

## Excellent Integrated System Limited

Stocking Distributor

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[M/A-Com Technology Solutions](#)  
[MRF316](#)

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# MRF316



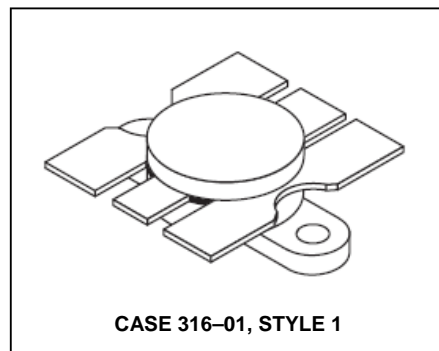
## The RF Line NPN Silicon Power Transistor 80W, 3.0-200MHz, 28V

M/A-COM Products  
Released - Rev. 07.07

Designed primarily for wideband large-signal output amplifier stages in the 30–200 MHz frequency range.

- Guaranteed performance at 150 MHz, 28 Vdc  
Output power = 80 W  
Minimum gain = 10 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

### Product Image



### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	35	Vdc
Collector–Base Voltage	$V_{CBO}$	65	Vdc
Emitter–Base Voltage	$V_{EBO}$	4.0	Vdc
Collector Current — Continuous Peak	$I_C$	9.0 13.5	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1) Derate above $25^\circ\text{C}$	$P_D$	220 1.26	Watts W/ $^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	–65 to +150	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.8	$^\circ\text{C/W}$

### 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 ( $I_C = 50\text{ mAdc}$ , $I_B = 0$ )	$V_{(BR)CEO}$	35	—	—	Vdc
Collector–Emitter Breakdown Voltage ( $I_C = 50\text{ mAdc}$ , $V_{BE} = 0$ )	$V_{(BR)CES}$	65	—	—	Vdc
Collector–Base Breakdown Voltage ( $I_C = 50\text{ mAdc}$ , $I_E = 0$ )	$V_{(BR)CBO}$	65	—	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 5.0\text{ mAdc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = 30\text{ Vdc}$ , $I_E = 0$ )	$I_{CBO}$	—	—	5.0	mAdc

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## ON CHARACTERISTICS

DC Current Gain ( $I_C = 4.0 \text{ Adc}$ , $V_{CE} = 5.0 \text{ Vdc}$ )	$h_{FE}$	10	—	80	—
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## DYNAMIC CHARACTERISTICS

Output Capacitance ( $V_{CB} = 28 \text{ Vdc}$ , $I_E = 0$ , $f = 1.0 \text{ MHz}$ )	$C_{ob}$	—	100	130	pF
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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 ( $T_C = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
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## NARROW BAND FUNCTIONAL TESTS (Figure 1)

