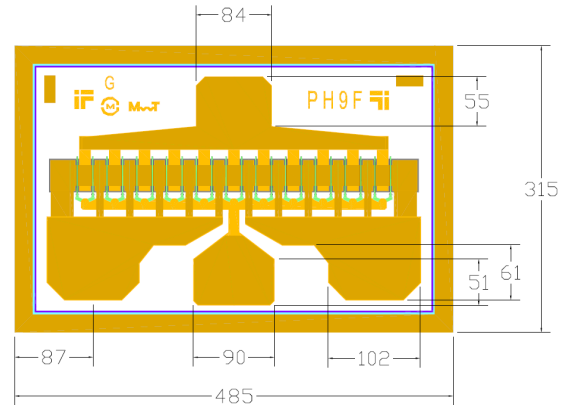


Features:

- 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 $T_a = 25^\circ C$

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

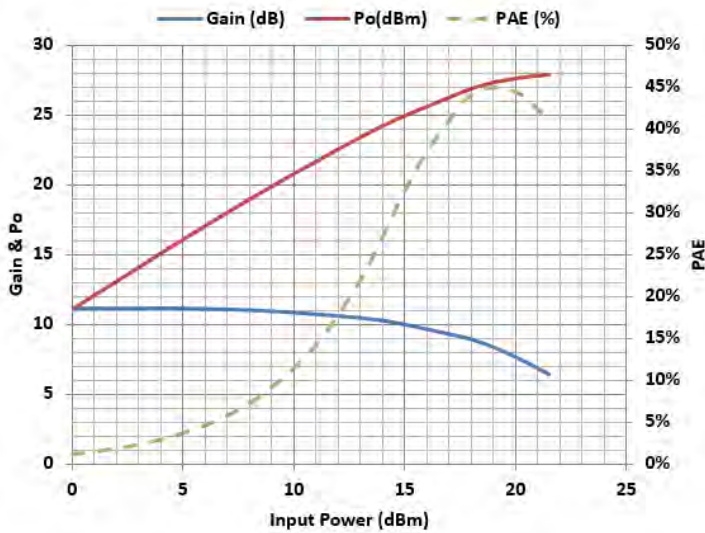
Note: I_{ds} should be between 40% and 80% of I_{dss} . Currently, our data shows I_{ds} at 70% of I_{dss} . Low I_{ds} will improve efficiency, but high I_{ds} will make Psat and IP3 better.

DC Specifications: • at $T_a = 25^\circ C$

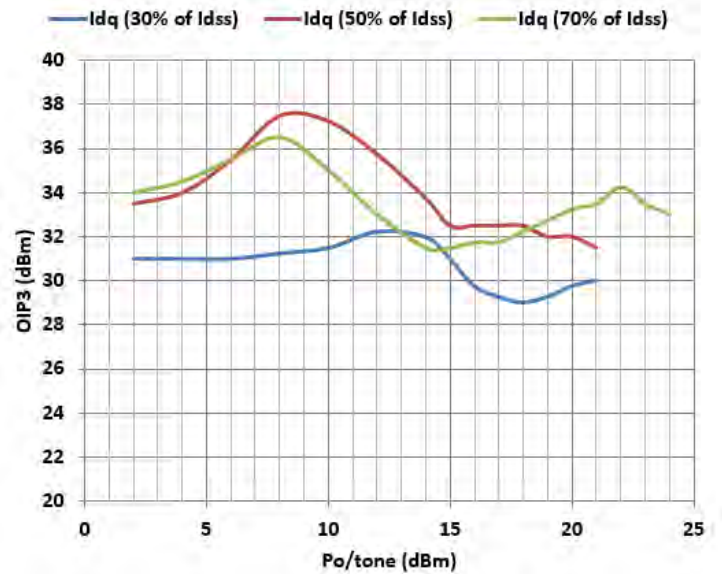
PARAMETERS & CONDITIONS	SYMBOL	UNITS	MIN	TYP	MAX
Saturated Drain Current $V_{ds}= 4.0 V$ $V_{gs}= 0.0 V$	I_{DSS}	mA	180		220
Transconductance $V_{ds}= 2.5 V$ $V_{gs}= 0.0 V$	G_m	mS		270	
Pinch-off Voltage $V_{ds}= 3.0 V$ $I_{ds}= 5.0 mA$	V_p	V		-0.8	
Gate-to-Source Breakdown Voltage $I_{gs}= -1.0 mA$	BVGSO	V		-17.0	
Gate-to-Drain Breakdown Voltage $I_{gd}= -1.0 mA$	BVGDO	V		-18.0	
Chip Thermal Resistance	MwT-PH7F Chip & 70 pkg 71 pkg & 73 pkg	R_{th}	C/W	60 175*	

