

NJG1550F

■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_{DD}		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}		150	mW
Operating Temp.	T_{opr}		-30~+85	$^{\circ}\text{C}$
Storage Tempe.	T_{stg}		-40~+150	$^{\circ}\text{C}$

■RECOMMENDED OPERATING RANGE

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
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

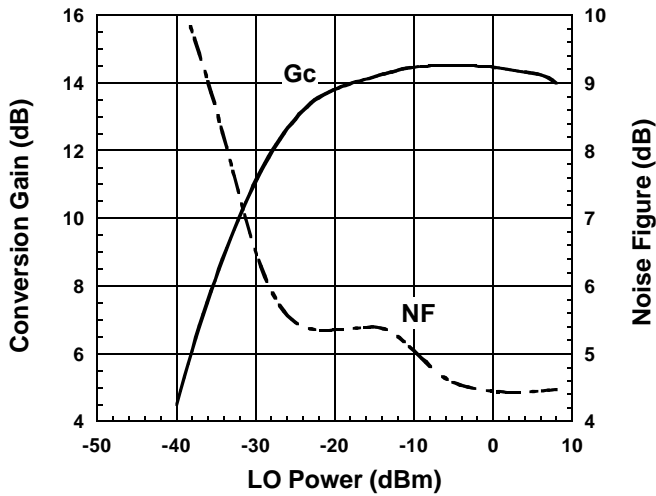
■ELECTRICAL CHARACTERISTICS

($T_a=25^{\circ}\text{C}$, $V_{\text{MIX}}=2.7\text{V}$, $V_{\text{LO}}=2.7\text{V}$, $f_{\text{IF}}=130\text{MHz}$, $P_{\text{LO}}=-10\text{dBm}$)

PARAMETERS	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Mixer Current	I_{MIX}	$P_{\text{RF}}=\text{OFF}$, $P_{\text{LO}}=\text{OFF}$	-	3.0	4.5	mA
Local Amplifier Current	I_{LO}	$P_{\text{RF}}=\text{OFF}$, $P_{\text{LO}}=\text{OFF}$	-	1.5	2.3	mA
Conversion Gain	G_{C}	$f_{\text{RF}}=820\text{MHz}$, $P_{\text{RF}}=-30\text{dBm}$ $f_{\text{LO}}=690\text{MHz}$	11.0	14.0	-	dB
Input 3rd Order Intercept Point	IIP3	$f_{\text{RF}}=820.0\text{MHz}+820.1\text{MHz}$ $f_{\text{LO}}=690\text{MHz}$	-	-6.0	-	dBm
Noise Figure	NF	$f_{\text{RF}}=820\text{MHz}$ $f_{\text{LO}}=690\text{MHz}$	-	5.0	6.0	dB

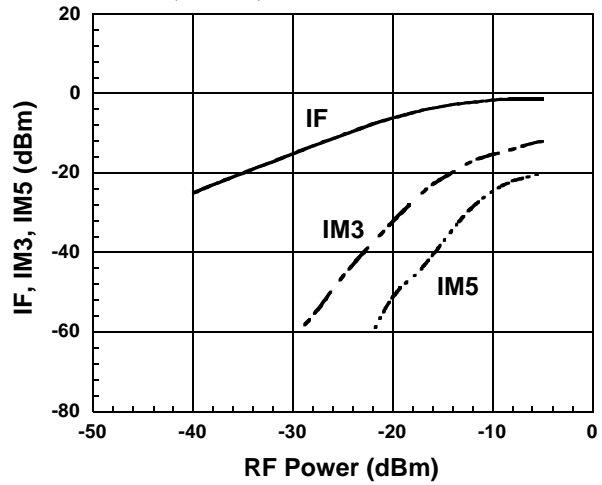
■ TYPICAL CHARACTERISTICS (Application 1, $f_{LO}=690\text{MHz}$)

Conversion Gain , Noise Figure vs. LO Power



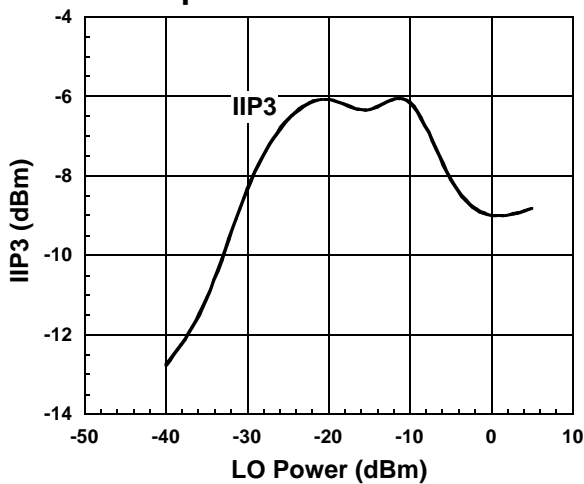
Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF}=820\text{MHz}, P_{RF}=-30\text{dBm}$
 $f_{LO}=690\text{MHz}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

IF , IM3 , IM5 vs. RF Power



Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF1}=820.0\text{MHz}$
 $f_{RF2}=820.1\text{MHz}$
 $f_{LO}=690\text{MHz}, P_{LO}=-10\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

