



GaAs POWER AMPLIFIER IC

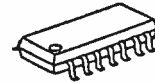
■ GENERAL DESCRIPTION

NJG1303 is a GaAs MMIC designed mainly for driver amplifier of PHS base station in Japan.

It features very low distortion and P_{acp} is less than -70dBc at 17dBm output power. It has input and output matching circuits internally. It enables low voltage and high efficiency operation.

Small Plastic mold Package are adopted.

■ PACKAGE OUTLINE



NJG1303E

■ APPLICATIONS

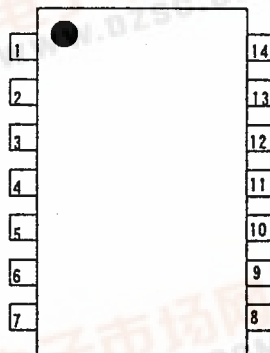
- PHS base station etc.

■ FEATURES

- Low voltage operation ($V_{DD}=3.0V$)
- Input and output internal matching circuits
- Low distortion ($P_{acp}=-70dBc$ Typ.@1.9GHz, 17dBm)
- Low current consumption ($I_{DD}=170mA$ Typ.@1.9GHz, 17dBm)
- Reduction of parasitic oscillation
- EMP 14 Maximum Power Dissipation: 1000mW($T_J=150^{\circ}C$, PCB: 24*30*1.0mm FR4)

■ PIN CONFIGURATION

(Top View)



Pin Connection

- | | |
|--------------------|---------------------|
| 1.GND | 8.GND |
| 2.RF _{in} | 9.RF _{out} |
| 3.V _{GG1} | 10.V _{DD2} |
| 4.V _{GG2} | 11.GND |
| 5.GND | 12.V _{DD1} |
| 6.GND | 13.GND |
| 7.GND | 14.GND |



NJG1303E



■ ABSOLUTE MAXIMUM RATINGS

(Z_s=Z_o=50ohm, T_a=25°C)

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Drain Voltage	V _{DD1} , V _{DD2}	V _{GG1,2} =-0.9V	6	V
Gate Voltage	V _{GG1} , V _{GG2}	V _{DD1,2} =3.0V	-4	V
Input Power	P _{in}	V _{DD1,2} =3.0V, V _{GG1,2} =-0.9V	10	dBm
Power Dissipation	P _D	24*30*1.0mm PCB : FR4, T _j =150°C	1000	mW
Operating Temperature	T _{opr}		-30~+85	°C
Storage Temperature	T _{stg}		-40~+150	°C

