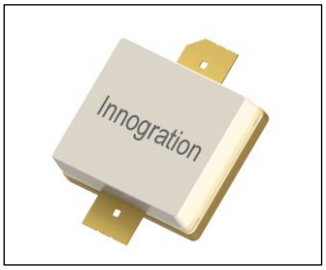
GaN HEMT 28V, UHF ,200W, RF Power Transistor



Description

The STCH09200A2C is a 200W 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

  Vds=28V, Idq=100mA，CW

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
700	53.28	212.8	65.8	17.42	53.89	244.7	70.4
750	52.7	186.2	64.9	18.38	53.49	223.5	70.7
800	52.31	170.1	63.5	18.09	53.22	210.1	69.9
850	52.44	175.5	64.4	17.69	53.3	213.8	70.5
900	52.19	165.4	60.6	17.33	53.05	201.7	66.1
950	52.49	177.3	62.9	17.66	53.42	219.7	69.1
1000	52.49	177.3	66.0	18.03	53.33	215.1	71.8

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 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}	+200	Vdc
Gate--Source Voltage	V_{GS}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	50	Vdc
Maximum gate current	Igs	56	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=60W	$R_{\theta JC}$	0.85	°C /W

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

DC Characteristics (measured on wafer prior to packaging)

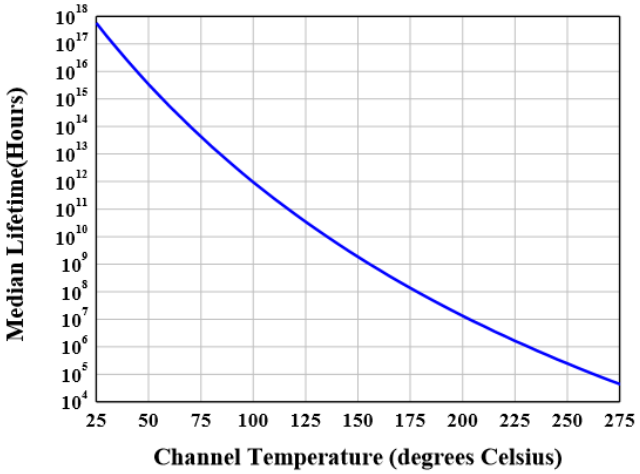
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit

Drain-Source Breakdown Voltage	VGS=-8V; IDS=56mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 56mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =28V, IDS=200mA, Measured in Functional Test	$V_{GS(Q)}$		-3.4		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	900MHz, Pout=200W 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

