

The RF Line Controlled "Q" Broadband Power Transistor

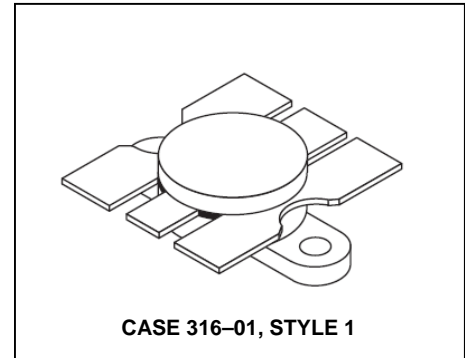
80W, 100 to 500MHz, 28V

M/A-COM Products
Released - Rev. 07.07

Designed primarily for wideband large-signal output amplifier stages in the 100 to 500 MHz frequency range.

- Guaranteed performance @ 400 MHz, 28 Vdc
Output power = 80 W over 225 to 400 MHz Band
Minimum gain = 7.3 dB @ 400 MHz
- Built-in matching network for broadband operation using double match technique
- 100% tested for load mismatch at all phase angles with 30:1 VSWR
- Gold metallization system for high reliability applications
- Characterized for 100 – 500 MHz

Product Image



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	33	Vdc
Collector-Base Voltage	V_{CBO}	60	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous — Peak	I_C	9.0 12	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1) Derate above 25°C	P_D	250 1.43	Watts W/ $^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.7	$^\circ\text{C/W}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ($I_C = 80 \text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	33	—	—	Vdc
Collector-Emitter Breakdown Voltage ($I_C = 80 \text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	60	—	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 8.0 \text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 80 \text{ mAdc}$, $I_C = 0$)	$V_{(BR)CBO}$	60	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 30 \text{ Vdc}$, $I_E = 0$)	I_{CBO}	—	—	5.0	mAdc

ON CHARACTERISTICS

DC Current Gain ($I_C = 4.0 \text{ Adc}$, $V_{CE} = 5.0 \text{ Vdc}$)	h_{FE}	20	—	80	—
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NOTE:

1. This device is designed for RF operation. The total device dissipation rating applies only when the device is operated as an RF amplifier. (continued)

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DYNAMIC CHARACTERISTICS

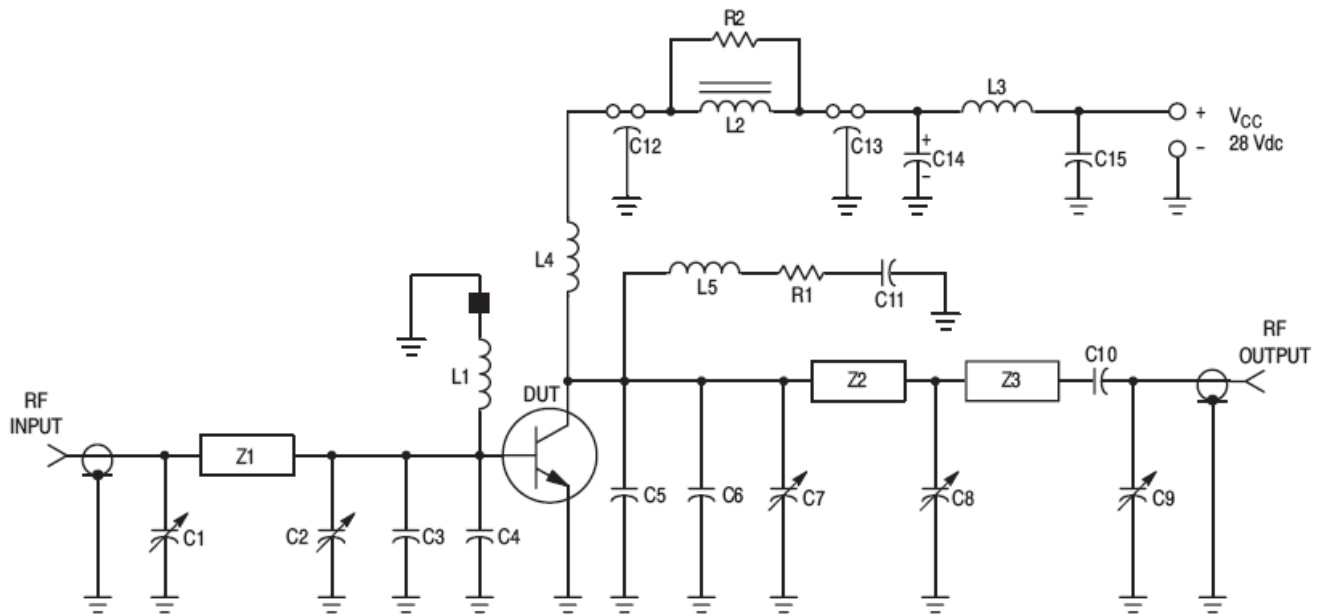
Output Capacitance ($V_{CB} = 28 \text{ Vdc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)	C_{ob}	—	95	125	pF
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ELECTRICAL CHARACTERISTICS – continued ($T_C = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
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FUNCTIONAL TESTS (Figure 1)

