

< GaAs Hybrid IC for Mobile Phone >

BA012L5C-01

UMTS Band5 and cdma2000 BC0 High Efficiency Power Amplifier
3mm x 3mm Power Amplifier Module with Coupler

DESCRIPTION

BA012L5C is GaAs RF amplifier designed for W-CDMA UMTS (Band5) / cdma2000 (BC0) handset and wireless data communication transmitters.

FEATURES

Frequency

f=815 ~ 849MHz

Output power

Po=28.5dBm (R99)

Po=27.5dBm (HSDPA / HSUPA)

Po=27.5dBm (LTE)

Po=28.0dBm (cdma2000 1x RC1)

High efficiency

PAE=42% @Po=28.5dBm, Vcc=3.4V (R99)

PAE=19% @Po=13.5dBm, Vcc=1.2V (R99)

PAE=15% @Po=7.0dBm, Vcc=0.8V (R99)

2-mode gain operation

Internal voltage regulator

Internal input and output matching

Internal coupler

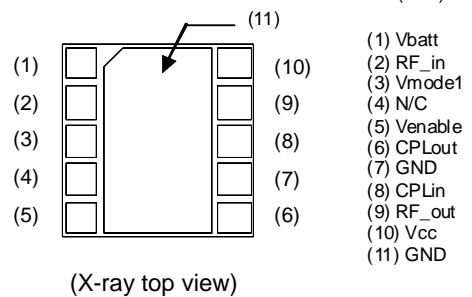
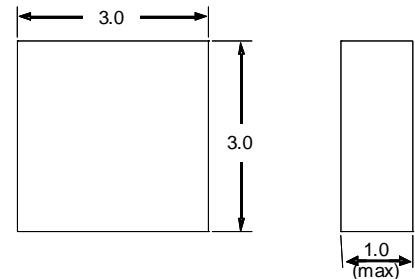
Small size 3.0 x3.0 x1.0mm³

MSL (moisture sensitivity level) 3

HSDPA / HSUPA / LTE / cdma2000 capable

OUTLINE DRAWING

Unit : millimeters



(X-ray top view)

APPLICATION

W-CDMA (UTRA / FDD) Band5 UMTS handset and wireless data communication transmitters.
(UE Power class 3)

1. ABSOLUTE MAXIMUM RATINGS

Unless otherwise specified, Ta =+25°C, Zs =Zl =50ohms

Symbol	Parameter	Ratings	Unit	Note
Vcc / Vbatt	Supply voltage	6.0	V	1
Venable / Vmode1	Control voltage	3.5	V	1
Pin	Input power	7	dBm	1
Tstg	Storage temperature	-30 ~ +100	°C	1
Ru	Output load VSWR (Ruggedness)	10:1	-	1

2. RECOMMENDED OPERATING CONDITIONS

Unless otherwise specified, Ta =+25°C, Zs =Zl =50ohms

Symbol	Parameter	Min	Typ	Max	Unit	Note
Vcc	Supply voltage	0.7	3.4	4.2	V	1
Vbatt	Supply voltage	3.2	3.4	4.2	V	-
Venable	DC control voltage	0	-	0.5	V	Disable
		1.35	1.8	3.1	V	Enable
Vmode1	DC control voltage	0	-	0.5	V	High-mode
		1.35	1.8	3.1	V	Low-mode
Pout	Output power (high-mode)	-	-	27.3	dBm	R99
	Output power (low-mode)	-	-	7.0	dBm	R99
Tc	Case temperature	-20	-	+85	°C	-

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BA012L5C-01UMTS Band5 and cdma2000 BC0 High Efficiency Power Amplifier
3mm x 3mm Power Amplifier Module with Coupler**PRELIMINARY****Confidential****3. ELECTRICAL CHARACTERISTICS**

Electrical characteristics are specified under R99.

