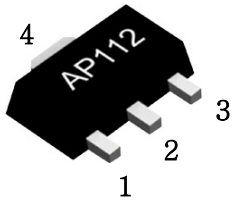
Product Features

- DC ~ 2.2GHz
- GaAs MMIC
- 34dB Output IP3
- 17dB Gain
- 20dB P1dB
- Single +5V Supply
- SOT89 SMT Package

Application

- PCS Repeater
- RF Sub-Systems
- Base Station
- Converter



Pin No.	Function
P1	Input
P3	Output, Bias
P2, P4	Ground

Description

AP112 uses DC up to 2.2GHz frequency.
The package is SOT-89, which is pin-to-pin compatible with competitor's products.

Specifications (50MHz to 1000MHz)

PARAMETER	Units	Minimum	Typical	Maximum	Condition
S21(SSG)	dB	17	17.7		
S11 (Input Return Loss)	dB		-15		
S22 (Input Return Loss)	dB		-14		
Output IP3	dBm	34	38		
Output P1dB	dBm		20		
Noise Figure	dB		3.4		
DC Current	mA		100	105	
Supply Voltage	V		5		

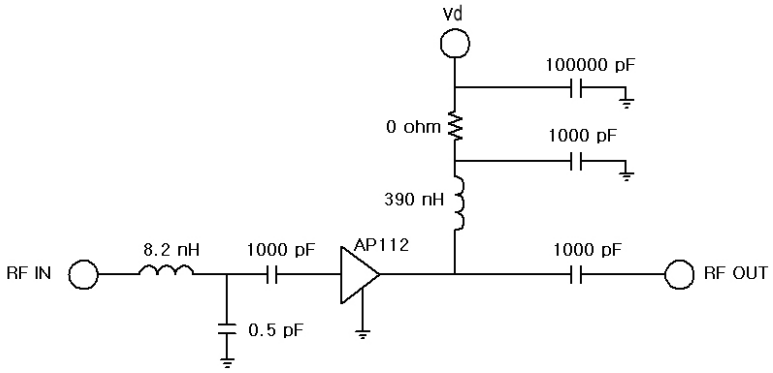
Specification (50MHz to 2200MHz)

PARAMETER	Units	Minimum	Typical	Maximum	Condition
S21(SSG)	dB	16	17		
S11 (Input Return Loss)	dB		-12		
S22 (Input Return Loss)	dB		-11		
Output IP3	dBm	28	34		
Output P1dB	dBm		18		
Noise Figure	dB		3.4		
DC Current	mA		100	105	
Supply Voltage	V		5		

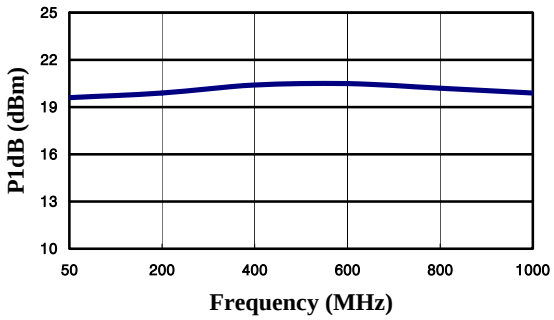
Application Circuit 1. : 50MHz ~ 1000MHz

PARAMETER	Units	50MHz	200MHz	400MHz	600MHz	800MHz	1000MHz
S21(SSG)	dB	17.6	17.9	17.6	17.7	17.7	17.6
S11(Input Return Loss)	dB	-12.2	-16.1	-16.1	-15.4	-15.3	-14.0
S22(Input Return Loss)	dB	-11.4	-14.3	-15.5	-14.1	-15.7	-17.1
Output IP3	dBm	38	38.5	38.8	38.5	36.5	35.2
Output P1dB	dBm	19.6	20	20.4	20.5	20.1	19.9
Noise Figure	dB	3.2	3.24	3.28	3.4	3.45	3.55
Bias	Vd = 5V, Id = 100mA						

