



GaN 50V,960W, RF Power Transistor

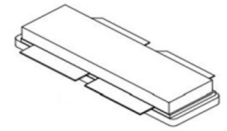
SQ1096RVPS

Description

The SQ1096RVPS is a push pull 960W capable, internally matched GaN HEMT, ideal for multiple applications up to 1GHz. It is optimized thermally to support higher duty cycle or longer pulse up to CW application.

In typical wideband application from 600 to 700MHz, it can deliver >700W across the full band.

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



- Typical Pulsed CW performance at 600-700MHz applications

SQ1096RVPS Vgs=-3.44V Vds=50V Idq=120mA Pulse 100us 10%						
Freq (MHz)	Psat (dBm)	Psat (W)	IDS (A)	Pin (dBm)	Gain (dB)	Eff (%)
600	58.68	737.9	2.0	42.90	15.78	72
700	58.69	739.6	2.1	45.25	13.44	70

- Typical CW performance at 600-700MHz applications

SQ1096RVPS Vgs=-3.44V Vds=40V Idq=120mA CW								
Freq (MHz)	Psat (dBm)	Psat (W)	IDS (A)	Pin (dBm)	Gain (dB)	Eff(%)	2nd (dBc)	3rd (dBc)
600	56.89	488.7	17.17	42.25	14.64	71.15	-22.30	-29.40
700	56.64	461.3	17.46	43.90	12.74	66.05	-25.60	-39.40

Applications

- P band power amplifier
- UHF TV
- Public Safety Radio
- Data link power amplifier

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}	-8 to +0.5	Vdc
Operating Voltage	V _{DD}	55	Vdc
Maximum gate current	I _{gs}	100	mA



Storage Temperature Range	T _{stg}	-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 = 25°C, at P _{out} =700W @700MHz	R _{θJC}	0.2	°C /W

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

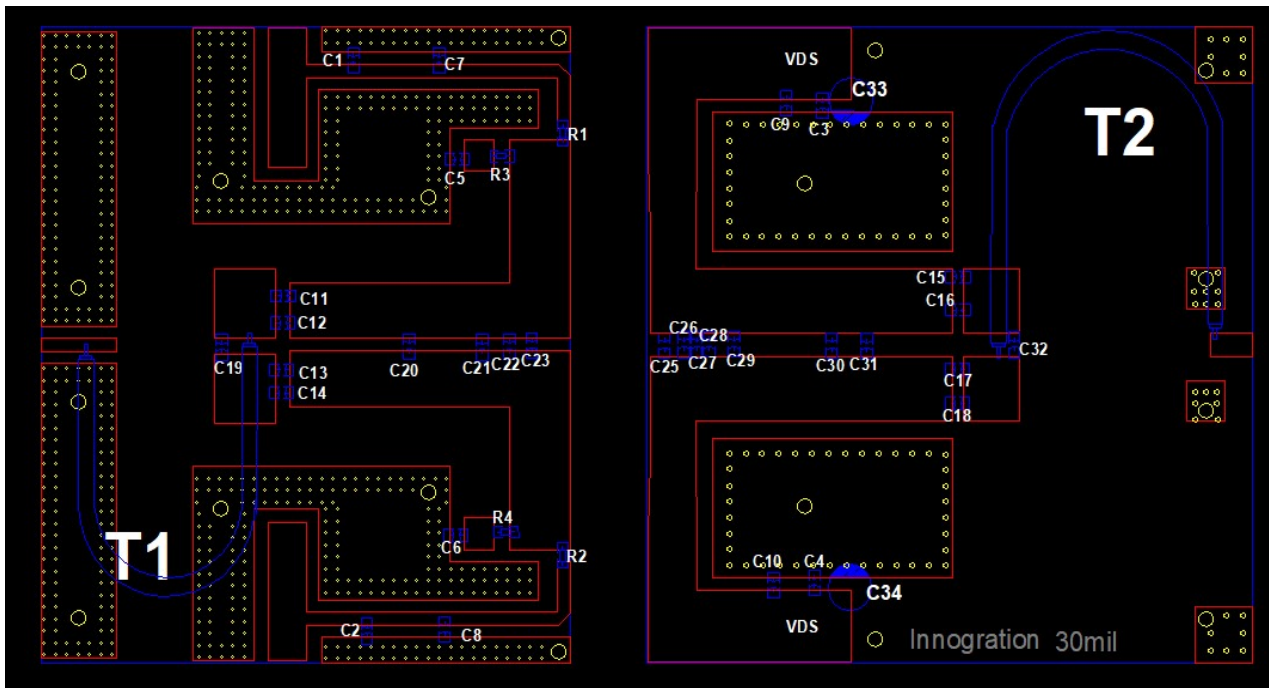
DC Characteristics (Each path, measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V _{GS} =-8V; I _{DS} =120mA	V _{DSS}		200		V
Gate Threshold Voltage	V _{DS} =10V, I _D = 120mA	V _{GS(th)}	-4	-	-2	V
Gate Quiescent Voltage	V _{DS} =50V, I _{DS} =120mA, Measured in Functional Test	V _{GS(Q)}		-3.4		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	700MHz, P _{out} =600W pulse CW All phase, No device damages	VSWR		5:1		

