

# The RF Line

## NPN Silicon

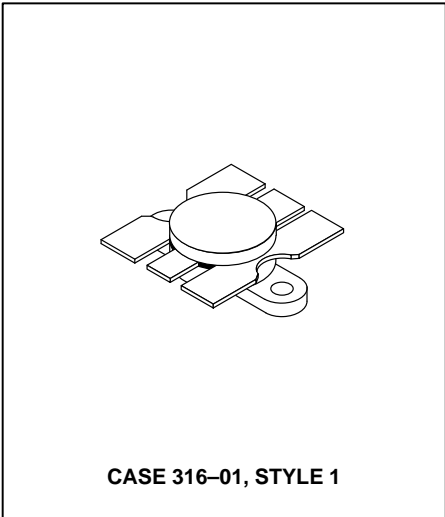
### RF Power Transistor



**100 W, 30–200 MHz  
CONTROLLED Q  
BROADBAND RF POWER  
TRANSISTOR  
NPN SILICON**

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

- Guaranteed Performance at 150 MHz, 28 Vdc  
Output Power = 100 W  
Minimum Gain = 9.0 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
- High Output Saturation Power — Ideally Suited for 30 W Carrier/120 W Peak AM Amplifier Service
- Guaranteed Performance in Broadband Test Fixture



#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V <sub>CEO</sub>	35	Vdc
Collector–Base Voltage	V <sub>CBO</sub>	65	Vdc
Emitter–Base Voltage	V <sub>EBO</sub>	4.0	Vdc
Collector Current — Continuous	I <sub>C</sub>	12	Adc
— Peak (10 seconds)		18	
Total Device Dissipation @ T <sub>C</sub> = 25°C (1) Derate above 25°C	P <sub>D</sub>	270 1.54	Watts W/°C
Storage Temperature Range	T <sub>stg</sub>	–65 to +150	°C

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	0.65	°C/W

#### ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
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#### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 100 mAdc, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	35	—	—	Vdc
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 100 mAdc, V <sub>BE</sub> = 0)	V <sub>(BR)CES</sub>	65	—	—	Vdc
Collector–Base Breakdown Voltage (I <sub>C</sub> = 100 mAdc, I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	65	—	—	Vdc
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 10 mAdc, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	4.0	—	—	Vdc
Collector Cutoff Current (V <sub>CB</sub> = 30 Vdc, I <sub>E</sub> = 0)	I <sub>CBO</sub>	—	—	5.0	mAdc

#### ON CHARACTERISTICS

DC Current Gain (I <sub>C</sub> = 5.0 Adc, V <sub>CE</sub> = 5.0 Vdc)	h <sub>FE</sub>	10	25	80	—
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NOTE:

(continued)

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

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

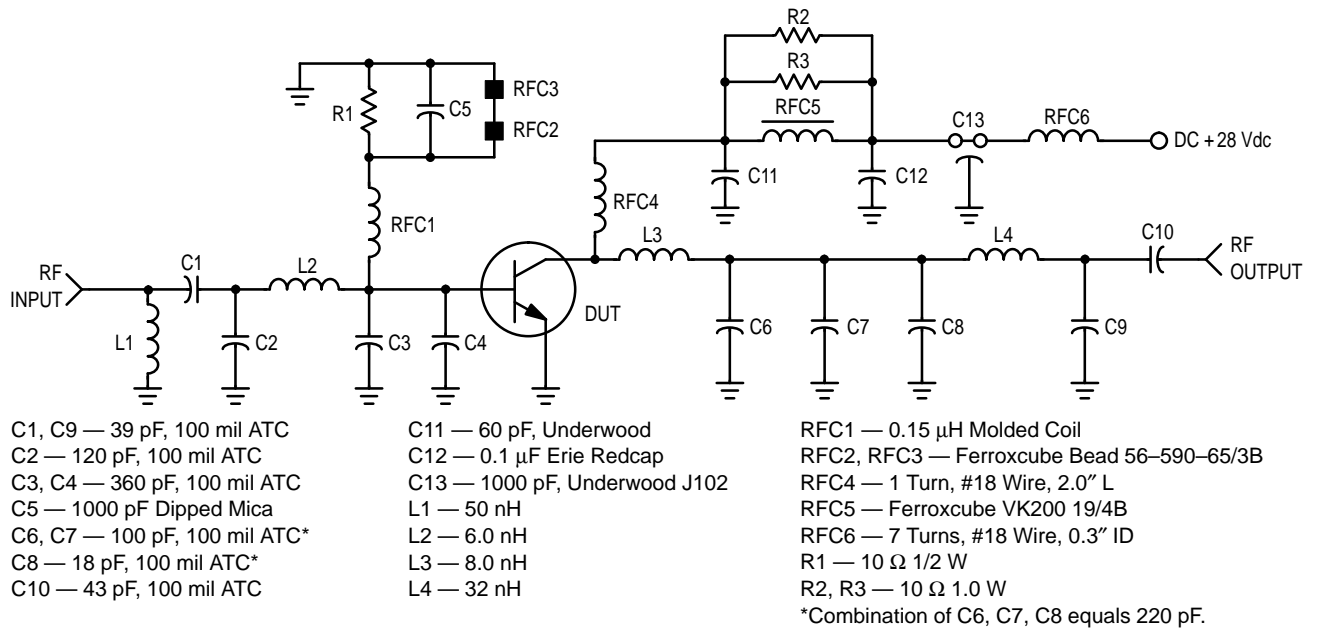
Characteristic	Symbol	Min	Typ	Max	Unit
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**DYNAMIC CHARACTERISTICS**

