The RF Line

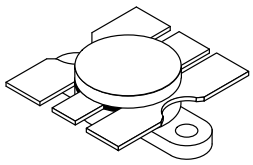
NPN Silicon RF Power Transistor

MRF326

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

- Guaranteed Performance @ 400 MHz, 28 Vdc
  Output Power = 40 Watts
  Minimum Gain = 9.0 dB
- Built–In Matching Network for Broadband Operation
- 100% Tested for Load Mismatch at all Phase Angles with 30:1 VSWR
- Gold Metallization System for High Reliability Applications

40 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	4.5 6.0	Adc
Total Device Dissipation @ T_C = 25°C (1) Derate above 25°C	P_D	110 0.63	Watts W/°C
Storage Temperature Range	T_{stg}	–65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.6	°C/W

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

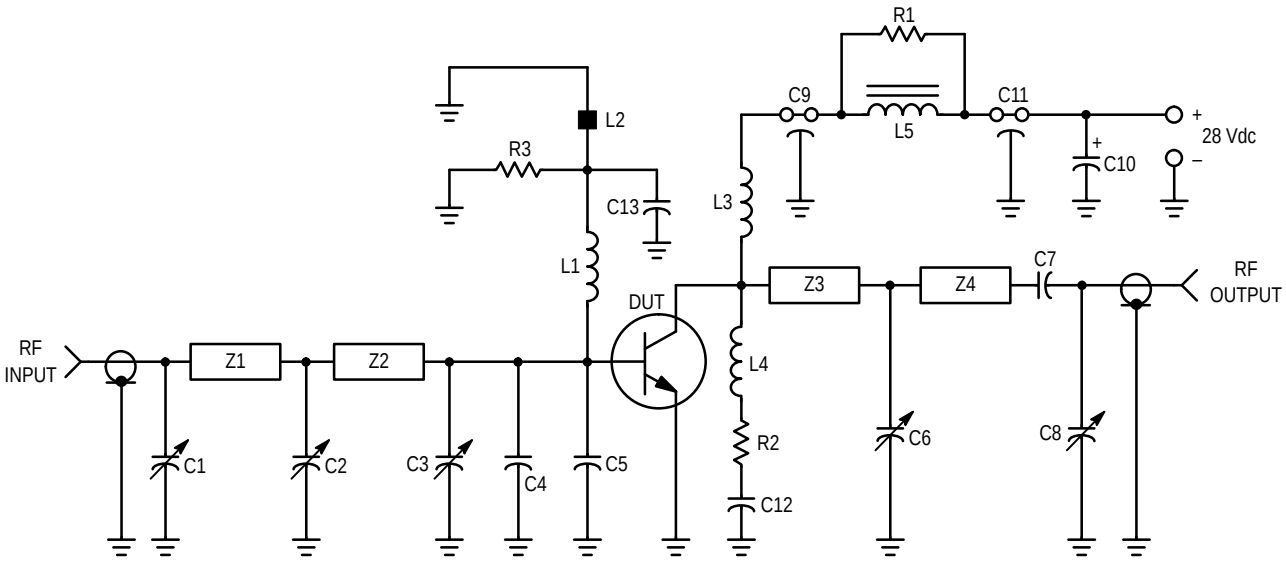
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I_C = 40 mAdc, I_B = 0)	$V_{(BR)CEO}$	33	—	—	Vdc
Collector–Emitter Breakdown Voltage (I_C = 40 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	60	—	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 4.0 mAdc, I_C = 0)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector–Base Breakdown Voltage (I_C = 40 mAdc, I_E = 0)	$V_{(BR)CBO}$	60	—	—	Vdc
Collector Cutoff Current (V_{CB} = 30 Vdc, I_E = 0)	I_{CBO}	—	—	4.0	mAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 2.0 Adc, V_{CE} = 5.0 Vdc)	h_{FE}	20	50	80	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 28 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	—	45	60	pF

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
FUNCTIONAL TESTS (Figure 1)					
Common–Emitter Amplifier Power Gain (V_{CC} = 28 Vdc, P_{out} = 40 W, f = 400 MHz, I_C Max = 2.85 Adc)	G_{PE}	9.0	11	—	dB
Collector Efficiency (V_{CC} = 28 Vdc, P_{out} = 40 W, f = 400 MHz, I_C Max = 2.85 Adc)	η	50	—	—	%
Load Mismatch (V_{CC} = 28 Vdc, P_{out} = 40 W CW, f = 400 MHz, VSWR = 30:1 All Phase Angles)	ψ	No Degradation in Output Power			



