Avionics Pulsed Power Transistor, 700 Watts, 1.03-1.09 GHz, 32 μS Pulse, 2% Duty

12/10/01

Rev. 0

PH1090-700B

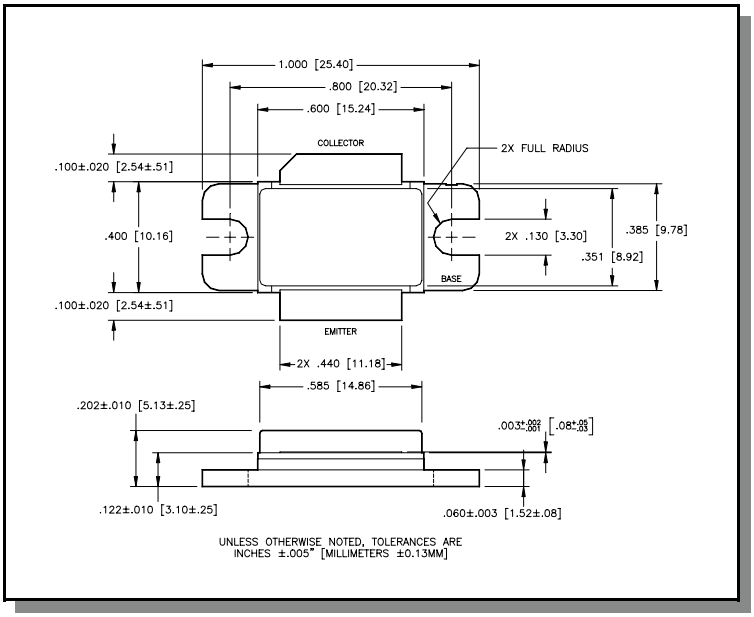
Features

- Designed for Mode-S IFF Applications
- NPN Silicon Microwave Power Transistor
- Common Base Configuration
- Broadband Class C Operation
- High Efficiency Interdigitated Geometry
- Gold Metalization System
- Internal Input and Output Impedance Matching
- Hermetic Metal/Ceramic Package

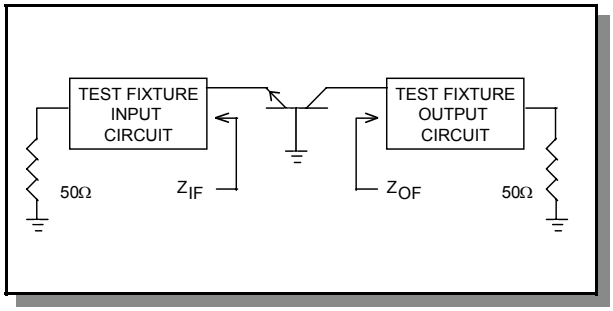
Absolute Maximum Ratings @ 25 °C

Parameter	Symbol	Rating	Units
Collector-Emitter Voltage	V_{CES}	65	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current (Peak)	I_C	35	A
Dissipated Power (Standard Pulse Cond.)	P_{TOT}	2.9	kW
Dissipated Power (Mode-S Pulse Train)	P_{TOT}	700	W
Storage Temperature	T_{STG}	-65 to +200	°C
Junction Temperature	T_j	200	°C

Outline Drawing



Broadband Test Fixture Impedances



F (GHz)	Z_{IF} (Ω)	Z_{OF} (Ω)
1.03	1.1 –j1.4	1.2 –j0.8
1.06	1.1 –j1.2	1.0 –j0.7
1.09	1.0 –j1.0	0.8 –j0.7

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Electrical Characteristics at 25ºC

Standard Pulse Condition: 32μS Pulse Width, 2% Duty Cycle

Peak Power: 700 Watts

Parameter	Symbol	Test Conditions	Min	Max	Units
Collector-Emitter Breakdown Voltage	BVCES	IC = 250 mA	80	-	V
Collector-Emitter Leakage Current	ICES	VCE = 50 V	-	25	mA
Thermal Resistance	RTH(JC)	V_{CC}=50 V, Pout=700 W, F=1.03, 1.09 GHz Pulse Conditions: 32μs, 2%	-	0.06	°C/W
Power Gain	GP	V_{CC}=50 V, Pout=700 W, F=1.03, 1.09 GHz Pulse Conditions: 32μs, 2%	7.5	-	dB
Collector Efficiency	η	V_{CC}=50 V, Pout=700 W, F=1.03, 1.09 GHz Pulse Conditions: 32μs, 2%	50	-	%
Input Return Loss	RL	V_{CC}=50 V, Pout=700 W, F=1.03, 1.09 GHz Pulse Conditions: 32μs, 2%	-10	-	dB
Load Mismatch Tolerance	VSWR-T	V_{CC}=50 V, Pout=700 W, F=1.03, 1.09 GHz Pulse Conditions: 32μs, 2%	-	5.0:1	-
Load Mismatch Stability	VSWR-S	V_{CC}=50 V, Pout=700 W, F=1.03, 1.09 GHz Pulse Conditions: 32μs, 2%	-	1.5:1	-

