2.1GHz Band LNA GaAs MMIC

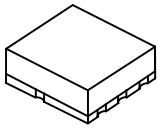
■GENERAL DESCRIPTION

NJG1126HB6 is a LNA IC designed for 2.1GHz band W-CDMA cellular phone . This IC has the function which bypasses LNA, and high gain mode or low gain mode can be chosen.

High IIP3 and a low noise are achieved at the High gain mode. And low current consumption can be achieved at the low gain mode because LNA enters the state of the standby.

A small and thin package of USB8 is adopted.

■PACKAGE OUTLINE



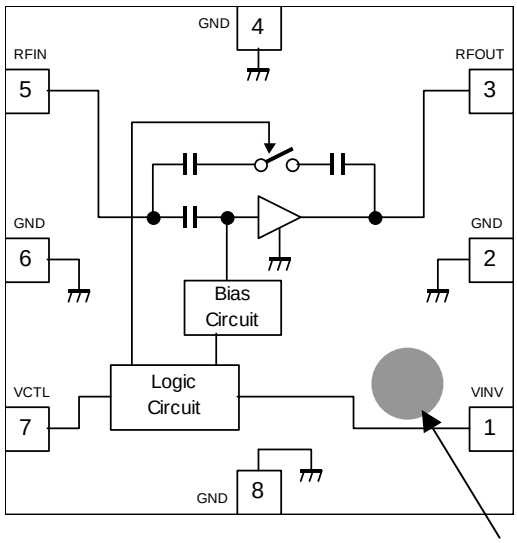
NJG1126HB6

■FEATURES

●Low voltage operation	+2.7V typ.	
●Low CTL voltage operation	+1.85V typ.	
●Low current consumption	2.2mA typ.	@V_{CTL}=1.85V
	1uA typ.	@V_{CTL}=0V
●High gain	16.5dB typ.	@V_{CTL}=1.85V, f_{RF} =2140MHz
●Low noise figure	1.4dB typ.	@V_{CTL}=1.85V, f_{RF} =2140MHz
●Pin at 1dB Gain Compression point	-12.0dBm typ.	@V_{CTL}=1.85V, f_{RF} =2140MHz
	+11.0dBm typ.	@V_{CTL}=0V, f_{RF}=2140MHz
●High input IP3	0dBm typ.	@V_{CTL}=1.85V, f_{RF} =2140MHz
	+16.0dBm typ.	@V_{CTL}=0V, f_{RF}=2140MHz
●Small package	USB8-B6 (Package size: 1.5mmx1.5mmx0.55mm typ.)	

■PIN CONFIGURATION

(Top View)



1 Pin INDEX

Pin Connection
1. V_{INV}
2. GND
3. RF OUT
4. GND
5. RF IN
6. GND
7. V_{CTL}
8. GND

Note: Specifications and description listed in this catalog are subject to change without prior notice.

■ABSOLUTE MAXIMUM RATINGS

T_a=+25°C, Z_s=Z_l=50Ω

PARAMETERS	SYMBOL	CONDITIONS	RATINGS	UNITS
Supply voltage	V_{DD}		5.0	V
Inverter supply voltage	V_{INV}		5.0	V
Control voltage	V_{CTL}		5.0	V
Input power	Pin	V_{DD}=2.85V	+15	dBm
Power dissipation	P_D	on PCB board, Tjmax=150°C	135	mW
Operating temperature	T_{opr}		-40~+85	°C
Storage temperature	T_{stg}		-55~+150	°C

■ELECTRICAL CHARACTERISTICS 1 (DC)

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

PARAMETERS	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Operating voltage	V_{DD}		2.5	2.85	3.2	V
Inverter supply voltage	V_{INV}		2.5	2.85	3.2	V
Control voltage (High)	V_{CTL}(H)		1.5	1.85	V_{INV}+0.3	V
Control voltage (Low)	V_{CTL}(L)		0	0	0.3	V
Operating current1 (LNA High Gain Mode)	I_{DD}1	RF OFF, V_{CTL}=1.85V	-	2.2	3.2	mA
Operating current2 (LNA High Gain Mode)	I_{DD}2	RFOFF, V_{CTL}=0V	-	1	5	uA
Inverter current1 (LNA High Gain Mode)	I_{INV}1	RF OFF, V_{CTL}=1.85V	-	90	150	uA
Inverter current2 (LNA High Gain Mode)	I_{INV}2	RF OFF, V_{CTL}=0V	-	16	50	uA
Control current	I_{CTL}	RF OFF, V_{CTL}=1.85V	-	5	20	uA

■**ELECTRICAL CHARACTERISTICS 2 (LNA High Gain Mode)**

(General Conditions: V_{DD}=V_{INV}=2.7V, V_{CTL}=1.85V, freq=2140MHz, T_a=+25°C, Z_S=Z_l=50Ω)

PARAMETERS	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Small signal gain1	Gain1		15.0	16.5	19.0	dB
Noise figure1	NF1	Exclude PCB & connector losses (IN: 0.09dB)	-	1.4	1.7	dB
1dB gain compression output power1	$P_{-1dB(IN)}1$		-15.5	-12.0	-	dBm
3rd order Input Intercept Point1	IIP3_1	f1=fRF, f2=fRF+100kHz, Pin=-32dBm	-5.0	0	-	dBm
RF IN VSWR1	$VSWR_i1$		-	1.6	2.2	-
RF OUT VSWR1	$VSWR_o1$		-	1.5	2.2	-

■**ELECTRICAL CHARACTERISTICS 2 (LNA Low Gain Mode)**

(General Conditions: V_{DD}=V_{INV}=2.7V, V_{CTL}=0V, freq=2140MHz, T_a=+25°C, Z_S=Z_l=50Ω)

PARAMETERS	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Small signal gain2	Gain2		-10.0	-7.0	-5.5	dB
Noise figure2	NF2	Exclude PCB & connector losses (IN: 0.09dB)	-	7.0	10.0	dB
1dB gain compression output power2	$P_{-1dB(IN)}2$		+4.5	+11.0	-	dBm
3rd order Input Intercept Point2	IIP3_2	F1=fRF, f2=fRF+100kHz, Pin=-16dBm	0	+16.0	-	dBm
RF IN VSWR2	$VSWR_i2$		-	1.5	2.0	-
RF OUT VSWR2	$VSWR_o2$		-	1.5	2.0	-

■TERMINAL INFOMATION

No.	SYMBOL	DESCRIPTION
1	VINV	Supply voltage terminal for internal logic circuit (inverter). Please place a bypass capacitor between this and GND for avoiding RF noise from outside.
2	GND	Ground terminal.
3	RFOUT	RF signal comes out from this terminal, and goes through an external matching circuit connected to this. Inductor L3 as shown in the application circuit is a part of an external matching circuit, and also provide DC power to LNA. Capacitor C2 as shown in the application circuit is a bypass capacitor.
4	GND	Ground terminal.
5	RFIN	RF input signal is input to this terminal through an external matching circuit connected to this terminal. A DC blocking capacitor is not required.
6	GND	Ground terminal.
7	VCTL	Control port. A logic control signal is required to select High or Low gain mode of LNA. This terminal is set to more than +1.5V of logical high level for High gain mode of LNA, and set to 0~+0.3V of logical low level for Low gain mode.
8	GND	Ground terminal.

CAUTION

1) Ground terminal (No.2, 4, 6, 8) should be connected to the ground plane as close as possible for excellent RF performance, because distance to GND makes parasitic inductance.

