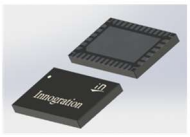
GaN HEMT 28V, 120W, 2.7-3.5GHz Power Transistor

GTAH35120C6



Description

The GTAH35120C6 is a 120W, internal matched GaN HEMT, operated from 2.7-3.5GHz.

It features high gain, high efficiency, wide band and low cost, in 10*6mm open cavity plastic package.

As QMT(Quasi-MMIC-Transistor), with innovative internal and external matching design,it is highly compact ,similar to MMIC size while with better performance and cost structure

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

- Typical Class AB RF Performance with device soldered

Vds= 28V, Vgs=-2.40V,Idq=200mA					
Pulse width(20us) Duty cycle(20%)					
Freq(MHz)	P-1(dBm)	P-1Gain（dB）	P-3(dBm)	P-3(W)	EFF (%)
2500	50.41	15.1	51.54	142.7	63.3
2700	50.04	15.1	51.28	134.4	61.7
3100	50.07	15.5	51.32	135.5	62.3
3300	50.05	15.6	51.49	140.9	61.4
3500	49.73	15.3	51.28	134.3	58.7

Applications

- S band pulsed power amplifier

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

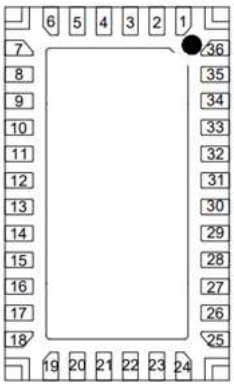
1. Set VGS to the pinch--off (VP) voltage, typically –5 V
2. Turn on VDS to nominal supply voltage
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

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)



Pin No.	Symbol	Description
8,9,10,11,14,15,16,17	RF IN/Vgs	RF Input, Vgs bias
26,27,28,29,32,33,34,35	RF OUT/VDD	RFOutput, Drain bias

Rest Pins and Package Base	GND	DC/RF Ground. Must be soldered directly to heatsink or copper coin for CW application.

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DSS}	+150	Vdc
Gate--Source Voltage	V_{GS}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	36	Vdc
Maximum gate current	Igs	27.2	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=120W Pulsed CW	$R_{\theta JC}$	0.6	°C /W

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

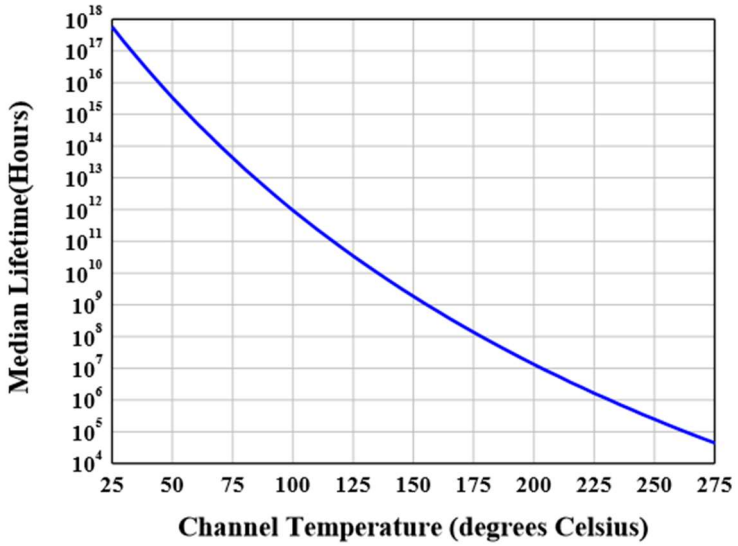
DC Characteristics (main path, measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=27.2mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 27.2mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =28V, IDS=200mA, Measured in Functional Test	$V_{GS(Q)}$		-2.4		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	3.5GHz, Pout=120W Pulsed CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature



Typical performance

Figure 3: Efficiency and power gain as function of Pout

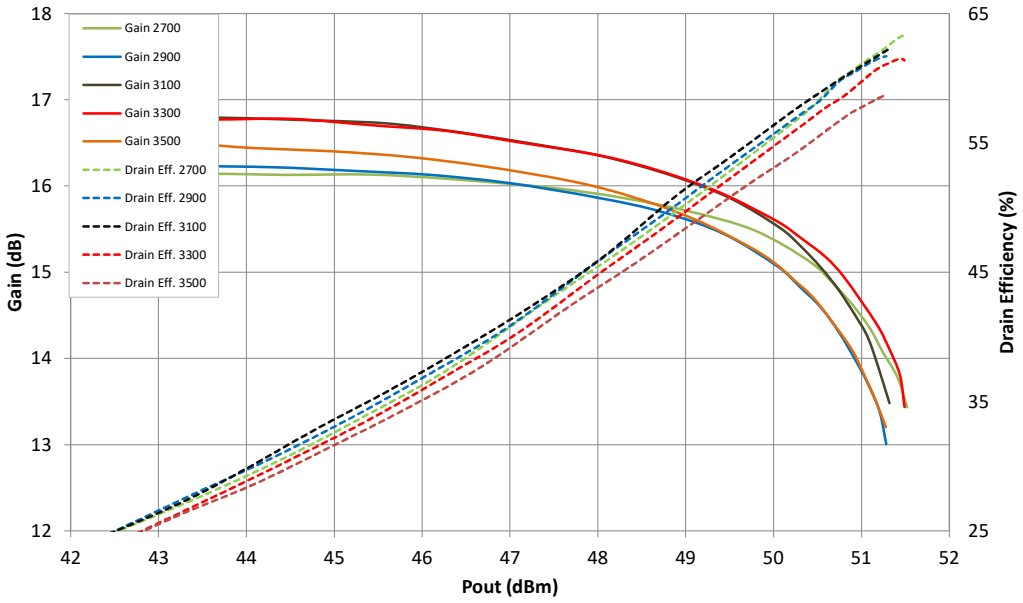


Figure 4: Network analyzer output, S11 and S21

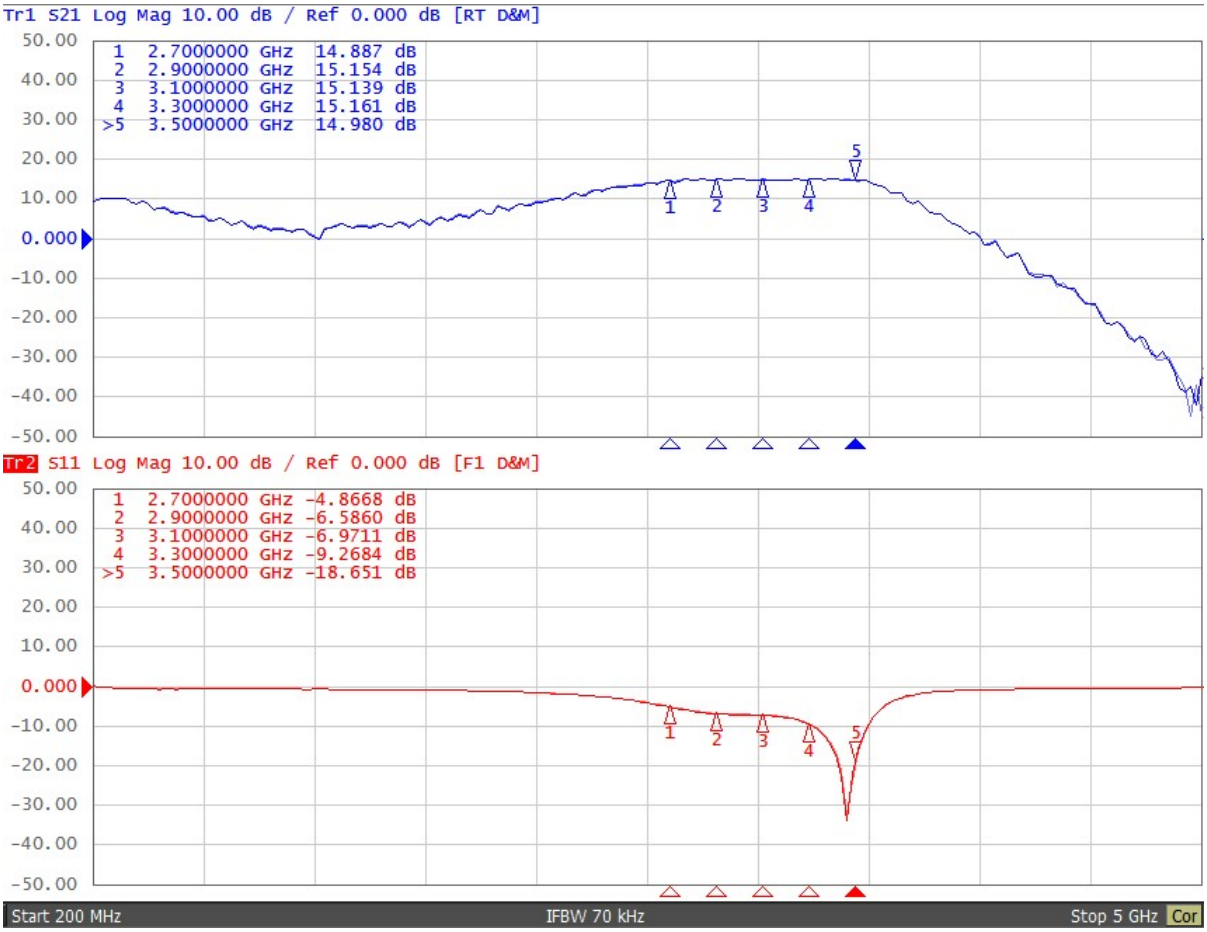


Figure 5: Picture of application board

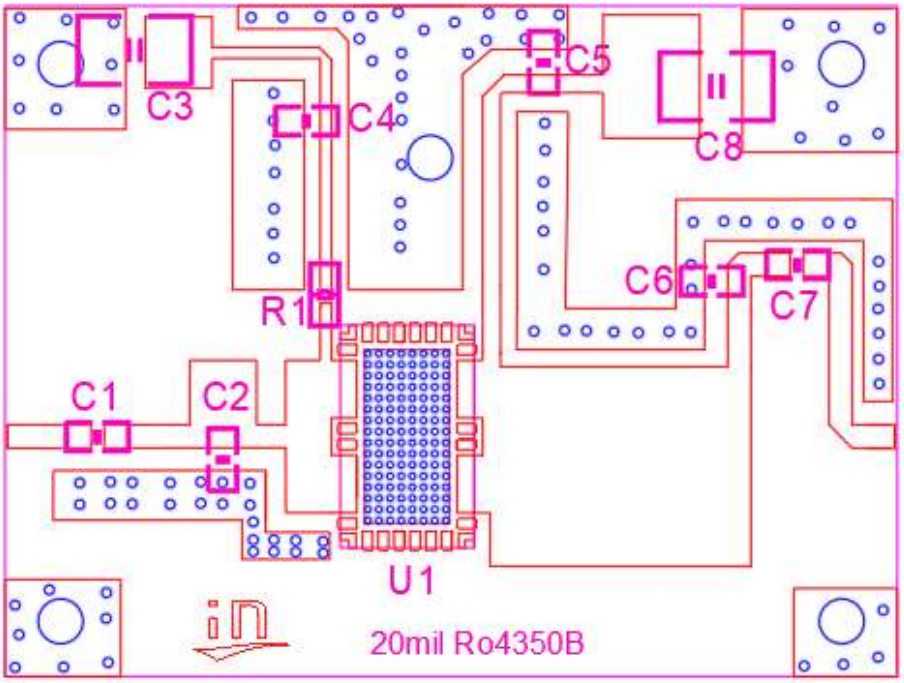
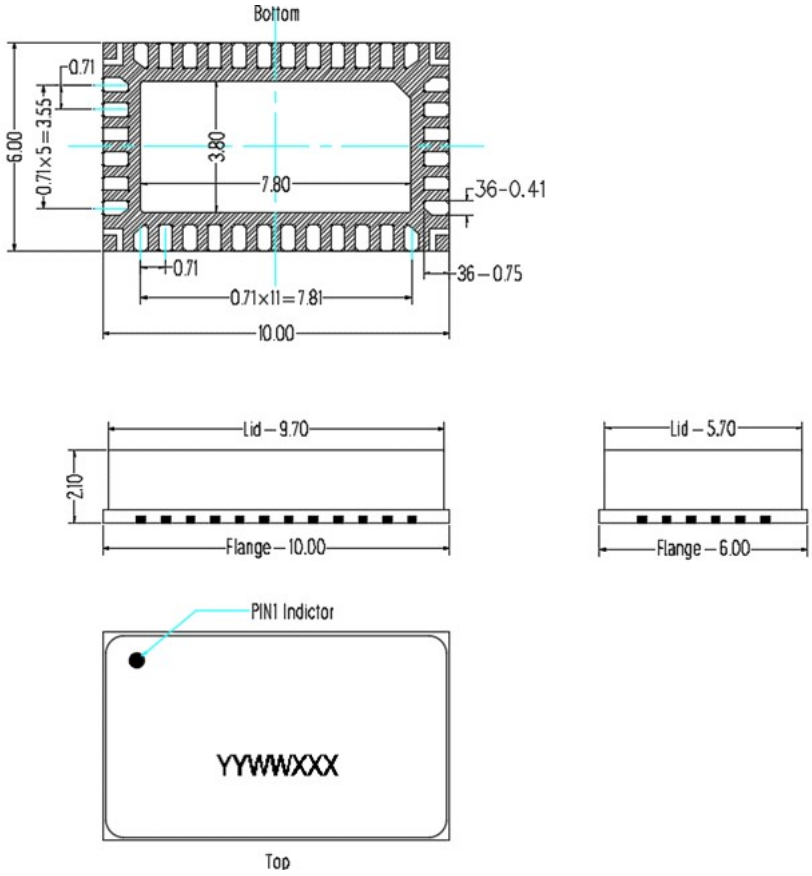


Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 20mils)

Component	Value	Description
PCB	thickness,20mil	Rogers 4350
U1	GTAH2537-120H	PA
C1、C4、C5、C7	8.2pF	ATC600S
C3、C8	10uF	TDK1206
C2	1.5pF	ATC600S
C6	0.7pF	ATC600S
R1	10Ω	TDK0805

10*6 Plastic Package



Notes:

1. All dimensions are in mm;
2. The tolerances unless specified are ±0.2mm.

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2023/11/4	**V1.0**	**Preliminary Datasheet Creation**

Application data based on: HJ-23-19

Notice

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