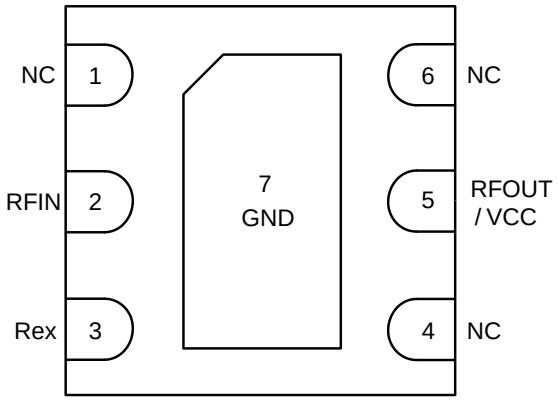
Features

- Operating Frequency 50MHz to 4GHz
- 18dB Gain at 1.0GHz
- 20dBm P1dB at 1.0GHz
- +33.5 dBm OIP3 at 3.5GHz
- +34.5 dBm OIP3 at 2.65GHz
- OIP3 ≥+33 dBm up to 4G
- 5V Single Power Supply
- Integrated Active Bias Circuit
- Industry Standard DFN2X2-6L Package
- ESD protection all ports above 1000V HBM



Functional Block Diagram

Applications

- WLAN / WiMAX / WiBro
- GSM / CDMA / PCS
- WCDMA / LTE
- ISM

Product Description

The YG401820 is a high performance InGaP/GaAs HBT MMIC gain block amplifier utilizing a Darlington pair configuration with an active bias network. The active bias network provides stable current over temperature and process variations. The YG401820 is internally matched to 50Ω, its typical bias condition is a single 5V, and does not require a dropping resistor as compared to typical Darlington amplifiers. The YG401820 is assembled in an industry standard DFN2X2-6L package. It is internally integrated with ESD protection unit.

Pin Description

Pin No.	Symbol	Description
1,4,6	NC	No Connection
2	RFIN	RF input
5	RFOUT/VCC	RF output and bias
3	Rex	Gain and Device Current controlling(1)
7	GND	Ground connected

Notes: The Current and Gain can be controlled by the external resistor connected between Rex and RFIN. When the resistor is 0Ω, Device is shut down.

Absolute Maximum Ratings

Parameter	Rating	Unit
Input RF Power	+25	dBm
Supply Voltage	6.0	V
Device Current	150	mA
Operating Ambient Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C

Caution!

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability.

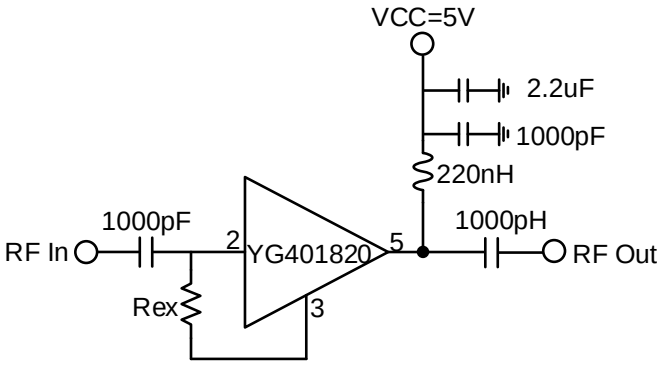
Electrical Specifications

Parameter	Condition(1)	Specification			Units
		Min.	Typ.	Max.	
Operational Frequency Range		50		4000	MHz
Small Signal Gain	433		20.5		dB
	960		19.2		dB
	1950		15.3		dB
	3500		10		dB
P1dB Output Power	433		20.2		dBm
	960		19.7		dBm
	1950		19.2		dBm
	3500		17.9		dBm
Input Return Loss	433		21.5		dB
	960		16.0		dB
	1950		24.2		dB
	3500		11		dB
Output Return Loss	433		13.4		dB
	960		10.7		dB
	1950		9.6		dB
	3500		10		dB
Reverse Isolation	1950		-25		dB
OIP3	433		34.5		dBm
	960		33.5		dBm
	1950		33		dBm
	3500		33		dBm
Noise Figure	1950		7.8		dB
Supply Voltage			5		V
Device Current	ON, Normal operation, Rex=∞	75	85	92	mA
	OFF, Shut down, Rex=0		1		mA

Notes:

1. Test condition unless otherwise noted: Vcc=+5V, Temp=+25℃, Rex=∞, 50Ω system.
2. OIP3 measured with two tones at an output power of 0dBm/ tone separated by 1MHz.

