

RX Gain Control Amplifier

Description

CXA3221AN is an RX gain control amplifier suitable for CDMA cellular/PCS phone.

Features

- Wide gain control range
- Linear gain slope
- Wideband operation (50MHz to 300MHz)
- Very small package (8 Pin SSOP)
- Low voltage operation
- Power save function included

Absolute Maximum Ratings

- | | | | |
|-------------------------------------|-----------|------------------------|----|
| • Supply voltage | V_{cc} | 6 | V |
| • Operating temperature | T_{opr} | -55 to +125 | °C |
| • Storage temperature | T_{stg} | -65 to +150 | °C |
| • Supply voltage range | | -0.3 to 6 | V |
| • Logic input voltage | | -0.3 to $V_{cc} + 0.3$ | V |
| • Signal input voltage | | -0.3 to $V_{cc} + 0.3$ | V |
| • Differential signal input voltage | | 0 to 2.5 | V |

Operating Condition

- | | | | |
|----------------|----------|------------|---|
| Supply voltage | V_{cc} | 2.7 to 3.8 | V |
|----------------|----------|------------|---|

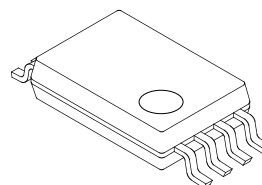
Applications

CDMA cellular/PCS phone

Structure

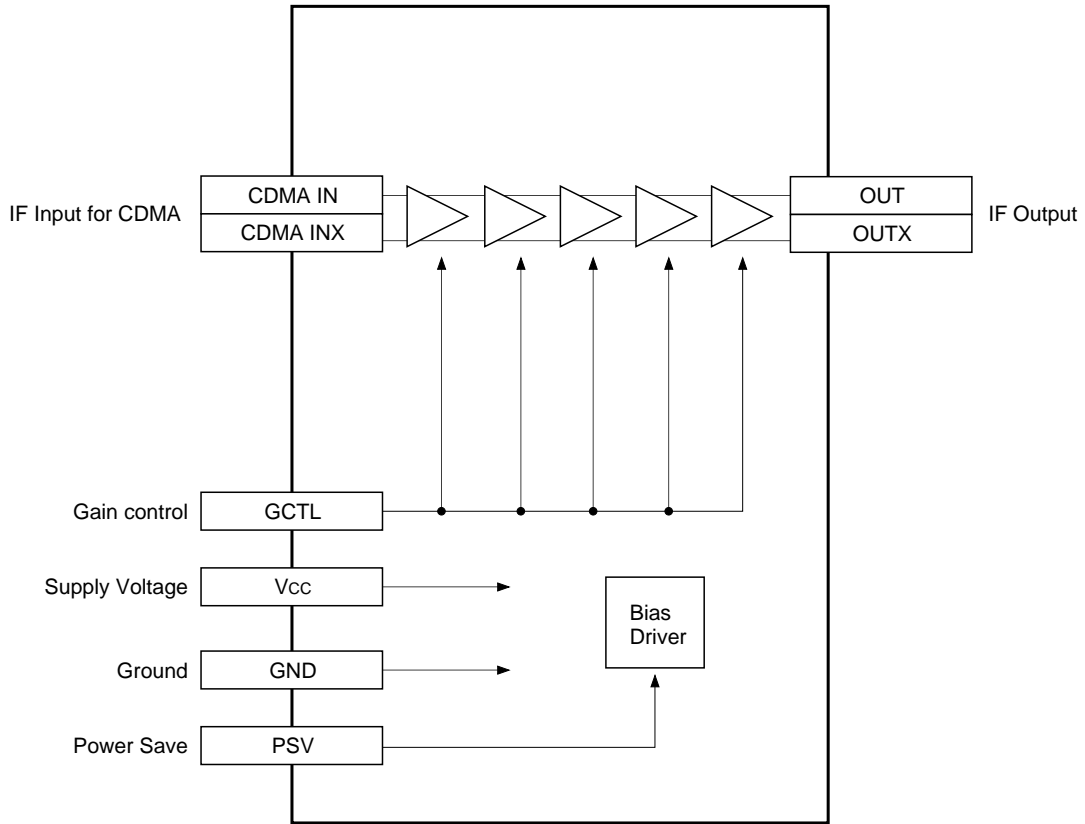
Bipolar silicon monolithic IC

8 pin SSOP (Plastic)

