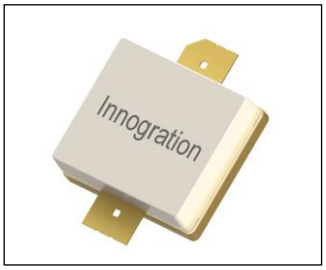
GaN HEMT 28V, 2450MHz 120W, RF Power Transistor



Description

The XTAH25120A2C is a 120W GaN HEMT, designed for ISM/RF Energy application within S Band low end, especially at 2.45GHz.It can be used in CW, Pulse and any other modulation modes.

It is recommended to use paired XTAH25120A2C to deliver >200W in cost effective ways, and offer better thermal management and easier maintenance.

- Typical 2.4-2.5GHz full band class AB RF Performance with **1pcs device** soldered
  Vds=28V, Idq=110mA, CW

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
2400	50.6	114.7	60.7	16.77	51.67	146.9	68
2450	50.45	111.0	65.0	17.49	51.45	139.8	71
2500	50.12	102.9	68.7	18.07	51	126.0	74

Recommended driver：ITEH38007P3 or GTAH35006PD

- Typical 2.4-2.5GHz full band class AB RF Performance with **2pcs devices** soldered
  Vds=28V, Idq=110mA, CW

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
2400	53.32	215.0	59.8	16.44	54.21	263.5	65
2450	53.3	214.0	64.3	16.85	54.13	258.8	69
2500	52.87	193.7	66.8	17.37	53.79	239.2	72

Recommended driver：ITEH27010P3 or GTAH35012PD

Applications

- S band power amplifier
- ISM/RF Energy power amplifier

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
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}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	36	Vdc
Maximum gate current	Igs	27.2	mA
Storage Temperature Range	Tstg	-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°C, at Pdiss=50W	$R_{\theta JC}$	1.6	°C /W

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

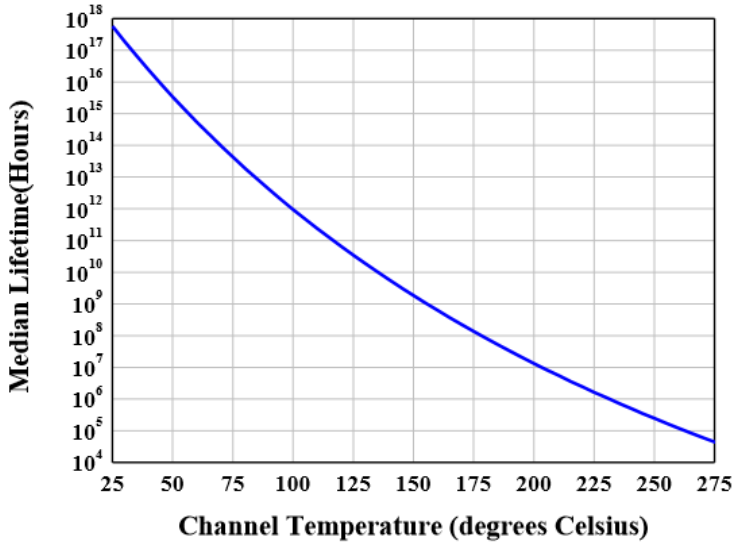
DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=27.2mA	V_{DSS}		150		V
Gate Threshold Voltage	VDS =10V, ID = 27.2mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =28V, IDS=60mA, Measured in Functional Test	$V_{GS(Q)}$		-2.3		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	2.5GHz, Pout=120W Pulsed CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature



XTAH25120A2C single device
Typical performance

Figure 3: Network analyzer output S11/S21

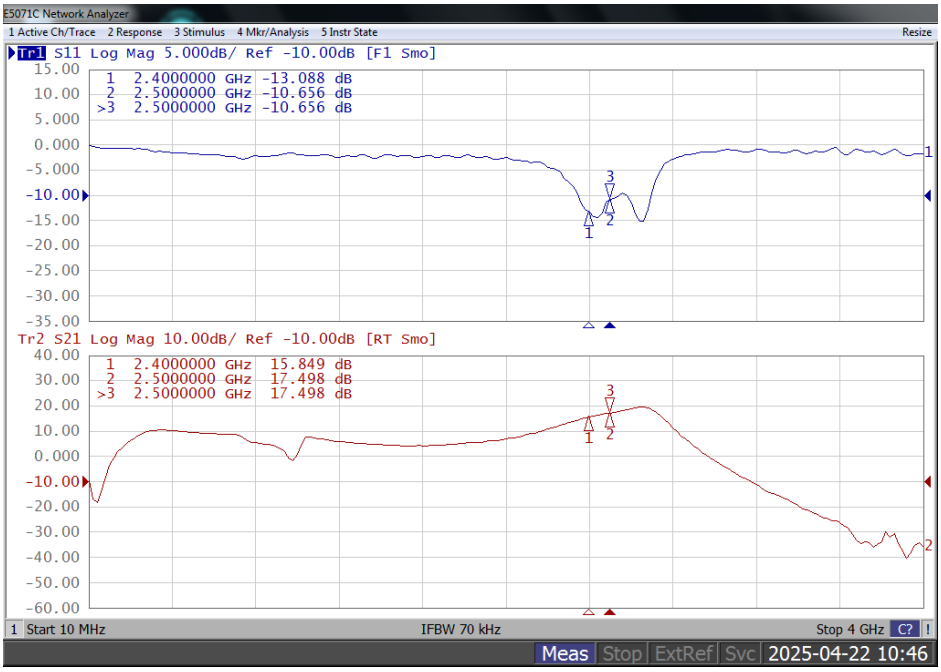


Figure 4: Picture of application board

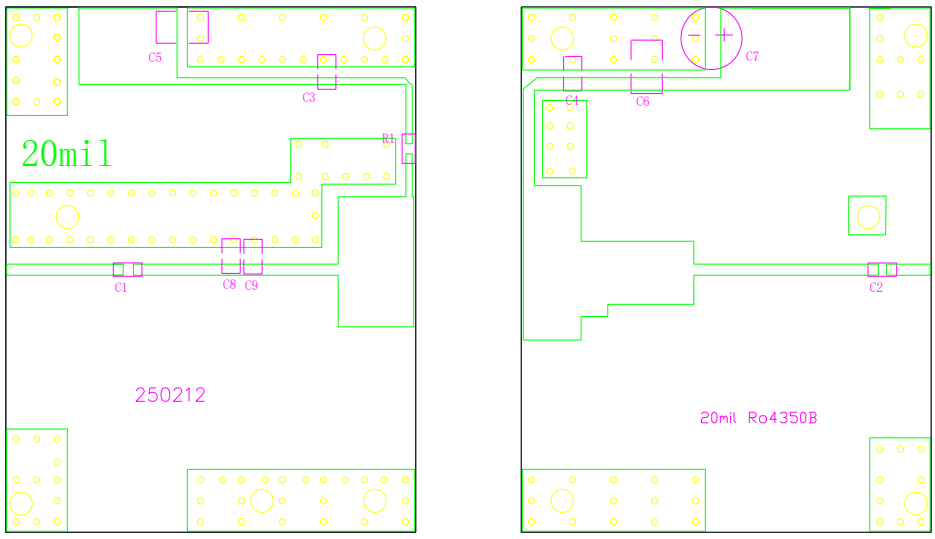


Table 4. Bill of materials of application board (PCB layout upon request)

Designator	Comment	Footprint	Quantity
C1, C2, C3, C4	10 pF	0805	4
C5, C6	10uF/100V	1210	2
C7	470 uF/63V		1
C8, C9	1.0 pF	0603	2
R1	10 Ω	0603	1