■TRUTH TABLE

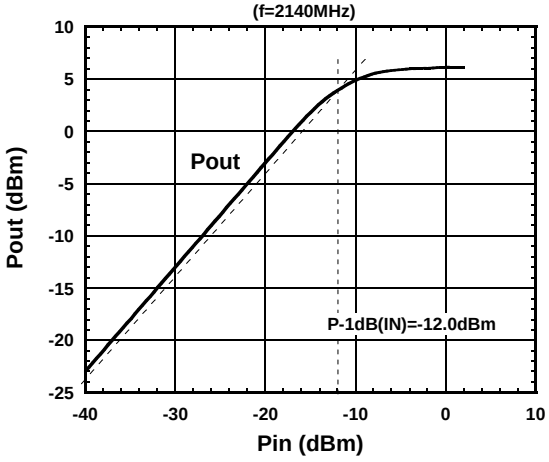
"H"=V_{CTL}(H), "L"=V_{CTL}(L)

V_{CTL}	Gain Mode	LNA
L	Low	bypass
H	High	pass

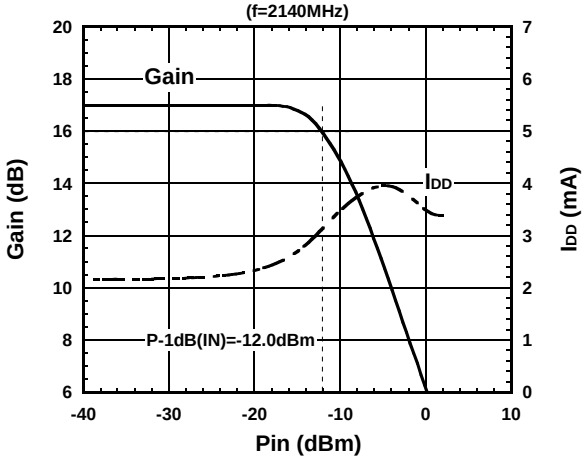
■ELECTRICAL CHARACTERISTICS (LNA High Gain Mode)

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

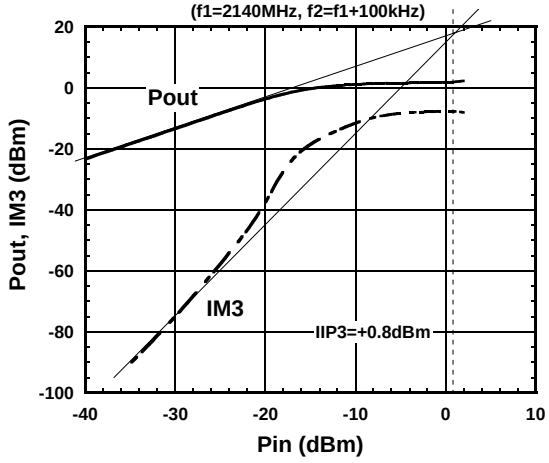
Pout vs. Pin



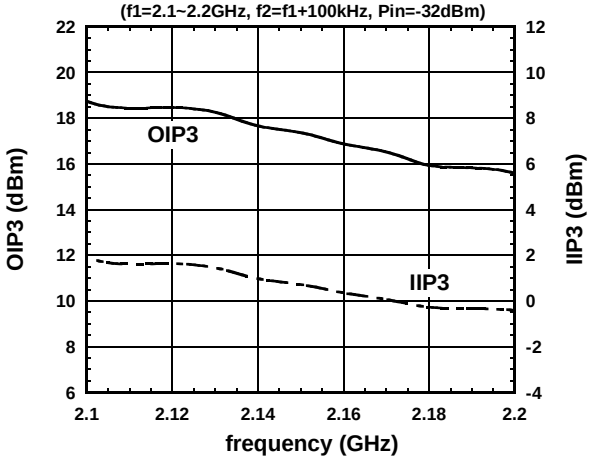
Gain, IDD vs. Pin



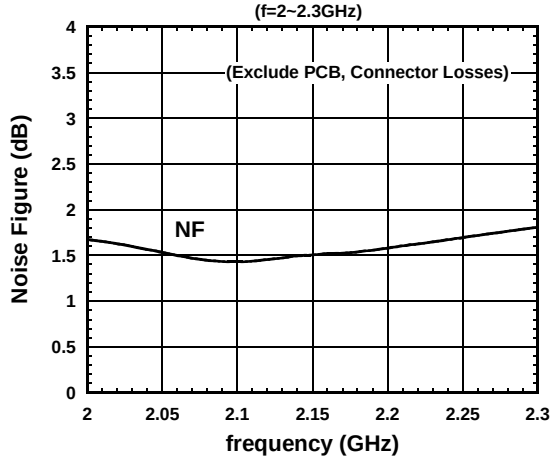
Pout, IM3 vs. Pin



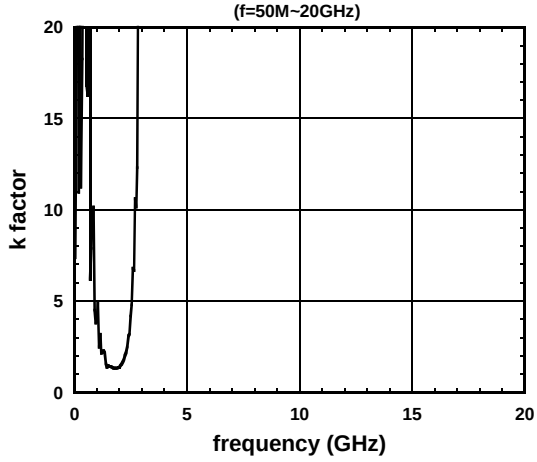
OIP3, IIP3 vs. frequency



NF vs. frequency



k factor vs. frequency

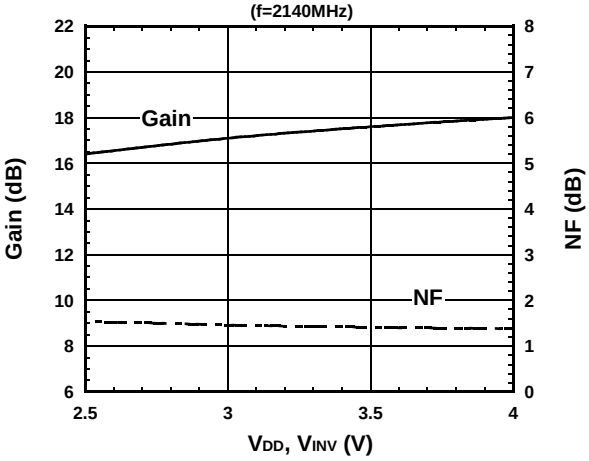


■ELECTRICAL CHARACTERISTICS (LNA High Gain Mode)

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

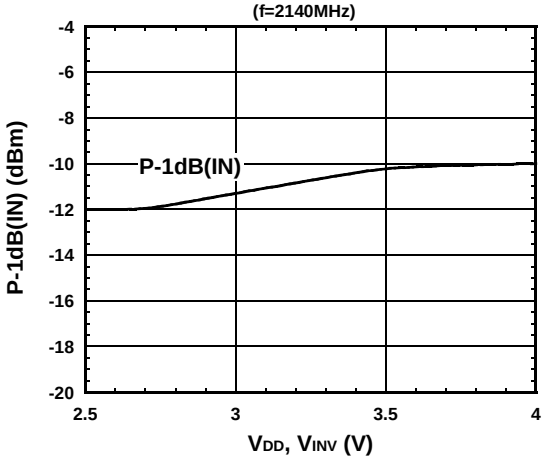
Gain, NF vs. VDD, VINV

(f=2140MHz)



