# WG0P47040SF-LV

## 400MHz - 470MHz 40W GaN Amplifier

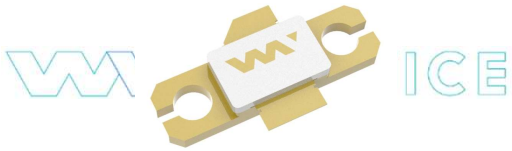
## Features

- Frequency Range : 400MHz - 470MHz
- Psat : 46 dBm
- Power Gain: 18 dB @Psat
- Small Signal Gain: 21 dB
- DE: 50% @Psat
- Bias : $V_D$ = 28V, $I_{DQ}$ = 250mA, $V_G$ = -2.5V (Typ.)
- Characterized at Pulse duty 10%, Pulse width 100uS

## Product Image



- Package Type : SCN-BG2



- Package Type : SCF-BG2

## Description

Wavice's WG0P47040SF-LV is a high power, L-Band amplifier fabricated on Wavice's Durable 0.3 um GaN on SiC process. Covering the frequency range of 400 to 470 MHz, the WG0P47040SF-LV typically provides 46 dBm of saturated output power and 18 dB of power gain while achieving 50% Drain efficiency.
The WG0P47040SF-LV is ideal for use in both commercial and military radar systems.

ROHS compliant.

## Applications

- Military Radar
- Commercial Radar
- Infra Structure
- Small Cell

## Ordering information

| Part No. | Description |
|---|---|
| WG0P47040SF-LV | SCF-BG2 |
| WG0P47040SP-LV | SCN-BG2 |
| WG0P47040SF-LVEV | WG0P47040SF-LV Evaluation Board |
| WG0P47040SP-LVEV | WG0P47040SP-LV Evaluation Board |

# WG0P47040SF-LV

400MHz - 470MHz 40W GaN Amplifier

## Absolute Maximum Ratings

| Parameter | Symbol | Value / Range |
|---|---|---|
| Drain Source Voltage | $V_{DS}$ | 55 V |
| Gate Source Voltage | $V_{GS}$ | -10 to +2 V |
| Maximum Forward Gate Current | $I_{GMAX}$ | 0.6 mA |
| Absolute Maximum Channel Temperature | $T_{CH}$ | +250 ℃ |
| Storage Temperature | $T_{STG}$ | -65 ℃ to +150 ℃ |
| Mounting Temperature | | 245 ℃ / 30 sec |

1) Case temperature $T_C$ =25 ℃
2) Wavice does not recommend sustained operation above maximum operating conditions.
3) Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability.

## Recommended Operating Conditions

| Parameter | Symbol | Value / Range |
|---|---|---|
| Drain Source Voltage | $V_{DS}$ | 28 V |
| Drain Current | $I_{DQ}$ | 250 mA |
| Gate Source Voltage (Typical) | $V_{GS}$ | -2.5 V |
| Case Operating Temperature | | ~40 ℃ to +85 ℃ |

1) Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.
2) Proper ESD(electrostatic discharge) control techniques should be used when handling these devices.

## Thermal Characteristics

| Parameter | Symbol | Units | Value | Test Conditions |
|---|---|---|---|---|
| Thermal Resistance using Infrared Measurement of Die Surface Temperature | $R_{\theta}$(IR) | ℃/W | 9.54 | Tbase = 85°C, $V_D$ =28V, $I_{DQ}$ = 250mA, Freq = 400MHz - 470MHz |
| Peak IR Surface Temperature | $T_{CH}$ | ℃ | 142 | |

1) Thermal resistance determined to the case temperature (85 ℃)
2) Channel temperature indicated is an IR scan equivalent temperature, Thermal resistance is calculated using this value.

