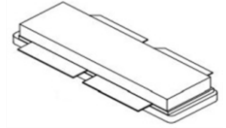




## GaN 50V,480W, RF Power Transistor

**SQ3049RVPS**



### Description

The SQ3049RVPS is a push pull 480W capable, internally matched GaN HEMT, ideal for multiple applications up to 3GHz. It is optimized thermally to support higher duty cycle or longer pulse up to CW application. **In typical wideband application from 0.15 to 1GHz, it can deliver >350W CW with high efficiency across the full band.**

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

Typical CW performance at 0.15-1GHz applications  $V_{gs} = -3.15V$ ,  $V_{ds} = 50V$ ,  $I_{dq} = 1000mA$

Freq (MHz)	Pin (dBm)	Psat (dBm)	Psat (W)	IDS (A)	Gain (dB)	Eff (%)	2 <sup>nd</sup> (-dBc)	3 <sup>rd</sup> (-dBc)
150	35.1	56.20	417	10.70	21.1	77.9	33.8	13.4
200	36.6	56.43	440	11.95	19.8	73.6	36.2	12.6
250	38.0	56.47	444	12.17	18.5	72.9	49.0	13.0
300	39.2	56.47	444	13.85	17.3	64.1	31.6	10.6
350	39.5	57.14	518	14.60	17.6	70.9	31.8	10.2
400	38.5	56.37	434	13.70	17.9	63.3	35.0	10.8
450	37.5	56.08	406	12.70	18.6	63.9	29.4	11.5
500	36.8	56.74	472	14.20	19.9	66.5	24.0	15.3
550	38.5	57.10	513	15.80	18.6	64.9	42.4	13.2
600	39.7	57.00	501	16.20	17.3	61.9	35.8	15.9
650	40.0	57.22	527	15.20	17.2	69.4	35.4	16.2
700	40.0	57.12	515	15.34	17.1	67.2	32.6	34.3
750	38.8	57.01	502	15.90	18.2	63.2	28.3	38.3
800	38.8	56.70	468	16.70	17.9	56.0	25.3	35.1
850	38.3	56.62	459	15.80	18.3	58.1	23.1	42.2
900	38.2	56.30	427	14.75	18.1	57.8	31.4	38.5
950	38.8	56.20	417	14.78	17.4	56.4	38.8	32.6
1000	39.4	56.12	409	14.52	16.7	56.4	40.0	29.5

### Applications

- P/L/S band power amplifier
- UHF TV
- 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	$I_{GS}$	50.4	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 $T_C = 25^\circ\text{C}$ , at $P_{out} = 400\text{W}$ @900MHz	$R_{\theta JC}$	0.31	°C /W

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

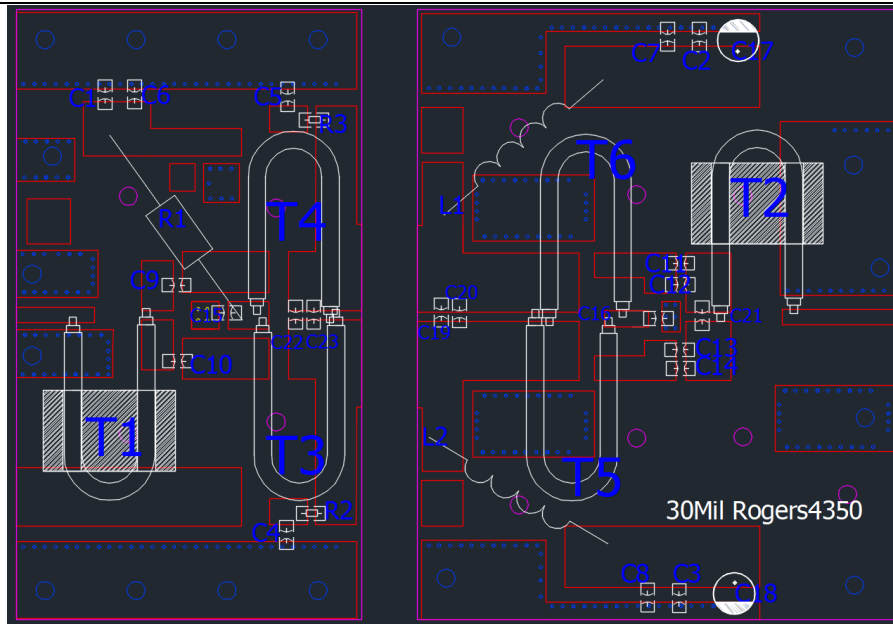
#### DC Characteristics (Each path, measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}$ ; $I_{DS} = 60\text{mA}$	$V_{DSS}$		200		V
Gate Threshold Voltage	$V_{DS} = 10\text{V}$ , $I_D = 60\text{mA}$	$V_{GS(th)}$	-4	-	-2	V
Gate Quiescent Voltage	$V_{DS} = 50\text{V}$ , $I_{DS} = 1000\text{mA}$ , Measured in Functional Test	$V_{GS(Q)}$		-3.15		V

