Typical performance:

◆ Frequency：1.5GHz

◆ Power Gain：>16.3dB

◆ Psat：>47dBm(50W)

◆ Drain Efficiency：>73%

◆ Package：RF0602
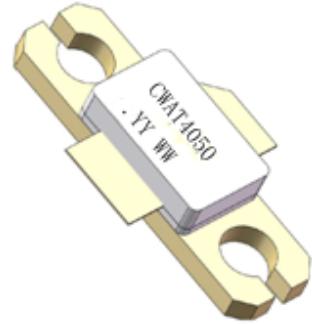
Product Description:

CWAT-0040P50 is a uninternally matched GaN HEMT, ideal for ISM application form DC to 4GHz,it can use in CW, pulse and linear applications, There high power,high gain,and high efficiency transistors are easy to use and will provide long life in even the most demanding environments.

Table 1. Typical performance（T_C=25℃）

Characteristic	Symbol	Conditions	Min.	Type.	Max.	Unit
Psat	Psat	f=1.5GHz		47		dBm
Gain@Psat	Gp	CW		16.3		dB
Eff@Psat	Eff	V_{DS}=28V,I_{DQ}=300mA		73		%

Table 2. Maximum Ratings

Characteristic	Symbol	Limit Value	Unit
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GS}	-8,+2	V
Operating Voltage	V_{DD}	36	V
Storage Temperature Range	Tstg	-65~175	℃
Maximum Channel Temperature	Tch	225	℃
Maximum Gate Current@TC=25℃	Igmax	10	mA

Table 3. Thermal Characteristics

| Characteristic	Symbol	Value	Unit
Thermal Resistance by Infrared Measurement, Active Die Surface-to-Case Case Temperature 125℃, P_D=50W	R_{QJC}	2.6	℃/W

Table 4. . Electrical Characteristics

DC Characteristics

Characteristic	Symbol	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage (V_G=-8V,I_D=1mA)	BV_{dss}		120		V
Gate Threshold Voltage （V_D=28V,I_D=10mA）	V_{GS}(th)		-3		V
Gate Quiescent Voltage (V_D=28V,I_D=200mA)	V_{GS}(Q)		-2.7		V
Gate-Source Leakage Current (V_{DS}=0V,V_{GS}=-5V)	I_{GSS}			0.1	mA
Drain-Source Leakage Current (V_{DS}=28V,V_{GS}=-5V)	I_{DSS}			1	mA

RF Characteristics (T_C=25℃,F_0=1.5GHz)

Characteristic	Symbol	Min	Typ	Max	Unit
Small signal Gain (V_{DS}=28V,I_{DQ}=200mA)	G_{SS}	19			dB
Output Power (V_{DS}=28V,I_{DQ}=200mA)	P_{OUT}		47(50)		dBm(W)
Drain Efficiency (V_{DS}=28V,I_{DQ}=200mA,P_{3dB})	η		73		%
Load mismatch capability	VSWR		10:1		V_{DD} = 28V, I_{DQ} = 200mA, P_{OUT} = 50W