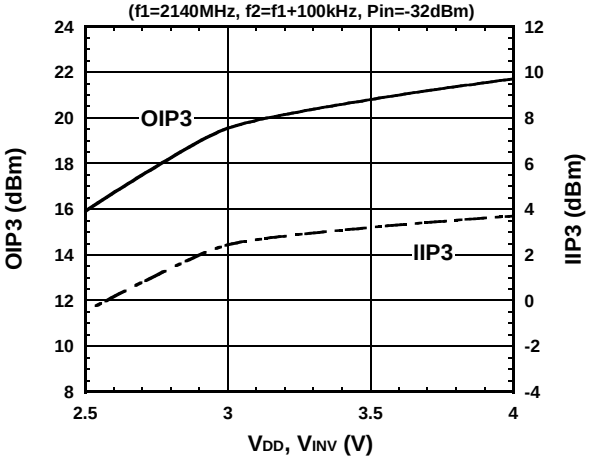
P-1dB(IN) vs. VDD, VINV

(f=2140MHz)



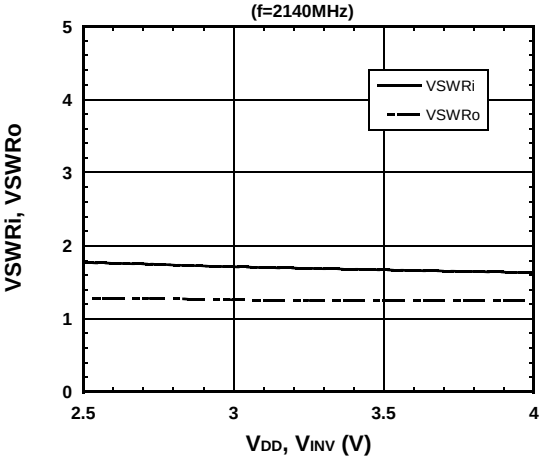
OIP3, IIP3 vs. VDD, VINV

(f1=2140MHz, f2=f1+100kHz, Pin=-32dBm)



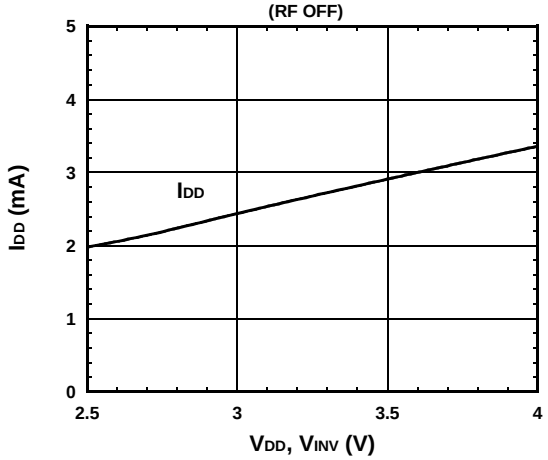
VSWR vs. VDD, VINV

(f=2140MHz)



IDD vs. VDD, VINV

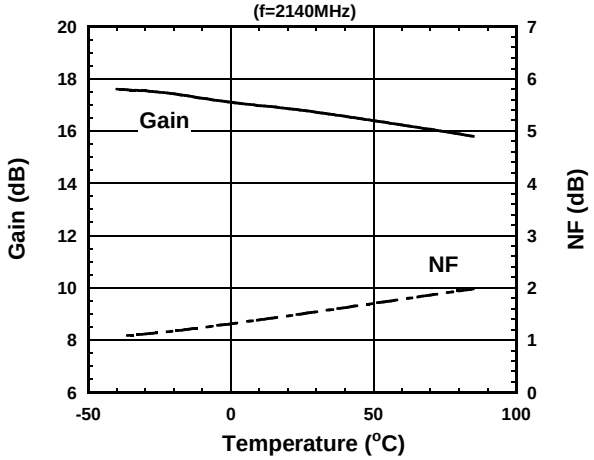
(RF OFF)



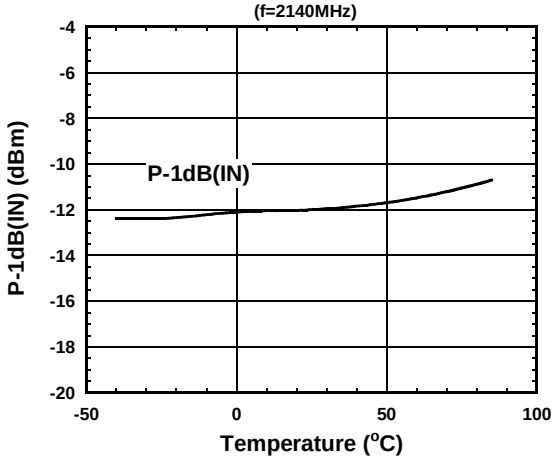
■ELECTRICAL CHARACTERISTICS (LNA High Gain Mode)

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

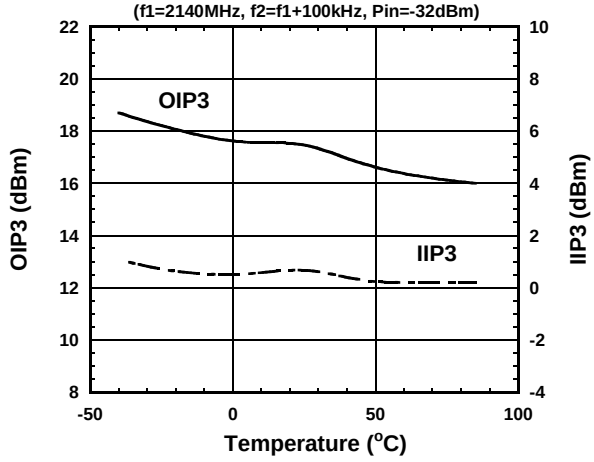
Gain, NF vs. Temperature
(f=2140MHz)



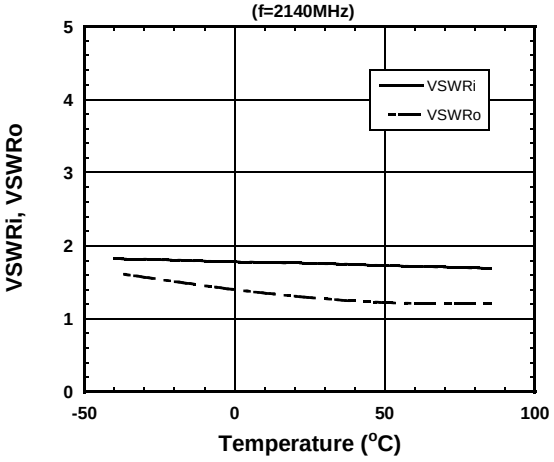
P-1dB(IN) vs. Temperature
(f=2140MHz)



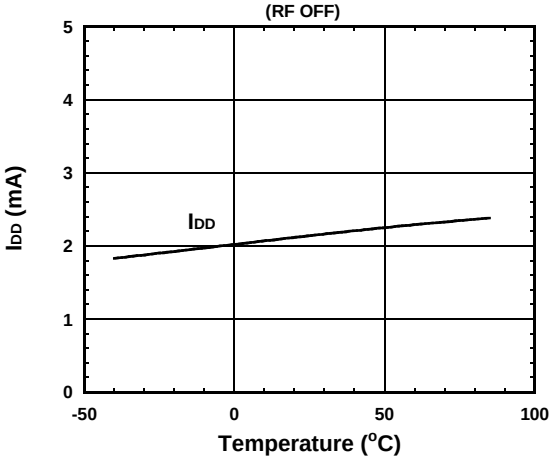
OIP3, IIP3 vs. Temperature
(f1=2140MHz, f2=f1+100kHz, Pin=-32dBm)



VSWR vs. Temperature
(f=2140MHz)

