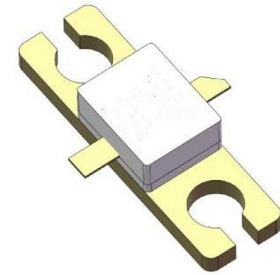


Performance features:

- ◆ Frequency range: 1.5 GHz
- ◆ Power gain: > 16.4 dB
- ◆ Output power: > 43dBm (20W)
- ◆ Drain efficiency: > 76%
- ◆ Package Form: RF0302



Product Introduction:

CWBT-004020 is a GaN power tube without pre-matching. The working frequency covers DC ~ 4.0 GHz. Under the test conditions of frequency 1.5 GHz and working voltage 28V, the output power is greater than 43dBm (20W) and the efficiency is greater than 76%. It has the characteristics of high efficiency, high power and high gain.

Table 1. Typical performance parameters (TC = 25 °C)

Index	Symbols	Test Conditions	Minimum Value	Typical value	Maximum value	Unit
Output power	P_{sat}	f = 1.5 GHz Pulse (1mS/100uS) VDS = 28V, IDQ = 150mA		43		dBm
Power gain	G_p			16.4		dB
Drain efficiency	E_{ff}				76	

Table 2. Maximum ratings

Parameter	Symbols	Limit value	Unit
Drain-source voltage	V_{DSS}	60	V
Gate-source voltage	V_{GS}	-8,+2	V
Drain operating voltage	V_{DD}	36	V
Storage Temperature	T_{stg}	-65~175	°C
Channel Temperature	T_{ch}	225	°C
Maximum gate current @ TC = 25 °C	I_{gmax}	5	mA

Table 3 Thermal resistance parameters

Parameter	Symbols	Value	Unit
Thermal resistance (infrared measurement), chip surface to flange TC = 85 °C, PD = 15W	R_{QJC}	4.98	°C/W

Table 4 Electrical parameters

DC parameters

Parameter	Symbols	Minimum Value	Typical value	Maximum value	Unit
Source-drain breakdown voltage ($V_g = -8\text{ V}$, $I_d = 1\text{ mA}$)	BV_{dss}		120		V
Gate on voltage ($V_d = 28\text{ V}$, $I_d = 5\text{ mA}$)	$V_{GS(th)}$		-3		V
Gate static voltage ($V_d = 28\text{ V}$, $I_d = 150\text{ mA}$)	$V_{GS(Q)}$		-2.7		V
Gate-source-drain current ($V_{DS} = 0\text{ V}$, $V_{GS} = -5\text{ V}$)	I_{GSS}			0.1	mA
Drain-Source-Drain Current ($V_{DS} = 28\text{ V}$, $V_{GS} = -5\text{ V}$)	I_{DSS}			1	mA

RF parameters (TC = 25 °C, F0 = 1.5 GHz)

Parameter	Symbols	Minimum Value	Typical value	Maximum value	Unit
Small signal gain ($V_{DS} = 28\text{ V}$, $I_{DQ} = 150\text{ mA}$)	G_{SS}	19.4			dB
Output power ($V_{DS} = 28\text{ V}$, $I_{DQ} = 150\text{ mA}$)	P_{OUT}		43(20)		dBm (W)
Drain efficiency ($V_{DS} = 28\text{ V}$, $I_{DQ} = 150\text{ mA}$, PSAT)	η		76		%
Voltage standing wave ratio	V_{SWR}		10:1		$V_{DD} = 28\text{ V}$, $I_{DQ} = 150\text{ mA}$, $P_{OUT} = 20\text{ W}$

Remarks: $V_{DS} = 28\text{ V}$, CW signal, after 30 minutes of open circuit test under saturated power, there is no damage to the tube.

Typical test curve:

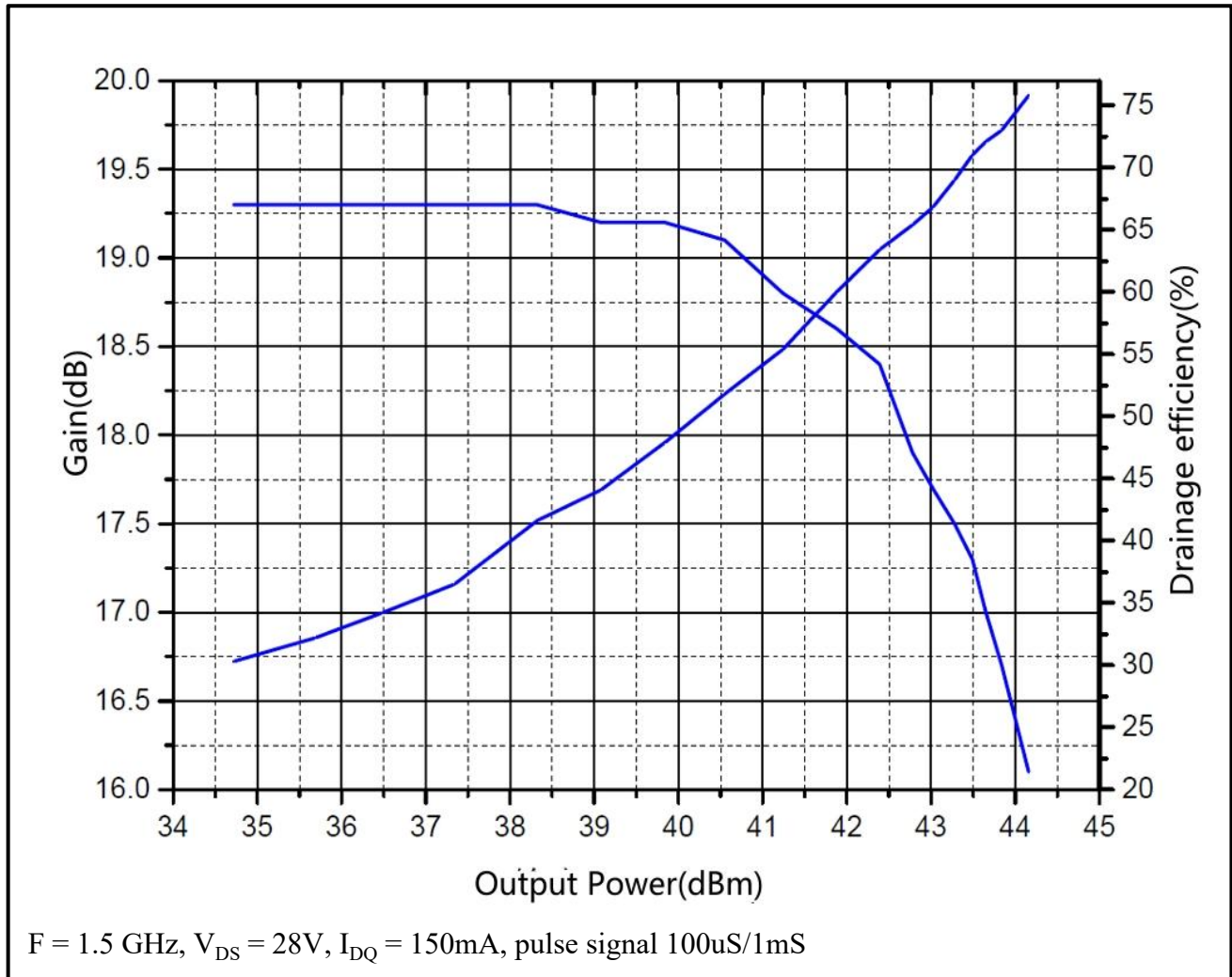


Figure 1

GaN device operation considerations:

- 1 When powering on, please strictly follow the order of first negative and then positive; When powering on, please add the gate voltage first and then add the leakage voltage; When powering down, reduce the leakage voltage first and then the gate voltage.
- 2 Pay attention to heat dissipation during use. The lower the temperature of the tube and shell, the longer the service life of the device.
- 3 It is recommended that the working shell temperature of the device should not exceed 75 °C. If it is too high, the performance of the device will deteriorate and the service life will be shortened.
- 4 During use, devices, instruments, etc. should be well grounded. This product is an electrostatic sensitive device. Pay attention to anti-static when storing and using.



Table 5. Additional Application References (DEMO Test Completed)

Attachments	Application frequency (GHz)	Minimum ~ Maximum Power (W)	Lowest ~ highest gain (dB)	Minimum ~ Maximum Efficiency (%)	Remark
1	1~2	20~28	13.1~14.1	65~78	CW
2	1~2.5	20~28	13.9~14.1	60~74	CW
3	2.0~2.1	~30	~21	~70	CW @ 32V
4	0.5~2.7	20~33	12.6~15.3	51~75	CW
5	1.6~1.65	24	19.3	77	CW

Table 6. S-Parameters

(Small signal, VDS = 28V, IDQ = 140mA, angle in degrees)