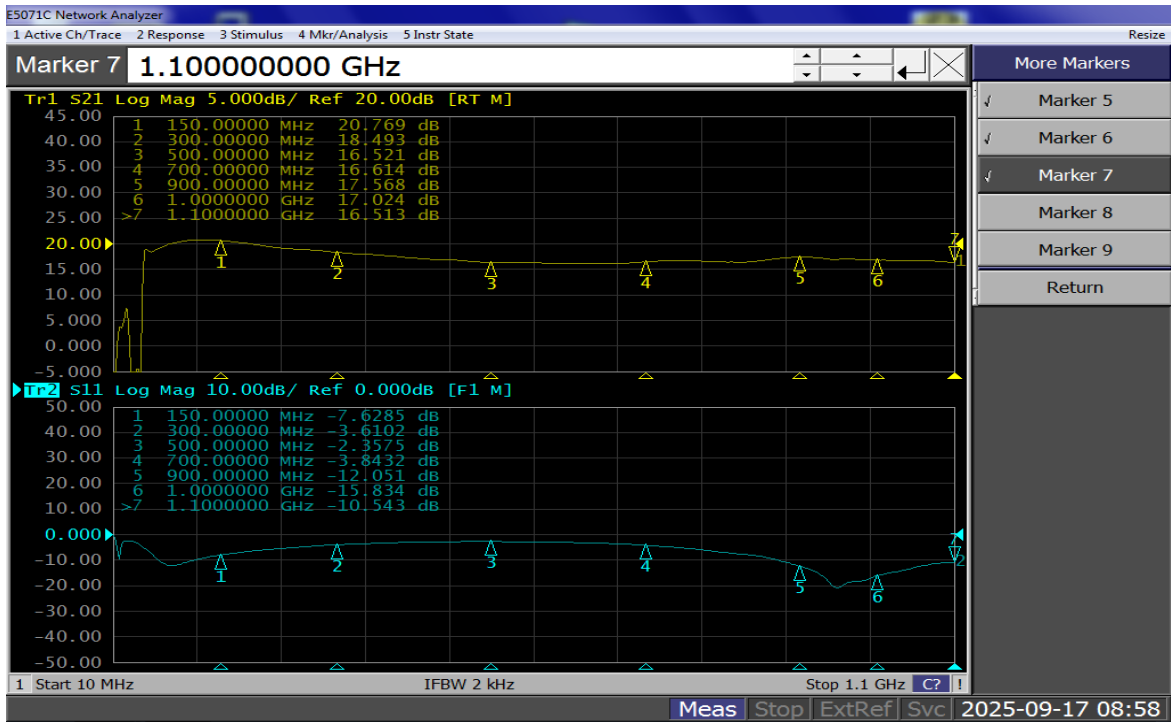
#### Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	900MHz, $P_{out} = 480\text{W}$ pulse CW All phase, No device damages	VSWR		5:1		

