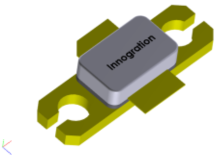
S3U3010V GaN TRANSISTOR

Gallium Nitride 50V 100W, RF Power Transistor

S3U3010V



Description

The S3U3010V is a 100W single ended, unmatched 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 300-3000MHz class AB fixture with device soldered)

V_{gs}= -3.27V，V_{ds}= 50V，I_{dq} = 100mA, Pulse Width=100us，Duty Cycle= 10%

Freq(MHz)	Pin(dBm)	Pout(dBm)	Pout(W)	IDS(A)	Gain(dB)	Eff(%)
300	35.82	51.1	128.82	0.6	15.28	42.94
400	32.23	51.79	151.01	0.47	19.56	64.26
500	30.95	51.24	133.05	0.43	20.29	61.88
600	33.28	51.25	133.35	0.56	17.97	47.63
700	34.29	50.82	120.78	0.58	16.53	41.65
800	37.82	51.05	127.35	0.5	13.23	50.94
900	37.04	51.14	130.02	0.37	14.1	70.28
1000	37.19	51.44	139.32	0.42	14.25	66.34
1100	35.83	51.09	128.53	0.51	15.26	50.40
1200	36.18	50.87	122.18	0.52	14.69	46.99
1300	38.15	51.11	129.12	0.42	12.96	61.49
1400	39.79	50.54	113.24	0.37	10.75	61.21
1500	40.74	50.49	111.94	0.52	9.75	43.06
1600	39.48	50.93	123.88	0.58	11.45	42.72
1700	37.83	51.25	133.35	0.55	13.42	48.49
1800	35.57	50.91	123.31	0.52	15.34	47.43
1900	36.5	50.57	114.02	0.57	14.07	40.01
2000	38.34	50.66	116.41	0.61	12.32	38.17
2100	39.07	50.64	115.88	0.6	11.57	38.63
2200	39.6	50.55	113.50	0.58	10.95	39.14
2300	38.22	50.87	122.18	0.54	12.65	45.25
2400	38.78	50.98	125.31	0.47	12.2	53.33
2500	37.99	51.15	130.32	0.43	13.16	60.61
2600	38.51	51.04	127.06	0.43	12.53	59.10
2700	38.73	50.91	123.31	0.47	12.18	52.47
2800	39.33	50.53	112.98	0.49	11.2	46.11
2900	39.34	50.6	114.82	0.49	11.26	46.86
3000	39.54	50.85	121.62	0.47	11.31	51.75

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	12.6	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,Pulsed CW 10% 100us, Pdiss=130W， FEA	$R_{\theta JC}$	1.1	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}=12.6mA	V_{DSS}		200		V
Gate Threshold Voltage	V_{DS} = 50V, I_D = 12.6mA	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