Freq.	Mag S11	Ang S11	Mag S21	Ang S21	Mag S12	Ang S12	Mag S22	Ang S22
500	0.891	-124.69	20.66	102.18	0.016	15.34	0.400	-118.93
600	0.885	-133.30	17.66	95.43	0.016	9.23	0.417	-124.35
700	0.882	-139.91	15.33	89.70	0.016	4.14	0.435	-128.24
800	0.880	-145.15	13.49	84.68	0.016	-0.24	0.435	-131.20
900	0.879	-149.43	11.99	80.17	0.016	-4.10	0.472	-133.59
1000	0.879	-153.01	10.77	76.06	0.016	-7.57	0.490	-135.61
1100	0.880	-156.06	9.74	72.25	0.016	-10.72	0.509	-137.39
1200	0.881	-158.72	8.87	68.68	0.016	-13.63	0.527	-139.02
1300	0.883	-161.07	8.12	65.33	0.016	-16.32	0.544	-140.54
1400	0.884	-163.18	7.47	62.16	0.015	-18.82	0.562	-141.99
1500	0.886	-165.09	6.91	59.13	0.015	-21.17	0.579	-143.39
1600	0.888	-166.85	6.41	56.25	0.015	-23.38	0.595	-144.75
1700	0.889	-168.49	5.97	53.48	0.015	-25.45	0.611	-146.08
1800	0.891	-170.02	5.58	50.82	0.015	-27.41	0.626	-147.38
1900	0.893	-171.46	5.23	48.27	0.014	-29.27	0.640	-148.65
2000	0.895	-172.84	4.91	45.80	0.014	-31.02	0.653	-149.91
2100	0.896	-174.15	4.63	43.42	0.014	-32.68	0.666	-151.14
2200	0.898	-175.42	4.37	41.11	0.014	-34.25	0.679	-152.35
2300	0.899	-176.64	4.14	38.87	0.014	-35.74	0.690	-153.55
2400	0.901	-177.83	3.92	36.70	0.013	-37.16	0.701	-154.72
2500	0.902	-178.99	3.73	34.59	0.013	-38.50	0.712	-155.87
2600	0.903	179.87	3.55	32.54	0.013	-39.78	0.721	-157.01
2700	0.904	178.75	3.39	30.54	0.013	-40.99	0.730	-158.12
2800	0.905	177.66	3.24	28.59	0.013	-42.13	0.739	-159.22
2900	0.906	176.57	3.10	26.68	0.012	-43.22	0.747	-160.30
3000	0.907	175.50	2.98	24.81	0.012	-44.26	0.755	-161.37
3100	0.908	174.43	2.86	22.98	0.012	-45.24	0.762	-162.42
3200	0.908	173.37	2.75	21.18	0.012	-46.16	0.769	-163.45
3300	0.909	172.31	2.66	19.42	0.012	-47.04	0.775	-164.47
3400	0.909	171.25	2.56	17.68	0.012	-47.88	0.781	-165.48
3500	0.910	170.19	2.48	15.97	0.011	-48.66	0.787	-166.48
3600	0.910	169.13	2.40	14.28	0.011	-49.41	0.792	-167.46
3700	0.910	168.06	2.33	12.62	0.011	-50.11	0.797	-168.44
3800	0.910	166.98	2.26	10.97	0.011	-50.77	0.801	-169.40
3900	0.910	165.89	2.20	9.33	0.011	-51.39	0.806	-170.36
4000	0.910	164.80	2.14	7.71	0.011	-51.98	0.810	-171.30
4100	0.909	163.69	2.09	6.11	0.011	-52.53	0.813	-172.25
4200	0.909	162.56	2.042	4.51	0.011	-53.05	0.817	-173.18
4300	0.908	161.42	1.99	2.92	0.011	-53.53	0.820	-174.11
4400	0.908	160.26	1.95	1.33	0.011	-53.98	0.823	-175.04
4500	0.907	159.08	1.91	-0.25	0.010	-54.40	0.825	-175.97
4600	0.906	157.88	1.87	-1.83	0.010	-54.79	0.828	-176.89
4700	0.905	156.65	1.84	-3.42	0.010	-55.15	0.830	-177.82
4800	0.904	155.40	1.81	-5.01	0.010	-55.49	0.832	-178.74
4900	0.903	154.11	1.78	-6.61	0.010	-55.80	0.834	-179.66
5000	0.901	152.80	1.76	-8.21	0.010	-56.09	0.836	179.40
5100	0.900	151.45	1.74	-9.83	0.010	-56.35	0.837	178.47
5200	0.898	150.06	1.72	-11.46	0.010	-56.59	0.839	177.53
5300	0.897	148.63	1.70	-13.10	0.010	-56.82	0.840	176.59
5400	0.895	147.17	1.68	-14.76	0.010	-57.03	0.841	175.64
5500	0.893	145.65	1.67	-16.45	0.010	-57.22	0.842	174.69
5600	0.891	144.09	1.66	-18.15	0.010	-57.40	0.842	173.72
5700	0.888	142.47	1.65	-19.88	0.010	-57.57	0.843	172.75
5800	0.886	140.79	1.64	-21.64	0.011	-57.73	0.843	171.76
5900	0.883	139.06	1.63	-23.43	0.011	-57.90	0.843	170.76
6000	0.880	137.26	1.63	-25.25	0.011	-58.06	0.843	169.74

