

# VRFA0144-BD

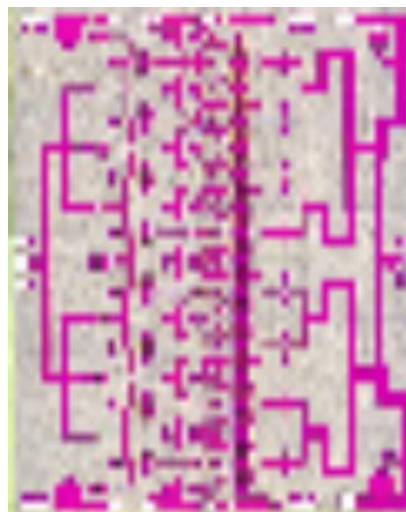


## Ku-Band GaN MMIC Amplifier

Datasheet v1

### Features

- Frequency Range: 16.5 to 17.5 GHz
- Supply 28V (Drain)
- 44dBm P<sub>SAT</sub>
- 12dB large signal gain
- 50Ω matched RF ports
- Die size: 4.45 mm x 5.5 mm x 0.1mm



### Description

The VRFA0144-BD is a gallium nitride high power amplifier MMIC which operates over the frequency range of 16.5GHz to 17.5GHz. The device demonstrates an output power of 44dBm with a PAE of approximately 18% and a large-signal gain of 12dB under pulsed conditions.

Typical applications for the VRFA0144-BD include satellite communication transmitter solutions, radar and terrestrial communication links.

### Electrical Specifications

Parameter	Specification			Unit
	Min.	Typical	Max.	
Frequency Bandwidth		16.5 to 17.5		GHz
Small Signal Gain	21.8	22	22.1	dB
Input Return Loss	16	17	19	dB
Output Return Loss	7	8.4	10.5	dB
P <sub>sat</sub>		44		dBm
Power Added Efficiency		18		%
Large Signal Gain		12		dB

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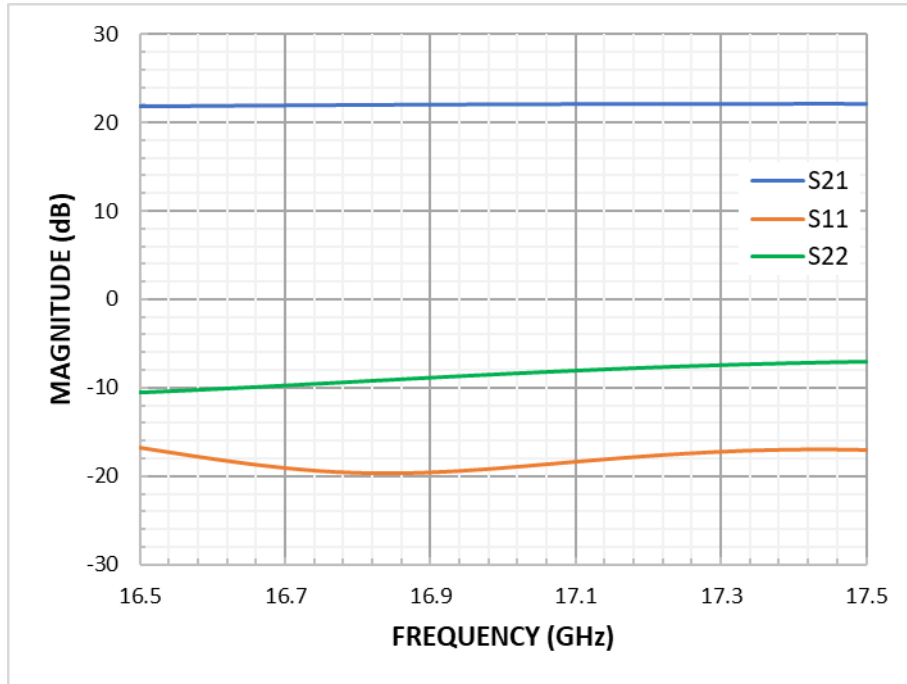
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### Performance vs Frequency

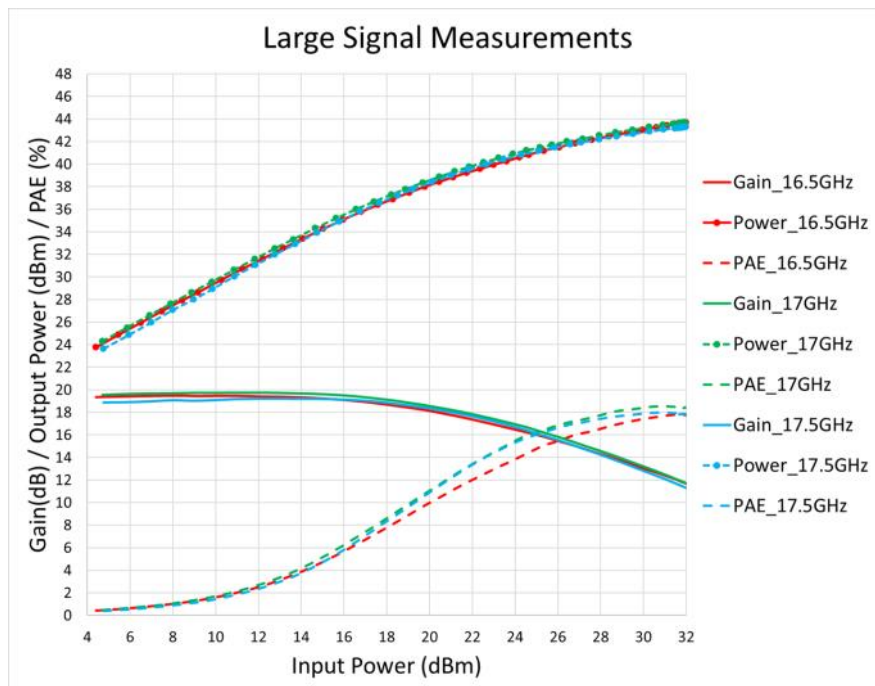
T=+25°C baseplate.