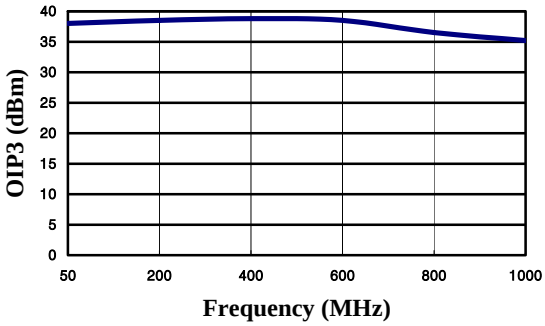
Schematic



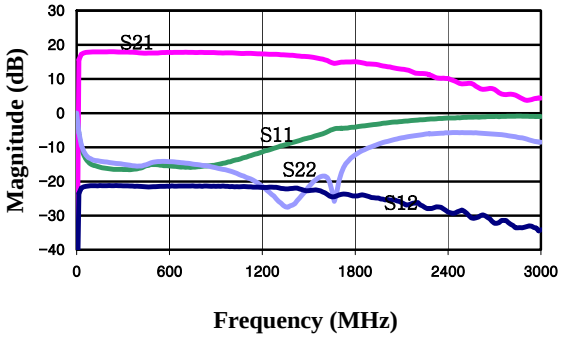
Output P1dB vs. Frequency



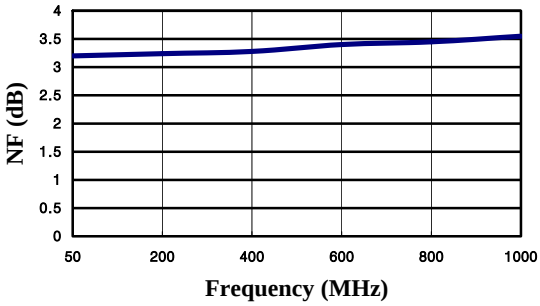
OIP3 vs. Frequency



S Parameter



Noise Figure



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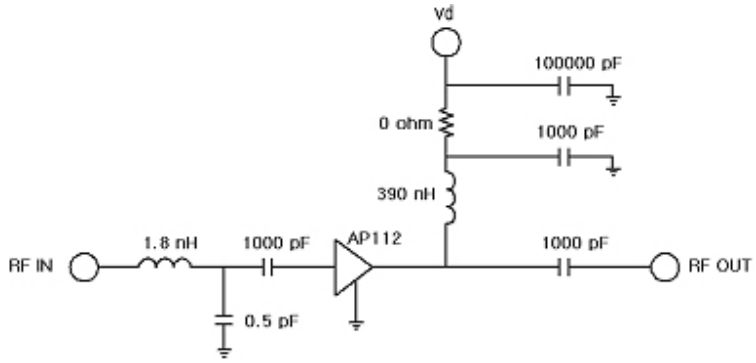
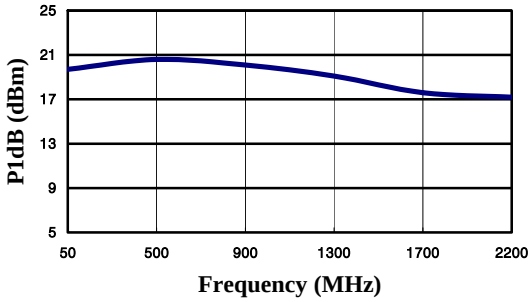
Application Circuit 2. : 50MHz ~ 2200MHz

PARAMETER	Units	50MHz	500MHz	900MHz	1300MHz	1700MHz	2200MHz
S21(SSG)	dB	17.5	17.8	17.8	17.6	16.4	16.3
S11(Input Return Loss)	dB	-11.8	-16.2	-17.3	-15.7	-12.2	-10.1
S22(Input Return Loss)	dB	-11.2	-13.7	-13.1	-11.8	-11.2	9.9
Output IP3	dBm	38	38.5	36.5	34.5	31	28
Output P1dB	dBm	19.7	20.6	20.1	19.1	17.6	17.2
Noise Figure	dB	3.0	3.1	3.2	3.4	3.55	3.71
Bias	Vd = 5V, Id = 100mA						