Common-Emitter Amplifier Power Gain ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 80 \text{ W}$, $f = 400 \text{ MHz}$)	G_{PE}	7.3	9.0	—	dB
Collector Efficiency ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 80 \text{ W}$, $f = 400 \text{ MHz}$)	η	50	60	—	%
Load Mismatch ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 80 \text{ W}$, $f = 400 \text{ MHz}$, VSWR = 30:1 All Phase Angles)	ψ	No Degradation in Output Power			



C1, C2, C7, C8, C9 — 1.0–20 pF Piston Trimmer (Johanson JMC 5501)
 C3, C4 — 36 pF ATC 100 mil Chip Capacitor
 C5, C6 — 43 pF ATC 100 mil Chip Capacitor
 C10 — 100 pF UNELCO
 C11, C15 — 0.1 μF Erie Redcap
 C12, C13 — 680 pF Feedthru
 C14 — 1.0 μF 50 V Tantalum
 L1 — 4 Turns #22 AWG Enameled, 3/16" ID Closewound with Ferroxcube Bead (#56–590–65/4B) on Ground End of Coil
 L2 — Ferroxcube VK200–19/4B Ferrite Choke
 L3 — 7 Turns #18 AWG, 11/16" Long, Wound on a 100 k Ω 2.0 Watt Resistor

L4 — 6 Turns #20 AWG Enameled, 3/16" ID Closewound
 L5 — 4 Turns #22 AWG Enameled, 1/8" ID Closewound
 Z1 — Microstrip 0.2" W x 1.5" L
 Z2 — Microstrip 0.17" W x 1.16" L
 Z3 — Microstrip 0.17" W x 0.63" L
 R1, R2 — 10 Ω 2.0 Watt
 Board — Glass Teflon $\epsilon_r = 2.56$, $t = 0.062"$
 Input/Output Connectors Type N
 DUT Socket Lead Frame Etched from 80–mil–Thick Copper

Figure 1. 400 MHz Test Circuit

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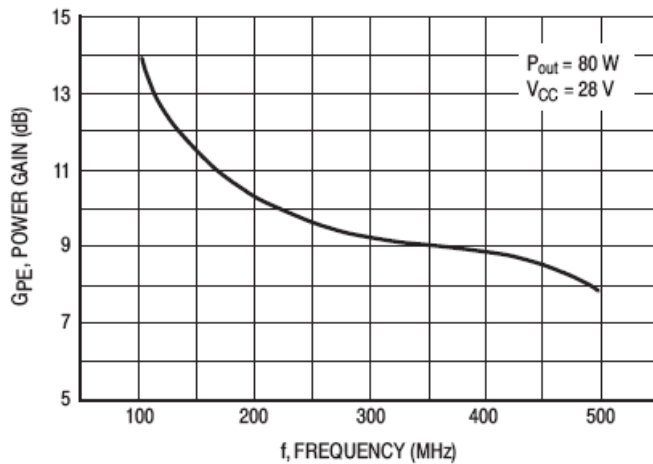


