

Product Features

- 50 ~ 3500MHz
- InGaP HBT MMIC
- 35dBm Output IP3
- 19.5dB Gain
- 20dBm P1dB
- On Chip Active bias
- Pb Free / RoHS Standard

Application

- CDMA, W-CDMA Medium Power Amplifier
- High Linearity Drive Amplifier



Package Type: SOT-89

Description

AP410 is a gain block amplifier designed with InGaP HBT MMIC in a low cost SOT-89 package.

This MMIC amplifier is designed for use as driver devices for infrastructure equipment in the 50~3500MHz Wireless technologies such as Cellular, GSM, PCS CDMA, W-CDMA.

Specifications

PARAMETER	Units	Min	Typ	Max	Typ	
Gain (S_{21})	dB	18	19.5		19	18.5
Input Return Loss (S_{11})	dB		-20		-21	-20
Output Return Loss (S_{22})	dB		-16		-27	-30
Output 3 rd Order Intercept Point (OIP3)	dBm	+32	+35		+31.5	+26.7
Output 1dB compression Point (P_{1dB})	dBm		+20		+18.7	+16.7
Noise Figure	dB		5.5		5.4	5.3
DC Operating Current	mA	70	85	100	64	50
Supply Voltage	Vdc		+5		+4.8	+4.5
Thermal Resistance (R_{th})	°C/W			140		

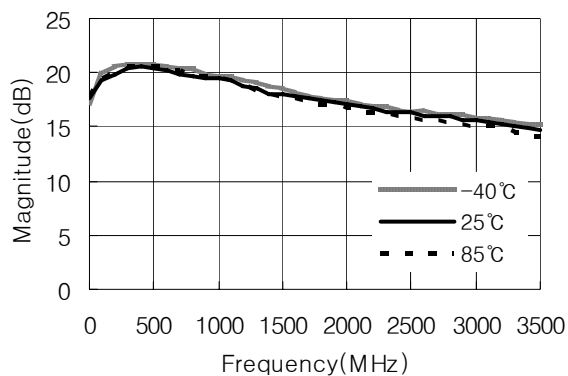
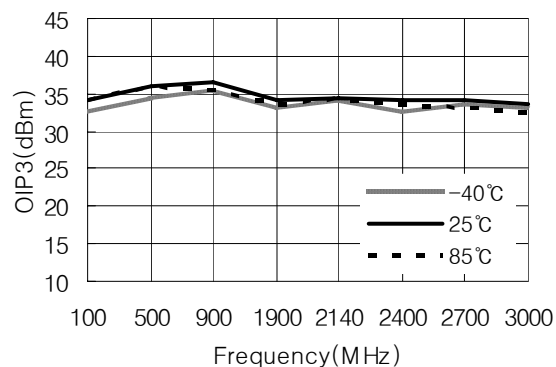
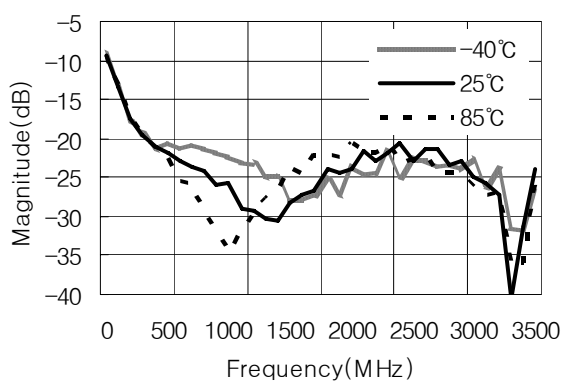
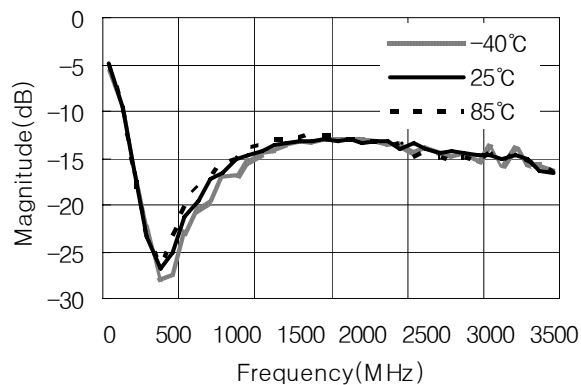
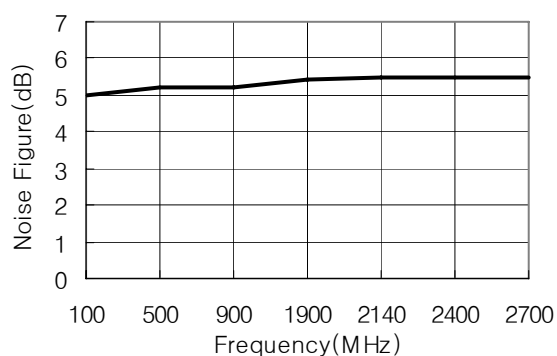
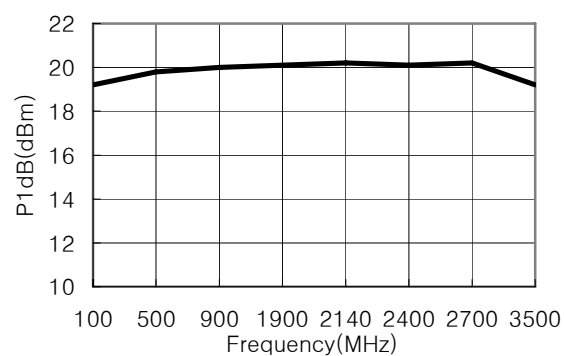
Test Condition

