HR2504868B

4.8-6.8 GHz 25 W GaN PA MMIC

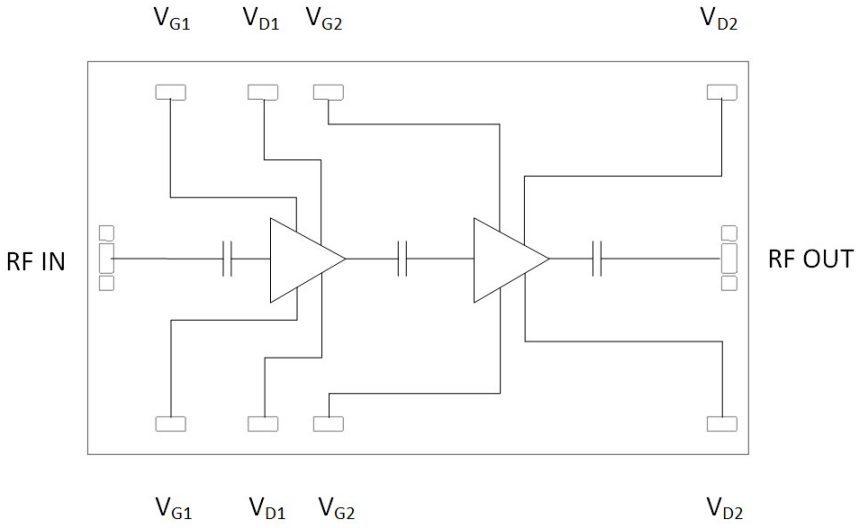
Product Features

- Frequency Range: 4.8-6.8 GHz
- Large Signal Gain: 21.0 dB
- Output Power (P_{IN}= 23 dBm): 44.0 dBm
- PAE (P_{IN}= 23 dBm): 47.0%
- Small Signal Gain: 30.2 dB
- Input Return Loss: > 7.5 dB
- Output Return Loss: > 5.9 dB
- Recommended Bias: V_D = 28 V, I_{DQ} = 500 mA
- Die Dimensions: 4.45×2.65 mm

Performance is typical at room temperature. Please reference electrical specification table and data plots for more details.

4.45 mm × 2.65 mm bare die

Functional Block Diagram



Description

The HR2504868B is a fully integrated 2-stage power amplifier MMIC designed for radar applications, covering frequency range from 4.8 GHz to 6.8 GHz. The device delivers saturated output power of 25 W and has typical 47% power added efficiency with operating drain voltage of 28 V.

Applications

- Satcom
- Commercial and Military Radar

DC Characteristics

PARAMETER	SYMBOL	VALUE	UNIT
Drain Voltage	V_D	28	V
Drain Quiescent Current	I_{DQ}	500	mA
Typical Gate Voltage	V_G	-2.5	V
Operating Temperature Range		-40 to 85	°C

1. Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.
2. Gate voltage shown are typical, can be adjusted to set required drain current.

Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN VALUE	MAX VALUE	UNIT
Drain Voltage	V_D	-	48	V
Drain Current	I_{DQ}	-	2400	mA
Gate Voltage	V_G	-7	0	V
Gate Current	I_G	-	10	mA
TX Input Power(@ 85°C, Pulse, 50 Ohm)		-	26	dBm
Mounting Temperature		-55	150	°C

Operation of this device outside the parameter ranges given above may cause permanent damage. These are stress ratings only, and functional operation of the device at these conditions is not implied. Extended application of Absolute Maximum Rating conditions may reduce device reliability.

