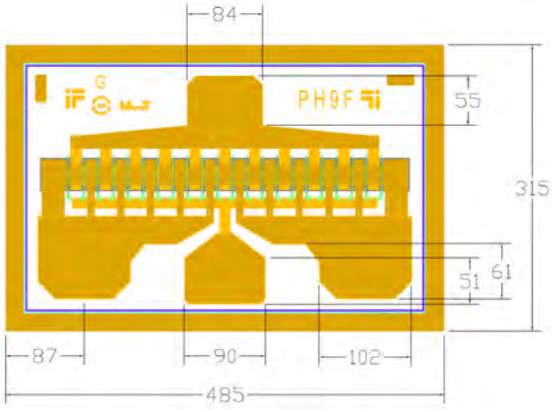
MwT-PH9F 26 GHz Medium Power AlGaAs/InGaAs pHEMT

Features:

- **28 dBm of typical Output Power at 12 GHz**
- **13 dB typical Small Signal Gain at 12 GHz**
- **45% typical PAE at 12 GHz**
- **0.25 x 750 Micron Refractory Metal/Gold Gate**
- **Excellent for Power, Gain, and High Power Added Efficiency Applications**
- **Ideal for Commercial, Military, Hi-Rel Space Applications**



Chip Dimensions: 485 x 315 microns
Chip Thickness: 100 microns

Description:

The MwT-PH9F is a AlGaAs/InGaAs pHEMT (Pseudomorphic-High-Electron-Mobility-Transistor) device whose nominal 0.25 micron gate length and 750 micron gate width make it ideally suited for applications requiring high-gain and power up to 18 GHz frequency range with power outputs ranging from 400 to 500 milli-watts. The device is equally effective for either wideband (e.g. 6 to 18 GHz) or narrow-band applications. The chip is produced using reliable metal systems and passivated to insure excellent reliability.

Electrical Specifications: • *at Ta= 25° C*

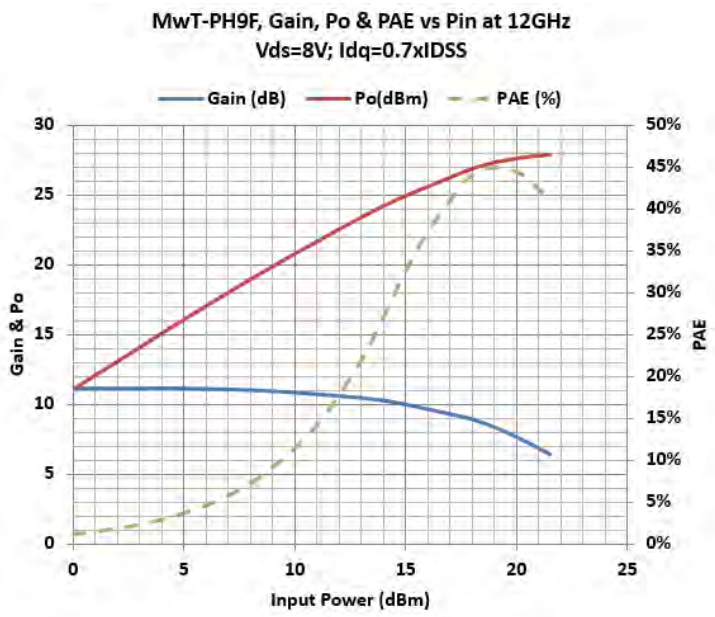
PARAMETERS & CONDITIONS	SYMBOL	FREQ	UNITS	MIN	TYP
Output Power at 1dB Compression Vds=8.0V Ids=0.7xIdss	P1dB	12 GHz	dBm		25.0
Saturated Power Vds=8.0V Ids=0.7xIdss	Psat	12 GHz	dBm		28.0
Output Third Order Intercept Point Vds=8.0V Ids=0.7xIdss	OIP3	12 GHz	dBm		34.0
Small Signal Gain Vds=8.0V Ids=0.7xIdss	SSG	12 GHz	dB		13.0
Power Added Efficiency Vds=8.0V Ids=0.7xIdss	PAE	12 GHz	%		45

