



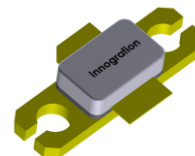
Gallium Nitride 28V 40W, RF Power Transistor

Description

The GTAH50040GX is a 40W internally matched, GaN HEMT, designed from 2.5 to 5.0GHz, 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.

GTAH50040GX



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

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

Freq(MHz)	Pin(dBm)	Psat(dBm)	Psat(W)	IDS(A)	Gain(dB)	Eff(%)
2500	35.8	46.16	41.30	2.37	10.36	62.24
2600	35.6	46.1	40.74	2.35	10.5	61.91
2700	35.9	46.05	40.27	2.35	10.15	61.20
2800	35.6	45.56	35.97	2.1	9.96	61.18
2900	35.7	46	39.81	2.36	10.3	60.25
3000	36.2	46.9	48.98	2.82	10.7	62.03
3100	36.4	47.17	52.12	2.94	10.77	63.31
3200	36.4	46.9	48.98	2.75	10.5	63.61
3300	35.2	46.76	47.42	2.75	11.56	61.59
3400	35.1	46.57	45.39	2.67	11.47	60.72
3500	36	46.38	43.45	2.63	10.38	59.00
3600	35.4	46.1	40.74	2.51	10.7	57.97
3700	36	45.94	39.26	2.5	9.94	56.09
3800	36.4	45.77	37.76	2.53	9.37	53.30
3900	36.6	45.77	37.76	2.61	9.17	51.67
4000	35.6	45.9	38.90	2.73	10.3	50.90
4100	35.3	45.72	37.33	2.63	10.42	50.69
4200	36.3	45.8	38.02	2.8	9.5	48.49
4300	36.2	45.85	38.46	2.75	9.65	49.95
4400	35.6	45.5	35.48	2.58	9.9	49.12
4500	36.3	45.54	35.81	2.66	9.24	48.08
4600	35.8	45.53	35.73	2.68	9.73	47.61
4700	36.2	45.78	37.84	2.83	9.58	47.76
4800	36	45.8	38.02	2.85	9.8	47.64
4900	36	45.8	38.02	2.88	9.8	47.15
5000	35.1	45.7	37.15	2.82	10.6	47.05
5100	35.3	45.8	38.02	2.81	10.5	48.32
5150	36	45.84	38.37	2.8	9.84	48.94

Recommended driver: GMAH2060-10C9



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_{DS}	150	Vdc
Gate--Source Voltage	V_{GS}	-10,+2	Vdc
Operating Voltage	V_{DD}	36	Vdc
Maximum Forward Gate Current @ $T_C = 25^\circ\text{C}$	I_{gmax}	10.8	mA
Storage Temperature Range	T_{stg}	-65 to +150	$^\circ\text{C}$
Case Operating Temperature	T_C	+150	$^\circ\text{C}$
Operating Junction Temperature(See note 1)	T_J	+225	$^\circ\text{C}$
Total Device Power Dissipation (Derated above 25°C , see note 2)	P_{diss}	60	W

Note: 1. Continuous operation at maximum junction temperature will affect MTTF

2. Bias Conditions should also satisfy the following expression: $P_{diss} < (T_J - T_C) / R_{JC}$ and $T_C = T_{case}$

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case $T_C = 85^\circ\text{C}$, $T_J = 200^\circ\text{C}$, RF CW operation	$R_{\theta JC}$	2.1	C/W

Table 3. Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless otherwise noted)

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}$; $I_{DS} = 10.8\text{mA}$	V_{DS}	150			V
Gate Threshold Voltage	$V_{DS} = 28\text{V}$, $I_D = 10.8\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS} = 28\text{V}$, $I_{DS} = 200\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-2.5		V



