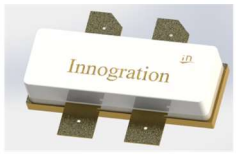
GTAH30130L4 GaN TRANSISTOR

Document Number: GTAH30130L4
Product Datasheet V2.0

Gallium Nitride 28V 130W, 3GHz RF Power Transistor

GTAH30130L4



Description

The GTAH30130L4 is a 130W internally matched, GaN HEMT, designed for multiple applications, up to 3GHz

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

In its typical wideband application, it can deliver 80W CW at 28V, and 100W at 30V across the full band of 0.5-3.0GHz.

- Typical **CW** performance (on 0.5-3.0GHz fixture with device soldered)：

Vds=28V, Idq=100mA

Freq(GHz)	Pin(dBm)	Psat(dBm)	Psat(W)	Ids(A)	Gain(dB)	Eff(%)
0.5	40.3	51.5	140.9	10.22	11.2	49.2
0.6	37.5	51.0	124.5	6.59	13.4	67.4
0.7	35.5	49.9	97.1	4.43	14.4	78.2
0.8	35.8	49.8	94.4	5.01	13.9	67.3
0.9	38.0	50.3	107.2	5.47	12.3	70.0
1.0	37.6	50.3	105.9	5.78	12.7	65.5
1.1	36.6	50.1	103.0	5.70	13.5	64.6
1.2	37.5	50.3	105.9	6.12	12.7	61.8
1.3	36.5	49.8	94.6	5.47	13.3	61.8
1.4	35.6	49.7	93.1	5.96	14.1	55.8
1.5	34.4	50.2	103.5	7.51	15.8	49.2
1.6	34.7	50.1	102.3	8.69	15.4	42.1
1.7	37.7	51.9	153.1	10.06	14.2	54.4
1.8	38.0	52.1	161.8	9.66	14.1	59.8
1.9	39.3	51.6	145.9	7.89	12.4	66.0
2.0	39.4	50.0	100.0	5.68	10.6	62.9
2.1	39.0	49.9	98.2	5.93	10.9	59.1
2.2	36.9	50.1	103.3	6.76	13.2	54.6
2.3	37.1	50.1	102.6	7.06	13.0	51.9
2.4	38.4	50.3	105.9	7.33	11.8	51.6
2.5	39.3	50.6	113.8	7.74	11.3	52.5
2.6	37.4	50.7	118.0	7.44	13.3	56.7
2.7	37.0	50.6	115.3	6.96	13.6	59.2
2.8	37.1	50.2	104.5	6.59	13.1	56.6
2.9	37.4	49.6	91.6	5.96	12.3	54.9
3.0	39.0	49.8	95.1	6.08	10.8	55.8

Recommended driver: G2MAH0133-12 (2 stage higher gain MCDA)

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Applications and Features

- Suitable for wireless communication infrastructure, wideband amplifier, EMC testing, ISM etc.
- High Efficiency and Linear Gain Operations
- 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

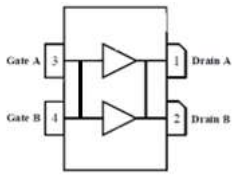
1. Set VGS to the pinch--off (VP) voltage, typically –5 V
2. Turn on VDS to nominal supply voltage (28V)
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

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}	150	Vdc
Gate--Source Voltage	V_{GS}	-10,+2	Vdc
Operating Voltage	V_{DD}	36	Vdc
Maximum Forward Gate Current @ TC = 25°C	Igmax	28.8	mA
Storage Temperature Range	Tstg	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature(See note 1)	T_J	+225	°C
Total Device Power Dissipation (Derated above 25°C, see note 2)	Pdiss	120	W

Note: 1. Continuous operation at maximum junction temperature will affect MTTF
2.Bias Conditions should also satisfy the following expression: Pdiss < (Tj – Tc) / RJC and Tc = Tcase

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T_C= 85°C, RF CW operation，Pout=80W, 3GHz	$R_{\theta JC}$	1.2	C/W

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

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=-8V; I_{DS}=28.8mA	V_{DSS}	150			V
Gate Threshold Voltage	V_{DS} = 28V, I_D =28.8mA	V_{GS}(th)	-4		-2	V
Gate Quiescent Voltage	V_{DS} =28V, I_{DS}=200mA, Measured in Functional Test	$V_{GS(Q)}$		-2.6		V