# WG0P47040SF-LV

400MHz - 470MHz 40W GaN Amplifier

## Electrical Specifications

| Parameter | Units | Min | Typ | Max |
|---|---|---|---|---|
| Saturated Output Power [1)] | dBm | | 46 | |
| Drain Efficiency | % | | 50 | |
| Power Gain @Psat | dB | | 18 | |
| Small Signal Gain | dB | | 21 | |
| Input Return Loss | dB | | -5 | |

Test conditions, unless otherwise noted :
- TA = 25 °C, $V_D$ = 28V, $I_{DQ}$ = 250mA, $V_G$ = -2.5V(Typ.)
- Test Frequency : 400MHz - 470MHz
- Measured in WG0P47040SF-LV Evaluation Board

1) Characterized at Pulse duty 10%, Pulse width 100uS

| Parameter | Units | Min | Typ | Max | Test Conditions |
|---|---|---|---|---|---|
| Gate Threshold Voltage | V | -3.8 | -2.7 | -2.0 | $V_{DS}$= 10V, $I_D$= 14 mA |
| Drain-Source Breakdown Voltage | V | 120 | | | $V_{GS}$= -8V, $I_D$= 14 mA |
| Drain Current($I_{DMAX}$)[1)] | A | 11.9 | 13.4 | | $V_{DS}$= 10V, $V_{GS}$= 2.0V |
| Gate Forward Voltage | V | | 2 | | $I_{GS}$= 14 mA |

Test conditions, unless otherwise noted :

