VRFA0125V1-BD

9GHz - 11GHz GaAs MMIC 13W High-Power Amplifier

Advanced Product Information



Features

- Frequency Range: 9 - 11 GHz
- Saturated Output Power: 41.2dBm CW
- Power Added Efficiency: 38%
- Small Signal Gain: 30.5dB

Applications

- General Purpose
- X-Band Radar
- Test and Instrumentation
- Telecommunications
- Point-to-Point Radio

Description

The VRFA0125V1-BD is a GaAs high power amplifier MMIC which operates over the frequency range of 9GHz to 11GHz. The amplifier typically delivers a small signal gain of +30.5dB with a typial saturated output power greater than 41.2dBm and a typical PAE of 38%. The HPI is biased with a typical drain voltage supply of +8V DC and a typical gate voltage supply of -0.85V resulting in a typical quiescent current of 2.6A. The RF ports are DC blocked and matched to 50Ω.

Electrical Specifications

Test conditions: T = +25 °C, 8V, Idq=2.6A, CW

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Frequency Bandwidth	Δf	-	9		11	GHz
Small Signal Gain	S21	Small Signal	29.5	30.5		dB
Saturated Output Power	PSAT	Saturation		41.2		dBm
Output Power at 1 dB Compression	P1dB	-		39.5		dBm
Power Added Efficiency	PAE	-		38		%
Input Return Loss	RLin	Small Signal	14	18		dB
Output Return Loss	RLout	Small Signal	14	18		dB
Current Consumption	Id	Saturation		4.5		A

Absolute Maximum Ratings

Parameter	Symbol	Value
Drain Bias Voltage	Vd	8V
Minimum Gate Bias Voltage	Vg	-0.8V
RF Input Power	RFin	+22dBm
Junction Temperature	Tj	225 °C
Storage Temperature	Tstg	-55°C to 150°C

Operation outside these conditions may cause permanent damage. Combination of maximum-rating conditions may reduce individual values. Performance at these ratings is not implied.

Recommended Operating Conditions

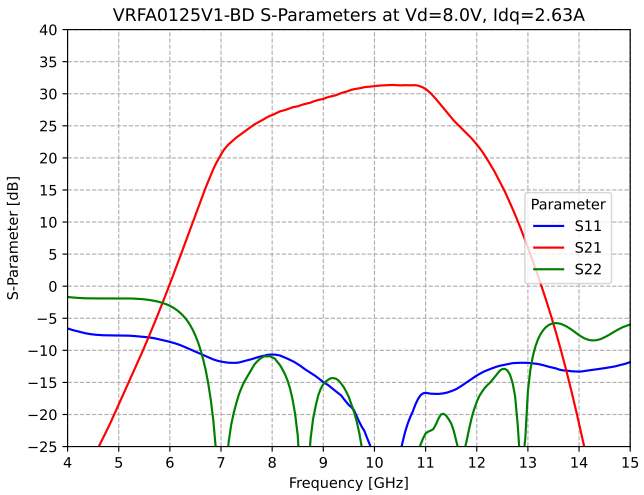
Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	Vd	7	8	8	V
Quiescent Drain Current	Idq	-	2.6	-	A
Ambient Temperature	TA	-40	25	85	°C

S-Parameters

Measured on the evaluation board; reference plane at the RF bondwires, CW.

