# PH1214-220M

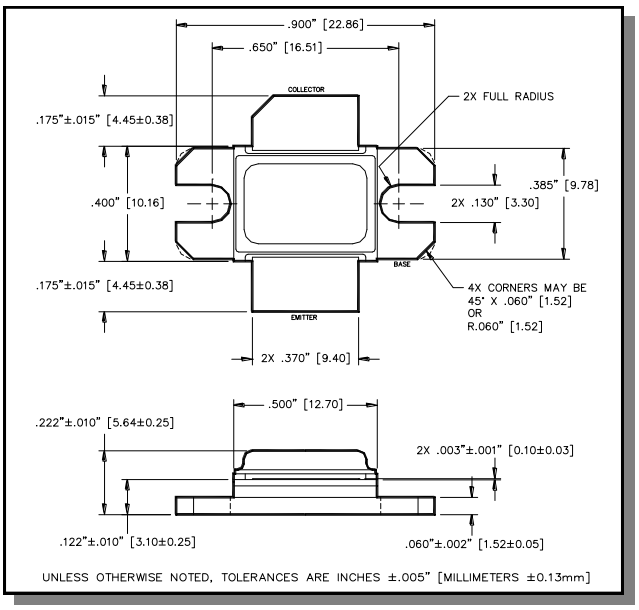
## Radar Pulsed Power Transistor
## 220W, 1.2-1.4 GHz, 150µs Pulse, 10% Duty

Rev. V1

### 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 | $V_{CES}$ | 70 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 3.0 | V |
| Collector Current (Peak) | $I_C$ | 21 | A |
| Power Dissipation @ +25°C | $P_{TOT}$ | 700 | 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 | $I_C$ = 100mA | | $BV_{CES}$ | 70 | - | 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 | $R_{TH(JC)}$ | - | 0.25 | °C/W |
| Output Power | Vcc = 40V, Pin = 40W | F = 1.2, 1.3, 1.4 GHz | $P_{OUT}$ | 220 | - | W |
| Power Gain | Vcc = 40V, Pin = 40W | F = 1.2, 1.3, 1.4 GHz | $G_P$ | 7.4 | - | dB |
| Collector Efficiency | Vcc = 40V, Pin = 40W | F = 1.2, 1.3, 1.4 GHz | $\eta_C$ | 50 | - | % |
| Input Return Loss | Vcc = 40V, Pin = 40W | F = 1.2, 1.3, 1.4 GHz | RL | - | -9 | dB |
| Pulse Droop | Vcc = 40V, Pin = 40W | F = 1.2, 1.3, 1.4 GHz | Droop | - | 0.8 | dB |
| Load Mismatch Tolerance | Vcc = 40V, Pin = 40W | F = 1.2, 1.3, 1.4 GHz | VSWR-T | - | 3:1 | - |
| Load Mismatch Stability | Vcc = 40V, Pin = 40W | F = 1.2, 1.3, 1.4 GHz | VSWR-S | - | 1.5:1 | - |

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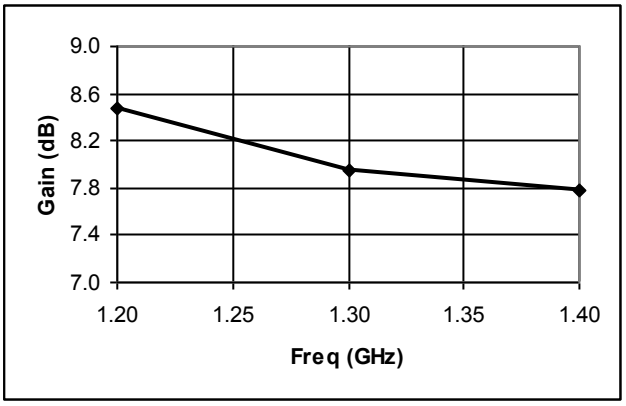
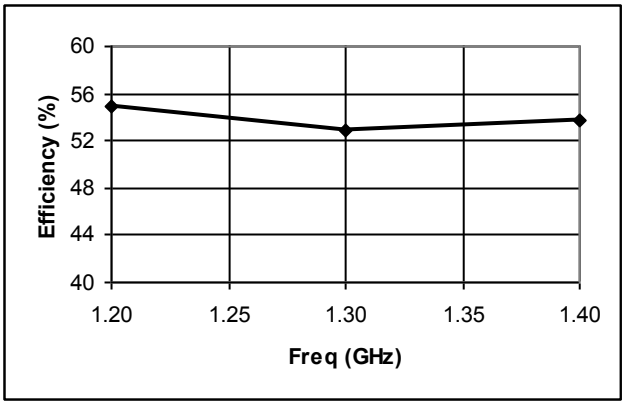
### Typical RF Performance

