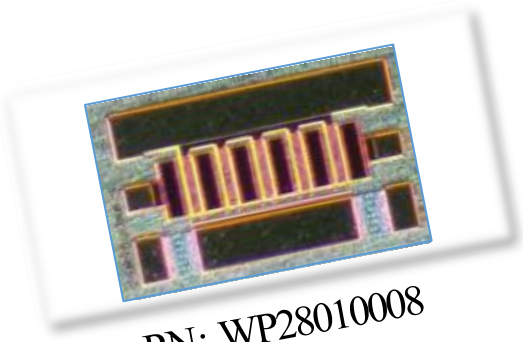
WAVE PIA

I C D E S I G N

WP28010008

8W, 28V GaN HEMT Die



PN: WP28010008

The WP28010008 is a 8W gallium nitride (GaN) High Electron Mobility Transistor (HEMT). This GaN HEMT is a wideband transistor optimized for X-band operation in a user-friendly device for high bandwidth applications. Gallium nitride (GaN) HEMT is a device optimized for 5G. GaN HEMT resistance is only 1/10 that of silicon transistors, making it capable of switching frequencies faster for greater energy efficiency.

Features

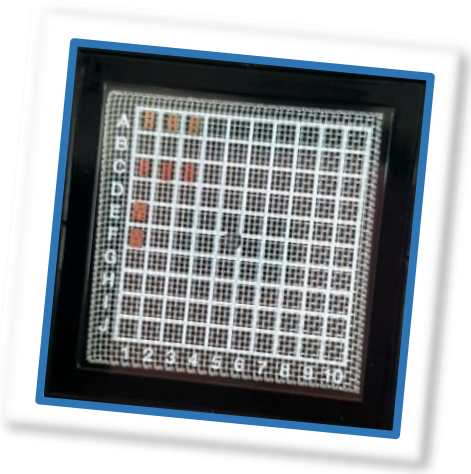
- Up to 10 GHz Operation
- 10.0 dB Typical Small Signal Gain @ 8.15 GHz
- 8 W Typical Psat @8.15GHz
- 28V Operation
- High Breakdown Voltage
- High Breakdown Voltage
- High Efficiency
- Reliability Monitoring Supporting

Applications

- U/VHF Amplifiers
- Broadband Amplifiers
- Base Station Communications
- Drone, UAV
- WiMAX, LTE, WCDMA, GSM
- WPT, V2X
- Radar application

Packaging Information

- Bare die are shipped in Wafer-level with Expander Ring or Gel-Pak® containers.
- Possible UV Curing for Wafer-level with dicing saw



For price, delivery, and to place orders: WAVEPIA Co., Ltd.
#1301, 557, Dongtangiheung-ro, Hwaseong-si, Gyeonggi-do, Republic of Korea
• Phone: +82-31-8058-3374 • Order online at www.wavepia.com
• Application Support: platune@wavepia.com

