Austria Mikro Systeme International AG

CDMA/FM RECEIVE AGC AMPLIFIER AS3802

Key Features

- ❒ Supports dual mode operation.
- ❒ -50 to +50db gain control guaranteed.
- ❒ Single 3.6V supply.
- ❒ Temperature and supply stabilized.
- ❒ Power down feature.
- ❒ 80MHz to 250MHz operation.
- ❒ Silicon BiCMOS process.
- ❒ Miniature surface mount 16 pin, 150 mil SSOP package.

Compatibility

The AS3802 is designed to be functionally or/and pin compatible to the following products:

- ❒ RF9907 (RF Micro Devices), pin compat.
- ❒ Q5500 (Qualcomm), pin compat.
- ❒ CXA3001N (Sony)

General Description

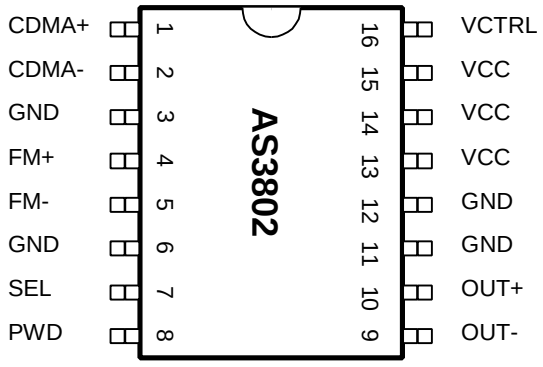
The AS3802 is a gain controlled amplifier designed for the receive section of dual mode CDMA/FDM, TDMA/FDM or FM/FDM cellular phones.

Key specifications like gain range noise figure, IP3, temperature range and other specifications are designed to be in line with the IS-95 Standard for CDMA cellular communications.

The circuit is designed for narrow band IF applications but can also be used in wideband applications.

Applications

- ❒ Digital cellular systems with receiving methods: CDMA/FDM, TDMA/FDM, FM/FDM and TDMA/TDD.
- ❒ Examples: IS-95 CDMA, IS-54 DAMPS, AMPS, PWT.
- ❒ Cordless phones analog/digital.
- ❒ General purpose linear IF amp's.
- ❒ WLL / WLAN



SSOP-16

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Absolut Maximum Ratings (non operating)

Symbol	Parameter	min	max	Unit	Note
VDD	Positive Supply Voltage	-0.5	7	V	
GND	Analog Ground	0	0	V	
Vin	Voltage at every Input Pin)	Gnd-0.5	VDD+0.5	V	
Iin	Input Current (into any pin except supply pins and except low leakage pin)	-40	40	mA	
Iin_15	Input Current into Low Leakage Pin	-25	25	mA	
H	Humidity Noncondensing				1)
ESD	Electrostatic Discharge		1000	V	2)
Tstg	Storage Temperature	-55	125	deg C	
Tlead	Lead Temperature		260	deg C	3)

Notes:
1) Defined DIN 40040 cond. F.
2) HBM: R=1.5kOhm, C=100pF.
   Open collector outputs have less ESD protection because the protection diode to the positive supply cannot be implemented (The output swing is higher than Vpos.+0.7V).
3) 260 deg C for 10 sec (Reflow and wave soldering), 360 deg C for 3 sec (Manual soldering).

The above figures conform to CMOS standard for low leakage application.

Recommended Operating Conditions

Symbol	Parameter	min	typ	max	Unit	Note
VDD	Positive Supply Voltage		3.6		V	1)
GND	Analog Ground	0	0	0	V	
Idd	Supply Current		10	14	mA	2)
Tamb	Ambient Temperature Range, Operating Range	-30		+80	deg C	

Notes:
1) 3.6V $\pm$ 5%.
2) Measured at pin VDD, see test schematic, no signal.

