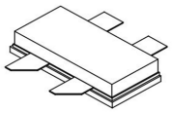
Gallium Nitride, 160W, S band RF Power Transistor

XTAH35160BY4



Description

The XTAH35160BY4 is a 160W 28V，both input and output matched GaN HEMT, ideal for multiple applications within S band 2.0 to 3.5GHz. .

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

- Typical performance across 2.7-3.2GHz class AB application circuit with device soldered

V_{DS}= 28V，I_{DQ}=180mA，V_{GS} =-2.62V, CW

FREQ (MHZ)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
2700	51.69	147.6	54.4	15.35	53.22	210.0	62.6
2800	51.11	129.2	50.0	15.53	52.89	194.7	58.7
2900	50.98	125.2	49.2	15.99	52.93	196.5	58.7
3000	50.73	118.4	48.6	16.52	52.9	195.0	59.0
3100	50.27	106.3	47.7	16.36	52.64	183.6	59.0
3200	49.78	95.1	46.9	15.33	52.28	168.9	58.5

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)

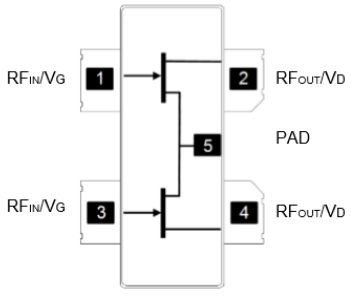


Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DSS}	+150	Vdc
Gate--Source Voltage	V_{GS}	-10 to +2	Vdc
Operating Voltage	V_{DD}	36	Vdc

Maximum gate current	Igs	43.6	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=200W at 3.5GHz	$R_{\theta JC}$	0.82	°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=43.6mA	V_{DSS}		150		V
Gate Threshold Voltage	VDS =10V, ID = 43.6mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =28V, IDS=200mA, Measured in Functinal Test	$V_{GS(Q)}$		-2.6		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	3.5 GHz, Pout=160W Pulsed CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature

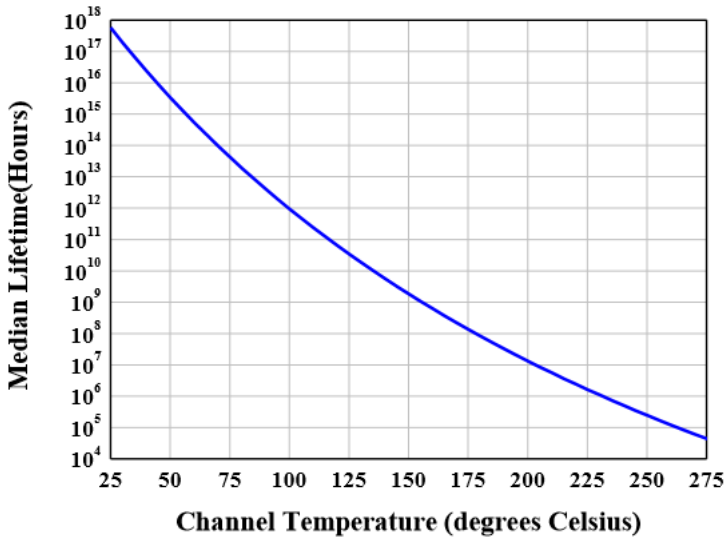


Figure 3: Efficiency and power gain as function of Pout at different VDD (Pulsed CW Signal: 100us width , 10% duty cycle)

28V:

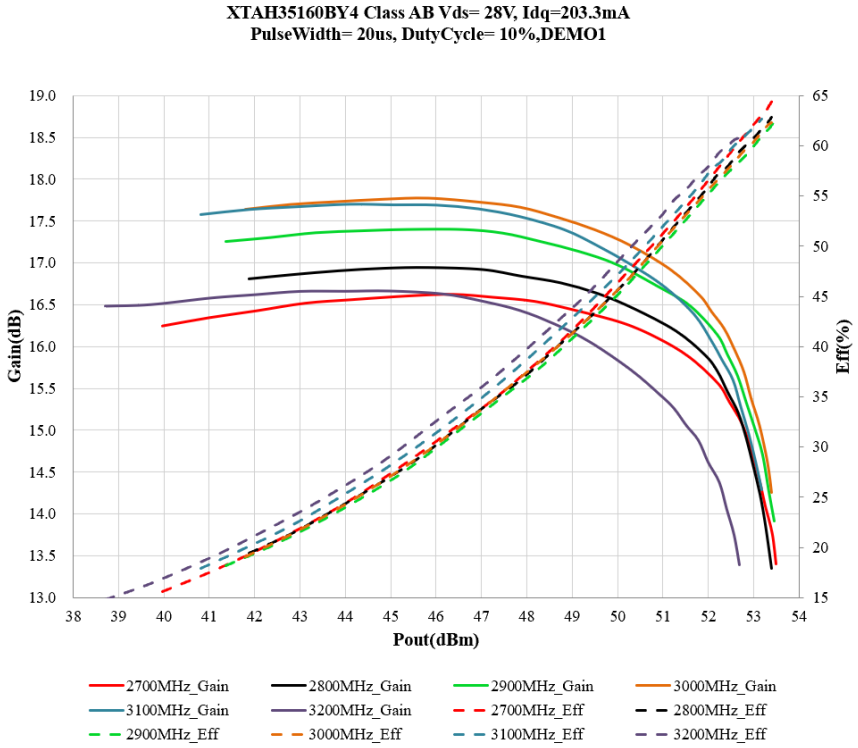


Figure 4: Picture of application board 2.7-3.2GHz class AB

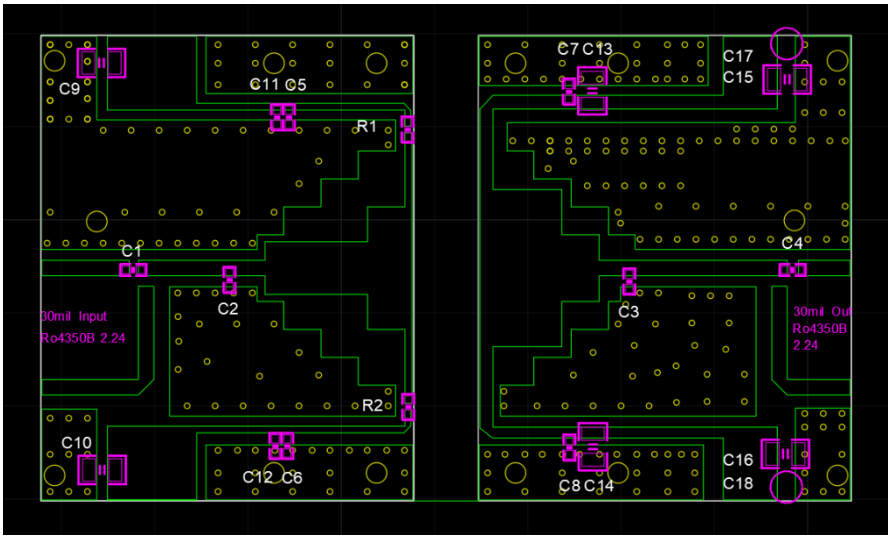
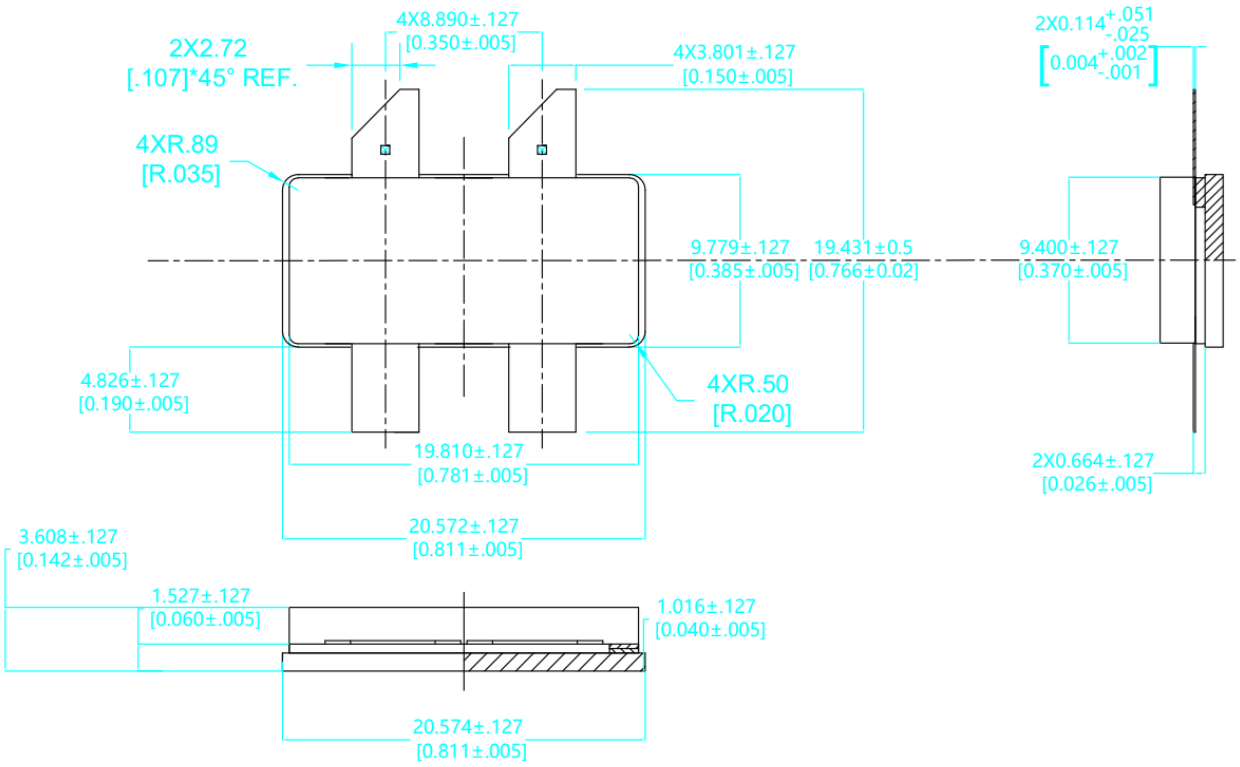


Table 4. Bill of materials of application board (PCB layout upon request)

Component	Value	Quantity
U1	XTAH35160BY4	1
C1	5.6pF	1
C4、 C5、C6、 C7、C8	15pF	5
C2	0.5pF	1

Earless Flanged Ceramic Package; 4 leads



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2025/7/2	**V1.0**	**Preliminary Datasheet Creation**

Application data based on: ZYX-25-19

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