Absolute Maximum Ratings (not simultaneous) at 25˚C

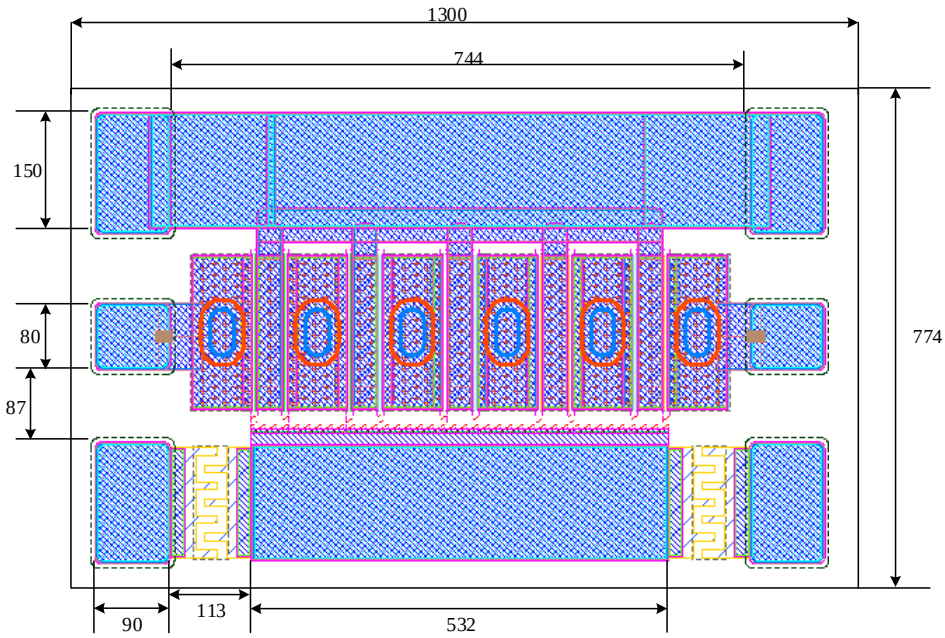
Parameter	Parameter	Typical Value	Units	Conditions
Threshold voltage @ Id=1mA/mm, Vd=10V	V_{to}	-3.2	V	25°C
Breakdown voltage @ Id=1mA/mm	V_{DG}	>100	V	25°C
Drain-source current, Id @ Vd=10V, Vg=0	I_{dss}	880	mA/mm	25°C
Operating Junction Temperature	T_J	225	°C	
Storage Temperature	T_{STG}	-65, +150	°C	
Thermal Resistance, Junction to Case (packaged)	$R_{\theta JC}$		°C/W	
Thermal Resistance, Junction to Case (die only)	$R_{\theta JC}$		°C/W	
Mounting Temperature (30 seconds)	T_S	320	°C	30 seconds

Electrical Characteristics (Frequency = 8.15 GHz unless otherwise stated; TC = 25˚C)

Parameter	Parameter	Typical Value	Units	Conditions
DC Characteristics				
Ohmic contact resistance	RC	0.4	Ohm-mm	25°C
Maximum Drain-source current, Id @ Vd=10V, Vg=1V (1X125μm device)	I_{dmax}	1050	mA/mm	25°C
Max. trans-conductance, @ Vd=10V, Vg=-4V ~ -1V (1X125μm device)	GM_PEAK	340	mS/mm	25°C
Maximum Drain-source current, Id @ Vd=10V, Vg=1V (1X125μm device)	I_{dmax}	1000	mA/mm	25°C
RF Characteristics				
Small Signal Gain	G_{SS}	>10	dB	V_{DD}=28V, I_{DQ}=100mA
Saturated Power Output	P_{SAT}	10	W	V_{DD}=28V, I_{DQ}=100mA
Drain Efficiency	η	>40	%	V_{DD}=28V, I_{DQ}=100mA
Intermodulation Distortion	IM3	<-30	dBc	V_{DD}=28V, I_{DQ}=100mA
Output Mismatch Stress	VSWR	10:1	ψ	

For price, delivery, and to place orders: WAVEPIA Co., Ltd.
#1301, 557, Dongtangiheung-ro, Hwaseong-si, Gyeonggi-do, Republic of Korea
• Phone: +82-31-8058-3374 • Order online at www.wavepia.com
• Application Support: platune@wavepia.com

DIE Dimensions (units in microns)



Overall die size 1300 x 774 (+0/-50) microns, die thickness 100 (+/- 10) microns.
All Gate and Drain pads must be wire bonded for electrical connection.

Assembly Notes:

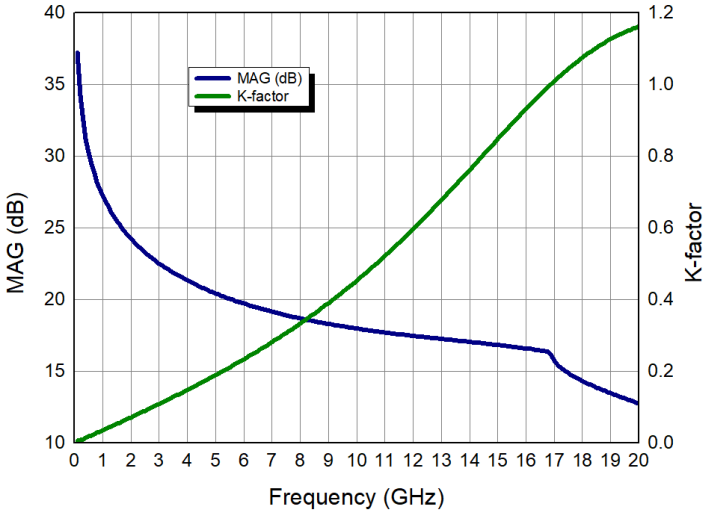
- Recommended solder is AuSn (80/20) solder. Refer to Wavepia's guide for the Eutectic Die Bond Procedure
- Vacuum collet is the preferred method of pick-up.
- The backside of the die is the Source (ground) contact.
- Die back side gold plating is 5 microns thick minimum.
- Thermosonic ball or wedge bonding are the preferred connection methods.
- Gold wire must be used for connections.

