



GaN 100W,0.8-2GHz ,28V,RF Power Transistor

Description

The GTAH21140B4 is a 28V 100W 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 120W.

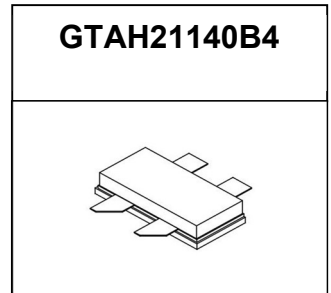
It can support linear and saturated , pulsed or CW application, configured as push pull or single ended

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

- Typical performance across 1-2GHz 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	110-135	>47	11-15
32	0.8-2	130-160	>46	12-16



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)

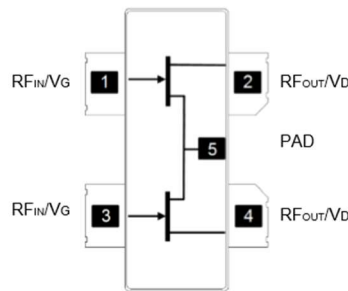


Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V _{DSS}	+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

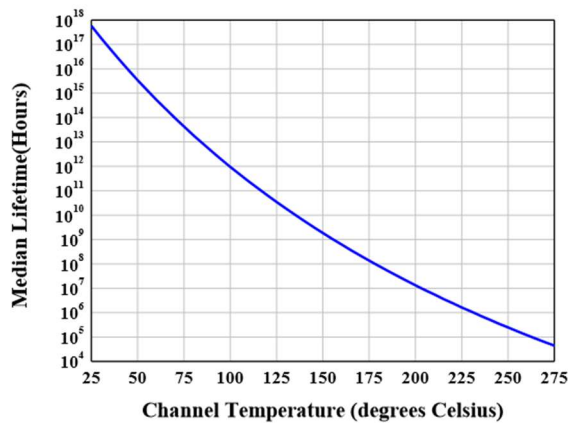


Figure 3: Picture of application board 1-2GHz class AB

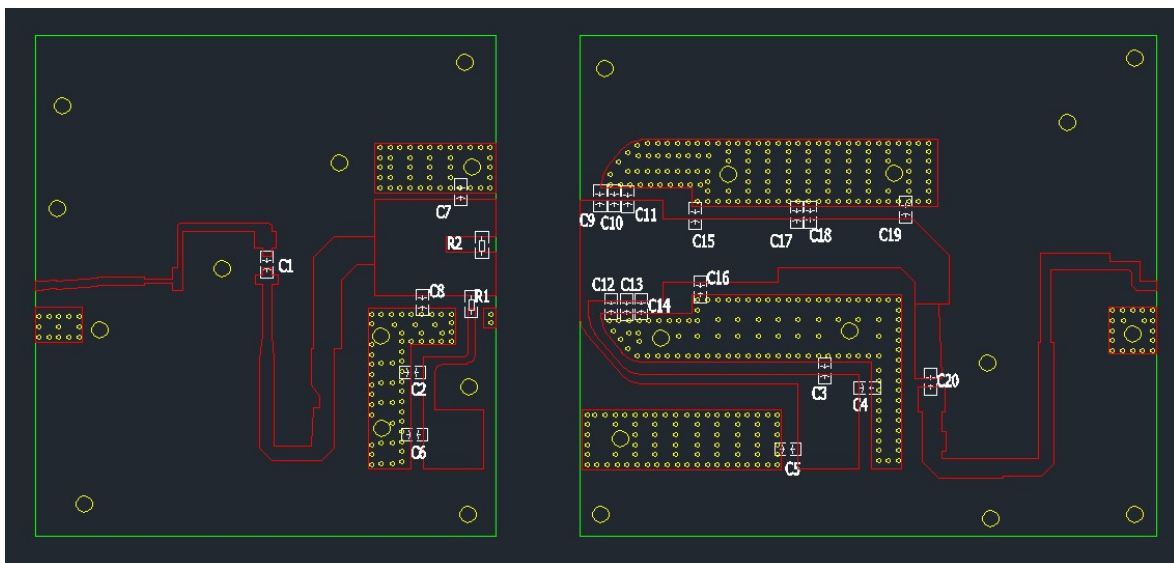
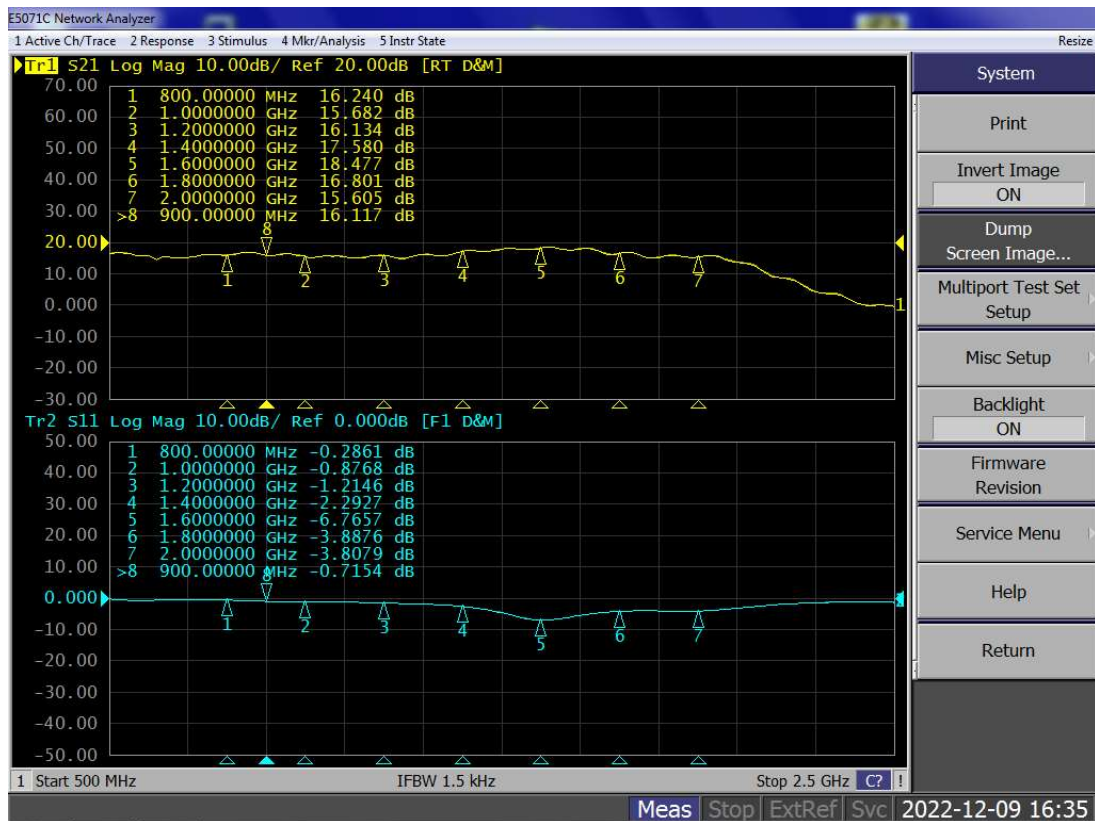




Table 4. Bill of materials of application board (PCB layout upon request)

