

NJG1555KB2

■ABSOLUTE MAXIMUM RATINGS

($T_a=25^{\circ}\text{C}$, $Z_s=Z_l=50\Omega$)

PARAMETERS	SYMBOL	CONDITIONS	RATINGS	UNITS
Mixer Supply Voltage	V_{MIX}		5	V
Local Amplifier Supply Voltage	V_{LO}		5	V
Mixer RF Input Power	P_{RFIN}	$V_{\text{MIX}}=2.7\text{V}$, $V_{\text{LO}}=2.7\text{V}$	10	dBm
Mixer LO Input Power	P_{LOIN}	$V_{\text{MIX}}=2.7\text{V}$, $V_{\text{LO}}=2.7\text{V}$	10	dBm
Power Dissipation	P_{D}		450	mW
Operating Temperature	T_{opr}		-40~+85	$^{\circ}\text{C}$
Storage Temperature	T_{stg}		-55~+125	$^{\circ}\text{C}$

■ELECTRICAL CHARACTERISTICS

GENERAL CONDITIONS: $T_a=25^{\circ}\text{C}$, $V_{\text{MIX}}=2.7\text{V}$, $V_{\text{LO}}=2.7\text{V}$, $f_{\text{RF}}=820\text{MHz}$, $f_{\text{LO}}=690\text{MHz}$
 $P_{\text{RF}}=-30\text{dBm}$, $P_{\text{LO}}=-15\text{dBm}$, $Z_s=Z_l=50\Omega$, with test circuit

PARAMETERS	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Operating Frequency	freq		800	820	900	MHz
Mixer Supply Voltage	V_{MIX}		2.5	2.7	4.5	V
Local Amplifier Supply Voltage	V_{LO}		2.5	2.7	4.5	V
Mixer Current	I_{MIX}	$P_{\text{RF}}=\text{OFF}$, $P_{\text{LO}}=\text{OFF}$	-	5.0	7.0	mA
Local Amplifier Current	I_{LO}	$P_{\text{RF}}=\text{OFF}$, $P_{\text{LO}}=\text{OFF}$	-	1.0	1.6	mA
Conversion Gain	G_{C}		10.0	12.0	-	dB
Input 3rd Order Intercept point	IIP3	$f_{\text{RF}}=820.0\text{MHz}+820.1\text{MHz}$	-1.0	+1.0	-	dBm
Noise Figure	NF		-	5.0	6.0	dB
LO to RF Isolation	ISL	IF OUT Port: 50 Ω term.	-	9.0	-	dB

■ TERMINAL INFORMATION

PIN No.	SYMBOL	DESCRIPTIONS
1	LOIN	Local power input terminal of local amplifier. External matching circuit is required.
2	GND	Ground terminal (0V).
3	RFIN	RF input terminal of mixer. External matching circuit is required.
4	IFOUT	IF signal output terminal for mixer external matching circuit is required. Please connect mixer power supply through choke inductor (L6) as shown in test circuit.
5	BPC	Optional bypass capacitor terminal for mixer. Please connect optimum capacitor if need for tuning Gc or IP3.
6	VLO	Local amplifier supply terminal. Please place R1 & L4 close to this terminal as shown in test circuit.

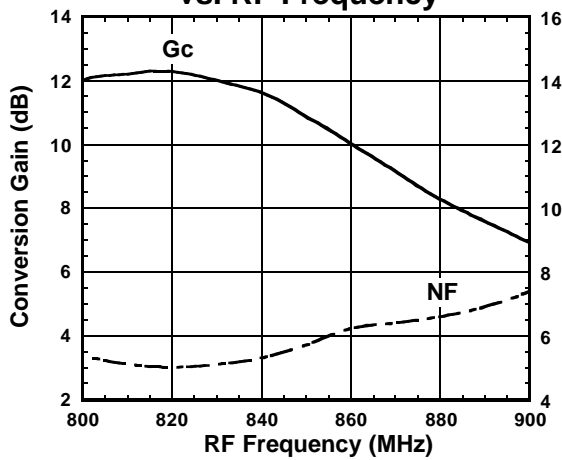
NOTE:

- 1) Ground terminal (2pin) should be connected with ground plane by multiple via holes for good grounding.