Electrical Specifications

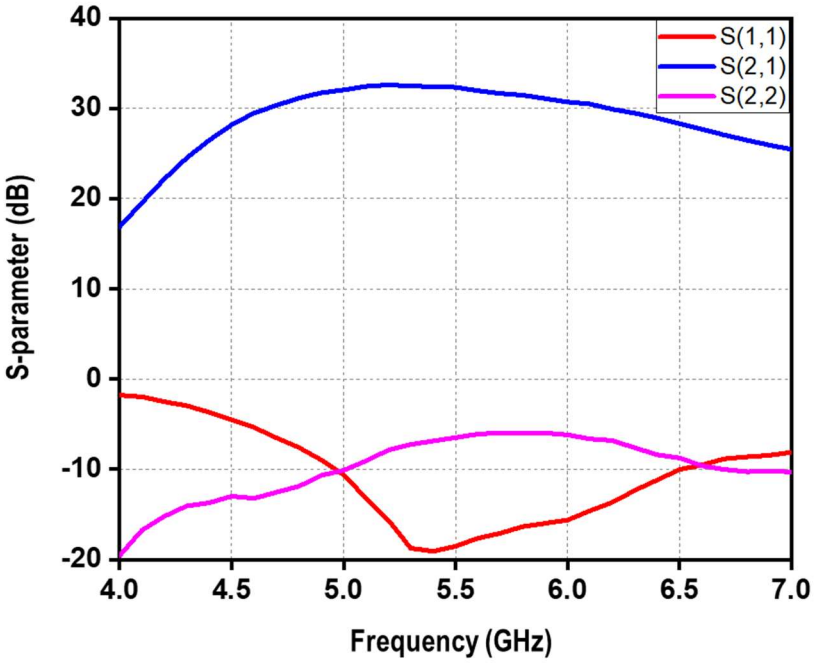
Test conditions unless otherwise noted: VD = 28 V, IDQ = 500 mA
Data de-embedded to device reference plane, 25 °C.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Frequency	f	4.8		6.8	GHz
Small Signal Gain	G	26.1	30.2	32.3	dB
Large Signal Gain*	LG	21.0	21.2	21.5	dB
Input Return Loss	IRL	7.5		18.8	dB
Output Return Loss	ORL	5.9		11.5	dB
Output Power*	Psat	44.0	44.2	44.5	dBm
PAE*	PAE	41.5	47.0	52.0	%

*Pin = 23 dBm, PW 100 µs / DC 10% pulsed CW signal

Small Signal Performance

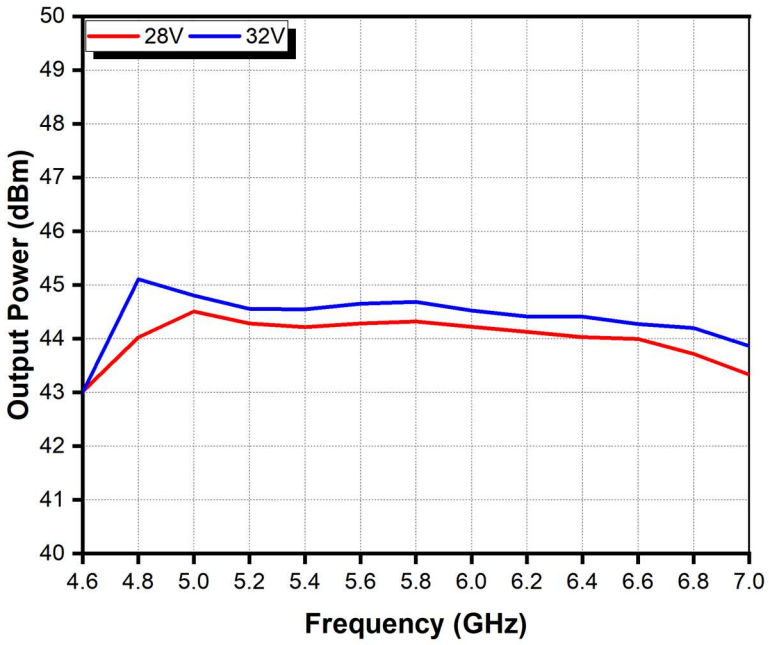
Test Conditions unless otherwise stated: VD = 28 V, IDQ = 500 mA, 25 °C