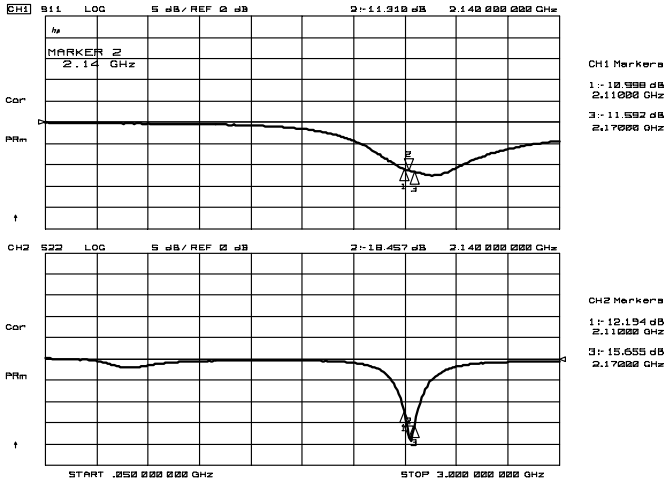


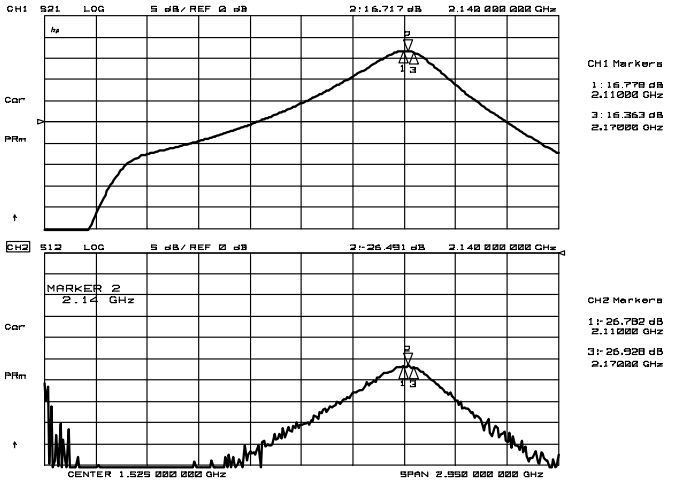
I_{DD} vs. Temperature
(RF OFF)

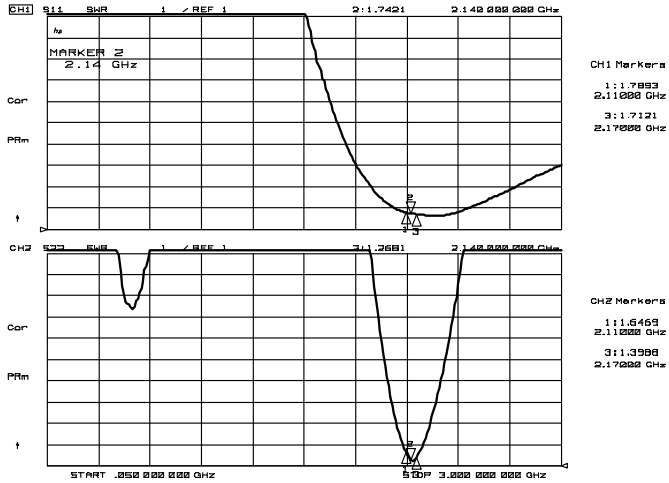


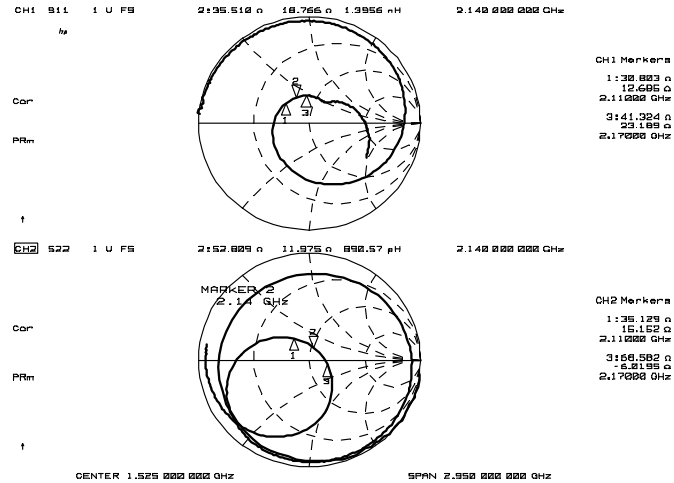
■ELECTRICAL CHARACTERISTICS (LNA High Gain Mode)

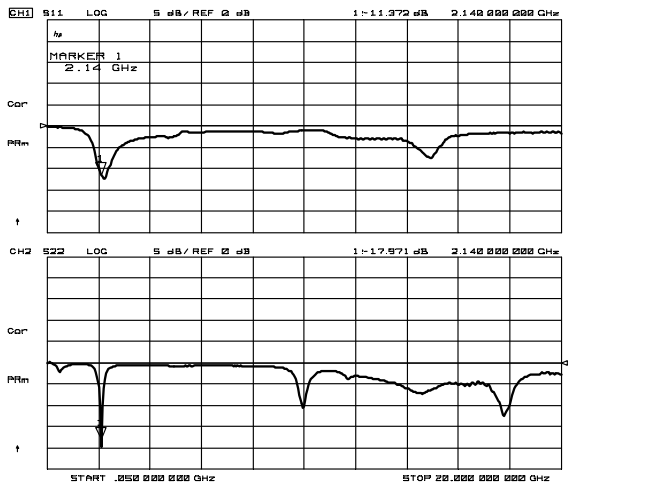
General Conditions: Ta=+25°C, V_{DD}=V_{INV}=2.7V, V_{CTL}=1.85V, Zs=Zl=50Ω

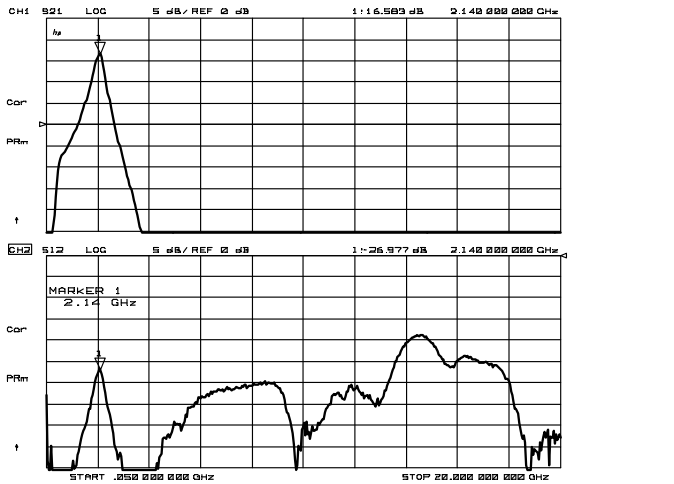








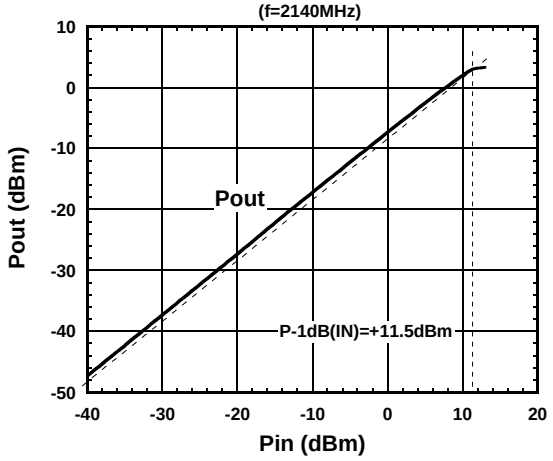




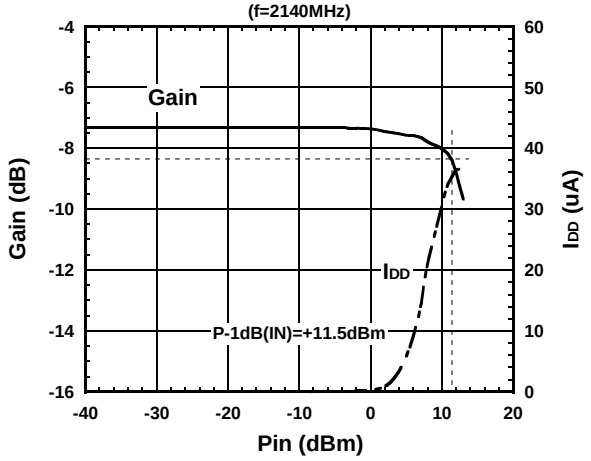
■ELECTRICAL CHARACTERISTICS (LNA Low Gain Mode)

