PH1214-300M

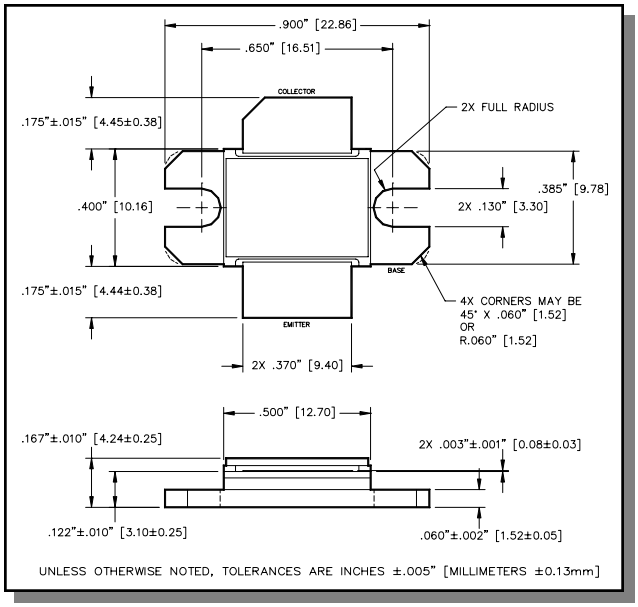
Radar Pulsed Power Transistor
300W, 1.2-1.4 GHz, 150µs Pulse, 10% Duty

M/A-COM Products
Released, 30 May 07

Features

- NPN silicon microwave power transistors
- Common base configuration
- Broadband Class C operation
- High efficiency inter-digitized geometry
- Diffused emitter ballasting resistors
- Gold metallization system
- Internal input and output impedance matching
- Hermetic metal/ceramic package
- RoHS compliant

Outline Drawing



Absolute Maximum Ratings at 25°C

Parameter	Symbol	Rating	Units
Collector-Emitter Voltage	V_{CES}	90	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current (Peak)	I_C	21.0	A
Power Dissipation @ +25 °C	P_{TOT}	583	W
Storage Temperature	T_{STG}	-65 to +200	°C
Junction Temperature	T_j	200	°C

Electrical Specifications: T_C = 25 ± 5°C (Room Ambient)

Parameter	Test Conditions	Frequency	Symbol	Min	Max	Units
Collector-Emitter Breakdown Voltage	I_C = 80mA		BV_{CES}	90	-	V
Collector-Emitter Leakage Current	V_{CE} = 40V		I_{CES}	-	10	mA
Thermal Resistance	Vcc = 40V, Pin = 40W	F = 1.2, 1.3, 1.4 GHz	$R_{TH(JC)}$	-	0.30	°C/W
Output Power	Vcc = 40V, Pin = 40W	F = 1.2, 1.3, 1.4 GHz	P_{OUT}	300	-	W
Power Gain	Vcc = 40V, Pin = 40W	F = 1.2, 1.3, 1.4 GHz	G_P	8.75	-	dB
Collector Efficiency	Vcc = 40V, Pin = 40W	F = 1.2, 1.3, 1.4 GHz	η_C	50	-	%
Input Return Loss	Vcc = 40V, Pin = 40W	F = 1.2, 1.3, 1.4 GHz	RL	-	-10	dB
Pulse Droop	Vcc = 40V, Pin = 40W	F = 1.2, 1.3, 1.4 GHz	Droop	-	1.0	dB
Load Mismatch Tolerance	Vcc = 40V, Pin = 40W	F = 1.2, 1.3, 1.4 GHz	VSWR-T	-	2:1	-
Load Mismatch Stability	Vcc = 40V, Pin = 40W	F = 1.2, 1.3, 1.4 GHz	VSWR-S	-	1.5:1	-

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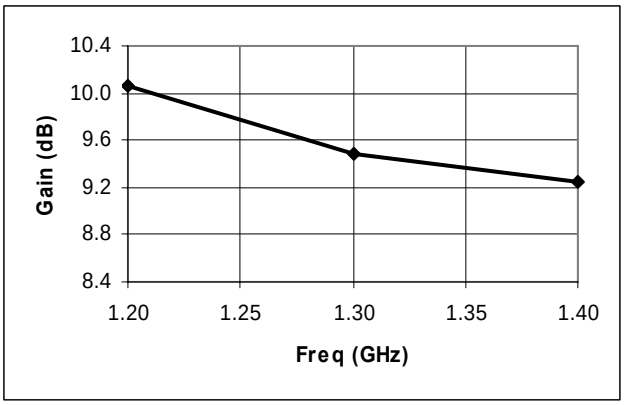
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Typical RF Performance

