

The RF Line

NPN Silicon

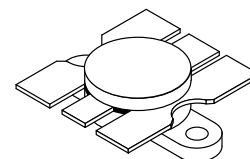
RF Power Transistor

... 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

MRF317

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



CASE 316-01, STYLE 1

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 (10 seconds)	I_C	12 18	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	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.65	$^\circ\text{C/W}$

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 ($I_C = 100\text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	35	—	—	Vdc
Collector–Emitter Breakdown Voltage ($I_C = 100\text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	65	—	—	Vdc
Collector–Base Breakdown Voltage ($I_C = 100\text{ mAdc}$, $I_E = 0$)	$V_{(BR)CBO}$	65	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 10\text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 30\text{ Vdc}$, $I_E = 0$)	I_{CBO}	—	—	5.0	mAdc

ON CHARACTERISTICS

DC Current Gain ($I_C = 5.0\text{ Adc}$, $V_{CE} = 5.0\text{ Vdc}$)	h_{FE}	10	25	80	—
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NOTE:

(continued)

- 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 ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 100\text{ W}$, $f = 150\text{ MHz}$, $I_C (\text{Max}) = 6.5\text{ Adc}$)	η	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)	ψ	No Degradation in Output Power			

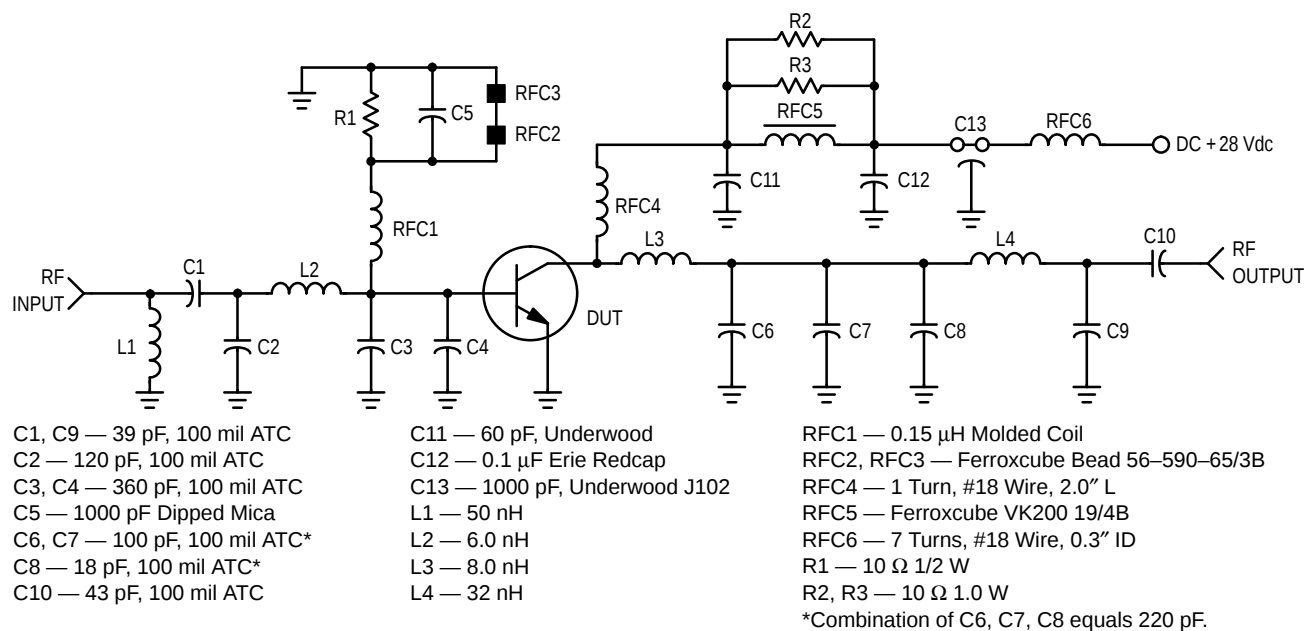


Figure 1. 110–160 MHz Broadband Amplifier — Test Fixture Schematic

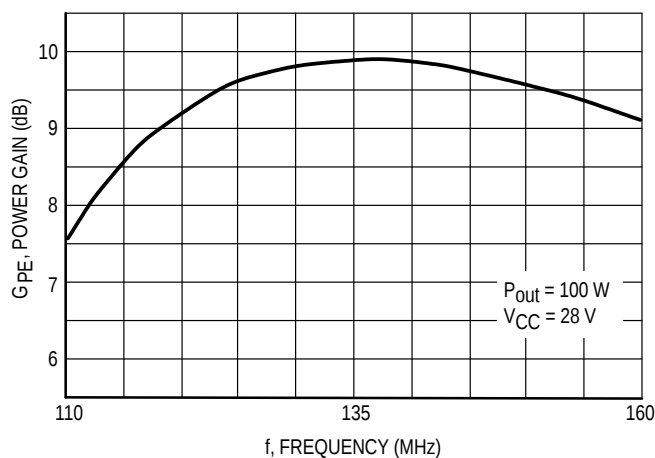


Figure 2. Power Gain versus Frequency Broadband Test Fixture

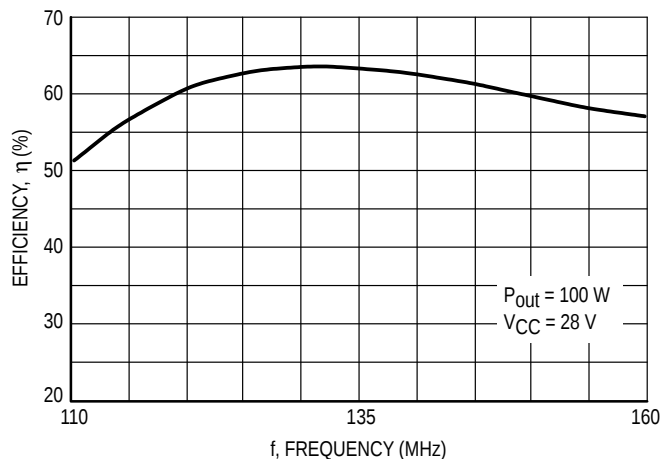


Figure 3. Efficiency versus Frequency Broadband Test Fixture

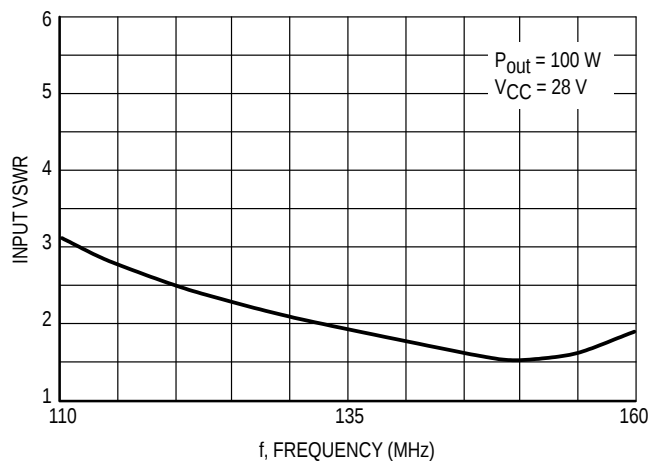


Figure 4. Input VSWR versus Frequency Broadband Test Fixture