Typical performance

Figure 2: Small signal gain and return loss Vs Frequency

$V_{ds}=28V$, $I_{dQ}=200mA$, input power=0dBm

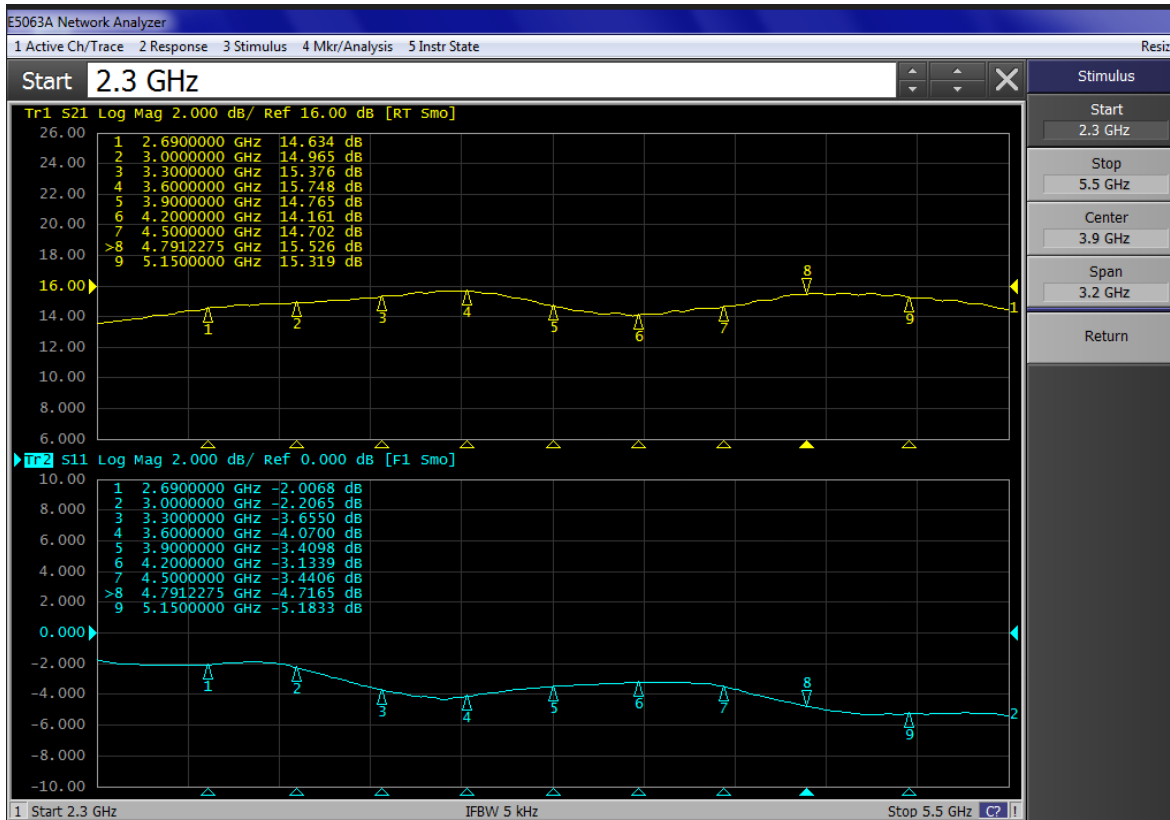
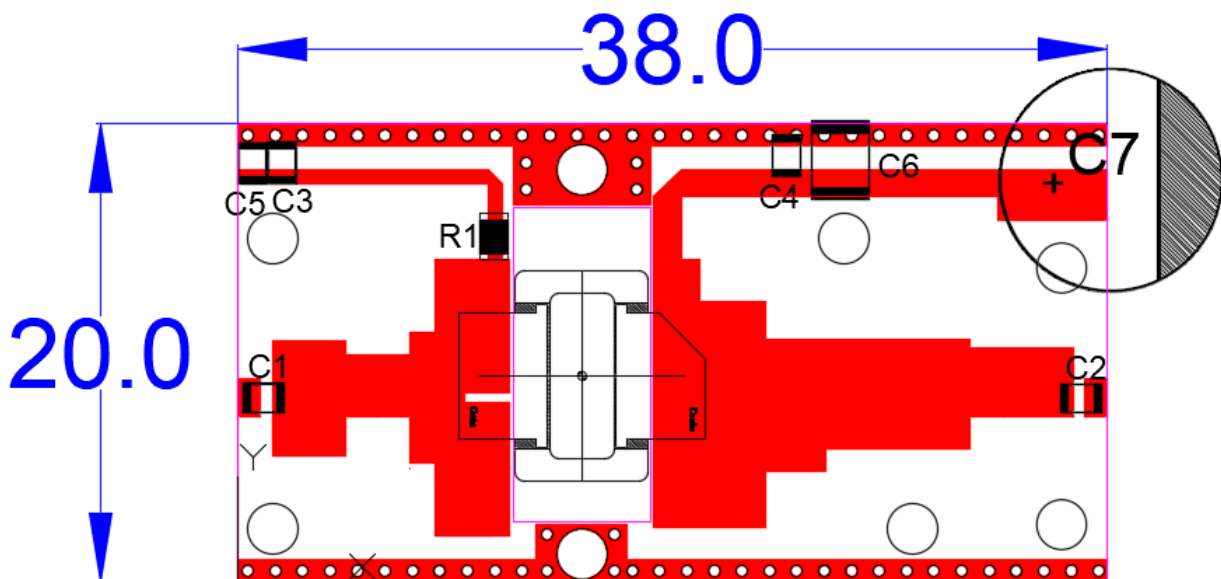