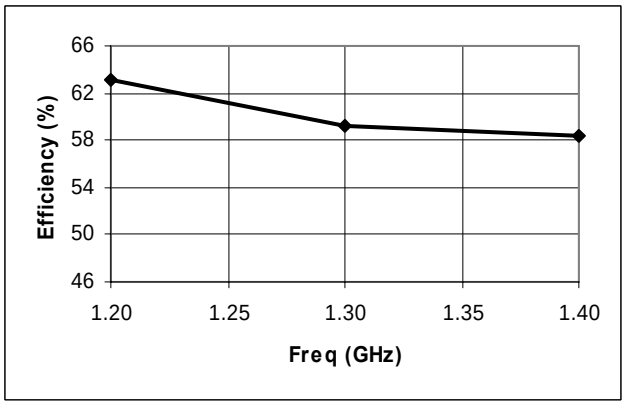
Freq. (GHz)	Pin (W)	Pout (W)	Gain (dB)	ΔGain (dB)	Ic (A)	Eff. (%)	Droop (dB)	RL (dB)	P1dB Overdrive					VSWR-S		
									Pout (W)	ΔPout (dB)	Gain (dB)	Droop (dB)	Eff. (%)	1.5:1	2:1	2.5:1
1.2	40	406	10.06	0.82	16.1	63.2	0.10	-18	451	0.46	9.52	0.38	59.8	S	S	S
1.3	40	355	9.48		15.0	59.3	0.04	-15	412	0.65	9.12	0.32	58.2	S	S	S
1.4	40	336	9.24		14.4	58.4	0.06	-16	378	0.51	8.75	0.35	56.0	S	S	S

Note: **ΔPo(dB)** is the difference between Pout at 1dB overdrive and Pout at Pin = 40W.

