

Power Amplifier/Antenna Switch for PHS

Description

The CXG1015N is a power amplifier/antenna switch MMIC for PHS. This is designed using the Sony's GaAs J-FET process and operates at a single positive power supply.

Features

- Single positive power supply 3.0 V
- Output power 20.2 dBm
(Antenna switch transfer output pin power)
- Low current consumption 160 mA
(Output power of 20.2 dBm)
- High power gain 39 dB Typ.
(Output power of 20.2 dBm)
- Low insertion loss 0.5 dB Typ.
- Small mold package 20-pin SSOP
(Pin interval of 0.5 mm pitch)

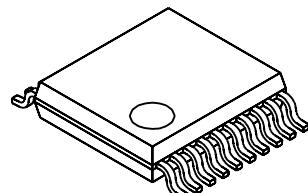
Structure

GaAs J-FET MMIC

Applications

- Power amplifiers for PHS
- Antenna switches for PHS

20 pin SSOP (Plastic)



Absolute Maximum Ratings (Ta=25 °C)

• Supply voltage	V _{DD}	6	V
• Voltage between gate and source			
	V _{GS0}	1.5	V
• Drain current	I _{DD}	550	mA
• Power dissipation	P _D	3	W
• Channel temperature	T _{ch}	150	°C
• Operating temperature	T _{opr}	-35 to +85	°C
• Storage temperature	T _{stg}	-65 to +150	°C

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Electrical Characteristics**Power Amplifier + Antenna Switch Transfer Block**V_{DD}=3.0 V, V_{CTL}=2.0 V, f=1.90 GHz

(Ta=25 °C)

Item	Symbol	Min.	Typ.	Max.	Unit
* Current consumption	I _{DD}		160		mA
* Gate voltage adjustment value	V _{GG2}	0	0.25	0.7	V
Output power (Power Amplifier + Antenna Switch Transfer Block)	P _{OUT}	20.2			dBm
* Power gain	G _P	35.5	39	42	dB
* Adjacent channel leak power ratio (600 kHz±100 kHz)	ACPR600		-59	-54	dBc

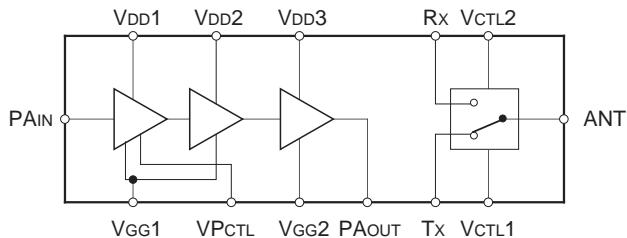
- * Values where V_{GG1} and V_{GG2} are adjusted so that I_{DD} becomes 160 mA when the power amplifier output pin and the antenna switch transfer input pin are connected on the Sony's recommended evaluation board and the output power on the antenna switch transfer output pin is 20.2 dBm.

Antenna Switch Receive BlockV_{CTL(L)}=0 V, V_{CTL(H)}=3.0 V

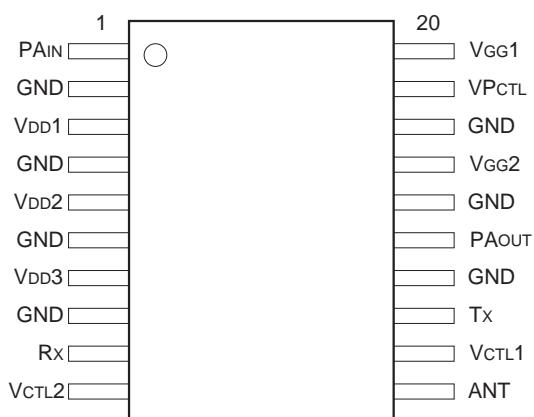
(Ta=25 °C)

Item	Symbol	Min.	Typ.	Max.	Unit
Insertion loss	I _L		0.5	0.8	dB
Isolation	I _{SO}	20	24		dB
Control pin current	I _{CTL}		40	100	µA