① 900MHz, Vdd=5V at 25°C

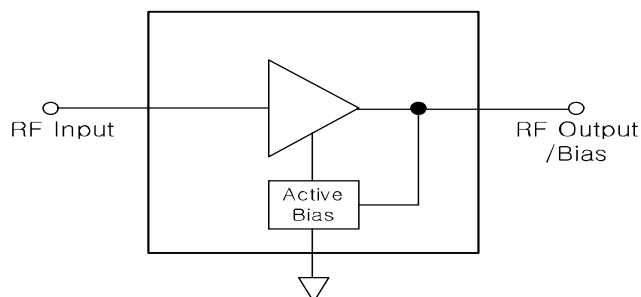
② OIP3 is measured with two tones, at an output power of +5dBm/tone separated by 1MHz.

Absolute Maximum Ratings

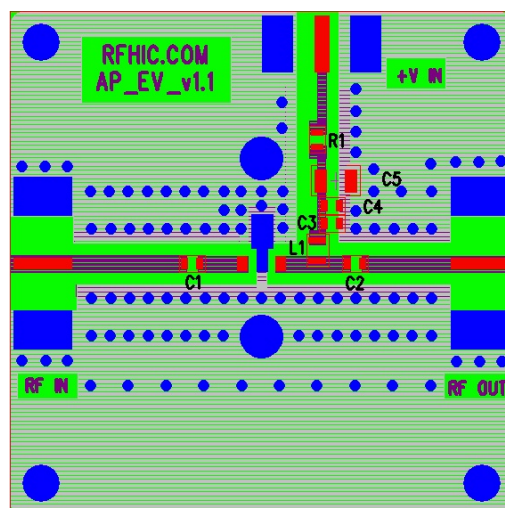
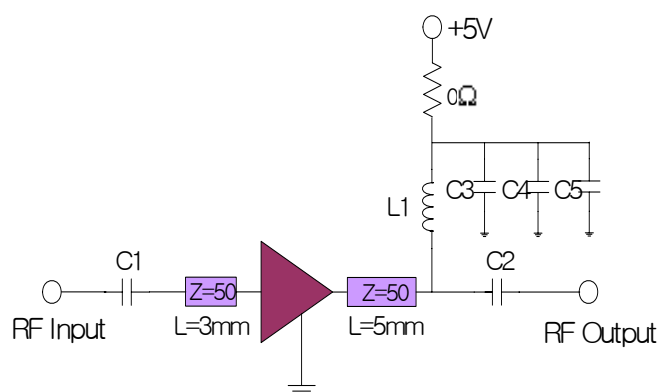
PARAMETER	Rating	Remark
Operating Case Temperature (°C)	-40 ~ +85	
Storage Temperature (°C)	-50 ~ +150	
Supply Voltage	+6	
Junction Temperature (°C)	+220	

