



GaN HEMT 50V, 200W, 5.8GHz RF Power Transistor

STCV58200F4C

Description

The STCV58200F4C is a single ended 200watt, GaN HEMT, ideal for ISM applications at 5.8GHz.

It can support CW, pulse and linear applications.

There is no guarantee of performance when this part is used outside of stated frequencies.

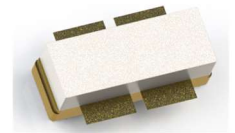
- Typical pulse CW performance across the band with device soldered

$V_{DD} = 50\text{ Vdc}$, $I_{dq} = 100\text{ mA}$ $T_c = 25^\circ\text{C}$, air cooling

CW:

Freq (MHz)	Pin(dBm)	Psat(dBm)	Psat(W)	Ids(A)	Gain(dB)	Eff(%)
5800	42.7	53.36	216.77	7.82	10.66	55.44

Recommended driver: STAV58030J2



Applications

- C band Class AB power amplifier
- 5.8GHz RF Energy

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}	55	Vdc
Maximum gate current	I_{gs}	25.2	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 $T_c = 25^\circ\text{C}$, at $P_{out} = 200\text{ W}$ at 5.8GHz	$R_{\theta JC}$	0.75	°C /W

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

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{ V}$; $I_{DS} = 25.2\text{ mA}$	V_{DSS}		200		V



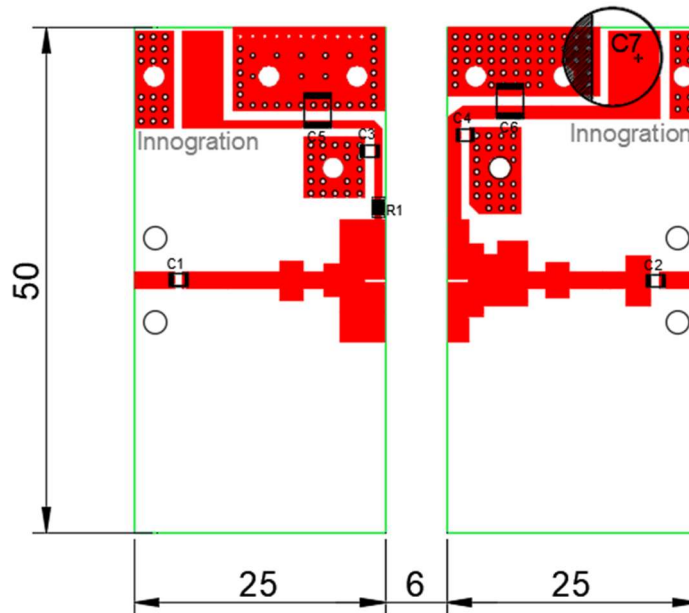
Gate Threshold Voltage	VDS =10V, ID = 25.2mA	V _{GS(th)}	-4	-	-2	V
Gate Quiescent Voltage	VDS =50V, IDS=100mA, Measured in Functional Test	V _{GS(Q)}		--3.35		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	5.8GHz, Pout=200W pulse CW All phase, No device damages	VSWR		10:1		

Reference Circuit of Test Fixture Assembly Diagram

PCB materials: Ro4350B , DXF file upon request



Component	Description	Suggestion
C7	470uF/63V	
C5,C6	10uF	10uF/100V
C1, C2, C3 C4	3.9pF	MQ300805
R1	Chip Resistor,10Ω	0805
PCB	30mil Rogers 4350B	



Figure 3: Efficiency and power gain as function of Pout

(VDD = 50 Vdc, Idq = 100mA, Pulse width=20us, duty cycle=10%, 5.8GHz)

