HA31006ANP

SiGe MMIC
High Frequency Low Noise Amplifier

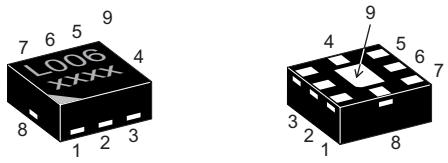
REJ03F0174-0300
Rev.3.00
Jul 31, 2007

Features

- Ideal for 2.4 / 5 GHz Band applications. e.g. 2.4 / 5 GHz Band Wireless LAN
- Low Noise (1.3 dB @ 2.4 GHz, 1.7 dB @ 5.2 GHz)
- High Gain (20 dB @ 2.4 GHz, 16 dB @ 5.2 GHz)
- 8 Pin, Lead less, Small mounting area
  (HWQFN-8 : 2.0 × 2.0 × 0.8 mm)

Outline

RENESAS package code: PWQN0008ZA-A
(Package name: HWQFN-8 <TNP-8TV>)



1. Vctrl
2. RFout
3. GND
4. GND
5. GND
6. RFin
7. GND
8. GND
9. GND

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Supply Voltage	V_{CC}	4	V
Maximum Current	I_{CC}	15	mA
Maximum Input Power	$P_{in\ max}$	+5	dBm
Power Dissipation	P_t	60 Note	mW
Operating temperature	Tcop	–10 to +85	°C
Storage temperature	Tstg	–55 to +150	°C

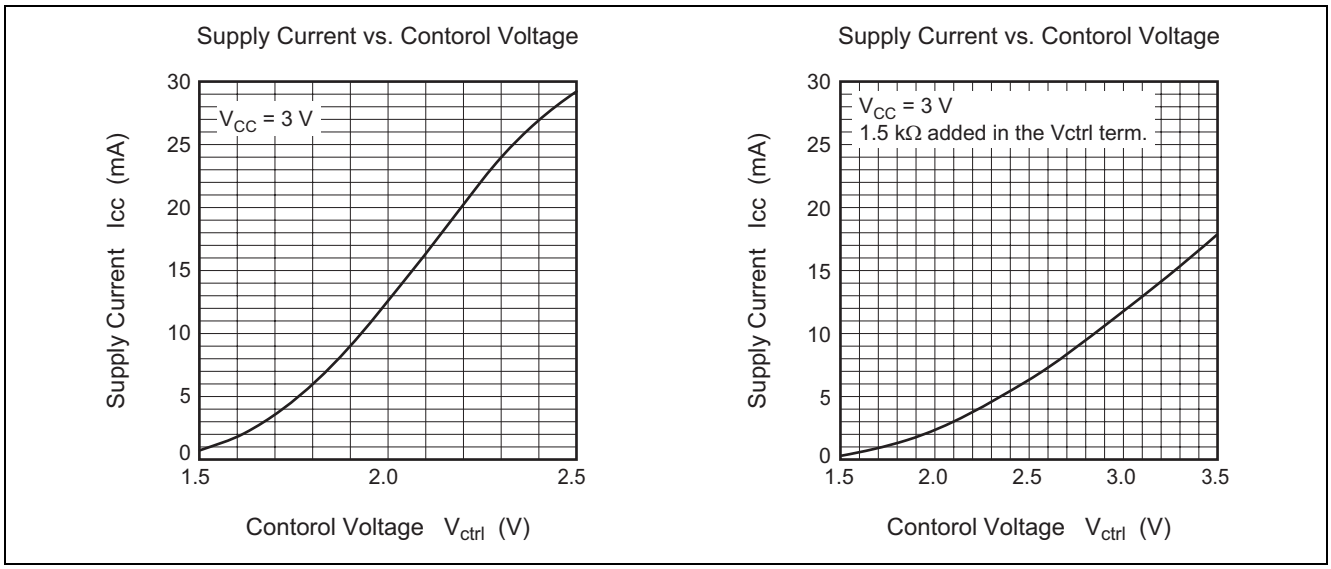
Notes: Specified condition

Electrical Characteristics

(Ta = 25°C)

