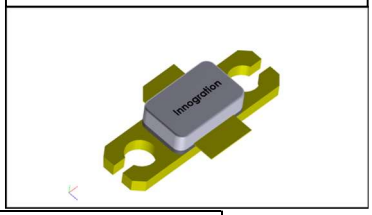
SU6012V GaN TRANSISTOR

Document Number: SU6012V
Preliminary Datasheet V2.0

Gallium Nitride 50V 120W, RF Power Transistor

SU6012V



Description

The SU6012V is a 120W single ended, input matched GaN HEMT, designed for multiple applications with frequencies up to 4GHz.

There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.

•Typical performance (on Innogration 1.8-4.0GHz class AB fixture with device soldered)

SU6012V Vgs=-2.95V Vds=50V Idq=100mA CW						
Freq (MHz)	Psat (dBm)	Psat (W)	IDS (A)	Pin (dBm)	Gain (dB)	Eff(%)
1800	50.21	105.0	4.51	38.98	11.23	46.54
2000	49.54	89.9	3.45	37.87	11.67	52.14
2100	49.23	83.8	3.26	38.08	11.15	51.38
2200	49.93	98.4	3.56	39.57	10.36	55.28
2300	49.41	87.3	3.22	38.94	10.47	54.22
2400	49.88	97.3	3.96	39.63	10.25	49.13
2500	49.67	92.7	4.32	39.51	10.16	42.91
2600	50.70	117.5	5.30	41.65	9.05	44.34
2700	50.80	120.2	5.05	40.80	10.00	47.61
2800	50.52	112.7	4.94	40.56	9.96	45.64
2900	50.35	108.4	4.87	41.10	9.25	44.51
3000	50.08	101.9	4.70	40.43	9.65	43.34
3100	50.24	105.7	4.63	40.74	9.50	45.65
3200	50.21	105.0	4.52	40.96	9.25	46.44
3300	50.34	108.1	4.61	40.87	9.47	46.92
3400	50.10	102.3	4.38	40.91	9.19	46.73
3500	50.31	107.4	4.58	41.06	9.25	46.90
3600	50.35	108.4	4.62	40.82	9.53	46.92
3700	49.94	98.6	4.54	39.86	10.08	43.45
3800	50.14	103.3	4.64	40.01	10.13	44.52
3900	49.83	96.2	4.35	38.73	11.10	44.21
4000	49.36	86.3	3.76	37.86	11.50	45.90

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)

Turning the device OFF

1. Turn RF power off
2. Reduce VGS down to VP, typically –5 V

3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level
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	16	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	$R_{\theta JC}$	2	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}=16mA	V_{DSS}		200		V
Gate Threshold Voltage	V_{DS} = 50V, I_D = 16mA	V_{GS}(th)	-4		-2	V
Gate Quiescent Voltage	V_{DS} =50V, I_{DS}=100mA, Measured in Functional Test	$V_{GS(Q)}$		-3.04		V

