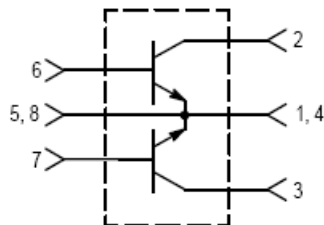


## The RF Line Controlled “Q” Broadband Power Transistor 125W, 30 to 500MHz, 28V

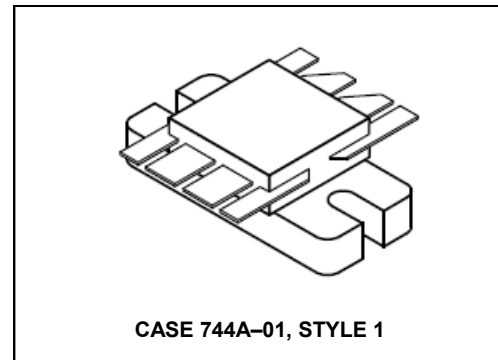
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Designed primarily for wideband large-signal output and driver amplifier stages in the 30 to 500 MHz frequency range.

- 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



### Product Image



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

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	$^\circ\text{C}/\text{W}$

#### 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.

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

Characteristic	Symbol	Min	Typ	Max	Unit
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#### OFF CHARACTERISTICS (1)

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

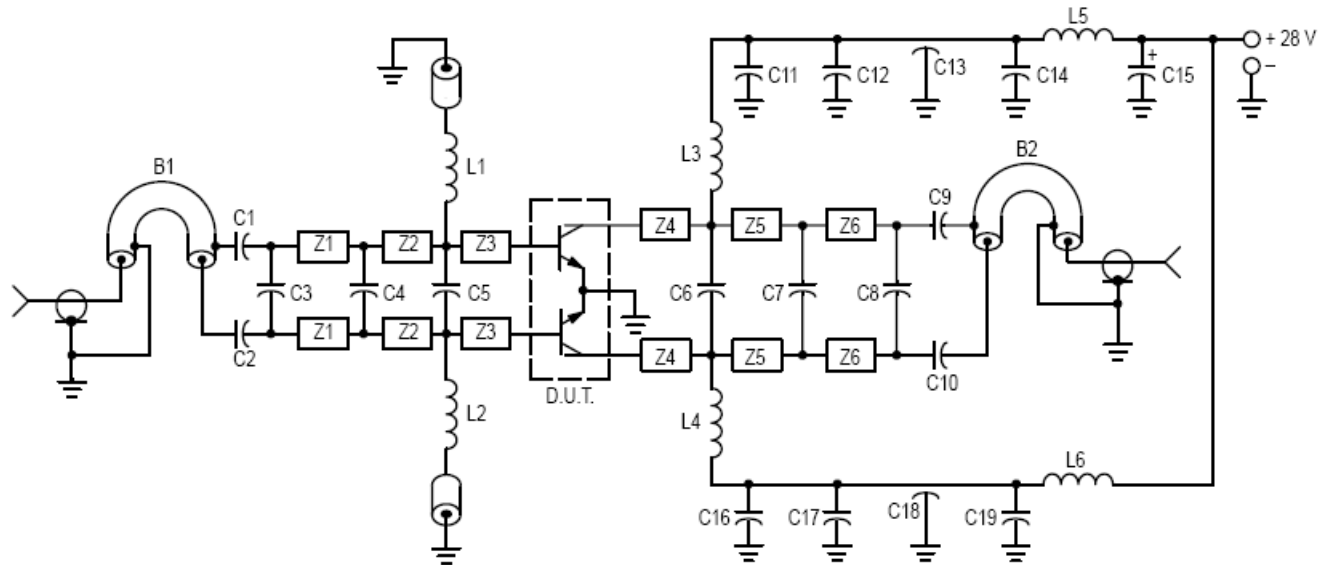
Common–Emitter Amplifier Power Gain ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 125\text{ W}$ , $f = 400\text{ MHz}$ )	$G_{pe}$	8.0	10	—	dB
Collector Efficiency ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 125\text{ W}$ , $f = 400\text{ MHz}$ )	$\eta$	50	55	—	%
Load Mismatch ( $V_{CC} = 28\text{ Vdc}$ , $P_{out}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

#### NOTES:

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

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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 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  $\mu$ F Erie Redcap or Equivalent
- C15 — 20  $\mu$ F, 50 V

- L1, L2 — 0.15  $\mu$ 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

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

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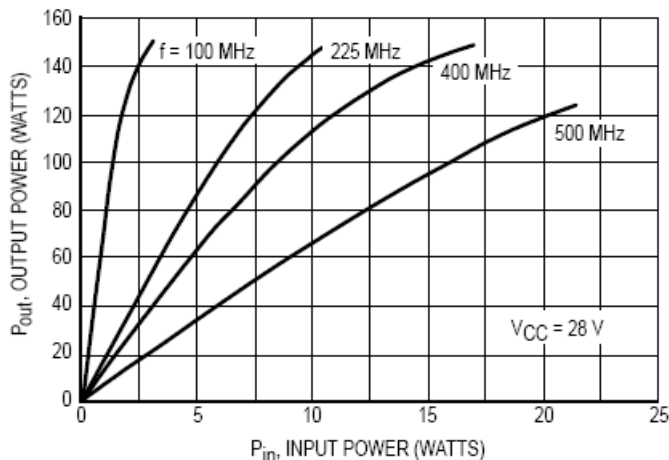


