MRF321

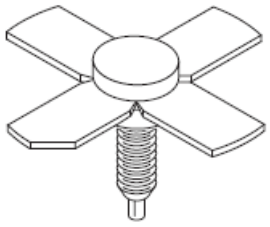
The RF Line NPN Silicon Power Transistor
10W, 400MHz, 28V

Rev. V1

Designed primarily for wideband large–signal driver and predriver amplifier stages in 200–500 MHz frequency range.

- Guaranteed performance at 400 MHz, 28 Vdc
  Output power = 10 W
  Power gain = 12 dB min.
  Efficiency = 50% min.
- 100% tested for load mismatch at all phase angles with 30:1 VSWR
- Gold metallization system for high reliability
- Computer–controlled wirebonding gives consistent input Impedance

Product Image



CASE 244–04, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	33	Vdc
Collector–Base Voltage	V_{CBO}	60	Vdc
Emitter–Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous — Peak	I_C	1.1 1.5	Adc
Total Device Dissipation @ T_A = 25°C (1) Derate above 25°C	P_D	27 160	Watts mW/°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	6.4	°C/W

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

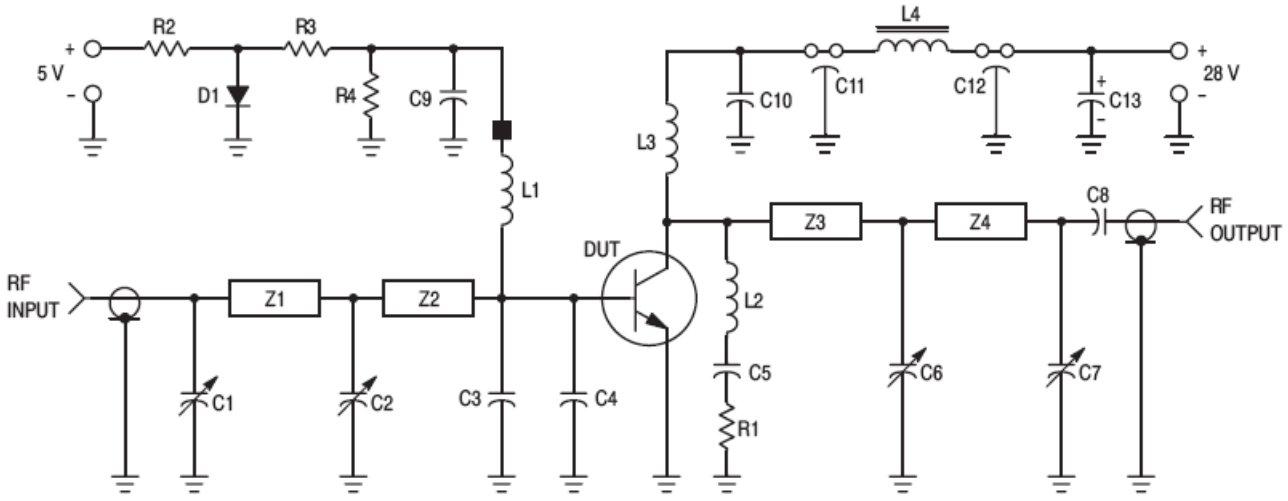
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I_C = 20 mAdc, I_B = 0)	$V_{(BR)CEO}$	33	—	—	Vdc
Collector–Emitter Breakdown Voltage (I_C = 20 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	60	—	—	Vdc
Collector–Base Breakdown Voltage (I_C = 20 mAdc, I_E = 0)	$V_{(BR)CBO}$	60	—	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 2.0 mAdc, I_C = 0)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current (V_{CB} = 30 Vdc, I_E = 0)	I_{CBO}	—	—	1.0	mAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 500 mA, V_{CE} = 5.0 Vdc)	h_{FE}	20	—	80	—

NOTE: (continued)

1. This device is designed for RF operation. The total device dissipation rating applies only when the device is operated as an RF amplifier.

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

Characteristic	Symbol	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 28 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	—	10	12	pF
FUNCTIONAL TESTS (Figure 1)					
Common–Emitter Amplifier Power Gain (V_{CC} = 28 Vdc, P_{out} = 10 W, f = 400 MHz)	G_{PE}	12	13	—	dB
Collector Efficiency (V_{CC} = 28 Vdc, P_{out} = 10 W, f = 400 MHz)	η	50	60	—	%
Load Mismatch (V_{CC} = 28 Vdc, P_{out} = 10 W, f = 400 MHz, VSWR = 30:1 all phase angles)	ψ	No Degradation in Output Power			



C1, C2, C3 — 1.0–20 pF Johanson Trimmer (JMC 5501)
C3, C4 — 47 pF ATC Chip Capacitor
C5, C10 — 0.1 µF Erie Redcap
C7 — 0.5–10 pF Johanson Trimmer (JMC 5201)
C8 — 0.018 µF Vitramon Chip Capacitor
C9 — 200 pF UNELCO Capacitor
C11, C12 — 680 pF Feedthru
C13 — 1.0 µF, 50 Volt Tantalum Capacitor