Reference Circuit of Test Fixture Assembly Diagram

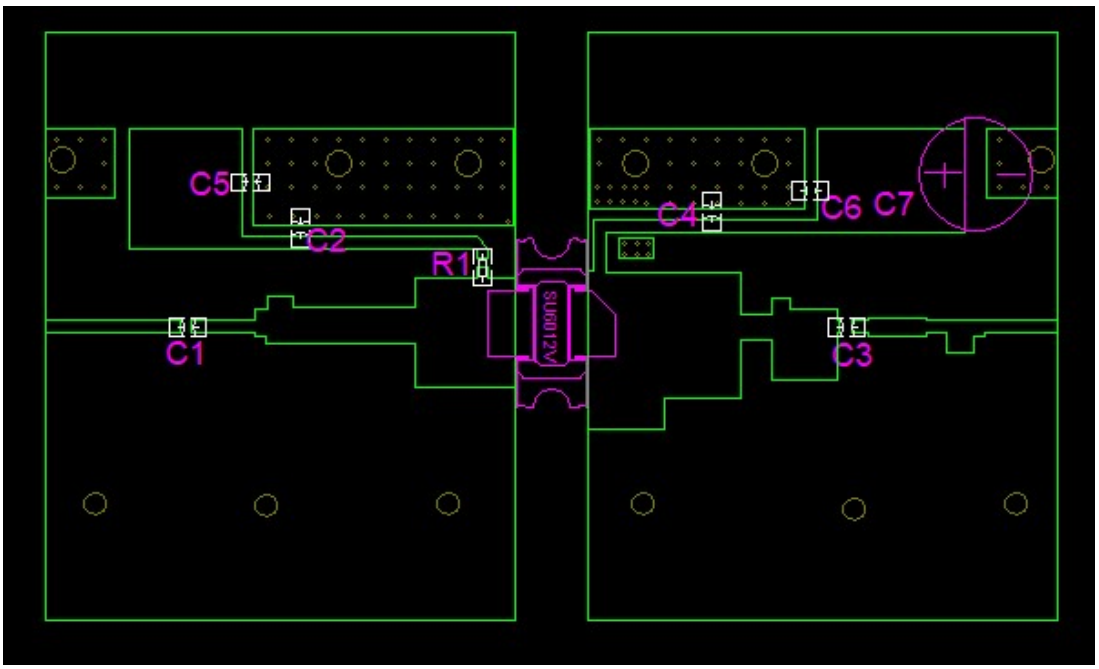
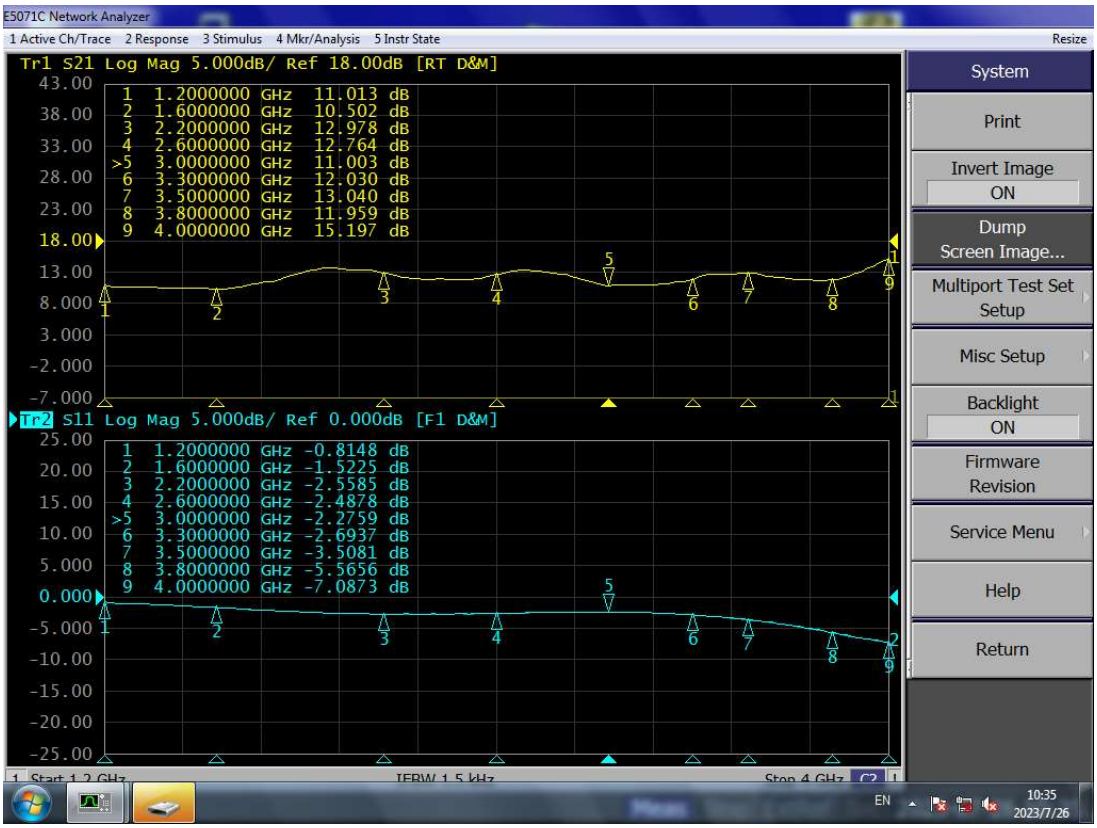


