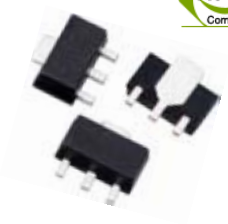
Product Features

- SOT89 Type Package
- High IP3, High Gain
- No matching circuit needed
- 3MHz-2.6GHz
- -67 dBc CTB, 135Channels, +30dBmV/ch, Single
- -53 dBc CSO, 135Channels, +30dBmV/ch, Single
- -72 dBc CTB, 8Channels, +45dBmV/ch, Single
- -54 dBc CSO, 8Channels, +45dBmV/ch, Single
- 3.5 dB Noise Figure
- +18.0 dBm P1dB
- MTTF > 100Years
- Single +5V Supply

Applications

- CATV Amplifier
- Satellite
- Transceiver Application
- FTTH(G-PON, GE-PON)



Package Type: SOT-89

Description

AP112 is used from 3MHz to 2.6GHz frequencies.
One can operate the circuit with only 2 DC-blocking capacitors, a bias optional inductor and a single supply voltage.
The package is SOT-89, which is pin-to-pin compatible with many of competitor's products.

Electrical Specifications @ $Z_S = Z_L = 75\Omega$

PARAMETER		UNIT	MIN	TYP	MAX	CONDITION
Frequency Range		MHz	3MHz	-	2.6GHz	-
Supply Voltage		V	-	5	5.2	Vcc=5V
Current		mA	90	110	130	-
S21-Gain		dB	17	18	19	5MHz~1GHz
			16	17	18	1GHz~2GHz
S11-Input Return Loss		dB	-12	-14	-	-
S22-Output Return Loss		dB	-12	-14	-	-
OIP3		dBm	-	37	-	note 1
OIP1		dBm	-	18	-	5MHz~1GHz
				17		1GHz~2GHz
Noise Figure		dB	-	3	-	-
d2	Second order distortion	dBc	-	68.5	-	note 2
Vo	Output voltage	dBmV	-	55	-	note 3
CSO	50 ~ 870MHz	dBc	-	-53	-	135 channels,+30dBmV/ch,Single
CTB				-67		135 channels,+30dBmV/ch,Single
XMD				-65		135 channels,+30dBmV/ch,Single
CSO	5 ~ 50MHz	dBc	-	-54	-	8 channels,+45dBmV/ch,Single
CTB				-72		8 channels,+45dBmV/ch,Single
XMD				-70		8 channels,+45dBmV/ch,Single

PARAMETER	UNIT	TYPICAL	
Frequency	MHz	50	870
S21-Gain	dB	18	17.5
S11-Input Return Loss	dB	-10	-15
S22-Output Return Loss	dB	-12	-14
OIP3	dBm	37	34
OIP1	dBm	18	18.5
Noise Figure	dB	3.5	3.5
CSO (1)	dBc	-53	
CTB (1)	dBc	-67	
XMD (1)	dBc	-65	
Supply Voltage	V	5	
Current	mA	90~130	

(1) 135channels,30dBmV/ch,Single

Note

1. OIP3 measured with 2 tones at an output power of 5dBm/tone separated by 1MHz
2. f_p=55.25MHz; V_p=40dBmV; f_q=805.25MHz; V_q=40dBmV; measured at f_p+f_q=860.5MHz.
3. f_p=851.25MHz; $V_p=V_o$; f_q=858.25MHz; $V_q=V_o$-6dB; f_r=860.25MHz;

Operating Ranges

PARAMETER	UNIT	MIN	TYP	MAX
Device Voltage	VDC	-	5	5.3
Case Temperature	℃	-40	-	85

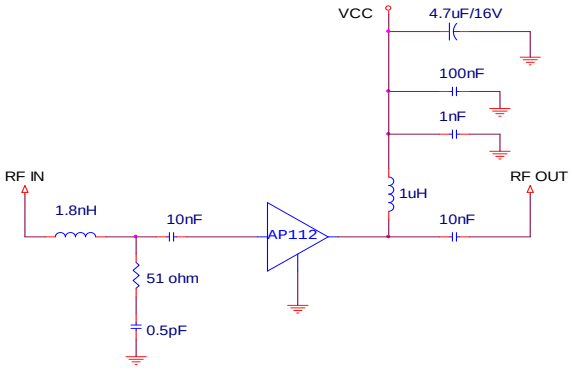
Absolute Minimum and Maximum Ratings

PARAMETER	UNIT	MIN	MAX
Device Voltage	VDC	-	5.5
Device Current	mA	-	180
RF Input Power	dBm	-	10
Storage Temperature	℃	-40	150