■ ELECTRICAL CHARACTERISTICS

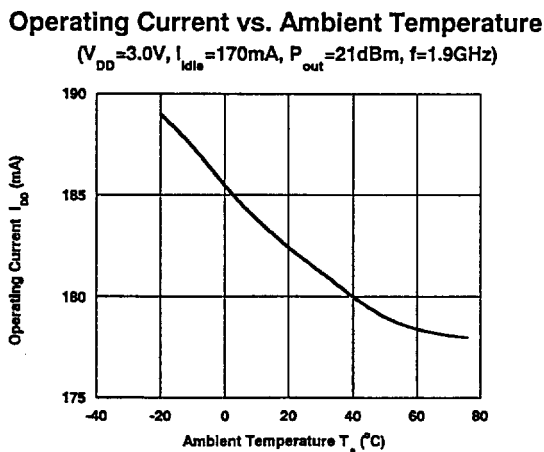
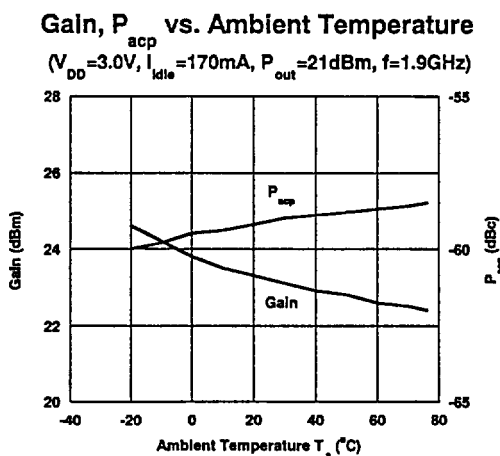
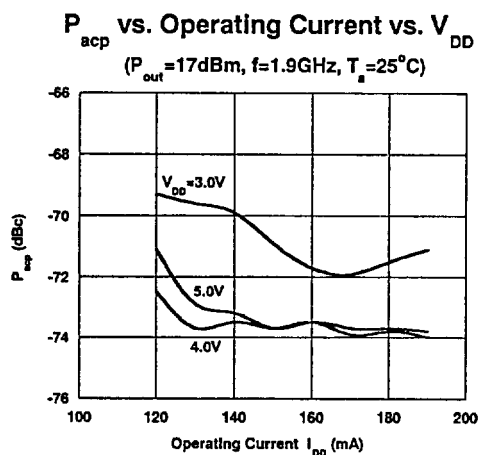
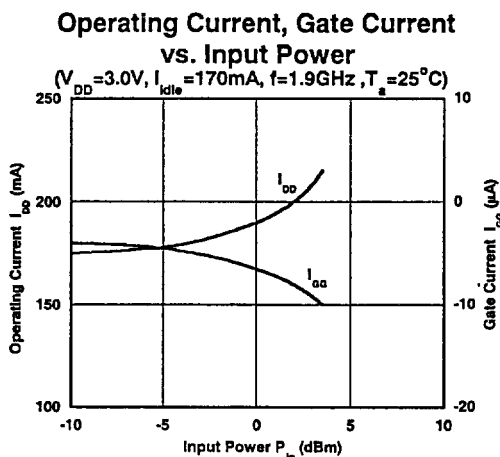
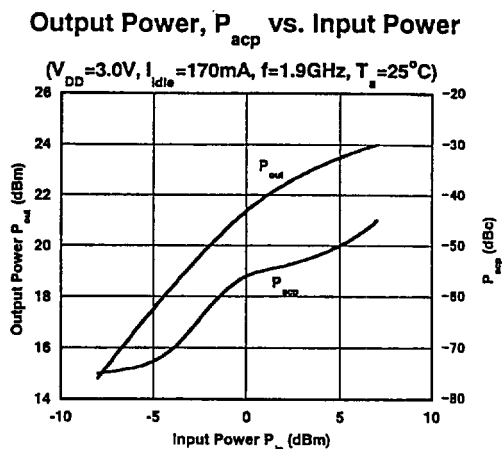
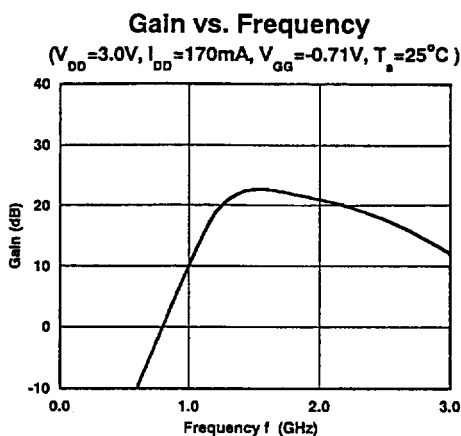
(f=1.9GHz, Z_s=Z_o=50ohm, T_a=25°C)

