W-LAN/WiMAX Application

2. 2.6GHz BAND APPLICATION

2-1 SUMMARY

The characteristics of 2.6GHz band have evaluated as follows. The evaluation circuit structure and measured data are reviewed.

2-2-1 MEASURED DATA1 (DC)

General conditions: V_{DD}=V_{INV}=2.85V, T_a=+25°C, Z_s=Z_l=50Ω

Parameter	Symbol	Conditions	Measurement data	Unit
Operating Voltage	V_{DD}		2.85	V
Inverter Voltage	V_{INV}		2.85	V
Control Voltage (High)	V_{CTL}(H)		1.85	V
Control Voltage (Low)	V_{CTL}(L)		0	V
Operating current	I_{DD}1	RF OFF, V_{CTL}=1.85V	2.63	mA
Operating current	I_{DD}2	RF OFF, V_{CTL}=0V	0.03	uA
Inverter current	I_{INV}1	RF OFF, V_{CTL}=1.85V	98.1	uA
Inverter current	I_{INV}2	RF OFF, V_{CTL}=0V	18.1	uA
Control current	I_{CTL}	RF OFF, V_{CTL}=1.85V	4.5	uA

2-2-2 MEASURED DATA2 (LNA HIGH GAIN MODE)

General conditions: V_{DD}=V_{INV}=2.7V, V_{CTL}=1.85V, f_{RF}=2585MHz, T_a=+25°C, Z_s=Z_l=50Ω with application circuit

Parameter	Symbol	Conditions	Measurement data	Unit
Operating current	I_{DD}	RF OFF	2.47	mA
Small signal gain	Gain		15.3	dB
Noise figure	NF	Exclude PCB/Connector losses (0.11dB)	1.65	dB
Pin at 1dB compression point	P-1dB(IN)		-9.7	dBm
Input 3rd order intercept point	IIP3	f1=f_{RF}, f2=f_{RF}+100kHz, Pin=-32dBm	+2.4	dBm
RF Input port VSWR	VSWRi		1.95	
RF Output port VSWR	VSWRo		1.53	

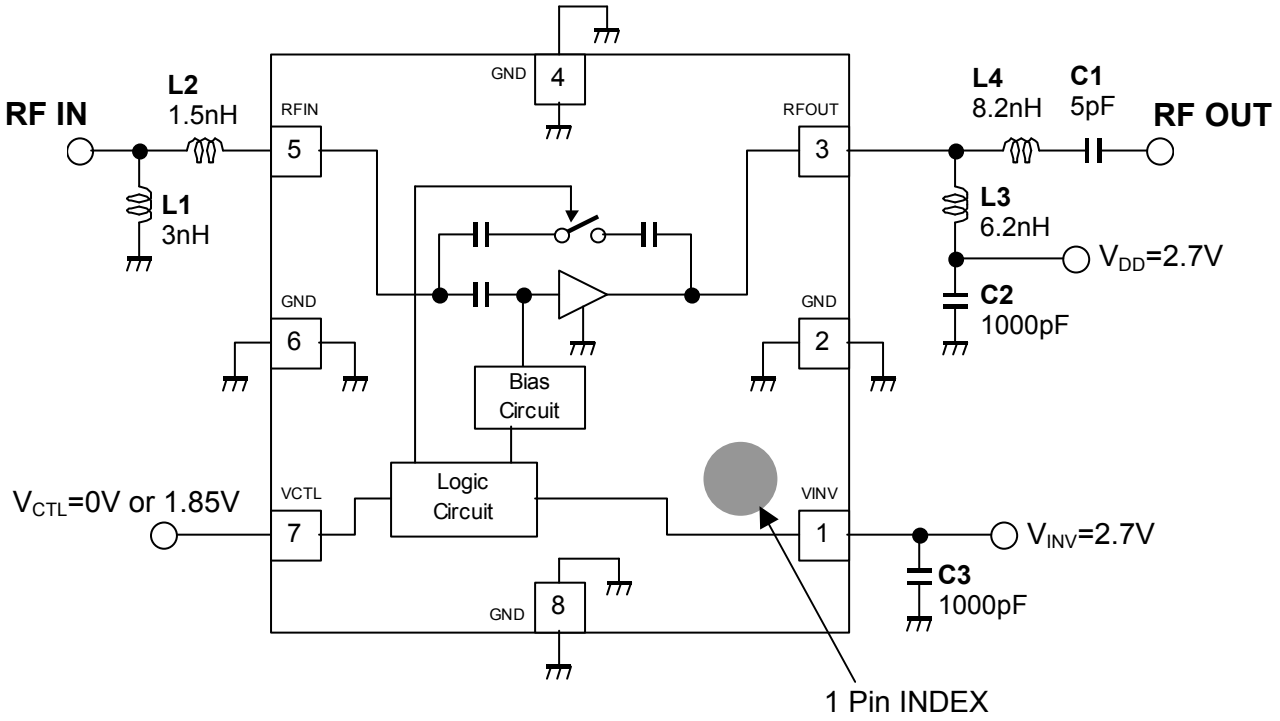
2-2-3 MEASURED DATA3 (LNA LOW GAIN MODE)