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



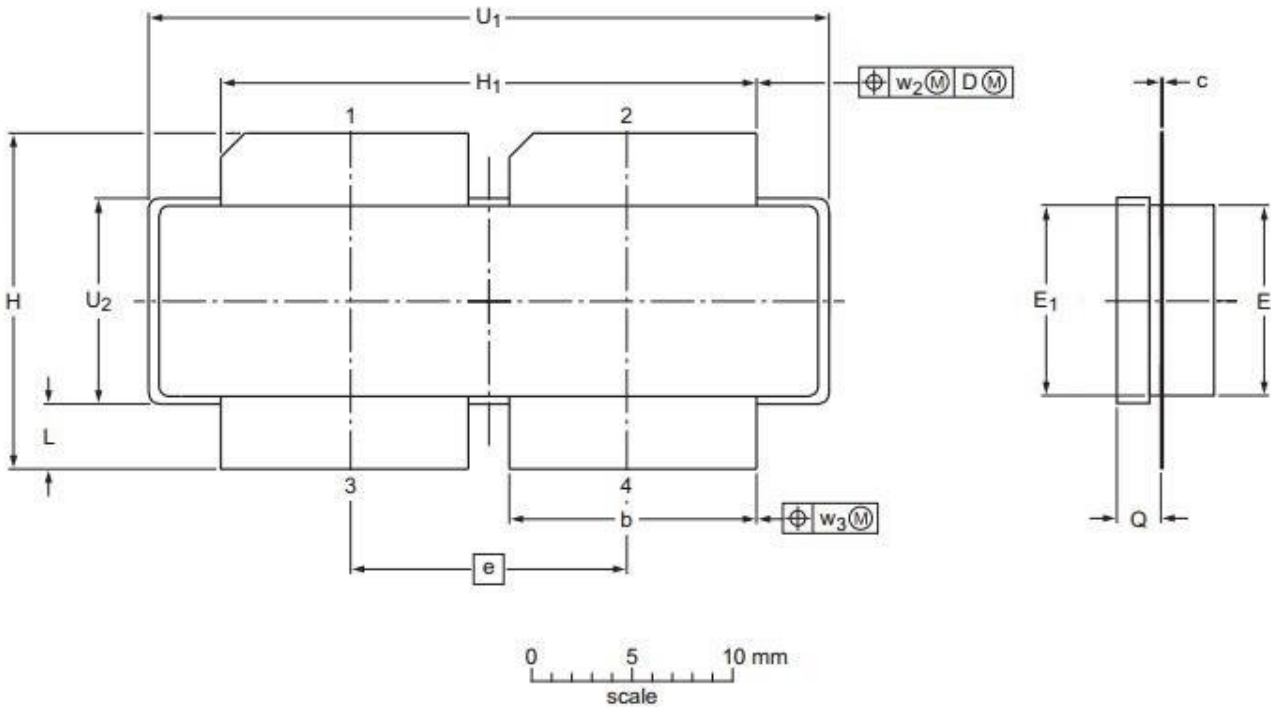
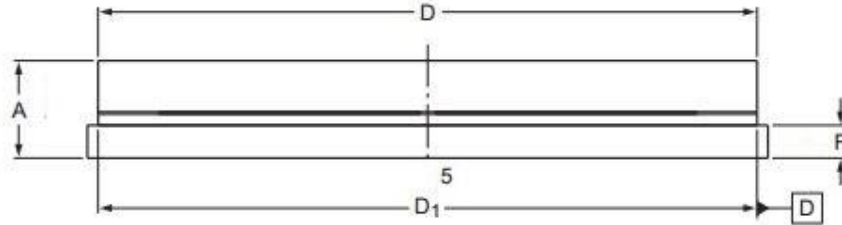
Component	Description	Suggestion
C1~C5	10uF/1210	10uF/100V
C6~C8	200pF/MQ301111	
C9,C10	75pF/MQ301111	
C11~C14	56pF/MQ301111	
C16	560pF/MQ301111	
C15	5.1pF/MQ301111	
C19	4.7pF/MQ301111	
C20,C22	5.6pF /MQ301111	
C21	0.8pF/MQ301111	
C23	10pF/MQ301111	
C17,C18	1000uF/63V	Electrolytic Capacitor
R1	200 Ω /0.25W	//
R2,R3	10 Ω /1206	Chip Resistor
L1,L2	1.5mm wire, 4Turns , 5mm inner diameter,	DIY
T1	50 ohm,60mm	RFSFBU-086-50,BN-61-202
T2	50 ohm,50mm	RFSFBU-086-50,NXO-60
T3,T4	16.7ohm,50mm	SFF-16.7-1.5
T5,T6	25 ohm,50mm	RFSFBUB-086-25
PCB	30Mil Rogers4350	





### Package Outline

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



UNIT	A	b	c	D	D <sub>1</sub>	e	E	E <sub>1</sub>	F	H	H <sub>1</sub>	L	Q	U <sub>1</sub>	U <sub>2</sub>	W <sub>2</sub>	W <sub>2</sub>
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
2025/9/17	V1.0	Preliminary Datasheet Creation

Application data based on: SYX-25-35

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