

S3L3020VS^{V0} Class AB 500~4000MHz

Jan. 5, 2024

Introduction

This amplifier is designed with Innogrations 50V GaN transistor.

Demo and Transistor

Frequencyband	: 500~4000MHz
Application	: Multi Market
Configuration	: Class AB
Test Signal	: Pulse
Transistor	: S3L3020VS ^{V0}
Date code	: 235104S-03
PCB	: FSD1020T , Dk=10.2 , 20mil /Rogers4350 20mil

The amplifier has been characterized under the following conditions:

- Network Analyzer plots for gain and IRL.
- The output power measurement using CW

Note: The PA is tested with a supply voltage of $V_{DS} = 50V$, $V_{GS} = -3.31V$, $I_{dq} = 100mA$, all measurements unless otherwise noted.

Test Results

1. Summary @ Bench (Chengdu)

(1) Test Condition

$V_{ds} = 50V$, $V_{gs} = -3.31V$, $I_{dq} = 100mA$

Signal mode: Pulse Width=100us, Duty Cycle= 10%,

S3L3020VS VDS=50V VGS=-3.31V Idq=100mA Pulse width=100us DutyCycle=10%

Freq(MHz)	Psat(dBm)	Psat(W)	Ids(A)	Pin(dBm)	Gain(dB)	Eff(%)	2th(dBc)	3th(dBc)
500	52.84	192.31	0.99	40.44	12.4	38.85	-23.4	-11.0
600	53.78	238.78	0.67	39.68	14.1	71.28	-17.1	-13.5
700	53.31	214.29	0.64	39.41	13.9	66.97	-20.5	-14.0
800	53.23	210.38	0.73	38.83	14.4	57.64	-12.0	-15.3
900	53.66	232.27	1.01	37.86	15.8	45.99	-20.4	-14.7
1000	54.19	262.42	1.04	40.47	13.72	50.47	-20.5	-13.4
1100	54.4	275.42	0.88	40.48	13.92	62.60	-17.2	-14.3
1200	53.83	241.55	0.7	40.28	13.55	69.01	-21.2	-13.4
1300	53.26	211.84	0.65	41.17	12.09	65.18	-33.9	-14.8
1400	53.29	213.30	0.76	41.54	11.75	56.13	-21.4	-15.5
1500	53.5	223.87	0.86	41.21	12.29	52.06	-17.6	-15.5
1600	53.16	207.01	0.84	39.63	13.53	49.29	-16.6	-20.9
1700	53.61	229.61	0.89	36.48	17.13	51.60	-28.0	-22.7
1800	53.6	229.09	0.88	38.58	15.02	52.07	-29.0	-20.0
1900	53.18	207.97	0.91	40.11	13.07	45.71	-28.0	-22.0
2000	52.71	186.64	0.98	41.21	11.5	38.09	-26.9	-29.1
2100	52.15	164.06	0.98	42.02	10.13	33.48	-18.0	-21.5
2200	52.53	179.06	1.01	42.17	10.36	35.46	-19.0	-24.0
2300	53.83	241.55	1.02	44.61	9.22	47.36	/	/
2400	54.19	262.42	0.88	43.21	10.98	59.64	/	/
2500	53.06	202.30	0.77	41.53	11.53	52.55	/	/
2600	52.87	193.64	0.89	41.57	11.3	43.52	/	/
2700	52.39	173.38	0.91	40.79	11.6	38.11	/	/
2800	52.69	185.78	1.03	41.43	11.26	36.07	/	/

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S3L3020VS⁰⁰

2900	53.24	210.86	1.07	42.12	11.12	39.41	/	/
3000	53.67	232.81	0.95	42.27	11.4	49.01	/	/
3100	53.19	208.45	0.79	42.49	10.7	52.77	/	/
3200	52.63	183.23	0.78	43.35	9.28	46.98	/	/
3300	52.01	158.85	0.85	43.04	8.97	37.38	/	/
3400	51.96	157.04	0.86	43.14	8.82	36.52	/	/
3500	52.16	164.44	0.91	42.33	9.83	36.14	/	/
3600	52.09	161.81	0.93	42.74	9.35	34.80	/	/
3700	52.04	159.96	0.93	42.96	9.08	34.40	/	/
3800	51.98	157.76	0.95	43.51	8.47	33.21	/	/
3900	52.22	166.72	0.93	42.87	9.35	35.85	/	/
4000	51.94	156.31	0.87	42.76	9.18	35.93	/	/

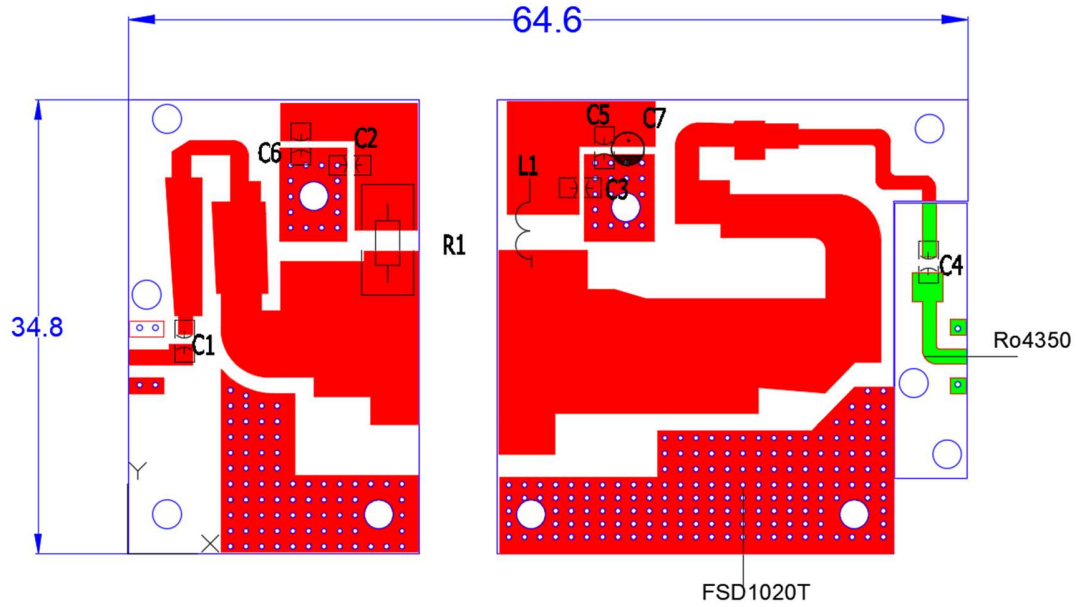
2. Network Results

Test Condition

$V_{gs} = -3.25\text{ V}$, $V_{ds} = 50\text{ V}$, $I_{dq} = 200\text{ mA}$ input power = 0 dBm



BOM of Test Circuit



Component	Description	Suggestion
C7	470uF/63V	
C5,C6	10uF	1210
C1	9.1pF	MQ300805
C2,C3	18pF	MQ101111
C4	4.7pF	MQ300805
R1	Chip Resistor ,100Ω	2512
L1	d=1mm, 2turns, D=3.5mm	
PCB	FSD1020T , Dk=10.2 , 20mil / Rogers 4350 20mil	