Performance Charts ($V_d=5V$, $I_d=85mA$, $T_c=25^\circ C$)**Gain vs. Frequency****OIP3 vs. Frequency****Input Return Loss vs. Frequency****Output Return Loss vs. Frequency****Noise Figure vs. Frequency****P1dB vs. Frequency**

Block Diagram



Application Circuit



Recommended Component Values

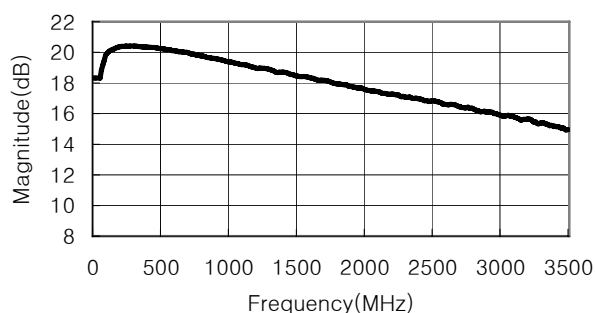
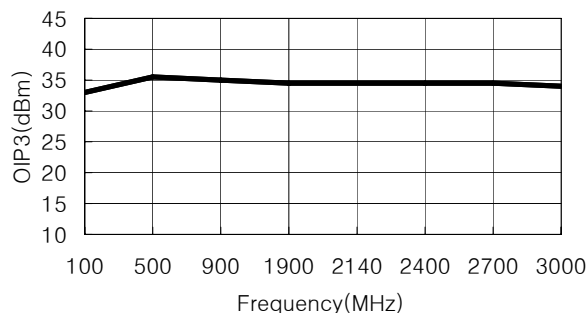
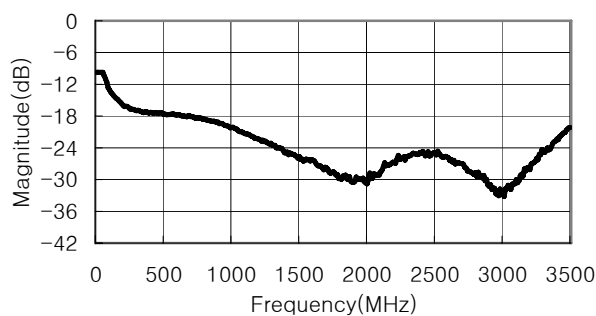
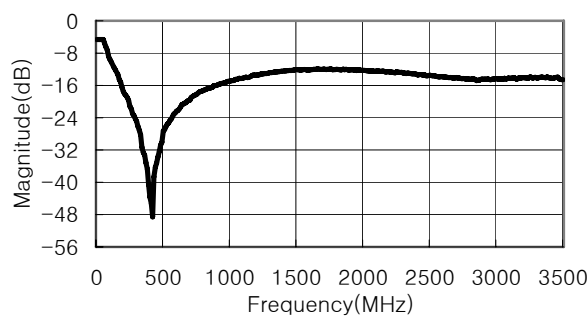
	70MHz	500MHz-3500MHz
L1	560nH	100nH
C1,C2,C3	0.1uF	1000pF
C4	1000pF	0.1uF
C5	4.7uF/16V	4.7uF/16V

Recommended Bias Resistor Values

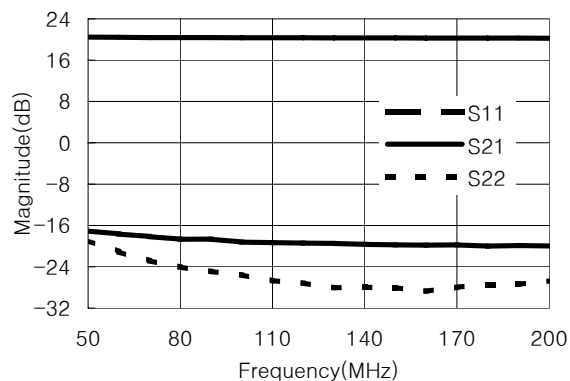
Vsupply	Rbias(5V)	Rbias(4.8V)	Rbias(4.5V)
6V	11 ohms	18 ohms	30 ohms
7V	23 ohms	34 ohms	50 ohms
8V	35 ohms	50 ohms	70 ohms
9V	47 ohms	65 ohms	90 ohms