For price, delivery, and to place orders: WAVEPIA Co., Ltd.
#1301, 557, Dongtangiheung-ro, Hwaseong-si, Gyeonggi-do, Republic of Korea
• Phone: +82-31-8058-3374 • Order online at www.wavepia.com
• Application Support: platune@wavepia.com

Typical Performance

Simulated Maximum Available Gain (MAG) and K Factor of the WP28010008

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



Intrinsic die parameters - reference planes at centers of gate and drain bonding pads. No wire bonds assumed.

Typical Performance

Simulated Minimum Noise Figure of the WP28010008

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

Under construction!

For price, delivery, and to place orders: WAVEPIA Co., Ltd.
#1301, 557, Dongtangiheung-ro, Hwaseong-si, Gyeonggi-do, Republic of Korea
• Phone: +82-31-8058-3374 • Order online at www.wavepia.com
• Application Support: platune@wavepia.com

Typical Die S-Parameters

(Small Signal, V_{DS} = 28 V, I_{DQ} = 100 mA, magnitude / angle)

Frequency	Mag S11	Ang S11	Mag S21	Ang S21	Mag S12	Ang S12	Mag S22	Ang S22
1000MHz	0.995187	-20.5602	38.41224	168.4109	0.007261	78.4696	0.646454	-15.3721
1100MHz	0.984095	-39.8592	36.48038	157.5657	0.013791	67.96535	0.623222	-29.8954
1200MHz	0.969574	-57.0515	33.81925	147.9492	0.019175	58.62725	0.591911	-43.0076
1300MHz	0.954755	-71.8265	30.91068	139.7088	0.023365	50.64955	0.558777	-54.492
1400MHz	0.941432	-84.2704	28.07755	132.7609	0.026525	43.9582	0.527844	-64.3856
1500MHz	0.930231	-94.6653	25.48069	126.9209	0.02888	38.37174	0.500937	-72.8486
1600MHz	0.921131	-103.345	23.17374	121.9877	0.030636	33.69042	0.478475	-80.0767
1700MHz	0.913852	-110.625	21.15426	117.7815	0.031953	29.73523	0.460189	-86.2582
1800MHz	0.90806	-116.77	19.39586	114.1548	0.032949	26.35897	0.445551	-91.5591
1900MHz	0.90345	-122	17.86495	110.9908	0.033708	23.4451	0.433993	-96.1204
2000MHz	0.899773	-126.485	16.52841	108.1985	0.034292	20.90287	0.424992	-100.06
2100MHz	0.896827	-130.364	15.35655	105.7073	0.034743	18.66181	0.418103	-103.475
2200MHz	0.894462	-133.744	14.32393	103.4625	0.035091	16.66709	0.412961	-106.447
2300MHz	0.892558	-136.711	13.40919	101.4208	0.03536	14.87582	0.409267	-109.044
2400MHz	0.891024	-139.332	12.59461	99.54857	0.035565	13.25414	0.406781	-111.322
2500MHz	0.889792	-141.662	11.86549	97.81868	0.03572	11.77514	0.40531	-113.328
2600MHz	0.888805	-143.746	11.20967	96.20953	0.035833	10.41721	0.404697	-115.102
2700MHz	0.888023	-145.619	10.61702	94.70361	0.035912	9.162899	0.404814	-116.677
2800MHz	0.88741	-147.312	10.07914	93.28662	0.035963	7.997943	0.405556	-118.081
2900MHz	0.88694	-148.848	9.588945	91.94681	0.035989	6.910629	0.406838	-119.339
3000MHz	0.886592	-150.248	9.140502	90.67445	0.035994	5.891257	0.408587	-120.47
3100MHz	0.886348	-151.529	8.72878	89.4614	0.035981	4.931734	0.410743	-121.492
3200MHz	0.886194	-152.705	8.349505	88.30084	0.035953	4.02527	0.413256	-122.42
3300MHz	0.886118	-153.789	7.999024	87.18701	0.035911	3.166129	0.416081	-123.266
3400MHz	0.886111	-154.791	7.674202	86.11499	0.035856	2.349439	0.419182	-124.042
3500MHz	0.886164	-155.72	7.372332	85.08061	0.03579	1.57104	0.422525	-124.756
3600MHz	0.88627	-156.584	7.09107	84.08024	0.035715	0.827363	0.426083	-125.417
3700MHz	0.886424	-157.389	6.828378	83.11079	0.03563	0.115328	0.429831	-126.031
3800MHz	0.886621	-158.142	6.582473	82.16956	0.035536	-0.56773	0.433746	-126.606
3900MHz	0.886855	-158.847	6.351791	81.25419	0.035436	-1.22413	0.43781	-127.145
4000MHz	0.887124	-159.51	6.134956	80.36263	0.035328	-1.85589	0.442005	-127.653
4100MHz	0.887425	-160.133	5.930753	79.49309	0.035213	-2.46478	0.446316	-128.135
4200MHz	0.887753	-160.721	5.738101	78.64396	0.035093	-3.05237	0.450727	-128.593
4300MHz	0.888108	-161.276	5.556043	77.81384	0.034966	-3.62003	0.455227	-129.031
4400MHz	0.888486	-161.801	5.383721	77.00149	0.034835	-4.16897	0.459804	-129.451
4500MHz	0.888885	-162.3	5.220371	76.20579	0.034698	-4.70027	0.464447	-129.856
4600MHz	0.889304	-162.773	5.065305	75.42575	0.034557	-5.21489	0.469147	-130.247
4700MHz	0.88974	-163.223	4.917904	74.66048	0.034412	-5.71369	0.473895	-130.627
4800MHz	0.890194	-163.652	4.777609	73.9092	0.034262	-6.19743	0.478682	-130.995