Gain vs. Frequency



Collector Efficiency vs. Frequency



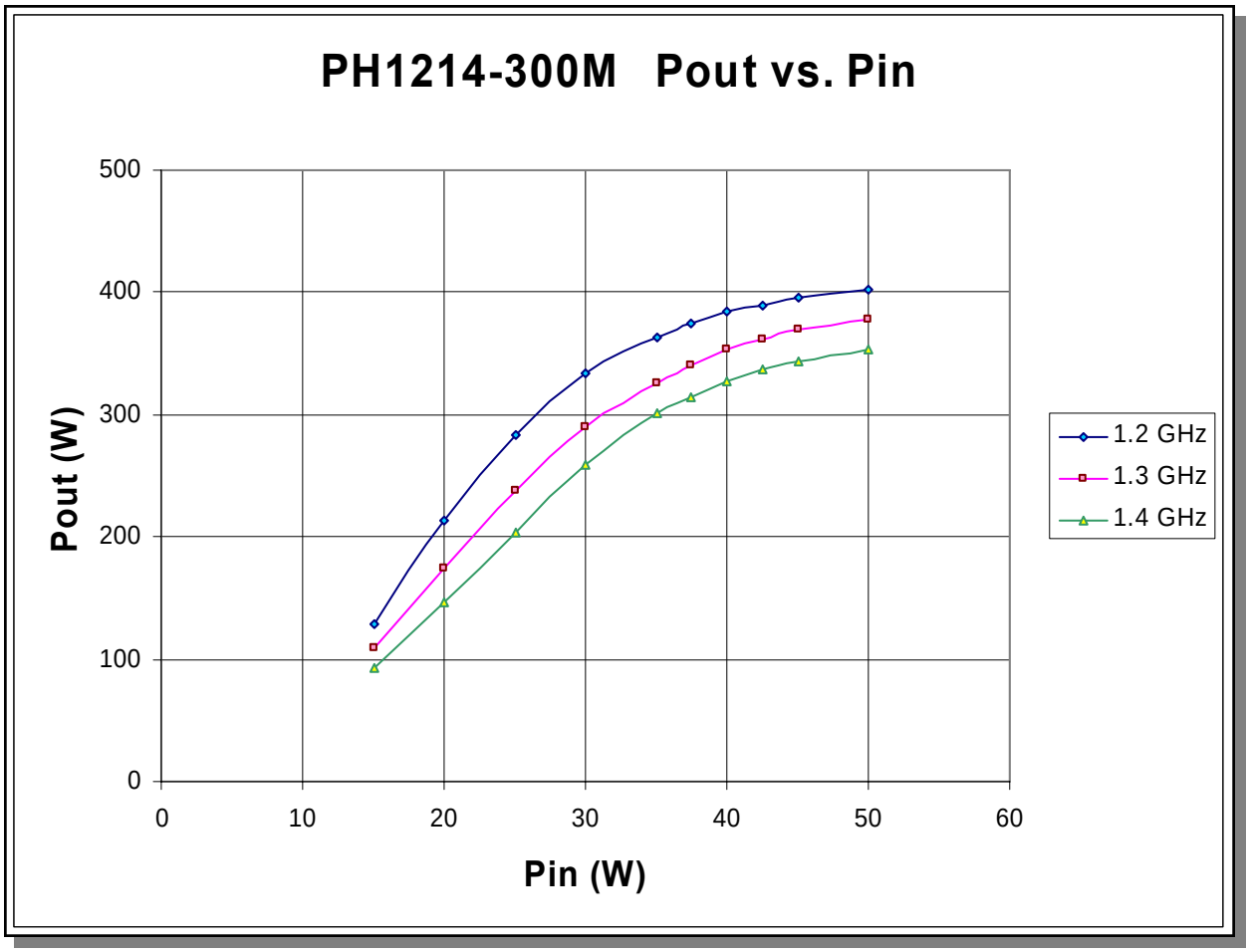
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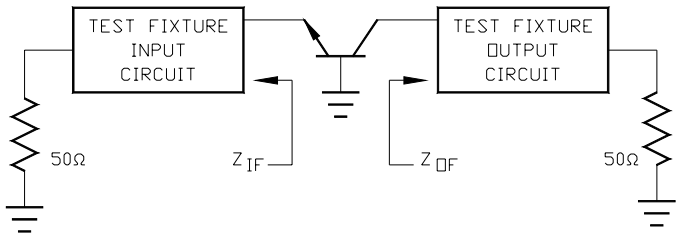
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RF Power Transfer Curve
(Output Power Vs. Input Power)



Broadband Test Fixture Impedance

F (GHz)	Z_{IF} (Ω)	Z_{OF} (Ω)
1.2	1.9 - j2.3	1.3 - j1.6
1.3	1.9 - j1.7	1.2 - j1.2
1.4	1.8 - j1.4	1.0 - j0.9