General conditions: V_{DD}=V_{INV}=2.7V, V_{CTL}=0V, f_{RF}=2585MHz, T_a=+25°C, Z_s=Z_l=50Ω with application circuit

Parameter	Symbol	Conditions	Measurement data	Unit
Small signal gain	Gain		-7.0	dB
Noise figure	NF	Exclude PCB/Connector losses (0.11dB)	7.0	dB
Pin at 1dB compression point	P-1dB(IN)		+11.0	dBm
Input 3rd order intercept point	IIP3	f1=f_{RF}, f2=f_{RF}+100kHz, Pin=-16dBm	+14.8	dBm
RF Input port VSWR	VSWRi		1.12	
RF Output port VSWR	VSWRo		1.38	

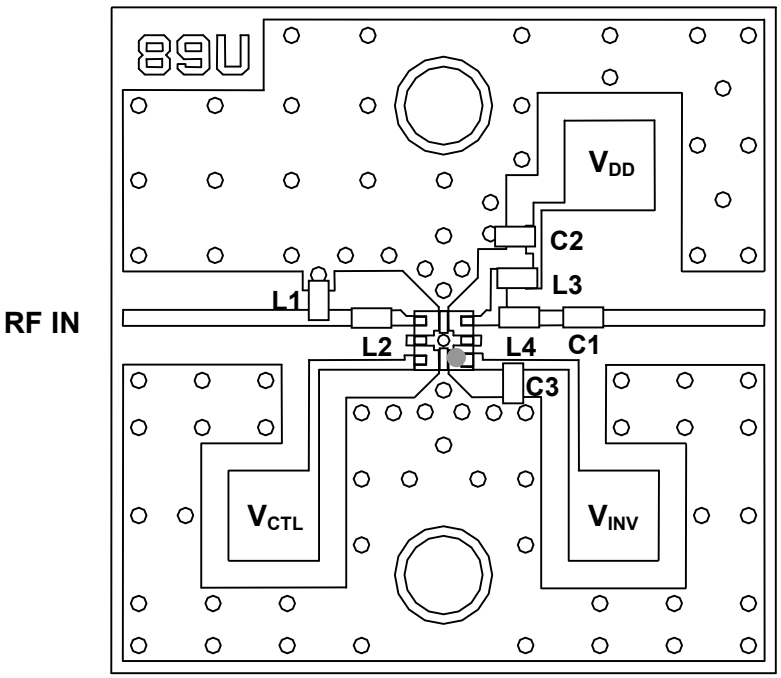
2-3 APPLICATION CIRCUIT

(Top View)



2-4 PCB DESIGN

(Top View)



Parts List

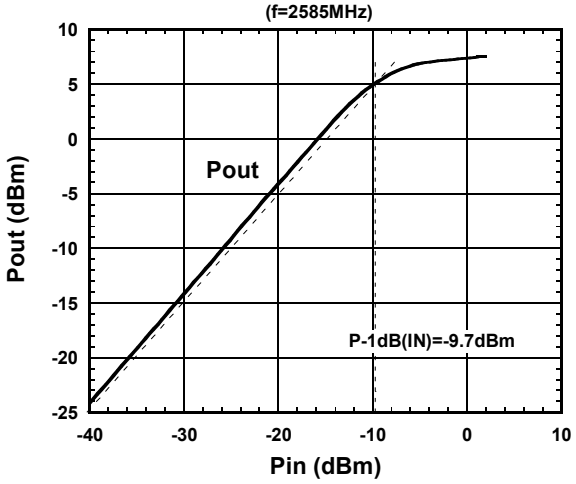
Parts ID	Comment
L1~L4	TAIYO-YUDEN (HK1005 Series)
C1~C3	MURATA (GRM15 Series)

