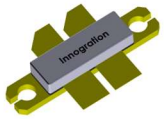
SX3040RVP GaN TRANSISTOR

Document Number: SX3040RVP
Preliminary Datasheet V1.2

Gallium Nitride 50V, 400W, RF Power Transistor

SX3040RVP



Description

The SX3040RVP is a 400-watt, unmatched GaN HEMT in form of push-pull configuration, designed for general purposes and wide band amplifier applications with frequencies from HF to 2GHz. There is no guarantee of performance when this part is used in applications designed outside of these frequencies.

•Typical Performance (On Innogration broadband application board):

I_{DQ} = 150 mA, CW

Freq(MHz)	Drain Voltage(V)	Psat(W)	Gain(dB)	Eff(%)
225-512	50	360-400	>19	68~76
500-800	50	380-420	>18	68~75

Applications and Features

- Suitable for wireless communication infrastructure, 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_{DSS}	+200	Vdc
Gate--Source Voltage	V_{GS}	-8 to 0	Vdc
Operating Voltage	V_{DD}	0 to 55	Vdc
Maximum forward gate current	Igf	50	mA
Storage Temperature Range	Tstg	-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 T_C= 85°C, T_J=200°C, DC Power Dissipation, FEA	$R_{\theta JC}$	0.7	C/W

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

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=-8V; I_{DS}=50mA	V_{DSS}		200		V
Gate Threshold Voltage	V_{DS} = 10V, I_D = 50mA	V_{GS}(th)	-4	-	-3	V

Gate Quiescent Voltage	V_{DS} =50V, I_{DS}=200mA, Measured in Functional Test	$V_{GS(Q)}$		-3.12		V

