NPA2050-SM

27.5 – 31 GHz GaN 8 W Power Amplifier

Product Description

The Nxbeam NPA2050-SM is a Ka-band power amplifier that operates from 27.5 to 31 GHz and provides 8 W of saturated output power, 28% average PAE, and a linear gain of 23 dB. The product is offered in a ceramic QFN package.

Applications

- Ka-band Satellite Communications
- 5G Infrastructure
- Point-to-Point/Multipoint Digital Radios

Key Features

- Frequency: 27.5 – 31 GHz
- Linear Gain (Ave.): 23 dB
- Psat (Ave.): 8 W
- PAE (Ave.): 27 %

Electrical Specifications

Test Condition: Vd = 26 V, Idq = 0.5 A, CW Performance in Fixture, Typical Performance at 25°C

Parameter		Min	Typical	Max	Unit
Frequency		27.5		31	GHz
Gain (Small Signal)	27.5 GHz		22.5		dB
	29.25 GHz		24.0		
	31 GHz		24.0		
Output Power (at Psat, Pin=21.3 dBm)	27.5 GHz		38.5		dBm
	29.25 GHz		39.0		
	31 GHz		38.5		
PAE (at Psat, Pin=21.3 dBm)	27.5 GHz		27.0		%
	29.25 GHz		27.0		
	31 GHz		26.0		
Power Gain (at Psat, Pin=21.3 dBm)	27.5 GHz		18.0		dB
	29.25 GHz		17.0		
	31 GHz		18.0		
Input Return Loss	27.5 GHz		9		dB
	29.25 GHz		15		
	31 GHz		15		
Output Return Loss	27.5 GHz		15		dB
	29.25 GHz		10		
	31 GHz		10		

Maximum Quiescent Bias

Parameter	Max	Unit
Drain Voltage (Vd1, Vd2, Vd3)	28	V
Drain Current (Id1)	140	mA
Drain Current (Id2)	160	mA
Drain Current (Id3)	550	mA

Maximum quiescent bias represents the operational bias used during reliability life testing. Biasing the part at or below this bias ensures reliability will be bound by the published reliability results.

4388 Cerritos Avenue
Los Alamitos, CA 90720

www.nxbeam.com
info@nxbeam.com

Phone: 949-656-2883

Absolute Maximum Ratings (Temp. = 25°C)

Parameter	Min	Max	Unit
Drain Voltage (Vd1, Vd2, Vd3)		28	V
Drain Current (Id1)		350	mA
Drain Current (Id2)		400	mA
Drain Current (Id3)		1400	mA
Gate Voltage (Vg1, Vg2, Vg3)	-8	0	V

Absolute maximum ratings represent the maximum current under power saturation conditions.

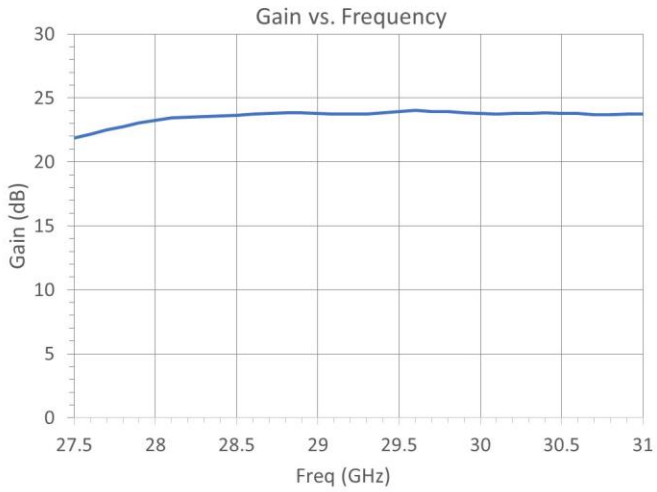
Recommended Quiescent Operating Condition

