



GaN 140W,2-5GHz ,28V,RF Power Transistor

Description

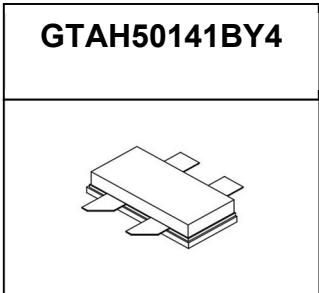
The GTAH50141BY4 is a 28V 140W device, both input and output matched GaN HEMT, ideal for multiple applications within 2 to 5GHz. It can support CW and pulse CW , and any other modulation signals

In its typical wideband application, it can deliver 100W across the full band of 2 to 5GHz

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

- Typical performance across 2-5GHz class AB application circuit with device soldered

Vds=32V Vgs=-2.62V Idq=100mA



Freq(MHz)	Pin(dBm)	Psat(dBm)	Psat(W)	Ids(A)	Gain(dB)	Eff(%)	2nd(dBc)	3rd(dBc)
2000	43.1	50.9	121.6	7.94	7.7	47.9	-13.1	-16.2
2100	42.2	51.0	126.5	7.83	8.8	50.5	-11.6	-20.3
2200	43.1	51.1	129.4	7.78	8.0	52.0	-11.8	-24.4
2300	43.4	51.4	138.4	8.21	8.0	52.7	-11.0	-25.6
2400	43.4	51.5	141.6	9.60	8.1	46.1	-13.6	-25.5
2500	43.3	51.1	130.0	9.78	7.8	41.5	-19.0	-27.7
2600	44.7	51.2	132.7	9.37	6.5	44.3	-14.9	-26.3
2700	44.1	51.4	136.8	8.80	7.3	48.6	-13.5	-22.2
2800	44.2	51.4	138.7	8.35	7.2	51.9	-11.7	-17.8
2900	43.5	50.9	123.3	7.80	7.4	49.4	-11.9	-18.6
3000	44.6	51.2	131.8	7.87	6.6	52.3	-12.5	-19.8
3100	44.8	51.4	139.0	7.41	6.6	58.6	-16.0	-21.5
3200	44.7	50.9	123.6	6.37	6.2	60.6	-20.7	-22.7
3300	43.9	50.4	109.9	5.58	6.5	61.5	-24.8	-28.0
3400	43.2	50.3	106.7	5.45	7.1	61.2	/	/
3500	42.5	50.3	106.4	5.58	7.8	59.6	/	/
3600	42.4	50.2	104.5	5.65	7.8	57.8	-29.6	-36.6
3700	43.1	50.2	105.4	6.11	7.1	53.9	/	/
3800	42.1	50.2	104.0	6.54	8.0	49.7	/	/
3900	42.2	50.3	107.2	6.96	8.2	48.1	/	/
4000	41.8	50.7	116.7	7.66	8.9	47.6	-33.9	-40.0
4100	40.9	50.6	115.9	7.68	9.7	47.2	/	/
4200	40.0	50.5	112.5	7.71	10.5	45.6	/	/
4300	40.0	50.5	110.9	7.93	10.4	43.7	/	/
4400	40.5	50.2	104.5	7.70	9.7	42.4	/	/
4500	40.4	50.2	105.0	7.97	9.8	41.2	-37.7	-40.0
4600	41.0	50.9	123.6	8.49	9.9	45.5	/	/



4700	41.2	51.2	132.4	8.84	10.0	46.8	/	/
4800	41.0	51.1	128.2	8.65	10.1	46.3	/	/
4900	41.4	50.7	116.4	8.05	9.2	45.2	/	/
5000	42.9	50.5	111.2	7.93	7.6	43.8	-37.9	-40.0

Applications

- S and C band power amplifier
- 5G wideband 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)

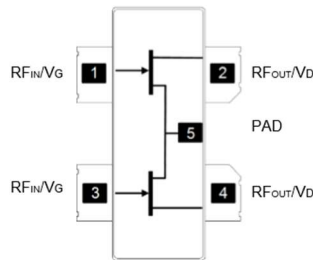


Table 1. Maximum Ratings

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 $P_{out} = 140\text{W}$ Pulsed CW at 4GHz	$R_{\theta JC}$	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	$V_{GS} = -8\text{V}$; $I_{DS} = 36\text{mA}$	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	$V_{DS} = 28\text{V}$, $I_{DS} = 110\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-2.57		V



Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	4GHz, Pout=140W Pulsed CW All phase, No device damages	VSWR		10:1		

