

The RF Line

NPN Silicon

RF Power Transistors

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

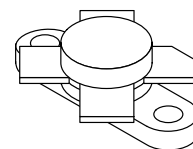
- Guaranteed Performance at 150 MHz, 28 Vdc
Output Power = 30 Watts
Minimum Gain = 10 dB
- 100% Tested for Load Mismatch at All Phase Angles with 30:1 VSWR
- Gold Metallization System for High Reliability Applications

MRF314

**30 W, 30–200 MHz
RF POWER
TRANSISTORS
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	I _C	3.4	Adc
Total Device Dissipation @ T _C = 25°C (1) Derate above 25°C	P _D	82 0.47	Watts W/°C
Storage Temperature Range	T _{stg}	–65 to +150	°C



CASE 211–07, STYLE 1

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R _{θJC}	2.13	°C/W

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage (I _C = 30 mAdc, I _B = 0)	V _{(BR)CEO}	35	—	—	Vdc
Collector–Emitter Breakdown Voltage (I _C = 30 mAdc, V _{BE} = 0)	V _{(BR)CES}	65	—	—	Vdc
Collector–Base Breakdown Voltage (I _C = 30 mAdc, I _E = 0)	V _{(BR)CBO}	65	—	—	Vdc
Emitter–Base Breakdown Voltage (I _E = 3.0 mAdc, I _C = 0)	V _{(BR)EBO}	4.0	—	—	Vdc
Collector Cutoff Current (V _{CB} = 30 Vdc, I _E = 0)	I _{CBO}	—	—	3.0	mAdc

ON CHARACTERISTICS

DC Current Gain (I _C = 1.5 Adc, V _{CE} = 5.0 Vdc)	h _{FE}	20	—	80	—
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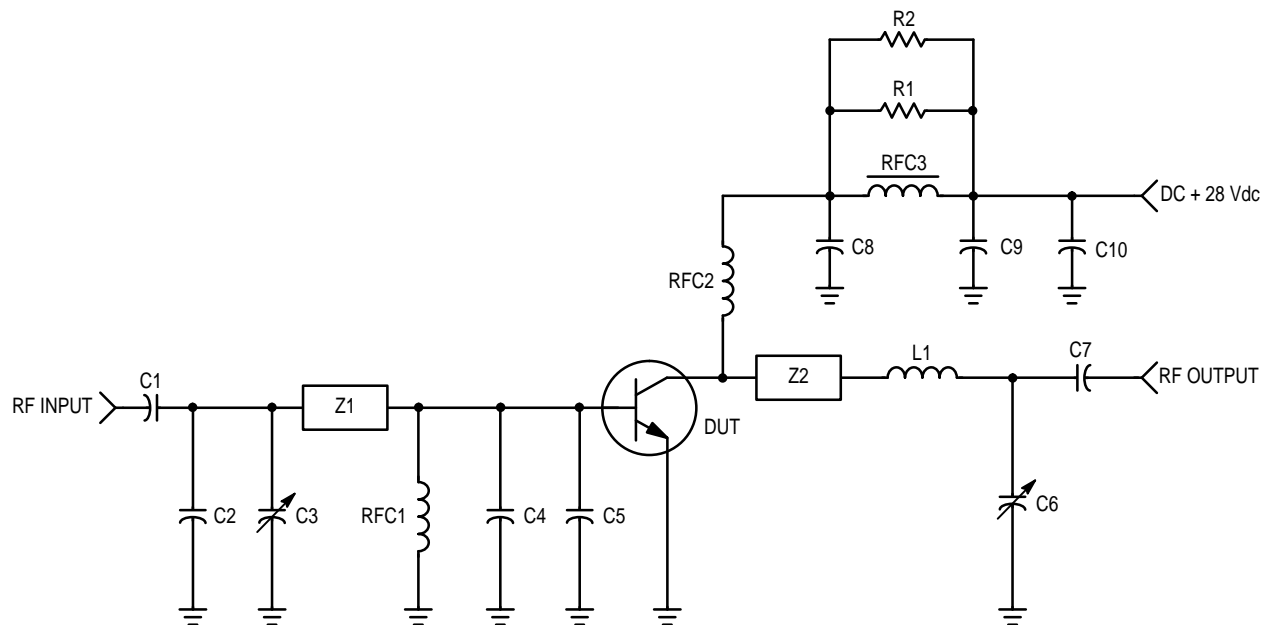
NOTE:

1. These devices are designed for RF operation. The total device dissipation rating applies only when the devices are operated as RF amplifiers.

(continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS					
Output Capacitance ($V_{CB} = 30\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{ob}	—	30	40	pF
FUNCTIONAL TESTS (Figure 1)					
Common-Emitter Amplifier Power Gain ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 30\text{ W}$, $f = 150\text{ MHz}$)	G_{PE}	10	13.5	—	dB
Collector Efficiency ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 30\text{ W}$, $f = 150\text{ MHz}$)	η	50	—	—	%
Load Mismatch ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 30\text{ W}$, $f = 150\text{ MHz}$, VSWR = 30:1 all phase angles)	ψ	No Degradation in Power Output			



C1, C7 — 18 pF, 100 mil ATC
 C2 — 68 pF, 100 mil ATC
 C3, C6 — Johanson #JMC 5501
 C4 — 270 pF, 100 mil ATC
 C5 — 240 pF, 100 mil ATC
 C8, C9 — 100 pF Underwood
 C10 — 1.0 μF Tantalum
 L1 — 2 Turns, 2.5" #20 Wire, ID = 0.275"

R1, R2 — 10 Ω , 1.0 W
 RFC1 — 15 μH Molded Coil
 RFC2 — 2 Turns, 2.5" #20 Wire, ID = 0.2"
 RFC3 — Ferroxcube VK200-19/4B
 Z1 — Microstrip, 0.168" W x 1.6" L
 Z2 — Microstrip, 0.168" W x 1.2" L
 Board — Glass Teflon $\epsilon_r = 2.55$

