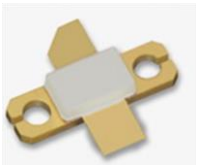
GaN 28V, 70W, RF Power Transistor

XTAH42070GX



Description

The XTAH42070GX is a 70W internally matched, GaN HEMT, designed for ultrawide RF CW or pulse applications under 4.2GHz. In typical application within 0.4-4GHz, it can deliver >50W CW across the full band

There is no guarantee of performance when it is used in applications designed outside of these frequencies.

- 400-4000M

  Vds=28V, Idq=100mA, signal: CW, with device soldered (Data up to 40V upon request)

Freq(MHz)	Pin(dBm)	Pout(dBm)	Pout(W)	Ids(A)	Gain(dB)	Eff(%)
400	30.94	47.56	57.02	3.53	16.62	57.69
600	33.32	48.09	64.42	3.64	14.77	63.20
1000	34.04	48.19	65.92	3.92	14.15	60.06
1500	37.5	48.19	65.92	3.62	10.69	65.03
2000	39.19	47.95	62.37	4.18	8.76	53.29
2500	37.94	48.69	73.96	4.75	10.75	55.61
3000	38.7	47	50.12	5.05	8.3	35.44
3500	39.25	47.61	57.68	4.86	8.36	42.38
4000	38.4	47.5	56.23	4.17	9.1	48.16

- 2400-4200M

  Vds=28V, Idq=100mA, signal: CW, with device soldered

Freq(MHz)	Pin(dBm)	Pout(dBm)	Pout(W)	Ids(A)	Gain(dB)	Eff(%)
2400	**37.70**	**48.50**	**70.8**	**4.92**	**10.8**	**51.4**
3000	**38.30**	**48.30**	**67.6**	**5.50**	**10.0**	**43.9**
3500	**37.50**	**48.50**	**70.8**	**5.92**	**11.0**	**42.7**
4000	**37.70**	**48.90**	**77.6**	**5.54**	**11.2**	**50.0**
4280	**39.40**	**48.20**	**66.1**	**4.35**	**8.8**	**54.2**

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}	40	Vdc
Maximum Forward Gate Current @ TC = 25°C	Igmax	16.8	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	RθJC	2.3	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}=16.8mA	V_{DSS}	150			V
Gate Threshold Voltage	V_{DS} = 28V, I_D =16.8mA	V_{GS}(th)	-4	-	-2	V
Gate Quiescent Voltage	V_{DS} =28V, I_{DS}=100mA, Measured in Functional Test	$V_{GS(Q)}$		-2.35		V

400-4000MHz

Figure 2: Output of network analyzer S11, S21 Vgs=-2.4V, Vds=32V, Idq=130mA, input power=0dBm

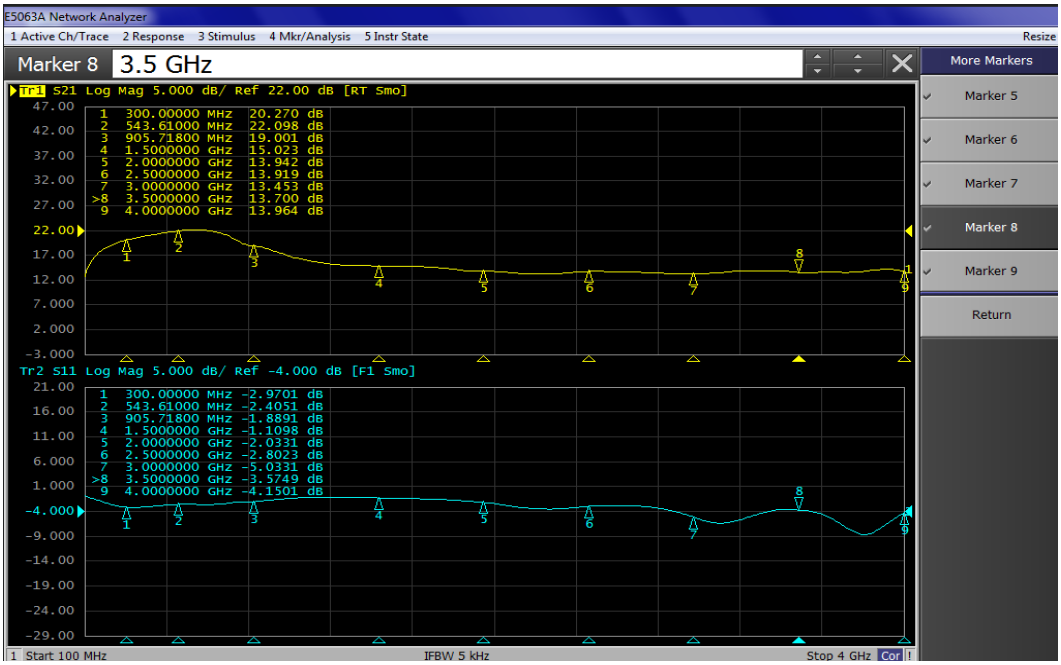
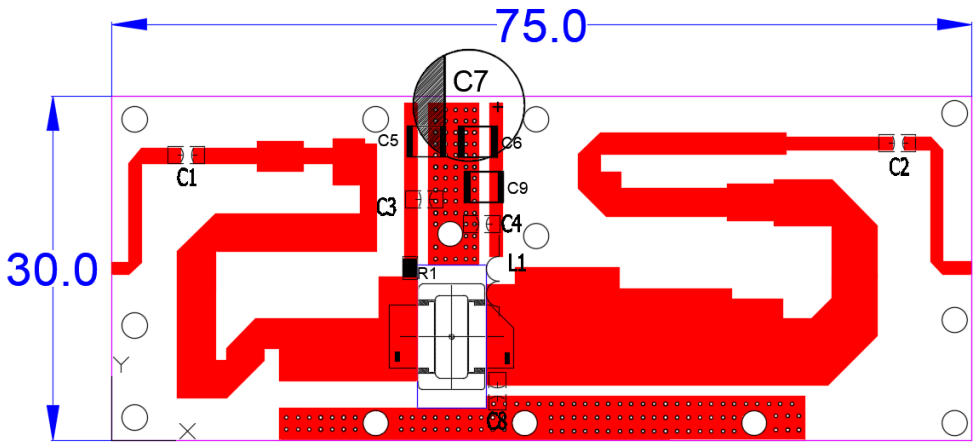


