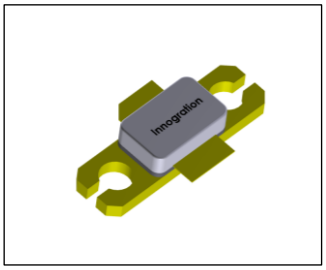
GaN HEMT 28V, HF-2.7GHz 180W, RF Power Transistor

Description



The STCH27180GX is a 180W GaN HEMT, designed for multiple application up 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.

In typical broadband 0.6-2GHz application, it can deliver >130W pulsed CW within full band

- Typical class AB 600-2000MHz RF Performance with device soldered

  Vds=28V, Idq=300mA，Pulsed CW: 10us, 10%

Freq(MHz)	Pin(dBm)	Pout(dBm)	Pout(W)	IDS(A)	Gain(dB)	Eff(%)	2nd	3rd
600	41.96	52.68	185.35	0.91	10.72	72.74	-15.10	-12.7
800	40.8	51.8	151.36	0.74	11	73.05	-18.60	-14.6
1000	40.25	52.35	171.79	0.93	12.1	65.97	-20.70	-21.5
1200	42.12	52.89	194.54	1.03	10.77	67.45	-17.20	-22.4
1400	42.18	51.58	143.88	0.81	9.4	63.44	-18.10	-27.7
1600	42.14	51.75	149.62	0.94	9.61	56.85		
1800	42.18	53.08	203.24	1.16	10.9	62.57		
2000	42.58	51.59	144.21	0.81	9.01	63.59		

- Typical class AB 2400-2500MHz RF Performance with device soldered

  Vds=28V, Idq=100mA，Pulsed CW: 10us, 10%

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
2400	52.16	164.4	54.9	13.73	53.53	225.5	61.2
2450	51.28	134.1	53.1	13.77	53.2	208.8	62.7
2500	50.29	107.0	51.2	13.11	52.69	185.9	63.7

Applications

- L/P band power amplifier
- S band 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	47	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, CW, at Pdiss=100W	$R_{\theta JC}$	0.85	°C /W
Thermal Resistance, Junction to Case by FEA T_C= 85°C,Pulsed CW, 10us, 10%, at Pdiss=100W	$R_{\theta JC}$	0.4	°C /W

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

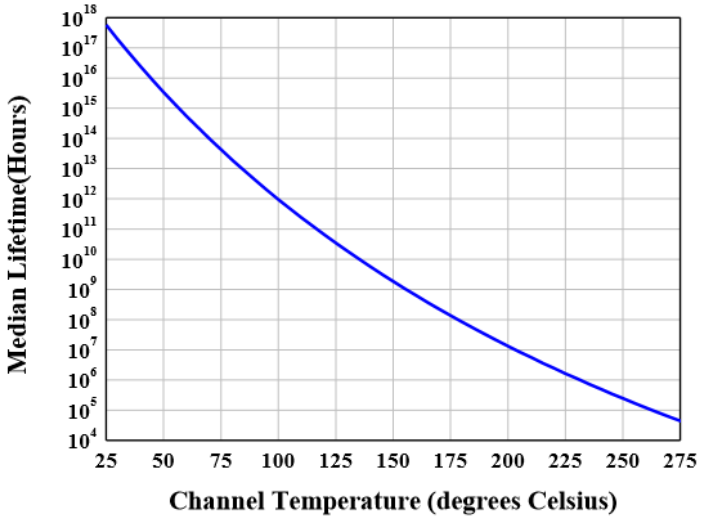
DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=47mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 47mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =28V, IDS=300mA, Measured in Functional Test	$V_{GS(Q)}$		-3.2		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	1.5GHz, Pout=180W Pulsed CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature



600-2000MHz

Typical performance

Figure 3: Network analyzer output S11/S21

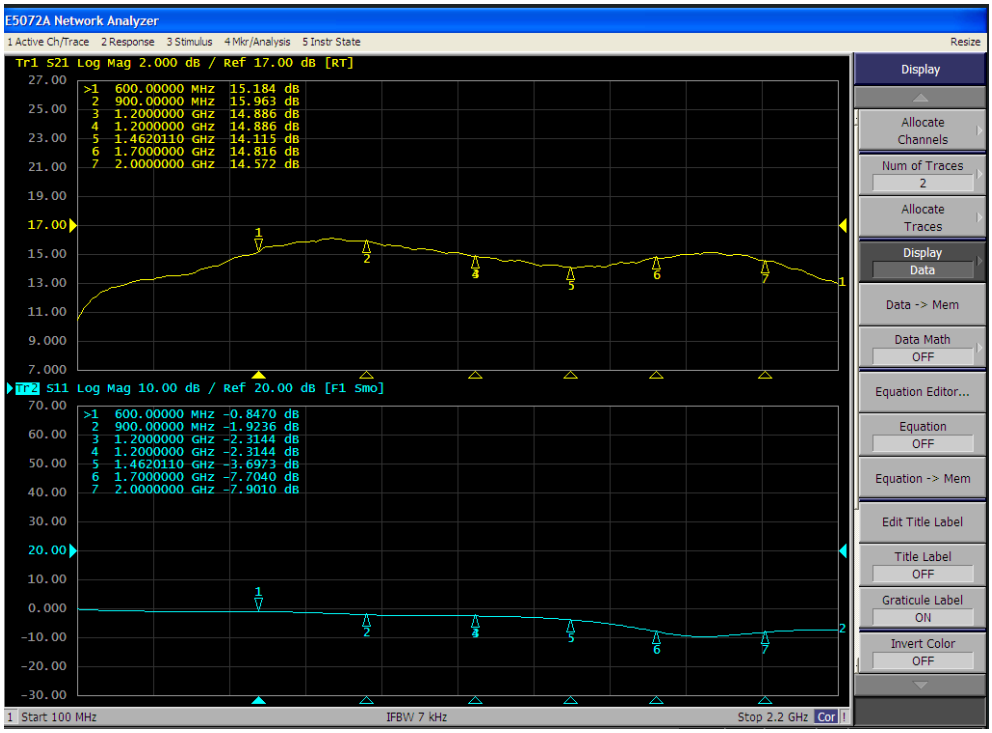
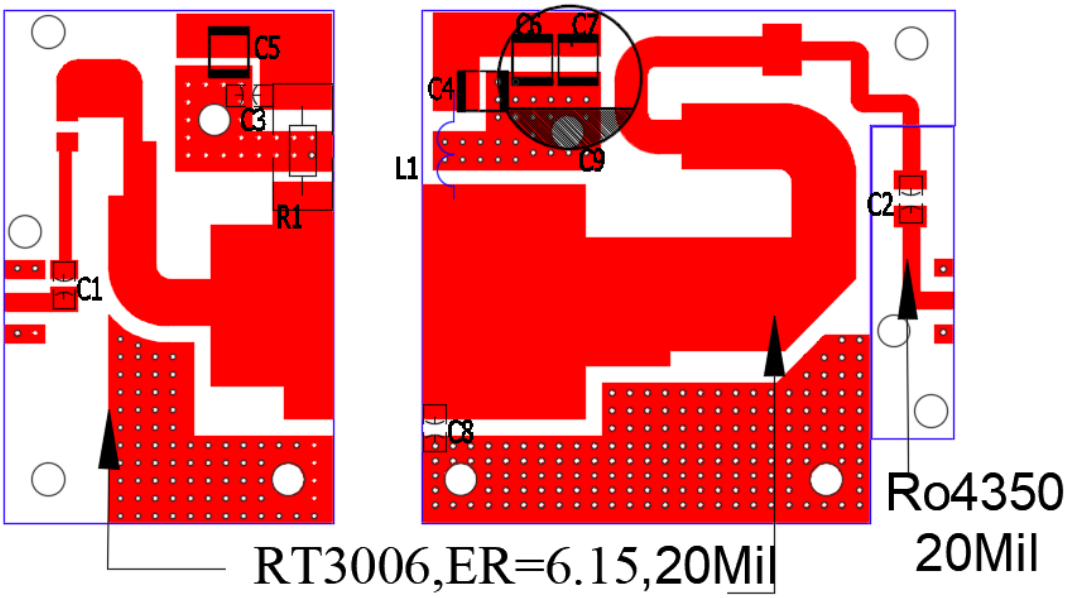