Contact WAVEPIA to receive this s-parameter file in ".s2p" format at platune@wavepia.com

Typical Die S-Parameters

(Small Signal, V_{DS} = 28 V, I_{DQ} = 100 mA, magnitude / angle)

Frequency	Mag S11	Ang S11	Mag S21	Ang S21	Mag S12	Ang S12	Mag S22	Ang S22
4900MHz	0.895368	-167.069	3.674159	67.0357	0.032584	-10.3283	0.52737	-134.321
5000MHz	0.895929	-167.345	3.586919	66.40268	0.032401	-10.6796	0.532213	-134.631
5100MHz	0.896496	-167.612	3.502943	65.77823	0.032217	-11.0208	0.537038	-134.938
5200MHz	0.897067	-167.871	3.422052	65.16208	0.032031	-11.3521	0.541839	-135.243
5300MHz	0.897641	-168.121	3.344082	64.55402	0.031843	-11.6738	0.546616	-135.546
5400MHz	0.898219	-168.364	3.268879	63.95382	0.031654	-11.986	0.551366	-135.847
5500MHz	0.8988	-168.6	3.196302	63.36129	0.031463	-12.2889	0.556087	-136.146
5600MHz	0.899383	-168.83	3.126219	62.77622	0.03127	-12.5826	0.560775	-136.443
5700MHz	0.899967	-169.053	3.058504	62.19845	0.031076	-12.8673	0.565431	-136.739
5800MHz	0.900554	-169.27	2.993045	61.62781	0.030881	-13.143	0.570052	-137.033
5900MHz	0.901141	-169.482	2.929731	61.06413	0.030685	-13.41	0.574636	-137.326
6000MHz	0.901729	-169.688	2.868464	60.50727	0.030488	-13.6683	0.579182	-137.617
6100MHz	0.902317	-169.889	2.809148	59.95709	0.03029	-13.918	0.583689	-137.906
6200MHz	0.902905	-170.086	2.751695	59.41344	0.030091	-14.1593	0.588156	-138.194
6300MHz	0.903492	-170.278	2.696021	58.87621	0.029892	-14.3921	0.592582	-138.481
6400MHz	0.904079	-170.466	2.64205	58.34527	0.029691	-14.6166	0.596965	-138.767
6500MHz	0.904664	-170.65	2.589705	57.82051	0.029491	-14.8329	0.601305	-139.051
6600MHz	0.905249	-170.83	2.53892	57.30181	0.029289	-15.041	0.605602	-139.334
6700MHz	0.905831	-171.006	2.489628	56.78907	0.029087	-15.241	0.609854	-139.615
6800MHz	0.906412	-171.179	2.441768	56.28218	0.028885	-15.4329	0.614061	-139.895
6900MHz	0.906991	-171.348	2.395281	55.78105	0.028683	-15.6168	0.618223	-140.174
7000MHz	0.907567	-171.515	2.350112	55.28558	0.02848	-15.7927	0.622339	-140.452
7100MHz	0.908141	-171.678	2.30621	54.79569	0.028278	-15.9607	0.626409	-140.728
7200MHz	0.908712	-171.839	2.263524	54.31127	0.028075	-16.1209	0.630433	-141.003
7300MHz	0.909281	-171.996	2.222009	53.83225	0.027872	-16.2732	0.63441	-141.276
7400MHz	0.909846	-172.151	2.18162	53.35854	0.02767	-16.4177	0.638341	-141.548
7500MHz	0.910408	-172.304	2.142314	52.89007	0.027467	-16.5544	0.642224	-141.818
