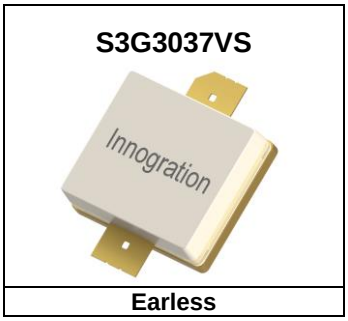
S3G3037VS GaN TRANSISTOR

Document Number: S3G3037VS
Preliminary Datasheet V1.0

GaN HEMT 50V, 370W,S band RF Power Transistor



Description

The S3G3037VS is a 370-watt capable, internally matched GaN HEMT, designed for pulsed amp applications within low end of S band.When used for full band like 2-3GHz etc, it can deliver >300W pulsed CW with high efficiency.

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

It is recommended to use this device only at pulse condition, and power rating will be different according to different pulse width and duty cycle

- Typical **pulse** Performance (On Innogration fixture with device soldered):

V_{DD} = 50 Volts, I_{DQ} = 10 mA, Pulse CW, Pulse width=20us, Duty cycle=10%.

Freq (MHz)	P1-Gain(dB)	P3 (dBm)	P3 (W)	EFF(%) @P3
2000	14.16	55.68	369.47	63.85
2100	15.48	56.11	408.42	63.63
2200	15.29	56.29	420.05	64.61
2300	14.81	56.12	409.22	66.21
2400	14.72	55.92	390.51	66.64
2500	14.05	55.62	364.78	65.59
2600	14.17	55.39	345.87	63.15
2700	14.19	55.46	351.79	62.11
2800	15.26	55.62	365.09	63.38
2900	15.48	55.58	361.30	65.38
3000	14.83	55.46	351.52	66.12

Applications and Features

- Suitable for broad band application in S band pulse amplifier applications.
- 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 (50 V)
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 @ T_C = 25°C	Igmax	47	mA
Storage Temperature Range	Tstg	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature	T_J	+225	°C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case,P_{OUT}=370W @3GHz by FEA 20us/10%, Tcase=85°C, 50 Vdc, I_{DQ} =200 mA	$R_{\theta JC}$	0.75	°C/W

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

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=-8V; I_{DS}=47mA	V_{DSS}	——	200	——	V
Gate Threshold Voltage	V_{DS} = 10V, I_D = 47mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	V_{DS} =50V, I_{DS}=340mA, Measured in Functional Test	$V_{GS(Q)}$	——	-3.22	——	V

Load Mismatch (In Innogration Test Fixture, 50 ohm system): V_{DD} = 50 Vdc, I_{DQ} = 100 mA, f = 3000 MHz

