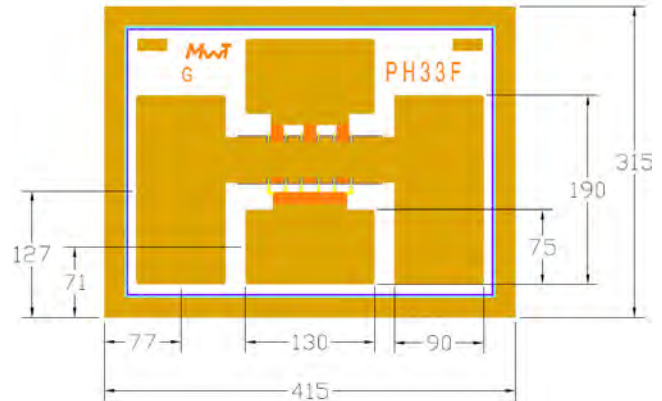


MwT-PH33F 26 GHz Medium Power AlGaAs/InGaAs pHEMT

Features:

- 24 dBm of Power at 18 GHz
- 14 dB Small Signal Gain at 18 GHz
- 45% typical PAE at 18 GHz
- 0.25 x 300 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: 415 x 315 microns
Chip Thickness: 100 microns

Description:

The MwT-PH33F 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 26 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	18 GHz	dBm		21.0
Saturated Power $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	Psat	18 GHz	dBm		24.0
Output Third Order Intercept Point $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	OIP3	18 GHz	dBm		29.0
Small Signal Gain $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	SSG	18 GHz	dB		14.0
Power Added Efficiency at P1dB $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	PAE	18 GHz	%		45

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

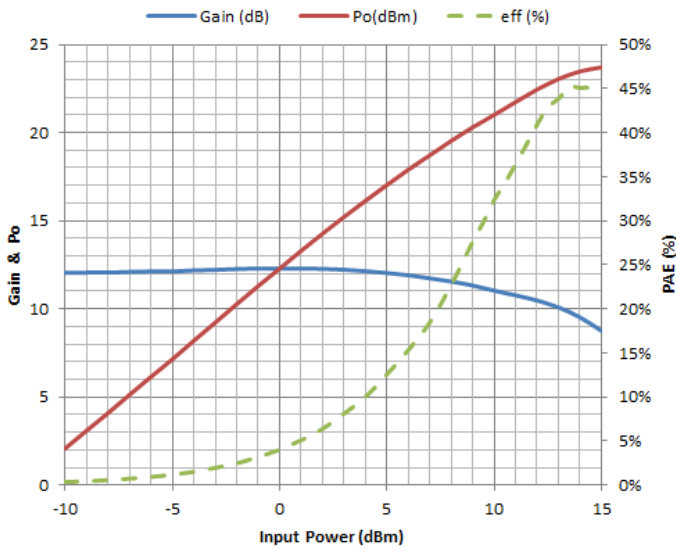
PARAMETERS & CONDITIONS	SYMBOL	UNITS	MIN	TYP	MAX
Saturated Drain Current $V_{ds}= 3.0\text{V}$ $V_{gs}= 0.0\text{V}$	I_{DSS}	mA	70		90
Transconductance $V_{ds}= 2.5\text{V}$ $V_{gs}= 0.0\text{V}$	G_m	mS		100	
Pinch-off Voltage $V_{ds}= 3.0\text{V}$ $I_{ds}= 1.0\text{mA}$	V_p	V		-0.8	-1.0
Gate-to-Source Breakdown Voltage $I_{gs}= -0.3\text{mA}$	BVGSO	V		-18.0	
Gate-to-Drain Breakdown Voltage $I_{gd}= -0.3\text{mA}$	BVGDO	V		-18.0	
Chip Thermal Resistance					
	Chip & 71 pkg			120	
	70 & 73 pkg			290*	

