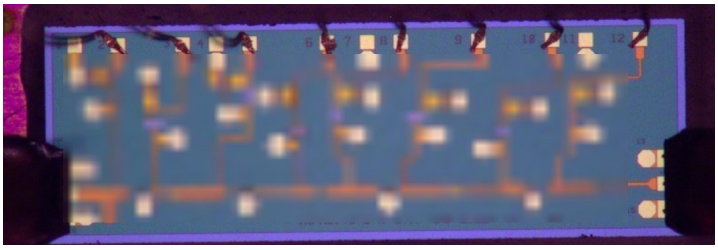
VRFA0145V2-BD

78-88GHz GaAs MMIC Low Noise Amplifier

Preliminary Datasheet v1



Features

- Frequency Range: 78 to 88 GHz
- Drain Voltage 1V ($V_{D1/2/3/4}$)
- 2.2dB Noise Figure Typical
- 33dB small signal gain
- 50Ω matched RF ports
- Die size: 3.45 mm x 1.2 mm x 0.1 mm

Description

The VRFA0145V2-BD is a 4-stage low noise amplifier MMIC which operates over the frequency range of 78GHz to 88GHz. The device demonstrates a typical noise figure of 2.2dB with small signal gain of 33dB across the frequency band. Each stage of the VRFA0145V2-BD is biased from a +1V DC supply. Total current drawn is 33mA. The RF ports are matched to 50Ω. Typical applications for the VRFA0145V2-BD include high frequency point to point radios and test & instrumentation.

Electrical Specifications

T = 25°C baseplate, Vg1,2 = -0.18V, Vg3,4 = -0.22V, Vd1,g2,g3,g4 = 1V, Id 1 = 9.7mA, Id2 = 9.4mA, Id3 = 7.9mA, Id4 = 6.3mA

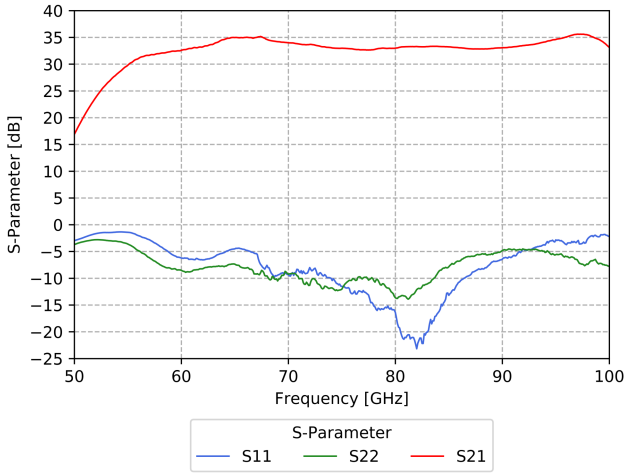
Parameter	Specification			Unit
	Min.	Typ.	Max.	
Frequency Bandwidth	78		88	GHz
Small Signal Gain	32	33	34	dB
Noise Figure		2.2	3.0	dB
I/P Return Loss		-10@86GHz	-8	dB
O/P Return Loss		-7@86GHz	-5	dB

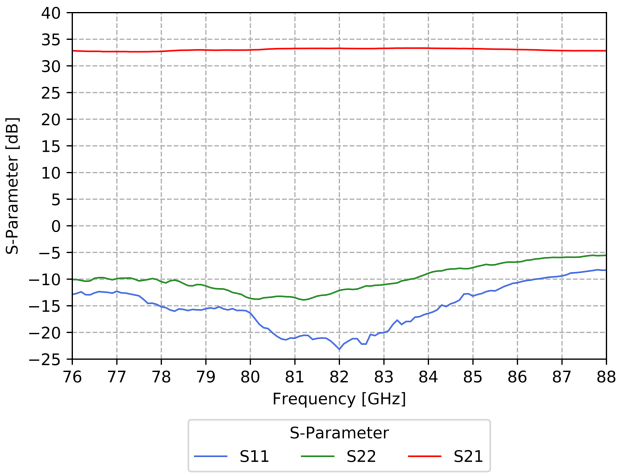
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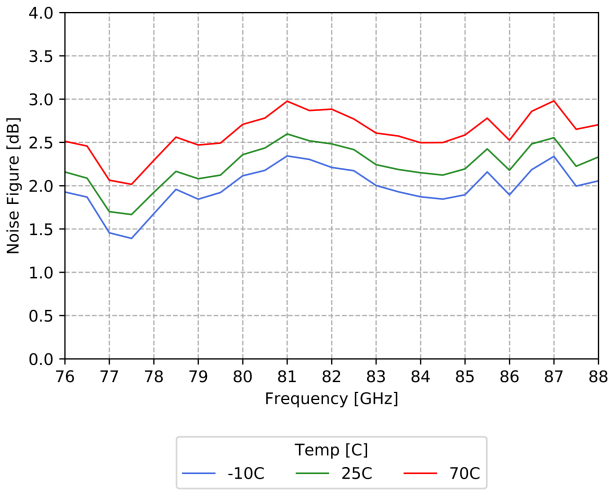
Preliminary Datasheet v1

