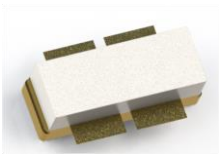
GTAH50125F4C GaN TRANSISTC

Document Number: GTAH50125F4C
Preliminary Datasheet V1.0

Gallium Nitride 28V 125W, C band RF Power Transistor

GTAH50125F4C



Description

The GTAH50125F4C is a 125W internally matched, GaN HEMT, designed from 4.4 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.

- Typical **CW** performance (on 4.4-5.0GHz fixture with device soldered)：

  Vds=28V, I_{DQ}=120mA, Tc=25 °C

Freq(MHz)	P1(dBm)	P3(dBm)	P3(W)	Eff(%)@P3	Gp1 (dB)
4400	50.79	51.31	135.1	53.50	9.60
4500	51.09	51.59	144.2	55.08	10.09
4600	50.88	51.69	147.7	56.75	11.02
4700	50.40	51.57	143.5	56.80	11.18
4800	50.28	51.35	136.5	55.31	10.66
4900	50.15	51.24	132.9	54.77	9.85
5000	49.50	51.13	129.8	55.58	9.80

Recommended driver：GTAH35025P3

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

Figure 1: Pin definitions (Top view)

Because of internal configuration, it must be used as single ended device.

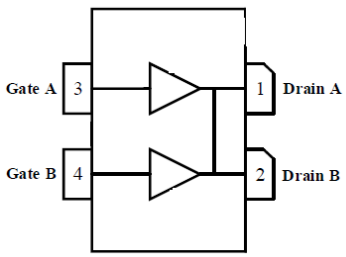


Table 1. Maximum Ratings

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	34.8	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
Total Device Power Dissipation (Derated above 25°C, see note 2)	Pdiss	150	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	0.85	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}=34.8mA	V_{DSS}	150			V
Gate Threshold Voltage	V_{DS} = 28V, I_D =34.8mA	V_{GS}(th)	-4		-2	V
Gate Quiescent Voltage	V_{DS} =28V, I_{DS}=300mA, Measured in Functional Test	$V_{GS(Q)}$		-2.5		V

Typical performance

Figure 2: Small singal gain and return loss Vs Frequency
Vds=28V, Idq=300mA, input power=0dBm