Typical performance

0.5-3.0GHz

Figure 1: Small singal gain and return loss Vs Frequency

Vgs=-2.6V, Vds=28V, Idq=300mA, input power=0dBm

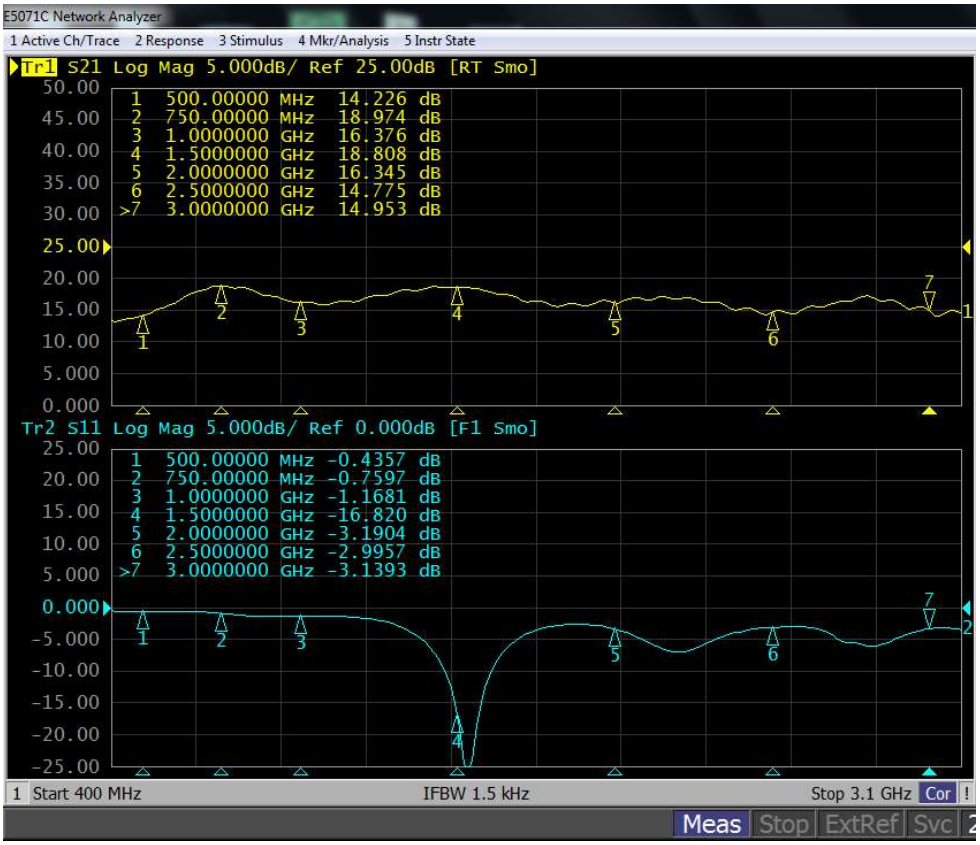
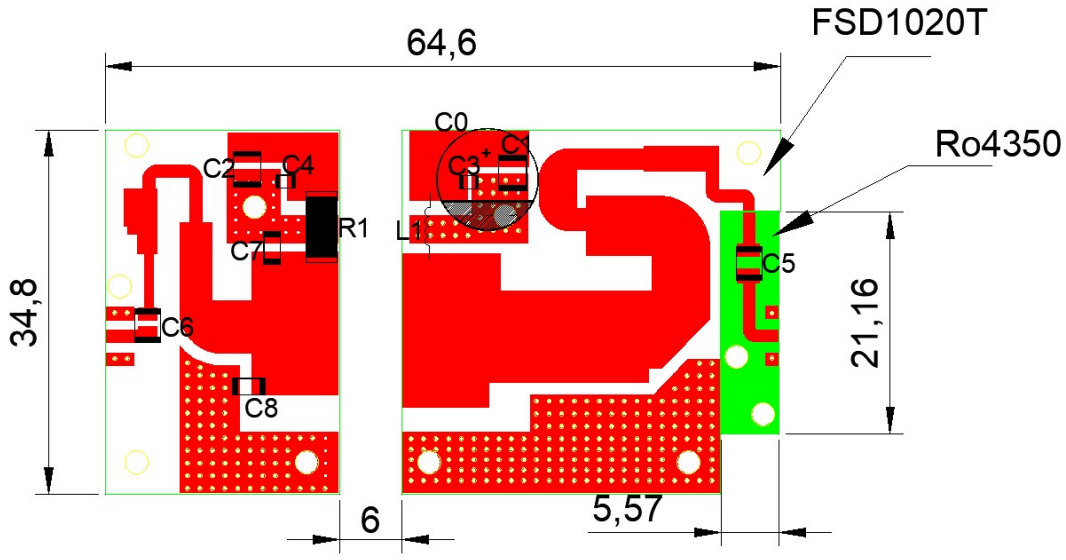