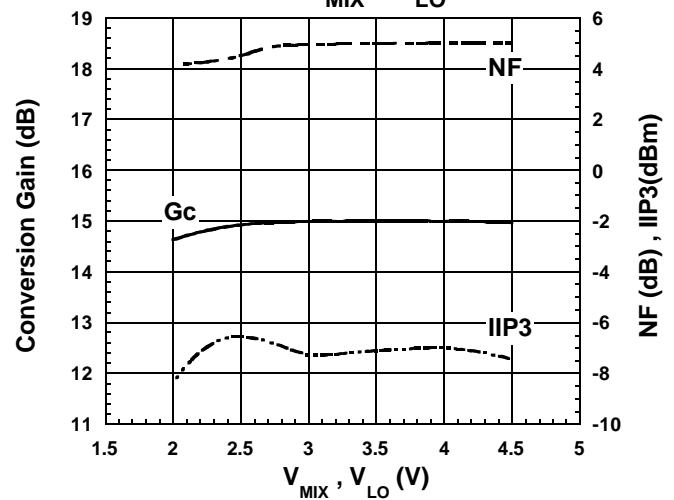
Input-IP3 vs. LO Power



Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF1}=820.0\text{MHz}, P_{RF}=-30\text{dBm}$
 $f_{RF2}=820.1\text{MHz}$
 $f_{LO}=690\text{MHz}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

$$IIP3 = \frac{3IF - IM3}{2} - G_c$$
 @ $P_{RF} = -30\text{dBm}$

Conversion Gain , Noise Figure , Input-IP3 vs. V_{MIX}, V_{LO}



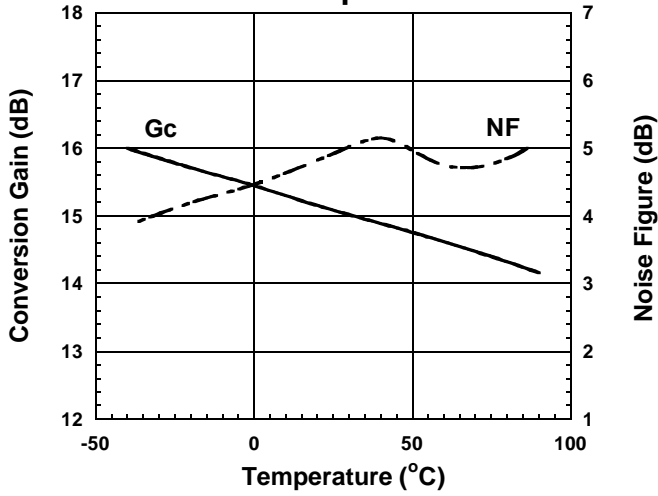
Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF1}=820.0\text{MHz}, P_{RF}=-30\text{dBm}$
 $f_{RF2}=820.1\text{MHz}$
 $f_{LO}=690\text{MHz}, P_{LO}=-10\text{dBm}$

$$IIP3 = \frac{3IF - IM3}{2} - G_c$$
 @ $P_{RF} = -30\text{dBm}$

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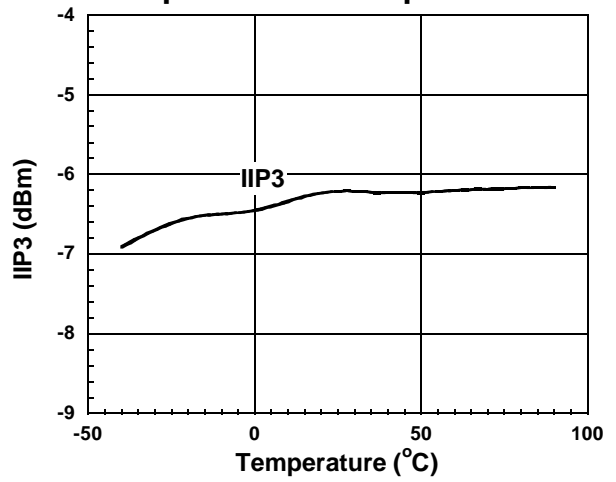
■ TYPICAL CHARACTERISTICS (Continued)

Conversion Gain , Noise Figure vs. Temperature



Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF}=820\text{MHz}, P_{RF}=-30\text{dBm}$
 $f_{LO}=690\text{MHz}, P_{LO}=-10\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

Input-IP3 vs. Temperature

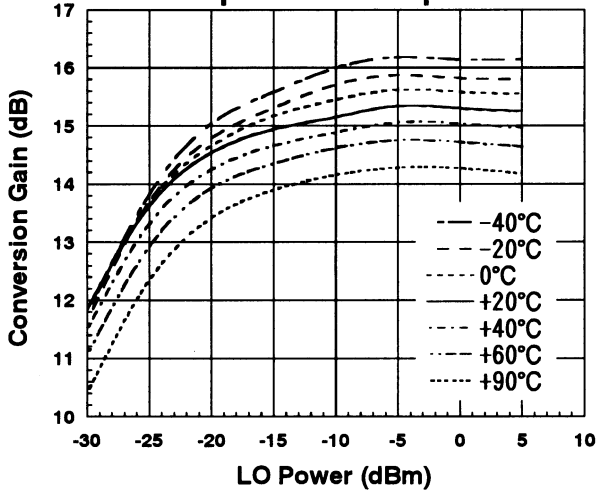


Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF1}=820.0\text{MHz}, P_{RF}=-30\text{dBm}$
 $f_{RF2}=820.1\text{MHz}$
 $f_{LO}=690\text{MHz}, P_{LO}=-10\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

