GaN 28V 50W, C band RF Power Transistor

STAH58051T2C

Description

The STAH58051T2C is a 50W internally matched, GaN HEMT, designed from 5.0 to 6.0GHz, especially 5G NR or LTE application, as well as either Pulse or CW application There is no guarantee of performance when this part is used in applications designed Outside of these frequencies. **It is taken as the cost down version of its ceramic peer STAH58051GX(STAH58051G2) with slightly worse performance in the cost effective Air cavity plastic package**

- Typical performance (on wideband fixture with device soldered)

V_{DD}=28V I_{DQ}=100mA, CW

FREQ (MHZ)	P1dB(dBm)	P1dB(W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB(dBm)	P3dB(W)	P3dB Eff(%)
5100	46.4	43.7	46.8	10.52	47.64	58.1	51.3
5200	46.36	43.3	46.8	10.71	47.64	58.1	51.5
5300	46.34	43.1	47.2	10.94	47.6	57.5	51.6
5400	46.27	42.4	47.1	11.03	47.59	57.4	51.8
5500	46.24	42.1	47.1	10.94	47.54	56.7	51.7
5600	46.11	40.8	46.8	10.75	47.45	55.6	51.5
5700	46.12	41.0	47.1	10.47	47.4	55.0	51.5
5800	46.02	40.0	47.3	10.21	47.3	53.7	51.7
5900	45.86	38.5	48.7	10.03	47.06	50.8	52.9

Applications and Features

- Suitable for wireless communication infrastructure, wideband amplifier, EMC testing, ISM etc.
- High Efficiency and Linear Gain Operations
- Thermally Enhanced Industry Standard Package
- High Reliability Metallization Process
- Excellent thermal Stability and Excellent Ruggedness
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

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 (28V)
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}	-10,+2	Vdc
Operating Voltage	V_{DD}	36	Vdc
Maximum Forward Gate Current @ TC = 25°C	Igmax	12.5	mA
Storage Temperature Range	Tstg	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C

Operating Junction Temperature(See note 1)	T_J	+225	°C
Total Device Power Dissipation (Derated above 25°C, see note 2)	Pdiss	75	W

Note: 1. Continuous operation at maximum junction temperature will affect MTTF
2.Bias Conditions should also satisfy the following expression: Pdiss < (Tj – Tc) / RJC and Tc = Tcase

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T_C= 85°C, T_J=200°C, RF CW operation	$R_{\theta JC}$	1.8	C/W

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

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=-8V; I_{DS}=12.6mA	V_{DSS}	150			V
Gate Threshold Voltage	V_{DS} = 28V, I_D =12.6mA	V_{GS}(th)	-4		-2	V
Gate Quiescent Voltage	V_{DS} =28V, I_{DS}=100mA, Measured in Functional Test	$V_{GS(Q)}$		-3.16		V