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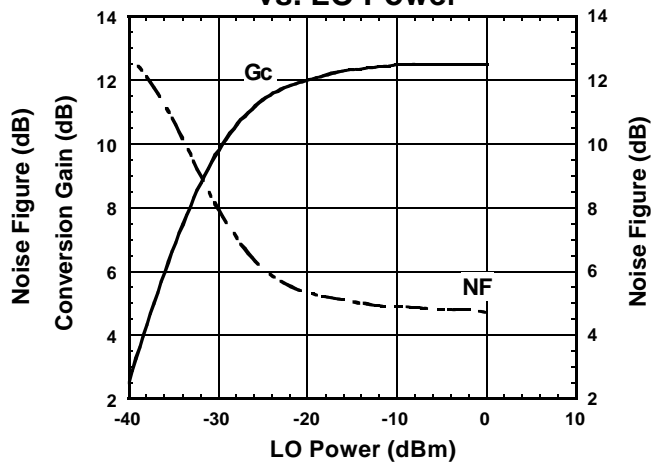
■ TYPICAL CHARACTERISTICS ($f_{LO}=690\text{MHz}$)

Conversion Gain , Noise Figure vs. RF Frequency



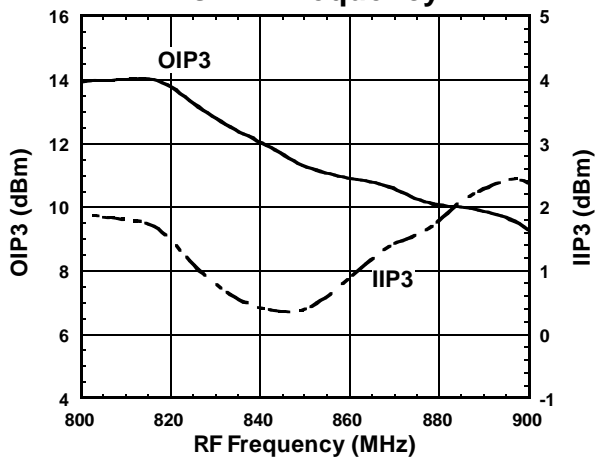
Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF}=800\sim 900\text{MHz}$, $P_{RF}=-30\text{dBm}$
 $f_{LO}=670\sim 770\text{MHz}$, $P_{LO}=-15\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

Conversion Gain , Noise Figure vs. LO Power



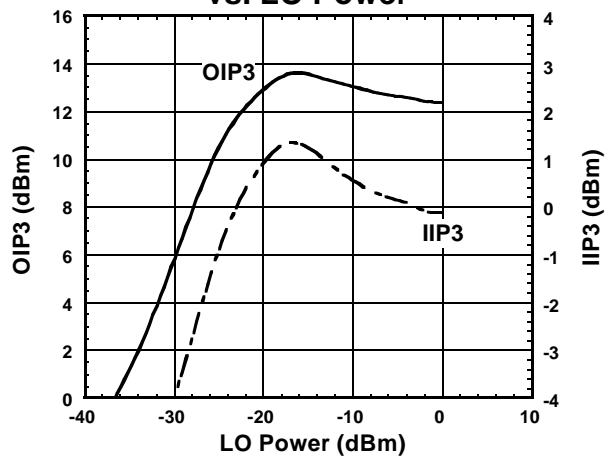
Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF}=820\text{MHz}$, $P_{RF}=-30\text{dBm}$
 $f_{LO}=690\text{MHz}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

Output IP3 , Input IP3 vs. RF Frequency



Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF1}=800\sim 900\text{MHz}$, $P_{RF}=-30\text{dBm}$
 $f_{RF2}=f_{RF1}+100\text{kHz}$
 $f_{LO}=670\sim 770\text{MHz}$, $P_{LO}=-15\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

Output IP3 , Input IP3 vs. LO Power



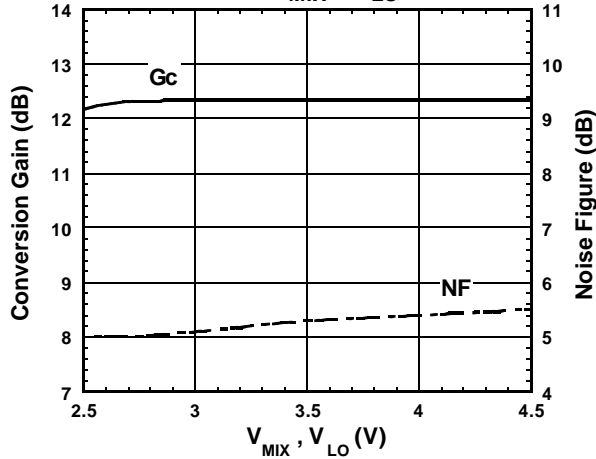
Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF}=820.0+820.1\text{MHz}$
 $P_{RF}=-30\text{dBm}$
 $f_{LO}=690\text{MHz}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

