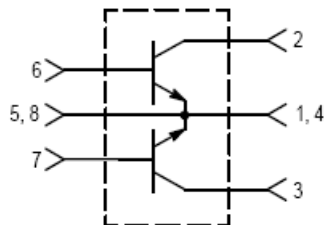


The RF Line Controlled “Q” Broadband Power Transistor 125W, 30 to 500MHz, 28V

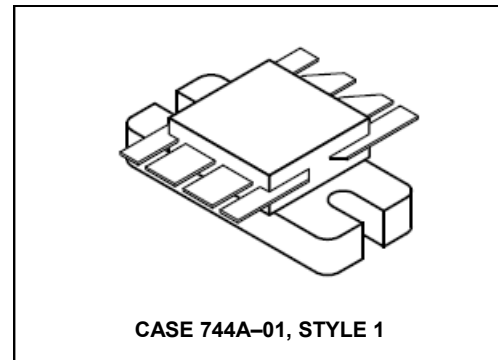
Rev. V1

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°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.

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

Rev. V1

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

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

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	—
--	----------	----	----	-----	---

DYNAMIC CHARACTERISTICS (1)

Output Capacitance ($V_{CB} = 28\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{ob}	—	75	95	pF
--	----------	---	----	----	----

FUNCTIONAL TESTS (2) — See Figure 1

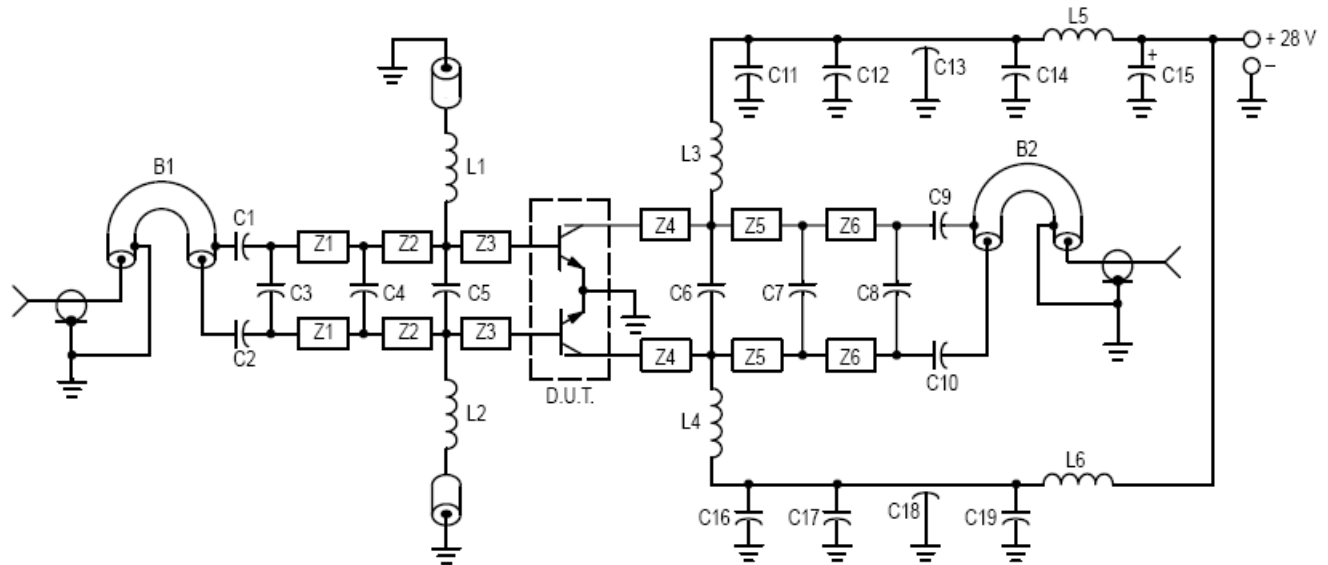
Common–Emitter Amplifier Power Gain ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 125\text{ W}$, $f = 400\text{ MHz}$)	G_{pe}	8.0	10	—	dB
Collector Efficiency ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 125\text{ W}$, $f = 400\text{ MHz}$)	η	50	55	—	%
Load Mismatch ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 125\text{ W}$,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

NOTES:

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

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

Rev. V1



- 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 μ F Erie Redcap or Equivalent
- C15 — 20 μ F, 50 V

- L1, L2 — 0.15 μ 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 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 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

