

# S3C111K2VS GaN TRANSISTOR

Document Number: S3C111K2VS  
Preliminary Datasheet V1.0

## 1030-1090MHz, 1200W, GaN RF Power Transistor

### Description

The S3C111K2VS is a 1200-watt, high performance, internally matched GaN RF Power transistor, designed for multiple applications with frequencies from 1030-1090MHz.

It is featured for high power and high ruggedness, suitable for Industrial, Scientific and Medical application, as well as Avionics application, within L band

**Supported by high breakdown voltage, it is also usable at higher voltage up to 55V, with higher output power.**

•Typical **Pulsed CW** Performance (On Innogration fixture with device soldered):

$V_{DD} = 50$  Volts,  $I_{DQ} = 150$ mA, Pulse CW, Pulse width=20us, Duty cycle=10%.

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
1060	60.74	1185.9	71.8	20.68	61.12	1295.1	73.6

S3C111K2VS



### Applications and Features

- Suitable for L band pulse amplifier, 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	$V_{DSS}$	+200	Vdc
Gate--Source Voltage	$V_{GS}$	-8 to 0	Vdc
Operating Voltage	$V_{DD}$	0 to 55	Vdc
Maximum forward gate current	$I_{gf}$	141	mA
Storage Temperature Range	$T_{stg}$	-65 to +150	C
Case Operating Temperature	$T_c$	-55 to +150	C
Operating Junction Temperature	$T_j$	+225	C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case 85 °C Case backside Temperature Pout = 1200 W, Pulse: 20 us PW, 10% DC	$R_{\theta JC}$	0.2	C/W

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

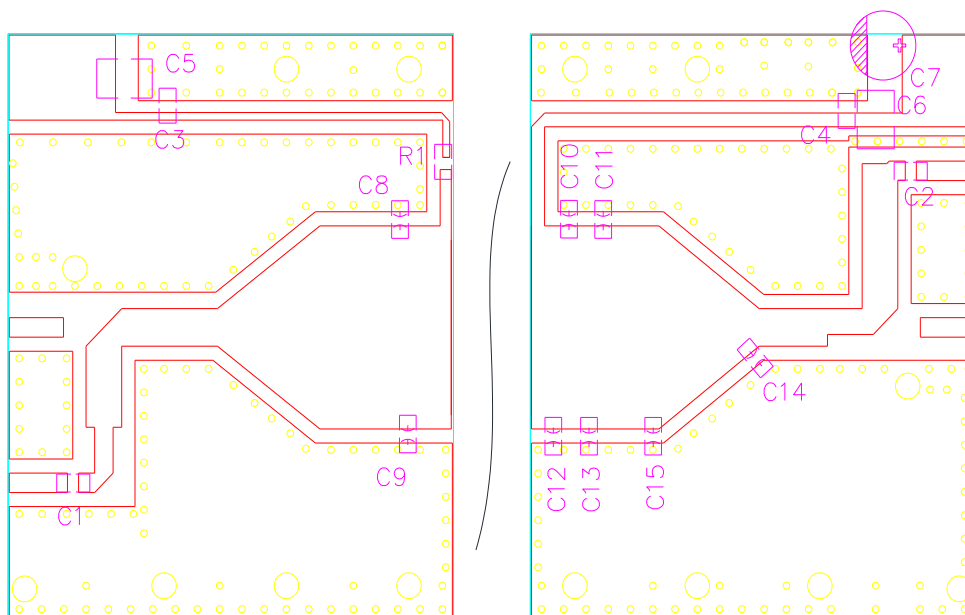
## DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}; I_{DS} = 141\text{mA}$	$V_{DSS}$		200		V
Gate Threshold Voltage	$V_{DS} = 50\text{V}, I_D = 141\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS} = 50\text{V}, I_{DS} = 150\text{mA}$ , Measured in Functional Test	$V_{GS(Q)}$		-3.3		V

**Functional Tests (In Innogration broadband Test Fixture, 50 ohm system) :**  $V_{DD} = 50\text{ Vdc}$ ,  $I_{DQ} = 150\text{ mA}$ ,  $f = 1060\text{ MHz}$ , Pulse CW

Characteristic	Symbol	Min	Typ	Max	Unit
Power Gain @ P3dB	Gp		17		dB
Drain Efficiency@P3dB <sub>t</sub>	Eff		70		%
3dB Compressed point	P3dB		1200		W
Input Return Loss	IRL		-7		dB
Mismatch stress at all phases(No device damage)	VSWR		10:1		Ψ

## Reference Circuit of Test Fixture Assembly Diagram



**Figure 1. Test Circuit Component Layout**

**Table 5. Test Circuit Component Designations and Values**

Designator	Comment	Footprint	Quantity
C1	2.7pF/250V	0603/0805	1
C2, C3, C4	43 pF/250V	0805	3
C5, C6	10uF/100V	1210	2
C7	100uF/63V		1
C8, C9, C10, C11, C12	8.2pF/250V	0603/0805	5
C13, C14	6.8pF/250V	0603/0805	2
C15	2.2pF/250V	0603/0805	1
R1	10 Ω	0603	1