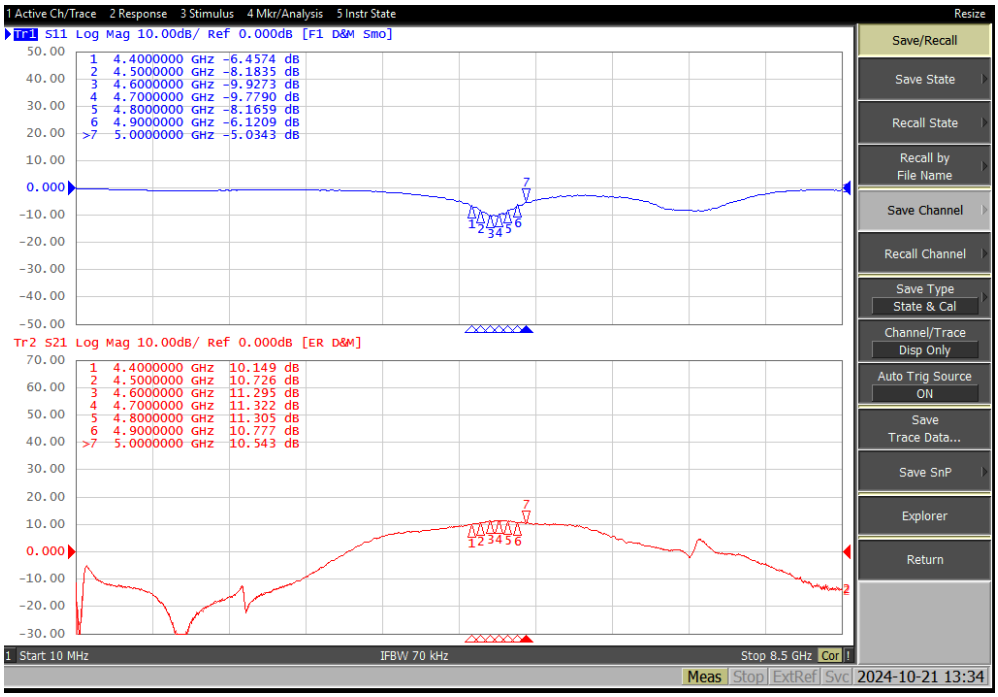


Figure 3:Power gain， Efficiency as function of output power

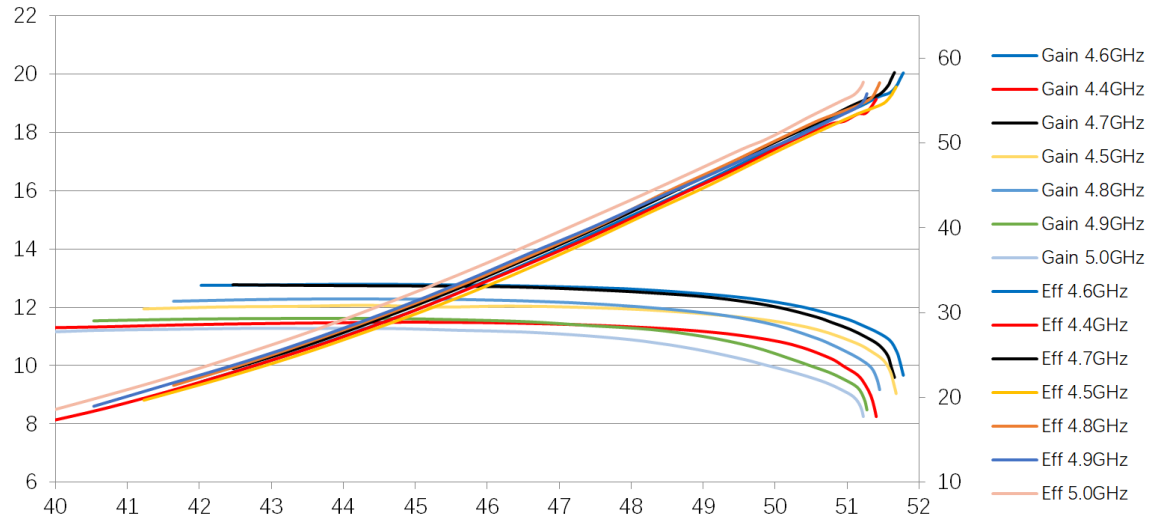
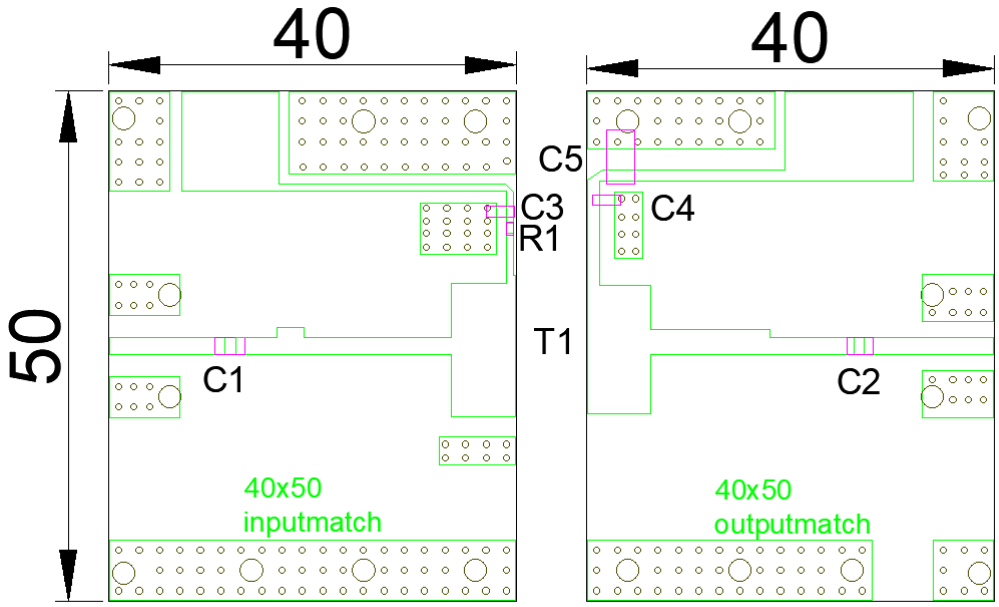