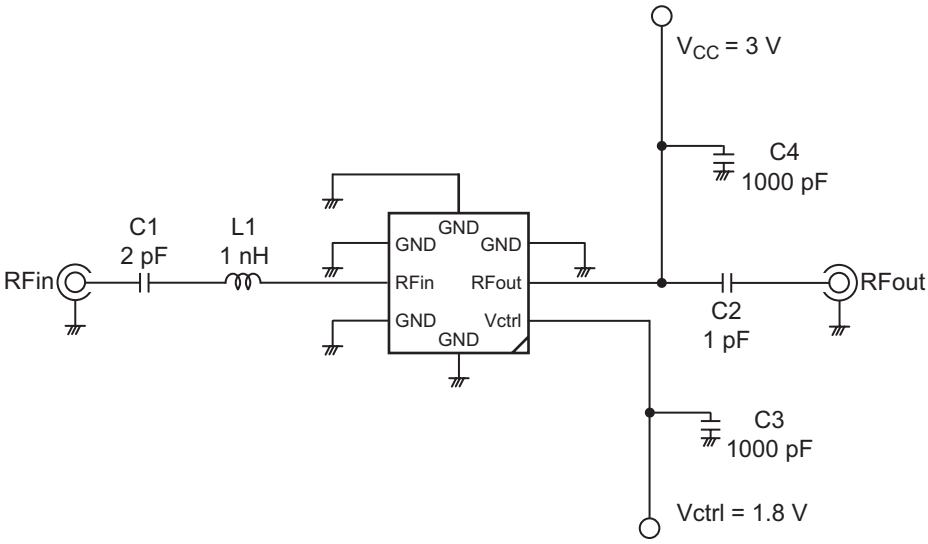
Item	Symbol	Min.	Typ	Max.	Unit	Test Conditions
Supply Current	I_{CC}	—	6	—	mA	No RF signal
Noise Figure	NF	—	1.3	—	dB	f = 2.35 to 2.55 GHz V_{CC} = 3 V, Vctrl = 1.8 V
		—	1.7	—		f = 5 to 6 GHz V_{CC} = 3 V, Vctrl = 1.8 V
Power Gain	PG	—	20	—	dB	f = 2.35 to 2.55 GHz V_{CC} = 3 V, Vctrl = 1.8 V
		—	16	—		f = 5 to 6 GHz V_{CC} = 3 V, Vctrl = 1.8 V
Input Return Loss	Rlin	—	11	—	dB	f = 2.35 to 2.55 GHz V_{CC} = 3 V, Vctrl = 1.8 V
		—	10	—		f = 5 to 6 GHz V_{CC} = 3 V, Vctrl = 1.8 V
Output Return Loss	Rlout	—	21	—	dB	f = 2.35 to 2.55 GHz V_{CC} = 3 V, Vctrl = 1.8 V
		—	24	—		f = 5 to 6 GHz V_{CC} = 3 V, Vctrl = 1.8 V