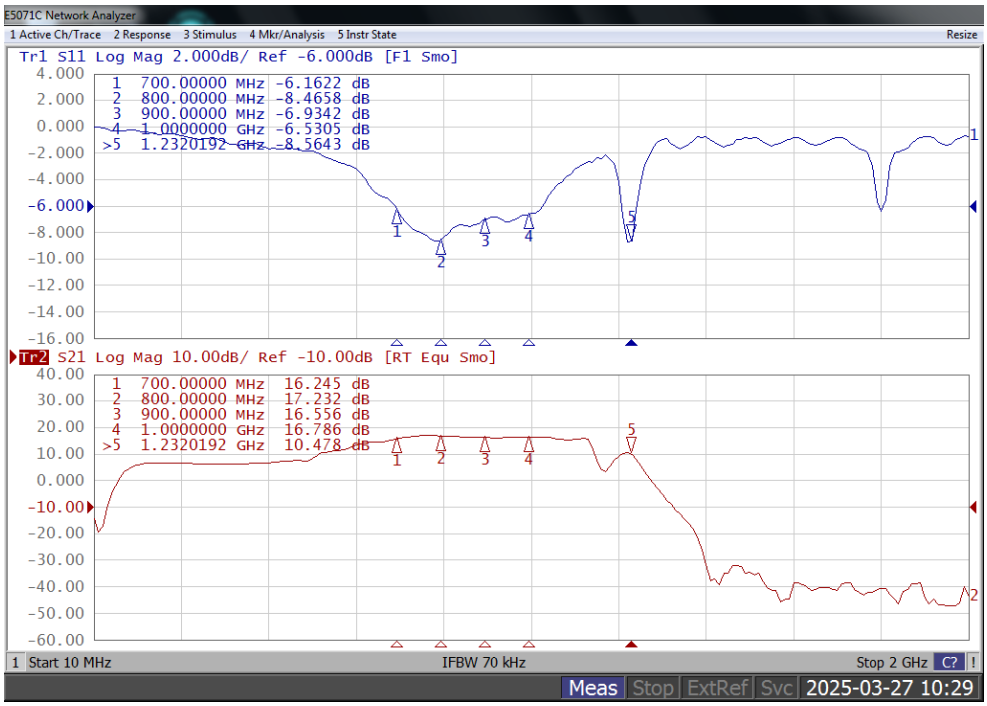
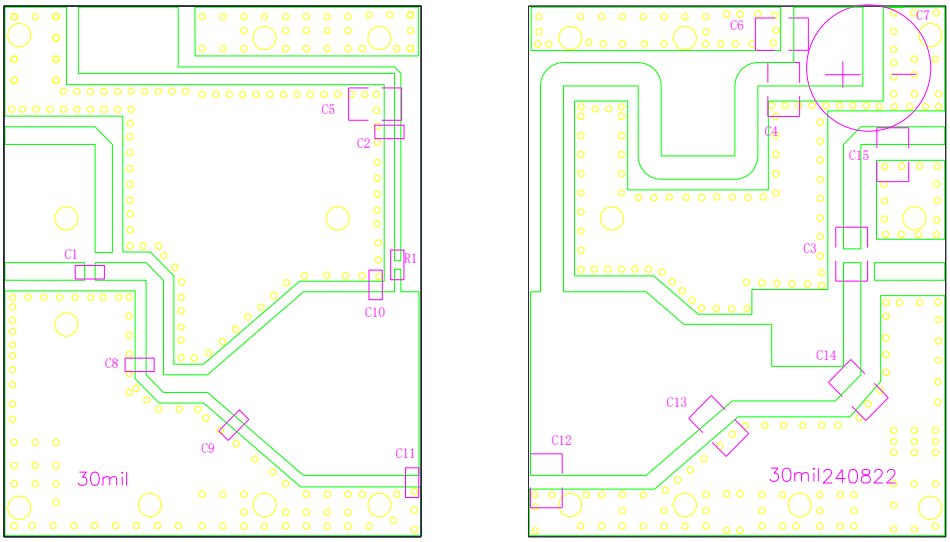
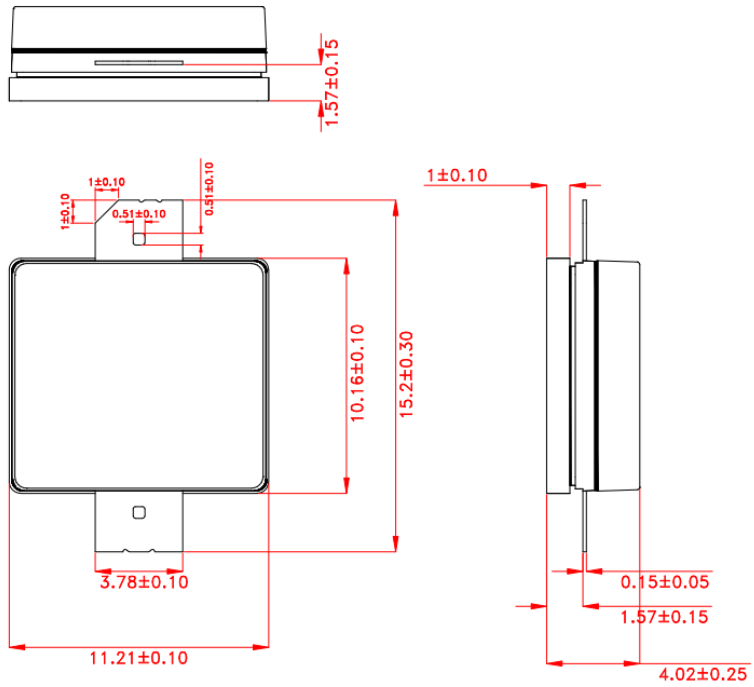


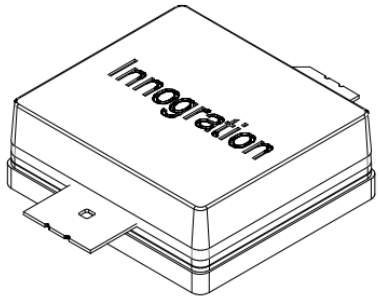
Figure 4: Picture of application board



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	10 pF	1210	1
C13	8.2 pF	1210	1
C14	4.7 pF	1210	1
C15	2.7 pF	1210	1

Package Dimensions （Unit:mm）





Unit:mm

Tolerance ±0.10mm,Except as Noted.

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2024/11/2	V1.0	Preliminary Datasheet Creation
2025/3/28	V2.0	Add 0.7-1G application data to replace 0.7-0.9G as carrier info

Application data based on: LSM-24-34/25-03

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