PCB (FR-4):
t=0.2mm
MICROSTRIP LINE WIDTH
=0.4mm (Z_0=50Ω)
PCB SIZE=17.0mm x 17.0mm

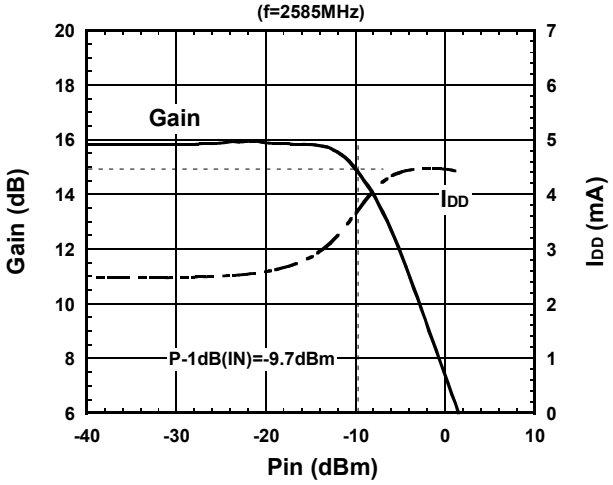
2-5-1 TYPICAL CHARACTERISTICS (LNA HIGH GAIN MODE)

Condition: Ta=+25°C, V_{DD}=V_{INV}=2.7V, V_{CTL}=1.85V, Zs=Zl=50Ω

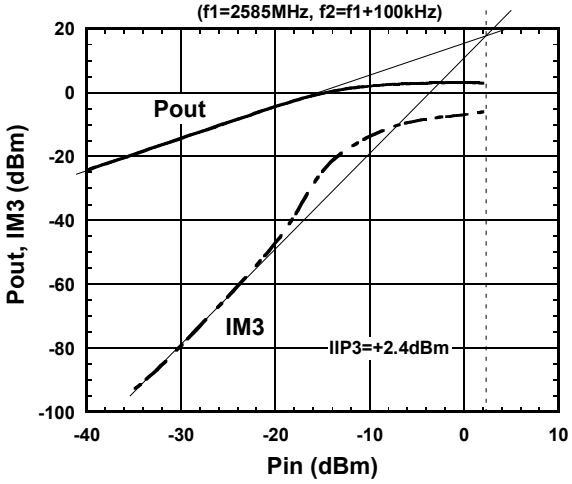
NJG1126HB6 @High Gain
Pout vs. Pin
(f=2585MHz)



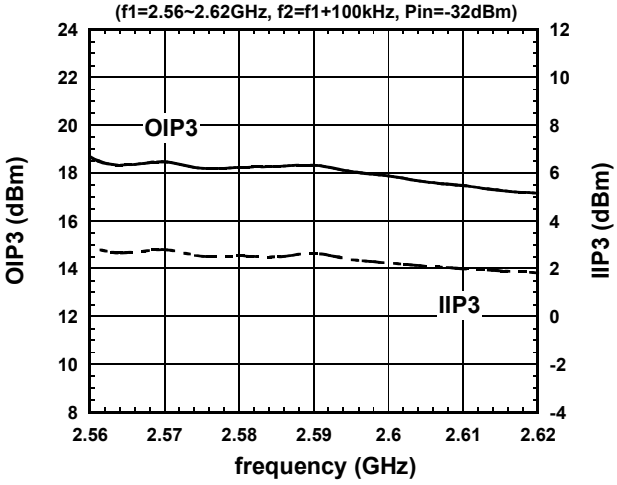
NJG1126HB6 @High Gain
Gain, I_{DD} vs. Pin
(f=2585MHz)



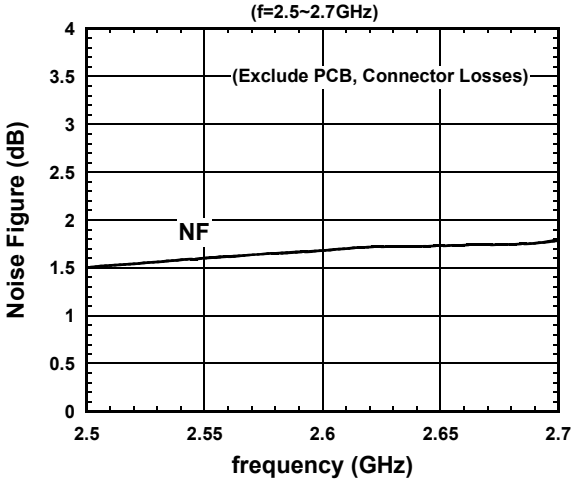
NJG1126HB6 @High Gain
Pout, IM3 vs. Pin
(f1=2585MHz, f2=f1+100kHz)



