

TX Gain Control Amplifier

Description

CXA3222AN is a TX gain control amplifier suitable for CDMA cellular/PCS phone.

Features

- Wide gain control range
- Linear gain slope
- Wideband operation (50 MHz to 300 MHz)
- Very small package (8 Pin SSOP)
- Low voltage operation
- High output IP3
- 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 |
|----------------|----------|------------|---|

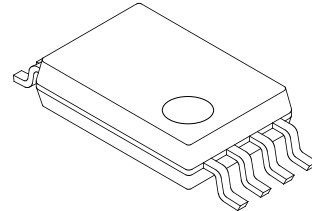
Applications

CDMA cellular/PCS phone

Structure

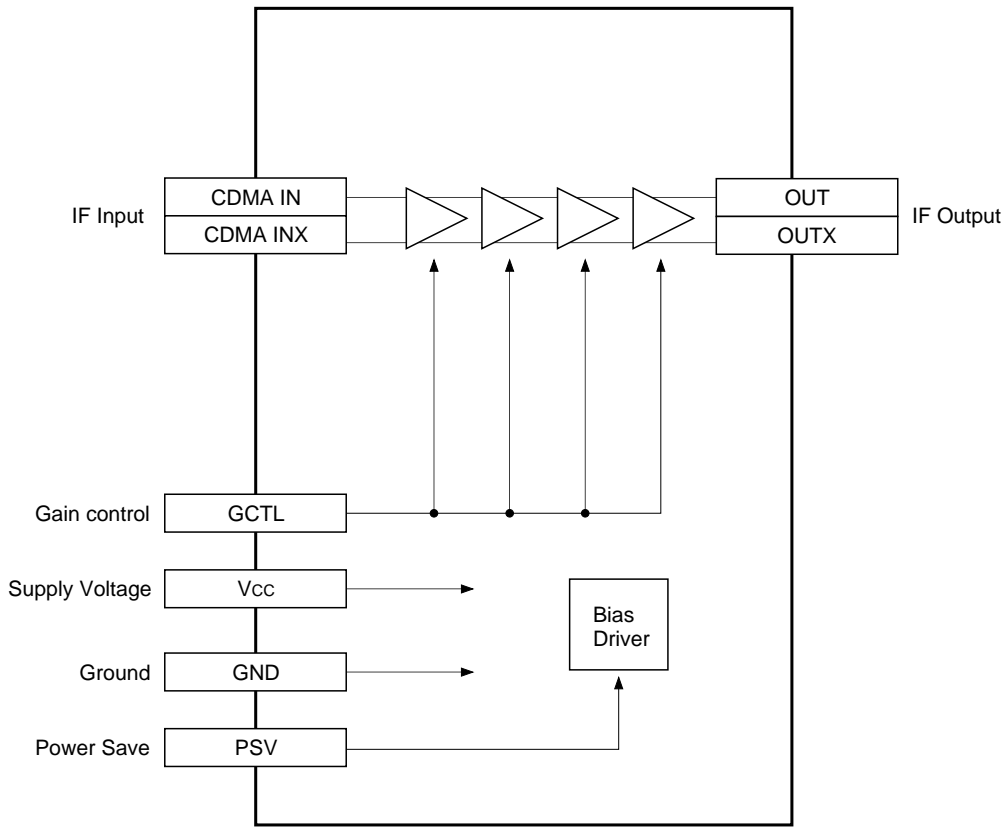
Bipolar silicon monolithic IC

8 pin SSOP (Plastic)

