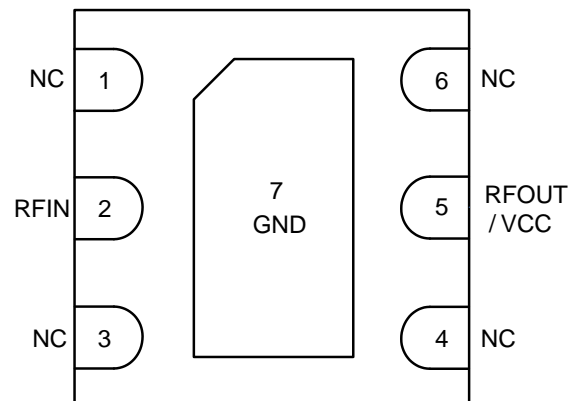


### Features

- 100kHz to 8GHz operational
- Typical 17.5dB Small Signal Gain up to 8GHz
- $\pm 1.5$ dB Wideband flat Gain up to 8GHz
- 17dB Gain at 3.5GHz
- +35 dBm OIP3 at 3.5GHz
- OIP3  $\geq +34.5$ dBm between 0.4GHz and 4.5GHz
- 3-5V single typical supply, 11mA~97mA operational
- Linearity and thermal compensation with Integrated Active Bias Circuit
- Industry Standard DFN2x2-6L Package
- ESD protection all ports above 1000V HBM



Functional Block Diagram

### Applications

- 5G mobile application/m-MIMO
- WLAN / WiMAX / WiBro
- WCDMA / LTE
- GPS / COMPASS
- TDD/FDD System
- GSM / CDMA / PCS
- CATV
- ISM

### Product Description

The YG801820W cascadable broadband InGaP/GaAs MMIC amplifier is a high performance solution for general purpose RF and microwave amplification needs, including Gain Stage or Driver Amplifier. This gain block is based on a reliable HBT proprietary MMIC design, covering 100kHz-8GHz operation frequency and providing a flat gain. At 3.5GHz, the YG801820W typically provides 17dB of gain, 21dBm P1dB and 33.5dBm OIP3 while drawing 97mA current from a 5V single supply. The YG801820W is internally matched to 50 $\Omega$  and assembled in an industry standard DFN2x2-6L package. It is internally integrated with ESD protection unit.

### Pin Description

Pin No.	Symbol	Description
1,3,4,6	N/C	No Connection
2	RF In	RF input
5	RF Out	RF output and bias
7	GND	Ground connected

### Absolute Maximum Ratings

Parameter	Rating	Unit
Input RF Power	+20	dBm
Supply Voltage	6	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 <sup>(1)</sup>	Specification			Unit
		Min.	Typ.	Max.	
Operational Frequency Range		0.1		8000	MHz
Test Frequency			3500		MHz
Small Signal Gain			17		dB
Gain Flatness	600M~4000M	1			dB
P1dB Output Power			21		dBm
Input Return Loss			16.7		dB
Output Return Loss			10.9		dB
Reverse Isolation			25.9		dB
OIP3	Pout=1dBm/ tone, Δf = 1MHz		35		dBm
Noise Figure			6		dB
Supply Voltage		3	5	6	V
Device Current	VCC=5V		97		mA
	VCC=3V		11		mA

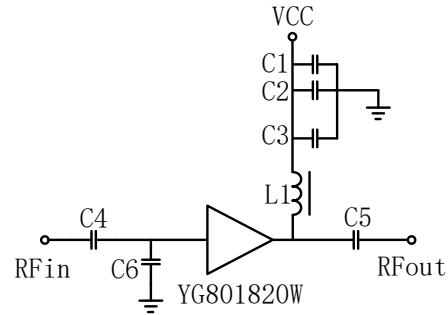
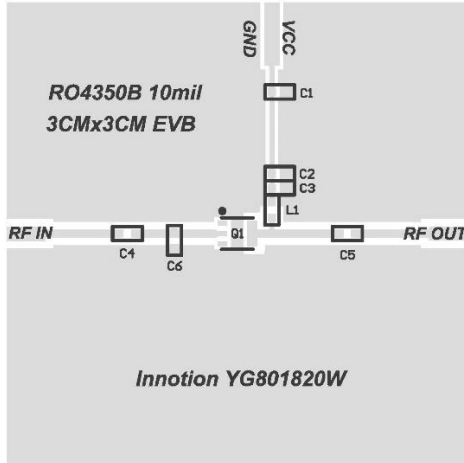
Notes: Test condition unless otherwise noted: Vcc=+5V, Temp=+25°C, 50Ω system.