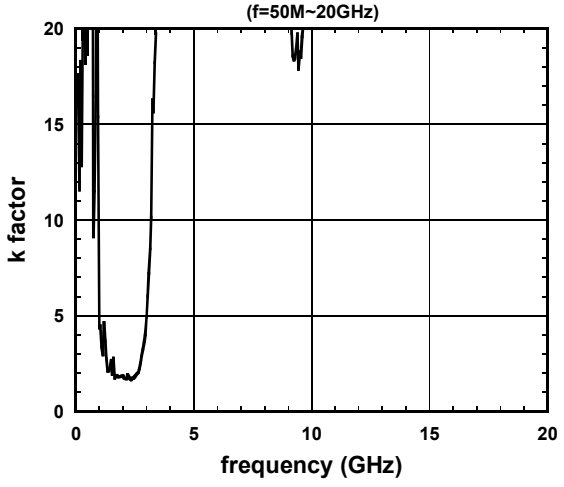
NJG1126HB6 @High Gain
OIP3, IIP3 vs. frequency
(f1=2.56~2.62GHz, f2=f1+100kHz, Pin=-32dBm)



NJG1126HB6 @High Gain
NF vs. frequency
(f=2.5~2.7GHz)

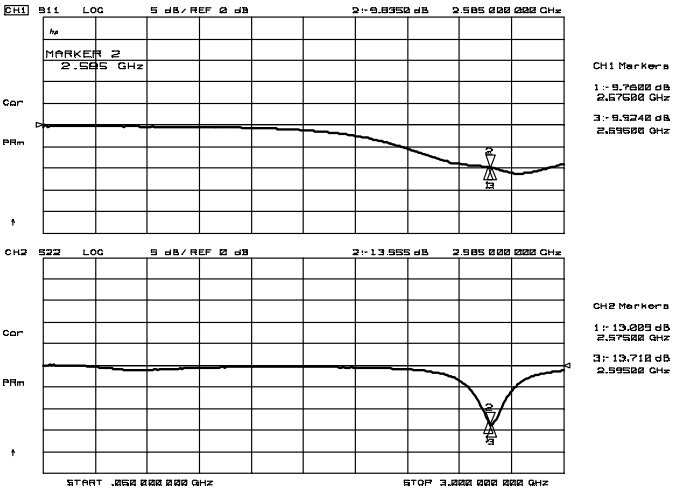


NJG1126HB6 @High Gain
k factor vs. frequency
(f=50M~20GHz)

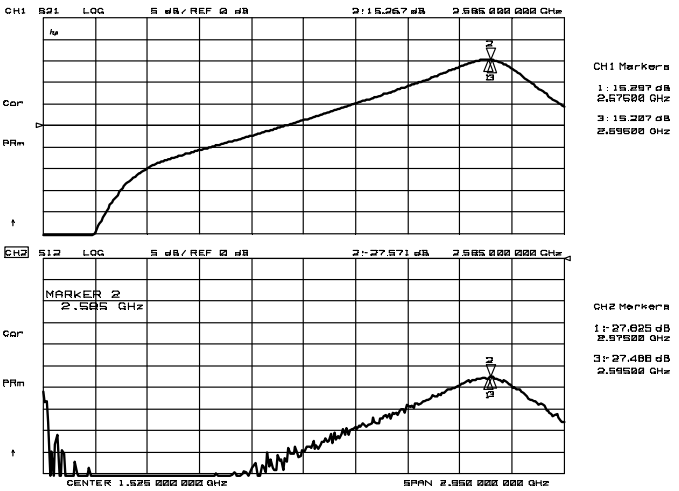


2-5-2 TYPICAL CHARACTERISTICS (LNA HIGH GAIN MODE)