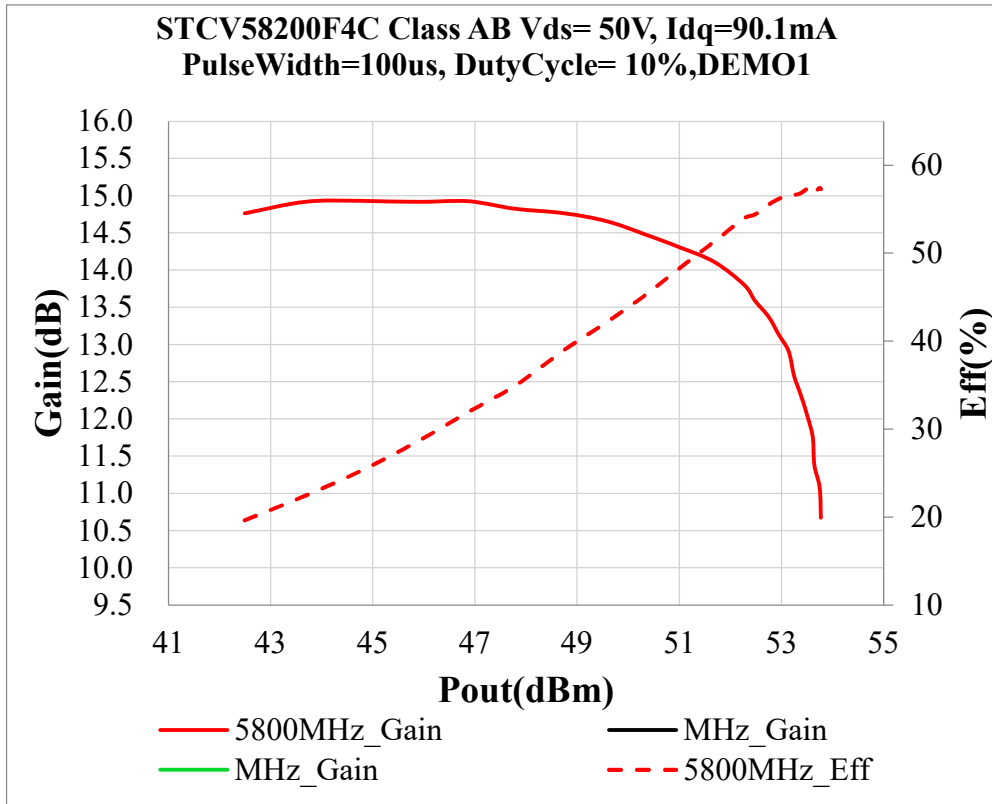
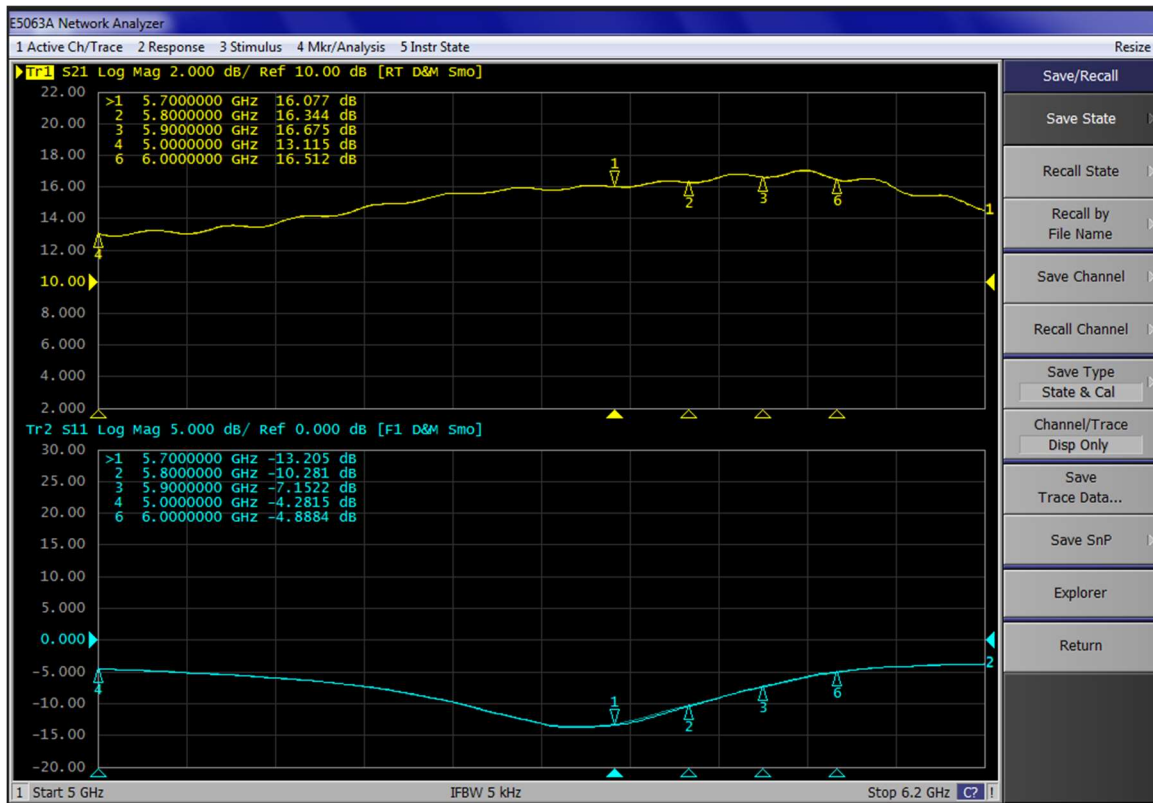


