MRF421

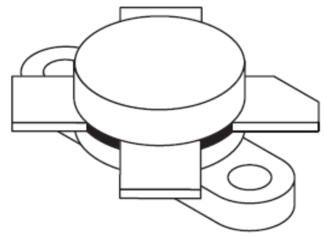
The RF Line NPN Silicon Power Transistor 100W(PEP), 30MHz, 28V

M/A-COM Products
Released - Rev. 07.07

Designed primarily for application as a high–power linear amplifier from 2.0 to 30 MHz.

- Specified 12.5 V, 30 MHz characteristics —
  Output power = 100 W (PEP)
  Minimum gain = 10 dB
  Efficiency = 40%
- Intermodulation distortion @ 100 W (PEP) — IMD = –30 dB (min.)
- 100% tested for load mismatch at all phase angles with 30:1 VSWR

Product Image



CASE 211–11, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	20	Vdc
Collector–Base Voltage	V_{CBO}	45	Vdc
Emitter–Base Voltage	V_{EBO}	3.0	Vdc
Collector Current — Continuous	I_C	20	Adc
Withstand Current — 10 s	—	30	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	290 1.66	Watts W/°C
Storage Temperature Range	T_{stg}	–65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.6	°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 = 50 mAdc, I_B = 0)	$V_{(BR)CEO}$	20	—	—	Vdc
Collector–Emitter Breakdown Voltage (I_C = 200 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	45	—	—	Vdc
Collector–Base Breakdown Voltage (I_C = 200 mAdc, I_E = 0)	$V_{(BR)CBO}$	45	—	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 10 mAdc, I_C = 0)	$V_{(BR)EBO}$	3.0	—	—	Vdc
Collector Cutoff Current (V_{CE} = 16 Vdc, V_{BE} = 0, T_C = 25°C)	I_{CES}	—	—	10	mAdc

(continued)

- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

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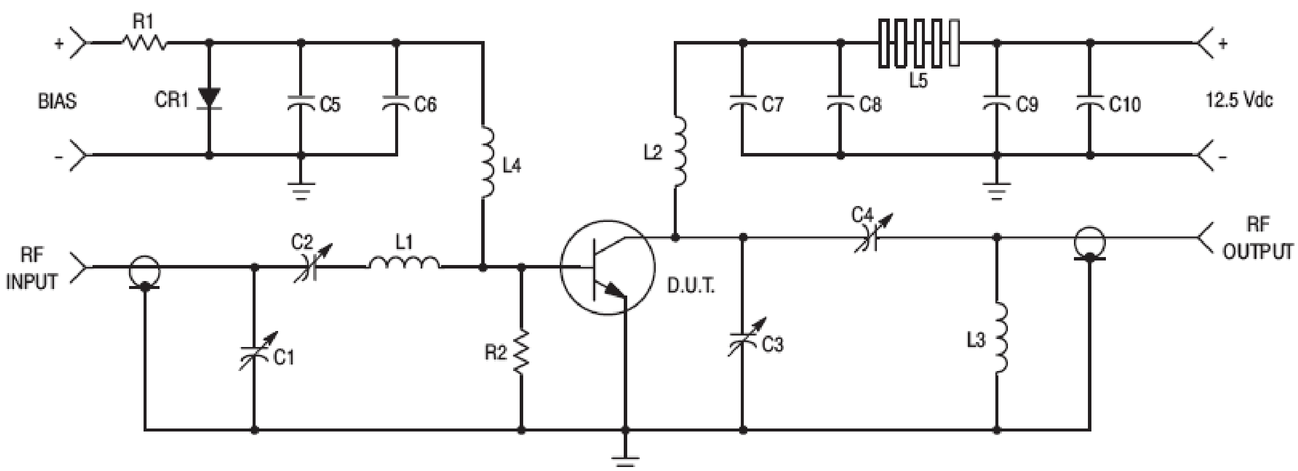
ELECTRICAL CHARACTERISTICS – continued (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS					
DC Current Gain (I_C = 5.0 Adc, V_{CE} = 5.0 Vdc)	h_{FE}	10	70	—	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 12.5 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	—	550	800	pF
FUNCTIONAL TESTS					
Common–Emitter Amplifier Power Gain (V_{CC} = 12.5 Vdc, P_{out} = 100 W, $I_{C(max)}$ = 10 Adc, I_{CQ} = 150 mAdc, f = 30, 30.001 MHz)	G_{PE}	10	12	—	dB
Collector Efficiency (V_{CC} = 12.5 Vdc, P_{out} = 100 W, $I_{C(max)}$ = 10 Adc, I_{CQ} = 150 mA, f = 30, 30.001 MHz)	η	40	—	—	%
Intermodulation Distortion (1) (V_{CE} = 12.5 Vdc, P_{out} = 100 W, I_C = 10 Adc, I_{CQ} = 150 mA, f = 30, 30.001 MHz)	IMD	—	–33	–30	dB

NOTE:
1. To proposed EIA method of measurement. Reference peak envelope power.