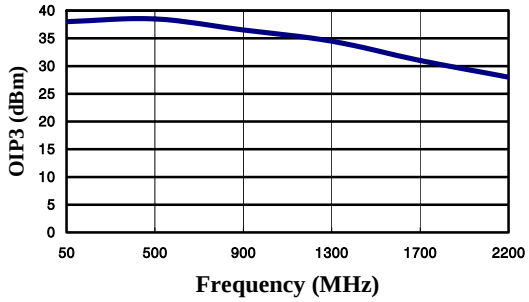
Schematic



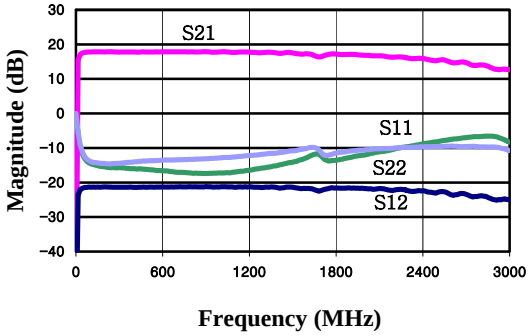
Output P1dB vs. Frequency



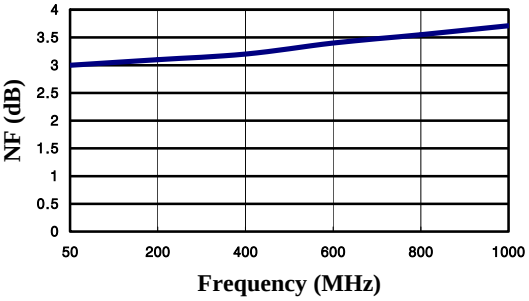
OIP3 vs. Frequency



S Parameter



Noise Figure



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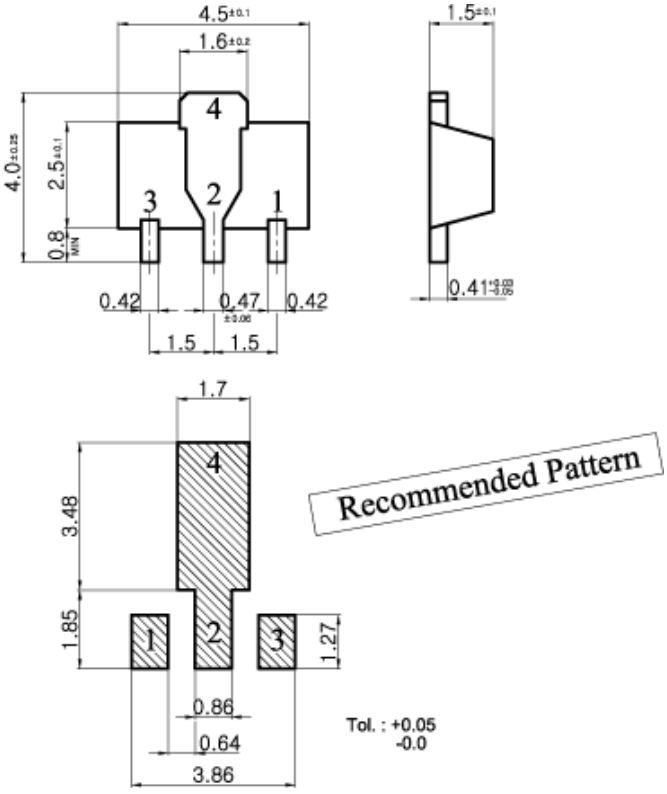
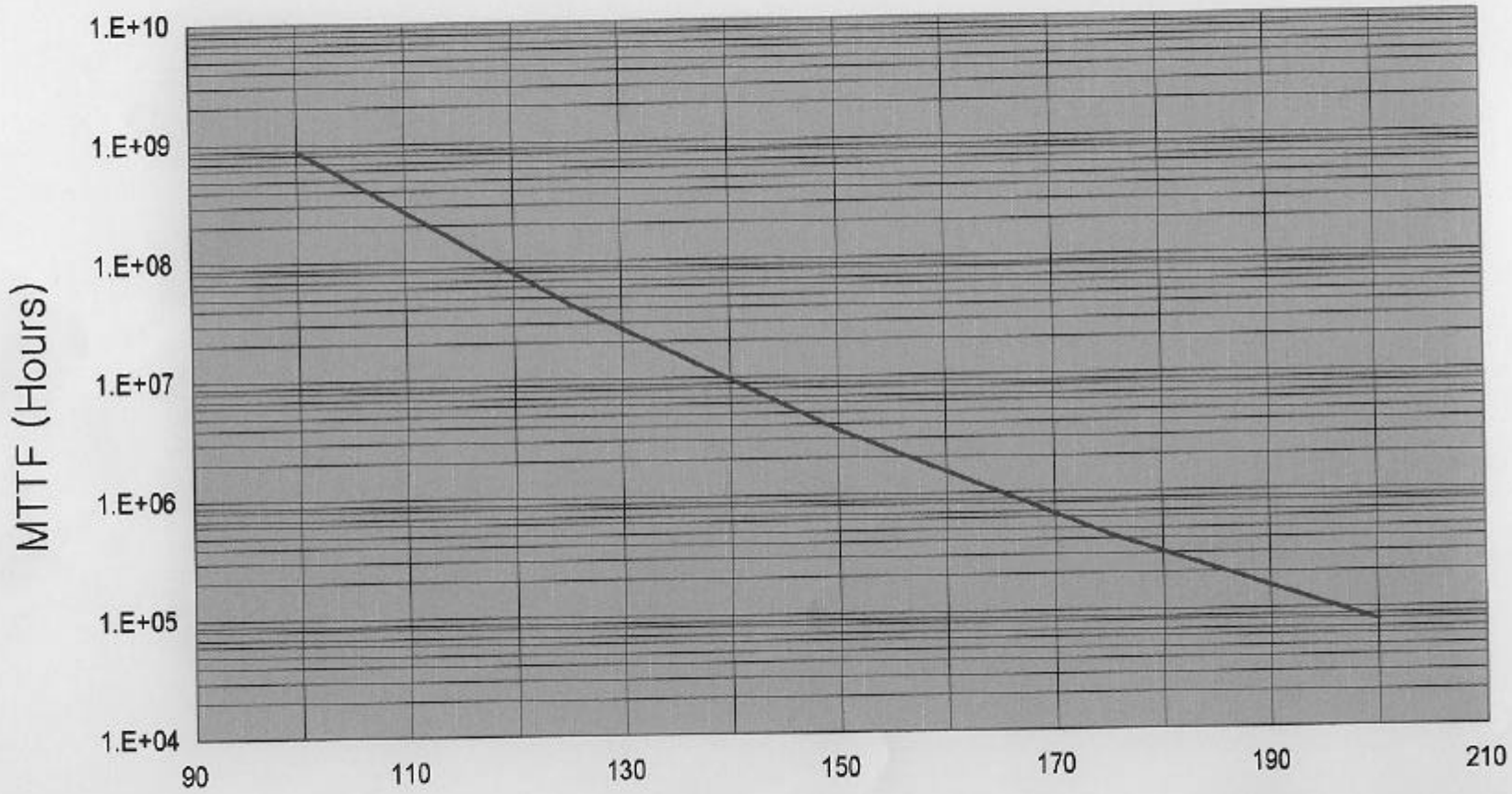
Dimensions in mm