Unless otherwise specified, Ta =+25°C, Zs =Zl =50ohms, Venable =High, Vmode1 =Low, Vcc =Vbatt =3.4V

Symbol	Parameter	Conditions	Limits			Unit	Note
			Min	Typ	Max		
freq	Frequency range	-	815	-	849	MHz	-
Iq	Quiescent current (HPM)	No RF input	-	60	TBD	mA	-
	Quiescent current (LPM)	No RF input	-	15	TBD	mA	-
Ileak	Leakage current	Pin : OFF, Venable=0V, Vmode1=0V	-	-	10	uA	-
Pout_max	Maximum Output power (HPM)	R99 WCDMA	28.5	-	-	dBm	-
		cdma2000 1x RC1	28.0	-	-	dBm	-
	Maximum Output power (LPM)	R99 WCDMA, Vmode1=Low	7	-	-	dBm	5
		cdma2000 1x RC1, Vmode1=High	6	-	-	dBm	5
Gp	Power gain (HPM)	Po=28.5dBm (Pin: control) Vmode1=Low	TBD	26.5	TBD	dB	-
	Power gain (LPM)	Po=7.0dBm (Pin: control) Vmode1=High	TBD	13.0	TBD	dB	-
Icc+Ibatt	Supply current	Po=28.5dBm (Pin: control)	-	496	TBD	mA	-
PAE	Power added efficiency	Po=28.5dBm (Pin: control)	[TBD]	[42]	-	%	1,4
Ienable	Enable current	Po=28.5dBm (Pin: control)	-	<0.1	TBD	mA	-
ACLR-5	Adjacent channel leakage power ratio (±5MHz)	Po=28.5dBm (Pin: control) ACLR: offset ±5MHz Bandwidth=3.84MHz	-	-41	-38	dBc	-
ACLR-10	Adjacent channel leakage power ratio (±10MHz)	Po=28.5dBm (Pin: control) ACLR: offset ±10MHz Bandwidth=3.84MHz	-	-55	-48	dBc	-
ACPR1	cdma2000 RC1 adjacent channel power ratio	Po=28.0dBm (Pin: control) cdma2000 1x RC1, ACPR+/-885kHz	-	-50	TBD	dBc/30 kHz	-
ACPR2		Po=28.0dBm (Pin: control) cdma2000 1x RC1, ACPR+/-1.98MHz	-	-60	TBD	dBc/30 kHz	-
pin	Input VSWR	Po=28.5dBm (Pin: control)	-	2	3	-	3,5
2fo	2 nd Harmonics	Po=28.5dBm (Pin: control)	-	-	-35	dBc	3,5
3fo	3 rd Harmonics	Po=28.5dBm (Pin: control)	-	-	-40	dBc	3,5
RxBN	Rx Band noise power	Rx: 869 – 894MHz, Po = 28.5dBm (Pin: control) RES BW = 1MHz,Noise Marker Averaging Mode	-	TBD	TBD	dBm/Hz	2,5
-	Stability at in-band	In-band, Vcc=Vbatt=4.2V, Venable=High Pin=const (fixed at Pout=28.5dBm, Zl=50ohms) Load VSWR=5:1, All Phase	Parasitic oscillation level ≤ -60dBc			-	5
CF	Coupling factor	Coupling from RF out to CPLout	TBD	-20	TBD	dB	5
-	Daisy chain VSWR	f=824 ~ 1980MHz	-	1.15:1	-	-	5
-	Daisy chain insertion loss	f=824 ~ 1980MHz	-	0.2	-	dB	5

Note 1 : We calculate the Total Efficiency (PAE) from Input Power value, Output Power value and Total Current value.
 $PAE = (Pout - Pin) / (Icc \times Vcc + Ienable \times Venable + Ibatt \times Vbatt) \times 100$ [%]

The PAE is reference value.

Note 2 : Settings of the Spectrum Analyzer: RBW=VBW=1MHz, SWP=20ms, Detector Mode=Sample, Average, Sweep Times=20times.

Note 3 : No modulation.

Note 4 : In this table, we use the symbol [] as the reference value.

Note 5 : Design assurance.

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Power / Bias Mode	Venable	Vmode1
High Power Mode (HPM)	High	Low
Low Power Mode (LPM)	High	High
Standby	Low	X
Shut down	Low	Low

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