Gallium Nitride 50V, 220W, RF Power Transistor

STBV15220AY2

Description

The STBV15220AY2 is a single ended 220-watt, unmatched GaN HEMT, designed for multiple applications with frequencies up to 1.5GHz, mainly for RF energy application at ISM band like 915MHz and 1300MHz etc.

The performance is guaranteed for applications operating in the mentioned frequencies There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.

- Typical Performance at 1300 and 915MHz (On Innogration fixture with device soldered):

V_{DD} = 50 Volts, I_{DQ} = 145 mA, CW.

FREQ (MHZ)	P1dB(dBm)	P1dB(W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB(dBm)	P3dB(W)	P3dB Eff(%)
1300	52.14	163.7	68.5	20.18	53.7	237	79
915	53	199.5	69.7	22.57	54.2	260	80

Applications and Features

- Suitable for 1.3GHz/915MHz ISM application
- Suitable for L band radar and avionics application
- Suitable for wideband power amplifier
- High Efficiency and Linear Gain Operations
- Thermally Enhanced Industry Standard Package
- High Reliability Metallization Process
- Excellent thermal Stability and Excellent Ruggedness
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

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}	-10 to +0.5	Vdc
Operating Voltage	V_{DD}	33.6	Vdc
Storage Temperature Range	Tstg	-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

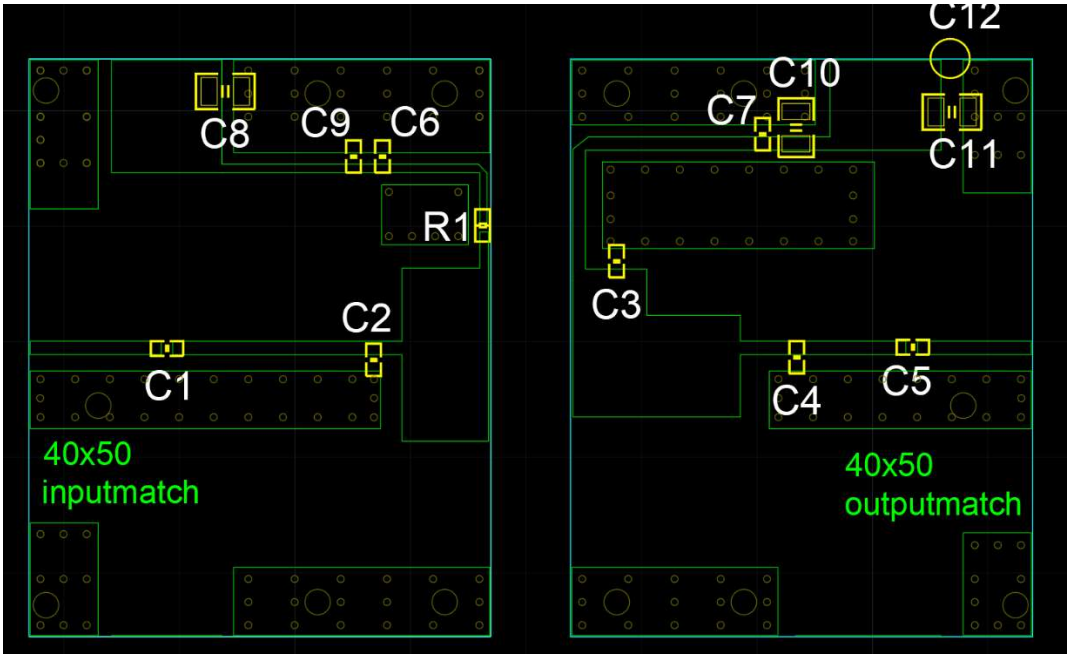
Thermal Resistance, Junction to Case T_C= 85°C, Power dissipation 70W	$R_{\theta JC}$	0.8	°C /W

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

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=33.6mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 33.6 mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =50V, IDS=145mA, Measured in Functional Test	$V_{GS(Q)}$		-3.31		V

1300MHz
Reference Circuit of Test Fixture Assembly Diagram
PCB RO4350B 20mils



Component	Value	Quantity
U1	STBV15220AY2	1
C1	8.2pF	1
C5、C6、C7	20pF	3
C2、C4	5.6pF	2
C3	3.3pF	1
C9	1nF	1
C8、C10、C11	10uF/63V	3
R1	10Ω	1
C12	470uF/63V	1

