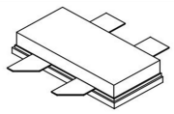
Gallium Nitride, 250-300W,3.7-4.2GHz RF Power Transistor

Description

GTAH42300BY4



The GTAH42300BY4 is a 250W 28V， both input and output matched GaN HEMT, ideal for multiple applications from 3.7-4.2GHz, and at higher voltage 32V, capable to output 300W. It can be supporting pulsed CW only.

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

- Typical performance across 3.7-4.2GHz class AB application circuit with device soldered

Pulsed CW Signal: 100us width , 10% duty cycle

VDS= 32V, IDQ=300mA(Vgs=-2.5V) T=25 C

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3.5dB (dBm)	P3.5dB (W)	P3.5dB Eff(%)
3700	53.07	202.7	47.7	13.84	55.03	318.2	55.6
3950	52.64	183.9	44.6	13.58	54.78	300.3	53.4
4200	52.65	184.2	43.2	12.45	54.67	293.2	51.1

Applications

- S band pulse 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)

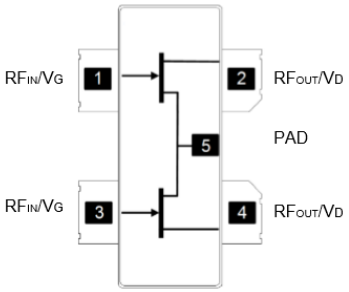


Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DSS}	+150	Vdc
Gate--Source Voltage	V_{GS}	-10 to +2	Vdc
Operating Voltage	V_{DD}	32	Vdc
Maximum gate current	Igs	72	mA
Storage Temperature Range	Tstg	-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°C, at Pout=300W at 4.2GHz	$R_{\theta JC}$	0.4	°C /W

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

DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=72mA	V_{DSS}		150		V
Gate Threshold Voltage	VDS =10V, ID = 72mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =28V, IDS=300mA, Measured in Functional Test	$V_{GS(Q)}$		-2.5		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	4.2 GHz, Pout=300W Pulsed CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature

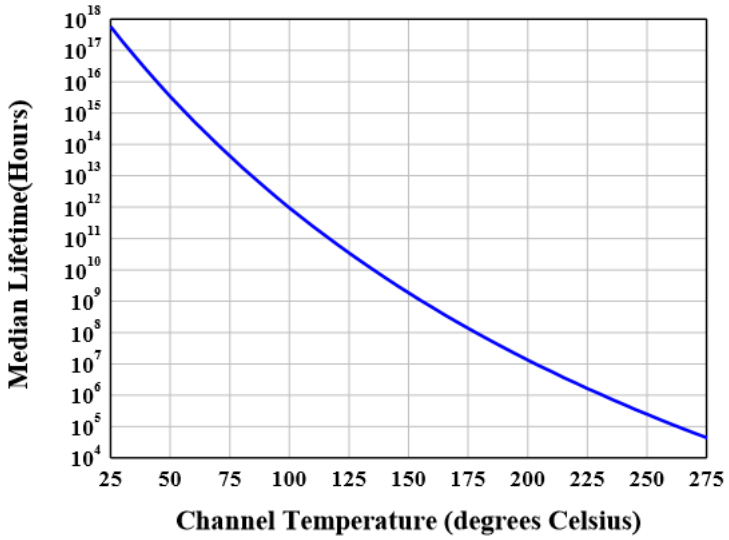


Figure 3: Efficiency and power gain as function of Pout at different VDD (Pulsed CW Signal: 100us width , 10% duty cycle)