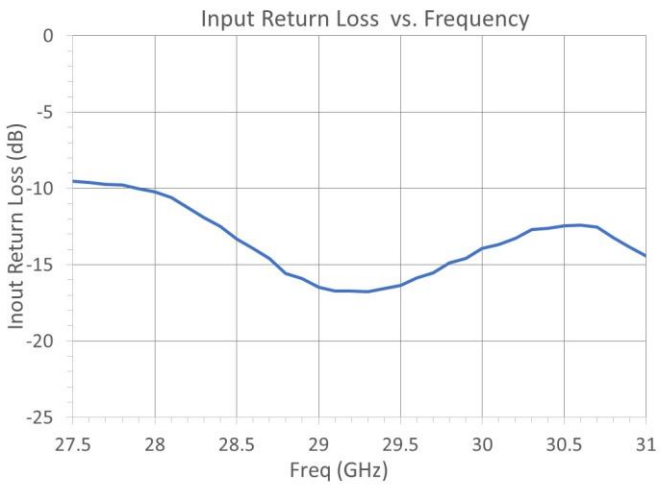
Parameter	Value	Unit
Drain Voltage (Vd)	20 - 28	V
Drain Current (Id1)	up to 140	mA
Drain Current (Id2)	up to 160	mA
Drain Current (Id3)	up to 550	mA
Gate Voltage (Vg) (Typical Range)	-5.5 to -3.5	V

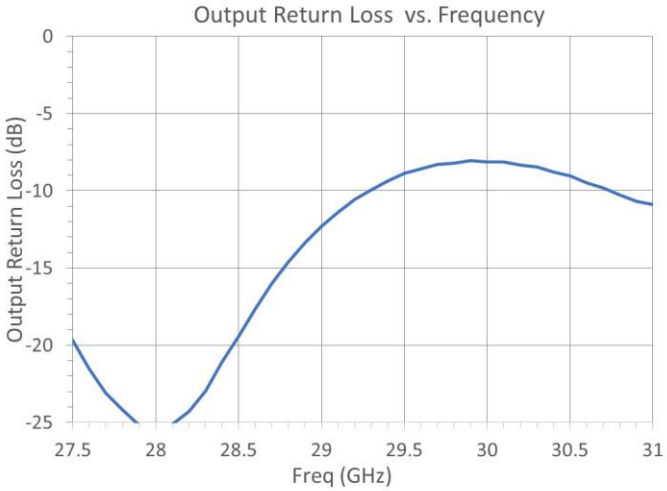
Gate voltage will vary based on desired current per stage

Small Signal Performance

Test Condition: Vd = 26 V, Idq = 0.5 A, (CW Performance in Fixture, Typical Performance at 25°C)







4388 Cerritos Avenue
Los Alamitos, CA 90720

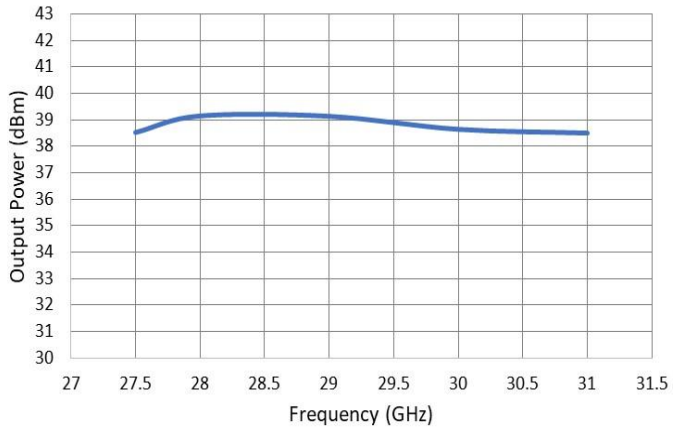
www.nxbeam.com
info@nxbeam.com

Phone: 949-656-2883

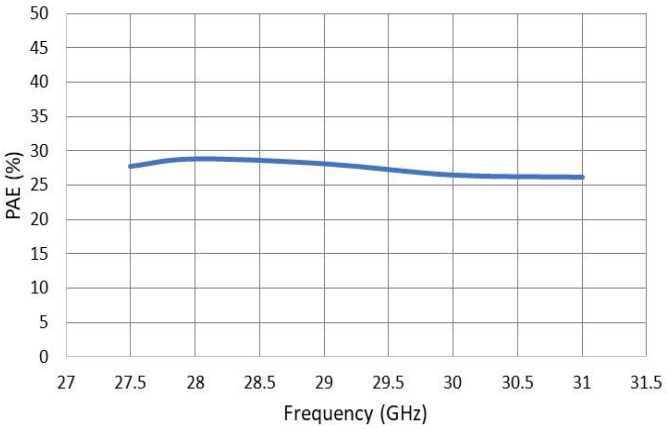
Large Signal Performance

Test Condition: Vd = 26 V, Idq = 0.5 A, Pin = 21 dBm (Psat)
(CW Performance in Fixture, Typical Performance at 25°C)

