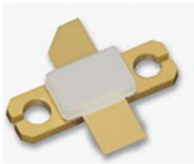
Gallium Nitride 28V 45W, RF Power Transistor

GTAH27045GX



Description

The GTAH27045GX is a 45W internally matched, GaN HEMT, designed for multiple applications, especially LTE/LTE-A/LTE-U from 700-2700MHz.

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

- Typical performance (on 0.9-2.7GHz wideband fixture with device soldered)

Vds=28V, Idq=200mA, Test signal: Pulsed CW 20%, 10us

Freq(MHz)	P1(dBm)	P3(dBm)	P3(W)	Eff(%)@P3	Gp1 (dB)
900	45.20	46.28	42.5	54.93	15.09
1000	45.96	46.90	48.9	56.28	15.40
1100	46.31	47.12	51.6	61.52	15.89
1200	46.15	47.18	52.3	69.77	16.25
1300	46.12	47.07	50.9	56.19	15.21
1400	47.44	48.40	69.2	63.71	14.49
1500	47.18	48.24	66.6	65.87	14.29
1600	46.24	47.31	53.9	62.18	13.86
1700	45.95	46.86	48.5	59.32	13.41
1800	46.79	47.63	57.9	67.58	13.56
1900	47.10	47.81	60.4	64.53	13.53
2000	46.98	47.84	60.8	59.83	13.77
2100	46.79	47.71	58.9	57.17	14.55
2200	46.72	47.81	60.4	56.95	15.82
2300	46.56	47.59	57.4	55.30	16.98
2400	47.09	47.95	62.3	60.96	18.14
2500	46.82	47.87	61.3	62.25	18.84
2600	46.42	47.43	55.3	62.27	18.66
2700	45.49	46.91	49.1	57.62	16.76

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}	40	Vdc
Maximum Forward Gate Current @ T_C = 25°C	Igmax	12	mA
Storage Temperature Range	Tstg	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature(See note 1)	T_J	+200	°C
Total Device Power Dissipation (Derated above 25°C, see note 2)	Pdiss	70	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

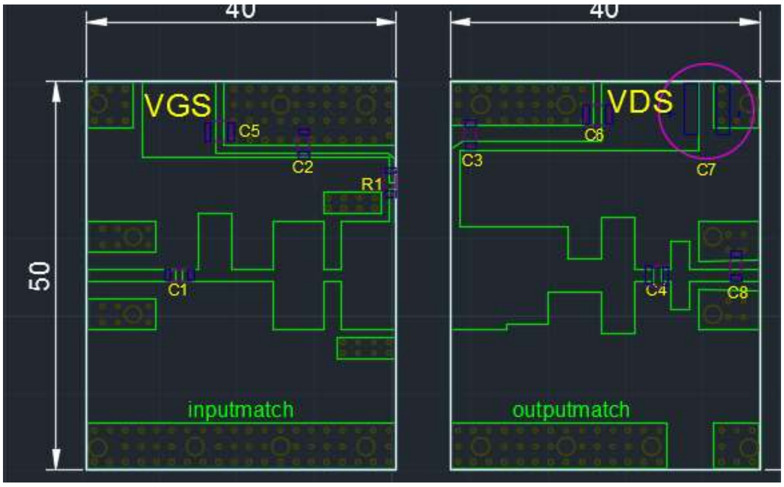
Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T_C= 85°C, T_J=200°C, RF CW operation	$R_{\theta JC}$	2.5	C/W

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

DC Characteristics

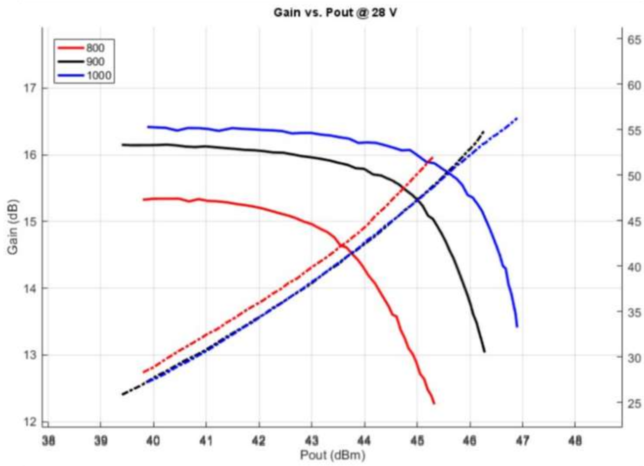
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=-8V; I_{DS}=12mA	V_{DSS}	150			V
Gate Threshold Voltage	V_{DS} = 28V, I_D =12mA	$V_{GS}(th)$	-4	-	-2	V
Gate Quiescent Voltage	V_{DS} =28V, I_{DS}=200mA, Measured in Functional Test	$V_{GS(Q)}$		-2.5		V

