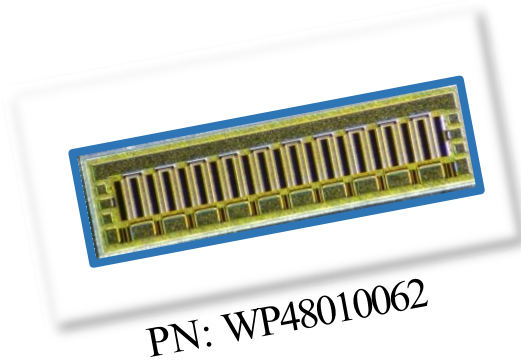




# WP48010062

## 62W, 48V GaN HEMT Die



The WP48010062 is a 62W 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

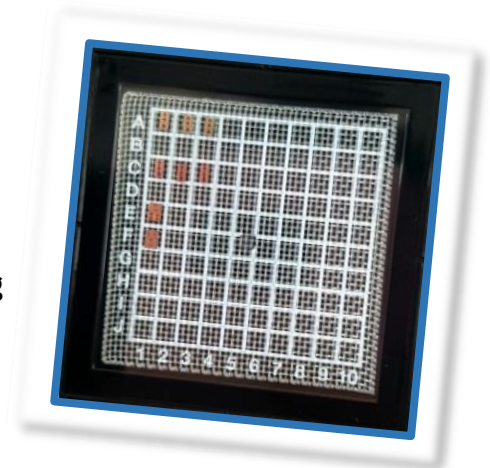
- Up to 10 GHz Operation
- 9.0 dB Typical Small Signal Gain @ 8.15 GHz
- 62 W Typical Psat @8.15GHz
- 48V Operation
- High Breakdown Voltage
- High Breakdown Voltage
- High Efficiency
- Reliability Monitoring Supporting

### 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



## Absolute Maximum Ratings (not simultaneous) at 25 °C

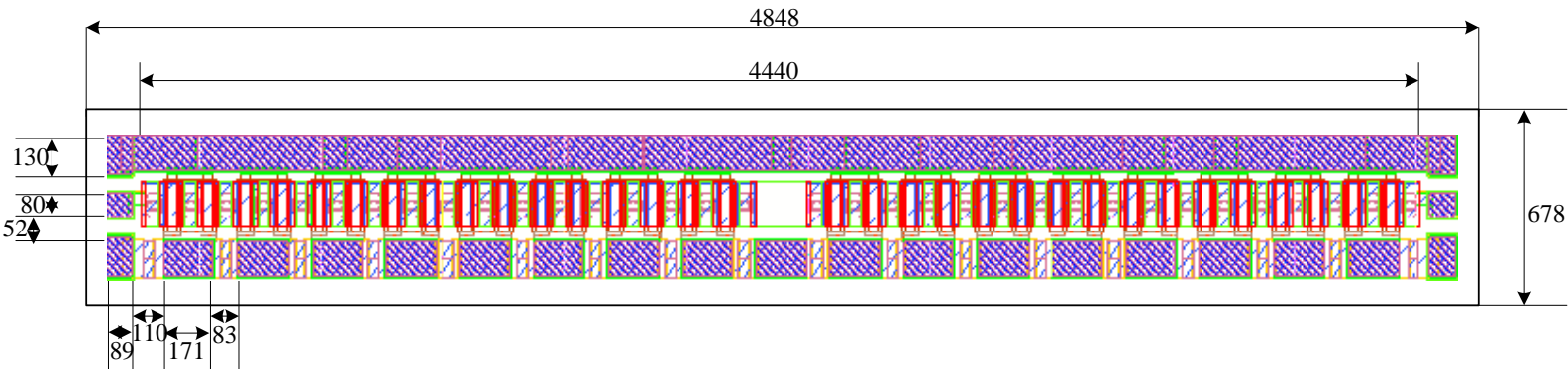
Parameter	Parameter	Typical Value	Units	Conditions
Threshold voltage @ Id=1mA/mm, Vd=10V	V <sub>to</sub>	-3.4	V	25°C
Breakdown voltage @ Id=1mA/mm	V <sub>DG</sub>	160	V	25°C
Drain-source current, Id @ Vd=10V, Vg=0	I <sub>dss</sub>	800	mA/mm	25°C
Operating Junction Temperature	T <sub>J</sub>	225	°C	
Storage Temperature	T <sub>STG</sub>	-65, +150	°C	
Thermal Resistance, Junction to Case (packaged)	R <sub>θJC</sub>		°C/W	
Thermal Resistance, Junction to Case (die only)	R <sub>θJC</sub>		°C/W	
Mounting Temperature (30 seconds)	T <sub>S</sub>	320	°C	30 seconds