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## TYPICAL CHARACTERISTICS

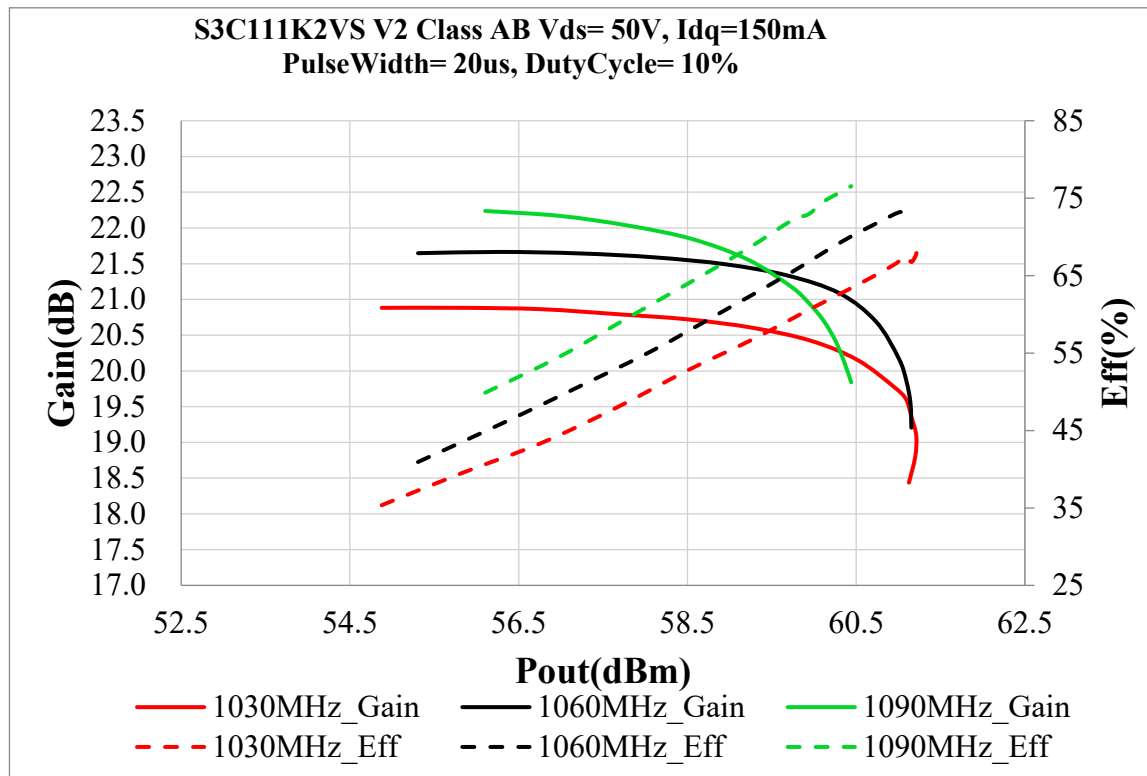


Figure 2. Power Gain and Drain Efficiency as Function of Pulse Output Power (1030-1090MHz)

