



GaN 50V,700W, RF Power Transistor

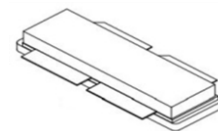
SQ1070RVPS

Description

The SQ1070RVPS is a push pull 700W 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 500 to 900MHz, it can deliver >500W CW across the full band.

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



● Typical CW performance at 500-900MHz applications

Freq (MHz)	Psat (dBm)	Psat (W)	Ids (A)	Pin (dBm)	Gain (dB)	Eff (%)	2 nd (dBc)	3 rd (dBc)
500	57.74	594.3	19.67	40.24	17.5	60.43	-23.5	-22.5
550	58.12	648.6	16.77	40.2	17.92	77.36	-24.2	-18
600	57.75	595.7	15.44	40.96	16.79	77.16	-24.9	-14.8
650	57.01	502.3	15.26	40.51	16.5	65.84	-21.7	-24.8
700	57.27	533.3	17.13	39.39	17.88	62.27	-26.3	-30.8
750	57.65	582.1	18.68	39.88	17.77	62.32	-23.1	-23.2
800	57.51	563.6	19.19	38.76	18.75	58.74	-23.8	-39
850	57.69	587.5	17.28	38.68	19.01	68.00	-22.3	-37.4
900	57.08	510.5	14.61	38.55	18.53	69.88	-21.1	-43

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}	86.6	mA
Storage Temperature Range	T _{stg}	-65 to +150	°C
Case Operating Temperature	T _c	+150	°C



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

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case by FEA $T_C = 25^\circ\text{C}$, at $P_{out}=700\text{W}$ @900MHz	$R_{\theta JC}$	0.21	$^\circ\text{C}/\text{W}$

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

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

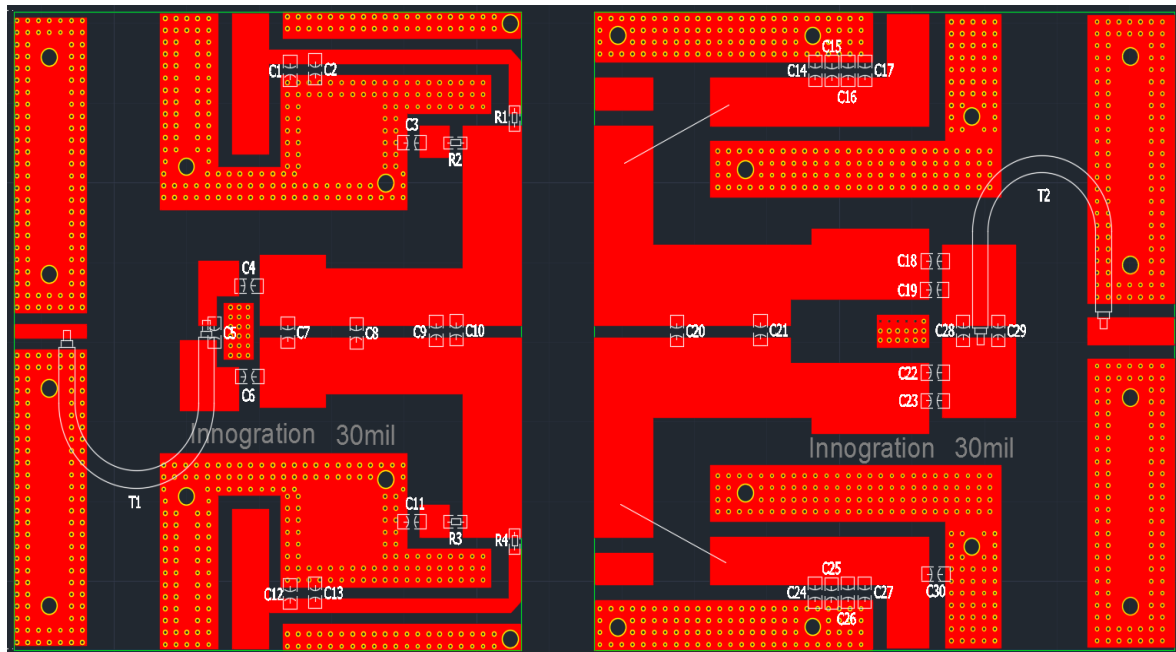
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=-8\text{V}$; $I_{DS}=43.2\text{mA}$	V_{DSS}		200		V
Gate Threshold Voltage	$V_{DS}=10\text{V}$, $I_D=43.2\text{mA}$	$V_{GS(th)}$	-4	-	-2	V
Gate Quiescent Voltage	$V_{DS}=50\text{V}$, $I_{DS}=100\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-3.5		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	900MHz, $P_{out}=700\text{W}$ pulse CW All phase, No device damages	VSWR		5:1		

