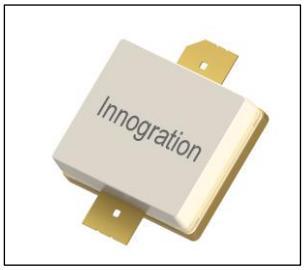
GaN HEMT 28V,1.5-2.7GHz 70W, RF Power Transistor



Description

The XTAH27071A2C is a 70W GaN HEMT, designed for multiple application within 1.5 to 2.7GHz 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 1.5-2.2GHz class AB RF Performance with device soldered on heatsink
  Vds=28V, Idq=100mA, CW

Freq(MHz)	P1(dBm)	P3(dBm)	P3(W)	Eff(%)@P3	Gp1 (dB)
1500	49.44	49.91	98.01	64.77	15.18
1600	49.05	49.66	92.55	69.74	15.44
1700	48.75	49.35	86.09	72.61	15.38
1800	47.96	48.53	71.37	64.90	15.31
1900	48.28	48.89	77.51	66.90	16.72
2000	48.28	49.01	79.56	64.66	16.64
2100	48.68	49.45	88.05	66.86	16.40
2200	48.65	49.36	86.27	67.66	15.65

- Typical 2.3-2.7GHz class AB RF Performance with device soldered on heatsink
  Vds=28V, Idq=100mA, CW

Freq(MHz)	P1(dBm)	P3(dBm)	P3(W)	Eff(%)@P3	Gp1 (dB)
2300	48.57	49.51	89.30	64.50	17.88
2400	48.26	49.36	86.36	67.76	18.01
2500	48.34	49.08	80.96	71.27	18.19
2600	47.53	48.53	71.25	74.23	17.88
2700	47.93	48.77	75.26	65.96	18.30

Applications

- L band power amplifier
- 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	16.8	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=30W	$R_{\theta JC}$	2.3	°C /W

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

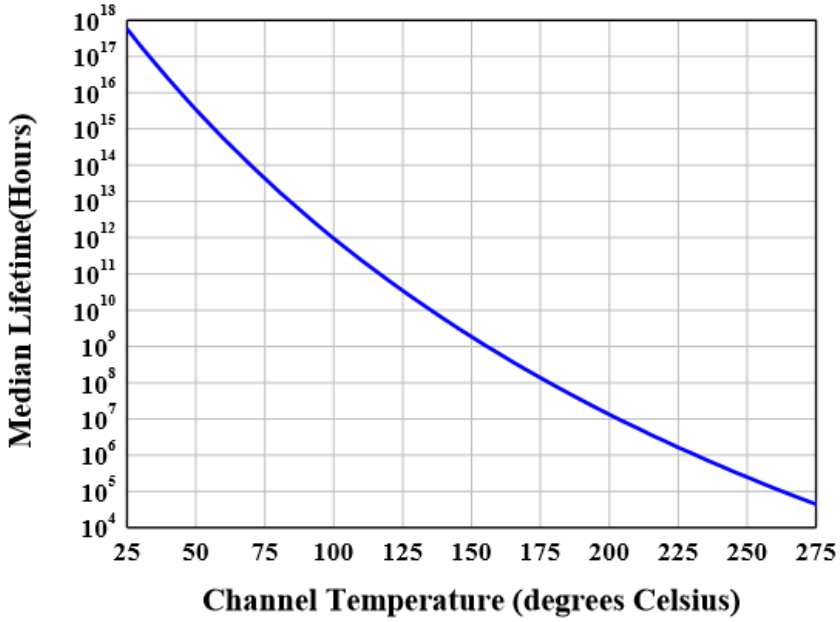
DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=16.8mA	V_{DSS}		150		V
Gate Threshold Voltage	VDS =10V, ID = 16.8mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =28V, IDS=100mA, Measured in Functional Test	$V_{GS(Q)}$		-2.3		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	2.7GHz, Pout=70W Pulsed CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature



