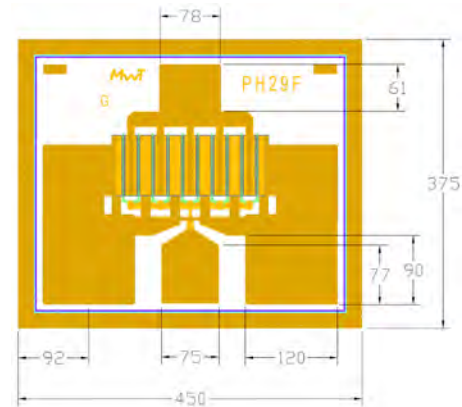


MwT-PH29F 18 GHz Medium Power AlGaAs/InGaAs pHEMT

Features:

- 28.5 dBm of Power at 12 GHz
- 13 dB Small Signal Gain at 12 GHz
- 48% PAE at 12 GHz
- 0.25 x 800 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: 450 x 375 microns
Chip Thickness: 100 microns

Description:

The MwT-PH29F is a AlGaAs/InGaAs pHEMT (Pseudomorphic-High-Electron-Mobility-Transistor) device whose nominal 0.25 micron gate length and 800 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 (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 $T_a = 25^\circ\text{C}$

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 $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	P _{sat}	12 GHz	dBm		28.5
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		13.0
Power Added Efficiency at P1dB $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	PAE	12 GHz	%		48

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 P_{sat} and IP3 better.

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

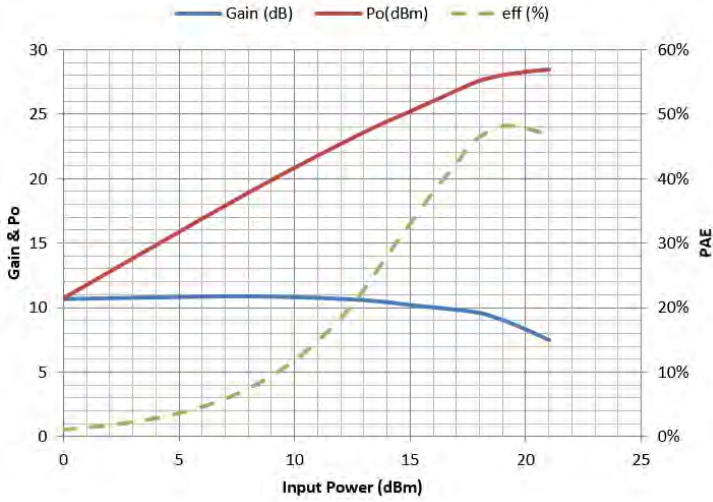
PARAMETERS & CONDITIONS	SYMBOL	UNITS	MIN	TYP	MAX
Saturated Drain Current $V_{ds}=3.0\text{V}$ $V_{gs}=0.0\text{V}$	I_{DSS}	mA	160		200
Transconductance $V_{ds}=2.5\text{V}$ $V_{gs}=0.0\text{V}$	G _m	mS		250	
Pinch-off Voltage $V_{ds}=3.0\text{V}$ $I_{ds}=1.0\text{mA}$	V_p	V		-0.8	-1.0
Gate-to-Source Breakdown Voltage $I_{gs}=-0.3\text{mA}$	BVGSO	V		-16.0	
Gate-to-Drain Breakdown Voltage $I_{gd}=-0.3\text{mA}$	BVGDO	V		-18.0	
Chip Thermal Resistance	R _{th}	C/W		50 170*	