$$\text{OIP3} = \frac{3\text{XIF} - \text{IM3}}{2}$$

$$\text{IIP3} = \text{OIP3} - \text{Gc}$$

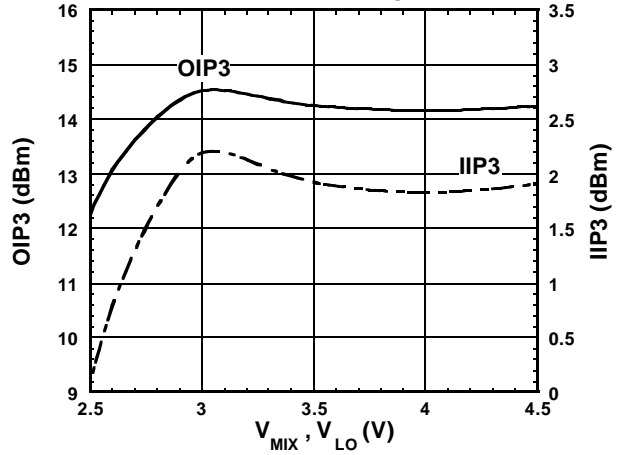
■ TYPICAL CHARACTERISTICS (Continued)

**Conversion Gain , Noise Figure
vs. V_{MIX} , V_{LO}**



Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF}=820\text{MHz}$, $P_{RF}=-30\text{dBm}$
 $f_{LO}=690\text{MHz}$, $P_{LO}=-15\text{dBm}$

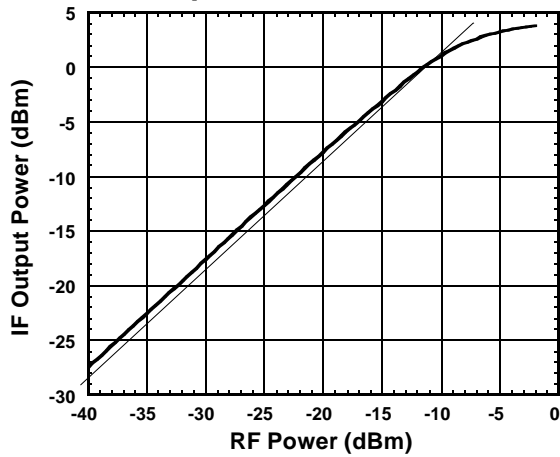
**Output IP3 , Input IP3
vs. V_{MIX} , V_{LO}**



Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF}=820.0+820.1\text{MHz}$
 $P_{RF}=-30\text{dBm}$
 $f_{LO}=690\text{MHz}$, $P_{LO}=-15\text{dBm}$

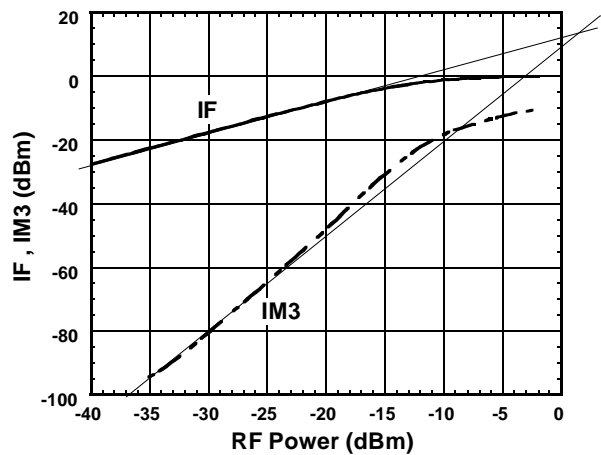
$OIP3 = \frac{3 \times IIP3}{2}$
 $IIP3 = OIP3 - Gc$

IF Output Power vs. RF Power



Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF}=820\text{MHz}$
 $f_{LO}=690\text{MHz}$, $P_{LO}=-15\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

IF , IM3 vs. RF Power

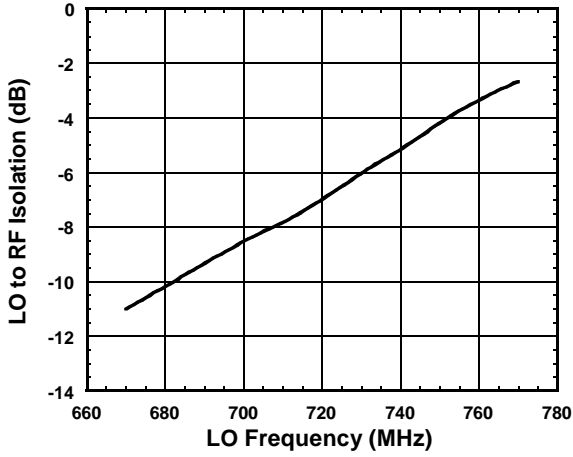


Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF}=820.0+820.1\text{MHz}$
 $f_{LO}=690\text{MHz}$, $P_{LO}=-15\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