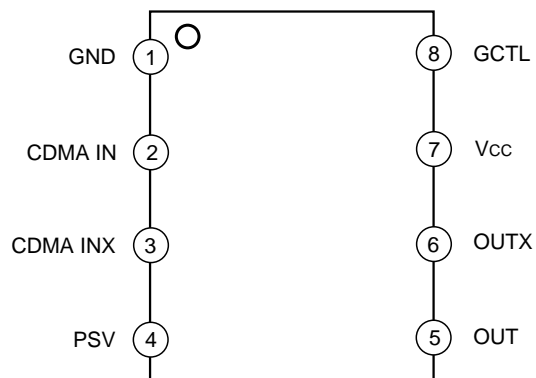


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Block Diagram



Pin Configuration



Pin Description

Pin No.	Symbol	Pin voltage TYP (V)	Equivalent circuit	Description
1	GND	0		Ground.
2	CDMA IN	1.15		Differential input pins for received CDMA IF signal.
3	CDMA INX	1.15		
4	PSV	—		Power save function pin. High: Active Low: Power save
5	OUT	—		Differential output pins for received CDMA IF signal. Open collector output.
6	OUTX	—		
7	Vcc	3.0		Positive power supply.
8	GCTL	—		Gain control pin.

Electrical Characteristics

DC Characteristics

(V_{CC} = 3.0V, T_a = 27°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current consumption 1	I _{CC1}	V _{PSV} = 3.0V, V _{GCTL} = 1.5V, Pin 7	7	10.2	15	mA
Current consumption 2	I _{CC2}	V _{PSV} = 0 V, V _{GCTL} = 1.5V, Pin 7	5	18	40	μA
Input current pin 8H	I _{PSVH}	V _{PSV} = 3.0V			1	
Input current pin 8L	I _{PSVL}	V _{PSV} = 0 V	-15			
Input current pin 16H	I _{GCTLH}	V _{GCTL} = 3.0V			1	
Input current pin 16L	I _{GCTL}	V _{GCTL} = 0.5V	-1			
PSV high voltage	V _{PSH}	Pin 4	2.5			V
PSV low voltage	V _{PSL}	Pin 4			0.5	