Device Current vs. Controlling Resistor



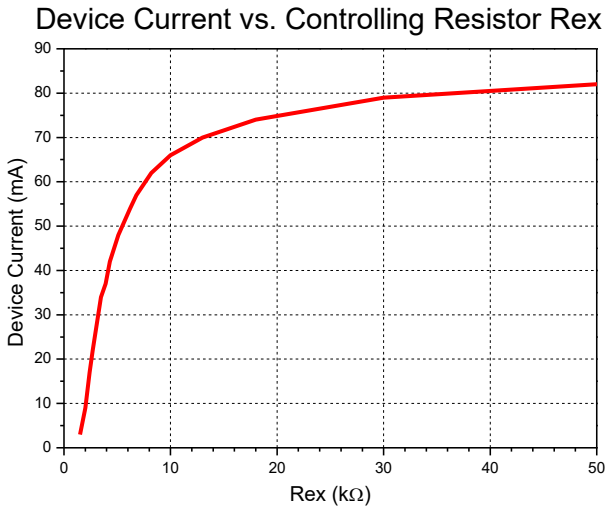
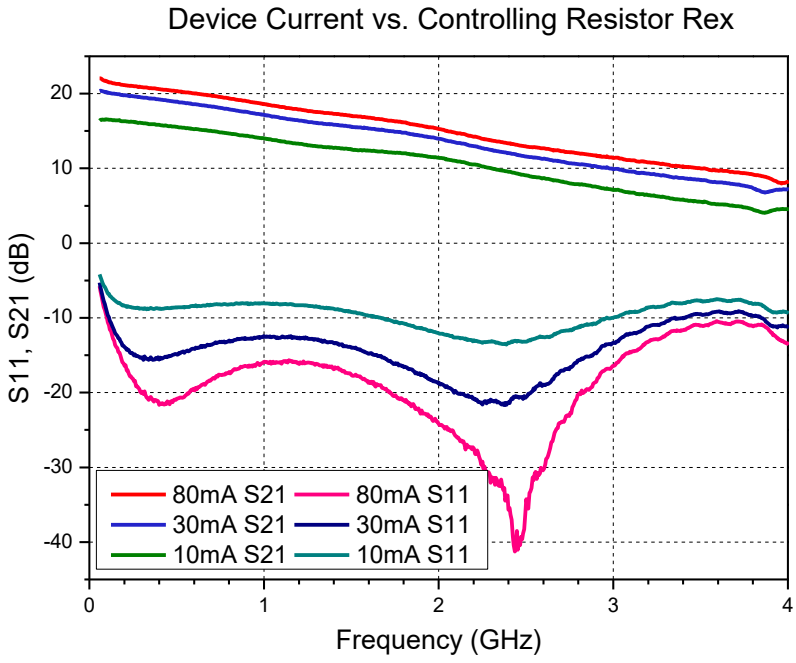


Table: Device Current vs. Controlling Resistor Rex

R(KΩ)	0	2.0	2.6	3.2	4.1	5.5	7.7	13.0	39	open
Current(mA)	1	10	20	30	40	50	60	70	80	85

Device Gain vs. Controlling Resistor

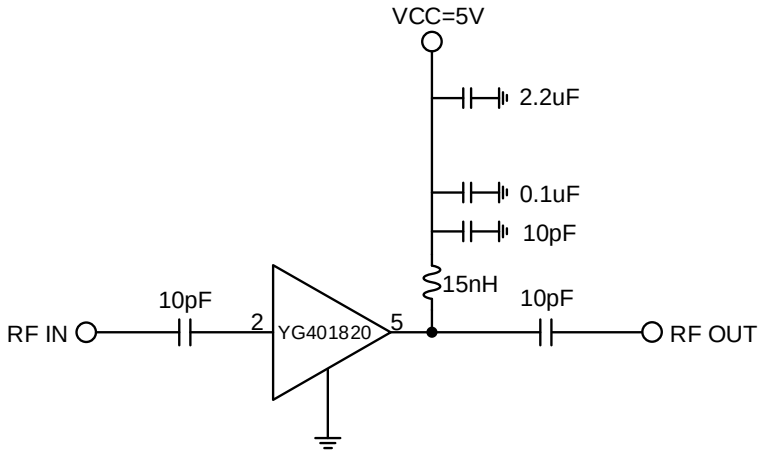


Notes:

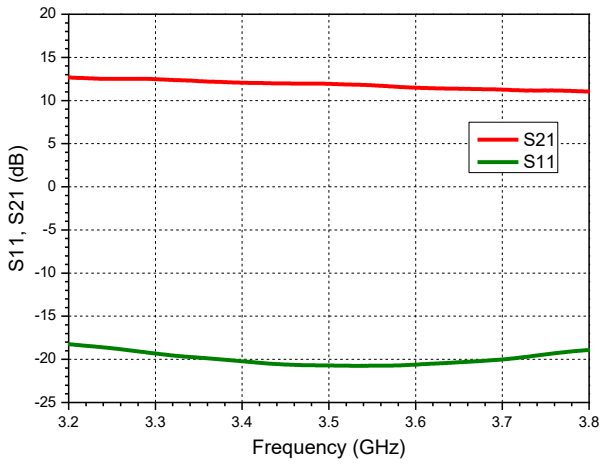
1. Test condition unless otherwise noted: Vcc=+5V, Temp=+25℃, 50Ω system.
2. When the resistor Rex is 0Ω, Device is shut down.

