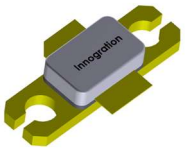
SU3014V GaN TRANSISTOR

Document Number: SU3014V
Preliminary Datasheet V1.0

Gallium Nitride 50V 140W, RF Power Transistor

SU3014V



Description

The SU3014V is a 1400W single ended aN HEMT, designed for multiple applications with frequencies up to 3GHz. It is thermally optimized for wideband CW operation

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

- Typical performance (on fixture with device soldered)：

SU3014V VGS=-3.17V VDS=50V IDQ=200mA CW								
Freq(MHz)	Pout(dBm)	Pout(W)	IDS(A)	Pin(dBm)	Gain(dB)	Eff(%)	2nd harmonic（dBc）	3rd harmonic（dBc）
500	50.89	122.7	4.76	38.87	12.02	51.57	-10.60	-15.60
600	51.23	132.7	5.85	38.59	12.64	45.38	-11.70	-14.10
700	51.72	148.6	6.03	38.64	13.08	49.28	-12.60	-14.40
800	52.52	178.6	5.84	39.81	12.71	61.18	-14.00	-13.30
900	52.48	177.0	5.07	40.09	12.39	69.83	-15.40	-12.70
1000	52.27	168.7	4.77	39.39	12.88	70.72	-17.00	-14.00
1100	52.04	160.0	4.6	39.3	12.74	69.55	-18.50	-14.70
1200	51.98	157.8	4.93	40.13	11.85	64.00	-20.80	-24.40
1300	52.15	164.1	5.34	39.95	12.2	61.45	-26.30	-24.40
1400	52.2	166.0	5.62	39.75	12.45	59.06	-25.80	-47.10
1500	51.9	154.9	5.27	39.64	12.26	58.78	-20.00	-24.40
1600	51.63	145.5	5.13	39.82	11.81	56.74	-24.10	-23.60
1700	51.43	139.0	5.03	39.33	12.1	55.27	-26.20	-36.50
1800	51.71	148.3	5.15	39.91	11.8	57.57	-32.20	-30.70
1900	51.71	148.3	5.48	39.73	11.98	54.11	-37.30	-34.40
2000	51.2	131.8	5.06	40.5	10.7	52.11	-51.30	-26.00
2100	51.22	132.4	5.14	41.35	9.87	51.53	-61.00	-37.00
2200	51.04	127.1	5.13	41.33	9.71	49.54	-43.00	-37.00
2300	51.24	133.0	5.22	40.29	10.95	50.98	-42.50	-33.30
2400	51.46	140.0	5.31	40.71	10.75	52.72	-35.10	-25.00
2500	51.54	142.6	5	40.86	10.68	57.02	-39.10	-25.80

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	20	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= 25°C, Pdiss=100W, FEA	$R_{\theta JC}$	1.2	°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}=20mA	V_{DSS}		200		V
Gate Threshold Voltage	V_{DS} = 50V, I_D = 20mA	V_{GS}(th)	-4		-2	V
Gate Quiescent Voltage	V_{DS} =50V, I_{DS}=200mA, Measured in Functional Test	$V_{GS(Q)}$		-3.18		V

Functional Tests (In Innogration broadband Test Fixture, 50 ohm system) : V_{DD} = 50 Vdc, I_{DQ} = 200 mA, f = 1300 MHz, Pulsed CW

Characteristic	Symbol	Min	Typ	Max	Unit
Power Gain @ Psat	Gp		13		dB
Drain Efficiency@Psat	Eff		60		%
3dB Compressed point	Psat	140	160		W
Input Return Loss	IRL		-4		dB
Mismatch stress at all phases(No device damage)	VSWR		10:1		Ψ