Figure 1: Photo of test fixture and bill of materials (Rogers RO4350B , Thickness 30Mils PCB layout upon request)

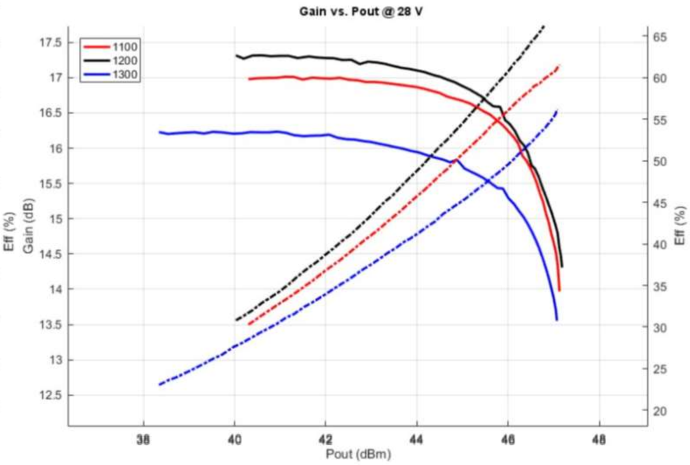


C1,C4	15PF	ATC600F
C8	0.7PF	ATC600F
C2, C3	100PF	ATC600F
C5,C6	10UF	10UF/50V
R1	10Ω	1206

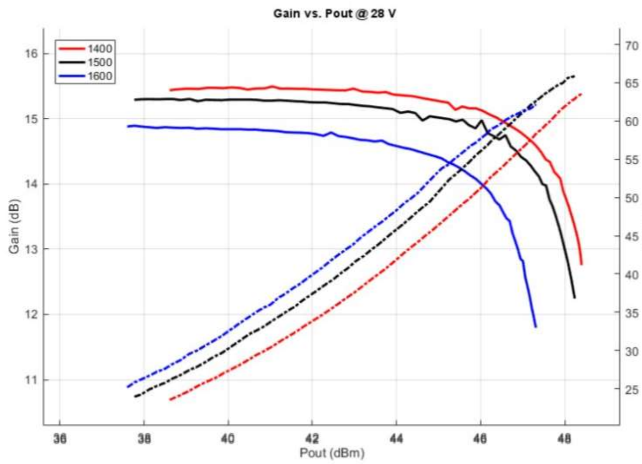
Figure 2. Power Gain and Drain Efficiency as Function of Pulse Output Power (900-2700MHz)



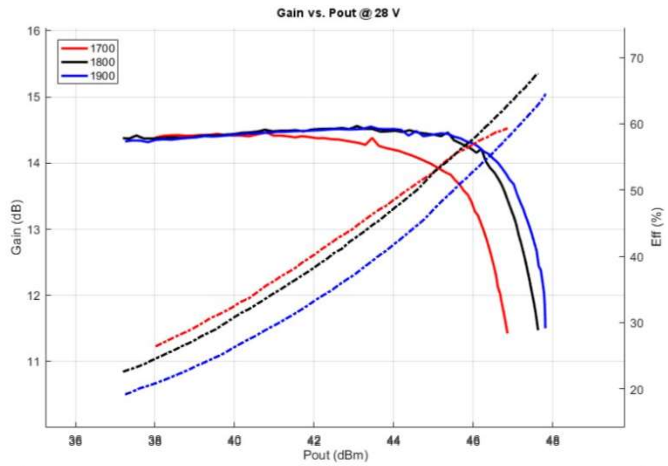
Freq(MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
800	43.98	24.99	44.12	14.32	45.32	34.08	52.05
900	45.20	33.14	48.28	15.09	46.28	42.46	54.93
1000	45.96	39.41	51.98	15.40	46.90	48.93	56.28