Typical Characteristics：

F=1.5GHz,V_{DS}=28V, I_{DQ}=200mA, CW
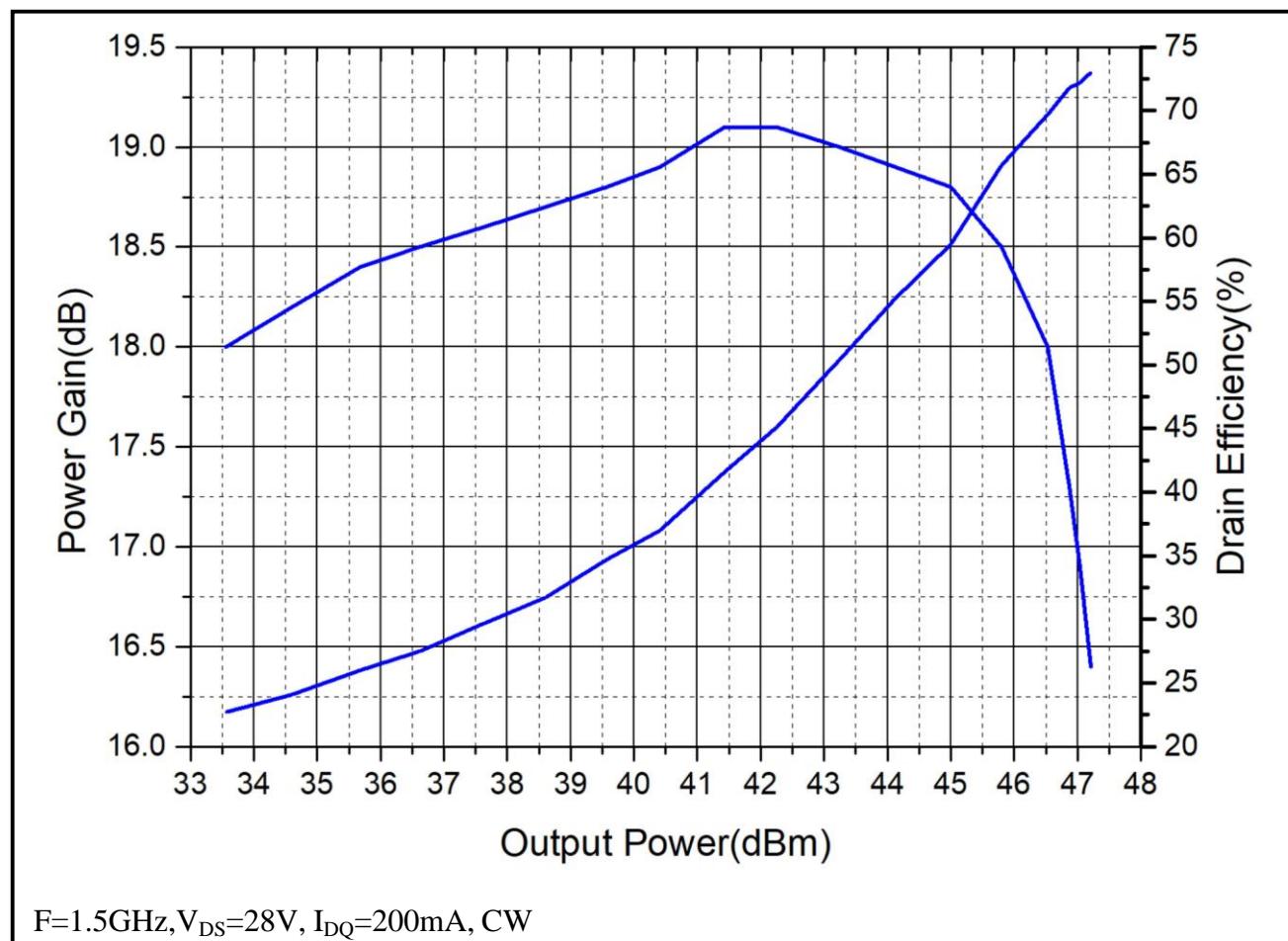
Pic.1

GaN HEMT Operating Notes:

1). Vgs should be biased before Vds bias. Vgs should not be disconnected while Vds is still biased!

2). Pay attention to the heat dissipation during the use. The lower the package temperature you apply for the transistors, the longer the shelf life of the transistors.

3). It is recommended that the working transistors temperature of the device should not exceed 75℃, otherwise will lead to deterioration of the transistors performance and shorten its shelf life time.

4). When using the transistors and instruments should be well grounded, the product belongs to electrostatic sensitive transistors,

therefore, must pay attention to ESD control when storing and using transistors.

