

# S3U1045V GaN TRANSISTOR

Document Number: S3U1045V  
Preliminary Datasheet V1.0

## Gallium Nitride 50V 450W, RF Power Transistor

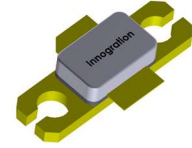
### Description

The S3U1045V is a 450W single ended GaN HEMT, designed for multiple applications with frequencies up to 1.0GHz. **It offers much smaller and simpler matching circuit than traditional push-pull matching circuit ,as key benefit to customers.**

**It is recommended to use this part for pulsed CW application only.**

There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.

**S3U1045V**



•Typical performance (on Innogen narrow band production fixture with device soldered)

S3U1045V, Vds=50V, Idq=130mA ,Vgs=-3.22V 100us/10%						
F(MHz)	Pin (dBm)	Psat (dBm)	Psat (W)	I(A)	Gain (dB)	Eff(%)
400.0	35	57.2	519	1.7	22.2	60
420.0	33.5	57.5	562	1.8	24	60
440.0	34	57.4	550	1.8	23.4	60
460.0	34	57.5	571	1.8	23.5	62
480.0	33.5	57.1	519	1.6	23.6	62
500.0	35	56.4	437	1.4	21.4	60

### Applications and Features

- Suitable for wireless communication infrastructure, wideband amplifier, EMC testing, ISM etc.
- 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 (50V)
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 <sub>DSS</sub>	+150	Vdc
Gate--Source Voltage	V <sub>GS</sub>	-8 to 0	Vdc
Operating Voltage	V <sub>DD</sub>	0 to 55	Vdc
Maximum forward gate current	I <sub>gf</sub>	54	mA
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	C
Case Operating Temperature	T <sub>C</sub>	-55 to +150	C

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Operating Junction Temperature	$T_J$	+225	C
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**Table 2. Thermal Characteristics**

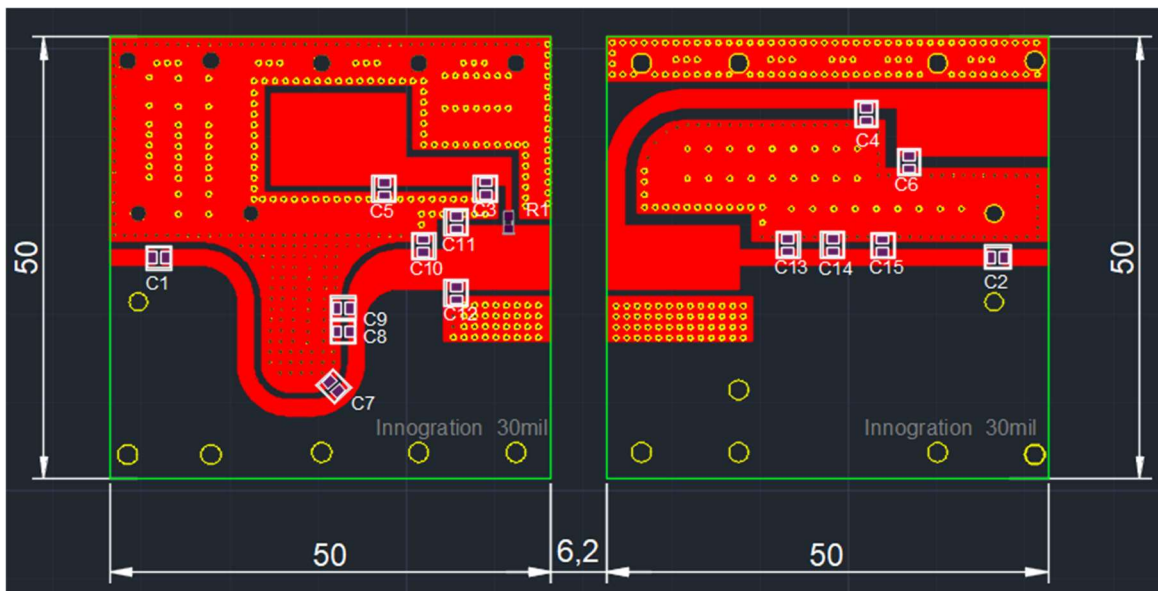
Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case $T_C = 85^\circ\text{C}$ , DC Power Dissipation, FEA	$R_{\theta JC}$	0.7	C/W