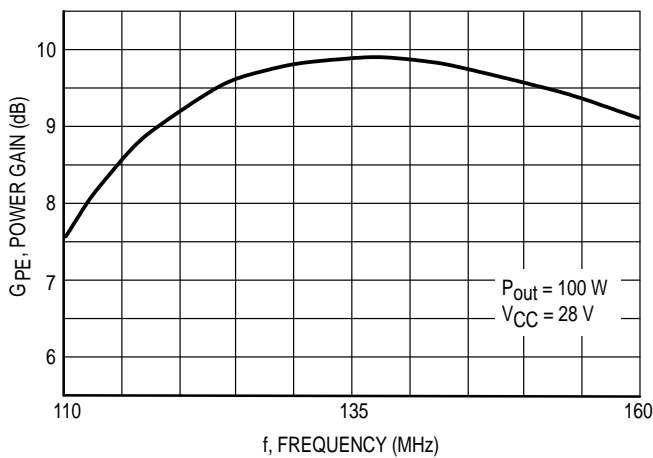
Output Capacitance ( $V_{CB} = 28\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ob}$	—	150	175	pF
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**FUNCTIONAL TESTS** (Figure 2)

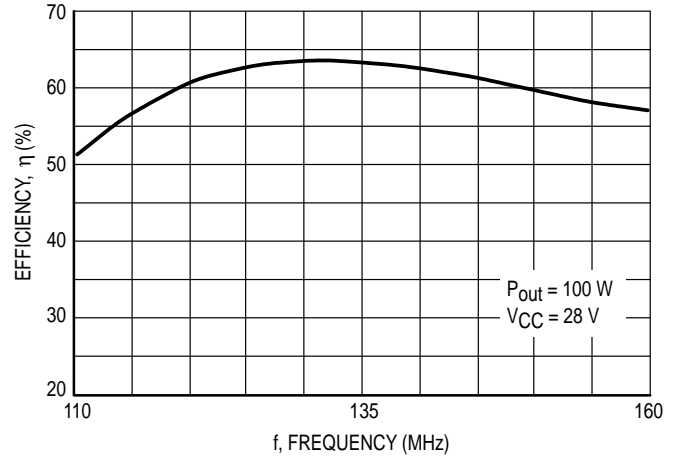
Common-Emitter Amplifier Power Gain ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 100\text{ W}$ , $f = 150\text{ MHz}$ , $I_C (\text{Max}) = 6.5\text{ Adc}$ )	$G_{PE}$	9.0	10	—	dB
Collector Efficiency ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 100\text{ W}$ , $f = 150\text{ MHz}$ , $I_C (\text{Max}) = 6.5\text{ Adc}$ )	$\eta$	55	60	—	%
Load Mismatch ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 100\text{ W CW}$ , $f = 150\text{ MHz}$ , $VSWR = 30:1$ all phase angles)	$\psi$	No Degradation in Output Power			



