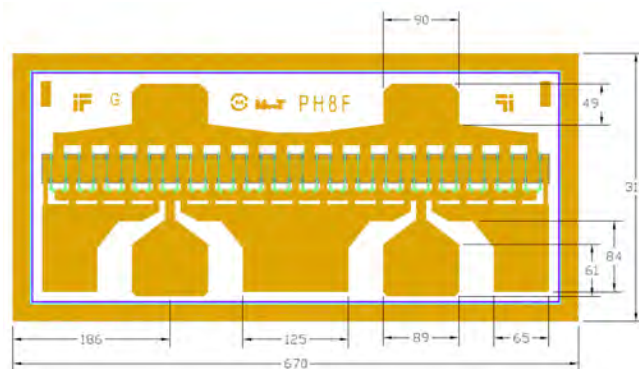


MwT-PH8F 18 GHz Medium Power AlGaAs/InGaAs pHEMT

Features:

- 30 dBm of Power at 12 GHz
- 11 dB Small Signal Gain at 12 GHz
- 42% PAE at 12 GHz
- 0.25 x 1200 Micron Refractory Metal/Gold Gate
- Excellent for Power, Gain, and High Power Added Efficiency
- Ideal for Commercial, Military, Hi-Rel Space Applications



Chip Dimensions: 670 x 315 microns
Chip Thickness: 100 microns

Description:

The MwT-PH8F is a AlGaAs/InGaAs pHEMT (Pseudomorphic-High-Electron-Mobility-Transistor) device whose nominal 0.25 micron gate length and 1200 micron gate width make it ideally suited for applications requiring high-gain and medium power up to 18 GHz frequency range. The device is equally effective for either wideband or narrow-band applications. The chip is produced using reliable metal systems and passivated to insure excellent reliability.

Electrical Specifications: at $T_a = 25^\circ\text{C}$

PARAMETERS & CONDITIONS	SYMBOL	FREQ	UNITS	MIN	TYP
Output Power at 1dB Compression $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	P1dB	12 GHz	dBm		27.5
Saturated Power $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	Psat	12 GHz	dBm		30.0
Output Third Order Intercept Point $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	OIP3	12 GHz	dBm		35.0
Small Signal Gain $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	SSG	12 GHz	dB		11.0
Power Added Efficiency at P1dB $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	PAE	12 GHz	%		42

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 $T_a = 25^\circ\text{C}$

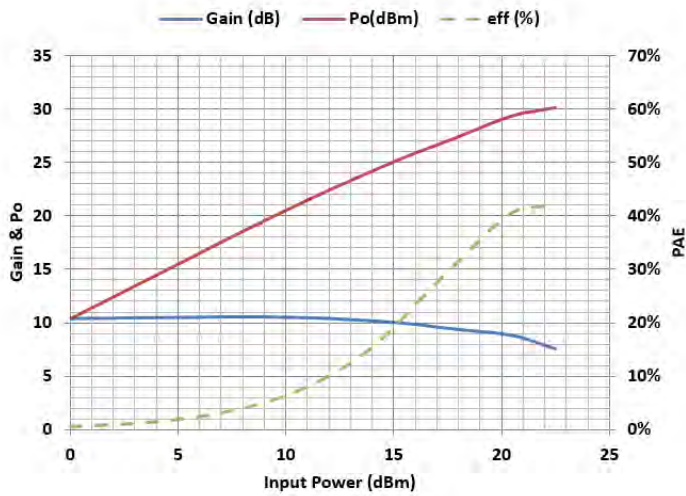
PARAMETERS & CONDITIONS	SYMBOL	UNITS	MIN	TYP	MAX
Saturated Drain Current $V_{ds}= 3.0\text{ V}$ $V_{gs}= 0.0\text{ V}$	I_{DSS}	mA	250		300
Transconductance $V_{ds}= 2.5\text{ V}$ $V_{gs}= 0.0\text{ V}$	Gm	mS		400	
Pinch-off Voltage $V_{ds}= 3.0\text{ V}$ $I_{ds}= 1.0\text{ mA}$	V_p	V		-0.8	-1.0
Gate-to-Source Breakdown Voltage $I_{gs}= -0.3\text{ mA}$	BVGSO	V		-17.0	
Gate-to-Drain Breakdown Voltage $I_{gd}= -0.3\text{ mA}$	BVGDO	V		-18.0	
Chip Thermal Resistance	Chip & 71 pkg	Rth	C/W	40	