Single - Ended CATV 75Ω Evaluation Circuit @ 50 ~ 870MHz

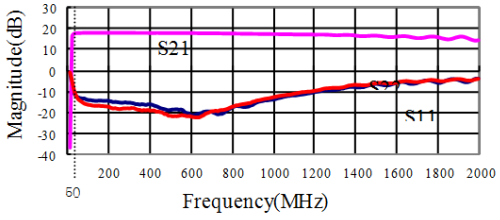
PARAMETER	UNIT	TYPICAL		
Frequency	MHz	50	450	870
S21-Gain	dB	18	18	17.5
S11-Input Return Loss	dB	-12	-17	-15
S22-Output Return Loss	dB	-12	-20	-14
OIP3	dBm	37	35	34
OIP1	dBm	18	18	18.5
Noise Figure	dB	3.5	3.5	3.5
CSO (1)	dBc	-53		
CTB (1)	dBc	-67		
XMD (1)	dBc	-65		
Supply Voltage	V	5		
Current	mA	90 ~ 130		

(1) 135channels,+30dBmV/ch, Single

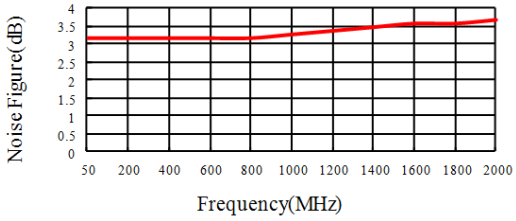


Typical Performance @ 30 ~ 870MHz, 75ohm System, VDD = 5V

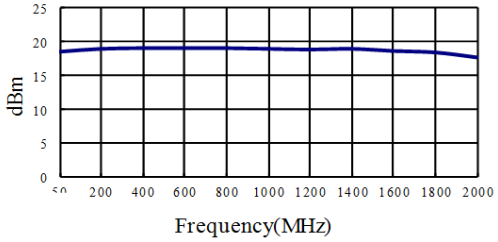
S-Parameter



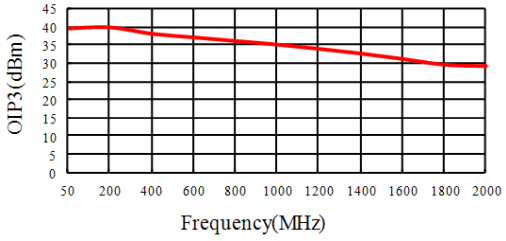
Noise Figure



P1dB



OIP3



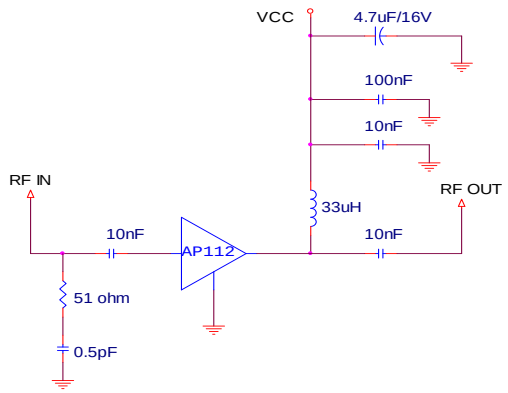
Multi-Tone Test : 135CH_FLAT@Output Power +30dBmV/Ch

Level: +30dBmV Tilt: 135CH FLAT (AP112)										
FRQ	**XMD (NCTA)**	**CTB RAW**	**CTB COR**	**N-FLR**	**CSU RAW**	**CSU COR**	**CSU FRQ**	**CSL RAW**	**CSL COR**	**CSL FRQ**
55.25	75.8	75	79.4	76.5	74	77.6	56	53.1	53.1	54
77.25	74.9	75.8	80.2	77	53.5	53.5	78	76.7	81	76.03
109.25	76.6	75.4	79.8	77.1	73.5	76	110	53.8	53.8	108
211.25	75.1	74.6	78.2	77	69.2	69.9	212.5	54.6	54.6	210
331.25	74.8	73.2	76.2	76.1	65.9	66.3	332.5	56.6	56.6	329.99
445.25	73.8	72.9	75.1	76.7	65.9	66.3	446.5	58.9	58.9	444
547.25	72.3	71.2	73.7	74.7	64.8	65.3	548.5	60.4	60.6	545.99
637.25	71.5	70.9	73.1	74.8	64.6	65	638.49	63.1	63.4	635.99
745.25	69.7	70.6	73.2	74.2	63.6	64	746.49	68.5	69.7	743.99
859.25	68.3	69.4	71.9	72.7	61.8	62.2	860.5	71	75.3	858.5

