INNOTION

YPH503833

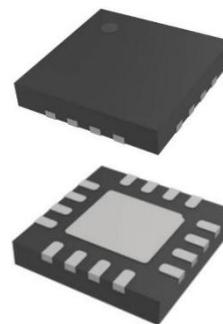*100MHz to 5GHz 2W GaN Amplifier*

Product Description

Innotion's YPH503833 is a 2-watt 3-stage integrated gallium nitride (GaN) amplifier that operates between 100MHz to 5GHz with simple external connection. YPH503833 is designed for broadband applications, and assembled in an industry standard QFN 4mmx4mm-16L package.

Features

■ Operating Frequency 100MHz to 5GHz

■ Pout=2-watt CW @ V_{DD}=28V, V_{GG}=-1.9V

■ Quiescent Current of Drain, Idq=240mA @ V_{DD}=28V, V_{GG}=-1.9V

■ Negative Gate Voltage and Bias Sequencing Required

Note: V_{DD}, Operating Drain-Source Voltage. V_{GG}, Gate-Source Voltage

Absolute Maximum Ratings

Parameter	Rating	Unit
V_{DD}	+40	V
V_{GG}	-10 to -1.5	V
Case Operating Temperature	+150	°C
Operating Junction Temperature	+225	°C
Storage Temperature	-65 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.
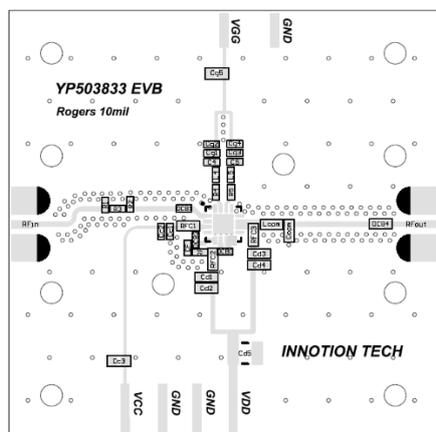
Pin Description

Pin No.	Symbol	Description
1	RFin_S1	RF input of Stage1
3	RFout_S1/V_{CC}	RF output and Supply voltage of Stage1
5	RFin_S2	RF input of Stage2
6	RFout_S2/V_{DD1}	RF output and Supply voltage of Stage2
7,8	RFin_S3	RF input of Stage3
10,11	RFout_S3/V_{DD2}	RF output and Supply voltage of Stage3
14	V_{GG2}	Gate-Source Voltage of Stage3
15	V_{GG1}	Gate-Source Voltage of Stage2
17(PKG Base)	GND	Ground
2,4,9,12,13,16	N/C	No Connection

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100MHz~4000MHz Application

Electrical Specifications

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Small Signal Gain		37.7		dB	3000MHz
		39		dB	2000MHz
		38.3		dB	1000MHz
Output Power at Pin=0dBm		33		dBm	3000MHz
		33		dBm	2000MHz
		33.5		dBm	1000MHz
Input Return Loss		17		dB	3000MHz
		30.7		dB	2000MHz
		17.2		dB	1000MHz
Supply Voltage of Drain		28		V	
Quiescent Device Current		246		mA	Bias: V_{DD}=28V, V_{GG}=-1.9V, V_{CC}=5V

Bill of material

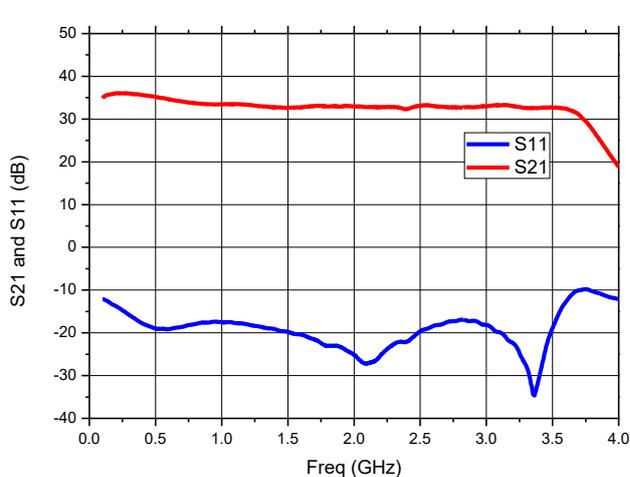| Items	Value	Description	Manuf.
PCB		5cmx5cm	
YPH503833		QFN4x4_16L	Innotion
R1,R2	300Ω	RES,SMD,0402	various
R3	18Ω	RES,SMD,0402	various
R4,R5,RF	100Ω	RES,SMD,0402	various
RFC1,RFC2	1uH	Coli IND,SMD,0603	various
RFC3	150nH	Coli IND,SMD,0603	TDK
L4,L5	2.7nH	IND,SMD,0402	various
Lopm	1nH	IND,SMD,0603	various
DCB1,Cc2,Cg2,Cg4	1nF	CAP,SMD,0402	various
DCB4,Cd2,Cd4	1nF	CAP,SMD,0603	various
DCB2,CF,C4,C5	5pF	CAP,SMD,0402	various
DCB3	100pF	CAP,SMD,0402	various
Cc1,Cg1,Cg3	10pF	CAP,SMD,0402	various
Cd1,Cd3	10pF	CAP,SMD,0603	various
Cc3,Cg5	10uF	CAP,SMD,0603	various
Cd5	10uF/50V	CAP,SMD,1210	various
Copm	0.8pF	CAP,SMD,0603	various