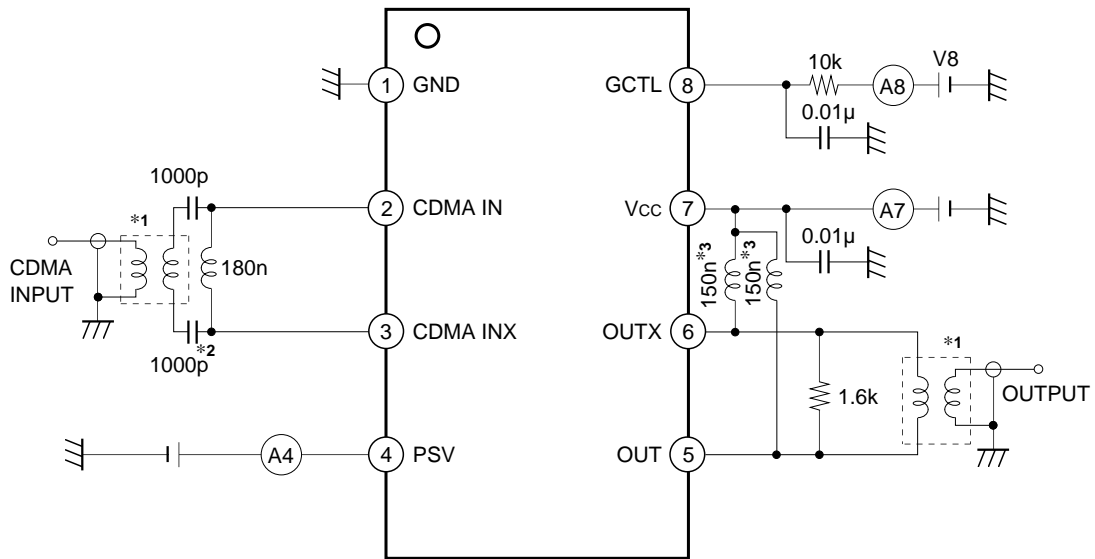
AC Characteristics

(V_{CC} = 3.0V, T_a = 27°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Operating frequency range	F _r		50		300	MHz
Gain 2.4	G _{2.4}	f = 210.38MHz, V _{GCTL} = 2.4V	42	46	50	dB
Gain 1.5	G _{1.5}	V _{GCTL} = 1.5V	-7	-3	1	
Gain 0.6	G _{0.6}	V _{GCTL} = 0.6V	-59	-55	-51	
Gain slope	G _{CLIN}	Gain at V _{GCTL} = 2.0V – Gain at V _{GCTL} = 1.0V	58	61	64	dB/V
Input level 3rd order intercept point	IIP ₃	G = 40dB*1 f ₁ = 209.38MHz, f ₂ = 211.38MHz Measure of 210.38MHz	-42	-38		dBm
Noise Figure	NF	G = 40dB*1 Measure of 210.38MHz		5	8	dB

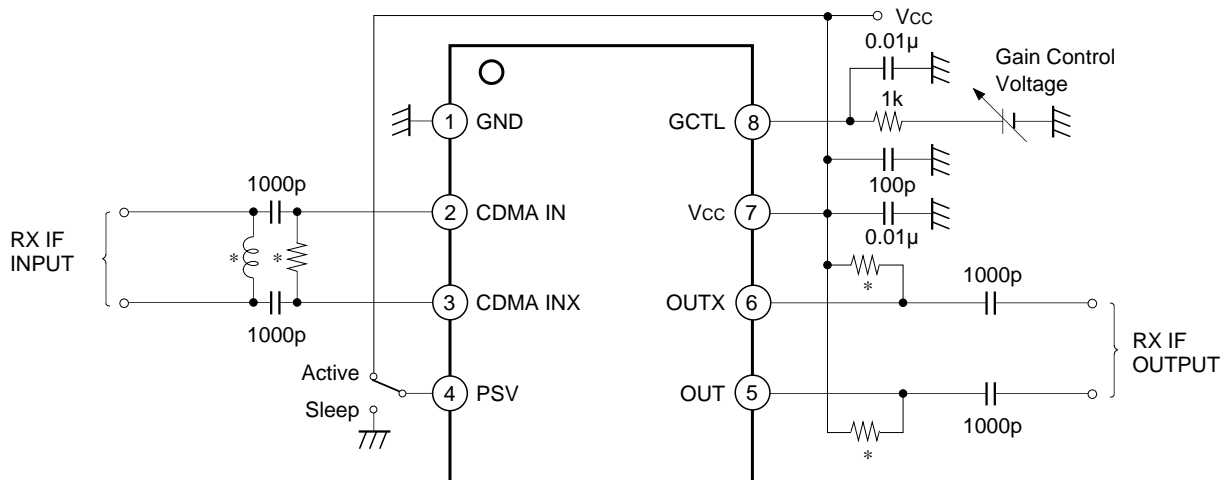
*1 Adjust GCTL voltage, and set the overall gain to 40dB.

Measurement Circuit



- *1 TOKO, Inc. B5FL 616DS-1135
- *2 Coilcraft, Inc. 0805HS-181TKBC
- *3 Coilcraft, Inc. 0805HS-151TKBC

Application Circuit



* Must be adjusting values to result a best impedance matching between BPF filter and this IC.

