gain Variation	-	-	1.0	dB	Po = 28 dBm over frequency
Power-Added Efficiency (1)					
PAE	7.5	9	-	%	Po = 16 dBm
PAEH	36	39	-		Po = 28 dBm
Total Current (I)	-	-	157	mA	Po = 16 dBm
	-	-	515		Po = 28 dBm
Adjacent Channel Power Ratio (2)					
1.25 MHz offset					
ACPR1L	-	-52	-49	dBc	Po = 16 dBm
ACPR1H	-	-50	-47		Po = 28 dBm
2.25 MHz Offset					
ACPR2L	-	-72	-60		Po = 16 dBm
ACPR2H	-	-59	-56		Po = 28 dBm
Quiescent Current					
Iqs (Shutdown Mode)	-	1	5	µA	V_{REF1} = 0 V, V_{REF2} = 0 V, No RF
Iq (3)	45	55	60	mA	V_{REF1} = 3 V, V_{REF2} = 3 V, No RF
Noise in Receive Band (4)	-	-136	-133	dBm/Hz	Po = 28 dBm
Harmonics					
2fo	-	-	-30	dBc	Po = 28 dBm
3fo	-	-	-30		Po = 28 dBm
Spurious Output Level	-	-	-60	dBc	VSWR < 6:1
Ruggedness - no damage (5)	10:1	-	-	VSWR	Po = 28 dBm

Notes:
(1) Includes the current at pins 1, 4, 5, and 9.
(2) ACPR is specified per IS95 as the ratio of adjacent power in 30 kHz BW to the total in-band power (1.23 MHz BW).
(3) Includes the current at pins 1 and 9 (Vcc current).
(4) RxBn is measured at 80 MHz above the operating frequency (Fo). (Measurement setup: RBW = 30 kHz, VBW = 30 kHz).
(5) All phases, time equals to 10 seconds.

Table 5: Power Mode Truth Table

POWER MODE	V_{REF1}	V_{REF2}	TYPICAL GAIN
Shut Down	0 V	0 V	<-40 dB
High Power	3 V	3 V	27.5 dB

PERFORMANCE DATA

Figure 2: ACP1_U vs Po
(V_{CC} = 3.4 V, V_{REF1} = 3.0 V, V_{REF2} = 3.0 V, F = 1.765 GHz)

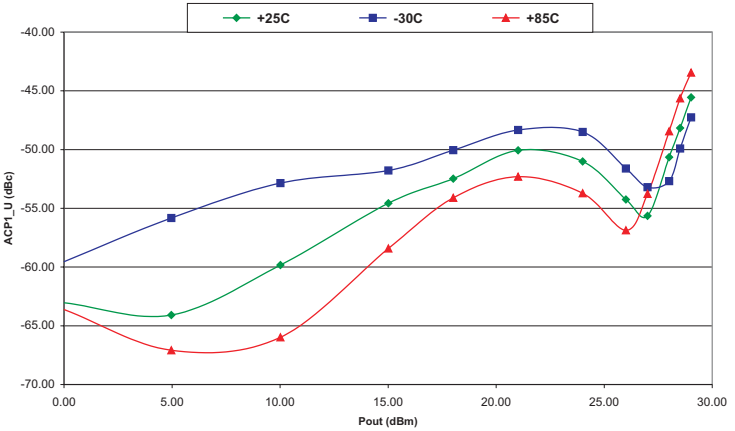


Figure 3: ACP2_U vs Po
(V_{CC} = 3.4 V, V_{REF1} = 3.0 V, V_{REF2} = 3.0 V, F = 1.765 GHz)

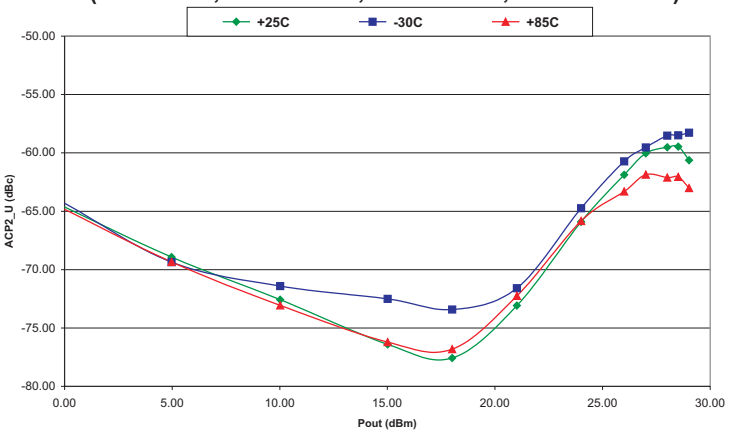


Figure 4: PAE vs Po
(V_{CC} = 3.4 V, V_{REF1} = 3.0 V, V_{REF2} = 3.0 V, F = 1.765 GHz)

