The RF Line Controlled “Q” Broadband Power Transistor
125W, 30 to 500MHz, 28V

Designed primarily for wideband large–signal output and driver amplifier stages in the 30 to 500 MHz frequency range.

- Specified 28 V, 400 MHz characteristics —
  - Output power = 125 W
  - Typical gain = 10 dB
  - Efficiency = 55% (typ.)
- Built–in input impedance matching networks for broadband operation
- Push–pull configuration reduces even numbered harmonics
- Gold metallization system for high reliability
- 100% tested for load mismatch

The MRF392 is two transistors in a single package with separate base and collector leads and emitters common. This arrangement provides the designer with a space saving device capable of operation in a push–pull configuration.

PUSH–PULL TRANSISTORS

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>VCEO</td>
<td>30</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector–Base Voltage</td>
<td>VCEO</td>
<td>60</td>
<td>Vdc</td>
</tr>
<tr>
<td>Emitter–Base Voltage</td>
<td>VEBO</td>
<td>4.0</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector Current — Continuous</td>
<td>IC</td>
<td>16</td>
<td>Adc</td>
</tr>
<tr>
<td>Total Device Dissipation @ TC = 25°C (1)</td>
<td>PD</td>
<td>270</td>
<td>Watts</td>
</tr>
<tr>
<td>Derate above 25°C</td>
<td></td>
<td>1.54</td>
<td>W/°C</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>Tstg</td>
<td>−65 to +150</td>
<td>°C</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>TJ</td>
<td>200</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>RθJC</td>
<td>0.65</td>
<td>°C/W</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 push–pull amplifier.
<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 (IC = 50 mA, IB = 0)</td>
<td>V(BR)CEO</td>
<td>30</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector–Emitter Breakdown Voltage (IC = 50 mA, VBE = 0)</td>
<td>V(BR)CES</td>
<td>60</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Emitter–Base Breakdown Voltage (IE = 5.0 mA, IC = 0)</td>
<td>V(BR)EBO</td>
<td>4.0</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector Cutoff Current (VCB = 30 V, IE = 0)</td>
<td>ICBO</td>
<td>—</td>
<td>—</td>
<td>5.0</td>
<td>mA dc</td>
</tr>
<tr>
<td>DC Current Gain (IC = 1.0 A, VCE = 5.0 V)</td>
<td>hFE</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>—</td>
</tr>
<tr>
<td>Output Capacitance (VCB = 28 V, IE = 0, f = 1.0 MHz)</td>
<td>Cobs</td>
<td>—</td>
<td>75</td>
<td>95</td>
<td>pF</td>
</tr>
</tbody>
</table>

**FUNCTIONAL TESTS (2) — See Figure 1**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Symbol</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common–Emitter Amplifier Power Gain</td>
<td>Gpe</td>
<td>8.0</td>
<td>10</td>
<td>—</td>
<td>dB</td>
</tr>
<tr>
<td>Collector Efficiency</td>
<td>η</td>
<td>50</td>
<td>55</td>
<td>—</td>
<td>%</td>
</tr>
<tr>
<td>Load Mismatch</td>
<td>ψ</td>
<td></td>
<td></td>
<td></td>
<td>No Degradation in Output Power</td>
</tr>
</tbody>
</table>

**NOTES:**
1. Each transistor chip measured separately.
2. Both transistor chips operating in push–pull amplifier.
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C1, C2 — 240 pF, 100 Mil Chip Cap (ATC) or Equivalent
C3 — 3.6 pF, 100 Mil Chip Cap (ATC) or Equivalent
C4, C8 — 8.2 pF, 100 Mil Chip Cap (ATC) or Equivalent
C5, C6 — 20 pF, 100 Mil Chip Cap (ATC) or Equivalent
C7 — 18 pF, Mini Unilco or Equivalent
C9, C10 — 270 pF, 100 Mil Chip Cap (ATC) or Equivalent
C11, C12, C16, C17 — 470 pF 100 Mil Chip Cap (ATC) or Equivalent
C13, C18 — 680 pF Feedthru
C14, C19 — 0.1 μF Erie Redcap or Equivalent
C15 — 20 μF, 50 V

L1, L2 — 0.15 μH Molded Choke With Ferrite Bead
L3, L4 — 2-1/2 Turns #20 AWG, 0.200 ID
L5, L6 — 3-1/2 Turns #18 AWG, 0.200 ID

B1 — Balun, 50 Ω Semi-Rigid Coaxial Cable 86 Mil OD, 2" L
B2 — Balun, 50 Ω Semi-Rigid Coaxial Cable 86 Mil OD, 2" L
Z1 — Microstrip Line 270 Mil L x 125 Mil W
Z2 — Microstrip Line 375 Mil L x 125 Mil W
Z3 — Microstrip Line 280 Mil L x 125 Mil W
Z4 — Microstrip Line 300 Mil L x 125 Mil W
Z5 — Microstrip Line 350 Mil L x 125 Mil W
Z6 — Microstrip Line 366 Mil L x 125 Mil W

Board Material — 0.0625” Teflon Fiberglass ε_r = 2.5 ± 0.05 1 oz. Cu.
CLAD, Double Sided

Figure 1. 400 MHz Test Fixture
The RF Line Controlled “Q” Broadband Power Transistor
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**Figure 2. Output Power versus Input Power**

**Figure 3. Output Power versus Input Power**

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

**Figure 5. Output Power versus Supply Voltage**
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Figure 6. Series Equivalent Input/Output Impedance

Z_in & Z_QL* are given from base-to-base and collector-to-collector respectively.
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PACKAGE DIMENSIONS

CASE 744A-01
ISSUE C
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