

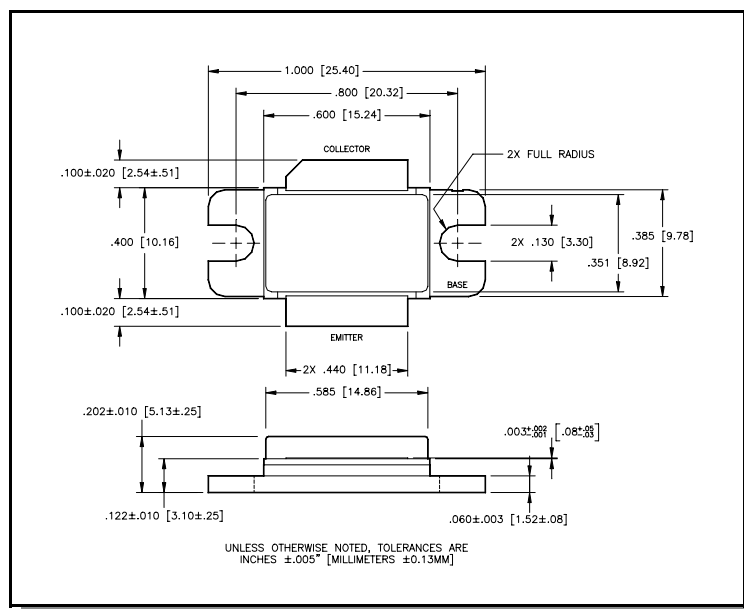
## Features

- 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

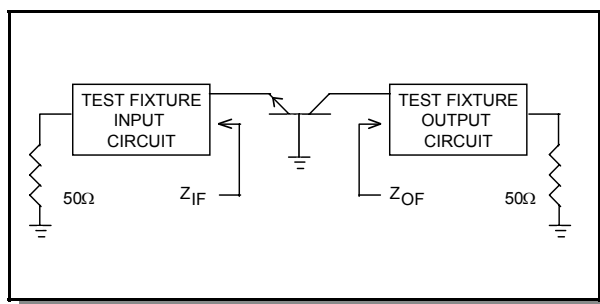
## Absolute Maximum Ratings @ 25 °C

| 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) | $Z_{IF} (\Omega)$ | $Z_{OF} (\Omega)$ |
|---------|-------------------|-------------------|
| 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         |

## Electrical Characteristics at 25°C

### Standard Pulse Condition: 32 $\mu$ S 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 <sub>CC</sub> =50 V, P <sub>out</sub> =700 W, F=1.03, 1.09 GHz<br>Pulse Conditions: 32 $\mu$ s, 2% | -   | 0.06  | °C/W  |
| Power Gain                          | GP      | V <sub>CC</sub> =50 V, P <sub>out</sub> =700 W, F=1.03, 1.09 GHz<br>Pulse Conditions: 32 $\mu$ s, 2% | 7.5 | -     | dB    |
| Collector Efficiency                | $\eta$  | V <sub>CC</sub> =50 V, P <sub>out</sub> =700 W, F=1.03, 1.09 GHz<br>Pulse Conditions: 32 $\mu$ s, 2% | 50  | -     | %     |
| Input Return Loss                   | RL      | V <sub>CC</sub> =50 V, P <sub>out</sub> =700 W, F=1.03, 1.09 GHz<br>Pulse Conditions: 32 $\mu$ s, 2% | -10 | -     | dB    |
| Load Mismatch Tolerance             | VSWR-T  | V <sub>CC</sub> =50 V, P <sub>out</sub> =700 W, F=1.03, 1.09 GHz<br>Pulse Conditions: 32 $\mu$ s, 2% | -   | 5.0:1 | -     |
| Load Mismatch Stability             | VSWR-S  | V <sub>CC</sub> =50 V, P <sub>out</sub> =700 W, F=1.03, 1.09 GHz<br>Pulse Conditions: 32 $\mu$ s, 2% | -   | 1.5:1 | -     |