Block Diagram



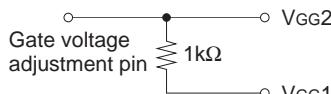
Pin Configuration



Antenna Switch Operation

VCTL1=3 V	ANT-Tx	ON
VCTL2=0 V	ANT-Rx	OFF
VCTL1=0 V	ANT-Tx	OFF
VCTL2=3 V	ANT-Rx	ON

Gate Bias Circuit of Power Amplifier Block



Recommended Current Adjustment Method

(1) VGG2/PIN separate adjustment

(VGG2 adjustment 1)

When the RF input (PIN) off, the current consumption (I_{DD}) is adjusted to 160 mA.

(PIN adjustment 1)

The output power (P_{OUT}) is adjusted to 20.2 dBm.

(VGG2 adjustment 2)

The current consumption (I_{DD}) is finely adjusted to 160 mA.

(PIN adjustment 2)

The output power (P_{OUT}) is finely adjusted to 20.2 dBm.

Variation of I_{DD} and P_{OUT} due to adjustment

$$\begin{aligned} I_{DD} &= 160 \pm 20 \text{ mA} \\ P_{OUT} &= 20.2 \text{ dBm} \end{aligned}$$

$$\begin{aligned} I_{DD} &= 160 \text{ mA} \\ P_{OUT} &= 20.2 \pm 0.2 \text{ dBm} \end{aligned}$$

$$\begin{aligned} I_{DD} &= 160 \pm 5 \text{ mA} \\ P_{OUT} &= 20.2 \text{ dBm} \end{aligned}$$

(2) Simple adjustment

(I_{DD} read)

When the RF input (PIN) is off, the gate voltage (VGG2) is set to 0.4 V and I_{DD} is read.

(VGG2 setting)

The formula* where $V_{GG2}=f(I_{DD}; V_{GG2}=0.4 \text{ V})$ is used to set VGG2.

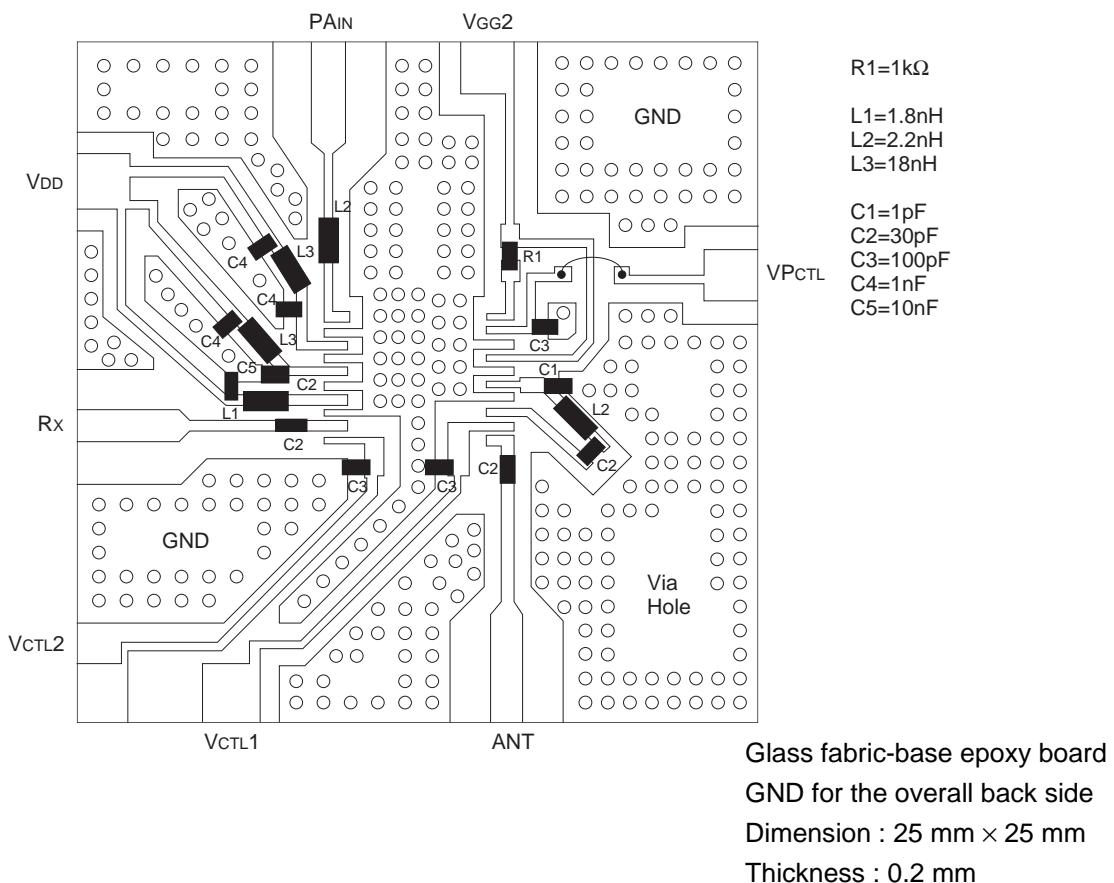
(PIN adjustment)