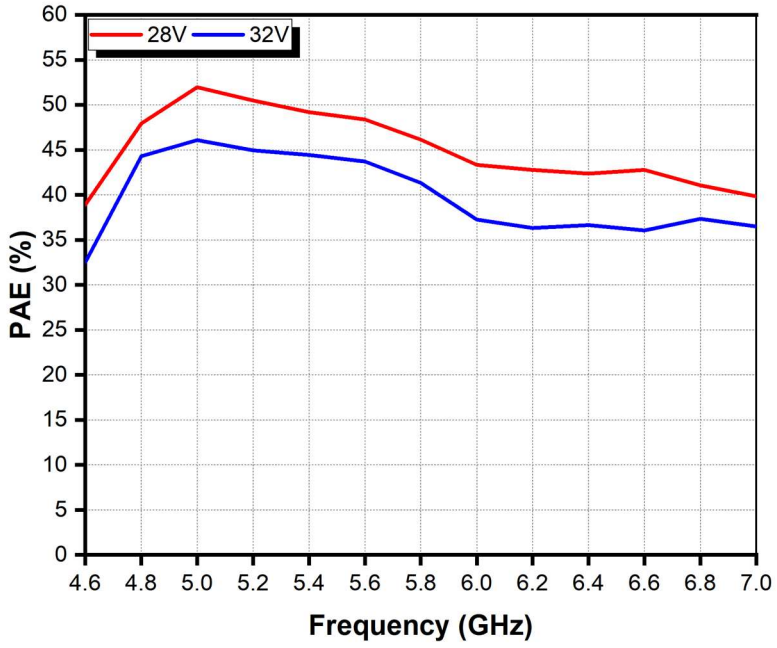
Large Signal Performance

Test Conditions unless otherwise stated: Pin=23 dBm, IDQ = 500 mA, 25 °C
Pulse Mode, PW = 100 us, DC = 10%, 25 °C