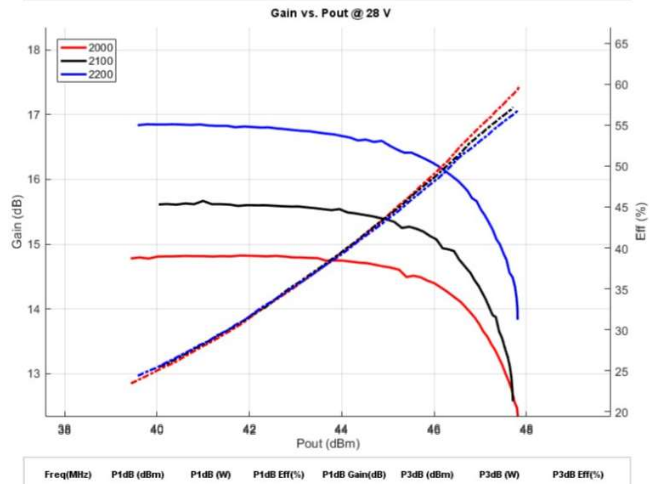
Freq(MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
1100	46.31	42.80	57.67	15.89	47.12	51.58	61.52
1200	46.15	41.17	61.79	16.25	47.18	52.28	69.77
1300	46.12	40.93	50.15	15.21	47.07	50.93	56.19



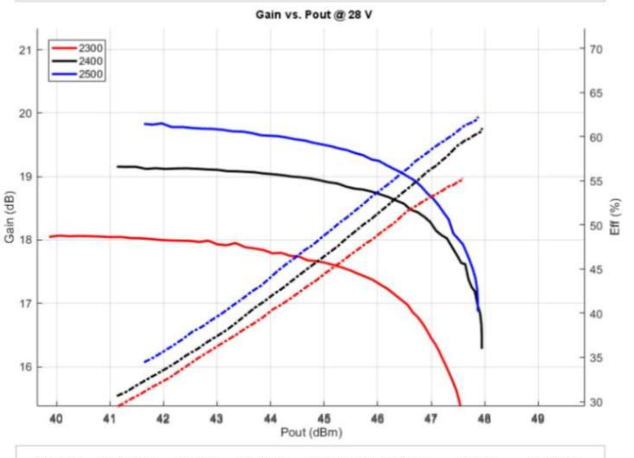
Freq(MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
1400	47.44	55.46	58.90	14.49	48.40	69.16	63.71
1500	47.18	52.26	62.07	14.29	48.24	66.64	65.87
1600	46.24	42.06	58.90	13.86	47.31	53.88	62.18



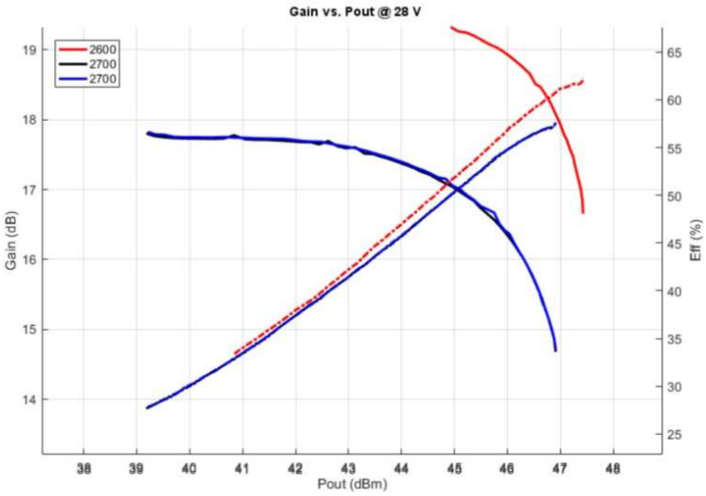
Freq(MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
1700	45.95	39.39	56.75	13.41	46.86	48.51	59.32
1800	46.79	47.78	62.33	13.56	47.63	57.89	67.58
1900	47.10	51.25	59.42	13.53	47.81	60.38	64.53



Freq(MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
2000	46.98	49.84	54.71	13.77	47.84	60.82	59.83
2100	46.79	47.75	52.91	14.55	47.71	58.96	57.17
2200	46.72	47.03	51.83	15.82	47.81	60.36	56.95



