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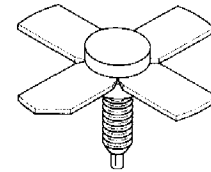
The RF Line NPN Silicon RF Power Transistor

... 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 Watts
 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

MRF321

10 W, 400 MHz
 RF POWER
 TRANSISTOR
 NPN SILICON



CASE 244-04,

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	I_C	1.1	Adc
— Peak		1.5	
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ (1) Derate above 25°C	P_D	27	Watts mW/ $^\circ\text{C}$
		160	
Storage Temperature Range	T_{slg}	-65 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

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

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 ($I_C = 20 \text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	33	—	—	Vdc
Collector-Emitter Breakdown Voltage ($I_C = 20 \text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	60	—	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 20 \text{ mAdc}$, $I_E = 0$)	$V_{(BR)CBO}$	60	—	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 2.0 \text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 30 \text{ Vdc}$, $I_E = 0$)	I_{CBO}	—	—	1.0	mAdc

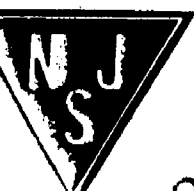
ON CHARACTERISTICS

DC Current Gain ($I_C = 500 \text{ mA}$, $V_{CE} = 5.0 \text{ Vdc}$)	h_{FE}	20	—	80	—
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NOTE:

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

(continued)



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

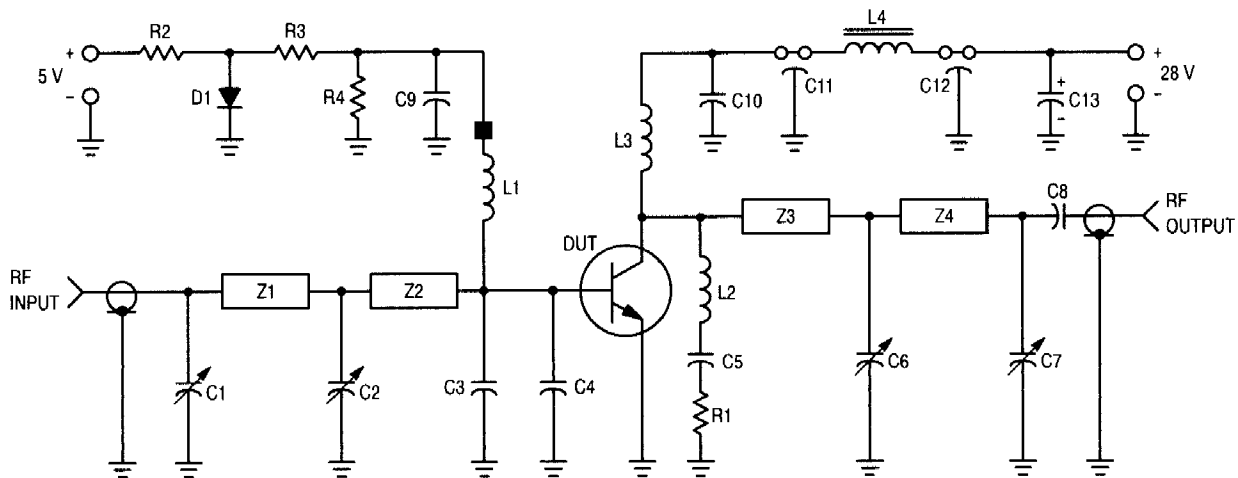
Characteristic	Symbol	Min	Typ	Max	Unit
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DYNAMIC CHARACTERISTICS

Output Capacitance ($V_{CB} = 28\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{ob}	—	10	12	pF
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FUNCTIONAL TESTS (Figure 1)

Common-Emitter Amplifier Power Gain ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 10\text{ W}$, $f = 400\text{ MHz}$)	G_{PE}	12	13	—	dB
Collector Efficiency ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 10\text{ W}$, $f = 400\text{ MHz}$)	η	50	60	—	%
Load Mismatch ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 10\text{ W}$, $f = 400\text{ MHz}$, 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, $\epsilon_R = 2.56$, $t = 0.062$ "
- Input/Output Connectors — Type N

Figure 1. 400 MHz Test Circuit Schematic