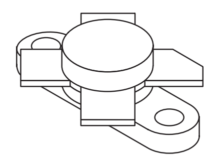
The RF Line
NPN Silicon RF Power Transistors

. . . 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**



CASE 211–07, 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	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

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.13	°C/W

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

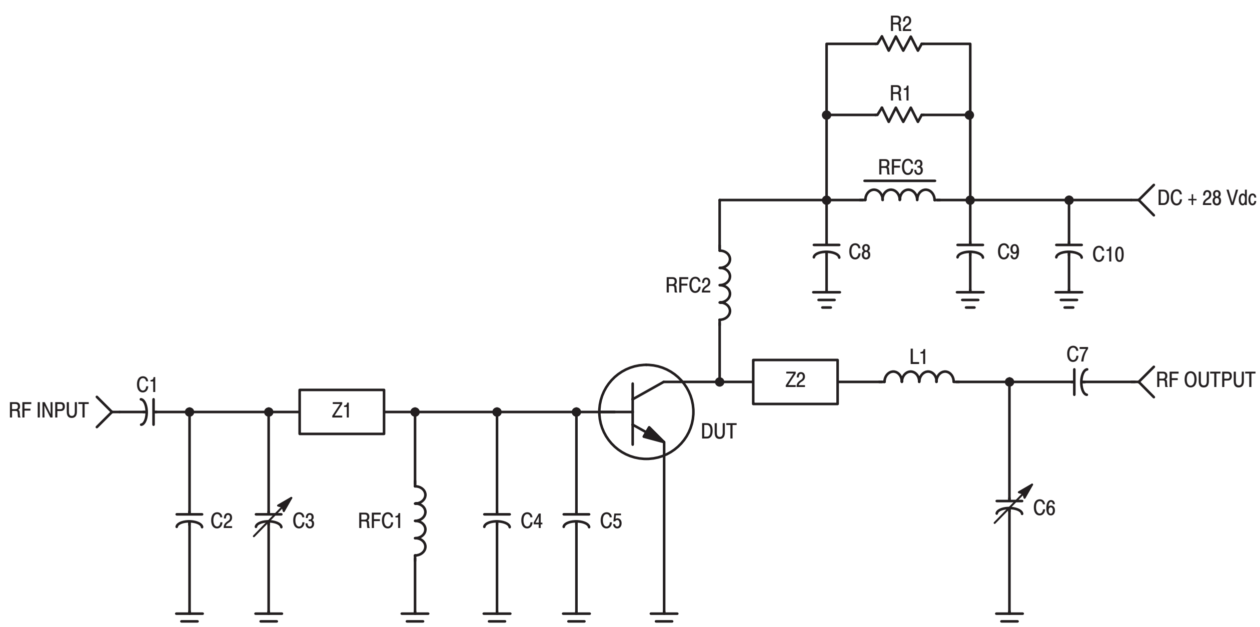
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I_C = 30 mAdc, I_B = 0)	$V_{(BR)CEO}$	35	—	—	Vdc
Collector–Emitter Breakdown Voltage (I_C = 30 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	65	—	—	Vdc
Collector–Base Breakdown Voltage (I_C = 30 mAdc, I_E = 0)	$V_{(BR)CBO}$	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	—

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°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 30 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	—	30	40	pF
FUNCTIONAL TESTS (Figure 1)					
Common–Emitter Amplifier Power Gain (V_{CC} = 28 Vdc, P_{out} = 30 W, f = 150 MHz)	G_{PE}	10	13.5	—	dB
Collector Efficiency (V_{CC} = 28 Vdc, P_{out} = 30 W, f = 150 MHz)	η	50	—	—	%
Load Mismatch (V_{CC} = 28 Vdc, P_{out} = 30 W, f = 150 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 ε_r = 2.55