MTTF vs Junction Temperature (℃)



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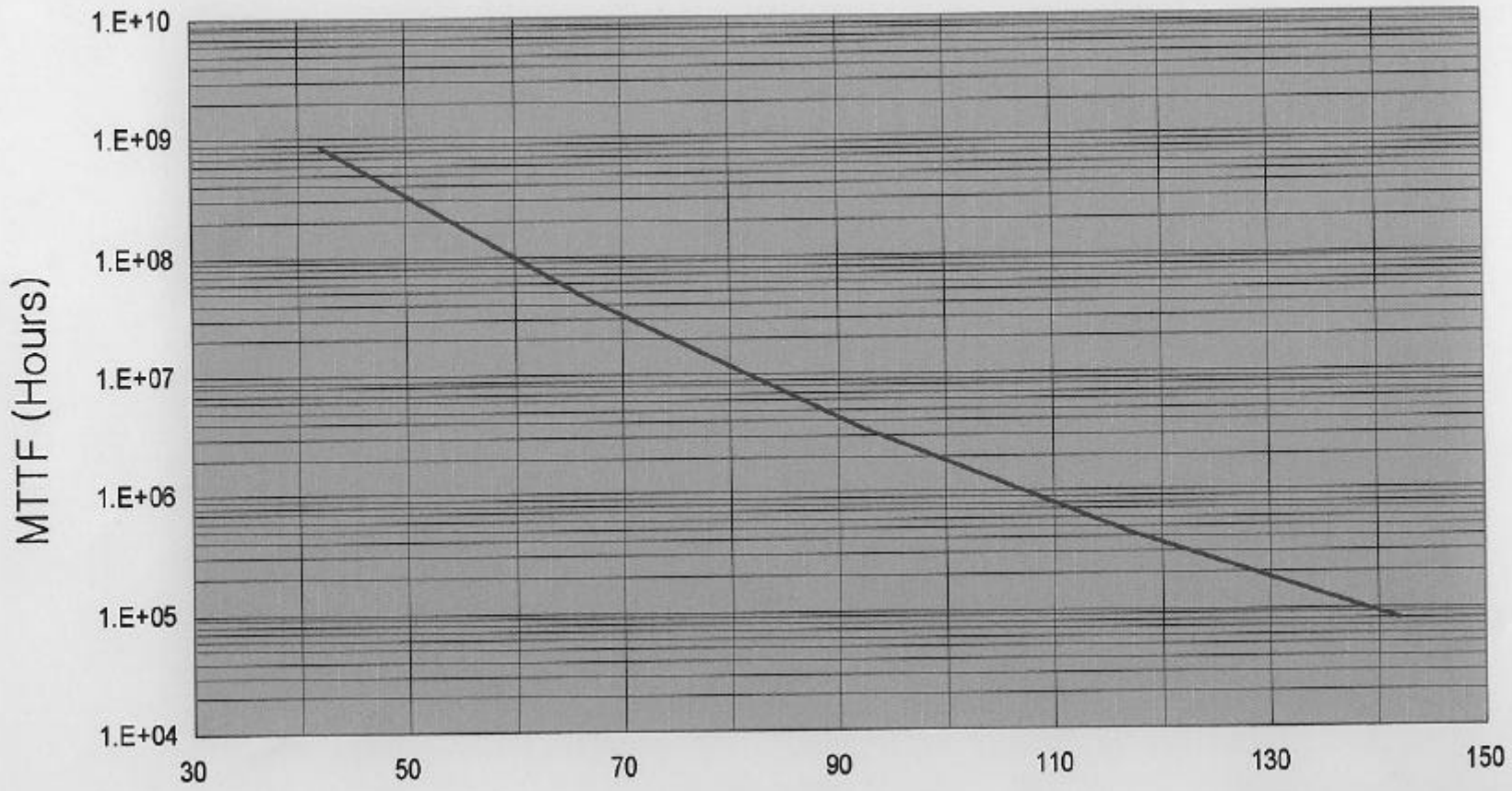
MTTF vs GND Lead Temperature (℃)