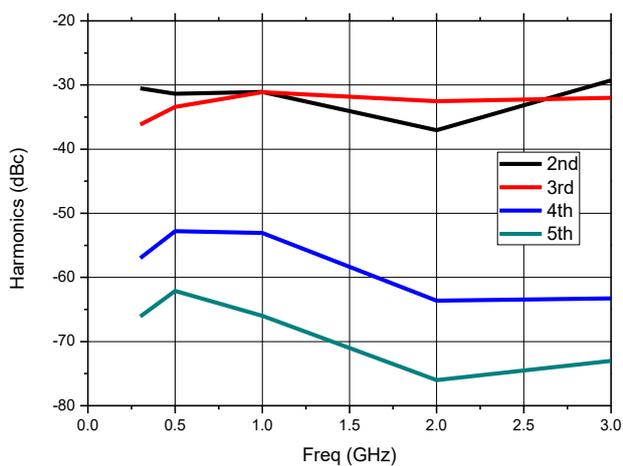## Performance plots (at Temp=25℃, V_{DD}=28V, V_{GG}=-1.9V, V_{CC}=5V)
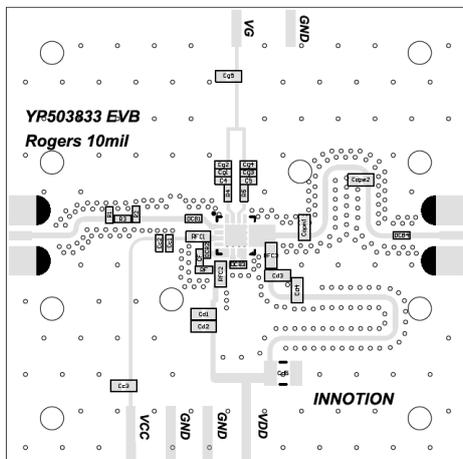
Small Signal S Parameters @ Pin=-30dBm
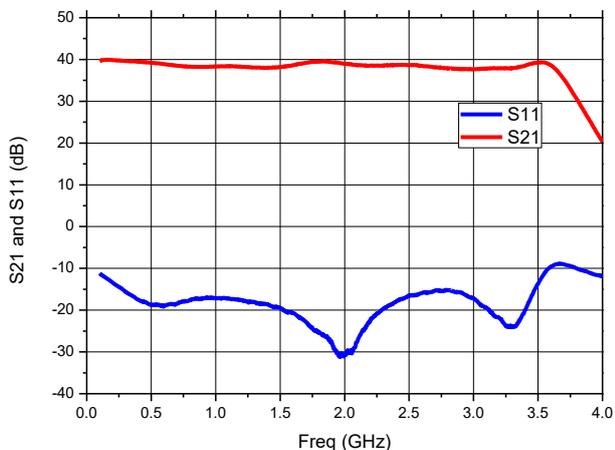
Large Signal S Parameters @ Pin=0dBm

