The RF Line

NPN Silicon RF Power Transistor

MRF464

. . . designed primarily for applications as a high–power linear amplifier from 2.0 to 30 MHz, in single sideband mobile, marine and base station equipment.

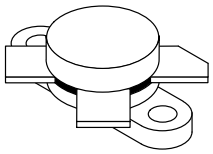
- Specified 28 Volt, 30 MHz Characteristics —
  Output Power = 80 W (PEP)
  Minimum Gain = 15 dB
  Efficiency = 40%
  Intermodulation Distortion = –32 dB (Max)

80 W (PEP), 30 MHz
RF POWER
TRANSISTOR
NPN SILICON

MATCHING PROCEDURE

In the push–pull circuit configuration it is preferred that the transistors are used as matched pairs to obtain optimum performance.

The matching procedure used by Motorola consists of measuring h_{FE} at the data sheet conditions and color coding the device to predetermined h_{FE} ranges within the normal h_{FE} limits. A color dot is added to the marking on top of the cap. Any two devices with the same color dot can be paired together to form a matched set of units.



CASE 211–11, 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	10	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	250 1.4	Watts W/°C
Storage Temperature Range	T_{stg}	–65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.7	°C/W
Stud Torque (1)	—	8.5	In. Lb.

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Breakdown Voltage (I_C = 100 mAdc, I_B = 0)	$V_{(BR)CEO}$	35	—	Vdc
Collector–Emitter Breakdown Voltage (I_C = 100 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	65	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 1.0 mAdc, I_C = 0)	$V_{(BR)EBO}$	4.0	—	Vdc
Collector Cutoff Current (V_{CE} = 28 Vdc, V_{BE} = 0, T_C = +55°C)	I_{CES}	—	10	mAdc
ON CHARACTERISTICS				
DC Current Gain (I_C = 0.5 Adc, V_{CE} = 5.0 Vdc)	h_{FE}	10	—	—

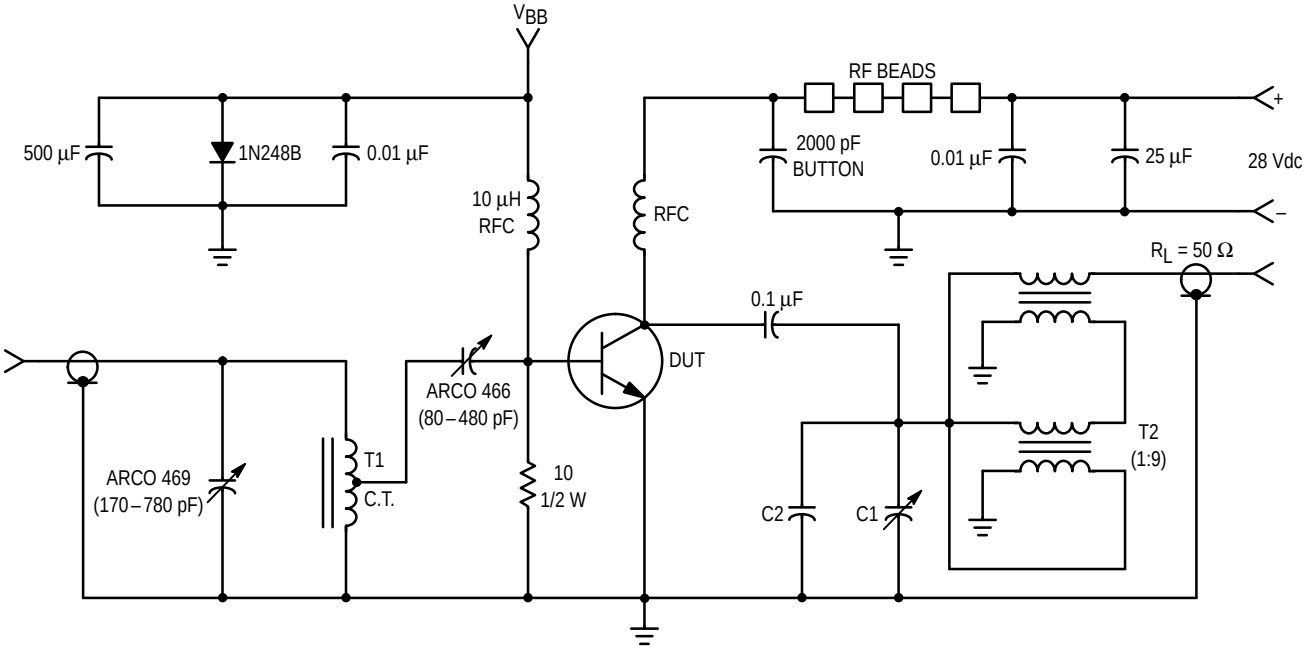
NOTE:
1. Case 145A–10 — For Repeated Assembly Use 11 In. Lb.