Figure 4: Picture and Bill of materials of application circuit

(Layout Gerber file upon request, 20mils RO4350B)





Component	Description	Suggestion
C7	470uF/63V	-
C6	10uF/1210	-
C5,	1uF/0805	
C1、C2、C3、C4	5.1pF/ MQ300805	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.
R1	Chip Resistor ,10Ω/0805	-
PCB	30mil / Rogers 4350 30mil	-

Package Outline

Flanged ceramic package; 2 leads

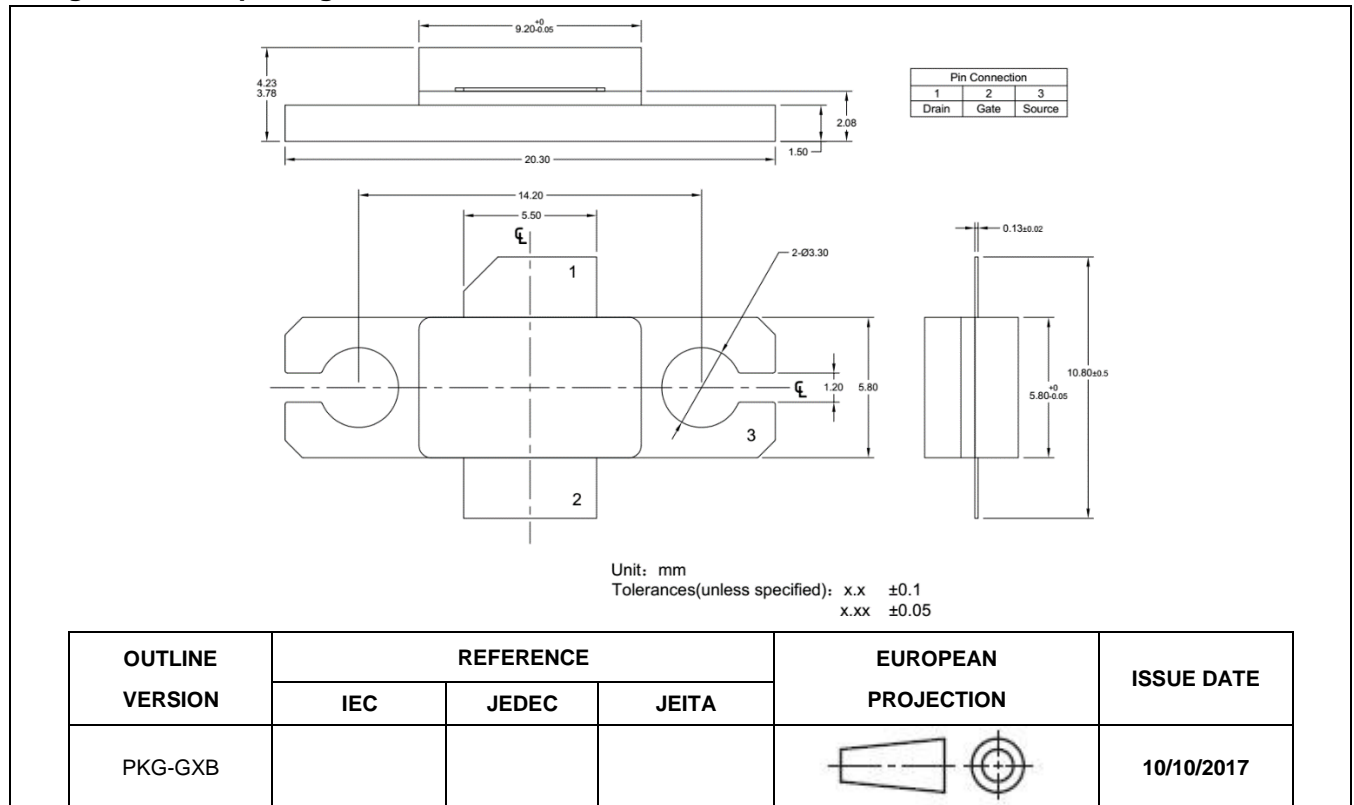


Figure 1. Package Outline PKG-G2E



Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2024/12/2	V1.0	Preliminary Datasheet Creation

Application data based on YHG-24-26

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