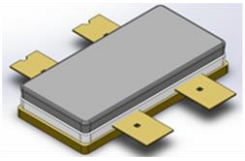
GaN 28V 100W,S band RF Power Transistor

XTAH42101B4C



Description

The XTAH42101B4C is a 100W internally matched, GaN HEMT, designed from 3.8 to 4.2GHz, especially 5G NR or LTE application, as well as either Pulse or CW application

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

Please note it is configured as single ended with both pins connected at input and output side

- Typical performance (on narrow band fixture with device soldered)

V_{DD}=32V I_{DQ}=100mA, CW,

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
3800	50.12	102.8	53.2	14.02	51.43	139.0	60.0
3900	49.96	99.1	55.2	14.47	51.26	133.7	62.0
4000	49.53	89.7	55.5	14.61	50.98	125.3	63.1
4100	49.17	82.6	54.1	14.3	50.95	124.7	62.6
4200	49.2	83.3	49.9	13.76	51.24	133.1	59.5

Recommended driver: GTAH35012PD

Applications and Features

- Suitable for wireless communication infrastructure, wideband amplifier, EMC testing, ISM etc.
- High Efficiency and Linear Gain Operations
- Thermally Enhanced Industry Standard Package
- High Reliability Metallization Process
- Excellent thermal Stability and Excellent Ruggedness
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

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 (28V)
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

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DSS}	150	Vdc
Gate--Source Voltage	V_{GS}	-10,+2	Vdc
Operating Voltage	V_{DD}	36	Vdc
Maximum Forward Gate Current @ TC = 25°C	Igmax	27.2	mA
Storage Temperature Range	Tstg	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature(See note 1)	T_J	+225	°C

Note: 1. Continuous operation at maximum junction temperature will affect MTTF
2.Bias Conditions should also satisfy the following expression: Pdiss < (Tj – Tc) / RJC and Tc = Tcase

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T_C= 85°C, T_J=200°C, RF CW operation	$R_{\theta JC}$	1.8	C/W

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

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=-8V; I_{DS}=27.2mA	V_{DSS}	150			V
Gate Threshold Voltage	V_{DS} = 28V, I_D =27.2mA	V_{GS}(th)	-4		-2	V
Gate Quiescent Voltage	V_{DS} =28V, I_{DS}=120mA, Measured in Functional Test	$V_{GS(Q)}$		-2.4		V