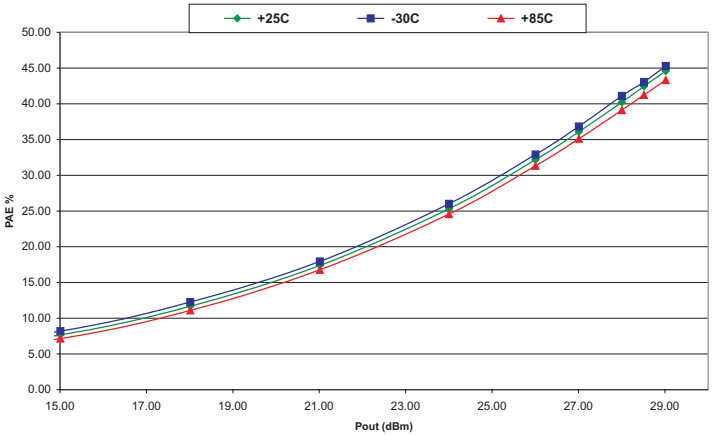


Figure 5: ACP1_U vs V_{CC}
(Po = 28 dBm, V_{REF1} = 3.0 V, V_{REF2} = 3.0 V)

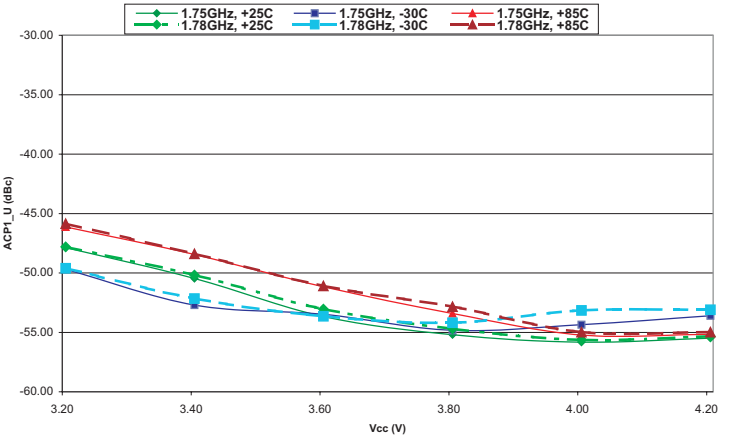


Figure 6: ACP2_U vs V_{CC}
(Po = 28 dBm, V_{REF1} = 3.0 V, V_{REF2} = 3.0 V)

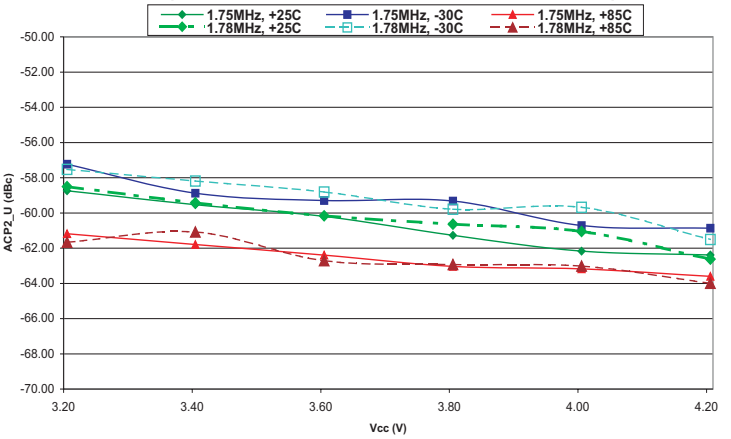


Figure 7: PAE vs V_{CC}
(Po = 28 dBm, V_{REF1} = 3.0 V, V_{REF2} = 3.0 V)

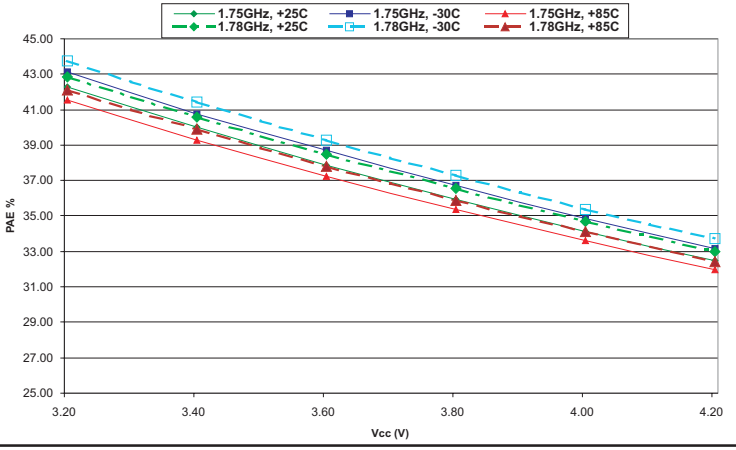


Figure 8: Gain vs P_{OUT}
(V_{CC} = 3.4 V, V_{REF1} = 3.0 V, F = 1.765 GHz)