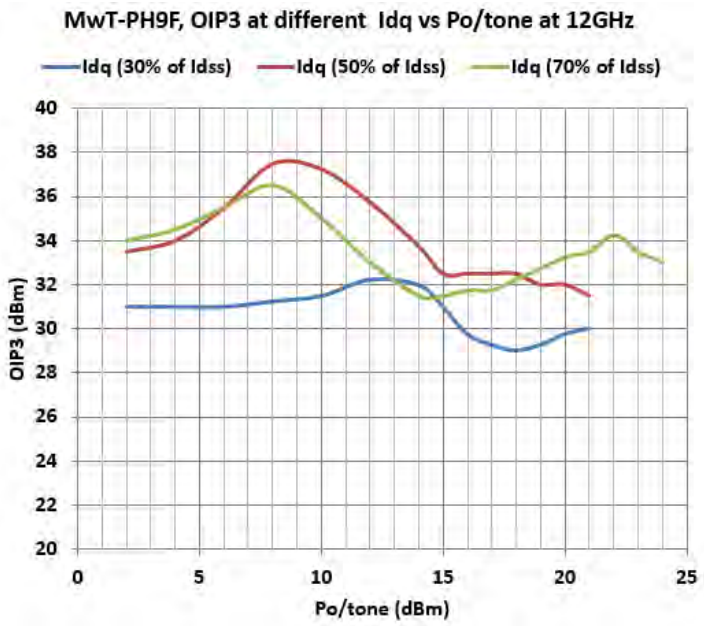
Note: Ids should be between 40% and 80% of Idss. Currently, our data shows Ids at 70% of IDSS. Low Ids will improve efficiency, but high Ids will make Psat and IP3 better.

DC Specifications: • *at Ta= 25 ℃*

PARAMETERS & CONDITIONS		SYMBOL	UNITS	MIN	TYP	MAX
Saturated Drain Current Vds= 4.0 V Vgs= 0.0 V		IDSS	mA	180		220
Transconductance Vds= 2.5 V Vgs= 0.0 V		Gm	mS		270	
Pinch-off Voltage Vds= 3.0 V Ids= 5.0 mA		Vp	V		-0.8	
Gate-to-Source Breakdown Voltage Igs= -1.0 mA		BVGSO	V		-17.0	
Gate-to-Drain Breakdown Voltage Igd= -1.0 mA		BVGDO	V		-18.0	
Chip Thermal Resistance	MwT-PH7F Chip & 70 pkg 71 pkg & 73 pkg	Rth	C/W		60 175*	

