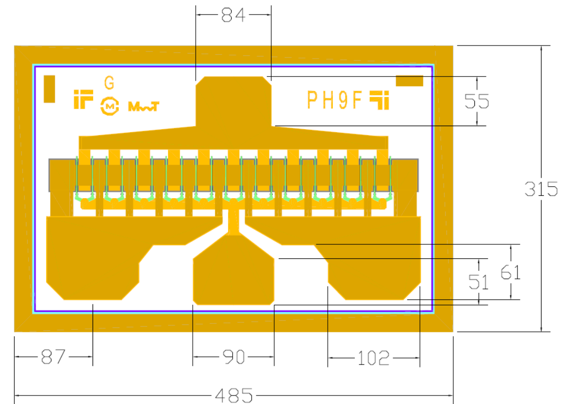
MwT-PH9F

26 GHz Medium Power AlGaAs/InGaAs pHEMT



Chip Dimensions: 485 x 315 microns
Chip Thickness: 100 microns

Features:

- **28 dBm of typical Output Power at 12 GHz**
- **13 dB typical Small Signal Gain at 12 GHz**
- **45% typical PAE at 12 GHz**
- **0.25 x 750 Micron Refractory Metal/Gold Gate**
- **Excellent for Power, Gain, and High Power Added Efficiency Applications**
- **Ideal for Commercial, Military, Hi-Rel Space Applications**

Description:

The MwT-PH9F is a AlGaAs/InGaAs pHEMT (Pseudomorphic-High-Electron-Mobility-Transistor) device whose nominal 0.25 micron gate length and 750 micron gate width make it ideally suited for applications requiring high-gain and power up to 18 GHz frequency range with power outputs ranging from 400 to 500 milli-watts. 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 Ta= 25° C*

PARAMETERS & CONDITIONS	SYMBOL	FREQ	UNITS	MIN	TYP
Output Power at 1dB Compression Vds=8.0V Ids=0.7xIdss	P1dB	12 GHz	dBm		25.0
Saturated Power Vds=8.0V Ids=0.7xIdss	Psat	12 GHz	dBm		28.0
Output Third Order Intercept Point Vds=8.0V Ids=0.7xIdss	OIP3	12 GHz	dBm		34.0
Small Signal Gain Vds=8.0V Ids=0.7xIdss	SSG	12 GHz	dB		13.0
Power Added Efficiency Vds=8.0V Ids=0.7xIdss	PAE	12 GHz	%		45

Note: Ids should be between 40% and 80% of Idss. Currently, our data shows Ids at 70% of IDSS. Low Ids will improve efficiency, but high Ids will make Psat and IP3 better.

DC Specifications: • *at Ta= 25 °C*

PARAMETERS & CONDITIONS		SYMBOL	UNITS	MIN	TYP	MAX
Saturated Drain Current Vds= 4.0 V Vgs= 0.0 V		IDSS	mA	180		220
Transconductance Vds= 2.5 V Vgs= 0.0 V		Gm	mS		270	
Pinch-off Voltage Vds= 3.0 V Ids= 5.0 mA		Vp	V		-0.8	
Gate-to-Source Breakdown Voltage Igs= -1.0 mA		BVGSO	V		-17.0	
Gate-to-Drain Breakdown Voltage Igd= -1.0 mA		BVGDO	V		-18.0	
Chip Thermal Resistance	MwT-PH7F Chip & 70 pkg 71 pkg & 73 pkg	Rth	C/W		60 175*	

* Overall Rth depends on case mounting

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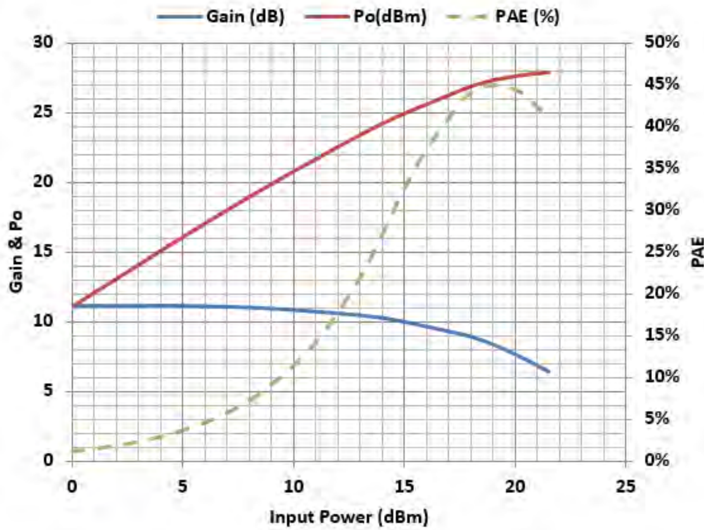

