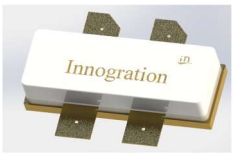
GaN HEMT 50V, 180W,5.8GHz RF Power Transistor

STAV58180L4



Description

The STAV58180L4 is a single ended 180watt, GaN HEMT, ideal for ISM applications at 5.8GHz.

It can support CW, pulse and linear applications.

There is no guarantee of performance when this part is used outside of stated frequencies.

- Typical pulse CW performance across the band with device soldered

V_{DD} = 50 Vdc,Idq=20mA Tc=25°C, air cooling

Pulsed CW:

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
5800	52.26	168.2	55.5	14.58	53.54	225.7	58.0

CW:

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
5800	51.71	148.3	50.0	13.5	53	200	53.0

Applications

- C band Class AB power amplifier
- 5.8GHz RF Energy

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

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	Igs	30	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 by FEA T_C= 25°C, at Pd=180W at 5.8GHz	$R_{\theta JC}$	0.8	°C /W

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

DC Characteristics

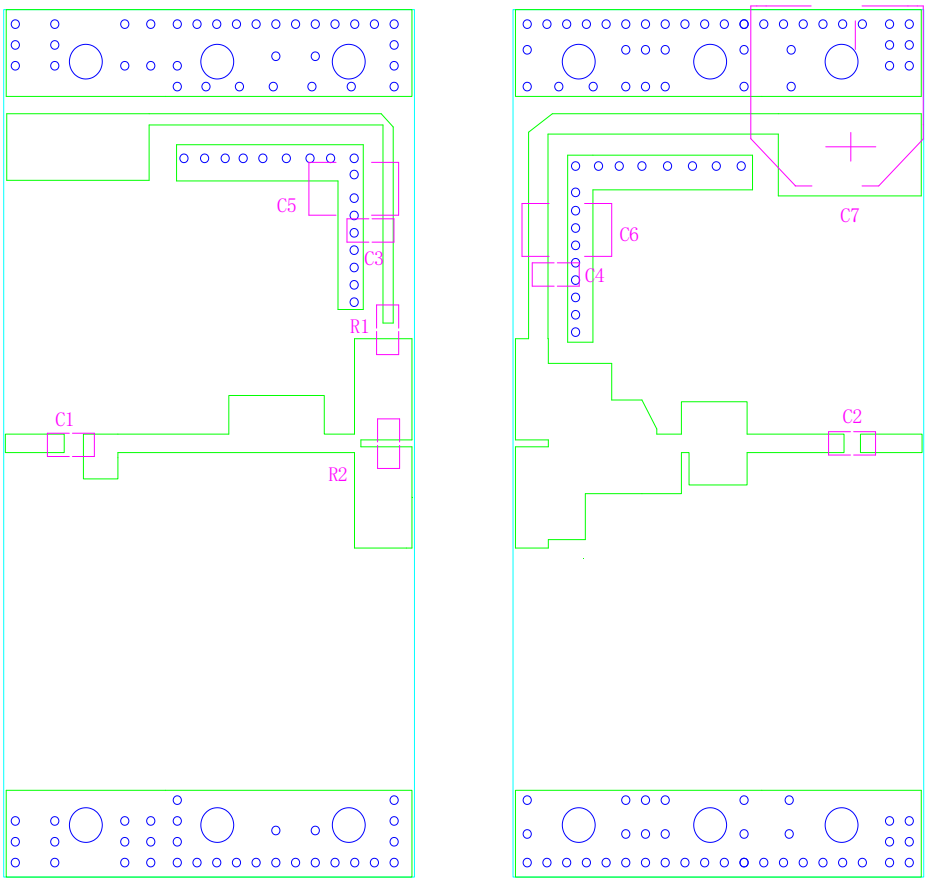
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=32mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 32mA	$V_{GS(th)}$	-4	-	-2	V
Gate Quiescent Voltage	VDS =50V, IDS=20mA, Measured in Functional Test	$V_{GS(Q)}$		--3.1		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	5.8GHz, Pout=180W pulse CW All phase, No device damages	VSWR		10:1		

Reference Circuit of Test Fixture Assembly Diagram

PCB materials: Ro4350B , DXF file upon request



Designator	Comment	Footprint	Quantity
C1, C2, C3, C4	3.9 pF/250V	0805	4
C5, C6	10uF/100V	1210	2
C7	100uF/63V		1
R1, R2	10 Ω	0603	2

