



## GaN 140W,0.8-2GHz ,28V,RF Power Transistor

### Description

The GTAH21140B4 is a 28V 140W CW device, both input and output matched GaN HEMT, ideal for multiple applications from 0.8-2GHz, and at higher voltage 32V, capable to output more than 130W.

It can support linear and saturated , pulsed or CW application, configured as push pull or single ended

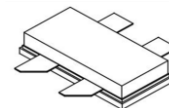
There is no guarantee of performance when this part is used outside of stated frequencies.

- Typical performance across 0.8-2GHz class AB application circuit with device soldered

### CW signal,Idq=120mA

Voltage (V)	Freq (GHz)	Psat (W)	Eff (%)	Power Gain (dB)
28	0.8-2	120-150	>53	12.5-14.5
32	0.8-2	140-175	>53	13.5-15.5

### GTAH21140B4



### Applications

- L band pulse power amplifier
- wideband power amplifier
- Beidou 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

Figure 1: Pin Connection definition

Transparent top view (Backside grounding for source)

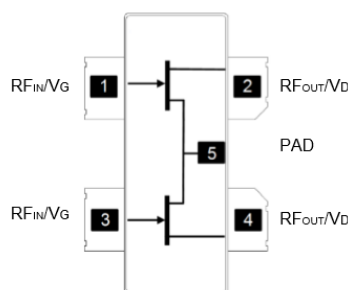


Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	$V_{DS}$	+150	Vdc
Gate--Source Voltage	$V_{GS}$	-10 to +2	Vdc
Operating Voltage	$V_{DD}$	36	Vdc
Maximum gate current	$I_{gs}$	36	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 $P_{out}=100\text{W}$ CW at 2GHz	$R_{\theta JC}$	0.9	$^\circ\text{C}/\text{W}$

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

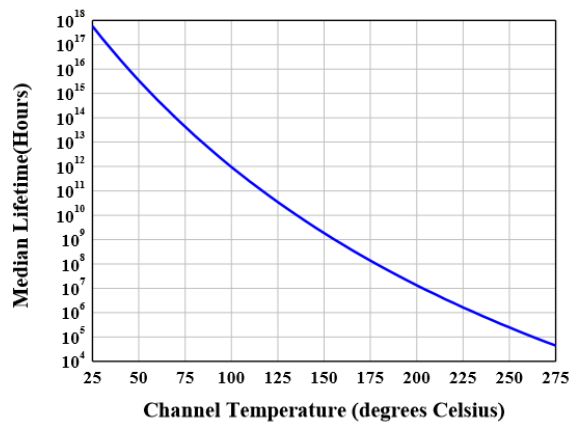
**DC Characteristics (measured on wafer prior to packaging)**

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=-8\text{V}$ ; $I_{DS}=36\text{mA}$	$V_{DSS}$		150		V
Gate Threshold Voltage	$V_{DS}=10\text{V}$ , $I_D=36\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS}=28\text{V}$ , $I_{DS}=180\text{mA}$ , Measured in Functional Test	$V_{GS(Q)}$		-2.4		V

**Ruggedness Characteristics**

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	2GHz, $P_{out}=100\text{W}$ Pulsed CW All phase, No device damages	VSWR		10:1		