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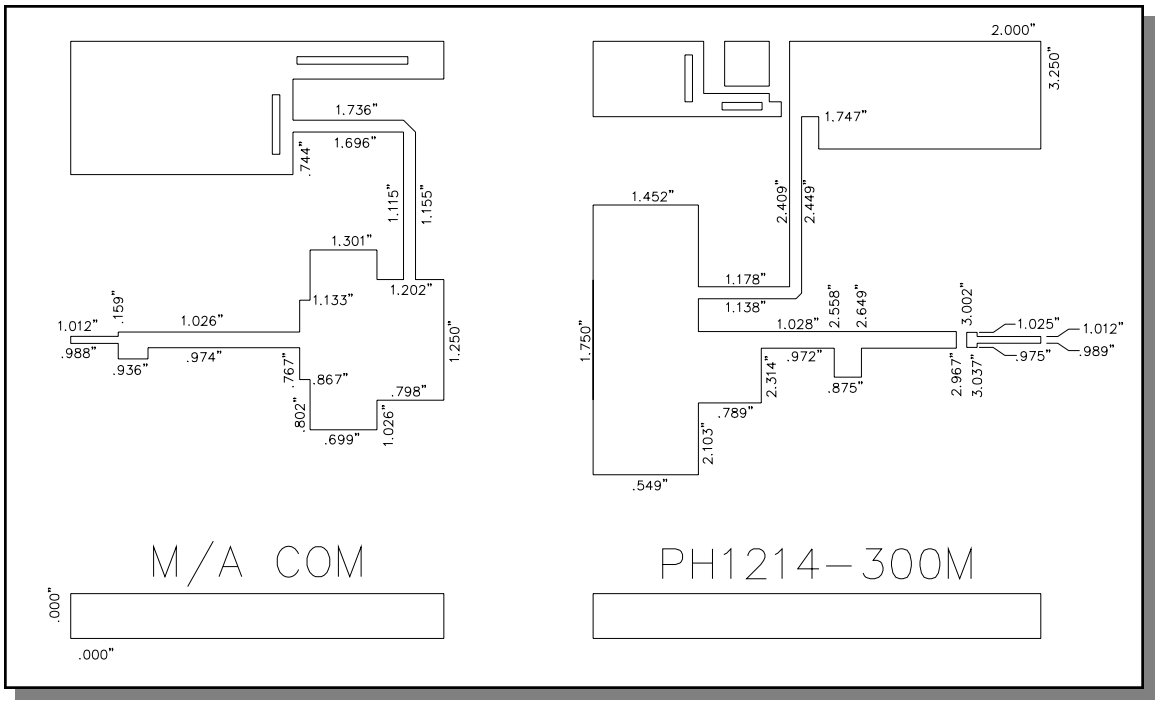
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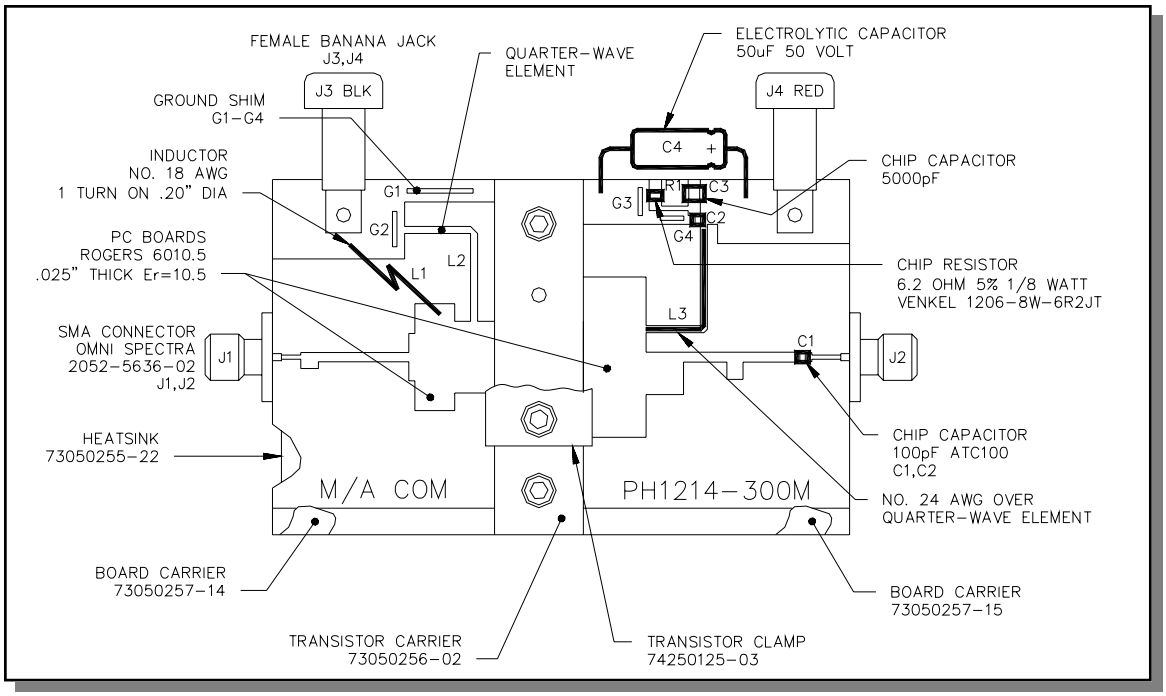
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Test Fixture Circuit Dimensions



Test Fixture Assembly



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