1500-2200MHz

Typical performance

Figure 3: Efficiency and power gain as function of Pout at 28V

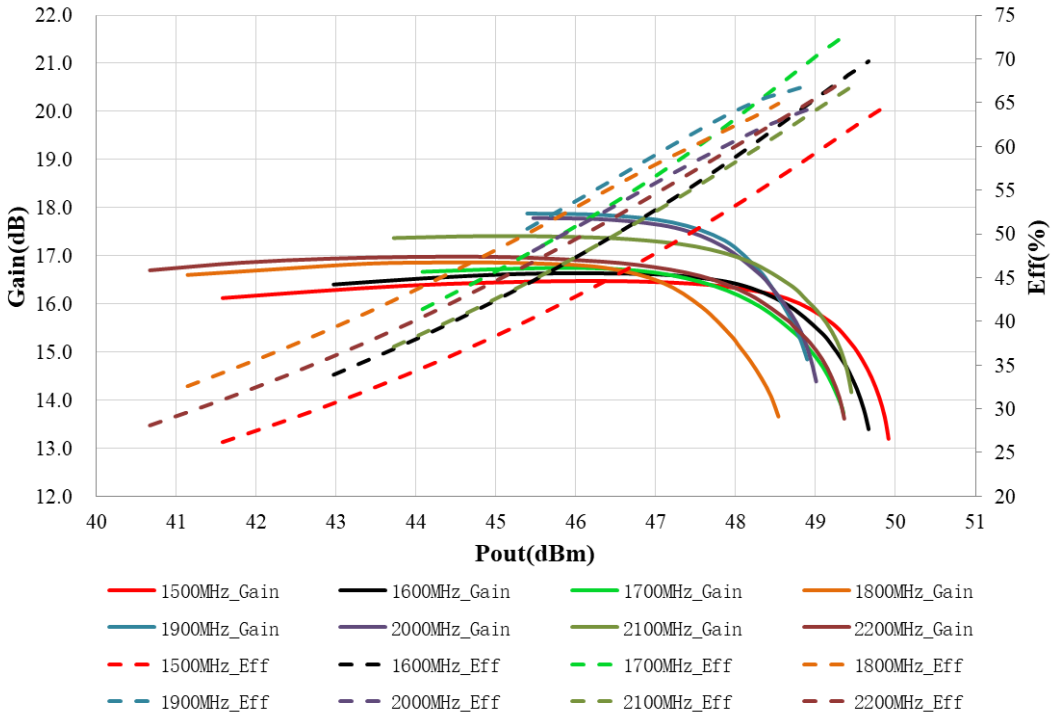


Figure 4: Network analyzer output S11/S21