Main Characteristics



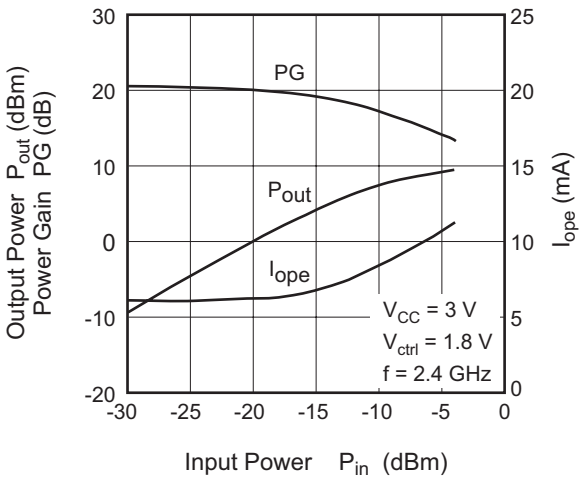
2.4 GHz Characteristics

Evaluation Board Circuit

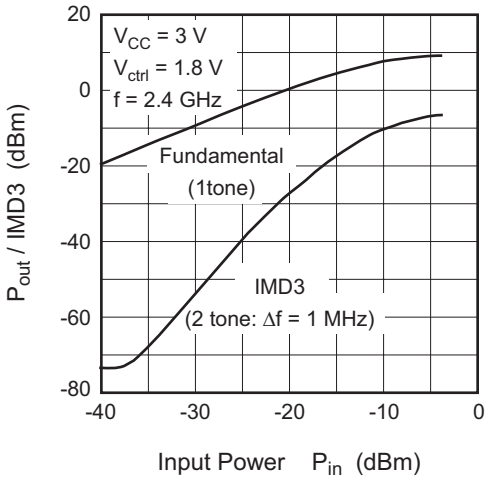


Pin - Pout Characteristics

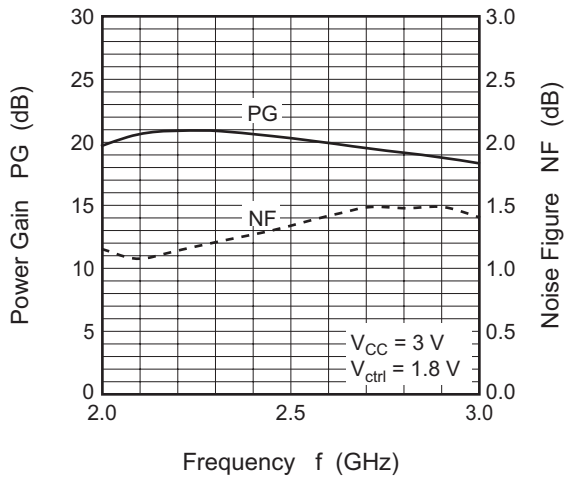
Pin - Pout Characteristics



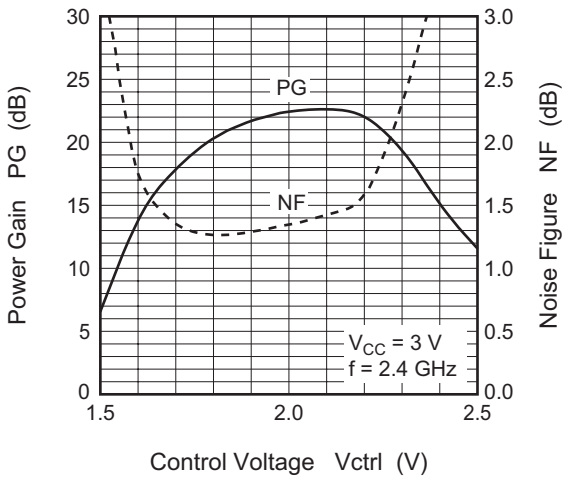
3rd. Order Intermodulation Distortion



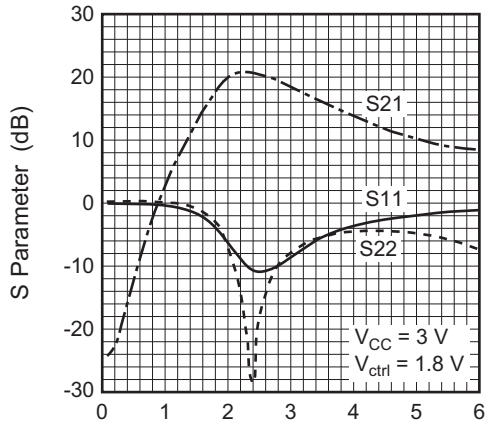
Power Gain, Noise Figure vs. Frequency



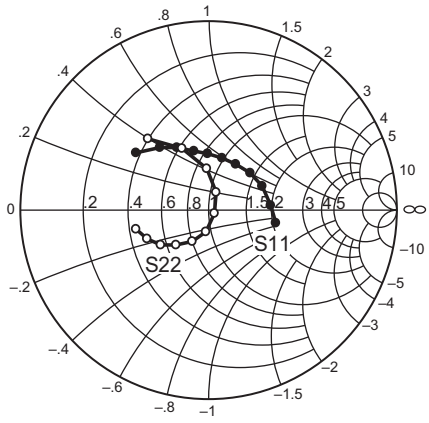
Power Gain, Noise Figure vs. Control Voltage



