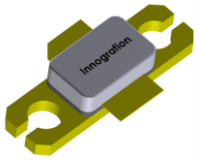
Gallium Nitride 28V 30W, RF Power Transistor

GTAH58030GX



Description

The GTAH58030GX is a 30W internally matched, GaN HEMT, designed for multiple applications, especially sub-6GHz LTE/LTE-A/LTE-U from 4500-5900MHz.

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

- Typical CW performance (on broad band fixture with device soldered)

Freq(MHz)	P1dB(dBm)	P1dB(W)	P1dB Eff(%)	P1dB Gain(dB)	Psat(dBm)	Psat(W)	Psat Eff(%)
5100	44.48	28.1	44.5	12.03	46.78	47.7	54.3
5200	44.59	28.8	46.2	12.36	46.72	47.0	55.2
5300	44.29	26.9	45.5	12.58	46.56	45.3	54.8
5400	43.92	24.7	44.2	12.71	46.42	43.8	54.5
5500	43.87	24.4	44.6	12.53	46.33	43.0	54.8
5600	43.47	22.3	43.3	12.38	46.19	41.6	54.7
5700	43.34	21.6	43.3	12.19	46.13	41.0	55.2
5800	43.71	23.5	46.7	11.83	46.12	40.9	56.9
5900	43.42	22.0	47.2	11.76	45.83	38.2	57.4

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 @ TC = 25°C	Igmax	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	+200	°C
Total Device Power Dissipation (Derated above 25°C, see note 2)	Pdiss	56	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. MSL Rating

Parameter	Rating	Standard
MSL – Moisture Sensitivity Level	Level 3	JEDEC Standard J-STD-020

Table 3. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T_C= 25°C, T_J=200°C, RF CW operation	$R_{\theta JC}$	3.21	C/W

Table 4. Electrical Characteristics (T_C = 25℃ unless otherwise noted)

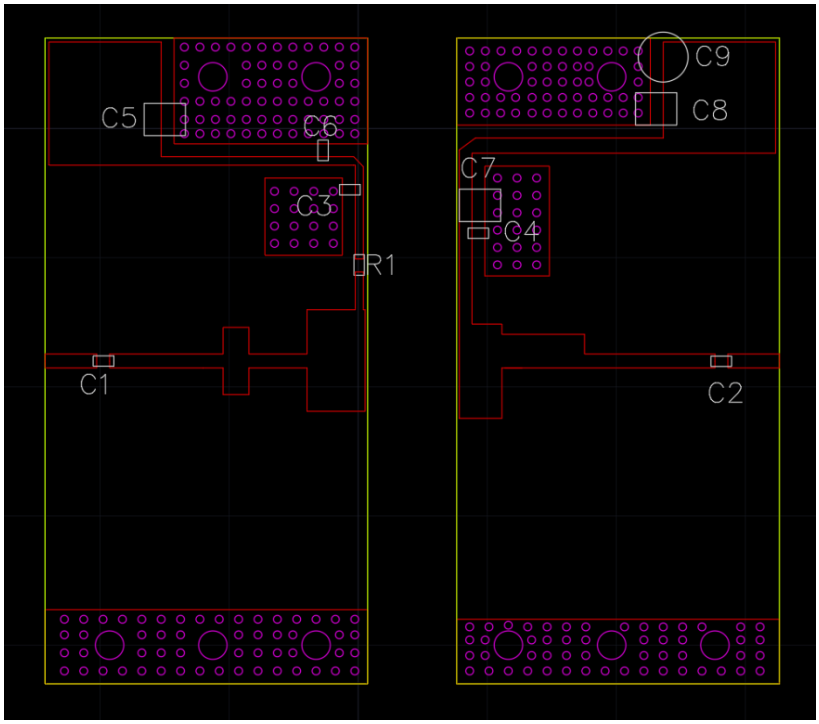
DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=-8V; I_{DS}=8mA	V_{DSS}	150			V
Gate Threshold Voltage	V_{DS} = 28V, I_D =8mA	V_{GS}(th)		-2.7		V
Gate Quiescent Voltage	V_{DS} =28V, I_{DS}=300mA, Measured in Functional Test	$V_{GS(Q)}$		-2.33		V