$$IIP3 = \frac{3IF-IM3}{2} - G_c$$

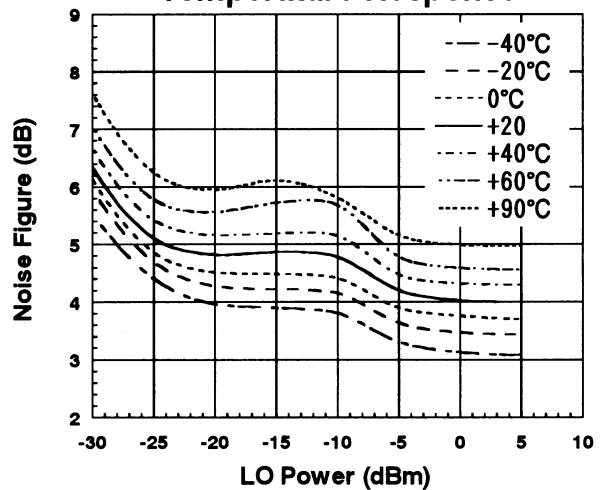
@ $P_{RF}=-30\text{dBm}$

Conversion Gain vs. LO Power Temperature Response



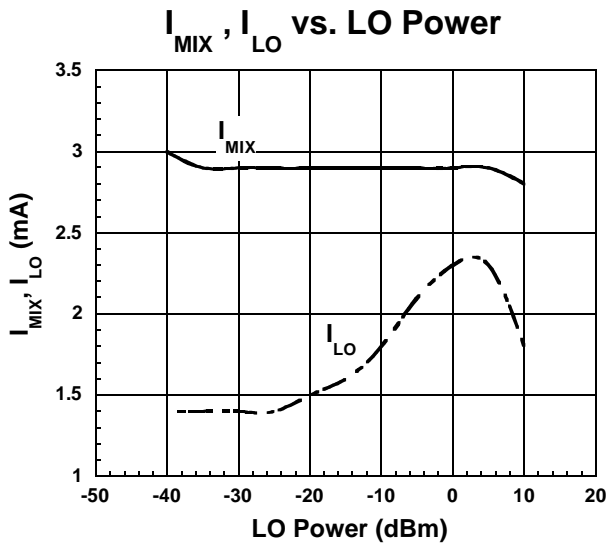
Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF}=820\text{MHz}, P_{RF}=-30\text{dBm}$
 $f_{LO}=690\text{MHz}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

Noise Figure vs. LO Power Temperature Response

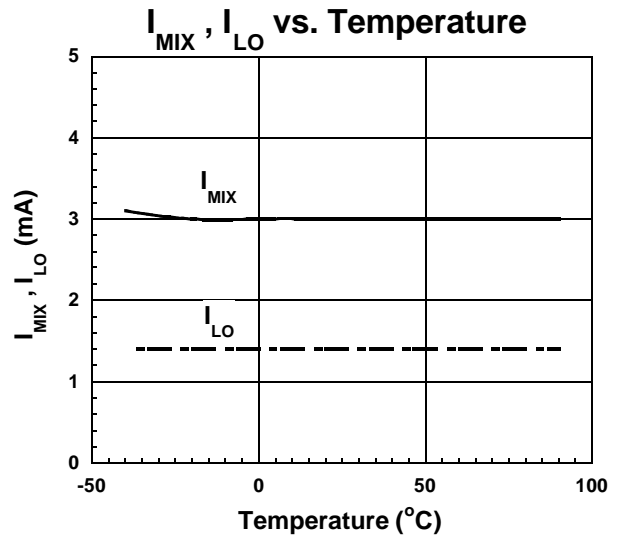


Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF}=820\text{MHz}$
 $f_{LO}=690\text{MHz}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

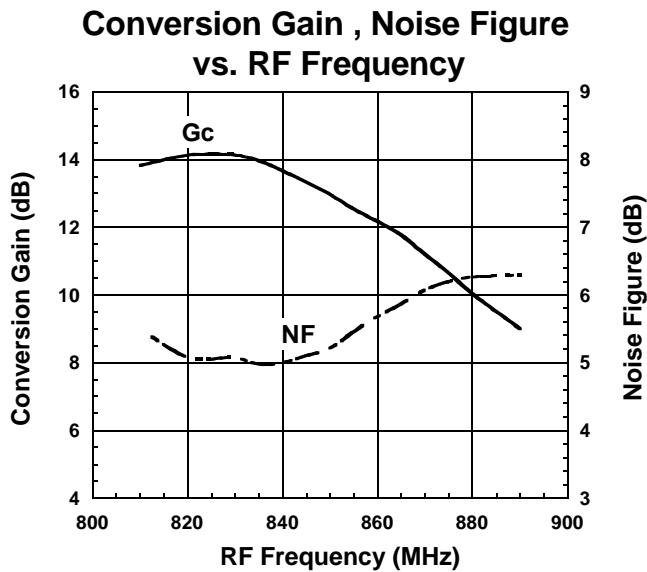
■ TYPICAL CHARACTERISTICS (Continued)



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



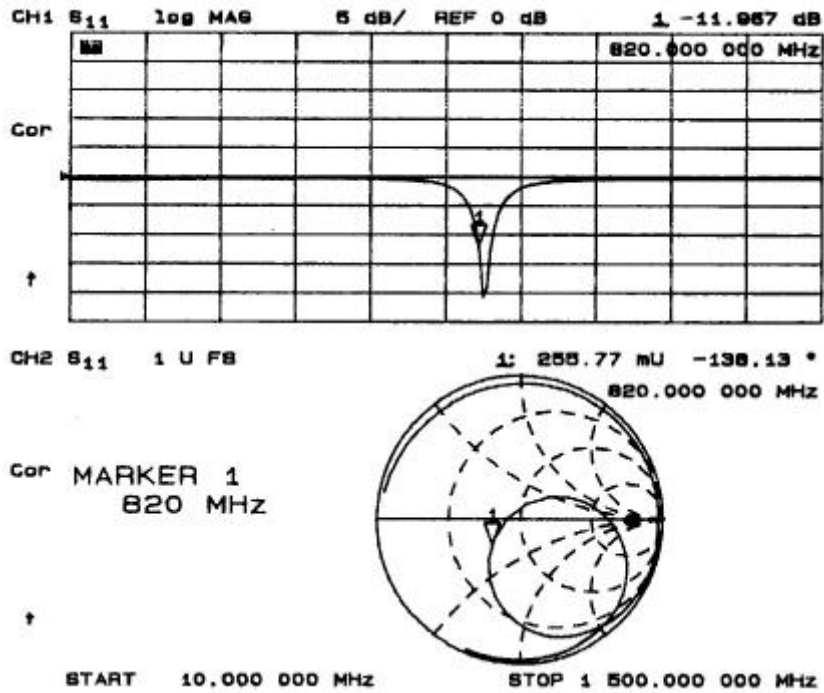
Condition
 $P_{RF}=\text{OFF}$
 $P_{LO}=\text{OFF}$
 $V_{MIX}=V_{LO}=2.7\text{V}$