Typical performance
2000-5000MHz

Figure 3: Picture of application board ,class AB

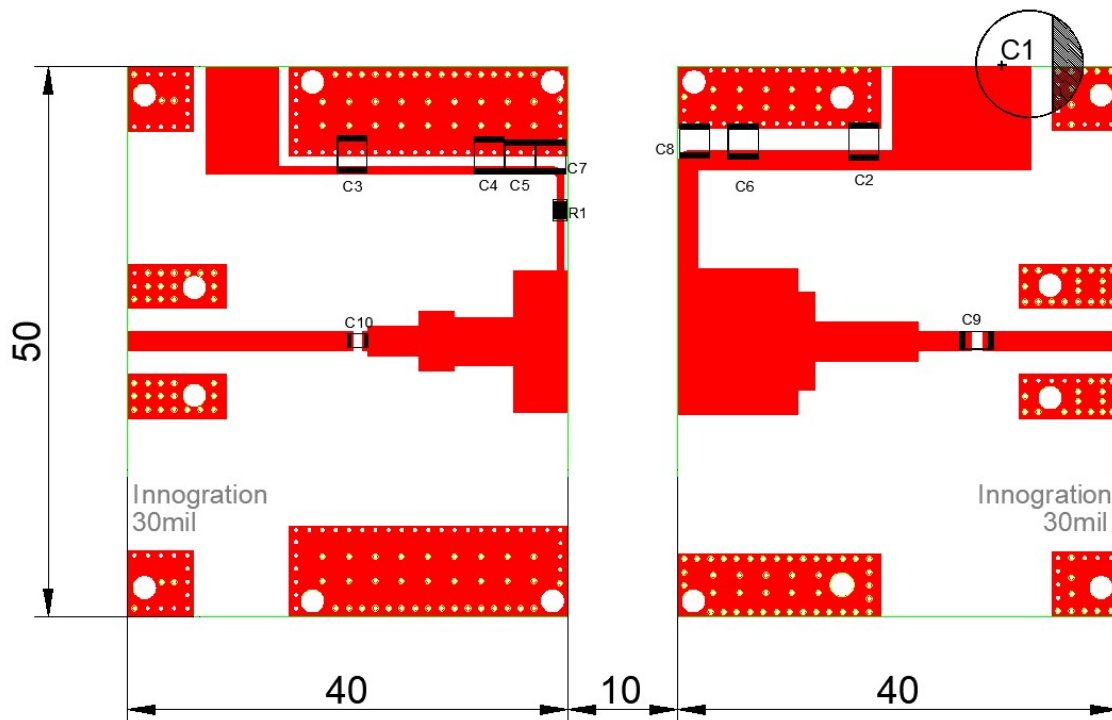
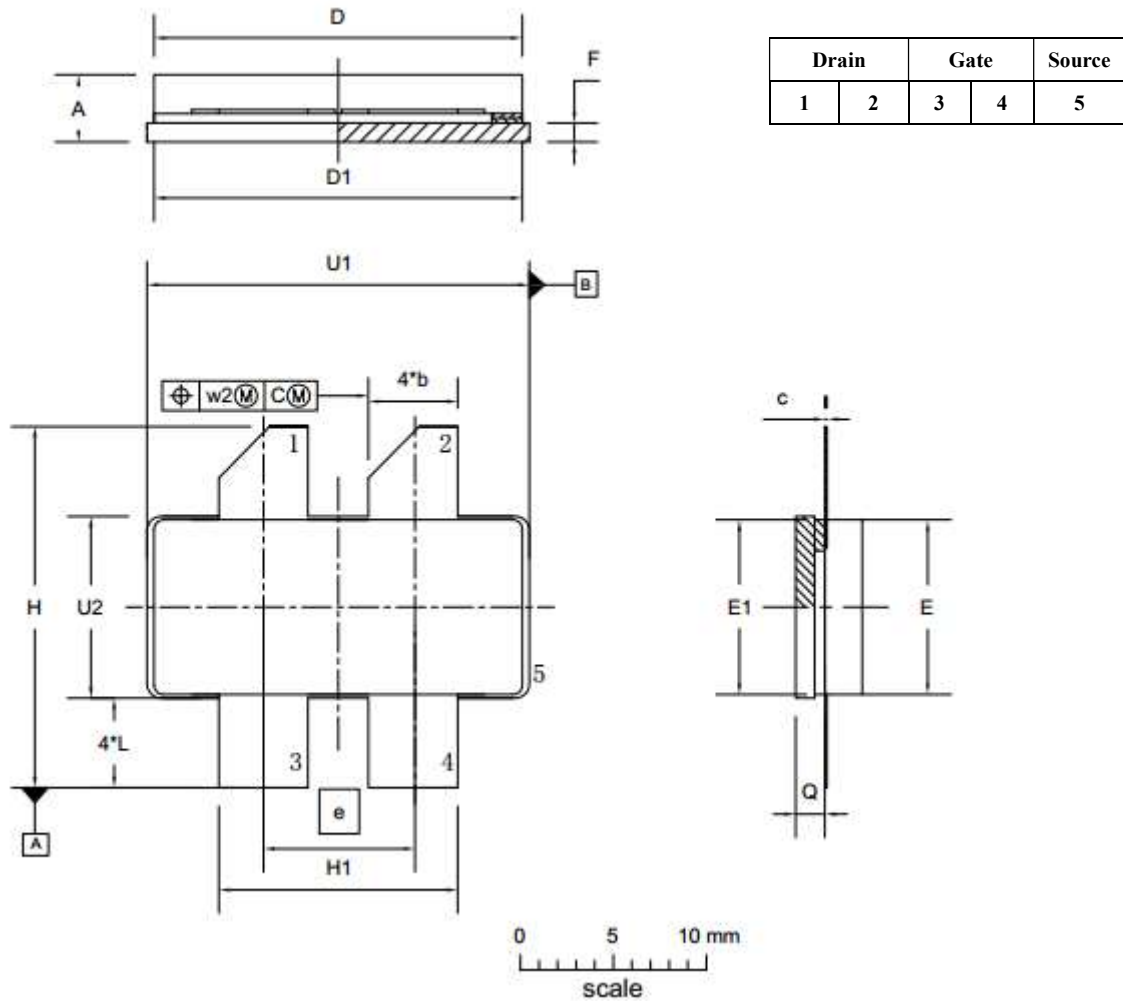


Table 4. Bill of materials of application board (PCB layout upon request)

Component	Description	Suggested Manufacturer
C1	1000uF/63V	
C2,C3,C4	10uF	1210
C5,C6	200pF	MQ301111
C7,C8,C9	5.6pF	MQ301111
C10	5.1pF	MQ300805
R1	Chip Resistor,10Ω	0805
PCB	30 mil Rogers 4350b	



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
2023/11/10	V1.0	Product Datasheet Creation

Application data based on: RXT-23-44

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