Functional Tests (In 5.7-5.9GHz wideband Production Test Fixture, 50 ohm system) :V_{DD} = 28 Vdc, I_{DQ} = 300 mA, f = 5800 MHz, WCDMA signal, Pout=4W

Characteristic	Symbol	Min	Typ	Max	Unit
Power Gain	Gp		13		dB
Drain Efficiency @ P_{out}	Eff		20		%
Saturated Power by CCDF test	P_{SAT}		30		W
Input Return Loss	IRL		-7		dB
Mismatch stress at all phases (Device no damage)	VSWR		10:1		Ψ

Figure 1: Photo of narrow band application circuit PCB:RO4350 20Mil (Layout gerber file upon request)



Reference	Footprint	Value	Quantity
C1, C2, C3, C4	0603	3.9pF	4
C5, C7, C8	1210	10uF/100V	3
C6	0603	10uF/10V	1
C9		470uF/63V	1
R1	0603	10ohm	1
U1	GX	GTAH58030GX	1

Figure 2: Power gain，efficiency as function of Pout

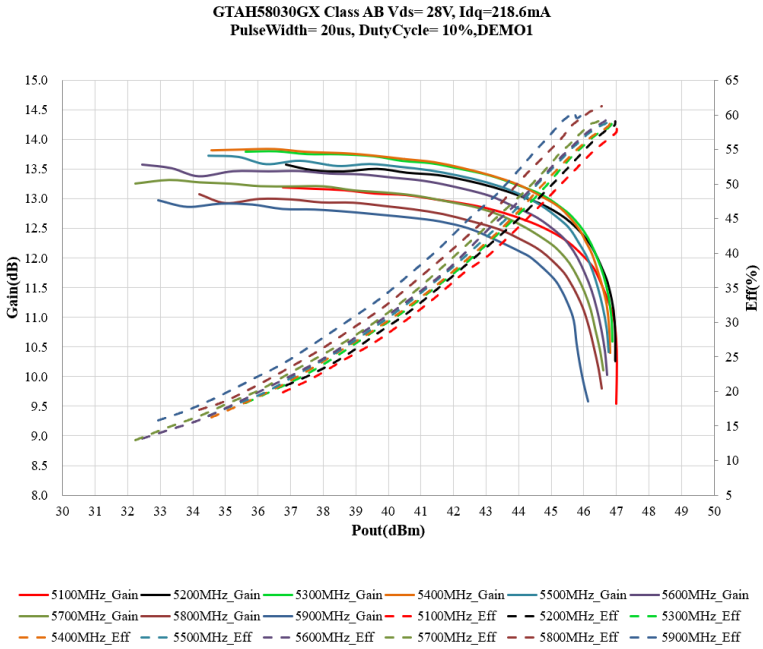
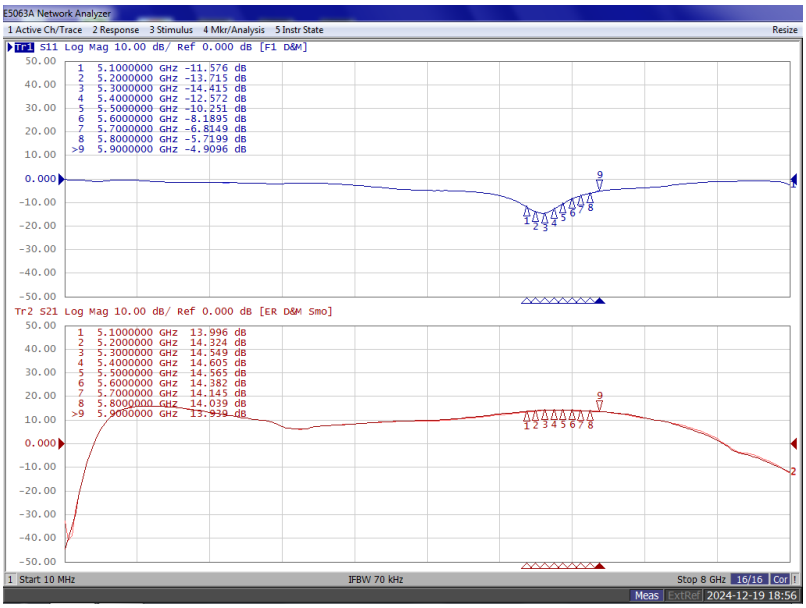
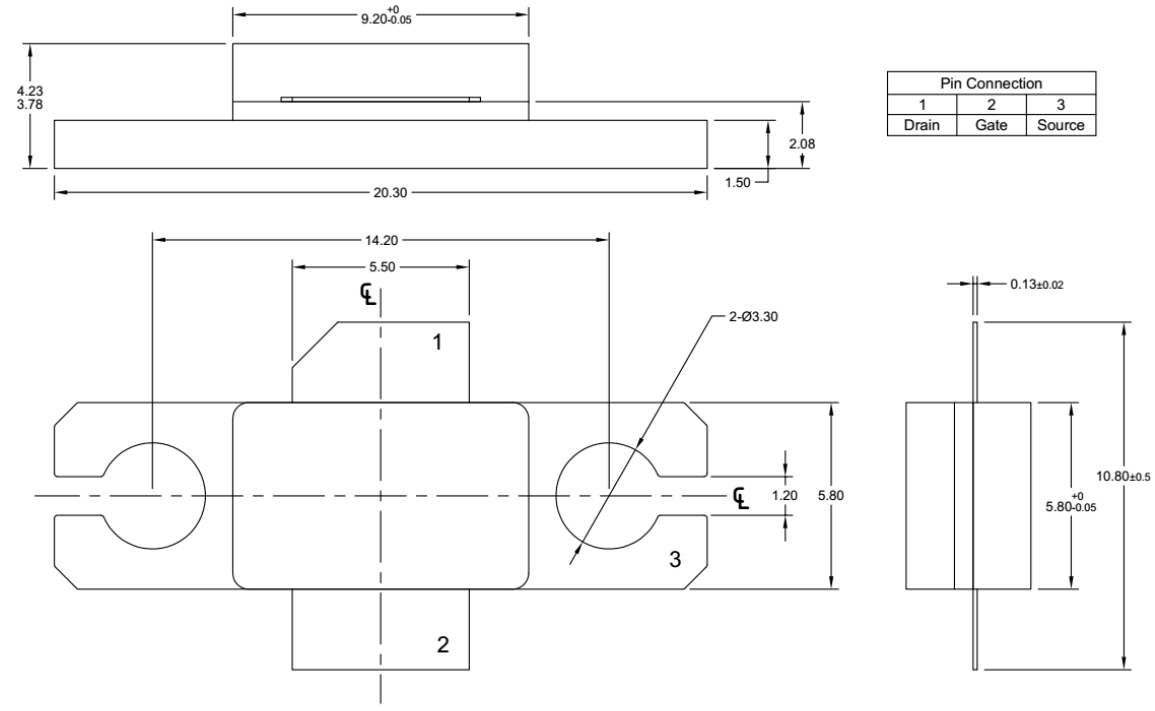


Figure 3: Network analyzer output, S11/S21



Package Outline

Flanged ceramic package; 2 leads



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

Figure 1. Package Outline PKG-G2E

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2017/4/27	V1.0	Preliminary Datasheet Creation
2017/6/01	V1.1	Preliminary Datasheet
2017/11/28	V1.2	Performance updated per new dice configuration
2023/8/24	V1.3	Add MSL information
2024/12/19	V1.4	Change the carrier application board photo t

Application data based on ZYX-24-69

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