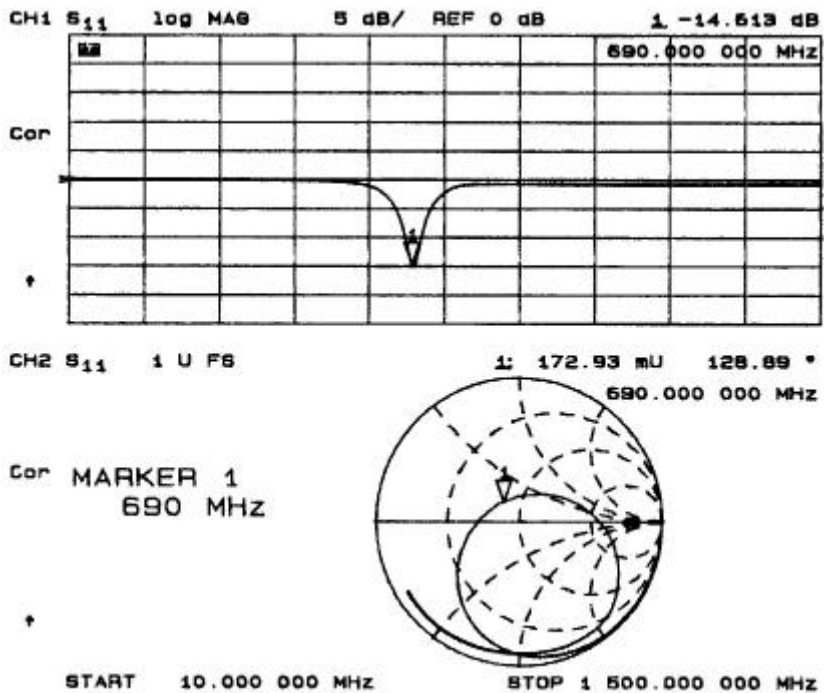
Condition
 $f_{IF}=130\text{MHz}$
 $P_{RF}=-30\text{dBm}$
 $P_{LO}=-10\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$
 Lower LOCAL

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■ TYPICAL CHARACTERISTICS (Continued)

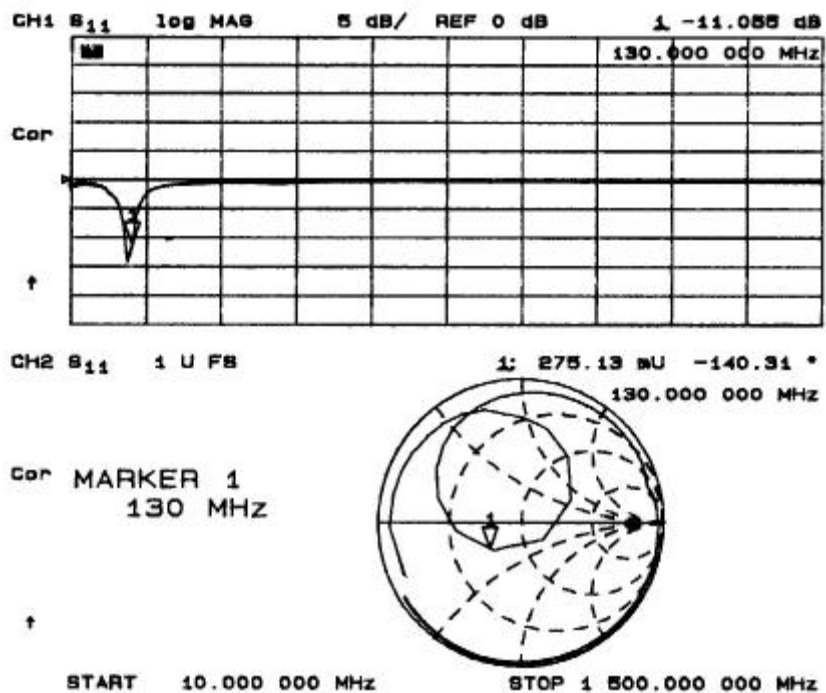


RFIN PORT EXTERNAL MATCHING NETWORK IMPEDANCE PLOT



LOIN PORT EXTERNAL MATCHING NETWORK IMPEDANCE PLOT

■ TYPICAL CHARACTERISTICS (Continued)

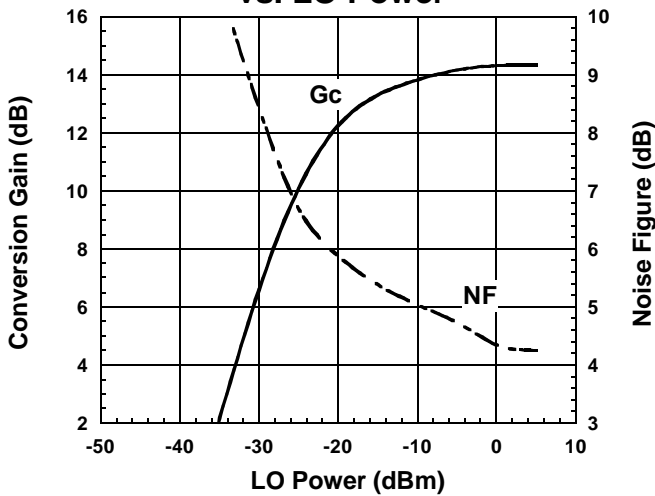


IFOUT PORT EXTERNAL MATCHING NETWORK IMPEDANCE PLOT

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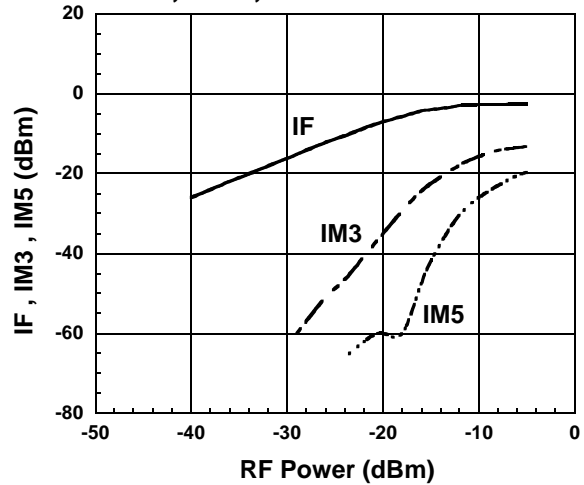
■ TYPICAL CHARACTERISTICS (Application 1, $f_{LO}=950\text{MHz}$)

