

# MAPRST1214-30UF



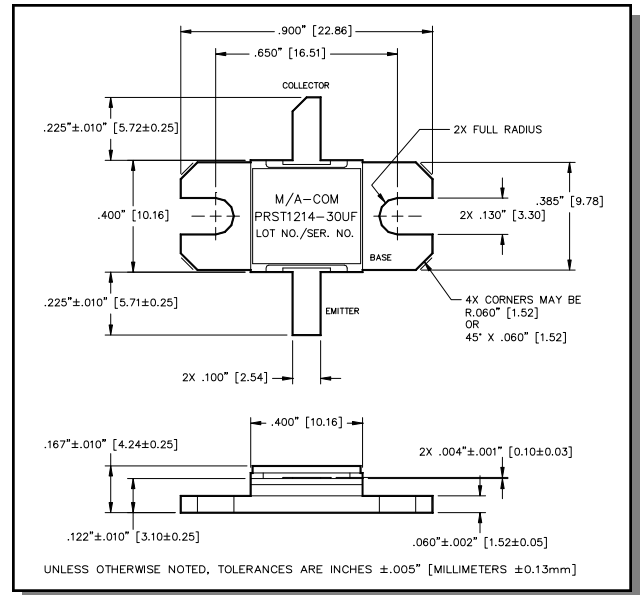
Radar Pulsed Power Transistor  
30W, 1.2-1.4 GHz, 6ms Pulse, 25% Duty

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 | $V_{CES}$ | 70          | V     |
| Emitter-Base Voltage      | $V_{EBO}$ | 3.0         | V     |
| Collector Current (Peak)  | $I_C$     | 5.0         | A     |
| Power Dissipation @ +25°C | $P_{TOT}$ | 145         | W     |
| Storage Temperature       | $T_{STG}$ | -65 to +200 | °C    |
| Junction Temperature      | $T_J$     | 200         | °C    |

## Electrical Specifications: $T_C = 25 \pm 5^\circ\text{C}$ (Room Ambient )

| Parameter                           | Test Conditions                                | Frequency                      | Symbol       | Min | Max   | Units |
|-------------------------------------|------------------------------------------------|--------------------------------|--------------|-----|-------|-------|
| Collector-Emitter Breakdown Voltage | $I_C = 10\text{mA}$                            |                                | $BV_{CES}$   | 70  | -     | V     |
| Collector-Emitter Leakage Current   | $V_{CE} = 40\text{V}$                          |                                | $I_{CES}$    | -   | 2.0   | mA    |
| Thermal Resistance                  | $V_{CC} = 36\text{V}$ , $P_{in} = 5.3\text{W}$ | $F = 1.2, 1.3, 1.4\text{ GHz}$ | $R_{TH(JC)}$ | -   | 1.2   | °C/W  |
| Output Power                        | $V_{CC} = 36\text{V}$ , $P_{in} = 5.3\text{W}$ | $F = 1.2, 1.3, 1.4\text{ GHz}$ | $P_{OUT}$    | 30  | -     | W     |
| Power Gain                          | $V_{CC} = 36\text{V}$ , $P_{in} = 5.3\text{W}$ | $F = 1.2, 1.3, 1.4\text{ GHz}$ | $G_P$        | 7.5 | -     | dB    |
| Gain Flatness                       | $V_{CC} = 36\text{V}$ , $P_{in} = 5.3\text{W}$ | $F = 1.2, 1.3, 1.4\text{ GHz}$ | $\Delta G$   | -   | 1.25  | dB    |
| Collector Efficiency                | $V_{CC} = 36\text{V}$ , $P_{in} = 5.3\text{W}$ | $F = 1.2, 1.3, 1.4\text{ GHz}$ | $\eta_C$     | 45  | -     | %     |
| Input Return Loss                   | $V_{CC} = 36\text{V}$ , $P_{in} = 5.3\text{W}$ | $F = 1.2, 1.3, 1.4\text{ GHz}$ | RL           | -   | -9    | dB    |
| Pulse Droop                         | $V_{CC} = 36\text{V}$ , $P_{in} = 5.3\text{W}$ | $F = 1.2, 1.3, 1.4\text{ GHz}$ | Droop        | -   | 0.5   | dB    |
| Load Mismatch Tolerance             | $V_{CC} = 36\text{V}$ , $P_{in} = 5.3\text{W}$ | $F = 1.2, 1.3, 1.4\text{ GHz}$ | VSWR-T       | -   | 3:1   | -     |
| Load Mismatch Stability             | $V_{CC} = 36\text{V}$ , $P_{in} = 5.3\text{W}$ | $F = 1.2, 1.3, 1.4\text{ GHz}$ | VSWR-S       | -   | 1.5:1 | -     |