**Table 3. Electrical Characteristics** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

**DC Characteristics**

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}$ ; $I_{DS} = 54\text{mA}$	$V_{DSS}$		150		V
Gate Threshold Voltage	$V_{DS} = 50\text{V}$ , $I_D = 54\text{mA}$	$V_{GS(th)}$		-3.4		V
Gate Quiescent Voltage	$V_{DS} = 50\text{V}$ , $I_{DS} = 100\text{mA}$ , Measured in Functional Test	$V_{GS(Q)}$		-3.2		V

## Reference Circuit of Test Fixture Assembly Diagram



**Figure 1. Test Circuit Component Layout (400-500MHz) RO4350B 30mils**

**Table 4. Test Circuit Component Designations and Values**

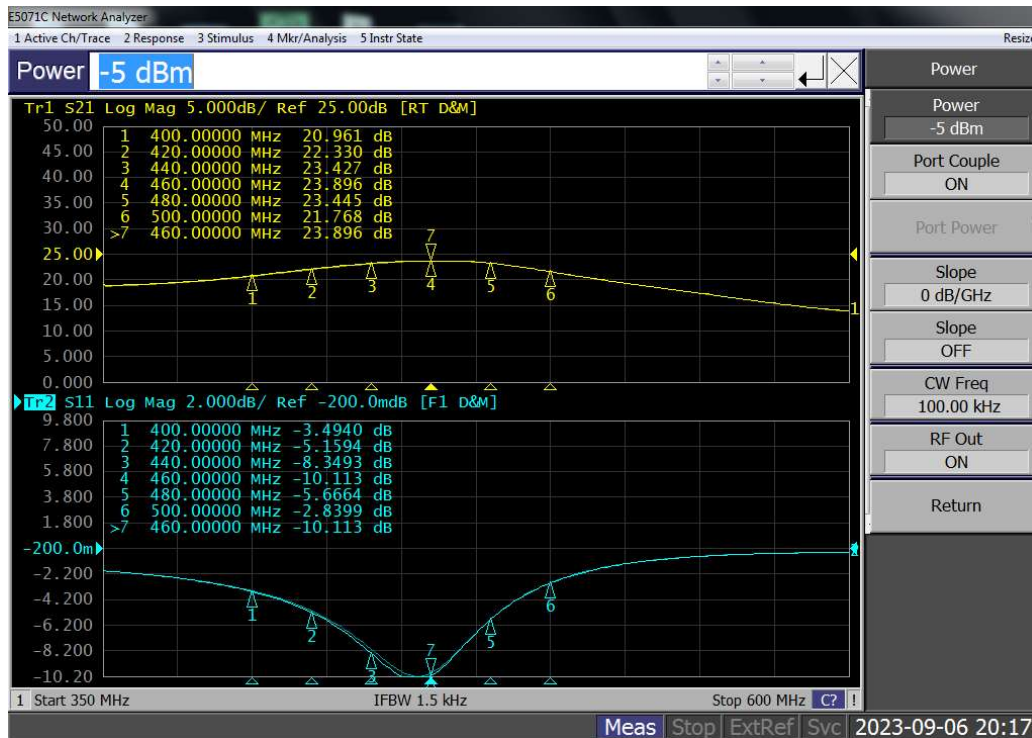
Component	Description	Suggested Manufacturer
C1,C2	82pF MQ101111	
C3,C4	1000pF MQ101111	
C7,C8	6.2pF MQ101111	
C8,C11,C12,C13	22pF MQ101111	
C10,C14	9.1pF MQ101111	
C15	2.7pF MQ101111	
C5,C6	10UF 1210	
R1	10 $\Omega$ 0603	

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PCB	30mil Rogers4350B
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Figure 2. Network Analyzer result S11 and S21  $V_{gs} = -3.1V$ ,  $V_{DS} = 50V$ ,  $I_{DQ} = 400mA$