TYPICAL CHARACTERISTICS

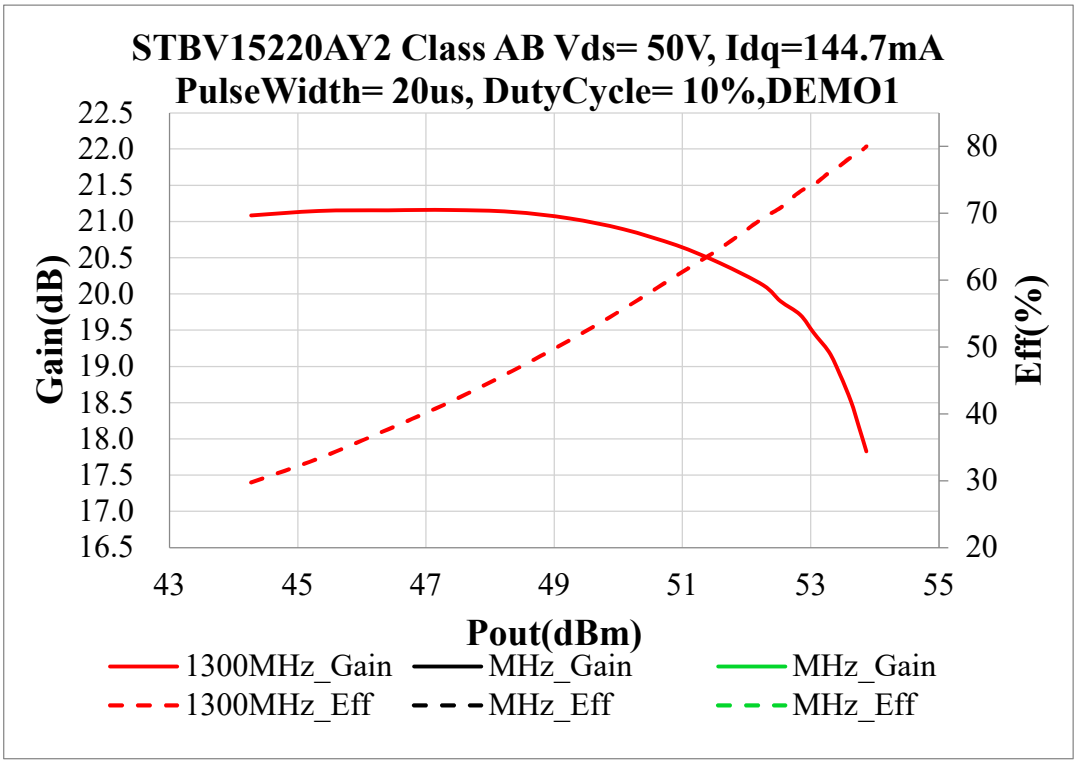


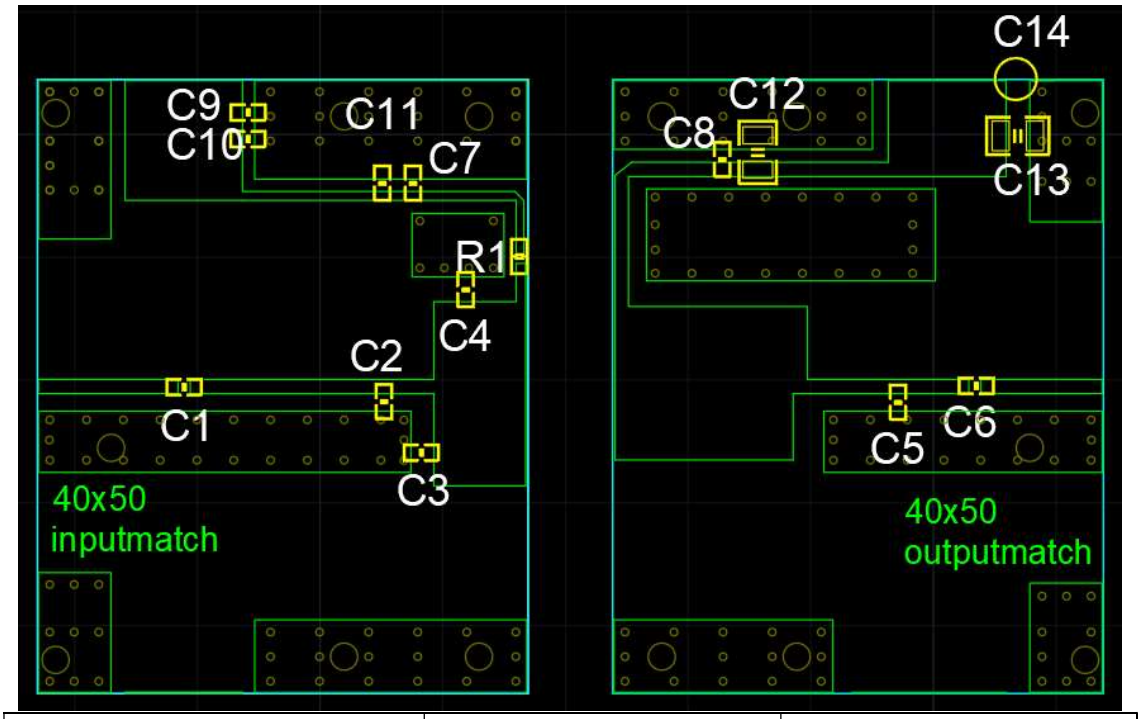
Figure 1. Power gain and drain efficiency as function of CW output power