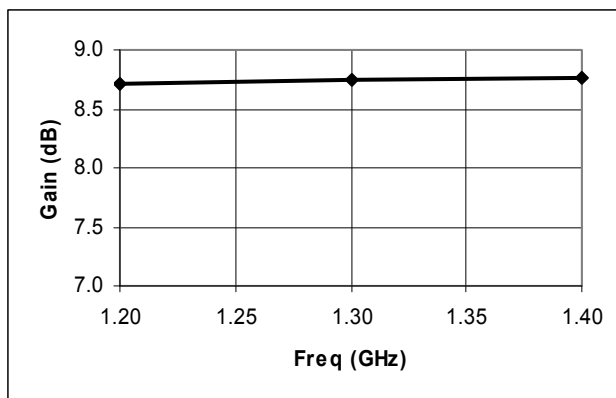
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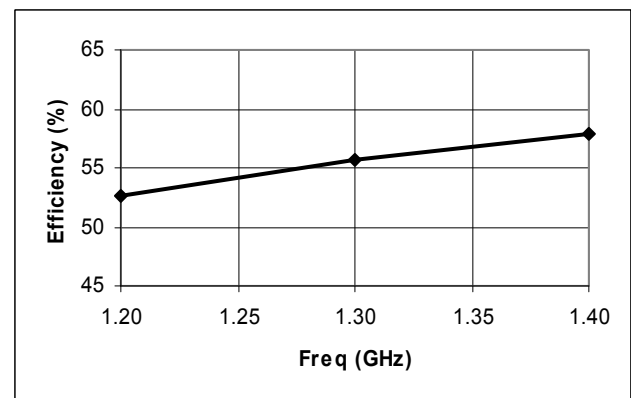
## Typical RF Performance

| 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         | 5.3     | 39.4     | 8.71      | 2.08   | 52.6    | 0.24       | -12.3   | S              | P            |
| 1.3         | 5.3     | 39.7     | 8.75      | 1.98   | 55.6    | 0.20       | -14.6   | S              | P            |
| 1.4         | 5.3     | 39.9     | 8.77      | 1.92   | 57.8    | 0.17       | -15.0   | S              | P            |

## Gain vs. Frequency

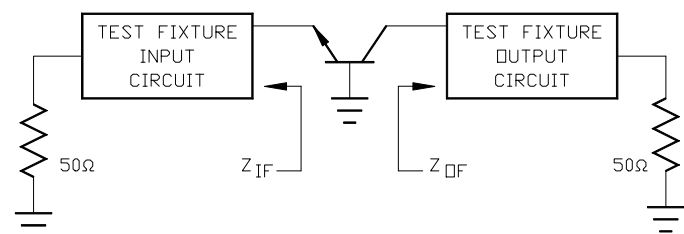


## Collector Efficiency vs. Frequency



## RF Test Fixture Impedance

| F (GHz) | Z <sub>IF</sub> (Ω) | Z <sub>OF</sub> (Ω) |
|---------|---------------------|---------------------|
| 1.2     | 6.7 - j6.9          | 14.3 + j2.4         |
| 1.3     | 6.5 - j6.5          | 11.2 - j0.8         |
| 1.4     | 6.3 - j4.5          | 7.2 - j0.1          |





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CHIP RESISTOR  
5.1 OHM 1/8 WATT

CHIP CAPACITOR  
5000pF ATC200B

NO. 24 AWG X .66" LONG  
OVER  
QUARTER-WAVE ELEMENT

FEMALE BANANA JACK  
J3, J4

J3 BLK

J4 RED

ELECTROLYTIC CAPACITOR  
(MILITARY GRADE)  
100uF 40 VOLT 125°C

GROUND SHIM  
G1, G2, G3

QUARTER-WAVE ELEMENT

PC BOARD  
ROGERS 6010.5  
.025" THICK Er=10.5

SMA CONNECTOR  
OMNI SPECTRA  
2052-5636-02  
J1, J2

HEATSINK  
73050255-14

BOARD CARRIER  
73050257-13

BOARD CARRIER  
73050257-15

TRANSISTOR CARRIER  
73050256-04

CHIP CAPACITOR  
100pF ATC100A  
C1, C2

M/A-COM

MAPRST124-30UF

G1

G2

G3

L1

L2

C1

C2

C3

C4

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