Figure 2. Output Power versus Input Power

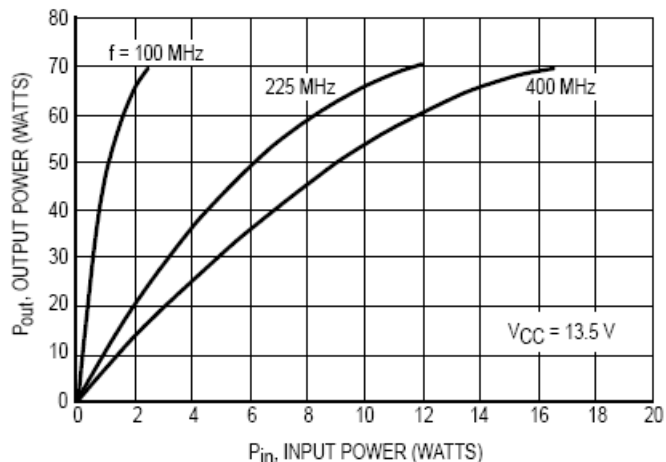


Figure 3. Output Power versus Input Power

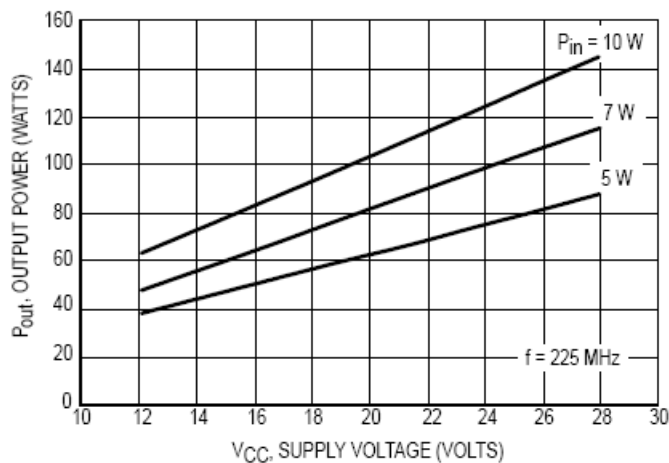


Figure 4. Output Power versus Supply Voltage

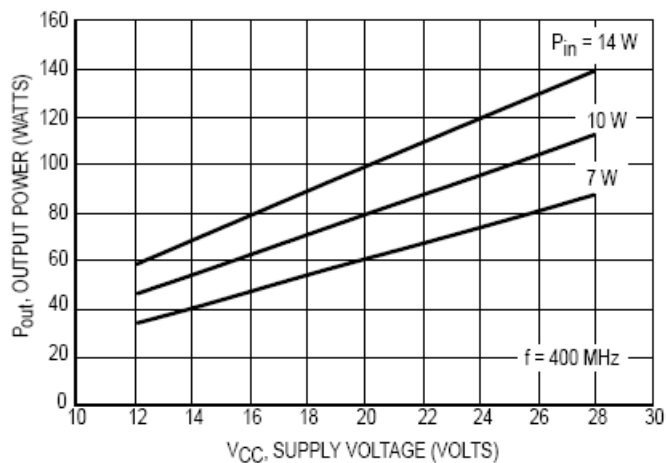


Figure 5. Output Power versus Supply Voltage