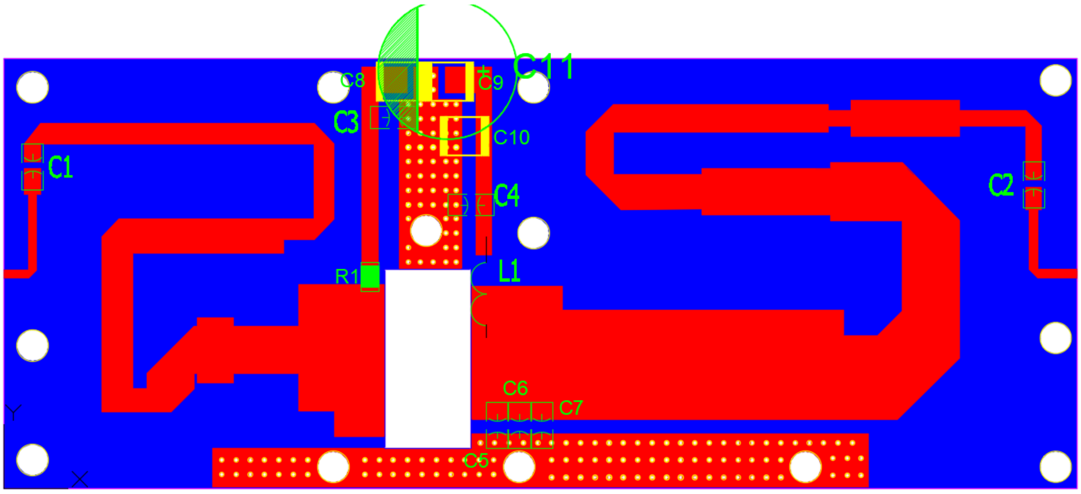
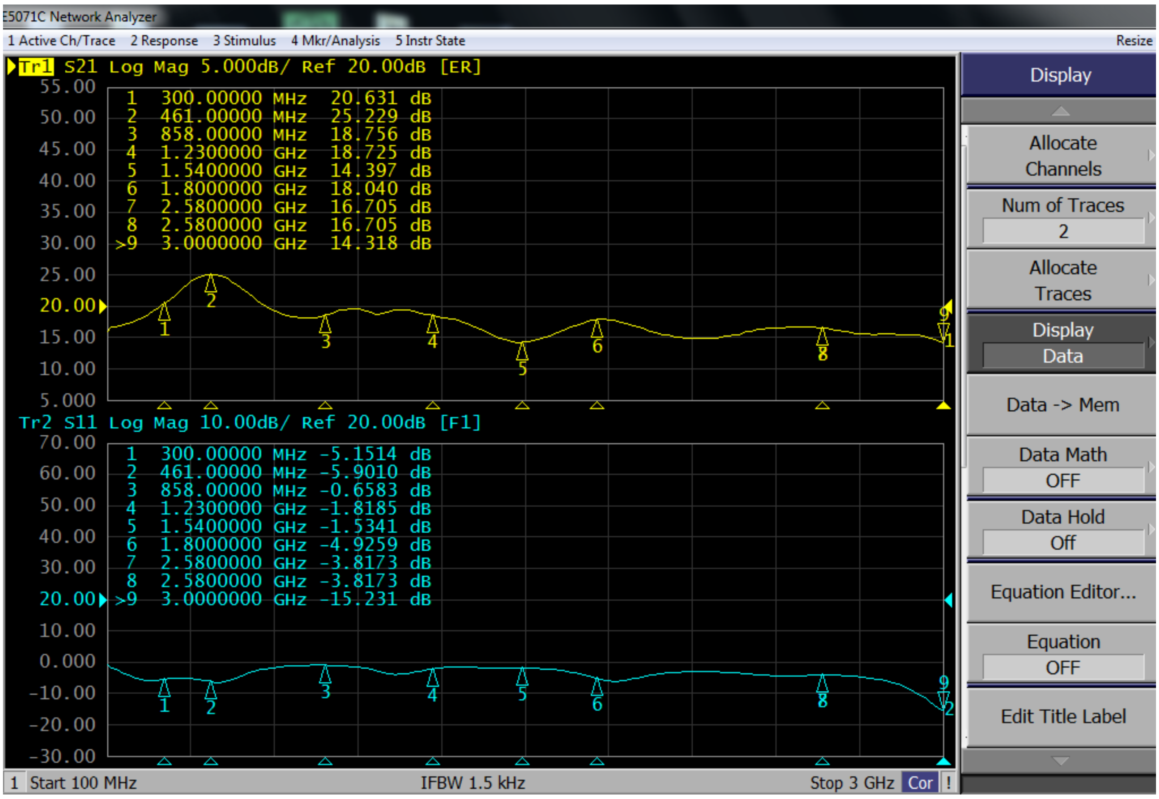


Figure 1. Test Circuit Component Layout (300-3000MHz)

Table 4. Test Circuit Component Designations and Values

Component	Description	Suggested Manufacturer
C11	470uF/63V	-
C8,C9,C10	10uF（1210）	-
C1,C2, C3, C4	18pF(MQ300805)	-
C5， C6,C7	0.8pF(MQ300805)	-
L1	1mm， 3 turns, diameter :5mm	
R1	Chip Resistor,10Ω（0805）	-
PCB	Rogers3010, r = 10.2, 25mils	-