Reference Circuit of Test Fixture Assembly Diagram

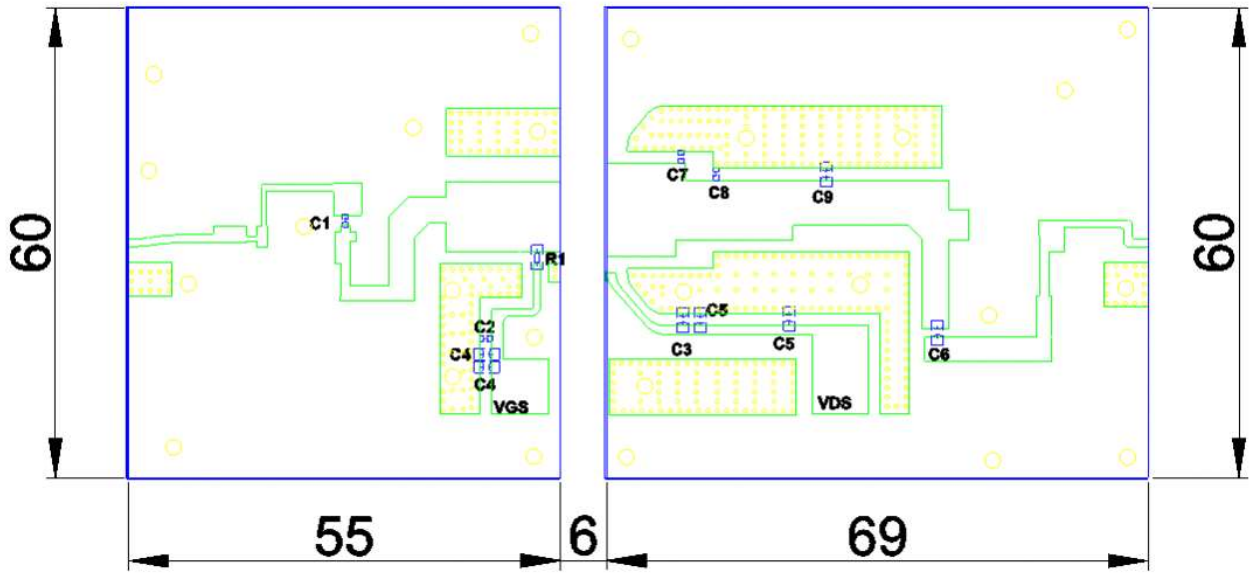


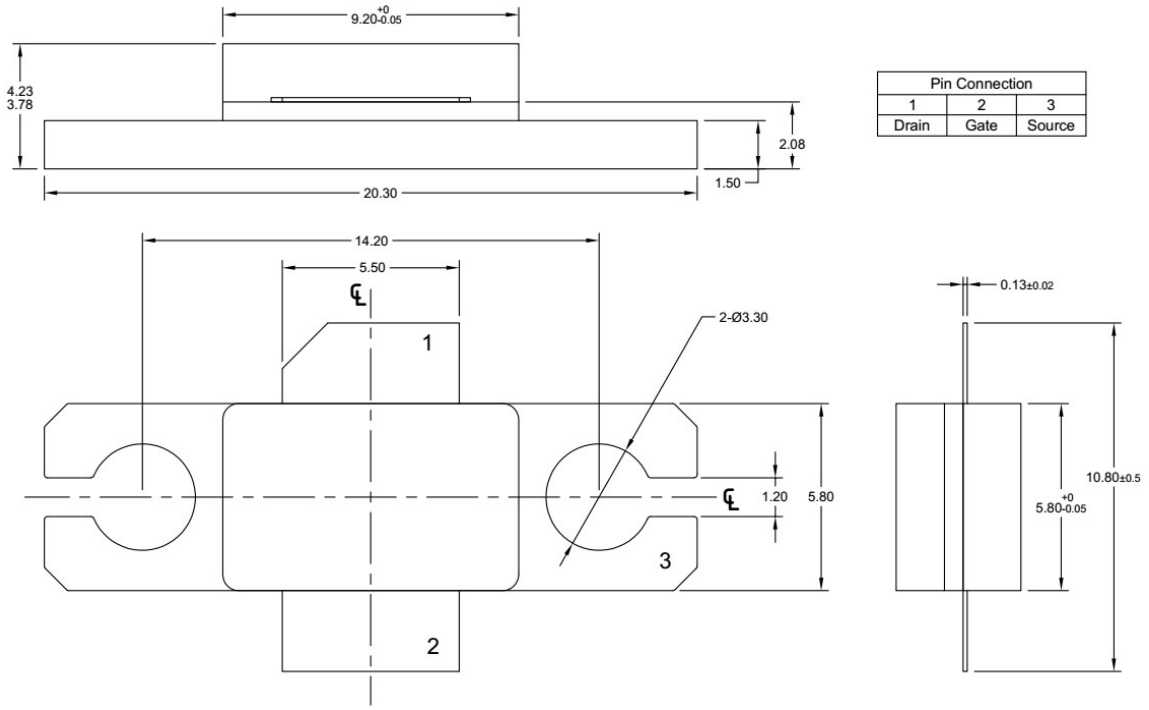
Figure 1. Test Circuit Component Layout (500MHz~2500MHz)

Table 4. Test Circuit Component Designations and Values

Designator	Comment	Footprint	Quantity
C1	18pF	0805	1
C2	120pF	0805	1
C3	82pF	1210	1
C4, C5	10uF/100V	1210	4
C6	100pF	ATC800R	1
R1	360ohm	0603	1
C7,C8	1.5pF	0805	2
C9	1.5pF	1210	1

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
2023/3/10	V1.0	Preliminary Datasheet Creation

Application data based HL-23-09

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