Harmonics @ Pout=31dBm

100MHz~5000MHz Application

YP503833 EVB
Rogers 10mil

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Bill of material

| Items	Value	Description	Manuf.
PCB		5cmx5cm	
YPH503833		QFN4x4_16L	Innotion
R1,R2	300Ω	RES,SMD,0402	various
R3	18Ω	RES,SMD,0402	various
R4	20Ω	RES,SMD,0402	various
R5	51Ω	RES,SMD,0402	various
RF	100Ω	RES,SMD,0402	various
RFC1,RFC2	1uH	Coli IND,SMD,0603	various
RFC3	100nH	Coli IND,SMD,0603	TDK
CF, C4, C5	5pF	CAP,SMD,0402	various
DCB2	8pF	CAP,SMD,0402	various
Cc1	10pF	CAP,SMD,0402	version
Cg1,Cg3	51pF	CAP,SMD,0402	various
DCB3	100pF	CAP,SMD,0402	various
DCB1, DCB4, Cc2,Cg2,Cg4	1nF	CAP,SMD,0402	various
Cd1,Cd3	10pF	CAP,SMD,0603	various
Cd2,Cd4	1nF	CAP,SMD,0603	various
Cc3,Cg5	10uF	CAP,SMD,0603	various
Cd5	10uF/50V	CAP,SMD,1210	various
Copm1, Copm2	0.5pF	CAP,SMD,0603	various
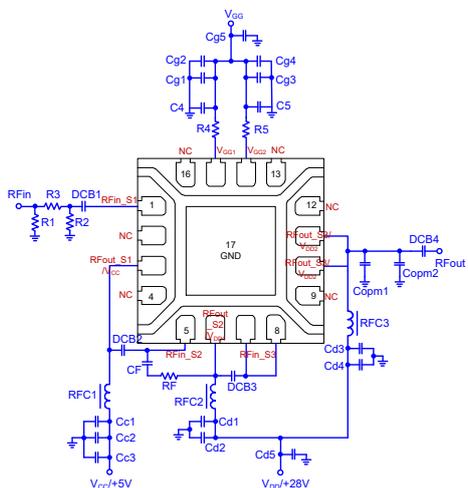
Performance plots (at Temp=25°C, V_{DD}=28V, V_{CC}=5V , Idq=180mA)

Small Signal S Parameters @ Pin=-30dBm

Large Signal S Parameters @ Pin=9dBm

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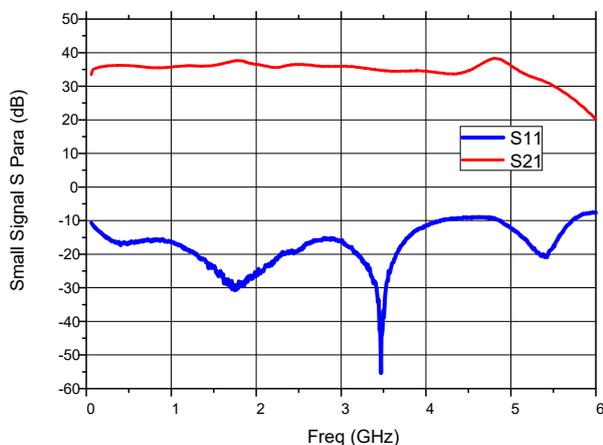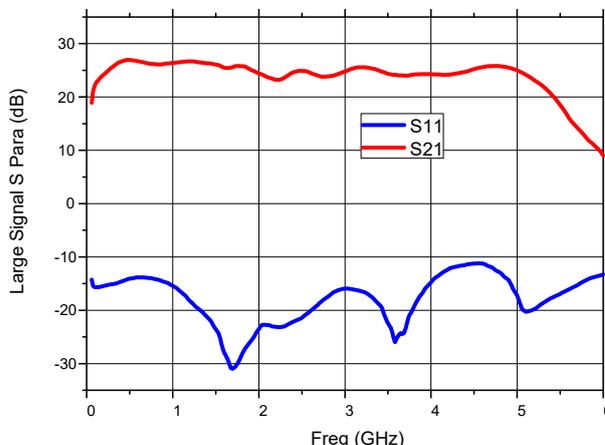
DC BIAS SEQUENCING

DC BIAS SEQUENCING	
Turn On GaN Device	Turn Off GaN Device
1. RF Power Off	1. Turn off RF Power
2. Set VGG=-5V(Negative Voltage to Pinch Off)	2. Turn off VDD and VCC Voltage
3. Turn on VDD and VCC Voltage	3. After VDD is Discharged, Set VGG=-5V
4. Slowly Increase VGG Until Bias Current IDQ is Set	4. Turn off VGG Voltage
5. Turn on RF Power	

Packaging Diagram

COMMON DIMENSIONS
(UNITS OF MEASURE = MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0	--	0.05
A3	0.2 REF		
b	0.25	0.30	0.35
D	3.95	4.00	4.05
E	3.95	4.00	4.05
D2	2.00	2.15	2.25
E2	2.00	2.15	2.25
e	0.60	0.65	0.70
L	0.45	0.55	0.65

NOTE:
ALL DIMENSIONS REFER TO JEDEC STANDARD MO-220 WEED-4.

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For sales, orders, and technical support, please contact us, Phone: (86-512-62997198)   Page 5 of 5