C1, C2, C4 — 170–780 pF, ARCO 469
C3 — 80–480 pF, ARCO 466
C5, C7, C10 — ERIE 0.1 µF, 100 V
C6 — MALLORY 500 µF @ 15 V Electrolytic
C9 — 100 µF, 15 V Electrolytic
C8 — 1000 pF, 350 V UNDERWOOD
R1 — 10 Ω, 25 Watt Wirewound
R2 — 10 Ω, 1.0 Watt Carbon
CR1 — 1N4997
L1 — 3 Turns, #16 Wire, 5/16″ I.D., 5/16″ Long
L2 — 12 Turns, #16 Enameled Wire Closewound, 1/4″ I.D.
L3 — 1–3/4 Turns, 1/8″ Tubing, 3/8″ I.D., 3/8″ Long
L4 — 10 µH Molded Choke
L5 — 10 Ferrite Beads — FERROXCUBE #56–590–65/3B

Figure 1. 30 MHz Test Circuit Schematic

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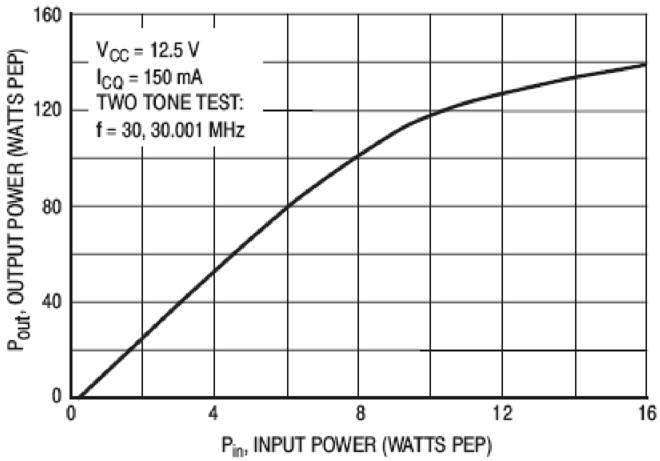