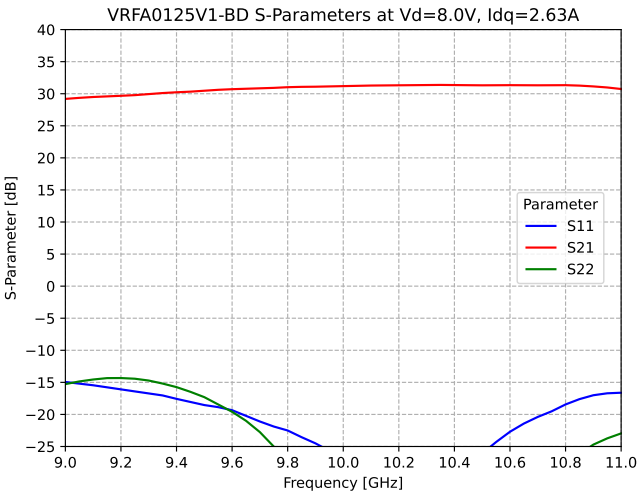
Wide Band S-Parameters

T = +25°C, Vd = 8V, Idq = 2.63A, reference plane: RF bondwires



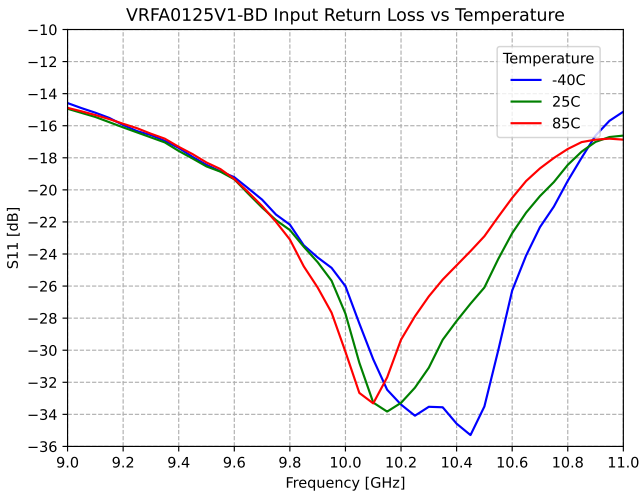
Narrow Band S-Parameters

T = +25°C, Vd = 8V, Idq = 2.63A, reference plane: RF bondwires



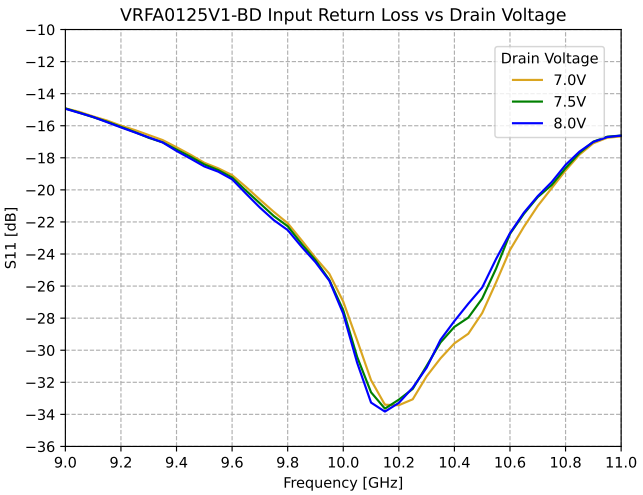
Input Return Loss over Temperature

Vd = 8V, Idq = 2.63A (At +25°C), reference plane: RF bondwires



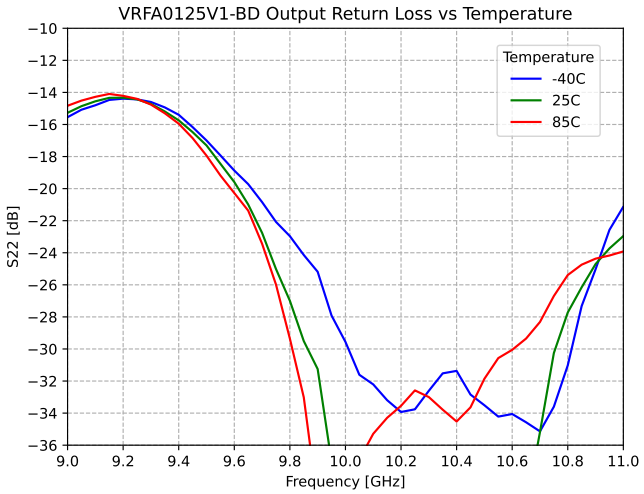
Input Return Loss over Drain Voltage

T = +25°C, Idq = 2.63A (At 8V), reference plane: RF bondwires



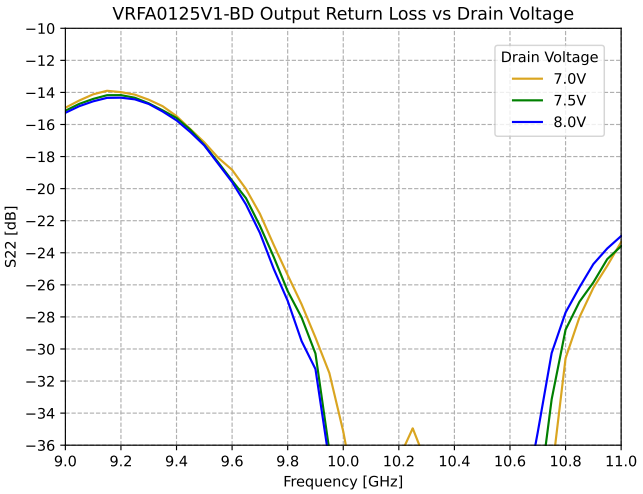