* Overall R_{th} depends on case mounting

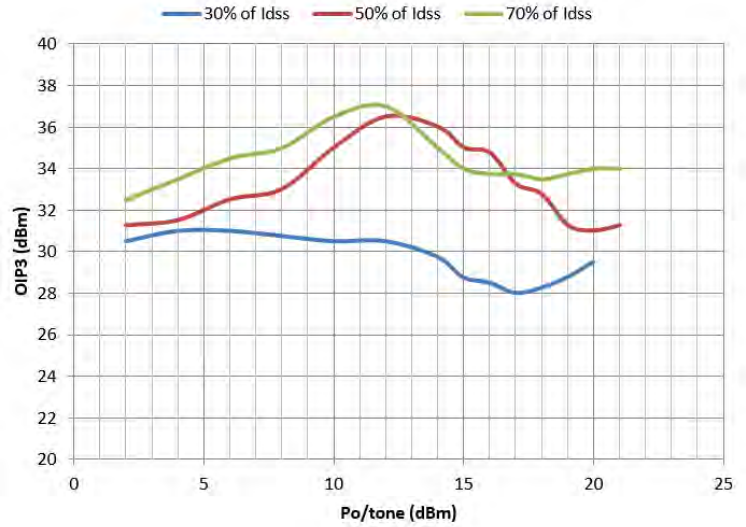
MwT-PH29F

18 GHz Medium Power AlGaAs/InGaAs pHEMT

MwT-PH29F, Po, Gain & PAE at 12GHz vs Pin
Vds=8V; Idq=0.7xIdSS



OIP3 at 12GHz with different Idq vs Po/tone



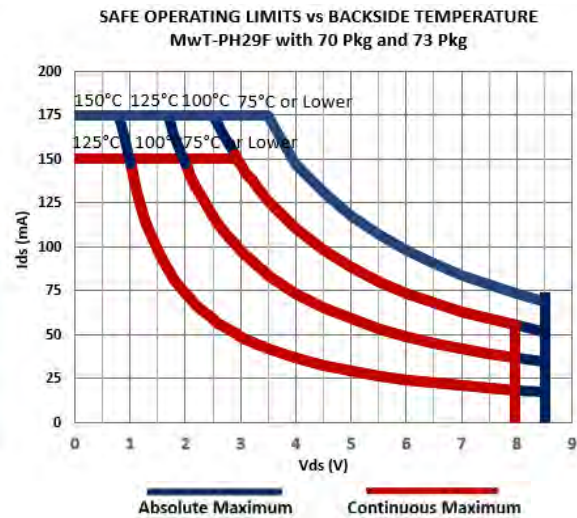
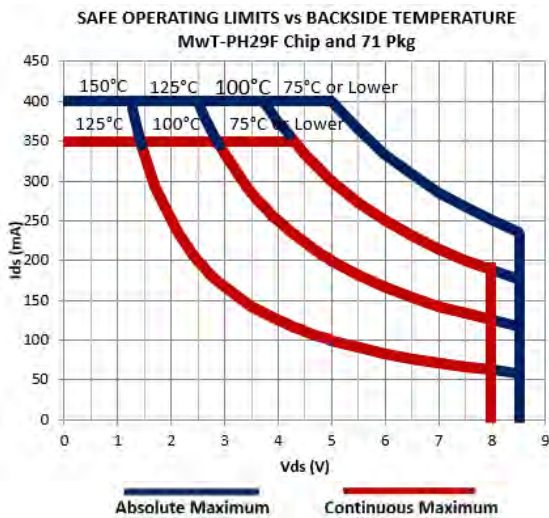
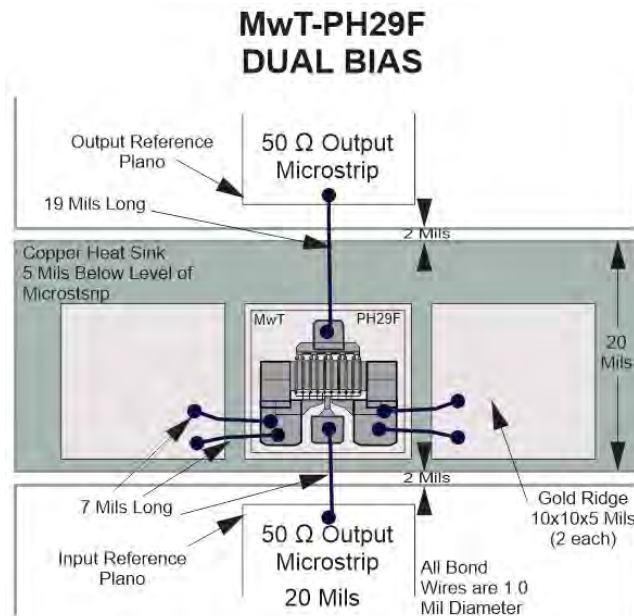
MwT-PH29F, Load Pull data, Vds=8V, Idq=0.7xIdss

Freq GHz	ZS		ZL		Psat dBm
	Mag	phase	mag	phase	
2	0.89	91.00	0.20	151.70	28.57
4	0.87	133.00	0.25	149.30	28.52
6	0.85	150.00	0.32	133.90	28.42
8	0.88	158.00	0.31	143.00	28.50
10	0.88	163.00	0.36	138.00	28.47
12	0.89	175.00	0.38	144.50	28.65

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

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18 GHz Medium Power AlGaAs/InGaAs pHEMT



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	300	400

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.