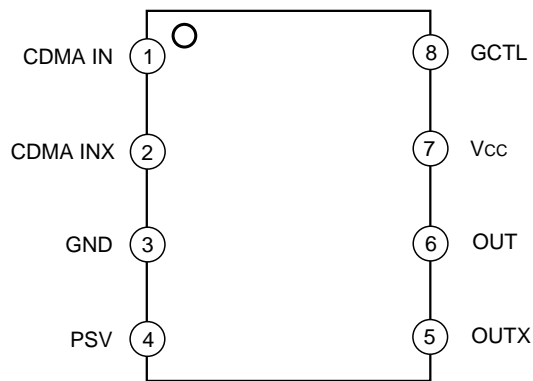


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Block Diagram



Pin Configuration



Pin Description

| Pin No. | Symbol | Pin voltage TYP (V) | Equivalent circuit | Description |
|---------|----------|---------------------|--------------------|--|
| 1 | CDMA IN | 1.1 | | Differential input pins for CDMA transmit IF signal. |
| 2 | CDMA INX | 1.1 | | |
| 3 | GND | 0 | | Ground. |
| 4 | PSV | — | | Power save function pin. High: Active Low: Power save |
| 5 | OUTX | — | | Differential output pins for transmit IF signal. Open collector output. |
| 6 | OUT | — | | |
| 7 | Vcc | 3.0 | | Positive power supply. |
| 8 | GCTL | — | | Gain control pin. |

Electrical Characteristics

DC Characteristics

(V_{CC}=3.0 V, T_a=27 °C)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|-----------------------|--------------------|--|------|------|------|------|
| Current consumption 1 | I _{CC1} | V _{PSV} =3.0 V, V _{GCTL} =1.5 V, Pin 7 | 10 | 15.7 | 21.5 | mA |
| Current consumption 2 | I _{CC2} | V _{PSV} =0 V, V _{GCTL} =1.5 V, Pin 7 | 5 | 18 | 40 | μA |
| Input current pin 4H | I _{PSVH} | V _{PSV} =3.0 V | | | 1 | |
| Input current pin 4L | I _{PSVL} | V _{PSV} =0 V | -15 | | | |
| Input current pin 8H | I _{GCTLH} | V _{GCTL} =3.0 V | | | 1 | |
| Input current pin 8L | I _{GCTL} | V _{GCTL} =0.5 V | -1 | | | |
| PSV high voltage | V _{PSH} | Pin 4 | 2.5 | | | V |
| PSV low voltage | V _{PSL} | Pin 4 | | | 0.5 | |