* Overall Rth depends on case mounting

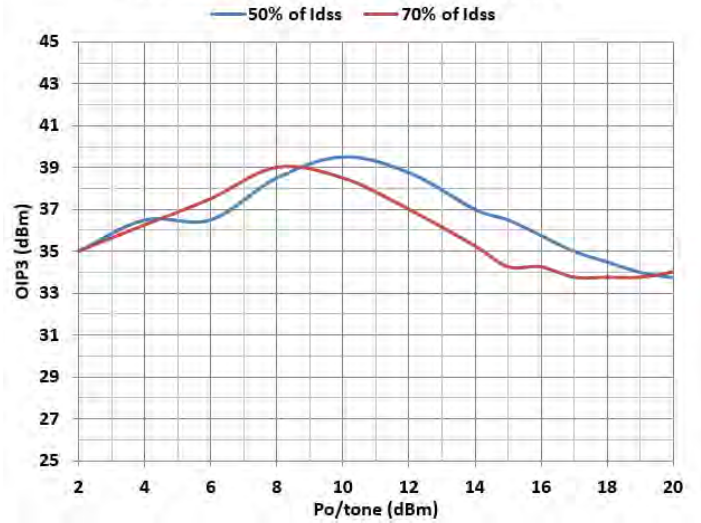
MwT-PH8F

18 GHz Medium Power AlGaAs/InGaAs pHEMT

MwT-PH8F, Gain, Po & PAE vs Pin at 12GHz
Vds=8V; Idq=0.7xIDSS



MwT-PH8F, OIP3 at different Idq vs Po/tone



MwT-PH8F, Load Pull Power Data, Vds=8V; Idq=0.7xIdss

Freq (GHz)	Z _s		Z _L		P _{sat} dBm
	mag	phase	mag	phase	
2	0.70	130.0	0.32	175.3	31.0
4	0.90	155.0	0.40	163.5	30.5
6	0.95	170.0	0.36	168.0	30.9
8	0.85	173.0	0.42	163.3	30.7
10	0.90	180.0	0.51	159.7	30.6
12	0.90	179.4	0.56	158.5	30.4

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

18 GHz Medium Power AlGaAs/InGaAs pHEMT



Symbol	Parameter	Units	Cont Max1	Absolute Max2
VDS	Drain to Source Volt.	V	8.0	8.5
Tch	Channel Temperature	°C	+150	+175
Tst	Storage Temperature	°C	-65 to +150	+175
Pin	RF Input Power	mW	240	360

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-Parameters

S-PARAMETER $V_{ds}=7V$, $I_{ds}=0.7 \times I_{dss}$										
Freq.	S11		S21		S12		S22		K	GVAX
GHz	dB	Ang(°)	dB	Ang(°)	dB	Ang(°)	dB	Ang(°)		dB
1	-0.797	-105.764	23.698	120.928	-30.475	36.428	-9.913	-66.285	0.142	27.086
2	-1.013	-142.316	19.168	98.781	-29.182	21.607	-12.065	-91.703	0.246	24.175
3	-1.074	-158.417	15.918	86.533	-28.890	14.949	-12.426	-103.823	0.361	22.404
4	-1.066	-168.735	13.455	76.864	-28.912	12.818	-12.109	-111.656	0.474	21.184
5	-1.135	-175.599	11.713	69.433	-28.982	11.368	-11.534	-115.912	0.622	20.347
6	-1.075	178.059	10.277	62.338	-28.608	11.162	-11.291	-117.393	0.663	19.443
7	-1.060	172.527	8.897	54.790	-28.664	11.342	-10.580	-121.871	0.761	18.781
8	-0.908	168.363	7.649	48.712	-28.888	12.493	-9.686	-127.227	0.737	18.268
9	-0.929	163.974	6.443	41.824	-29.157	13.847	-8.853	-133.165	0.887	17.800
10	-0.886	159.729	5.405	35.820	-29.187	15.047	-8.264	-137.075	0.952	17.296
11	-1.021	155.950	4.434	28.977	-29.154	18.775	-7.715	-141.092	1.220	13.962
12	-0.905	152.770	3.551	23.436	-29.122	20.573	-7.112	-144.743	1.144	14.033
13	-0.890	149.662	2.669	17.844	-28.938	24.087	-6.508	-148.828	1.184	13.208
14	-0.841	147.238	1.840	12.607	-28.562	27.535	-5.987	-153.195	1.135	12.972
15	-0.894	144.635	1.199	7.394	-28.365	29.575	-5.594	-156.596	1.247	11.787
16	-0.856	140.767	0.125	1.689	-27.839	32.064	-5.162	-160.689	1.237	11.049
17	-0.771	138.480	-0.600	-3.283	-27.337	33.623	-4.824	-164.458	1.089	11.553
18	-0.612	135.783	-1.326	-9.305	-26.534	35.571	-4.296	-168.525	0.748	12.604
19	-0.631	133.950	-1.999	-12.797	-26.039	36.300	-4.007	-171.216	0.761	12.020
20	-0.668	130.846	-2.771	-17.623	-25.622	37.231	-3.771	-174.525	0.836	11.426
21	-0.728	130.194	-3.354	-20.861	-24.776	35.806	-3.332	-177.864	0.786	10.711
22	-0.743	127.846	-4.125	-24.898	-24.335	38.120	-3.117	-179.188	0.827	10.105
23	-0.641	125.806	-4.776	-29.541	-23.912	35.358	-3.003	-175.194	0.669	9.568
24	-0.643	123.589	-5.319	-33.051	-23.417	35.689	-2.775	-172.108	0.642	9.049
25	-0.662	121.452	-6.156	-36.456	-22.474	34.629	-2.492	-169.560	0.582	8.159
26	-0.666	119.436	-6.822	-39.518	-22.043	33.914	-2.303	-166.785	0.566	7.611
27	-0.688	117.606	-7.493	-42.911	-21.454	32.623	-1.999	-163.882	0.503	6.981
28	-0.543	116.052	-8.099	-45.599	-21.207	30.986	-1.970	-161.331	0.362	6.554
29	-0.616	113.503	-8.716	-48.616	-20.636	29.121	-1.895	-159.018	0.422	5.960
30	-0.588	112.267	-9.324	-51.172	-20.334	27.951	-1.814	-155.833	0.398	5.505

Available Packaging:
71 Package - MwT-PH8F71

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