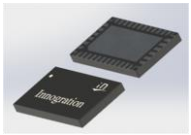
GaN HEMT 28V, 4W, X band RF Power Transistor

XTAH1A004C6



Description

The XTAH1A004C6 is a 4W GaN HEMT, designed for multiple applications, within 8-10GHz.

The transistor is available in a highly cost effective 10*6mm, surface mount, QFN package with 100% production test to ensure the quality and consistency.

It can be used in CW, Pulse and any other modulation modes.

There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.

- Typical 8-10GHz broadband performance with device soldered

V_{ds}= 28V, V_{gs}=-2.57V,I_{dq}=15mA					
CW					
Freq(MHz)	P-1(dBm)	P-1Gain(dB)	P-3(dBm)	P-3(W)	EFF (%)
8000	35.50	7.9	36.46	4.4	49.7
8500	34.74	8.6	36.16	4.1	39.8
9000	34.89	9.0	36.64	4.6	42.8
9500	35.18	8.0	36.92	4.9	45.3
10000	35.25	9.3	36.34	4.3	49.2

Applications

- X band power amplifier

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

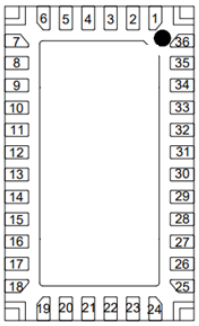
1. Set VGS to the pinch--off (VP) voltage, typically –5 V
2. Turn on VDS to nominal supply voltage
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

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)



Pin No.	Symbol	Description
8,9,10,11,	RF IN/Vgs	RF Input, Vgs bias
32,33,34,35	RF OUT/VDD	RFOutput, Drain bias
2,5,7,12,13,18,20,23,25,30,31,36, Package Base	GND	DC/RF Ground.
Rest Pins	NC	Not connected

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	1	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= 25°C, at Pdiss=5W	$R_{\theta JC}$	16	°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=1mA	V_{DSS}		150		V
Gate Threshold Voltage	VDS =10V, ID = 1mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =28V, IDS=20mA, Measured in Functional Test	$V_{GS(Q)}$		-2.57		V

Typical performance

Figure 2: Network analyzer output S11/S21

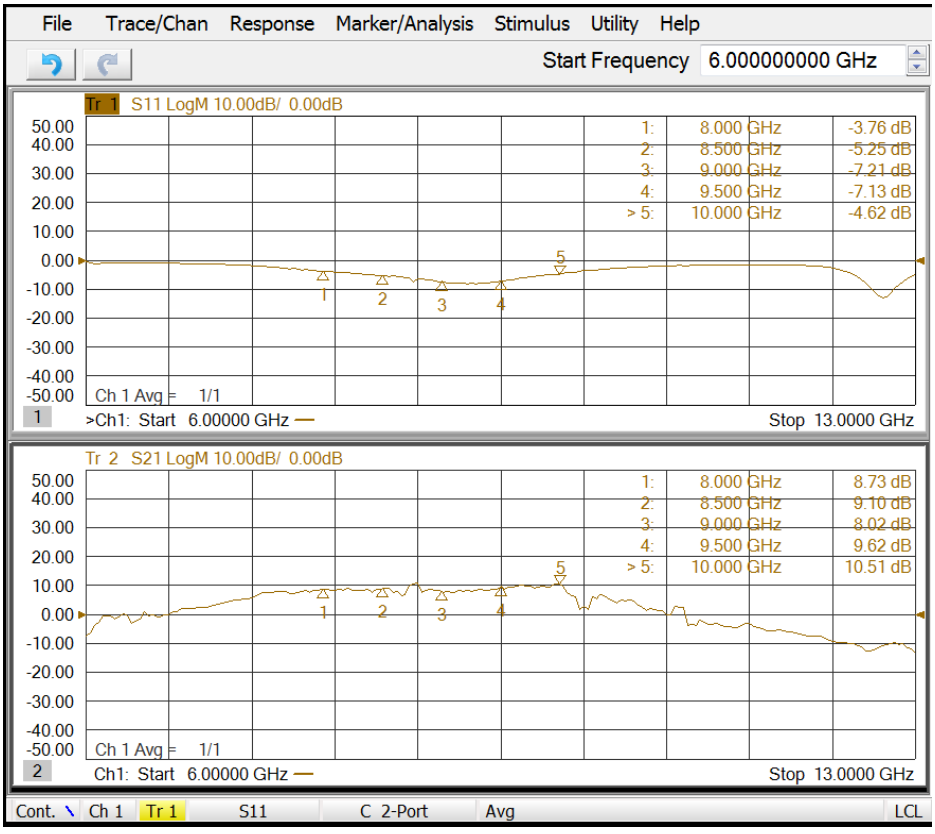


Figure 3: Power gain，Efficiency as function of Pout under Vds=28V, Idq=20mA,20us 15%