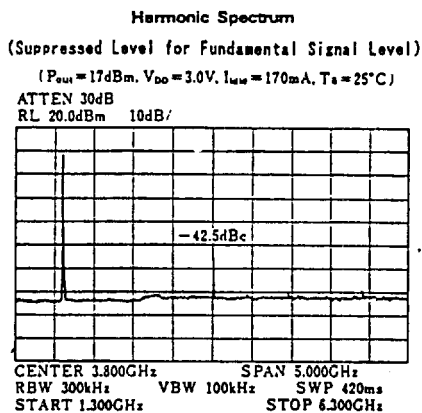
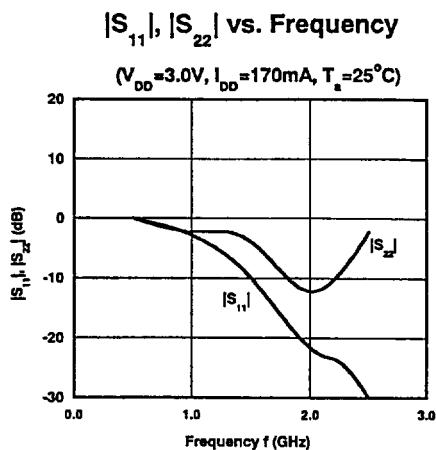
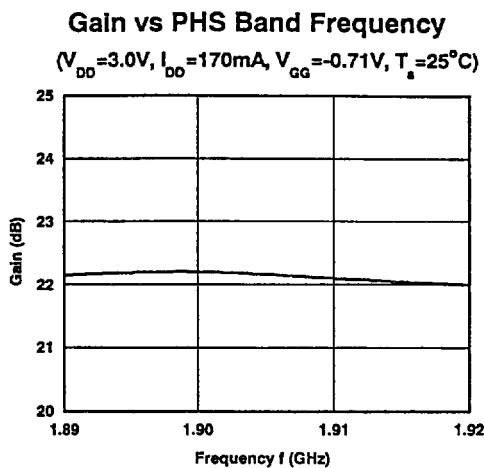
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Frequency	freq	V _{DD1,2} =3.0V	1.89	-	1.92	GHz
Drain Voltage	V _{DD1,2}		2.9	3.0	5.3	V
Gate Voltage	V _{GG1,2}	V _{DD1,2} =3.0V, I _{idle} =170mA	-1.25	-0.9	-0.6	V
Idle Current *1	I _{idle}	V _{DD1,2} =3.0V, No RF Signal	165	170	175	mA
Operating Current *1	I _{DD}	P _{out} =17dBm, V _{DD1,2} =3.0V	170	185	180	mA
Gate Current *2	I _{GG}	P _{out} =21dBm, V _{DD1,2} =3.0V	-150	-70	-	uA
Small Signal Gain	Gain	V _{DD1,2} =3.0V, I _{idle} =170mA	20	23	26	dB
Gain Flatness	G _{flat}	V _{DD1,2} =3.0V, I _{idle} =170mA	0.0	0.5	1.0	dB
Pout at 1dB Compression	P _{-1dB}	V _{DD1,2} =3.0V	21	22	-	dBm
Adjacent Channel Leakage Power ①	P _{acp1}	P _{out} =17dBm, offset=600kHz, P _{in} : π/4 QPSK, V _{DD1,2} =3.0V	-	-	-70	dBc
Adjacent Channel Leakage Power ②	P _{acp2}	P _{out} =17dBm, offset=900kHz, P _{in} : π/4 QPSK, V _{DD1,2} =3.0V	-	-	-70	dBc
Harmonics	P _{sp}	P _{out} =17dBm, V _{DD1,2} =3.0V	-	-35	-30	dBc
Input VSWR	VSWR _i	V _{DD1,2} =3.0V	-	-	2.2	
Load VSWR Tolerance		P _{out} =17dBm, V _{DD1,2} =3.0V Load VSWR=4:1, All Phase	Parasitic Oscillation for Fundamental Signal Level : ≤ -60dBc			

*1 ; V_{DD1} Terminal and V_{DD2} Terminal Total Current*2 ; V_{GG1} Terminal and V_{GG2} Terminal Total Current



■ TYPICAL CHARACTERISTICS

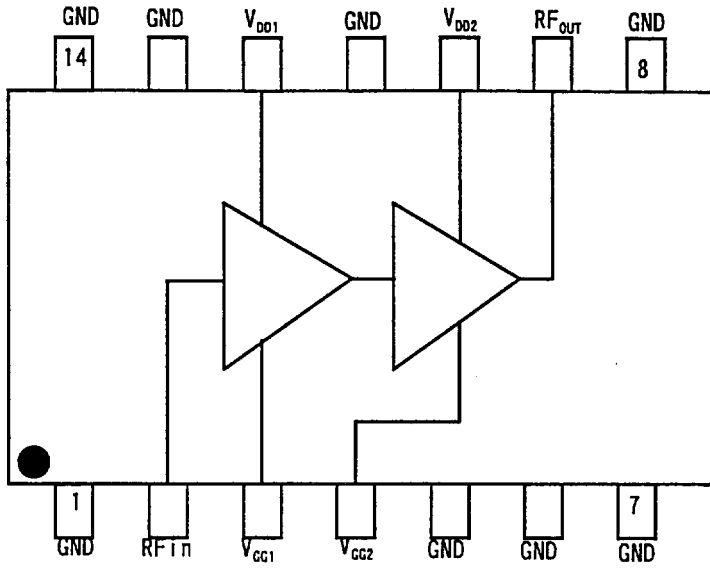



■ TYPICAL CHARACTERISTICS


※All adjacent channel leakage power used in these characteristics are those of 600kHz offset for fundamental wave at PHS operating condition($\pi/4$ QPSK)