Figure 1. 150 MHz Test Circuit

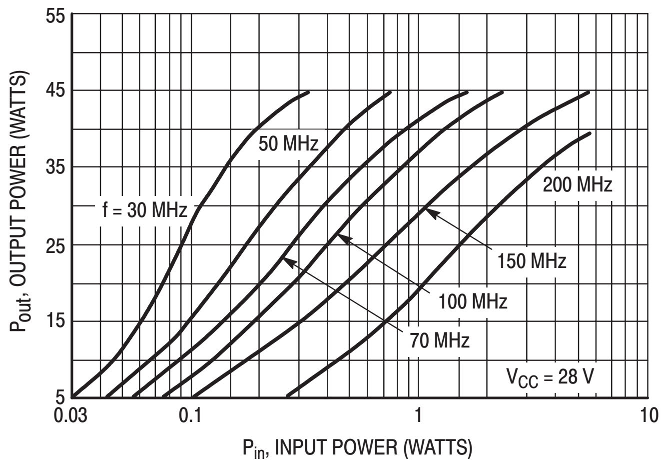


Figure 2. Output Power versus Input Power

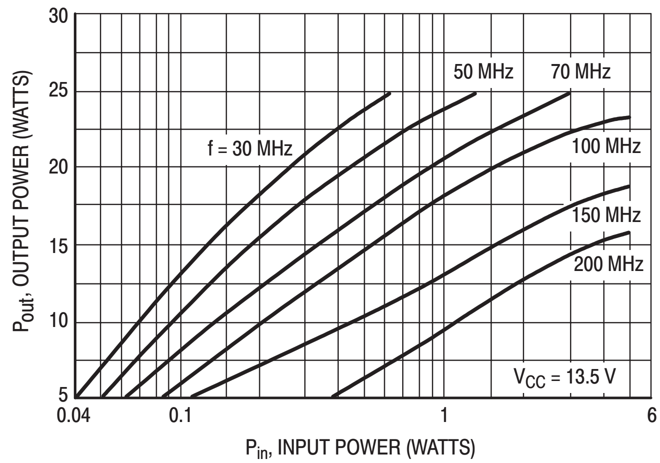


Figure 3. Output Power versus Input Power

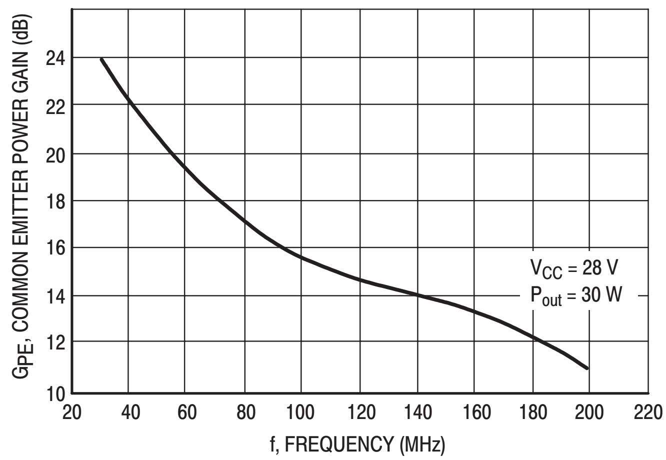


Figure 4. Power Gain versus Frequency

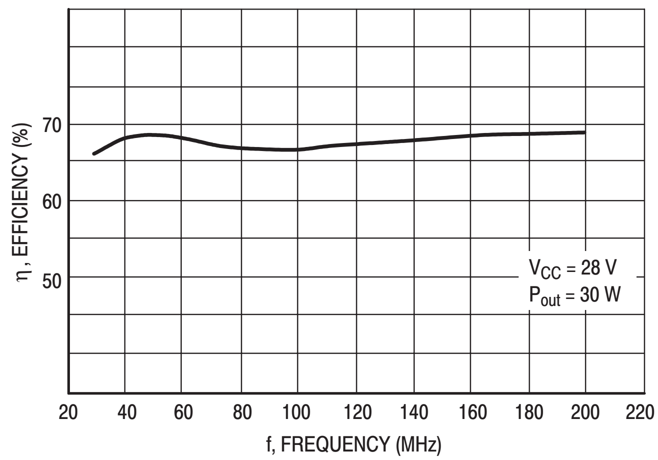
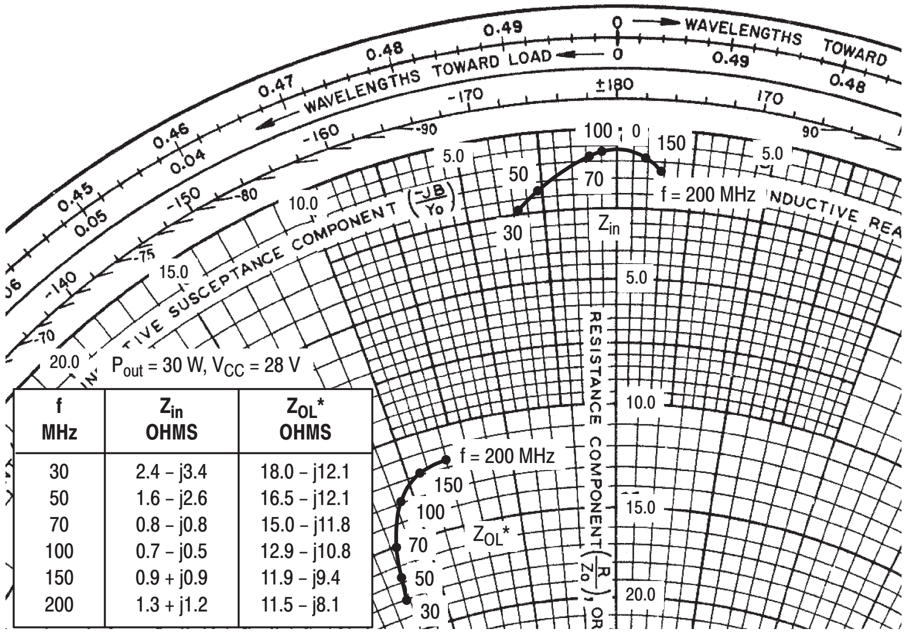


Figure 5. Efficiency versus Frequency

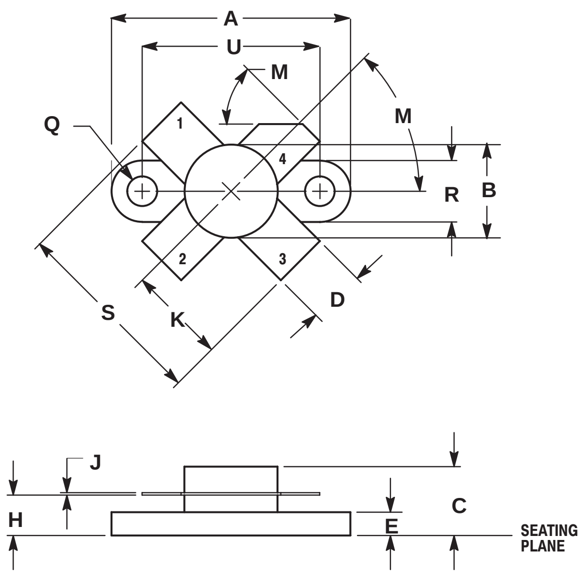


f MHz	Z_{in} OHMS	Z_{OL}* OHMS
30	2.4 – j3.4	18.0 – j12.1
50	1.6 – j2.6	16.5 – j12.1
70	0.8 – j0.8	15.0 – j11.8
100	0.7 – j0.5	12.9 – j10.8
150	0.9 + j0.9	11.9 – j9.4
200	1.3 + j1.2	11.5 – j8.1

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 MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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

Specifications subject to change without notice.

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