

VRFA0026-BD

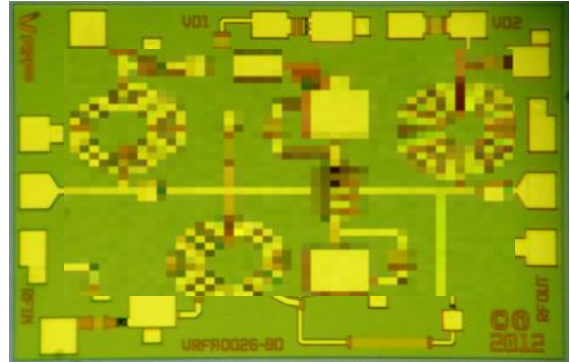


X-Band GaAs MMIC Low Noise Amplifier

Preliminary Datasheet v6

Features

- Frequency Range: 7 to 11 GHz
- Single supply 3V, 80mA self bias
- 1dB Noise Figure @ 9GHz typical
- 23dB small signal gain
- Rugged RFin handling capability
- 50Ω matched RF ports
- Die size: 1.5mm x 1mm x 0.05mm



Description

The VRFA0026-BD is an X-band low noise amplifier MMIC which operates over the frequency range of 8GHz to 11GHz. The circuit demonstrates a nominal 1dB noise figure at 9GHz with small signal gain of 23dB across the frequency band. The VRFA0026-BD draws 80mA from a +3VDC supply. The RF ports are DC blocked and matched to 50Ω. Typical applications for the VRFA0026-BD include point to point radios, VSAT, radar and test & instrumentation.

Electrical Specifications

$T=+25^{\circ}\text{C}$ baseplate, $V_{DD}=+3\text{V}$, $I_d=80\text{mA}$

Parameter	Specification			Unit
	Max.	Typ. @9GHz	Min.	
Frequency Bandwidth	7		11	GHz
Small Signal Gain		23		dB
Noise Figure		1.0		dB
I/P Return Loss		-8		dB
O/P return Loss		-9		
P1dB Output Power		15.5		dBm

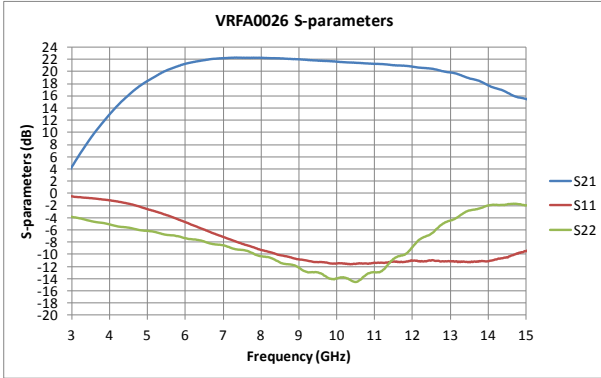
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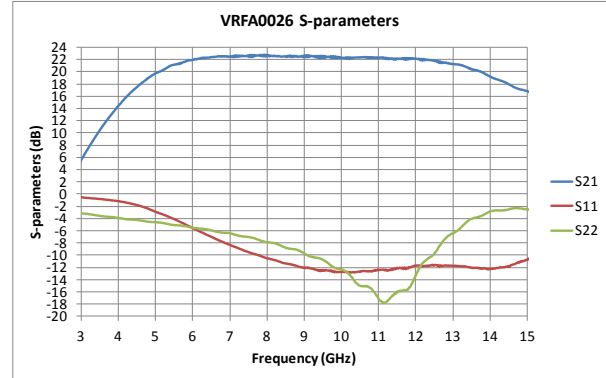
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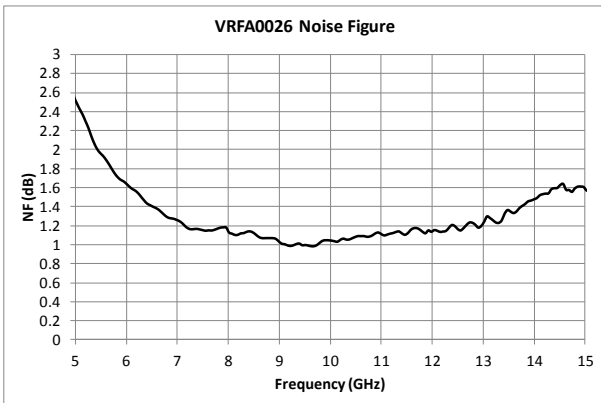
Measured Performance (on wafer)



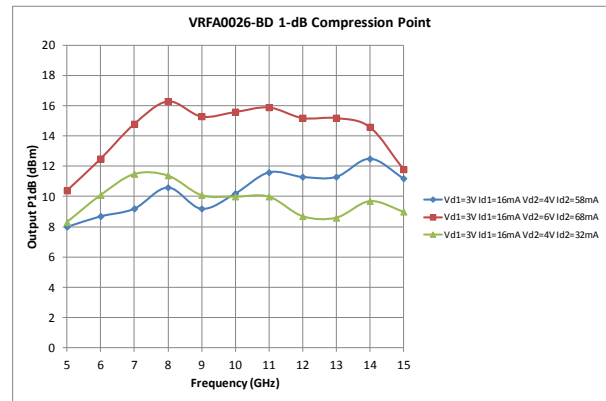
$V_{d1} = 3V, I_{d1} = 18mA, V_{d2} = 4V, I_{d2} = 29mA$



