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The RF Line

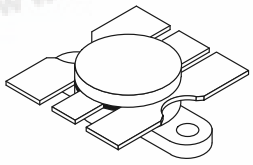
NPN Silicon RF Power Transistor

. . . designed primarily for wideband large–signal output and driver amplifier stages in 100 to 500 MHz frequency range.

- Specified 28 Volt, 400 MHz Characteristics —
  Output Power = 30 Watts
  Minimum Gain = 8.5 dB
  Efficiency = 54% (Min)
- Built–In Matching Network for Broadband Operation Using Internal Matching Techniques
- 100% Tested for Load Mismatch at all Phase Angles with 30:1 VSWR
- Gold Metallization for High Reliability Applications

MRF325

**30 W, 225 to 400 MHz
CONTROLLED "Q"
BROADBAND RF POWER
TRANSISTOR
NPN SILICON**



CASE 316–01, 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	3.4 4.5	Adc
Total Device Dissipation @ T_C = 25°C (1) Derate above 25°C	P_D	82 0.47	Watts W/°C
Storage Temperature Range	T_{stg}	–65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.13	°C/W

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

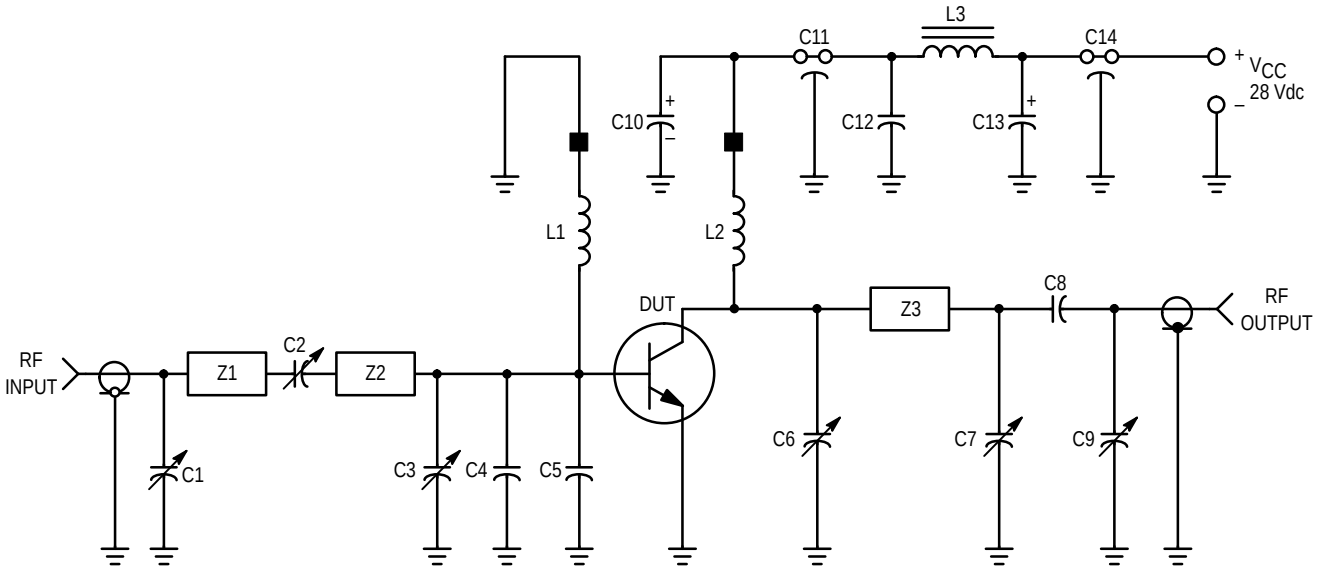
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I_C = 30 mAdc, I_B = 0)	$V_{(BR)CEO}$	33	—	—	Vdc
Collector–Emitter Breakdown Voltage (I_C = 30 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	60	—	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 3.0 mAdc, I_C = 0)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector–Base Breakdown Voltage (I_C = 30 mAdc, I_E = 0)	$V_{(BR)CBO}$	60	—	—	Vdc
Collector Cutoff Current (V_{CB} = 30 Vdc, I_E = 0)	I_{CBO}	—	—	3.0	mAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 1.5 Adc, 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}	—	30	40	pF
FUNCTIONAL TESTS (Figure 1)					
Common–Emitter Amplifier Power Gain (V_{CC} = 28 Vdc, P_{out} = 30 W, f = 400 MHz)	G_{PE}	8.5	9.5	—	dB
Collector Efficiency (V_{CC} = 28 Vdc, P_{out} = 30 W, f = 400 MHz)	η	50	60	—	%
Load Mismatch (V_{CC} = 28 Vdc, P_{out} = 30 W, f = 400 MHz, VSWR = 30:1 all angles)	ψ	No Degradation in Output Power			



