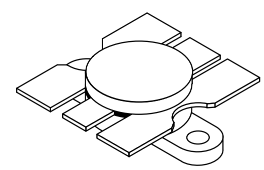
The RF Line
NPN Silicon RF Power Transistor

MRF327

80 W, 100 to 500 MHz
CONTROLLED "Q"
BROADBAND RF POWER TRANSISTOR
NPN SILICON



CASE 316–01, STYLE 1

. . . 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 = 80 Watts over 225 to 400 MHz Band
  Minimum Gain = 7.3 dB @ 400 MHz
- Built–In Matching Network for Broadband Operation Using Double Match Technique
- 100% Tested for Load Mismatch at all Phase Angles with 30:1 VSWR
- Gold Metallization System for High Reliability Applications
- Characterized for 100 to 500 MHz

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	9.0 12	Adc
Total Device Dissipation @ T_C = 25°C (1) Derate above 25°C	P_D	250 1.43	Watts W/°C
Storage Temperature Range	T_{stg}	–65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.7	°C/W

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

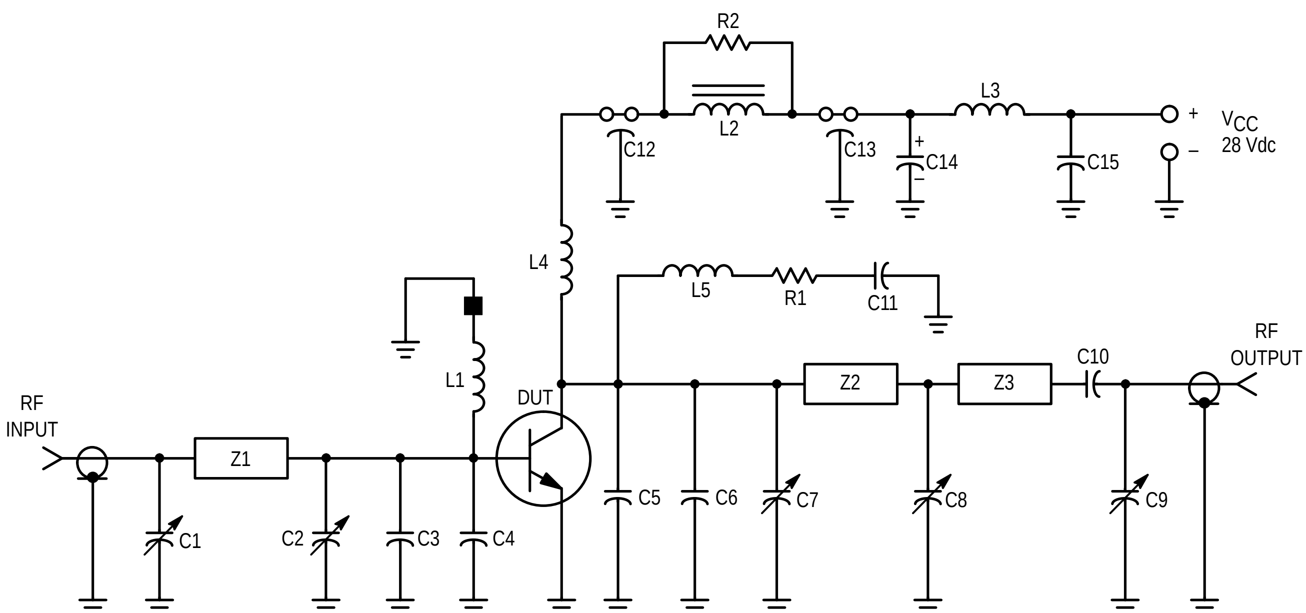
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I_C = 80 mAdc, I_B = 0)	$V_{(BR)CEO}$	33	—	—	Vdc
Collector–Emitter Breakdown Voltage (I_C = 80 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	60	—	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 8.0 mAdc, I_C = 0)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector–Base Breakdown Voltage (I_C = 80 mAdc, I_C = 0)	$V_{(BR)CBO}$	60	—	—	Vdc
Collector Cutoff Current (V_{CB} = 30 Vdc, I_E = 0)	I_{CBO}	—	—	5.0	mAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 4.0 Adc, V_{CE} = 5.0 Vdc)	h_{FE}	20	—	80	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 28 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	—	100	145	pF