Output Return Loss over Temperature

Vd = 8V, Idq = 2.63A (At +25°C), reference plane: RF bondwires



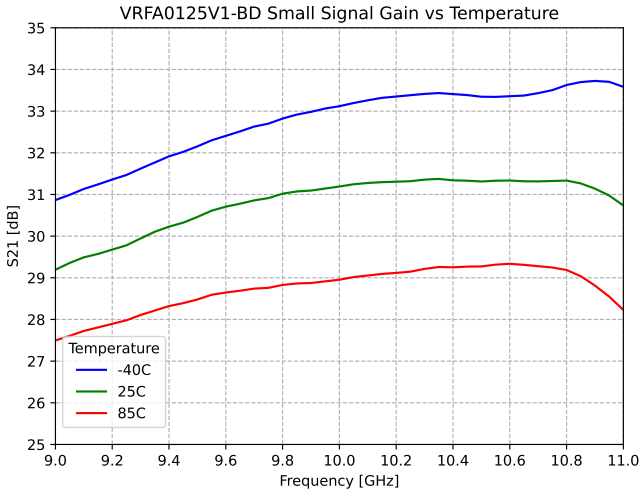
Output Return Loss over Drain Voltage

T = +25°C, Idq = 2.63A (At 8V), reference plane: RF bondwires



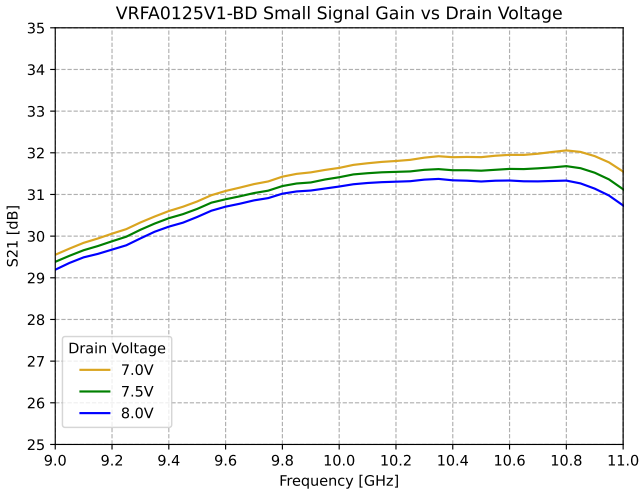
Small Signal Gain over Temperature

Vd = 8V, Idq = 2.63A (At +25°C), reference plane: RF bondwires



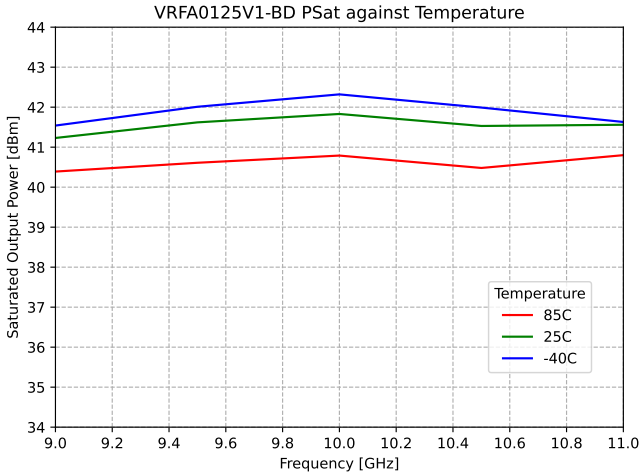
Small Signal Gain over Drain Voltage

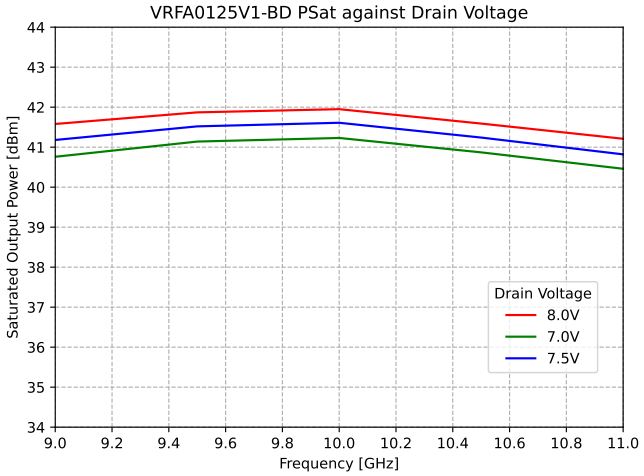
T = +25°C, Idq = 2.63A (At 8V), reference plane: RF bondwires