Typical performance

Figure 2: Small singal gain and return loss Vs Frequency

Vds=32V, Idq=200mA, input power=0dBm

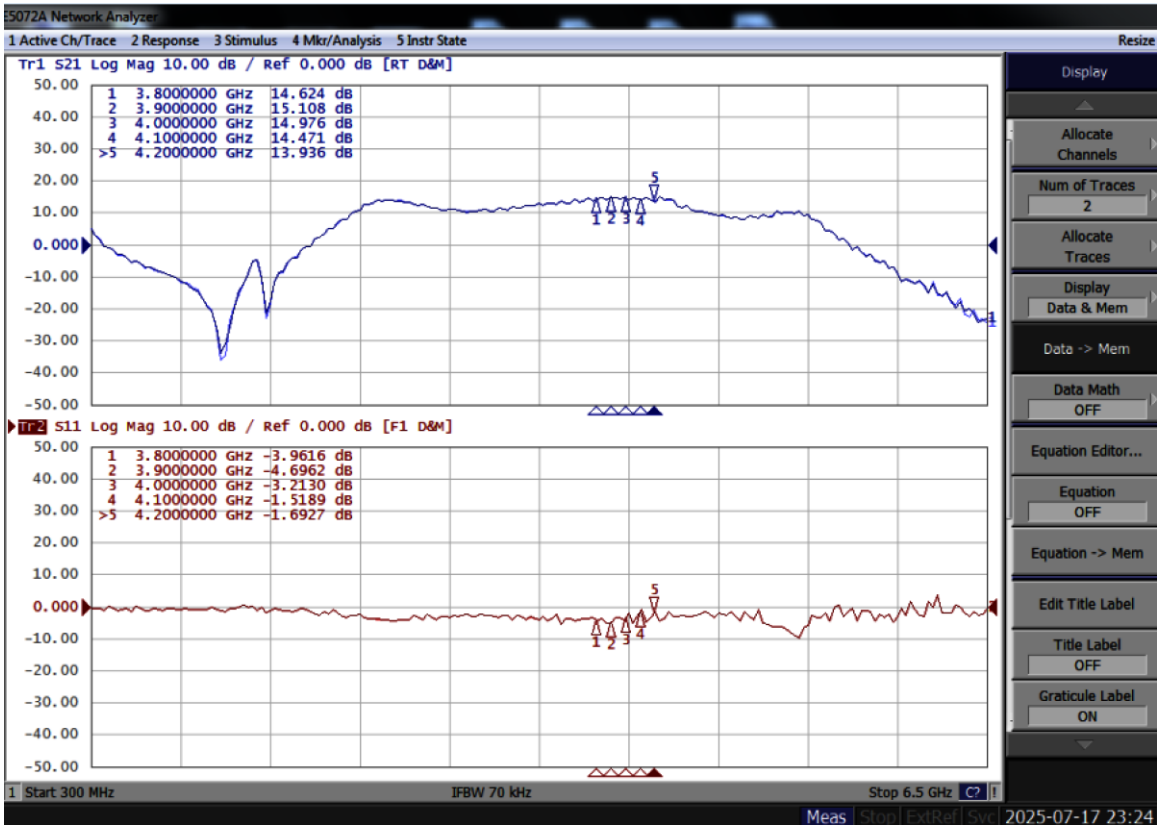


Figure 3: Efficiency and power gain as function of Pout

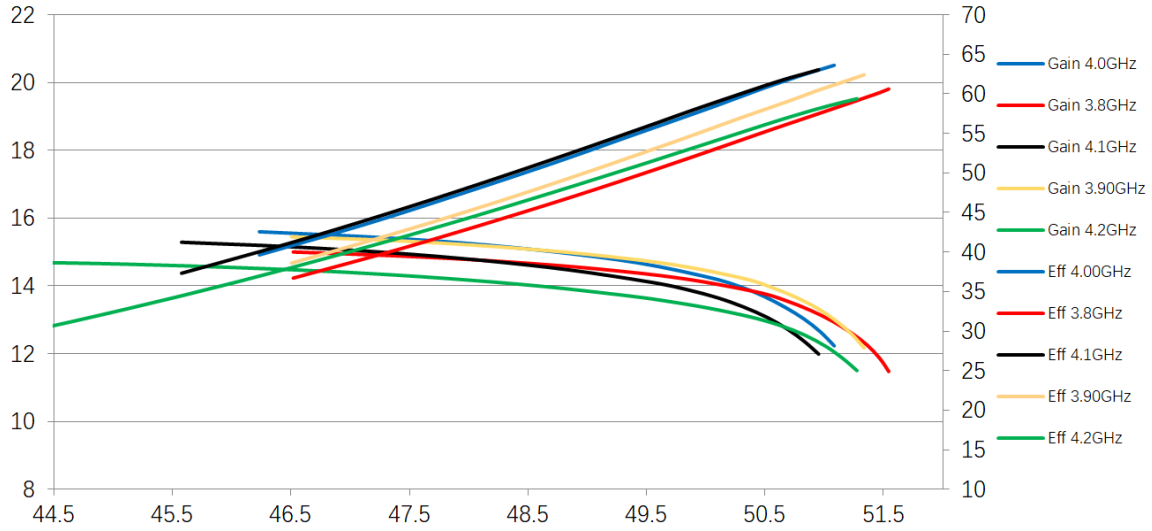
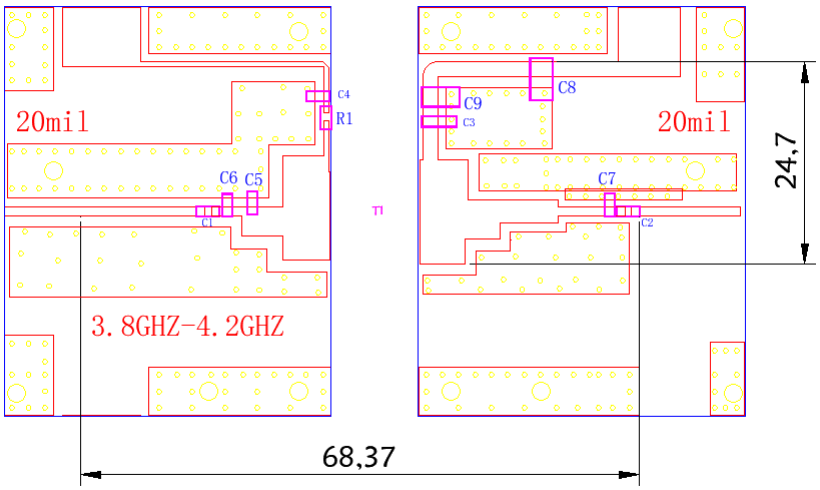