Performance Charts ($V_d=5V$, $I_d=85mA$, $T_c=25^\circ C$)

Frequency	MHz	100	500	900	1900	2140	2400	2700	3500
Gain	dB	20.1	20.1	19.5	17.6	17.3	16.7	16.4	14.6
S11	dB	-24	-18	-20	-29	-28	-27	-27	-19
S22	dB	-18	-28	-16	-12	-12	-13	-13	-14
OIP3	dBm	34	35.5	35	34.5	34.5	34.5	34.5	
P1dB	dBm	19.2	19.8	20.0	20.1	20.1	20.1	20.2	19.2
Noise Figure	dB	5.3	5.5	5.5	5.7	5.7	5.7	5.7	

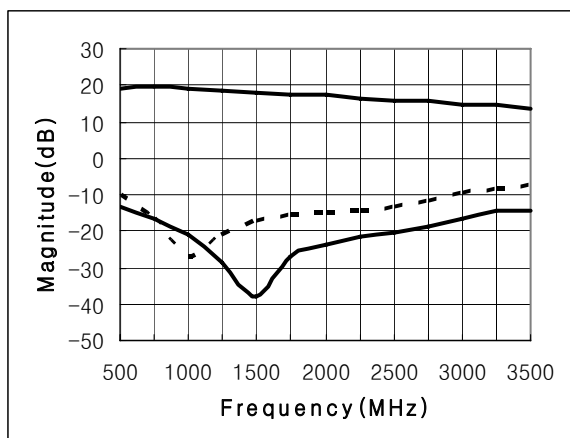
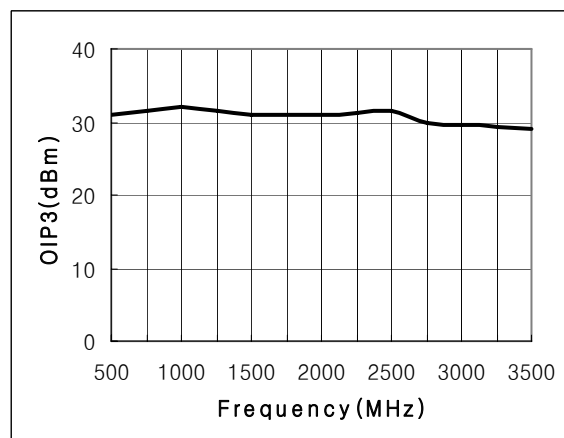
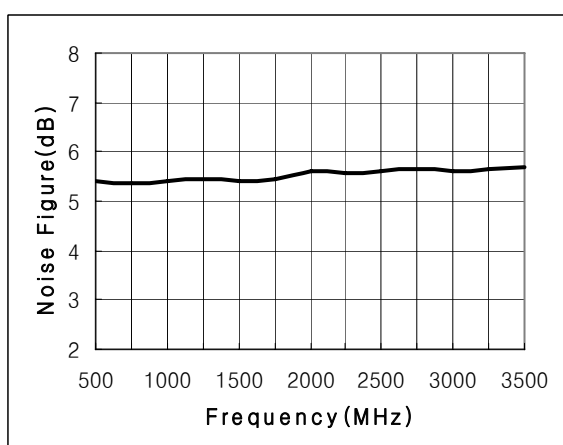
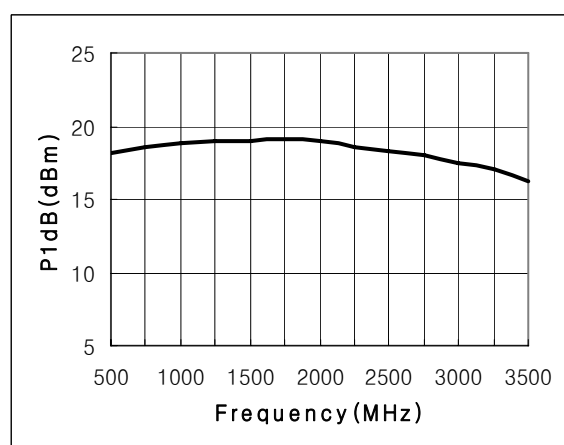
Gain vs. Frequency

