

# The RF Line

## NPN Silicon

### RF Power Transistor

... designed primarily for wideband large-signal output amplifier stages in the 30–200 MHz frequency range.

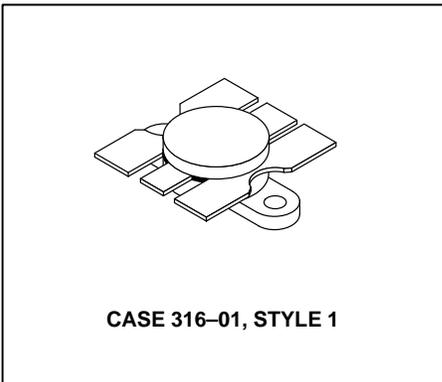
- Guaranteed Performance at 150 MHz, 28 Vdc  
Output Power = 80 Watts  
Minimum Gain = 10 dB
- Built-In Matching Network for Broadband Operation
- 100% Tested for Load Mismatch at all Phase Angles with 30:1 VSWR
- Gold Metallization System for High Reliability Applications



**80 W, 3.0–200 MHz  
CONTROLLED “Q”  
BROADBAND RF POWER  
TRANSISTOR  
NPN SILICON**

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	35	Vdc
Collector–Base Voltage	$V_{CBO}$	65	Vdc
Emitter–Base Voltage	$V_{EBO}$	4.0	Vdc
Collector Current — Continuous Peak	$I_C$	9.0 13.5	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1) Derate above $25^\circ\text{C}$	$P_D$	220 1.26	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	$R_{\theta JC}$	0.8	$^\circ\text{C}/\text{W}$

#### 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 ( $I_C = 50$ mAdc, $I_B = 0$ )	$V_{(BR)CEO}$	35	—	—	Vdc
Collector–Emitter Breakdown Voltage ( $I_C = 50$ mAdc, $V_{BE} = 0$ )	$V_{(BR)CES}$	65	—	—	Vdc
Collector–Base Breakdown Voltage ( $I_C = 50$ mAdc, $I_E = 0$ )	$V_{(BR)CBO}$	65	—	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 5.0$ mAdc, $I_C = 0$ )	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = 30$ Vdc, $I_E = 0$ )	$I_{CBO}$	—	—	5.0	mAdc

#### ON CHARACTERISTICS

DC Current Gain ( $I_C = 4.0$ Adc, $V_{CE} = 5.0$ Vdc)	$h_{FE}$	10	—	80	—
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#### DYNAMIC CHARACTERISTICS

Output Capacitance ( $V_{CB} = 28$ Vdc, $I_E = 0$ , $f = 1.0$ MHz)	$C_{ob}$	—	100	130	pF
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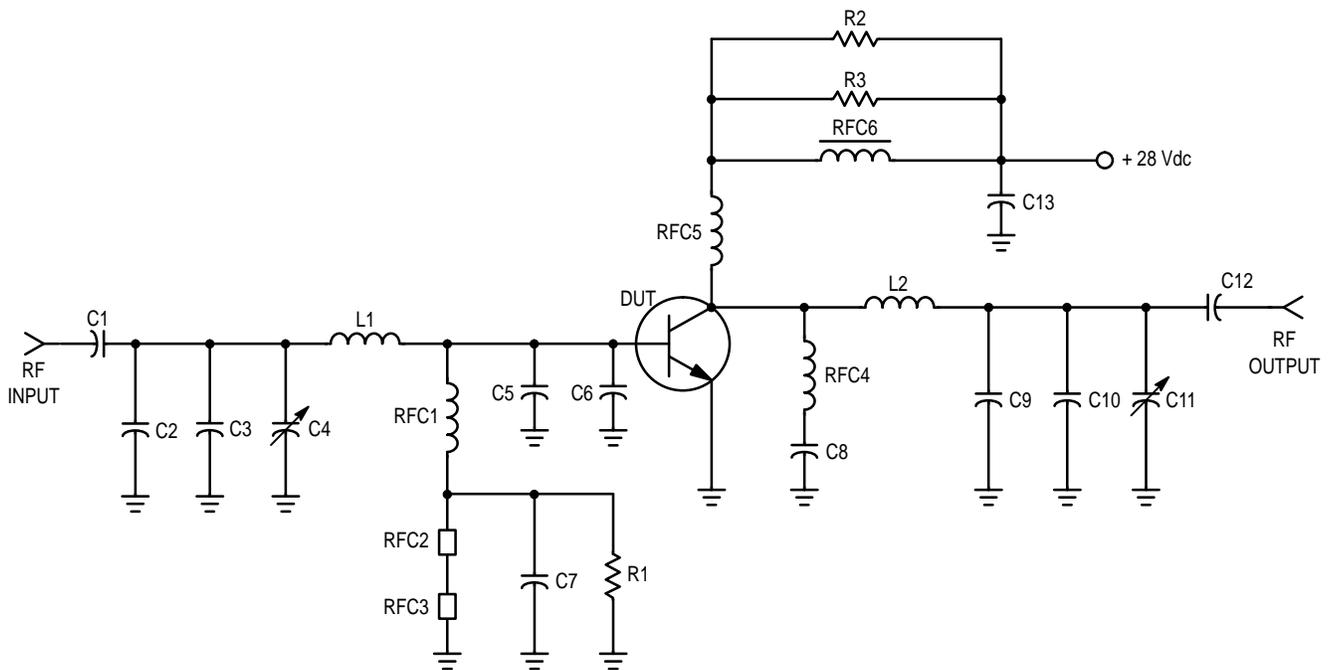
NOTE:

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)

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

Characteristic	Symbol	Min	Typ	Max	Unit
<b>NARROW BAND FUNCTIONAL TESTS</b> (Figure 1)					
Common-Emitter Amplifier Power Gain ( $V_{CC} = 28\text{ Vdc}$ , $P_{Out} = 80\text{ W}$ , $f = 150\text{ MHz}$ )	$G_{PE}$	10	13	—	dB
Collector Efficiency ( $V_{CC} = 28\text{ Vdc}$ , $P_{Out} = 80\text{ W}$ , $f = 150\text{ MHz}$ )	$\eta$	55	—	—	%
Load Mismatch ( $V_{CC} = 28\text{ Vdc}$ , $P_{Out} = 80\text{ W CW}$ , $f = 150\text{ MHz}$ , $VSWR = 30:1$ all phase angles)	$\psi$	No Degradation in Output Power			

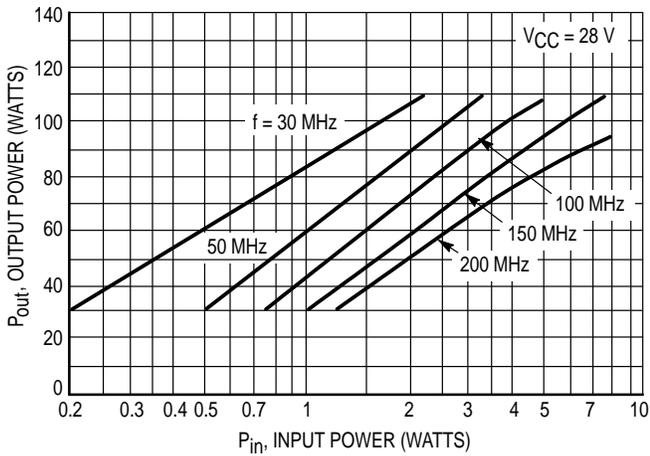


- C1 — 22 pF 100 mil ATC
- C2, C3 — 24 pF 100 mil ATC
- C4, C11 — 0.8–20 pF JMC #5501 Johanson
- C5 — 200 pF 100 mil ATC
- C6 — 240 pF 100 mil ATC
- C7 — Dipped Mica 1000 pF
- C8 — 0.1  $\mu\text{F}$  Erie Red Cap
- C9, C10, C12 — 30 pF 100 mil ATC
- C13 — 1.0  $\mu\text{F}$  Tantalum