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°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} = 80 W, f = 400 MHz)	G_{PE}	7.3	9.0	—	dB
Collector Efficiency (V_{CC} = 28 Vdc, P_{out} = 80 W, f = 400 MHz)	η	50	60	—	%
Load Mismatch (V_{CC} = 28 Vdc, P_{out} = 80 W, f = 400 MHz, VSWR = 30:1 All Phase Angles)	ψ	No Degradation in Output Power			



C1, C2, C7, C8, C9 — 1.0–20 pF Piston Trimmer (Johanson JMC 5501)
C3, C4 — 36 pF ATC 100 mil Chip Capacitor
C5, C6 — 43 pF ATC 100 mil Chip Capacitor
C10 — 100 pF UNELCO
C11, C15 — 0.1 µF Erie Redcap
C12, C13 — 680 pF Feedthru
C14 — 1.0 µF 50 V Tantalum
L1 — 4 Turns #22 AWG Enameled, 3/16″ ID Closewound with Ferroxcube Bead (#56–590–65/4B) on Ground End of Coil
L2 — Ferroxcube VK200–19/4B Ferrite Choke
L3 — 7 Turns #18 AWG, 11/16″ Long, Wound on a 100 kΩ 2.0 Watt Resistor
L4 — 6 Turns #20 AWG Enameled, 3/16″ ID Closewound
L5 — 4 Turns #22 AWG Enameled, 1/8″ ID Closewound
Z1 — Microstrip 0.2″ W x 1.5″ L
Z2 — Microstrip 0.17″ W x 1.16″ L
Z3 — Microstrip 0.17″ W x 0.63″ L
R1, R2 — 10 Ω 2.0 Watt
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

