



Gallium Nitride, 130W,3-4GHz RF Power Transistor

Description

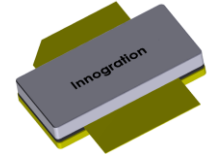
The GTAH42130BY2 is a 130W 28V, both input and output matched transistor, ideal for any application within S band 3.0-4.0GHz, in typical full band application, it can deliver more than 100W CW.

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

- Typical performance across 3.0-4.0GHz class AB application circuit with device soldered

$V_{ds}=28V$ $I_{dq}=180mA$

GTAH42130BY2



Freq(MHz)	Pin(dBm)	Psat(dBm)	Psat(W)	Ids(A)	Gain(dB)	Eff(%)
3000	36.30	50.77	119.4	9.30	14.5	46.0
3100	36.21	50.76	119.1	9.19	14.6	46.3
3200	36.80	50.86	121.9	8.75	14.1	49.8
3300	37.68	51.13	129.7	8.85	13.5	52.3
3400	37.81	50.93	123.9	8.00	13.1	55.3
3500	37.32	50.45	110.9	7.02	13.1	56.4
3600	37.60	50.46	111.2	8.89	12.9	44.7
3700	37.17	50.87	122.2	9.00	13.7	48.5
3800	37.29	51.02	126.5	8.87	13.7	50.9
3900	37.36	50.94	124.2	8.68	13.6	51.1
4000	37.95	50.87	122.2	8.46	12.9	51.6

Recommended driver: GTAH80008PD

Applications

- S band CW power amplifier
- 5G Power amplifier

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}	+150	Vdc
Gate--Source Voltage	V_{GS}	-10 to +2	Vdc
Operating Voltage	V_{DD}	32	Vdc
Maximum gate current	I_{gs}	28.8	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°C, at P _{out} =130W CW at 3.5GHz	R _{θJC}	1.1	°C /W

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

DC Characteristics (measured on wafer prior to packaging)

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} =10V, I _D = 28.8mA	V _{GS(th)}	-4		-2	V
Gate Quiescent Voltage	V _{DS} =28V, I _{DS} =180mA, Measured in Functional Test	V _{GS(Q)}		-2.5		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	3.5 GHz, P _{out} =130W Pulsed CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature

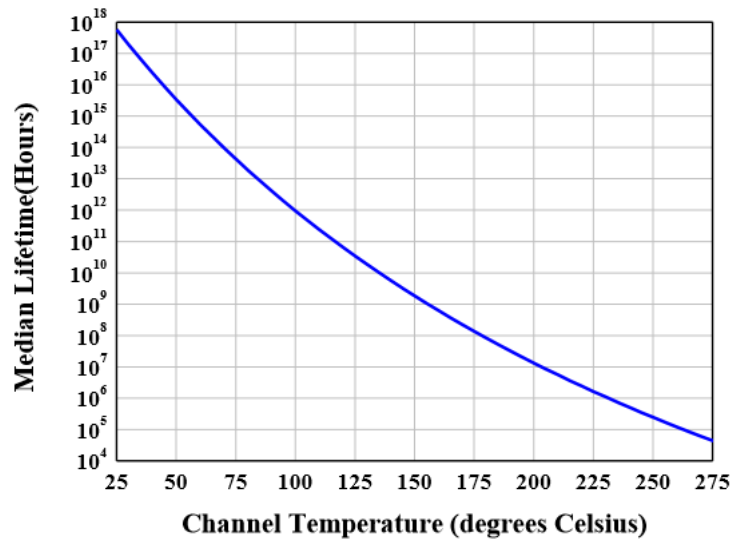


Figure 3: Network analyzer output, S11 and S21 (3.0-4.0GHz Class AB)