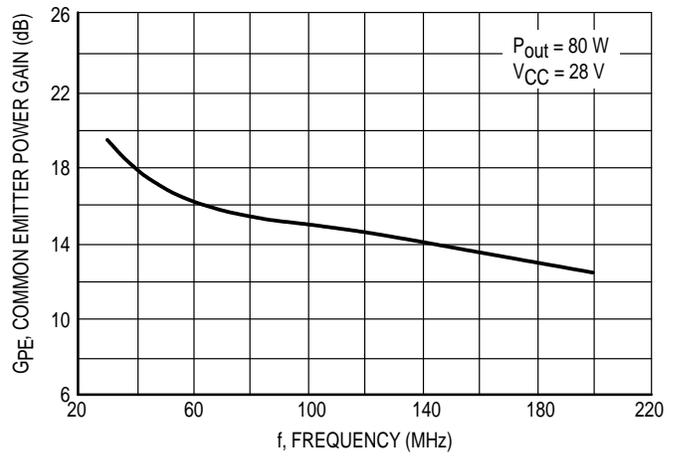
- L1 — 0.8", #20 Wire
- L2 — 1.0", #20 Wire
- RFC1, RFC4 — 0.15  $\mu\text{H}$  Molded Coil
- RFC2, RFC3 — Ferroxcube Bead 56–590–65–3B
- RFC5 — 2.5", #20 Wire, 1.5 Turns
- RFC6 — Ferroxcube VK200–19/4B
- R1 — 10  $\Omega$ , 1/2 W
- R2, R3 — 10  $\Omega$ , 1.0 W

**Figure 1. 150 MHz Test Amplifier**

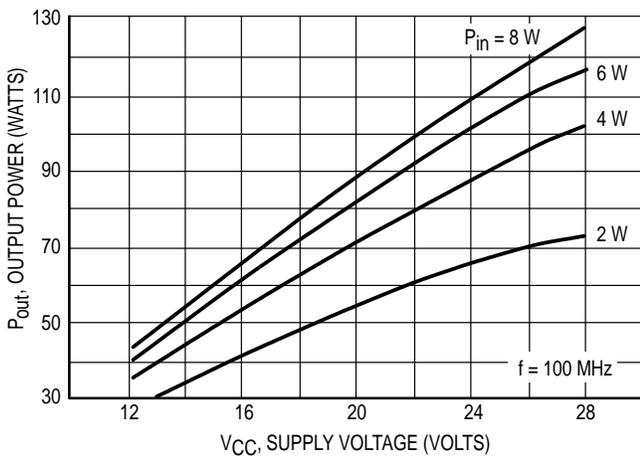
## TYPICAL PERFORMANCE CURVES



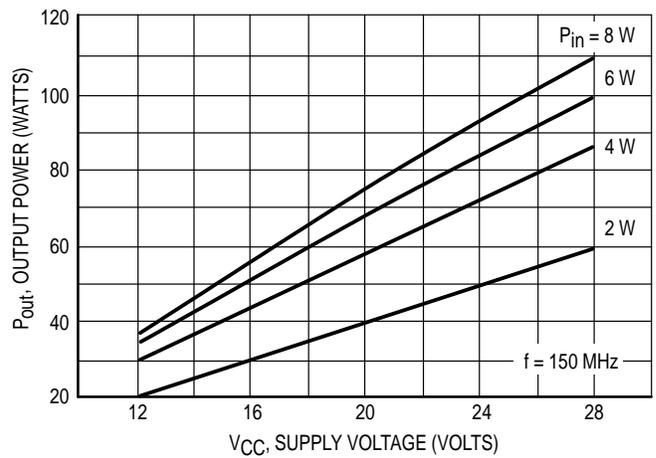
**Figure 2. Output Power versus Input Power**