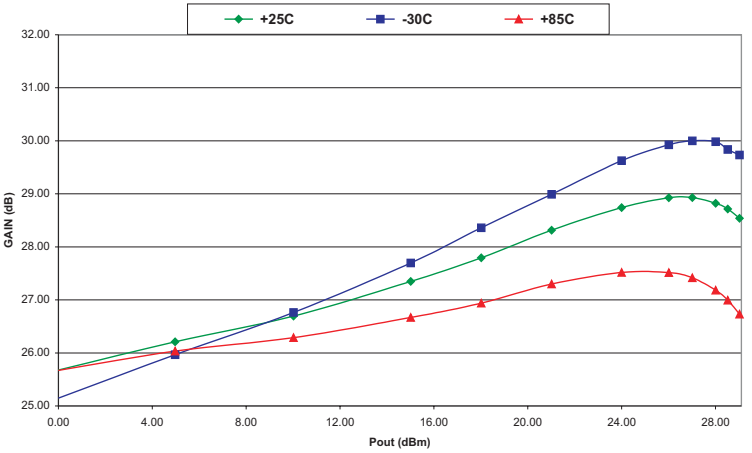
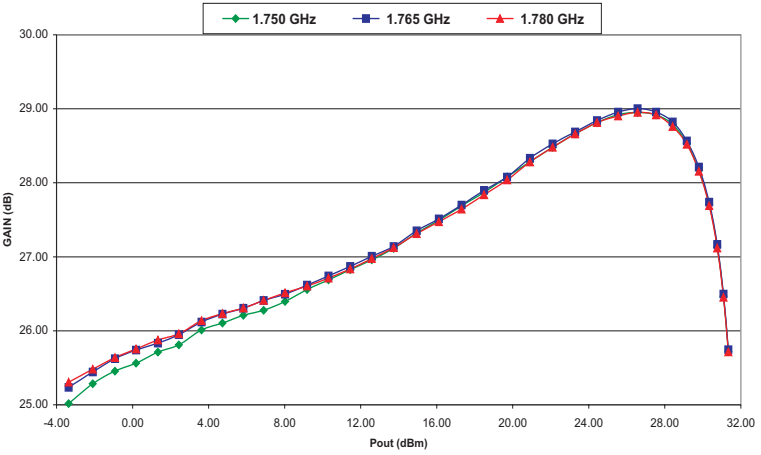
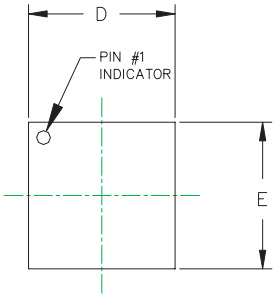


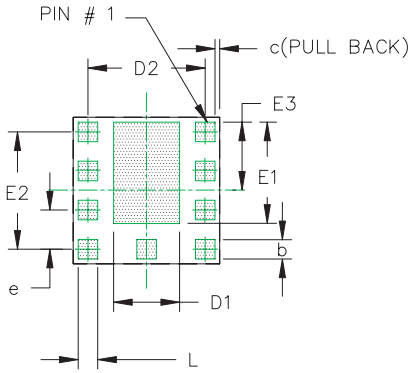
Figure 9: Gain vs P_{OUT}
(V_{CC} = 3.4 V, V_{REF1} = 3.0 V)



PACKAGE OUTLINES

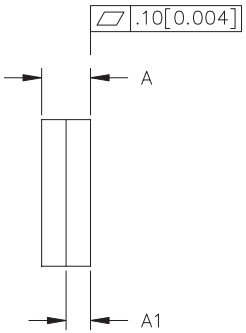


TOP VIEW



BOTTOM VIEW

SYMBOL	MILLIMETER			INCHES		
	MIN	NOM.	MAX	MIN	NOM.	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
A1	0.45	0.50	0.55	0.018	0.020	0.022
b	0.40	0.47	0.55	0.016	0.019	0.022
c	–	0.10	–	–	0.004	–
D	2.90	3.00	3.10	0.114	0.118	0.122
D1	–	1.35	–	–	0.053	–
D2	–	2.40	–	–	0.094	–
E	2.90	3.00	3.10	0.114	0.118	0.122
E1	–	2.07	–	–	0.081	–
E2	–	2.40	–	–	0.094	–
E3	–	1.40	–	–	0.055	–
e	0.80 BSC			0.031 BSC		
L	0.40	0.47	0.55	0.016	0.019	0.022



SIDE VIEW

NOTES :

1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS
2. UNLESS SPECIFIED TOLERANCE= ±0.076[±0.003].

Figure 10: Package Outline

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