

# HTT2402



LOW-NOISE AMPLIFIER

## □ GENERAL DESCRIPTION

The HTT2402 is a low-noise amplifier (LNA), which is used by frequency 950~2150MHz for the Satellite television transmission. The device works with the low power supply voltage using a CMOS process, with external enable control mode

## □ APPLICATION

Digital Satellite television RF module  
950M~2150MHz

## □ FEATURES

Operation Voltage Range : 3.135V~3.465V  
Operating Temperature Range : -40°C~+85°C  
Ultra Small Package : SON-6L  
Environmentally Friendly: EU RoHS Compliant,  
Pb Free

Current Circuit 1 : 45mA(TYP.)

Noise Figure

: NF=2.8dB(TYP.) (@ 1500MHz)

Input return loss

: S11=24dB(TYP.) (@ 1500MHz)

Output return loss

: S22=23dB(TYP.) (@ 1500MHz)

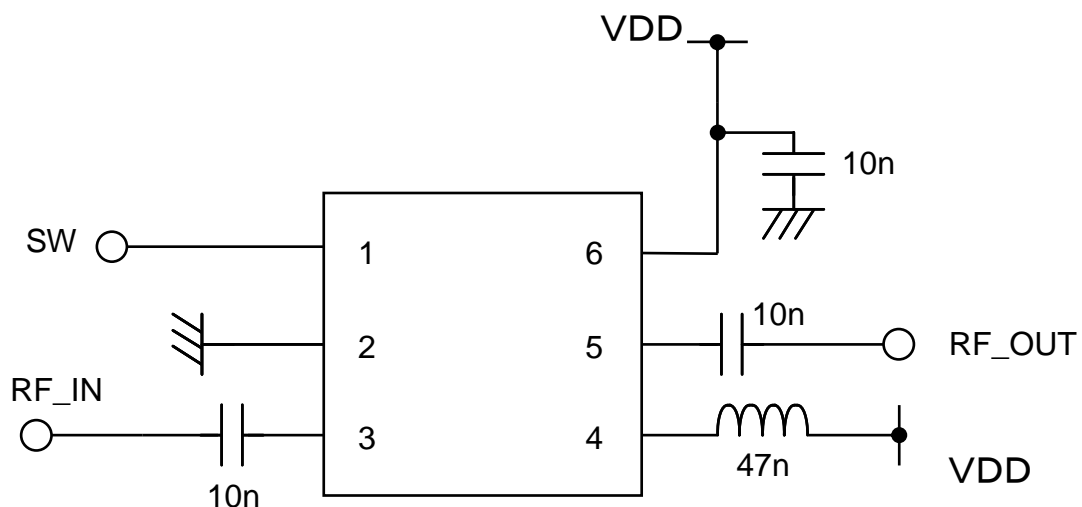
Gain : |S21|=13dB(TYP.) (@ 1500MHz)

IIP3 : +16dBm

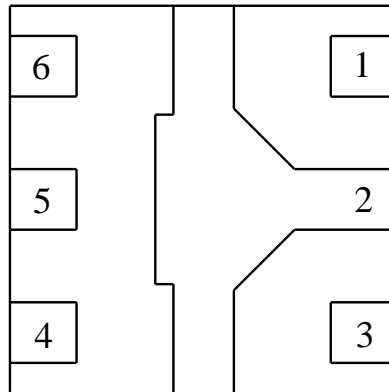
enable control (SW=0)

