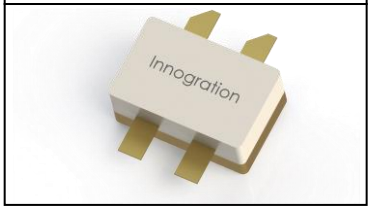
Gallium Nitride 28V 70W, RF Power Transistor

GTAH50070G4



Description

The GTAH50070G4 is a 70W internally matched, GaN HEMT, designed from 3.0 to 5.0GHz, especially 5G NR or LTE application, as well as either Pulse or CW application.

In typical broadband application from 3.0-5.0GHz, it can deliver 50W within full band

There is no guarantee of performance when this part is used in applications designed Outside of these frequencies. **Please notice that both leads at input and output are internally connected to make it as single ended configuration**

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

V_{DD}=28V I_{DQ}=200mA, CW

Freq(GHz)	Pin(dBm)	Psat(dBm)	Psat(W)	Ids(A)	Gain(dB)	Eff(%)
4.4	39.5	48.5	70.5	5.44	9.0	46.3
4.5	39.4	48.8	75.5	5.62	9.4	48.0
4.6	39.6	49.1	80.4	5.75	9.5	49.9
4.7	39.9	49.3	84.1	5.64	9.4	53.3
4.8	39.5	49.1	80.7	5.31	9.5	54.3
4.9	39.8	48.9	76.7	4.94	9.1	55.5
5.0	40.2	48.4	70.2	4.40	8.3	56.2

Recommended driver:GTAH58012C6 or GTAH35012PD

- Typical broadband RF performance (on broadband fixture with device soldered)

V_{DD}=28V I_{DQ}=200mA, CW

Freq(GHz)	Pin(dBm)	Psat(dBm)	Psat(W)	Ids(A)	Gain(dB)	Eff(%)
3.0	39.5	47.82	60.53	3.86	8.32	56.01
3.2	39.4	48.03	63.53	4.21	8.63	53.90
3.4	38.1	47.87	61.24	4.09	9.77	53.47
3.6	39.7	47.67	58.48	4.02	7.97	51.95
3.8	40	47.27	53.33	3.94	7.27	48.34
4.0	39.6	47.82	60.53	4.32	8.22	50.04
4.2	39.3	47.78	59.98	4.16	8.48	51.49
4.4	39.9	47.71	59.02	4.03	7.81	52.30
4.6	40	47.54	56.75	4	7.54	50.93
4.8	38.3	47.54	56.75	3.91	9.24	52.24
5.0	39.6	47.1	51.29	3.63	7.5	50.46

Recommended driver: GTAH58015GX or GTAH58018C6

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 @ T_C = 25°C	Igmax	18	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

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	1.6	C/W

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

DC Characteristics

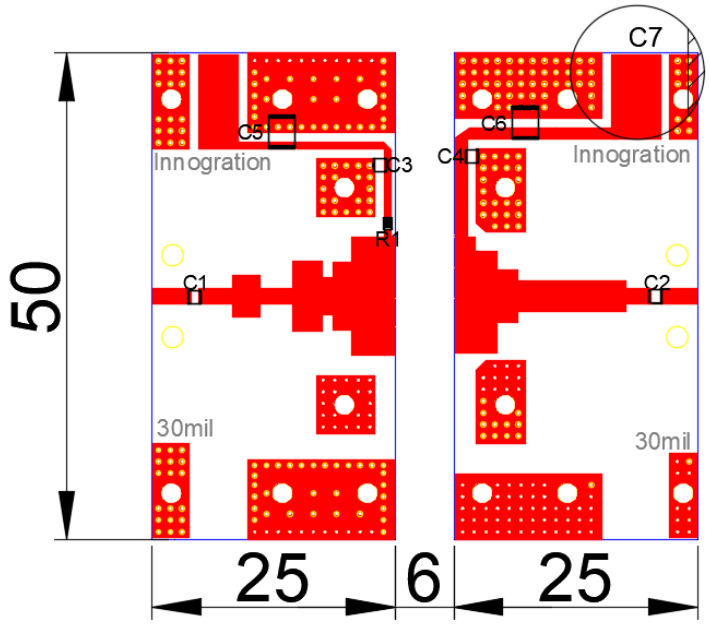
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=-8V; I_{DS}=18mA	V_{DSS}	150			V
Gate Threshold Voltage	V_{DS} = 28V, I_D =18mA	V_{GS}(th)	-4		-2	V
Gate Quiescent Voltage	V_{DS} =28V, I_{DS}=200mA, Measured in Functional Test	$V_{GS(Q)}$		-2.5		V

Typical performance

3--5GHz

Figure 2: Small singal gain and return loss Vs Frequency
Vds=28V, Idq=200mA, input power=0dBm

Figure 3: Picture and Bill of materials of 3-5GHz wide band application circuit
(Layout Gerber file upon request)



