The RF Line NPN Silicon Power Transistor
80W, 3.0-200MHz, 28V

M/A-COM Products
Released - Rev. 07.07

MRF316

Designed primarily for wideband large-signal output amplifier stages in the 30–200 MHz frequency range.

- Guaranteed performance at 150 MHz, 28 Vdc
  Output power = 80 W
  Minimum gain = 10 dB
- Built-in matching network for broadband operation
- 100% tested for load mismatch at all phase angles with 30:1 VSWR
- Gold metallization system for high reliability applications

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>35</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector-Base Voltage</td>
<td>V_CBO</td>
<td>65</td>
<td>Vdc</td>
</tr>
<tr>
<td>Emitter-Base Voltage</td>
<td>V_EBO</td>
<td>4.0</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector Current — Continuous Peak</td>
<td>I_C</td>
<td>9.0</td>
<td>A dc</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13.5</td>
<td>A dc</td>
</tr>
<tr>
<td>Total Device Dissipation @ T_C = 25°C (1)</td>
<td>P_D</td>
<td>220</td>
<td>Watts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.26</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_{JJC}</td>
<td>0.8</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 dc, I_B = 0)</td>
<td>V_{BRJCEO}</td>
<td>35</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector-Emitter Breakdown Voltage (I_C = 50 mA dc, V_{BE} = 0)</td>
<td>V_{BRICES}</td>
<td>65</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector-Base Breakdown Voltage (I_C = 50 mA dc, I_E = 0)</td>
<td>V_{BRJOB}</td>
<td>65</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Emitter-Base Breakdown Voltage (I_E = 50 mA dc, I_C = 0)</td>
<td>V_{BRUEBO}</td>
<td>4.0</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector Cutoff Current (V_{CEB} = 30 V dc, I_E = 0)</td>
<td>I_{CEO}</td>
<td>—</td>
<td>—</td>
<td>5.0</td>
<td>mA dc</td>
</tr>
</tbody>
</table>

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.

PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

- North America  Tel: 800.366.2266 / Fax: 978.366.2266
- Europe       Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- Asia/Pacific Tel: 81.44.844.8296 / Fax: 81.44.844.8298

Visit www.macomtech.com for additional data sheets and product information.
### ON CHARACTERISTICS

<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>DC Current Gain</td>
<td>hFE</td>
<td>10</td>
<td>—</td>
<td>80</td>
<td>—</td>
</tr>
</tbody>
</table>

### DYNAMIC CHARACTERISTICS

<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>Output Capacitance</td>
<td>CCB</td>
<td>—</td>
<td>100</td>
<td>130</td>
<td>pF</td>
</tr>
</tbody>
</table>

NOTE: 1. This device is designed for RF operation. The total device dissipation rating applies only when the device is operated as an RF amplifier.

### 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>
<tbody>
<tr>
<td>NARROW BAND FUNCTIONAL TESTS (Figure 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common–Emitter Amplifier Power Gain</td>
<td>GPE</td>
<td>10</td>
<td>13</td>
<td>—</td>
<td>dB</td>
</tr>
<tr>
<td>Collector Efficiency</td>
<td>η</td>
<td>55</td>
<td>—</td>
<td>—</td>
<td>%</td>
</tr>
<tr>
<td>Load Mismatch</td>
<td>ψ</td>
<td>No Degradation in Output Power</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MRF316

The RF Line NPN Silicon Power Transistor
80W, 3.0-200MHz, 28V

M/A-COM Products
Released - Rev. 07.07

![RF Line NPN Silicon Power Transistor Diagram]

C1 — 22 pF 100 mil ATC  
C2, C3 — 24 pF 100 mil ATC  
C4, C11 — 0.8–20 pF JMC #5501 Johanson  
C5 — 200 pF 100 mil ATC  
C6 — 240 pF 100 mil ATC  
C7 — Dipped Mica 1000 pF  
C8 — 0.1 μF Enie Red Cap  
C9, C10, C12 — 30 pF 100 mil ATC  
C13 — 1.0 μF Tantalum  
L1 — 0.8", #20 Wire  
L2 — 1.0", #20 Wire  
RFC1, RFC4 — 0.15 μH Molded Coil  
RFC2, RFC3 — Ferroxcube Bead 56–590–55–3B  
RFC5 — 2.5", #20 Wire, 1.5 Turns  
RFC6 — Ferroxcube VK200–19/4B  
R1 — 10 Ω, 1/2 W  
R2, R3 — 10 Ω, 1.0 W

Figure 1. 150 MHz Test Amplifier

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.

PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

Visit www.macomtech.com for additional data sheets and product information.
**MRF316**

The RF Line NPN Silicon Power Transistor
80W, 3.0-200MHz, 28V

**TYPICAL PERFORMANCE CURVES**

**Figure 2. Output Power versus Input Power**

**Figure 3. Power Gain versus Frequency**

**Figure 4. Output Power versus Supply Voltage**

**Figure 5. Output Power versus Supply Voltage**

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.

PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

Visit www.macomtech.com for additional data sheets and product information.
The RF Line NPN Silicon Power Transistor
80W, 3.0-200MHz, 28V

Figure 6. Output Power versus Supply Voltage

Figure 7. Series Equivalent Input–Output Impedance
The RF Line NPN Silicon Power Transistor
80W, 3.0-200MHz, 28V

M/A-COM Products
Released - Rev. 07.07

MRF316

- North America  Tel: 800.366.2266 / Fax: 978.366.2266
- Europe    Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- Asia/Pacific Tel: 81.44.844.8296 / Fax: 81.44.844.8298

Visit www.macomtech.com for additional data sheets and product information.

M/A-COM Technology Solutions Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.