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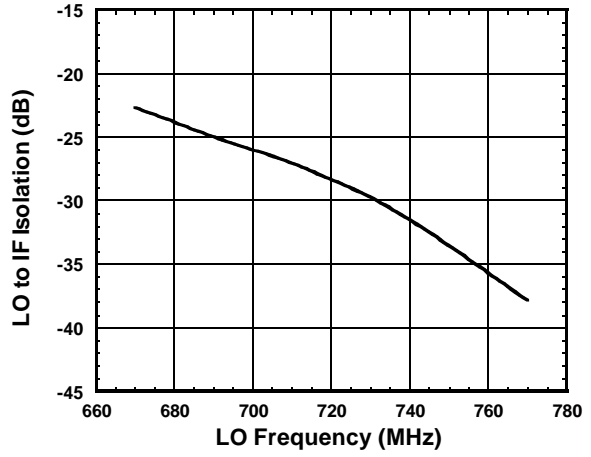
■ TYPICAL CHARACTERISTICS (Continued)

LO to RF Isolation vs. LO Frequency



Condition
 $f_{LO}=670\sim 770\text{MHz}$
 $P_{LO}=-15\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$
IF OUT Port: 50Ω term.

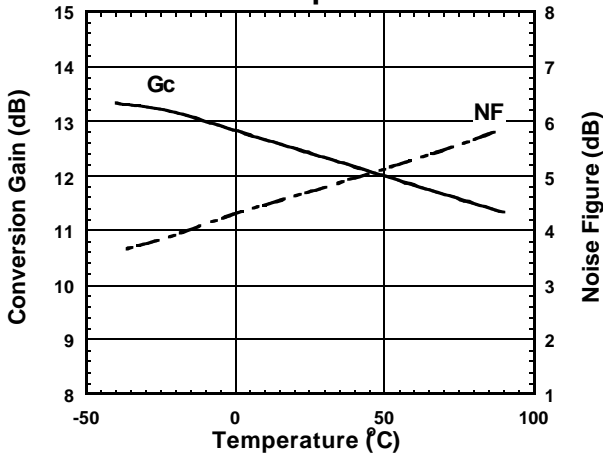
LO to IF Isolation vs. LO Frequency



Condition
 $f_{LO}=670\sim 770\text{MHz}$
 $P_{LO}=-15\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$
RF IN Port: 50Ω term.

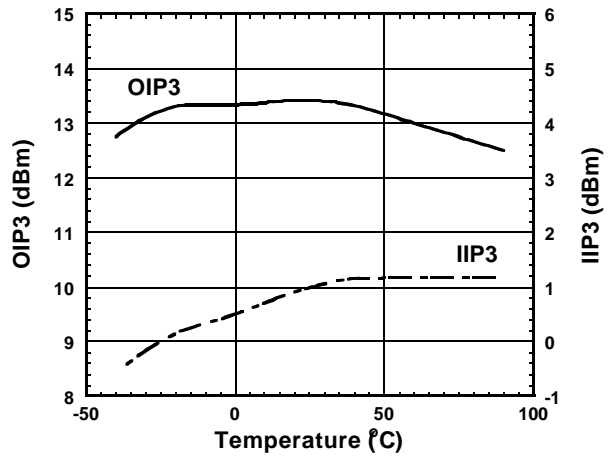
■ TYPICAL CHARACTERISTICS (Continued)

Conversion Gain , Noise Figure vs. Temperature



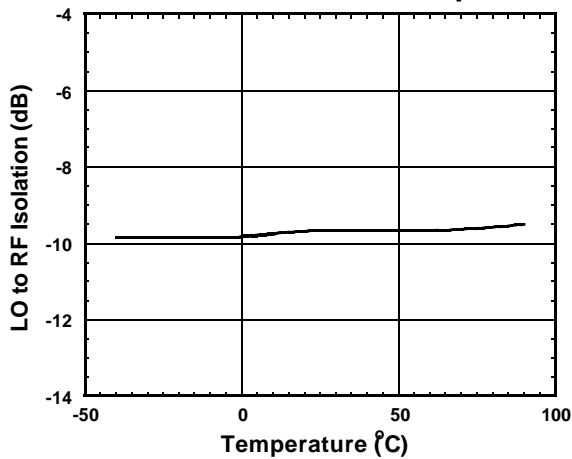
Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF}=820\text{MHz}$, $P_{RF}=-30\text{dBm}$
 $f_{LO}=690\text{MHz}$, $P_{LO}=-15\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