500-900MHz

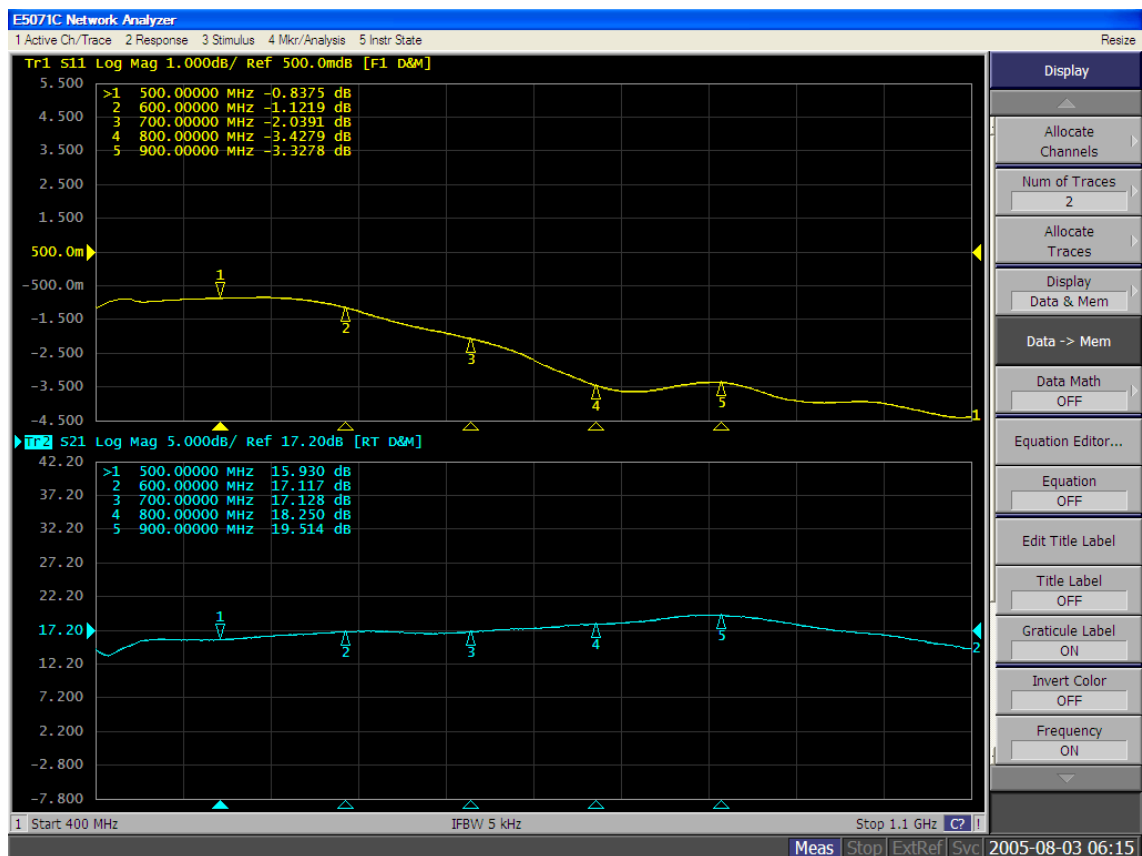
Figure 1: Reference design circuit (PCB DWG file upon request,)