Output Power vs Frequency



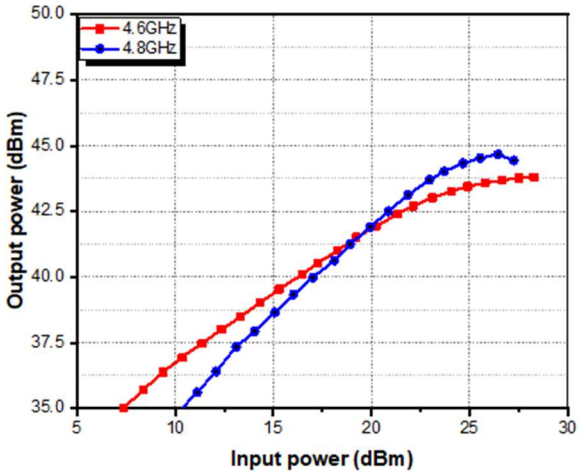
Power Added Efficiency vs Frequency

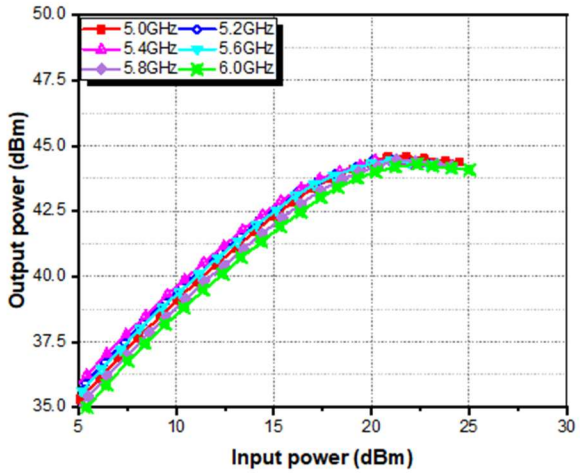


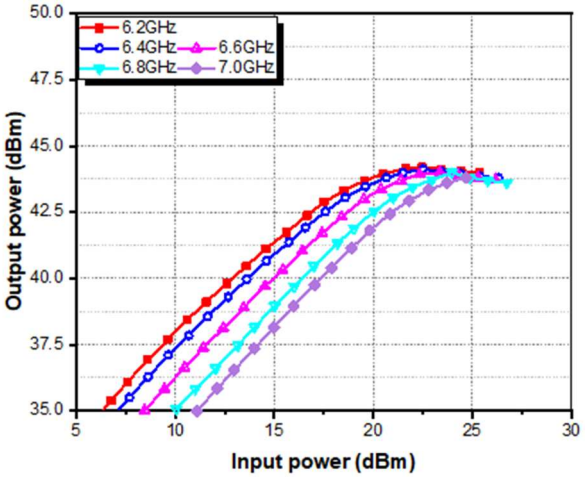
Power Sweep

Test Conditions unless otherwise stated: VD = 28 V, IDQ = 500 mA, 25 °C
Pulse Mode, PW = 100 us, DC = 10%, 25 °C