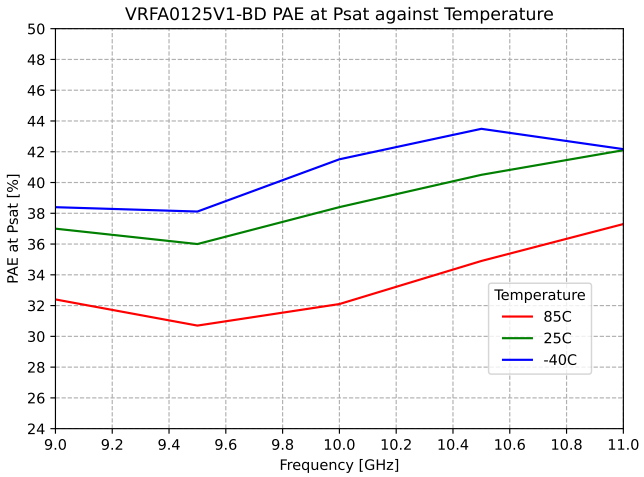


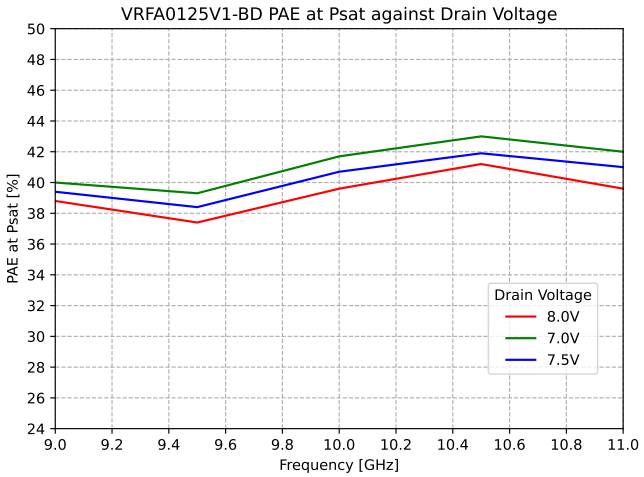
Large Signal against Frequency

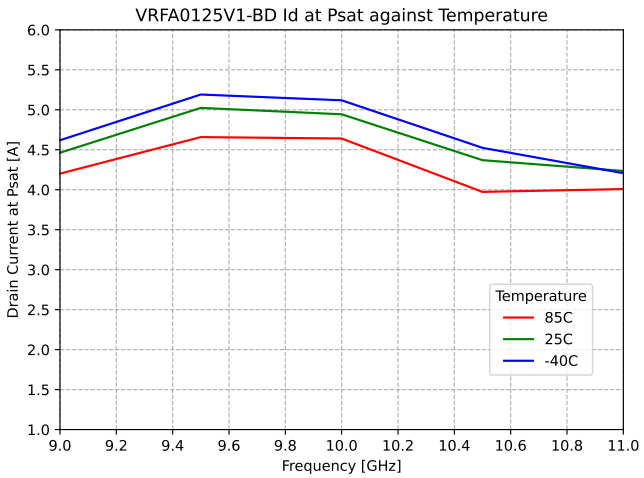
Measured on the evaluation board; reference plane at the RF bondwires, CW.