Output IP3 , Input IP3 vs. Temperature



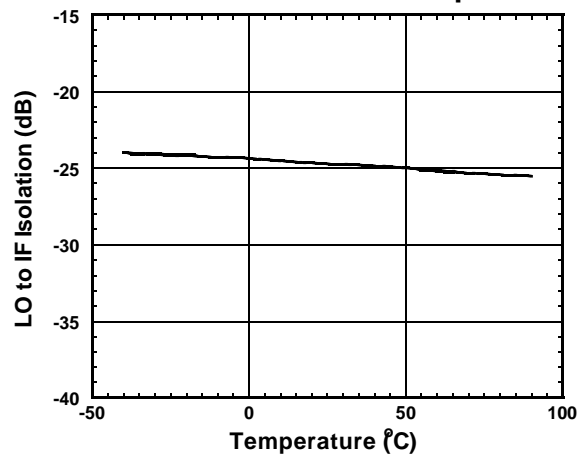
Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF}=820.0+820.1\text{MHz}$, $P_{RF}=-30\text{dBm}$, $OIP3=\frac{3XIF-IM3}{2}$
 $f_{LO}=690\text{MHz}$, $P_{LO}=-15\text{dBm}$, $IIP3=OIP3-Gc$
 $V_{MIX}=V_{LO}=2.7\text{V}$

LO to RF Isolation vs. Temperature



Condition
 $f_{LO}=690\text{MHz}$
 $P_{LO}=-15\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$
 IF OUT Port: 50Ω term.

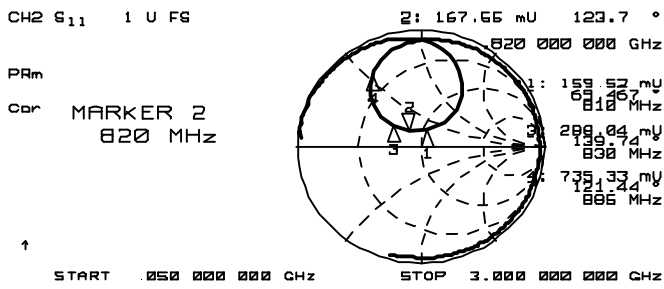
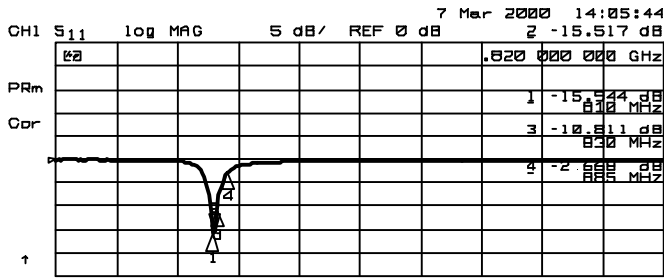
LO to IF Isolation vs. Temperature



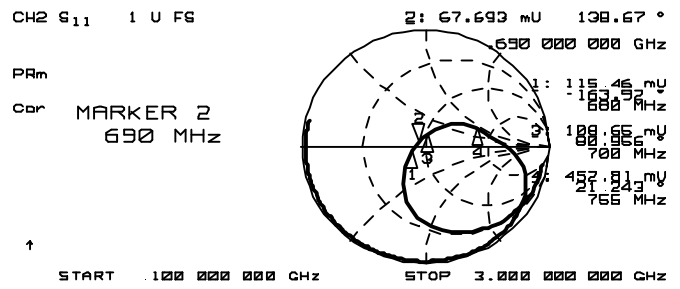
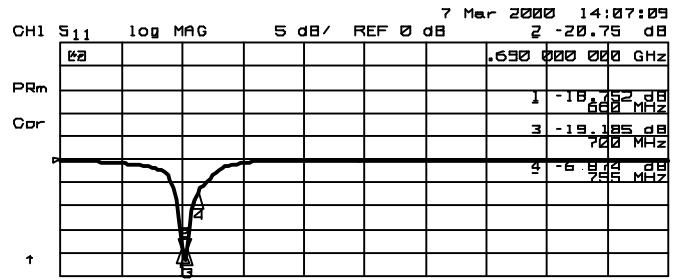
Condition
 $f_{LO}=690\text{MHz}$
 $P_{LO}=-15\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$
 RF IN Port: 50Ω term.