C1 — 1.0–10 pF Johanson, Capacitor (JMC 5201)
C2, C3, C6, C8 — 1.0–20 pF Johanson Capacitor
C4, C5 — 36 pF ATC “B” Style Chip Capacitor
C7, C9, C13 — 100 pF UNELCO Capacitor
C11 — 680 pF Feedthru
C10 — 1.0 μF 50 V Tantalum
C12 — 0.1 μF Erie Redcap
L1 — 8 Turns #26 AWG Enameled, 1/16″ ID Closewound
L2, L5 — Ferroxcube VK200–19/4B Ferrite Choke
L3 — 8 Turns #20 AWG Enameled, 1/4″ ID Closewound
L4 — 4 Turns #26 AWG 0.1″ ID
R1 — 10 Ohm 2.0 W Carbon
R2, R3 — 10 Ohm 1.0 W Carbon
Z1 — Microstrip 0.19″ W x 1.28″ L
Z2 — Microstrip 0.28″ W x 1.0″ L
Z3 — Microstrip 0.31″ W x 1.0″ L
Z4 — Microstrip 0.31″ W x 0.9″ L
Board — Glass Teflon ε_r = 2.56 t = 0.062″
Input/Output Connectors — Type N UG58 A/U

Figure 1. 400 MHz Test Amplifier

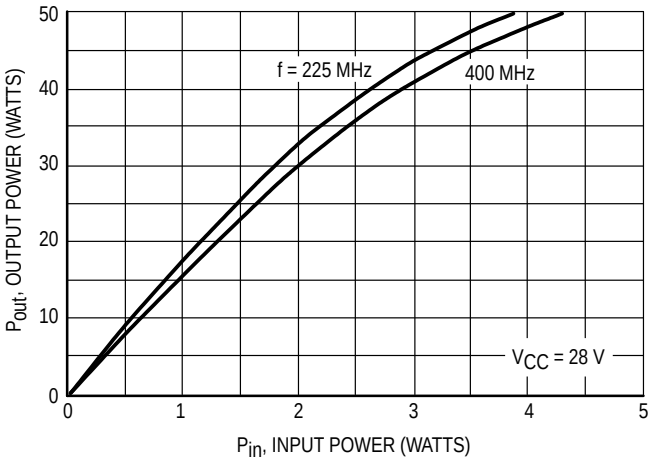


Figure 2. Output Power versus Input Power

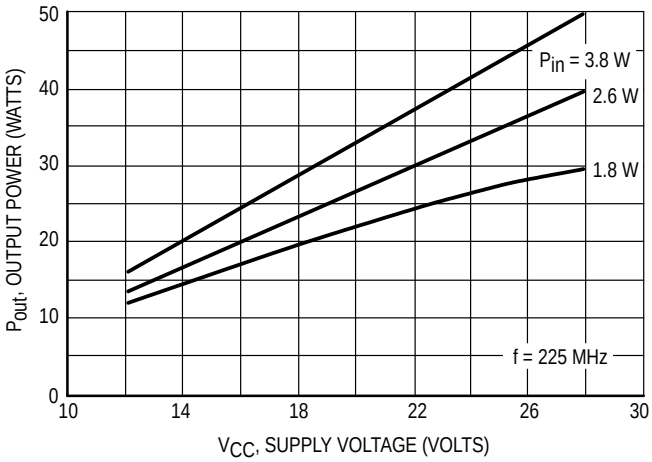


Figure 3. Output Power versus Supply Voltage