Typical performance

5.1-5.9GHz

Figure 4: Small singal gain and return loss Vs Frequency

Vds=28V, Idq=100mA, input power=0dBm

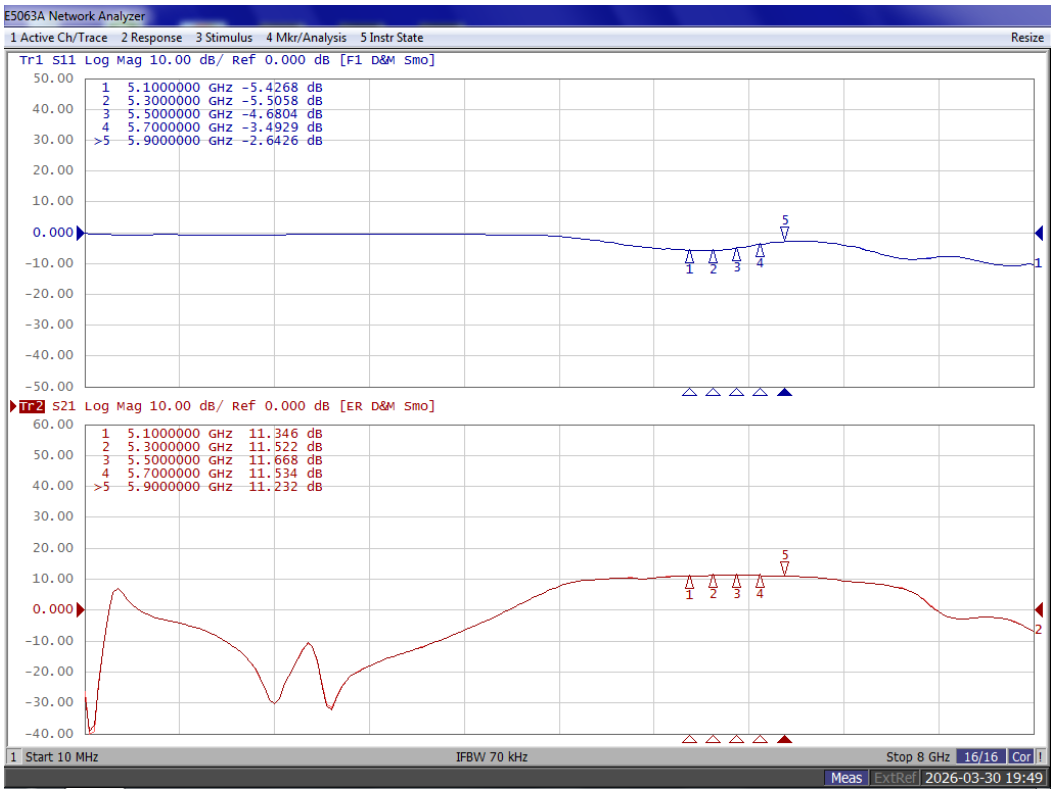


Figure 5: Efficiency and power gain as function of Pout

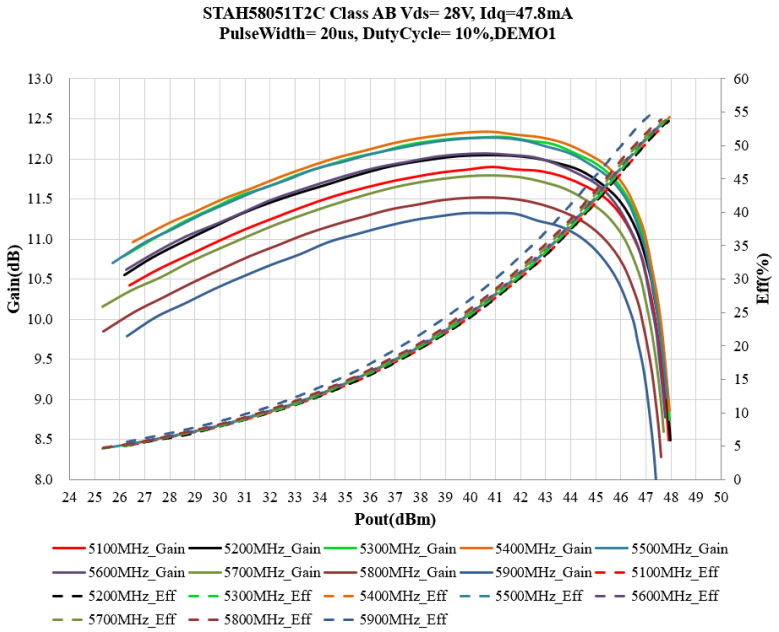
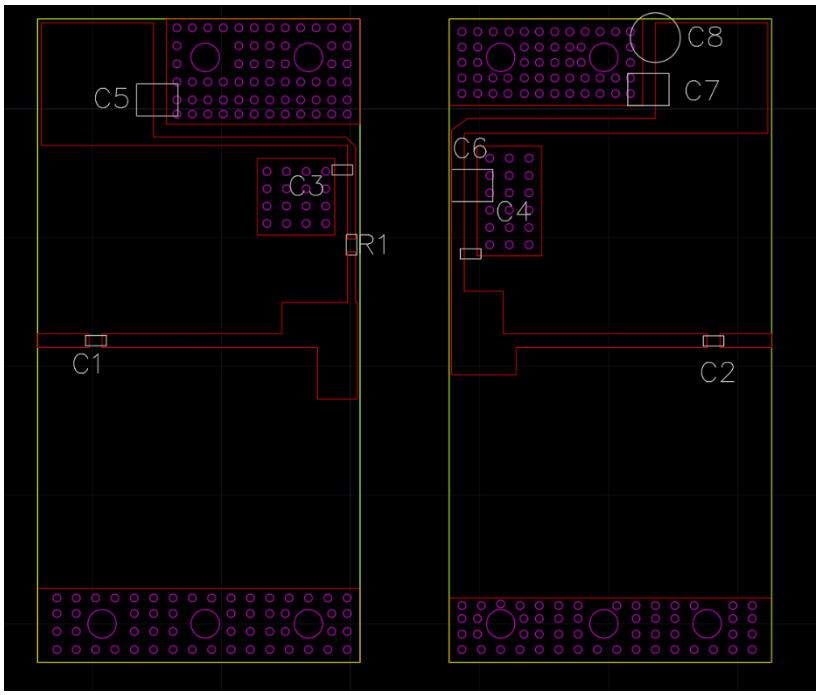