Typical Performance

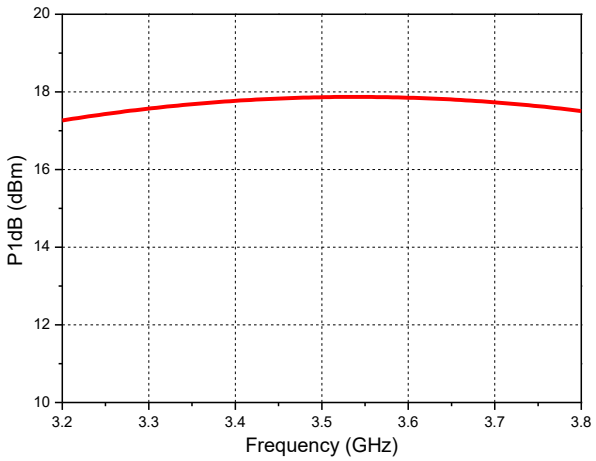
5G (3300~3800MHz) Application：



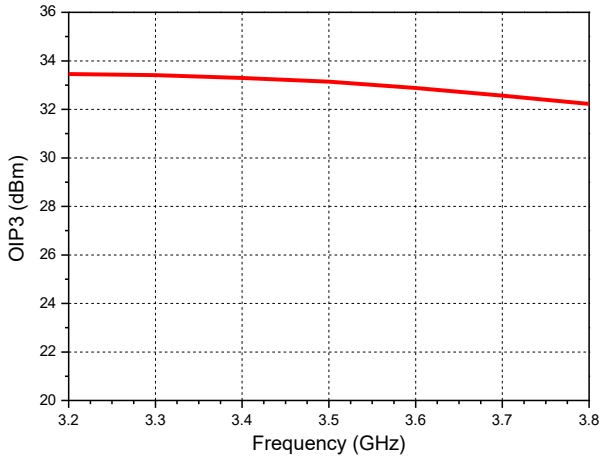
S parameter vs. Frequency



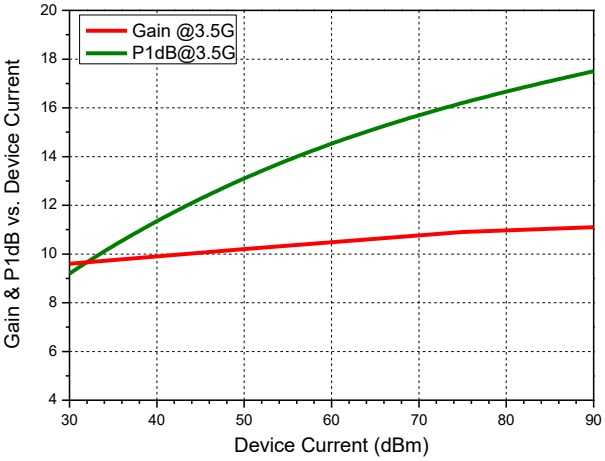
P1dB vs. Frequency



OIP3 vs. Frequency



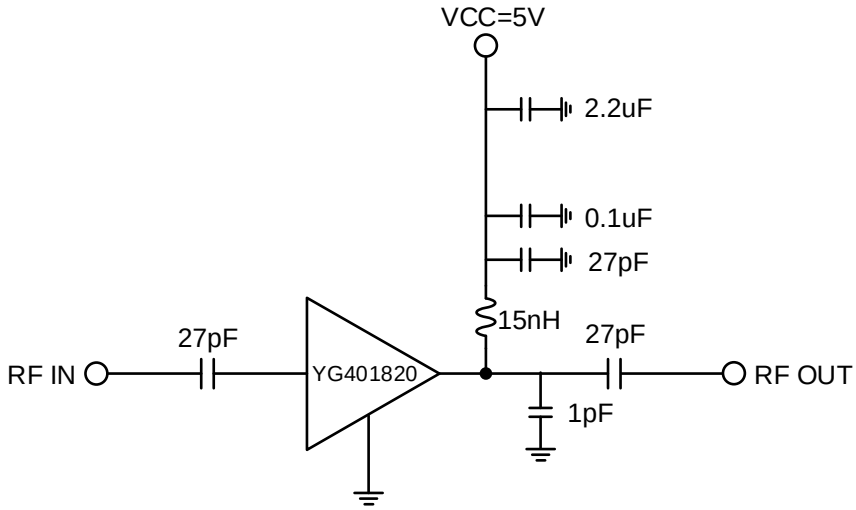
Gain & P1dB vs. Current



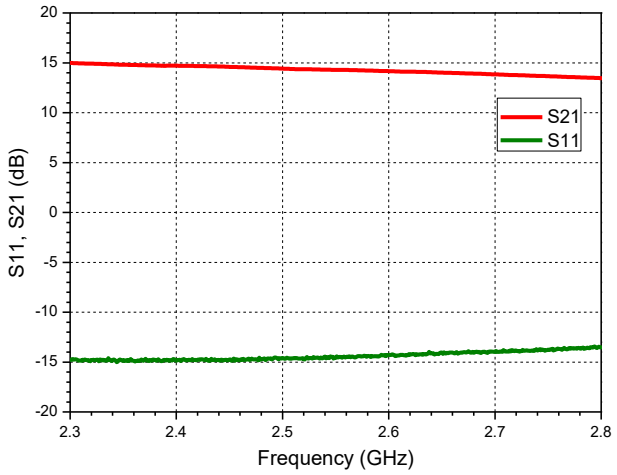
Notes:

1. Test condition unless otherwise noted: Vcc=+5V, Temp=+25℃, Rex=∞, 50Ω system.
2. The Device Current in 'Gain & P1dB vs. current' can be achieved from external resistor Rex.