RX AGC Electrical Characteristics

Parameter	min	typ	max	Unit	Note
Frequency Range		80-250		MHz	f_{-3dB}=250MHz
Maximum Gain	50			dB	V_G=3V
Minimum Gain			-50	dB	V_G=0.2V
Noise Figure		6.5		dB	max Gain
Input IP3		-7 -14		dBm dBm	min Gain FM min Gain CDMA 1)
Output CP1		-25		dBm	
Gain Var. in +/-630 kHz bandwidth centered at 85MHz		+/-0.05		dB	
Gain Slope Linearity (over any 6dB segment)		+/- 3		dB	-32 to +72 deg.C
Gain Control Voltage Range		0.2-3		V	0.2V min Gain 3.0V max Gain ref. To GND
Gain Control Input Impedance		16		kΩ	
Current Consumption		10	14	mA	
Input Resistance		1k diff. 850 sing.		Ω Ω	CDMA FM
Output Impedance		500		Ω	500 Ω differential outside (Reff. =250Ω)
CDMA to FM Isolation		30		dB	
Power Down Mode					2)

Notes:

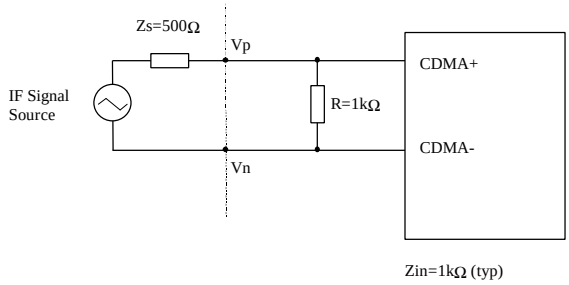
Measurements refered to 85MHz.

1) Two tone measurement is used.
   f_1=86MHz; f_2=87MHz; SEL=High for CDMA mode, SEL=Low for FM mode.
2) High≡Active, Low≡Power save, Input impedance ≥16kΩ.

Pin Description

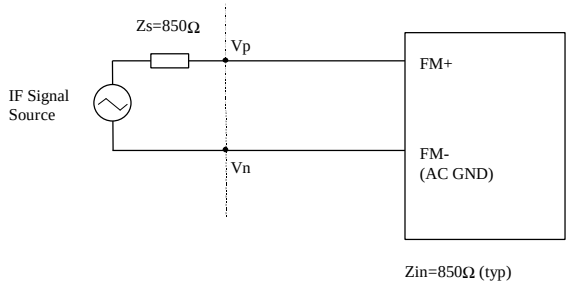
Pin#	Symbol	Function
1	CDMA+	CDMA Positive Differential Input
2	CDMA-	CDMA Negative Differential Input
3	GND	Analog Ground
4	FM+	Single Ended Analog Input
5	FM-	Analog Ground Connection (RX FM Input Reference)
6	GND	Analog Ground
7	SEL	Select, CMOS Input V_{SELECT}>=3.4V, CDMA Mode Select V_{SELECT}<=0.5V, FM Mode Select
8	PWD	Power down, CMOS Input V_{PWD-RX}>=3.4V, RX-AGC Active V_{PWD-RX}<=0.5V, RX-AGC Off
9	OUT-	Analog Differential Output
10	OUT+	Analog Differential Output
11	GND	Analog Ground
12	GND	Analog Ground
13	VCC	VCC Power Supply
14	VCC	VCC Power Supply
15	VCC	VCC Power Supply
16	VCTRL	Analog Control Input VCTRL=0.2V, Low Gain Rail; VCTRL=3V, High Gain Rail

Definition of CDMA Source Impedance, Z_S, and AS3802 Input Impedance Z_{IN}



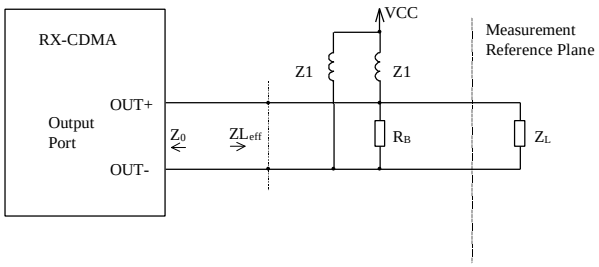
The value of the 1kΩ resistor is calculated in the matching network between the filter and the input of the RX-APM.