**Figure 2: Median Lifetime vs. Channel Temperature**



**Figure 3: Picture of application board 0.8-2GHz class AB**

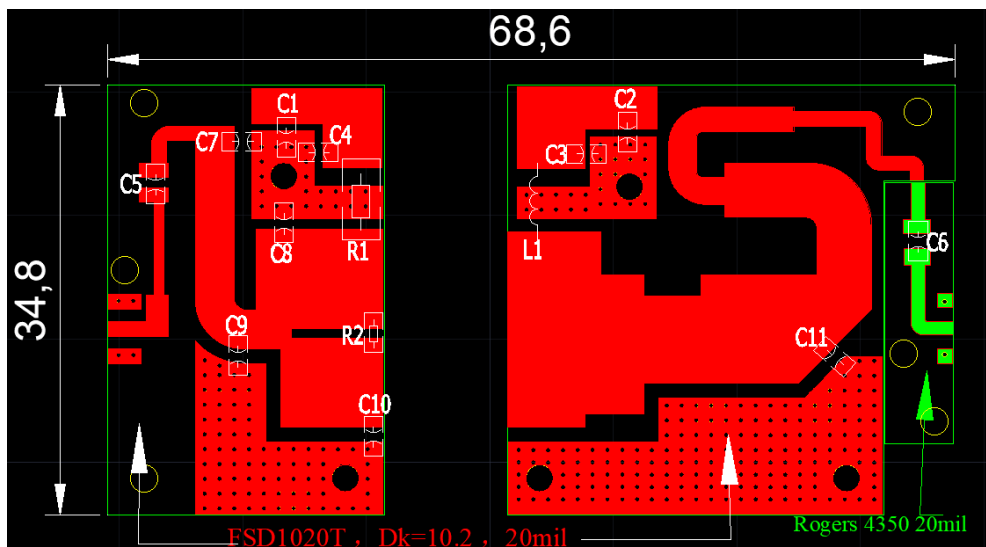
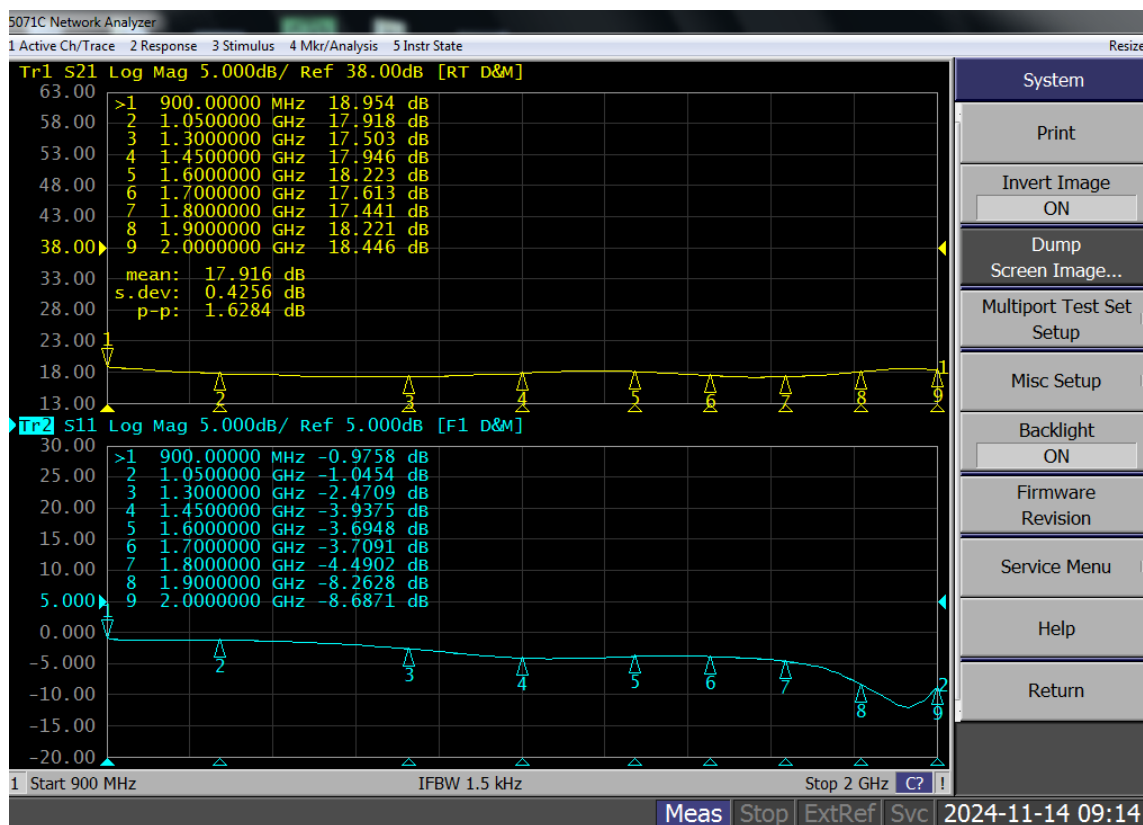




