



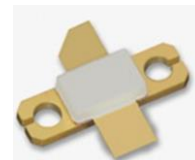
## Gallium Nitride 28V 120W, RF Power Transistor

### Description

The GTAH09120GX is a 120W, GaN HEMT, designed for multiple applications especially broad band communication applications with frequencies up to 1.8GHz, especially MC-GSM/WCDMA/LTE.

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

### GTAH09120GX



•Typical performance (on wide band fixture with device soldered):

Test signal: WCDMA, 3GPP test model 1; 1 to 64 DPCH; Channel Bandwidth=3.84MHz, PAR =10.5 dB at 0.01 % probability on CCDF.

Frequency (MHz)	V <sub>DD</sub> =28V I <sub>DQ</sub> =340mA, P <sub>AVG</sub> =20W					V <sub>DD</sub> =28V I <sub>DQ</sub> =1200mA, P <sub>AVG</sub> =20W				
	G <sub>p</sub> (dB)	$\eta_D$ (%)	ACPR <sub>5MHz</sub> (dBc)	CCDF (dB)	P <sub>peak</sub> (W)	G <sub>p</sub> (dB)	$\eta_D$ (%)	ACPR <sub>5MHz</sub> (dBc)	CCDF (dB)	P <sub>peak</sub> (W)
750	18.2	31.2	-29.1	8.6	144	19.0	29.2	-35.4	8.4	139
850	21.0	30.4	-33.3	8.6	145	21.8	28.9	-41.4	8.4	139
950	20.8	37.8	-32.4	8.2	131	21.3	36.1	-37.8	8.1	130

•Typical performance (on Innegration wide band fixture with device soldered):

V<sub>DD</sub>=28V I<sub>DQ</sub>=340mA, CW.

Frequency(MHz)	P <sub>SAT</sub> (W)	Efficiency (%)
750	122	58.6
850	143	67.6
950	134	80.0

### 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 V<sub>GS</sub> to the pinch-off (V<sub>P</sub>) voltage, typically -5 V
2. Turn on V<sub>DS</sub> to nominal supply voltage (28V)
3. Increase V<sub>GS</sub> until I<sub>DS</sub> current is attained
4. Apply RF input power to desired level

#### Turning the device OFF

1. Turn RF power off
2. Reduce V<sub>GS</sub> down to V<sub>P</sub>, typically -5 V
3. Reduce V<sub>DS</sub> down to 0 V
4. Turn off V<sub>GS</sub>

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V <sub>DSS</sub>	150	Vdc
Gate--Source Voltage	V <sub>GS</sub>	-10,+2	Vdc
Operating Voltage	V <sub>DD</sub>	40	Vdc



Maximum Forward Gate Current @ $T_C = 25^{\circ}\text{C}$	$I_{gmax}$	27	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 not2 1)	$T_J$	+200	$^{\circ}\text{C}$
Total Device Power Dissipation (Derated above $25^{\circ}\text{C}$ , see note 2)	$P_{diss}$	125	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	$R_{\theta JC}$	1.44	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	$V_{GS} = -8\text{V}$ ; $I_{DS} = 27\text{mA}$	$V_{DSS}$	150			V
Gate Threshold Voltage	$V_{DS} = 28\text{V}$ , $I_D = 27\text{mA}$	$V_{GS(th)}$		-2.7		V
Gate Quiescent Voltage	$V_{DS} = 28\text{V}$ , $I_{DS} = 1200\text{mA}$ , Measured in Functional Test	$V_{GS(Q)}$		-2.31		V

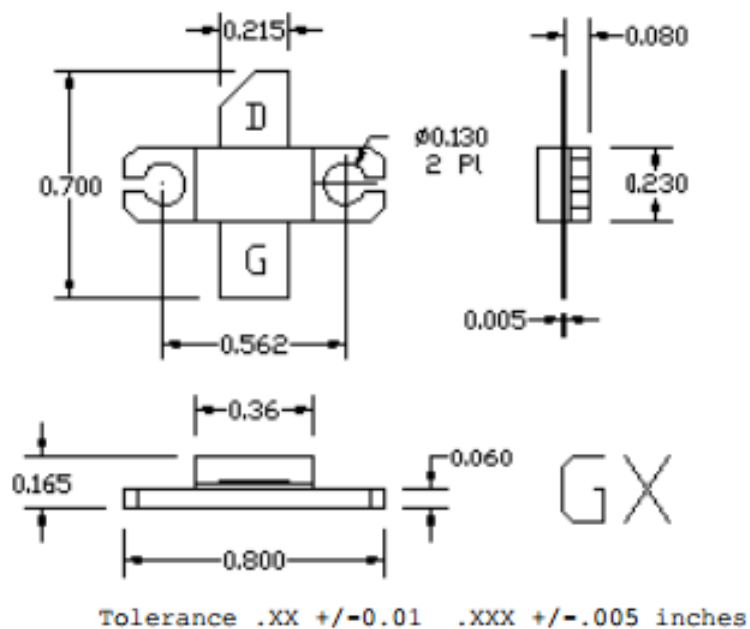
**Functional Tests (In 0.7-1GHz Test Fixture, 50 ohm system) :**  $V_{DD} = 28\text{Vdc}$ ,  $I_{DQ} = 1200\text{mA}$ ,  $f = 950\text{MHz}$ , WCDMA signal,  $P_{out} = 24\text{W}$

Characteristic	Symbol	Min	Typ	Max	Unit
Power Gain	$G_p$		21		dB
Drain Efficiency @ $P_{out}$	$Eff$		39		%
Saturated Power by CCDF test	$P_{SAT}$	120			W
Input Return Loss	IRL		-7		dB
Mismatch stress at all phases (Device no damage)	VSWR		10:1		$\Psi$



## Package Outline

Flanged ceramic package; 2 leads



OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-G2E					03/12/2013

Figure 1. Package Outline PKG-G2E



## Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2017/6/12	V1.0	Preliminary Datasheet Creation
2017/6/20	V1.1	Maximum rating modified, and function test condition modified
2017/7/27	V1.2	Maximum rating modified, and function test data modified

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