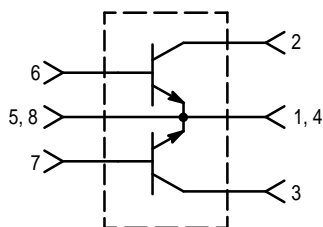


## The RF Line

### NPN Silicon Push-Pull RF Power Transistor

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

- Specified 28 Volt, 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
- Circuit board photomaster available upon request by contacting RF Tactical Marketing in Phoenix, AZ.

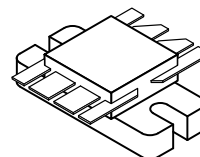


The MRF392 is two transistors in a single package with separate base and collector leads and emitters common. This arrangement provides the designer with a space saving device capable of operation in a push-pull configuration.

#### PUSH-PULL TRANSISTORS

**MRF392**

**125 W, 30 to 500 MHz  
CONTROLLED "Q"  
BROADBAND PUSH-PULL  
RF POWER TRANSISTOR  
NPN SILICON**



**CASE 744A-01, STYLE 1**

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	30	Vdc
Collector-Base Voltage	$V_{CBO}$	60	Vdc
Emitter-Base Voltage	$V_{EBO}$	4.0	Vdc
Collector Current — Continuous	$I_C$	16	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1) Derate above $25^\circ\text{C}$	$P_D$	270 1.54	Watts W/ $^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-65 to +150	$^\circ\text{C}$
Junction Temperature	$T_J$	200	$^\circ\text{C}$

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.65	$^\circ\text{C/W}$

NOTE:

- 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.



**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS (1)</b>					
Collector–Emitter Breakdown Voltage ( $I_C = 50\text{ mAdc}$ , $I_B = 0$ )	$V_{(BR)CEO}$	30	—	—	Vdc
Collector–Emitter Breakdown Voltage ( $I_C = 50\text{ mAdc}$ , $V_{BE} = 0$ )	$V_{(BR)CES}$	60	—	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 5.0\text{ mAdc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = 30\text{ Vdc}$ , $I_E = 0$ )	$I_{CBO}$	—	—	5.0	mAdc

**ON CHARACTERISTICS (1)**

DC Current Gain ( $I_C = 1.0\text{ Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ )	$h_{FE}$	40	60	100	—
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**DYNAMIC CHARACTERISTICS (1)**

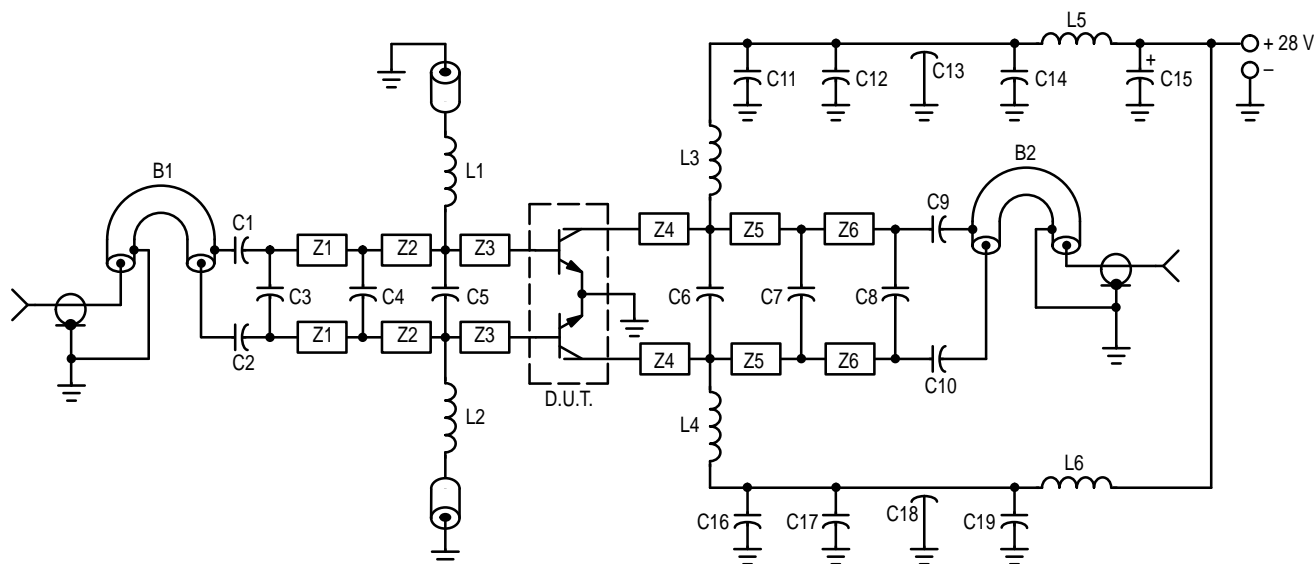
Output Capacitance ( $V_{CB} = 28\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ob}$	—	75	95	pF
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**FUNCTIONAL TESTS (2) — See Figure 1**