225-512MHz

Figure 2. Network analyzer output S11/S21 VDS=50V IDQ=300mA

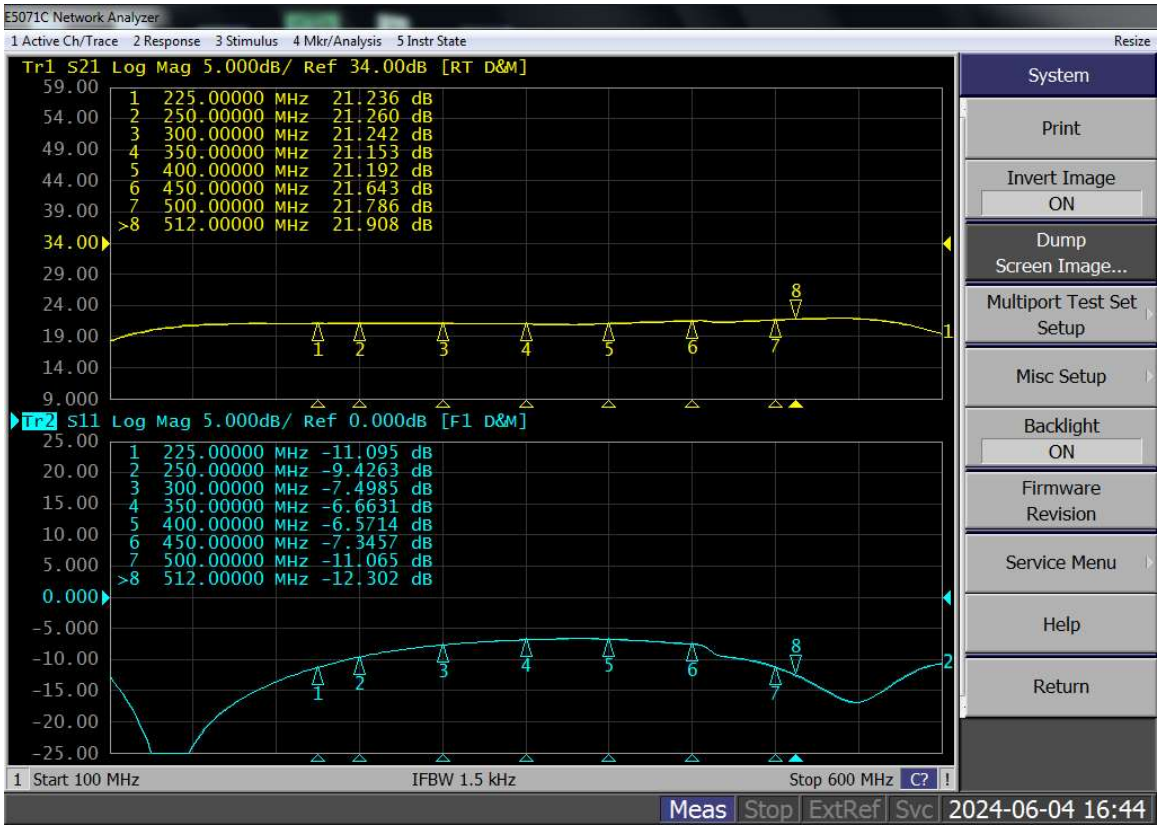


Figure 3. Test Circuit Component Layout

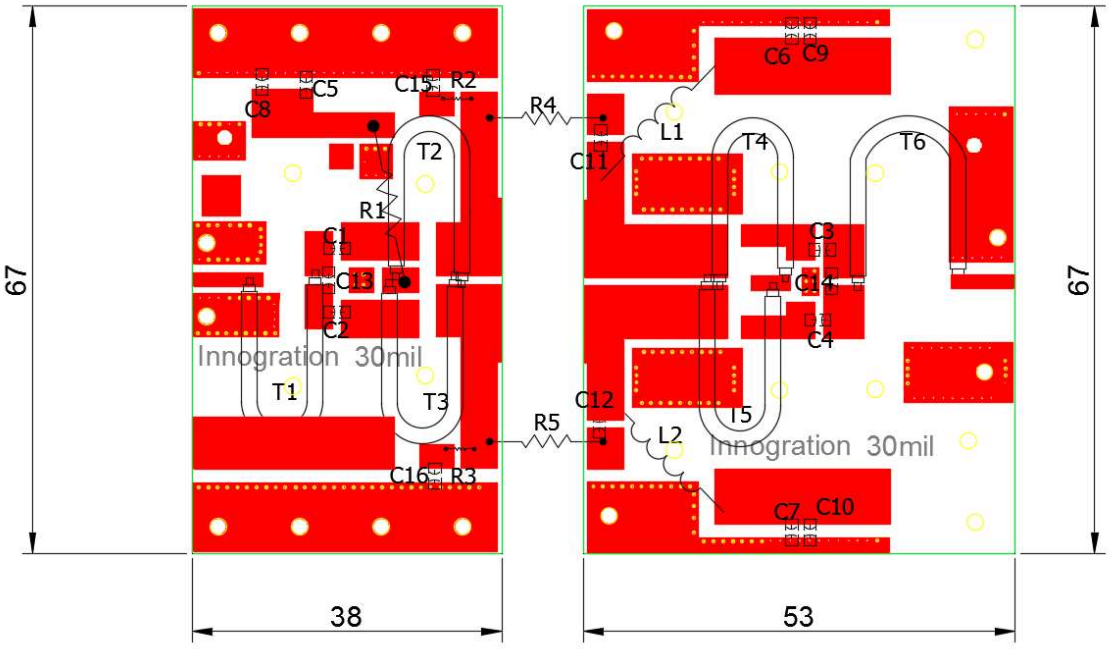


Table 4. Test Circuit Component Designations and Values

Component	Description	Suggestion
C1~C7	200pF	MQ301111
C8~C10	10uF/100V	Ceramic Multilayer Capacitor
C11,C12,C15,C16	1000pF	MQ301111
C13	5.1pF	MQ301111
C14	2pF	MQ301111
R1	470Ω	plug-in resistor
R2,R3	10Ω 1812	Chip Resistor
R4,R5	470Ω	plug-in resistor
T1,T6	50ohm 60mm	RFSFBU-086-50
T2,T3	16.7ohm 60mm	SFF-16.7-1.5
T4,T5	25ohm 60mm	SFF-25-1.5
L1,L2	d=1.5mm，D=3mm，2 turns	DIY
PCB	30Mil Rogers4350	