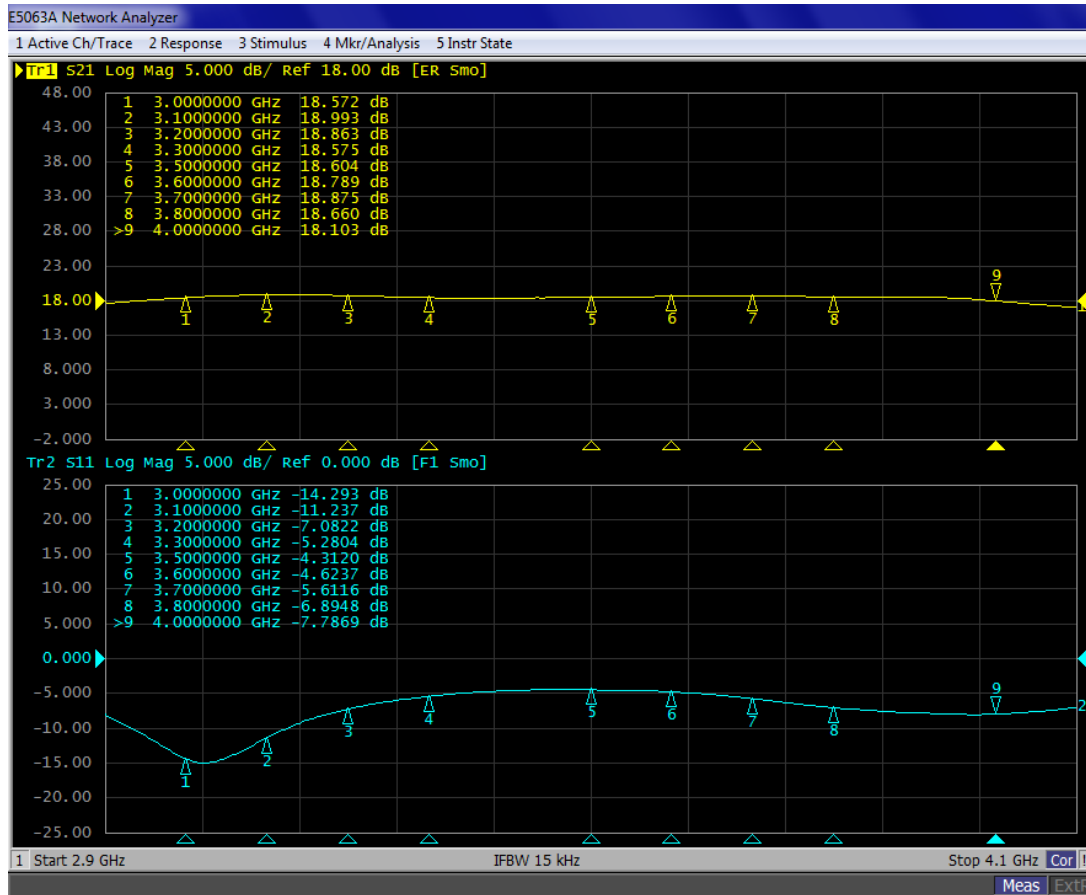


Figure 4: Picture of application board 3.0-4.0GHz class AB

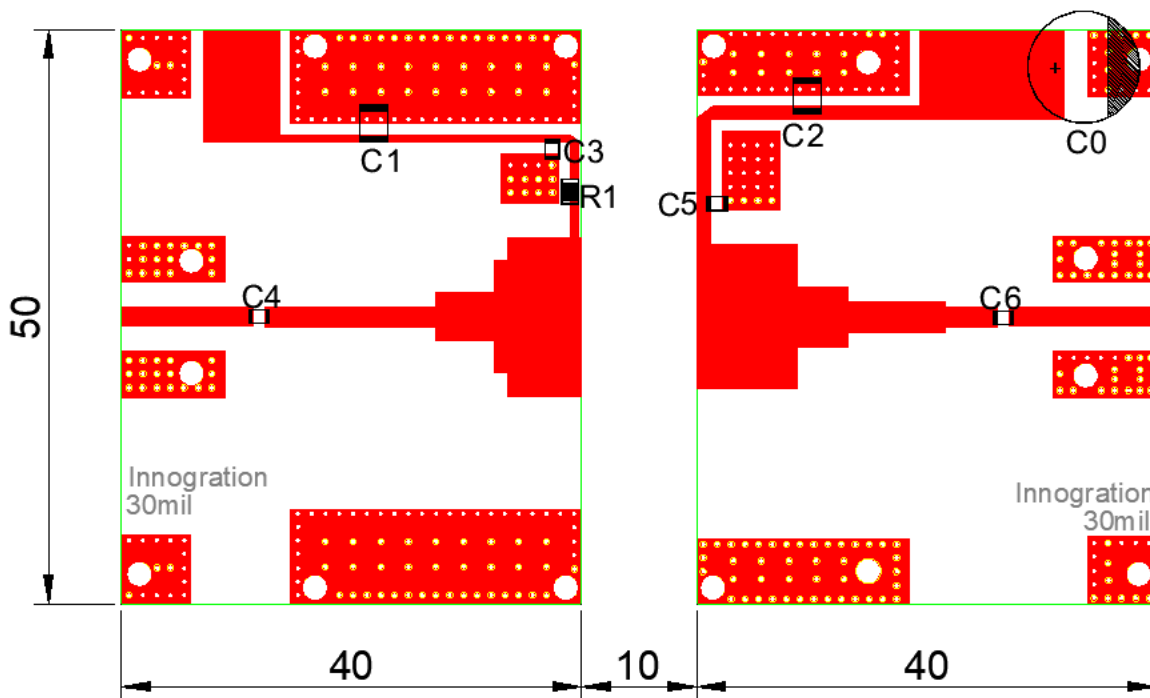




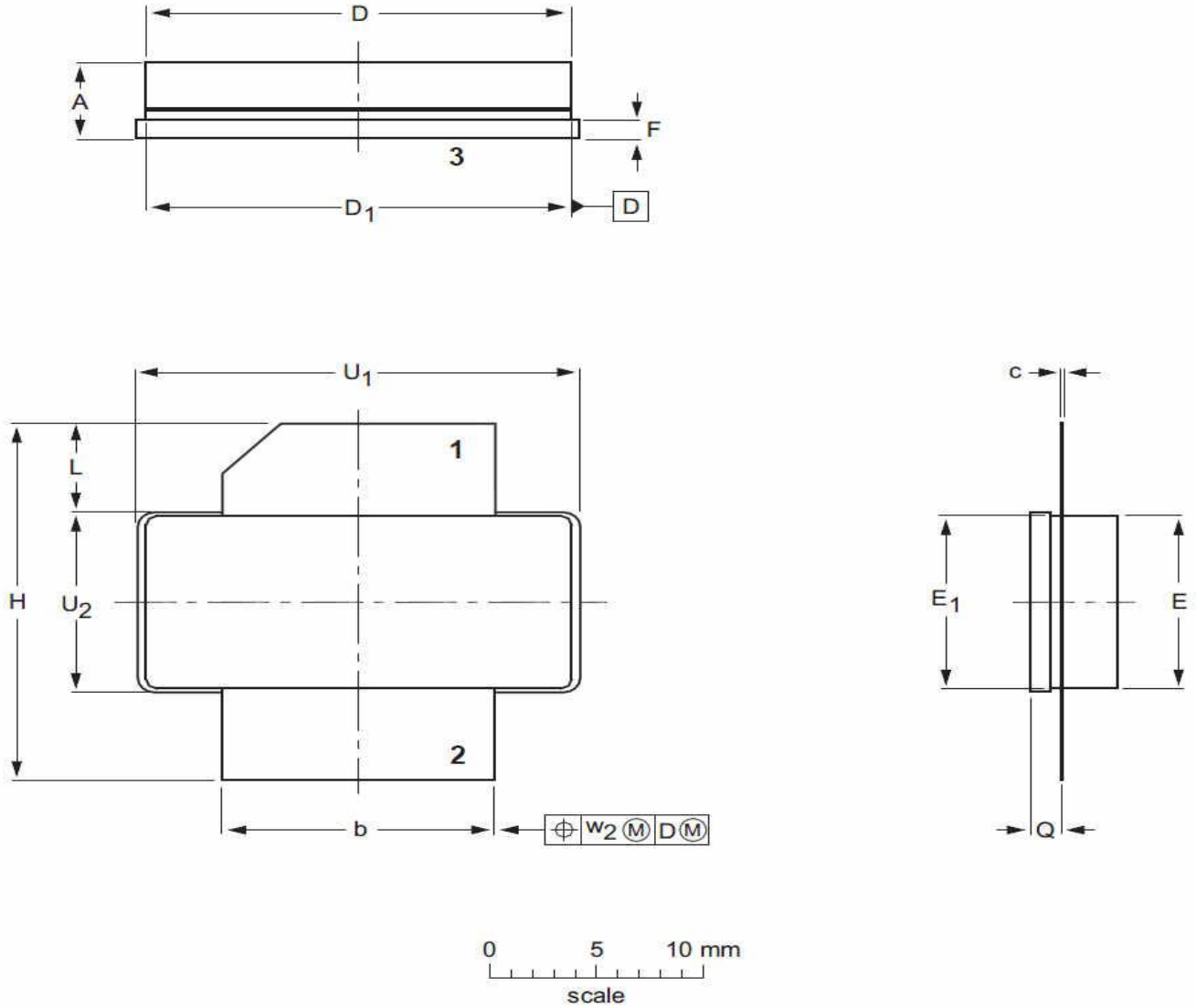
Table 4. Bill of materials of application board (PCB layout upon request)

Component	Description	Suggestion
C0	1000uF/63V	Electrolytic Capacitor
C1, C2	10uF	1210
C3, C4	4.3pF	Beijing YuanLu HongYuan Electronic Technology CO., LTD MQ200805
C5	5.1pF	Beijing YuanLu HongYuan Electronic Technology CO., LTD MQ200805
C6	5.1pF	Beijing YuanLu HongYuan Electronic Technology CO., LTD MQ301111
R1	Chip Resistor,10Ω	0805
PCB	Rogers 4350B, thickness 30 mils, 1oz copper	



Package Outline

Earless flanged ceramic package; 2 leads (1—DRAIN、2—GATE、3—SOURCE)



UNIT	A	b	c	D	D ₁	E	E ₁	F	H	L	Q	U ₁	U ₂	W ₂
mm	4.72	12.83	0.15	20.02	19.96	9.50	9.53	1.14	19.94	5.33	1.70	20.70	9.91	0.25
	3.43	12.57	0.08	19.61	19.66	9.30	9.25	0.89	18.92	4.32	1.45	20.45	9.65	
inches	0.186	0.505	0.006	0.788	0.786	0.374	0.375	0.045	0.785	0.210	0.067	0.815	0.390	0.010
	0.135	0.495	0.003	0.772	0.774	0.366	0.364	0.035	0.745	0.170	0.057	0.805	0.380	

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-B2					03/12/2013



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2024/11/8	V1.0	Preliminary Datasheet Creation

Application data based on: RXT-24-51

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