Figure 2. Output Power versus Input Power

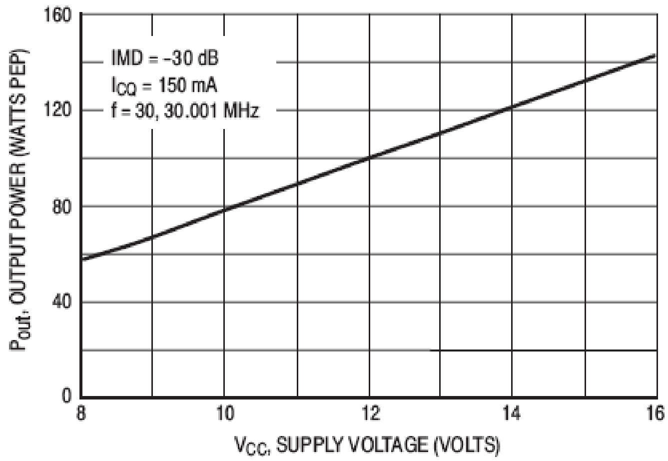


Figure 3. Output Power versus Supply Voltage

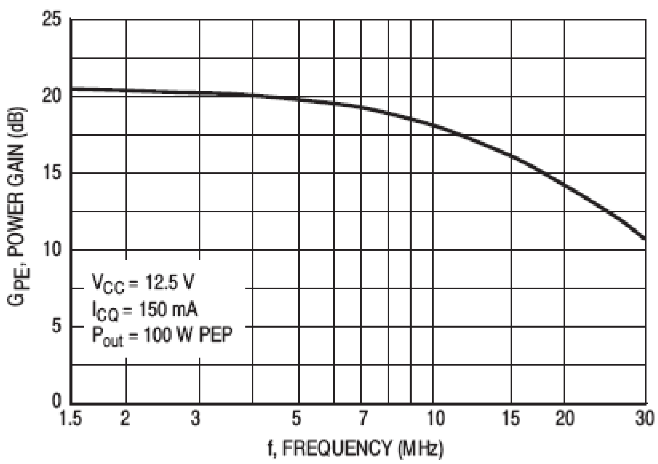


Figure 4. Power Gain versus Frequency

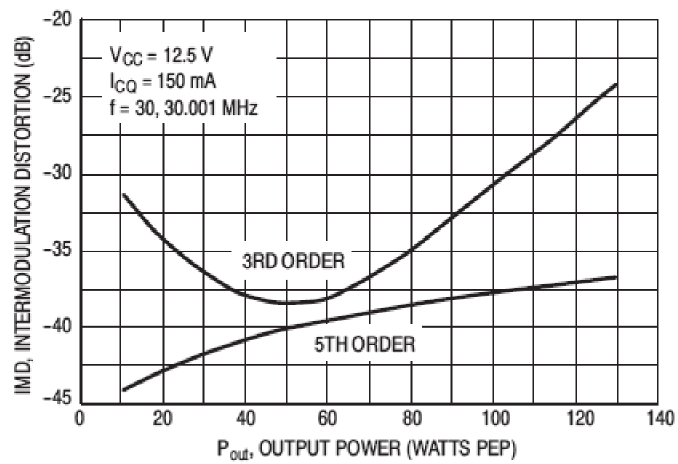


Figure 5. Intermodulation Distortion versus Output Power

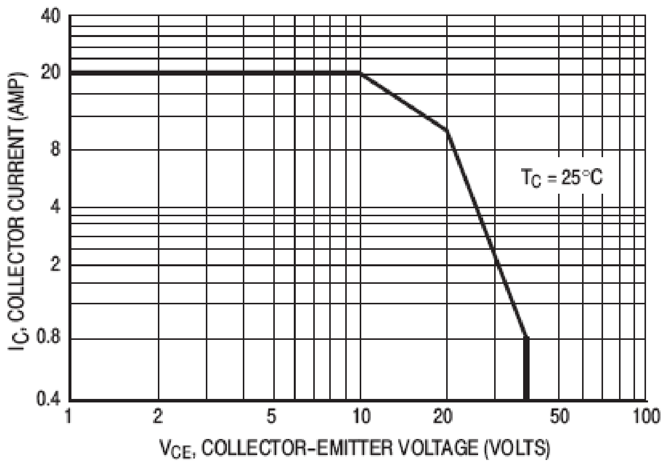
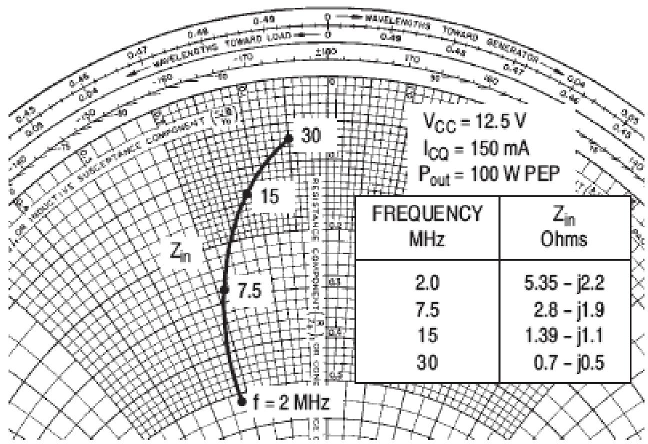


Figure 6. DC Safe Operating Area



FREQUENCY MHz	Z_{in} Ohms
2.0	5.35 – j2.2
7.5	2.8 – j1.9
15	1.39 – j1.1
30	0.7 – j0.5

Figure 7. Series Equivalent Impedance

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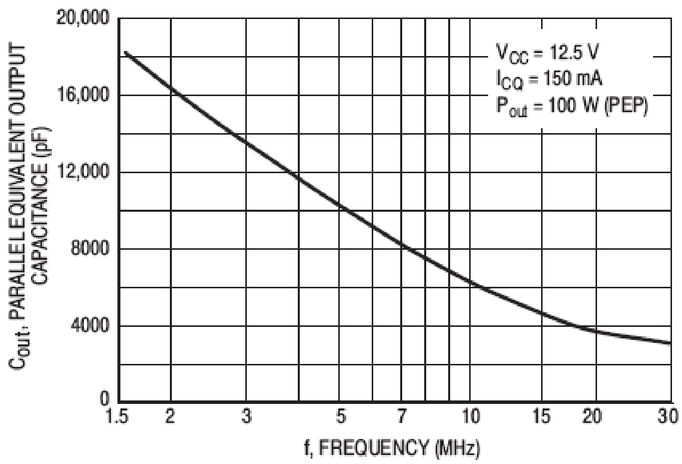