XTAH25120A2C*2 combination
Typical performance

Figure 5: Network analyzer output S11/S21

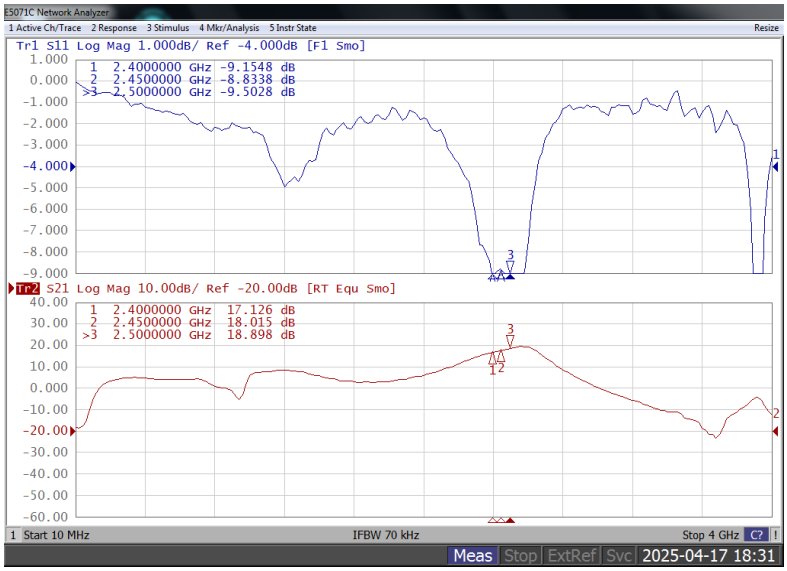


Figure 6: Picture of application board

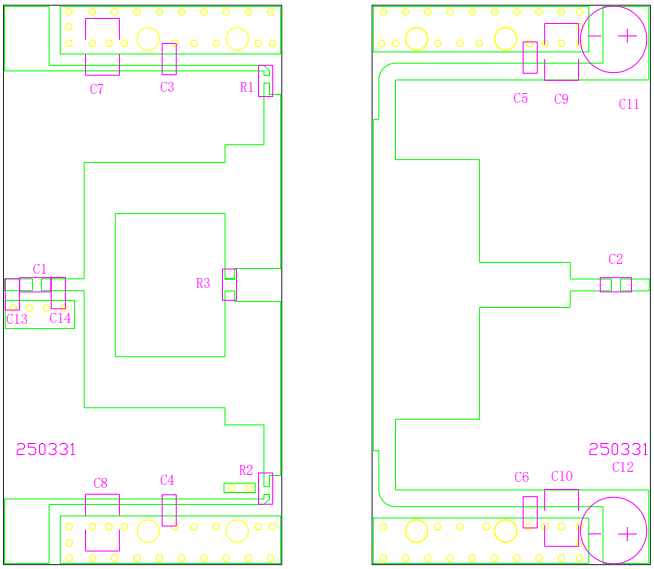
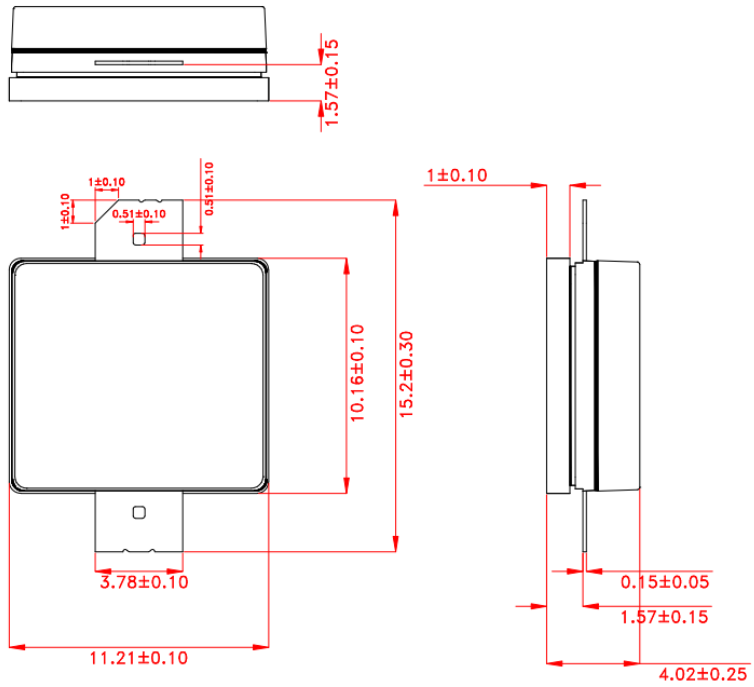
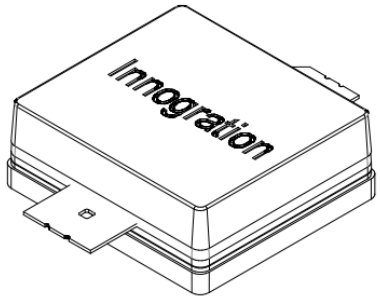


Table 5. Bill of materials of application board (PCB layout upon request)

Designator	Comment	Footprint	Quantity
C1, C2, C3, C4, C5, C6	12 pF	0805	6
C7, C8, C9, C10	10uF/100V	1210	4
C11, C12,	470 uF/63V		2
R1, R2, R3	10 Ω	0603	3
C13	1.0 pF	0603	1
C14	2.0 pF	0603	1

Package Dimensions （Unit:mm）





Unit:mm

Tolerance ±0.10mm,Except as Noted.

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2025/4/22	V1.0	Preliminary Datasheet Creation

Application data based on: LSM-25-06/08

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