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>VCBO</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 @ T_C = 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>T_{stg}</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>R_{θJC}</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.
MRF392

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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 mADC, I_B = 0)</td>
<td>V(BR)CEO</td>
<td>30</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector–Emitter Breakdown Voltage (I_C = 50 mADC, V_BE = 0)</td>
<td>V(BR)CES</td>
<td>60</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Emitter–Base Breakdown Voltage (I_E = 5.0 mA, I_C = 0)</td>
<td>V(BR)EBO</td>
<td>4.0</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector Cutoff Current (V_CB = 30 Vdc, I_E = 0)</td>
<td>I_CBO</td>
<td>—</td>
<td>5.0</td>
<td>mA</td>
<td></td>
</tr>
</tbody>
</table>

ON CHARACTERISTICS (1)

| DC Current Gain (I_C = 1.0 Adc, V_CE = 5.0 Vdc) | h_FE | 40  | 60  | 100 | — |

DYNAMIC CHARACTERISTICS (1)

| Output Capacitance (V_CB = 28 Vdc, I_E = 0, f = 1.0 MHz) | C_ob | —   | 75  | 95  | pF |

FUNCTIONAL TESTS (2) — See Figure 1

| Common–Emitter Amplifier Power Gain (V_CC = 28 Vdc, P_out = 125 W, f = 400 MHz) | G_pe | 8.0 | 10  | —   | dB |
| Collector Efficiency (V_CC = 28 Vdc, P_out = 125 W, f = 400 MHz)              | η    | 50  | 55  | —   | %  |
| Load Mismatch (V_CC = 28 Vdc, P_out = 125 W, f = 400 MHz, VSWR = 30:1, all phase angles) | Ψ    | No Degradation in Output Power |

NOTES:
1. Each transistor chip measured separately.
2. Both transistor chips operating in push–pull amplifier.
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Figure 1. 400 MHz Test Fixture

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 Erié 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 εr = 2.5 ± 0.05 1 oz. Cu.
ClAD, Double Sided

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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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$Z_{in}$ & $Z_{OL}^*$ are given from base-to-base and collector-to-collector respectively.

$V_{CC} = 28\, V, \; P_{out} = 125\, W$

Figure 6. Series Equivalent Input/Output Impedance
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PACKAGE DIMENSIONS

CASE 744A–01
ISSUE C
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