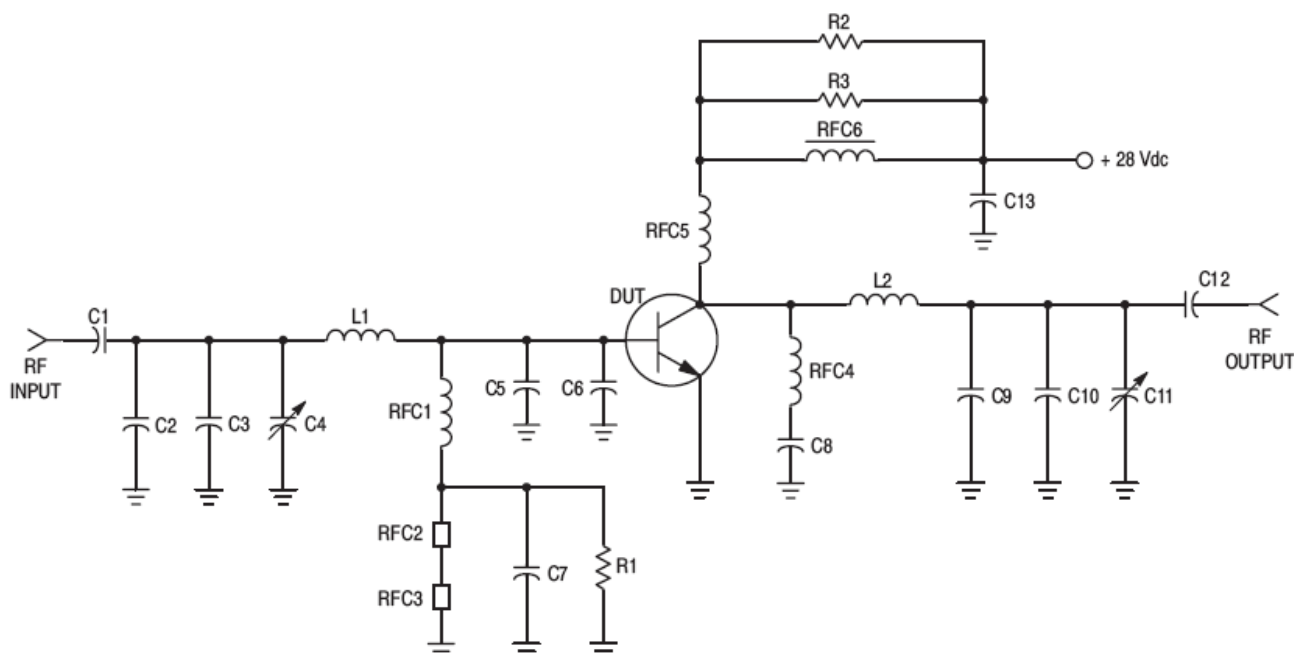
Common-Emitter Amplifier Power Gain ( $V_{CC} = 28 \text{ Vdc}$ , $P_{out} = 80 \text{ W}$ , $f = 150 \text{ MHz}$ )	$G_{PE}$	10	13	—	dB
Collector Efficiency ( $V_{CC} = 28 \text{ Vdc}$ , $P_{out} = 80 \text{ W}$ , $f = 150 \text{ MHz}$ )	$\eta$	55	—	—	%
Load Mismatch ( $V_{CC} = 28 \text{ Vdc}$ , $P_{out} = 80 \text{ W CW}$ , $f = 150 \text{ MHz}$ , $VSWR = 30:1$ all phase angles)	$\psi$	No Degradation in Output Power			

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C1 — 22 pF 100 mil ATC  
C2, C3 — 24 pF 100 mil ATC  
C4, C11 — 0.8–20 pF JMC #5501 Johanson  
C5 — 200 pF 100 mil ATC  
C6 — 240 pF 100 mil ATC  
C7 — Dipped Mica 1000 pF  
C8 — 0.1  $\mu$ F Erie Red Cap  
C9, C10, C12 — 30 pF 100 mil ATC  
C13 — 1.0  $\mu$ F Tantalum

L1 — 0.8", #20 Wire  
L2 — 1.0", #20 Wire  
RFC1, RFC4 — 0.15  $\mu$ H Molded Coil  
RFC2, RFC3 — Ferroxcube Bead 56–590–65–3B  
RFC5 — 2.5", #20 Wire, 1.5 Turns  
RFC6 — Ferroxcube VK200–19/4B  
R1 — 10  $\Omega$ , 1/2 W  
R2, R3 — 10  $\Omega$ , 1.0 W

**Figure 1. 150 MHz Test Amplifier**

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## TYPICAL PERFORMANCE CURVES