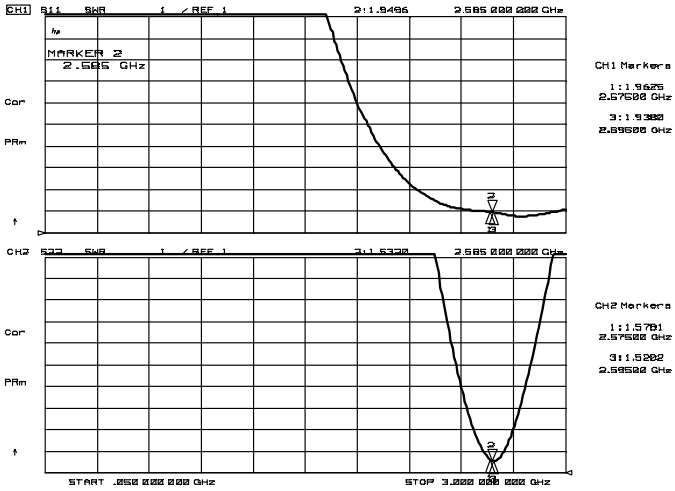
Condition: Ta=+25°C, V_{DD}=V_{INV}=2.7V, V_{CTL}=1.85V, Zs=Zl=50Ω



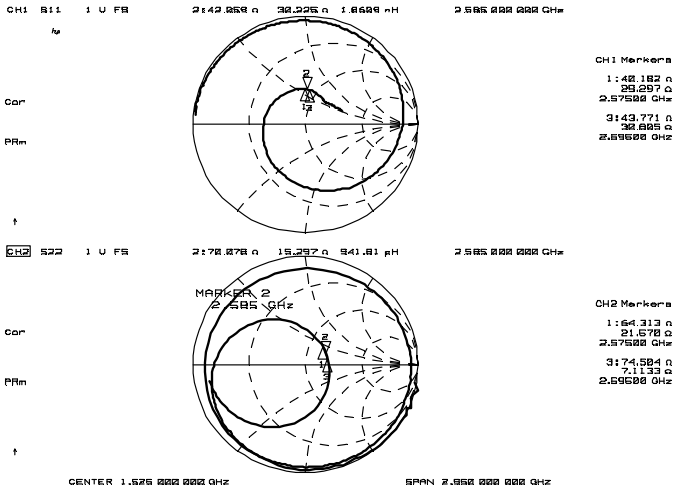
S11, S22



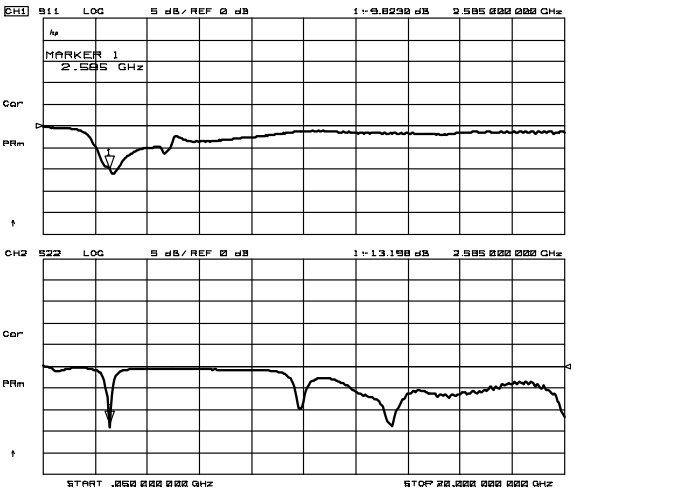
S21, S12



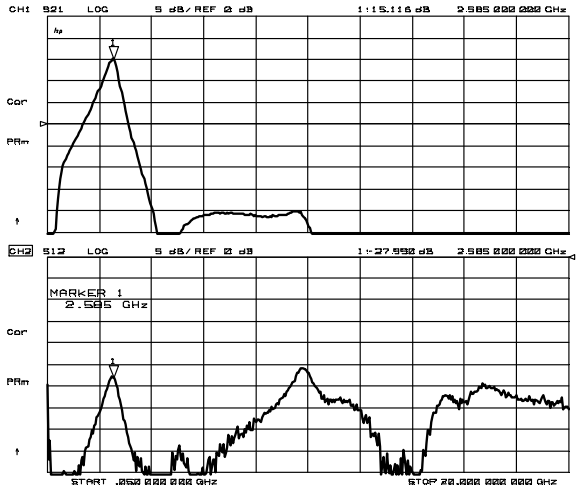
VSWR



Zin, Zout



S11, S22 (f=50MHz ~ 20GHz)

