

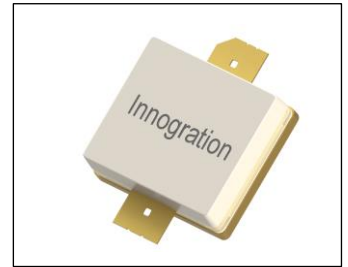


GaN 50V, 150W, 2.45GHz RF Power Transistor

Description

The STBV25150A2C is a single ended 150 watt capable, GaN HEMT, ideal for ISM applications at 2.45GHz. It can be used in CW, Pulse and any other modulation modes. There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.

- Typical RF performance at selected 2.4-2.5GHz applications with device soldered on heatsink
 $V_{DD} = 50V_{dc}$, $V_{gs} = -4.5V$



Pulse CW: Pulse width=20us, duty cycle=20%

| Freq (MHz) | P1dB (dBm) | P1dB (W) | P1dB Eff(%) | P1dB Gain(dB) | P3dB (dBm) | P3dB (W) | P3dB Eff(%) |
|------------|------------|----------|-------------|---------------|------------|----------|-------------|
| 2400 | 52.46 | 176.3 | 72.1 | 15.99 | 53.08 | 203.5 | 75.0 |
| 2450 | 52.01 | 159.0 | 74.9 | 16.41 | 52.59 | 181.5 | 77.4 |
| 2500 | 51.28 | 134.2 | 75.9 | 16.46 | 51.91 | 155.3 | 78.5 |

CW:

| Freq (MHz) | P1dB (dBm) | P1dB (W) | P1dB Eff(%) | P1dB Gain(dB) | P3dB (dBm) | P3dB (W) | P3dB Eff(%) |
|------------|------------|----------|-------------|---------------|------------|----------|-------------|
| 2400 | 52.39 | 173.2 | 70.3 | 15.4 | 52.87 | 193.6 | 72.3 |
| 2450 | 51.86 | 153.4 | 72.4 | 15.89 | 52.4 | 173.7 | 74.6 |
| 2500 | 51.21 | 132.3 | 74.3 | 15.99 | 51.81 | 151.8 | 76.7 |

Applications

- 2.45GHz RF Energy
- S band power amplifier

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

1. Set VGS to the pinch-off (VP) voltage, typically -5 V
2. Turn on VDS to nominal supply voltage
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

Turning the device OFF

1. Turn RF power off
2. Reduce VGS down to VP, typically -5 V
3. Reduce VDS down to 0 V
4. Turn off VGS

Table 1. Maximum Ratings

| Rating | Symbol | Value | Unit |
|--------------------------------|-----------|-------------|------|
| Drain--Source Voltage | V_{DSS} | +200 | Vdc |
| Gate--Source Voltage | V_{GS} | -8 to +0.5 | Vdc |
| Operating Voltage | V_{DD} | 55 | Vdc |
| Maximum gate current | I_{gs} | 21.6 | mA |
| Storage Temperature Range | T_{stg} | -65 to +150 | °C |
| Case Operating Temperature | T_C | +150 | °C |
| Operating Junction Temperature | T_J | +225 | °C |



Table 2. Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|-----------------|-------|---------------------------|
| Thermal Resistance, Junction to Case by FEA $T_c = 85^\circ\text{C}$, at $P_d = 55\text{W}$ | $R_{\theta JC}$ | 1.6 | $^\circ\text{C}/\text{W}$ |

Table 3. Electrical Characteristics (TA = 25°C unless otherwise noted)

DC Characteristics (Each path, measured on wafer prior to packaging)

| Characteristic | Conditions | Symbol | Min | Typ | Max | Unit |
|--------------------------------|--|--------------|-----|------|-----|------|
| Drain-Source Breakdown Voltage | $V_{GS} = -8\text{V}$; $I_{DS} = 21.6\text{mA}$ | V_{DSS} | | 200 | | V |
| Gate Threshold Voltage | $V_{DS} = 10\text{V}$, $I_D = 21.6\text{mA}$ | $V_{GS(th)}$ | -4 | - | -2 | V |
| Gate Quiescent Voltage | $V_{DS} = 48\text{V}$, $I_{DS} = 190\text{mA}$, Measured in Functional Test | $V_{GS(Q)}$ | | -3.0 | | V |

Ruggedness Characteristics

| Characteristic | Conditions | Symbol | Min | Typ | Max | Unit |
|--------------------------|--|--------|-----|------|-----|------|
| Load mismatch capability | 2.45GHz, $P_{out} = 150\text{W}$ pulse CW All phase, No device damages | VSWR | | 10:1 | | |

TYPICAL CHARACTERISTICS

Figure 1: Efficiency and power gain as function of P_{out}
($V_{DD} = 50\text{Vdc}$, $V_{GS} = -4.5\text{V}$, Pulse width=20us, duty cycle=10%)