$V_{d1} = 3V, I_{d1} = 28mA, V_{d2} = 4V, I_{d2} = 47mA$

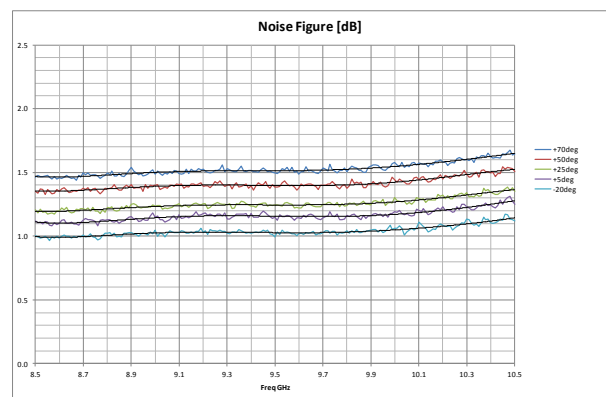
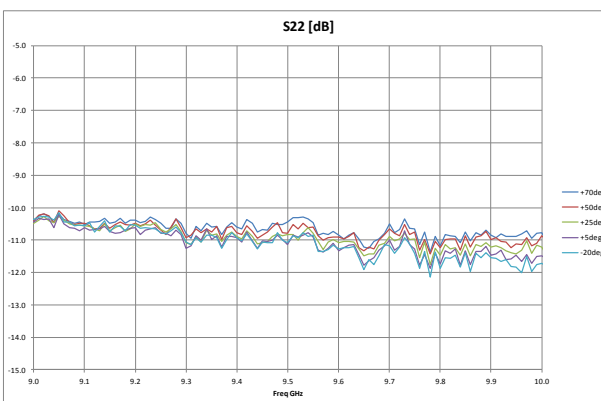
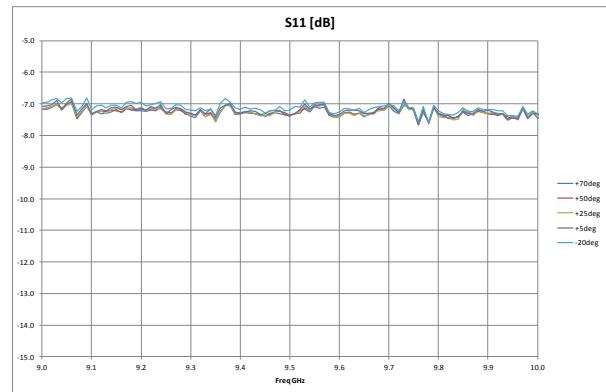
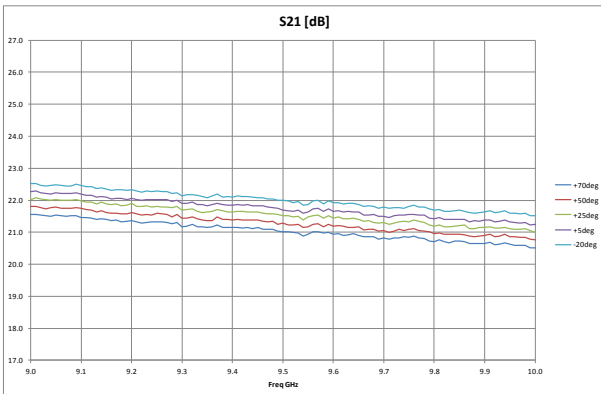


$V_{d1} = 3V, I_{d1} = 39mA, V_{d2} = 4.5V, I_{d2} = 33mA$



Measured Performance (test fixture—not de-embedded))