Schematic @ 5 ~ 200MHz

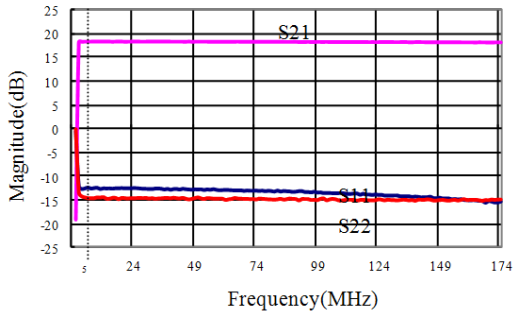
PARAMETER	UNIT	TYPICAL		
Frequency	MHz	5	100	200
S21-Gain	dB	18	18	17.5
S11-Input Return Loss	dB	-12	-12	-13
S22-Output Return Loss	dB	-14	-14	-14
OIP3	dBm	37	35	34
OIP1	dBm	18	18	18.5
Noise Figure	dB	3.5	3.5	3.5
CSO (1)	dBc	-54		
CTB (1)	dBc	-72		
XMD (1)	dBc	-70		
Supply Voltage	V	5		
Current	mA	90 ~ 130		

(1) 8channels,+45dBmV/ch, Single

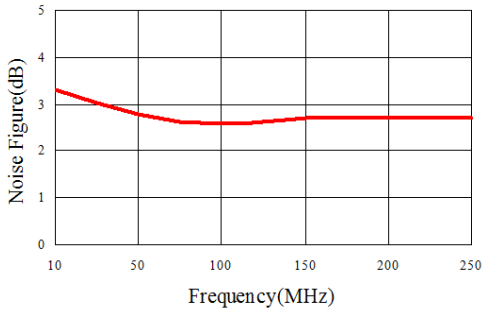


Typical Performance @ 5 ~ 200MHz, 75ohm System, Vcc = 5V

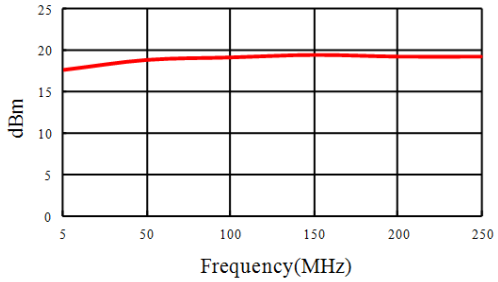
S-Parameter



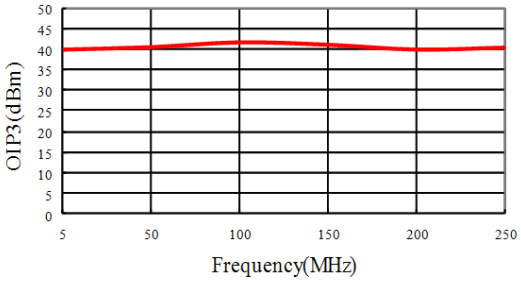
Noise Figure



P1dB



OIP3

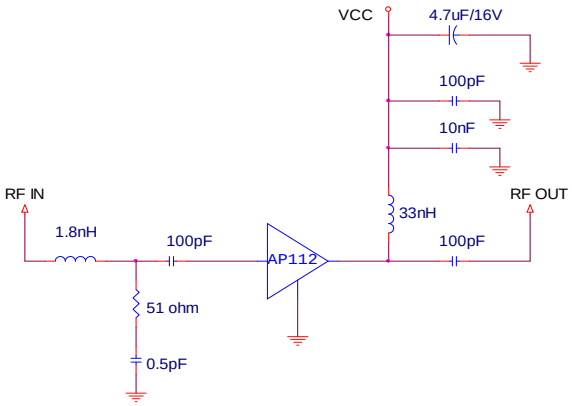


Multi-Tone Test @ 8CH_FLAT@Output Power +45dBmV/Ch

Level: +45dBmV Tilt: 8CH FLAT(AP112)										
FRQ	**XMD (NCTA)**	**CTB RAW**	**CTB COR**	**N-FLR**	**CSU RAW**	**CSU COR**	**CSU FRQ**	**CSL RAW**	**CSL COR**	**CSL FRQ**
7	80.4	83.9	84.5	92.4	91.5	95.8	7.65	58.2	58.2	6
31	79.4	80.8	81.2	91.5	63.2	63.2	32	62.9	62.9	30
49	79.8	80.7	81.2	90.2	62.4	62.4	50	89.3	93.6	47.99