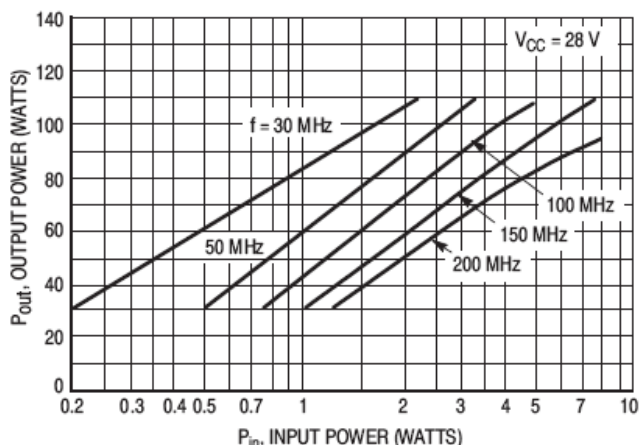


Figure 2. Output Power versus Input Power

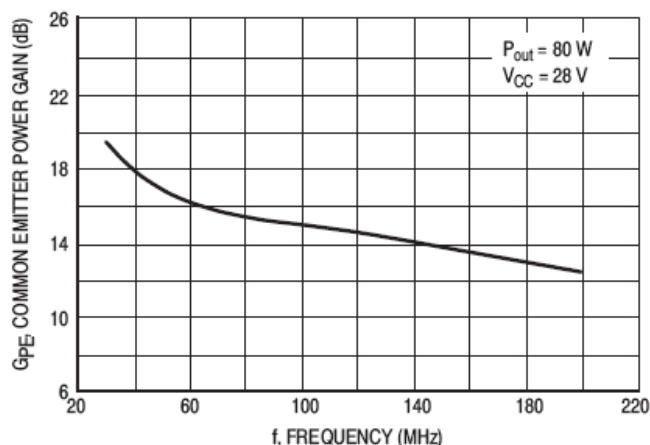


Figure 3. Power Gain versus Frequency

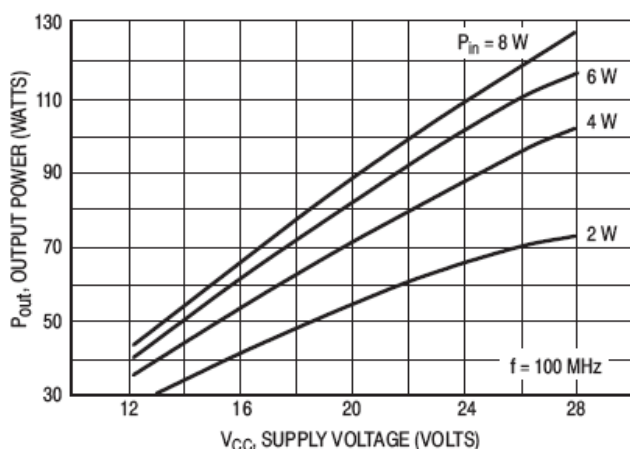


Figure 4. Output Power versus Supply Voltage

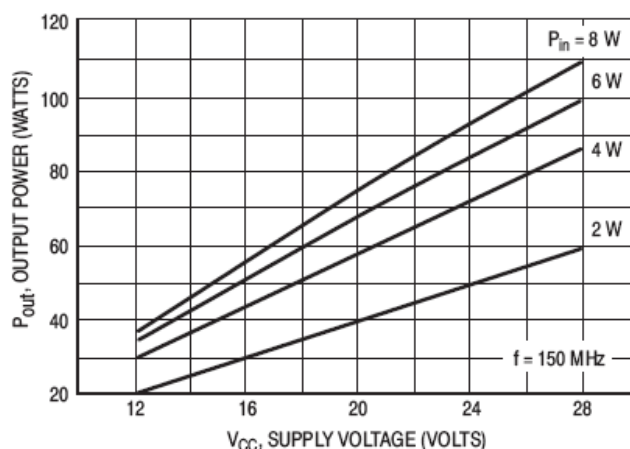


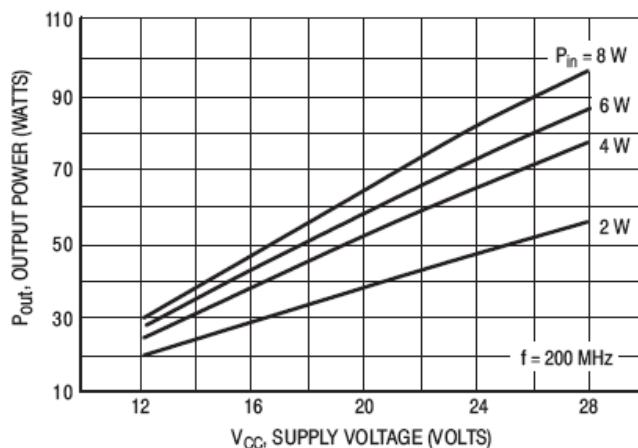
Figure 5. Output Power versus Supply Voltage

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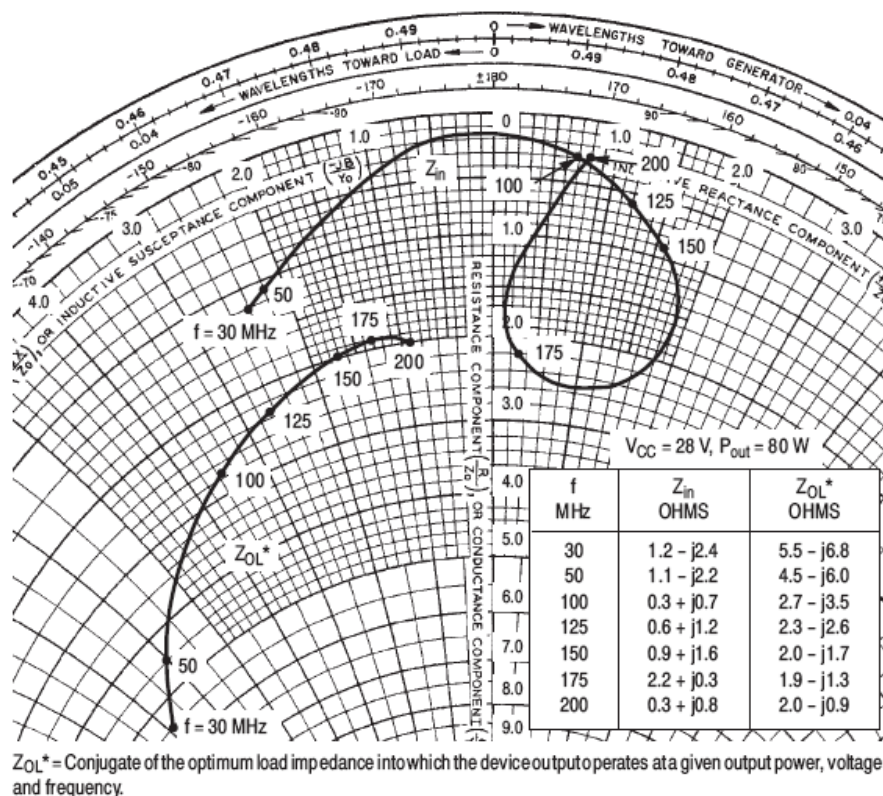


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**Figure 6. Output Power versus Supply Voltage**



**Figure 7. Series Equivalent Input-Output Impedance**

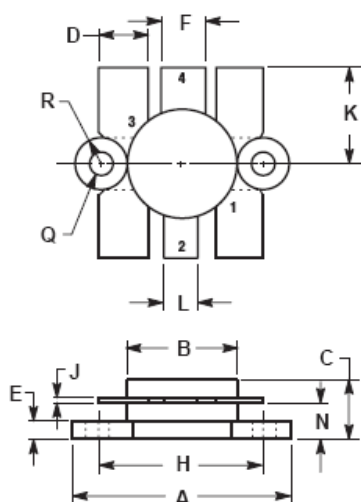
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## PACKAGE DIMENSIONS



NOTES:  
1. FLANGE IS ISOLATED IN ALL STYLES.

DIM	INCHES		MILLIMETERS	
	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