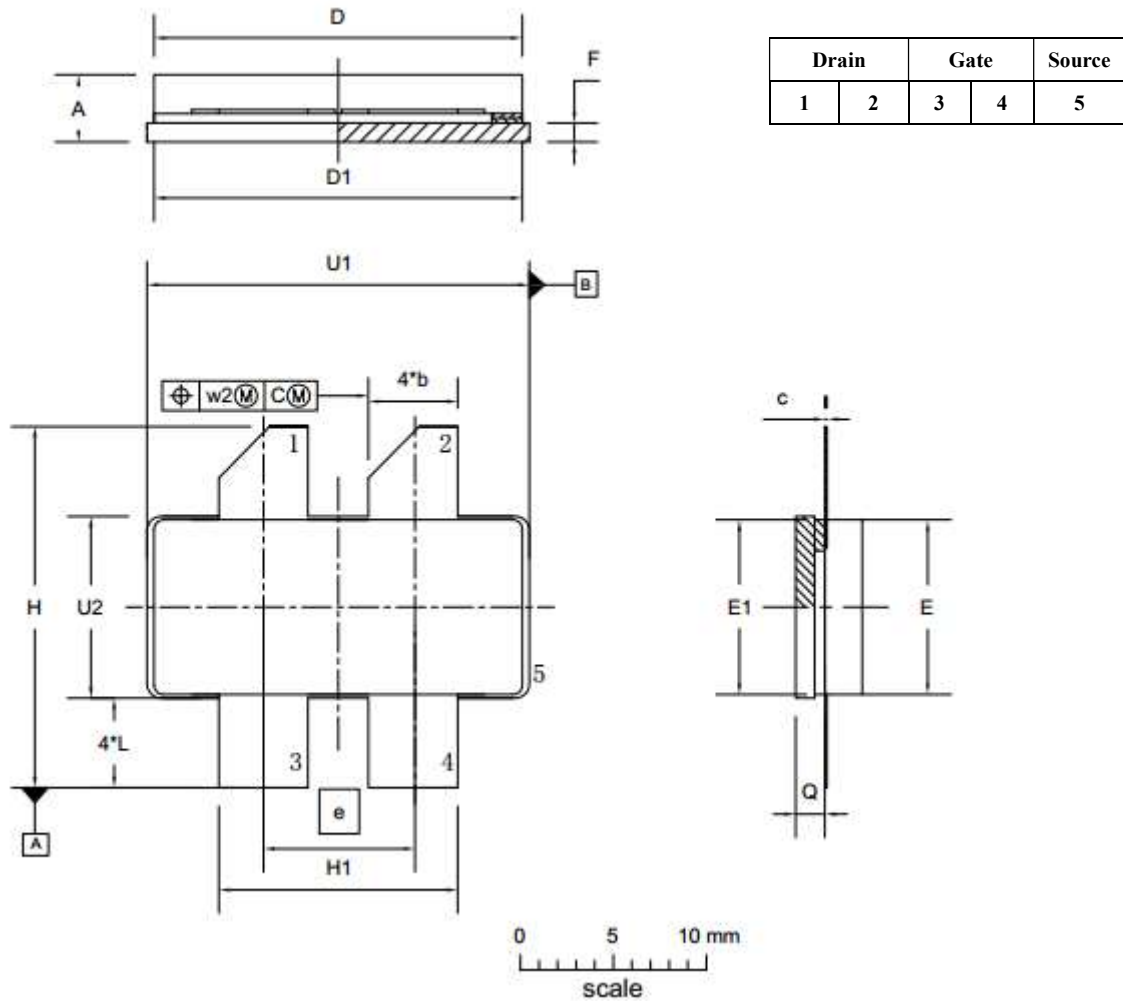
Component	Description	Suggestion
C1,C2,C3,C4,C20	20pF	10uF/50V
C5,C6	10uF	MQ101111
C7,C8	3pF	MQ101111
C9,C11,C17,C14	1pF	MQ101111
C13,C19	0.5pF	MQ101111
C10	1.8pF	MQ101111
C12	0.8pF	MQ101111
C15	1.2pF	MQ101111
C16	2pF	MQ101111
C18	1.5pF	MQ101111
R1,R2	Chip Resistor,10 ohm	1206
PCB	20Mil RO4350B	

Figure 4: Network analyzer S11/S21 (Idq=450mA, Input Power =0dBm)





Earless Flanged Ceramic Package; 4 leads



UNIT	A	b	c	D	D ₁	e	E	E ₁	F	H	H ₁	L	Q	U ₁	U ₂	W ₁	W ₂
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

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

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