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

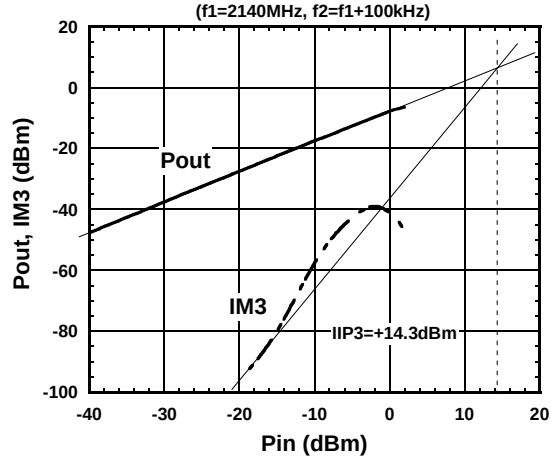
Pout vs. Pin
(f=2140MHz)



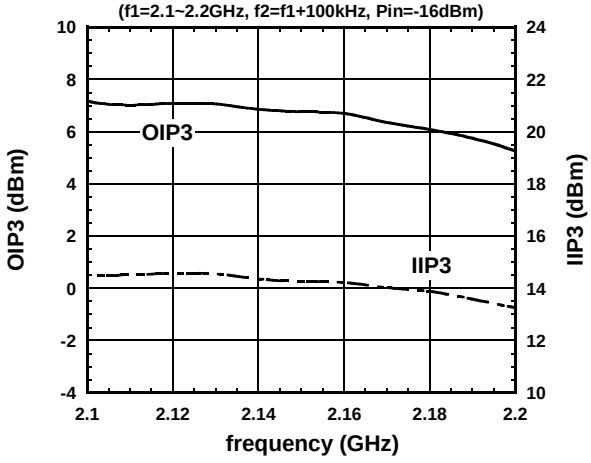
Gain, IDD vs. Pin
(f=2140MHz)



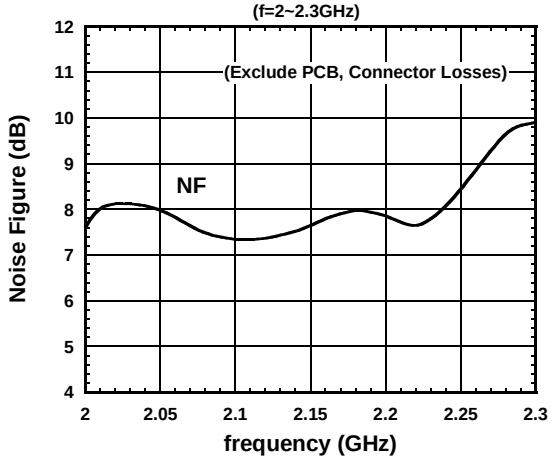
Pout, IM3 vs. Pin
(f1=2140MHz, f2=f1+100kHz)



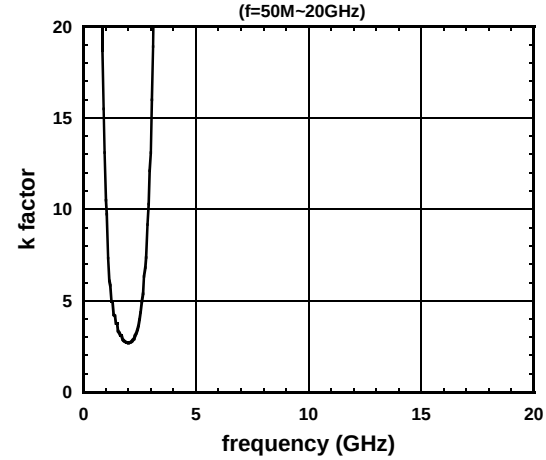
OIP3, IIP3 vs. frequency
(f1=2.1~2.2GHz, f2=f1+100kHz, Pin=-16dBm)



NF vs. frequency
(f=2~2.3GHz)



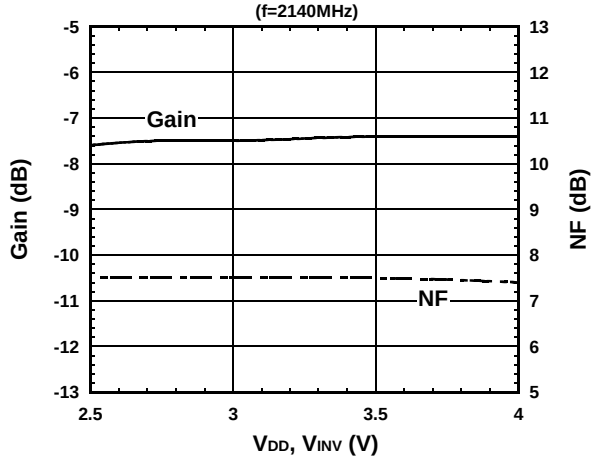
k factor vs. frequency
(f=50M~20GHz)



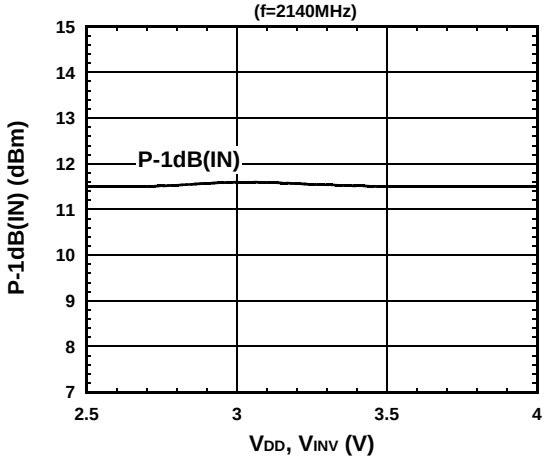
■ELECTRICAL CHARACTERISTICS (LNA Low Gain Mode)

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

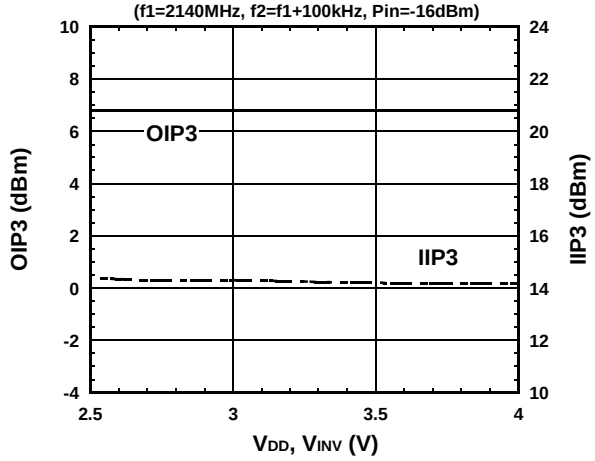
Gain, NF vs. VDD, VINV
(f=2140MHz)



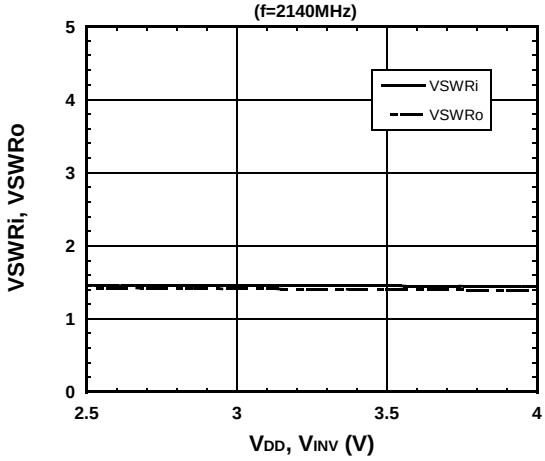
P-1dB(IN) vs. VDD, VINV
(f=2140MHz)



