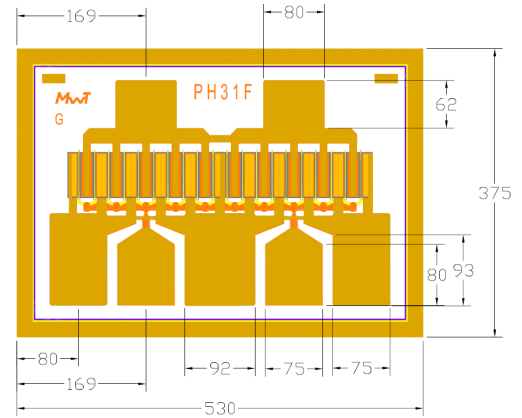


Features:

- 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

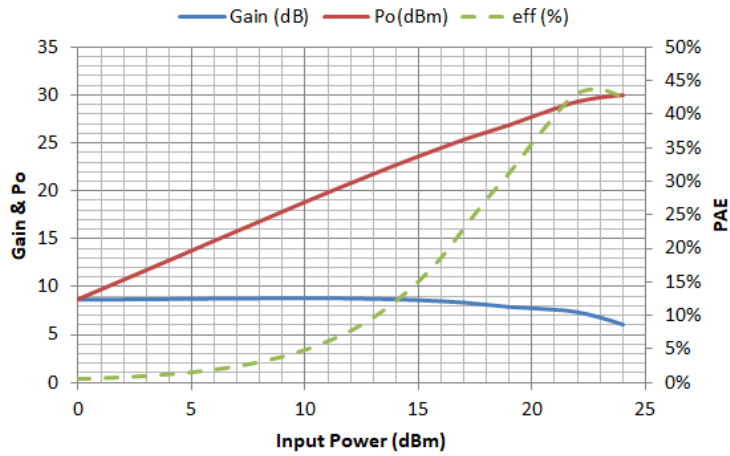
Note: I_{ds} should be between 40% and 80% of I_{DSS} . Currently, our data shows I_{ds} at 70% of I_{DSS} . Low I_{ds} will improve efficiency, but high I_{ds} will make Psat and IP3 better.

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

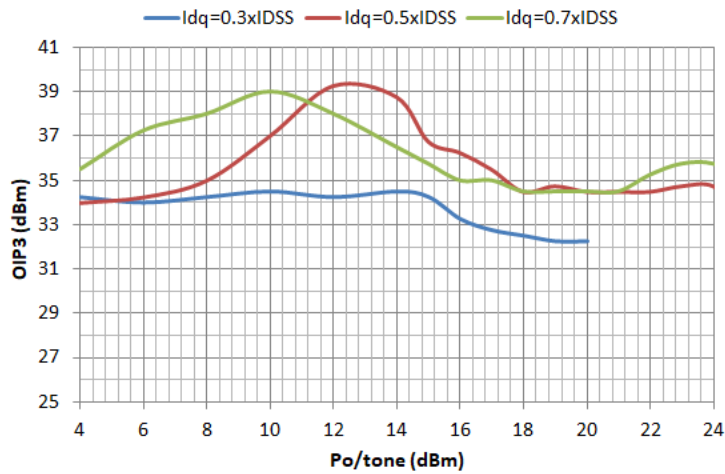
PARAMETERS & CONDITIONS	SYMBOL	UNITS	MIN	TYP	MAX
Saturated Drain Current $V_{ds}= 2.0\text{V}$ $V_{gs}= 0.0\text{V}$	I_{DSS}	mA	240		280
Transconductance $V_{ds}= 2.0\text{V}$ $V_{gs}= 0.0\text{V}$	Gm	mS		260	
Pinch-off Voltage $V_{ds}= 2.0\text{V}$ $I_{ds}= 1.0\text{mA}$	V_p	V		-0.8	-1.0
Gate-to-Source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

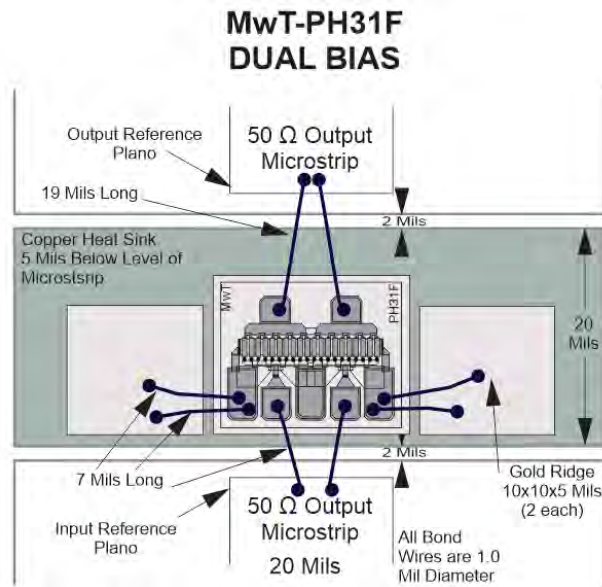
* Overall Rth depends on case mounting

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

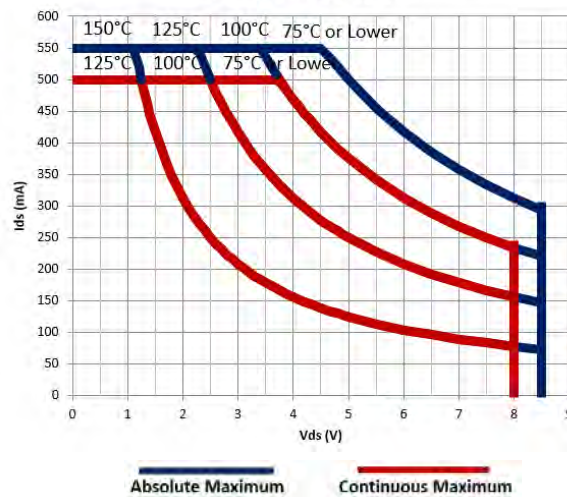


MwT-PH31F, OIP3 with different Idq vs Po/Tone at 12GHz
Vds=8V; Idq=0.7xIDSS





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. For package information, please see supplementary application note in PDF format by clicking located on our website.

Available Packaging:

71 Package - MwT-PH31F71