D1 — 1N4001

L1 — 0.33 µH Molded Choke with Ferroxcube Bead (Ferroxcube 56–590–65/4B) on Ground End of Coil
L2 — 4 Turns #20 Enamel, 1/8″ ID

L3 — 6 Turns #20 Enamel, 1/4″ ID
L4 — Ferroxcube VK200–19/4B

R1 — 5.1 Ω, 1/4 Watt
R2 — 120 Ω, 1.0 Watt
R3 — 20 Ω, 1/2 Watt
R4 — 47 Ω, 1/2 Watt

Z1 — Microstrip 0.1″ W x 1.35″ L
Z2 — Microstrip 0.1″ W x 0.55″ L
Z3 — Microstrip 0.1″ W x 0.8″ L
Z4 — Microstrip 0.1″ W x 1.75″ L

Board — Glass Teflon, ε_R = 2.56, t = 0.062″

Input/Output Connectors — Type N

Figure 1. 400 MHz Test Circuit Schematic

The RF Line NPN Silicon Power Transistor
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Rev. V1

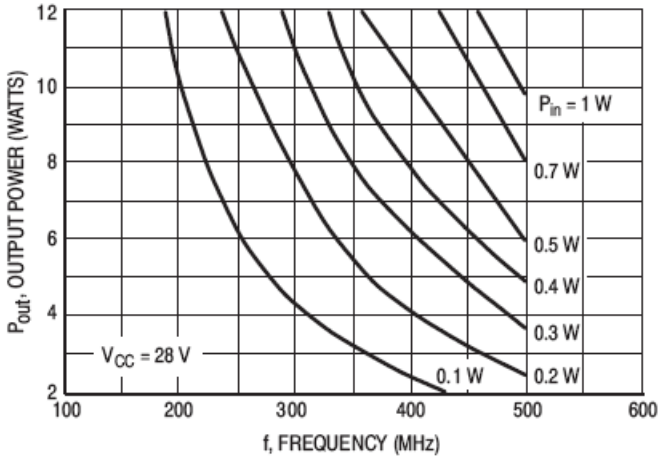


Figure 2. Output Power versus Frequency

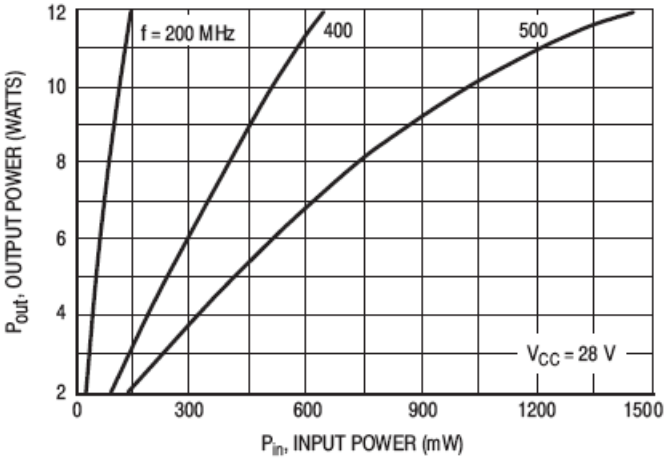


Figure 3. Output Power versus Input Power