Figure 8. Output Capacitance versus Frequency

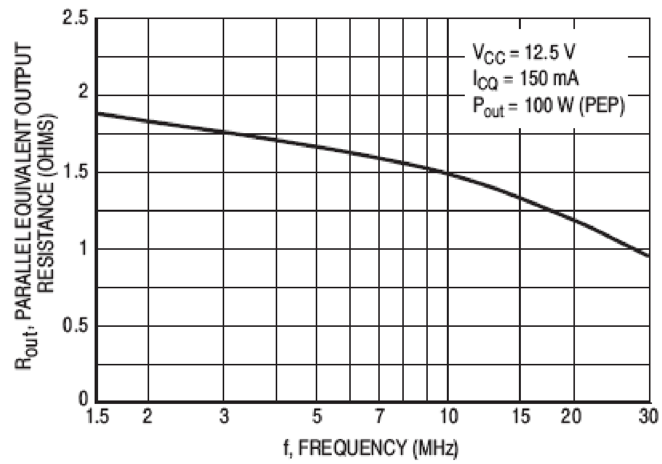
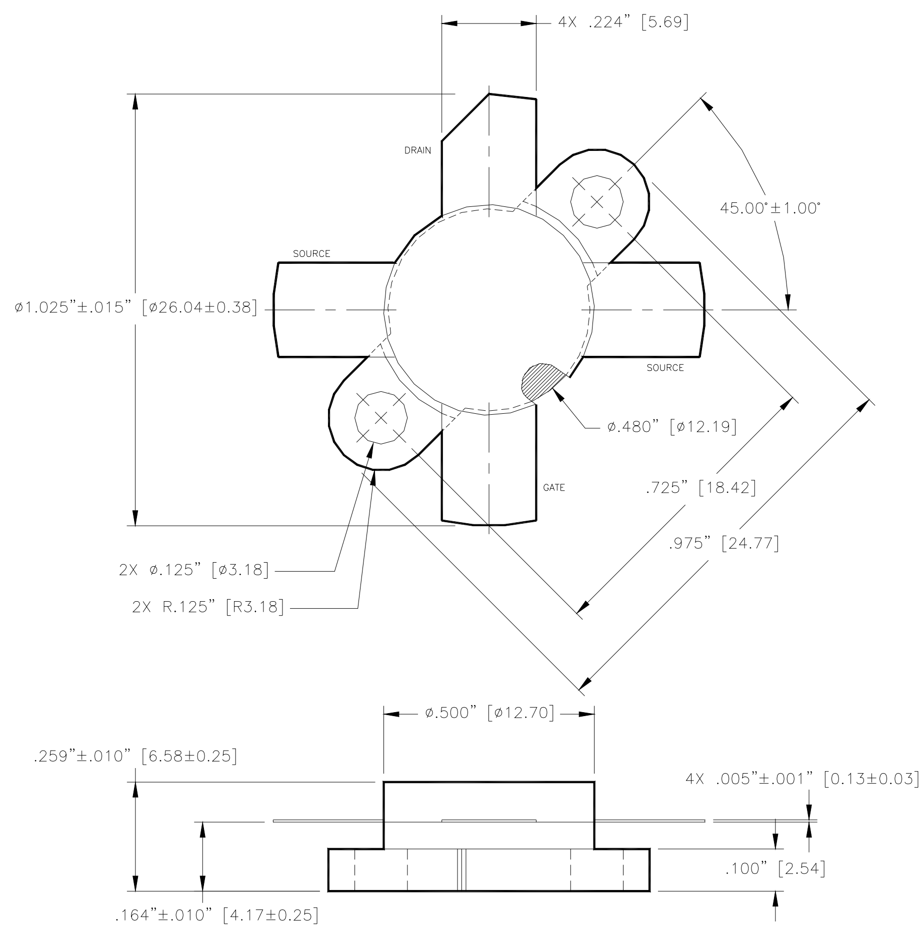


Figure 9. Output Resistance versus Frequency



Unless otherwise noted, tolerances are inches ±.005" [millimeters ±0.13mm]

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