Figure 1. 150 MHz Test Circuit

TYPICAL PERFORMANCE CURVES

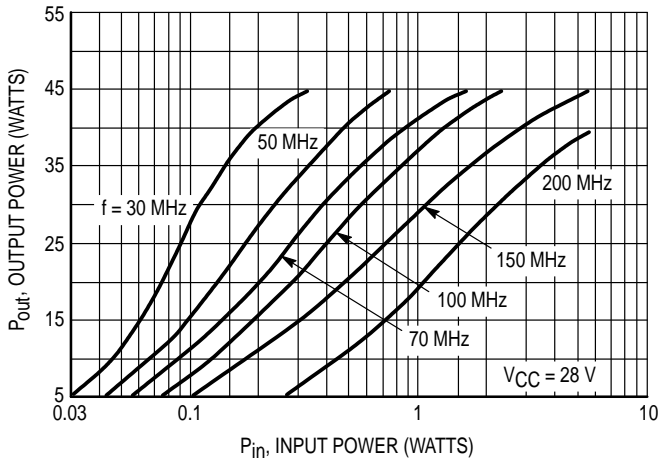


Figure 2. Output Power versus Input Power

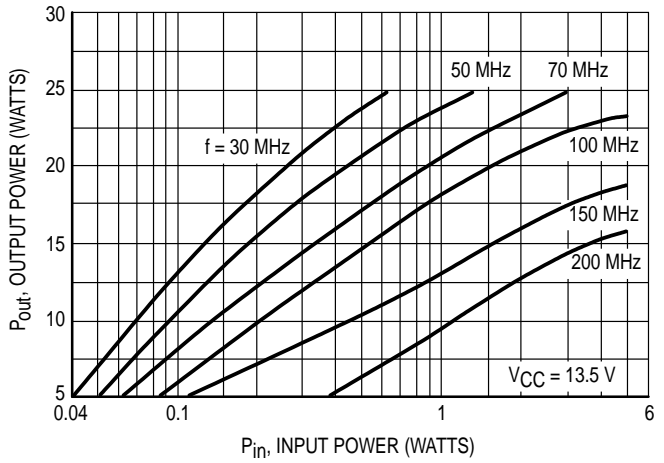


Figure 3. Output Power versus Input Power

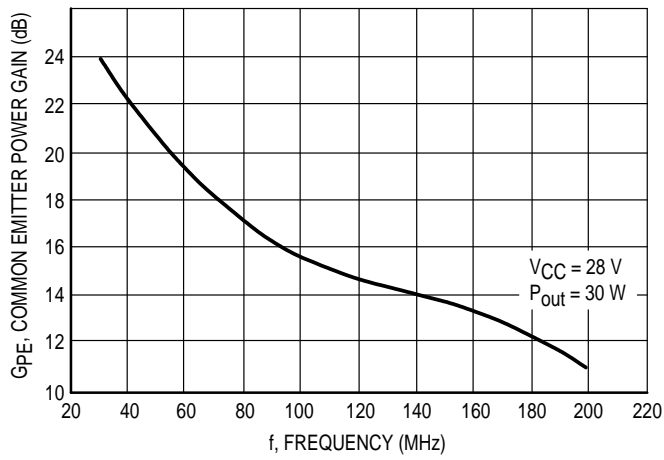


Figure 4. Power Gain versus Frequency

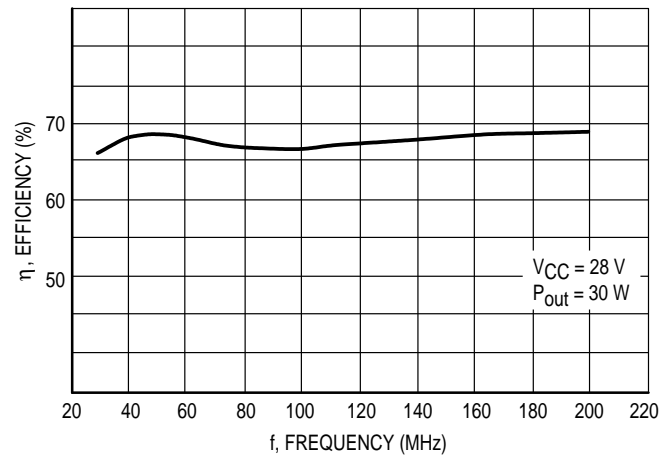
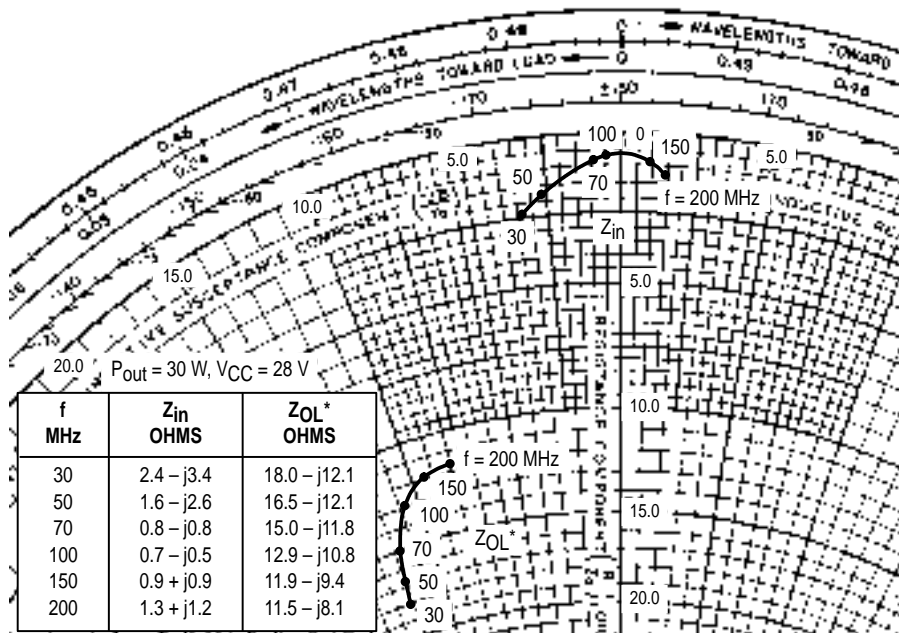


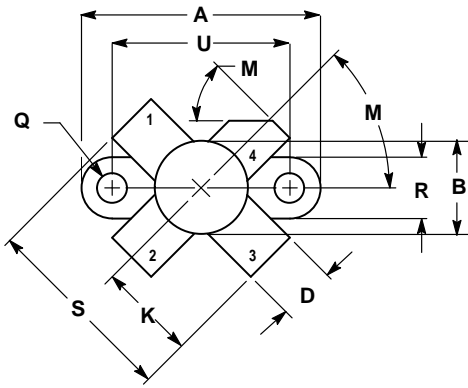
Figure 5. Efficiency versus Frequency



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

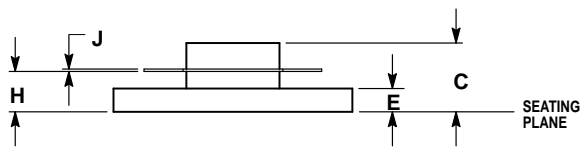
Figure 6. Series Equivalent Input/Output Impedance

PACKAGE DIMENSIONS




- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.960	0.990	24.39	25.14
B	0.370	0.390	9.40	9.90
C	0.229	0.281	5.82	7.13
D	0.215	0.235	5.47	5.96
E	0.085	0.105	2.16	2.66
H	0.150	0.108	3.81	4.57
J	0.004	0.006	0.11	0.15
K	0.395	0.405	10.04	10.28
M	40°	50°	40°	50°
Q	0.113	0.130	2.88	3.30
R	0.245	0.255	6.23	6.47
S	0.790	0.810	20.07	20.57
U	0.720	0.730	18.29	18.54



- STYLE 1:
 PIN 1. EMITTER
 2. BASE
 3. EMITTER
 4. COLLECTOR

**CASE 211-07
 ISSUE N**

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MRF314/D