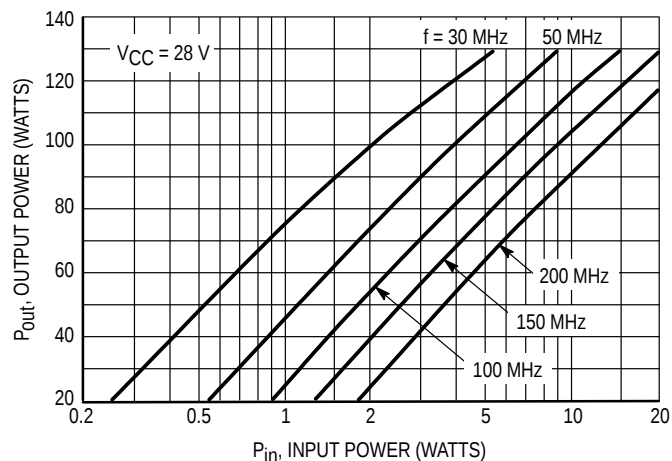


Figure 5. Output Power versus Input Power

TYPICAL PERFORMANCE CURVES

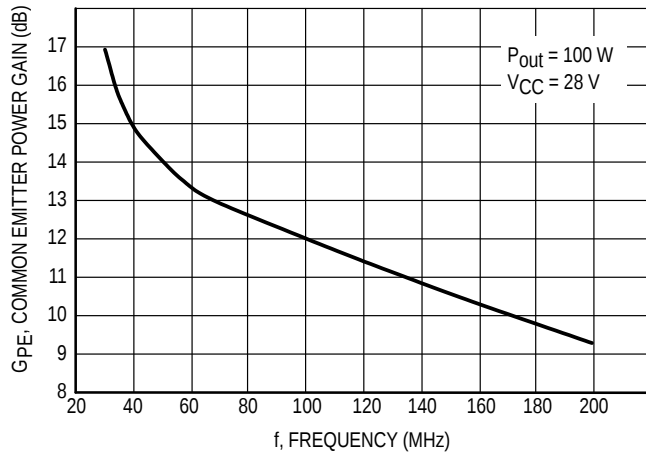


Figure 6. Power Gain versus Frequency

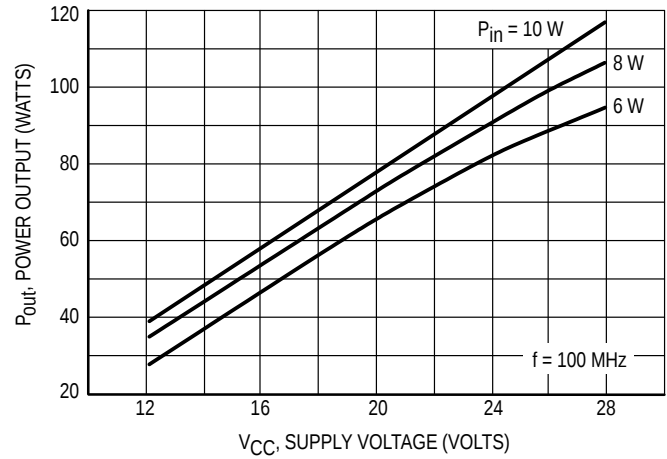


Figure 7. Power Output versus Supply Voltage

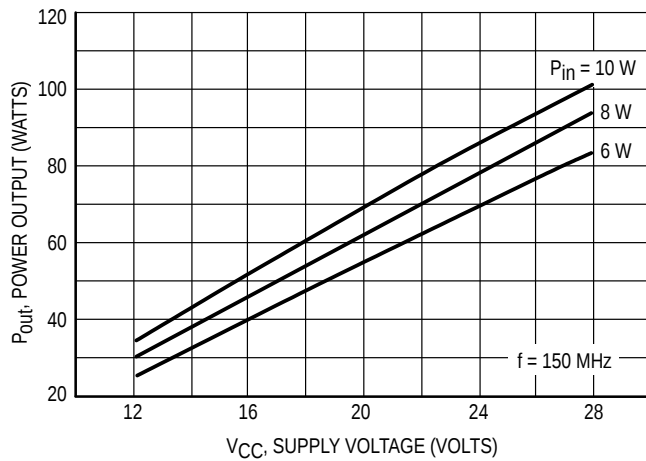


Figure 8. Power Output versus Supply Voltage

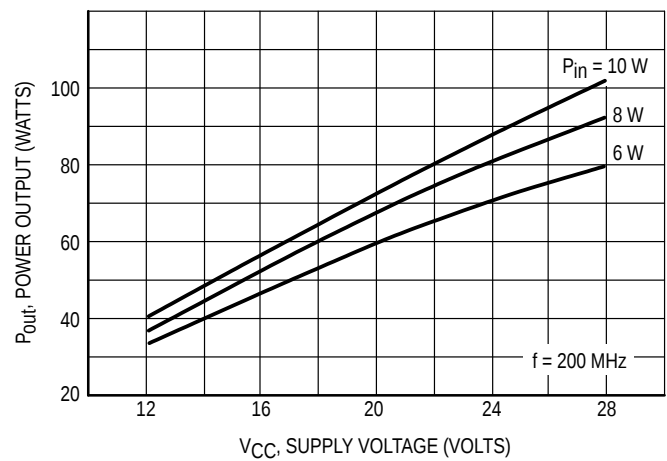
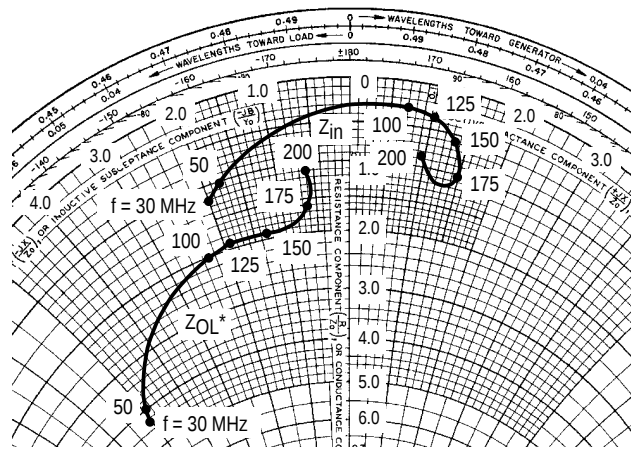


Figure 9. Power Output versus Supply Voltage



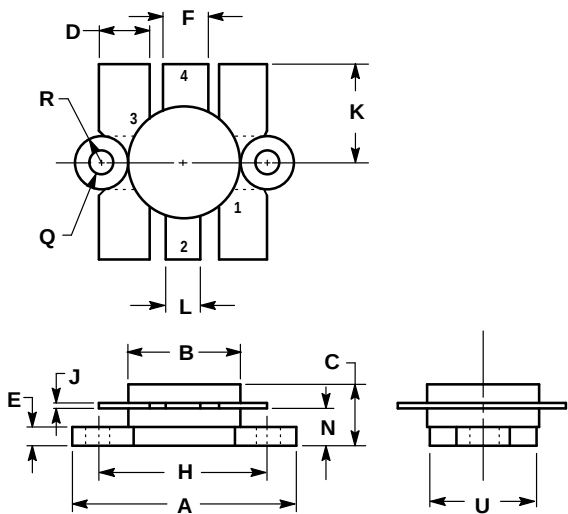
Z_{OL}^* = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and frequency.

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

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	$0.9 + j1.0$	$1.1 - j0.6$

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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MRF317/D