* Overall Rth depends on case mounting



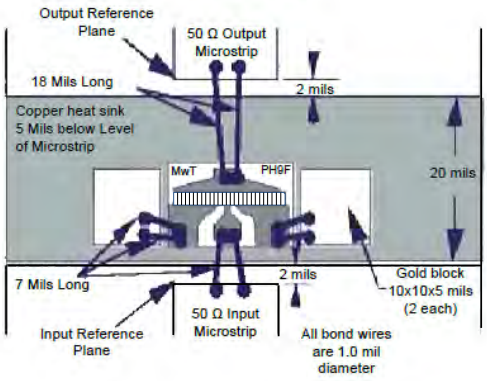


MwT-PH9F, Load Pull data for Power, Vds=8V, Idq=0.7xIdss

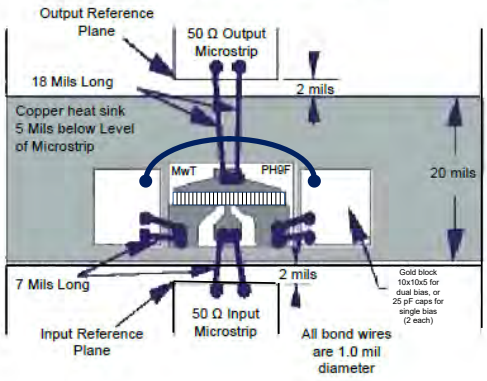
Freq (GHz)	Z_S		Z_L		P_{sat}
	Mag	phase	mag	phase	dBm
2	0.60	95.0	0.13	162.3	28.3
4	0.75	135.0	0.23	129.0	27.9
6	0.85	155.0	0.31	121.2	27.4
8	0.90	172.1	0.36	134.2	27.5
10	0.87	175.0	0.42	140.0	27.1
12	0.80	180.0	0.48	143.0	27.1

The load pull data is based on nonlinear model provided by the foundry that processes the device.

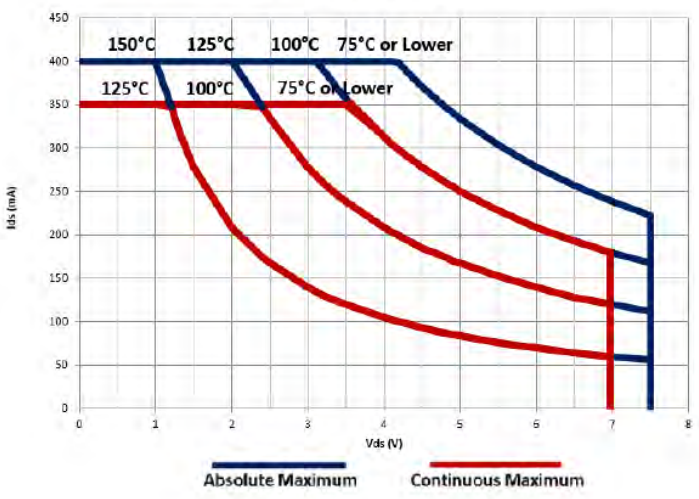
MwT-PH9F
DUAL BIAS



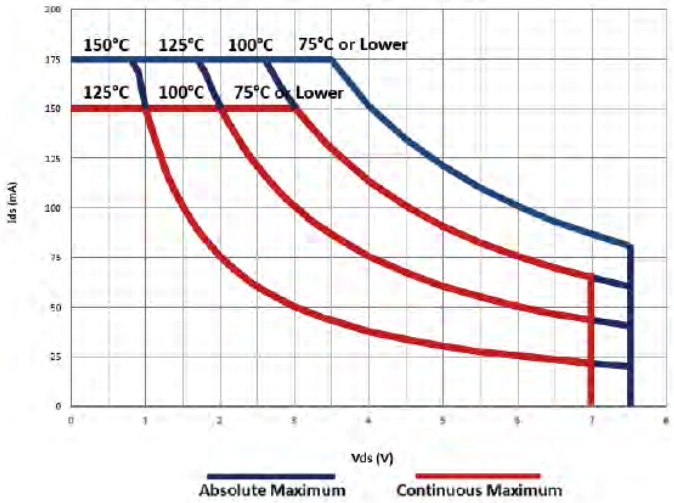
MwT-PH9F
OPTIONAL BONDING



SAFE OPERATING LIMITS vs BACKSIDE TEMPERATURE
MwT-PH9F Chip and Pkg



SAFE OPERATING LIMITS vs BACKSIDE TEMPERATURE
MwT-PH9F with 70Pkg and 73Pkg



MAXIMUM RATINGS AT Ta = 25 °C

Symbol	Parameter	Units	Cont Max1	Absolute Max2
VDS	Drain to Source Volt.	V	7.5	8.0
Tch	Channel Temperature	°C	+150	+175
Tst	Storage Temperature	°C	-65 to +160	+180
Pin	RF Input Power	mW	240	360
Pt	Total Power Dissipation	mW	2700	3300

Notes:
1. Exceeding any one of these limits in continuous operation may reduce the mean-time- to-failure below the design goal.
2. Exceeding any one of these limits may cause permanent damage.