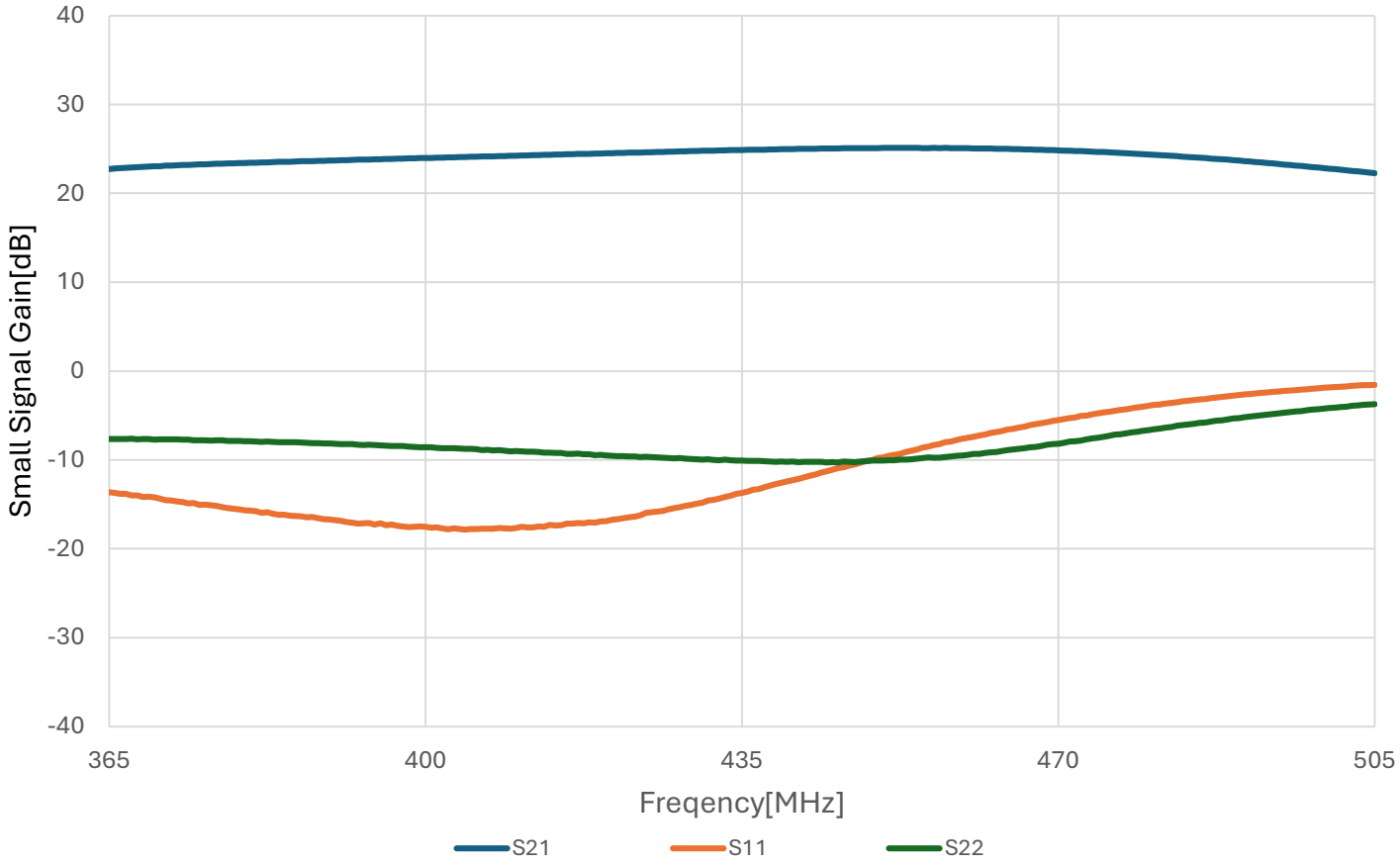
1) Scaled from PCM unit cell

# WG0P47040SF-LV

## 400MHz - 470MHz 40W GaN Amplifier

## Performance Plots | S-Parameter

Test conditions, unless otherwise noted: T = +25 °C, $V_D$ = 28 V, $I_{DQ}$ = 250 mA