Figure 3: Layout info and bill of materials for 0.7-4GHz application circuit



Component	Description	Suggestion
C7	470uF/63V	
C5,C6,C9	10uF	10uF/100V
C1,C2, C3, C4	18pF(MQ300805)	
C8	0.9pF(MQ300805)	
L1	0.5mm wire，4mm innerdiameter，3turns	DIY
R1	Chip Resistor,10Ω	0805
PCB	20mil Rogers 4350B	

2400-4280MHz

Figure 2: Output of network analyzer S11, S21 Vgs=-2.4V, Vds=32V, Idq=130mA, input power=0dBm

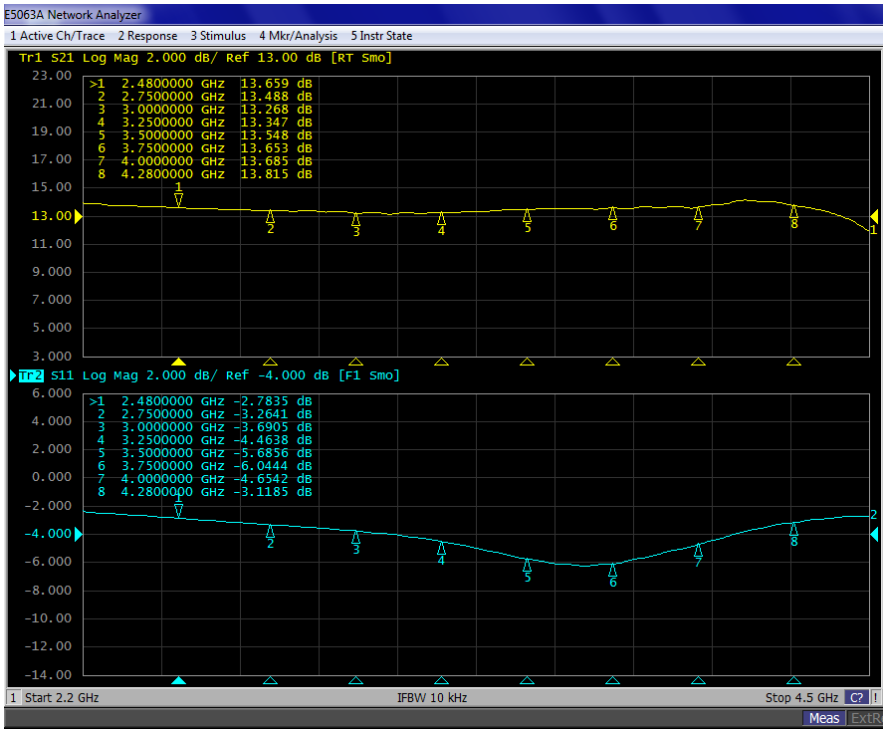
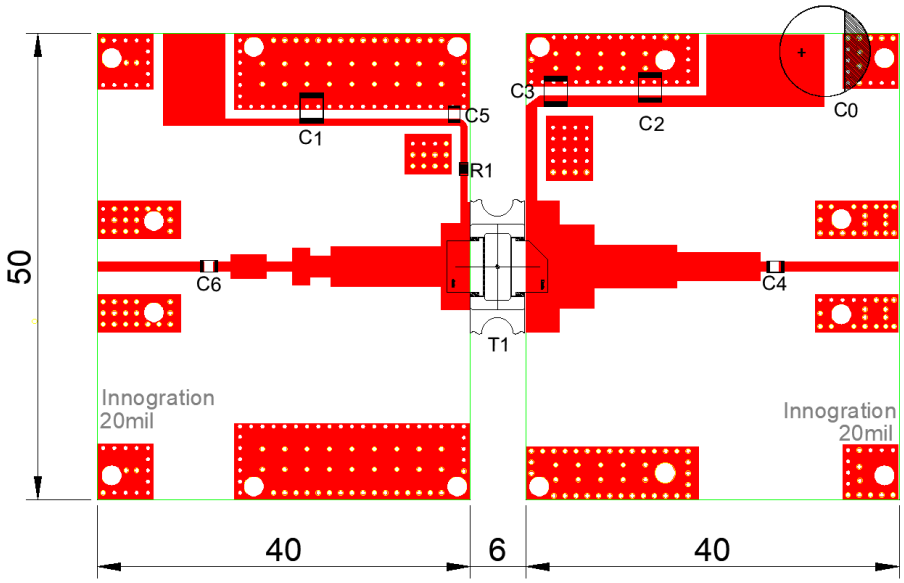