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

Parameter	Parameter	Typical Value	Units	Conditions
<b>DC Characteristics</b>				
Ohmic contact resistance	RC	0.3	Ohm-mm	25°C
Maximum Drain-source current, Id @ Vd=10V, Vg=1V (1X125µm device)	I <sub>dmax</sub>	1000	mA/mm	25°C
Max. trans-conductance, @ Vd=10V, Vg=-4V ~ -1V (1X125µm device)	GM_PEAK	290	mS/mm	25°C
Maximum Drain-source current, Id @ Vd=10V, Vg=1V (1X125µm device)	I <sub>dmax</sub>	1000	mA/mm	25°C
<b>RF Characteristics</b>				
Small Signal Gain	G <sub>SS</sub>	>10	dB	V <sub>DD</sub> =48V, I <sub>DQ</sub> =300mA
Saturated Power Output	P <sub>SAT</sub>	62	W	V <sub>DD</sub> =48V, I <sub>DQ</sub> =300mA
Drain Efficiency	η	>40	%	V <sub>DD</sub> =48V, I <sub>DQ</sub> =300mA
Intermodulation Distortion	IM3	<-30	dBc	V <sub>DD</sub> =48V, I <sub>DQ</sub> =300mA
Output Mismatch Stress	VSWR	10:1	ψ	



**DIE Dimensions (units in microns)**



Overall die size 4848 x 678 (+0/-50) microns, die thickness 100 (+/- 10) microns.  
All Gate and Drain pads must be wire bonded for electrical connection.

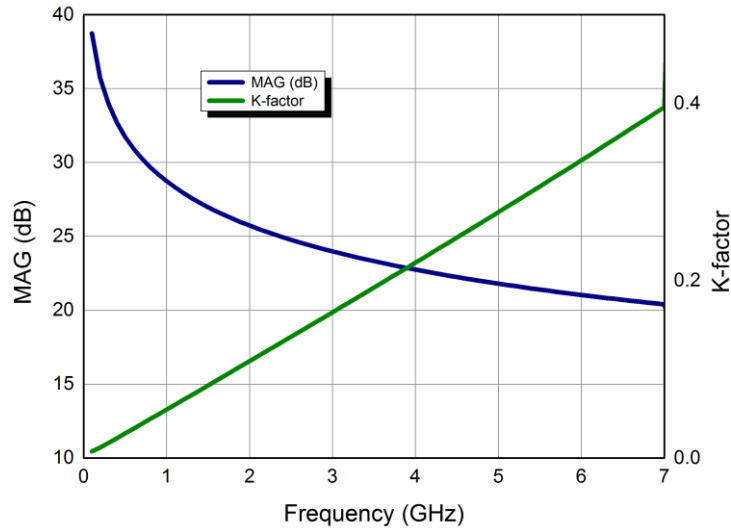
**Assembly Notes:**

- 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.

**Typical Performance**

**Simulated Maximum Available Gain (MAG) and K Factor of the WP48010062**

$V_{DD} = 48\text{ V}$ ,  $I_{DQ} = 300\text{ mA}$

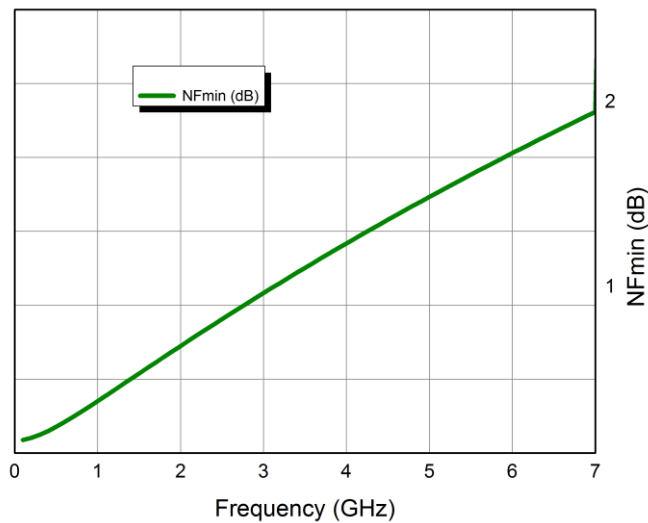


Intrinsic die parameters - reference planes at centers of gate and drain bonding pads. No wire bonds assumed.