Definition of FM Source Impedance, Z_S, and AS3802 Input Impedance Z_{IN}



AC GND is defined as FM- in the package pin definition.

Definition of Load Impedance, Z_L, and AS3802 Output Impedance Z_O



RX-CDMA Output Port Impedance	Z_O>5kΩ
Load Impedance	Z_L=500Ω
Bias Resistor	R_B=500Ω *
Bias Inductors	L=Choke, ω.L>>R_B*
Effective Load	Z_{Leff}=250Ω

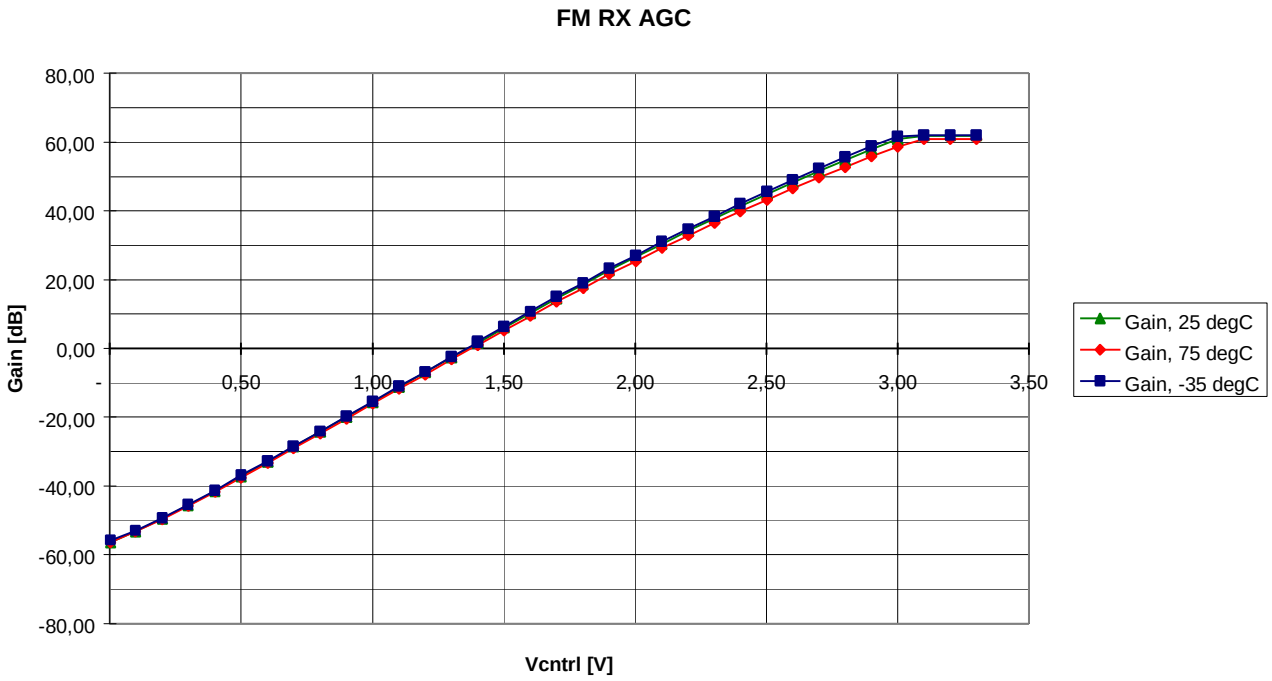
*Note:

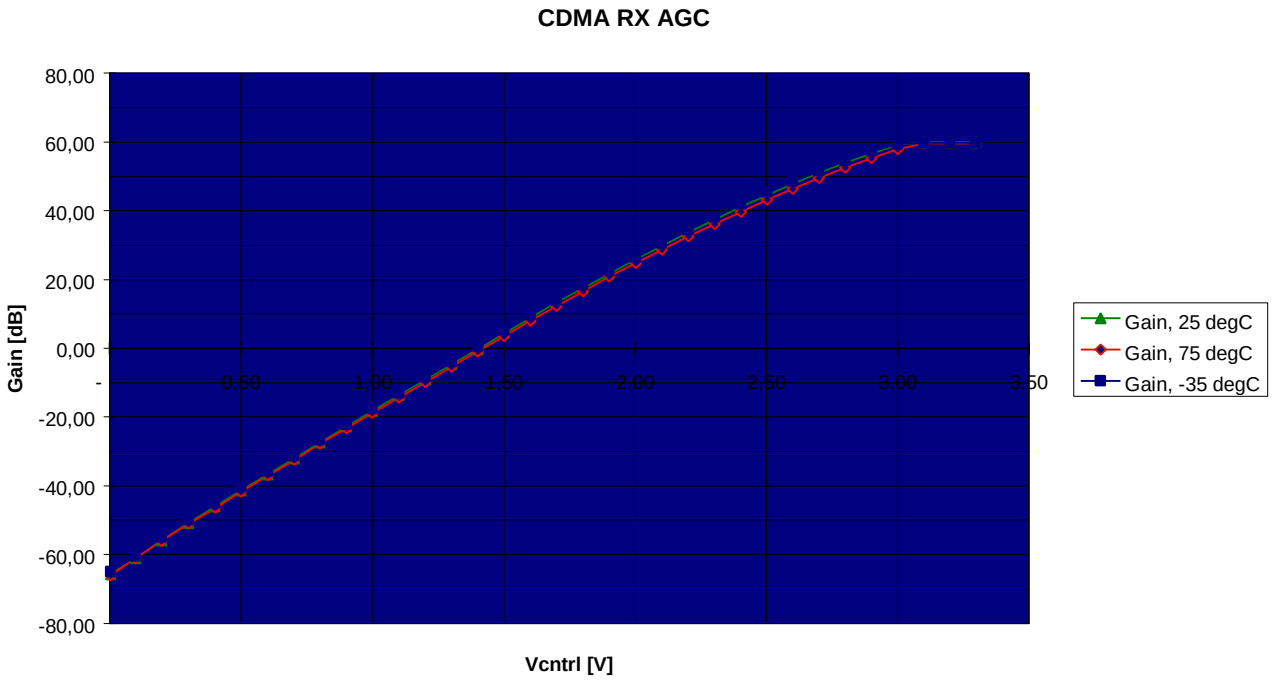
Z_1 can be a resistor or a choke.

If it is a resistor Z_1=R_1=250Ω then R_B is not used.