Component	Description	Suggestion
C0	470uF/63V	Electrolytic capacitors
C1, C2, C3	10uF/1210	1210
C4, C5, C6, C7	5.1pF/ MQ300805	Beijing YuanLu HongYuan Electronic Technology CO.,LTD MQ300805
R1	Chip Resistor ,10Ω/0805	0805
PCB	30mil / Rogers 4350 30mil	

4.4-5GHz

Figure 4: Small singal gain and return loss Vs Frequency

Vds=28V, Idq=200mA, input power=0dBm

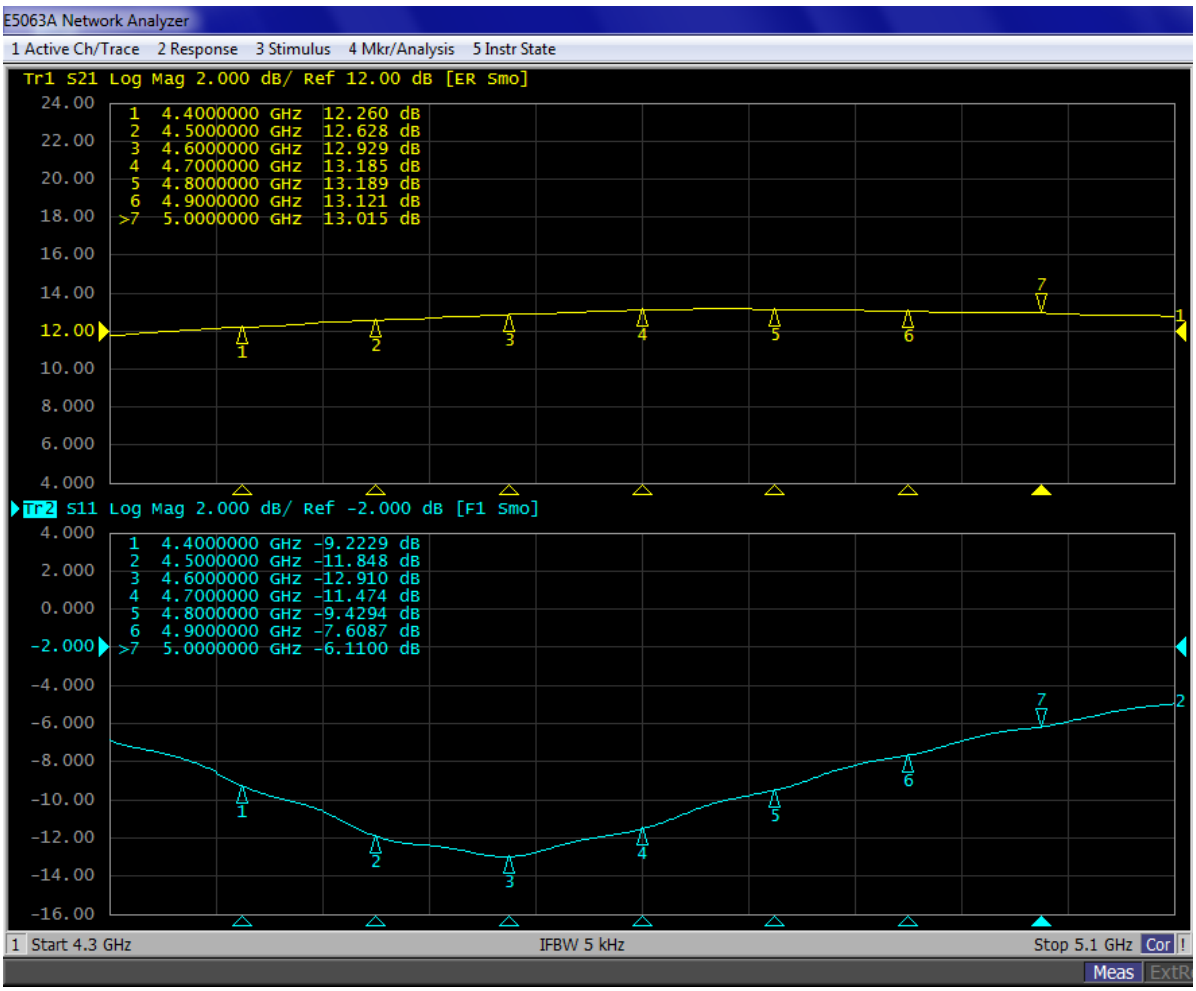
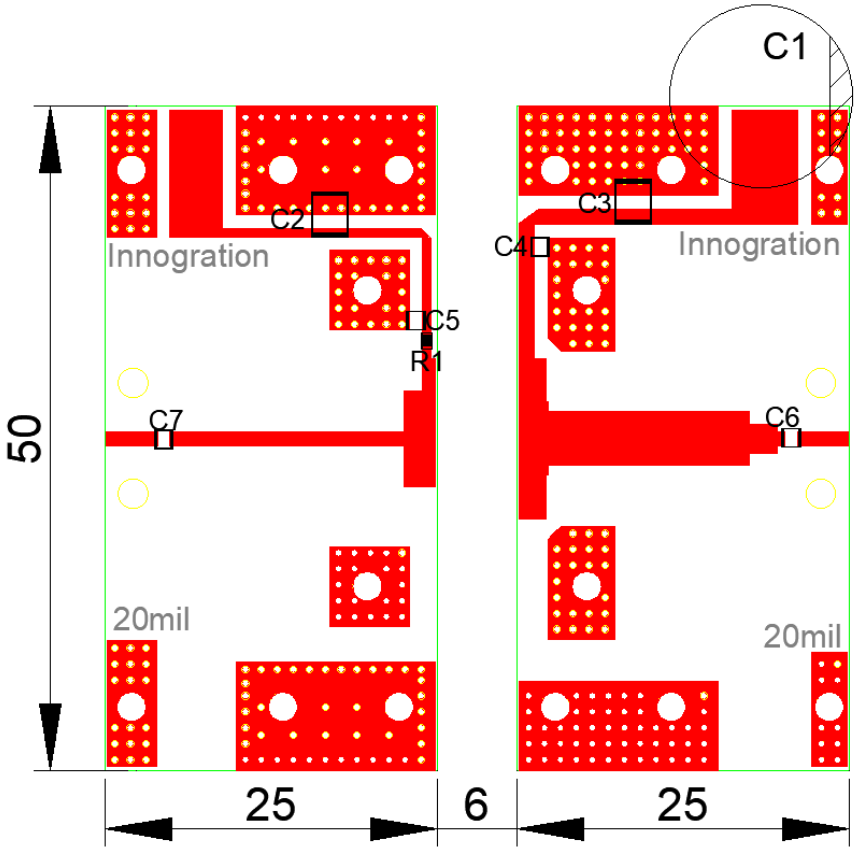