: Current = 0  $\mu$  A

## □ TYPICAL APPLICATION CIRCUIT



## □ PIN CONFIGURATION



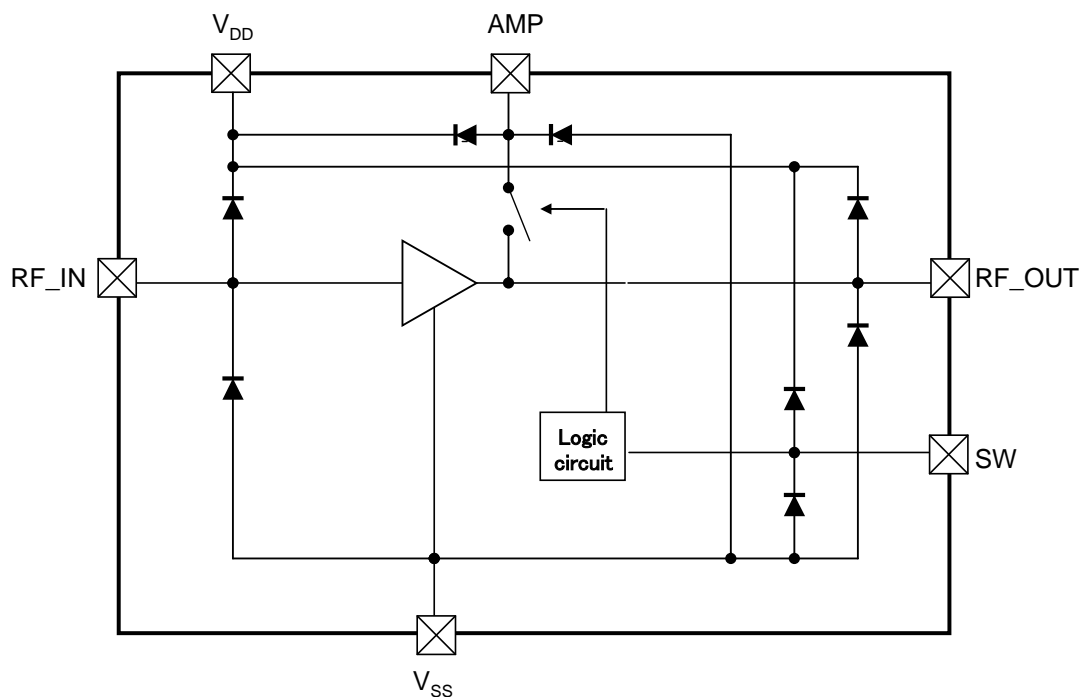
SON-6L  
(BOTOM VIEW)

## □ PIN ASSIGNMENT

PIN NUMBER	PIN NAME	FUNCTIONS
1	SW	Enable Switching
2	V <sub>SS</sub>	Ground
3	RF_IN	RF Signal Input
4	AMP	Amplifier circuit pin
5	RF_OUT	RF Signal Output
6	V <sub>DD</sub>	Power Supply

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## □ BLOCK DIAGRAM



## □ Absolute Maximum Ratings

PARAMETER	SYMBOL	RATING	UNITS
Power Supply Voltage	$V_{DD}$	4.4	V
Device Current	$I_{DD}$	120	mA
RF Input Power	$P_{IN}$	10	dBm
Total Power Dissipation[	$P_d$	400	mW
operating ambient temperature range	$T_a$	-40~+85	°C
storage temperature range	$T_{stg}$	-55~+125	°C

## ELECTRICAL CHARACTERISTICS

### DC Characteristics

Ta=25°C

PARAMETER	SYMBOL	CONDITIONS	Value of standard			UNITS	Measurem ent circuit
			MIN.	TYP.	MAX.		
Power Supply Pin Voltage	V <sub>DD</sub>	-	3.135	3.30	3.465	V	①
Current Circuit 1 (Enable Mode)	I <sub>DD</sub>	V <sub>DD</sub> =3.3V (SW=H)	-	45	-	mA	①
Current Circuit 2 (Disable Mode)	I <sub>DD</sub>	V <sub>DD</sub> =3.3V (SW=L)	-	0	-	uA	①
SW "H" Level Voltage	V <sub>sw(H)</sub>		0.9	1.8	3.465	V	①
SW "L" Level Voltage	V <sub>sw(L)</sub>			0	0.5	V	①

### AC Characteristics 1 (Enable Mode)

V<sub>DD</sub>=3.3V Ta=25°C SW(H)