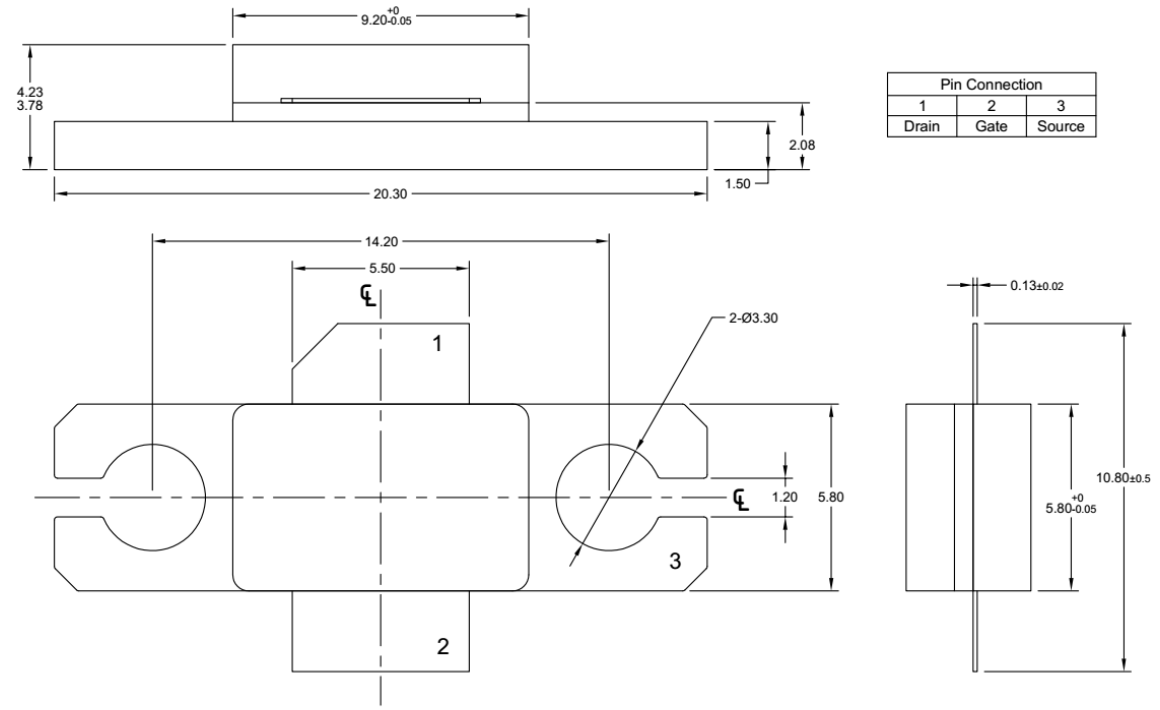
Figure 3: Layout info and bill of materials for 0.7-4GHz application circuit



Component	Description	Suggestion
C0	470uF/100V	Electrolytic Capacitor
C1, C2	10uF	1210
C3, C4	6.8pF	MQ301111
C5,C6	6.8pF	MQ400805
R1	Chip Resistor,10Ω	0805
T1	XTAH42070GX V1	Innogration
PCB	Rogers 4350b, thickness 20 mils, 1oz copper	

Package Outline

Flanged ceramic package; 2 leads



OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-GXB					10/10/2017

Figure 1. Package Outline PKG-G2E

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2025/3/28	V1.0	Preliminary Datasheet Creation
2025/6/5	V1.1	Add 2.4-2.42G application data

Application data based on YHG-25-13/RXT-25-19

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