Figure 1. Test Circuit Component Layout (1800-4000MHz)

Table 4. Test Circuit Component Designations and Values

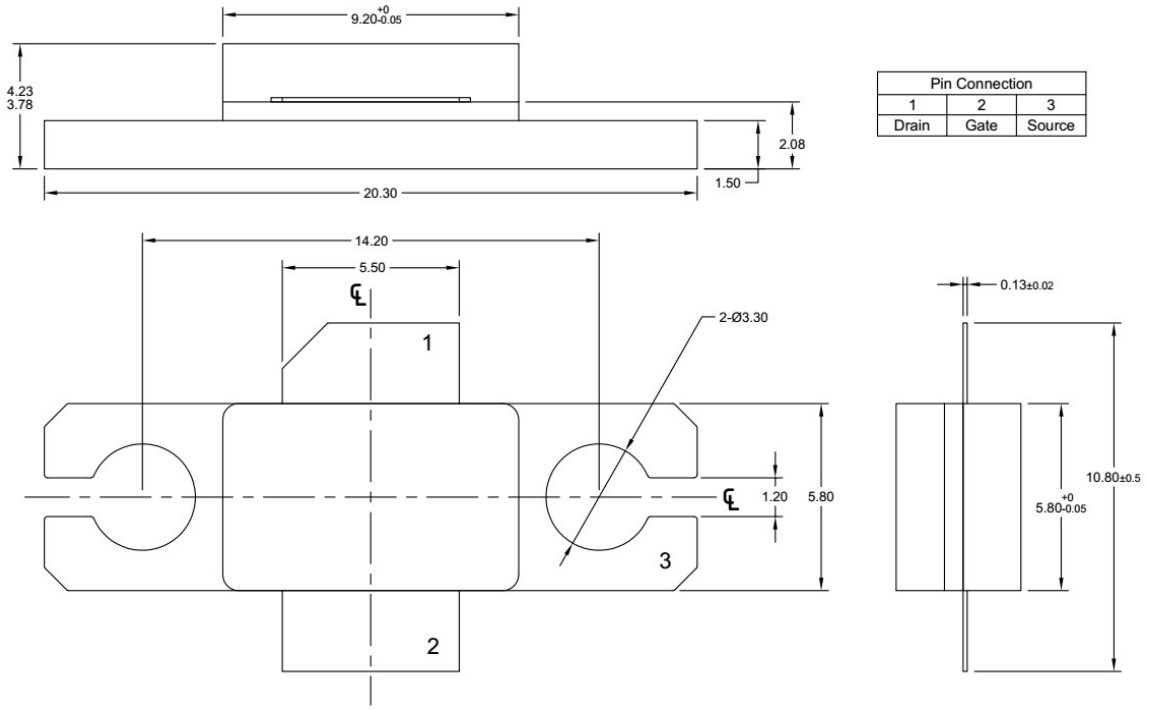
Component	Description	Suggestion
C5,C6	10uF	10uF/100V
C1	8.2pF	MQ101111
C2	4.7pF	MQ101111
C3	6.8pF	MQ101111
C4	9.1pF	MQ101111
C7	470uF/63V	Electrolytic Capacitor
R1	100 Ω	Chip Resistor
PCB	20Mil Rogers4350	

Figure 2. Network Analyzer result S11 and S21



Package Outline

Flanged ceramic package; 2 leads



OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-GXB					10/10/2017

Figure 1. Package Outline PKG-G2E

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2020/5/13	V1.0	Preliminary Datasheet creation
2020/7/7	V1.1	Correct typo on 1st page
2023/7/26	V2.0	Use the latest application result, upper limits to 4GHz

Application data based on YHG-20-11/TC-23-47

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