



GaN HEMT 28V, UHF ,220W, RF Power Transistor

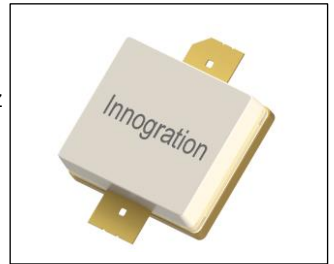
Description

The XTAH09220A2C is a 220W GaN HEMT, designed for multiple application within UHF up to 1GHz. It can be used in CW, Pulse and any other modulation modes. There is no guarantee of performance when this part is used in applications designed outside of these frequencies.

- Typical class AB 0.7-1.0GHz RF Performance with device soldered

$V_{ds}=28V$, $I_{dq}=150mA$, CW

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
700	53.21	209.5	60.9	17.37	54.03	252.9	65.9
750	53.3	213.7	66.0	17.67	54.05	253.8	70.9
800	52.51	178.2	60.2	16.51	53.51	224.3	66.4
850	52.36	172.0	59.8	17.04	53.47	222.3	66.4
900	52.73	187.4	61.8	17.1	53.72	235.7	67.8
950	53.03	200.8	65.1	17.44	53.94	247.9	71.0
1000	52.63	183.1	66.8	18.22	53.53	225.2	73.0



Applications

- P band power amplifier
- UHF power amplifier
- ISM/RF Energy power amplifier

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

1. Set V_{GS} to the pinch-off (V_P) voltage, typically $-5V$
2. Turn on V_{DS} to nominal supply voltage
3. Increase V_{GS} until I_{DS} current is attained
4. Apply RF input power to desired level

Turning the device OFF

1. Turn RF power off
2. Reduce V_{GS} down to V_P , typically $-5V$
3. Reduce V_{DS} down to $0V$
4. Turn off V_{GS}

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DS}	+200	Vdc
Gate--Source Voltage	V_{GS}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	50	Vdc
Maximum gate current	I_{GS}	63	mA
Storage Temperature Range	T_{stg}	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature	T_J	+225	°C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case by FEA $T_C = 85^\circ C$, at $P_{diss} = 100W$	$R_{\theta JC}$	0.8	°C /W

Table 3. Electrical Characteristics ($T_A = 25^\circ C$ unless otherwise noted)

DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
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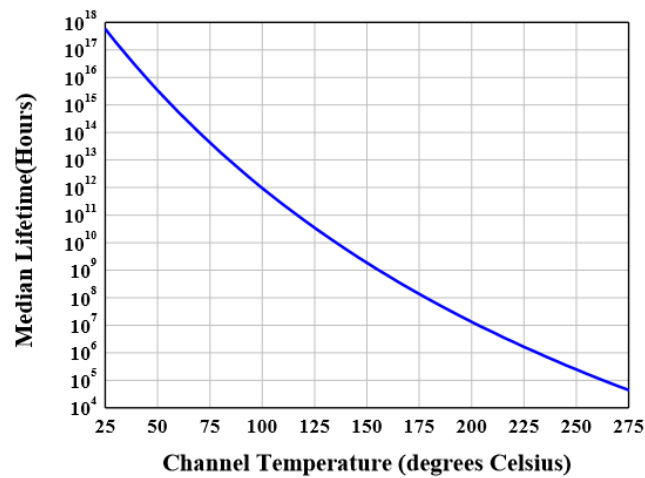


Drain-Source Breakdown Voltage	V _{GS} =-8V; I _{DS} =63mA	V _{DSS}		200		V
Gate Threshold Voltage	V _{DS} =10V, I _D = 63mA	V _{GS(th)}	-4		-2	V
Gate Quiescent Voltage	V _{DS} =28V, I _{DS} =150mA, Measured in Functional Test	V _{GS(Q)}		-3.2		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	900MHz, P _{out} =220W Pulsed CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature



0.7-1GHz Typical performance

Figure 3: Network analyzer output S11/S21

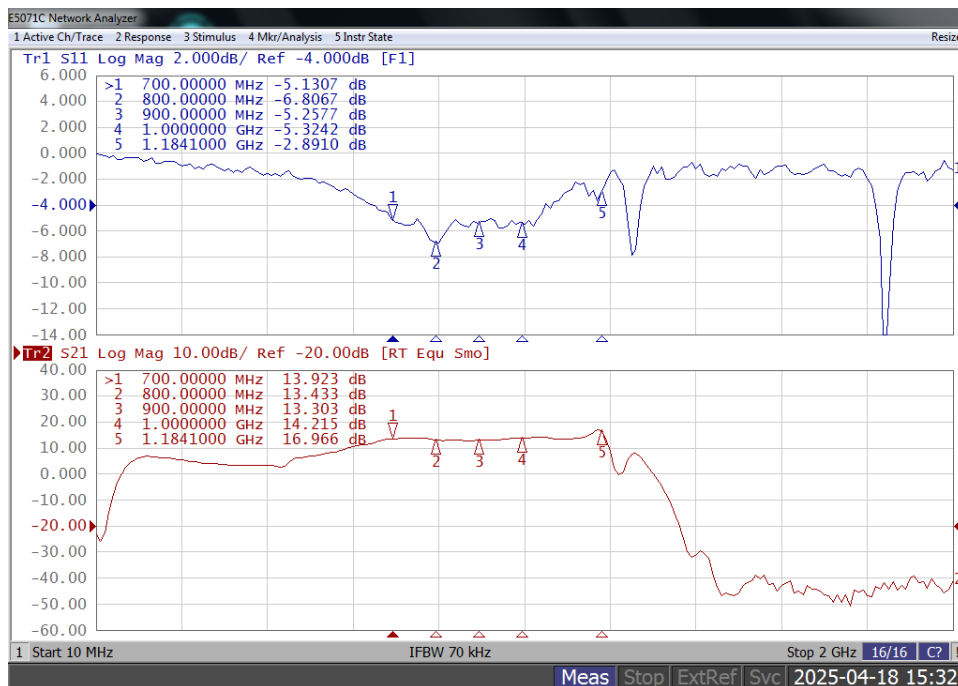
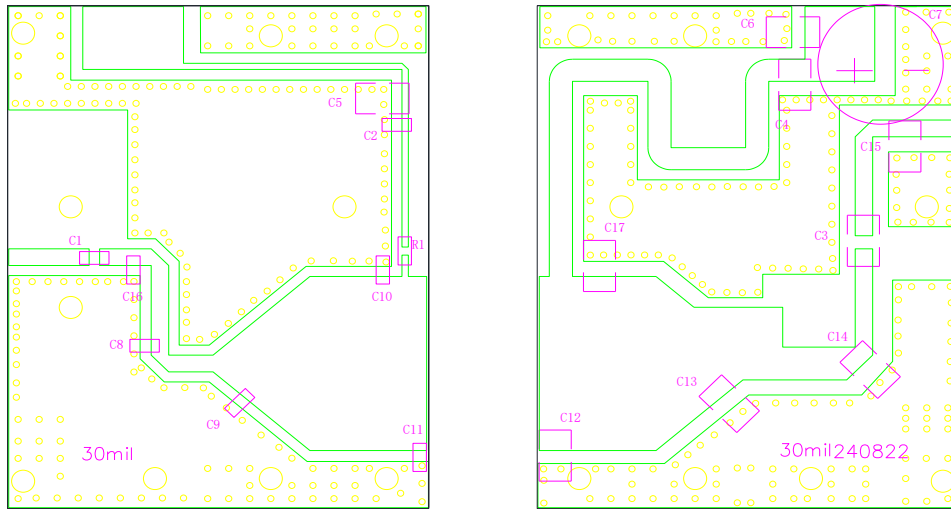




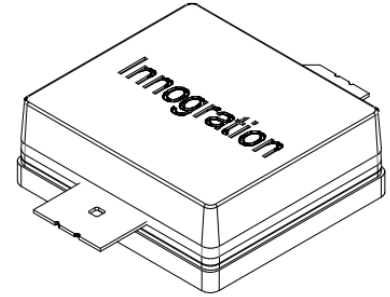
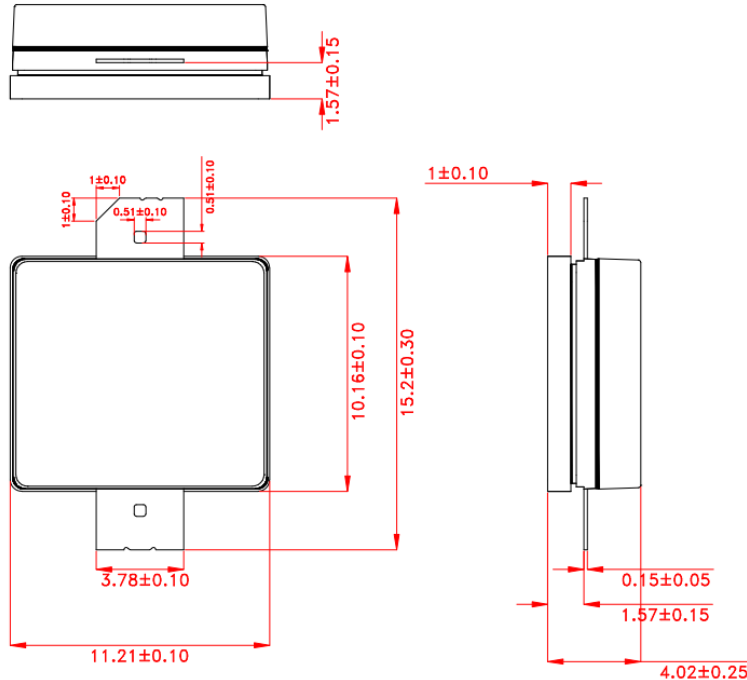
Figure 4: Picture of application board



Designator	Comment	Footprint	Quantity
C1, C10, C11	10pF	0603/0805	3
C2	47 pF	0603/0805	1
C3, C4	47 pF	1210	2
C5, C6	10 uF/100V	1210	2
C7	1000 uF/63V		1
R1	10 Ω	0603	1
C8	5.6 pF	0603/0805	1
C9	3.9 pF	0603/0805	1
C12, C13	8.2 pF	1210	2
C14	4.7 pF	1210	1
C15	2.7 pF	1210	1
C16	1.0 pF	0603/0805	1
C17	2.0 pF	1210	1



Package Dimensions (Unit:mm)



Unit:mm

Tolerance ± 0.10 mm, Except as Noted.

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2025/4/18	V1.0	Preliminary Datasheet Creation

Application data based on: LSM-25-07

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