The output power (P_{OUT}) is adjusted to 20.2 dBm.

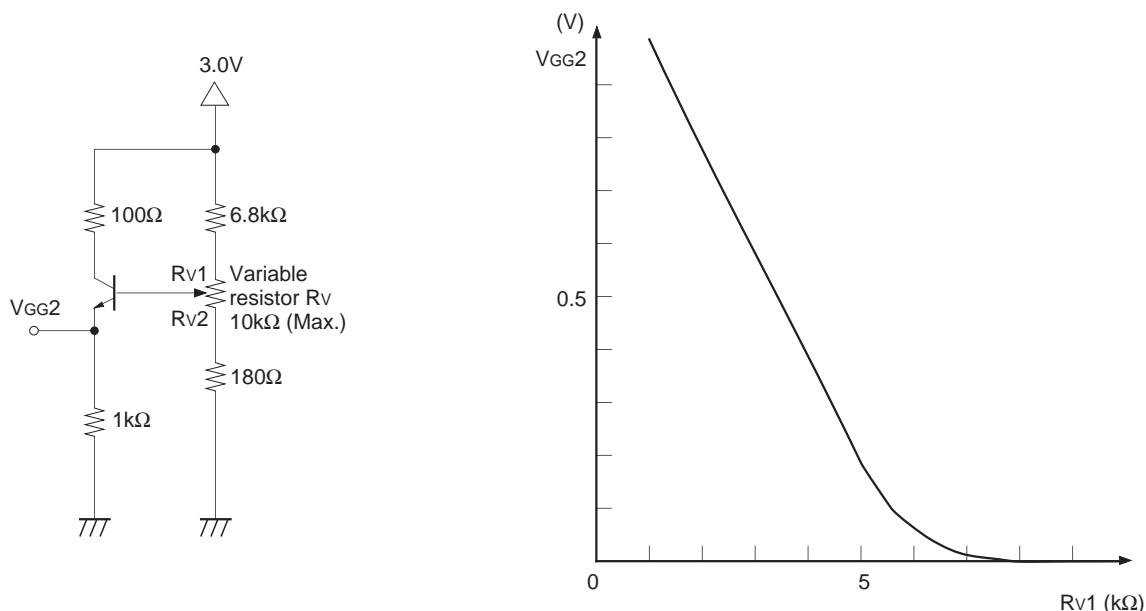
* e.g. $V_{GG2}=a-b \times I_{DD}$

$$\begin{aligned} I_{DD} &= 160 \pm 5 \text{ mA} \\ P_{OUT} &= 20.2 \text{ dBm} \end{aligned}$$