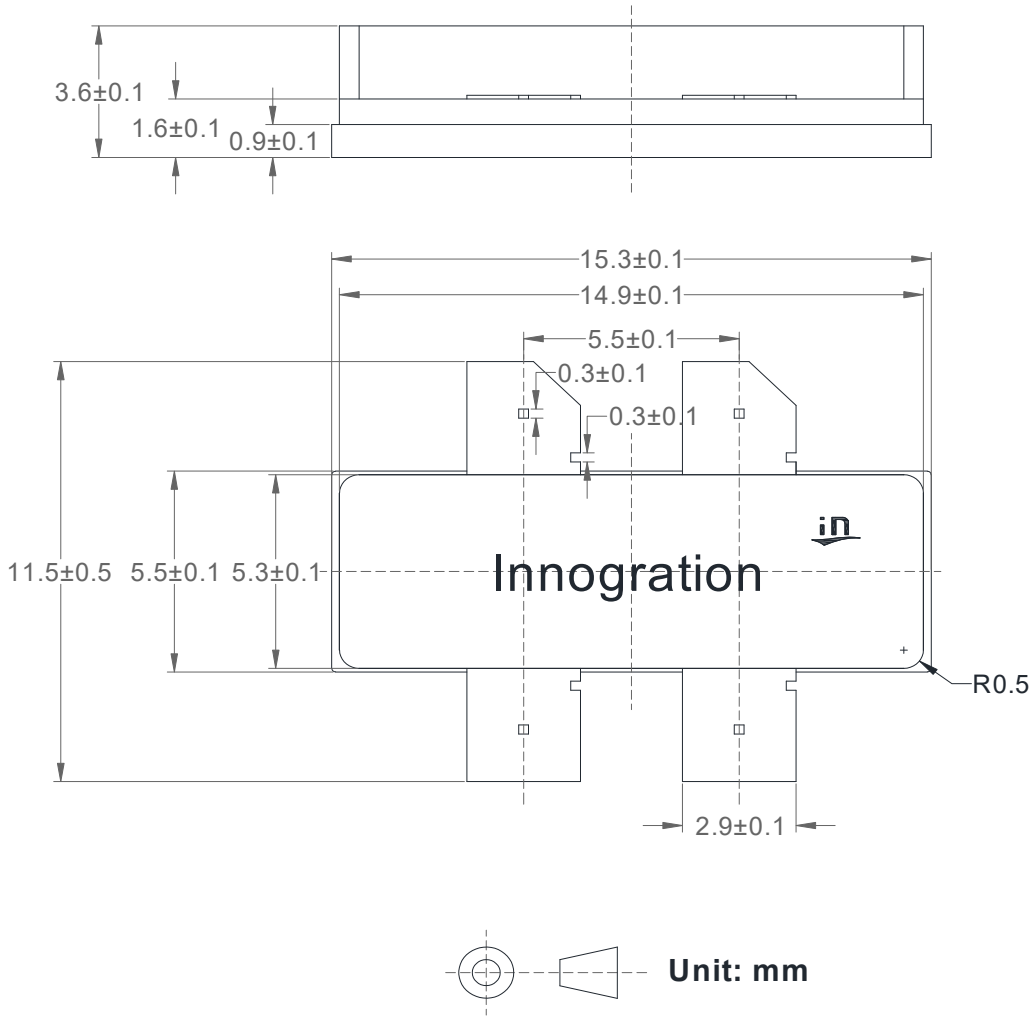
Figure 3: Picture and Bill of materials of 0.5-3GHz wide band application circuit

(Layout Gerber file upon request)



Component	Description	Suggestion
C0	470uF/63V	
C1,C2	10uF	1210
C3	100pF	MQ300805
C4	56pF	MQ300805
C5,C6	27pF	MQ101111
C7,C8	1pF	MQ301111
R1	Chip Resistor ,100Ω	2512
L1	d=1.5mm， 2 turns,D=4.8mm	
PCB	FSD1020T ， Dk=10.2 ， 20mil / Rogers 4350 20mil	

Earless Flanged Ceramic Package; 4 leads



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2023/8/11	V1.0	Production Datasheet Creation
2023/11/4	V2.0	Update per latest application work
2023/12/26	V2.1	Update per latest application work

Application data based on TC-23-70/RXT-23-50

Notice

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