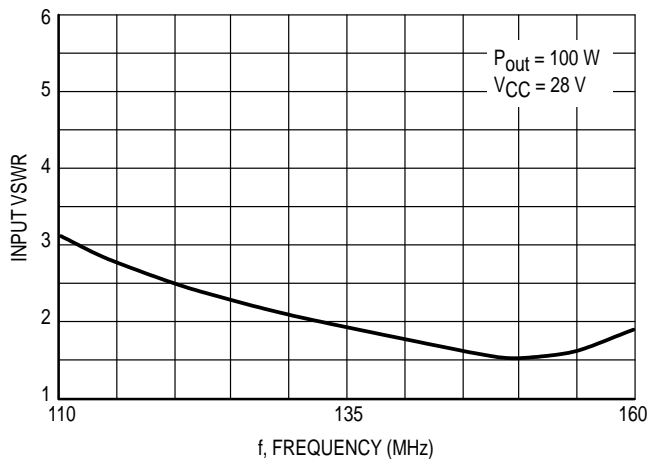
**Figure 1. 110–160 MHz Broadband Amplifier — Test Fixture Schematic**



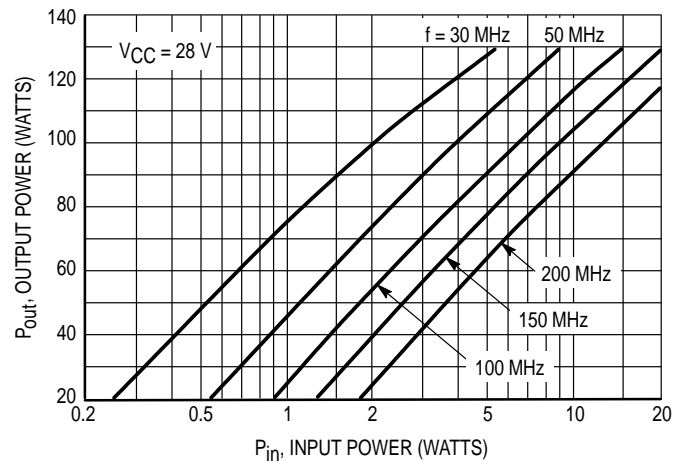
**Figure 2. Power Gain versus Frequency  
Broadband Test Fixture**