Figure 4: Picture of application board



Component	Description	Suggested Manufacturer
C9	470uF/63V	-
C5,C6 ,C7	10uF	-
C1,C3,	18pF(MQ300805)	
C2，C4	18pF(MQ301111)	
C8	1.5pF(MQ300805)	
L1	1mm wire， 5mm diameter，4turns	-
R1	Chip Resistor,51Ω，1812	-
PCB	RT3006,ER=6.15,20mil / Rogers4350 20mil	-

2400-2500MHz

Typical performance

Figure 5: Network analyzer output S11/S21

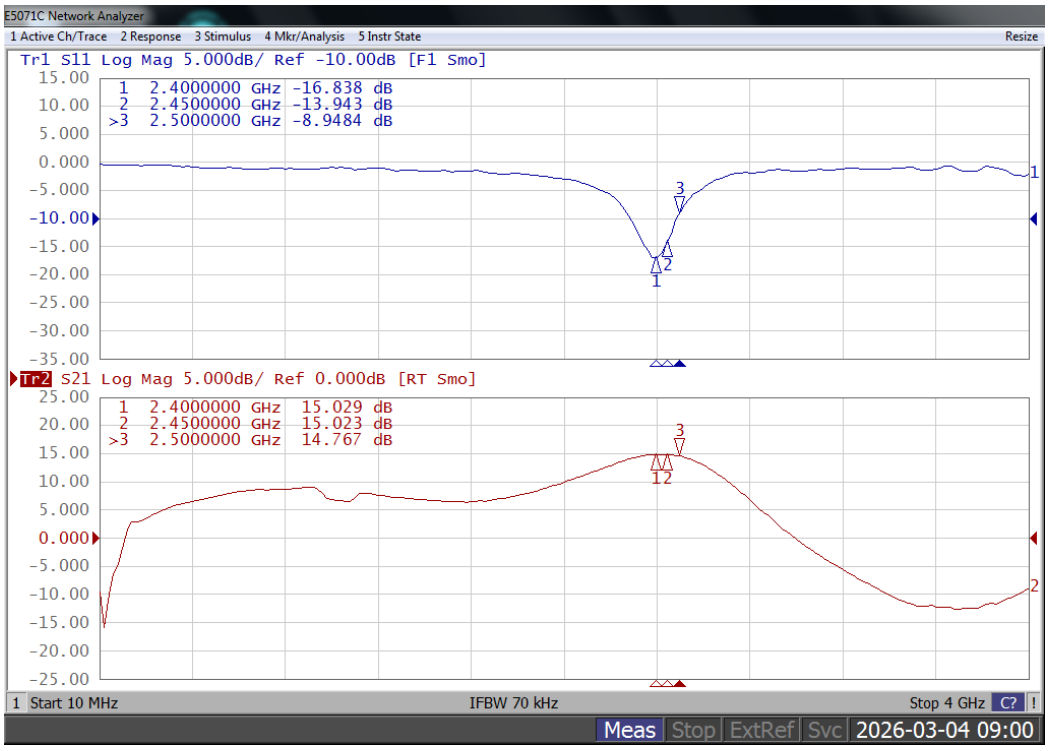
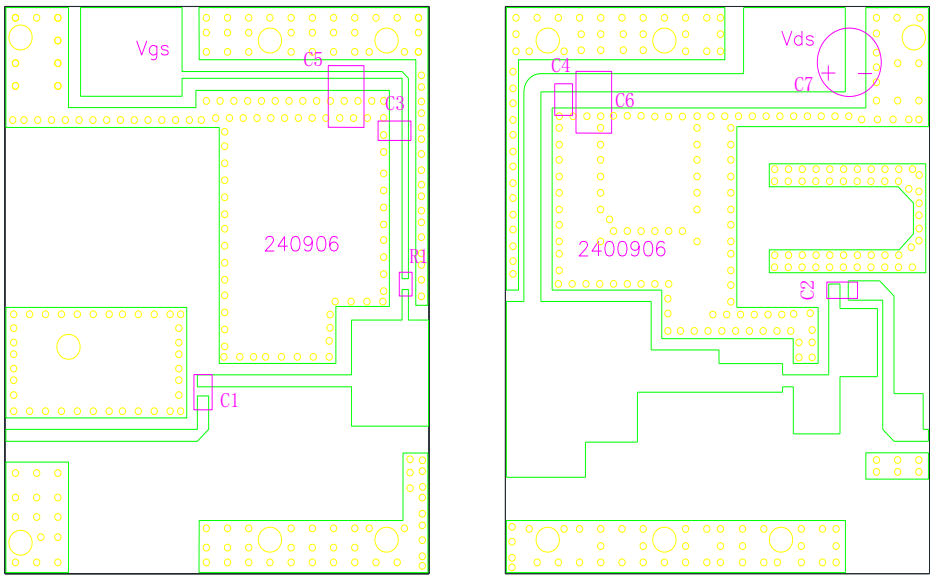


