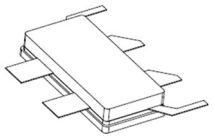
Gallium Nitride 28V, 240W,0.5-2GHz RF Power Transistor

GTAH20240BY4V



Description

The GTAH20240BY4V is a 240W， both input and output matched GaN HEMT, ideal for multiple applications from 0.5-2GHz. It can support CW, pulse or any modulated signal.

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

- Typical performance across 700-1100MHz class AB application circuit with device soldered

VDS= 28V, IDQ=100mA(Vgs=-2.59V) T=25 C, CW

Freq(MHz)	Pin(dBm)	Psat(dBm)	Psat(W)	Ids(A)	Gain(dB)	Eff(%)	2nd (dBc)	3rd(dBc)
700	38.1	52.7	187.5	10.30	14.6	65.0	-15.75	-16.27
800	36.3	52.8	190.5	9.71	16.5	70.1	-20.82	-17.00
900	39.1	53.0	197.7	10.18	13.9	69.4	-28.77	-21.17
1000	38.3	53.5	221.3	11.63	15.2	68.0	-22.44	-16.83
1100	37.5	52.5	177.8	8.63	15.1	73.6	-14.83	-23.10

Applications

- L band power amplifier
- 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)

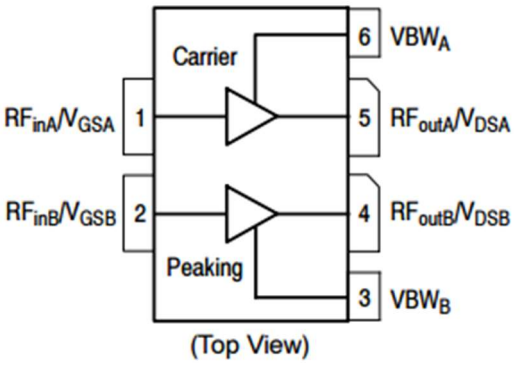


Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DSS}	+150	Vdc
Gate--Source Voltage	V_{GS}	-10 to +2	Vdc
Operating Voltage	V_{DD}	32	Vdc
Maximum gate current	Igs	60.4	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 Tj=200°C	$R_{\theta JC}$	0.8	°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=60.4mA	V_{DSS}		150		V
Gate Threshold Voltage	VDS =10V, ID = 60.4mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =50V, IDS=100mA, Measured in Functional Test	$V_{GS(Q)}$		-2.59		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	2 GHz, Pout=240W Pulsed CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature

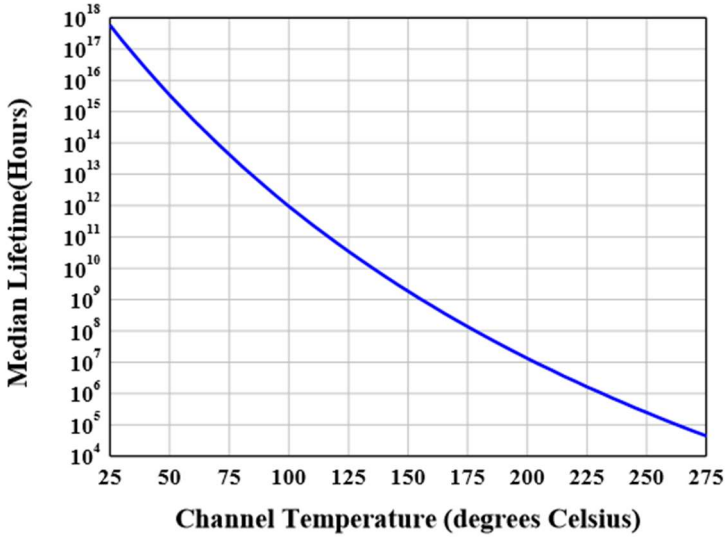


Figure 4: Network analyzer output, S11 and S21 ， Idq=500mA

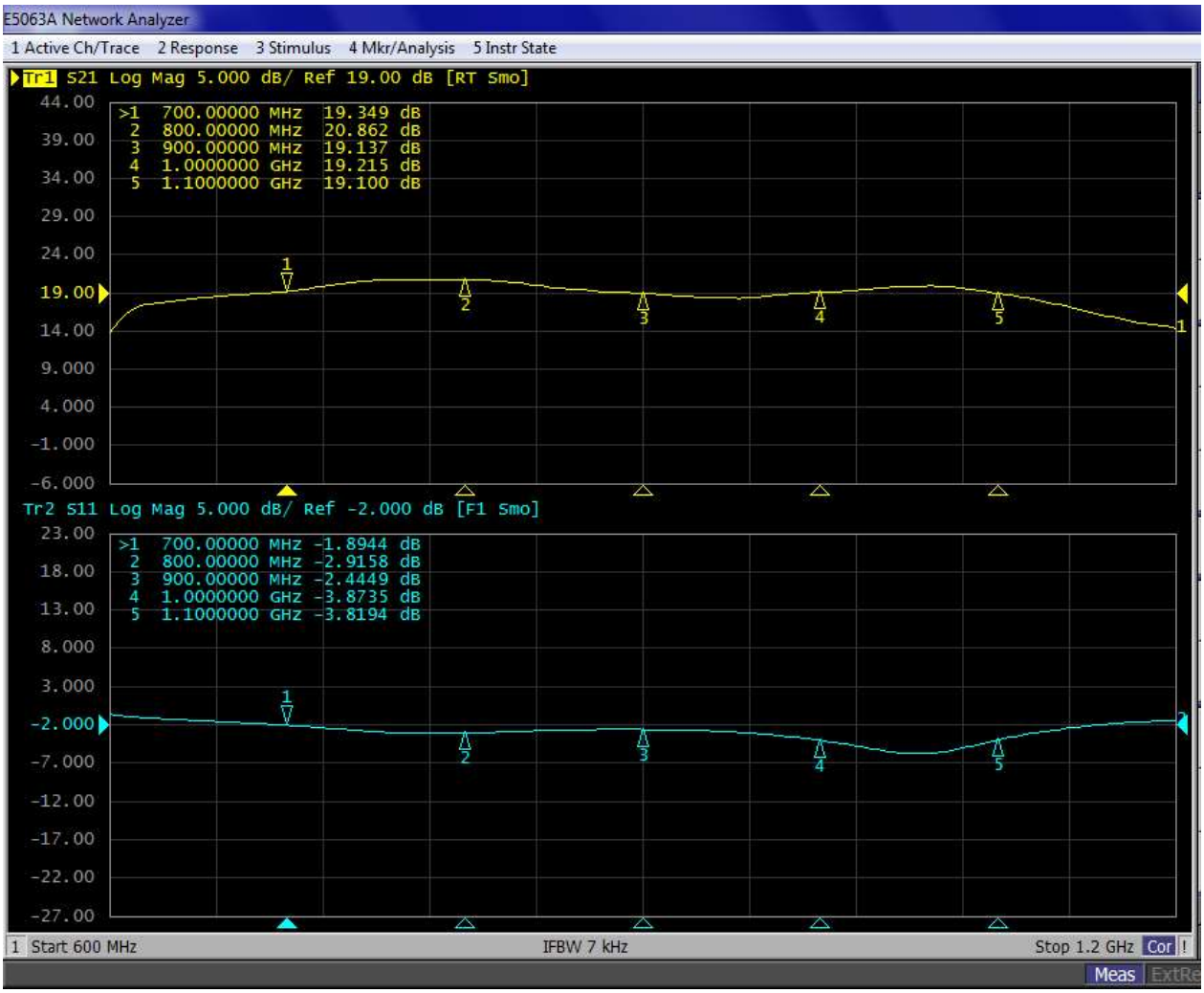


Figure 5: Picture of application board

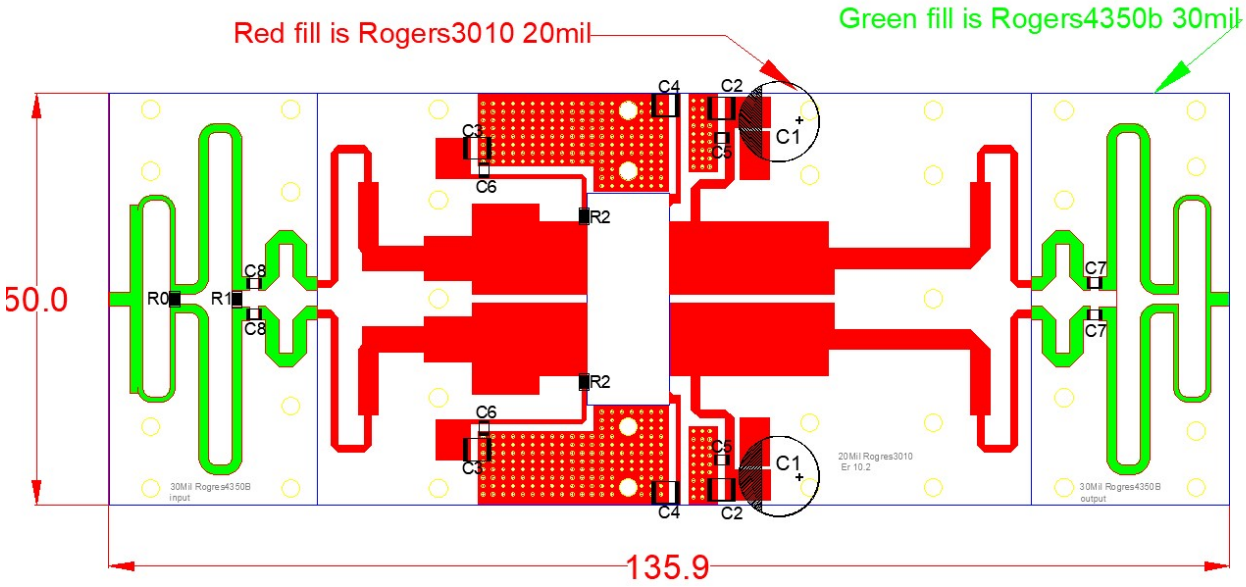
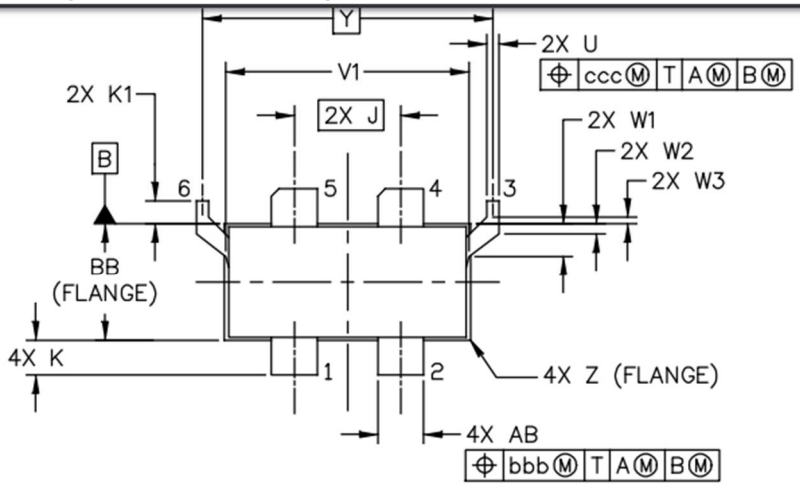
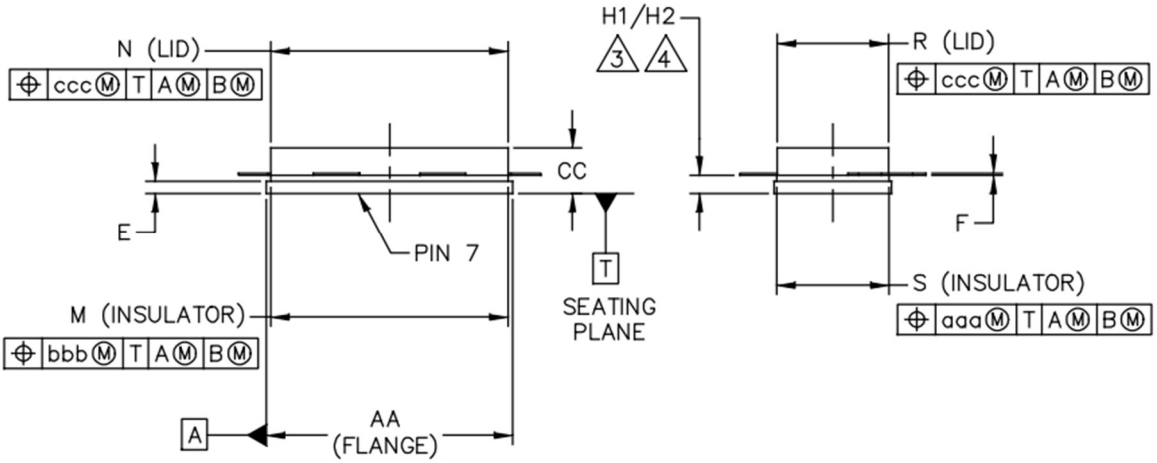


Table 4. Bill of materials of application board (PCB layout upon request)

Component	Description	Suggestion
C1	470uF/63V	
C2, C3	10uF	1210
C4	240pF	MQ301111
C5, C6, C7, C8	51pF	MQ300805
R0	Chip Resistor,100Ω	0805
R1	Chip Resistor,240Ω	1206
R2	Chip Resistor,10Ω	0805
PCB	Rogers 3010, r=10.2, thickness 20 mils, 1oz copper; Rogers 4350B, r=3.5, thickness 30 mils, 1oz copper;	

Earless Flanged Ceramic Package; 6 leads- BY4VV





DIM	INCH MIN	INCH MAX	MILLIMETER MIN	MILLIMETER MAX	DIM	INCH MIN	INCH MAX	MILLIMETER MIN	MILLIMETER MAX
AA	.805	.815	20.45	20.70	R	.365	.375	9.27	9.53
BB	.380	.390	9.65	9.91	S	.365	.375	9.27	9.53
CC	.125	.170	3.18	4.32	U	.035	.045	0.89	1.14
E	.035	.045	0.89	1.14	V1	.795	.805	20.19	20.45
F	.004	.007	0.10	0.18	W1	.0975	.1175	2.48	2.98
H1	.057	.067	1.45	1.70	W2	.0225	.0425	0.57	1.08
H2	.054	.070	1.37	1.78	W3	.0125	.0325	0.32	0.83
J	.350 BSC		8.89 BSC		Y	.956 BSC		24.28 BSC	
K	.0995	.1295	2.53	3.29	Z	R.000	R.040	R0.00	R1.02
K1	.070	.090	1.78	2.29	AB	.145	.155	3.68	3.94
M	.774	.786	19.66	19.96	aaa	.005		0.13	
N	.772	.788	19.61	20.02	bbb	.010		0.25	
					ccc	.015		0.38	

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2024/5/16	**V1.0**	**Preliminary Datasheet Creation**

Application data based on: RXT-24-23

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