* Overall R_{th} depends on case mounting

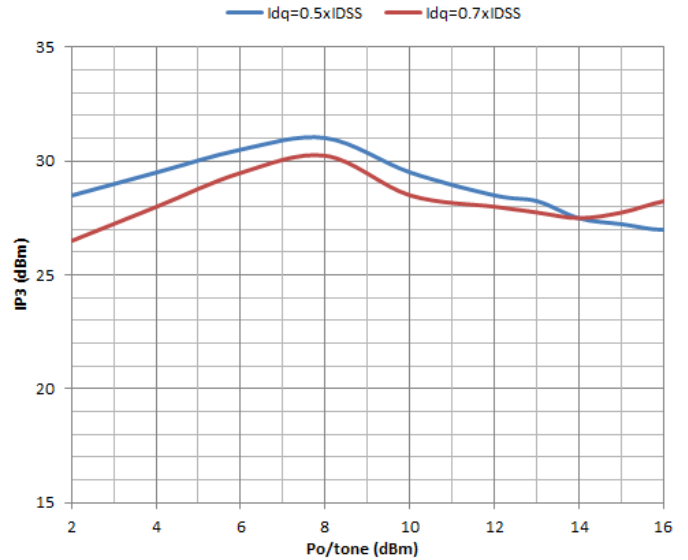
MwT-PH33F

26 GHz Medium Power AlGaAs/InGaAs pHEMT

MwT-PH33F, Po, Gain & PAE vs Pin at 18GHz
Vds=8V; Idq=0.7xIdSS



MwT-PH33F, OIP3 vs Po/tone with different Idq



MwT-PH33F, Load Pull Data, Vdq=8V; Idq=0.7xIdSS

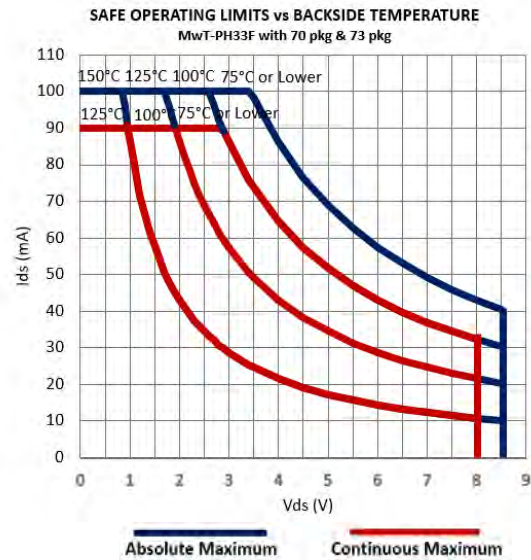
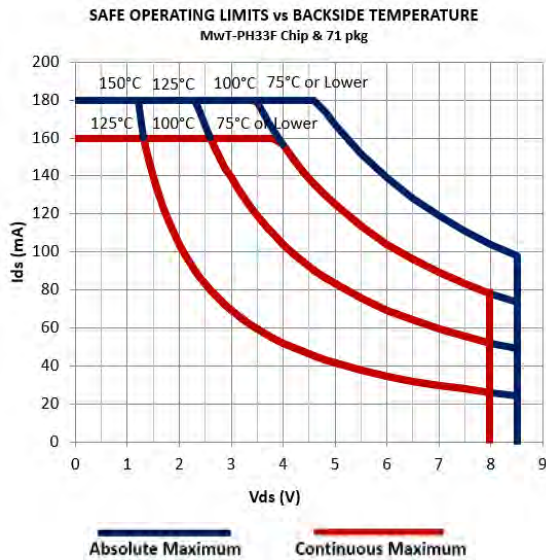
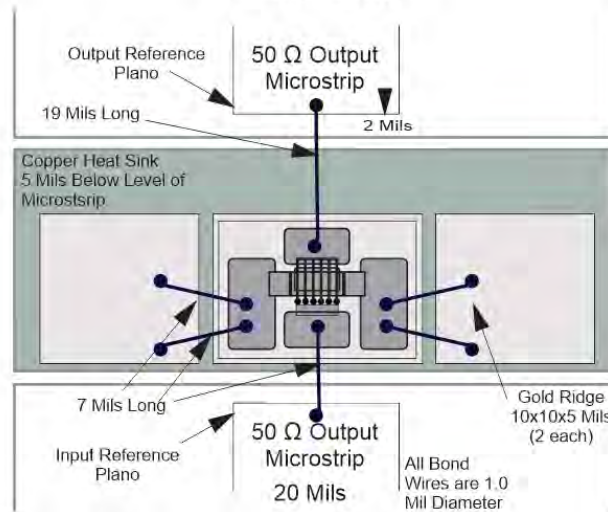
Freq (GHz)	Zs		ZL		Psat
	Mag	phase	mag	phase	dBm
2	0.78	39.00	0.30	10.49	24.7
4	0.74	71.00	0.32	22.73	24.4
6	0.67	103.00	0.30	24.48	24.6
8	0.72	111.00	0.32	37.18	24.5
10	0.83	126.00	0.36	45.10	24.4
12	0.83	134.00	0.40	53.96	24.2
14	0.78	142.00	0.40	59.61	24.3
16	0.82	147.00	0.43	66.47	24.1
18	0.80	153.00	0.43	72.15	24.1