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AP112 Reliability Prediction

1. Junction Temperature Determination

Junction temperature(Tj) was measured with using IR scan. Tj is typically referenced to a package bottom temperature of 85℃. When Tc(case temperature) is 85℃, Tj is 143℃.
And when different Tc, Tj is calculated as following equation.

Tj = Tc+Rth*(Id*Vd)

Tj=Junction Temperature
Tc=Case Temperature
Vd=Device Voltage
Id=Device Current
Rth=Thermal Resistance

Ex) When supplied to 5V on device, 100mA current flows, and 85℃ GND Lead temperature is 85℃, Junction Temperature is calculated as follows.

Tj = 85℃ + 116(℃/w) * 0.1(A) * 5(V)
= 143℃

2. MTTF Prediction

Mean Time To Failure(MTTF) was calculated when device(ap112) is nominal operating condition(5V,100mA). Testing was performed at three high junction temperature for accelerated life test. MTTF results(Fig.1) of lower junction temperature was extrapolated by arrhenius plot.

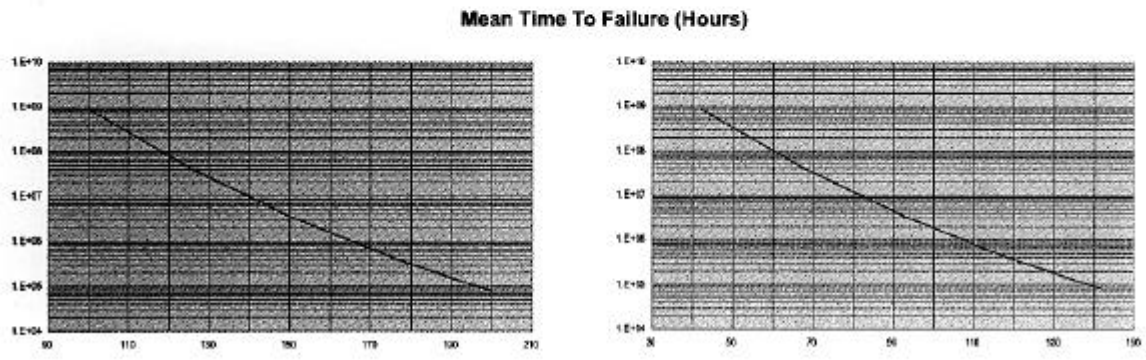

Fig.1 Junction Temperature(℃)

GND Lead Temperature(℃)