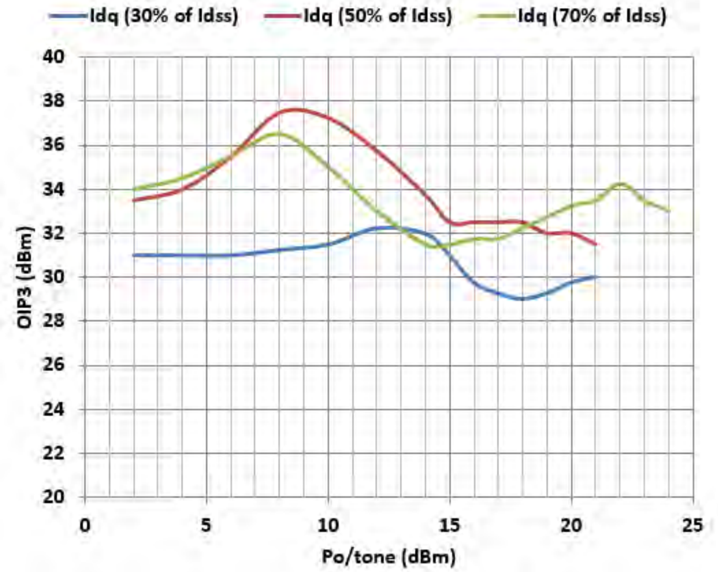

MwT-PH9F, Load Pull data for Power, Vds=8V, Idq=0.7xIdss

Freq (GHz)	Z_S		Z_L		P_{sat}
	Mag	phase	mag	phase	dBm
2	0.60	95.0	0.13	162.3	28.3
4	0.75	135.0	0.23	129.0	27.9
6	0.85	155.0	0.31	121.2	27.4
8	0.90	172.1	0.36	134.2	27.5
10	0.87	175.0	0.42	140.0	27.1
12	0.80	180.0	0.48	143.0	27.1

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

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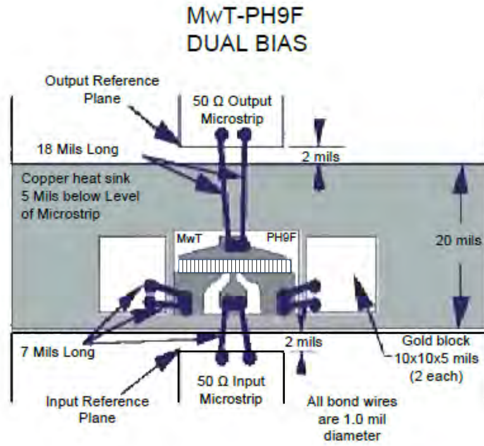

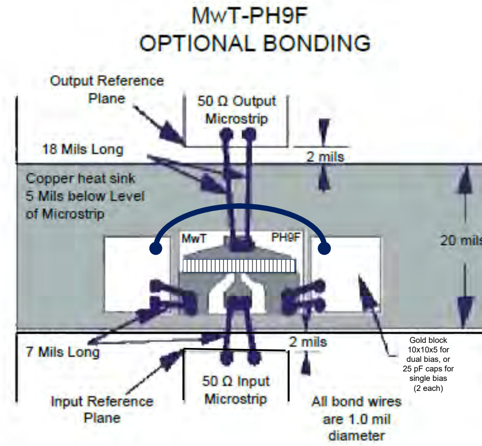

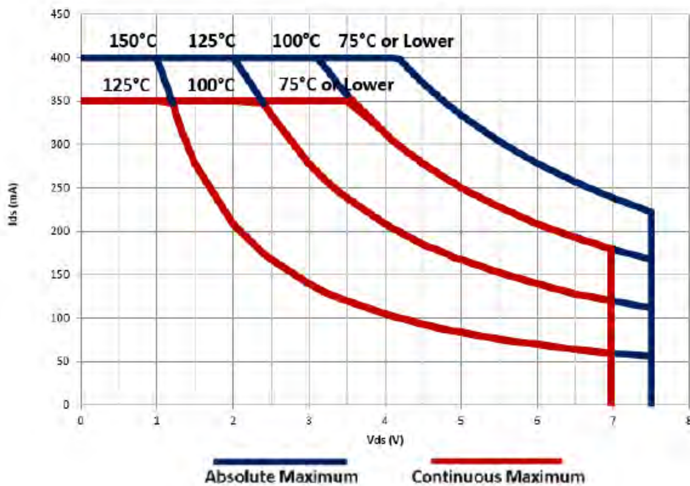

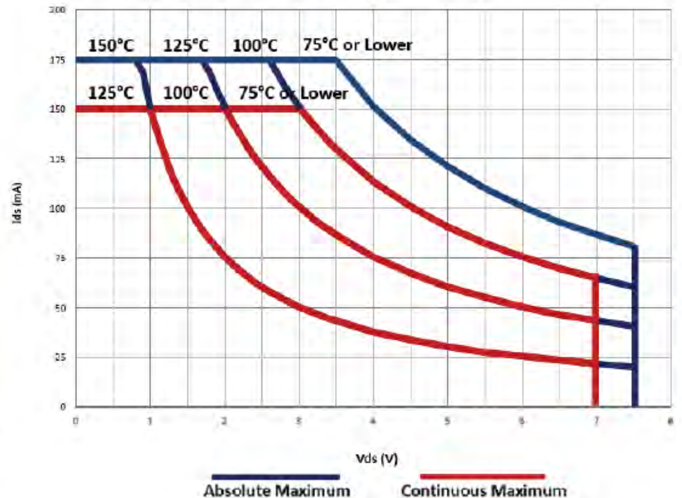

MAXIMUM RATINGS AT Ta = 25 °C

Symbol	Parameter	Units	Cont Max1	Absolute Max2
VDS	Drain to Source Volt.	V	7.5	8.0
Tch	Channel Temperature	°C	+150	+175
Tst	Storage Temperature	°C	-65 to +160	+180
Pin	RF Input Power	mW	240	360
Pt	Total Power Dissipation	mW	2700	3300

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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