



GaN ,0.4-3GHz full band 100W transistor

Description

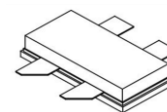
The GTAH30140BY4 is a 28V 140W capable, both input and output matched GaN HEMT, ideal for multiple applications below 3GHz. **In typical wideband 0.4-3GHz application, it can deliver >100W across the full band**

- Typical performance across 0.4-3GHz class AB application circuit with device soldered

CW signal, Idq=250mA

Freq (MHz)	Psat (dBm)	Psat (W)	IDS (A)	Pin (dBm)	Gain (dB)	Eff (%)	2 nd (dBc)	3 rd (dBc)
400	50.30	107.2	7.30	41.10	9.20	52.42	-10.20	-10.90
500	51.65	146.2	7.90	36.90	14.75	66.10	-19.40	-12.90
600	51.40	138.0	6.68	41.44	9.96	73.80	-28.30	-12.80
700	50.14	103.3	5.23	41.99	8.15	70.52	-21.60	-11.70
800	50.57	114.0	5.87	41.07	9.50	69.38	-17.30	-10.50
900	50.63	115.6	6.34	39.97	10.66	65.13	-14.80	-12.20
1000	50.56	113.8	6.60	39.45	11.11	61.56	-15.70	-15.70
1100	50.64	115.9	6.51	42.05	8.59	63.57	-14.40	-14.50
1200	50.52	112.7	6.57	39.84	10.68	61.27	-12.50	-13.20
1300	50.05	101.2	6.56	41.08	8.97	55.07	-10.60	-15.40
1400	50.26	106.2	8.21	41.73	8.53	46.18	-12.90	-19.50
1500	50.90	123.0	9.11	41.32	9.58	48.23	-12.30	-26.80
1600	51.42	138.7	10.04	40.20	11.22	49.33	-12.80	-25.10
1700	51.17	130.9	9.70	40.26	10.91	48.20	-13.60	-27.70
1800	50.98	125.3	9.56	41.51	9.47	46.81	-13.60	-29.30
1900	50.97	125.0	8.97	41.16	9.81	49.78	-15.60	-29.00
2000	50.01	100.2	8.02	40.88	9.13	44.63	-18.20	-27.30
2100	50.14	103.3	7.66	41.35	8.79	48.15	-17.60	-27.70
2200	50.89	122.7	8.48	42.20	8.69	51.69	-25.10	-35.00
2300	50.23	105.4	7.54	41.15	9.08	49.94	-29.40	-38.30
2400	50.89	122.7	9.47	42.08	8.81	46.29	-26.20	-47.30
2500	50.53	113.0	9.61	41.61	8.92	41.99	-39.70	-40.30
2600	50.17	104.0	9.51	40.61	9.56	39.05	-44.30	-38.60
2700	51.52	141.9	13.30	41.70	9.82	38.11	-42.30	-36.00
2800	52.08	161.4	14.15	42.70	9.38	40.75	-51.40	-49.60
2900	51.91	155.2	12.90	43.08	8.83	42.98	-39.70	-44.00
3000	51.67	146.9	11.34	42.90	8.77	46.26	-33.30	-44.00

GTAH30140BY



Applications

- S/L/P band 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)

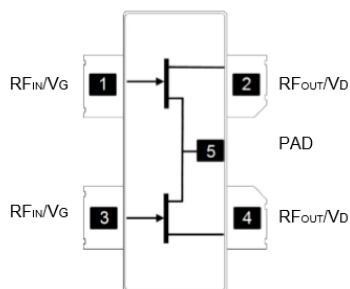


Table 1. Maximum Ratings

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 3GHz	$R_{\theta JC}$	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	GHz, $P_{out} = 100\text{W}$ Pulsed CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature

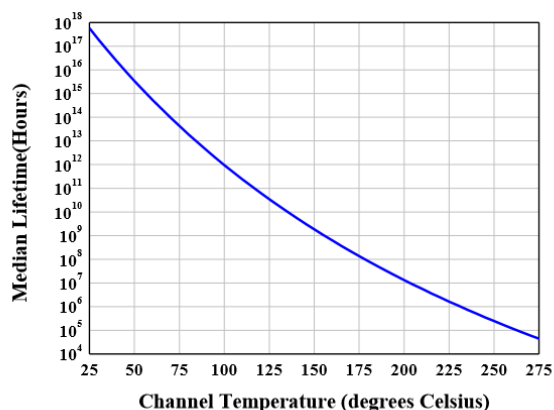


Figure 3: Picture of application board 0.4-3GHz class AB

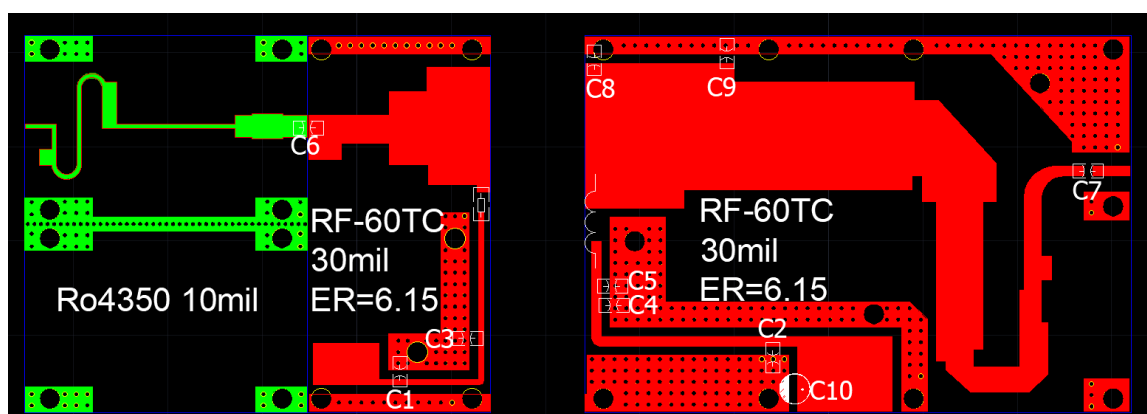
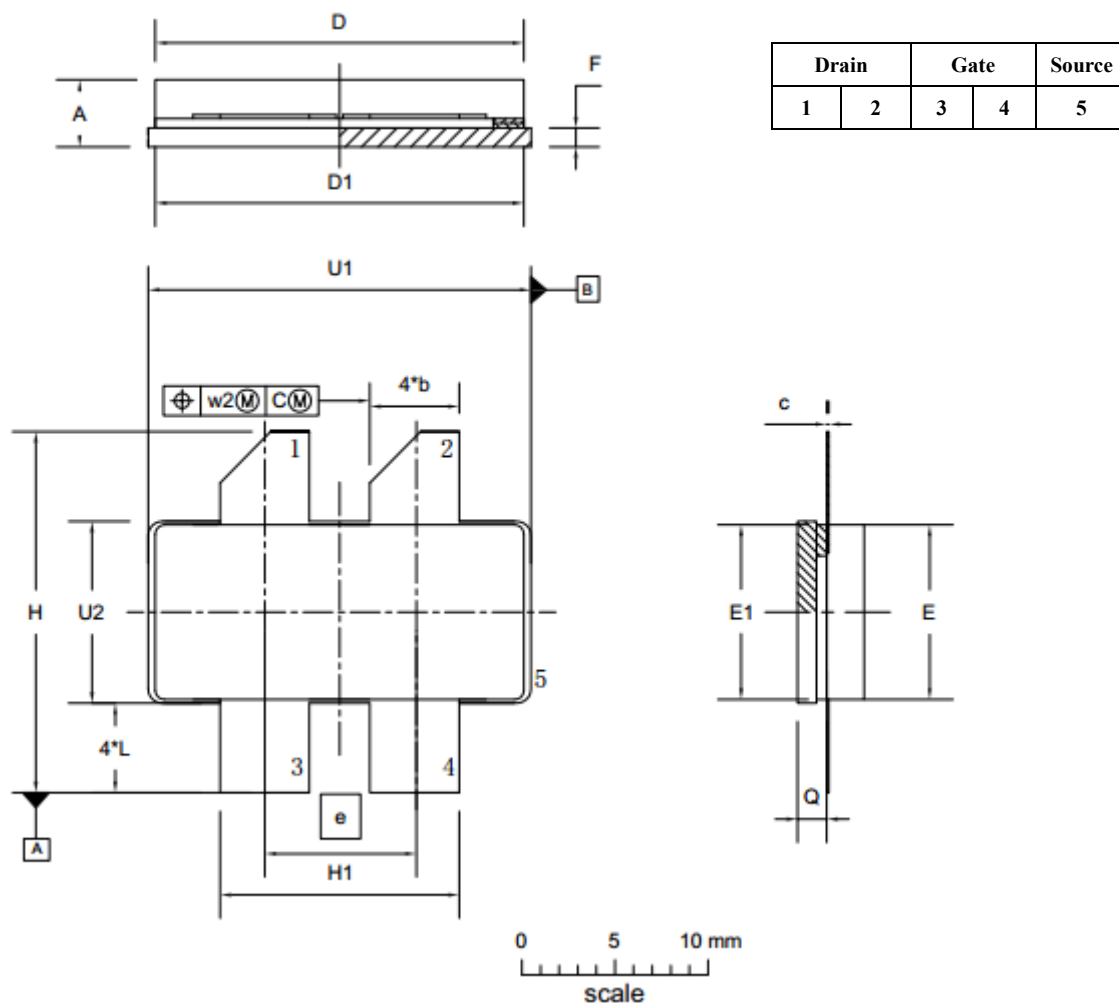


Table 4. Bill of materials of application board (PCB layout upon request)

Component	Description	Suggestion
C1~C2	10uF/200V-1812	Ceramic multilayer capacitor
C3	39pF	
C4	100pF	
C5	200pF	
C6,C7	36pF	
C8,C9	0.5pF	
C10	470uF/63V	Electrolytic Capacitor
R1	51 Ω *3-1206	Chip Resistor
L1	1mm wire, 3mm innerdiameter, 3turns	DIY
PCB	Red: RF-60TC,30mil, er=6.15 green: Rogers4350,10mil	



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
2021/01/14	V1.1	Modify according to the new matching topology
2025/6/16	V2.0	Change the carrier application to 0.4-3GHz 100W

Application data based on: YHG-21-20/22-01/TC-25-25

Notice

Specifications are subject to change without notice. Innogrations believes the information within the data sheet to be reliable. Innogrations makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose.

“Typical” parameter is the average values expected by Innogrations in quantities and are provided for information purposes only. It can and do vary in different applications and related performance can vary over time. All parameters should be validated by customer’s technical experts for each application.

Innogrations products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Innogrations product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility.

For any concerns or questions related to terms or conditions, please check with Innogrations and authorized distributors

Copyright © by Innogrations (Suzhou) Co.,Ltd.