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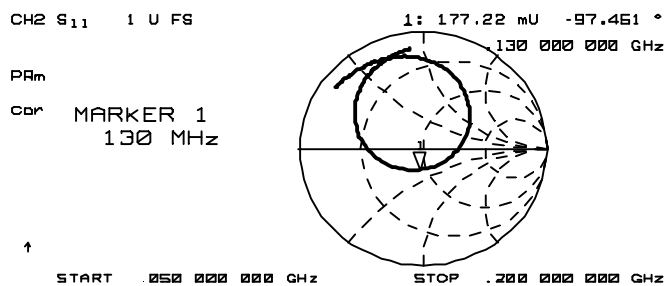
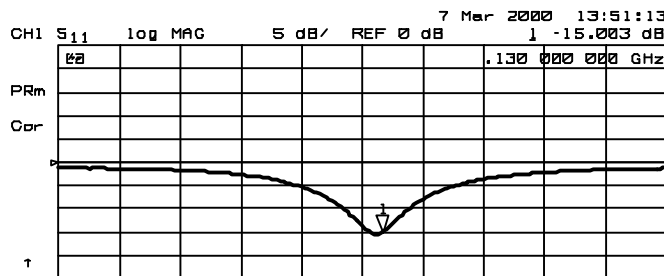
■ TYPICAL CHARACTERISTICS (Continued)



RF IN Port Impedance
(LOCAL IN Port, IF OUT Port : 50Ω term.)

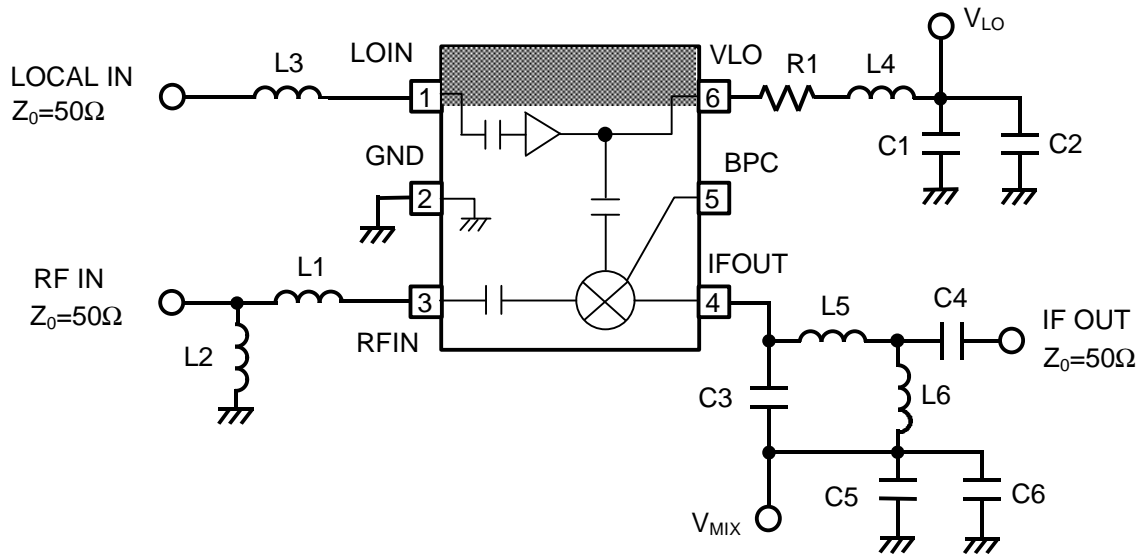


LOCAL IN Port Impedance
(RF IN Port, IF OUT Port : 50Ω term.)



IF OUT Port Impedance
(RF IN Port, LOCAL IN Port : 50Ω term.)