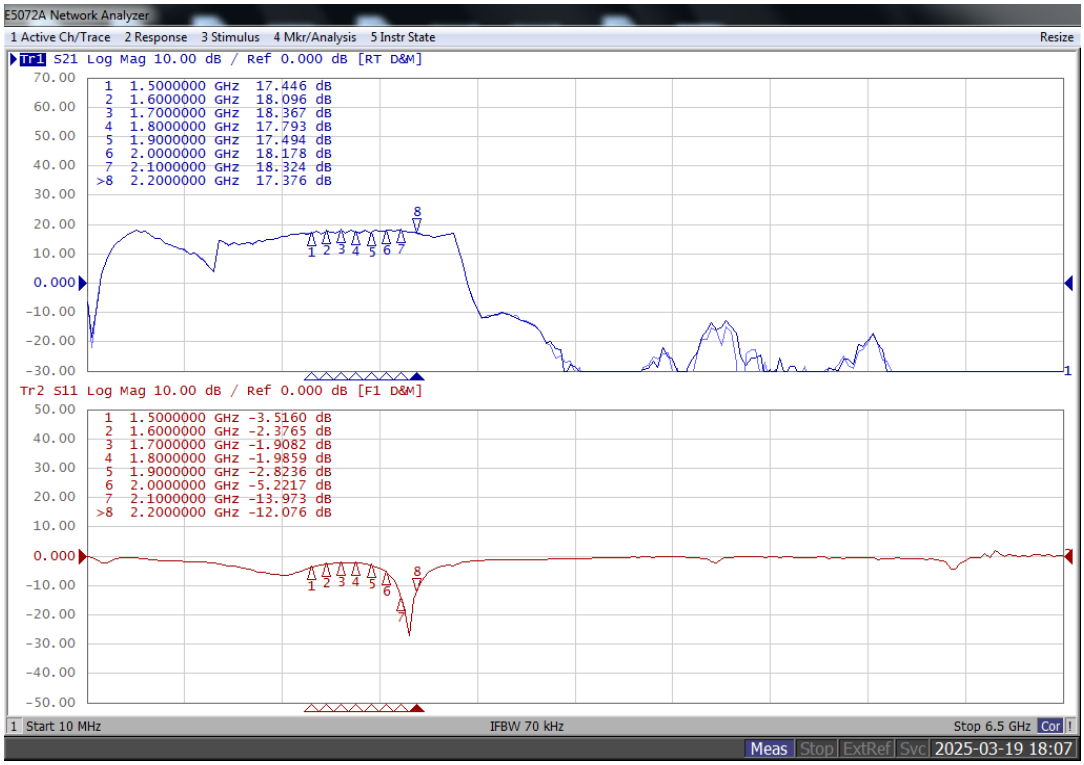


Figure 5: Picture of application board

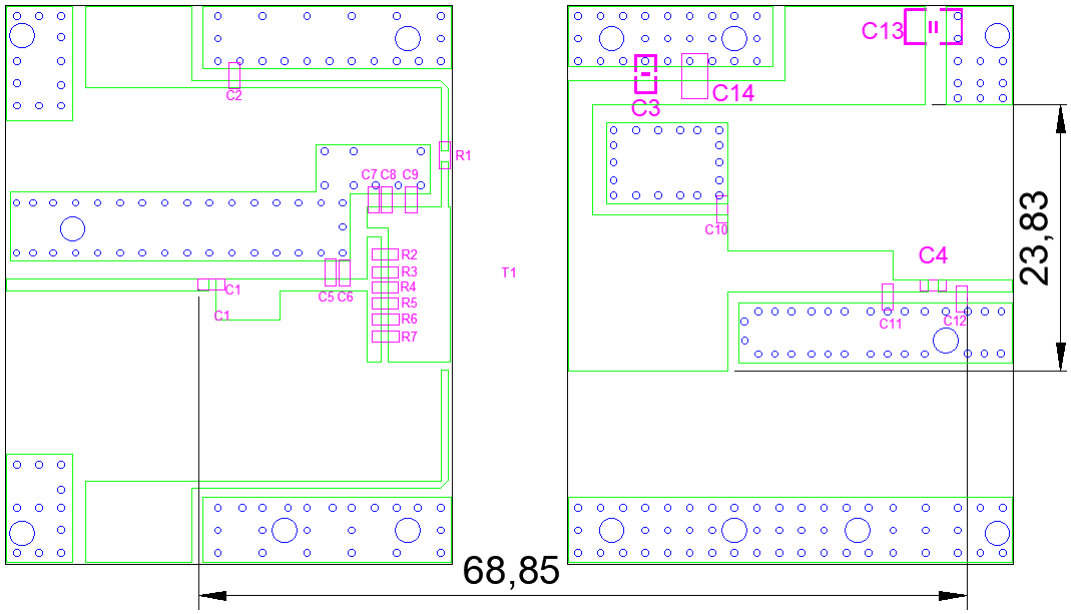


Table 4. Bill of materials of application board (PCB layout upon request)