Table 5. Other application references (Completed DEMO testing)

No.	Freq. (GHz)	Min.~Max.Power (W)	Min.~Max Gain (dB)	Min.~Max.Eff (%)	Remark
1	0.4~2.5	40~54	11~14.1	42~67	
2	0.3~2	36~52	12~16	50~70	
3	1.1~1.7	46~55	15.6~17	70~80	
4	1.43~1.52	60	17	71	
5	1.8~2.6	45~65	12~13	55~70	
6	1~3	42~55	10~13	60~70	
7	2~3	45~55	10.3~11.6	60~73	
8	2.4~3	45~55	10.3~11.5	>60	
9	0.5~2.7	30~55	10~14	50~80	

Table 6.S-Parameters

(Small signal,V_{DS}=28V,I_{DQ}=400mA,angle in degrees)

Freq.	Mag S11	Ang S11	Mag S21	Ang S21	Mag S12	Ang S12	Mag S22	Ang S22
500	0.909	-156.86	14.35	86.23	0.011	-1.46	0.574	-163.57
600	0.908	-161.20	11.98	81.32	0.011	-5.91	0.586	-164.29
700	0.909	-164.45	10.25	76.98	0.011	-9.79	0.598	-164.69
800	0.910	-167.00	8.94	73.03	0.011	-13.28	0.610	-164.93
900	0.911	-169.10	7.91	69.36	0.011	-16.48	0.621	-165.10
1000	0.9121	-170.87	7.08	65.91	0.011	-19.47	0.633	-165.26
1100	0.913	-172.42	6.40	62.64	0.010	-22.28	0.645	-165.44
1200	0.914	-173.80	5.83	59.52	0.010	-24.94	0.657	-165.65
1300	0.915	-175.05	5.35	56.52	0.010	-27.46	0.668	-165.90
1400	0.917	-176.22	4.94	53.64	0.010	-29.87	0.680	-166.20
1500	0.918	-177.32	4.59	50.86	0.010	-32.18	0.691	-166.54
1600	0.919	-178.36	4.28	48.18	0.010	-34.40	0.701	-166.92
1700	0.920	-179.37	4.01	45.57	0.010	-36.53	0.711	-167.34
1800	0.921	179.64	3.78	43.05	0.010	-38.58	0.721	-167.79
1900	0.922	178.68	3.57	40.59	0.010	-40.55	0.730	-168.27
2000	0.923	177.72	3.39	38.20	0.010	-42.47	0.738	-168.77
2100	0.923	176.78	3.22	35.86	0.010	-44.32	0.747	-169.30
2200	0.924	175.83	3.08	33.57	0.010	-46.13	0.754	-169.85
2300	0.924	174.87	2.95	31.33	0.010	-47.88	0.761	-170.41
2400	0.924	173.91	2.84	29.12	0.010	-49.60	0.768	-171.00
2500	0.924	172.92	2.73	26.95	0.010	-51.28	0.774	-171.59
2600	0.924	171.92	2.64	24.81	0.010	-52.92	0.779	-172.20
2700	0.924	170.89	2.57	22.69	0.010	-54.55	0.785	-172.82
2800	0.923	169.83	2.50	20.58	0.010	-56.15	0.789	-173.45
2900	0.923	168.73	2.44	18.48	0.010	-57.75	0.794	-174.09
3000	0.922	167.59	2.39	16.39	0.010	-59.33	0.797	-174.74
3100	0.920	166.40	2.34	14.29	0.010	-60.92	0.801	-175.41
3200	0.919	165.16	2.31	12.18	0.011	-62.51	0.804	-176.08
3300	0.917	163.85	2.28	10.06	0.011	-64.12	0.807	-176.77
3400	0.915	162.47	2.26	7.90	0.011	-65.75	0.809	-177.47
3500	0.913	161.01	2.25	5.72	0.011	-67.41	0.811	-178.19
3600	0.910	159.46	2.24	3.49	0.012	-69.11	0.812	-178.93
3700	0.907	157.80	2.24	1.20	0.012	-70.85	0.814	-179.68
3800	0.903	156.02	2.25	-1.13	0.012	-72.66	0.814	179.53
3900	0.899	154.10	2.27	-3.56	0.013	-74.54	0.815	178.73
4000	0.895	152.02	2.29	-6.08	0.013	-76.51	0.815	177.90