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18 GHz Medium Power AlGaAs/InGaAs pHEMT

S-Parameters

S-PARAMETER Vds=8.0V, Ids= 0.7 x Idss

Freq. GHz	S11		S21		S12		S22		K	GMAX dB
	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)		
1	-0.712	-67.337	23.023	139.525	-32.599	57.496	-5.155	-23.436	0.169	27.811
2	-1.353	-108.137	20.085	115.840	-29.767	41.079	-6.895	-34.175	0.300	24.926
3	-1.665	-131.813	17.484	100.794	-28.622	34.042	-7.978	-40.417	0.423	23.053
4	-1.763	-146.856	15.400	89.895	-28.156	31.334	-8.553	-45.057	0.530	21.778
5	-1.885	-157.678	13.551	81.830	-28.171	31.322	-9.010	-50.315	0.699	20.861
6	-1.916	-165.644	12.211	74.642	-27.788	33.022	-9.071	-53.629	0.786	20.000
7	-1.895	-173.359	10.986	67.218	-27.597	34.315	-9.208	-58.792	0.877	19.291
8	-1.799	-178.234	9.805	61.180	-27.386	35.942	-9.089	-66.587	0.920	18.596
9	-1.812	176.799	8.648	54.437	-27.206	39.784	-9.273	-73.885	1.057	16.466
10	-1.777	171.859	7.816	48.903	-26.686	40.303	-8.856	-79.598	1.045	15.947
11	-1.680	166.906	7.074	42.841	-26.328	44.397	-8.779	-86.121	1.033	15.586
12	-1.603	163.630	6.265	37.485	-25.918	47.483	-8.540	-93.146	1.026	15.103
13	-1.640	160.115	5.521	31.985	-25.233	49.370	-8.271	-100.349	1.050	14.016
14	-1.615	157.560	4.698	27.199	-24.623	52.216	-7.926	-107.380	1.050	13.287
15	-1.533	152.951	4.147	22.340	-24.021	54.193	-7.658	-113.008	0.987	14.084
16	-1.353	150.924	3.478	16.561	-22.985	54.691	-7.219	-121.113	0.798	13.231
17	-1.425	148.177	2.835	11.779	-22.403	55.650	-6.777	-127.836	0.839	12.619
18	-1.311	146.809	2.236	7.466	-21.459	56.044	-6.257	-135.260	0.706	11.848
19	-1.286	145.148	1.551	3.522	-20.735	55.550	-6.003	-140.108	0.675	11.143
20	-1.136	140.448	1.032	-1.969	-20.112	54.770	-5.697	-145.992	0.573	10.572
21	-1.230	137.630	0.160	-7.121	-19.229	55.449	-5.186	-151.442	0.604	9.695
22	-1.163	135.653	-0.361	-11.359	-18.769	54.385	-4.748	-156.476	0.539	9.204
23	-1.003	134.207	-0.870	-15.331	-18.253	51.773	-4.515	-162.925	0.435	8.691
24	-1.066	131.414	-1.646	-19.291	-17.634	50.708	-4.317	-168.685	0.490	7.994
25	-1.027	129.270	-2.280	-24.007	-17.122	48.641	-3.752	-174.041	0.420	7.421
26	-0.915	127.789	-2.841	-27.153	-16.387	45.878	-3.430	-178.848	0.320	6.773
27	-0.862	125.477	-3.472	-30.993	-15.709	44.780	-3.126	-176.329	0.280	6.119
28	-0.863	124.404	-4.116	-33.323	-15.403	42.689	-2.958	-171.827	0.287	5.643
29	-0.850	121.049	-4.841	-36.377	-14.913	40.266	-2.709	-167.484	0.284	5.036
30	-0.883	119.313	-5.459	-38.681	-14.322	37.936	-2.480	-163.570	0.282	4.431

Available Packaging:

70 Package - MwT-PH29F70
 71 Package - MwT-PH29F71
 73 Package - MwT-PH29F73

MwT-PH29F

18 GHz Medium Power AlGaAs/InGaAs pHEMT

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