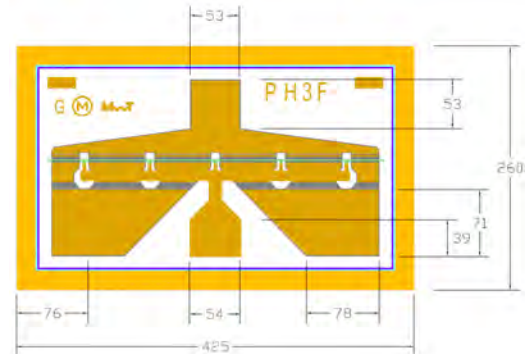


MwT-PH3F 28 GHz Medium Power AlGaAs/InGaAs pHEMT

Features:

- 24 dBm typical Output Power at 18 GHz
- 14 dB typical Small Signal Gain at 18 GHz
- 50% typical PAE at 18 GHz
- 0.25 x 300 Micron Refractory Metal/Gold Gate
- Excellent for High Gain, and High Power Added Efficiency
- Ideal for Commercial, Military, Hi-Rel Space Applications



Chip Dimensions: 425 x 260 microns
Chip Thickness: 100 microns

Description:

The MwT-PH3F is a AlGaAs/InGaAs pHEMT (Pseudomorphic-High-Electron-Mobility-Transistor) device whose nominal 0.25 micron gate length and 300 micron gate width make it ideally suited for applications requiring high-gain and medium power up to 28 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 $T_a = 25\text{ }^\circ\text{C}$

PARAMETERS & CONDITIONS	SYMBOL	FREQ	UNITS	MIN	TYP
Output Power at 1dB Compression $V_{ds}=8.0V$ $I_{ds}=0.7 \times I_{DSS}$	P1dB	18 GHz	dBm		23.0
Saturated Power $V_{ds}=8.0V$ $I_{ds}=0.7 \times I_{DSS}$	Psat	18 GHz	dBm		24.0
Output Third Order Intercept Point $V_{ds}=8.0V$ $I_{ds}=0.7 \times I_{DSS}$	OIP3	18 GHz	dBm		32.0
Small Signal Gain $V_{ds}=8.0V$ $I_{ds}=0.7 \times I_{DSS}$	SSG	18 GHz	dB		14.0
Power Added Efficiency at P1dB $V_{ds}=8.0V$ $I_{ds}=0.7 \times I_{DSS}$	PAE	18 GHz	%		50

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

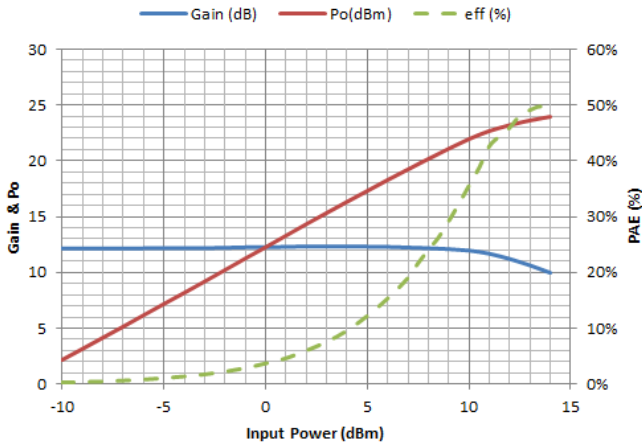
PARAMETERS & CONDITIONS	SYMBOL	UNITS	MIN	TYP	MAX
Saturated Drain Current $V_{ds}= 3.0 V$ $V_{gs}= 0.0 V$	I_{DSS}	mA	60		90
Transconductance $V_{ds}= 2.5 V$ $V_{gs}= 0.0 V$	G_m	mS		100	
Pinch-off Voltage $V_{ds}= 3.0 V$ $I_{ds}= 1.0 mA$	V_p	V		-0.8	-1.0
Gate-to-Source Breakdown Voltage $I_{gs}= -0.3 mA$	BVGSO	V		-17.0	
Gate-to-Drain Breakdown Voltage $I_{gd}= -0.3 mA$	BVGDO	V		-18.0	
Chip Thermal Resistance	R_{th}	C/W		120 290*	