$V_{DD} = +3V, I_{d}=48mA$

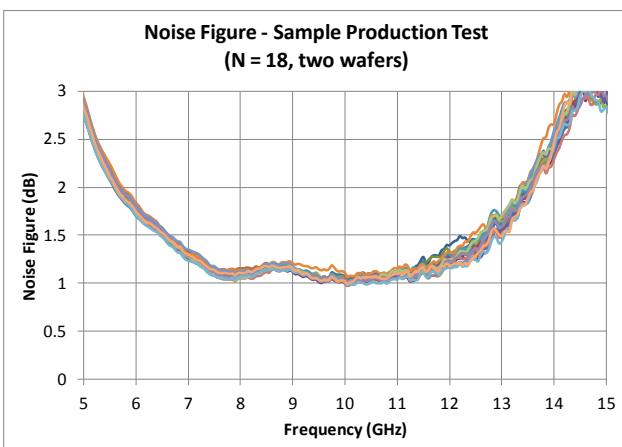
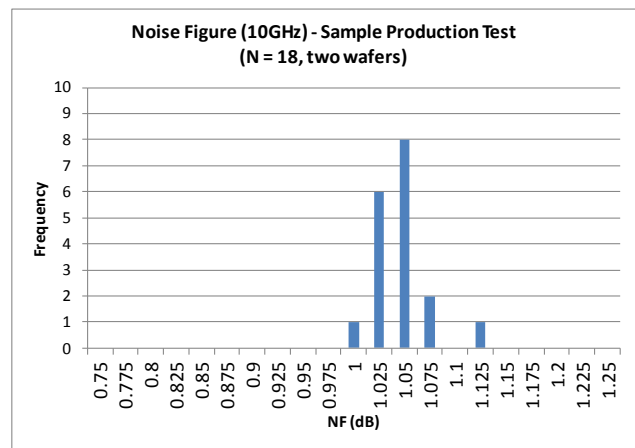
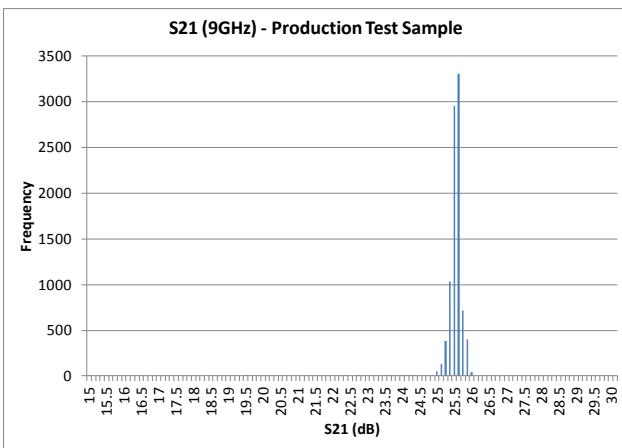
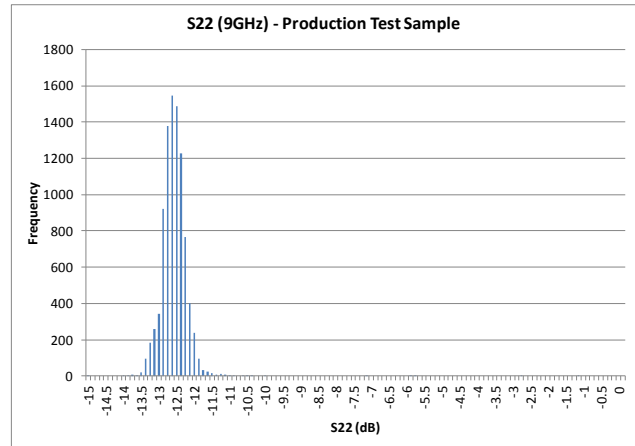
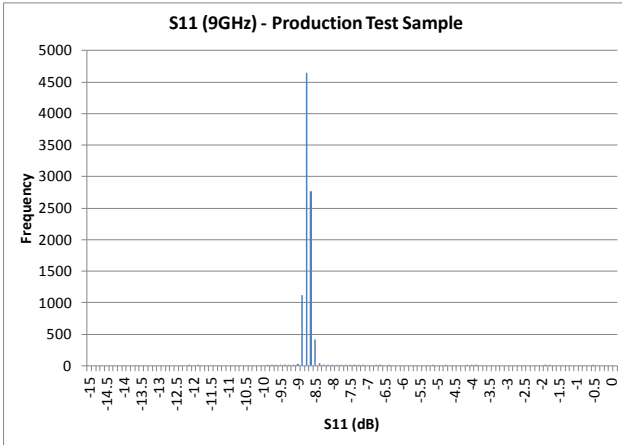


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Measured Performance (on wafer, production test)

$V_{DD} = +3V, I_d = 100mA$



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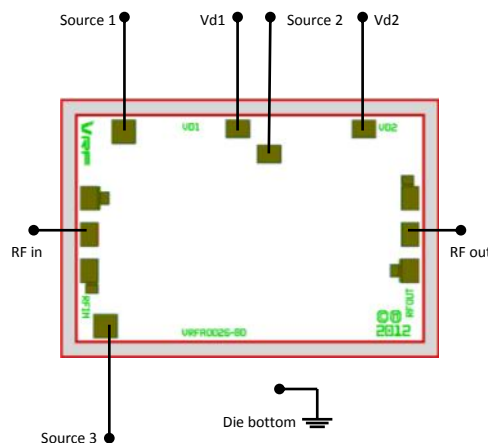
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Recommended Absolute Maximum Ratings ^[1]

Parameter	Symbol	Value	Notes
Drain Bias Voltage	V_d	+4V	
Gate Bias Voltage	V_g	-5V	
Gate Current	I_g	50mA	
RF input power (Pulsed)	RF_{in}	28dBm	Tested under 20% 40us Recommended maximum is dependant on bias
Junction Temperature	T_j	175°C	For maximum median device lifetime, T_j should be minimised
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



PAD	CONNECTION
Vd1, Vd2	Device is self-biased, both connections are required
Source 1/2/3	Optional Connections to GND modifying the bias point, to adjust gain/NF/compression
Die bottom	GND

Die Size	1.5mm x 1.0mm
Die Thickness	50µm
Minimum Bondpad opening	70µm x 70µm

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

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