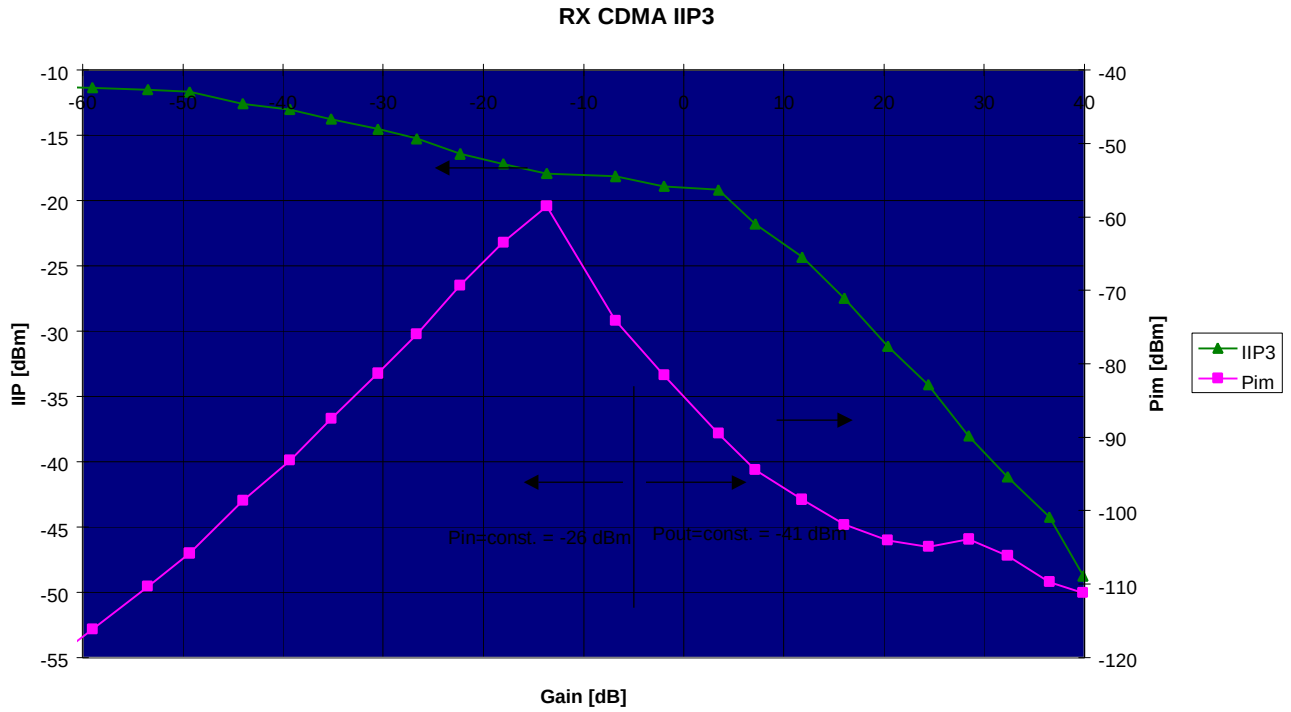
If it is a choke, ω.L>>R_B and R_B=500Ω.