Figure 2. Network Analyzer result S11 and S21



```
Tr1 S21 Log Mag 5.000dB/ Ref 20.00dB [ER]
 1   300.00000 MHz  20.631 dB
 2   461.00000 MHz  25.229 dB
 3   858.00000 MHz  18.756 dB
 4   1.2300000 GHz  18.725 dB
 5   1.5400000 GHz  14.397 dB
 6   1.8000000 GHz  18.040 dB
 7   2.5800000 GHz  16.705 dB
 8   2.5800000 GHz  16.705 dB
>9   3.0000000 GHz  14.318 dB
```

```
Tr2 S11 Log Mag 10.00dB/ Ref 20.00dB [F1]
 1   300.00000 MHz -5.1514 dB
 2   461.00000 MHz -5.9010 dB
 3   858.00000 MHz -0.6583 dB
 4   1.2300000 GHz -1.8185 dB
 5   1.5400000 GHz -1.5341 dB
 6   1.8000000 GHz -4.9259 dB
 7   2.5800000 GHz -3.8173 dB
 8   2.5800000 GHz -3.8173 dB
>9   3.0000000 GHz -15.231 dB
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1  Start 100 MHz          IFBW 1.5 kHz          Stop 3 GHz  Cor  !
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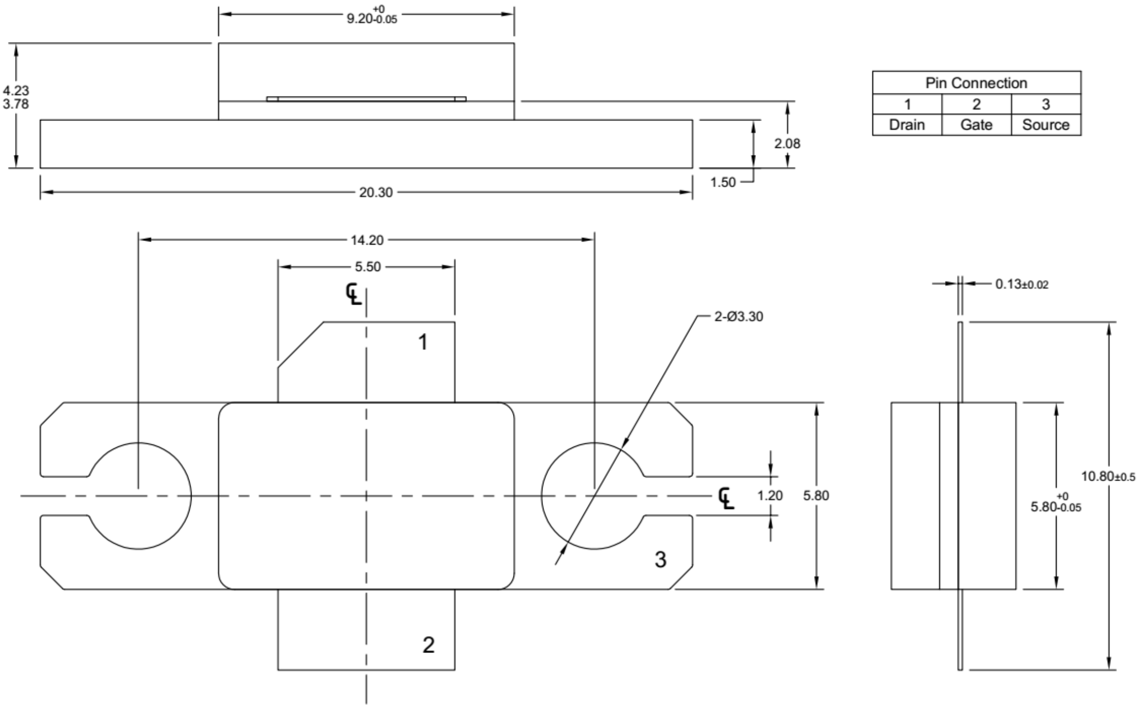
Package Outline

Flanged ceramic package; 2 leads



Unit: mm
Tolerances(unless specified): x.x ±0.1
x.xx ±0.05

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
2026/2/3	**V1.0**	**Preliminary Datasheet creation**

Application data based on YHG-26-07

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