S Parameter vs. Frequency



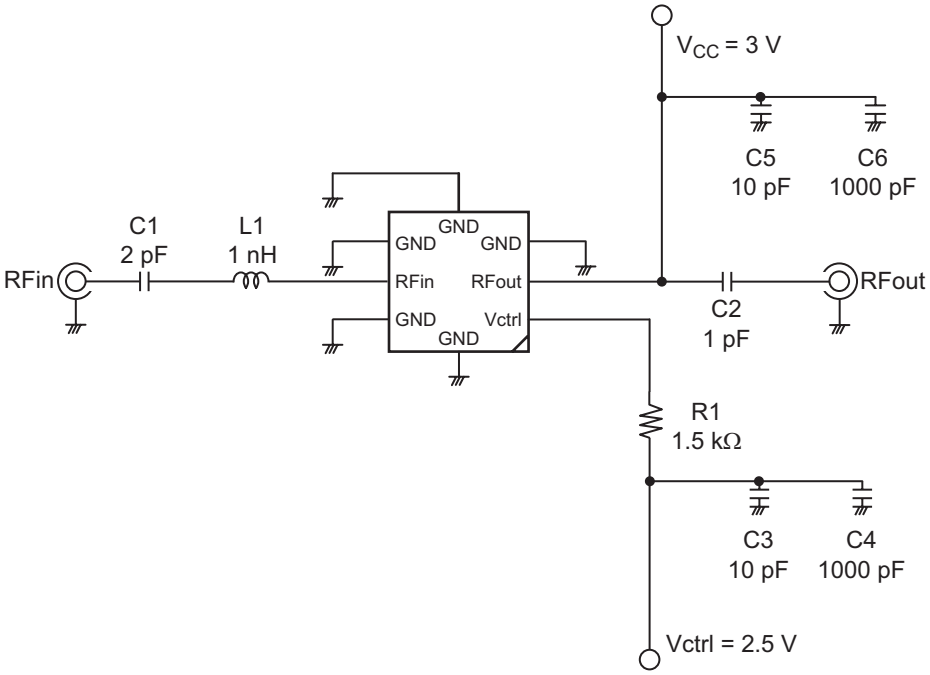
S Parameter vs. Frequency



Condition: V_{CC} = 3 V, V_{ctrl} = 1.8 V
f = 2.0 to 3.0 GHz (0.1 GHz step)

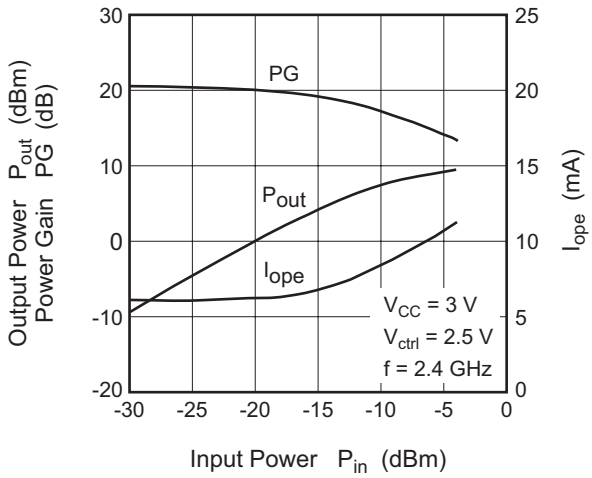
2.4 GHz Characteristics (Vctrl 1.5 kΩ)

