



## Gallium Nitride 50V, 190W, DC-3GHz RF Power Transistor

### Description

The SL3019VS is a 190W, **single ended** GaN HEMT, designed for multiple applications with frequencies up to 3GHz. It is optimized thermally to support wideband CW application.

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

### SL3019VS



SL3019VS VDS=50V Idq=100mA Vgs=-2.95V CW						
F(MHz)	Pin (dBm)	Psat (dBm)	Psat (W)	I(A)	Gain (dB)	Eff (%)
800	40.0	52.4	173.8	5.7	12.4	61.0
900	40.4	52.32	170.6	5.7	11.9	59.9
1000	39.4	52.53	179.1	6.5	13.1	55.1
1100	41.2	53.27	212.3	7.5	12.1	56.6
1200	39.9	53.21	209.4	7.2	13.3	58.2
1300	41.3	52.85	192.8	6.7	11.6	57.5
1400	39.71	52.71	186.6	6.2	13.0	60.2
1500	39.54	52.54	179.5	6	13.0	59.8
1600	39.59	52.39	173.4	6.15	12.8	56.4
1700	38.1	52.3	169.8	6.3	14.2	53.9
1800	37.92	52.42	174.6	6.5	14.5	53.7
1900	37.73	52.3	169.8	6.4	14.6	53.1
2000	37.45	52.35	171.8	6.1	14.9	56.3

\*Other application upon request: 225-2000MHz >100W

### Applications

- L band power amplifier application
- P band power amplifier application

### Important Note: Proper Biasing Sequence for GaN HEMT Transistors

#### Turning the device ON

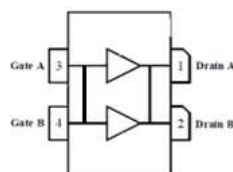
1. Set VGS to the pinch-off (VP) voltage, typically -5 V
2. Turn on VDS to nominal supply voltage
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

#### 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

Figure 1: Pin Connection definition

Transparent top view (Backside grounding for source)



**\*Notice: Both leads at input and output are internally connected, device is only usable as single ended**



**Table 1. Maximum Ratings**

Rating	Symbol	Value	Unit
Drain--Source Voltage	$V_{DSS}$	+200	Vdc
Gate--Source Voltage	$V_{GS}$	-8 to +0.5	Vdc
Operating Voltage	$V_{DD}$	32	Vdc
Maximum gate current	$I_{gs}$	24	mA
Storage Temperature Range	$T_{stg}$	-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 by FEA $T_c=25^\circ\text{C}$ , at $P_d=150\text{W}$ ,	$R_{\theta JC}$	1.0	°C /W

**Table 3. Electrical Characteristics (TA = 25°C unless otherwise noted)**

**DC Characteristics**

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=-8\text{V}$ ; $I_{DS}=24\text{mA}$	$V_{DSS}$		200		V
Gate Threshold Voltage	$V_{DS}=10\text{V}$ , $I_D=24\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS}=50\text{V}$ , $I_{DS}=100\text{mA}$ , Measured in Functional Test	$V_{GS(Q)}$		-3.0		V

**Ruggedness Characteristics**

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	50V 2GHz, $P_{out}=190\text{W}$ pulsed CW, All phase, No device damages	VSWR		10:1		