APPLICATION CIRCUIT

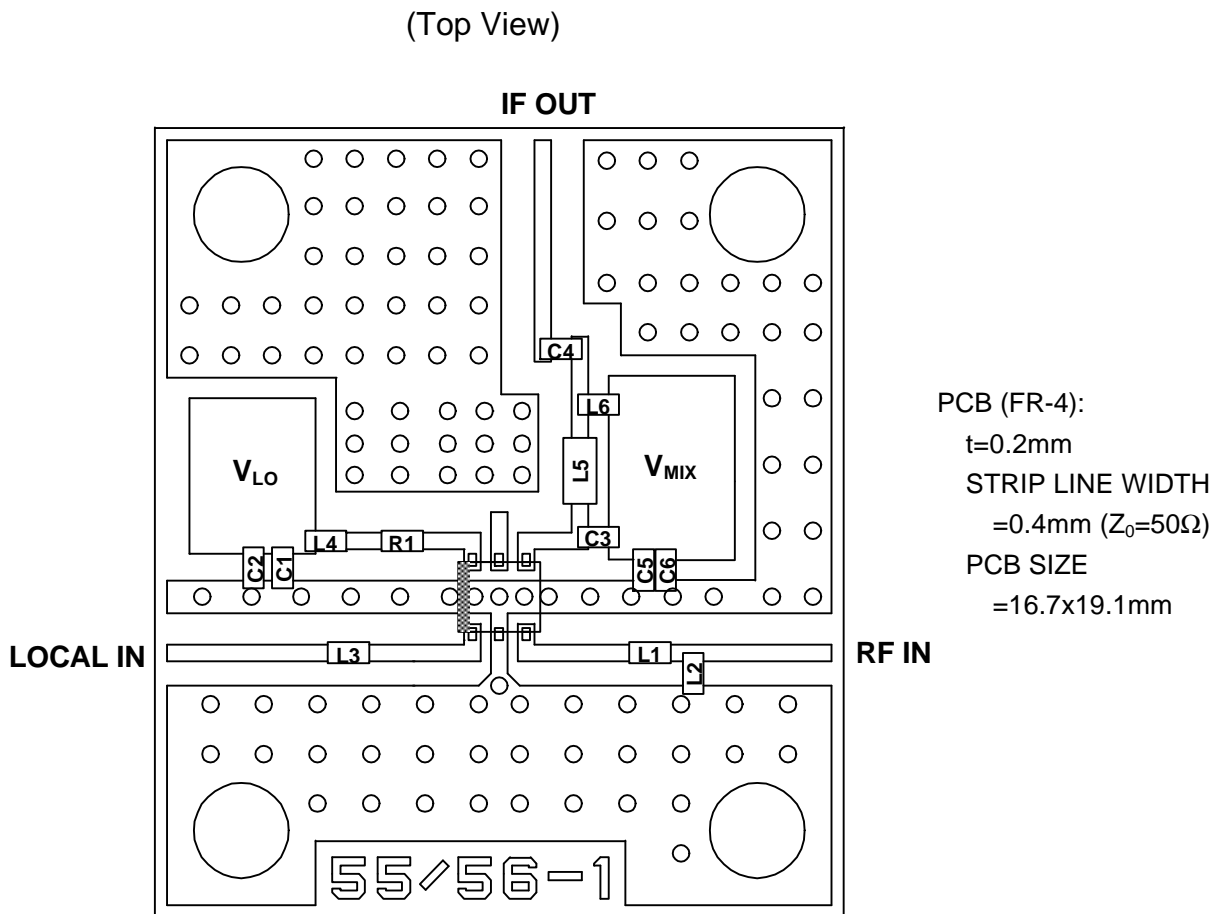


PARTS LIST

PARTS ID	800MHz Band		COMMENT
	Lower LOCAL	Upper LOCAL	
	$f_{LO}=690\text{MHz}$ $f_{IF}=130\text{MHz}$	$f_{LO}=950\text{MHz}$ $f_{IF}=130\text{MHz}$	
L1	15nH	15nH	TAIYO-YUDEN (HK1005)
L2	3.9nH	3.9nH	TAIYO-YUDEN (HK1005)
L3	47nH	27nH	TAIYO-YUDEN (HK1005)
L4	39nH	22nH	TAIYO-YUDEN (HK1005)
L5	120nH	120nH	TAIYO-YUDEN (HK1608)
L6	56nH	56nH	TAIYO-YUDEN (HK1005)
C1	100pF	100pF	MURATA (GRM36)
C2	1000pF	1000pF	MURATA (GRM36)
C3	9pF	9pF	MURATA (GRM36)
C4	1000pF	1000pF	MURATA (GRM36)
C5	10pF	10pF	MURATA (GRM36)
C6	1000pF	1000pF	MURATA (GRM36)
R1	27Ω	22Ω	1005 Size

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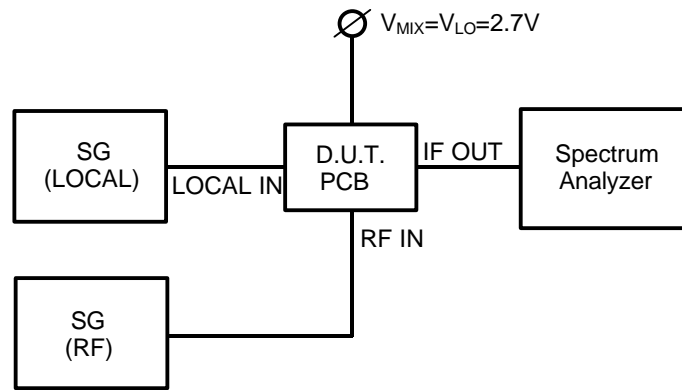
RECOMMENDED PCB DESIGN