Freq(MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
2300	46.56	45.29	51.61	16.98	47.59	57.37	55.30
2400	47.09	51.22	56.71	18.14	47.95	62.32	60.96
2500	46.82	48.09	57.70	18.84	47.87	61.25	62.25



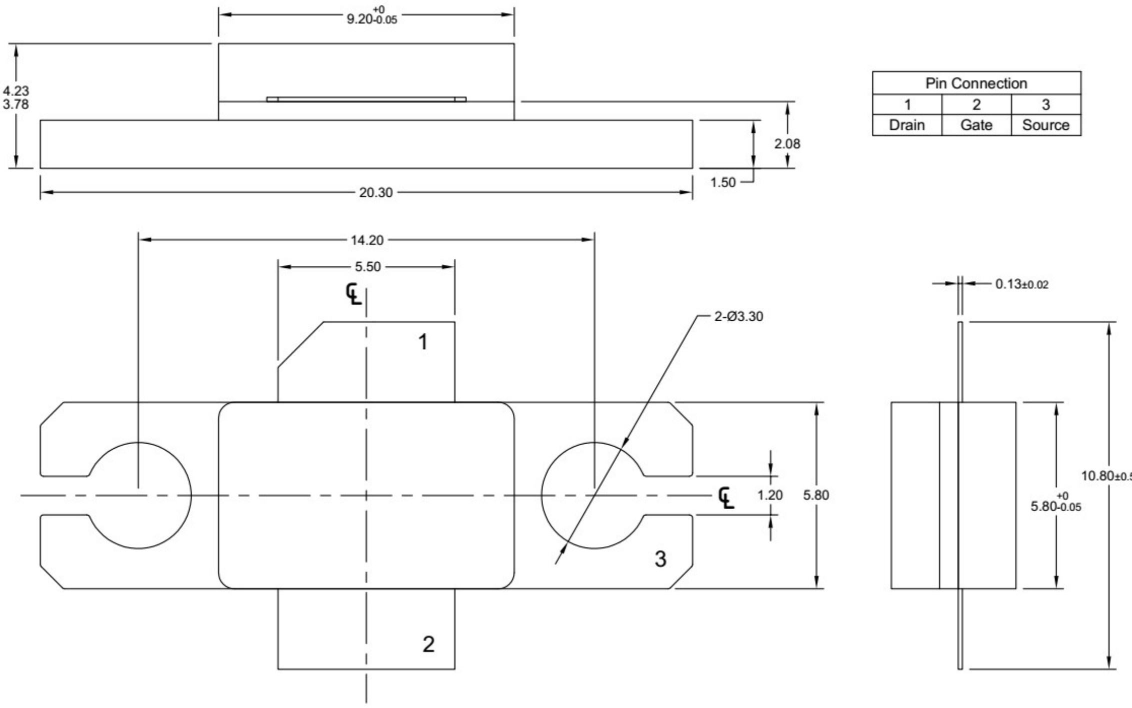
Freq(MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
2600	46.42	43.86	58.74	18.66	47.43	55.32	62.27
2700	45.48	35.33	52.45	16.75	46.91	49.12	57.53
2700	45.49	35.42	52.54	16.76	46.91	49.13	57.62

Table 4. 1 carrier WCDMA back off performance across the band @Pout=4W

Freq(MHz)	Pout(dBm)	ACPR(dBc)	Gain	Eff(%)
900	36	-37.3	16.23	19.61
1000	36	-48.9	16.85	18.23
1100	36	-40.6	17.59	17.39
1200	36	-38.7	17.81	17.80
1300	36	-37.4	17.13	16.68
1400	36	-38.5	16.68	17.81
1500	36	-37.9	16.65	19.51
1600	36	-39.6	16.05	21.06
1700	36	-40.7	15.52	21.15
1800	36	-43.8	15.21	20.35
1900	36	-42.5	14.79	18.11
2000	36	-43.8	15.23	17.16
2100	36	-41.3	16.24	16.98
2200	36	-38.8	17.49	16.65
2300	36	-39.1	18.49	17.12
2400	36	-37.2	19.67	17.13
2500	36	-37.3	20.05	17.84
2600	36	-39.5	19.70	19.25
2700	36	-41.3	17.81	19.46

Package Outline

Flanged ceramic package; 2 leads



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

Figure 1. Package Outline PKG-G2E

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2021/1/2	V1.0	Preliminary Datasheet Creation

Application data based on LWH-17-58

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