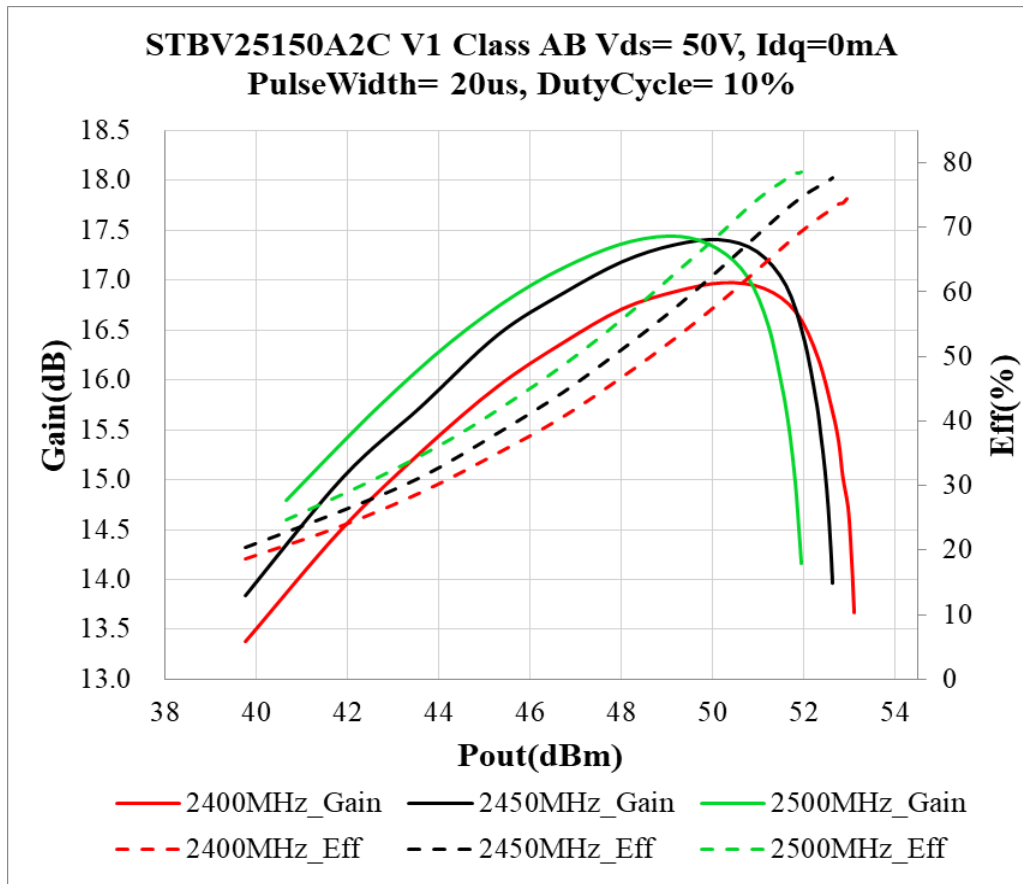


Figure 2: S11/S21 output from Network analyser

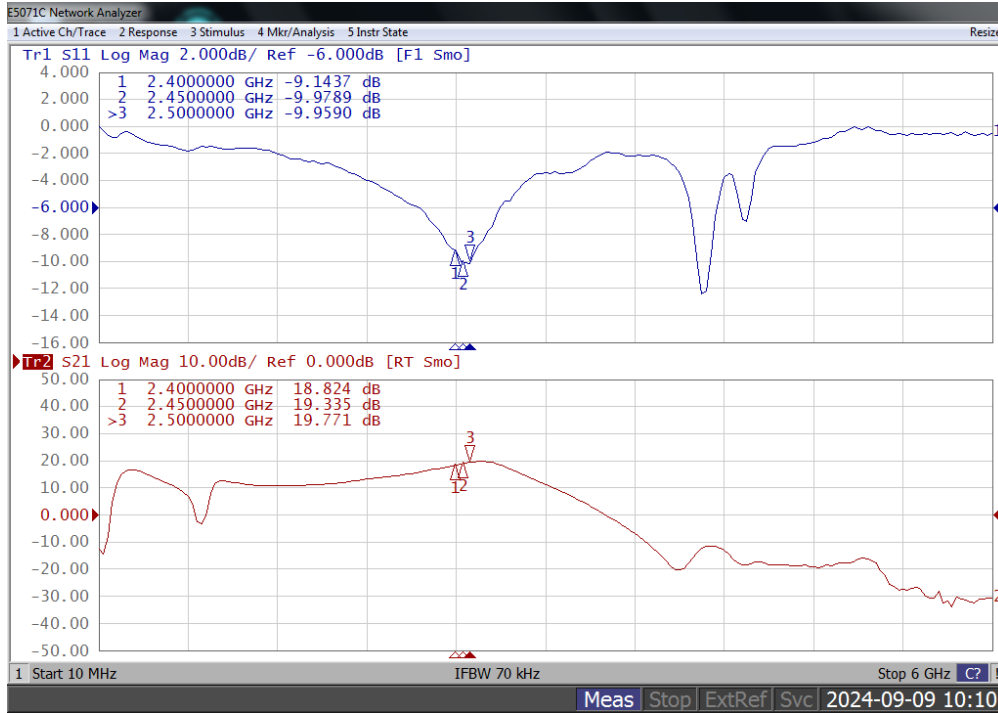
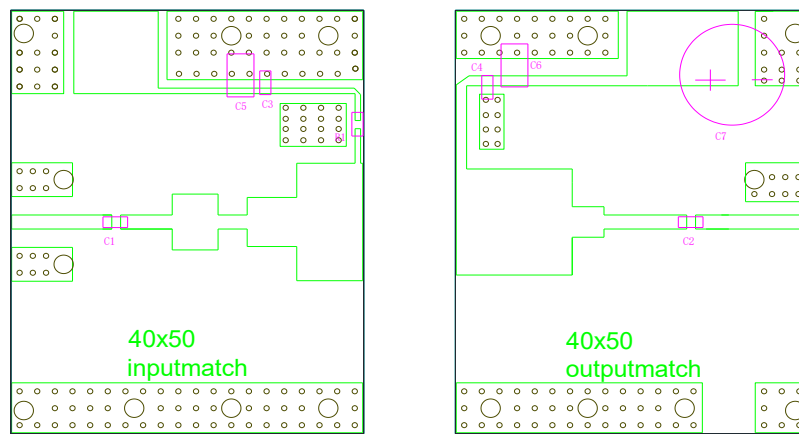