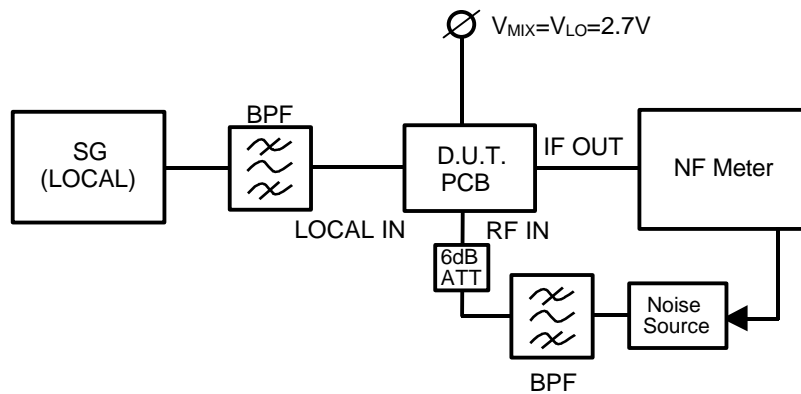
PRECAUTIONS

- [1] Please locate L4 and R1 close to V_{Lo} terminal (6).
- [2] Please locate C1 and C2 close to L4.
- [3] Please locate C5 and C6 close to C3.

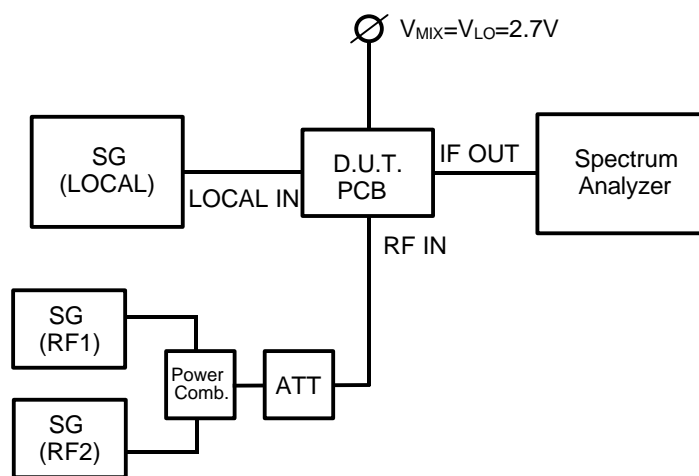
MEASURING BLOCK DIAGRAM



Conversion Gain Measuring Block Diagram



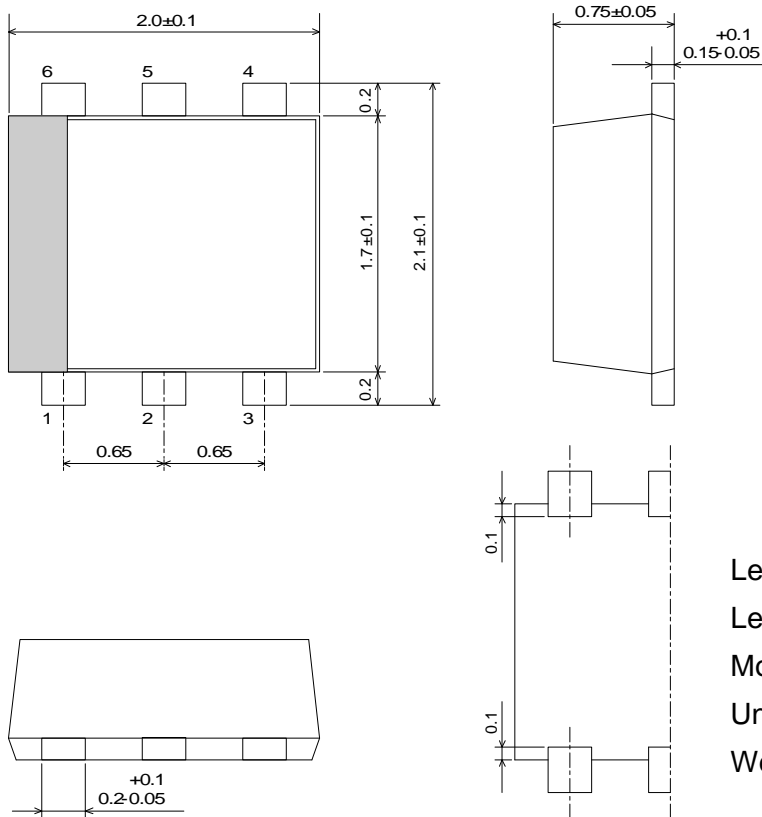
Noise Figure Measuring Block Diagram



OIP3, IIP3 Measuring Block Diagram

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PACKAGE OUTLINE (FLP6-B2)



Lead material	: Copper
Lead surface finish	: Solder plating
Molding material	: Epoxy resin
Unit	: mm
Weight	: 6.5mg

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.

[CAUTION]

The specifications on this databook are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.

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