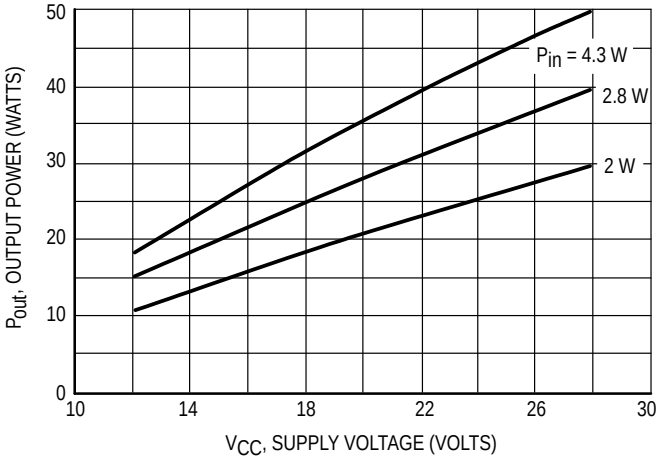
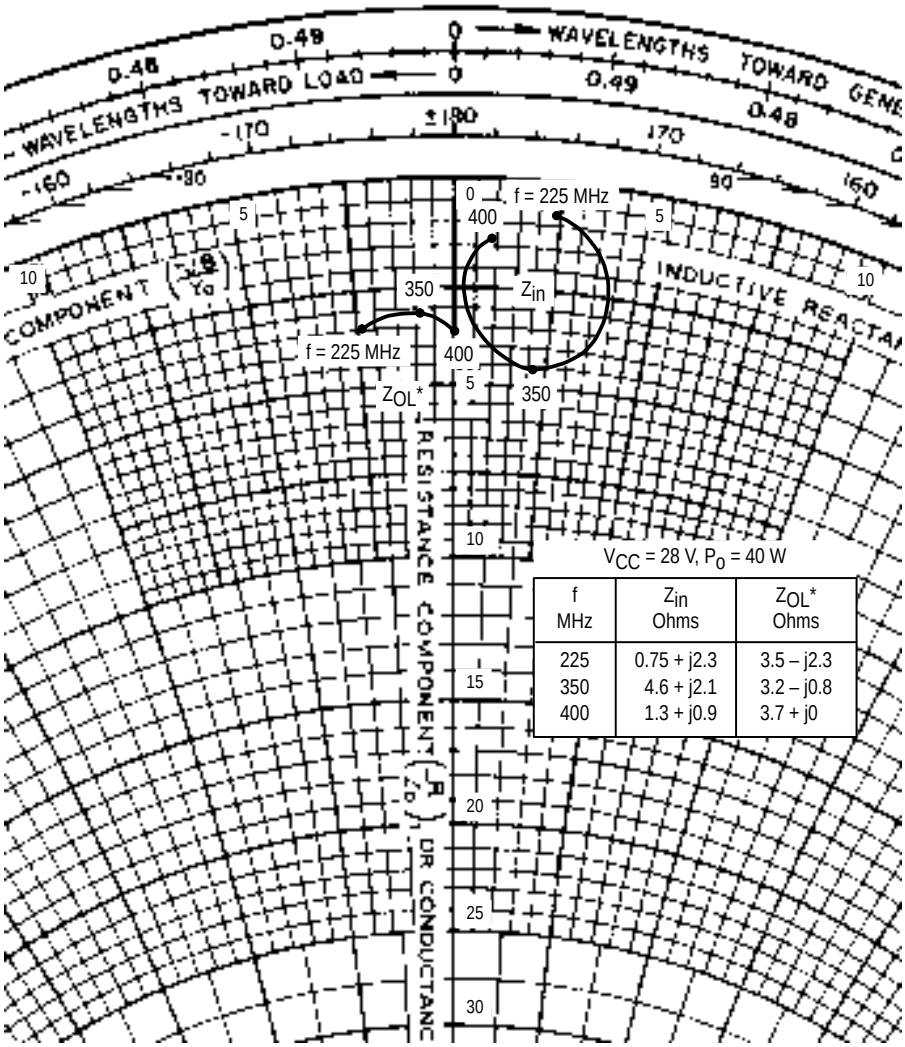


Figure 4. Output Power versus Supply Voltage
f = 400 MHz

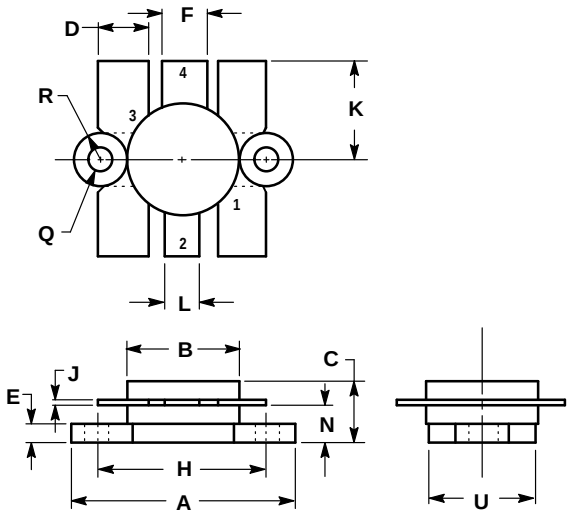


f MHz	Z_{in} Ohms	Z_{OL}* Ohms
225	0.75 + j2.3	3.5 – j2.3
350	4.6 + j2.1	3.2 – j0.8
400	1.3 + j0.9	3.7 + j0

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 Input–Output 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

Literature Distribution Centers:
USA: Motorola Literature Distribution; P.O. Box 20912; Phoenix, Arizona 85036.
EUROPE: Motorola Ltd.; European Literature Centre; 88 Tanners Drive, Blakelands, Milton Keynes, MK14 5BP, England.
JAPAN: Nippon Motorola Ltd.; 4-32-1, Nishi-Gotanda, Shinagawa-ku, Tokyo 141, Japan.
ASIA PACIFIC: Motorola Semiconductors H.K. Ltd.; Silicon Harbour Center, No. 2 Dai King Street, Tai Po Industrial Estate, Tai Po, N.T., Hong Kong.