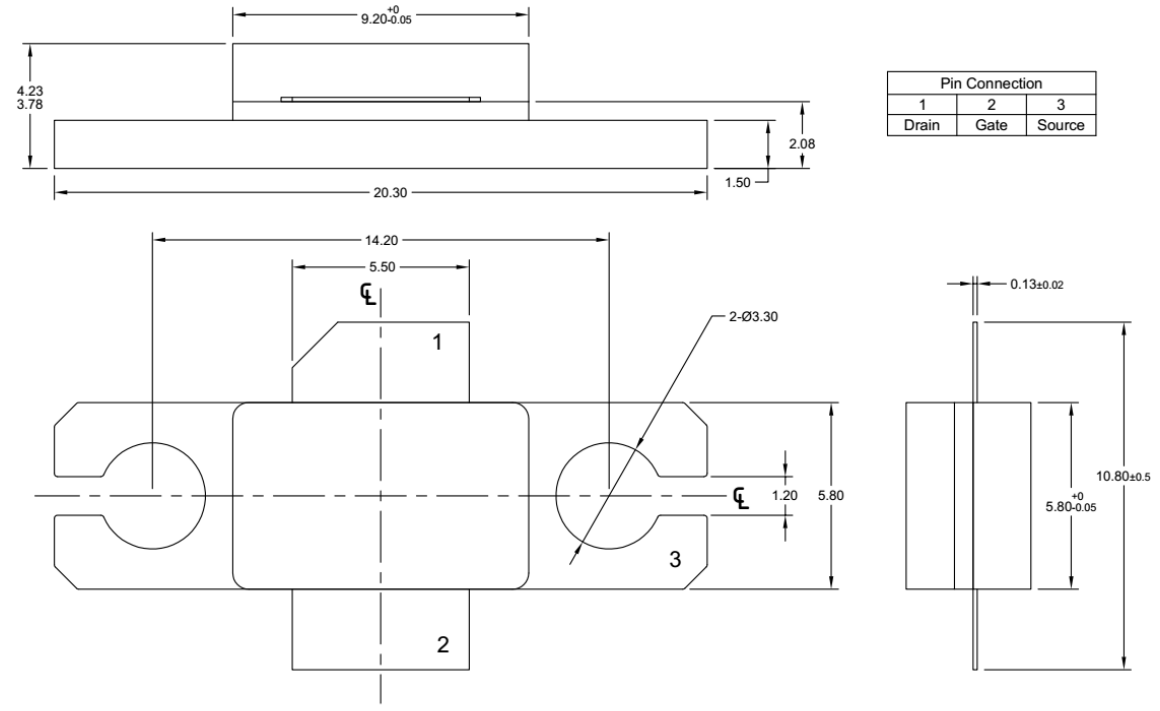
Figure 6: Picture of application board



Designator	Comment	Footprint	Quantity
C1C2, C3, C4,	8.2 pF	0805	4
C5, C6	10uF/100V	1210	2
C7	470uF/63V		1
R1	10 Ω	0603	1

Package Outline

Flanged ceramic package; 2 leads



OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-GXB					10/10/2017

Figure 1. Package Outline PKG-G2E

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2026/3/4	V1.0	Preliminary Datasheet Creation

Application data based on: YHG-26-09/LSM-26-07

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