PARAMETER	SYMBOL	CONDITIONS	Value of standard			UNITS	Measurem ent circuit
			MIN.	TYP.	MAX.		
Frequency	f		950		2150	MHz	
Power Gain	S <sub>21</sub>	f=1500MHz、Z <sub>0</sub> =50Ω	-	13	-	dB	②
Input Return Loss	S <sub>11</sub>	f=1500MHz、Z <sub>0</sub> =50Ω	-	24		dB	②
	V <sub>SWRi</sub>	f=1500MHz、Z <sub>0</sub> =50Ω		1.13			②
Output Return Loss	S <sub>22</sub>	f=1500MHz、Z <sub>0</sub> =50Ω	-	23		dB	②
	V <sub>SWRo</sub>	f=1500MHz、Z <sub>0</sub> =50Ω		1.15			②
Noise Figure *1	NF	f=1500MHz、Z <sub>0</sub> =50Ω	-	2.8		dB	③
Input Power IP3	I <sub>IP3</sub>	f=1500MHz、1501MHz Pin = -20dBm	-	16.2	-	dBm	④
Input Power @1dB Gain Compression	P <sub>1dB</sub>	f=1500MHz	-	3	-	dBm	②

\*1 NF is the value including the PCB loss.

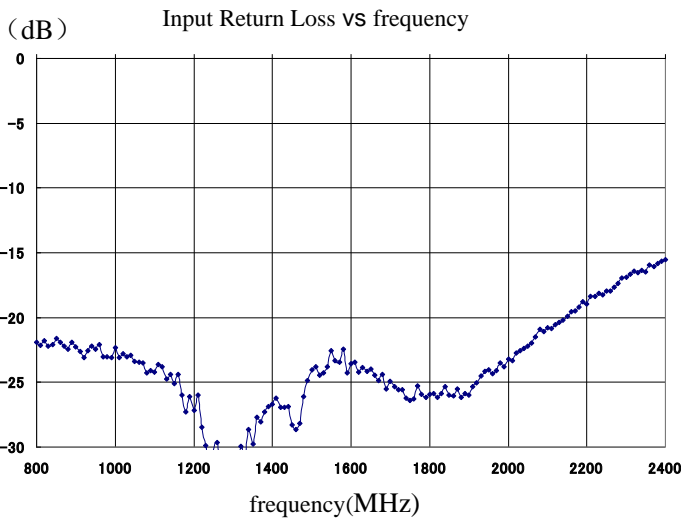
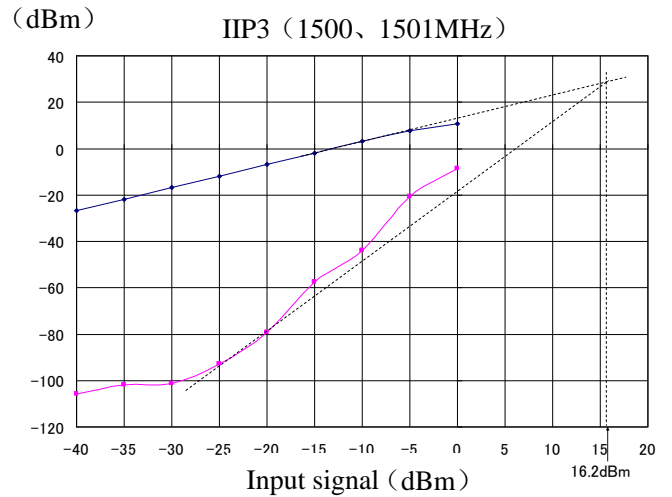
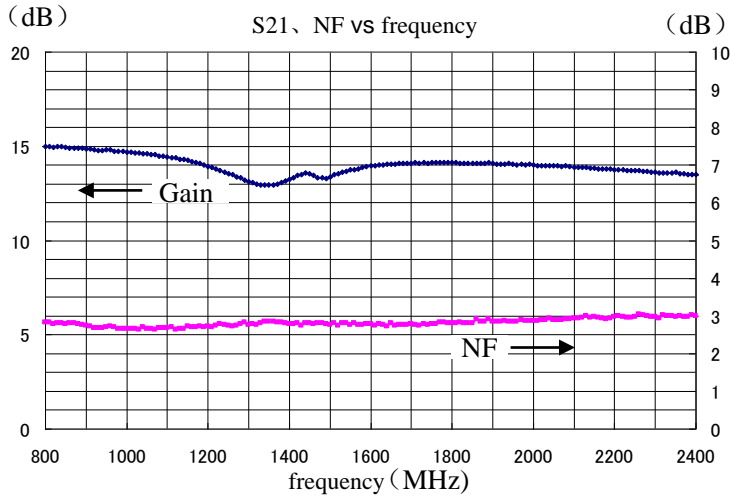
# HTT2402