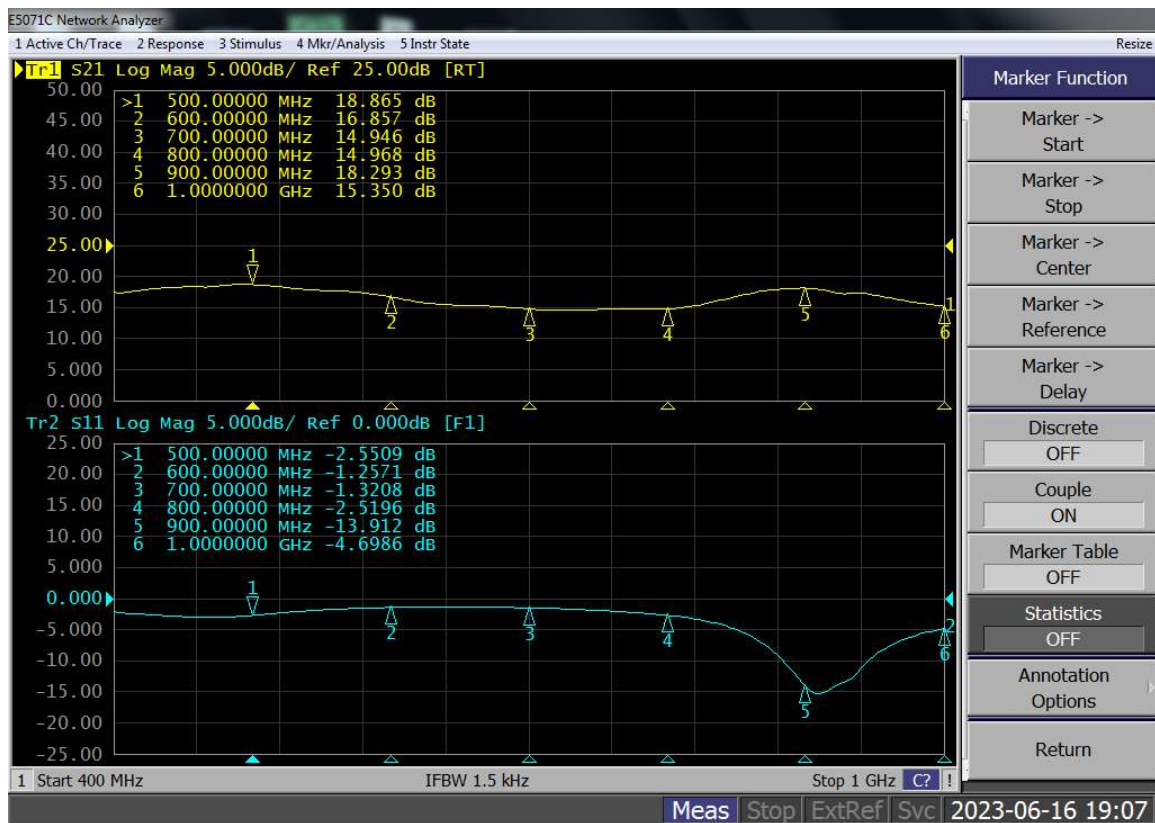
Figure 1: Reference design circuit (PCB DWG file upon request,)



Component	Description	Suggestion
C1,C2,C3,C4,C5,C6	10uF	10uF/100V
C7~C10	100pF	MQ101111
C11~C14	39pF	MQ101111