**Typical Performance**

**Simulated Minimum Noise Figure of the WP48010062**

$V_{DD} = 48\text{ V}$ ,  $I_{DQ} = 300\text{ mA}$





## Typical Die S-Parameters

(Small Signal,  $V_{DS} = 48\text{ V}$ ,  $I_{DQ} = 300\text{ mA}$ , magnitude / angle)

Frequency	Mag S11	Ang S11	Mag S21	Ang S21	Mag S12	Ang S12	Mag S22	Ang S22
100MHz	0.973075	-78.4011	61.22435	138.5477	0.008202	48.64937	0.343566	-124.111
200MHz	0.952952	-116.886	40.81959	118.0366	0.010937	28.23994	0.45795	-144.715
300MHz	0.945185	-135.362	29.38861	107.6258	0.011811	17.93075	0.496289	-153.587
400MHz	0.941918	-145.662	22.68718	101.2603	0.012157	11.66696	0.513582	-158.023
500MHz	0.940403	-152.116	18.38185	96.78367	0.012311	7.291981	0.523789	-160.433
600MHz	0.939696	-156.503	15.40585	93.32113	0.012381	3.931109	0.531254	-161.781
700MHz	0.93942	-159.664	13.23244	90.46271	0.012406	1.174363	0.537614	-162.517
800MHz	0.939401	-162.041	11.57736	87.99348	0.012404	-1.1932	0.543575	-162.88
900MHz	0.939554	-163.889	10.27526	85.79074	0.012384	-3.29427	0.549468	-163.005
1000MHz	0.939829	-165.362	9.223907	83.77976	0.012351	-5.20357	0.555455	-162.977
1100MHz	0.940198	-166.563	8.356905	81.9126	0.012307	-6.96905	0.561612	-162.851
1200MHz	0.94064	-167.557	7.629326	80.15723	0.012256	-8.62274	0.56797	-162.663
1300MHz	0.941145	-168.394	7.009727	78.4915	0.012197	-10.1868	0.574537	-162.438
1400MHz	0.9417	-169.107	6.475462	76.89968	0.012132	-11.6769	0.581303	-162.195
1500MHz	0.9423	-169.72	6.009816	75.3703	0.012062	-13.1046	0.588252	-161.946
1600MHz	0.942938	-170.254	5.600192	73.89485	0.011987	-14.4783	0.595362	-161.7
1700MHz	0.943609	-170.722	5.236912	72.46689	0.011908	-15.8046	0.602609	-161.464
1800MHz	0.944308	-171.136	4.912427	71.08144	0.011825	-17.0883	0.609968	-161.243
1900MHz	0.945032	-171.504	4.620758	69.73465	0.011739	-18.3334	0.617414	-161.039
2000MHz	0.945776	-171.834	4.35711	68.42343	0.011649	-19.5429	0.624921	-160.854
2100MHz	0.946537	-172.131	4.117591	67.14531	0.011557	-20.7193	0.632466	-160.691
2200MHz	0.947313	-172.401	3.89901	65.89829	0.011461	-21.8646	0.640027	-160.548
2300MHz	0.9481	-172.646	3.698725	64.68067	0.011364	-22.9804	0.647584	-160.427
2400MHz	0.948896	-172.872	3.51453	63.49107	0.011265	-24.0683	0.655116	-160.326
2500MHz	0.949698	-173.079	3.344568	62.32829	0.011164	-25.1293	0.662606	-160.247
2600MHz	0.950505	-173.27	3.187261	61.1913	0.011061	-26.1645	0.670039	-160.186
2700MHz	0.951313	-173.448	3.041266	60.07918	0.010957	-27.1748	0.6774	-160.145
2800MHz	0.952122	-173.614	2.905424	58.99112	0.010852	-28.1611	0.684678	-160.122
2900MHz	0.952929	-173.769	2.778735	57.9264	0.010746	-29.124	0.69186	-160.115
3000MHz	0.953732	-173.914	2.660329	56.88434	0.01064	-30.0643	0.698937	-160.124
3100MHz	0.954531	-174.051	2.549447	55.86433	0.010533	-30.9825	0.705901	-160.148
3200MHz	0.955324	-174.181	2.445419	54.86577	0.010425	-31.8792	0.712745	-160.186
3300MHz	0.95611	-174.303	2.347656	53.88813	0.010318	-32.755	0.719464	-160.236
3400MHz	0.956888	-174.42	2.255637	52.93087	0.01021	-33.6104	0.726051	-160.298
3500MHz	0.957656	-174.531	2.168897	51.9935	0.010102	-34.4459	0.732504	-160.371
3600MHz	0.958414	-174.637	2.08702	51.07553	0.009995	-35.262	0.738819	-160.453
3700MHz	0.959162	-174.738	2.009634	50.1765	0.009887	-36.0591	0.744995	-160.544
3800MHz	0.959898	-174.835	1.936406	49.29593	0.009781	-36.8378	0.751029	-160.643
3900MHz	0.960623	-174.929	1.867032	48.4334	0.009674	-37.5984	0.756921	-160.749

