

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 = 60 Watts
 - Minimum Gain = 13 dB
 - Efficiency = 55%

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.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	18	Vdc
Collector-Emitter Voltage	V_{CES}	36	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	15	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	175 1.0	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	$R_{\theta JC}$	1.0	$^\circ\text{C}/\text{W}$

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 ($I_C = 100 \text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	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}	10	—	150	—
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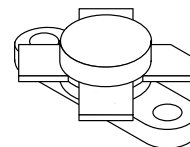
DYNAMIC CHARACTERISTICS

Output Capacitance ($V_{CB} = 12.5 \text{ Vdc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)	C_{ob}	—	—	250	pF
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(continued)

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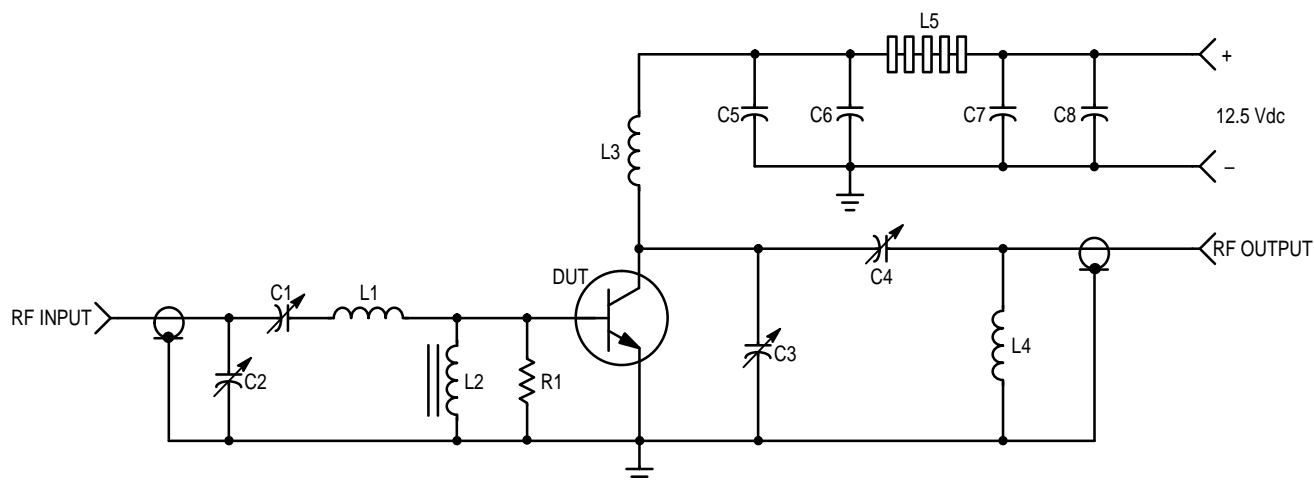
**60 W, 30 MHz
RF POWER
TRANSISTOR
NPN SILICON**



CASE 211-07, STYLE 1

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

Characteristic	Symbol	Min	Typ	Max	Unit
FUNCTIONAL TESTS (Figure 1)					
Common-Emitter Amplifier Power Gain ($V_{CC} = 12.5\text{ Vdc}$, $P_{Out} = 60\text{ W}$, $f = 30\text{ MHz}$)	G_{pe}	13	—	—	dB
Collector Efficiency ($V_{CC} = 12.5\text{ Vdc}$, $P_{Out} = 60\text{ W}$, $f = 30\text{ MHz}$)	η	55	—	—	%
Series Equivalent Input Impedance ($V_{CC} = 12.5\text{ Vdc}$, $P_{Out} = 60\text{ W}$, $f = 30\text{ MHz}$)	Z_{in}	—	1.66-j.844	—	Ohms
Series Equivalent Output Impedance ($V_{CC} = 12.5\text{ Vdc}$, $P_{Out} = 60\text{ W}$, $f = 30\text{ MHz}$)	Z_{out}	—	1.73-j.188	—	Ohms
Parallel Equivalent Input Impedance ($V_{CC} = 12.5\text{ Vdc}$, $P_{Out} = 60\text{ W}$, $f = 30\text{ MHz}$)	Z_{in}	—	2.09/1030	—	Ω/pF
Parallel Equivalent Output Impedance ($V_{CC} = 12.5\text{ Vdc}$, $P_{Out} = 60\text{ W}$, $f = 30\text{ MHz}$)	Z_{out}	—	1.75/330	—	Ω/pF