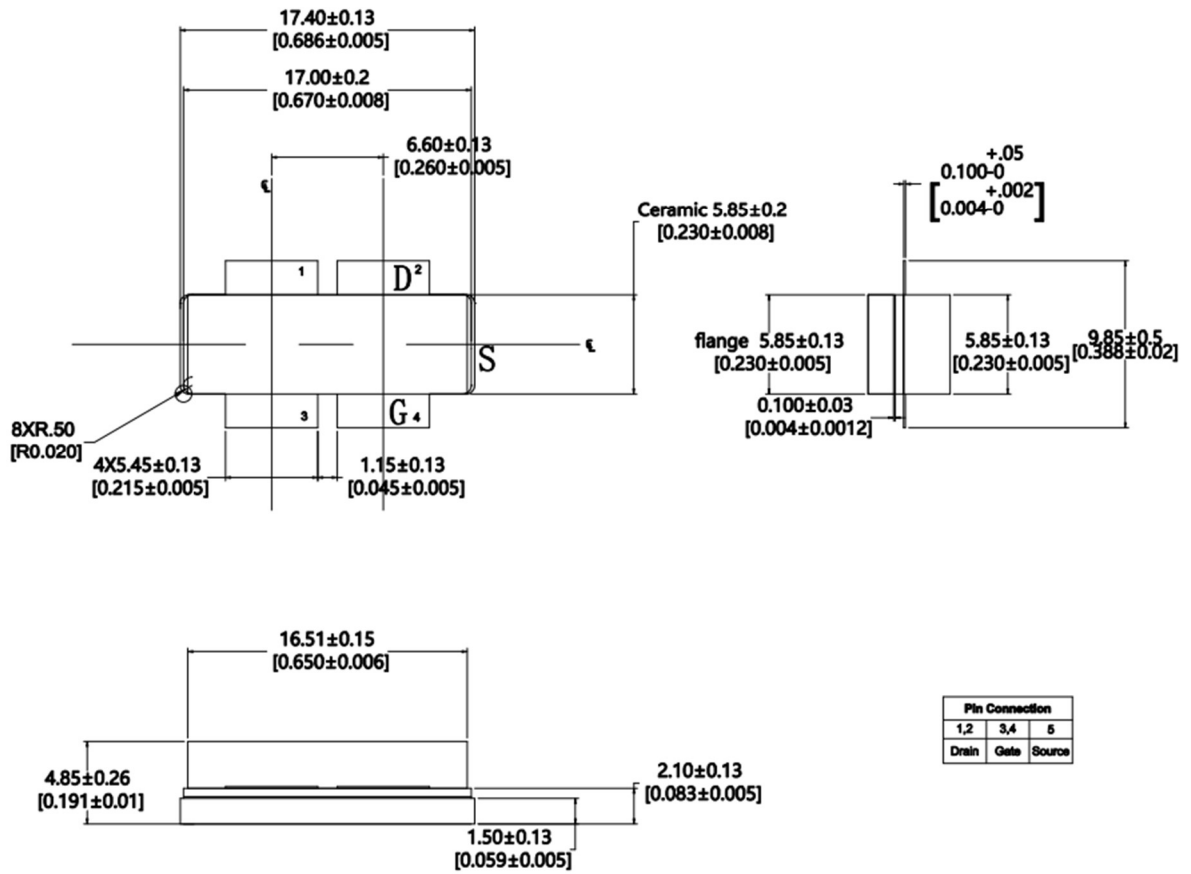
Figure 4: S11/S21 output from Network analyser (VDS= 50V, IDQ=500 mA Vgs =-3.2V)





Package Outline

Flangeless ceramic package; 4 leads



OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-LBS					07/31/2023



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2024/4/25	V1.0	Preliminary Datasheet Creation

Application data based on: YHG-24-06

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