



Gallium Nitride 50V, 400W, DC-1.5GHz RF Power Transistor

Description

The SL1540VS is a 400W, **single ended** GaN HEMT, designed for multiple applications with frequencies up to 1.5GHz. It is optimized thermally to support CW application.

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

- Typical RF performance on wideband application board with device soldered at 25 degree C Pulsed CW signal



$V_{ds} = 50V$, $I_{DQ} = 170mA$, $V_{gs} = -3.12V$

Freq (MHz)	P1dB(dBm)	P1dB(W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB(dBm)	P3dB(W)	P3dB Eff(%)
400	54.93	311.5	65.1	19.26	56.36	432.3	74.4
420	54.78	300.4	65.3	19.55	56.04	401.7	72.4
440	54.6	288.7	63.2	19.8	56.1	407.4	76.7
460	54.85	305.4	64.6	19.73	56.21	418.1	74.0
480	54.8	302.2	66.3	19.86	56.13	409.7	76.3
500	55.07	321.1	70.5	20.21	56.16	413.1	81.6

CW signal:

$V_{ds} = 50V$, $I_{DQ} = 170mA$, $V_{gs} = -3.12V$

Freq (MHz)	P1dB(dBm)	P1dB(W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB(dBm)	P3dB(W)	P3dB Eff(%)
400	54.68	293.7	62.4	18.2	56.22	419.0	71.9
420	54.36	272.8	61.4	18.38	55.81	381.1	70.1
440	54.33	270.7	61.3	18.66	55.93	391.5	71.1
460	54.41	275.9	61.3	18.82	55.86	385.8	70.8
480	54.77	299.8	65.6	18.83	56.07	404.1	75.3
500	55.07	321.1	71.0	19.19	55.9	389.4	79.3

Applications

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

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

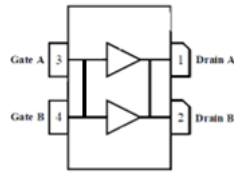
1. Set VGS to the pinch-off (VP) voltage, typically -5 V
2. Turn on VDS to nominal supply voltage
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

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}	55	Vdc
Maximum gate current	I_{GS}	50	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 $T_C = 85^\circ\text{C}$, at $P_d = 200\text{W}$,	$R_{\theta JC}$	0.5	°C /W

Table 3. Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}$; $I_{DS} = 50\text{mA}$	V_{DSS}		200		V
Gate Threshold Voltage	$V_{DS} = 10\text{V}$, $I_D = 50\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS} = 50\text{V}$, $I_{DS} = 100\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-3.2		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	50V 1.5GHz, $P_{out} = 400\text{W}$ pulsed CW, All phase, No device damages	VSWR		10:1		