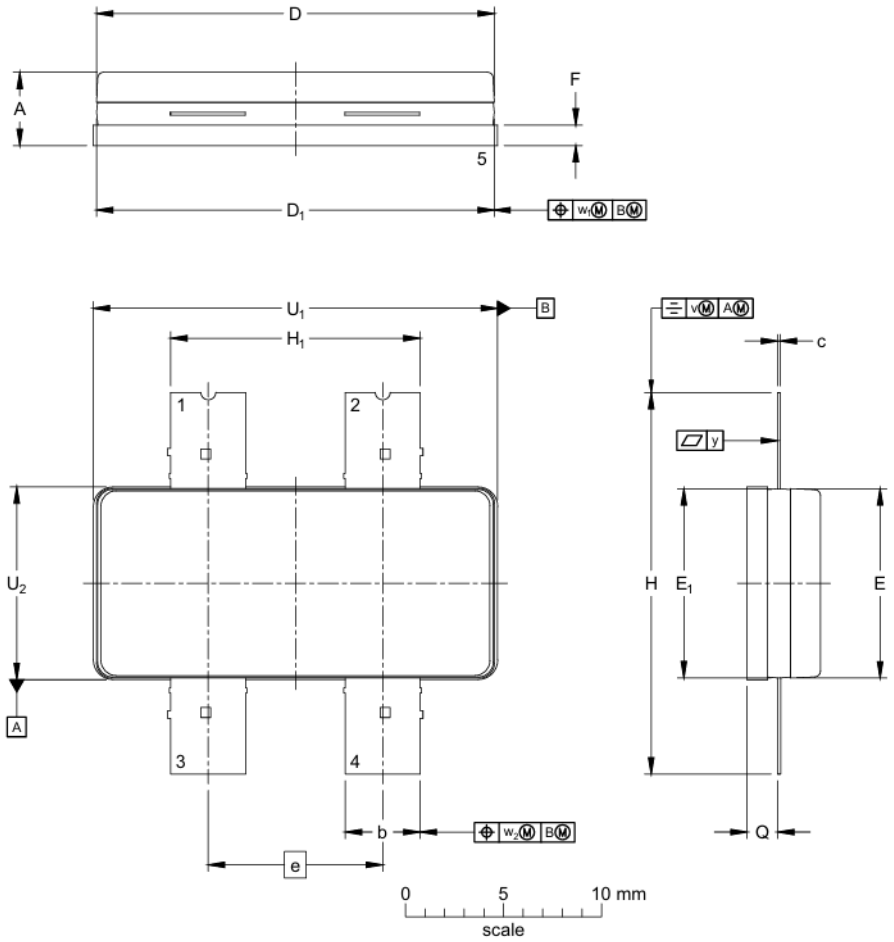
Figure 4: Picture and Bill of materials of application circuit

(Layout Gerber file upon request，20mils RO4350B)



Part	Quantity	Description	Part Number	Manufacture
C1,C3,C4	3	8.2pFHigh Q Capacitor	251SHS8R2BSE	TEMEX
C2	1	6.2pFHigh Q Capacitor	251SHS6R2BSE	TEMEX
C5,	1	0.5pFHigh Q Capacitor	251SHS0R5BSE	TEMEX
C6	1	0.3pFHigh Q Capacitor	251SHS0R3BSE	TEMEX
C7,	1	0.1pFHigh Q Capacitor	251SHS0R1BSE	TEMEX
C9,C8	2	10uF MLCC	GRM32EC72A106ME05	Murata
R1	1	10Ω Power Resistor	ESR03EZPF100	ROHM
T1	1	100W GaN Transistor	XTAH42121B4C	Innogration

Earless Flanged Plastic Air Cavity Package; 4 leads



Dimensions

Unit		A	b	c	D	D_1	E	E_1	e	F	H	H_1	Q(1)	U_1	U_2	v	w_1	w_2	y
mm	max	4.01	3.91	0.18	20.42	20.37	9.80	9.75		1.14	19.53	12.83	1.68	20.70	9.91	0.50	0.50	0.50	0.10
	nom								8.89										
	min	3.40	3.71	0.13	20.12	20.17	9.50	9.55		0.94	19.33	12.57	1.45	20.50	9.70				

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2025/7/18	**V1.0**	**Preliminary Datasheet Creation**

Application data based on LWH-25-35

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