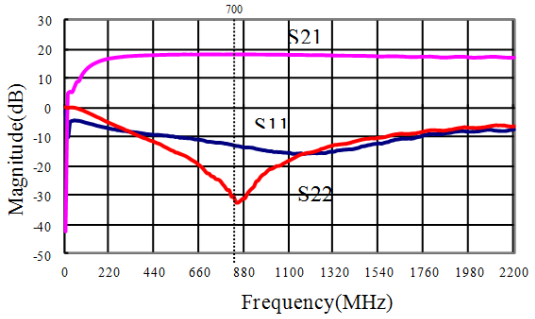
Schematic @ 800 ~ 2000MHz

PARAMETER	UNIT	TYPICAL		
Frequency	MHz	800	1500	2000
S21-Gain	dB	17	17	16
S11-Input Return Loss	dB	-10	-10	-7
S22-Output Return Loss	dB	-20	-10	-6
OIP3	dBm	34	30	27
OIP1	dBm	18	17	16
Noise Figure	dB	3.5	3.5	3.5
Supply Voltage	V	5		
Current	mA	90 ~ 130		

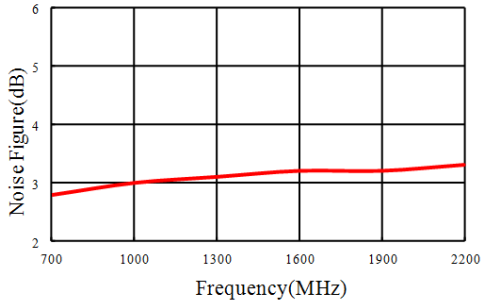


Typical Performance @ 800 ~ 2000MHz, 75ohm System, Vcc = 5V

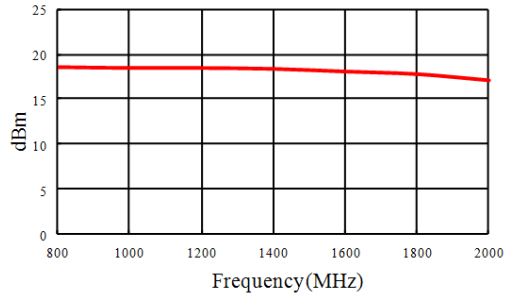
S-Parameter



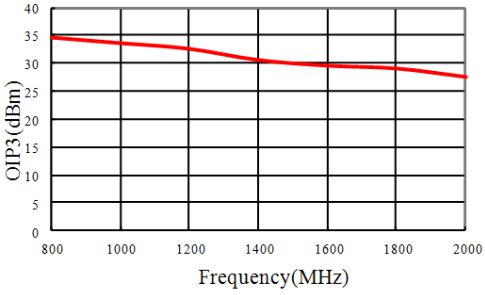
Noise Figure



P1dB

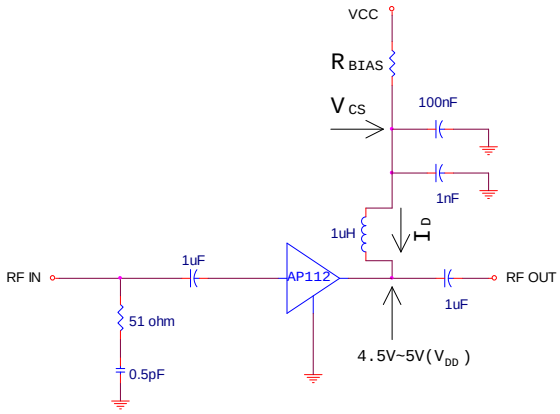


OIP3



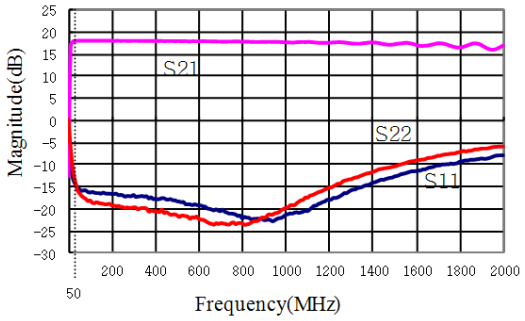
Recommended Bias Resistor Value for ID = 90±20 mA

Note
If Choke Coil Value is increased, Amp Characteristics is shifted to the Low Frequency Band. But at Same bias Voltage, the Current is decreased . So Air Coil, Which has Low Internal Resistance is recommended.