Mode-S Pulse Train: 48 Pulses of 32μS "on", 18μS "off" repeated every 24 mS, 6.4% Overall Duty Cycle**

Peak Power: 450 Watts

Parameter	Symbol	Test Conditions	Typical	Units
Thermal Resistance	RTH(JC)	V_{CC}=45v, Pout=450 W, F=1.03, 1.09 GHz Mode-S Pulse Train	0.20	°C/W
Power Gain	GP	V_{CC}=45v, Pout=450 W, F=1.03, 1.09 GHz Mode-S Pulse Train	8.0	dB
Collector Efficiency	η	V_{CC}=45v, Pout=450 W, F=1.03, 1.09 GHz Mode-S Pulse Train	55	%
Input Return Loss	RL	V_{CC}=45v, Pout=450 W, F=1.03, 1.09 GHz Mode-S Pulse Train	-13	dB
Load Mismatch Tolerance	VSWR-T	V_{CC}=45v, Pout=450 W, F=1.03, 1.09 GHz Mode-S Pulse Train	2:1	-
Load Mismatch Stability	VSWR-S	V_{CC}=45v, Pout=450 W, F=1.03, 1.09 GHz Mode-S Pulse Train	1.5:1	-

** Please note, the standard PH1090-700B device will be tested in accordance with the specifications defined for the Standard Pulse Condition (32μS, 2%)

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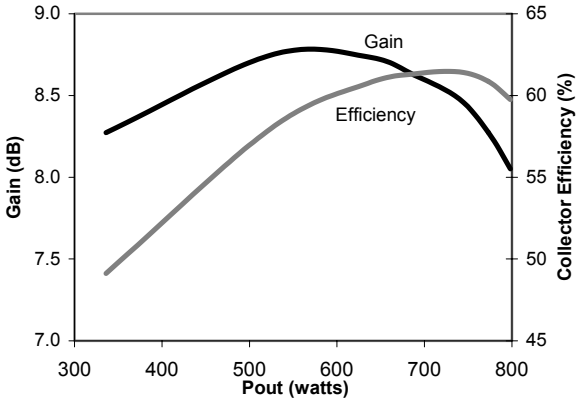
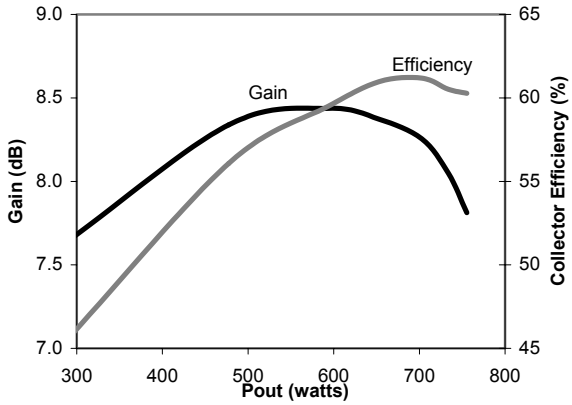
Gain & Efficiency vs P_{OUT}