Rev. V1

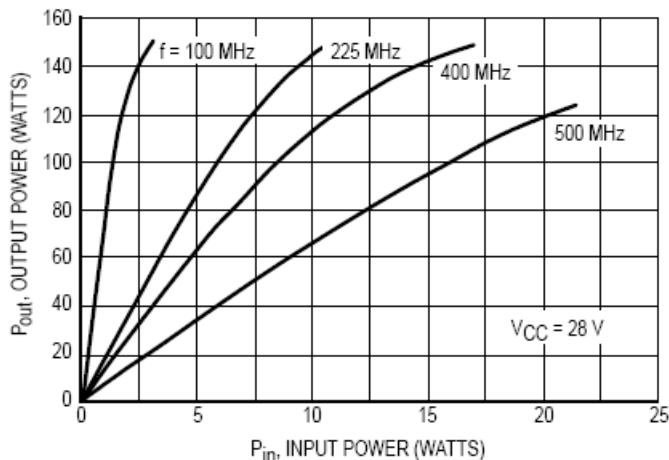


Figure 2. Output Power versus Input Power

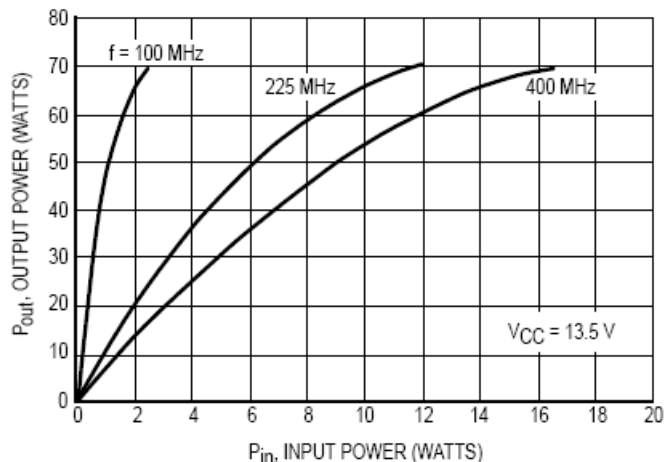


Figure 3. Output Power versus Input Power

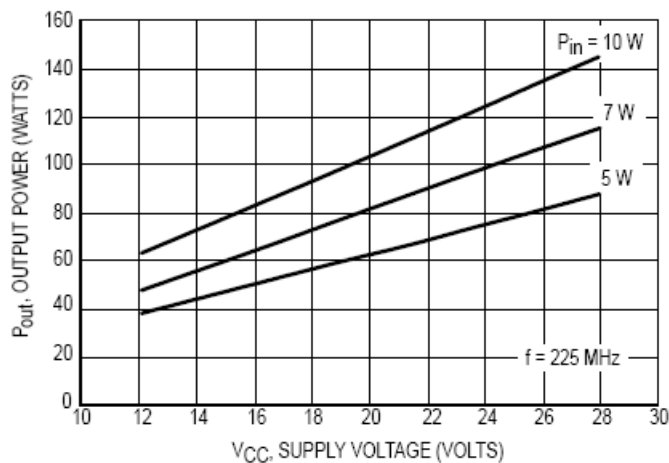


Figure 4. Output Power versus Supply Voltage

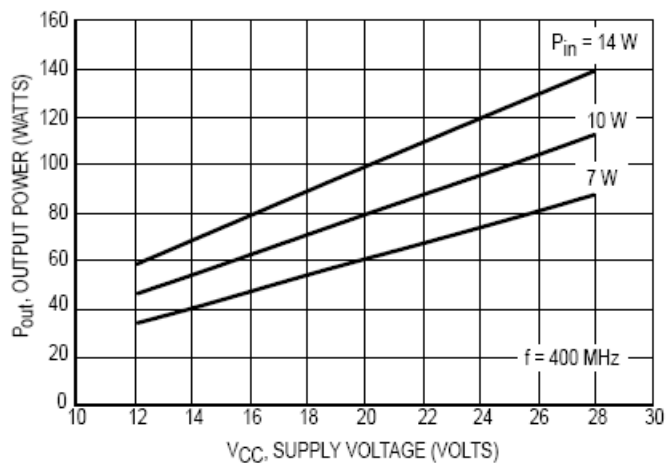


Figure 5. Output Power versus Supply Voltage

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