Product Dimensions (Package: RF0302)

Unit: mm

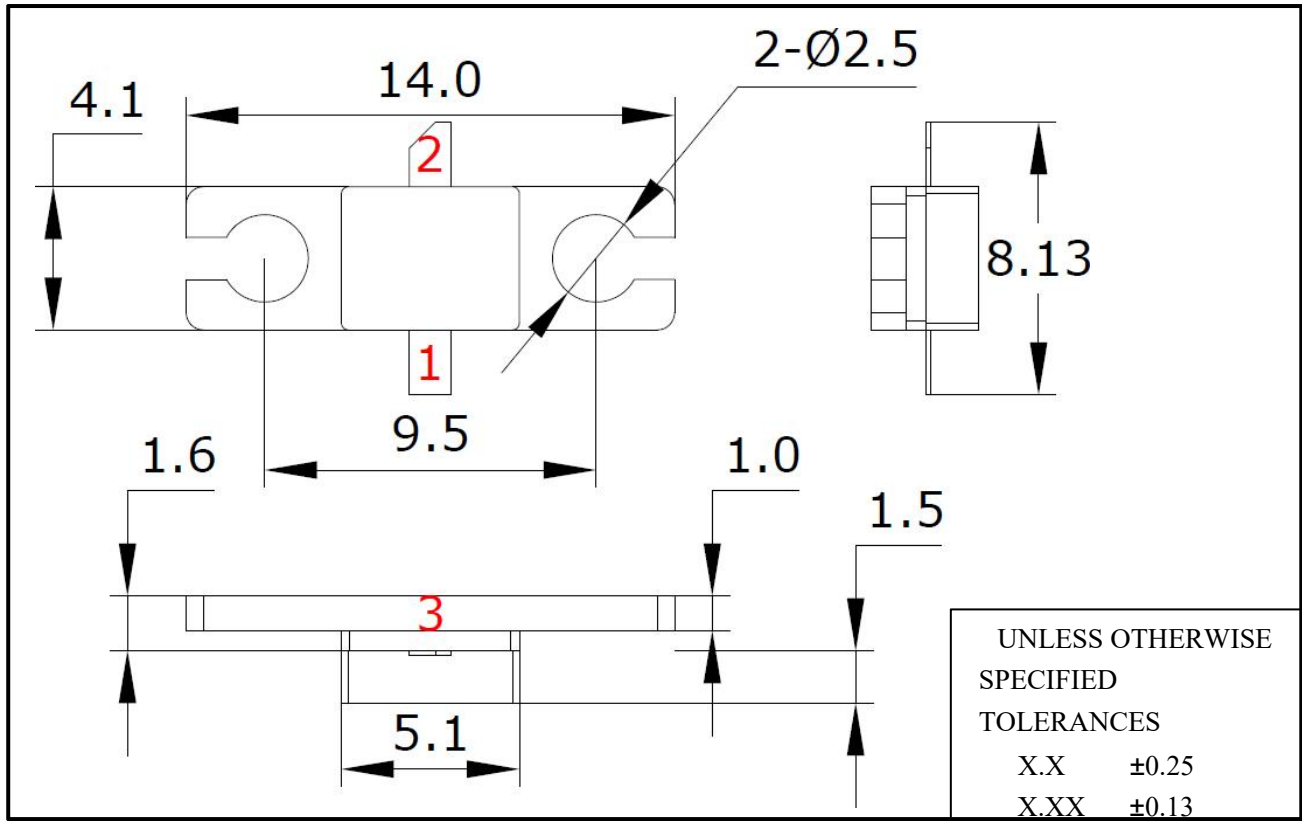


Figure 2

PIN 1: Gate PIN 2: Drain
PIN 3: Source (GND)

Table 6. Specifications and Revision History

Version	Description of modified content of specification sheet
V0.1	Preliminary Datasheet Creation
V1.0	Add S-Parameters