Figure 2. Power Gain versus Frequency

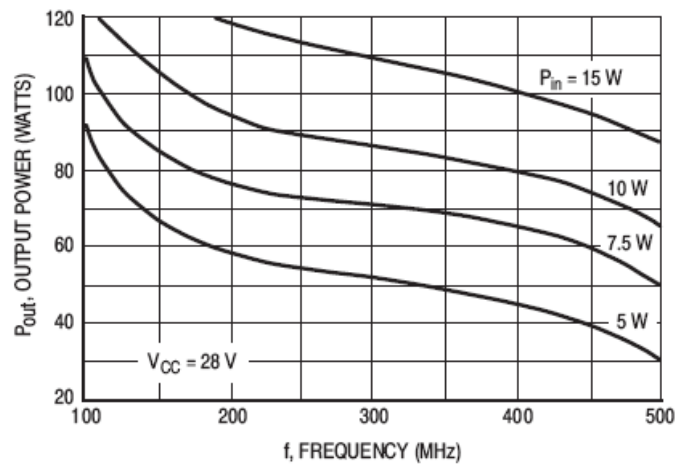


Figure 3. Output Power versus Frequency

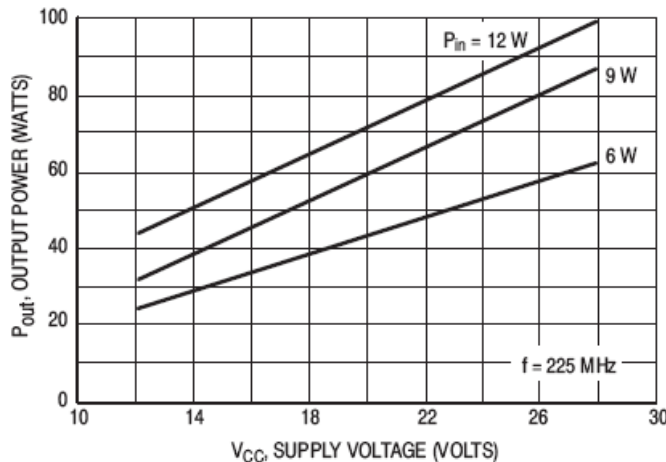


Figure 4. Output Power versus Supply Voltage

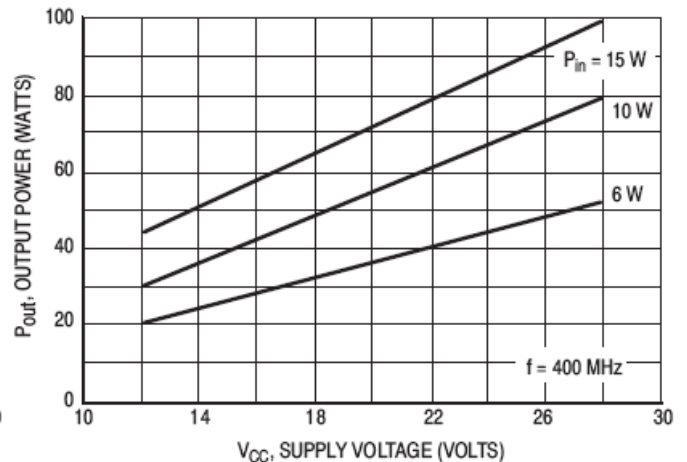


Figure 5. Output Power versus Supply Voltage

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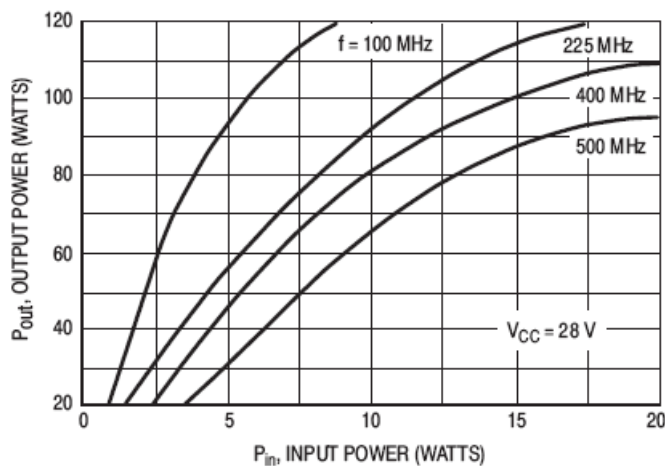


