The RF Line NPN Silicon Power Transistor
100W(PEP), 30MHz, 28V

Designed primarily for application as a high–power linear amplifier from 2.0 to 30 MHz.

- Specified 12.5 V, 30 MHz characteristics —
  - Output power = 100 W (PEP)
  - Minimum gain = 10 dB
  - Efficiency = 40%
- Intermodulation distortion @ 100 W (PEP) — IMD = –30 dB (min.)
- 100% tested for load mismatch at all phase angles with 30:1 VSWR

MAXIMUM RATINGS

<table>
<thead>
<tr>
<th>Rating</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector–Emitter Voltage</td>
<td>V_CEO</td>
<td>20</td>
<td>V_dC</td>
</tr>
<tr>
<td>Collector–Base Voltage</td>
<td>V_CBO</td>
<td>45</td>
<td>V_dC</td>
</tr>
<tr>
<td>Emitter–Base Voltage</td>
<td>V_EBO</td>
<td>3.0</td>
<td>V_dC</td>
</tr>
<tr>
<td>Collector Current — Continuous</td>
<td>I_C</td>
<td>20</td>
<td>A_dC</td>
</tr>
<tr>
<td>Withstand Current — 10 s</td>
<td></td>
<td>30</td>
<td>A_dC</td>
</tr>
<tr>
<td>Total Device Dissipation @ T_C = 25°C</td>
<td>P_D</td>
<td>290</td>
<td>Watts</td>
</tr>
<tr>
<td>Derate above 25°C</td>
<td></td>
<td>1.66</td>
<td>W/°C</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>T_STG</td>
<td>–65 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

THERMAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Resistance, Junction to Case</td>
<td>R_JVC</td>
<td>0.6</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector–Emitter Breakdown Voltage (I_C = 50 mA, I_B = 0)</td>
<td>V_CE_B</td>
<td>20</td>
<td>—</td>
<td>—</td>
<td>V_dC</td>
</tr>
<tr>
<td>Collector–Emitter Breakdown Voltage (I_C = 200 mA, V_E = 0)</td>
<td>V_CE_BES</td>
<td>45</td>
<td>—</td>
<td>—</td>
<td>V_dC</td>
</tr>
<tr>
<td>Collector–Base Breakdown Voltage (I_C = 200 mA, I_E = 0)</td>
<td>V_BE_B</td>
<td>45</td>
<td>—</td>
<td>—</td>
<td>V_dC</td>
</tr>
<tr>
<td>Emitter–Base Breakdown Voltage (I_E = 10 mA, I_C = 0)</td>
<td>V_BE_BEO</td>
<td>3.0</td>
<td>—</td>
<td>—</td>
<td>V_dC</td>
</tr>
<tr>
<td>Collector Cutoff Current (V_CE = 16 V, V_BE = 0, T_C = 25°C)</td>
<td>I_CE</td>
<td>—</td>
<td>10</td>
<td>—</td>
<td>mA_dC</td>
</tr>
</tbody>
</table>

(continued)
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M/A-COM Products
Released - Rev. 07.07

ELECTRICAL CHARACTERISTICS – continued  (T_c = 25°C unless otherwise noted)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
</table>

ON CHARACTERISTICS

DC Current Gain
(I_c = 5.0 Adc, V_CBE = 5.0 Vdc)

\( h_{FE} \)

10
70
—
—

DYNAMIC CHARACTERISTICS

Output Capacitance
(V_CCB = 12.5 Vdc, I_E = 0, f = 1.0 MHz)

\( C_{OB} \)

—
560
600
pF

FUNCTIONAL TESTS

Common–Emitter Amplifier Power Gain
(V_CCB = 12.5 Vdc, P_{out} = 100 W, I_c(max) = 10 Adc,
I_C = 150 mAAdc, f = 30, 30.001 MHz)

\( G_{FE} \)

10
12
—
dB

Collector Efficiency
(V_CCB = 12.5 Vdc, P_{out} = 100 W, I_c(max) = 10 Adc,
I_C = 150 mAAdc, f = 30, 30.001 MHz)

\( \eta \)

40
—
—
%

Intermodulation Distortion (1)
(V_CCE = 12.5 Vdc, P_{out} = 100 W, I_c = 10 Adc,
I_C = 150 mAAdc, f = 30, 30.001 MHz)

IMD

—
-33
-30
dB

NOTE:
1. To proposed EIA method of measurement. Reference peak envelope power.

ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.

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Figure 1. 30 MHz Test Circuit Schematic

C1, C2, C4 — 170–760 pF, ARCO 469
C3 — 80–480 pF, ARCO 466
C5, C7, C10 — ERIE 0.1 μF, 100 V
C6 — MALLORY 500 μF @ 15 V Electrolytic
C9 — 100 μF, 15 V Electrolytic
C8 — 1000 pF, 350 V UNDERWOOD
R1 — 10 Ω, 25 Watt Wirewound

R2 — 10 Ω, 1.0 Watt Carbon
CR1 — 1N4997
L1 — 3 Turn, #16 Wire, 5/16” I.D., 5/16” Long
L2 — 12 Turn, #16 Enamelled Wire Closewound, 1/4” I.D.
L3 — 1-3/4 Turn, 1/8” Tubing, 3/8” I.D., 3/8” Long
L4 — 10 μH Molded Choke
L5 — 10 Ferrite Beads — FERROXCUBE #56–590–65/5B

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Figure 2. Output Power versus Input Power

Figure 3. Output Power versus Supply Voltage

Figure 4. Power Gain versus Frequency

Figure 5. Intermodulation Distortion versus Output Power

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Figure 8. Output Capacitance versus Frequency
Figure 9. Output Resistance versus Frequency