### Mode-S Pulse Train: 48 Pulses of 32 $\mu$ S “on”, 18 $\mu$ S “off” repeated every 24 mS, 6.4% Overall Duty Cycle\*\*

#### Peak Power: 450 Watts

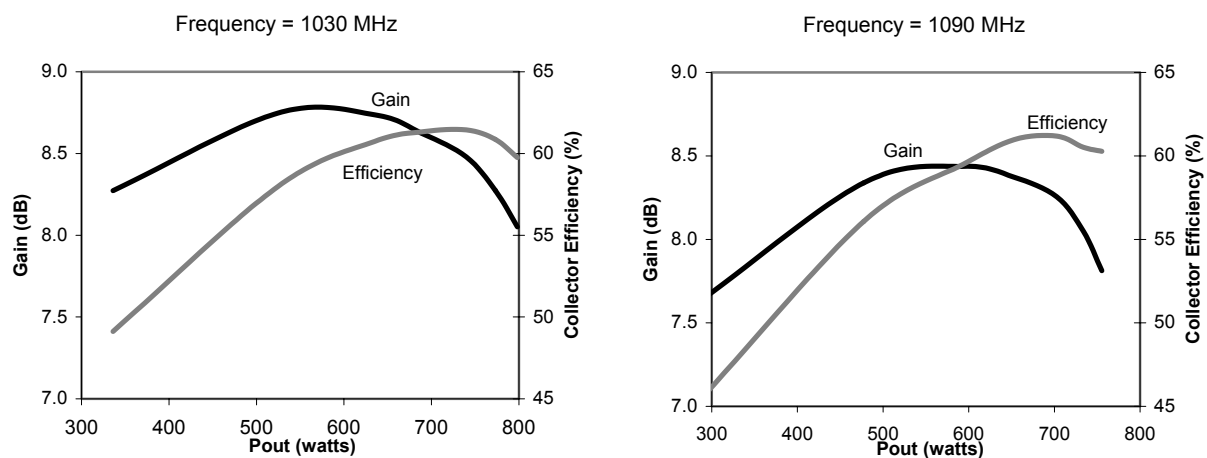
| Parameter               | Symbol  | Test Conditions                                                                       | Typical | Units |
|-------------------------|---------|---------------------------------------------------------------------------------------|---------|-------|
| Thermal Resistance      | RTH(JC) | V <sub>CC</sub> =45v, P <sub>out</sub> =450 W, F=1.03, 1.09 GHz<br>Mode-S Pulse Train | 0.20    | °C/W  |
| Power Gain              | GP      | V <sub>CC</sub> =45v, P <sub>out</sub> =450 W, F=1.03, 1.09 GHz<br>Mode-S Pulse Train | 8.0     | dB    |
| Collector Efficiency    | $\eta$  | V <sub>CC</sub> =45v, P <sub>out</sub> =450 W, F=1.03, 1.09 GHz<br>Mode-S Pulse Train | 55      | %     |
| Input Return Loss       | RL      | V <sub>CC</sub> =45v, P <sub>out</sub> =450 W, F=1.03, 1.09 GHz<br>Mode-S Pulse Train | -13     | dB    |
| Load Mismatch Tolerance | VSWR-T  | V <sub>CC</sub> =45v, P <sub>out</sub> =450 W, F=1.03, 1.09 GHz<br>Mode-S Pulse Train | 2:1     | -     |
| Load Mismatch Stability | VSWR-S  | V <sub>CC</sub> =45v, P <sub>out</sub> =450 W, F=1.03, 1.09 GHz<br>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 (32 $\mu$ S, 2%)

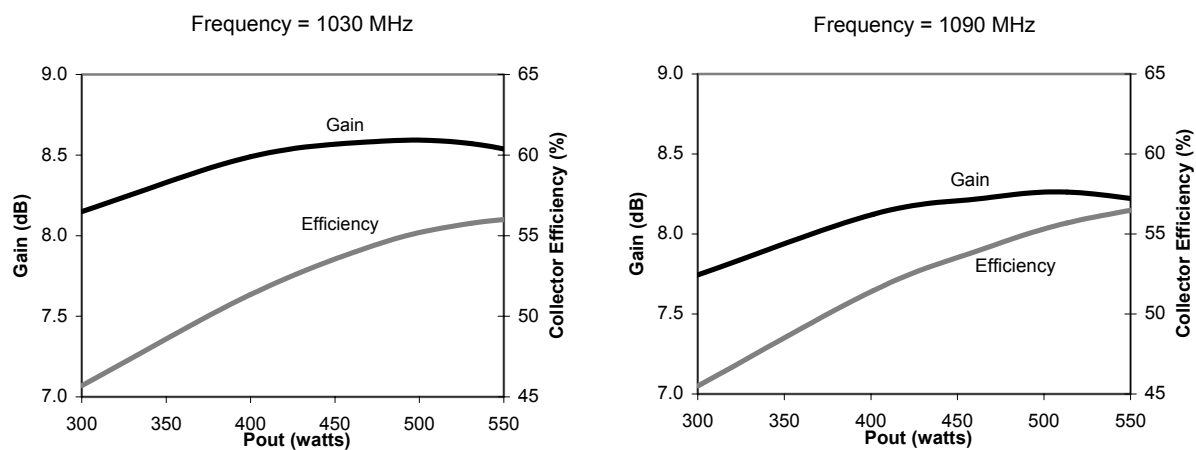
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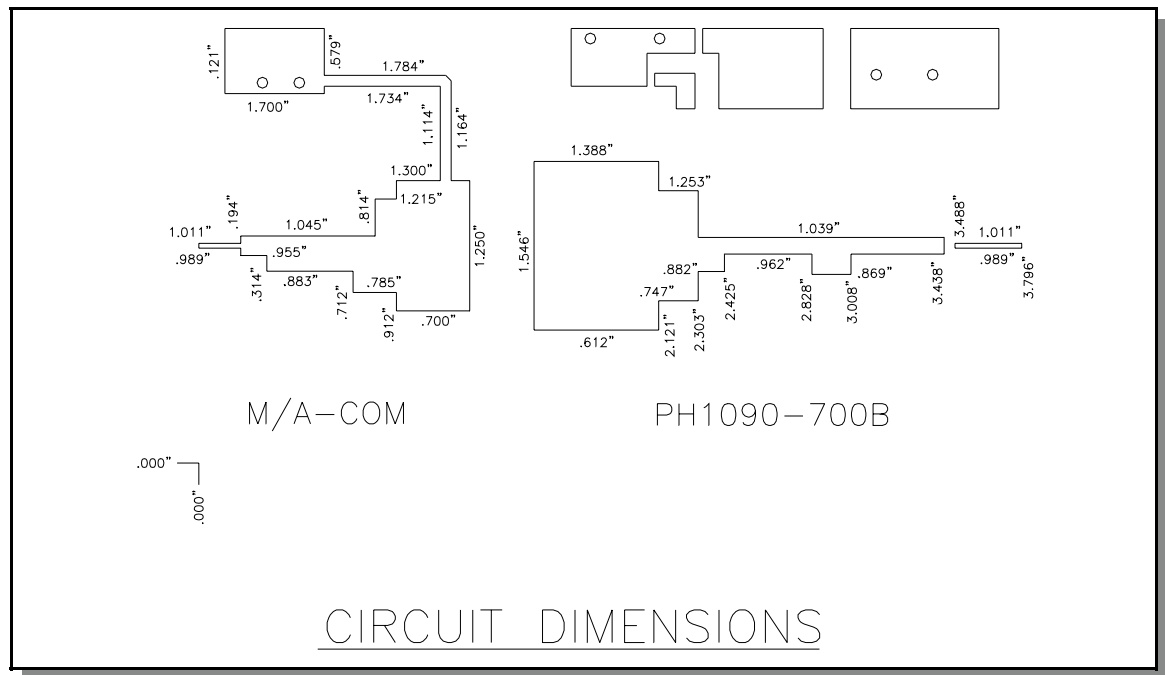
### Gain & Efficiency vs P<sub>OUT</sub>