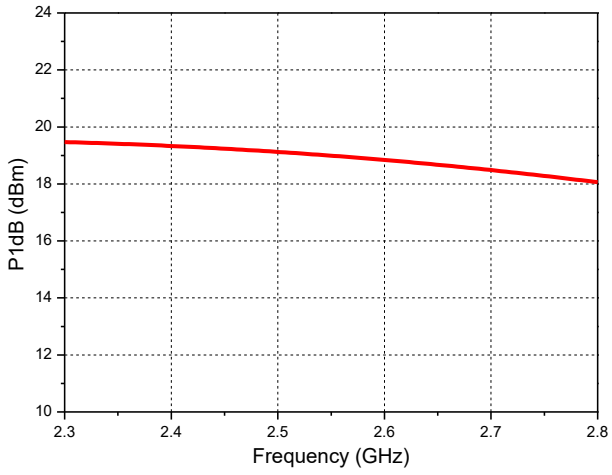
WLAN/4G (2300~2800MHz) Application：



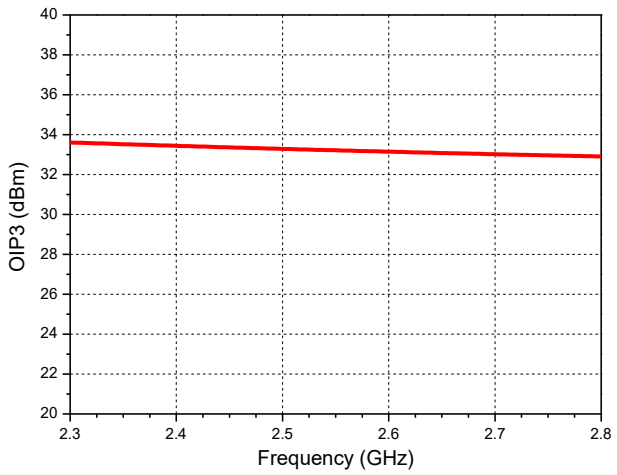
S parameter vs. Frequency



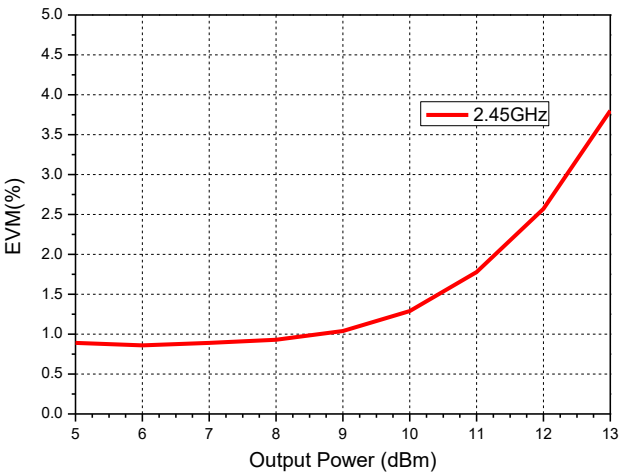
P1dB vs. Frequency



OIP3 vs. Frequency



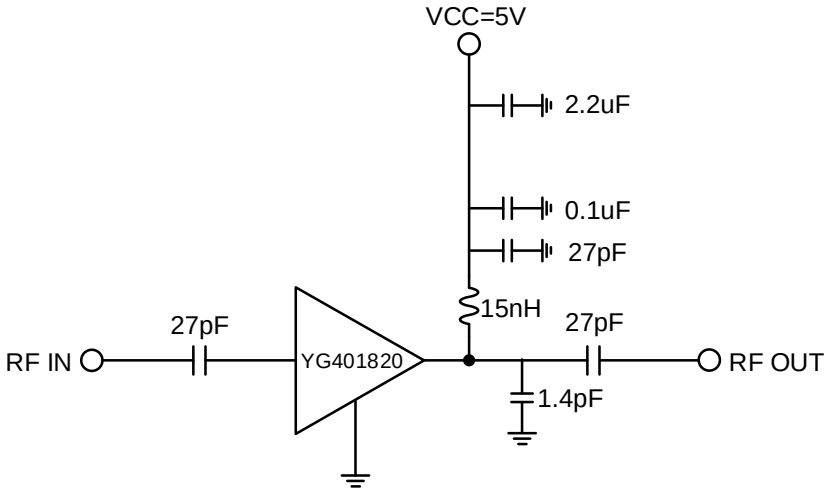
EVM (%) vs. Output Power



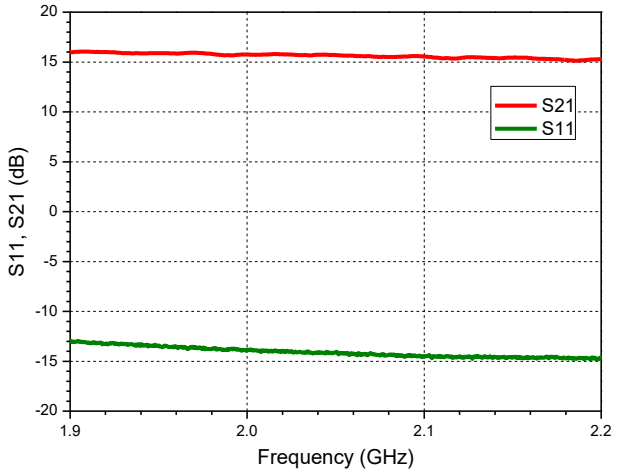
Notes:

1. Test condition unless otherwise noted: Vcc=+5V, Temp=+25℃, Rex=∞, 50Ω system.

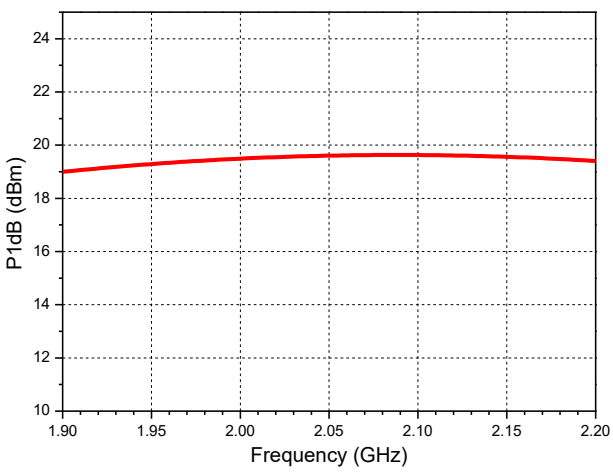
WCDMA (1900~2200MHz) Application：



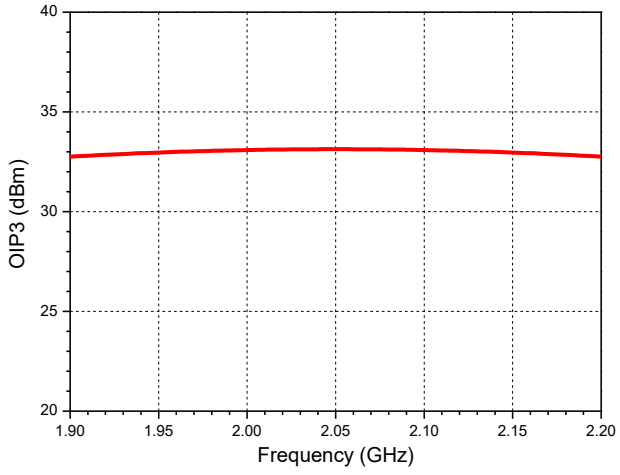
S parameter vs. Frequency



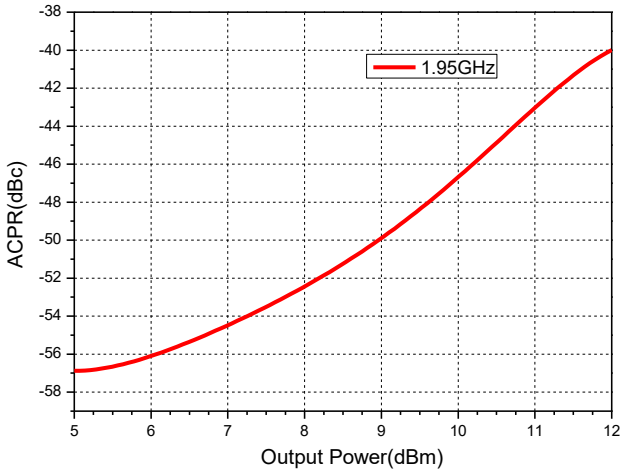
P1dB vs. Frequency