Recommended Evaluation Circuit

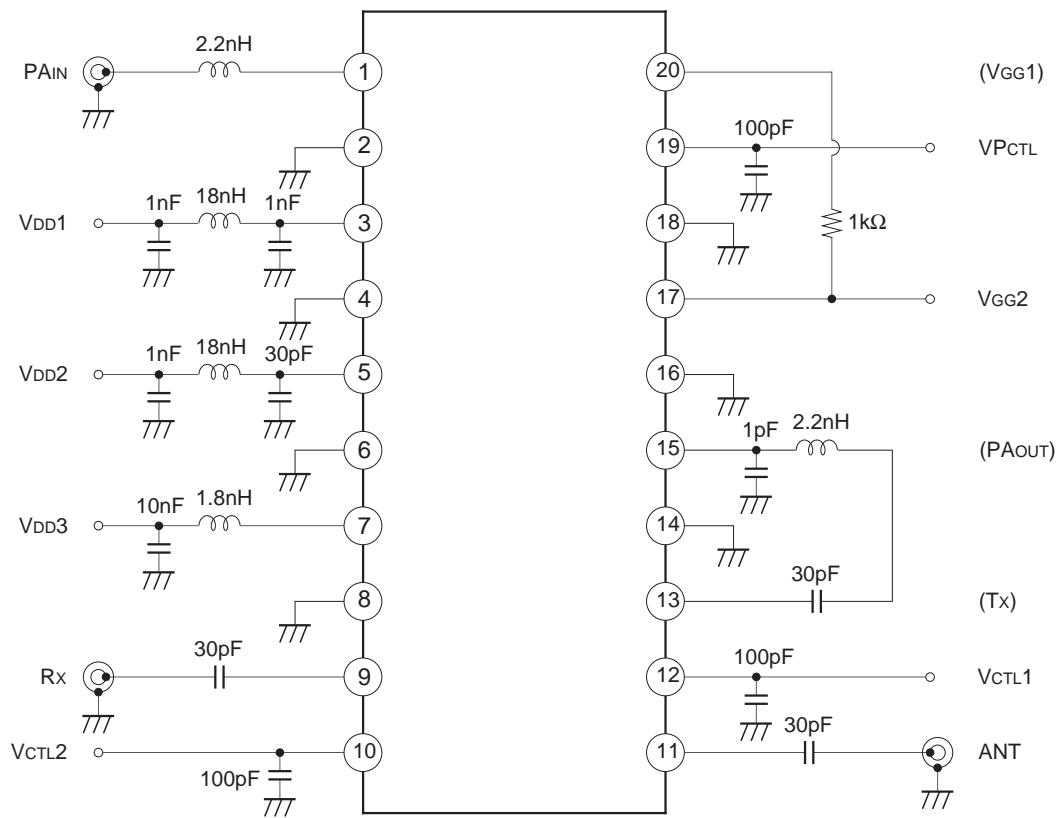


Recommended Gate Bias Circuit and Circuit Characteristics



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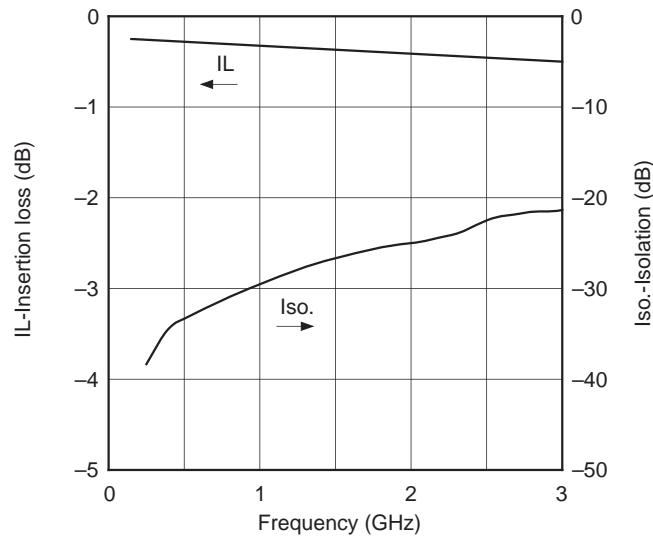
Recommended External Circuit