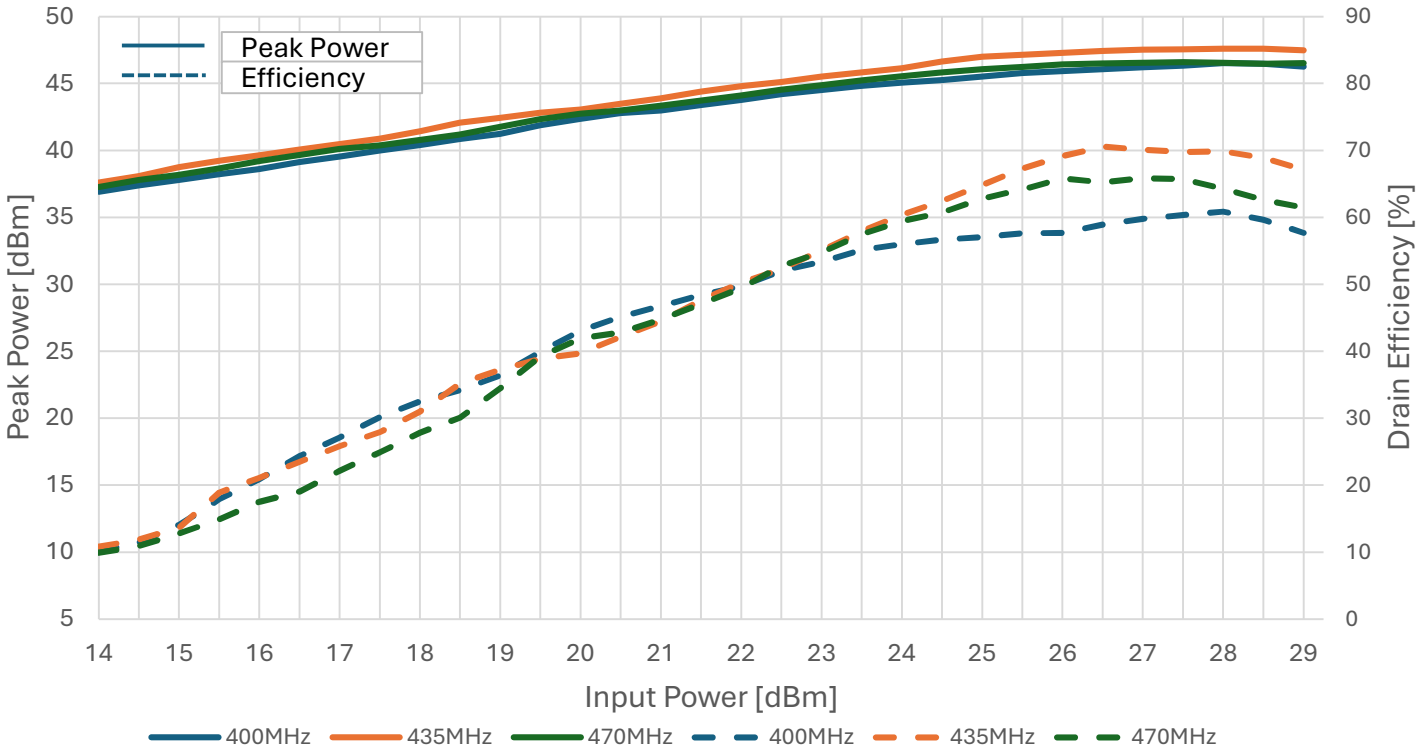


# WG0P47040SF-LV

400MHz - 470MHz 40W GaN Amplifier

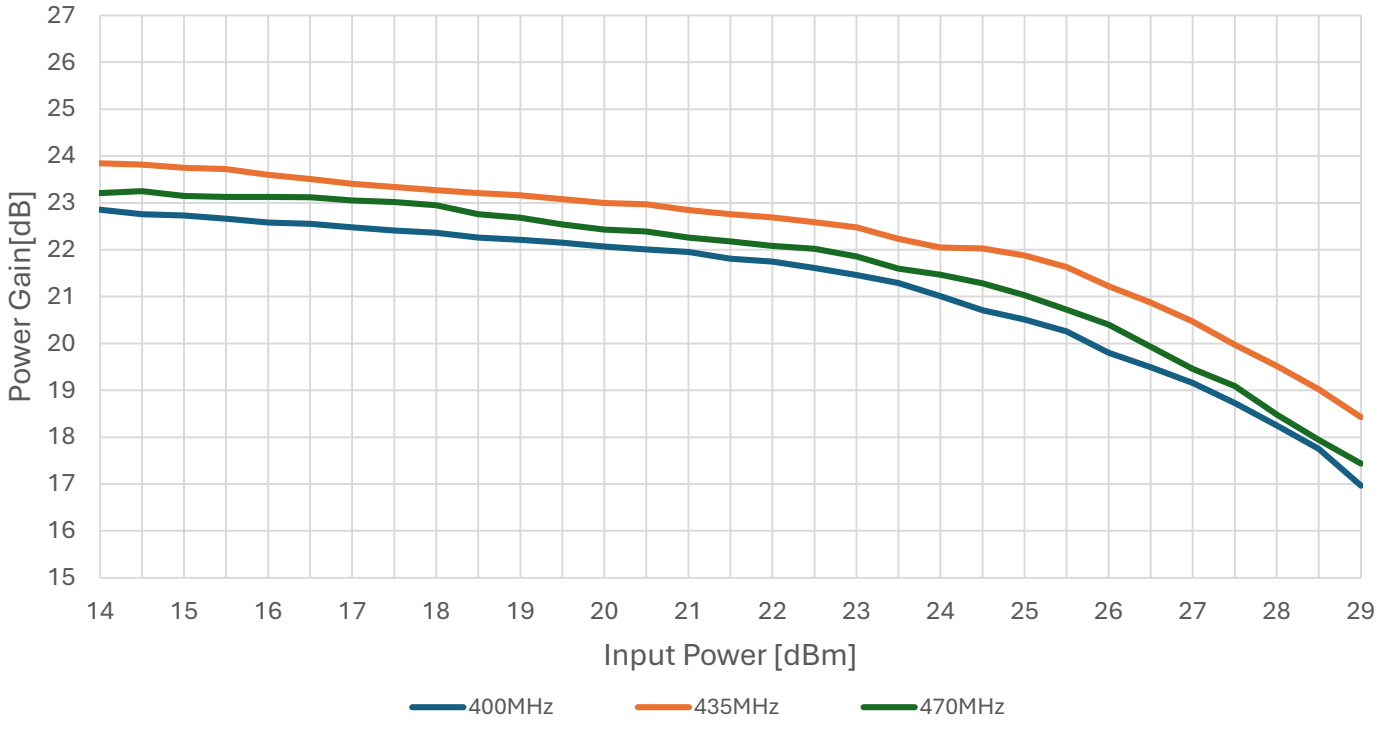
## Performance Plots | Peak Power / DE vs Input Power

Test conditions, unless otherwise noted: T = +25 °C, $V_D$ = 28 V, Characterized at Pulse duty 10%, Pulse width 100uS




## Performance Plots | Power Gain vs Input Power

Test conditions, unless otherwise noted: T = +25 °C, $V_D$ = 28 V, Characterized at Pulse duty 10%, Pulse width 100uS