Evaluation Board Circuit

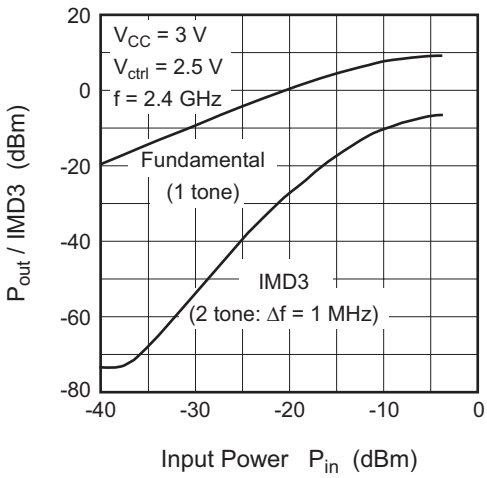


Pin - Pout Characteristics

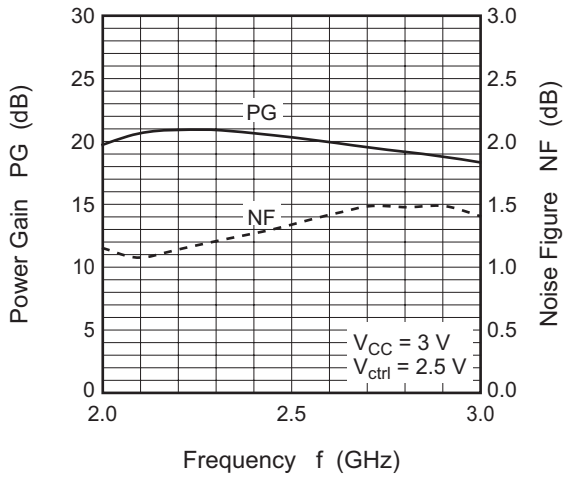
Pin - Pout Characteristics



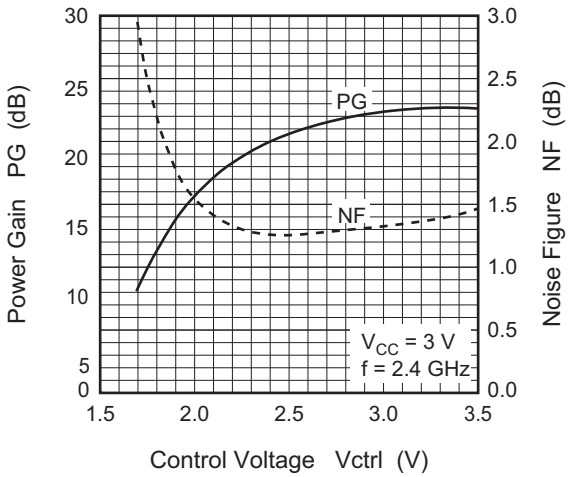
3rd. Order Intermodulation Distortion



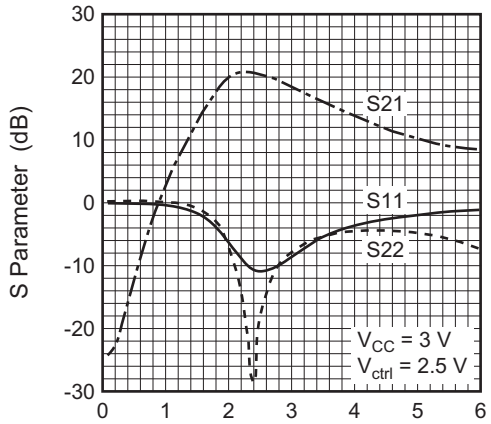
Power Gain, Noise Figure vs. Frequency



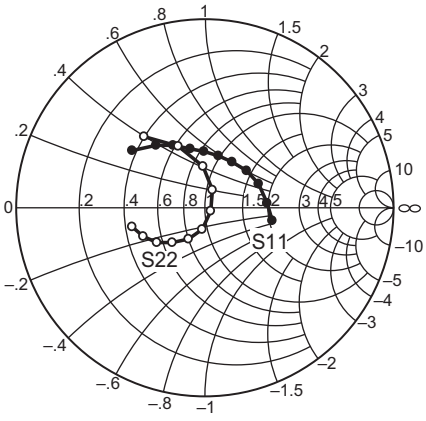
Power Gain, Noise Figure vs. Control Voltage