Figure 6: Picture and Bill of materials of 5.1-5.9GHz wide band application circuit

(Layout Gerber file upon request，20mils RO4350B)



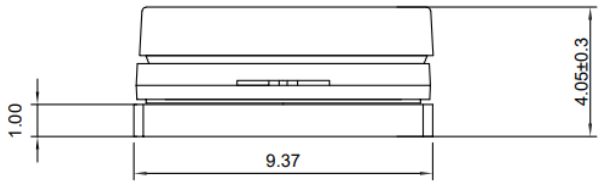
Component	Value	Suggested Manufacture	Quantity
U1	STAH58051T2C		1
C1、 C2、C3、C4	3.9pF	GQM2195C2E3R9BB12D	4
C5、 C6、C7	10uF/63V	GRM32EC72A106KE05	3
C8	470uF/63V	EEVFK1J471M	1
R1	10Ω	ERJPA3F10R0V	1

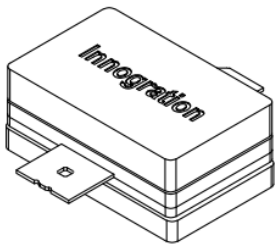
Package Outline

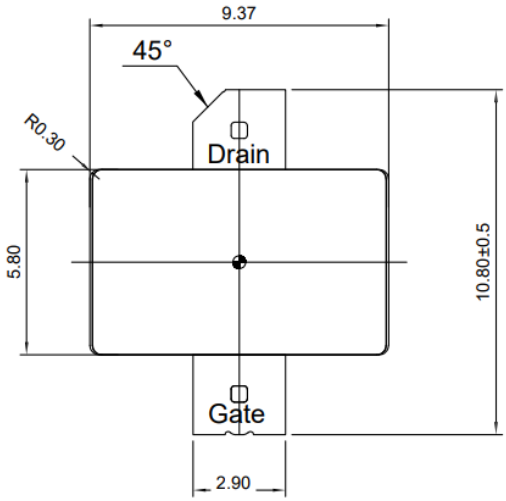
Flanged ceramic package; 2 leads

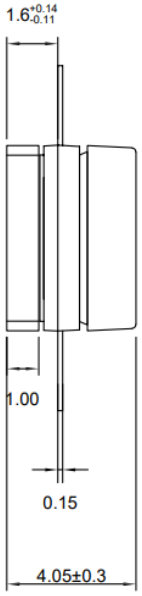
T2C POD

Rev.01 (2026.01.20)









Unit:mm
Tolerances(unless specified): x.x ±0.1

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-T2C/G2C					2018.1.31

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2026/3/30	**V1.0**	**Preliminary datasheet creation from GX version V1.1**

Application data based on ZYX-26-09

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