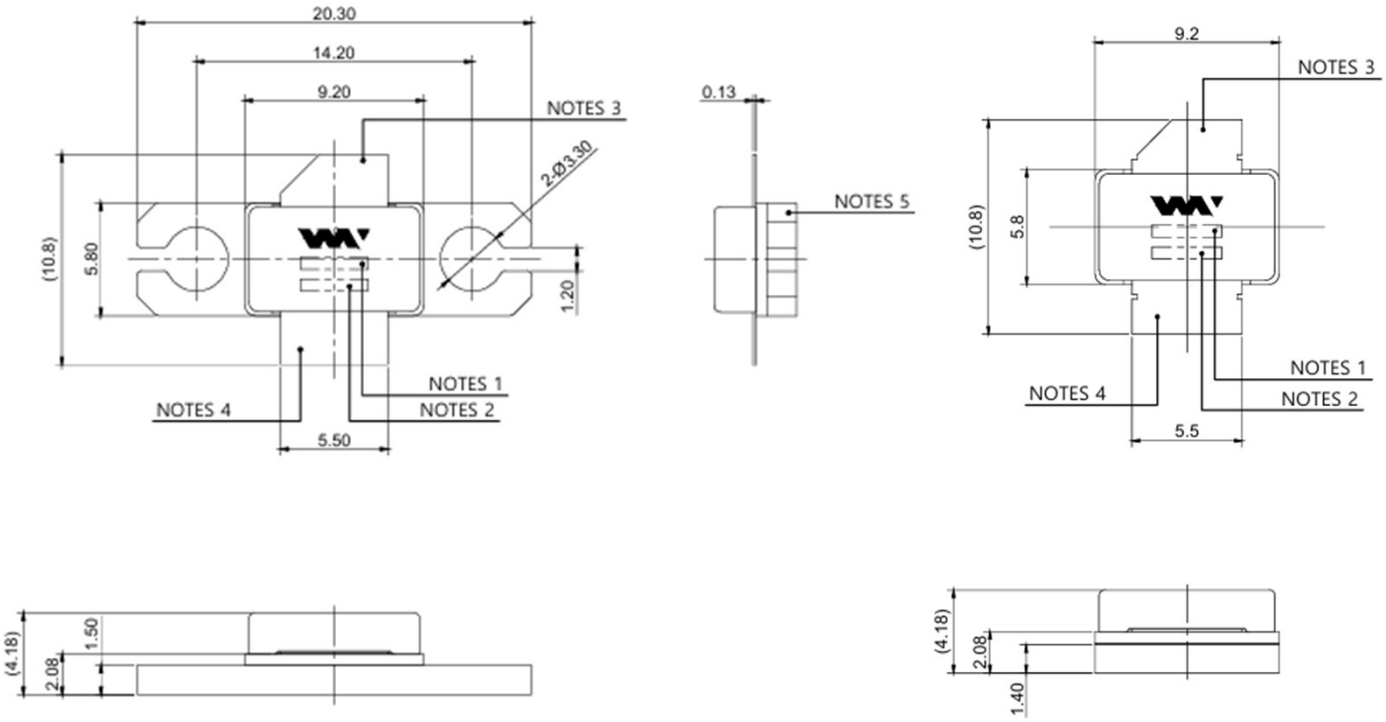
# WG0P47040SF-LV

400MHz - 470MHz 40W GaN Amplifier

## Package Dimensions

Notes:

1. All dimensions are in millimeters.
2. Dimension tolerances are ±0.20 mm for single-decimal dimensions (X.X) and ±0.15 mm for double-decimal dimensions (X.XX), unless otherwise noted.