OIP3 vs. Frequency

Input Return Loss vs. Frequency

Output Return Loss vs. Frequency

70MHz Performance

Typical Specifications	
Frequency	50~200MHz
Gain(S21)	20dB
Return Loss(S11)	-18dB
Return Loss(S22)	-22dB
OIP3	34dBm
Noise Figure	5.3dB
P1dB	20dBm



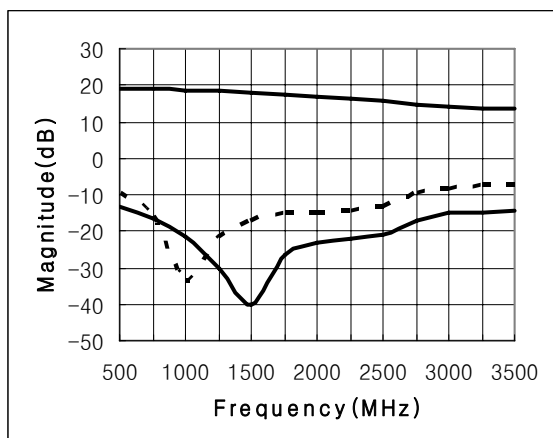
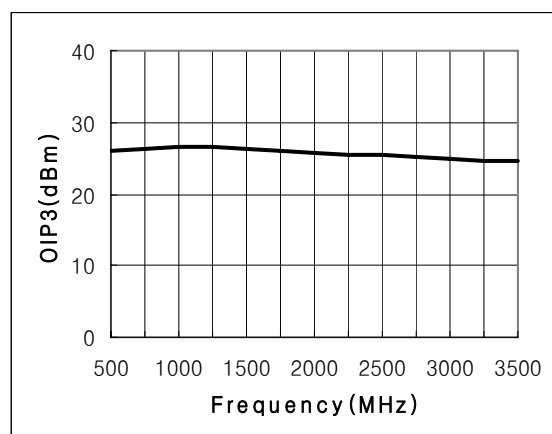
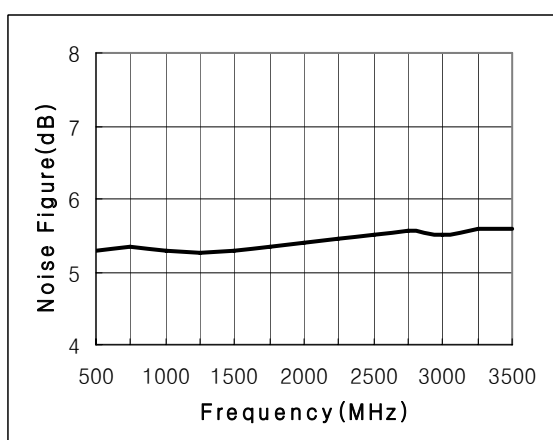
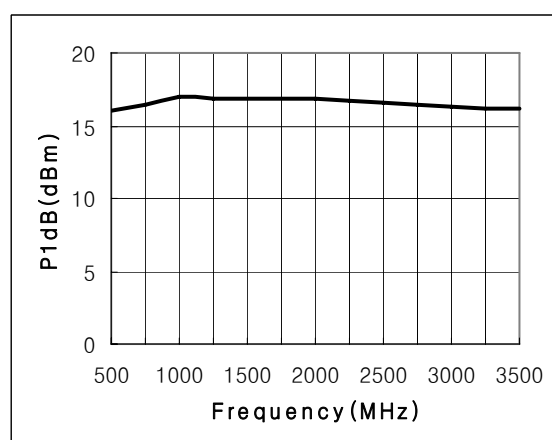
Performance Charts ($V_d=4.8V$, $I_d=64mA$, $T_c=25^\circ C$)

Frequency	MHz	500	880	960	1860	2140	2700	3500
Gain	dB	19.7	19.1	19	17.4	16.5	15.5	14
S11	dB	-13	-20	-21	-24	-22	-19	-15
S22	dB	-10	-25	-27	-14	-13	-11	-8
OIP3	dBm	31	31.5	32	31	31.5	30	29
P1dB	dBm	18.1	18.7	18.9	19	18.3	17.5	16.3
Noise Figure	dB	5.4	5.4	5.4	5.6	5.6	5.6	5.7