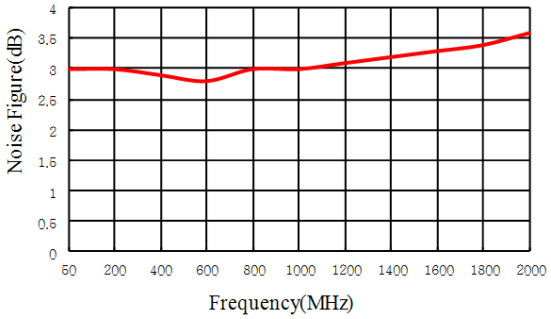


Supply voltage @ 5V , BIAS input Voltage : 4.5V , DC Current : 70㎃

S-Parameter



Noise Figure



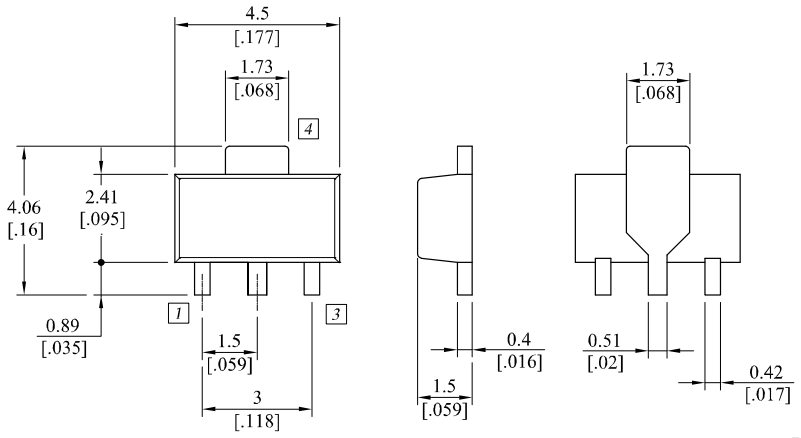
RBIAS = (VCC-VCS) / ID

PARAMETER	UNIT	TYPICAL		
Supply Voltage	V	5 V	5 V	5 V
BIAS Voltage	VS	4.5 V	4.7 V	4.9 V
RBIAS	Ω	6.8	4.7	2.2
ID	㎃	70	90	120

Note
RBIAS Controlles the DC BIAS Current
GAIN & S11,S22 Variety rate ≤ -2㏈

Package Dimensions (Type: SOT-89)

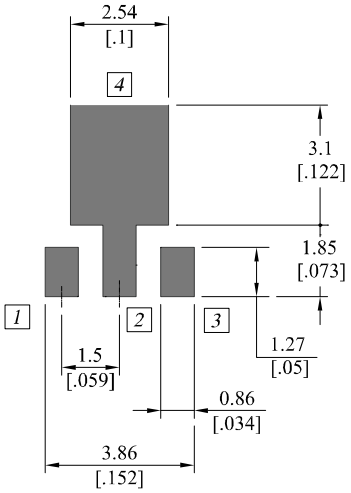
* Unit: mm[inch] | Tolerance ±0.2[.008]



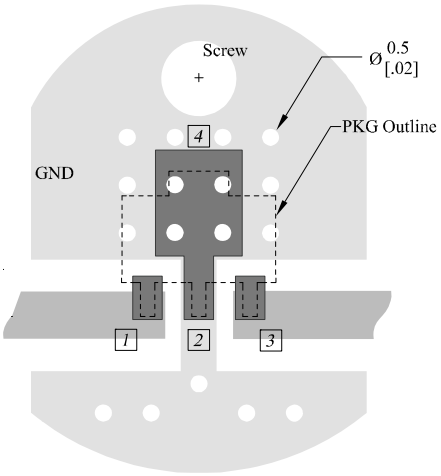
▲ Top View ▲ Side View ▲ Bottom View

Pin Description			
Pin No	**Function**	**Pin No**	**Function**
1	Input	4	GND
2	GND	-	-
3	Output / Bias	-	-

Recommended Pattern



Recommended Mounting Configuration



*** Mounting Configuration Notes**

1. Ground / thermal via holes are critical for the proper performance of this device.
2. Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.
3. Mounting screws can be added near the part to fasten the board to a heatsink. Ensure that the ground / thermal via hole region contacts the heatsink.
4. Do not put solder mask on the backside of the PCB in the region where the board contacts the heatsink.
5. RF trace width depends upon the PCB material and construction.
6. Use 1 oz. Copper minimum.

Revision History

Part Number	Release Date	Version	Modification	Data Sheet Status
AP112	20121022	6.0	Change by a new document form	-