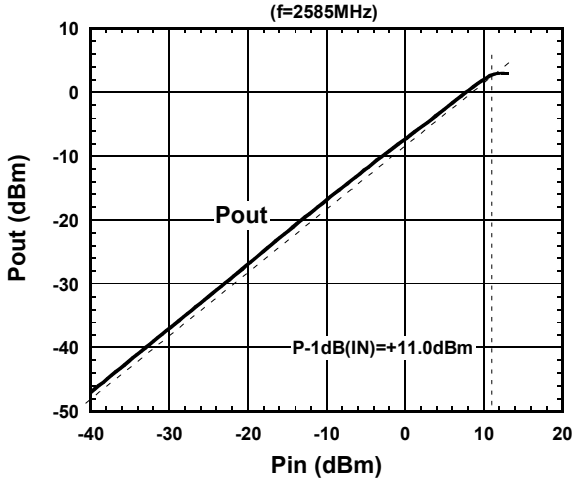


S21, S12 (f=50MHz ~ 20GHz)

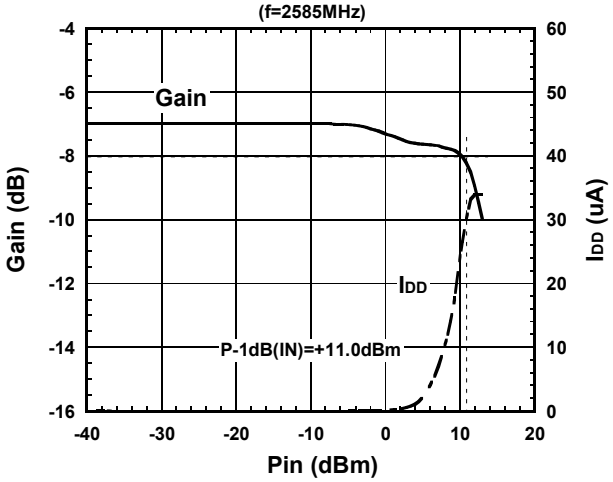
2-5-3 TYPICAL CHARACTERISTICS (LNA LOW GAIN MODE)

Condition: Ta=+25°C, V_{DD}=V_{INV}=2.7V, V_{CTL}=0V, Zs=Zl=50Ω

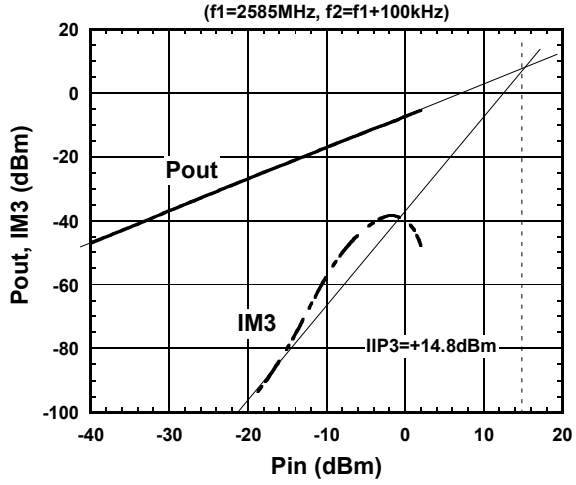
NJG1126HB6 @Low Gain
Pout vs. Pin
(f=2585MHz)



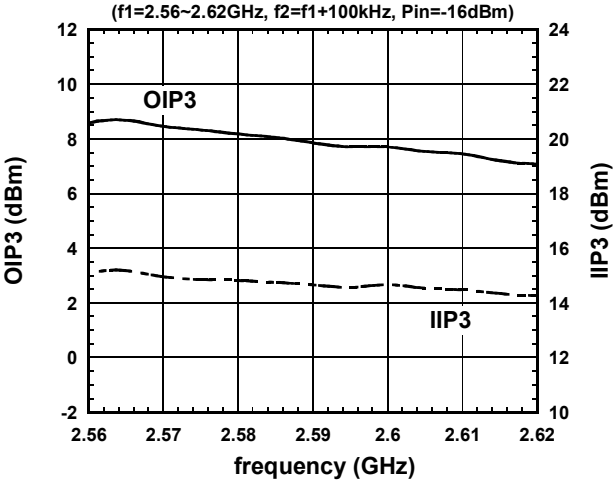
NJG1126HB6 @Low Gain
Gain, IDD vs. Pin
(f=2585MHz)