Figure 2. Network analyzer output, S11/S21

915MHz

Reference Circuit of Test Fixture Assembly Diagram

PCB RO4350B 20mils



Component	Value	Quantity
U1	STBV15220AY2	1
C1、C6、C7、C8	33pF	4
C3、C4	3.3pF	2
C2	15pF	1
C5	8.2pF	1
C9	10nF	1
C10、C11	1nF	2
C12、C13	10uF/63V	2
R1	10Ω	1

TYPICAL CHARACTERISTICS

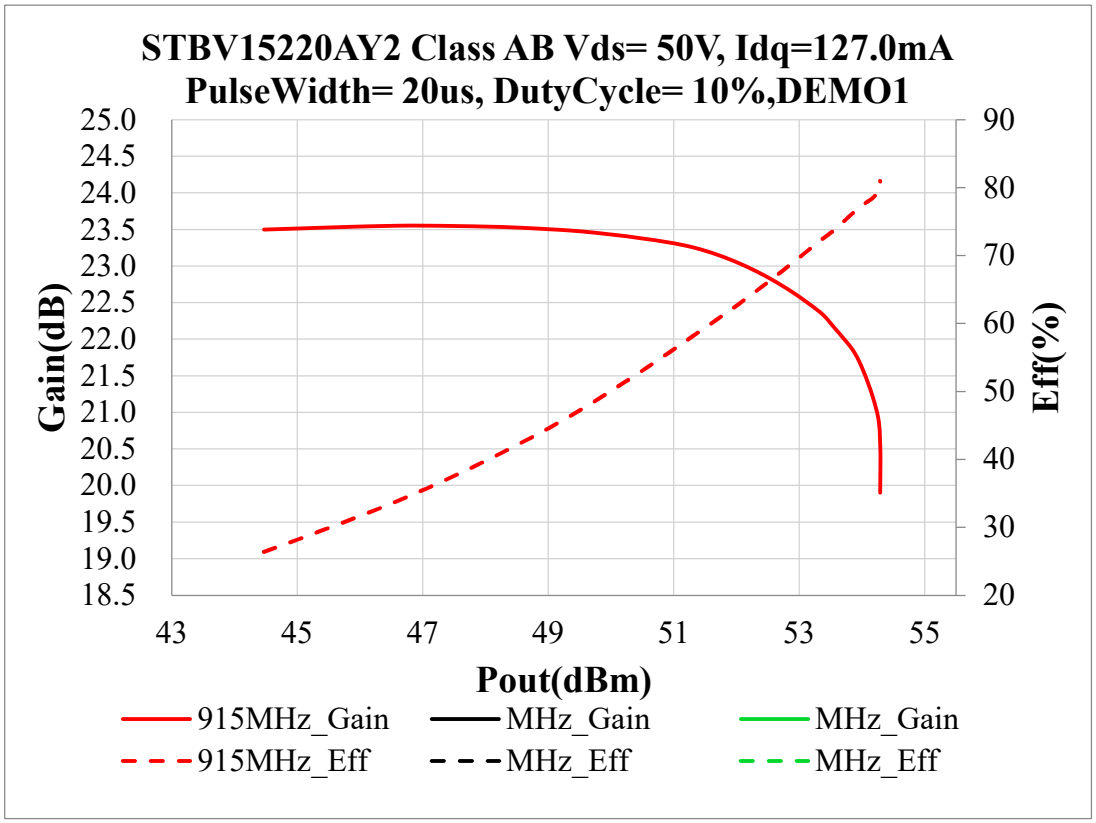
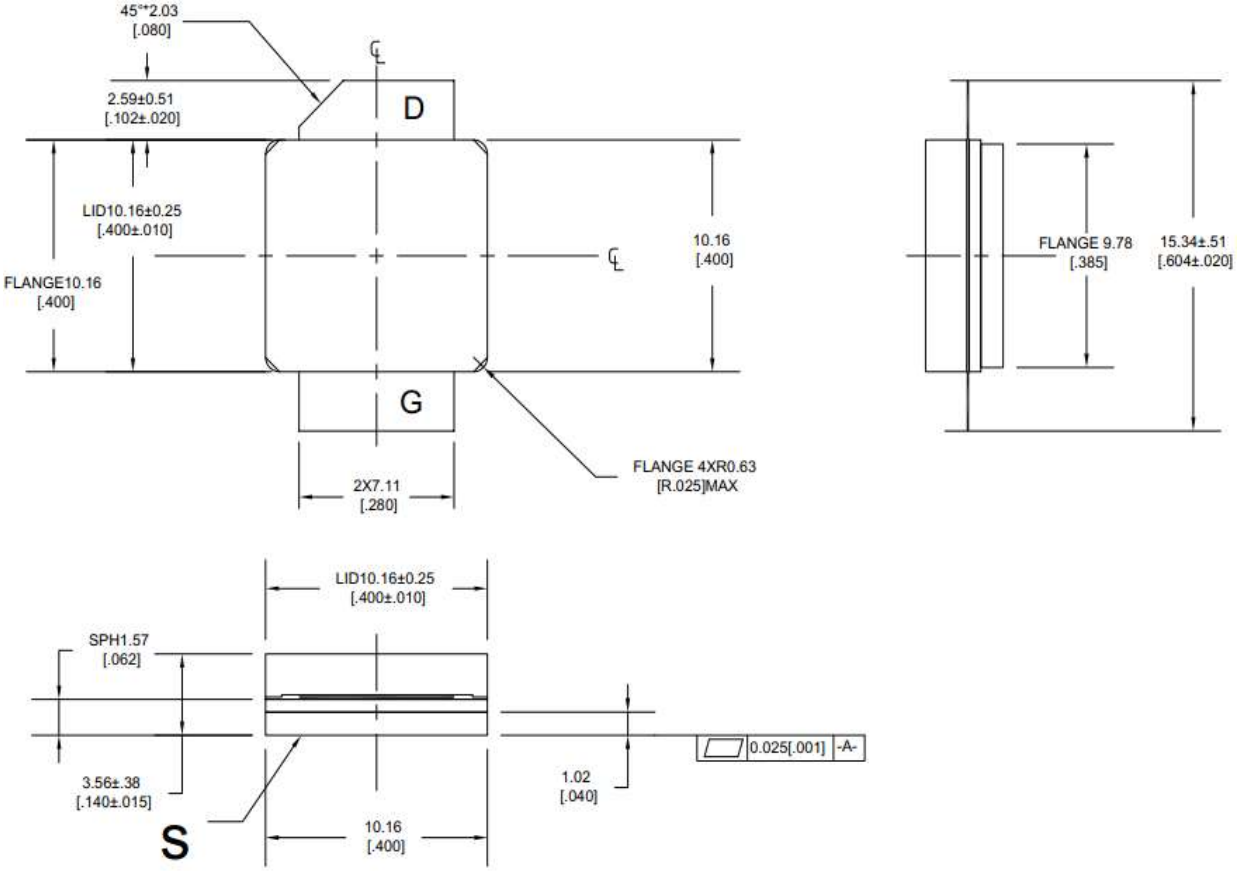


Figure 3. Power gain and drain efficiency as function of CW output power

Figure 4. Network analyzer output, S11/S21

Package Outline

Earless Flanged Ceramic Package; 2 leads



Unit: mm [inch]

Tolerance .xx +/- 0.01 .xxx +/- 0.005 inches

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2024/5/11	**V1.0**	**Preliminary Datasheet Creation**

Application data based on ZYX-24-38/39

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