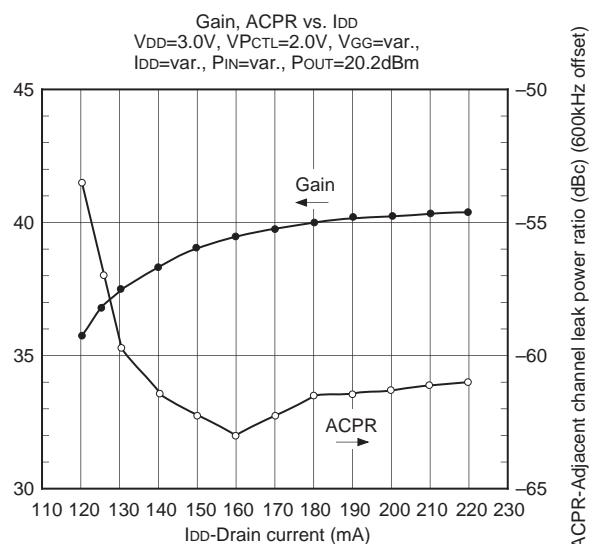
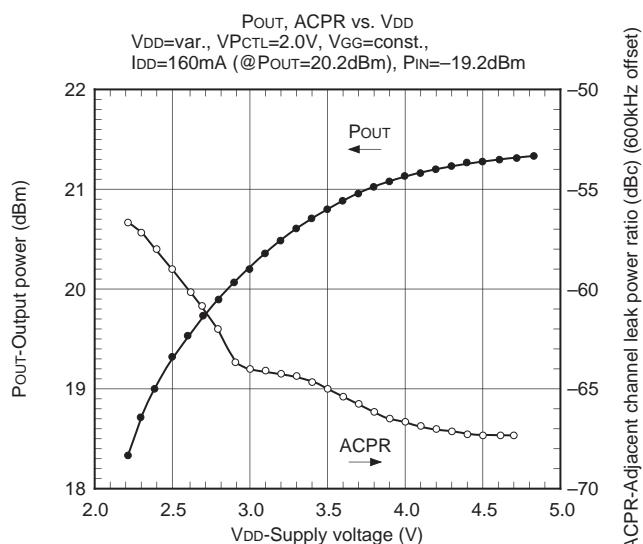
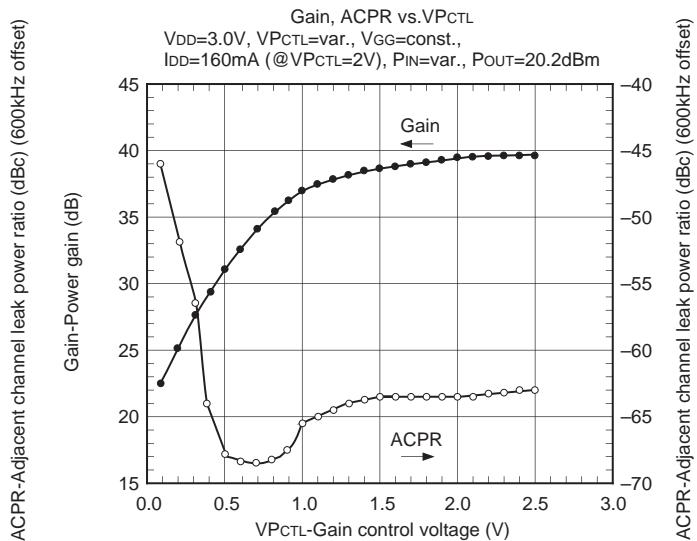
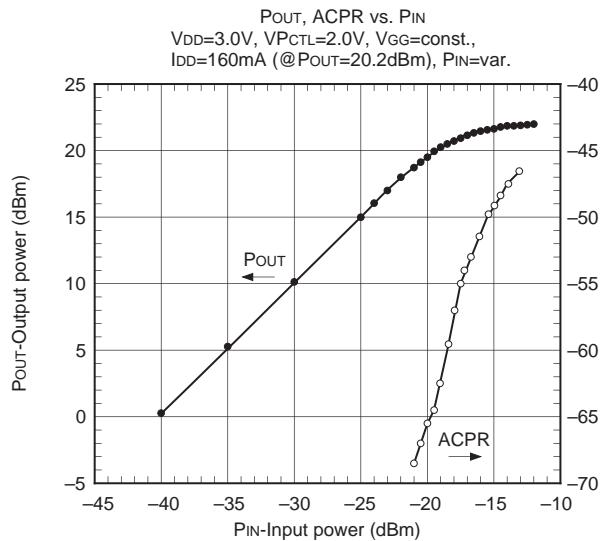
Example of Representative Characteristics ($T_a=25^\circ\text{C}$)