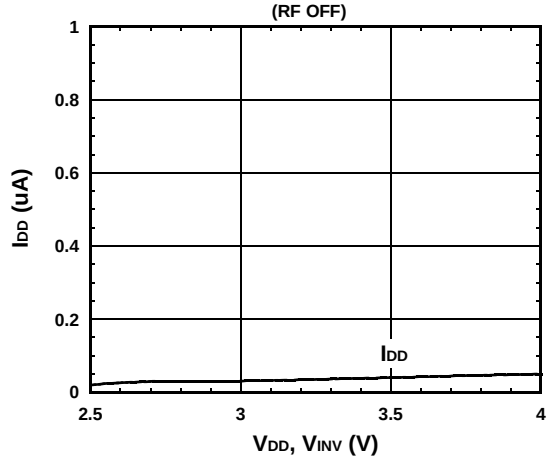
OIP3, IIP3 vs. VDD, VINV
(f1=2140MHz, f2=f1+100kHz, Pin=-16dBm)



VSWR vs. VDD, VINV
(f=2140MHz)



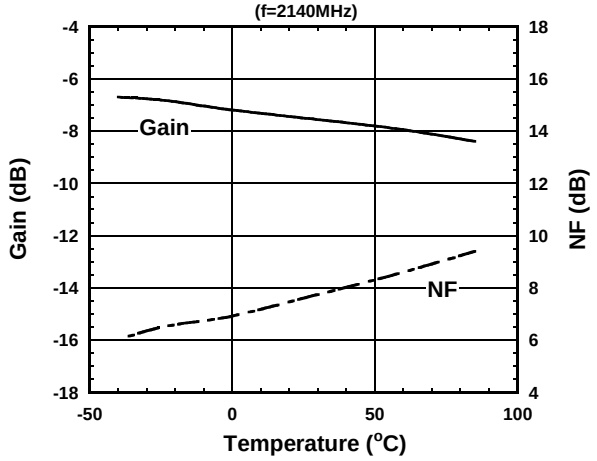
IDD vs. VDD, VINV
(RF OFF)



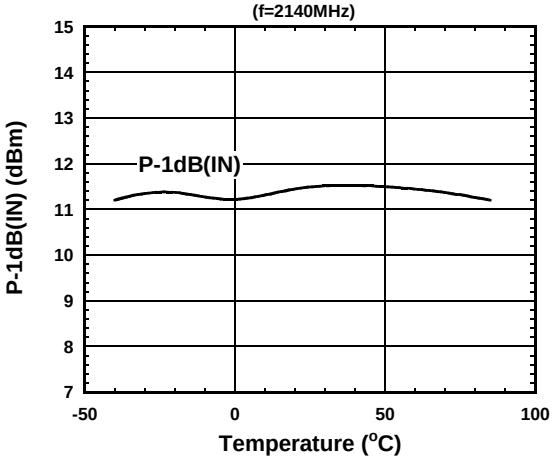
■ELECTRICAL CHARACTERISTICS (LNA Low Gain Mode)

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

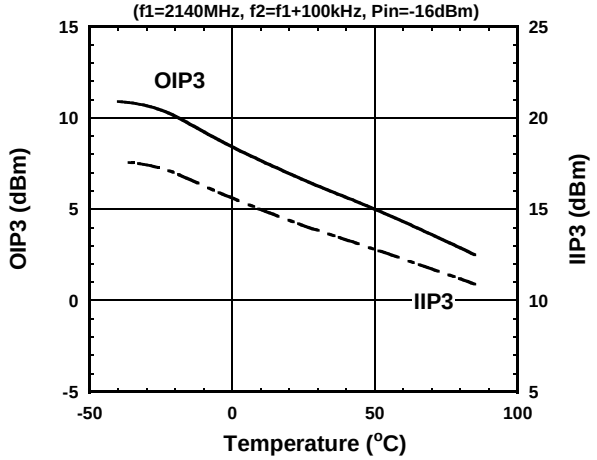
Gain, NF vs. Temperature
(f=2140MHz)



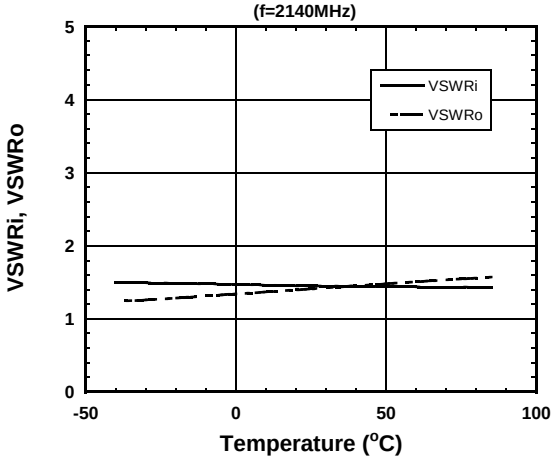
P-1dB(IN) vs. Temperature
(f=2140MHz)



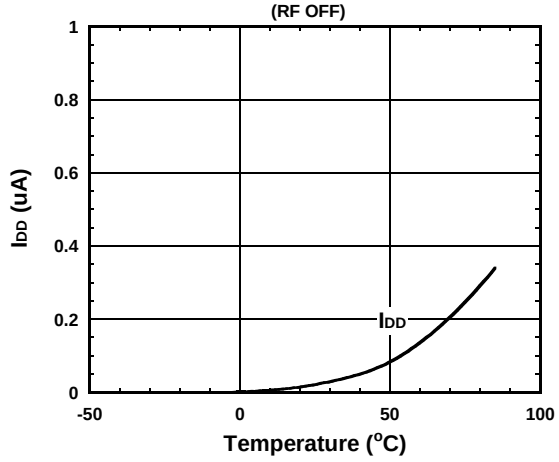
OIP3, IIP3 vs. Temperature
(f1=2140MHz, f2=f1+100kHz, Pin=-16dBm)



VSWR vs. Temperature
(f=2140MHz)

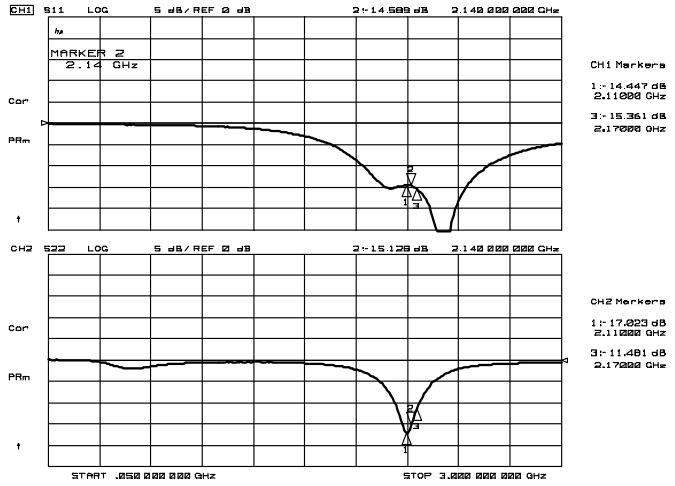


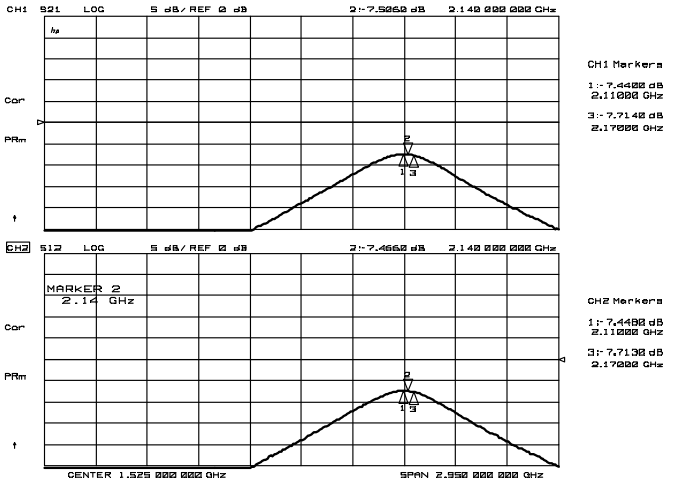
I_{DD} vs. Temperature
(RF OFF)