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Design Reference Values

Single ended measurement

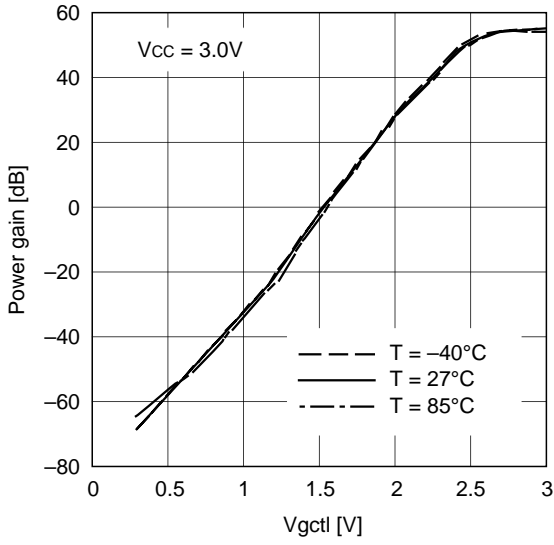
($V_{CC} = 3.0V$, $T_a = 27^{\circ}C$)

Item	Symbol	Conditions	Typ.	Unit
Input resistance	Rin	f = 210.38MHz, Vgctl = 1.5V	1.6	k Ω
Input capacitance	Cin		1.3	pF
Output resistance	Rout		5.9	k Ω
Output capacitance	Cout		0.73	pF

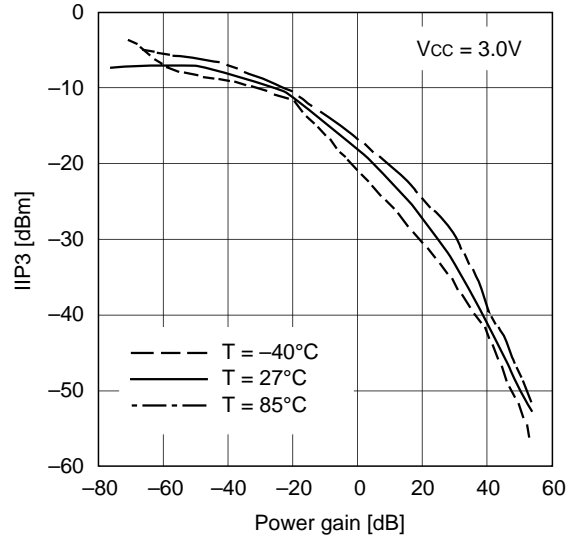
Notes on Operation

- 1) This IC is a wideband amplifier with wide gain control range. The decoupling capacitors between GND Pin and Vcc Pin should be as close to the IC as possible.
- 2) The resistors connected to Pins 5 and 6 should be as close to the IC as possible.
- 3) This IC assumes the excellent characteristics when the differential input impedance between Pins 2 and 3 is 500 Ω . Refer to the Measurement Circuit for the external element settings, etc.
- 4) Pay attention to handling this IC because its electrostatic discharge strength is weak.