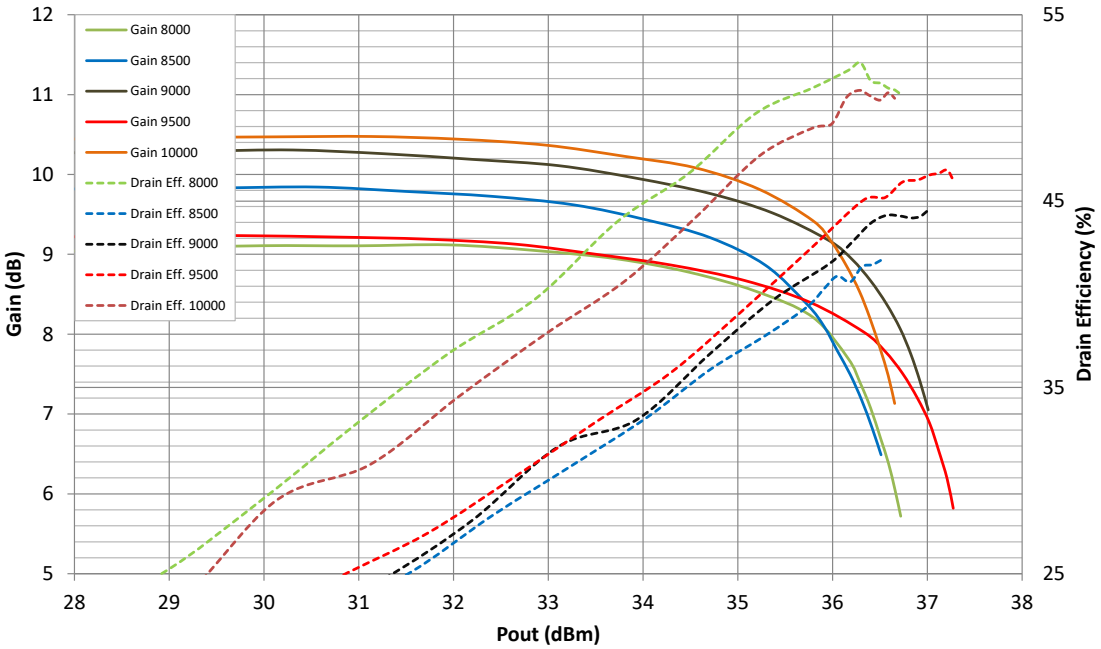


Figure 4: Picture of application board

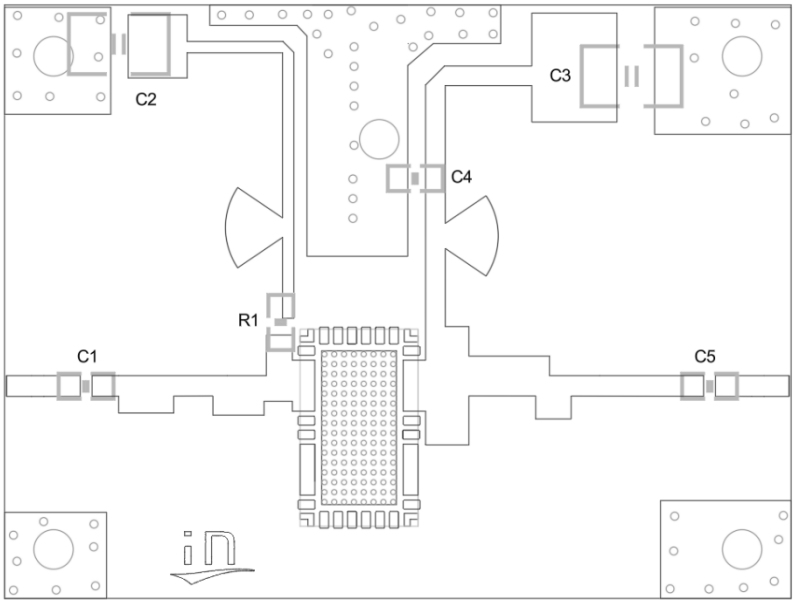
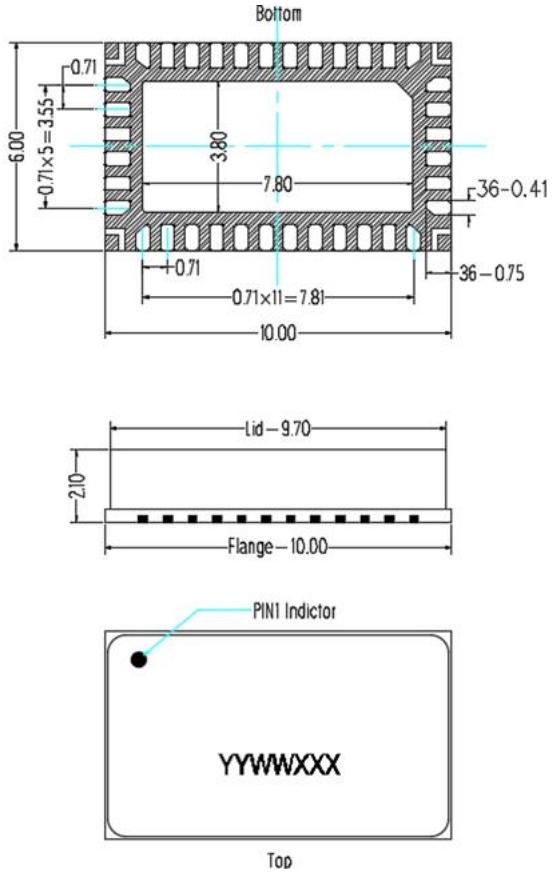


Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 20mils)

Component	Value	Description
U1	XTAH1A004C6	PA (10*6mm)
C1、C5	1.0pF	0603
C2、C3	10uF	TDK1206
C4	1.8Pf	0603
R1	10Ω	0603

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
2025/12/10	**V1.0**	**Preliminary Datasheet Creation**

Application data based on: HJ-25-22

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