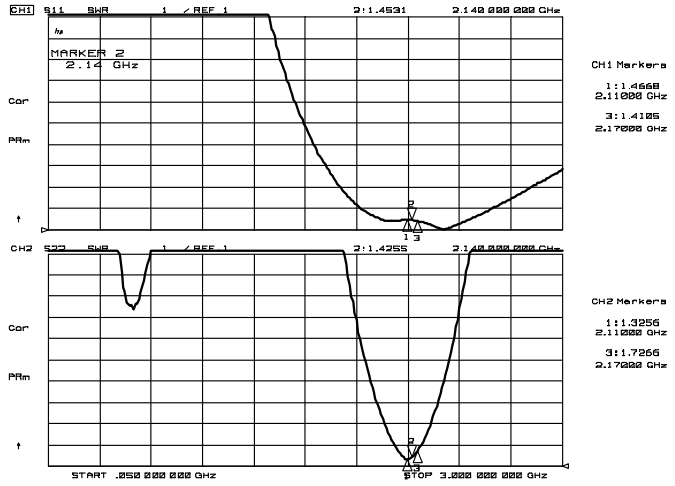


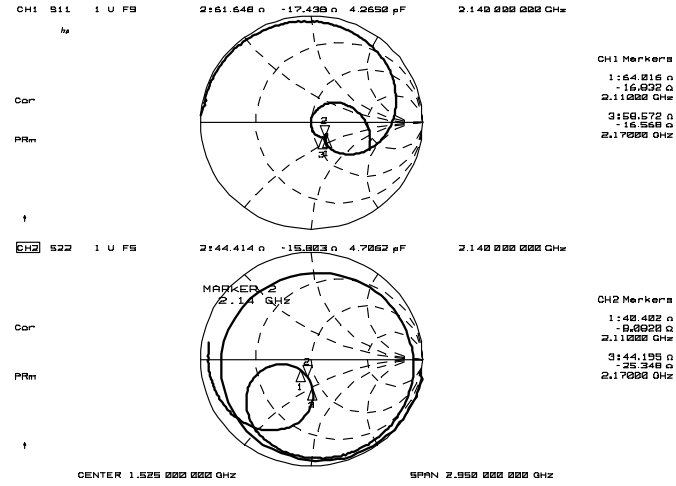
■ELECTRICAL CHARACTERISTICS (LNA Low Gain Mode)

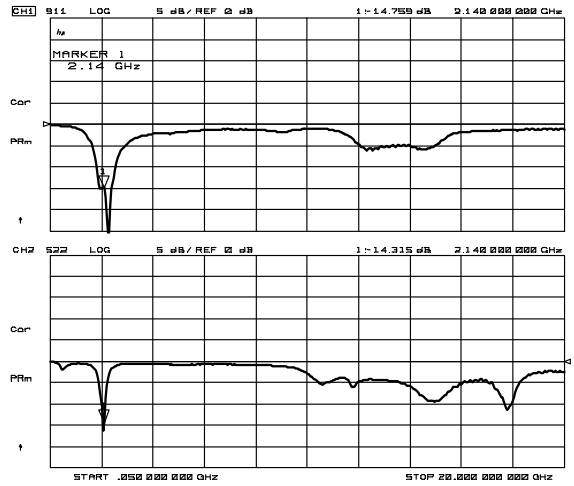
General Conditions: Ta=+25°C, V_{DD}=V_{INV}=2.7V, V_{CTL}=0V, Zs=Zl=50Ω

