

Gallium Nitride 28V 100W, RF Power Transistor

Description

The GTAH50100F4 is a 100W internally matched, GaN HEMT, designed from 4.4GHz to 5GHz, 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.

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

- Typical **Pulsed CW** performance (on 4.4-5GHz wideband fixture with device soldered):

$V_{DD}=28V$ $I_{DQ}=180mA$, pulse width 20 μs , 10% duty cycle. $T_c=25^\circ C$

Freq(MHz)	P1dB(dBm)	P3dB(dBm)	Eff(%)@P3dB	Gain @P1dB (dB)
4400	49.4	50.6	54.9	12.2
4500	49.7	50.7	53.7	12.8
4600	49.7	50.7	54.2	12.3
4700	49.7	50.8	54.0	11.9
4800	49.8	50.9	58.6	12.0
4900	49.5	50.9	62.4	12.2
5000	49.1	50.6	63.1	12.4

- Typical **CW** performance (on 4.4-5GHz wideband fixture with device soldered):

$V_{DD}=28V$ $I_{DQ}=180mA$, $T_c=25^\circ C$

Freq(MHz)	Pout(W)	G_P (dB)	Eff(%)
4400	101	9.7	49.8
4500	103	10.0	49.6
4600	104	10.0	49.3
4700	108	9.9	50.8
4800	106	10.6	53.3
4900	101	10.8	55.2
5000	101	10.8	57.3

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

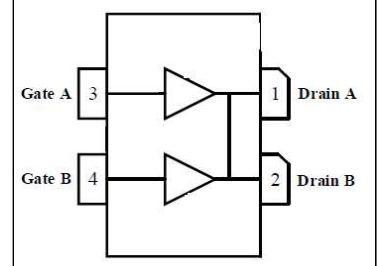
Turning the device ON

- Set VGS to the pinch-off (VP) voltage, typically -5 V
- Turn on VDS to nominal supply voltage (28V)
- Increase VGS until IDS current is attained
- Apply RF input power to desired level

Turning the device OFF

- Turn RF power off
- Reduce VGS down to VP, typically -5 V
- Reduce VDS down to 0 V
- Turn off VGS

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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}	40	Vdc
Maximum Forward Gate Current @ $T_C = 25^{\circ}\text{C}$	I_{gmax}	28.8	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}	150	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

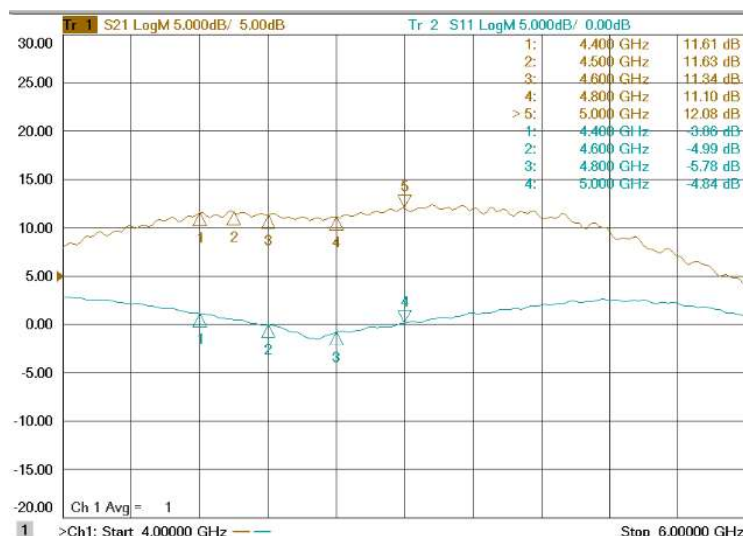
Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case $T_C = 85^{\circ}\text{C}$, $T_J = 200^{\circ}\text{C}$, RF CW operation	$R_{\theta JC}$	1.05	C/W

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	$V_{GS} = -8\text{V}$; $I_{DS} = 28.8\text{mA}$	V_{DSS}	150			V
Gate Threshold Voltage	$V_{DS} = 28\text{V}$, $I_D = 28.8\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS} = 28\text{V}$, $I_{DS} = 180\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-2.4		V