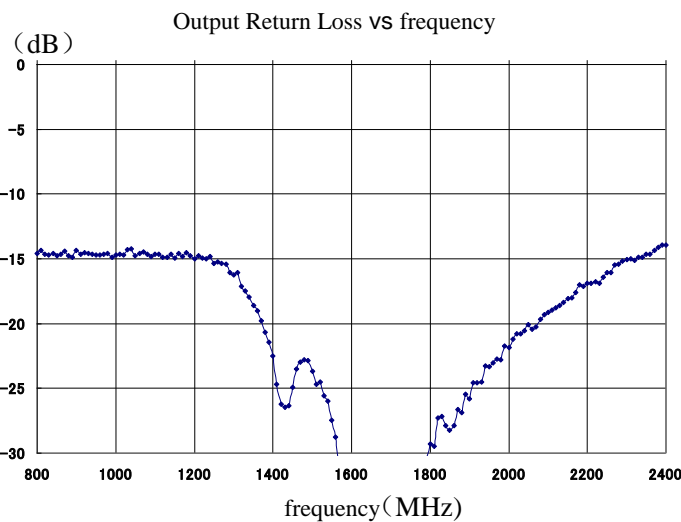
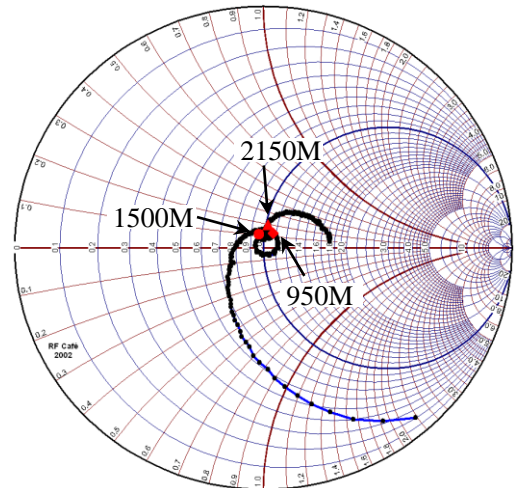
LOW-NOISE AMPLIFIER

## ● Operating Characteristics

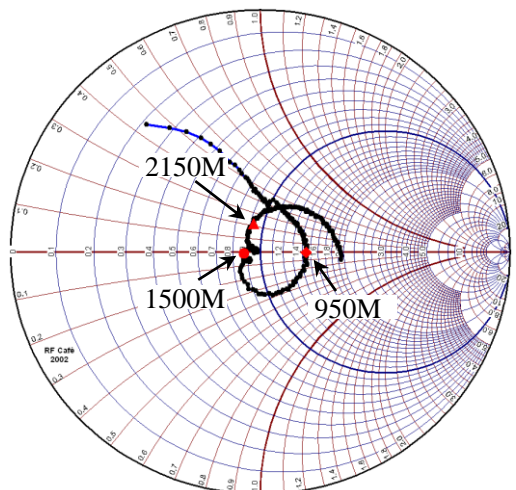
Condition:  $V_{DD}=3.3V$ 、 $T=25^{\circ}C$ 、 $Z=50\Omega$



Input Return Loss vs frequency (Smith chart)