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## Typical Die S-Parameters

(Small Signal,  $V_{DS} = 48 \text{ V}$ ,  $I_{DQ} = 100 \text{ mA}$ , magnitude / angle)

Frequency	Mag S11	Ang S11	Mag S21	Ang S21	Mag S12	Ang S12	Mag S22	Ang S22
4000MHz	0.961335	-175.019	1.801239	47.58847	0.009569	-38.3414	0.762671	-160.862
4100MHz	0.962034	-175.106	1.73878	46.7607	0.009464	-39.0672	0.768279	-160.981
4200MHz	0.962721	-175.189	1.679429	45.94968	0.009359	-39.7763	0.773746	-161.105
4300MHz	0.963394	-175.27	1.62298	45.15501	0.009256	-40.469	0.779073	-161.234
4400MHz	0.964054	-175.349	1.569245	44.37628	0.009153	-41.1457	0.784261	-161.367
4500MHz	0.9647	-175.425	1.518051	43.61309	0.009051	-41.8069	0.789313	-161.503
4600MHz	0.965333	-175.498	1.46924	42.86508	0.00895	-42.4529	0.794229	-161.642
4700MHz	0.965952	-175.57	1.422666	42.13184	0.00885	-43.0841	0.799013	-161.785
4800MHz	0.966558	-175.64	1.378195	41.41303	0.008752	-43.7008	0.803666	-161.929
4900MHz	0.96715	-175.708	1.335702	40.70826	0.008654	-44.3035	0.808191	-162.075
5000MHz	0.967728	-175.774	1.295073	40.01719	0.008557	-44.8925	0.812591	-162.223
5100MHz	0.968294	-175.839	1.256201	39.33947	0.008462	-45.4681	0.816869	-162.372
5200MHz	0.968846	-175.902	1.218987	38.67475	0.008367	-46.0307	0.821027	-162.522
5300MHz	0.969384	-175.963	1.18334	38.02271	0.008274	-46.5806	0.825069	-162.673
5400MHz	0.96991	-176.023	1.149173	37.38301	0.008182	-47.1181	0.828996	-162.824
5500MHz	0.970424	-176.082	1.116409	36.75534	0.008091	-47.6436	0.832813	-162.975
5600MHz	0.970925	-176.139	1.084972	36.13939	0.008001	-48.1573	0.836521	-163.126
5700MHz	0.971413	-176.196	1.054792	35.53485	0.007913	-48.6596	0.840124	-163.278
5800MHz	0.97189	-176.251	1.025806	34.94143	0.007825	-49.1508	0.843625	-163.429
6000MHz	0.972354	-176.304547	0.997952	34.35884	0.007739	-49.6311	0.847026	-163.579
6100MHz	0.972807	-176.357406	0.971173	33.78679	0.007654	-50.1009	0.850331	-163.729
6200MHz	0.973249	-176.409226	0.945416	33.22502	0.00757	-50.5603	0.853542	-163.878
6300MHz	0.97368	-176.46	0.920631	32.67324	0.007487	-51.0097	0.856662	-164.027
6400MHz	0.974099	-176.509907	0.896771	32.13121	0.007406	-51.4494	0.859694	-164.174
6500MHz	0.974509	-176.558837	0.873791	31.59867	0.007325	-51.8795	0.86264	-164.321
6600MHz	0.974907	-176.606871	0.85165	31.07537	0.007246	-52.3004	0.865503	-164.467
6700MHz	0.975296	-176.654038	0.830308	30.56108	0.007168	-52.7123	0.868285	-164.611
6800MHz	0.975675	-176.700367	0.809729	30.05555	0.007091	-53.1153	0.870989	-164.754
6900MHz	0.976044	-176.745885	0.789877	29.55856	0.007015	-53.5098	0.873617	-164.896
7000MHz	0.976404	-176.790617	0.77072	29.06989	0.006941	-53.896	0.876172	-165.037

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