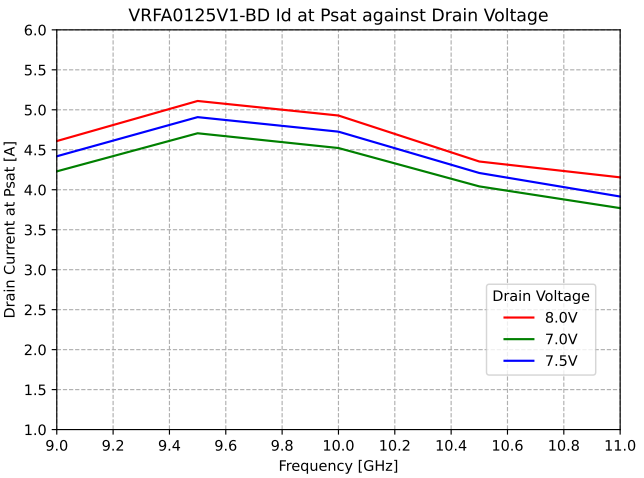






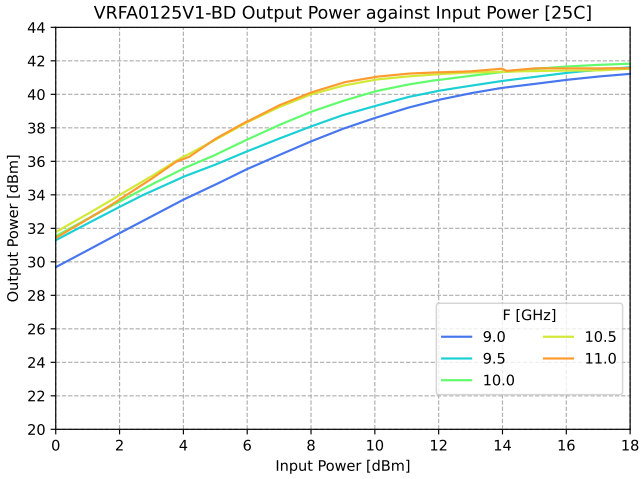


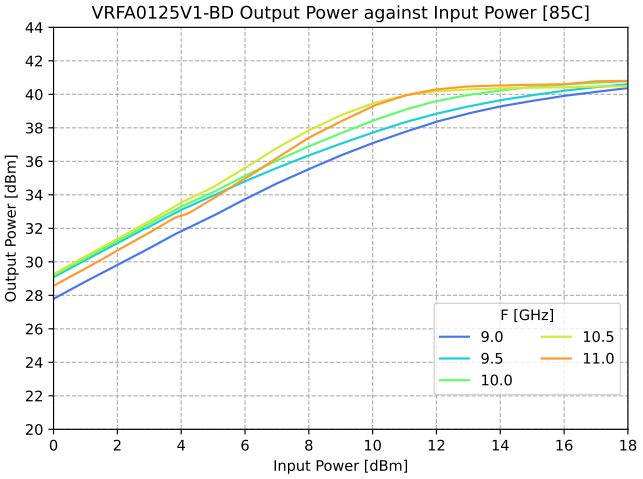


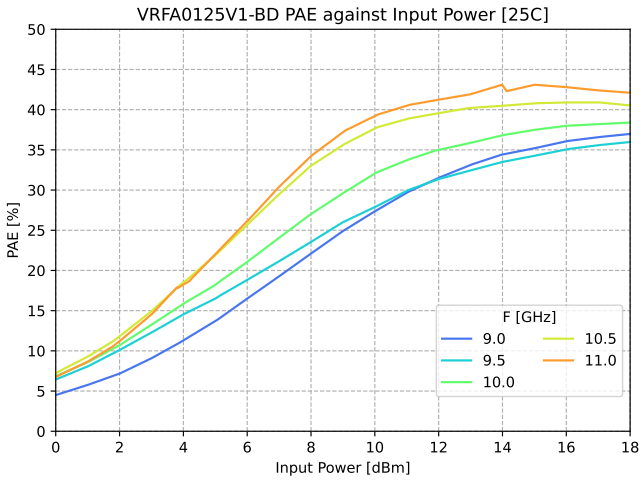


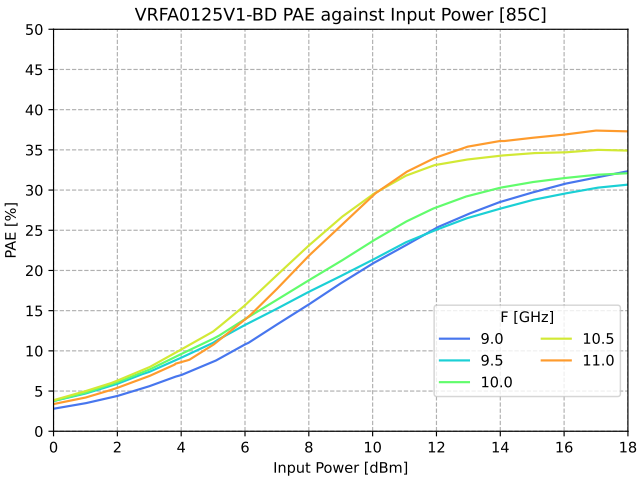
Large Signal against Input Power (8V, 25C/85C)

