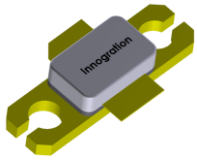
Gallium Nitride 28V 36W, RF Power Transistor

GTAH40036GX



Description

The GTAH40036GX is a 36W GaN HEMT, designed for ultrawide RF CW or pulse applications under 4GHz.

In typical broadband 0.4-3GHz, it can deliver more than 20W CW within the full band

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

- Vds=28V, Idq=130mA, signal: CW, with device soldered (Data up to 40V upon request)

Freq (MHz)	Psat (dBm)	Psat (W)	Ids (A)	Pin (dBm)	Gain (dB)	Eff (%)	2nd （dBc）	3rd （dBc）
300	42.80	19.1	1.13	28.30	14.50	60.22	-8.30	-9.20
400	44.22	26.4	2.05	31.87	12.35	46.03	-7.80	-16.20
500	45.21	33.2	2.80	31.05	14.16	42.33	-8.90	-12.30
600	46.01	39.9	2.86	31.70	14.31	49.83	-9.00	-13.00
700	46.34	43.1	2.88	32.64	13.70	53.39	-11.40	-14.10
800	46.63	46.0	2.91	30.00	16.63	56.49	-15.20	-13.80
900	46.57	45.4	2.64	31.18	15.39	61.41	-13.90	-13.30
1000	46.82	48.1	2.71	32.82	14.00	63.37	-18.60	-12.80
1100	46.66	46.3	2.55	32.30	14.36	64.91	-16.30	-13.80
1200	46.42	43.9	2.35	30.66	15.76	66.65	-13.90	-18.60
1300	46.33	43.0	2.61	33.68	12.65	58.78	-14.60	-24.30
1400	46.45	44.2	2.68	33.18	13.27	58.84	-14.80	-39.40
1500	46.07	40.5	2.35	33.88	12.19	61.49	-19.30	-23.20
1600	47.42	55.2	3.11	33.86	13.56	63.40	-13.40	-20.20
1700	46.27	42.4	2.40	33.51	12.76	63.04	-23.40	-19.00
1800	46.20	41.7	2.47	33.74	12.46	60.28	-30.60	-40.90
1900	46.12	40.9	2.55	33.05	13.07	57.32	-37.10	-24.60
2000	46.19	41.6	2.81	32.58	13.61	52.86	-42.80	-22.50
2100	46.06	40.4	2.82	33.88	12.18	51.12	-46.30	-20.60
2200	46.26	42.3	2.93	34.09	12.17	51.52	-39.00	-23.80
2300	46.30	42.7	2.98	33.95	12.35	51.12	-36.70	-25.20
2400	46.56	45.3	3.08	33.92	12.64	52.52	-30.20	-20.90
2500	46.47	44.4	3.01	33.40	13.07	52.64	-26.10	-21.00
2600	46.43	44.0	2.74	33.20	13.23	57.29	-30.70	-20.80
2700	46.34	43.1	2.57	32.81	13.53	59.83	-51.00	-26.30
2800	46.23	42.0	2.80	32.52	13.71	53.54	-35.00	-26.80
2900	46.53	45.0	2.95	33.48	13.05	54.45	-29.00	-24.80
3000	46.31	42.8	2.64	32.73	13.58	57.84	-25.20	-31.00

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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	9	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
Total Device Power Dissipation (Derated above 25°C, see note 2)	Pdiss	55	W

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	3.8	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}=9mA	V_{DSS}	150			V
Gate Threshold Voltage	V_{DS} = 28V, I_D =9mA	V_{GS}(th)	-4	-	-2	V
Gate Quiescent Voltage	V_{DS} =28V, I_{DS}=600mA, Measured in Functional Test	$V_{GS(Q)}$		-2.16		V

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Figure 2: Output of network analyzer S11, S21 Vgs=-2.4V, Vds=28V, Idq=600mA, input power=0dBm

