

XC121K8VS GaN TRANSISTOR

Document Number: XC121K8VS
Preliminary Datasheet V1.0

1030-1090MHz, 1800W, GaN RF Power Transistor

Description

The XC121K8VS is a 1800-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

XC121K8VS



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

$V_{DD} = 50$ Volts, $I_{DQ} = 100$ 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(%)
1030	62.26	1682.5	62.1	18.1	62.84	1923.0	64.4
1060	62.38	1730.0	62.9	17.82	62.9	1950.7	65.8
1090	62.49	1774.8	63.4	17.25	62.81	1908.7	66.1

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_{DS}	+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}	240	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	$R_{\theta JC}$	0.12	C/W

XC121K8VS GaN TRANSISTOR

Document Number: XC121K8VS
Preliminary Datasheet V1.0

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	$V_{GS} = -8\text{V}; I_{DS} = 240\text{mA}$	V_{DSS}		200		V
Gate Threshold Voltage	$V_{DS} = 50\text{V}, I_D = 240\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS} = 50\text{V}, I_{DS} = 100\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-3.2		V

Functional Tests (In Innogration broadband Test Fixture, 50 ohm system) : $V_{DD} = 50\text{Vdc}$, $I_{DQ} = 100\text{mA}$, $f = 1060\text{MHz}$, Pulse CW

Characteristic	Symbol	Min	Typ	Max	Unit
Power Gain @ P3dB	Gp		15		dB
Drain Efficiency@P3dB _t	Eff		65		%
3dB Compressed point	P3dB		1800		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

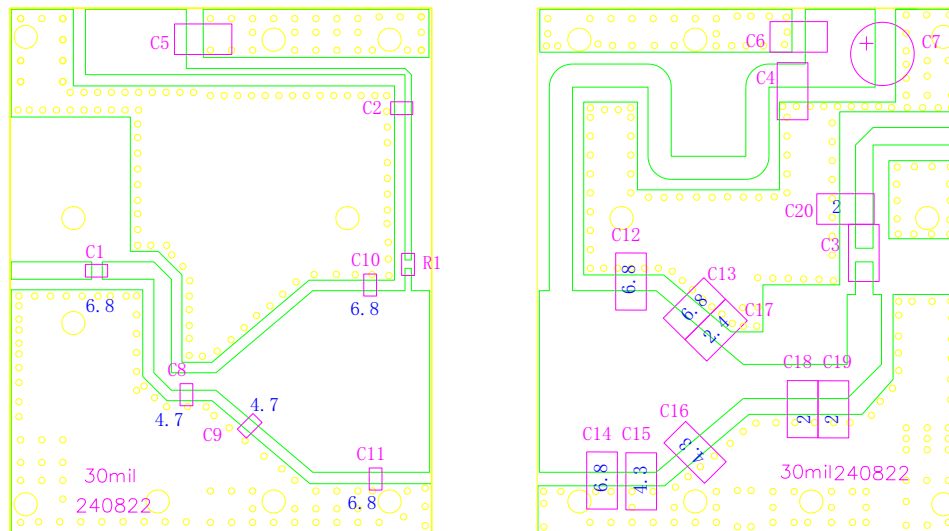


Figure 1. Test Circuit Component Layout

Table 5. Test Circuit Component Designations and Values

Designator	Comment	Footprint	Quantity
C1, C10, C11	6.8 pF	0603/0805	3
C2	47pF	0603/0805	1
C3, C4	47 pF	1210	2
C5, C6	10uF/100V	1210	2
C7	1000uF/63V		1
C8, C9	4.7 pF	0603/0805	2
C12, C13, C14	6.8 pF	1210	3
C15, C16	4.3 pF	1210	2
C17	2.4 pF	1210	1
C18, C19, C20	2.0 pF	1210	3
R1	10 Ω	0603	1