Conversion Gain , Noise Figure vs. LO Power



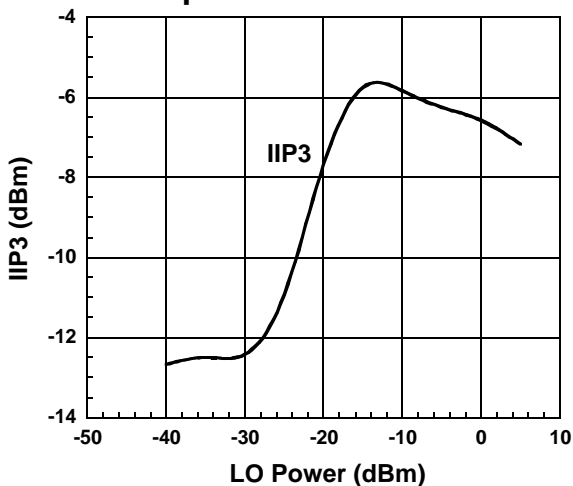
Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF1}=820\text{MHz}, P_{RF}=-30\text{dBm}$
 $f_{LO}=950\text{MHz}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

IF , IM3 , IM5 vs. RF Power



Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF1}=820.0\text{MHz}$
 $f_{RF2}=820.1\text{MHz}$
 $f_{LO}=950\text{MHz}, P_{LO}=-10\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

Input-IP3 vs. LO Power

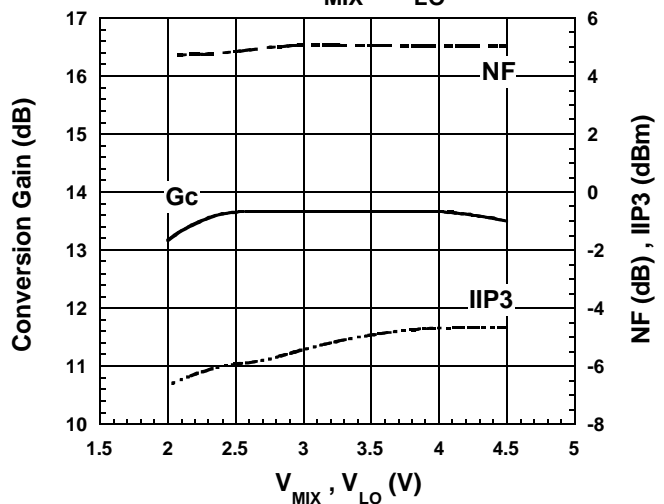


Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF1}=820.0\text{MHz}, P_{RF}=-30\text{dBm}$
 $f_{RF2}=820.1\text{MHz}$
 $f_{LO}=950\text{MHz}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

$$IIP3 = \frac{3IF - IM3}{2} - G_c$$

@ $P_{RF}=-30\text{dBm}$

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



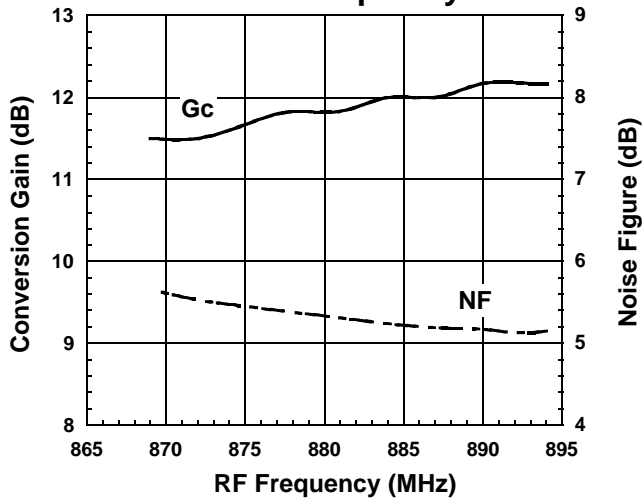
Condition
 $f_{IF}=130\text{MHz}$
 $f_{RF1}=820.0\text{MHz}, P_{RF}=-30\text{dBm}$
 $f_{RF2}=820.1\text{MHz}$
 $f_{LO}=950\text{MHz}, P_{LO}=-10\text{dBm}$

$$IIP3 = \frac{3IF - IM3}{2} - G_c$$

@ $P_{RF}=-30\text{dBm}$

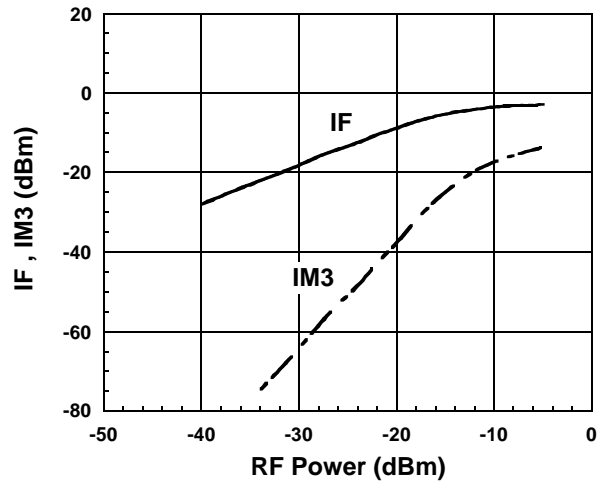
■ TYPICAL CHARACTERISTICS (Application 1, $f_{LO}=964.66\text{MHz}$)