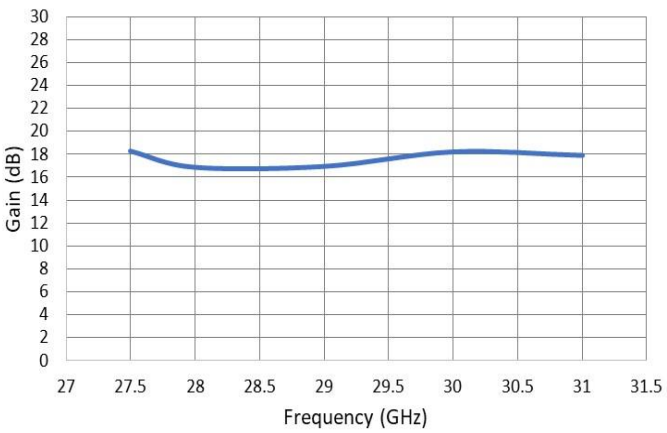
Output Power vs. Frequency (at 21.3 dBm Pin)



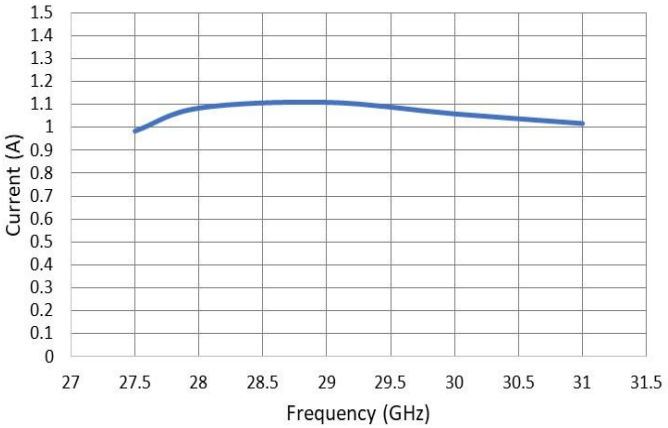
PAE vs. Frequency (at 21.3 dBm Pin)



Gain vs. Frequency (at 21.3 dBm Pin)



Drain Current vs. Frequency (at 21.3 dBm Pin)



4388 Cerritos Avenue
Los Alamitos, CA 90720

www.nxbeam.com
info@nxbeam.com

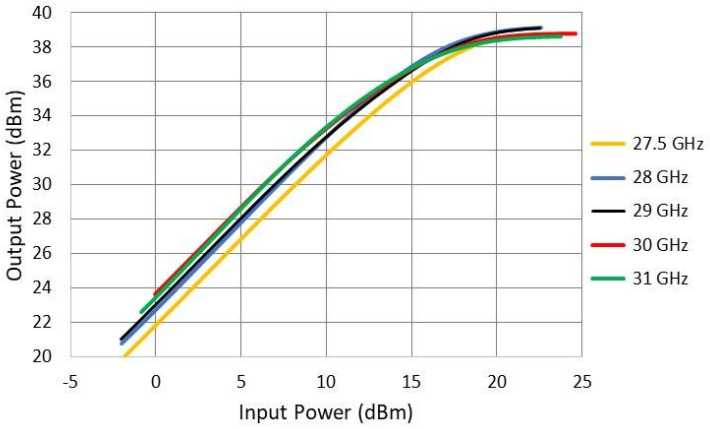
Phone: 949-656-2883

Large Signal Performance

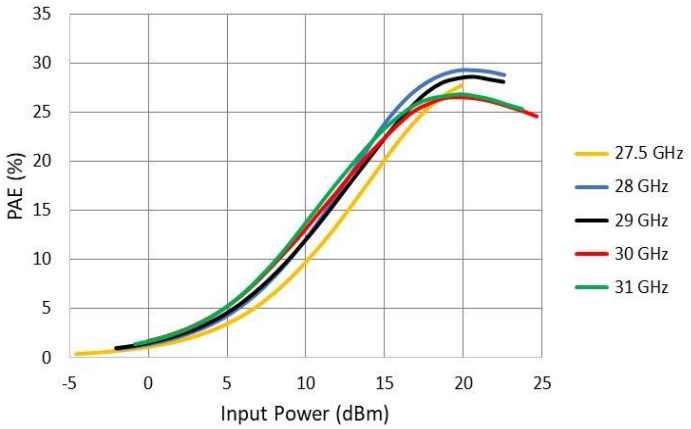
Test Condition: Vd = 26 V, Idq = 0.5 A

(CW Performance in Fixture, Typical Performance at 25°C)