Rev. V1

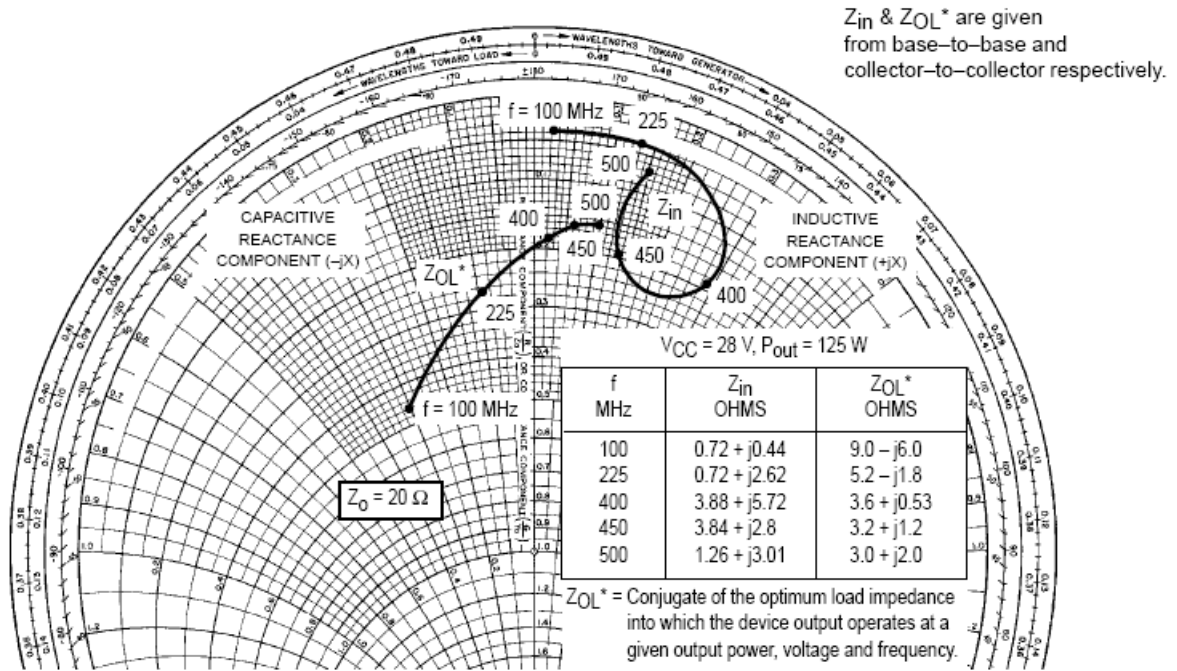
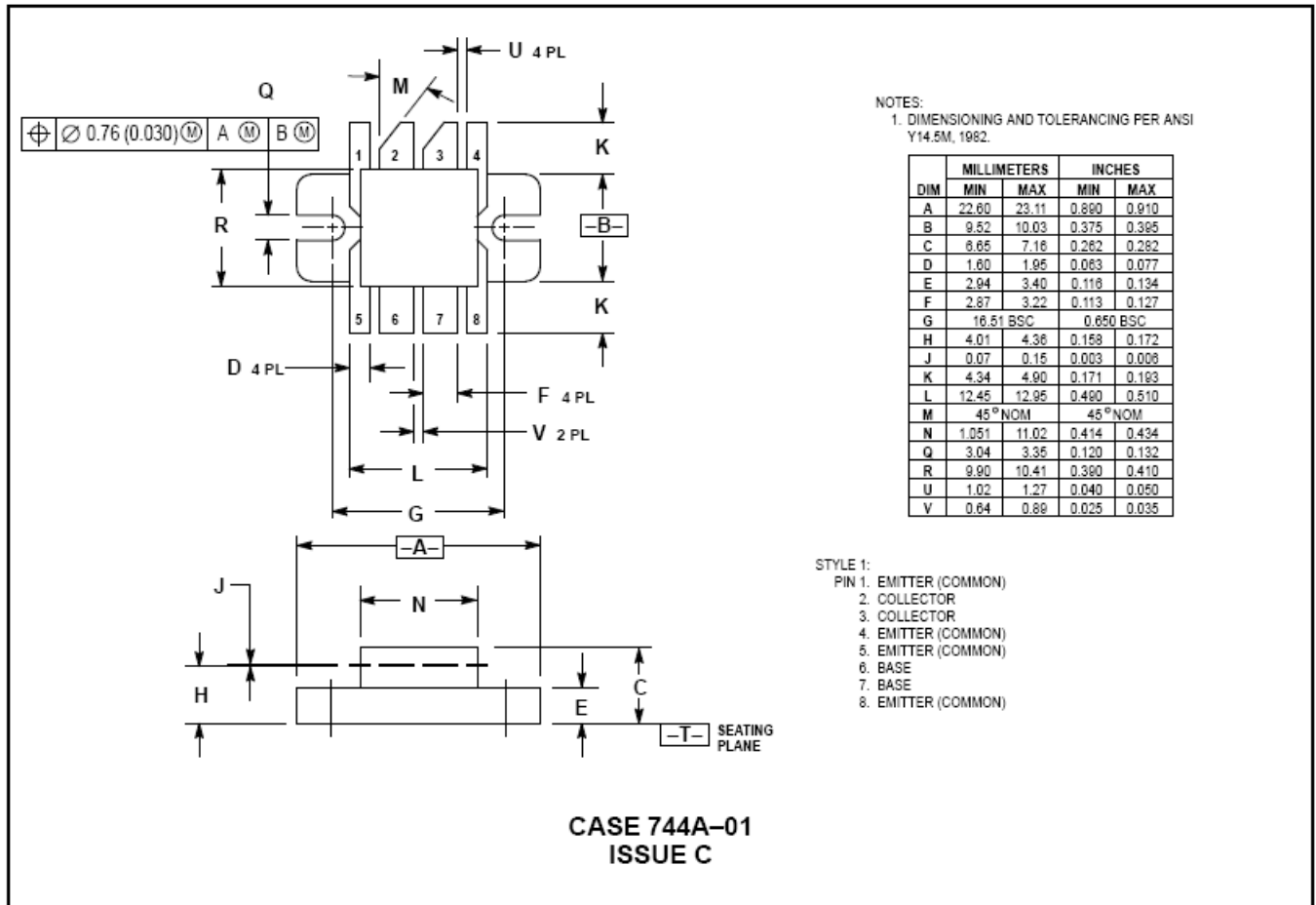


Figure 6. Series Equivalent Input/Output Impedance

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

Rev. V1

PACKAGE DIMENSIONS



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

Rev. V1

M/A-COM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with M/A-COM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.