Conversion Gain , Noise Figure vs. RF Frequency



Condition
 $f_{IF}=83.16\text{MHz}$
 $P_{LO}=-10\text{dBm}$
 $P_{RF}=-30\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$
 Upper LOCAL

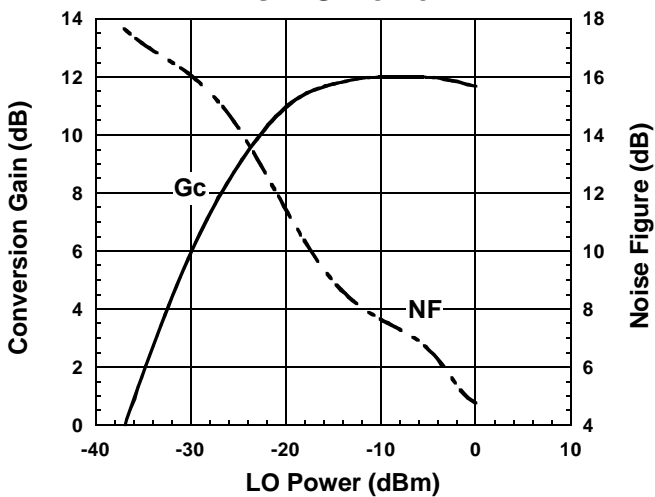
IF , IM3 vs. RF Power



Condition
 $f_{IF}=83.16\text{MHz}$
 $f_{RF1}=881.5\text{MHz}$
 $f_{RF2}=881.6\text{MHz}$
 $f_{LO}=964.66\text{MHz}, P_{LO}=-10\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

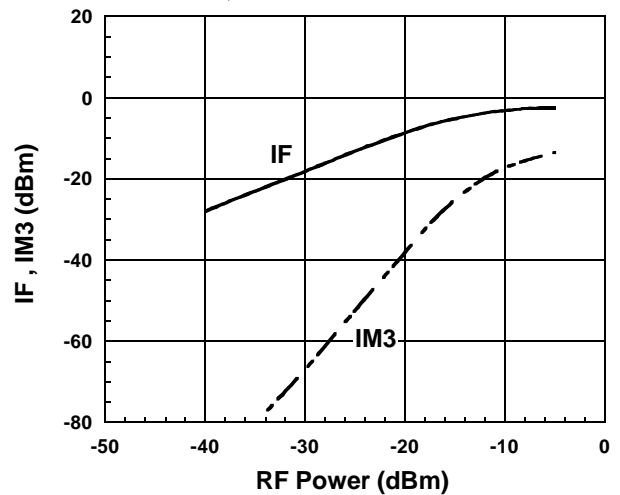
■ TYPICAL CHARACTERISTICS (Application 1, $f_{LO}=926.5\text{MHz}$)

Conversion Gain , Noise Figure vs. LO Power



Condition
 $f_{IF}=45\text{MHz}$
 $f_{RF}=881.5\text{MHz}, P_{RF}=-30\text{dBm}$
 $f_{LO}=926.5\text{MHz}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

IF , IM3 vs. RF Power

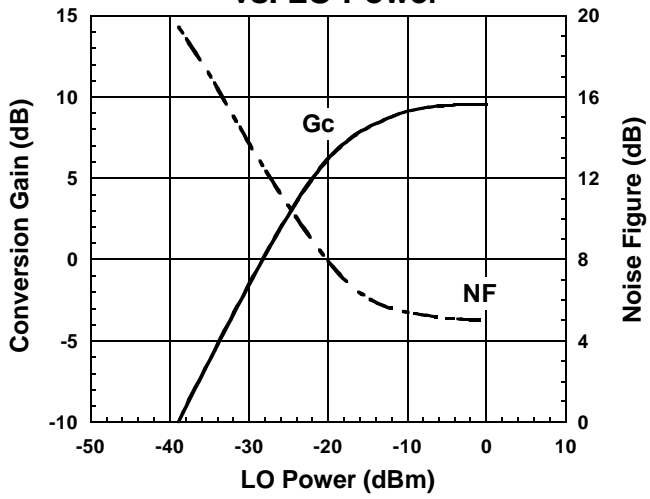


Condition
 $f_{IF}=45\text{MHz}$
 $f_{RF1}=881.5\text{MHz}$
 $f_{RF2}=881.6\text{MHz}$
 $f_{LO}=926.5\text{MHz}, P_{LO}=-10\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

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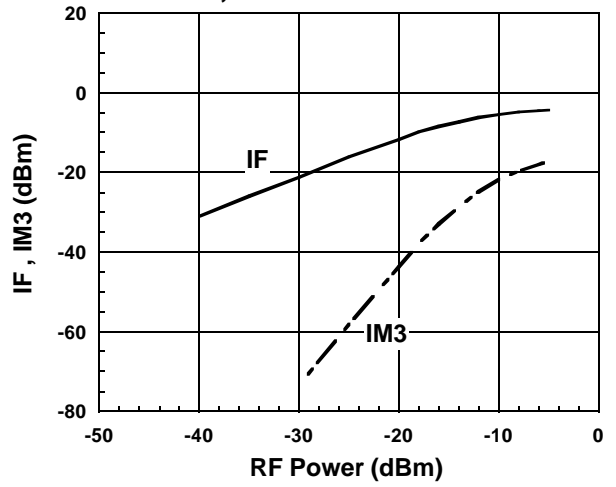
■ TYPICAL CHARACTERISTICS (Application 2, $f_{LO}=796.12\text{MHz}$)

Conversion Gain , Noise Figure
vs. LO Power



Condition
 $f_{IF}=85.38\text{MHz}$
 $f_{RF}=881.5\text{MHz}$, $P_{RF}=-30\text{dBm}$
 $f_{LO}=796.12\text{MHz}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

