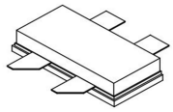
GaN 50V, 900W,DC-1GHz RF Power Transistor

SK1090RVPS



Description

The SK1090RVPS is a 900W, input matched GaN HEMT, ideal for multiple applications from DC-1GHz, with leading efficiency. It can support CW, pulse or any modulated signal.

There is no guarantee of performance when this part is used outside of stated frequencies.

- Typical performance across 0.4-0.7GHz class AB application circuit with device soldered

VDS= 50V, IDQ=200mA(Vgs=-3.25V) Pulsed CW 100us/10%

F(MHz)	Pin （dBm）	Pout (dBm)	Pout (W)	I(A)	Gain (dB)	Eff(%)
400	38.5	59.5	891.3	3.2	21	55.70
450	38.3	59.2	831.8	2.94	20.9	56.58
500	38.7	59.2	831.8	2.637	20.5	63.08
550	39.3	58.4	691.8	2.44	19.1	56.71
600	40.8	59.8	955.0	2.52	19	75.79
650	41.8	59.2	831.8	2.4	17.4	69.31
700	42	60	1000.0	2.76	18	72.46

Applications

- P band power amplifier
- UHF TV
- Wideband power amplifier
- ISM

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 +2	Vdc
Operating Voltage	V_{DD}	55	Vdc
Maximum gate current	Igs	108	mA
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 by FEA T_C= 85°C, at Tj=200°C	$R_{\theta JC}$	0.3	°C /W

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

DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=108mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 108mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =50V, IDS=200mA, Measured in Functional Test	$V_{GS(Q)}$		-3.25		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	1GHz, Pout=900W Pulsed CW All phase, No device damages	VSWR		5:1		