Figure 1: Small signal gain and return loss Vs Frequency
 $V_{GS} = -2.4\text{V}$, $V_{DS} = 28\text{V}$, $I_{DQ} = 180\text{mA}$, input power=0dBm



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Figure 2: Efficiency and power gain as function of Pout

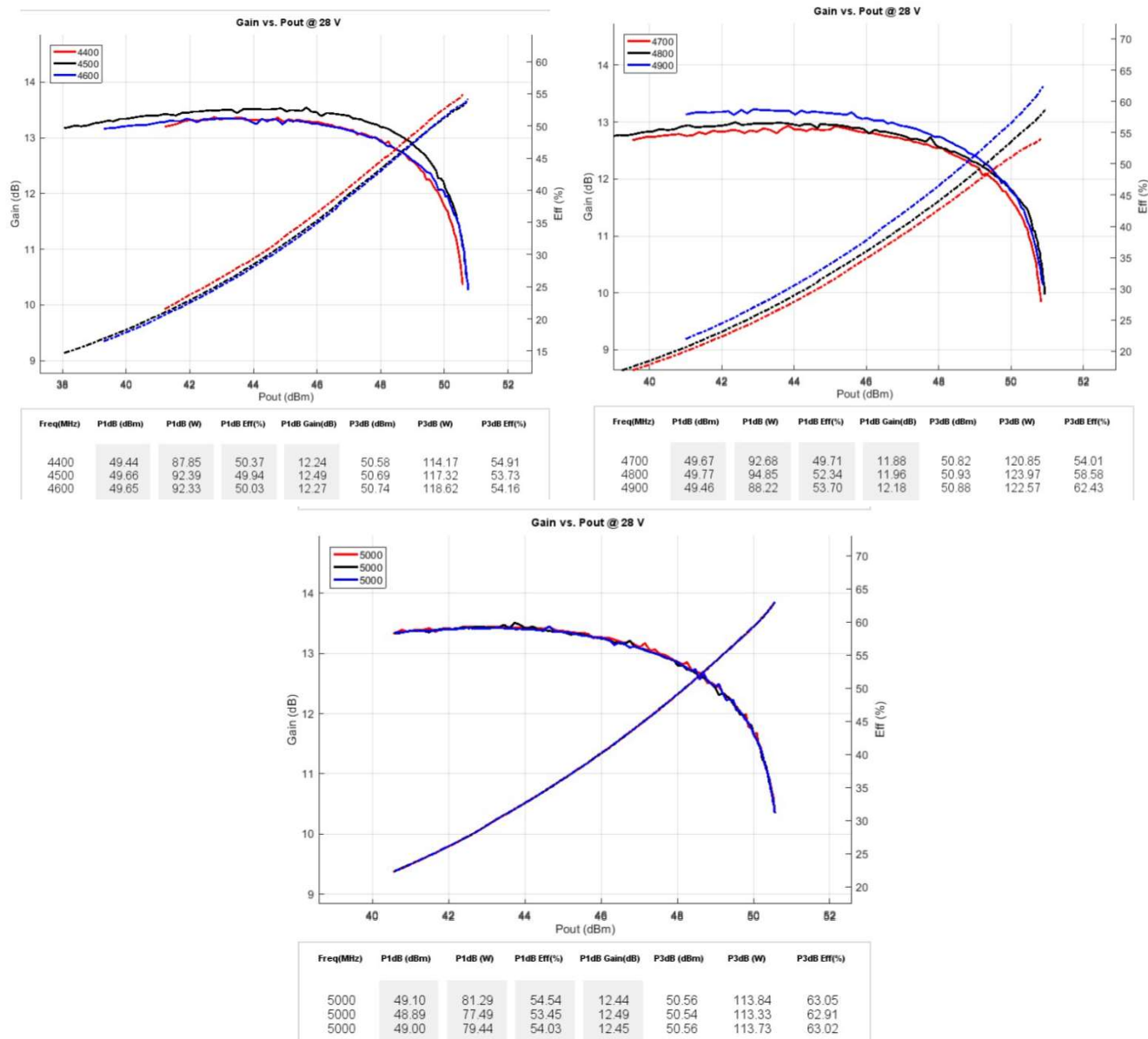
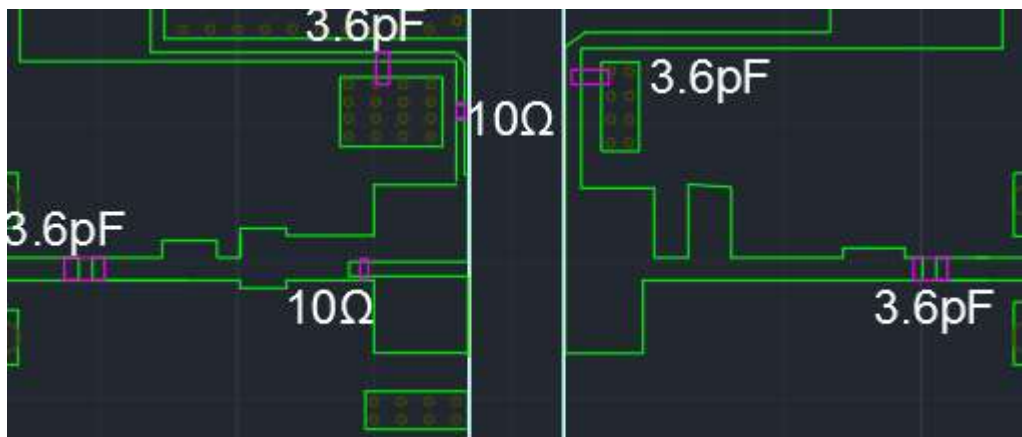
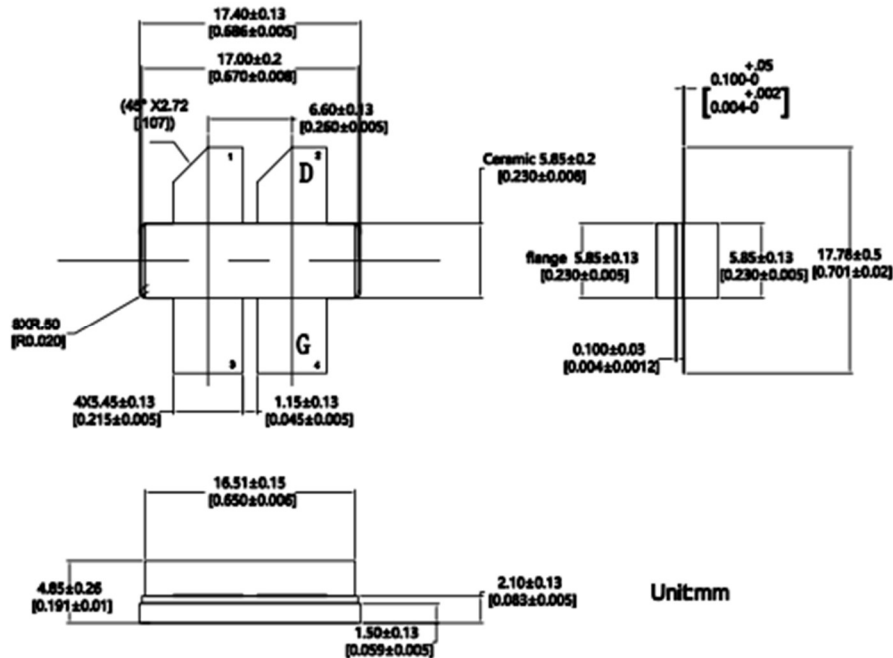


Figure 3: Photo and Bill of materials of 4.4-5GHz wide band application circuit
Rogers R4350B 30mil(Layout Gerber file upon request)



Package Outline

Flanged ceramic package; 2 mounting holes; 4 leads



OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-LBS					03/12/2013

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2022/9/19	V1.0	Preliminary Datasheet Creation ,based on LBS

Application data based on LWH-18-26