Figure 3: Picture of application board for 400-500MHz Class AB

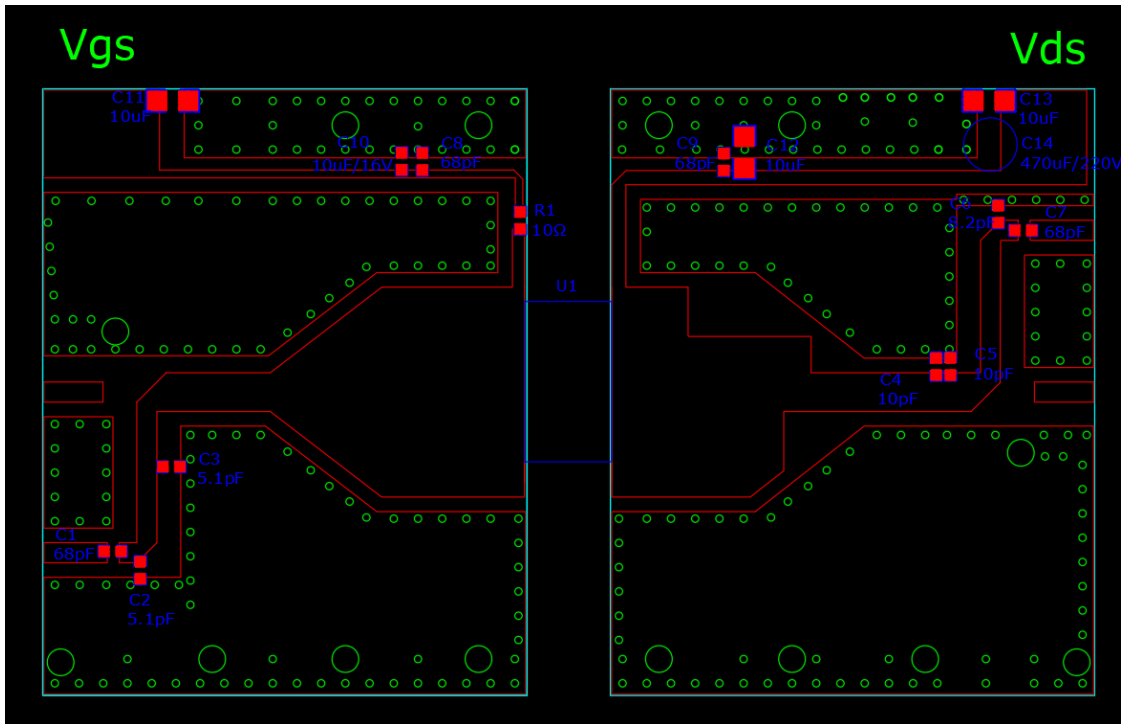
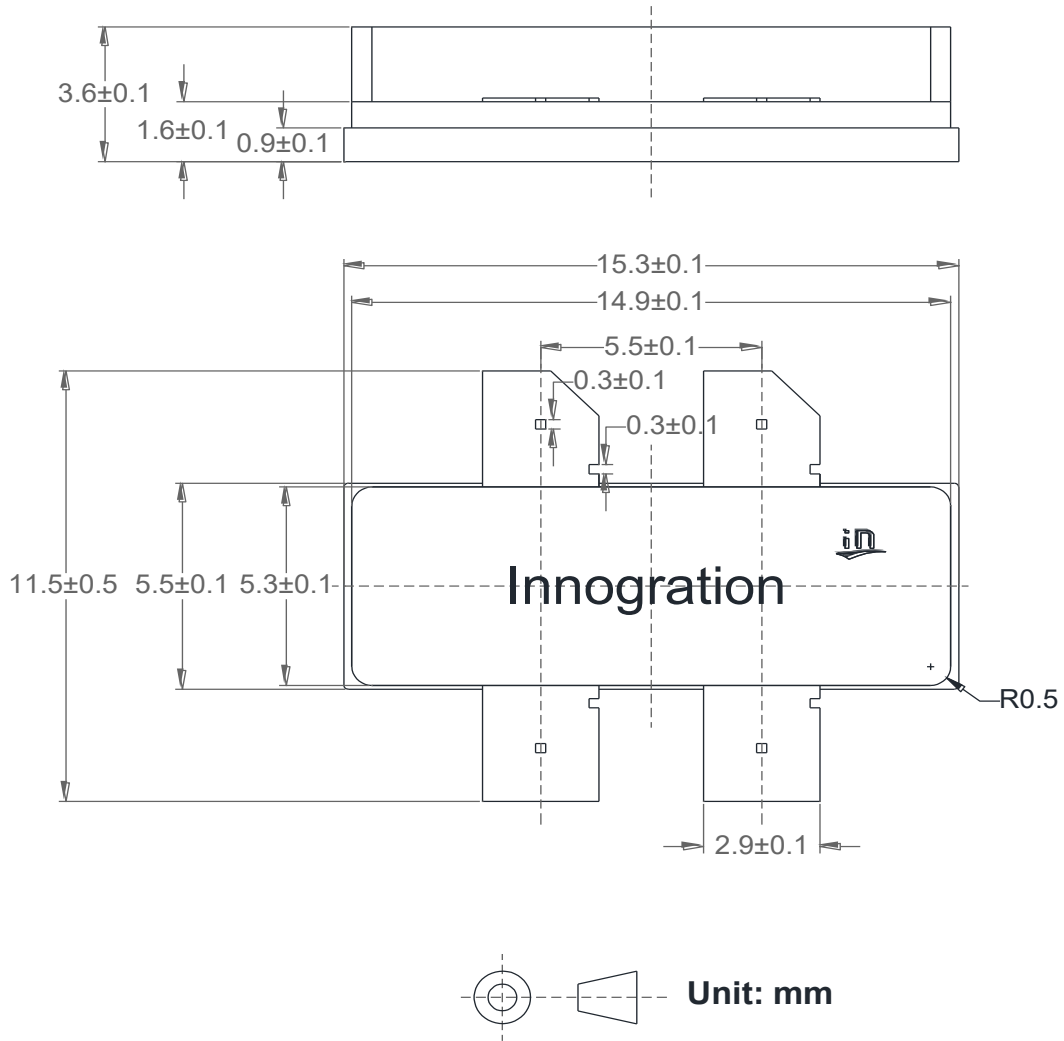


Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 30Mils)

Component	Value	Quantity
U1	SL1540VS	1
C1、C8、C9	68pF	3
C7	34pF	2
C2、C3	5.1pF	2
C4、C5	10pF	2
C6	8.2pF	1
C10	10uF/16V	1
C11、C12、C13	10uF/63V	3
R1	10Ω	1
C14	470uF/220V	1



Earless Flanged Ceramic Package; 4 leads





Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2023/9/27	V1.0	Production Datasheet Creation

Application data based on ZYX-23-09

Notice

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