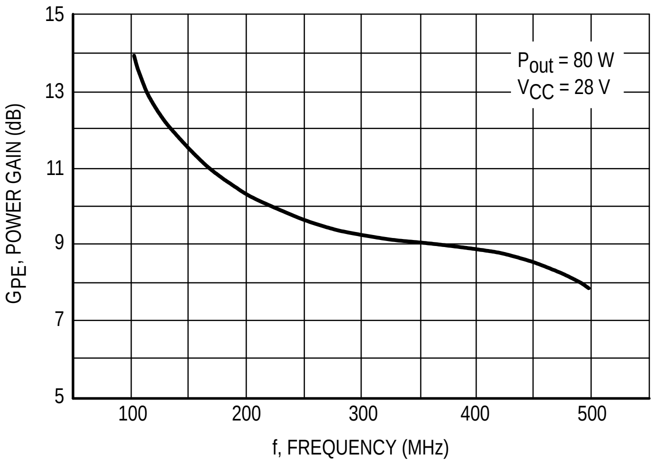


Figure 2. Power Gain versus Frequency

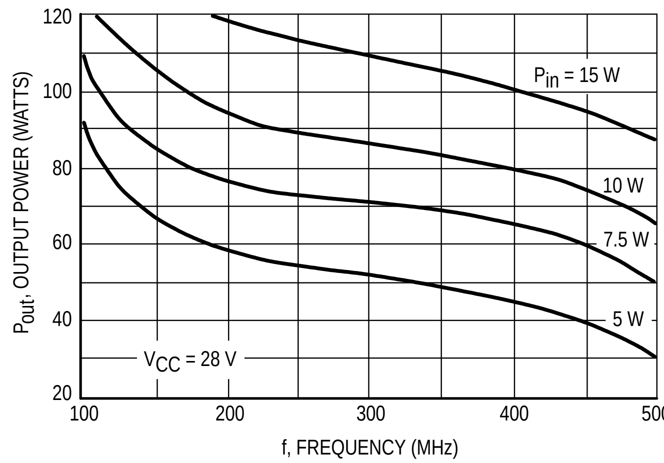


Figure 3. Output Power versus Frequency

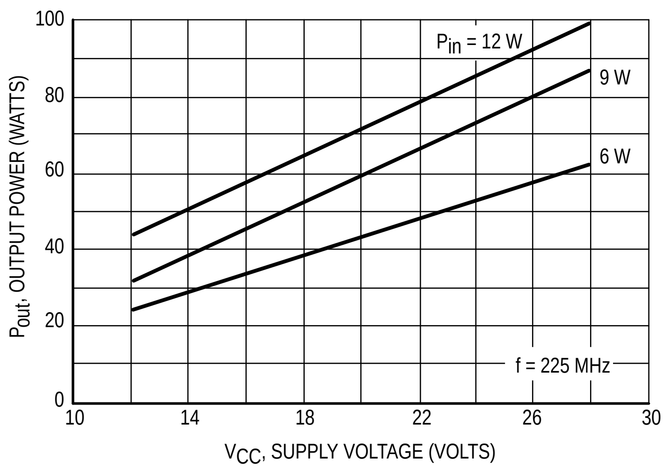


Figure 4. Output Power versus Supply Voltage

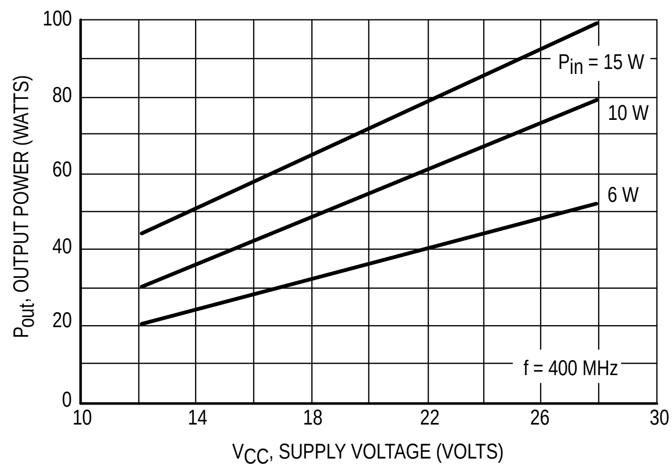


Figure 5. Output Power versus Supply Voltage

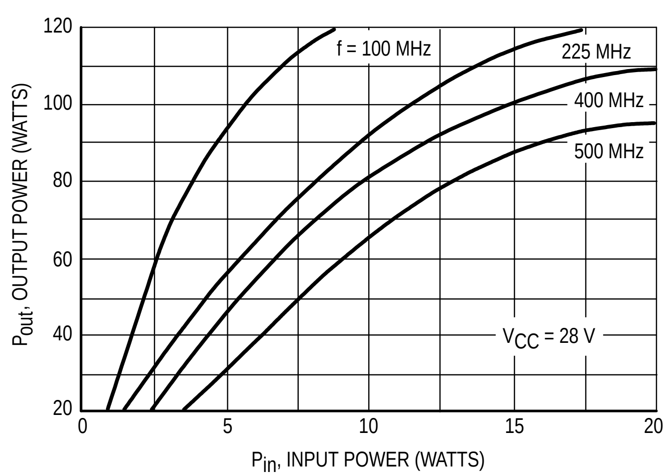
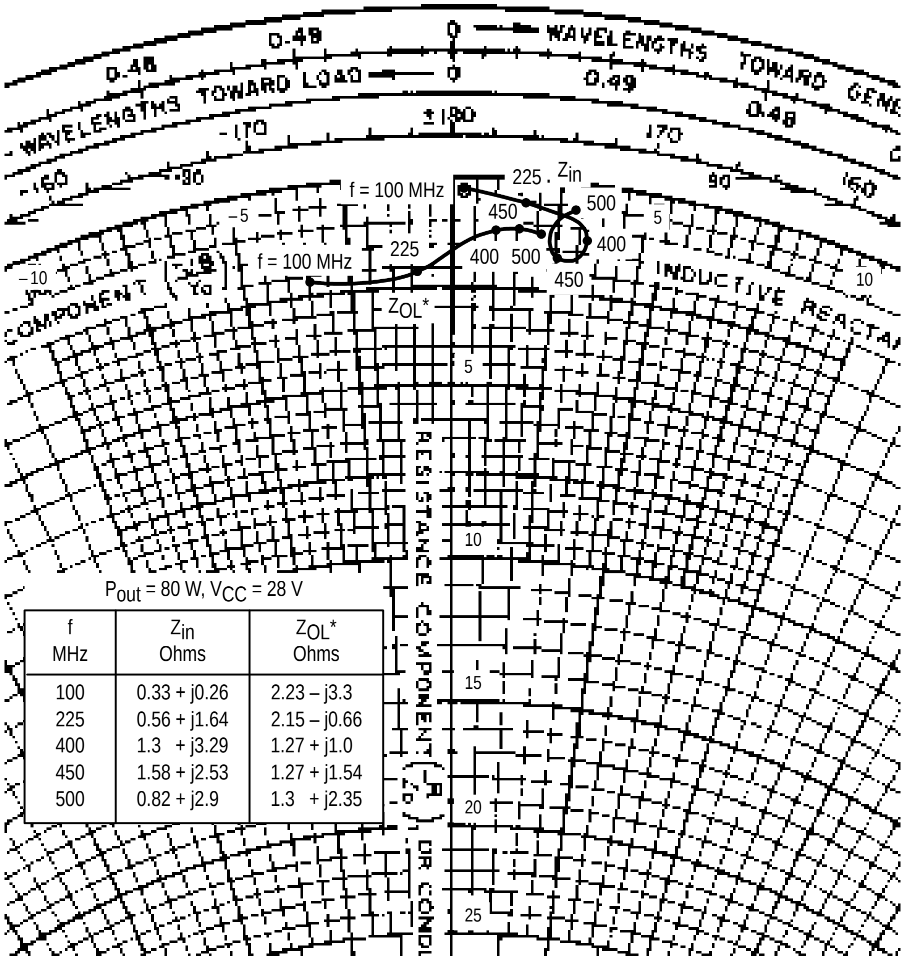