(continued)

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

Characteristic	Symbol	Min	Max	Unit
DYNAMIC CHARACTERISTICS				
Output Capacitance (V_{CB} = 28 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	—	200	pF
FUNCTIONAL TESTS				
Common–Emitter Amplifier Power Gain (Figure 1) (P_{out} = 80 W (PEP), I_C = 3.6 Adc (Max), V_{CC} = 28 Vdc, f_1 = 30 MHz, f_2 = 30.001 MHz)	G_{PE}	15	—	dB
Intermodulation Distortion Ratio (Figure 1) (2) (P_{out} = 80 W (PEP), I_C = 3.6 Adc (Max), V_{CC} = 28 Vdc, f_1 = 30 MHz, f_2 = 30.001 MHz)	IMD	—	–32	dB
Collector Efficiency (P_{out} = 80 W (PEP), I_C = 3.6 Adc (Max), V_{CC} = 28 Vdc, f_1 = 30 MHz, f_2 = 30.001 MHz)	η	40	—	%

NOTE:
2. To Mil–Std–1311 Version A, Test Method 2204B, Two Tone, Reference each Tone.



RFC — 20 Turns @12 AWG Enameled Wire Close Wound in 2 Layers, 1/4″ I.D.
T1 — 20 Turns #24 AWG Wire Wound on Micro–Metals T37–7 Toroid Core Center Tapped.
T2 — 1:9 XFMR; 6 Turns of 2 Twisted Pairs of #28 AWG Enameled Wire. (8 Crests Per Inch) Bifilar Wound on Each of 2 Separate Balun Cores. (Stackpole #57–1503, No. 14 Material) Interconnected as shown
RF Beads — Ferroxcube #56–590–65/3B

V_{BB} adjusted for I_{CQ} — 40 mAdc (I_{CQ} = Quiescent Collector Current)
C1 — 170–180 pF ARCO 469 or Equivalent
C2 — 330 pF