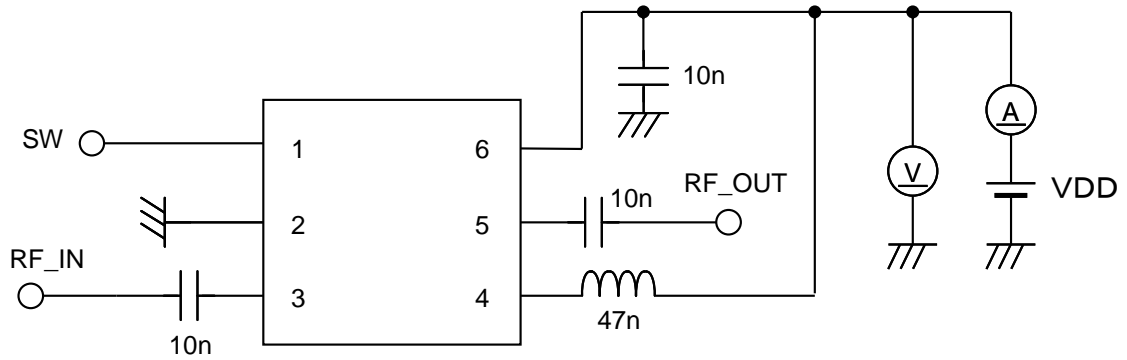


Output Return Loss vs frequency (Smith chart)



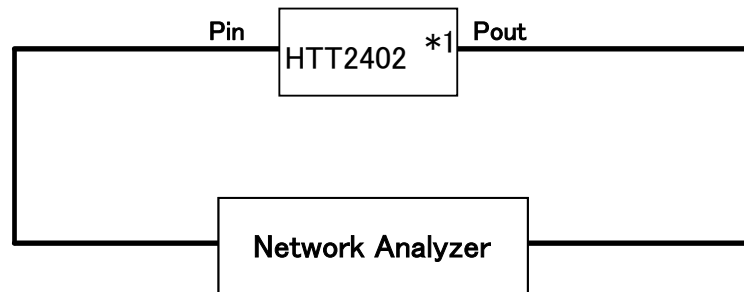
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Measurement Circuit 1 (DC Characteristics)



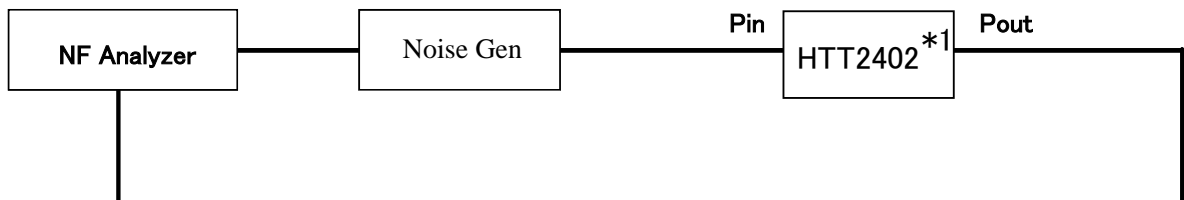
\* Pin/Pout 50Ω Termination

Measurement Circuit 2 (S11、S21、S22、S12、P1dB)



\*1: The block inside details refer to measurement circuit 5.

Measurement Circuit 3 (NF)

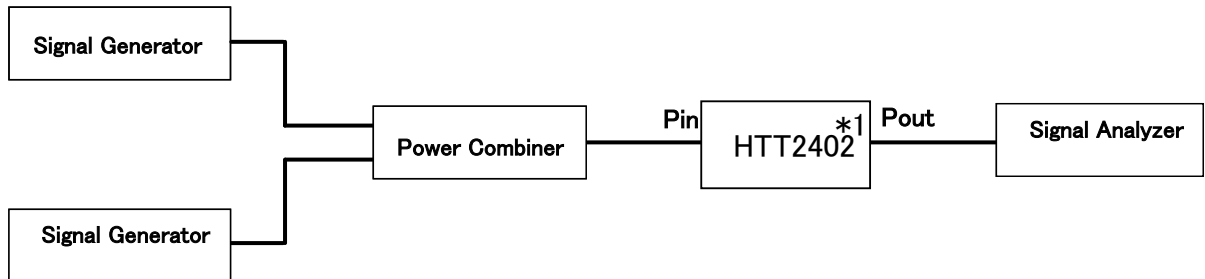


\*1: The block inside details refer to measurement circuit 5.