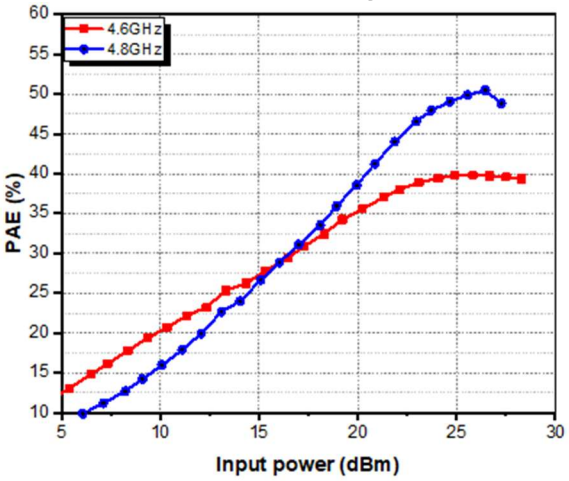
Output Power vs Input Power

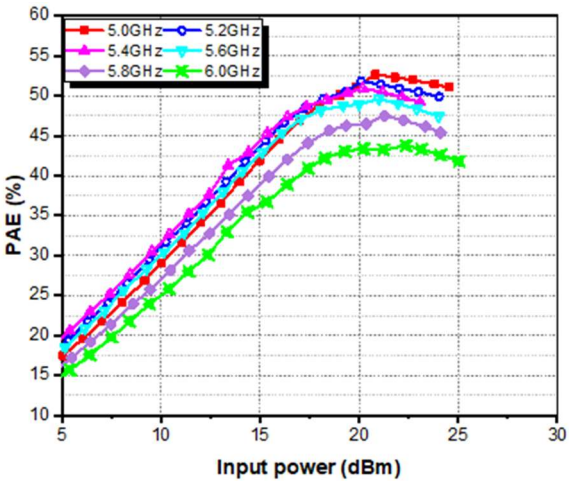


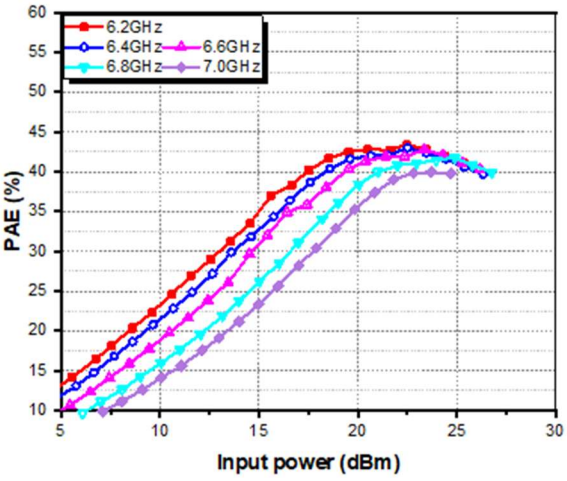




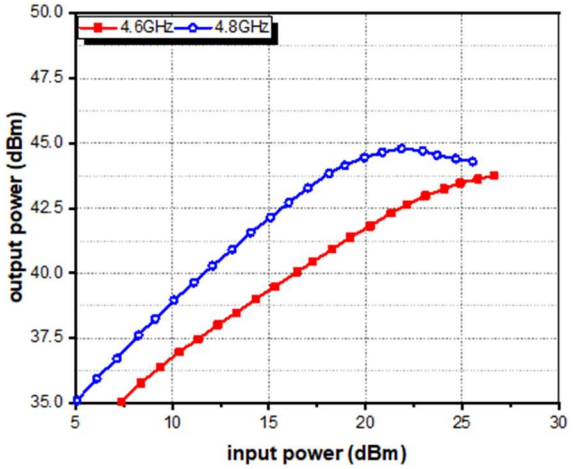