Figure 1. 30 MHz Test Circuit

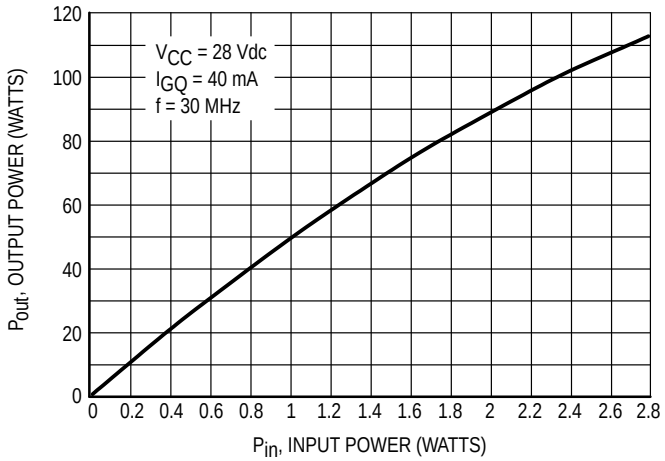


Figure 2. Output Power versus Input Power

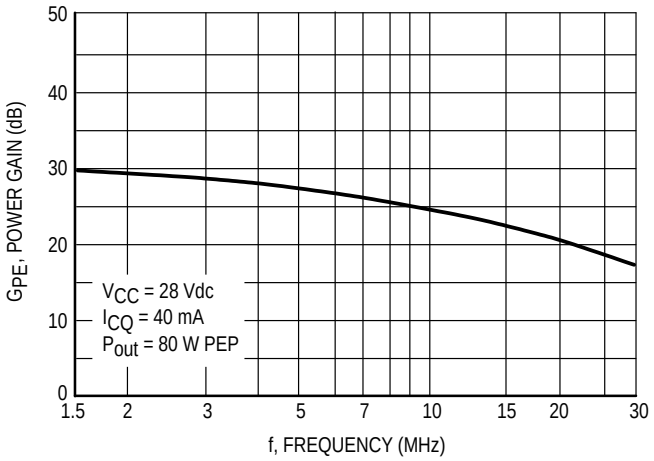


Figure 3. Power Gain versus Frequency

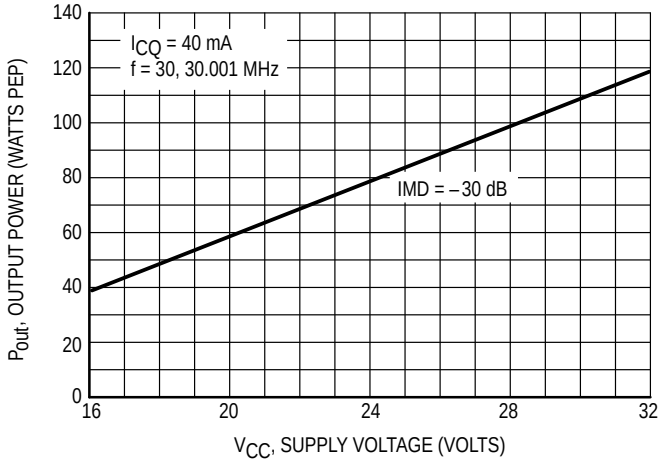


Figure 4. Output Power versus Supply Voltage

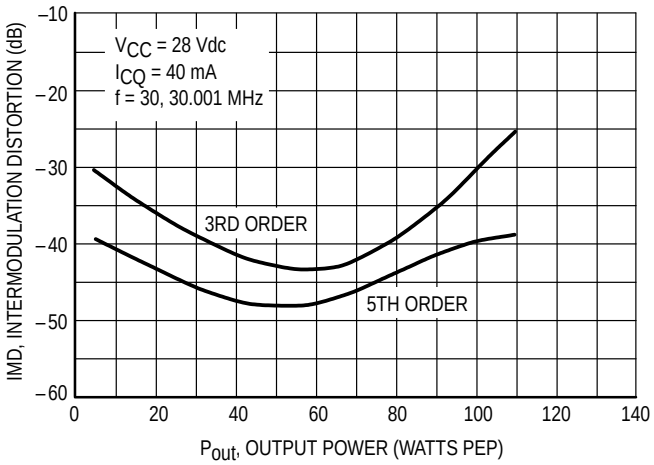


Figure 5. Intermodulation Distortion versus Output Power

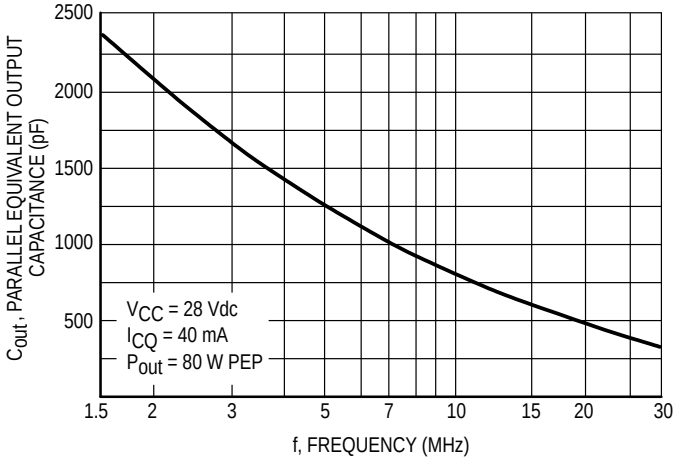


Figure 6. Output Capacitance versus Frequency

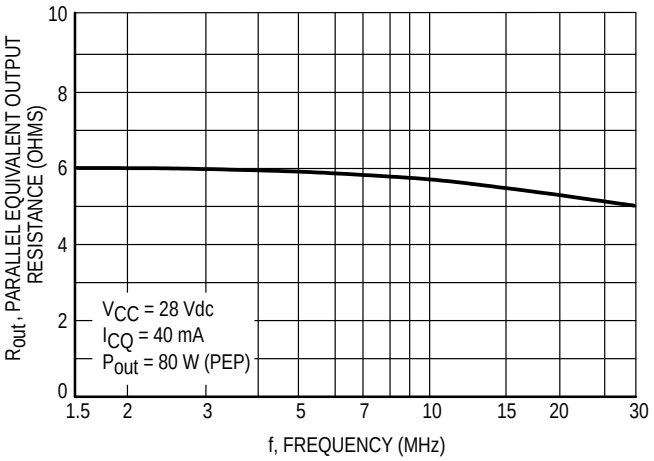


Figure 7. Output Resistance versus Frequency

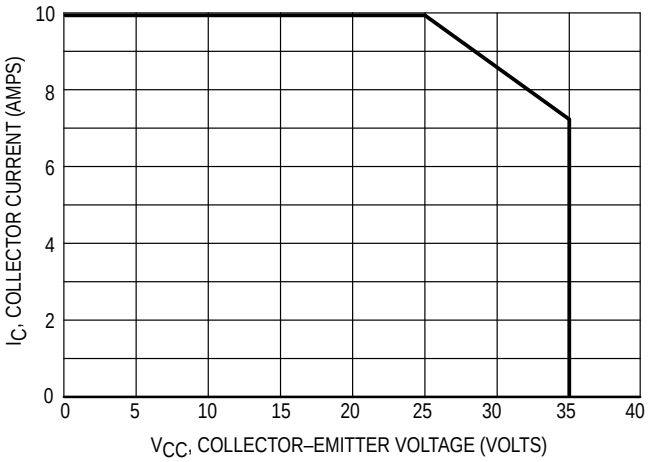
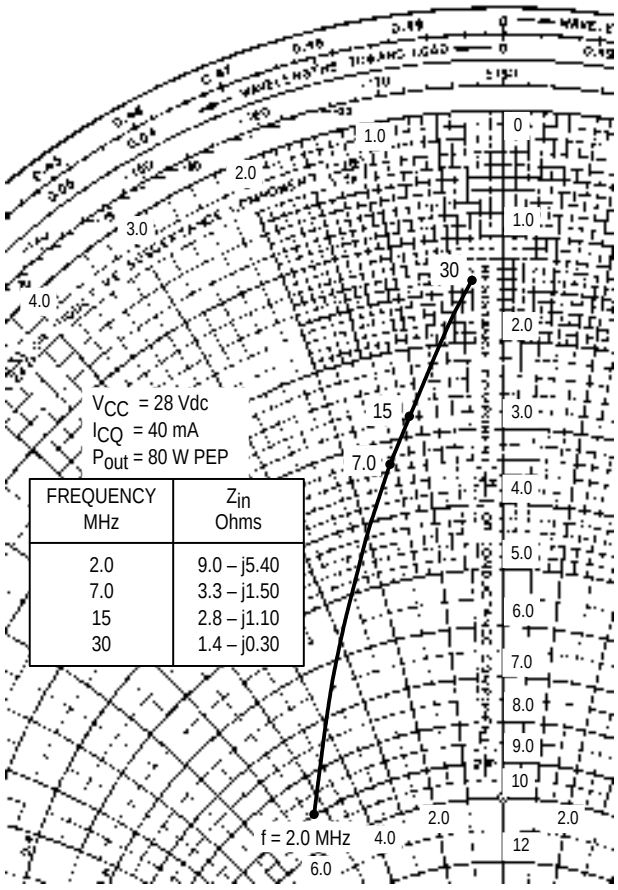


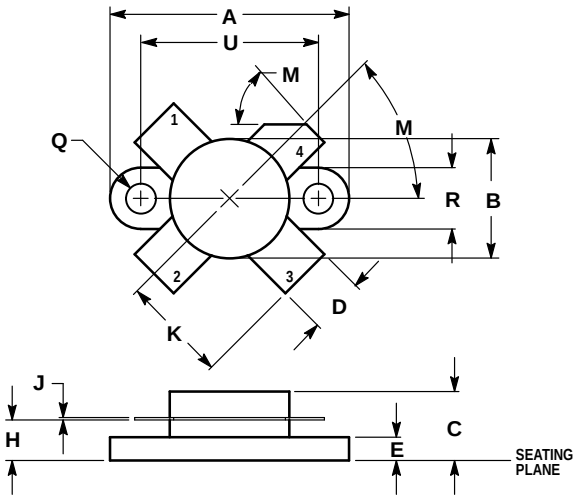
Figure 8. DC Safe Operating Area



FREQUENCY MHz	Z_{in} Ohms
2.0	9.0 – j5.40
7.0	3.3 – j1.50
15	2.8 – j1.10
30	1.4 – j0.30

Figure 9. Series Input Impedance

PACKAGE DIMENSIONS



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

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.960	0.990	24.39	25.14
B	0.465	0.510	11.82	12.95
C	0.229	0.275	5.82	6.98
D	0.216	0.235	5.49	5.96
E	0.084	0.110	2.14	2.79
H	0.144	0.178	3.66	4.52
J	0.003	0.007	0.08	0.17
K	0.435	—	11.05	—
M	45 °NOM		45 °NOM	
Q	0.115	0.130	2.93	3.30
R	0.246	0.255	6.25	6.47
U	0.720	0.730	18.29	18.54

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

CASE 211–11
ISSUE N

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