| Freq. (GHz) | Pin (W) | Pout (W) | Gain (dB) | Ic (A) | Eff (%) | Droop (dB) | RL (dB) | VSWR-S (1.5:1) | VSWR-T (3:1) |
|---|---|---|---|---|---|---|---|---|---|
| 1.2 | 40 | 281 | 8.47 | 12.8 | 54.8 | 0.34 | -16.7 | S | P |
| 1.3 | 40 | 250 | 7.95 | 11.8 | 53.0 | 0.22 | -16.8 | S | P |
| 1.4 | 40 | 240 | 7.78 | 11.2 | 53.7 | 0.24 | -15.4 | S | P |

### Gain vs. Frequency

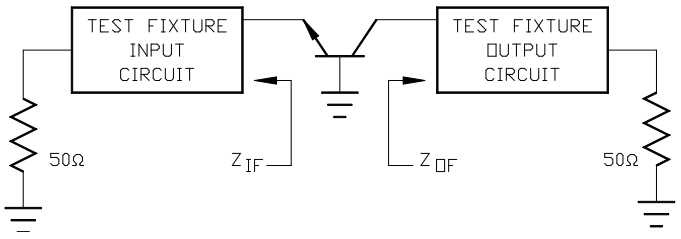



### Collector Efficiency vs. Frequency




### RF Test Fixture Impedance

| F (GHz) | $Z_{IF}$ (Ω) | $Z_{OF}$ (Ω) |
|---|---|---|
| 1.2 | 3.3 - j2.7 | 2.0 - j1.5 |
| 1.3 | 3.4 - j2.1 | 1.9 - j1.6 |
| 1.4 | 3.6 - j1.3 | 1.7 - j1.4 |



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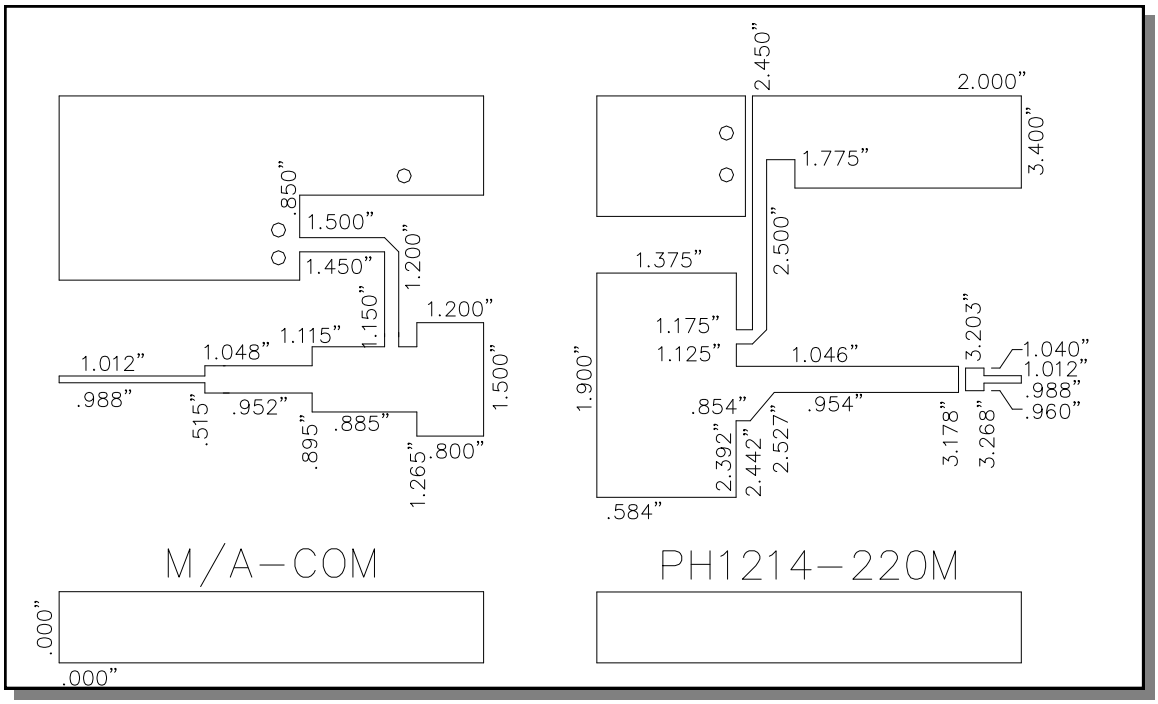
### Test Fixture Circuit Dimensions




### Test Fixture Assembly