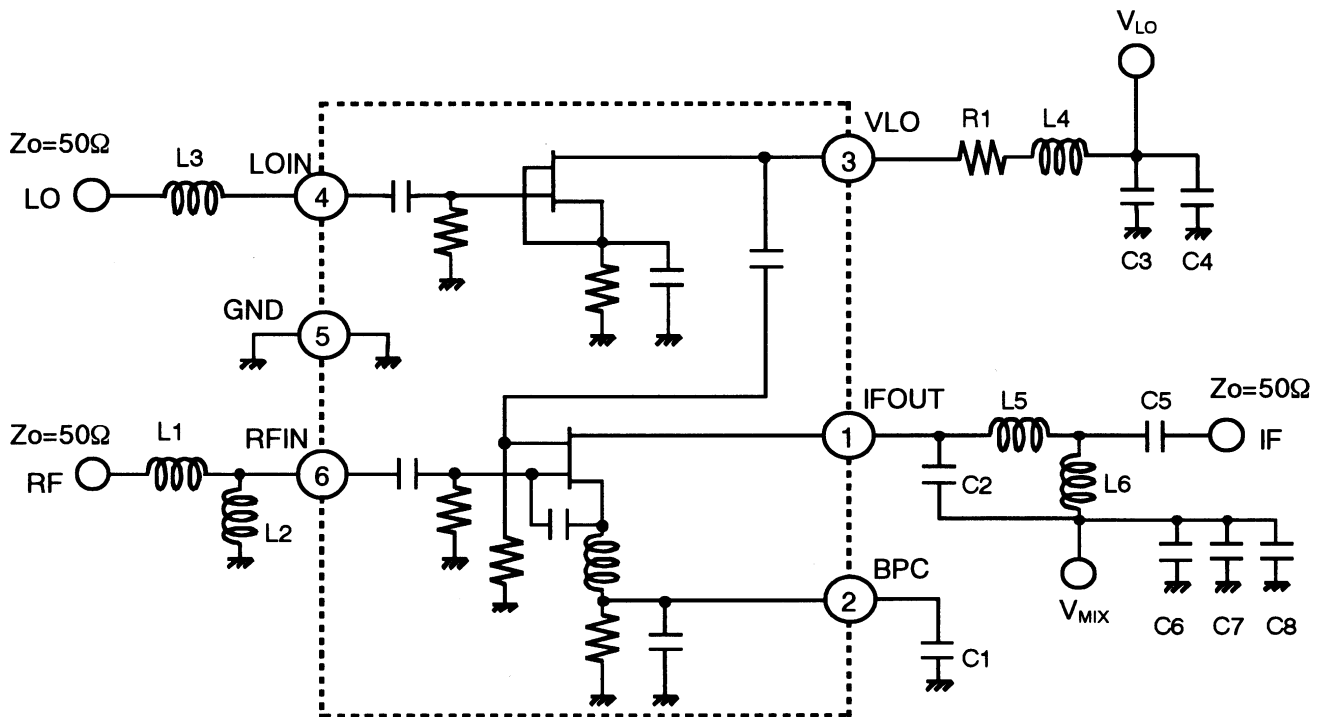
IF , IM3 vs. RF Power



Condition
 $f_{IF}=85.38\text{MHz}$
 $f_{RF1}=881.5\text{MHz}$
 $f_{RF2}=881.6\text{MHz}$
 $f_{LO}=796.12\text{MHz}$, $P_{LO}=-10\text{dBm}$
 $V_{MIX}=V_{LO}=2.7\text{V}$

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APPLICATION CIRCUIT 2 (Application 2)

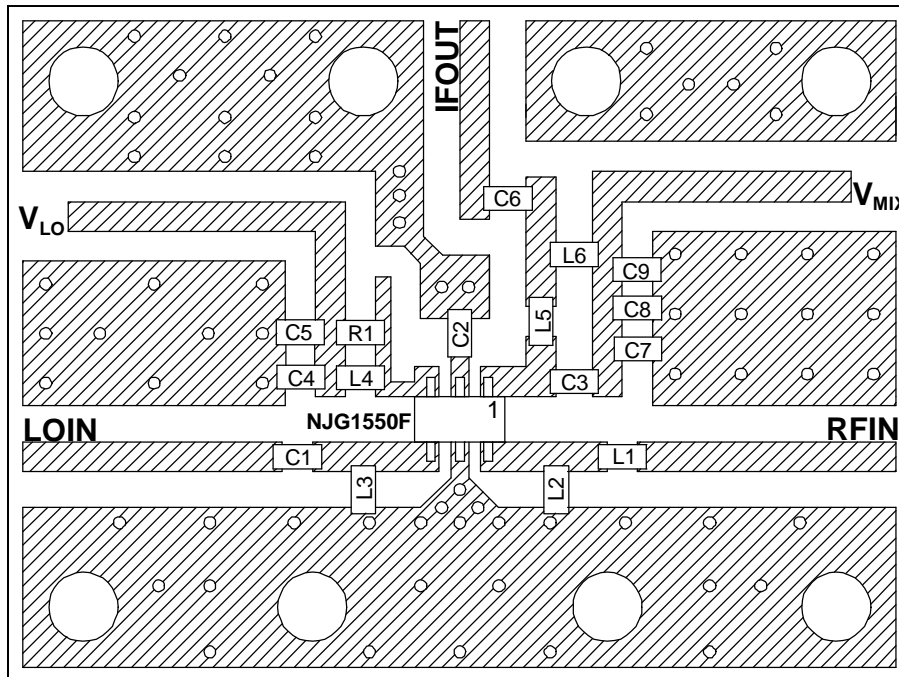


PARTS LIST 2

PART ID	800MHz Band		COMMENT
	Lower LOCAL		
	$f_{LO}=796.12\text{MHz}$		
	$f_{IF}=85.38\text{MHz}$		
L1	33nH		TAIYO-YUDEN(HK1608)
L2	22nH		TAIYO-YUDEN(HK1608)
L3	27nH		TAIYO-YUDEN(HK1608)
L4	27nH		TAIYO-YUDEN(HK1608)
L5	100nH		TAIYO-YUDEN(HK1608)
L6	47nH		TAIYO-YUDEN(HK1608)
C1	470pF		MURATA(GRM39)
C2	24pF		MURATA(GRM39)
C3	100pF		MURATA(GRM39)
C4	1000pF		MURATA(GRM39)
C5	1000pF		MURATA(GRM39)
C6	10pF		MURATA(GRM39)
C7	100pF		MURATA(GRM39)
C8	1000pF		MURATA(GRM39)
R1	100Ω		TAMA Electronics(CRG16G)

