MOTOROLA Semiconductors
BOX 20912 • PHOENIX, ARIZONA 85036

MRF326

The RF Line

40 W — 225–400 MHz

CONTROLLED "Q" BROADBAND RF POWER TRANSISTOR

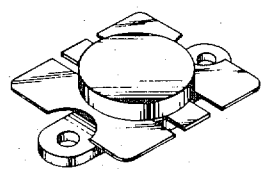
NPN SILICON

NPN SILICON RF POWER TRANSISTOR

. . . designed primarily for wideband large-signal output amplifier stages in the 100-500 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



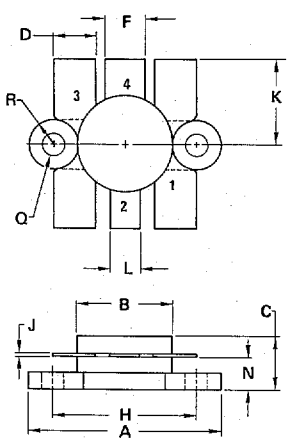
MAXIMUM RATINGS

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 @ $T_C = 25^oC$ (1) Derate above 25^oC	P_D	110 0.63	Watts $W/^oC$
Storage Temperature Range	T_{stg}	–65 to +200	^oC

THERMAL CHARACTERISTICS

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

(1) These devices are designed for RF operation. The total device dissipation rating applies only when the devices are operated as RF amplifiers.



STYLE 1:
PIN 1. EMITTER
2. COLLECTOR
3. EMITTER
4. BASE
FLANGE-ISOLATED

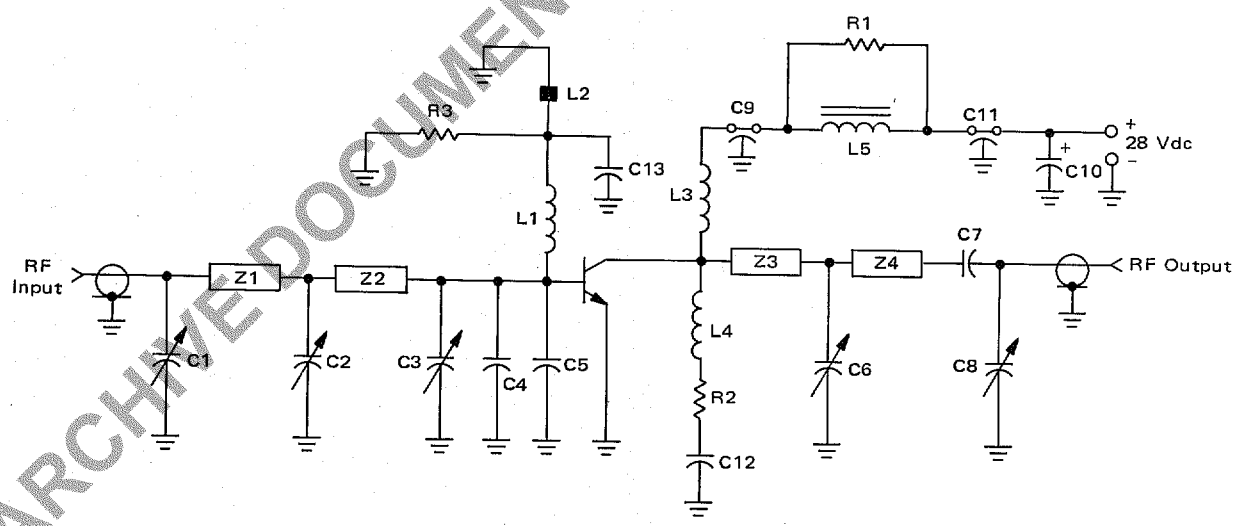
DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	24.38	25.15	0.960	0.990
B	12.45	12.95	0.490	0.510
C	5.97	7.62	0.235	0.300
D	5.33	5.59	0.210	0.220
F	5.08	5.33	0.200	0.210
H	18.29	18.54	0.720	0.730
J	0.10	0.15	0.004	0.006
K	10.29	–	0.405	–
L	3.81	4.06	0.150	0.160
N	3.81	4.32	0.150	0.170
Q	2.92	3.30	0.115	0.130
R	3.05	3.30	0.120	0.130