NOTES

1. Model Name
2. Lot No / Serial No
3. Vg / RF IN
4. Vd / RF out
5. GND

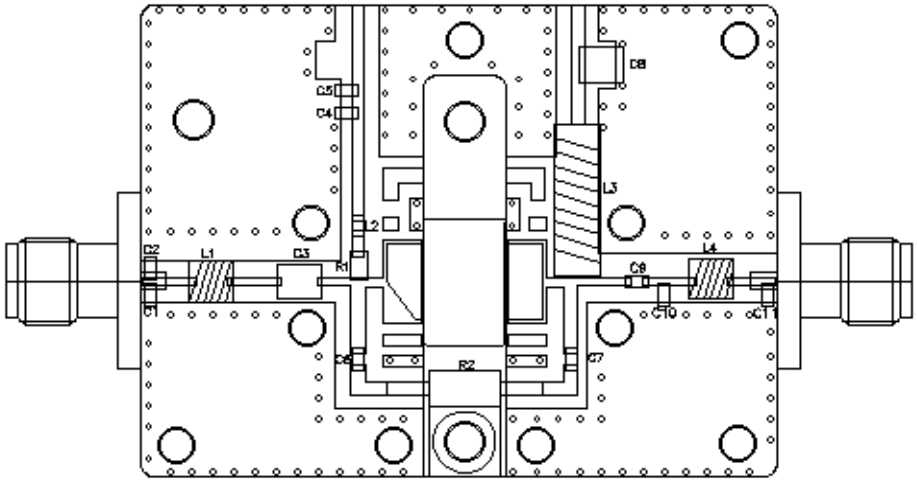
# WG0P47040SF-LV

400MHz - 470MHz 40W GaN Amplifier

## Evaluation Board

Notes:

1. Evaluation Board Size 45 X 34 [mm]




## Bill of Materials

| Reference Designator | Value | Description |
|---|---|---|
| C1 | 12pF | 201 HQ CAP, 200V |
| C2 | 4.7pF | 201 HQ CAP, 200V |
| C3 | 1000pF | 501 HQ CAP, 200V |
| C4 | 1nF | 0603 Chip CAP, 50V |
| C5 | 1uF | 0603 Chip CAP, 50V |
| C6 | 82pF | 201 HQ CAP, 200V |
| C7 | 82pF | 201 HQ CAP, 200V |
| C8 | 1uF | MLCC CAP, 10uF, 100V |
| C9 | 82pF | 201 HQ CAP, 200V |
| C10 | 10pF | 201 HQ CAP, 200V |
| C11 | 15pF | 201 HQ CAP, 200V |
| R1 | 47 Ohm | 0603 Chip Res, ±5% |
| R2 | 200 Ohm | 200 Ohm [IPP-RB201-200] |
| L1 | 5nH | 5uH A02T_L |
| L2 | 1uH | 0603 Chip |
| L3 | 3.3uH | 3.3uH, 4310LC-352KEB |
| L4 | 5nH | 5uH A02T_L |
| U1 | 40W | WG0P47040SP-LV |
| PCB Information | RO4350B, 20mil, 1oz | |