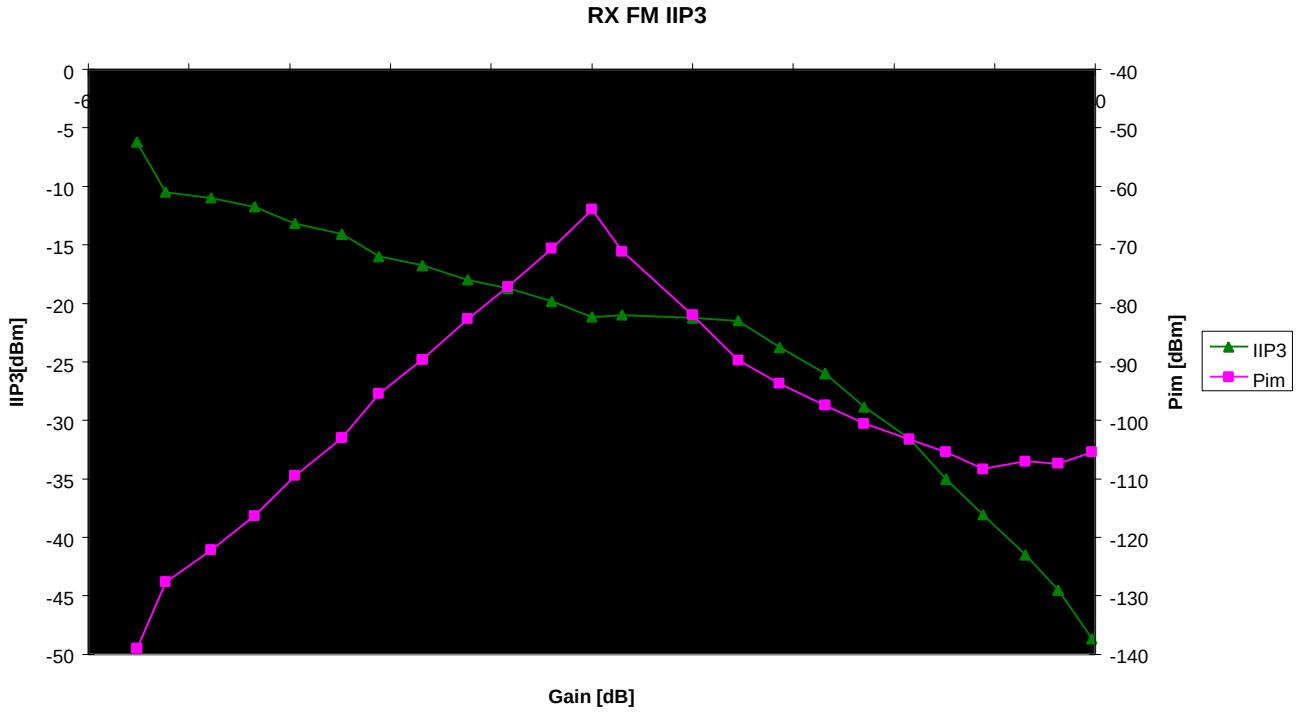
Transfer Characteristic



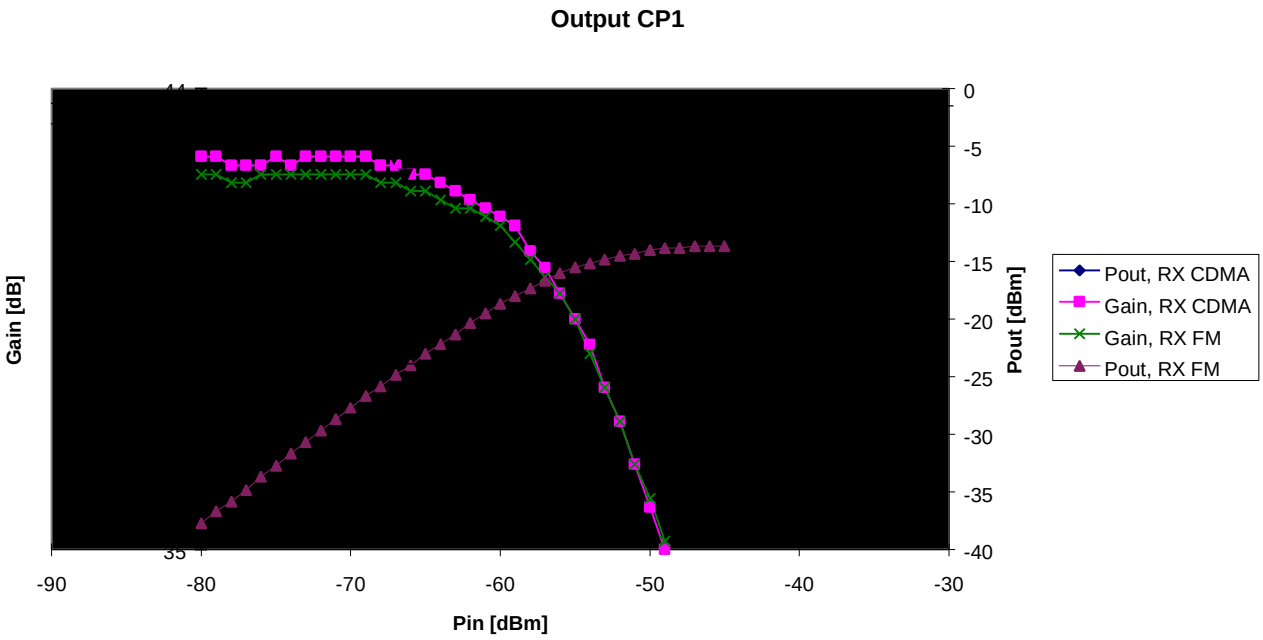


Intermodulation Performance





Compression Behaviour



Typical Application @ 85MHz