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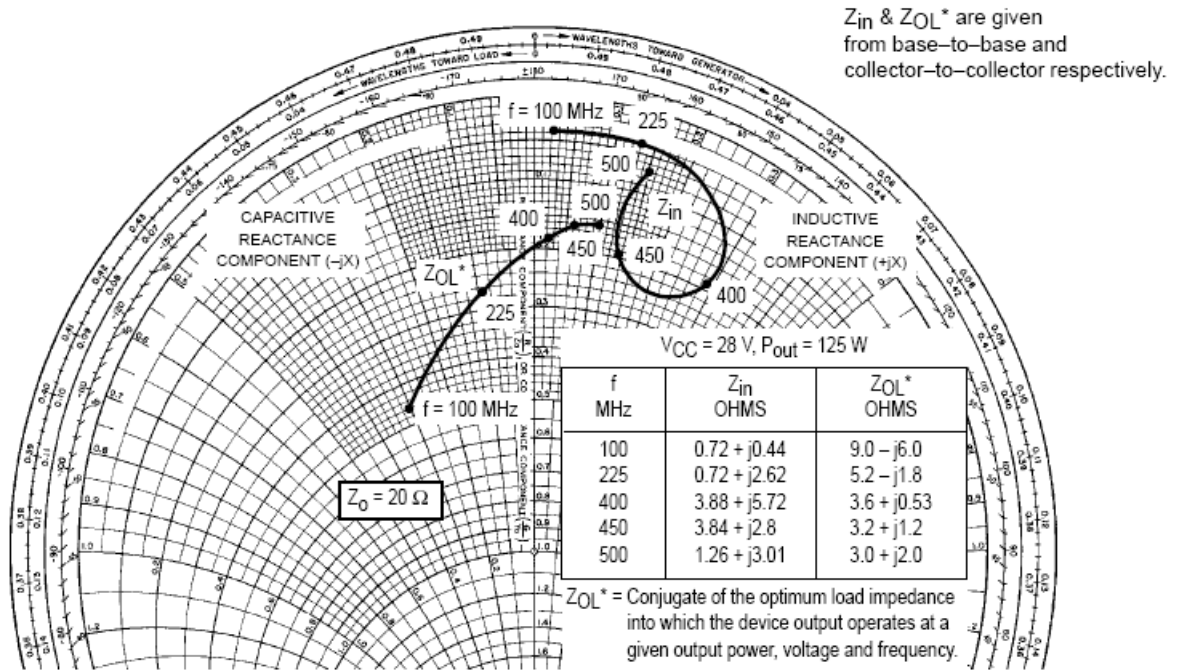
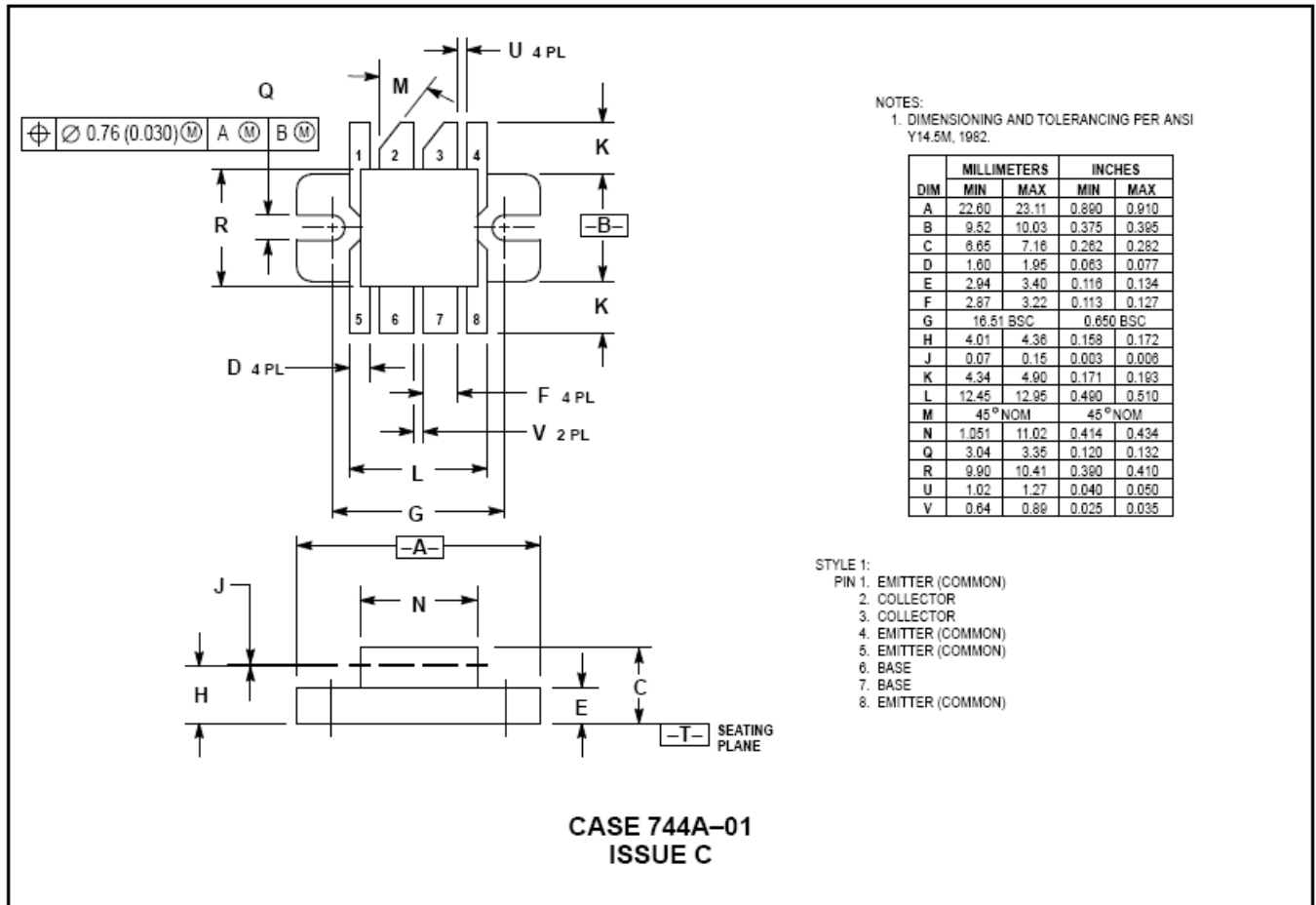


Figure 6. Series Equivalent Input/Output Impedance

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### PACKAGE DIMENSIONS



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

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