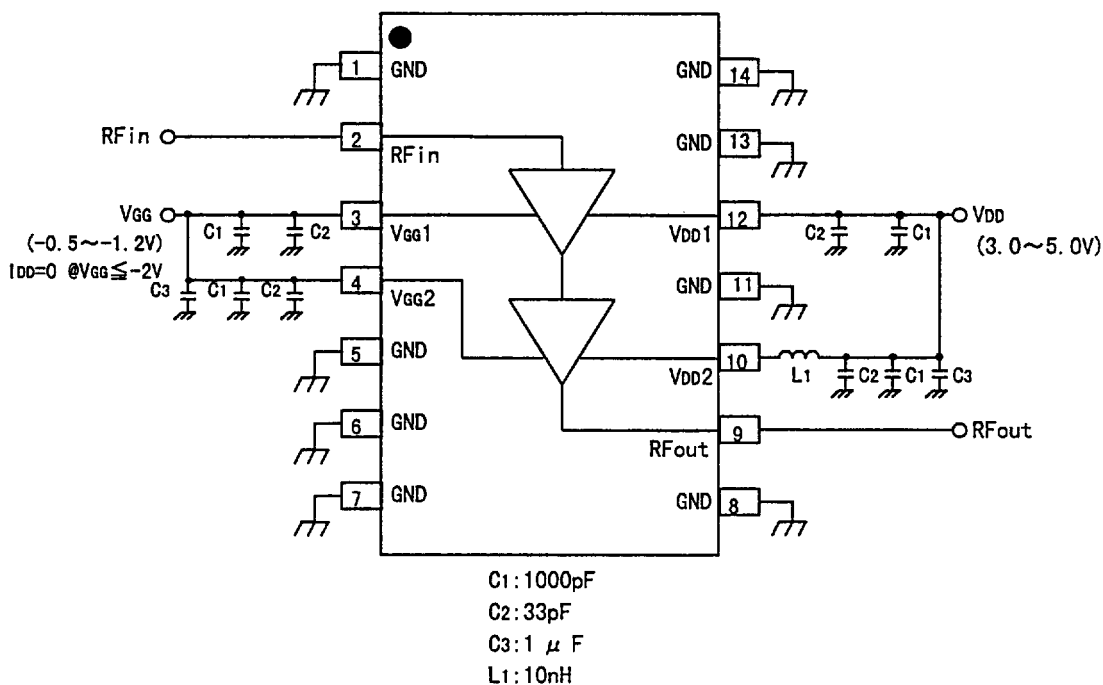


■ BLOCK DIAGRAM

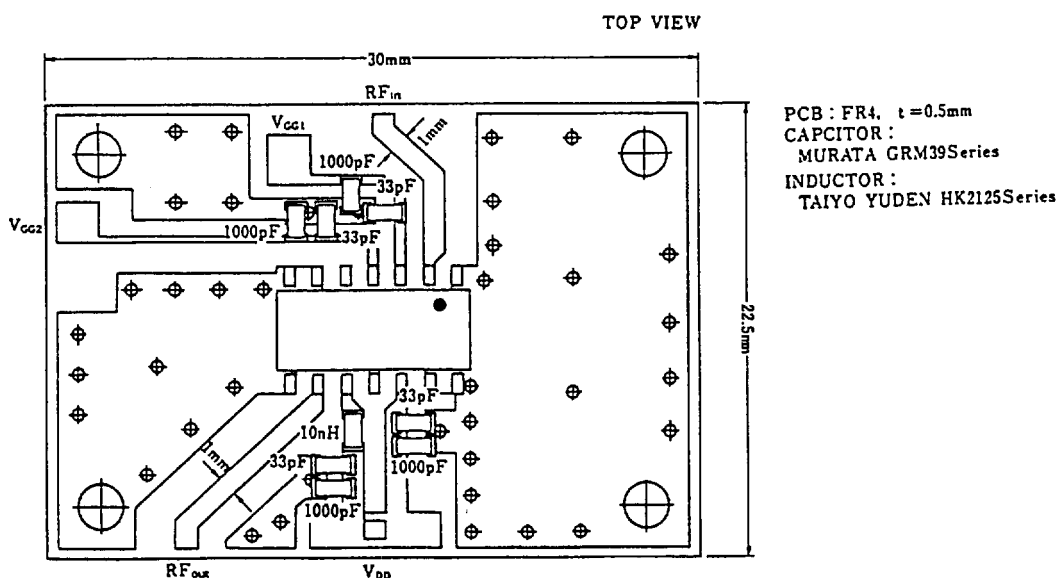




RECOMMENDED CIRCUIT



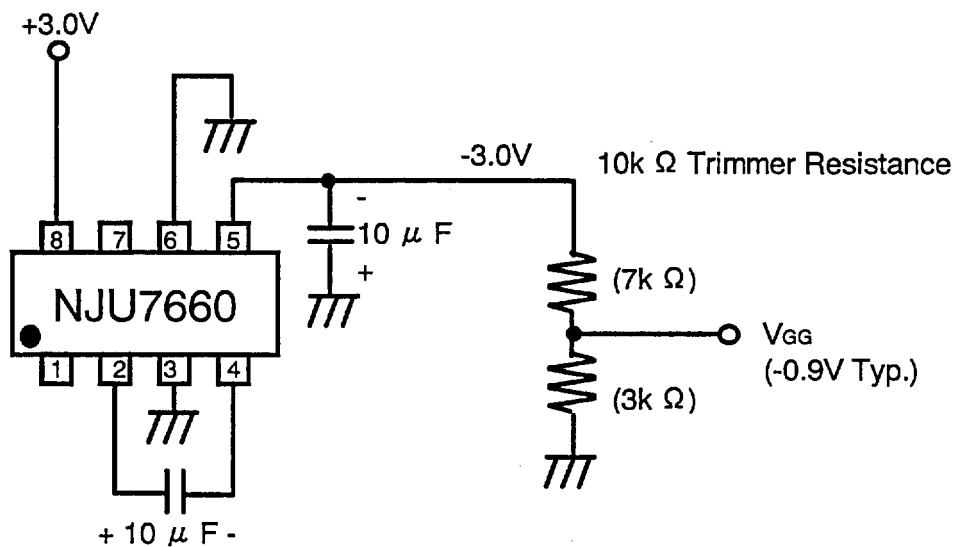
RECOMMENDED PCB



This reflow method is recommended to install this device to PCB.



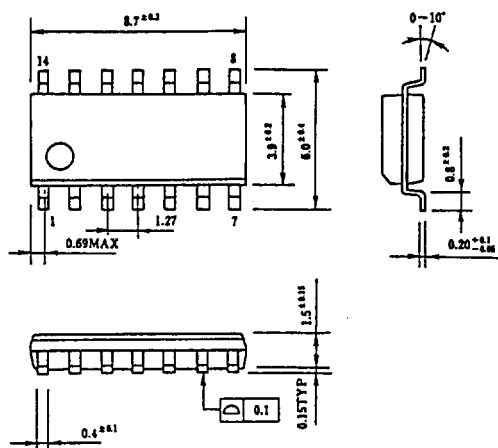
■ RECOMMENDED CIRCUIT TO PRODUCE NEGATIVE VOLTAGE





■ PACKAGE OUTLINE

EMPI4



UNIT:mm

Caution on using the products

A GaAs is used in this product. A GaAs is a harmful material.

- Don't eat or in the mouth.
- Don't dispose in fire or break up the products.
- Don't make a gas or a powdered with the chemical reaction.
- In the case of wasting the products, please obey the relation rule in the each country.

This product may be broken with static electric discharge or serge voltage. Therefore, please note a handling.

The other caution item

- The product specifications and descriptions listed in this catalog are subject to change at any time, without notice.
- We don't take upon ourselves the responsibilities that infringe on other people's rights of a patents bringing about the information and drawing in this catalog.
- It is not purpose to be equipped with the system needs a high reliability as air system, submarine cable system, atomic energy control system and medical instrument for keeping life.
- If you think the above system, please ask for the sales office before.