Power Added Efficiency vs Input Power

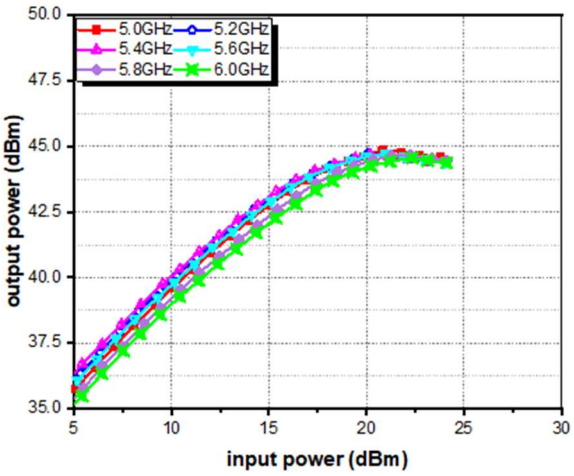


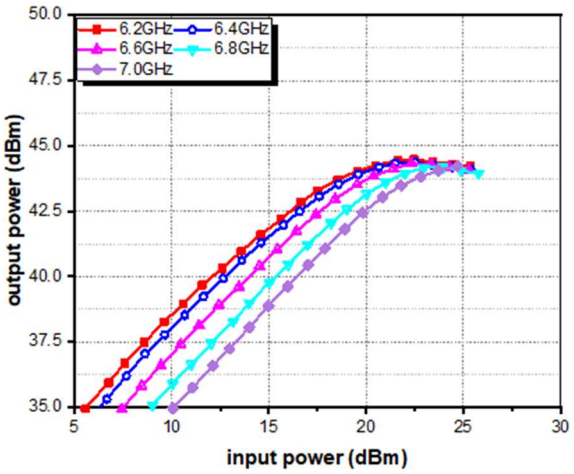




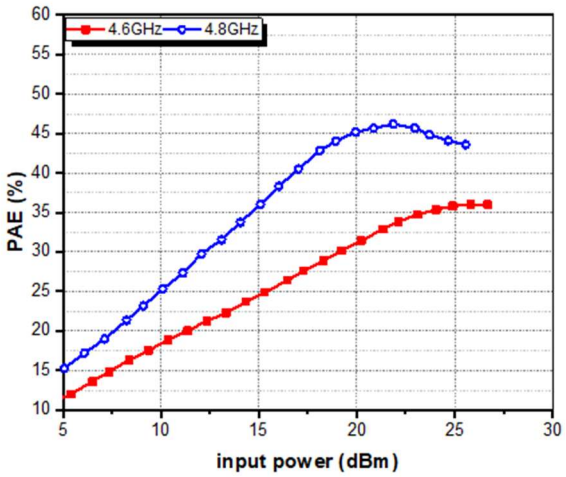
Output Power vs Input Power (VD=32 V)