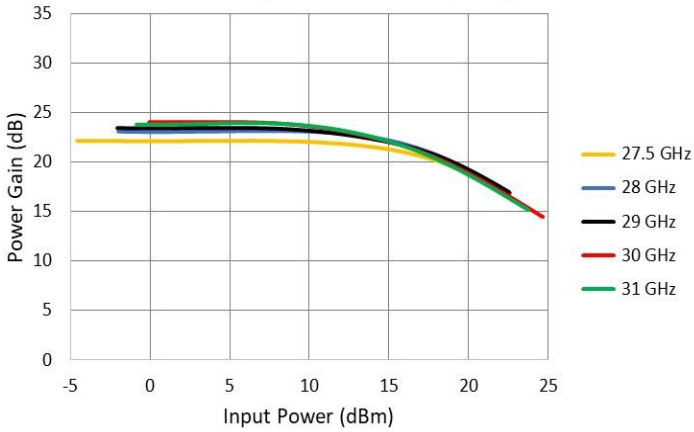
Output Power vs. Input Power vs. Frequency



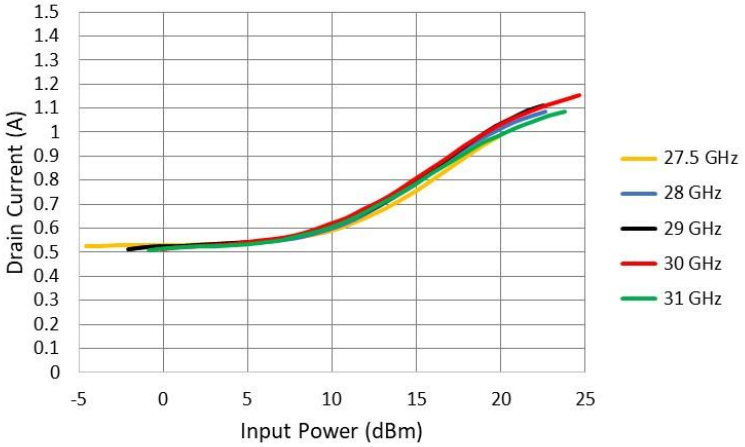
PAE vs. Input Power vs. Frequency



Power Gain vs. Input Power vs. Frequency



Drain Current vs. Input Power vs. Frequency



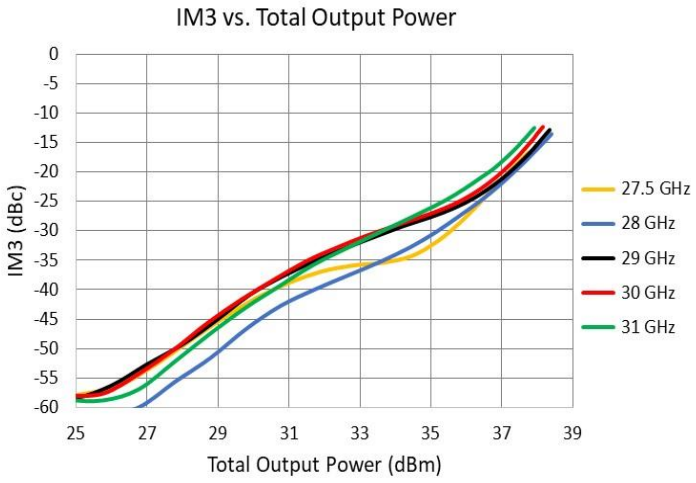
4388 Cerritos Avenue
Los Alamitos, CA 90720