Figure 6. Output Power versus Input Power



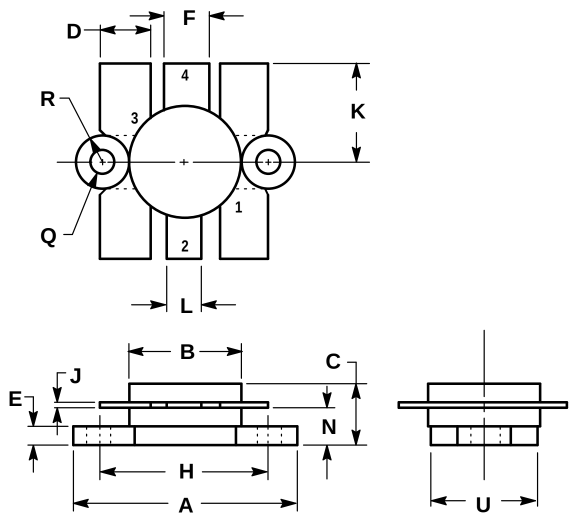
P_{out} = 80 W, V_{CC} = 28 V

f MHz	Z_{in} Ohms	Z_{OL}* Ohms
100	0.33 + j0.26	2.23 – j3.3
225	0.56 + j1.64	2.15 – j0.66
400	1.3 + j3.29	1.27 + j1.0
450	1.58 + j2.53	1.27 + j1.54
500	0.82 + j2.9	1.3 + j2.35

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

Figure 7. 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

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