Figure 3: Picture and Bill of materials of wide band application circuit

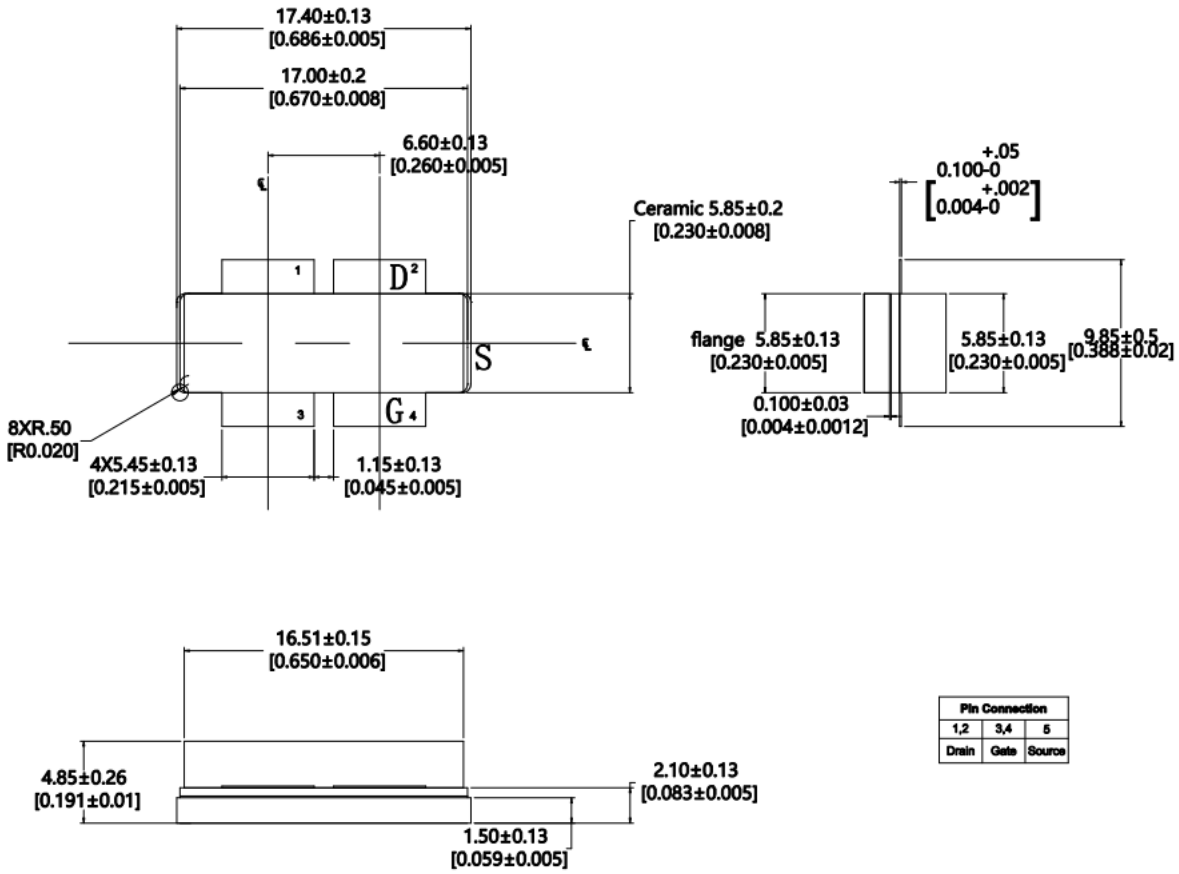
(Layout Gerber file upon request)



Part	Quantity	Description	Part Number	Manufacture
C1,C2,C3,C4	4	3.9pFHigh Q Capacitor	251SHS3R9BSE	TEMEX
C5	1	10uF MLCC	GRM32EC72A106ME05	Murata
R1	1	10Ω Power Resistor	ESR03EZPF100	ROHM
T1	1	120W GaN Dual Transistor	GTAH50125F4C	Innogration

Package Outline

Flangeless ceramic package; 4 leads



OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-LBS					07/31/2023

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2024/10/21	V1.0	Preliminary Datasheet Creation from NX5814H

Application data based on LWH-24-37