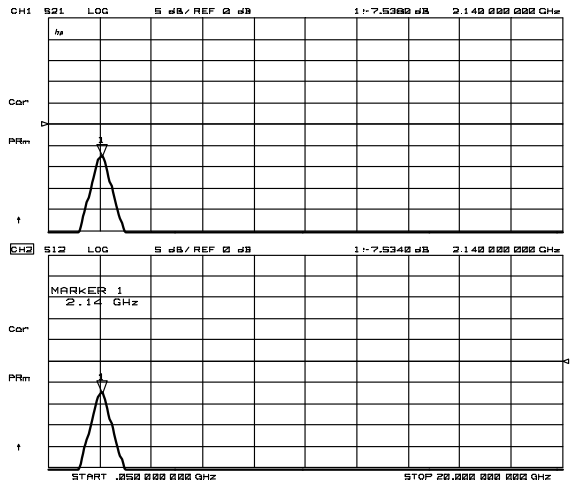




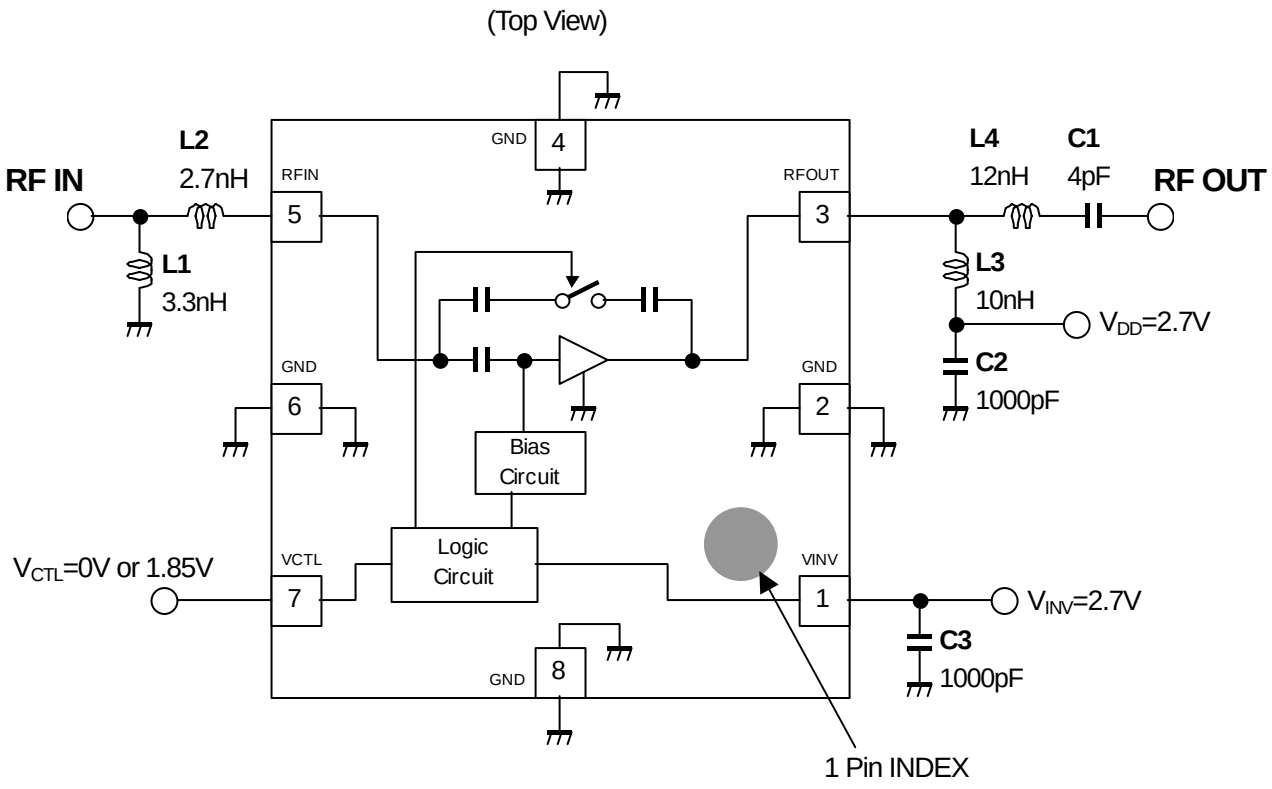




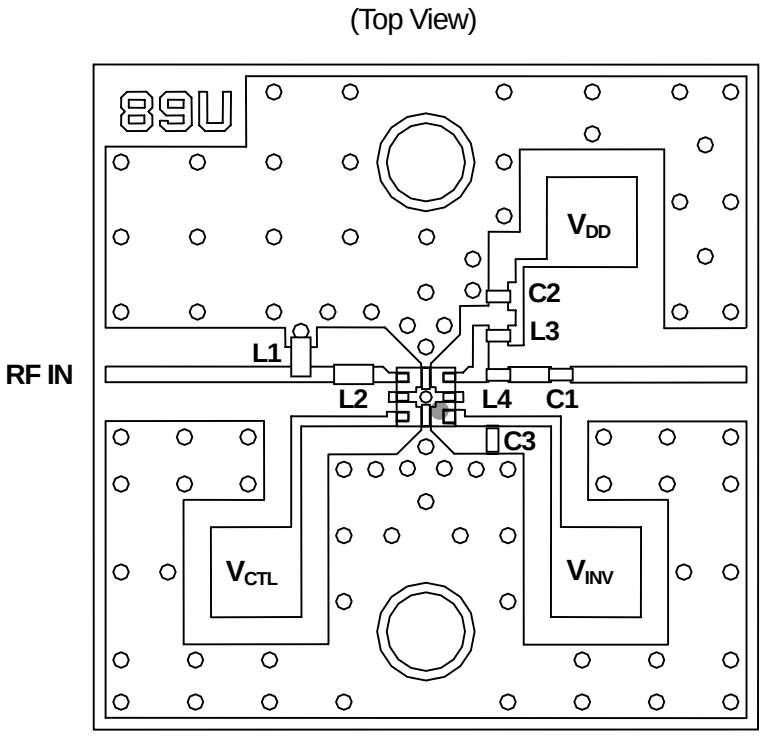




■APPLICATION CIRCUIT



■TEST PCB LAYOUT

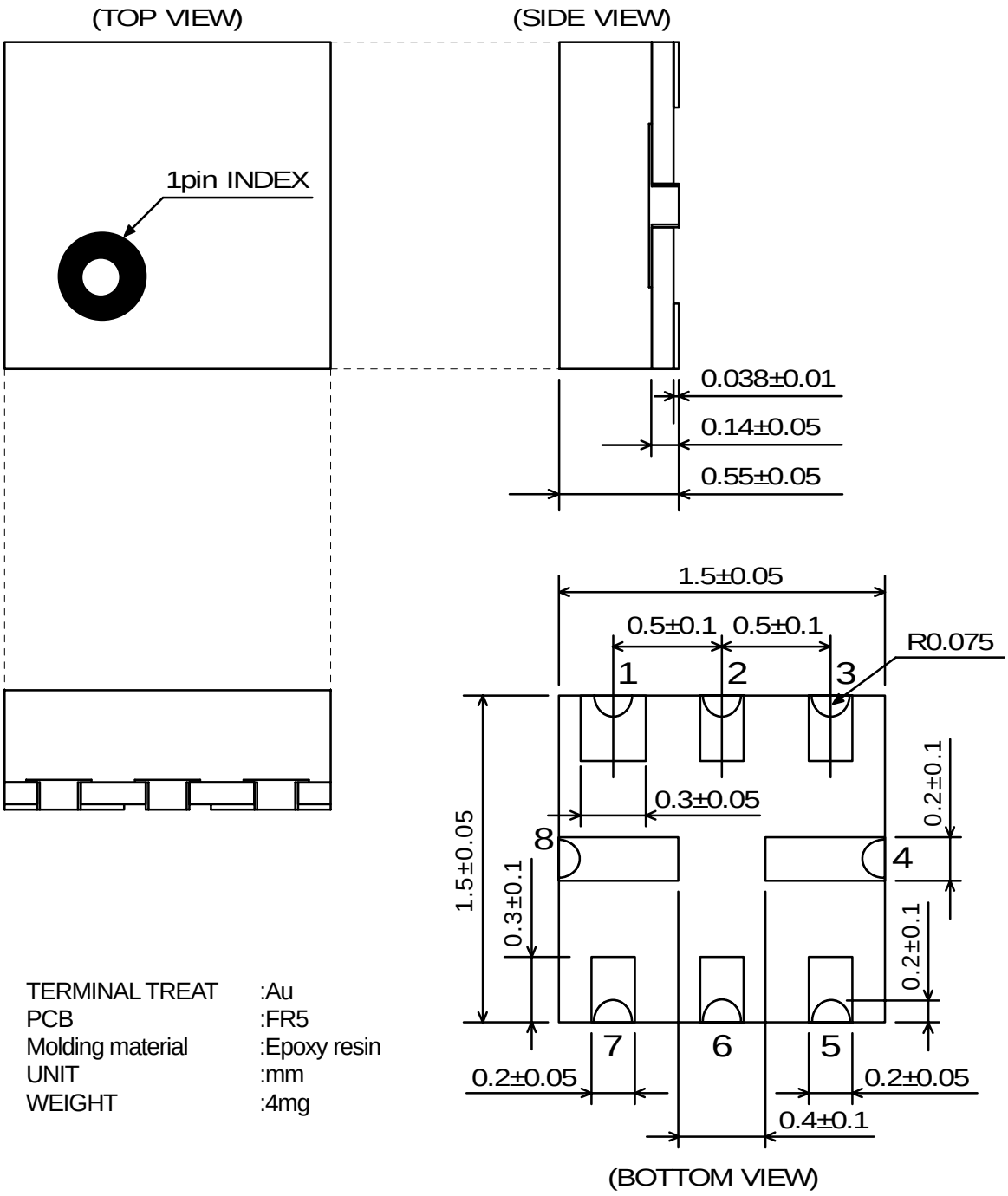


PARTS LIST

Parts ID	Comment
L1, L2	TAIYO-YUDEN (HK1005)
L3, L4	TDK (MLG0603Q)
C1~C3	MURATA (GRM03)

PCB (FR-4)
t=0.2mm
MICROSTRIP LINE WIDTH
=0.4mm (Z_0=50Ω)
PCB SIZE=17.0mmx17.0mm

■**PACKAGE OUTLINE** (USB8-B6)



TERMINAL TREAT	:Au
PCB	:FR5
Molding material	:Epoxy resin
UNIT	:mm
WEIGHT	:4mg

Cautions on using this product

This product contains Gallium-Arsenide (GaAs) which is a harmful material.

- Do NOT eat or put into mouth.
- Do NOT dispose in fire or break up this product.
- Do NOT chemically make gas or powder with this product.
- To waste this product, please obey the relating law of your country.

This product may be damaged with electric static discharge (ESD) or spike voltage. Please handle with care to avoid these damages.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

NJR:

NJG1126HB6-TE1

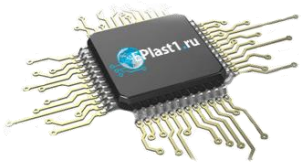
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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