Figure 3: Efficiency and power gain as function of Pout

(V_{DD} = 50 Vdc, I_{DQ} = 100mA, Pulse width=20us, duty cycle=10%，5.8GHz)

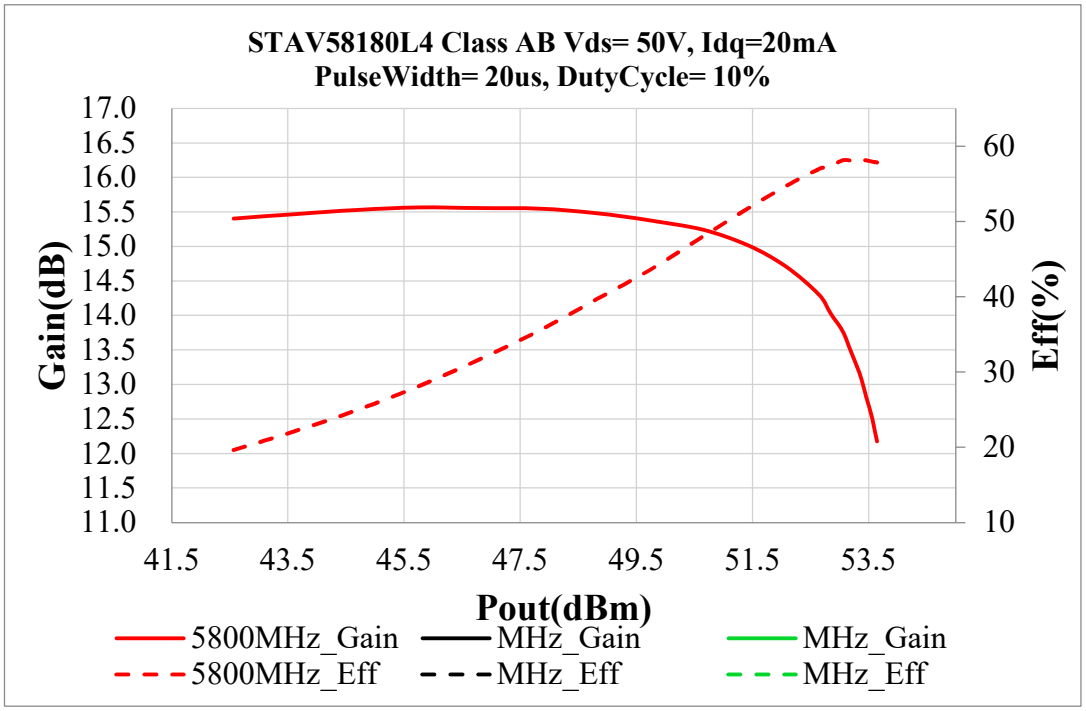
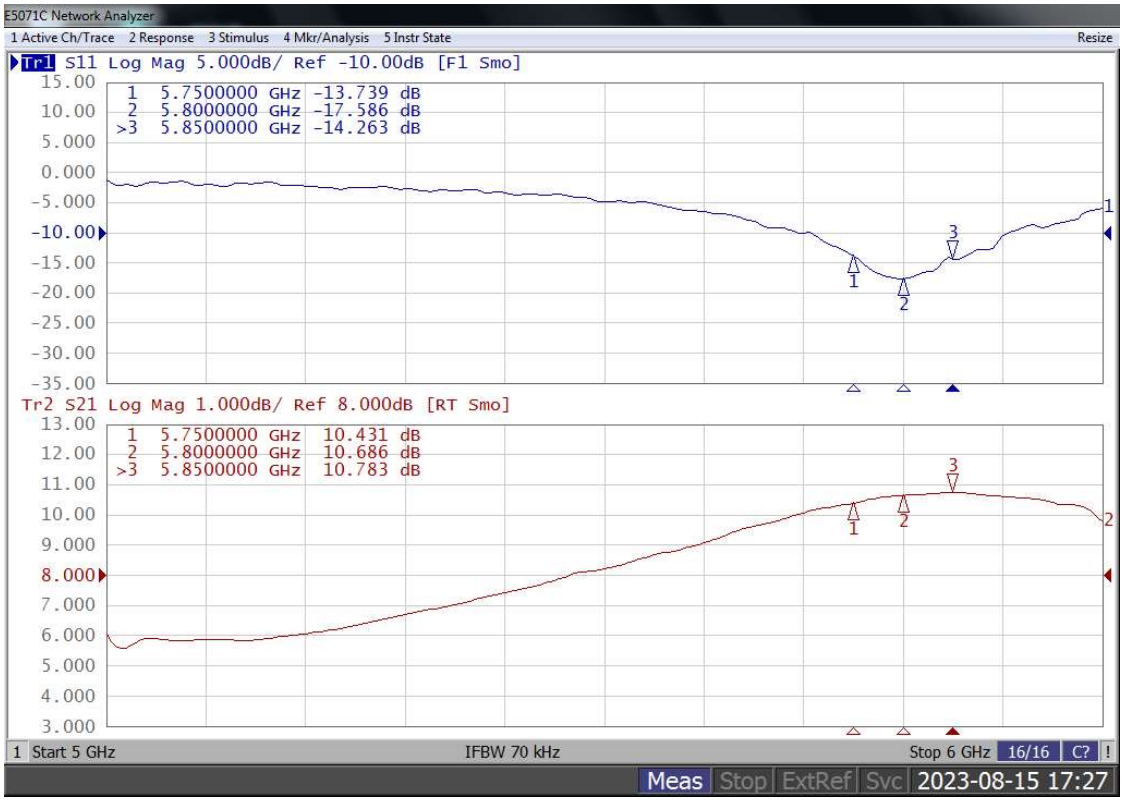
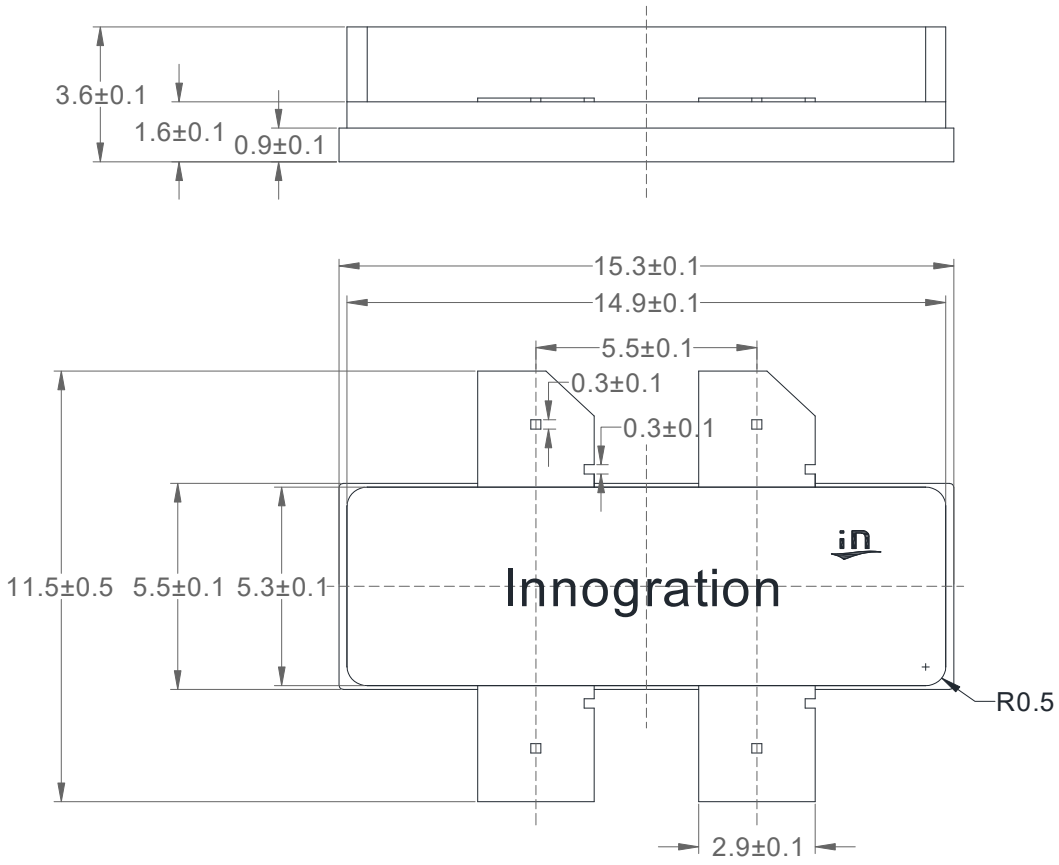


Figure 4: S11/S21 output from Network analyser (VDS= 50V, IDQ=100 mA Vgs =-3.08V)



Earless Flanged Ceramic Package; 4 leads



Unit: mm

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2023/8/15	**V1.0**	**Preliminary Datasheet Creation**

Application data based on: LSM-23-26

Notice