C1,C12,C15,C16 C17,C25,C26,C27	10uF	/
C2,C4,C6,C13	36pF/MQ301111	
C3,C11	1000pF/MQ301111	
C14,C24	120pF/MQ301111	



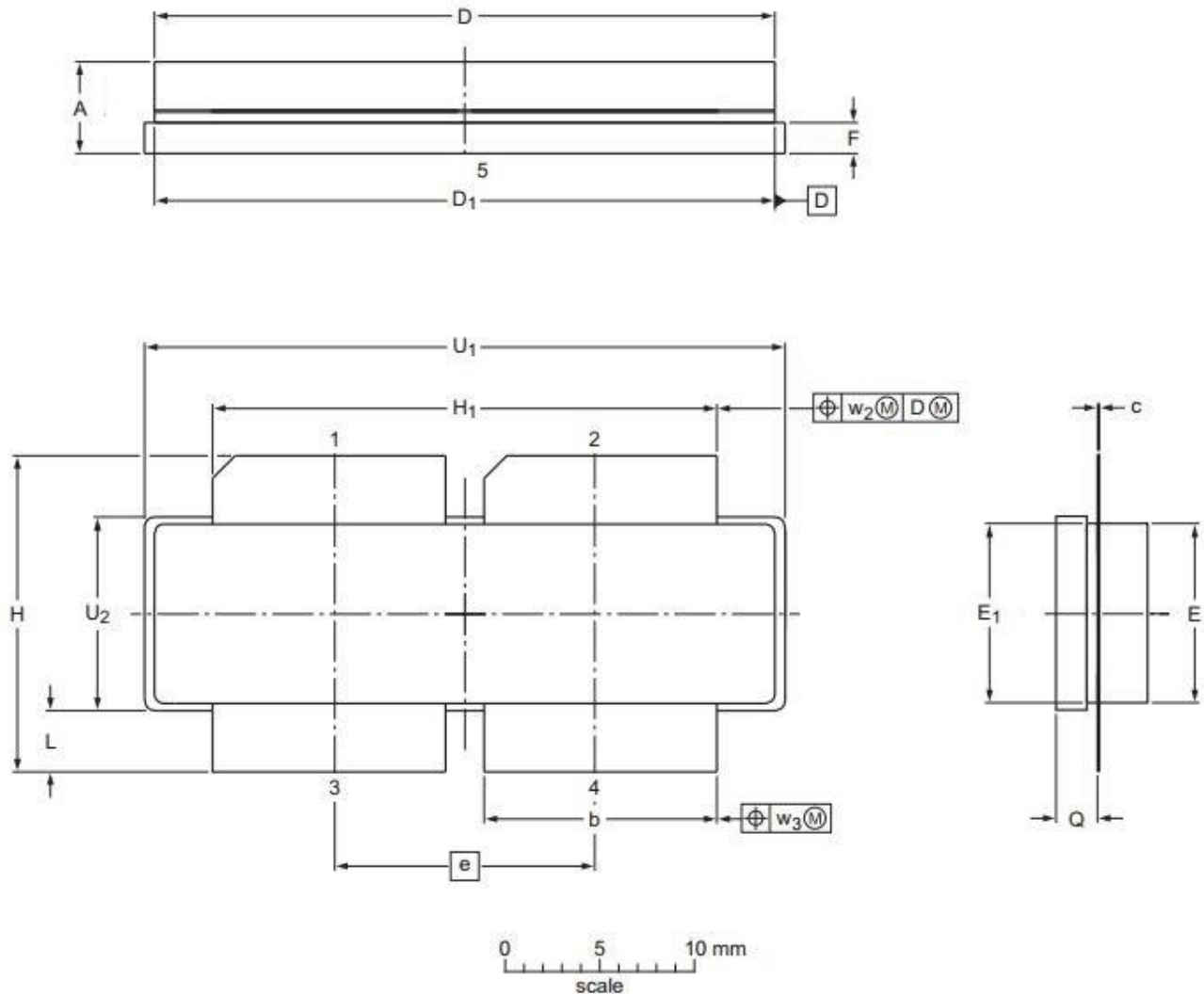
C18,C19,C22,C23	18pF/MQ301111	
C5,C28	0.5pF/MQ301111	
C7	2.7pF/MQ301111	
C8	0.8pF/MQ301111	
C9	1.0pF/MQ301111	
C10	10pF/MQ301111	
C20	3.6pF/MQ301111	
C21	3.9pF/MQ301111	
C29	1.2pF/MQ301111	
C30	4700uF/63V	
R1,R4	300Ω/1206	
R2,R3	10Ω/1206	
T1	50ohm,50mm	RFSFBU-086-50
T2	35ohm,65mm	SFF-35-3
PCB	30mil TC350	





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
2023/5/23	V1.0	Preliminary Datasheet Creation

Application data based on:SJJ-25-06

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