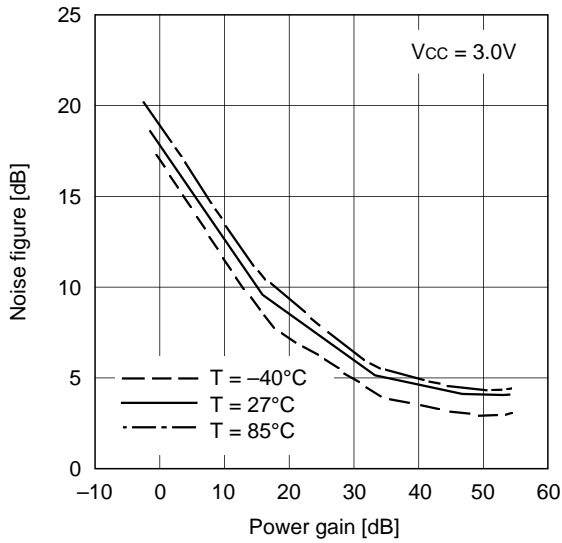
Sensitivity



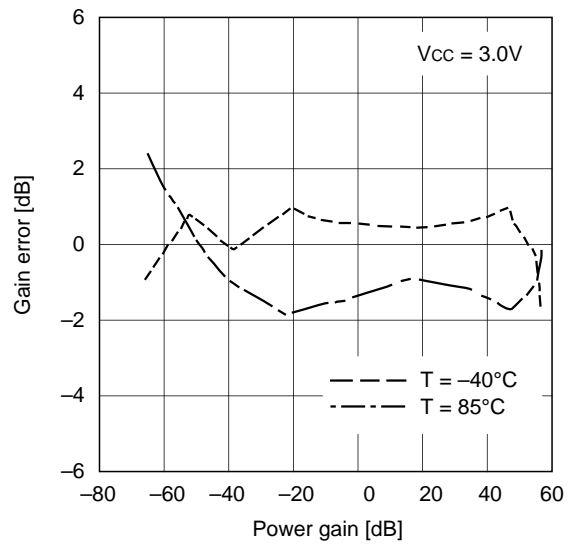
IIP3



Noise Figure



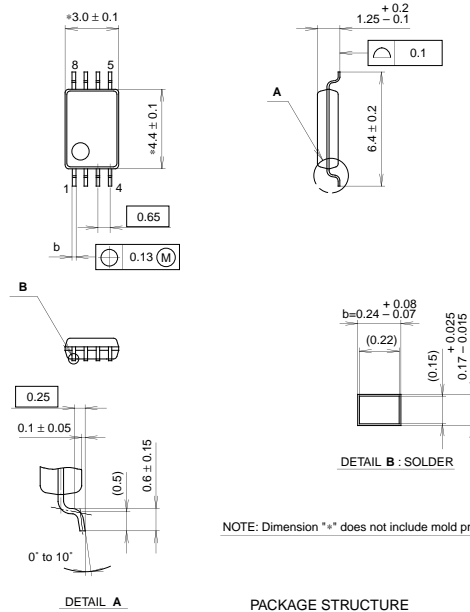
Gain Error from Room Temp



Package Outline

Unit: mm

8PIN SSOP (PLASTIC)



NOTE: Dimension "*" does not include mold protrusion.

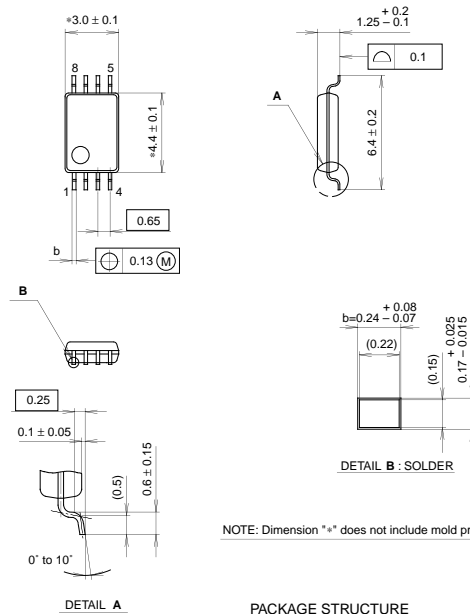
SONY CODE	SSOP-8P-L01
EIAJ CODE	P-SSOP8-8.4x3.0-0.65
JEDEC CODE	

PACKAGE STRUCTURE

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER PLATING
LEAD MATERIAL	COPPER ALLOY
PACKAGE MASS	0.04g

SCT Ass'y

8PIN SSOP (PLASTIC)



NOTE: Dimension "*" does not include mold protrusion.

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LEAD PLATING SPECIFICATIONS

ITEM	SPEC.
LEAD MATERIAL	COPPER ALLOY
SOLDER COMPOSITION	Sn-Bi Bi:1-4wt%
PLATING THICKNESS	5-18µm