OIP3 vs. Frequency



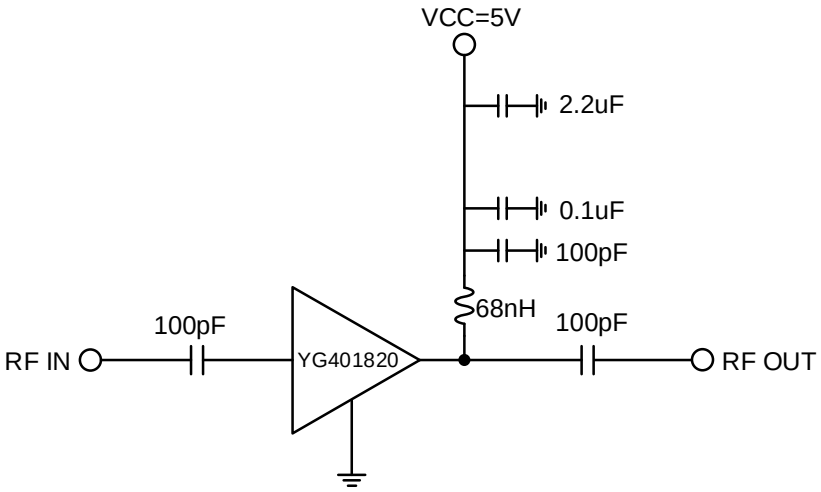
ACPR vs. Output Power



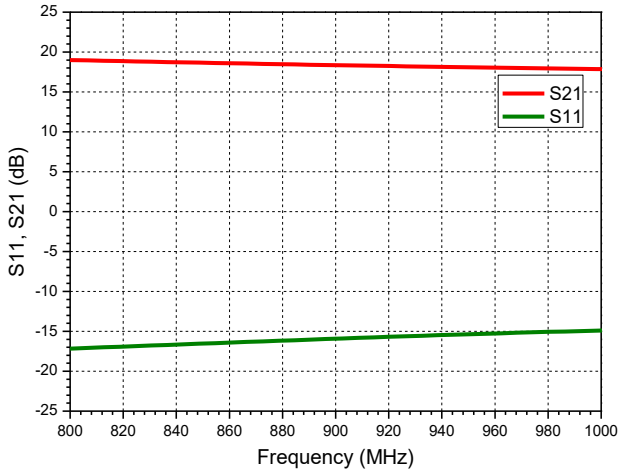
Notes:

1. Test condition unless otherwise noted: Vcc=+5V, Temp=+25℃, Rex=∞, 50Ω system.
2. The Device Current in 'Gain & P1dB vs. current' can be achieved from external resistor Rex.