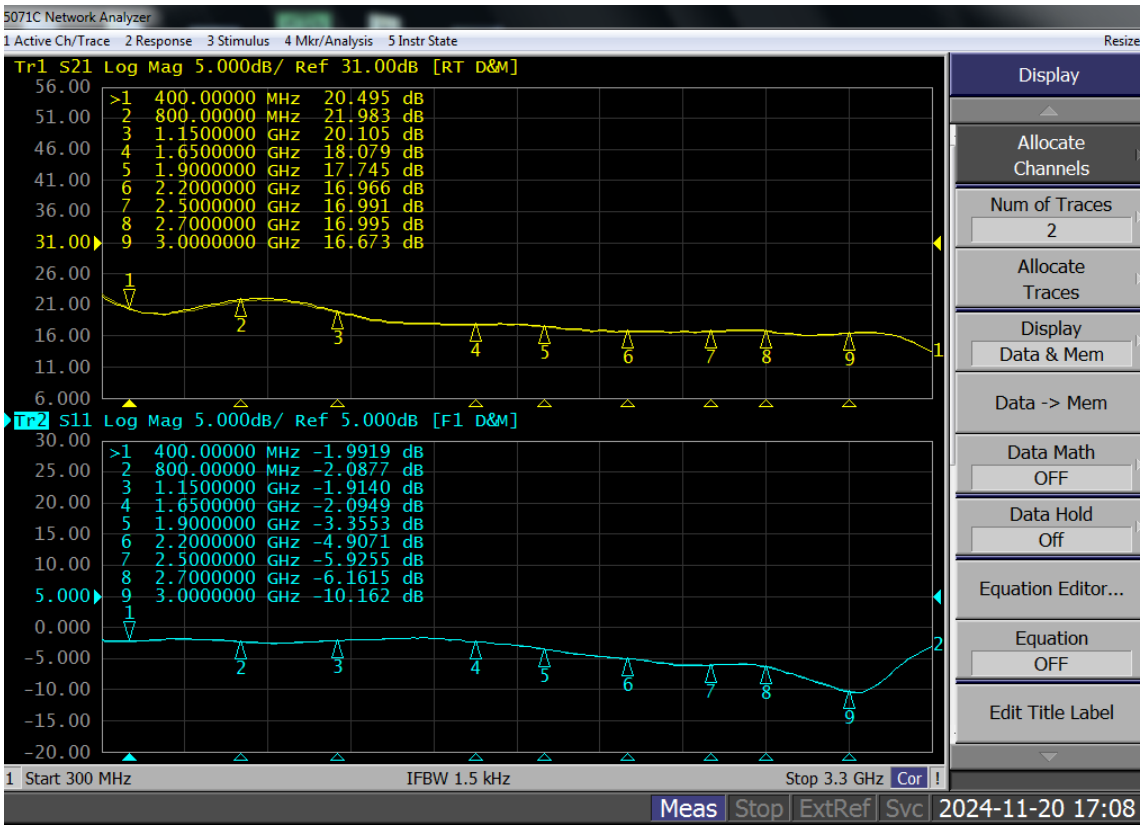
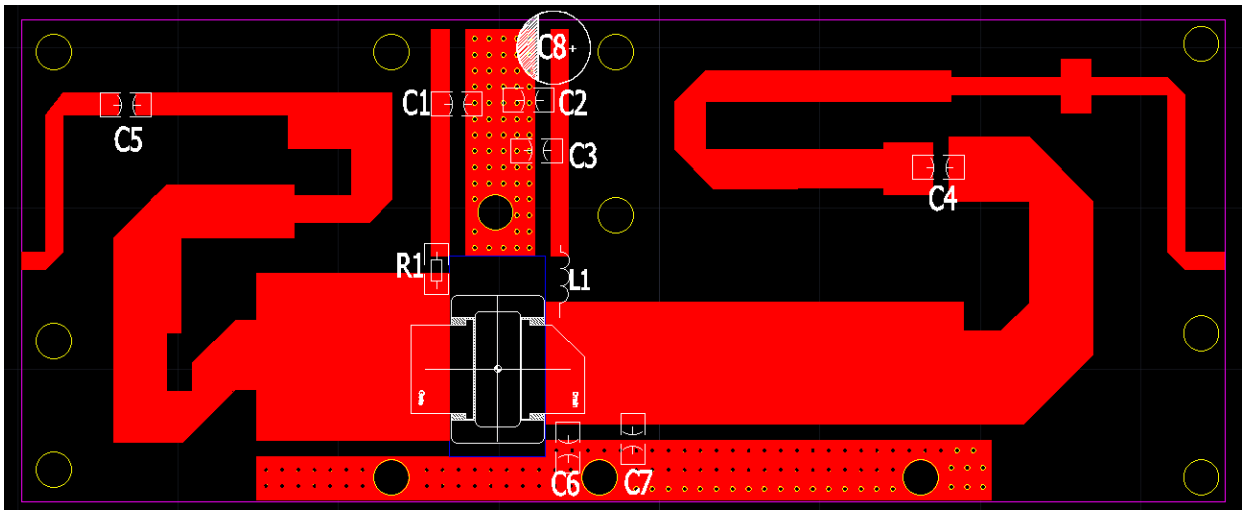