V<sub>CC</sub> = 50V, Pulse Width = 32 $\mu$ S, Duty Cycle = 2%

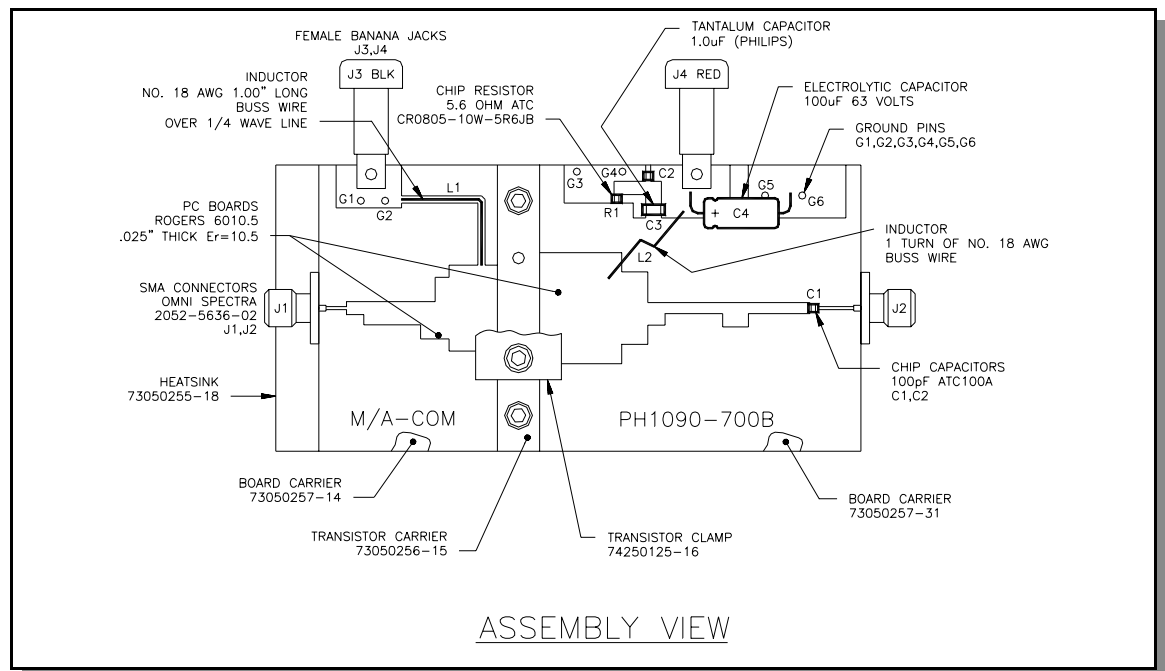
### Gain & Efficiency vs P<sub>OUT</sub>

V<sub>CC</sub> = 45V, Mode-S Pulse Train

## Broadband Circuit Dimensions



## Broadband Assembly Diagram



Specifications subject to change without notice.

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