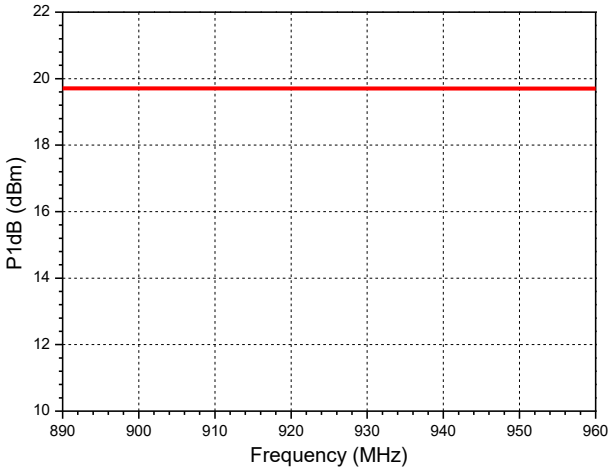
GSM (890~960MHz) Application：



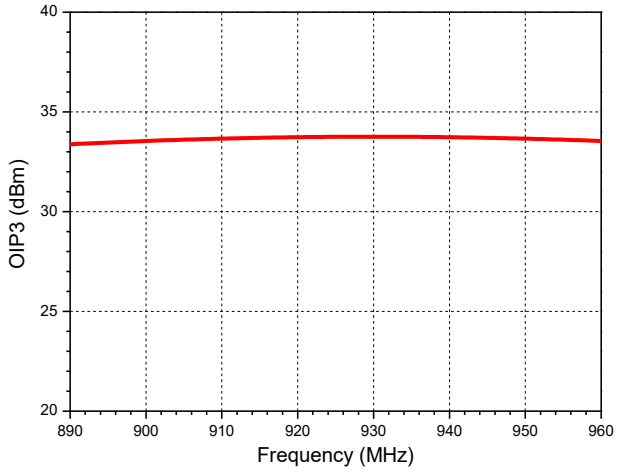
S parameter vs. Frequency



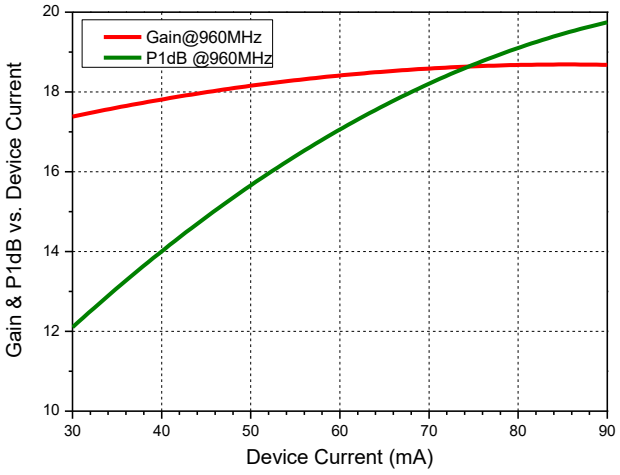
P1dB vs. Frequency



OIP3 vs. Frequency



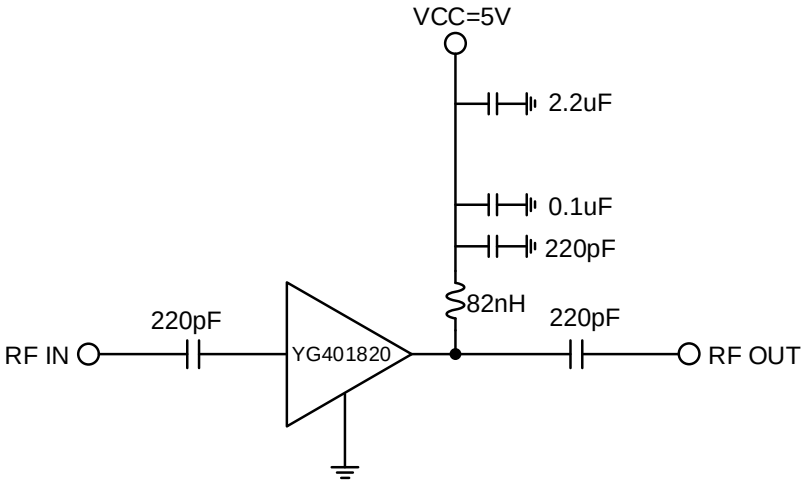
Gain&P1dB vs. Current



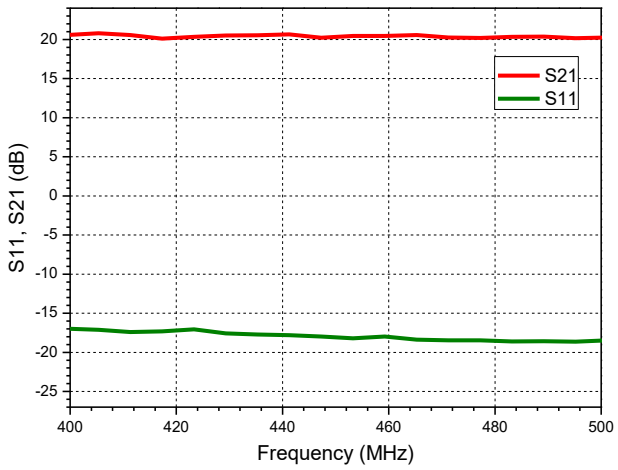
Notes:

1. Test condition unless otherwise noted: Vcc=+5V, Temp=+25℃, Rex=∞, 50Ω system.
2. The Device Current in 'Gain & P1dB vs. current' can be achieved from external resistor Rex.