Figure 3: Layout info and bill of materials for 0.4-3GHz application circuit



Component	Description	Suggestion
C1， C2	10uF/200V-1210	Ceramic multilayer capacitor
C3	68pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ101111
C4,C5	36pf	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ300709
C6	0.8pF	BEIJING YUANLU HONGYUAN ELECTRONIC

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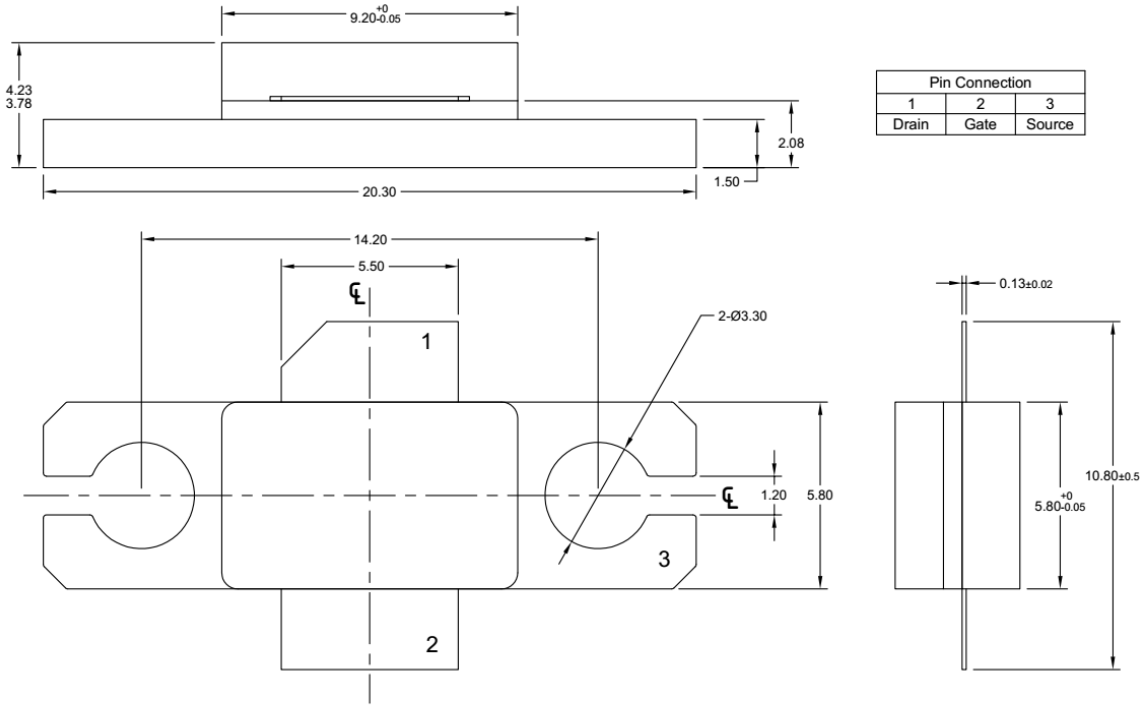
		TECHNOLOGY CO., LTD.MQ400805
C7	1.8pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ400805
C8	470uF/63v	Electrolytic Capacitor
L1	1mm wire，3mm innerdiameter，2turns	DIY
R1	51Ω-1206	Chip Resistor
PCB	Rogers 4350 20mil	

Package Outline

Flanged ceramic package; 2 leads



Pin Connection		
1	2	3
Drain	Gate	Source

Unit：mm
Tolerances(unless specified)：x.x ±0.1
x.xx ±0.05

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

Package Outline PKG-G2E

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Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2024/11/21	**V1.0**	**Preliminary Datasheet Creation**

Application data based on TC-24-72

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