Vcc = 50V, Pulse Width = 32μS, Duty Cycle = 2%

Frequency = 1030 MHz



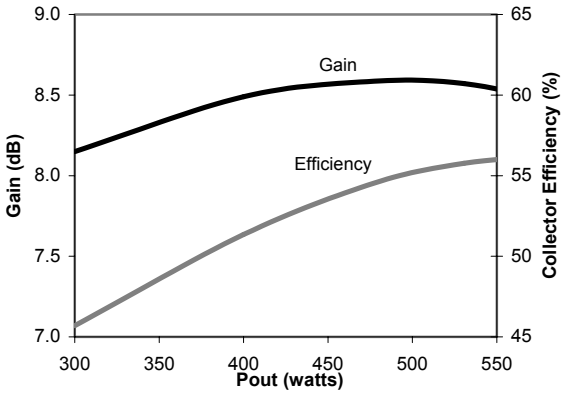
Frequency = 1090 MHz



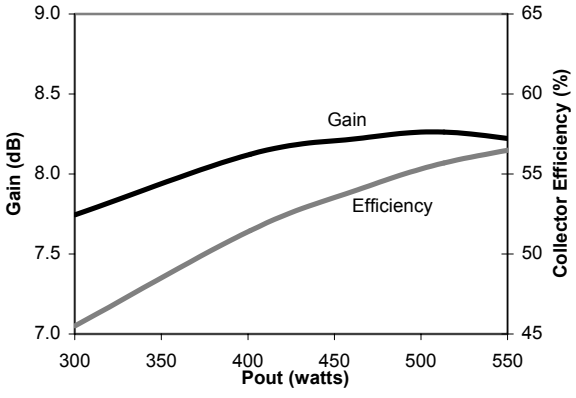
Gain & Efficiency vs P_{OUT}

Vcc = 45V, Mode-S Pulse Train

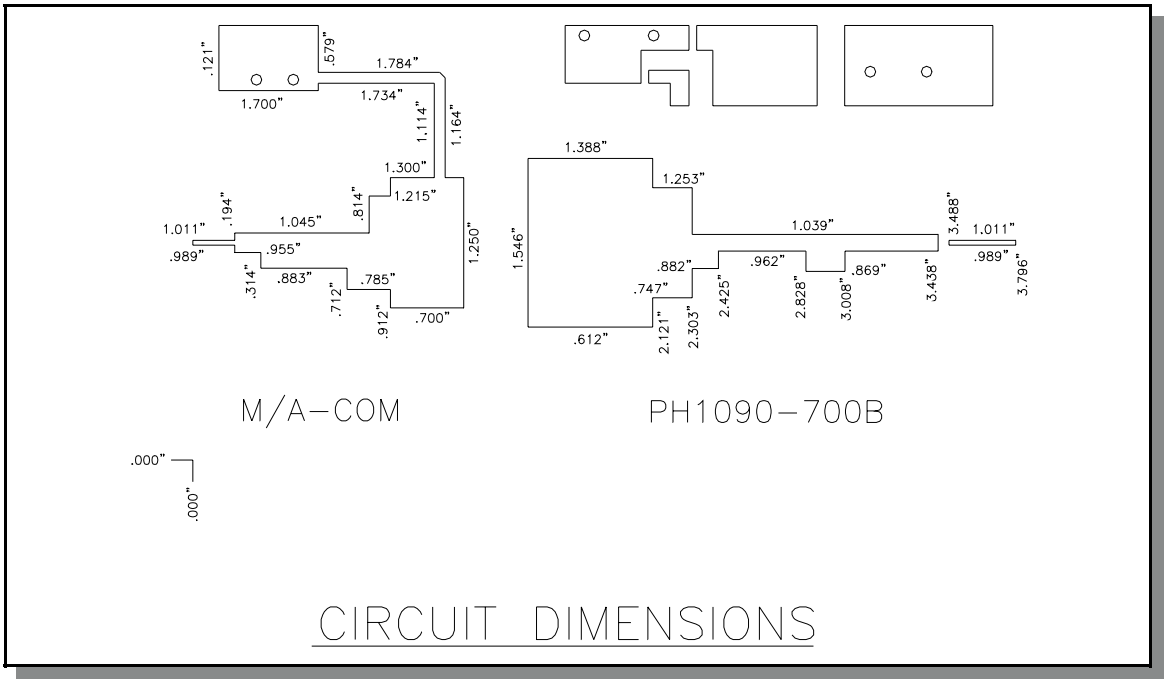
Frequency = 1030 MHz



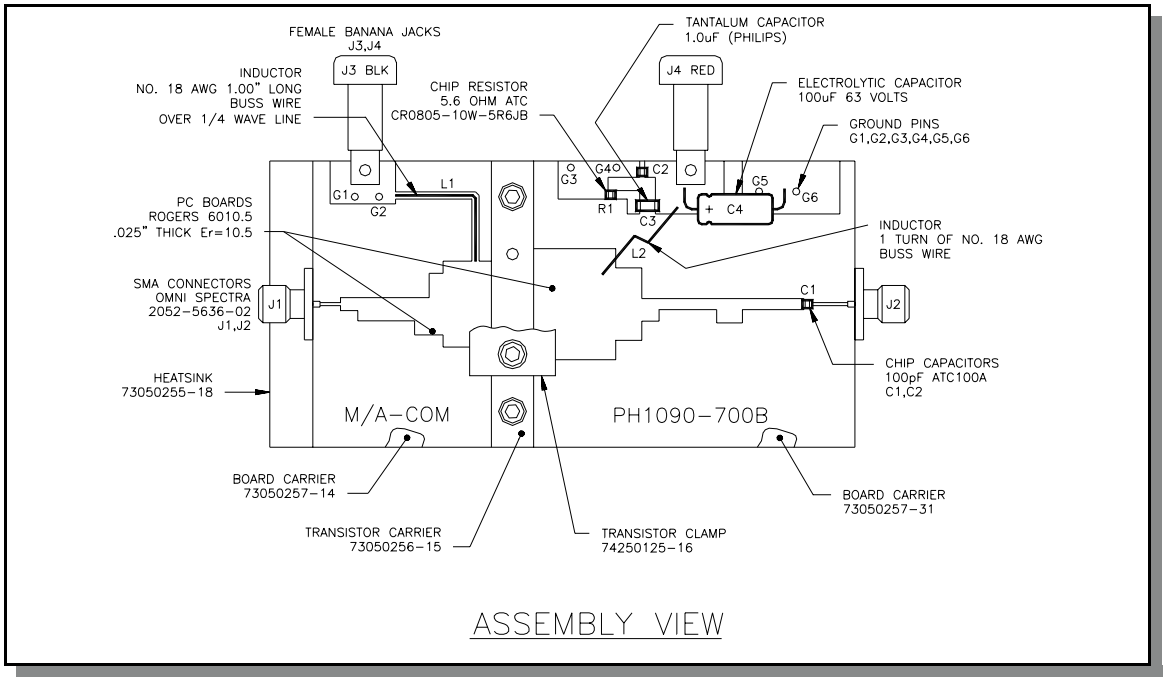
Frequency = 1090 MHz



Broadband Circuit Dimensions



Broadband Assembly Diagram



Specifications subject to change without notice.

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