### Device Current vs. VCC

VCC (V)	3	3.2	3.4	3.6	3.8	4	4.2	4.4	4.6	4.8	5
Current (mA)	11	19	27	35	44	53	61	70	79	88	97

### Evaluation Board-YG801820WEVB

### 200MHz~8000MHz Application



### Bill of material

Reference Des.	Value	Description	Manuf.	Part Number
PCB		Printed circuit Board,3CMX3CM		
Q1		YG801820W, DFN2x2_6L	Innotion	YG801820W
C1	4.7uF	CAP, SMD, 4.7uF, 0402	various	
C2	1000pF	CAP, SMD, 1000pF, 0402	various	
C3	10pF	CAP, SMD,10pF, 0402	various	
C4, C5	100pF	CAP, SMD, 100pF, 0402	various	
C6	0.3pF	CAP, SMD, 0.3pF,0402	various	
L1	100nH	Coli IND, SMD, 100nH, 0603	TDK	

### Typical performance on EVB

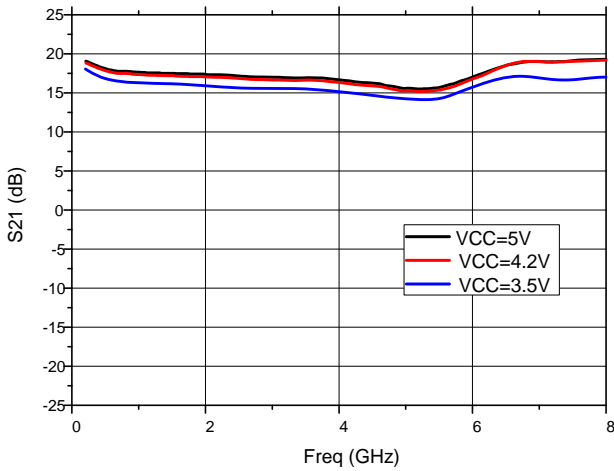
Parameter	Typical Value								Unit
	0.433	1	2.4	3.5	4	5.8	6.5	7.2	
Frequency									GHz
Small Signal Gain	18.3	17.7	17.2	17	16.7	16.4	18.4	19	dB
Input Return Loss	14.4	19.3	20.4	16.7	14	8.43	23.5	6.24	dB
Output Return Loss	19.1	16.5	13.9	10.9	8.35	4.36	8.44	30.9	dB
Reverse Isolation	23.8	24.1	25.1	25.9	26.3	27.7	25.5	24.6	dB
P1dB	19.8	20.8	21.5	21.5	21.5	20	18	16.6	dBm
OIP3	35.4	35.4	35.7	34.2	32.5	26	-	-	dBm
NF	8.5	7.2	6.1	6	6.1	7.4	8.2	7.4	dB

Notes:

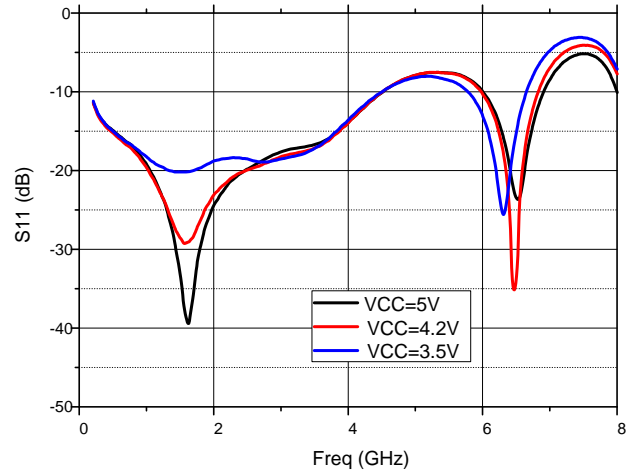
1. Test condition unless otherwise noted: Vcc=+5V, Temp=+25°C, 50Ω system.
2. OIP3 measured with two tones at an output power of 1dBm/ tone separated by 1MHz.