#### S-Parameters VRFA0144-BD



Bias Conditions: VD=28V, ID=3300mA

### Large-Signal Performance vs Input Power VRFA0144-BD

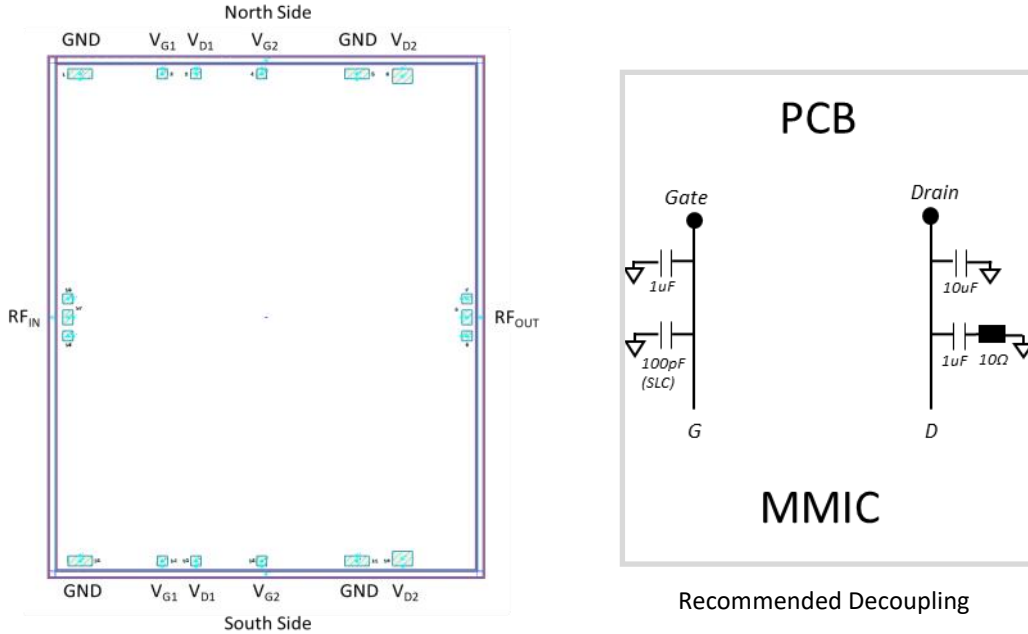


Bias Conditions: VD = 28V, Pulse Repetition Frequency 10kHz, Pulse Duty Ratio 33%

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### Assembly Information & Recommended Decoupling



### Pad Coordinates

Pad	X-coordinate	Y-coordinate	Pad	X-coordinate	Y-coordinate
1_GND_North	290	5354	10_V <sub>D2</sub> _South	3643	166
2_V <sub>G1</sub> _North	1144	5354	11_GND_South	3168	141
3_V <sub>D1</sub> _North	1495	5354	12_V <sub>G2</sub> _South	2179	141
4_V <sub>G2</sub> _North	2179	5354	13_V <sub>D1</sub> _South	1495	141
5_GND_North	3168	5354	14_V <sub>G1</sub> _South	1144	141
6_V <sub>D2</sub> _North	3643	5329	15_GND_South	290	141
7_GND	4314	2948	16_GND	161	2548
8_RF_Output	4314	2748	17_RF_Input	161	2748
9_GND	4314	2548	18_GND	161	2948

Pad coordinates – centre of pad with reference to lower left of the MMIC (0,0)

Minimal length (0.15nH) are recommended for RF bond wires. The RF input and output ports are DC blocked.

Die Size	4.45mm x 5.5mm
Die Thickness	100µm
Minimum Bondpad opening	100µm x 100µm

GaN devices are ESD sensitive and precautions should be observed during storage, handling, assembly and testing.



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### Recommended Absolute Maximum Ratings <sup>[1]</sup>

Parameter	Symbol	Value	Notes
Drain Bias Voltage	$V_d$	+28V	
Junction Temperature	$T_j$	225°C	For maximum median device lifetime, $T_j$ should be minimised
Storage Temperature	$T_{storage}$	-55 to 150°C	

<sup>[1]</sup> Operation outside these conditions may cause permanent damage to the device. Combination of maximum rating conditions may reduce the values. Device performance at these ratings is not implied.

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### Revision History

Version	Date	Author	Description
1	21/06/2022	MOK	<ul style="list-style-type: none"><li>New Document</li></ul>
2	30/06/2022	MOK	<ul style="list-style-type: none"><li>Ka corrected to Ku in title</li></ul>
3	20/09/2022	MOK	<ul style="list-style-type: none"><li>Pixelated image of die.</li></ul>
4	22/09/2022	PD	<ul style="list-style-type: none"><li>Large signal measurements</li></ul>