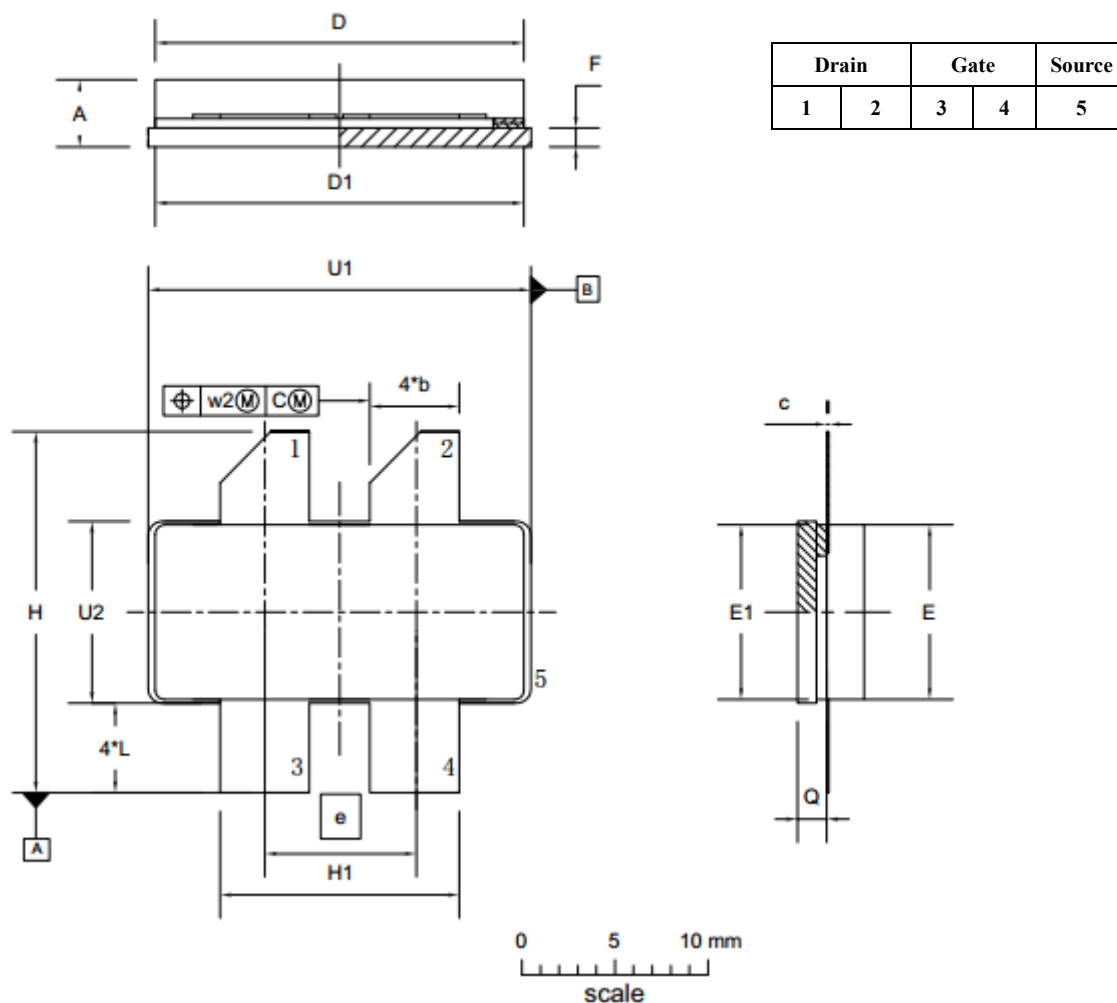
Table 4. Bill of materials of application board (PCB layout upon request)

Component	Description	Suggestion
C1, C2	10uF/200V-1210	Ceramic multilayer capacitor
C3, C4	100pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ301111
C5,C6	47pf	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ301111
C7, C8	0.5pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ301111
C9	1pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ301111
C10	1.2pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ301111
C11	1.8pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ301111
L1	1mm wire, 3mm innerdiameter, 2turns	DIY
R1	100 $\Omega$ -2512	Chip Resistor
R2	10 $\Omega$ -1206	Chip Resistor
PCB	FSD1020T , Dk=10.2 , 20mil + Rogers 4350 20mil	





Earless Flanged Ceramic Package; 4 leads



UNIT	A	b	c	D	D <sub>1</sub>	e	E	E <sub>1</sub>	F	H	H <sub>1</sub>	L	Q	U <sub>1</sub>	U <sub>2</sub>	W <sub>1</sub>	W <sub>2</sub>
mm	4.72	4.67	0.15	20.02	19.96	7.90	9.50	9.53	1.14	19.94	12.98	5.33	1.70	20.70	9.91	0.25	0.51
	3.43	4.93	0.08	19.61	19.66		9.30	9.25	0.89	18.92	12.73	4.32	1.45	20.45	9.65		
inches	0.186	0.194	0.006	0.788	0.786	0.311	0.374	0.375	0.045	0.785	0.511	0.210	0.067	0.815	0.390	0.01	0.02
	0.135	0.184	0.003	0.772	0.774		0.366	0.364	0.035	0.745	0.501	0.170	0.057	0.805	0.380		

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-B4					03/12/2013



## Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2021/12/29	V1.0	Product Datasheet Creation
2022/3/21	V1.1	Modify typo from B4 to BY4
2022/6/26	V1.2	Correct BY4 back to B4
2023/10/22	V1.3	Modify the carrier application to new one with performance updated
2024/11/14	V2.0	Modify the application result with improved RF performance

Application data based on: JF-22-01/TC-22-13/TC-24-70

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