Package Dimension（Package:RF0602） Unit:mm
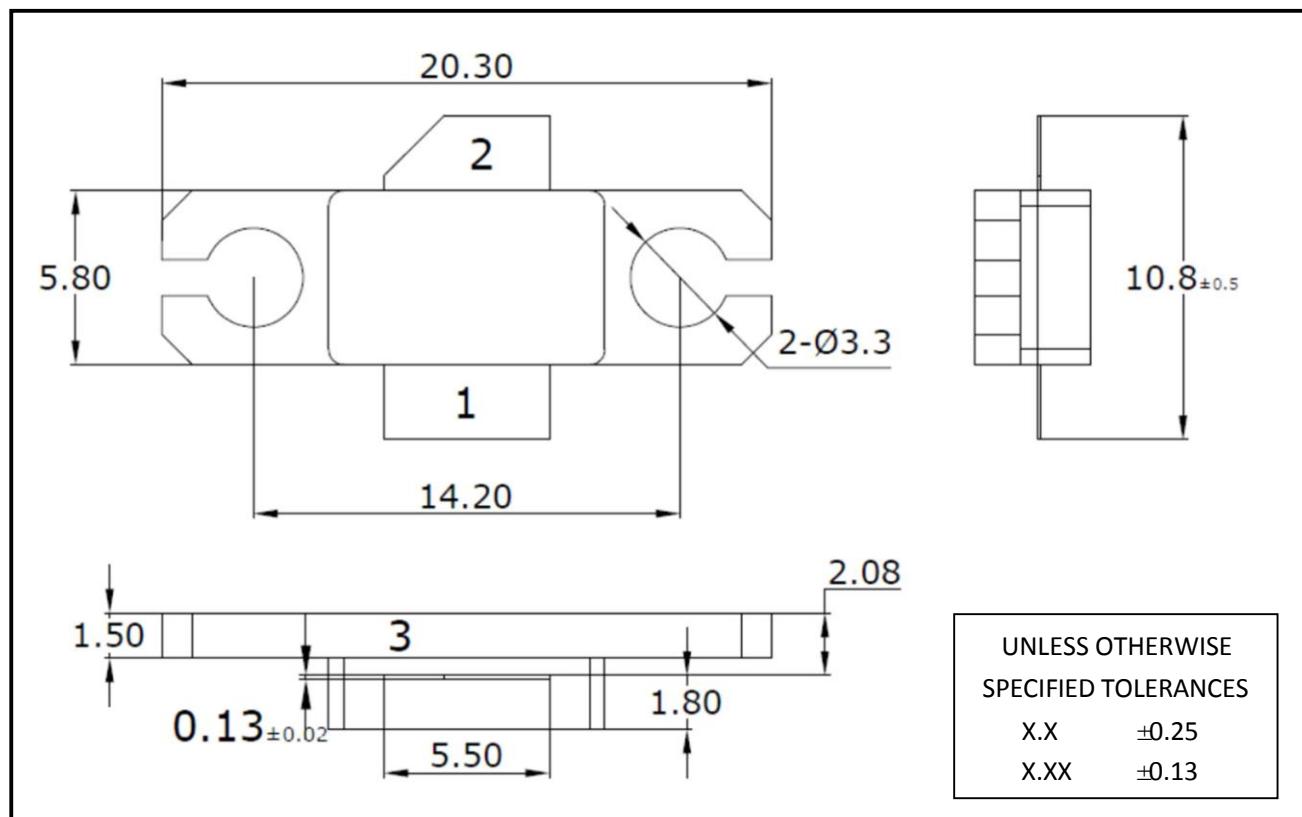
图**2**

PIN 1：Gate

PIN 2：Drain

PIN 3：Source（GND）

Table 6. Revision History

Revision	Description
V0.1	Released
V1.0	Add S-Parameters