VSWR 10:1 at 370W pulse CW Output Power	No Device Degradation

TYPICAL CHARACTERISTICS

Figure 1. Power Gain and Drain Efficiency as Function of Pulse Output Power

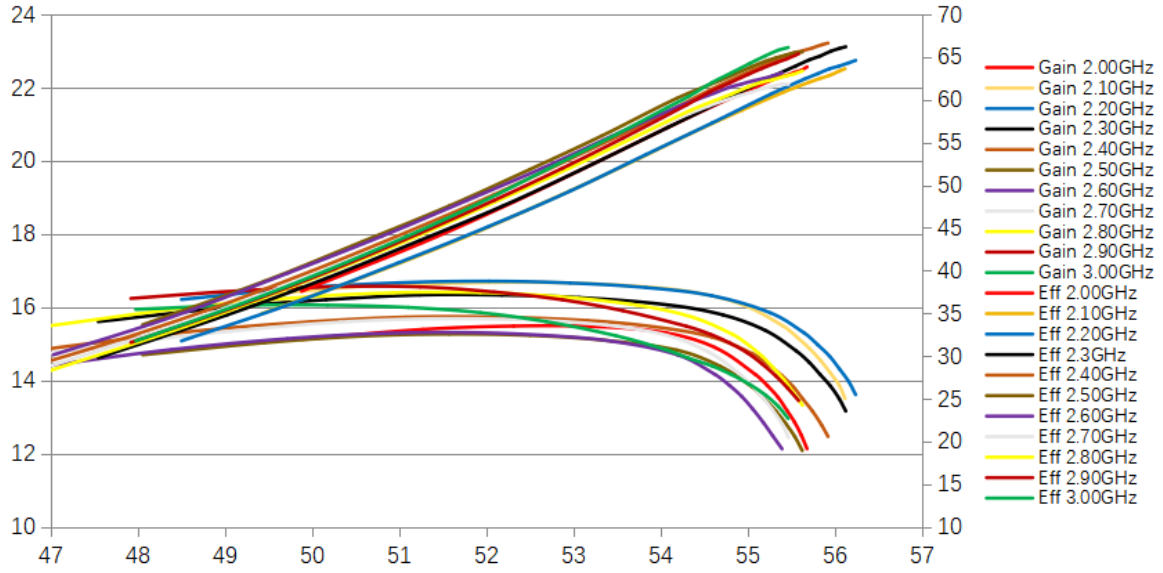


Figure 2. Network analyzer output S11/S21

VDS=50V IDQ=350mA VGS=-3.2V

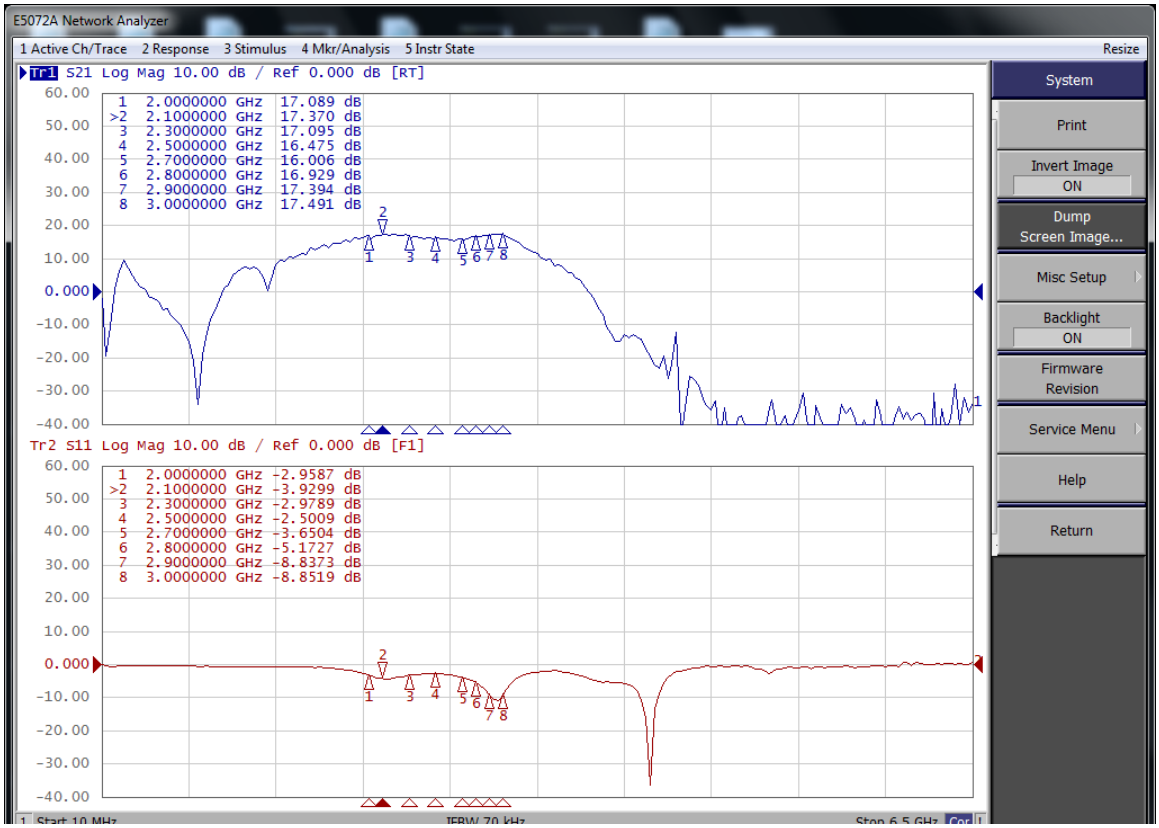
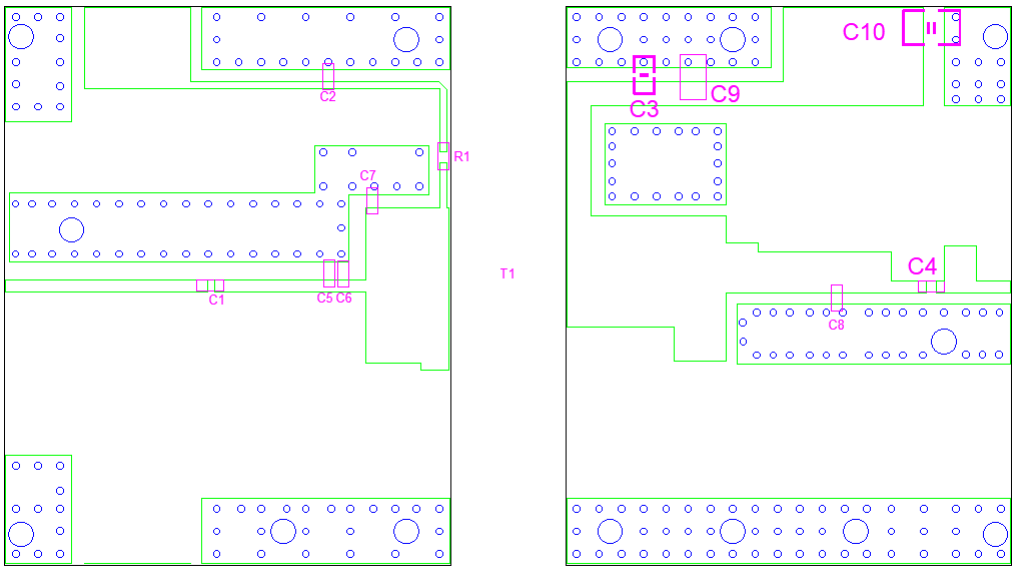
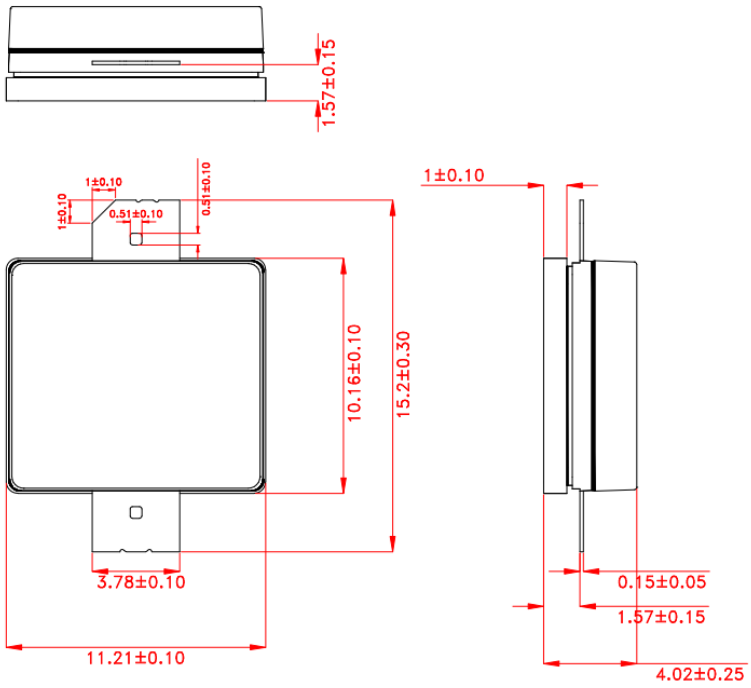