- C1, C2, C4 — ARCO 469
- C3 — ARCO 466
- C5 — 1000 pF, UNELCO
- C6, C7 — 0.1 μF Disc Ceramic
- C8 — 1000 $\mu\text{F}/15\text{ V}$ 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

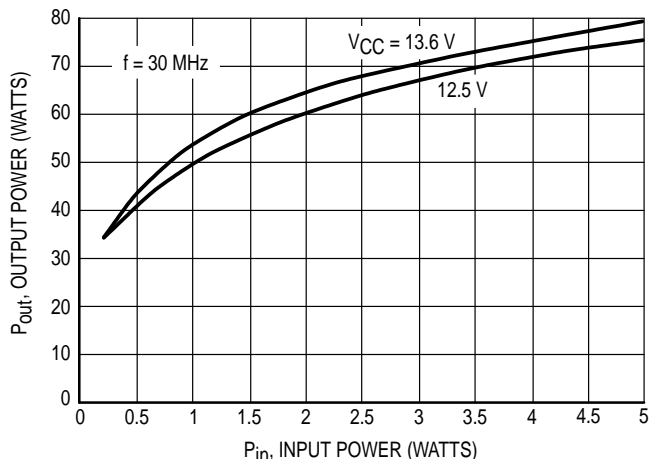


Figure 2. Output Power versus Input Power

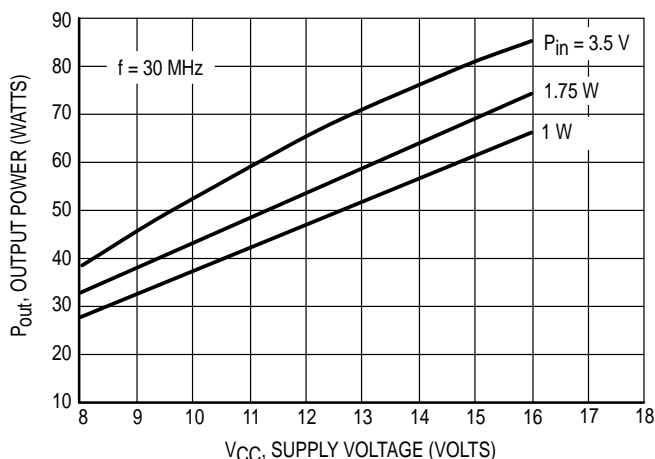
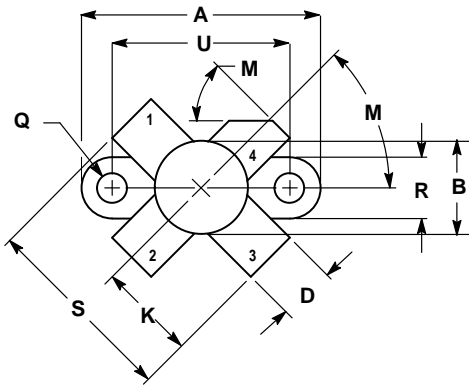


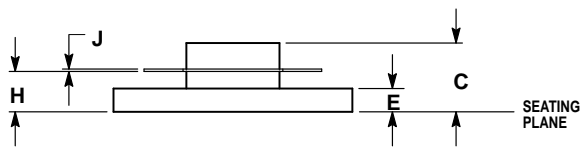
Figure 3. Output Power versus Supply Voltage

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	0.370	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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