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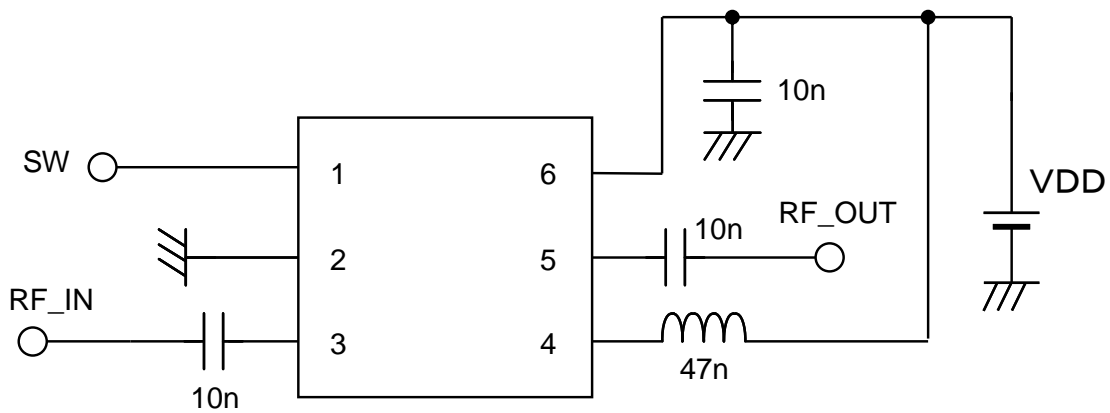
## □ The measurement Circuit

Measurement Circuit 4 (Input IP3)



\*1: The block inside details refer to measurement circuit 5.

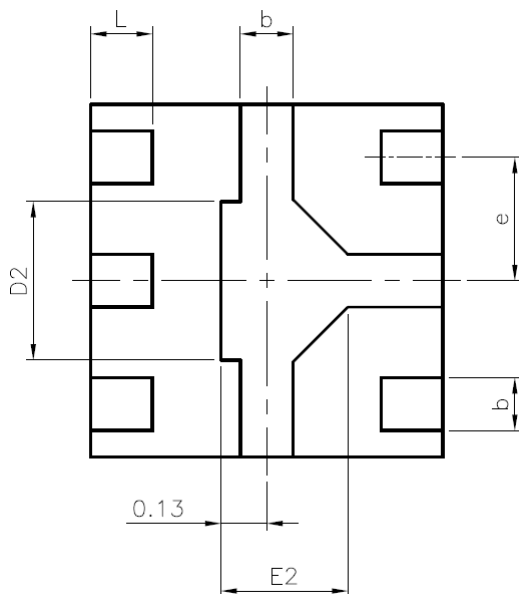
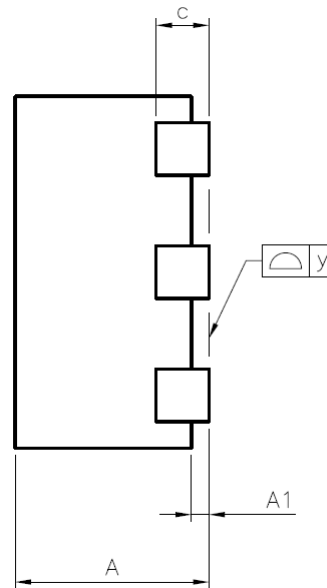
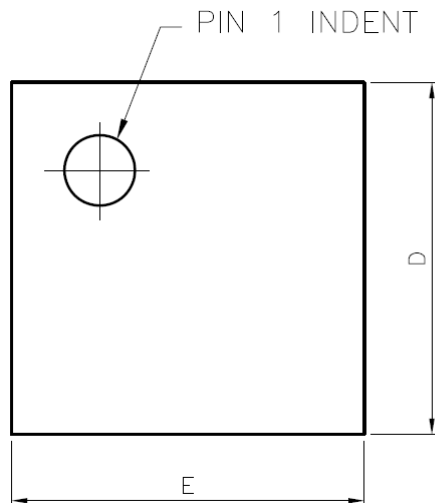
Measurement Circuit 5 (THH2402- block inside details)



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## PACKAGING INFORMATION

●SON-6L



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	0.50	0.55	0.60
A1	0.00	0.02	0.05
c	—	0.15 REF.	—
b	0.10	0.15	0.20
D	0.90	1.00	1.10
D2	0.40	0.45	0.50
E	0.90	1.00	1.10
E2	0.31	0.36	0.41
e	—	0.35	—
L	0.125	0.175	0.225
y	0.00	—	0.075