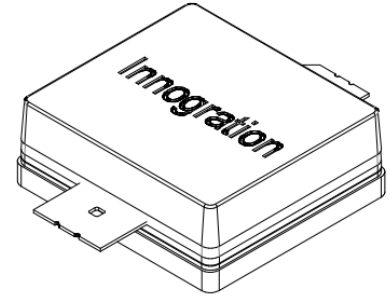
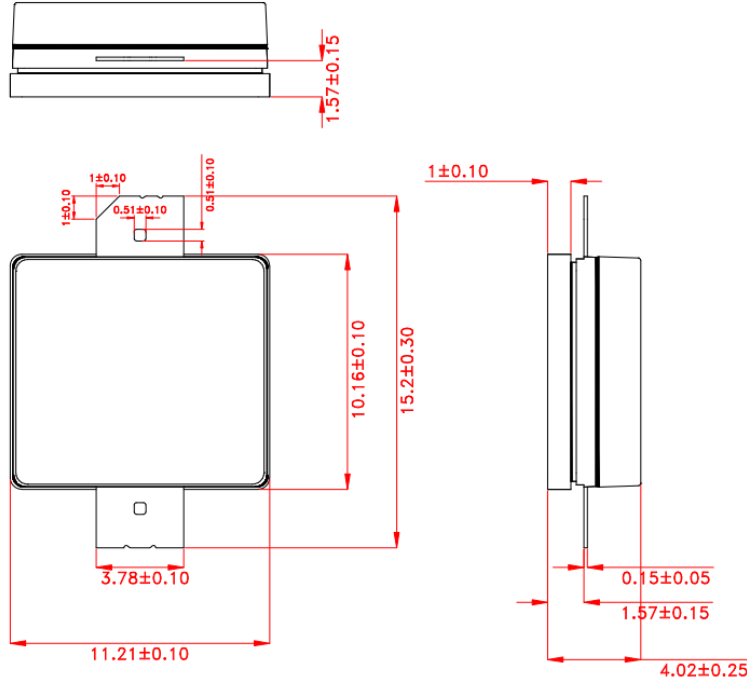
Figure 3: Reference design circuit (RO4350B 30mil, PCB DWG file upon request,)



| Designator | Comment | Footprint | Quantity |
|----------------|------------|--------------------|----------|
| C1, C2, C3, C4 | 12 pF | 0805/1210 (HIGH Q) | 4 |
| C5, C6 | 10 uF/100V | 1210 | 2 |
| C7 | 100 uF/63V | | 1 |
| R1 | 10 Ω | 0603 | 1 |



Package Dimensions (Unit:mm)



Unit:mm
Tolerance ± 0.10 mm, Except as Noted.

Revision history

Table 1. Document revision history

| Date | Revision | Datasheet Status |
|-----------|----------|---|
| 2024/9/10 | Rev 1.0 | Preliminary Datasheet |
| 2026/3/6 | Rev 1.1 | Modify the typo of board materials, thickness from 20mils to 30mils |

Application data based on LSM-24-28

Disclaimers

Specifications are subject to change without notice. Innegration believes the information contained within this data sheet to be accurate and reliable. However, no responsibility is assumed by Innegration 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 Innegration. Innegration makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose. "Typical" parameters are the average values expected by Innegration 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. All operating parameters should be validated by customer's technical experts for each application. Innegration products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Innegration product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility. For any concerns or questions related to terms or conditions, pls check with Innegration and authorized distributors

Copyright © by Innegration (Suzhou) Co.,Ltd.