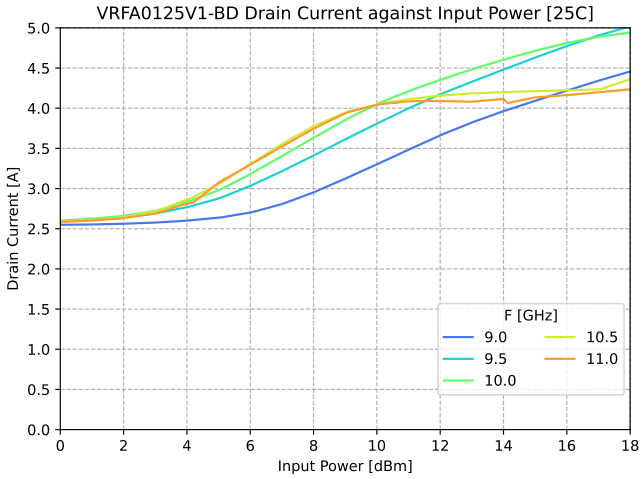
Measured on the evaluation board; reference plane at the RF bondwires, CW.

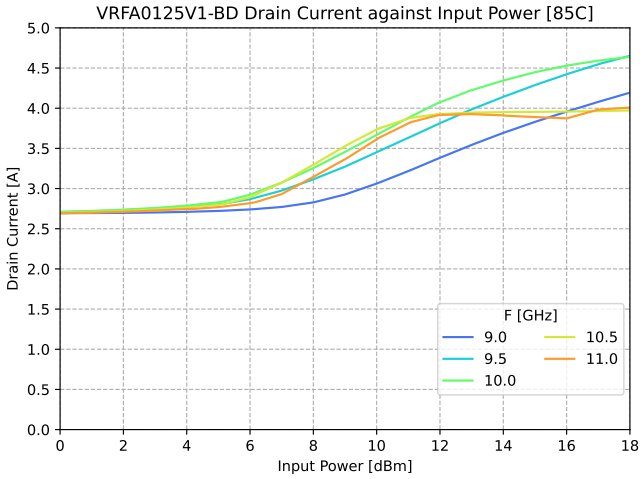






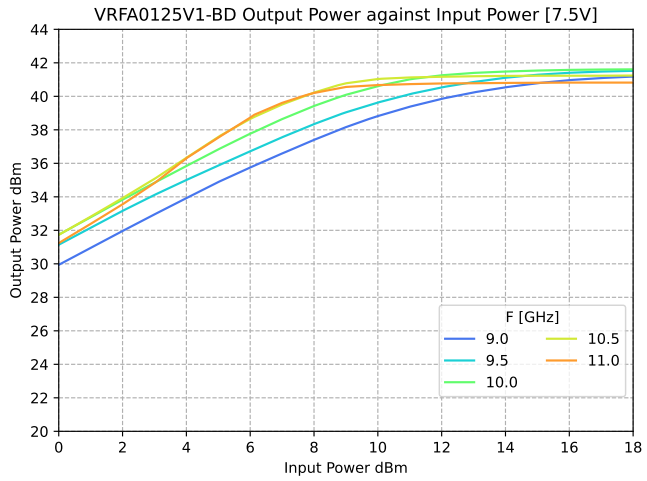


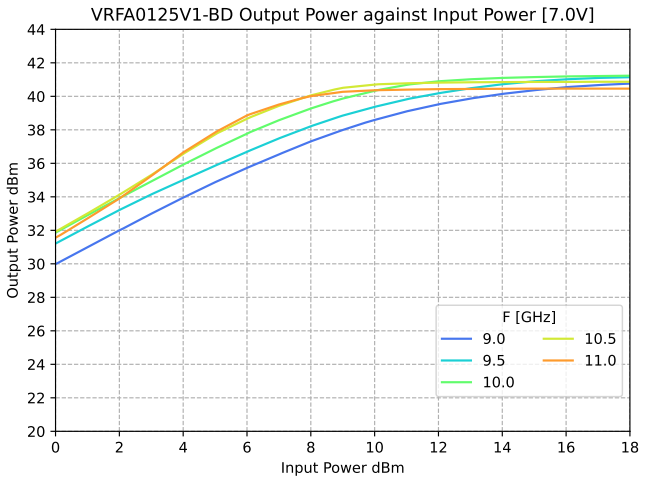


