

The RF Line

NPN Silicon

RF Power Transistor

Designed for power amplifier applications in industrial, commercial and amateur radio equipment to 30 MHz.

- Specified 12.5 Volt, 30 MHz Characteristics —
 - Output Power = 80 Watts
 - Minimum Gain = 12 dB
 - Efficiency = 50%

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	25	Vdc
Collector–Base Voltage	V_{CBO}	45	Vdc
Emitter–Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	20	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	250 1.43	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	$R_{\theta JC}$	0.7	$^\circ\text{C/W}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ($I_C = 100\text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	18	—	—	Vdc
Collector–Emitter Breakdown Voltage ($I_C = 50\text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	36	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 10\text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc

ON CHARACTERISTICS

DC Current Gain ($I_C = 5.0\text{ Adc}$, $V_{CE} = 5.0\text{ Vdc}$)	h_{FE}	40	—	150	—
--	----------	----	---	-----	---

DYNAMIC CHARACTERISTICS

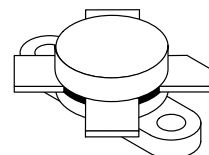
Output Capacitance ($V_{CB} = 15\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{ob}	—	—	250	pF
--	----------	---	---	-----	----

FUNCTIONAL TESTS (Figure 1)

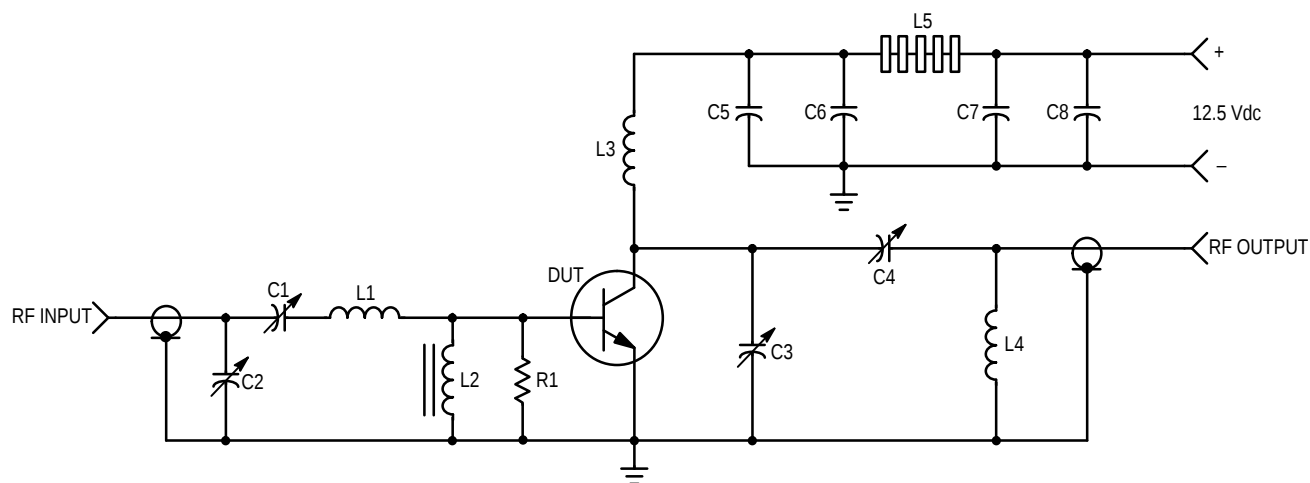
Common–Emitter Amplifier Power Gain ($V_{CC} = 12.5\text{ Vdc}$, $P_{out} = 80\text{ W}$, $f = 30\text{ MHz}$)	G_{pe}	12	—	—	dB
Collector Efficiency ($V_{CC} = 12.5\text{ Vdc}$, $P_{out} = 80\text{ W}$, $f = 30\text{ MHz}$)	η	50	—	—	%
Series Equivalent Input Impedance ($V_{CC} = 12.5\text{ Vdc}$, $P_{out} = 80\text{ W}$, $f = 30\text{ MHz}$)	Z_{in}	—	.938–j.341	—	Ohms
Series Equivalent Output Impedance ($V_{CC} = 12.5\text{ Vdc}$, $P_{out} = 80\text{ W}$, $f = 30\text{ MHz}$)	Z_{out}	—	1.16–j.201	—	Ohms
Parallel Equivalent Input Impedance ($V_{CC} = 12.5\text{ Vdc}$, $P_{out} = 80\text{ W}$, $f = 30\text{ MHz}$)	—	—	1.06 Ω 1817 pF	—	—
Parallel Equivalent Output Impedance ($V_{CC} = 12.5\text{ Vdc}$, $P_{out} = 80\text{ W}$, $f = 30\text{ MHz}$)	—	—	1.19 Ω 777 pF	—	—