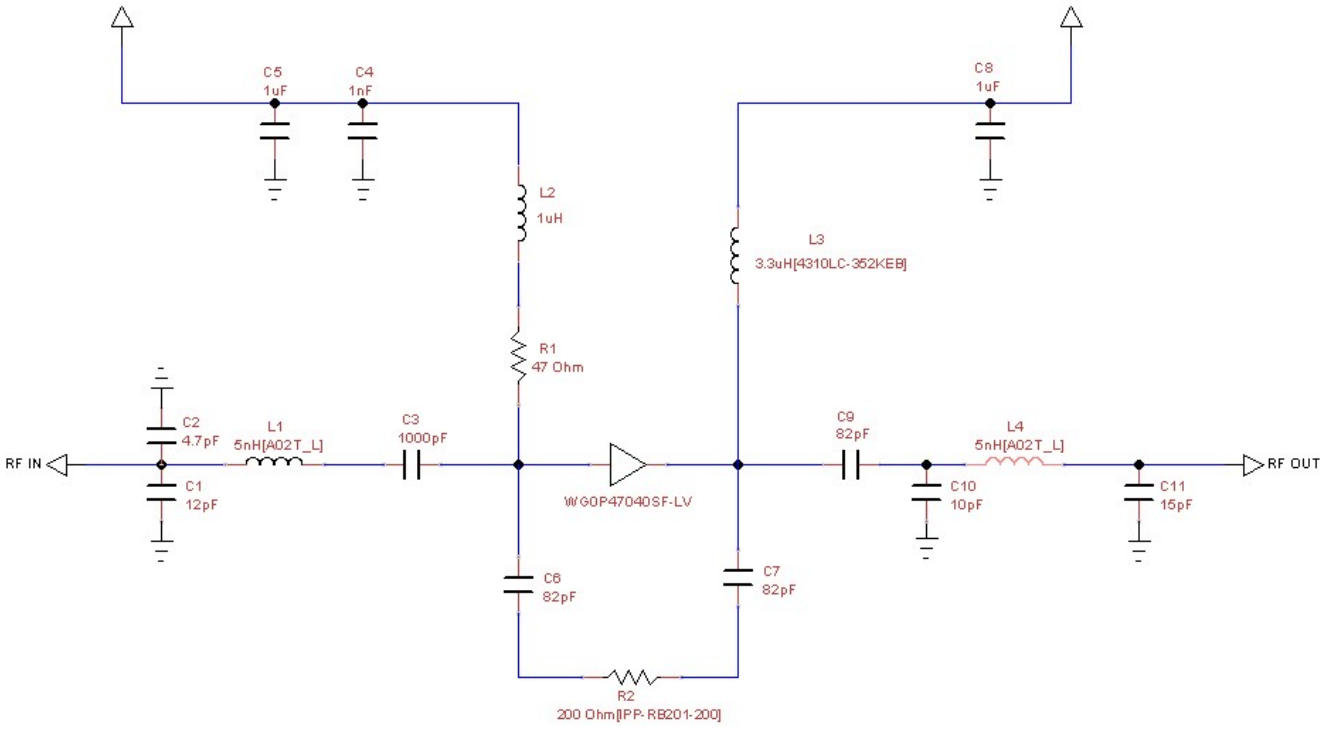
# WG0P47040SF-LV

400MHz - 470MHz 40W GaN Amplifier

## Applications Information

Notes:

1. Evaluation Board Schematic




## Bias-Up & Down Procedure

| Procedure | Description |
|---|---|
| **Bias-Up** | 1. Set $I_D$ limit to 5000 mA, $I_G$ limit to 20 mA |
| | 2. Set $V_G$ to −4.0 V |
| | 3. Set $V_D$ +28 V |
| | 4. Adjust $V_G$ more positive until $I_{DQ}$ |
| | 5. Apply RF signal |
| | |
| **Bias-Down** | 1. Turn off RF signal |
| | 2. Reduce $V_G$ to −4.0 V. Ensure $I_{DQ}$ ~ 0 mA |
| | 3. Set $V_D$ to 0 |
| | 4. Turn off $V_D$ supply |
| | 5. Turn off $V_G$ supply |
| | |

# WG0P47040SF-LV

400MHz - 470MHz 40W GaN Amplifier

## Handling Precautions

| Parameter | Class | Test Methodology |
|---|---|---|
| ESD – Human Body Model (HBM) | Class 1B | JEDEC JESD22 A114-D |
| ESD – Charged Device Model (CDM) | Class IV | JEDEC JESD22 C101-C |
| MSL – Moisture Sensitivity Level | N/A | IPC/JEDEC Standard J-STD-020 |

## Solderability

The component leads should be manually soldered, and the package cannot be subjected to conventional reflow processes. The use of no-clean solder to avoid washing after soldering is recommended.

## Contact Information


- Web : www.wavice.com
- Tel : +82-31-260-8600
- Email : sales@wavice.com


## Notes & Disclaimer

Specifications are subject to change without notice. Wavice Inc. believes the information contained within this data sheet to be accurate and reliable. However, no responsibility is assumed by Wavice for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Wavice. Wavice makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose.
“Typical” parameters are the average values expected by Wavice in large quantities and are provided for information purposes only. These values can and do vary in different applications and actual performance can vary over time. Customers should obtain and verify the latest relevant information before placing orders for Wavice products. All operating parameters should be validated by customer’s technical experts for each application.
Wavice products are not designed, intended or authorized for use as critical components in life-saving, or life-sustaining applications or other applications in which the failure of Wavice product could result in severe personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility.

Copyright © 2017- 2024 Wavice Inc. All rights reserved. The information in this document is subject to change without notice.