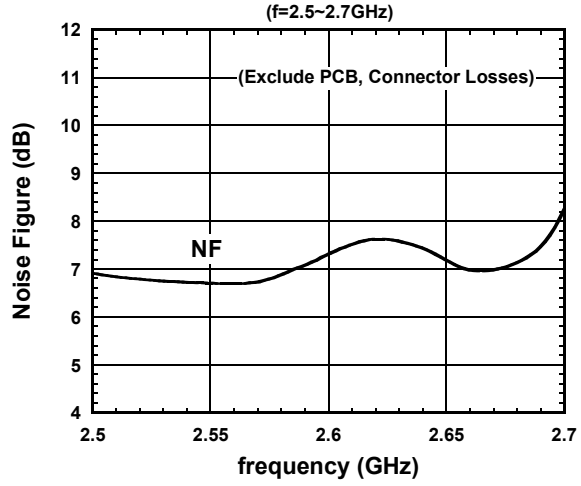
NJG1126HB6 @Low Gain
Pout, IM3 vs. Pin
(f1=2585MHz, f2=f1+100kHz)



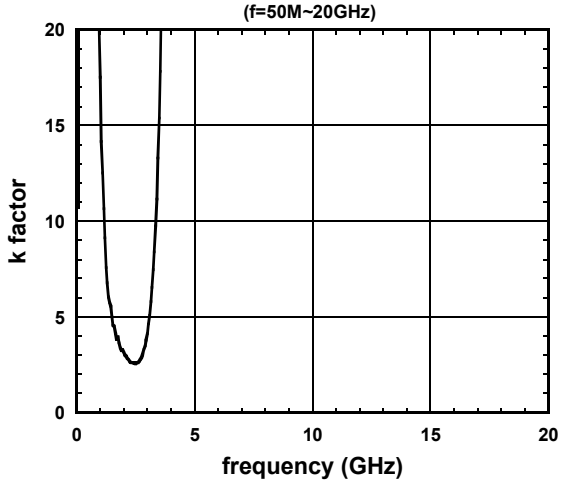
NJG1126HB6 @Low Gain
OIP3, IIP3 vs. frequency
(f1=2.56~2.62GHz, f2=f1+100kHz, Pin=-16dBm)



NJG1126HB6 @Low Gain
NF vs. frequency
(f=2.5~2.7GHz)

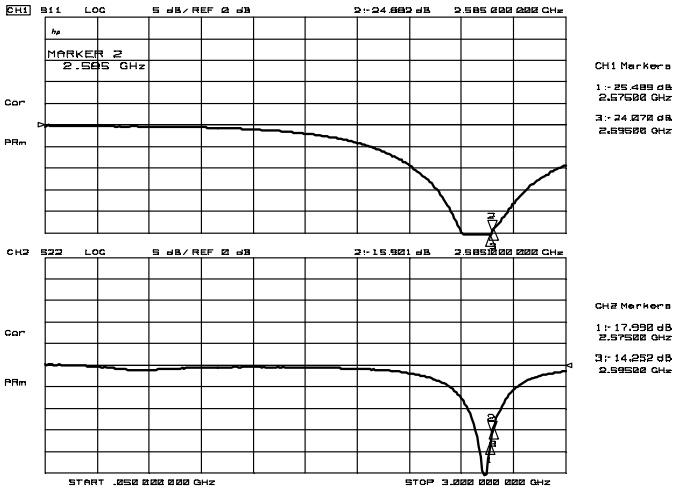


NJG1126HB6 @Low Gain
k factor vs. frequency
(f=50M~20GHz)

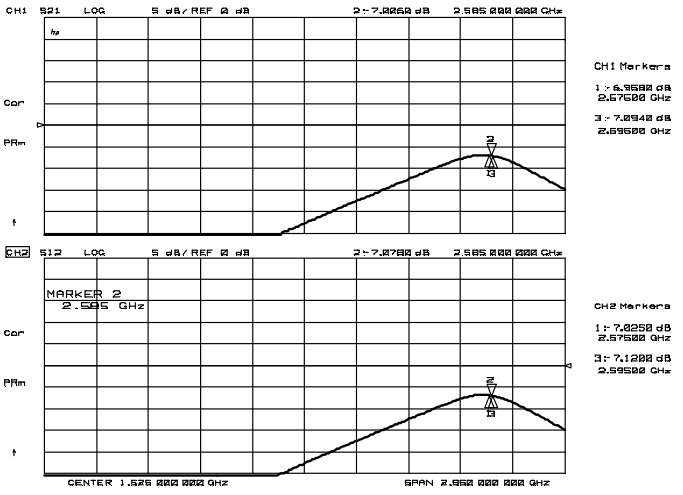


2-5-4 TYPICAL CHARACTERISTICS (LNA LOW GAIN MODE)