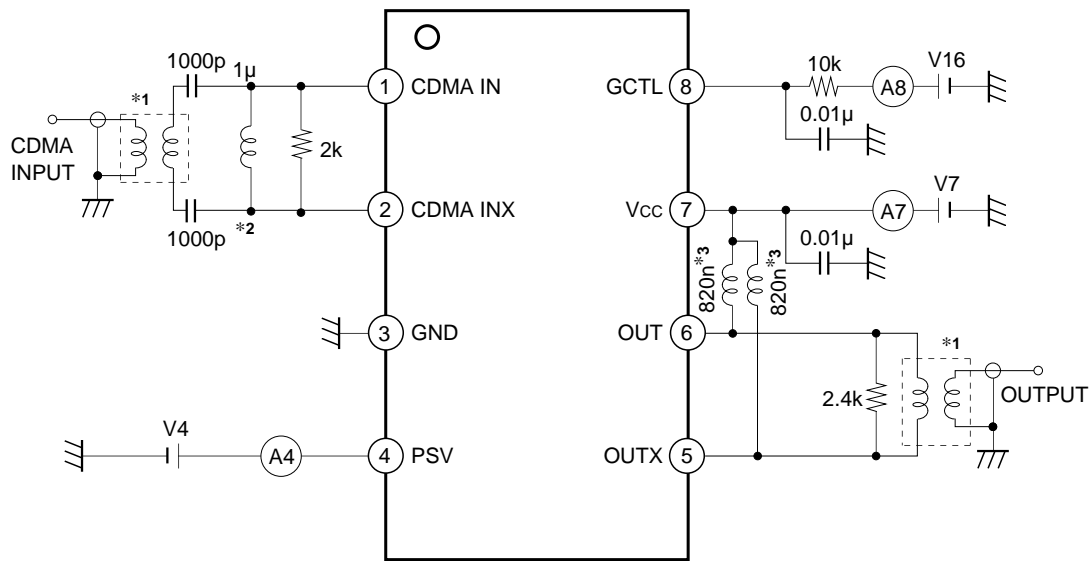
AC Characteristics

(V_{CC}=3.0 V, T_a=27 °C)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---------------------------------------|-------------------|---|------|------|------|------|
| Operating frequency range | F _r | | 50 | | 300 | MHz |
| Gain 2.3 | G _{2.3} | f=130.38 MHz, level=-22.5 dBm, V _{GCTL} =2.3 V | 13 | 17 | 21 | dB |
| Gain 1.5 | G _{1.5} | V _{GCTL} =1.5 V | -28 | -24 | -20 | |
| Gain 1.0 | G _{1.0} | V _{GCTL} =1.0 V | -58 | -54 | -50 | |
| Gain 0.7 | G _{0.7} | V _{GCTL} =0.7 V | -75 | -70 | -65 | |
| Gain slope | G _{CLIN} | Gain at V _{GCTL} =2.0 V – Gain at V _{GCTL} =1.0 V | 57 | 60 | 63 | dB/V |
| Input level 3rd order intercept point | IIP ₃ | G=15 dB *1 f ₁ =129.38 MHz, f ₂ =131.38 MHz Measure of 130.38 MHz | -8.5 | -4.5 | | dBm |
| Noise Figure | NF | G=15 dB *1 Measure of 130.38 MHz | | 28 | 32 | dB |

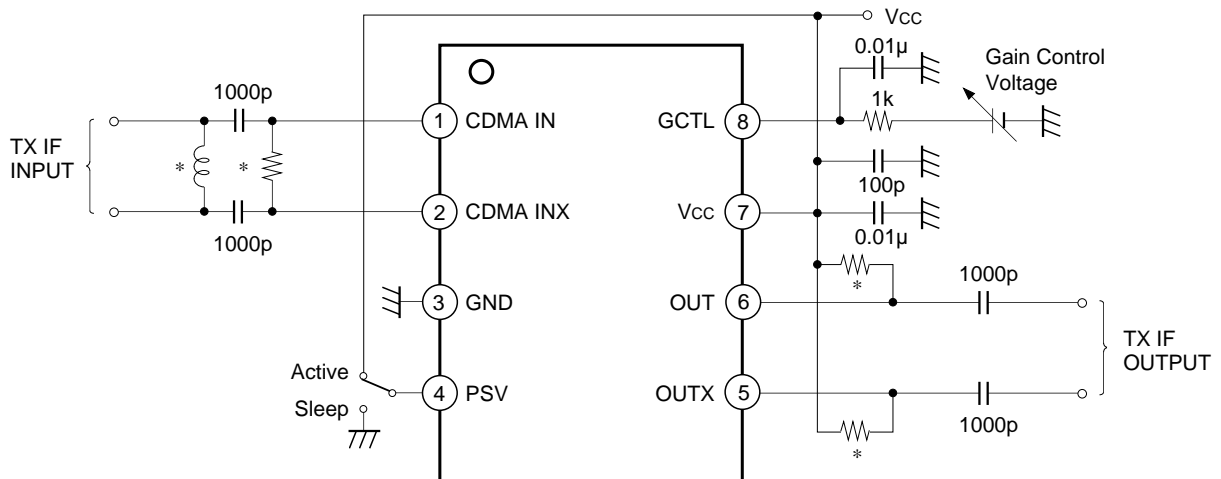
*1 Adjust GCTL voltage, and set the overall gain to 15 dB.