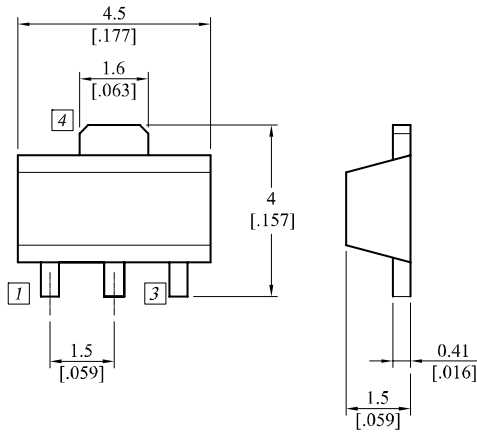
S-Parameter vs. Frequency**OIP3 vs. Frequency****Noise Figure vs. Frequency****P1dB vs. Frequency**

Performance Charts ($V_d=4.5V$, $I_d=50mA$, $T_c=25^\circ C$)

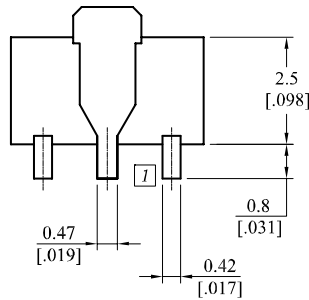
Frequency	MHz	500	880	960	1860	2140	2700	3500
Gain	dB	18.7	18.6	18.6	17.2	15.7	14.3	13.5
S11	dB	-13	-20	-21	-23	-21	-15	-14
S22	dB	-10	-30	-32	-15	-14	-9	-8
OIP3	dBm	26	26.7	26.7	25.7	25.4	24.9	24.5
P1dB	dBm	16	16.7	17	16.8	16.6	16.3	16.1
Noise Figure	dB	5.3	5.3	5.3	5.4	5.5	5.5	5.6

S-Parameter vs. Frequency**OIP3 vs. Frequency****Noise Figure vs. Frequency****P1dB vs. Frequency**

Package Dimensions (Type: SOT-89)



Unit : $\frac{\text{mm}}{[\text{inch}]}$	Tolerance : $\pm \frac{0.2}{.008}$
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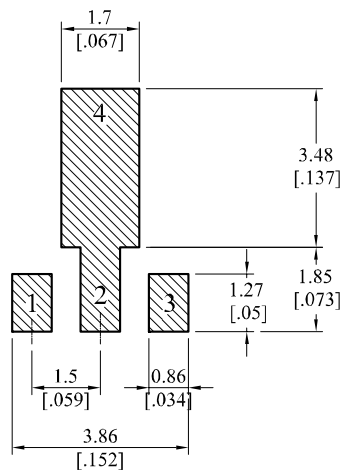


Pin No	Function
1	Input
2	Ground
3	Output/Bias
4	Ground

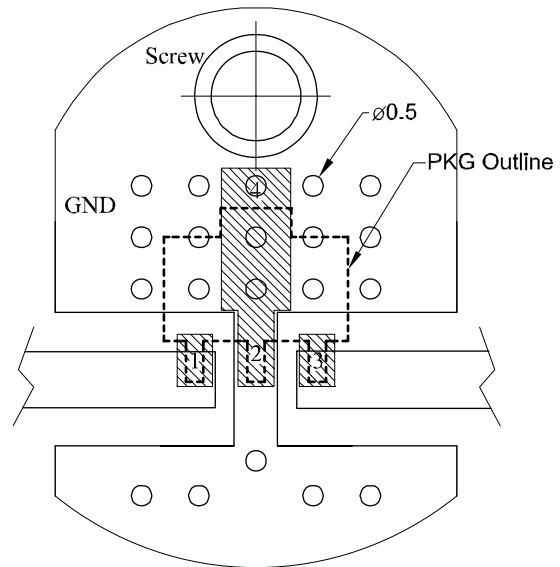
! ESD sensitive

Observe precautions for handling, testing and packaging.

Recommended Pattern



Recommended Mounting Configuration



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