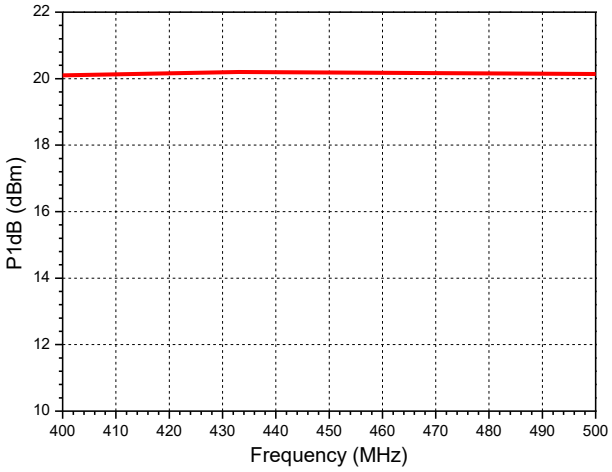
ISM (433MHz) Application Circuit：



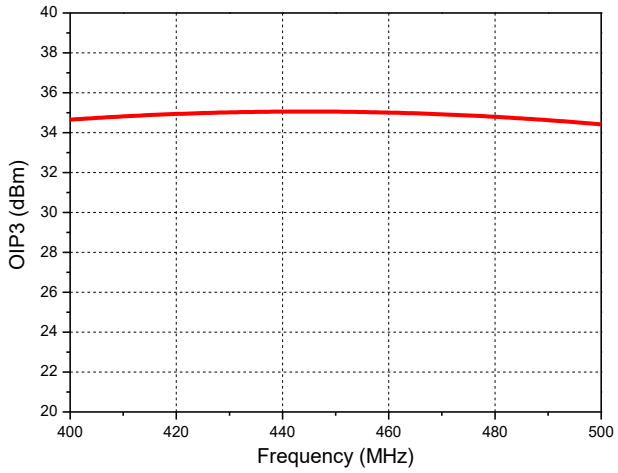
S parameter vs. Frequency



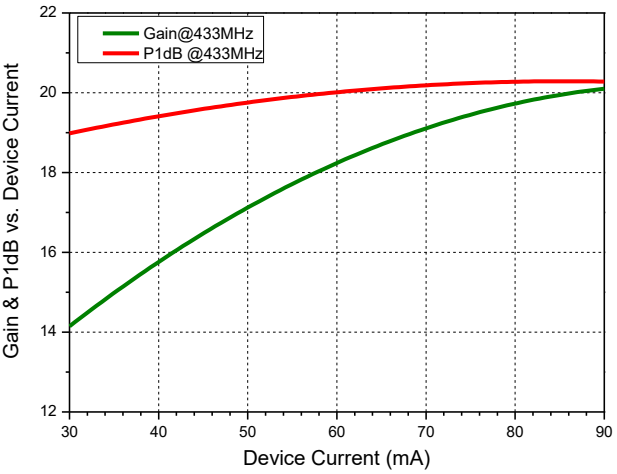
P1dB vs. Frequency



OIP3 vs. Frequency



Gain & P1dB vs. Current

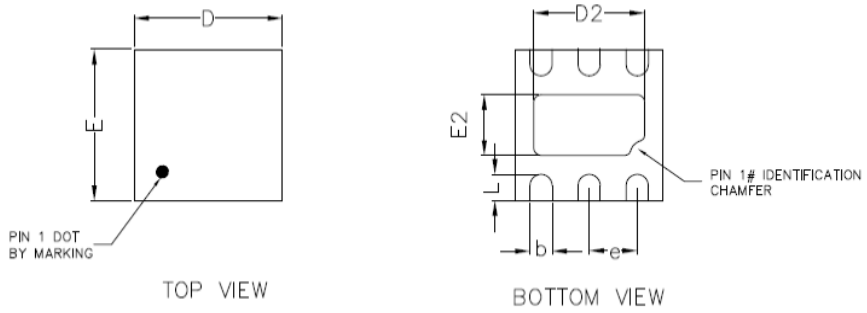


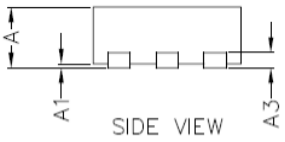
Notes:

1. Test condition unless otherwise noted: Vcc=+5V, Temp=+25℃, Rex=∞, 50Ω system.
2. The Device Current in 'Gain & P1dB vs. current' can be achieved from external resistor Rex.

Package Diagram

(Units: millimeters)





COMMON DIMENSIONS(MM)			
PKG.	W:VERY VERY THIN		
REF.	MIN.	NOM.	MAX
A	0.70	0.75	0.80
A1	0.00	–	0.05
A3	0.2 REF.		
D	1.95	2.00	2.05
E	1.95	2.00	2.05
D2	1.35	1.50	1.60
E2	0.65	0.80	0.90
L	0.25	0.35	0.45
b	0.25	0.30	0.35
e	0.65 Bsc		