### Performance plots

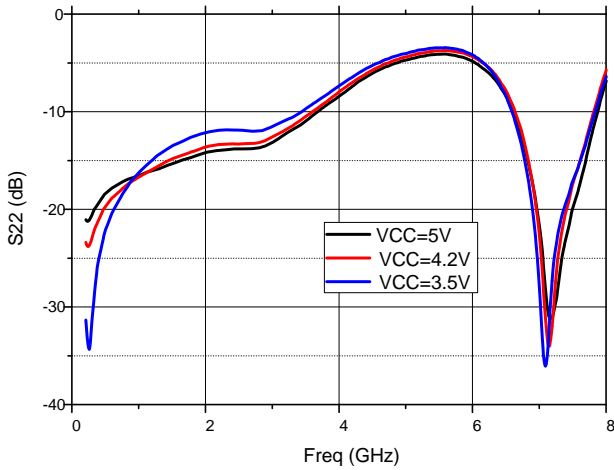
Small Signal Gain vs. Frequency



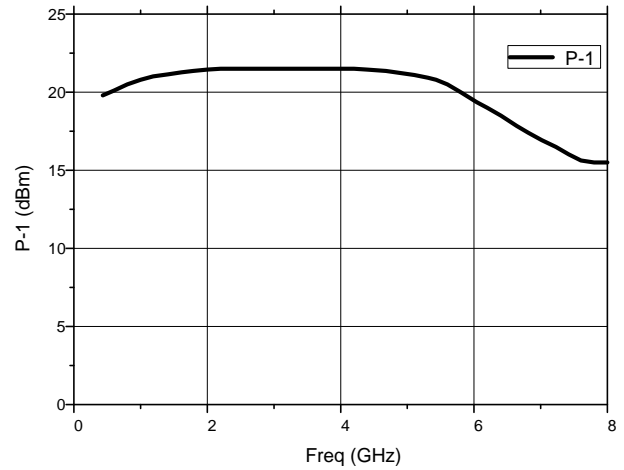
Input Return Loss vs. Frequency



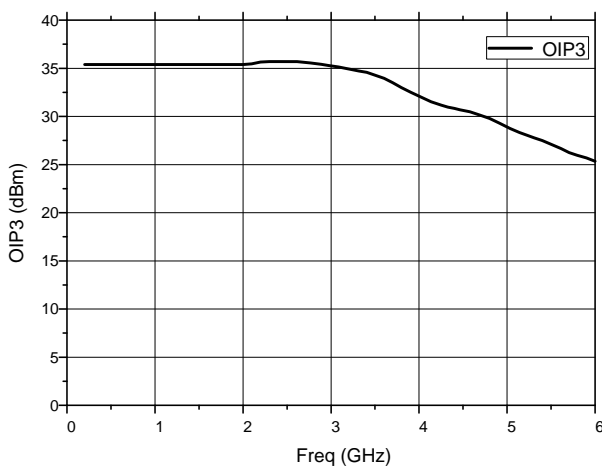
Output Return Loss vs. Frequency



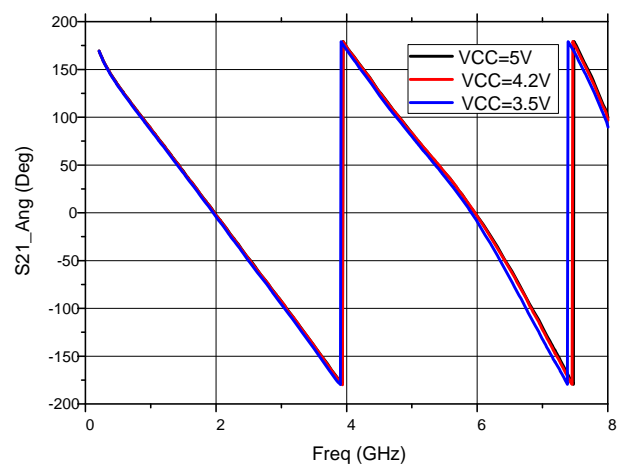
P1dB vs. Frequency



OIP3 vs. Frequency



S21\_Angle vs. Frequency



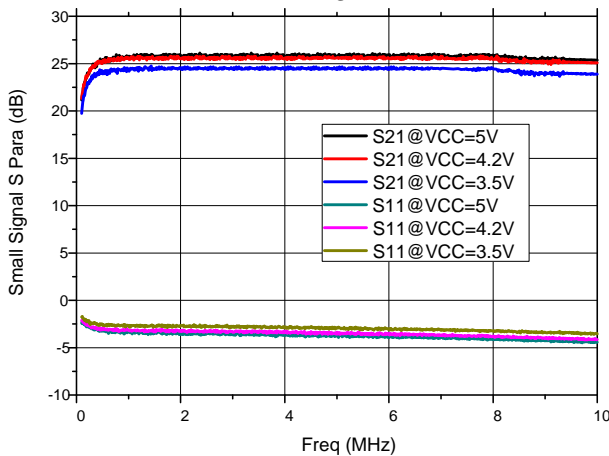
### DC~100MHz Application

### Bill of material

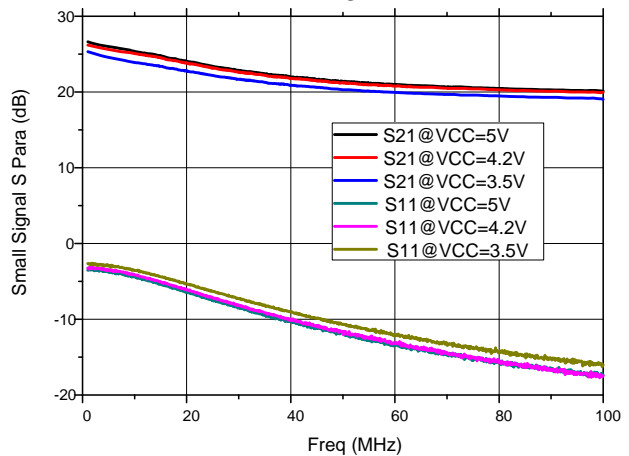
Reference Des.	Value	Description	Manuf.	Part Number
PCB		Printed circuit Board,3CMX3CM		
Q1		YG801820W, DFN2x2_6L	Innotion	YG801820W
C1	4.7uF	CAP, 4.7uF, 0402	various	