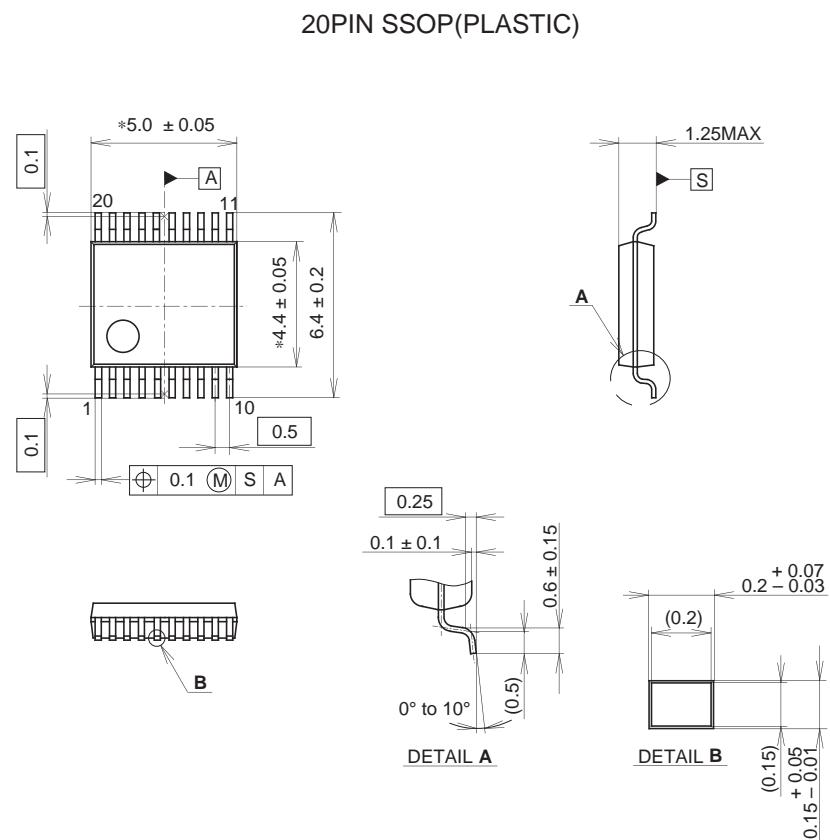
Antenna Switch Receive Block

IL, Iso. vs. Freq.



Example of Representative Characteristics
Power Amplifier + Antenna Switch Transfer Block



Package Outline Unit : mm**PACKAGE STRUCTURE**

SONY CODE	SSOP-20P-L03
EIAJ CODE	SSOP020-P-0044
JEDEC CODE	_____

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER/PALLADIUM PLATING
LEAD MATERIAL	COPPER ALLOY
PACKAGE MASS	0.1g