S Parameter vs. Frequency



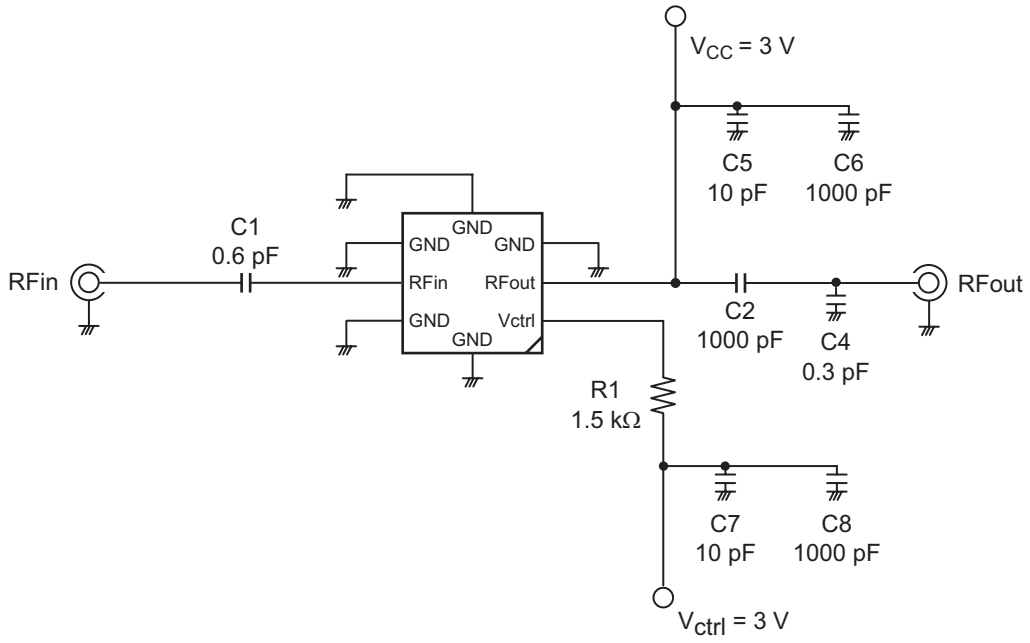
S Parameter vs. Frequency



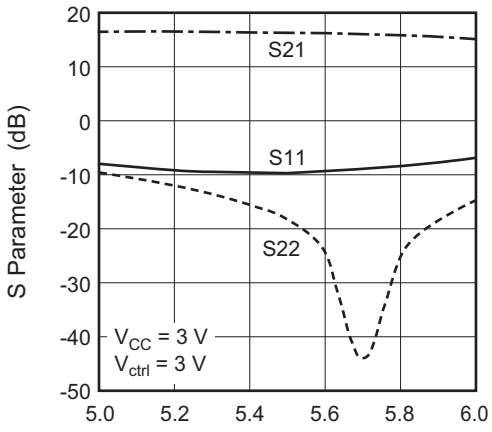
Condition: V_{CC} = 3 V, V_{ctrl} = 2.5 V
f = 2.0 to 3.0 GHz (0.1 GHz step)

5 GHz Characteristics

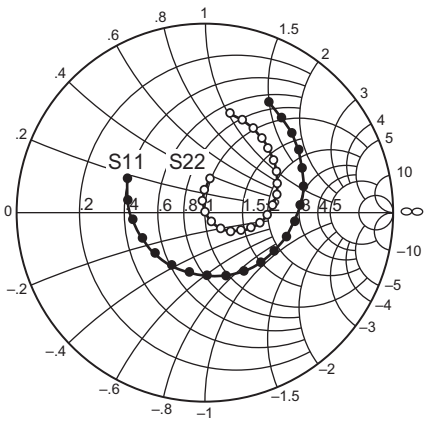
Evaluation Board Circuit



S Parameter vs. Frequency



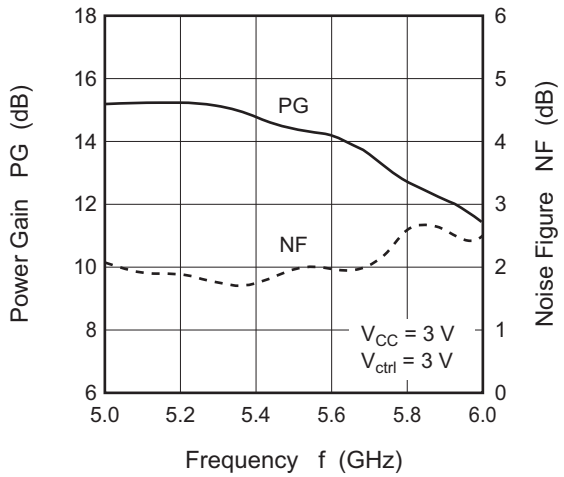
S Parameter vs. Frequency



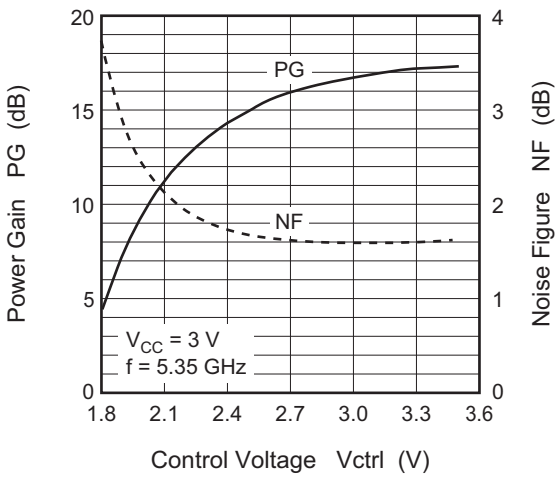
Condition: V_{CC} = 3 V, V_{ctrl} = 3 V
f = 4.0 to 6.0 GHz (0.1 GHz step)