* Overall R_{th} depends on case mounting

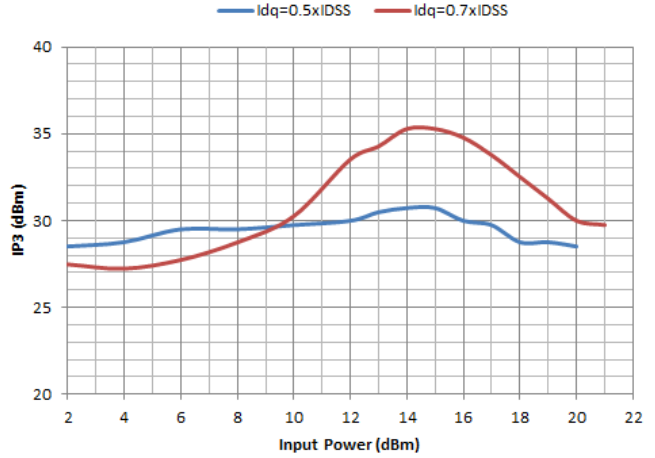
MwT-PH3F

28 GHz Medium Power AlGaAs/InGaAs pHEMT

MwT-PH3F from GCS, Typical Power at 18GHz
Vds=8V; Idq=0.7xIDSS



MwT-PH3F, OIP3 vs Input Power
with different Idq



MwT-PH3F, Load Pull Data, Vdq=8V; Idq=0.7xIdss

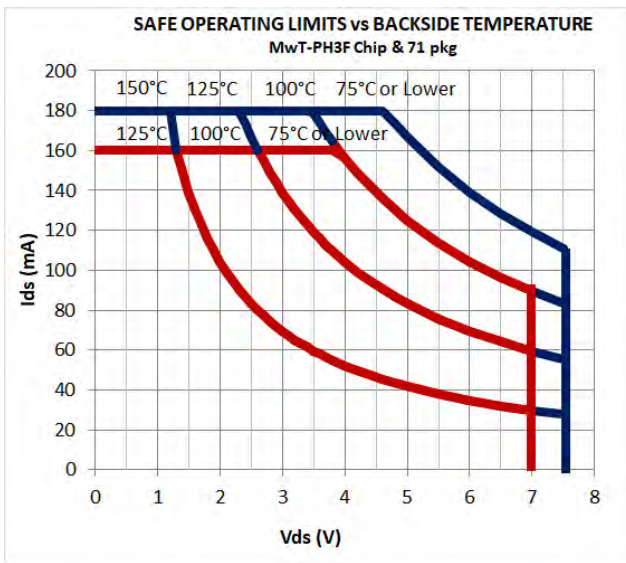
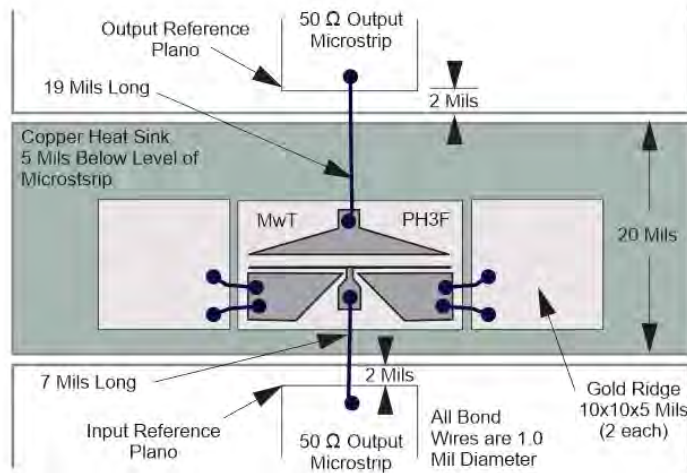
Freq (GHz)	Zs		ZL		Psat
	Mag	phase	mag	phase	dBm
2	0.55	55.00	0.34	9.79	24.9
4	0.70	87.00	0.33	25.34	24.6
6	0.77	104.00	0.36	37.49	24.4
8	0.75	118.00	0.38	47.61	24.3
10	0.78	131.00	0.41	57.36	24.2
12	0.77	139.00	0.43	66.17	24.1
14	0.80	146.00	0.45	68.70	24.1
16	0.83	151.00	0.49	76.41	24.1
18	0.84	153.00	0.54	89.62	23.9