TYPICAL CHARACTERISTICS

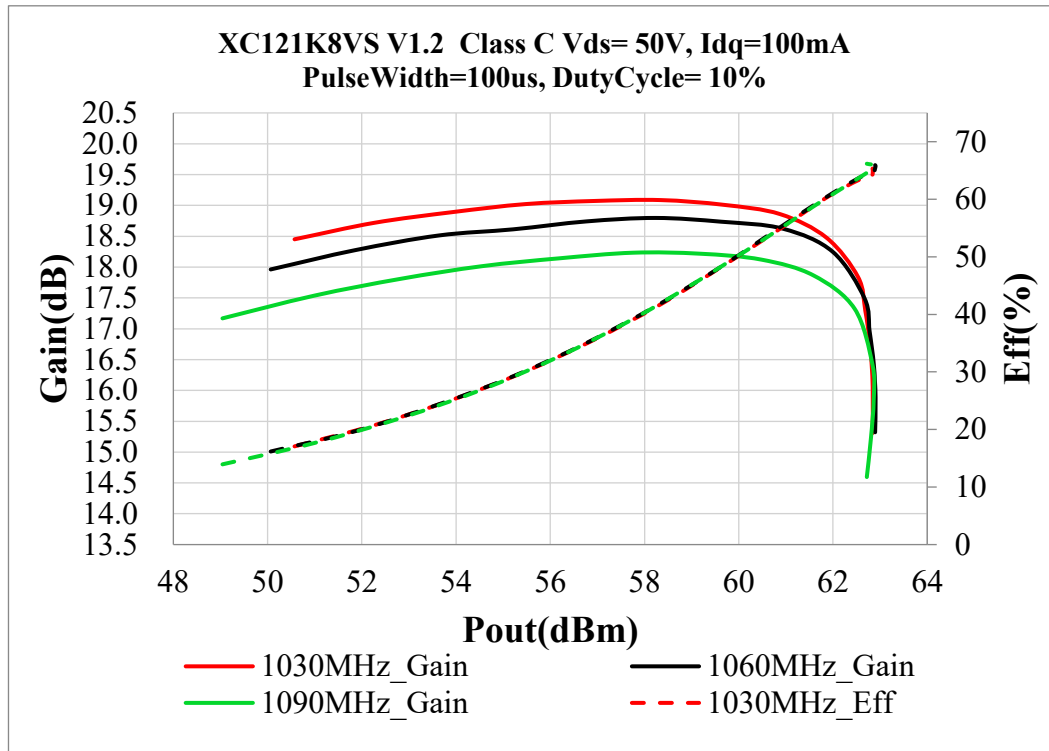


Figure 2. Power Gain and Drain Efficiency as Function of Pulse Output Power (1030-1090MHz)