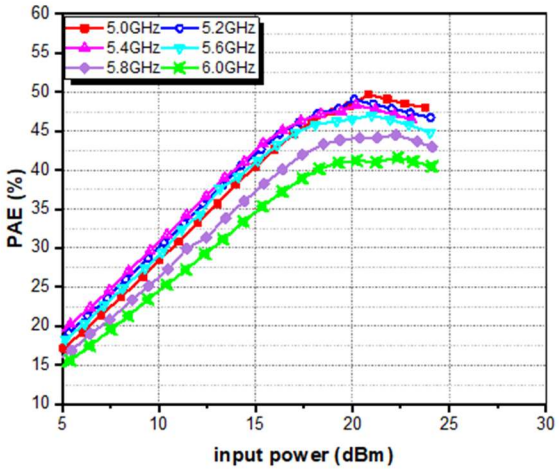


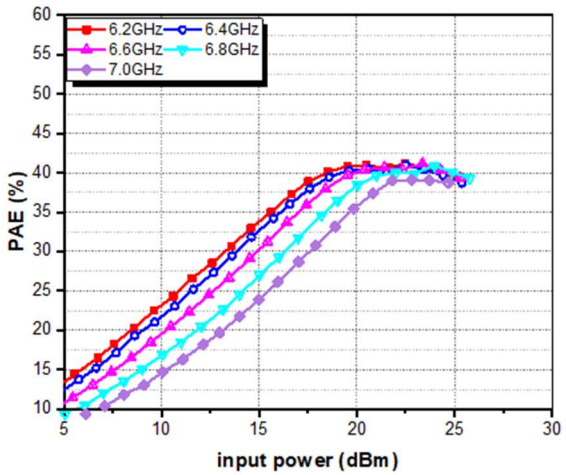




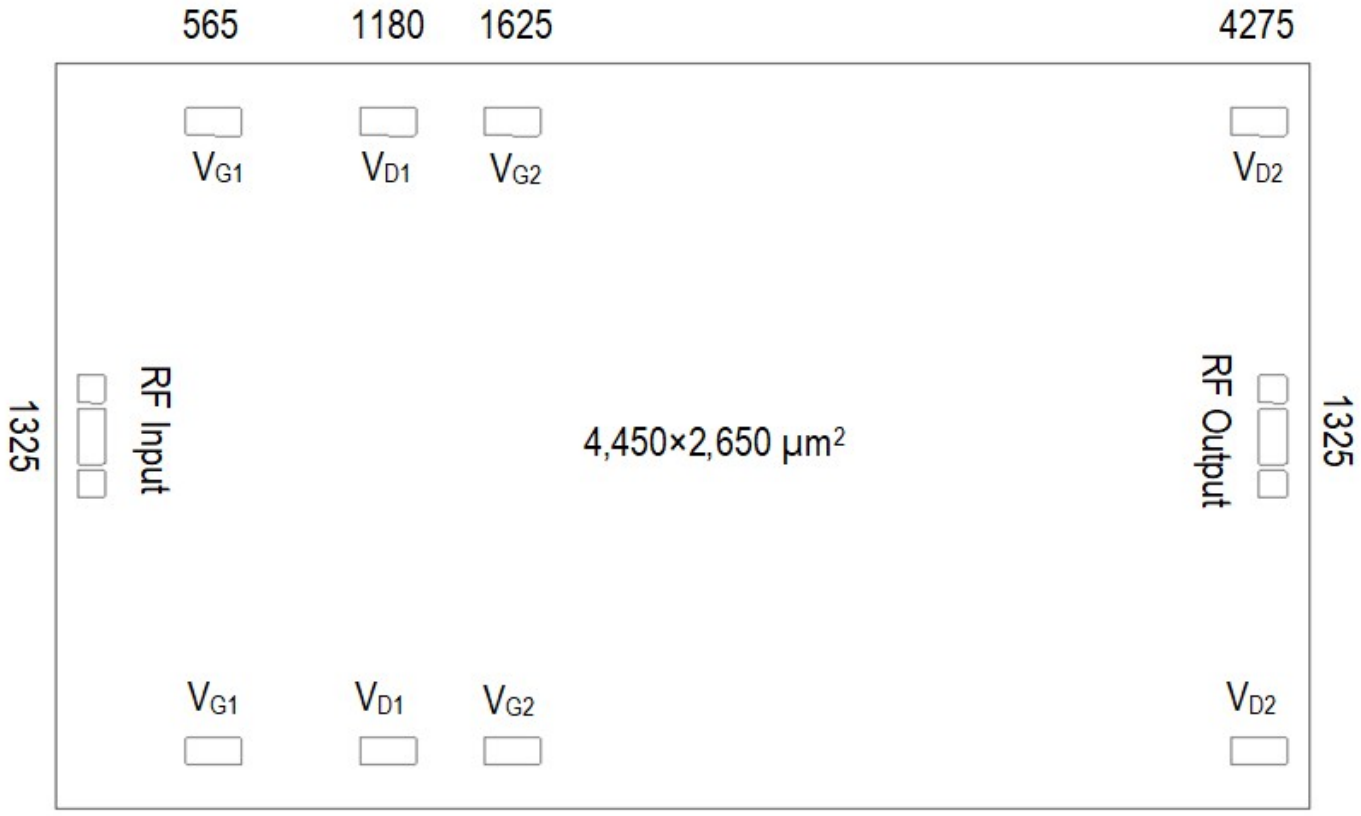
Power Added Efficiency vs Input Power (VD=32 V)