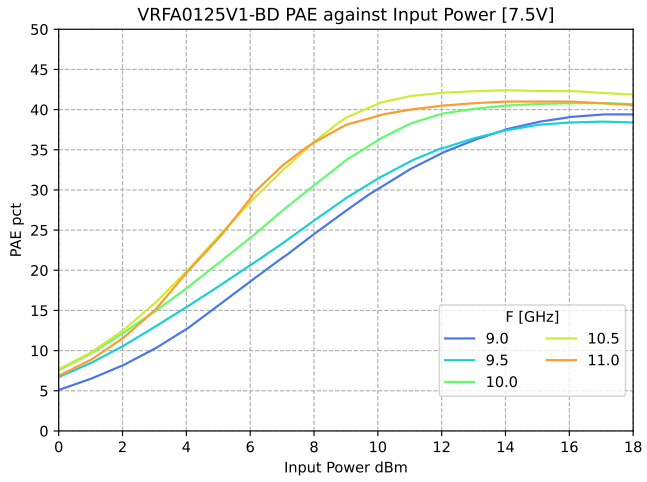


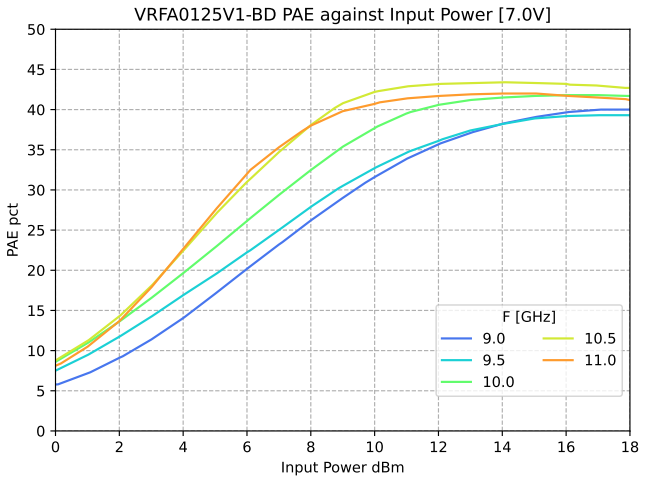
Large Signal against Input Power (7V/7.5V, 25C)

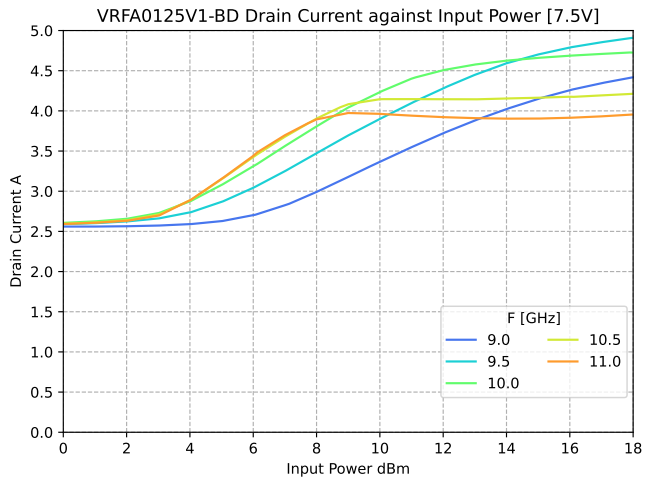
Measured on the evaluation board; reference plane at the RF bondwires, CW.