Figure 5: Picture and Bill of materials of 4.4-5GHz wide band application circuit

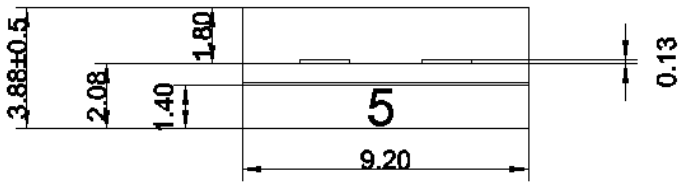
(Layout Gerber file upon request)



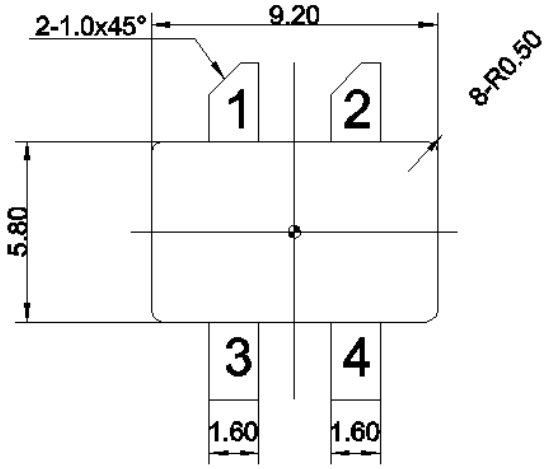
Component	Description	Suggestion
C1	1000uF	Electrolytic capacitors
C2, C3	10uF	1210
C4, C6	3.3pF	Beijing YuanLu HongYuan Electronic Technology CO.,LTD MQ300805
C5, C7	5.1pF	Beijing YuanLu HongYuan Electronic Technology CO.,LTD MQ300805
R1	Chip Resistor,10Ω	0805
PCB	Rogers 4350b, thickness 20 mils, 1oz copper	

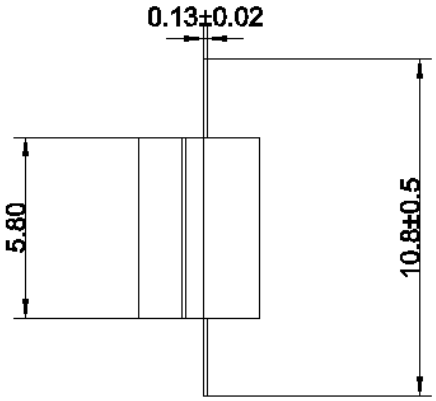
Package Outline

Ceramic package; 4 leads



Pin Connection		
1,2	3,4	5
Drain	Gate	Source





Unit:mm
Tolerances(unless specified): x.x ±0.25
x.xx ±0.13

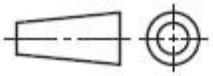
OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-G4					

Figure 1. Package Outline PKG-G4

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2024/8/20	**V1.0**	**Preliminary Datasheet Creation**
2024/12/3	**V2.0**	**Package finalized as G4H for production**

Application data based on RXT-24-40/41,YHG-24-27

Notice