* Overall R_{th} depends on case mounting

MwT-PH9F, Gain, Po & PAE vs Pin at 12GHz
Vds=8V; Idq=0.7xIDSS



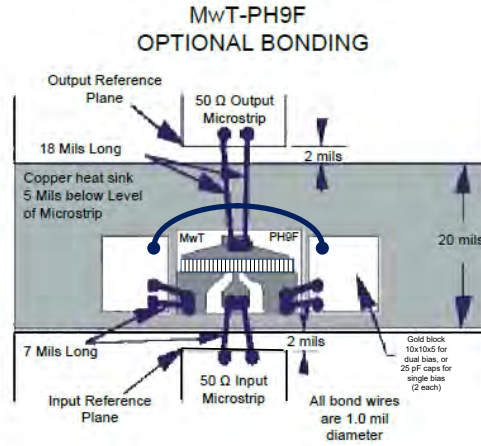
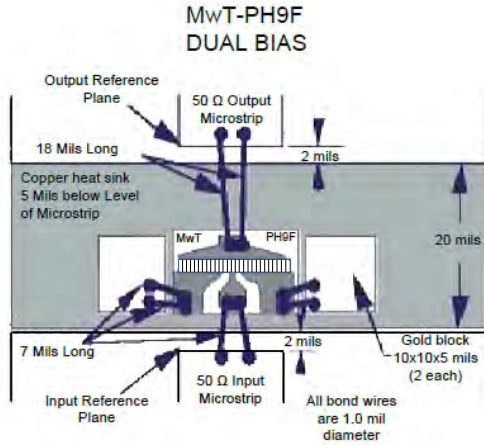
MwT-PH9F, OIP3 at different Idq vs Po/tone at 12GHz



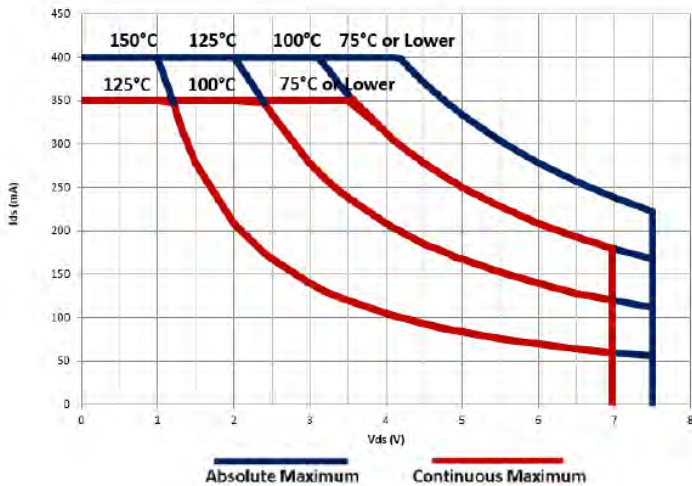
MwT-PH9F, Load Pull data for Power, Vds=8V, Idq=0.7xIdss

Freq (GHz)	Zs		ZL		P _{sat} (dBm)
	Mag	phase	mag	phase	
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

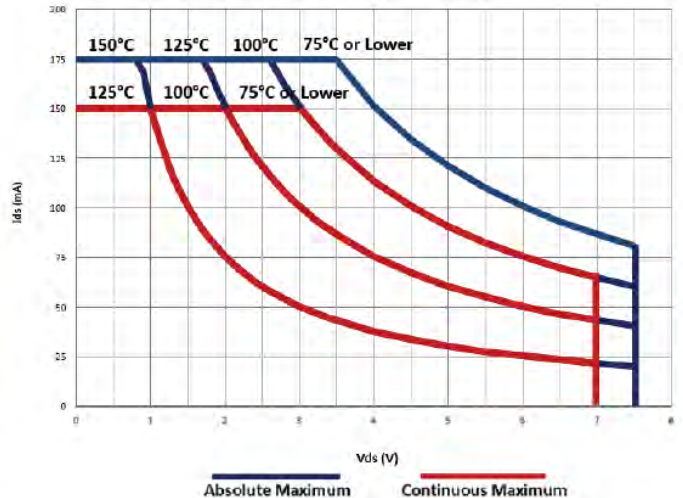
The load pull data is based on nonlinear model provided by the foundry that processes the device.



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.



MwT-PH9F

26 GHz Medium Power AlGaAs/InGaAs pHEMT

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

Freq. GHz	S11		S21		S12		S22		K	GMAX dB
	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)		
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

ORDERING INFORMATION:

When placing order or inquiring, please specify BIN range, wafer number, if known, and visual screening level required. For details of BIN Selection and Safe Handling Procedure please see supplementary information in available PDF on our website www.mwtinc.com.

Available Packaging:

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