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

MwT-PH3F

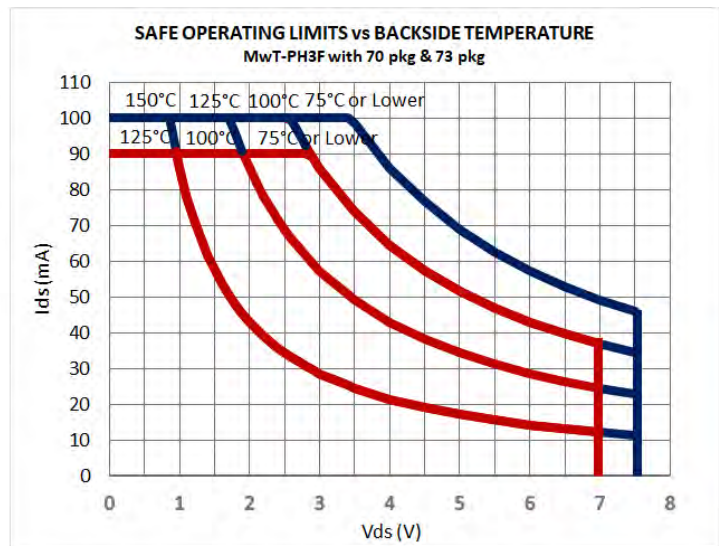
28 GHz Medium Power AlGaAs/InGaAs pHEMT

MwT-PH3F DUAL BIAS



Absolute Maximum

Continuous Maximum



Absolute Maximum

Continuous Maximum

Absolute Maximum Rating

Symbol	Parameter	Units	Cont Max1	Absolute Max2
VDS	Drain to Source Volt.	V	7.0	7.5
Tch	Channel Temperature	°C	+150	+175
Tst	Storage Temperature	°C	-65 to +150	+175
Pin	RF Input Power	mW	80	120

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=7V, Ids= 0.7 x Idss										
Freq. GHz	S11		S21		S12		S22		K	GMAX dB
	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)		
1	-0.207	-26.958	18.437	161.611	-35.811	75.975	-1.871	-8.010	0.093	27.124
2	-0.589	-51.462	17.748	145.283	-30.731	63.494	-2.232	-14.816	0.162	24.239
3	-1.052	-72.815	16.749	131.154	-28.069	54.936	-2.740	-20.416	0.216	22.409
4	-1.455	-90.734	15.682	119.517	-26.788	47.386	-3.289	-24.512	0.289	21.235
5	-1.978	-105.657	14.525	109.489	-25.985	40.663	-3.582	-28.103	0.391	20.255
6	-2.305	-116.551	13.563	102.505	-25.510	38.875	-3.766	-28.179	0.461	19.537
7	-2.564	-127.799	12.630	94.480	-25.117	35.755	-3.976	-30.652	0.531	18.874
8	-2.612	-138.786	11.783	87.029	-24.861	33.013	-4.265	-35.534	0.561	18.322
9	-2.730	-147.742	11.010	79.577	-24.842	31.599	-4.666	-37.908	0.664	17.926
10	-2.763	-157.160	10.180	73.582	-24.689	29.738	-4.854	-40.844	0.719	17.435
11	-2.897	-164.602	9.424	68.144	-24.774	29.567	-4.975	-42.937	0.824	17.099
12	-2.869	-170.932	8.798	62.626	-24.750	29.591	-5.053	-45.868	0.870	16.774
13	-2.822	-177.396	8.204	57.466	-24.713	29.727	-5.120	-49.781	0.901	16.459
14	-2.846	178.026	7.560	52.228	-24.721	31.088	-5.260	-53.563	0.990	16.141
15	-2.854	172.269	7.031	48.601	-24.737	32.183	-5.450	-55.464	1.076	14.199
16	-2.634	167.897	6.332	42.359	-24.580	34.613	-5.506	-61.495	1.055	14.017
17	-2.592	164.341	5.885	37.766	-24.373	35.833	-5.439	-65.857	1.048	13.786
18	-2.480	159.777	5.443	32.561	-24.055	39.522	-5.418	-70.660	0.995	14.749
19	-2.444	156.886	4.921	29.463	-23.900	41.464	-5.463	-74.320	1.031	13.325
20	-2.426	152.840	4.484	24.517	-23.613	42.897	-5.630	-78.993	1.068	12.452
21	-2.335	150.013	4.032	21.184	-23.258	46.457	-5.322	-83.283	0.985	13.645
22	-2.287	147.587	3.518	16.515	-22.824	46.118	-5.277	-88.436	0.966	13.171
23	-2.125	144.720	3.151	12.203	-22.251	47.678	-5.322	-95.031	0.870	12.701
24	-2.200	141.726	2.718	8.153	-21.957	47.983	-5.225	-100.633	0.918	12.337
25	-2.028	139.457	2.243	4.044	-21.202	51.531	-5.159	-105.565	0.800	11.722
26	-1.992	137.815	1.829	0.310	-20.709	49.459	-4.779	-110.553	0.712	11.269
27	-2.105	135.778	1.380	-3.350	-19.968	53.389	-4.538	-113.699	0.706	10.674
28	-1.818	134.508	0.990	-6.766	-19.487	51.132	-4.610	-120.484	0.588	10.239
29	-1.841	131.270	0.675	-10.983	-18.906	50.863	-4.339	-125.602	0.546	9.791
30	-1.716	128.616	0.274	-14.750	-18.467	50.134	-4.226	-130.296	0.484	9.370

Available Packaging:
70 Package - MwT-PH3F70
71 Package - MwT-PH3F71
73 Package - MwT-PH3F73

MwT-PH3F

28 GHz Medium Power AlGaAs/InGaAs pHEMT

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