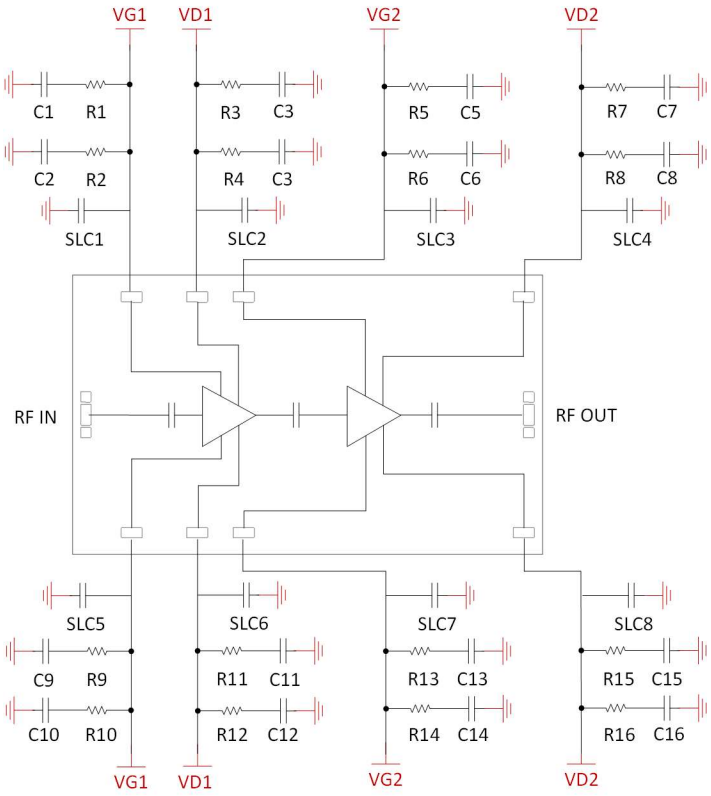




Mechanical Drawing & Pad Description



Application Circuit



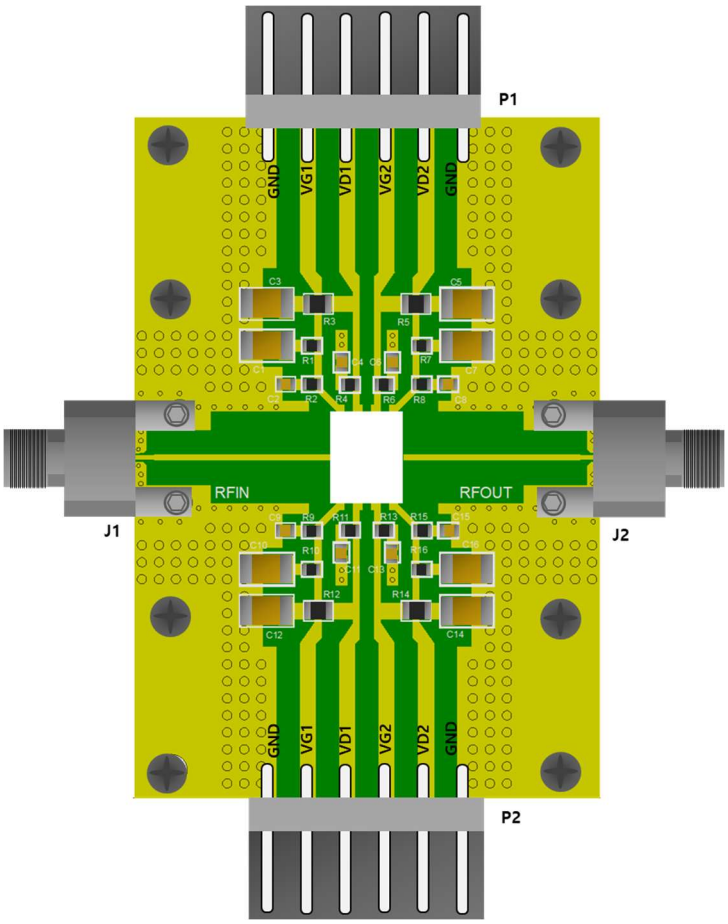
Bias-up Procedure

1. Set I_D limit to 2400 mA, I_G limit to 10 mA
2. Apply -4 V to V_G
3. Apply +28 V to V_D; ensure I_{DQ} is approx. 0mA
4. Adjust V_G until I_{DQ} = 500 mA
5. Turn on RF supply

Bias-down Procedure

1. Turn off RF signal
2. Reduce V_G to −4 V; ensure IDQ is approx. 0 mA
3. Set V_D to 0 V
4. Turn off V_D supply
5. Turn off V_G supply

HR2504868B Evaluation Board



RF Layer is 0.005" thick Rogers Corp. RT/Duroid 5880 (εr = 2.2). Metal layers are 0.5 oz. copper. The microstrip line at the connector interface is optimized for the With-wave end launch connector NE02FS001.

Ref. Des.	Component	Value	Manuf.	Part Number
C1, C3, C5, C7, C10, C12, C14, C16	SMT Cap.	10 uF, 1206 size, 10%, X5R, 50 V	Various	
C2, C4, C6, C8, C9, C11, C13, C15	SMT Cap.	10 nF, 0402 size, 10%, X7R, 50 V	Various	
R1, R7, R10, R16	SMT Res.	0 Ohm, 0402 size, 0.1 W, 50 V	Various	
R2, R4, R6, R8, R9, R11, R13, R15	SMT Res.	5 Ohm, 0402 size, 1%, 0.1 W, 50 V	Various	
R3, R5, R12, R14	SMT Res.	0 Ohm, 0603 size, 0.1 W, 50 V	Various	
SLC1-8	SLC	820 pF, 20%, 50 V	Various	
J1, J2	RF Connectors		With-wave	NE02FS001

Electrostatic Discharge (ESD) Classifications

PARAMETER	SYMBOL	CLASS	TEST METHODOLOGY
Human body model	HBM	TBD	TBD
Charge device model	CDM	TBD	TBD

For more information, please contact:

85517, Research Business Center
2066 Seobu-ro
Jangan-gu, Suwon-si, Gyeonggi-do, Korea
www.para-pa.com

Sales Contact
parapacompany@para-PA.com