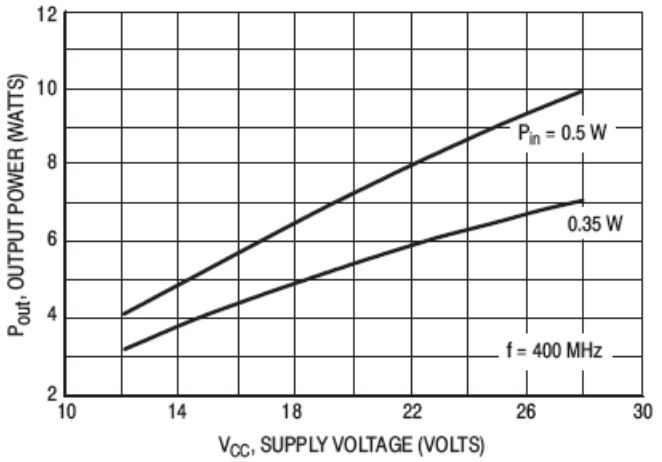


Figure 4. Output Power versus Supply Voltage

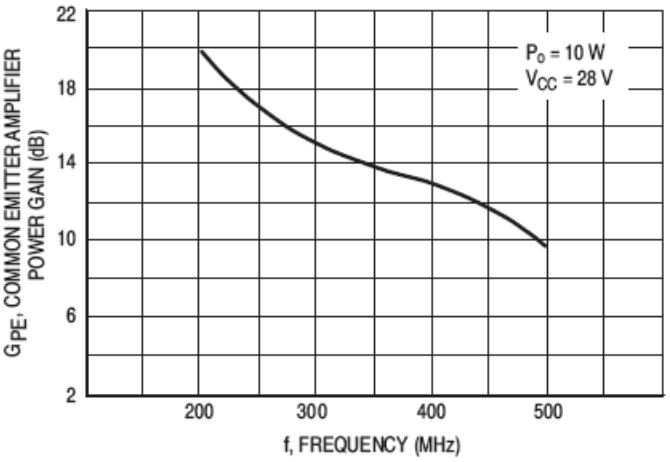
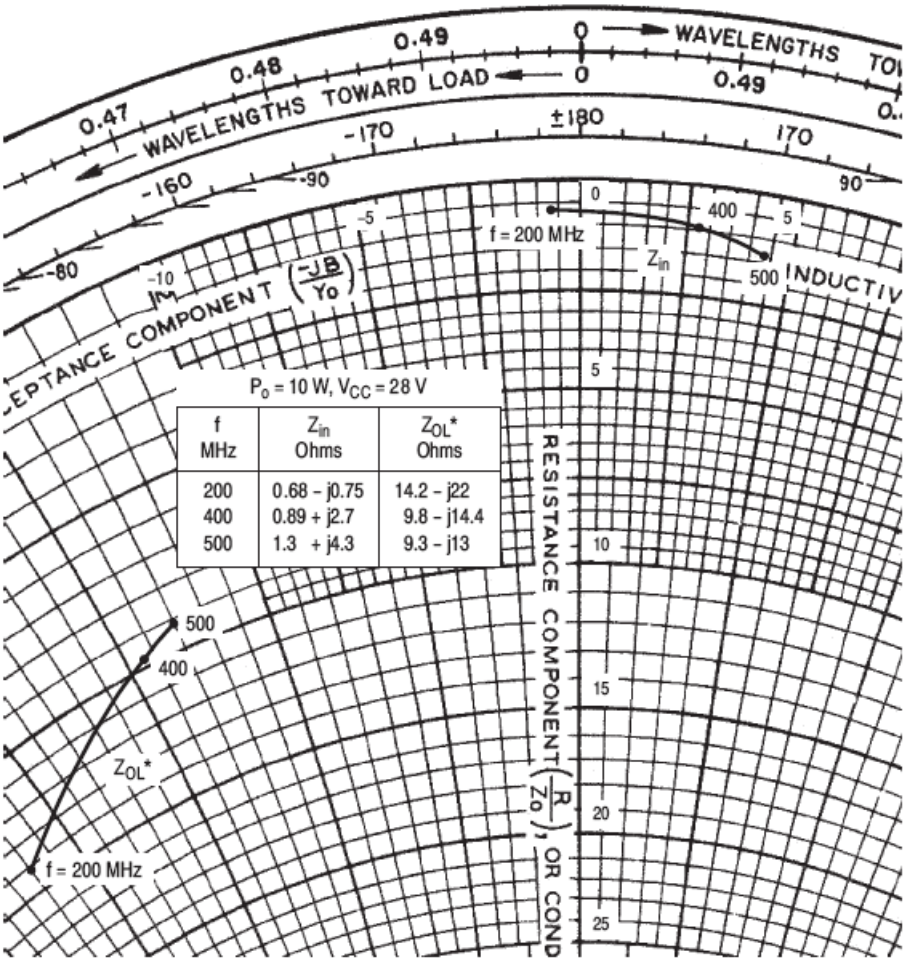


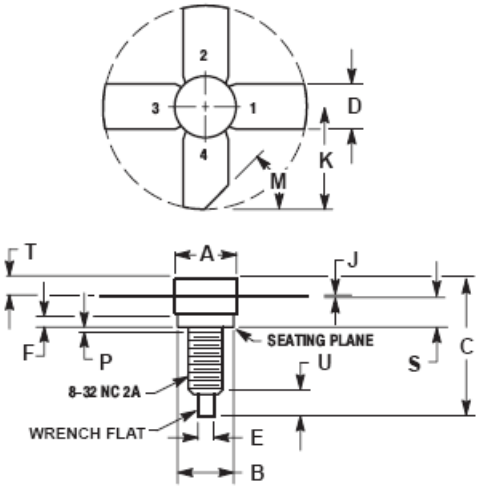
Figure 5. Power Gain versus Frequency



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 Impedance

PACKAGE DIMENSIONS



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	7.06	7.26	0.278	0.286
B	6.20	6.50	0.244	0.256
C	14.99	16.51	0.590	0.650
D	5.46	5.96	0.215	0.235
E	1.40	1.65	0.055	0.065
G	1.52	---	0.060	---
J	0.08	0.17	0.003	0.007
K	11.05	---	0.435	---
M	45° NOM		45° NOM	
P	---	1.27	---	0.050
S	3.00	3.25	0.118	0.128
T	1.40	1.77	0.055	0.070
U	2.92	3.68	0.115	0.145

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

CASE 244–04
ISSUE J

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