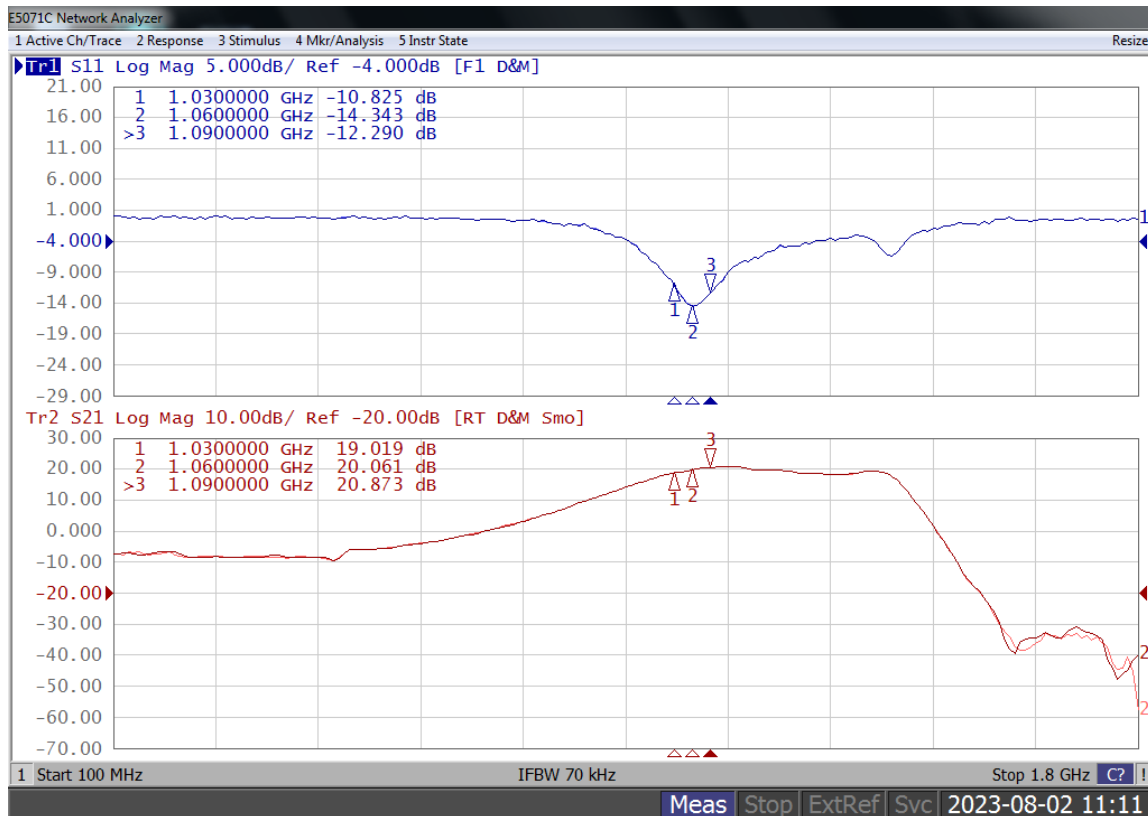


Figure 3. Network analyzer output S11/S21

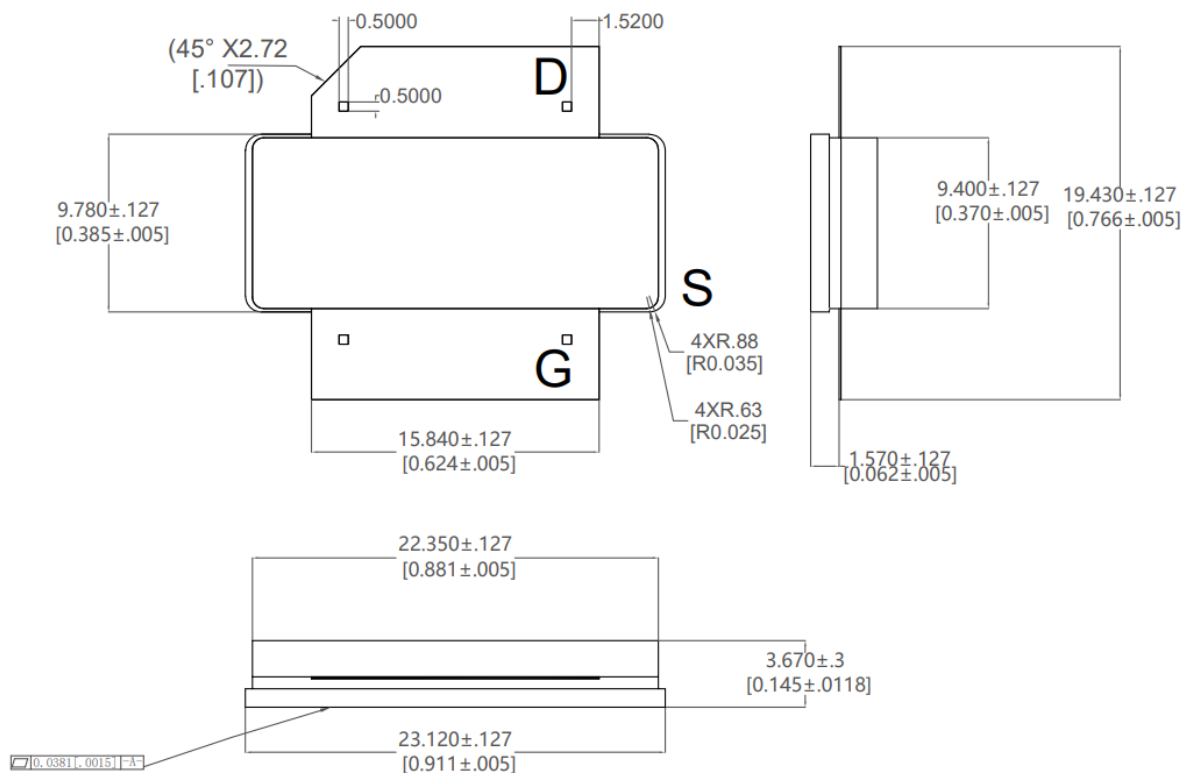
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## Package Outline

Flangeless ceramic package;

INP-688-2-EL (C2)



OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-C2					09/27/2018

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## Revision history

Table 6. Document revision history

Date	Revision	Datasheet Status
2023/8/2	Rev 1.0	Preliminary Datasheet

Application data based on LSM-23-25

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