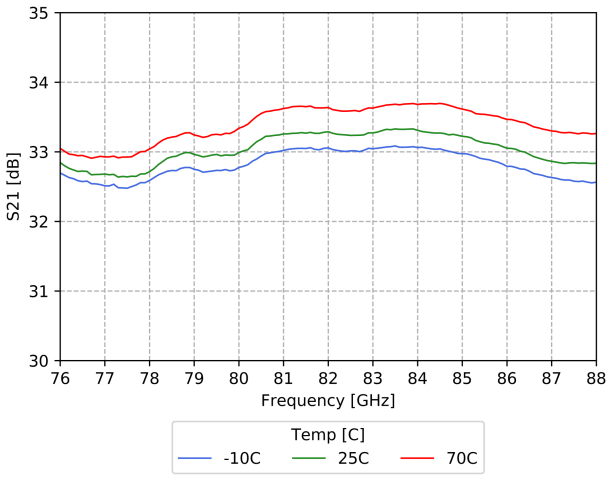
Measured Die Performance

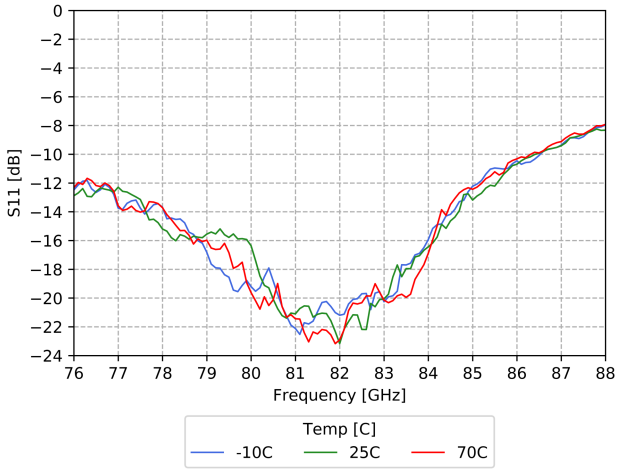
Vg1,2 = -0.18V, Vg3,4 = -0.22V, Vd1,g2,g3,g4 = 1V, Total Id = 33mA

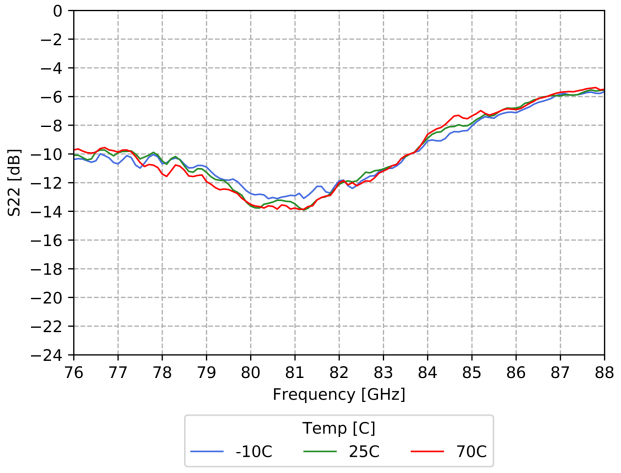












Typical measured S-Parameters and Noise Figure over Temperature

VRFA0145V2-BD

78-88GHz GaAs MMIC Low Noise Amplifier

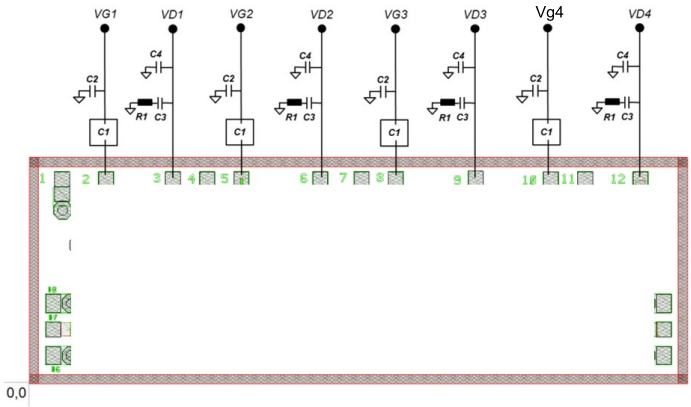
Preliminary Datasheet v1

Recommended Absolute Maximum Ratings [1]

Parameter	Symbol	Value	Notes
Drain bias voltage	Vd	1.5V	
Gate bias voltage	Vg	-1V	
Gate Current	Ig	2mA	
RF input power	RFin	-5dBm	
Junction Temperature	T_j	160°C/230°C	160°C for space applications/230°C for non-space applications
Storage Temperature	$T_{storage}$	-55 to 150°C	

[1] 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.

Assembly & Bonding Diagram



	Value	Max Voltage / Power Rating	Type
C1	100pF	16V	Single Layer chip capacitor
C2, C3	1uF	10V	0402
C4	10uF	10V	0402
R1	10ohm	200mW	0402

ID	PAD	Voltage	Current
17	RF IN		
2,5,8,10	Gate	Vg = -0.2V typical	Negligible
3,6,9,12	Drain	Vd = 1V typical	30-35mA
14	RF OUT		
Die Bottom	GND		

Die Size	3.5mm x 1.2mm
Die Thickness	100µm
Minimum Bondpad opening	100µm x 100µm

1. Ribbon Bond (Length: <0.15mm and diameter:0.05mm) is recommended

2. Please note that only the RF output port is DC blocked.

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



Amplifier Bias on Procedure:

- Set VG1, VG2, VG3 and VG4 to -1V
- Increase VD1, VD2, VD3 and VD4 to 1V
- Reduce VG1, VG2, VG3 and VG4 to approximately -0.1V to set the right drain current (around 30-35mA).
- Turn RF ON

Amplifier Bias off Procedure:

- Turn RF OFF
- Set VG1, VG2, VG3 and VG4 to -1V