RECOMMENDED PCB DESIGN

(TOP VIEW)



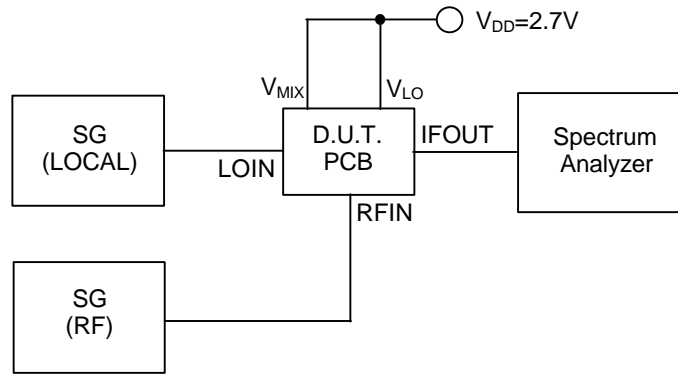
PCB: FR-4, t=0.5mm
 STRIPLINE WIDTH=1mm
 ($Z_0=50\Omega$)

(SIZE: 22.5mm x 30mm)

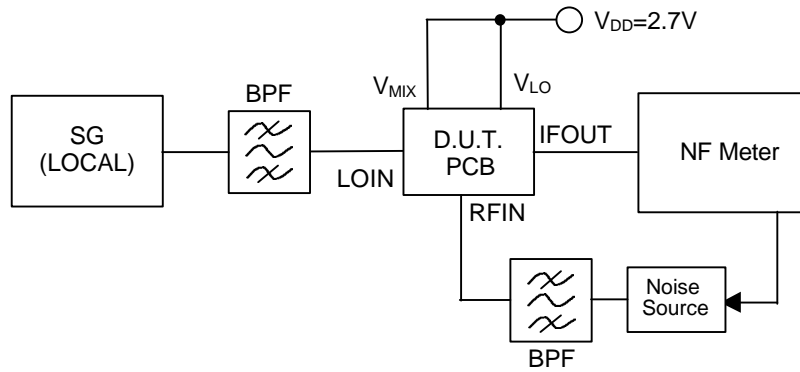
PRECAUTIONS

- [1] Please locate L4 and R1 close to VLO terminal (3).
- [2] Distance from L1 and RFIN terminal (6) is 3.5mm.
- [3] Distance from C1 and LOIN terminal (4) is 3.5mm.
- [4] Please locate C2 close to BPC terminal (2).
- [5] Please locate C7, C8, C9 close to C3, L6.
- [6] Please locate C4, C5 close to R1, L4.

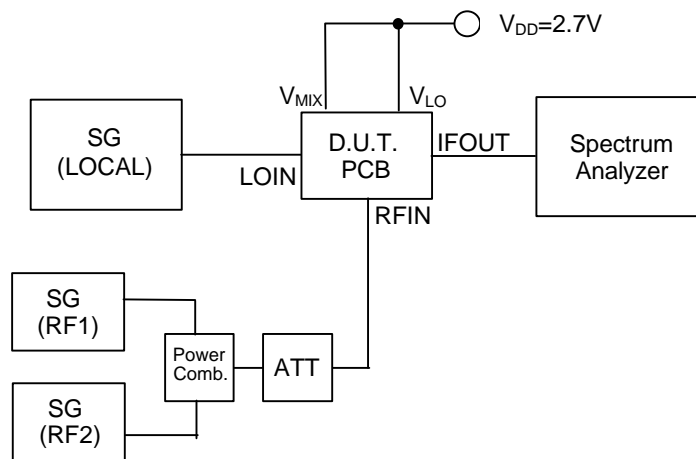
MEASURING BLOCK DIAGRAM



Conversion Gain Measurement Block Diagram

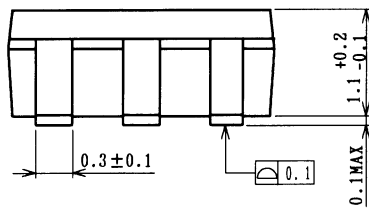
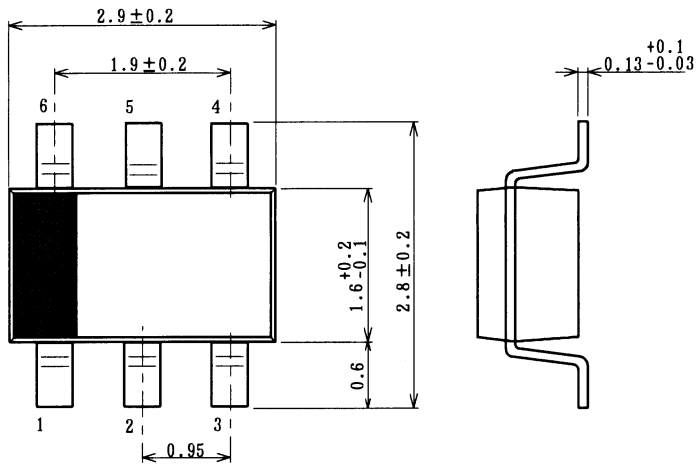


Noise Figure Measurement Block Diagram



IF, IM3, IM5 Measurement Block Diagram

■PACKAGE OUTLINE (MTP6)



Lead material	: Copper
Lead surface finish	: Solder plating
Molding material	: Epoxy resin
UNIT	: mm
Weight	: 14mg

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.