**Figure 3. Efficiency versus Frequency  
Broadband Test Fixture**

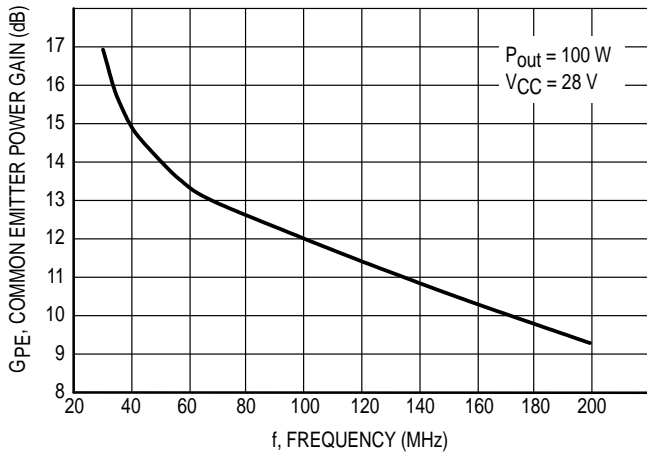


**Figure 4. Input VSWR versus Frequency  
Broadband Test Fixture**

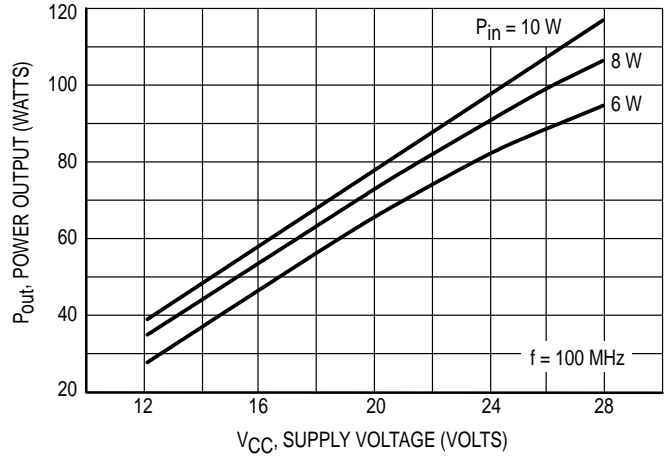


**Figure 5. Output Power versus Input Power**

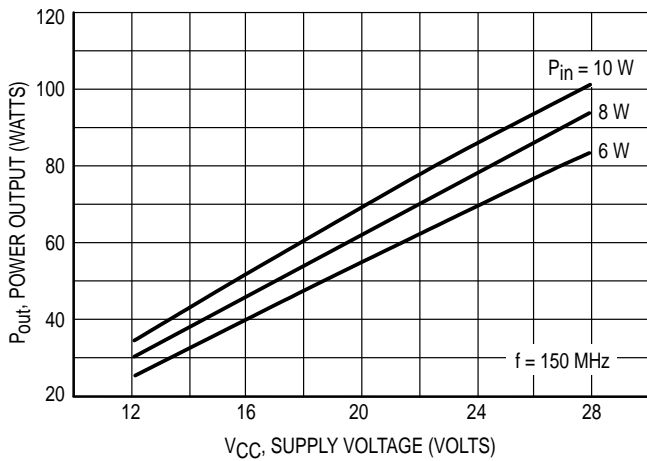
## TYPICAL PERFORMANCE CURVES



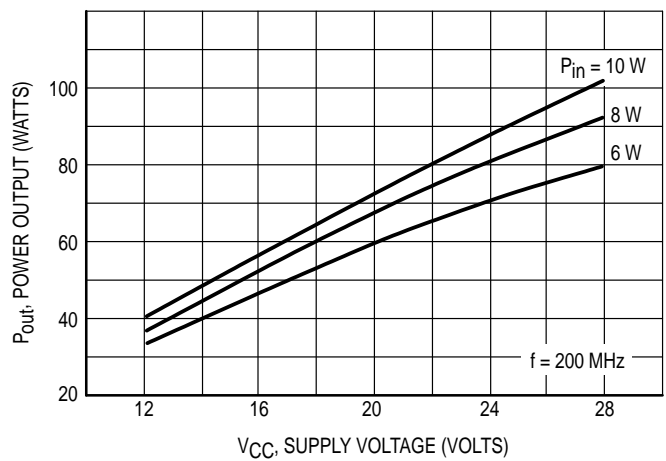
**Figure 6. Power Gain versus Frequency**



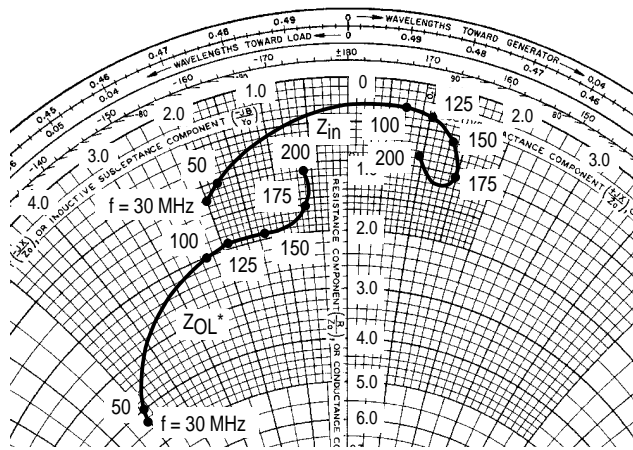
**Figure 7. Power Output versus Supply Voltage**



**Figure 8. Power Output versus Supply Voltage**



**Figure 9. Power Output versus Supply Voltage**



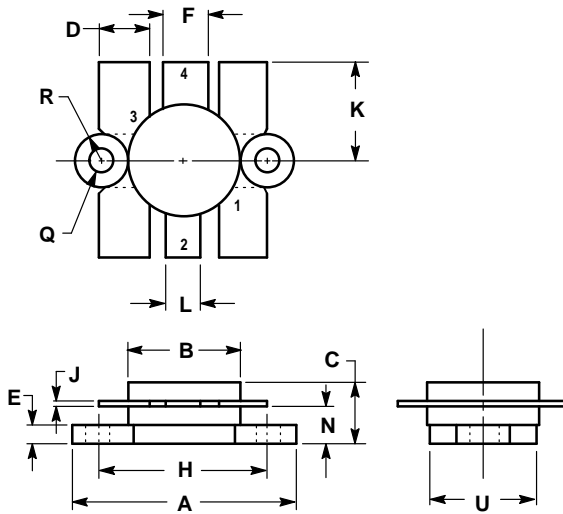
$V_{CC} = 28 \text{ V}, P_{out} = 100 \text{ W}$

f MHz	$Z_{in}$ OHMS	$Z_{OL}^*$ OHMS
30	$1.2 - j2.0$	$4.3 - j5.0$
50	$1.0 - j1.8$	$4.0 - j4.9$
100	$0.3 + j0.7$	$2.0 - j2.3$
125	$0.3 + j1.0$	$1.9 - j1.9$
150	$0.6 + j1.3$	$1.9 - j1.3$
175	$1.0 + j1.5$	$1.6 - j0.6$
200	$0.9 + j1.0$	$1.1 - j0.6$

$Z_{OL}^*$  = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and frequency.

**Figure 10. 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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