Figure 2: Network analyzer output, S11 and S21（ VDS=50V VGS=-3.2V IDQ=500mA）

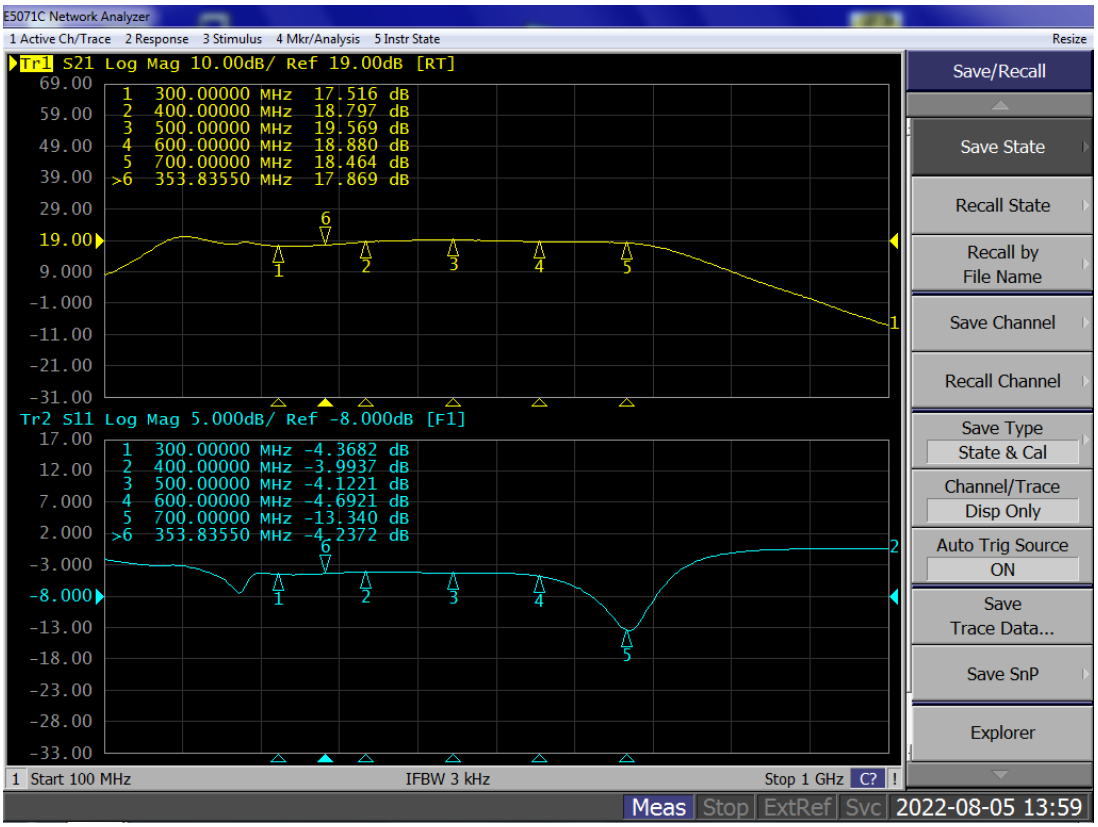


Figure 3: Picture of application board 0.4-0.7GHz class AB

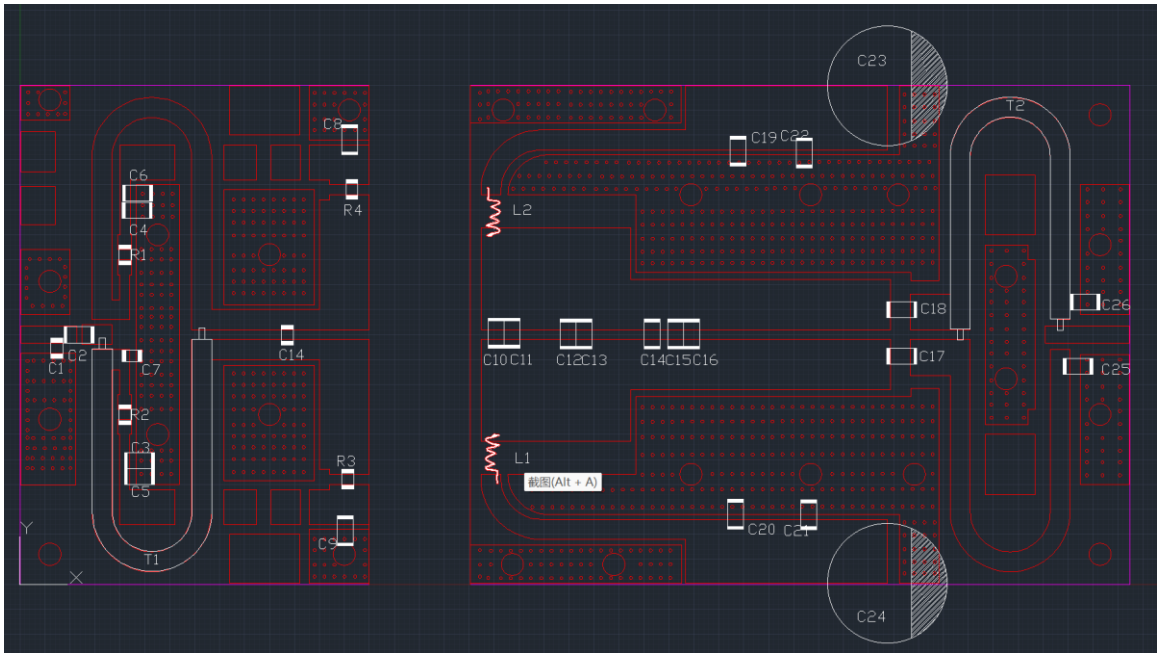
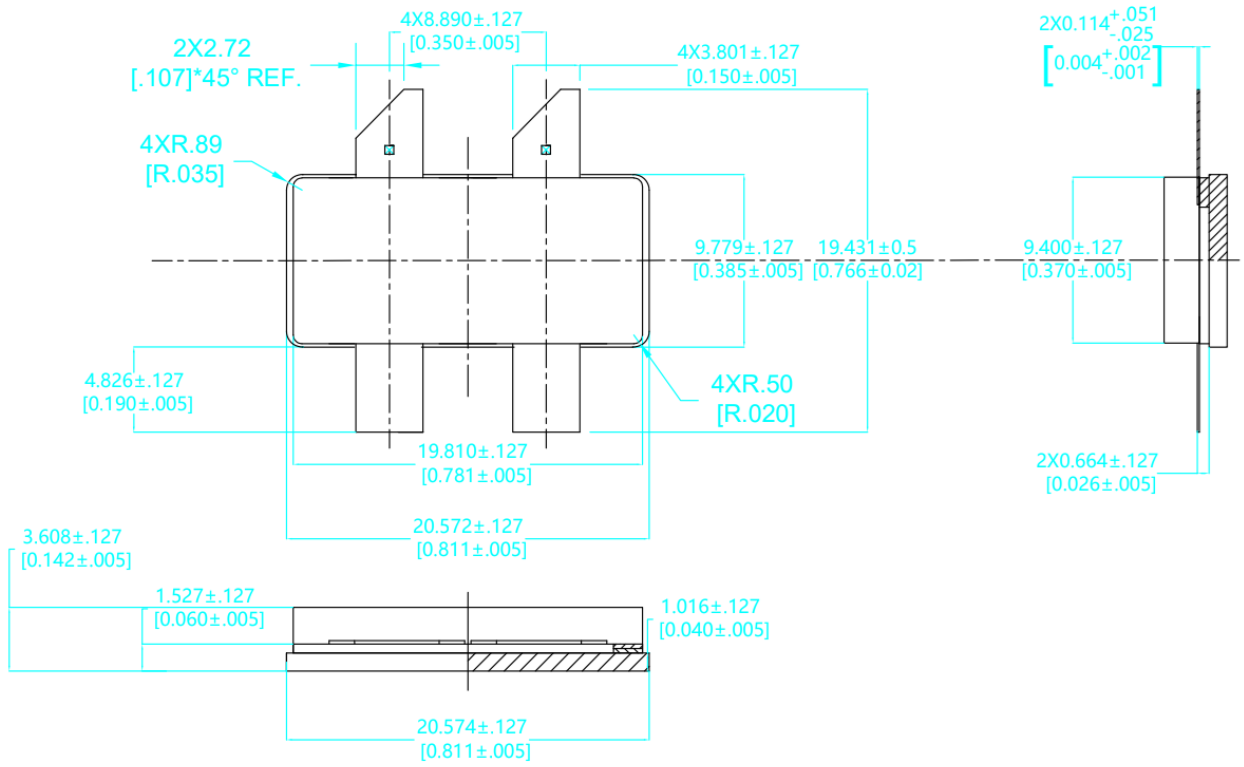


Table 4. Bill of materials of application board (PCB layout upon request)

Component	Description	Suggested Manufacturer
C1	2.7pF 100A	
C2、C3、C4、C20、C19	300pF 100B	
C5、C6、C21、C22、C8、C9	10UF 1210	
C14	20PF 100B	
C7、C25、C26	56PF 100B	
C10、C11	3.3PF 100B	
C12	3.9PF 100B	
C11	5.1PF 100B	
C14、C16	4.7PF 100B	
C15	10PF 100B	
C23、C24	钽电容 4700UF 63V	
C17、C18	8.2PF 100B	
R1、R2、R3、R4	Chip Resistor,9.1 Ω,0603	
L1、L2	自制电感 内径3.0mm Ψ0.67mm漆包线 5圈	
T1	SFF-25-1.5 50mm	
T2	SFF-16.7-1.5 50mm	
PCB	30mil Rogers4350B	

Earless Flanged Ceramic Package; 4 leads



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2022/01/08	**V1.0**	**Preliminary Datasheet Creation**
2022/8/5	**V1.1**	**Change carrier application to 0.4-0.7GHz**
2025/7/2	**V1.2**	**Correct the package info from B4 to BY4**

Application data based on: SYX-22-10

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