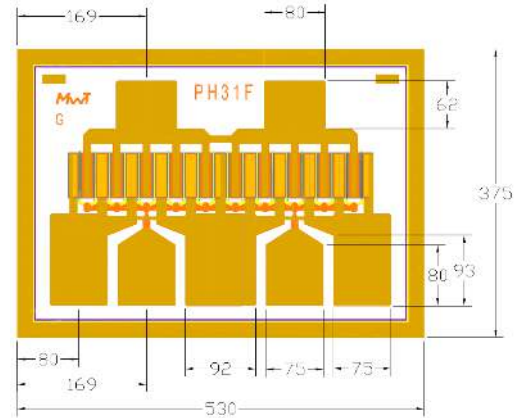


## Features:

- 30 dBm of Power at 12 GHz
- 13 dB Small Signal Gain at 12 GHz
- 44% PAE at 12 GHz
- 0.25 x 1200 Micron Refractory Metal/Gold Gate
- Excellent for Medium Power, Gain, and High Power Added Efficiency
- Ideal for Commercial, Military, Hi-Rel Space Applications



Chip Dimensions: 530 x 375 microns  
Chip Thickness: 100 microns

## Description:

The MwT-PH31F 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		28.5
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		37.0
Small Signal Gain $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	SSG	12 GHz	dB		13.0
Power Added Efficiency at P1dB $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	PAE	12 GHz	%		44

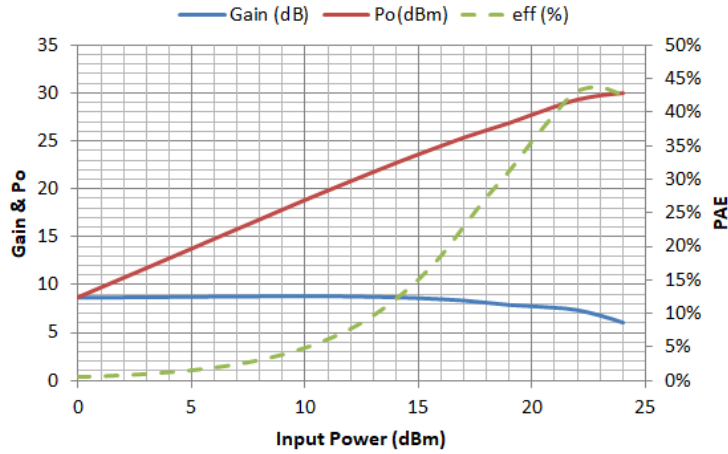
Note:  $I_{ds}$  should be between 40% and 80% of  $I_{DSS}$ . Currently, our data shows  $I_{ds}$  at 70% of  $I_{DSS}$ . Low  $I_{ds}$  will improve efficiency, but high  $I_{ds}$  will make Psat and IP3 better.

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

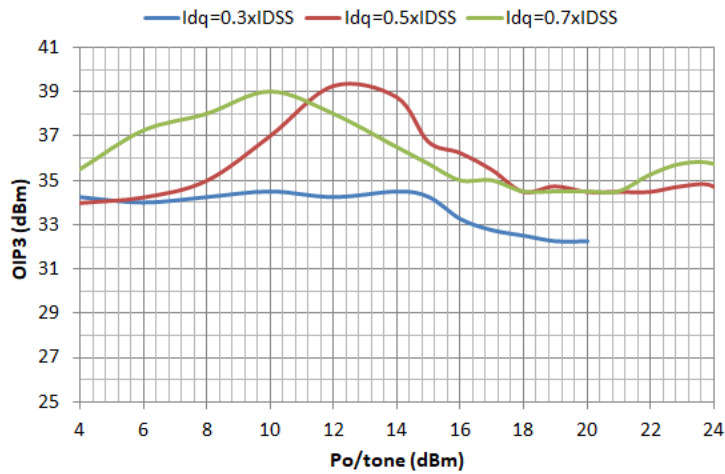
PARAMETERS & CONDITIONS	SYMBOL	UNITS	MIN	TYP	MAX
Saturated Drain Current $V_{ds}= 2.0\text{V}$ $V_{gs}= 0.0\text{V}$	$I_{DSS}$	mA	240		280
Transconductance $V_{ds}= 2.0\text{V}$ $V_{gs}= 0.0\text{V}$	Gm	mS		260	
Pinch-off Voltage $V_{ds}= 2.0\text{V}$ $I_{ds}= 1.0\text{mA}$	$V_p$	V		-0.8	-1.0
Gate-to-Source 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	