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

MwT-PH33F

26 GHz Medium Power AlGaAs/InGaAs pHEMT

MwT-PH33F DUAL BIAS



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	100	150

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=8V, Ids= 0.7 x Idss										
Freq.	S11		S21		S12		S22		K	GMAX
GHz	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)		dB
1	-0.183	-25.327	17.604	162.275	-37.987	76.340	-1.596	-6.660	0.106	27.795
2	-0.539	-48.599	16.930	146.469	-32.388	65.878	-1.893	-12.246	0.165	24.659
3	-1.016	-69.359	16.047	132.480	-29.751	55.469	-2.193	-17.309	0.248	22.899
4	-1.394	-87.173	15.102	120.450	-28.324	49.112	-2.464	-21.063	0.295	21.713
5	-1.868	-101.895	13.924	110.509	-27.659	43.211	-2.944	-24.615	0.419	20.792
6	-2.211	-113.757	12.993	102.137	-27.167	40.493	-3.081	-27.206	0.488	20.080
7	-2.539	-125.936	12.063	94.018	-26.779	37.723	-3.291	-29.596	0.580	19.421
8	-2.549	-135.590	11.348	86.930	-26.655	34.777	-3.340	-33.721	0.598	19.001
9	-2.671	-145.720	10.256	79.616	-26.645	34.484	-3.780	-35.765	0.751	18.451
10	-2.676	-153.374	9.705	73.468	-26.404	33.187	-3.609	-39.827	0.719	18.054
11	-2.595	-161.377	9.078	66.705	-26.506	33.582	-3.827	-41.951	0.783	17.792
12	-2.599	-167.847	8.369	61.321	-26.484	35.048	-3.853	-45.874	0.822	17.427
13	-2.603	-173.696	7.723	55.622	-26.483	35.639	-3.957	-49.609	0.896	17.103
14	-2.558	-179.318	6.999	50.263	-26.530	37.922	-3.985	-53.365	0.954	16.764
15	-2.490	175.476	6.548	45.300	-26.380	40.518	-4.064	-57.151	0.955	16.464
16	-2.494	170.999	6.070	40.875	-26.200	43.885	-3.976	-61.013	0.949	16.135
17	-2.511	166.967	5.476	35.956	-25.851	46.720	-3.930	-65.756	0.961	15.664
18	-2.303	162.920	4.897	31.857	-25.542	49.944	-3.865	-70.002	0.870	15.220
19	-2.272	161.235	4.450	27.655	-24.949	53.361	-3.844	-73.382	0.823	14.700
20	-2.248	155.053	4.057	23.089	-24.414	55.553	-3.993	-78.093	0.826	14.236
21	-2.178	152.324	3.543	16.206	-23.660	56.804	-3.783	-82.573	0.709	13.601
22	-2.200	149.391	3.061	12.687	-23.036	59.864	-3.727	-87.325	0.695	13.048
23	-1.910	147.069	2.643	8.442	-22.244	62.581	-3.685	-92.843	0.522	12.444
24	-1.938	143.894	2.178	3.482	-21.417	63.031	-3.730	-98.397	0.519	11.798
25	-1.982	140.780	1.659	-0.696	-20.838	61.265	-3.566	-103.955	0.505	11.249
26	-1.878	138.412	1.207	-4.718	-20.129	61.166	-3.462	-109.217	0.428	10.668
27	-1.711	135.244	0.747	-8.956	-19.558	60.255	-3.344	-114.074	0.337	10.153
28	-1.586	134.542	0.368	-12.927	-18.714	59.563	-3.233	-119.935	0.237	9.541
29	-1.635	130.710	-0.166	-17.261	-17.896	58.376	-3.120	-125.497	0.237	8.865
30	-2.277	205.120	-1.877	-33.900	-18.812	57.331	-4.035	-122.051	0.654	8.468

Available Packaging:

70 Package - MwT-PH33F70
 71 Package - MwT-PH33F71
 73 Package - MwT-PH33F73

MwT-PH33F

26 GHz Medium Power AlGaAs/InGaAs pHEMT

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