MRF454

80 W, 30 MHz
RF POWER
TRANSISTOR
NPN SILICON



CASE 211–11, STYLE 1



C1, C2, C4 — ARCO 469
 C3 — ARCO 466
 C5 — 1000 pF, UNELCO
 C6, C7 — 0.1 μ F Disc Ceramic
 C8 — 1000 μ F/15 V Electrolytic
 R1 — 10 Ohm/1.0 Watt, Carbon

L1 — 3 Turns, #18 AWG, 5/16" I.D., 5/16" Long
 L2 — VK200-20/4B, FERROXCUBE
 L3 — 12 Turns, #18 AWG Enameled Wire, 1/4" I.D., Close Wound
 L4 — 3 Turns 1/8" O.D. Copper Tubing, 3/8" I.D., 3/4" Long
 L5 — 7 FERRITE Beads, FERROXCUBE #56-590-65/3B

Figure 1. 30 MHz Test Circuit Schematic

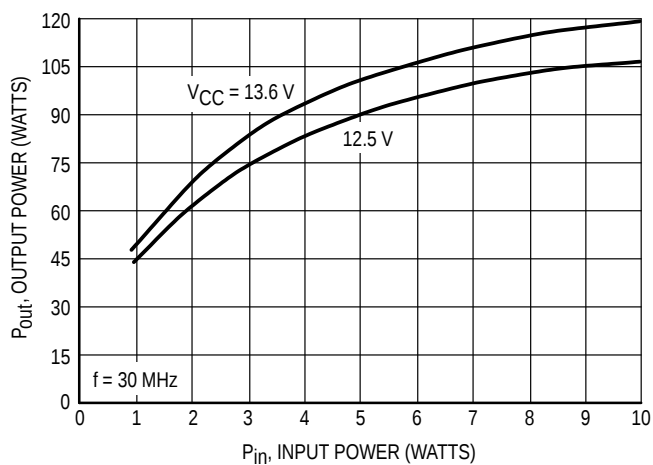


Figure 2. Output Power versus Input Power

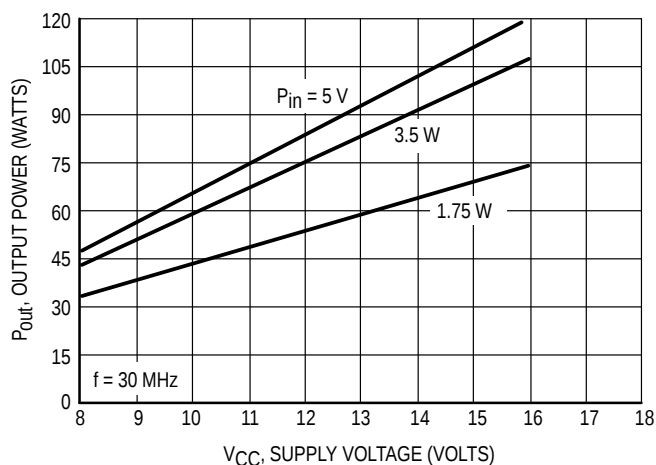
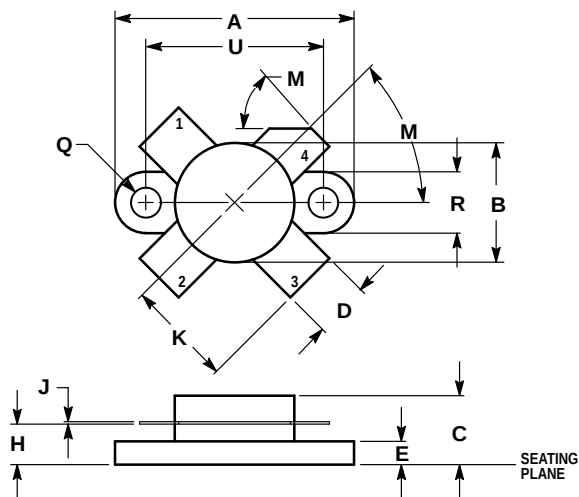


Figure 3. Output Power versus Supply Voltage

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	0.465	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

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters can and do vary in different applications. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

How to reach us:

USA / EUROPE: Motorola Literature Distribution;
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447

JAPAN: Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, Toshikatsu Otsuki,
6F Seibu-Butsuryu-Center, 3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-3521-8315

MFAX: RMFAX0@email.sps.mot.com - TOUCHTONE (602) 244-6609
INTERNET: <http://Design-NET.com>

HONG KONG: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298



MOTOROLA



MRF454/D