Figure 6. Output Power versus Input Power

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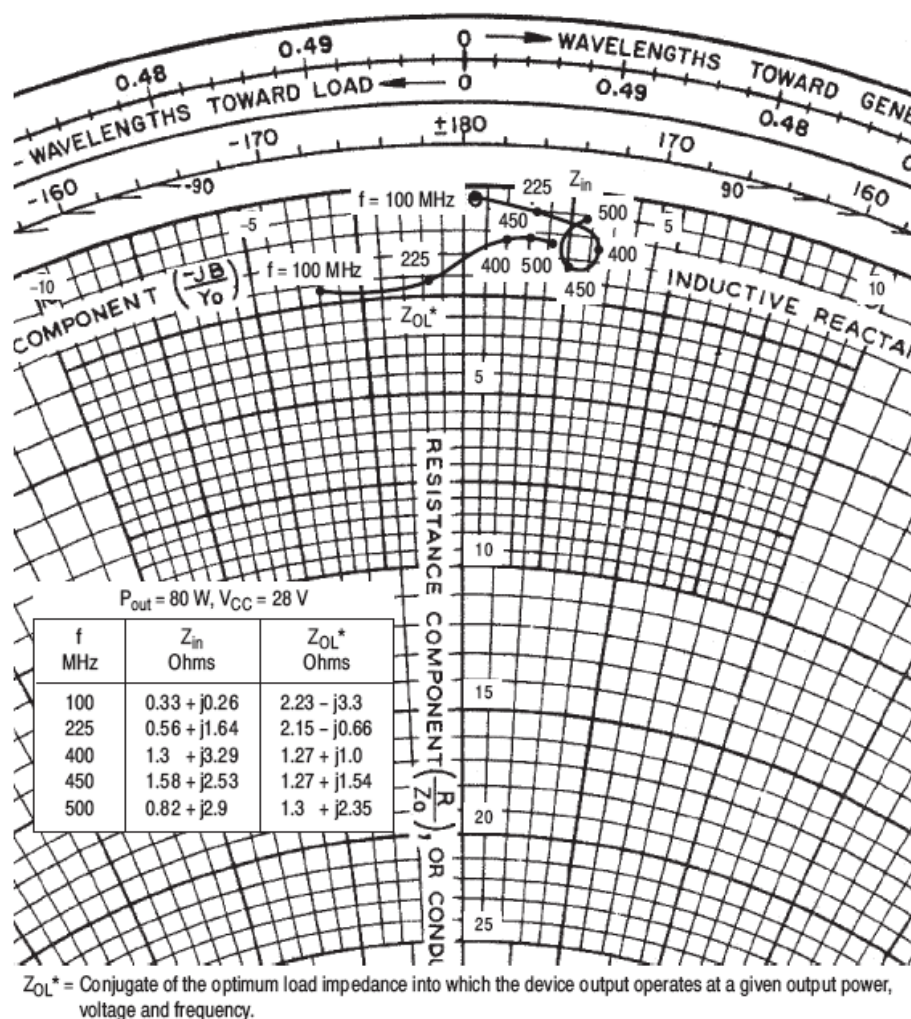
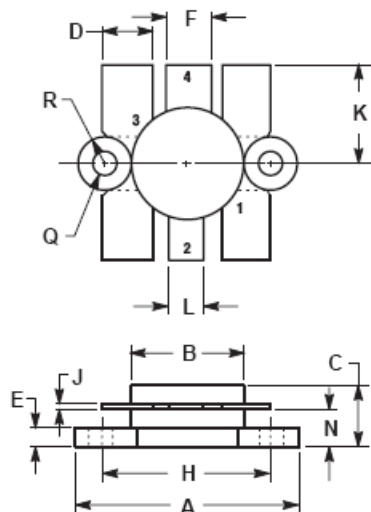


Figure 7. Series Equivalent Input-Output Impedance

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PACKAGE DIMENSIONS



NOTES:

1. FLANGE IS ISOLATED IN ALL STYLES.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	24.38	25.14	0.960	0.990
B	12.45	12.95	0.490	0.510
C	5.97	7.62	0.235	0.300
D	5.33	5.58	0.210	0.220
E	2.16	3.04	0.085	0.120
F	5.08	5.33	0.200	0.210
H	18.29	18.54	0.720	0.730
J	0.10	0.15	0.004	0.006
K	10.29	11.17	0.405	0.440
L	3.81	4.06	0.150	0.160
N	3.81	4.31	0.150	0.170
Q	2.92	3.30	0.115	0.130
R	3.05	3.30	0.120	0.130
U	11.94	12.57	0.470	0.495

STYLE 1:

PIN 1: EMITTER
2: COLLECTOR
3: EMITTER
4: BASE

CASE 316-01
ISSUE D