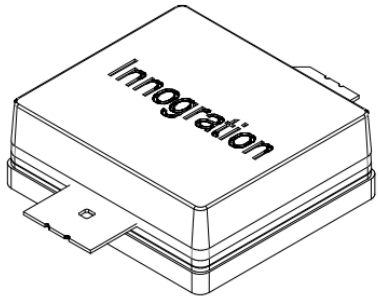
Figure 3. Test Circuit Component Layout



Part	Quantity	Description	Part Number	Manufacture
C1,C2,C3,C4	4	10pFHigh Q Capacitor	251SHS100BSE	TEMEX
R1	1	10Ω Power Resistor	ESR03EZPF100	ROHM
C9,C10	2	10uF MLCC	GRM32EC72A106ME05	Murata
C5	1	0.9pFHigh Q Capacitor	251SHS0R9BSE	TEMEX
C6,C8	2	0.5pFHigh Q Capacitor	251SHS0R5BSE	TEMEX
C7	1	0.3pFHigh Q Capacitor	251SHS0R3BSE	TEMEX
T1	1	GaN Transistor	S3G3037VS	Innogration

Package Dimensions （Unit:mm）





Unit:mm

Tolerance ±0.10mm,Except as Noted.

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2025/5/7	Rev 1.0	Preliminary Datasheet

Application data based on LWH-25-17

Notice

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