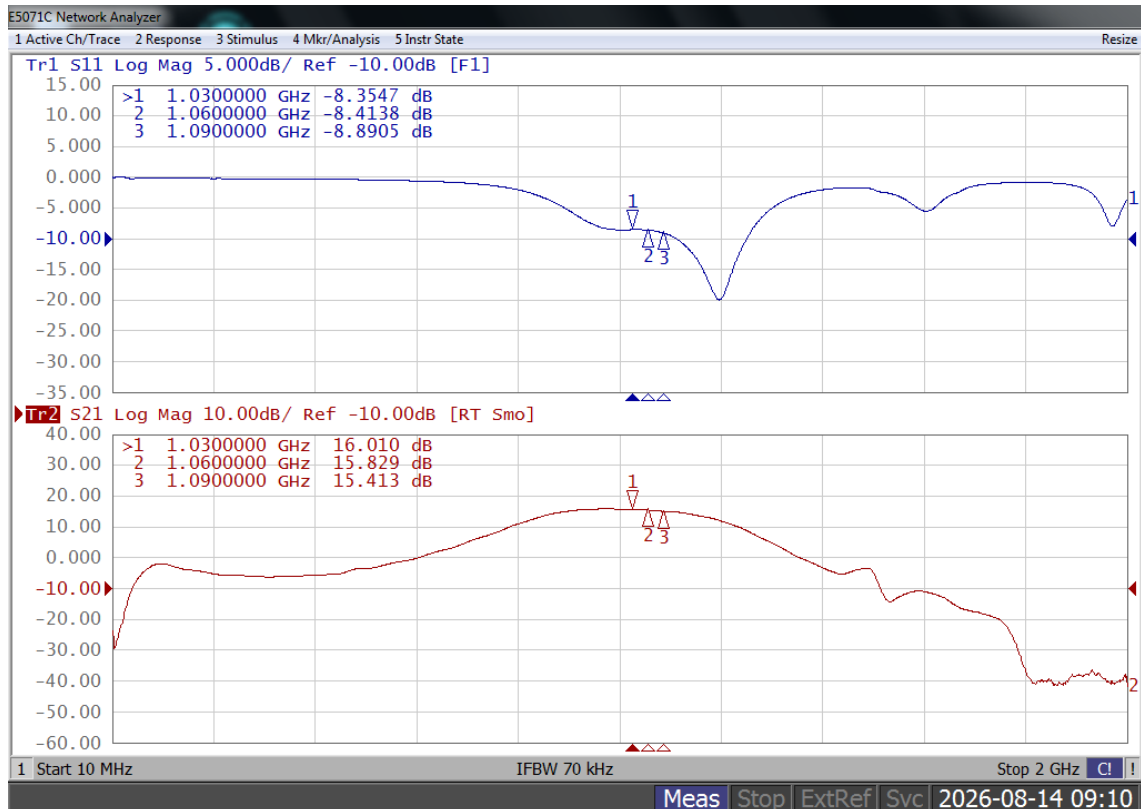


Figure 3. Network analyzer output S11/S21

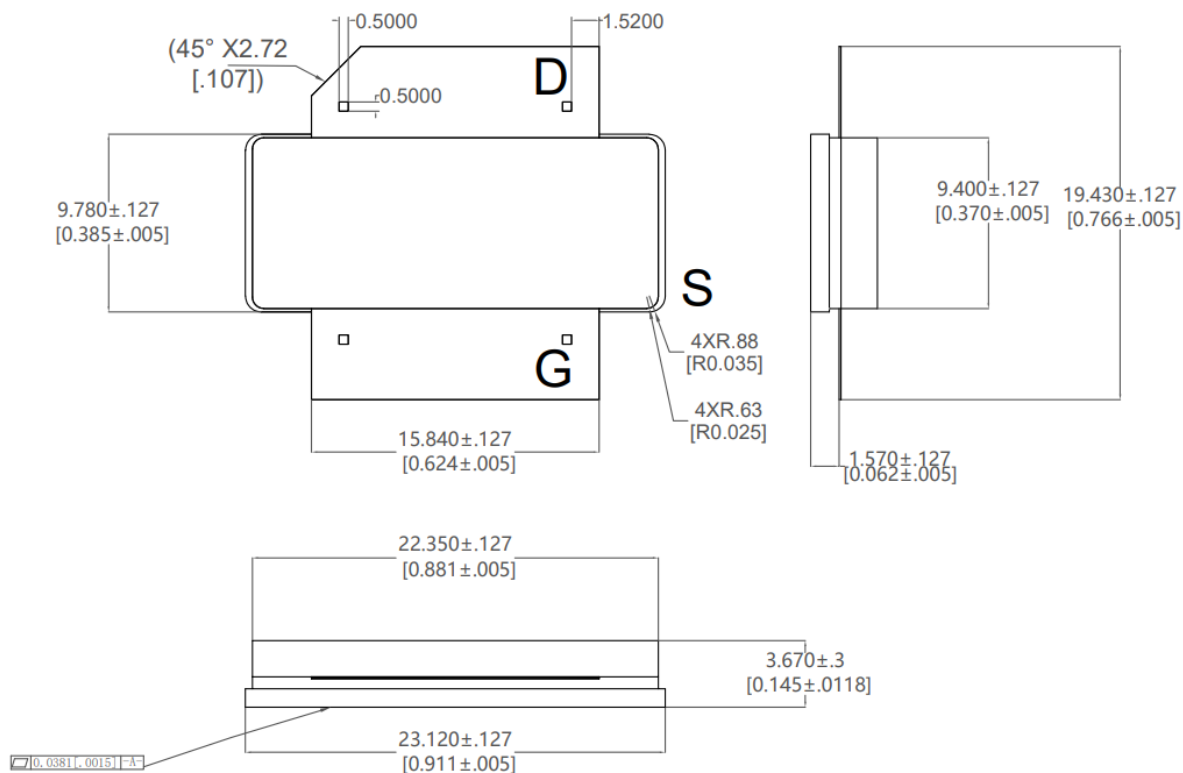
XC121K8VS GaN TRANSISTOR

Document Number: XC121K8VS
Preliminary Datasheet V1.0

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

XC121K8VS GaN TRANSISTOR

Document Number: XC121K8VS
Preliminary Datasheet V1.0

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

Disclaimers

Specifications are subject to change without notice. Innogration believes the information contained within this data sheet to be accurate and reliable. However, no responsibility is assumed by Innogration 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 Innogration . Innogration makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose. “Typical” parameters are the average values expected by Innogration 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. Innogration 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 Innogration 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 Innogration and authorized distributors

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