5.35 GHz Characteristics

Power Gain, Noise Figure vs. Frequency



Power Gain, Noise Figure vs. Control Voltage



Pin - Pout Characteristics

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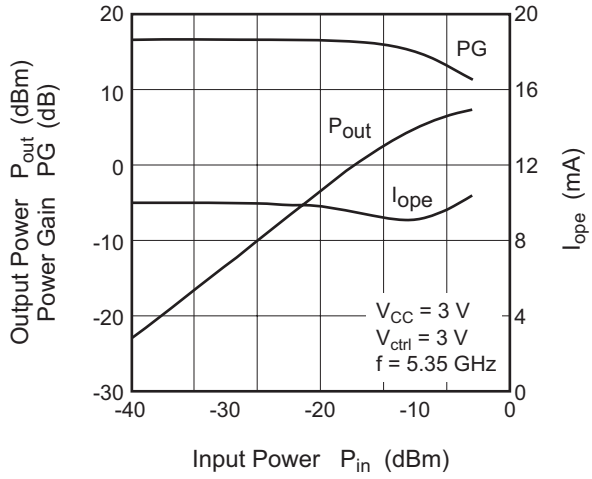
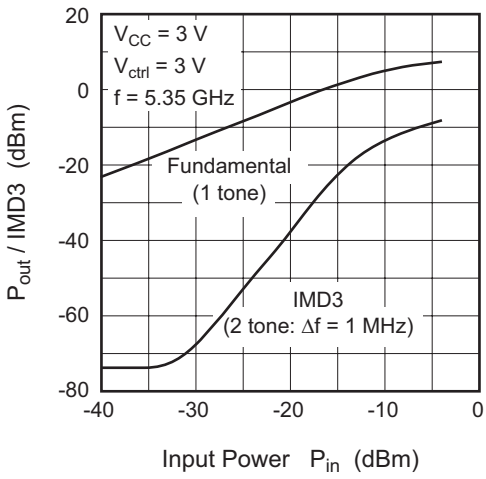
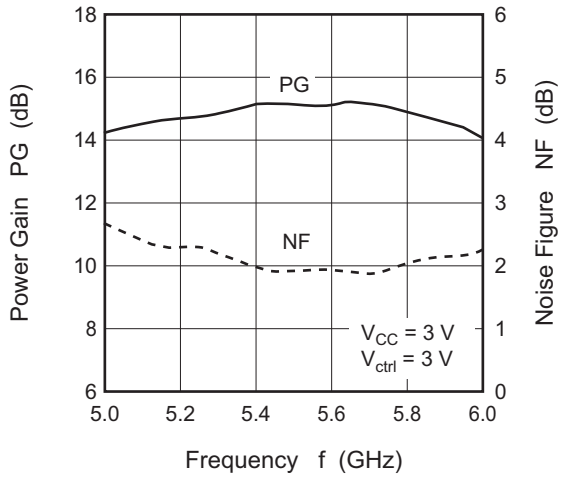