Measurement Circuit



- *1 TOKO, Inc. B5FL 616DS-1135
- *2 Coilcraft, Inc. 1008HS-102TKBC
- *3 Coilcraft, Inc. 1008HS-821TKBC

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

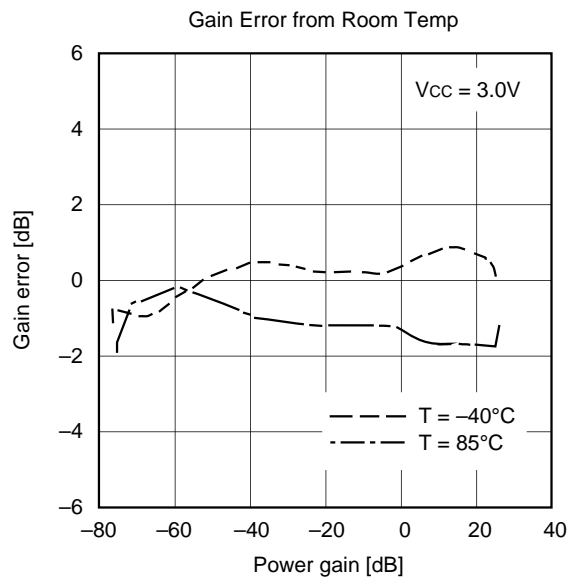
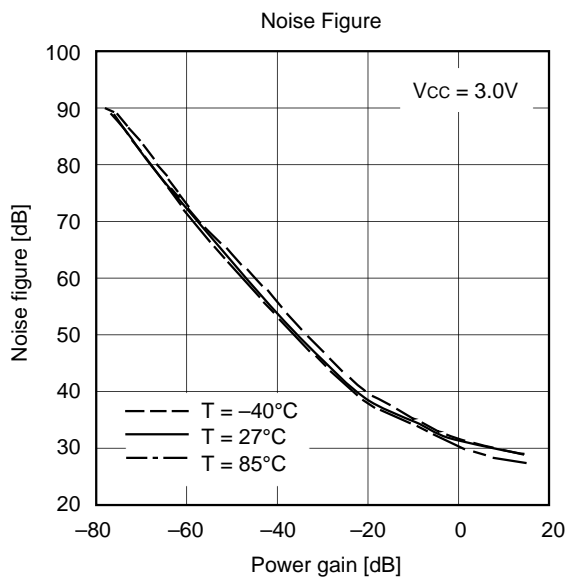
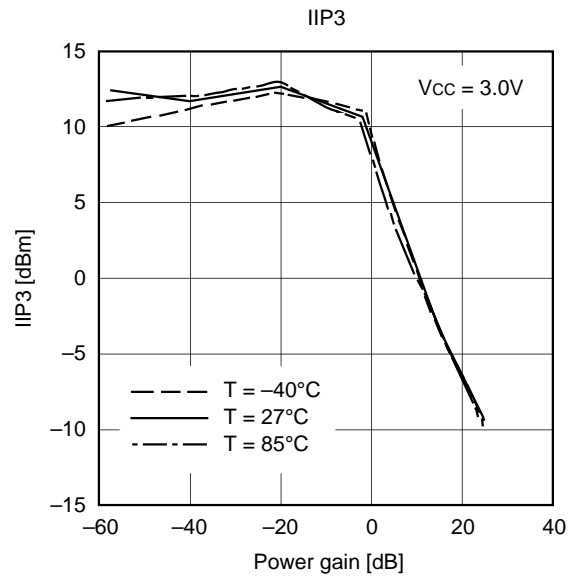
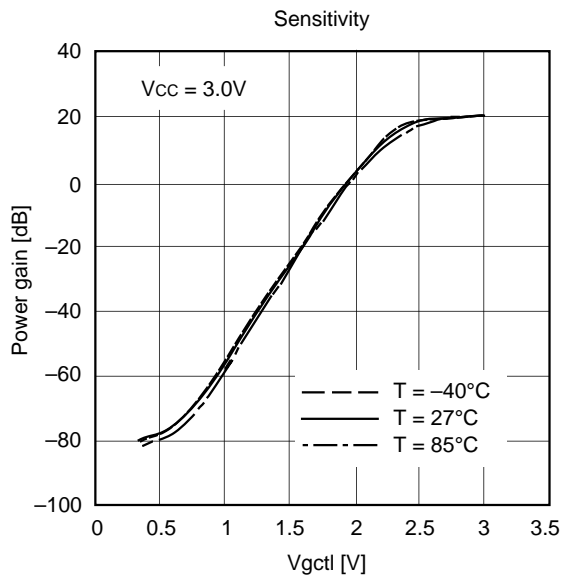
Single ended measurement