C1, C9 — 1.0–10 pF Johanson Capacitor (JMC 5201)
C2, C3, C6, C7 — 1.0–20 pF Johanson Capacitor (JMC 5501)
C4, C5 — 36 pF ATC 100–mil Chip Capacitor
C8 — 100 pF UNELCO
C10, C13 — 1.0 μF 50 V Tantalum
C11, C14 — 680 pF Feedthru
C12 — 0.1 μF Erie Redcap
L1 — 8 Turns #26 AWG Enameled, 1/16″ ID Closewound with Ferroxcube Bead (#56–590–65/4B) on Ground End
L2 — 14 Turns, #22 AWG Enameled, Closewound on a 470 Ω, 2.0 Watt Resistor with Ferroxcube Bead (#56–590–65/4B) on Cold End of L2
L3 — Ferroxcube VK200–19/4B Ferrite Choke
Z1 — Microstrip 0.19″ W x 0.88″ L
Z2 — Microstrip 0.28″ W x 1.0″ L
Z3 — Microstrip 0.31″ W x 1.25″ L
Board — Glass Teflon ε_r = 2.56, t = 0.062″
Input/Output Connectors — Type N
DUT Socket Lead Frame Etched from 80–mil–Thick Copper

Figure 1. 400 MHz Test Circuit

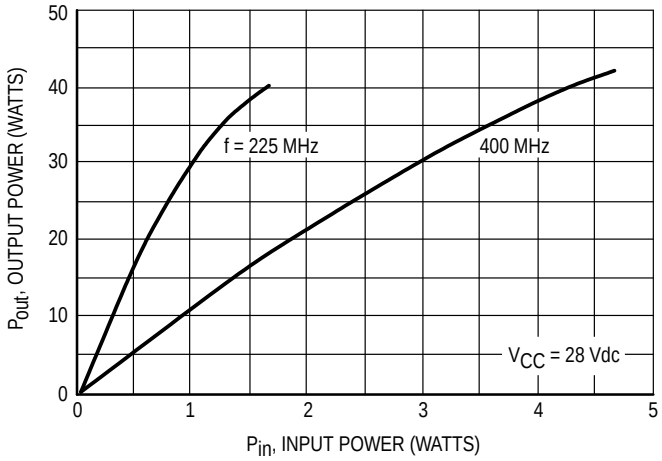


Figure 2. Output Power versus Input Power

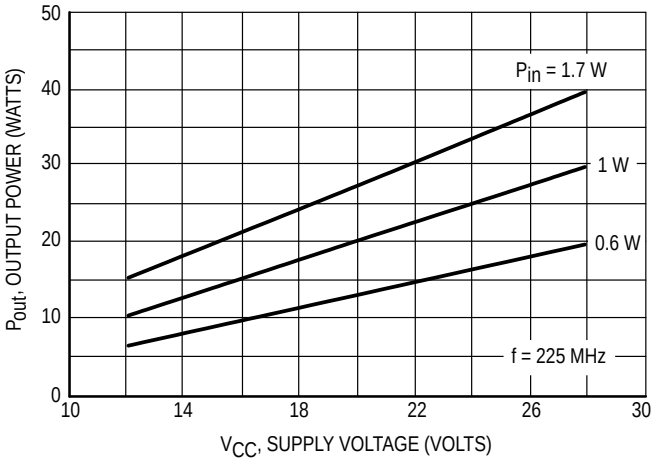


Figure 3. Output Power versus Supply Voltage