500-800MHz

Figure 4. Network analyzer output S11/S21 VDS=50V IDQ=300mA

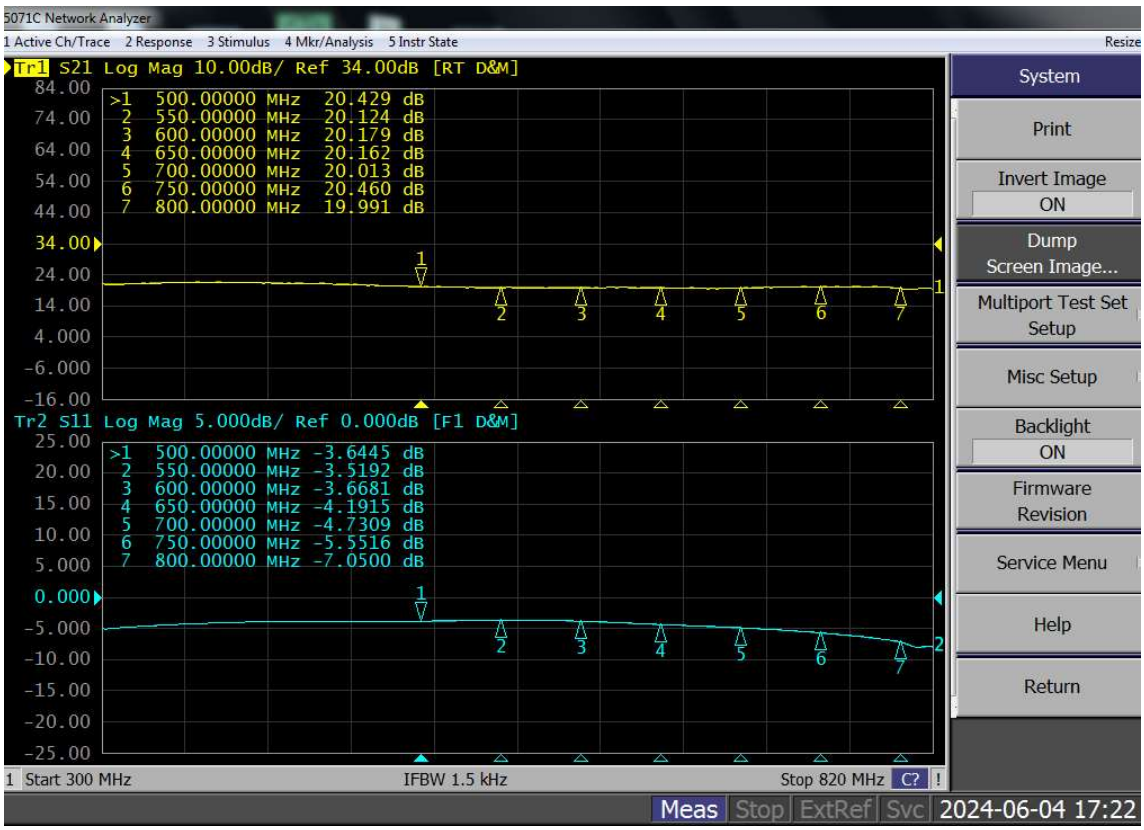


Figure 5. Test Circuit Component Layout

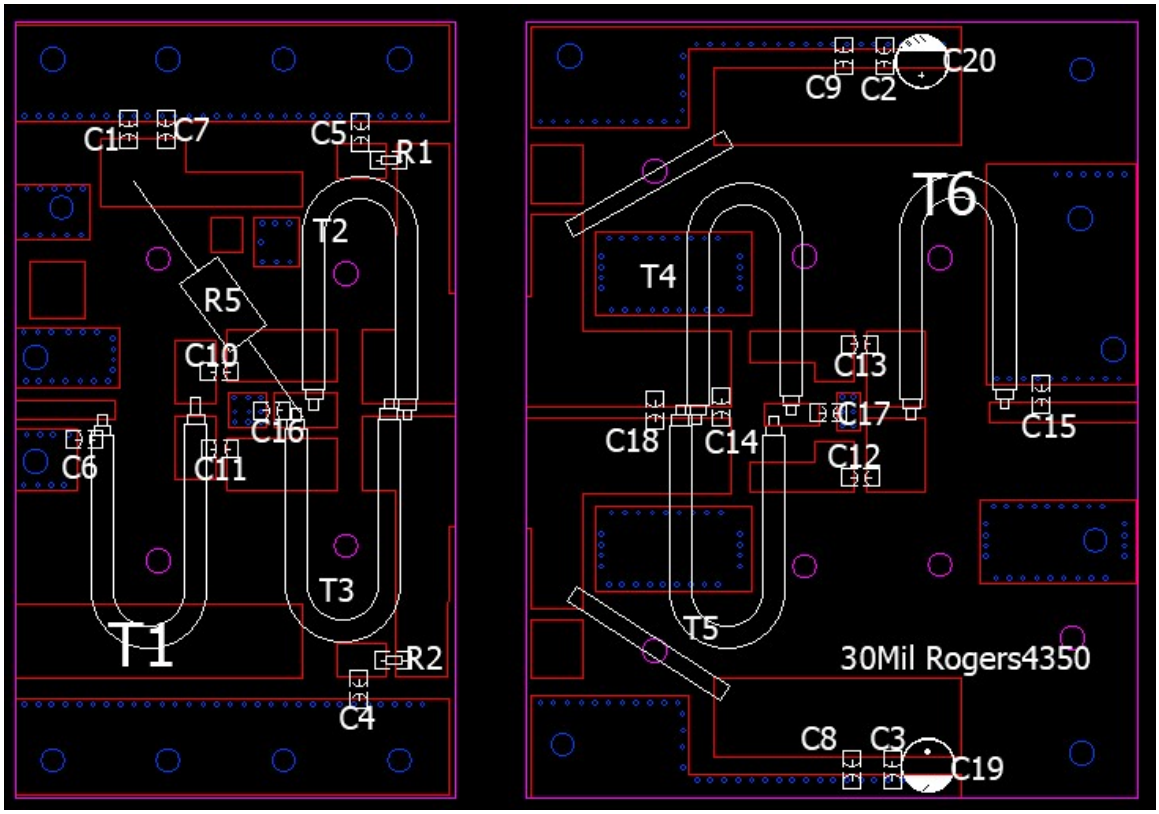
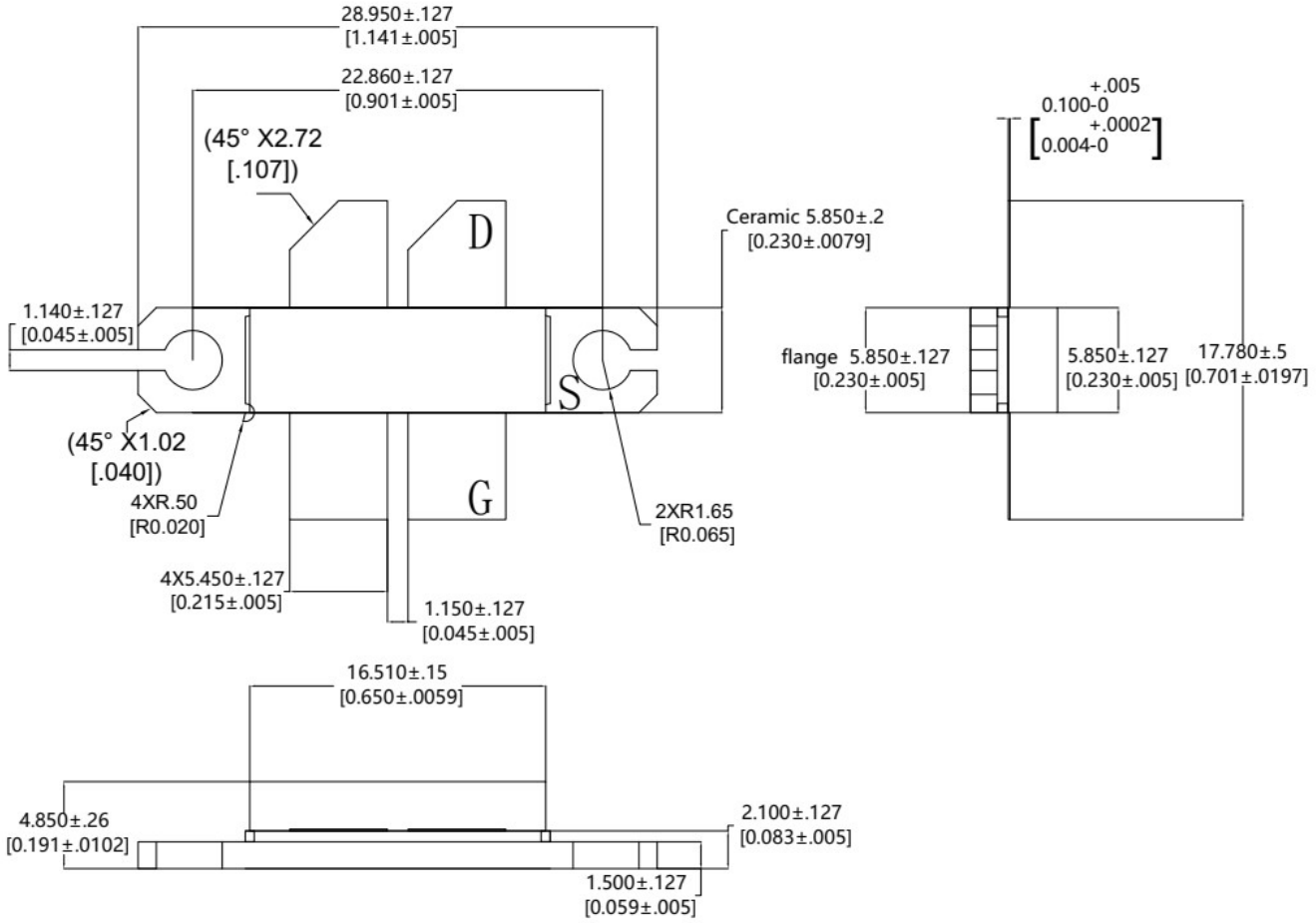


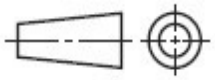
Table 5. Test Circuit Component Designations and Values

Component	Description	Suggestion
C1~C5	10uF	10uF/100V
C6~C9	910pF	MQ101111
C10,C11	39pF	MQ101111
C12,C13	150pf	MQ101111
C14	3pF	MQ101111
C15	0.5pF	MQ101111
C16,C17	560pF	MQ101111
C18	2.4pF	MQ101111
C19,C20	4700uF/50V	Electrolytic Capacitor
R1,R2	10 Ω	Chip Resistor
T1	50 ohm，60mm	RFSFBU-086
T2,T3	16.7 ohm，60mm	SFF-16.7-1.5
T4,T5	25 ohm，60mm	SFF-25-1.5
T6	50 ohm，50mm	RFSFBU-086
PCB	30Mil Rogers4350	

Package Outline

Flanged ceramic package; 2 mounting holes; 4 leads



OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-LB/LBB					05/21/2021

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2022/8/5	Rev 1.0	Preliminary Datasheet (NX/SX shared)
2023/5/5	Rev 1.1	Modify the upper limits of frequency to 2GHz
2024/6/4	Rev 1.2	Modify the application with latest result

Application data based on HL-22-32/24-20, TC-24-35

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