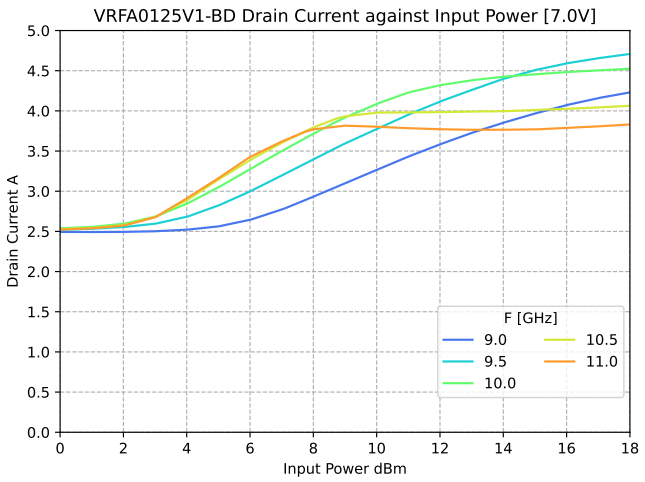








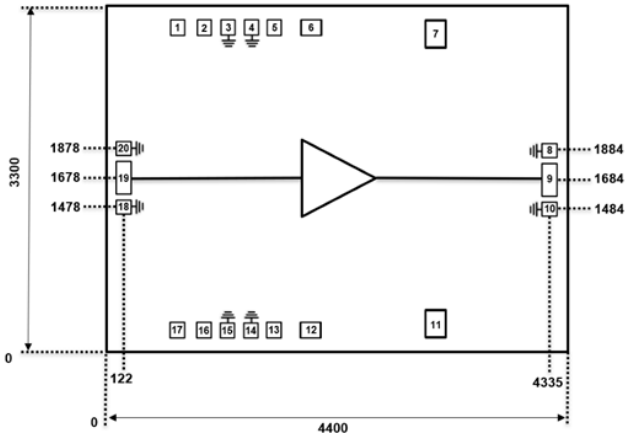




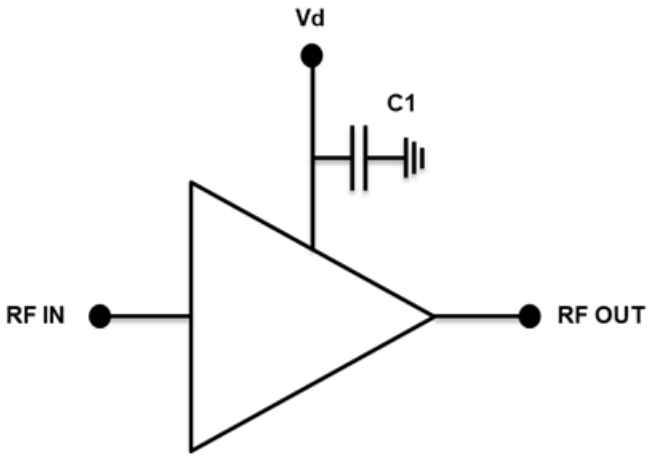
Pad Coordinates

Test conditions: Lower-left die corner (0,0); dimensions in μm

Pad	X (μm)	Y (μm)
[1] Test Point	943	3179
[2] Vg1	1129	3179
[3] GND	1287	3179
[4] GND	1445	3179
[5] Vg2	1609	3179
[6] Vd1	1985	3178
[7] Vd2	3247	3163
[8] RF GND	4335	1885
[9] RF Out	4335	1685
[10] RF GND	4335	1485
[11] Vd2	3247	206
[12] Vd1	1985	191
[13] Vg2	1609	190
[14] GND	1445	190
[15] GND	1287	190
[16] Vg1	1129	190
[17] Test Point	814	190
[18] RF GND	122	1478
[19] RF IN	122	1678
[20] RF GND	122	1878



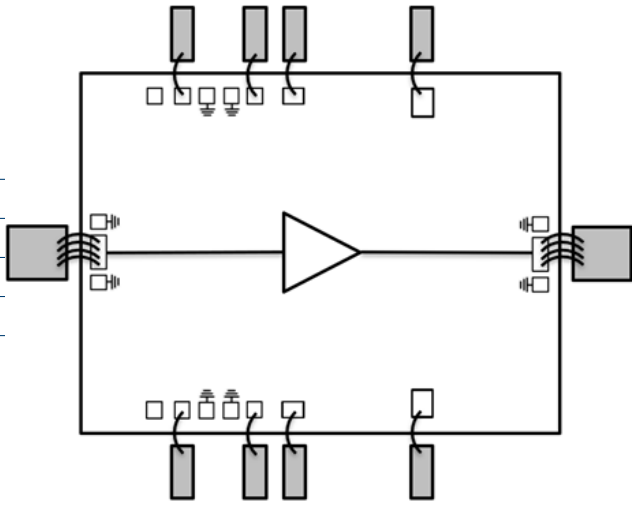
Application Circuit



Ref Des	Value
C1	0.01uF

Assembly and Bonding

Die size	4.4 x 3.3 mm
Die thickness	100 μm
Bond pads	100 x 100 minimum opening μm
Bond wires	2x400um bondwires at RF input, 4x400um bondwires at



Bias Sequencing

Power-up:

1. Set gate supply to pinch-off (-3V).
2. Raise drain supply to 8V.
3. Adjust gate voltage for IDQ = 2.6A.
4. Apply RF drive.

Power-down:

1. Remove RF drive.
2. Reduce drain supply to 0V.
3. Remove gate supply.

Handling and ESD

ESD-sensitive device. Observe full precautions during storage, handling, assembly and testing.

Ordering Information

Part Number	Details
VRFA0125V1	Die in gel pack

Revision History

Rev	Date	Author	Changes
1	17-11-2026	JMW	Initial release

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