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Preliminary Datasheet V1.0

## Package Outline

Flanged ceramic package; 2 leads

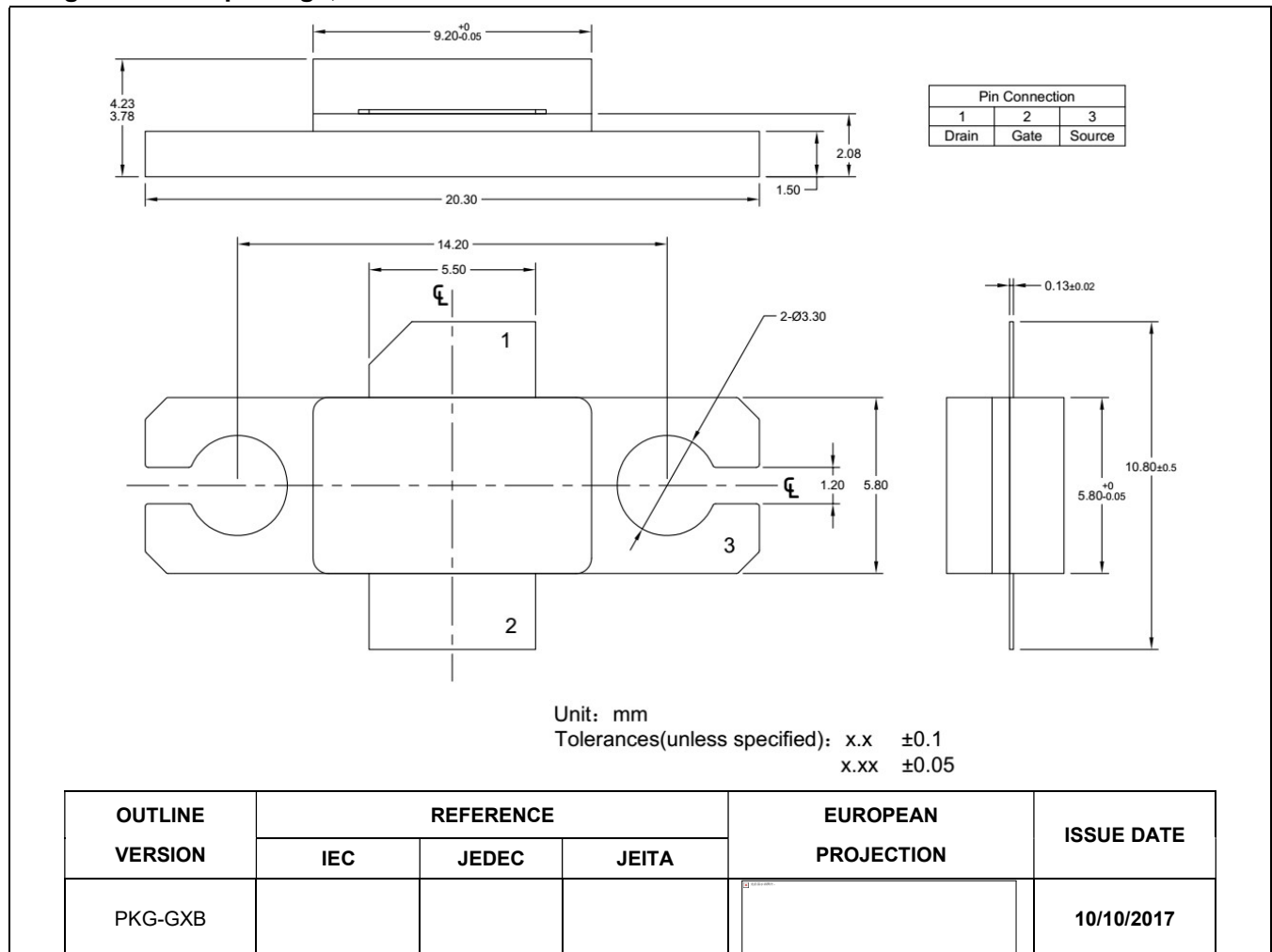


Figure 1. Package Outline PKG-G2E

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Preliminary Datasheet V1.0

## Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2023/9/7	V1.0	Preliminary Datasheet

Application data based on SYX-23-43

## Notice

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