7600MHz	0.910967	-172.454	2.104052	52.42675	0.027265	-16.6834	0.646061	-142.087
7700MHz	0.911522	-172.602	2.066795	51.96851	0.027063	-16.8046	0.649851	-142.355
7800MHz	0.912073	-172.747	2.030508	51.51528	0.026861	-16.9182	0.653594	-142.621
7900MHz	0.912621	-172.89	1.995156	51.06698	0.02666	-17.0241	0.657291	-142.886
8000MHz	0.913164	-173.032	1.960705	50.62355	0.026459	-17.1223	0.66094	-143.149
8100MHz	0.913704	-173.171	1.927125	50.18491	0.026258	-17.2129	0.664544	-143.411
8200MHz	0.91424	-173.309	1.894386	49.751	0.026058	-17.2958	0.668101	-143.672
8300MHz	0.914771	-173.444	1.86246	49.32176	0.025859	-17.3712	0.671612	-143.93
8400MHz	0.915299	-173.578	1.831318	48.89712	0.02566	-17.4389	0.675078	-144.188
8500MHz	0.915822	-173.711	1.800935	48.47701	0.025462	-17.4991	0.678497	-144.444
8600MHz	0.91634	-173.841	1.771286	48.06138	0.025264	-17.5516	0.681872	-144.698
8700MHz	0.916854	-173.97	1.742347	47.65017	0.025068	-17.5966	0.685202	-144.951

Contact WAVEPIA to receive this s-parameter file in ".s2p" format at platune@wavepia.com

Disclaimer

Information furnished by WAVEPIA Co., Ltd. is believed to be accurate and reliable. However, no responsibility is assumed by WAVEPIA Co., Ltd. for its use, nor for any infringements of patents or other rights of third parties that may result from its use. The information contained is provided “as it is" and with all defects, and the whole risk associated with such information is entirely with the user. Specifications subject to change without notice. WAVEPIA Co., Ltd. and registered trademarks are the property of their respective owners. Customers must search and verify the updated information before placing orders for our products. We makes no guarantee or representation regarding the information contained herein the useing of products for any specific purpose. WAVEPIA Co., Ltd. products are not warranted or authorized for use as key components in conditions, or other applications where a failure would be expected to cause severe personal injury or death.

For more information, please contact :

- *For more details : WAVEPIA Co., Ltd.*
- *#1301, 557, Dongtangiheung-ro, Hwaseong-si, Gyeonggi-do, Republic of Korea*
- *Application Support: platune@wavepia.com*

Sanghun Lee
CTO
WAVEPIA, IC DESIGN
+82.31.8058.3374

www.wavepia.com
#1301, 557, Dongtangiheung-ro,
Hwaseong-si, Gyeonggi-do, Korea
Tel : 82-31-8058-3374
Fax : 82-31-8058-3302
E-mail : platune@wavepia.com