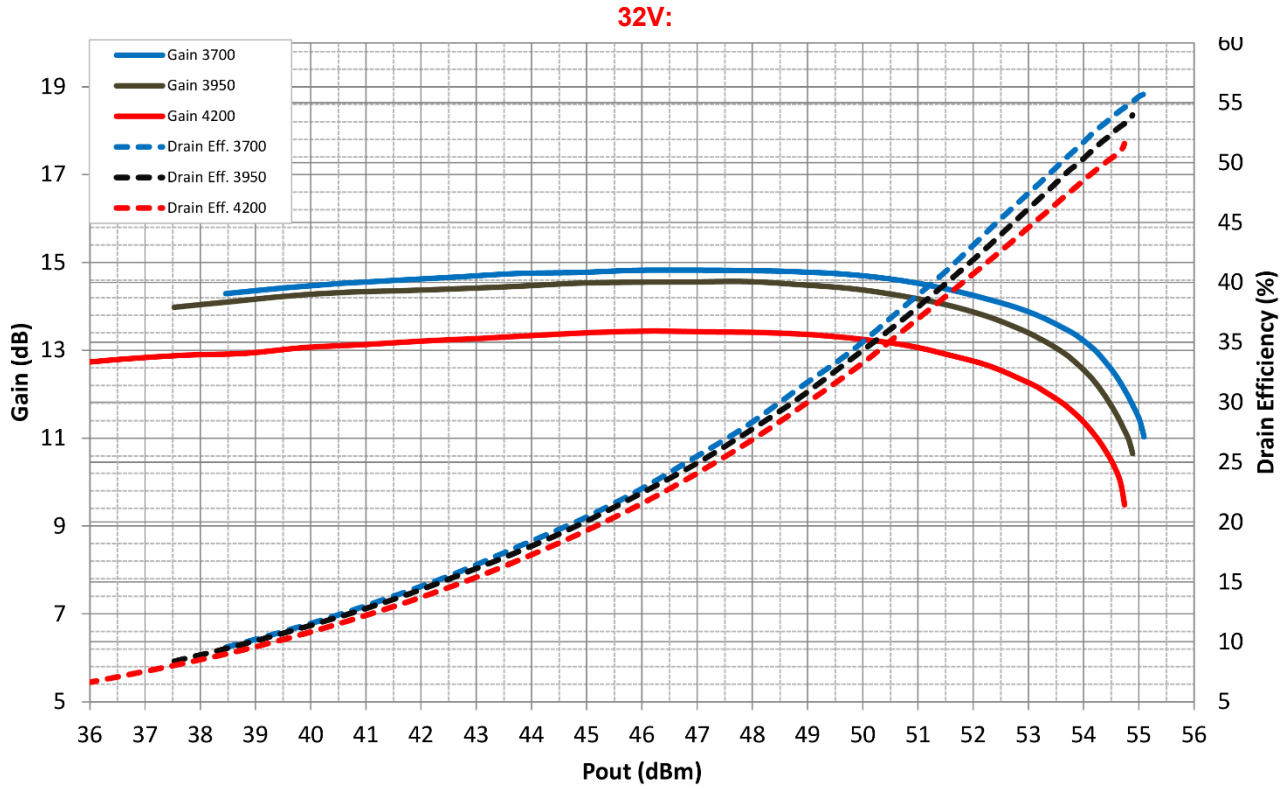


Figure 4: Network analyzer output, S11 and S21

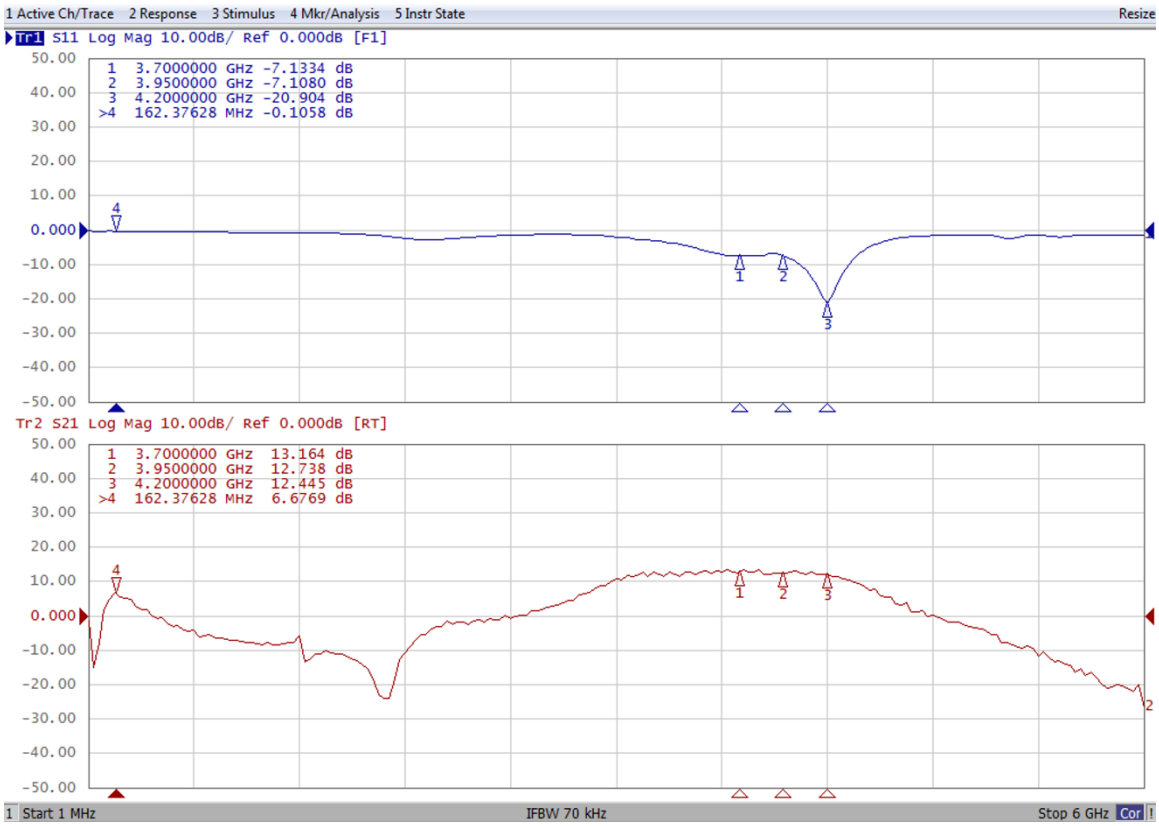


Figure 5: Picture of application board class AB

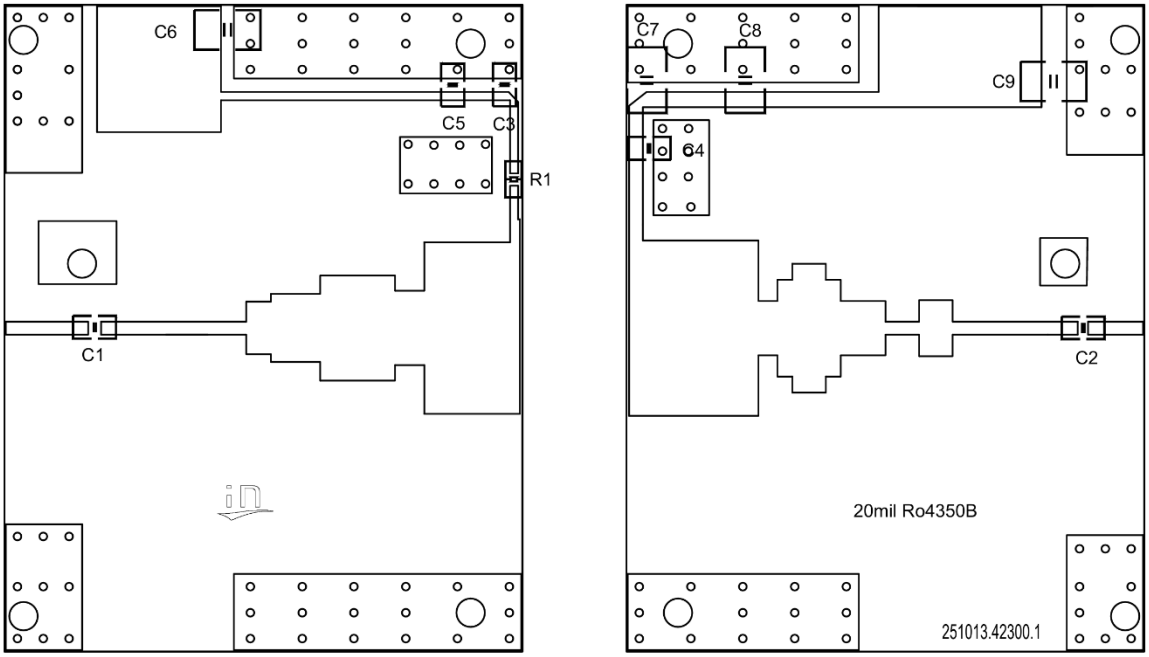
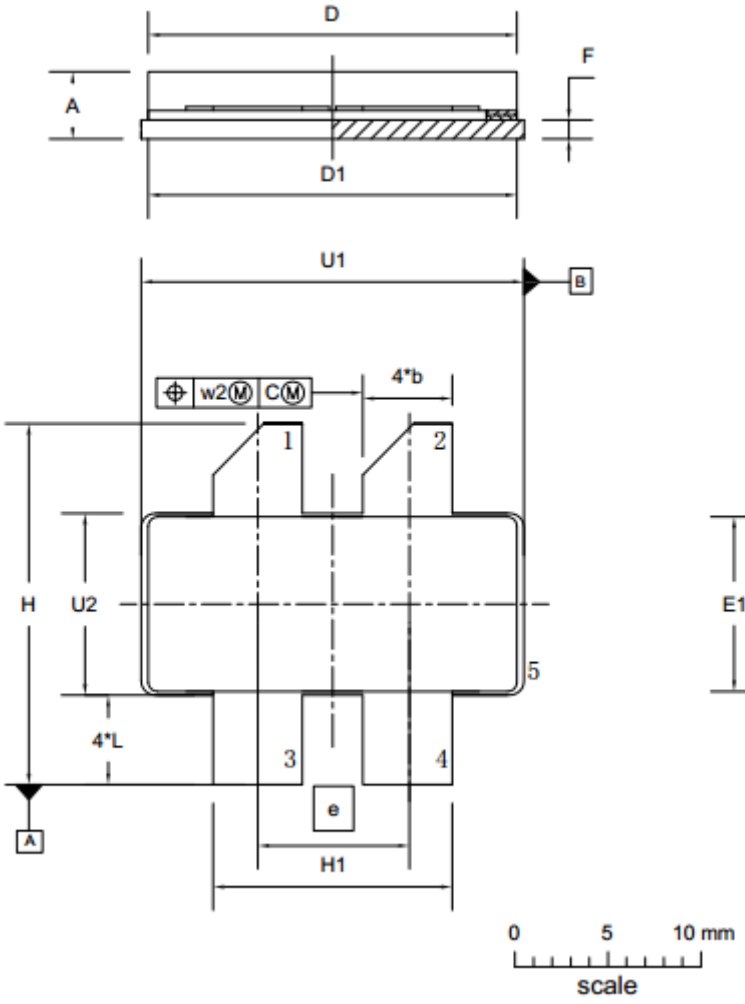


Table 4. Bill of materials of application board (PCB layout upon request)

Reference	Footprint	Value	Quantity
C1, C2, C3, C4	0603	10pF/250V	4
R1	0603	10R	1
C5	0603	4.7nF	1
C6, C7, C8, C9	1210	10uF/100V	4
U1	BY4	GTAH42300BY4	1

Earless Flanged Ceramic Package; 4 leads



Drain		Gate		Source
1	2	3	4	5

UNIT	A	b	c	D	D_1	e	E	E_1	F	H	H1	L	Q	U_1	U_2	W_1	W_2
mm	4.72 3.43	4.67 4.93	0.15 0.08	20.02 19.61	19.96 19.66	7.90	9.50 9.30	9.53 9.25	1.14 0.89	19.94 18.92	12.98 12.73	5.33 4.32	1.70 1.45	20.70 20.45	9.91 9.65	0.25	0.51
inches	0.186 0.135	0.194 0.184	0.006 0.003	0.788 0.772	0.786 0.774	0.311	0.374 0.366	0.375 0.364	0.045 0.035	0.785 0.745	0.511 0.501	0.210 0.170	0.067 0.057	0.815 0.805	0.390 0.380	0.01	0.02

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
2025/11/17	**V1.0**	**Preliminary Datasheet Creation**

Application data based on: ZBB-25-25

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