Common–Emitter Amplifier Power Gain ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 125\text{ W}$ , $f = 400\text{ MHz}$ )	$G_{pe}$	8.0	10	—	dB
Collector Efficiency ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 125\text{ W}$ , $f = 400\text{ MHz}$ )	$\eta$	50	55	—	%
Load Mismatch ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 125\text{ W}$ , $f = 400\text{ MHz}$ , VSWR = 30:1, all phase angles)	$\psi$	No Degradation in Output Power			

**NOTES:**

- Each transistor chip measured separately.
- Both transistor chips operating in push–pull amplifier.



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 Unelco 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  $\mu\text{F}$  Erie Redcap or Equivalent  
 C15 — 20  $\mu\text{F}$ , 50 V

L1, L2 — 0.15  $\mu\text{H}$  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  $\Omega$  Semi-Rigid Coaxial Cable 86 Mil OD, 2" L  
 B2 — Balun, 50  $\Omega$  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 365 Mil L x 125 Mil W

Board Material — 0.0625" Teflon Fiberglass  $\epsilon_r = 2.5 \pm 0.05$  1 oz. Cu.  
 CLAD, Double Sided

**Figure 1. 400 MHz Test Fixture**

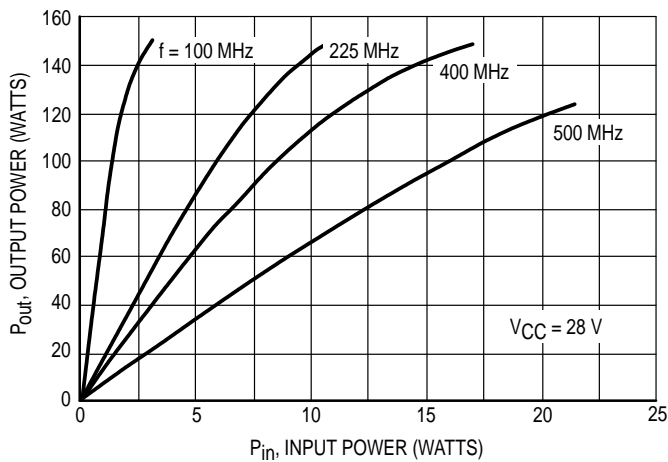


Figure 2. Output Power versus Input Power

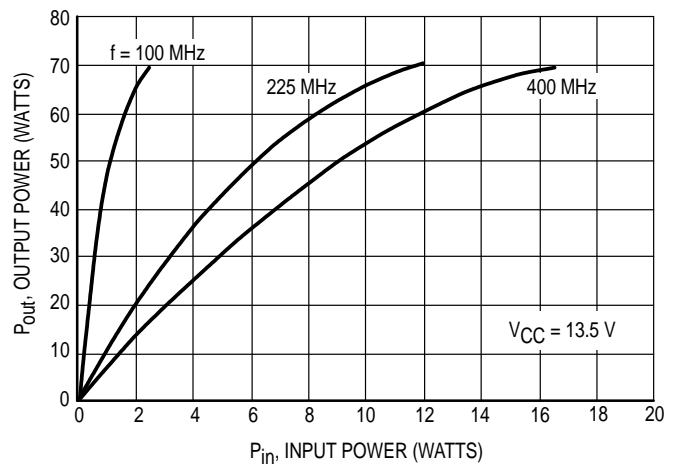


Figure 3. Output Power versus Input Power

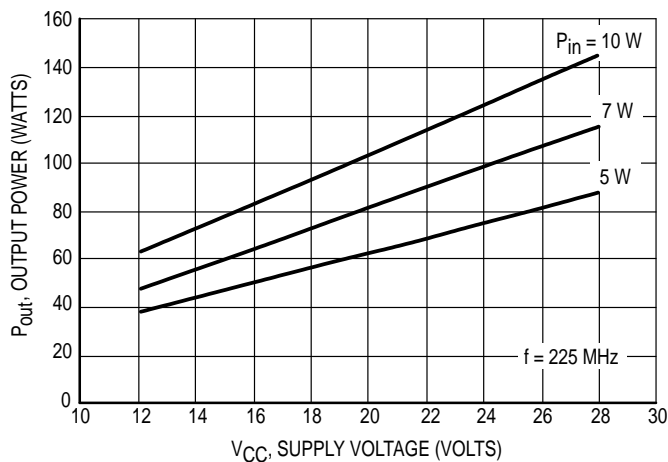


Figure 4. Output Power versus Supply Voltage

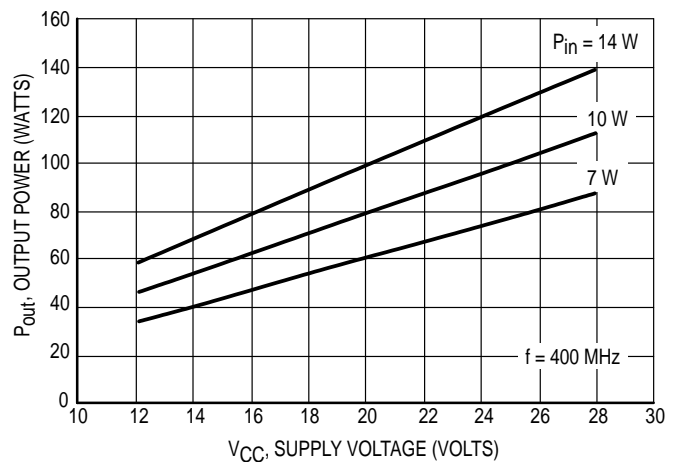


Figure 5. Output Power versus Supply Voltage

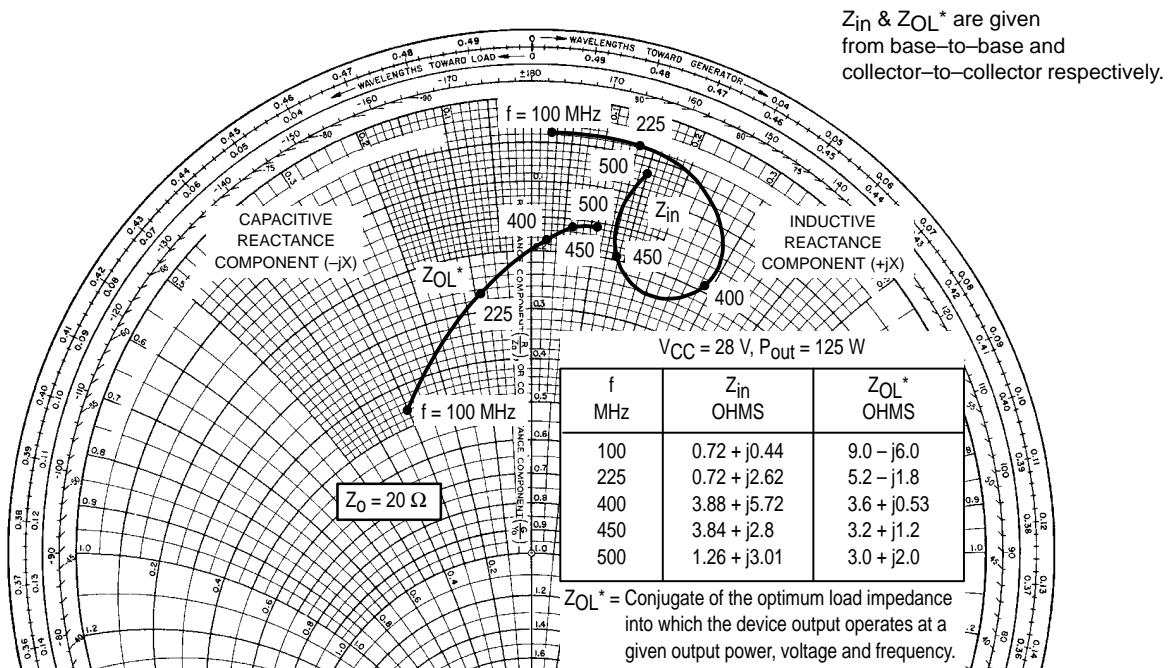
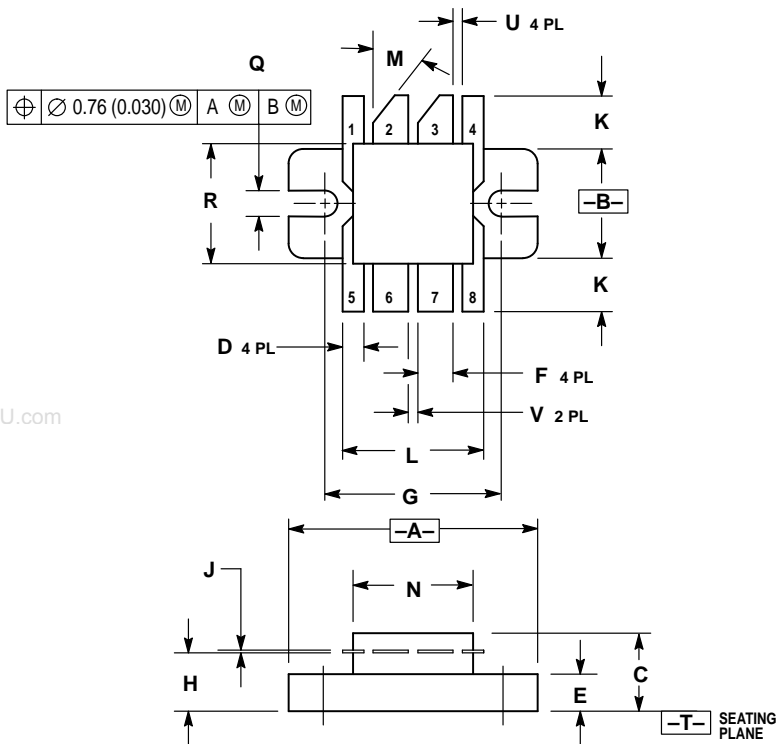


Figure 6. Series Equivalent Input/Output Impedance

PACKAGE DIMENSIONS




NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI  
Y14.5M, 1982.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	22.60	23.11	0.890	0.910
B	9.52	10.03	0.375	0.395
C	6.65	7.16	0.262	0.282
D	1.60	1.95	0.063	0.077
E	2.94	3.40	0.116	0.134
F	2.87	3.22	0.113	0.127
G	16.51	BSC	0.650	BSC
H	4.01	4.36	0.158	0.172
J	0.07	0.15	0.003	0.006
K	4.34	4.90	0.171	0.193
L	12.45	12.95	0.490	0.510
M	45°	NOM	45°	NOM
N	1.051	11.02	0.414	0.434
Q	3.04	3.35	0.120	0.132
R	9.90	10.41	0.390	0.410
U	1.02	1.27	0.040	0.050
V	0.64	0.89	0.025	0.035

STYLE 1:  
PIN 1: EMITTER (COMMON)  
2: COLLECTOR  
3: COLLECTOR  
4: EMITTER (COMMON)  
5: EMITTER (COMMON)  
6: BASE  
7: BASE  
8: EMITTER (COMMON)

CASE 744A-01  
ISSUE C

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