C2	1000pF	CAP, 1000pF, 0402	various	
C3	10pF	CAP,100pF, 0402	various	
C4, C5	1uF	CAP, 1uF, 0402	various	
C6	0.3pF	CAP, 0.3pF,0402	various	
L1	47uH	IND, 47uH, 0402	various	

### Performance plots

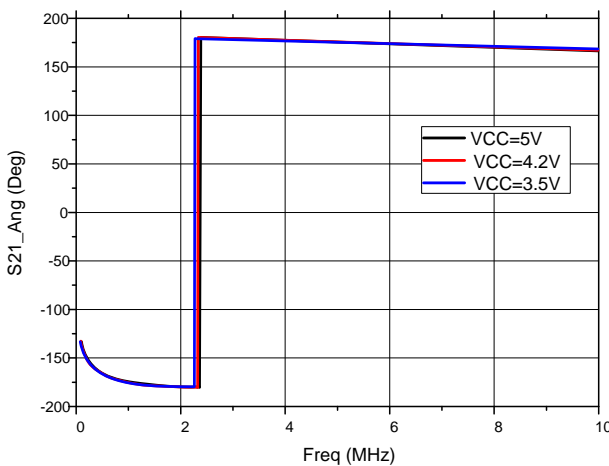
100kHz-10MHz Small Signal S Para v.s. VCC



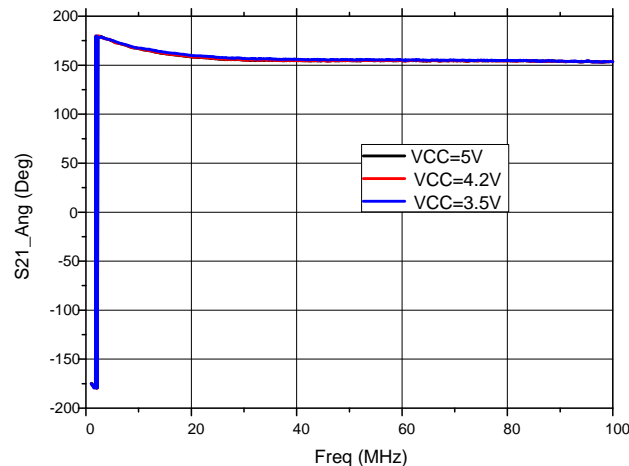
1MHz-100MHz Small Signal S Para v.s. VCC



100kHz-10MHz S21\_Angle v.s. VCC

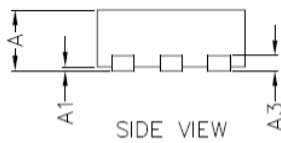
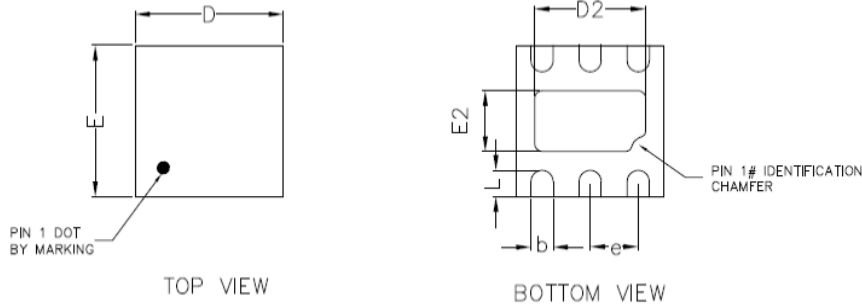


1MHz-100MHz S21\_Angle v.s. VCC



### 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
F	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		