(V_{CC}=3.0 V, T_a=27 °C)

| Item | Symbol | Conditions | Typ. | Unit |
|--------------------|------------------|--|------|------|
| Input resistance | R _{in} | f=130.38 MHz, V _{gctl} =1.5 V | 10 | kΩ |
| Input capacitance | C _{in} | | 0.92 | pF |
| Output resistance | R _{out} | | 6 | kΩ |
| Output capacitance | C _{out} | | 0.9 | pF |

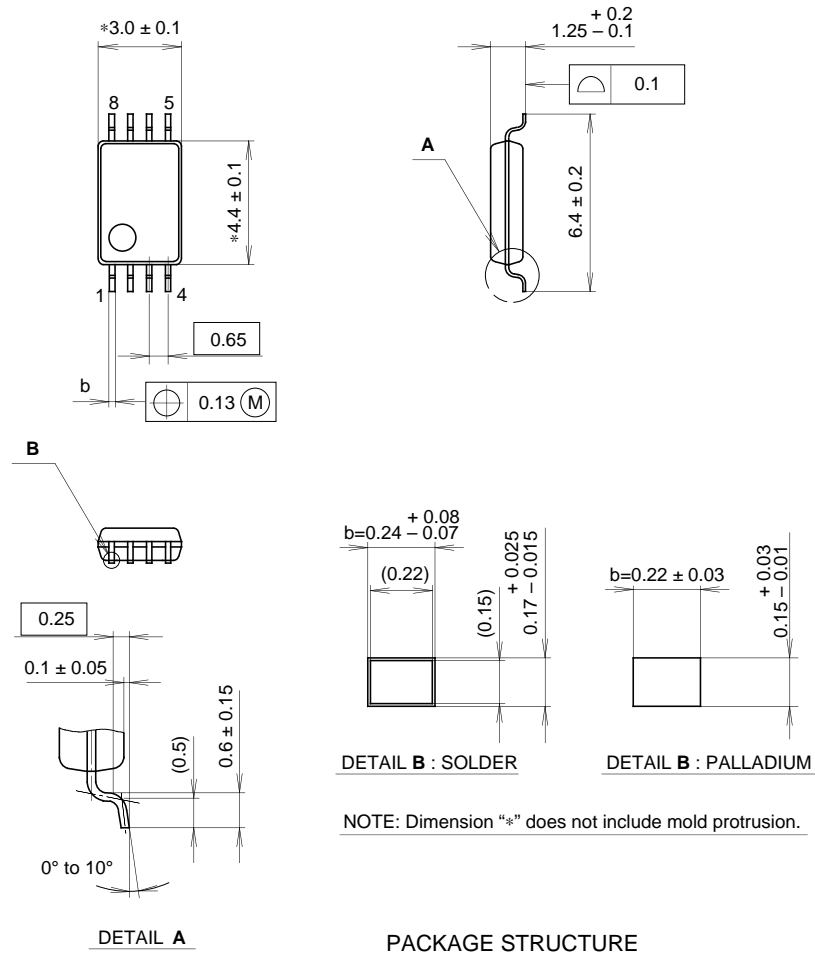
Notes on Operation

- 1) This IC is a wideband amplifier with wide gain control range. The decoupling capacitors between GND Pin and V_{CC} 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 1 and 2 is 500Ω. 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.



Package Outline Unit : mm

8PIN SSOP (PLASTIC)



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

| | |
|------------|----------------|
| SONY CODE | SSOP-8P-L01 |
| EIAJ CODE | SSOP008-P-0044 |
| JEDEC CODE | _____ |

PACKAGE STRUCTURE

| | |
|------------------|----------------------------|
| PACKAGE MATERIAL | EPOXY RESIN |
| LEAD TREATMENT | SOLDER / PALLADIUM PLATING |
| LEAD MATERIAL | COPPER ALLOY |
| PACKAGE MASS | 0.04g |