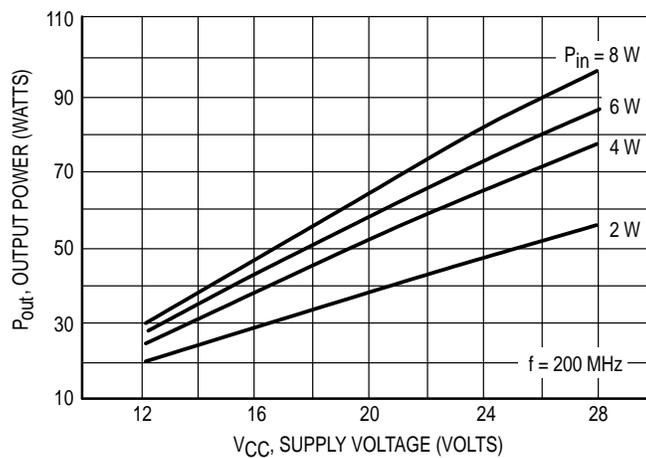
**Figure 3. Power Gain versus Frequency**



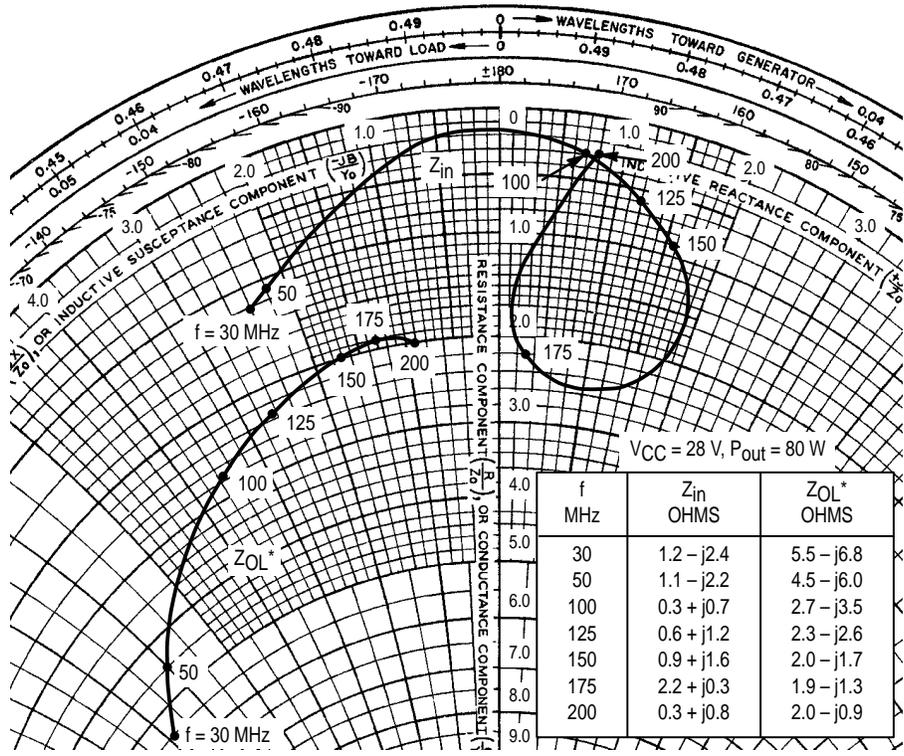
**Figure 4. Output Power versus Supply Voltage**



**Figure 5. Output Power versus Supply Voltage**



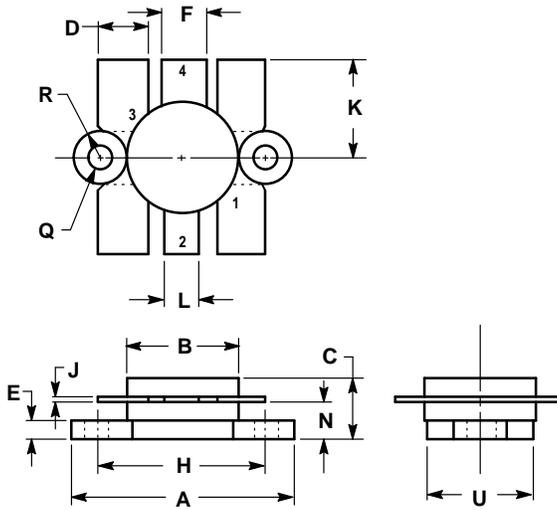
**Figure 6. Output Power versus Supply Voltage**



Z<sub>OL</sub><sup>\*</sup> = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and frequency.

Figure 7. Series Equivalent Input-Output Impedance

# 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**

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