S-PARAMETER Vds=7V, Ids= 0.7 x Idss

Freq.	S11		S21		S12		S22		K	GMAX
GHz	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)		dB
1	-0.806	-71.750	23.199	136.917	-31.422	55.413	-5.558	-29.458	0.160	27.311
2	-1.428	-113.508	20.042	112.384	-28.699	36.975	-7.682	-43.305	0.293	24.370
3	-1.757	-136.906	17.341	97.338	-27.887	31.296	-8.921	-51.462	0.423	22.614
4	-1.860	-152.417	15.171	86.096	-27.483	28.246	-9.550	-58.012	0.541	21.327
5	-1.934	-162.460	13.371	77.508	-27.441	27.615	-9.931	-64.349	0.690	20.406
6	-1.942	-171.023	11.954	70.007	-27.175	29.236	-9.980	-69.027	0.785	19.564
7	-1.925	-179.511	10.671	62.660	-26.964	30.240	-10.032	-75.342	0.882	18.818
8	-1.909	175.764	9.576	56.000	-26.819	32.373	-9.621	-84.018	0.957	18.197
9	-1.885	170.112	8.262	49.092	-26.727	36.176	-9.671	-92.272	1.114	15.441
10	-1.820	165.491	7.498	42.655	-26.162	37.670	-9.026	-98.865	1.064	15.289
11	-1.582	160.382	6.663	35.535	-25.749	41.269	-8.922	-106.277	0.978	16.206
12	-1.533	156.232	5.820	29.863	-25.115	42.802	-8.386	-113.358	0.949	15.467
13	-1.526	152.474	5.030	23.894	-24.580	45.652	-7.964	-120.820	0.970	14.805
14	-1.483	149.390	4.113	18.616	-23.921	48.373	-7.400	-128.071	0.957	14.017
15	-1.290	145.289	3.553	12.522	-23.108	49.400	-6.988	-134.137	0.786	13.330
16	-1.325	142.208	2.865	7.577	-22.361	49.584	-6.479	-140.954	0.786	12.613
17	-1.321	139.098	2.139	2.504	-21.684	49.431	-6.004	-147.257	0.770	11.912
18	-1.203	136.345	1.341	-2.284	-20.936	49.960	-5.502	-153.462	0.685	11.138
19	-1.110	134.426	0.696	-7.179	-20.259	48.203	-5.204	-158.917	0.601	10.477
20	-1.015	130.322	0.104	-12.077	-19.532	47.955	-4.738	-164.296	0.524	9.818
21	-1.017	128.019	-0.694	-18.027	-19.029	46.172	-4.320	-169.566	0.501	9.168
22	-1.028	125.679	-1.301	-21.732	-18.364	44.550	-3.915	-174.790	0.478	8.531
23	-0.837	123.850	-1.988	-26.246	-17.859	43.259	-3.662	179.806	0.371	7.936
24	-0.809	120.967	-2.790	-30.342	-17.310	41.366	-3.505	174.907	0.370	7.260
25	-0.988	118.586	-3.456	-33.601	-16.813	38.750	-3.008	169.245	0.434	6.678
26	-0.904	116.448	-4.198	-37.050	-16.373	37.589	-2.742	165.270	0.389	6.087
27	-0.838	113.305	-4.755	-40.152	-15.900	35.040	-2.580	161.352	0.356	5.572
28	-0.756	112.364	-5.522	-43.301	-15.525	31.987	-2.309	156.386	0.293	5.002
29	-0.799	109.303	-6.298	-45.678	-15.102	30.263	-2.175	153.018	0.336	4.402
30	-0.774	107.505	-6.888	-48.115	-14.632	27.968	-1.933	149.162	0.304	3.872

Available Packaging:

70 Package - MwT-PH9F70
71 Package - MwT-PH9F71
73 Package - MwT-PH9F73

Contact Information

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