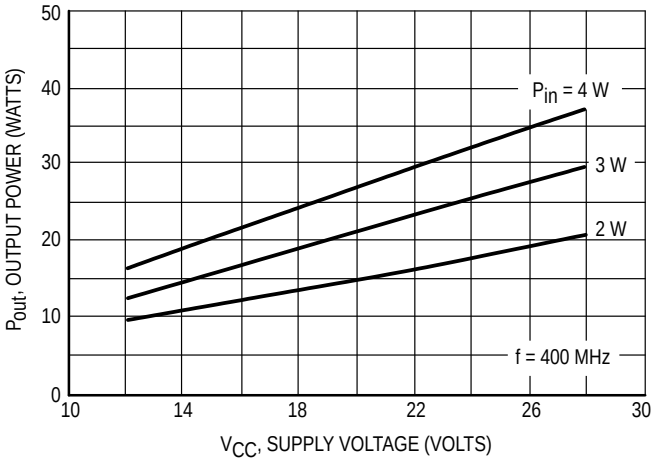
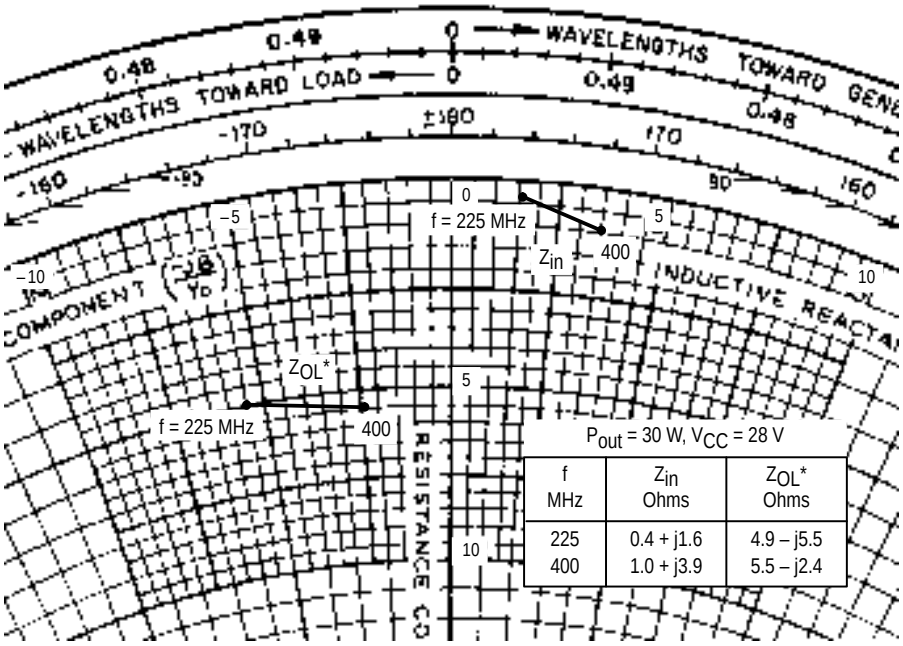


Figure 4. Output Power versus Supply Voltage



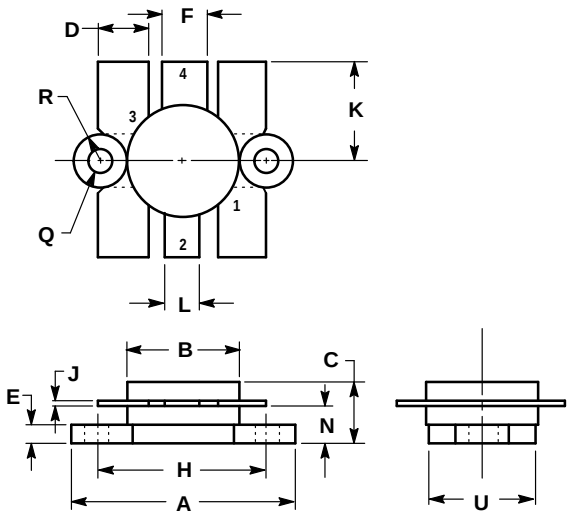
P_{out} = 30 W, V_{CC} = 28 V

f MHz	Z_{in} Ohms	Z_{OL}* Ohms
225	0.4 + j1.6	4.9 – j5.5
400	1.0 + j3.9	5.5 – j2.4

Z_{OL}* = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and frequency.

Figure 5. Series Equivalent Impedance

PACKAGE DIMENSIONS



NOTES:
1. FLANGE IS ISOLATED IN ALL STYLES.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	24.38	25.14	0.960	0.990
B	12.45	12.95	0.490	0.510
C	5.97	7.62	0.235	0.300
D	5.33	5.58	0.210	0.220
E	2.16	3.04	0.085	0.120
F	5.08	5.33	0.200	0.210
H	18.29	18.54	0.720	0.730
J	0.10	0.15	0.004	0.006
K	10.29	11.17	0.405	0.440
L	3.81	4.06	0.150	0.160
N	3.81	4.31	0.150	0.170
Q	2.92	3.30	0.115	0.130
R	3.05	3.30	0.120	0.130
U	11.94	12.57	0.470	0.495

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

CASE 316–01
ISSUE D

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