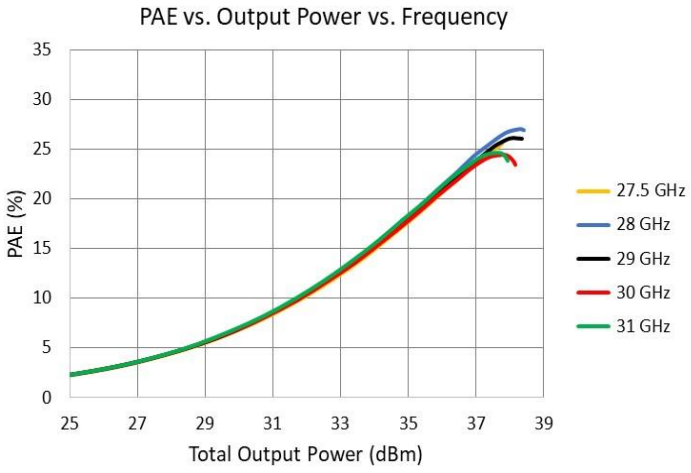
www.nxbeam.com
info@nxbeam.com

Phone: 949-656-2883

2-Tone Linearity Performance

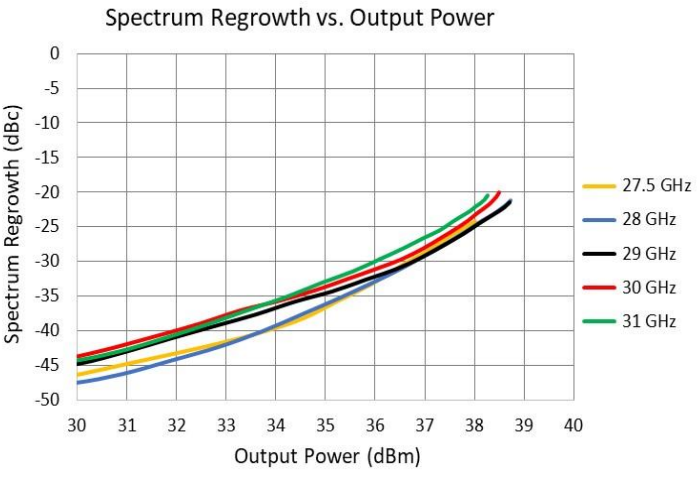
Test Condition: Vd = 26 V, Idq = 0.5 A, 10 MHz Tone Spacing
(CW Performance in Fixture, Typical Performance at 25°C)

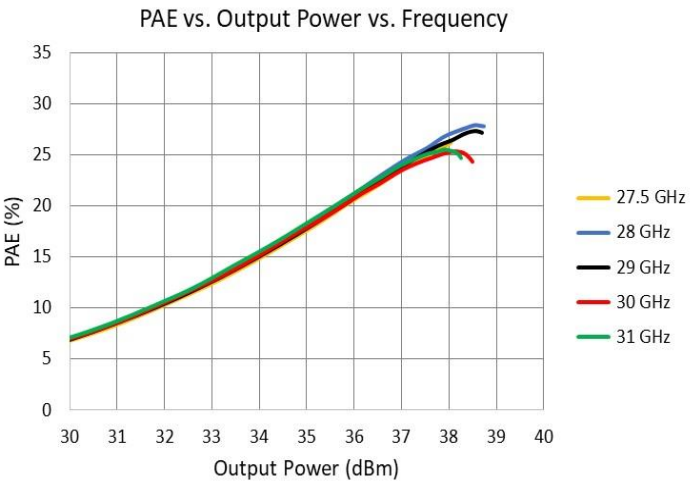




Spectral Regrowth Performance

Test Condition: Vd = 26 V, Idq = 0.5 A, 10 MHz Tone Spacing
(CW Performance in Fixture, Typical Performance at 25°C)





4388 Cerritos Avenue
Los Alamitos, CA 90720

www.nxbeam.com
info@nxbeam.com

Phone: 949-656-2883

Bias Information

Bias-up Procedure:

1.) It is recommended that voltage and current limits are set on the voltage supply's prior to biasing the product.
2.) Ensure power supplies are properly grounded to the product test fixture.
3.) Apply a negative gate voltage of -8V to Vg1, Vg2, and Vg3 to ensure all devices are pinched off.
4.) Gradually increase the drain bias voltage (Vd1, Vd2, Vd3) to the desired bias level but not to exceed the maximum voltage of 28 V.
5.) Gradually increase the gate voltages (Vg1, Vg2, Vg3) while monitoring the drain current until the desired drain current in each stage is achieved.
6.) Apply RF signal.

Bias-down Procedure:

1.) Turn off RF signal.
2.) Gradually decrease Vg1, Vg2, and Vg3 down to -6 V.
3.) Gradually decrease the drain voltages (Vd1, Vd2, Vd3) down to 0 V.
4.) Gradually increase gate voltages (Vg1, Vg2, Vg3) to 0 V.
5.) Turn off supply voltages

ESD Sensitive Product

Important Information

Nxbeam Inc. reserves the right to update and change without notice the characteristic data and other specifications as they apply to this document. Customers should obtain and verify the most recent product information before placing orders. Nxbeam Inc. assumes no responsibility or liability whatsoever for the use of the information contained herein.

4388 Cerritos Avenue
Los Alamitos, CA 90720

www.nxbeam.com
info@nxbeam.com

Phone: 949-656-2883