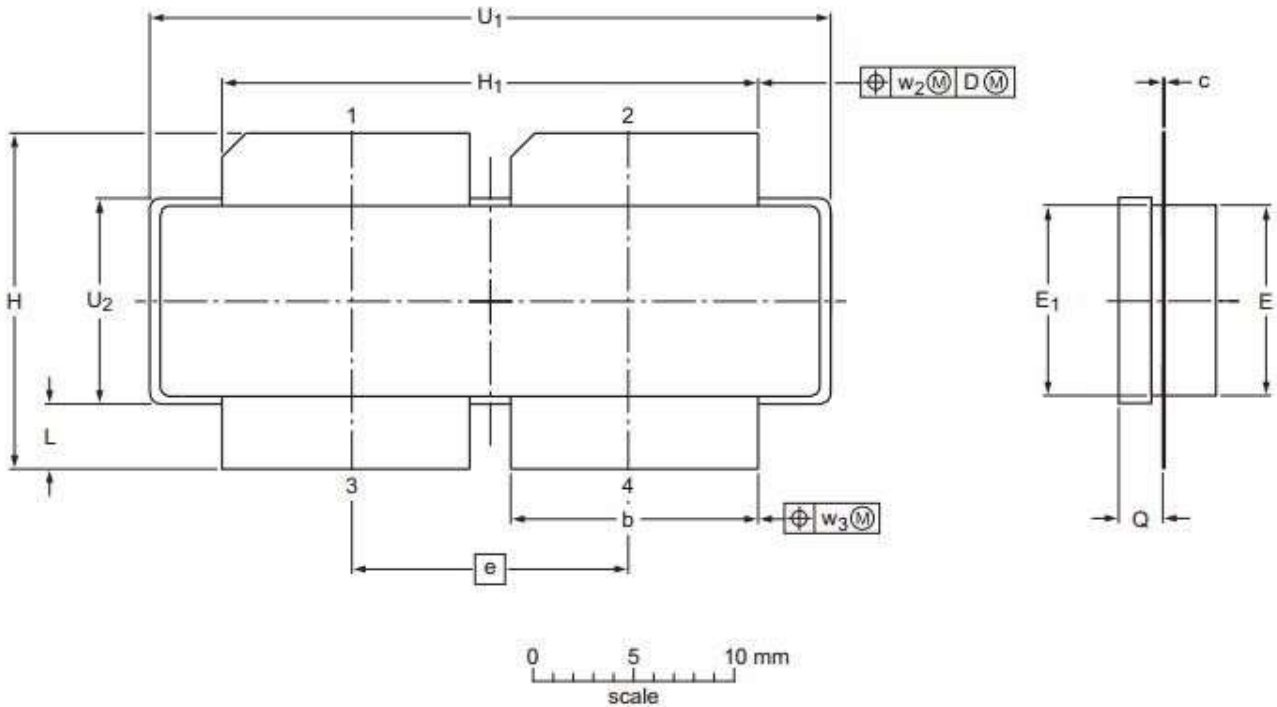
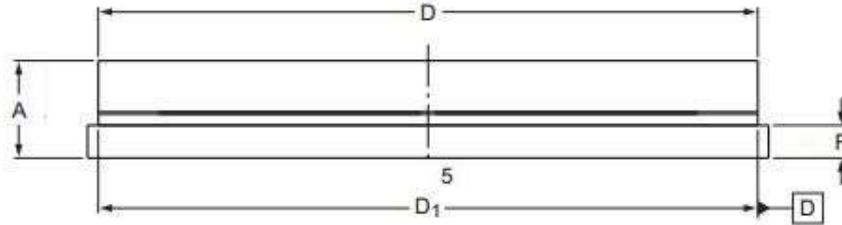
C15~C18	24pF	MQ101111
C19,C21,C27	3pF	MQ101111
C20	6.8pF	MQ101111
C22	10pF	MQ101111
C23	3.9pF	MQ101111
C25	1pF	MQ101111
C26	4.7pF	MQ101111
C28	1.8pF	MQ101111
C29	6.2pF	MQ101111
C30	2pF	MQ101111
C31	1.5pF	MQ101111
C32	2.7pF+1pF	MQ101111
C33,C34	4700uF/63V	Electrolytic Capacitor
R1,R2	300 Ω	Chip Resistor
R3,R4	10 Ω	Chip Resistor
T1	25 ohm ,70mm	RFSFBU-086-25
T2	35 ohm ,70mm	SFF-35-3
PCB	input : 30Mil Rogers4350	
	output: 30Mil RF-35TC-A	





Package Outline

Earless flanged ceramic package; 4 leads (1、2—DRAIN、3、4—GATE、5—SOURCE)



UNIT	A	b	c	D	D ₁	e	E	E ₁	F	H	H ₁	L	Q	U ₁	U ₂	W ₂	W ₂
mm	4.7	11.81	0.18	31.55	31.52	13.72	9.50	9.53	1.75	17.12	25.53	3.48	2.26	32.39	10.29	0.25	0.25
	4.2	11.56	0.10	30.94	30.96		9.30	9.27	1.50	16.10	25.27	2.97	2.01	32.13	10.03		
inches	0.185	0.465	0.007	1.242	1.241	0.540	0.374	0.375	0.069	0.674	1.005	0.137	0.089	1.275	0.405	0.01	0.01
	0.165	0.455	0.004	1.218	1.219		0.366	0.365	0.059	0.634	0.995	0.117	0.079	1.265	0.395		

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-D4					03/12/2013



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2023/6/19	V1.0	Preliminary Datasheet Creation

Application data based on:TC-23-38

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