3rd. Order Intermodulation Distortion

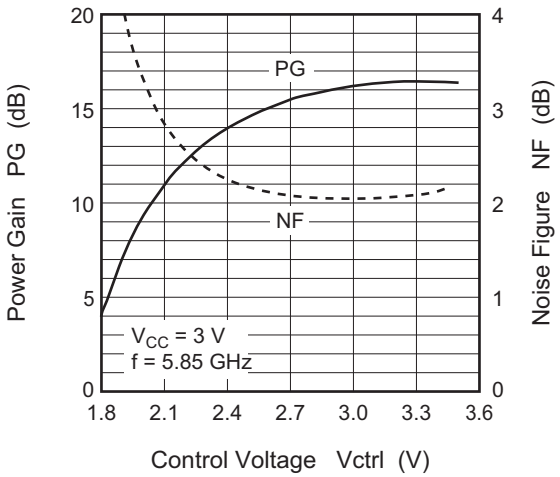


5.85 GHz Characteristics

Power Gain, Noise Figure vs. Frequency



Power Gain, Noise Figure vs. Control Voltage



Pin - Pout Characteristics

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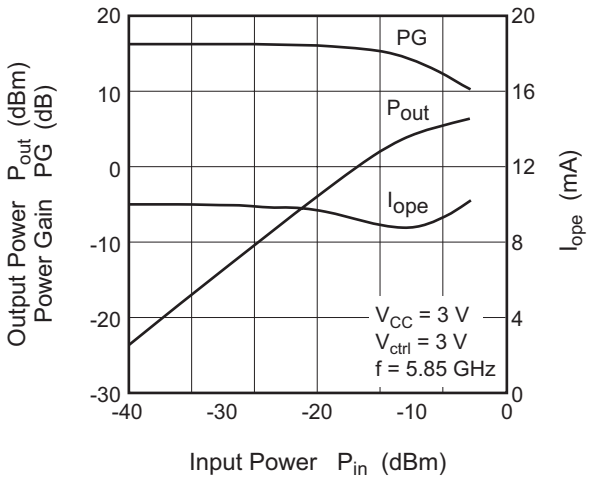
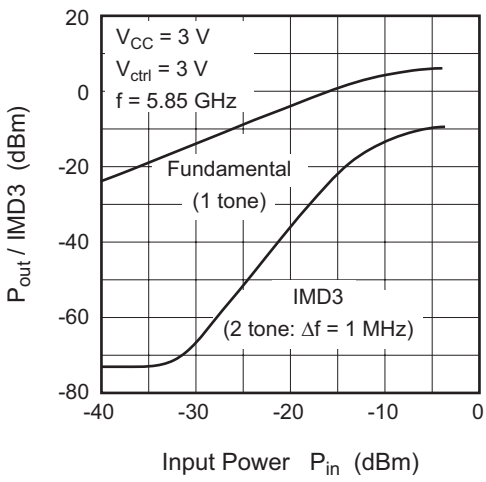
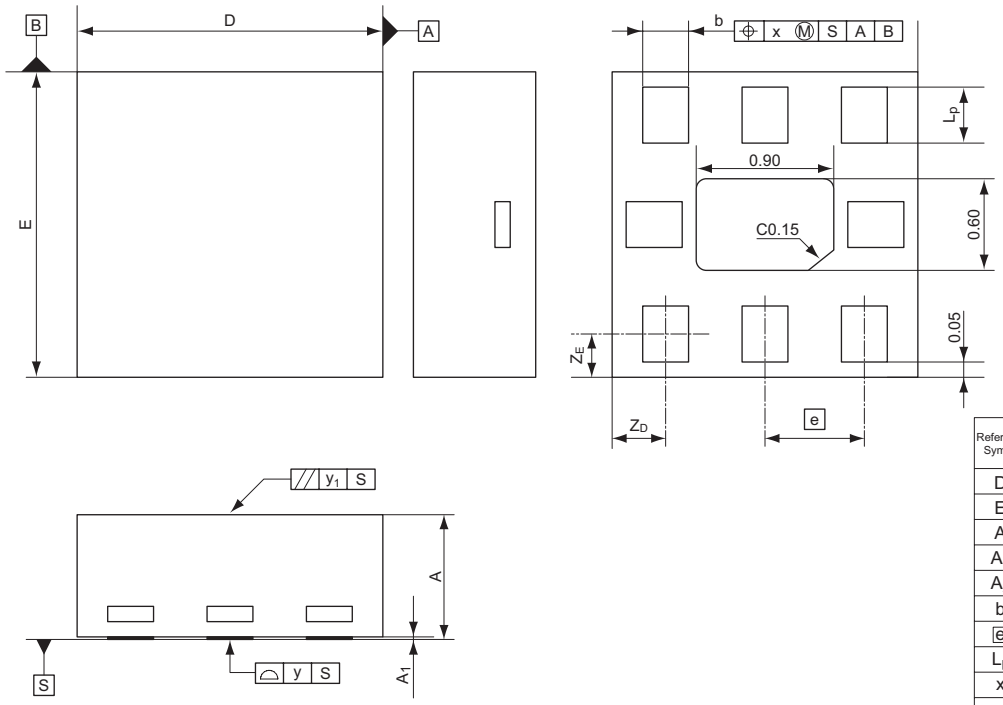


3rd. Order Intermodulation Distortion



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
HWQFN-8	P-HWQFN8-2x2-0.65	PWQN0008ZA-A	TNP-8TV	0.009g



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	1.965	2.00	2.075
E	1.965	2.00	2.075
A	0.70	0.75	0.80
A_1	0	—	0.05
A_2	—	—	—
b	—	0.3	—
e	—	0.65	—
L_p	—	0.35	—
x	—	—	0.10
y	—	—	0.08
y_1	—	—	0.10
Z_D	—	0.350	—
Z_E	—	0.225	—

Ordering Information

Part No.	Quantity	Shipping Container
HA31006ANPTL-E	3000 pcs.	ϕ178 mm reel, 8 mm emboss taping

Renesas Technology Corp. Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

RENESAS SALES OFFICES

http://www.renesas.com

Refer to "**http://www.renesas.com/en/network**" for the latest and detailed information.

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Colophon .7.0