CASE 316-01

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

Characteristics	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 40 mAdc, I_B = 0)	BV_{CEO}	33	–	–	Vdc
Collector-Emitter Breakdown Voltage (I_C = 40 mAdc, V_{BE} = 0)	BV_{CES}	60	–	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 4.0 mAdc, I_C = 0)	BV_{EBO}	4.0	–	–	Vdc
Collector-Base Breakdown Voltage (I_C = 40 mAdc, I_E = 0)	BV_{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
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 Power Output			

FIGURE 1 – 400 MHz TEST AMPLIFIER



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 2 – OUTPUT POWER versus INPUT POWER

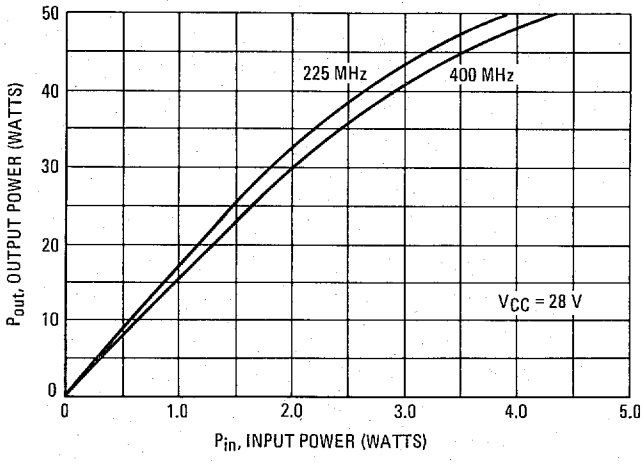


FIGURE 3 – OUTPUT POWER versus SUPPLY VOLTAGE
f = 225 MHz

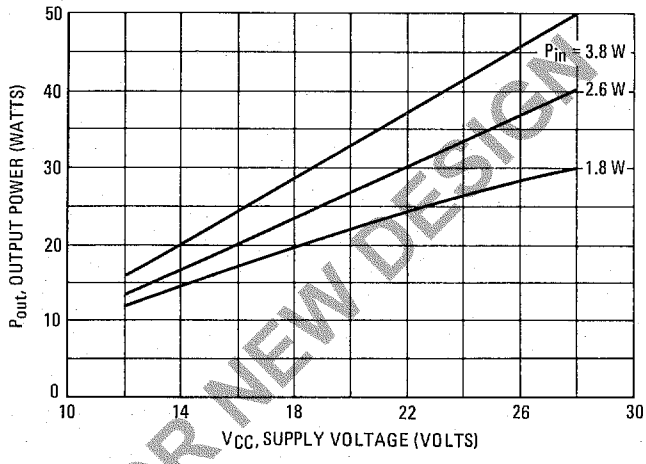


FIGURE 4 – OUTPUT POWER versus SUPPLY VOLTAGE
f = 400 MHz

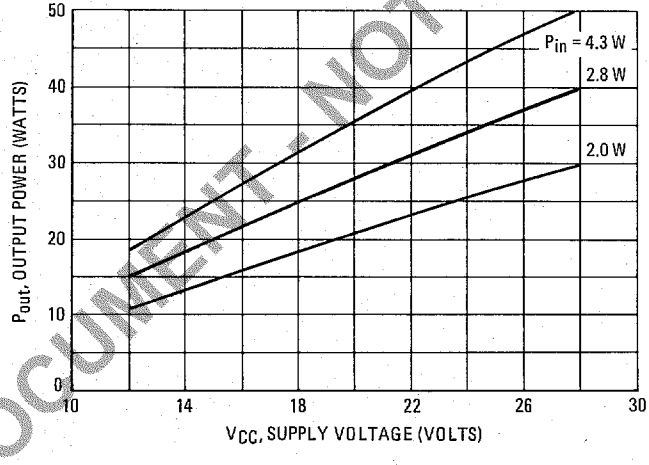
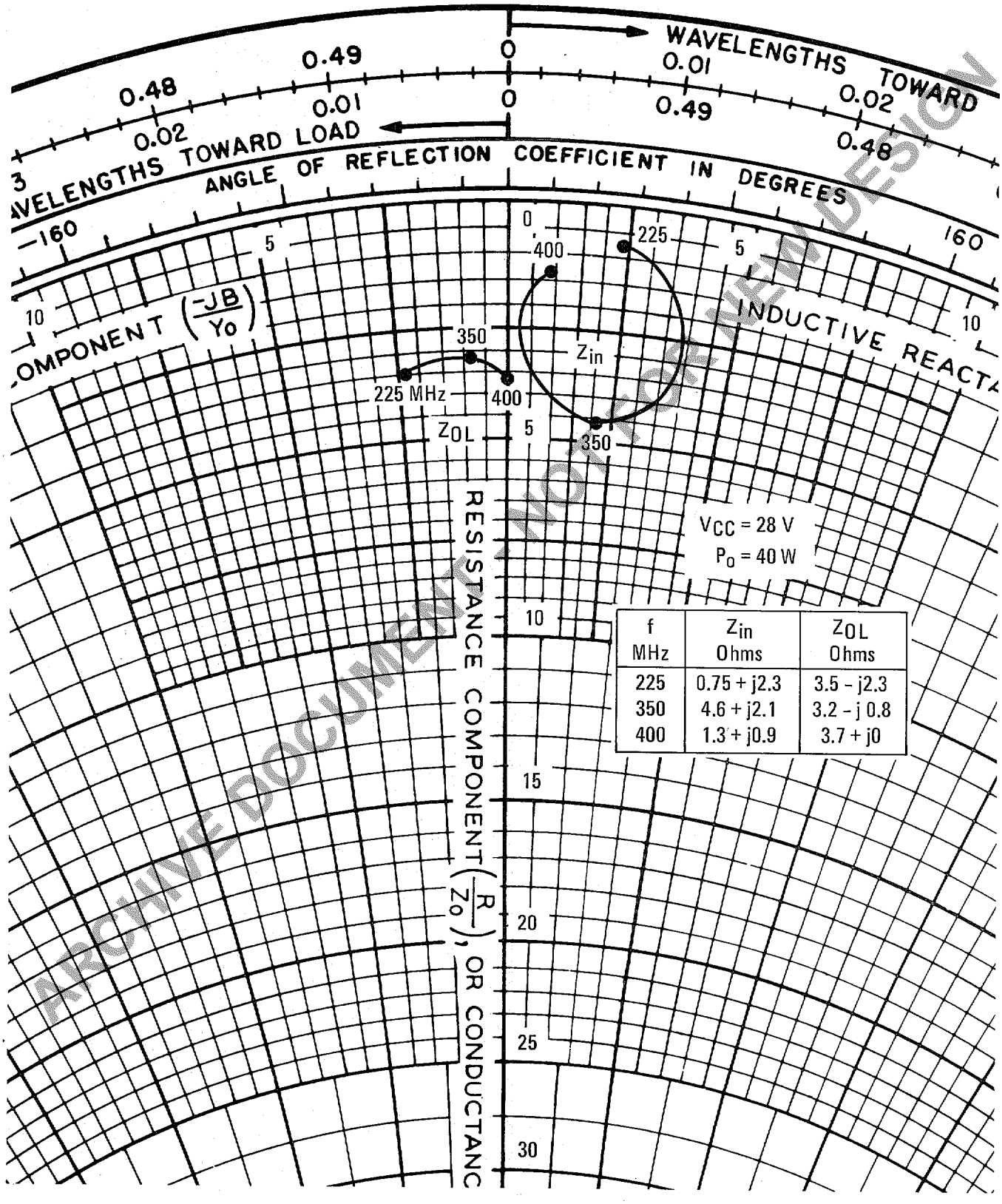


FIGURE 5 – SERIES EQUIVALENT INPUT-OUTPUT IMPEDANCE



f MHz	Zin Ohms	ZOL Ohms
225	0.75 + j2.3	3.5 - j2.3
350	4.6 + j2.1	3.2 - j 0.8
400	1.3 + j0.9	3.7 + j0