Part	Quantity	Description	Part Number	Manufacture
C1,C2,C3,C4	4	20pFHigh Q Capacitor	251SHS200BSE	TEMEX
C5,C7,C10	3	1.2pFHigh Q Capacitor	251SHS1R2BSE	TEMEX
C6	1	2.2pFHigh Q Capacitor	251SHS2R2BSE	TEMEX
C8,C9	2	0.9pFHigh Q Capacitor	251SHS0R9BSE	TEMEX
C12	1	0.4pFHigh Q Capacitor	251SHS0R4BSE	TEMEX
C11	2	1.1pFHigh Q Capacitor	251SHS1R1BSE	TEMEX
C13,C14	2	10uF MLCC	GRM32EC72A106ME05	Murata
R1,R2,R3,R4,R5,R6,R7	7	10Ω Power Resistor	ESR03EZPF100	ROHM
T1	1	70W GaN Transistor	XTAH27071A2C	Innogration

2300-2700MHz

Typical performance

Figure 6: Efficiency and power gain as function of Pout at 28V

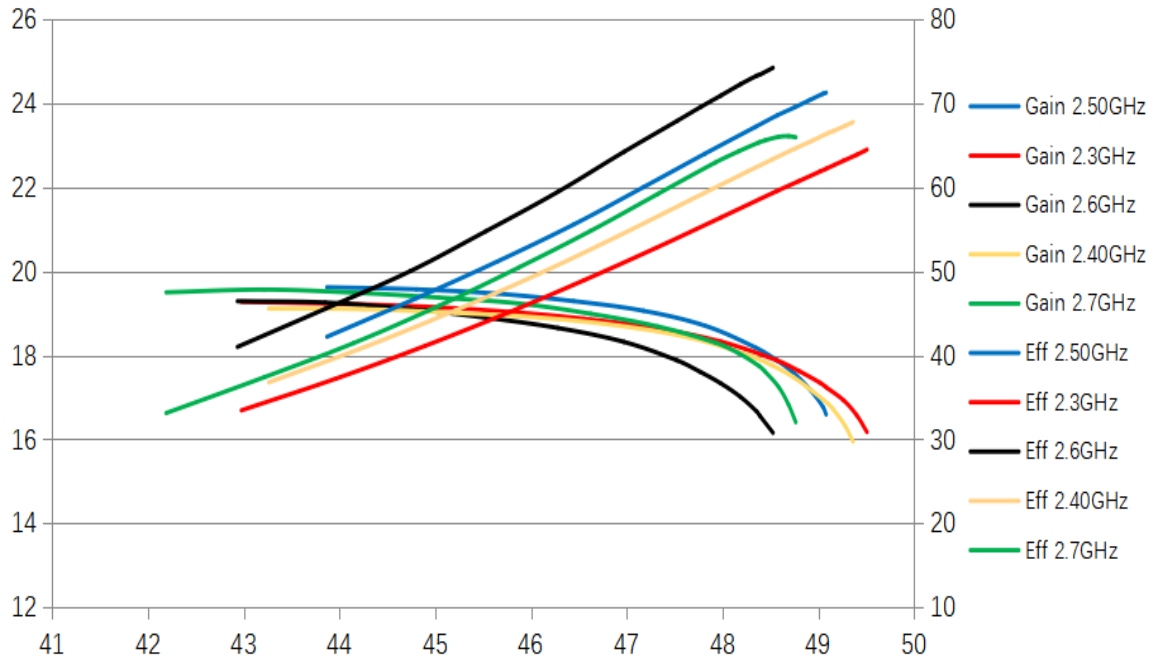


Figure 7: Network analyzer output S11/S21

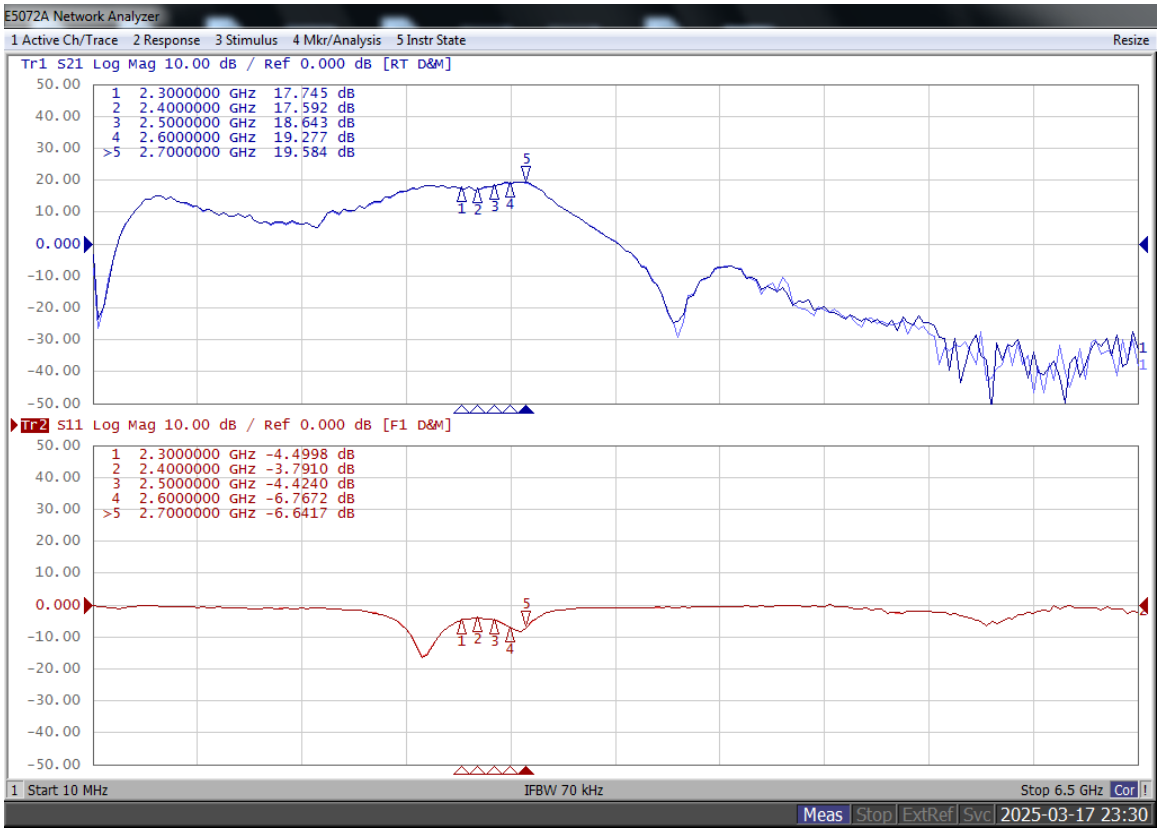


Figure 8: Picture of application board

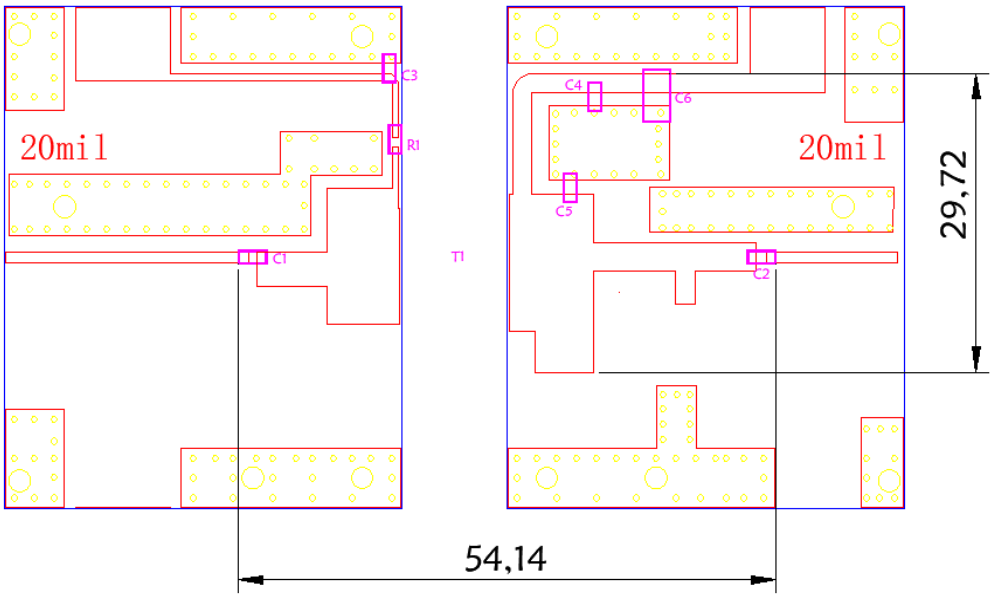
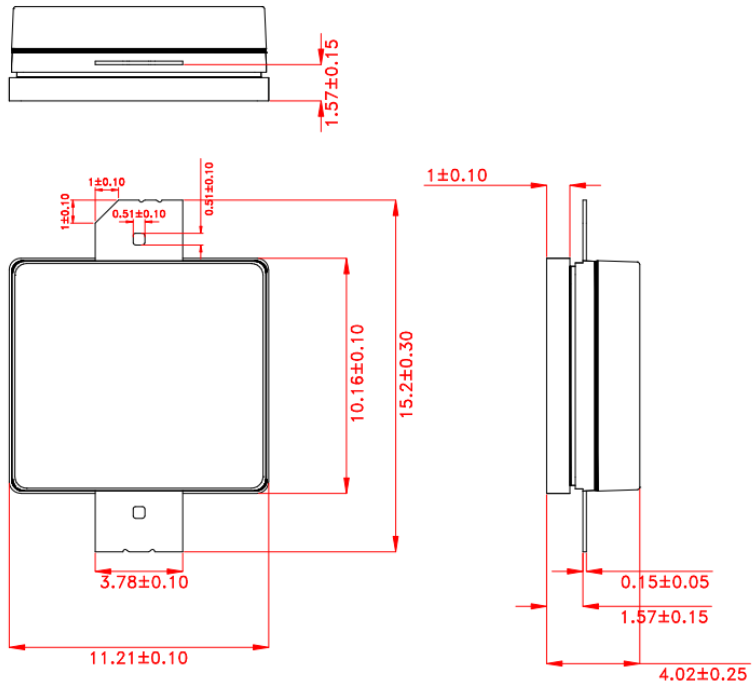
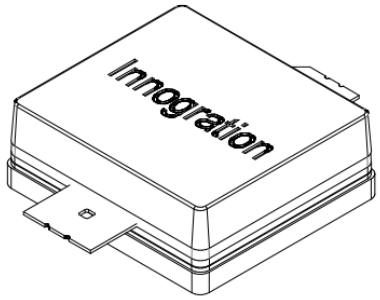


Table 5. Bill of materials of application board (PCB layout upon request)

Part	Quantity	Description	Part Number	Manufacture
C1,C2,C3,C4	4	10pFHigh Q Capacitor	251SHS120BSE	TEMEX
C5	1	1.2pFHigh Q Capacitor	251SHS0R9BSE	TEMEX
C6	1	10uF MLCC	GRM32EC72A106ME05	Murata
R1	1	10Ω Power Resistor	ESR03EZPF100	ROHM
T1	1	70W GaN Transistor	XTAH27071A2C	Innogration

Package Dimensions （Unit:mm）





Unit:mm

Tolerance ±0.10mm,Except as Noted.

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2025/3/18	V1.0	Preliminary Datasheet Creation

Application data based on: LWH-25-09/10

Notice

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