**Figure 2: Network analyzer output, S11 and S21**

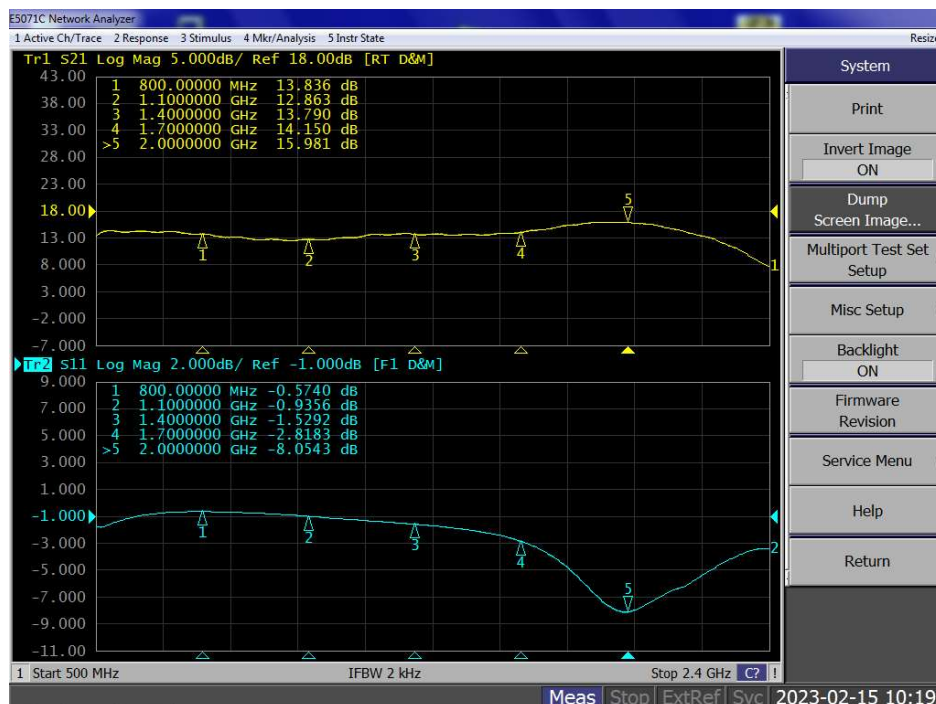


Figure 4: Picture of application board for 0.8-2GHz Class AB

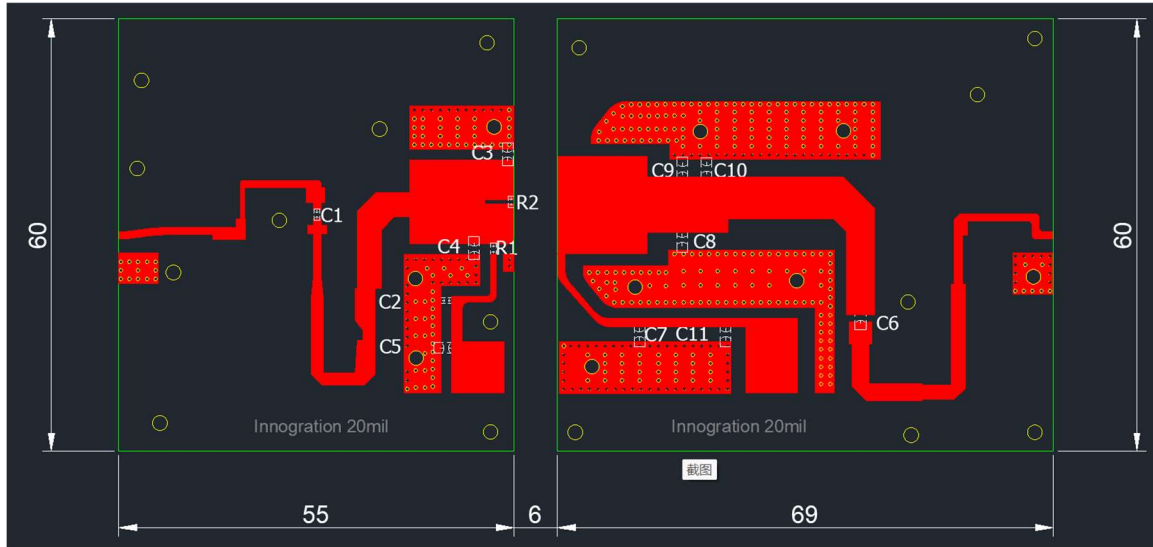
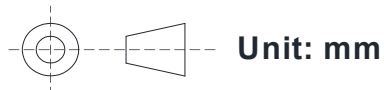
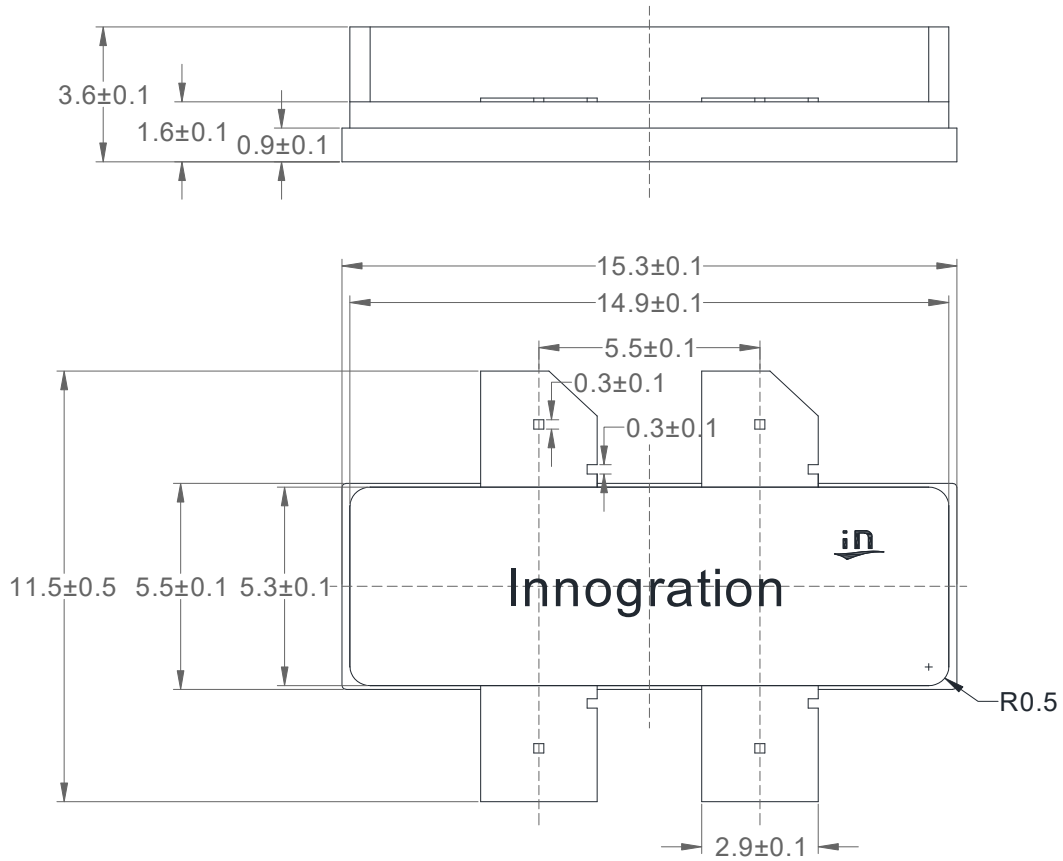


Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 30Mils)

Part	description	Model
C5,C11	10uF/100V	Ceramic multilayer capacitor
C1,C2	56PF 600F	
C3	3.9PF 100B	
C4	3.3PF 100B	
R1,	8.2Ω	Chip Resisto
R2	10Ω	Chip Resistor
C6,C7	39PF 100B	
C8,C9	1.8PF 100B	
C10	1.0PF 100B	
PCB	0.508mm [0.020"] thick, εr=3.50, Rogers 4350B, 1 oz. copper	



Earless Flanged Ceramic Package; 4 leads





## Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2023/2/15	V1.0	Production Datasheet Creation

Application data based on SYX-23-04/07

## Notice

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