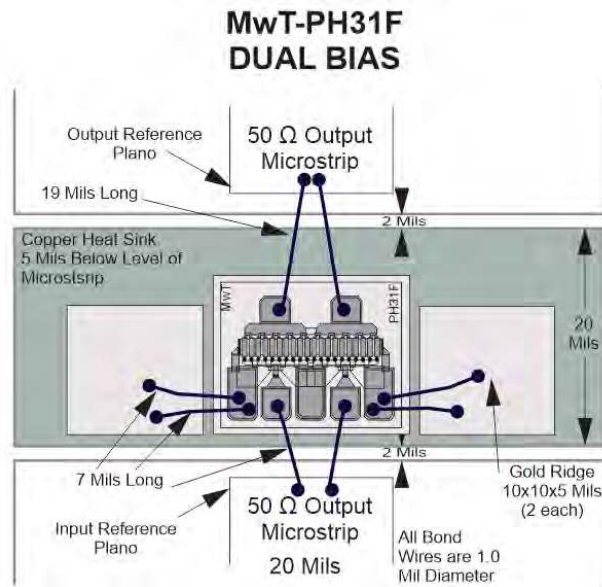
\* Overall Rth depends on case mounting

**MwT-PH31F, Po, Gain & PAE at 12GHz vs Pin**  
**Vds=8V; Idq=0.7xIDSS**

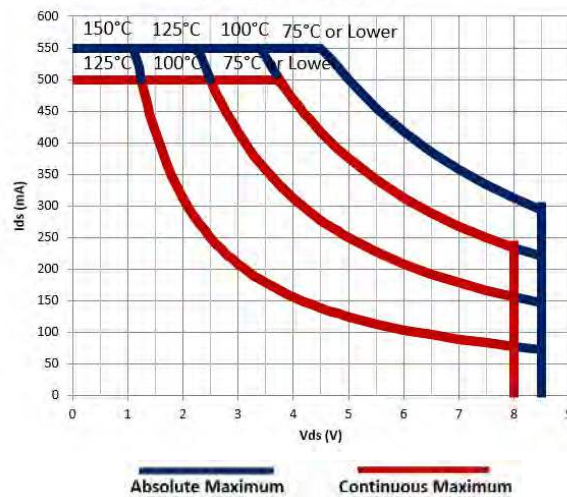


**MwT-PH31F, OIP3 with different Idq vs Po/Tone at 12GHz**  
**Vds=8V; Idq=0.7xIDSS**





**SAFE OPERATING LIMITS vs BACKSIDE TEMPERATURE**  
MwT-PH31F Chip and 71 Pkg



### Absolute Maximum Rating

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	400	500

**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-Parameters

S-PARAMETER Vds=8.0V, Ids= 0.7 x Idss										
Freq.	S11		S21		S12		S22		K	GMAX
GHz	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)		dB
1	-0.856	-98.858	23.713	124.210	-31.068	41.642	-9.306	-52.923	0.169	27.391
2	-1.126	-136.801	19.396	101.730	-29.580	26.348	-11.989	-73.608	0.295	24.488
3	-1.187	-154.298	16.288	88.779	-29.104	20.883	-12.849	-85.132	0.415	22.696
4	-1.214	-164.889	13.962	79.149	-28.877	18.339	-12.763	-93.478	0.533	21.420
5	-1.177	-172.272	11.967	71.631	-28.908	18.260	-12.459	-100.301	0.651	20.438
6	-1.191	-178.371	10.560	64.738	-28.809	18.831	-12.111	-104.555	0.767	19.685
7	-1.183	175.952	9.311	57.617	-28.624	20.736	-11.570	-110.970	0.855	18.968
8	-1.130	172.611	8.041	51.098	-28.513	21.777	-10.606	-116.867	0.904	18.277
9	-1.208	168.696	6.754	44.756	-28.498	24.004	-10.001	-123.659	1.124	15.483
10	-1.129	164.711	5.828	38.604	-28.378	25.482	-9.257	-127.312	1.120	15.000
11	-1.005	160.316	5.000	32.535	-28.252	29.080	-8.672	-132.778	1.060	15.127
12	-0.987	157.617	4.128	26.933	-27.850	31.077	-8.064	-137.285	1.070	14.368
13	-1.051	154.442	3.287	21.238	-27.547	33.862	-7.550	-142.388	1.206	12.677
14	-1.074	152.088	2.395	16.364	-27.121	37.341	-7.020	-147.005	1.281	11.572
15	-0.941	147.793	1.770	11.277	-26.528	40.086	-6.592	-150.663	1.099	12.233
16	-0.883	146.129	1.020	5.313	-25.745	41.127	-6.071	-156.256	0.974	13.383
17	-0.892	143.794	0.341	0.584	-25.141	41.622	-5.569	-160.728	0.951	12.741
18	-0.909	142.175	-0.308	-3.798	-24.475	41.227	-5.101	-165.805	0.918	12.084
19	-0.861	139.912	-1.092	-8.147	-23.866	42.063	-4.882	-169.054	0.869	11.387
20	-0.710	136.819	-1.615	-13.293	-23.311	42.288	-4.600	-172.327	0.663	10.848
21	-0.788	133.976	-2.529	-17.902	-22.382	41.615	-4.175	-175.873	0.698	9.926
22	-0.804	132.169	-3.096	-21.768	-22.031	41.256	-3.786	-179.774	0.686	9.468
23	-0.701	130.823	-3.691	-25.639	-21.623	38.278	-3.718	175.407	0.577	8.966
24	-0.784	128.186	-4.479	-29.154	-21.090	39.326	-3.552	171.496	0.700	8.305
25	-0.767	126.414	-5.039	-33.686	-20.375	37.433	-3.123	167.605	0.579	7.668
26	-0.686	124.598	-5.652	-37.271	-19.682	34.897	-2.871	163.404	0.449	7.015
27	-0.650	122.569	-6.125	-41.252	-19.203	32.833	-2.605	160.210	0.358	6.539
28	-0.592	121.413	-6.853	-43.261	-18.742	31.782	-2.617	156.689	0.344	5.945
29	-0.620	118.473	-7.512	-46.279	-18.198	30.189	-2.440	153.210	0.363	5.343
30	-0.654	117.126	-8.080	-48.940	-17.676	28.161	-2.275	149.717	0.363	4.798

### ORDERING INFORMATION:

When placing order or inquiring, please specify wafer number, if known. For details of Safe Handling Procedure please see supplementary information in available PDF on our website [www.mwtinc.com](http://www.mwtinc.com). For package information, please see supplementary application note in PDF format by clicking located on our website.

### Available Packaging:

71 Package - MwT-PH31F71