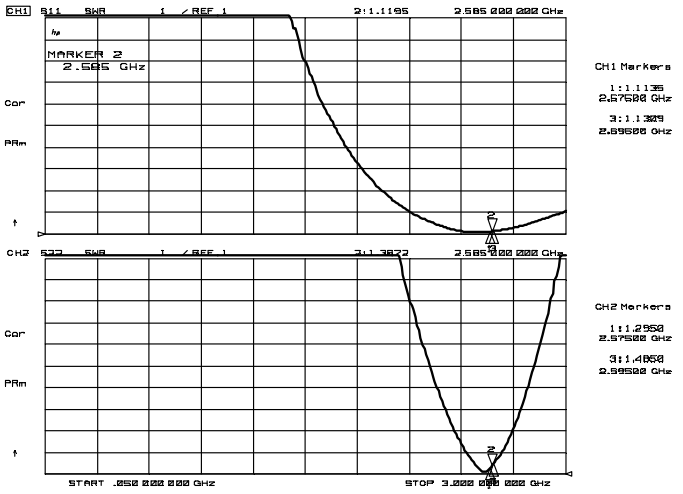
Condition: Ta=+25°C, V_{DD}=V_{INV}=2.7V, V_{CTL}=0V, Zs=Zl=50Ω



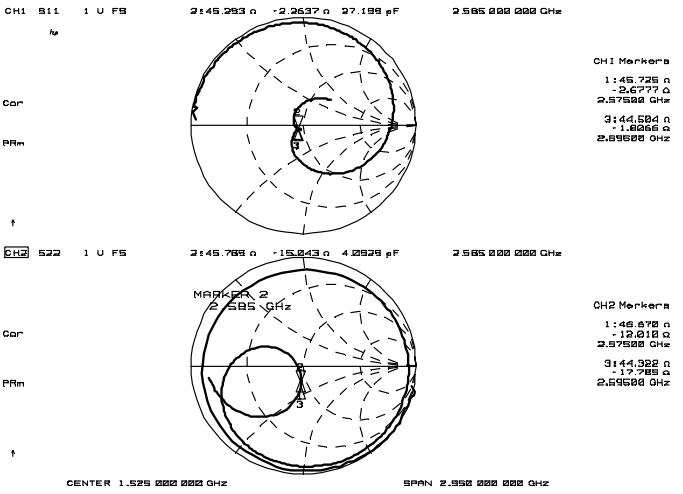
S11, S22



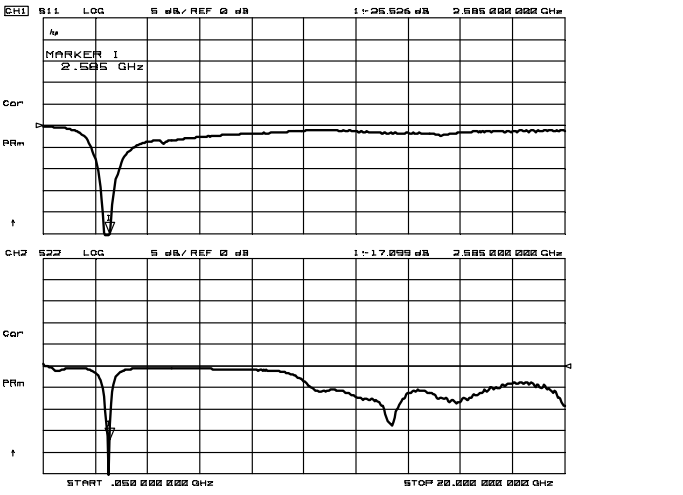
S21, S12



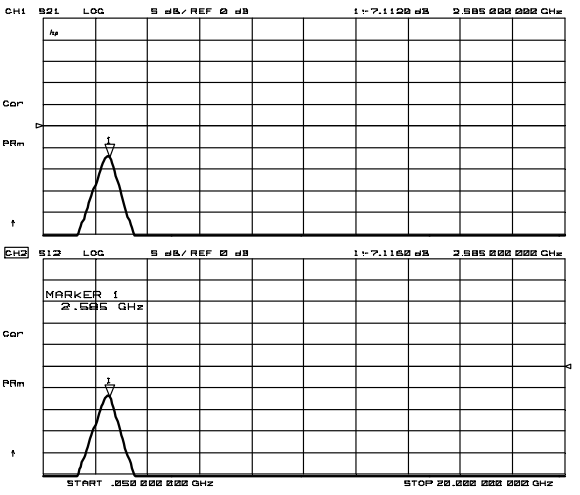
VSWR



Zin, Zout



S11, S22 (f=50MHz ~ 20GHz)



S21, S12 (f=50MHz ~ 20GHz)