



# THE DATASHEET OF MRF317



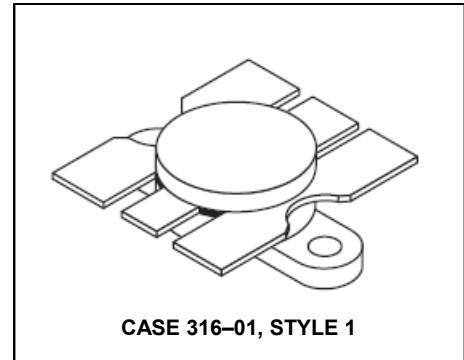
## The RF Line NPN Silicon Power Transistor 100W, 30-200MHz, 28V

Rev. V1

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

- Guaranteed performance at 150 MHz, 28 Vdc  
Output power = 100 W  
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
- High output saturation power — ideally suited for 30 W carrier/120 W
- Peak AM amplifier service
- Guaranteed performance in broadband test fixture

### 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 (10 seconds)	$I_C$	12 18	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1) Derate above $25^\circ\text{C}$	$P_D$	270 1.54	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	$R_{\theta JC}$	0.65	$^\circ\text{C/W}$

### 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 ( $I_C = 100 \text{ mAdc}$ , $I_B = 0$ )	$V_{(BR)CEO}$	35	—	—	Vdc
Collector–Emitter Breakdown Voltage ( $I_C = 100 \text{ mAdc}$ , $V_{BE} = 0$ )	$V_{(BR)CES}$	65	—	—	Vdc
Collector–Base Breakdown Voltage ( $I_C = 100 \text{ mAdc}$ , $I_E = 0$ )	$V_{(BR)CBO}$	65	—	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 10 \text{ mAdc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = 30 \text{ Vdc}$ , $I_E = 0$ )	$I_{CBO}$	—	—	5.0	mAdc

### ON CHARACTERISTICS

DC Current Gain ( $I_C = 5.0 \text{ Adc}$ , $V_{CE} = 5.0 \text{ Vdc}$ )	$h_{FE}$	10	25	80	—
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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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### DYNAMIC CHARACTERISTICS

Output Capacitance ( $V_{CB} = 28 \text{ Vdc}$ , $I_E = 0$ , $f = 1.0 \text{ MHz}$ )	$C_{ob}$	—	150	175	pF
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### FUNCTIONAL TESTS (Figure 2)

Common–Emitter Amplifier Power Gain ( $V_{CC} = 28 \text{ Vdc}$ , $P_{out} = 100 \text{ W}$ , $f = 150 \text{ MHz}$ , $I_C (\text{Max}) = 6.5 \text{ Adc}$ )	$G_{PE}$	9.0	10	—	dB
Collector Efficiency ( $V_{CC} = 28 \text{ Vdc}$ , $P_{out} = 100 \text{ W}$ , $f = 150 \text{ MHz}$ , $I_C (\text{Max}) = 6.5 \text{ Adc}$ )	$\eta$	55	60	—	%
Load Mismatch ( $V_{CC} = 28 \text{ Vdc}$ , $P_{out} = 100 \text{ W CW}$ , $f = 150 \text{ MHz}$ , $VSWR = 30:1$ all phase angles)	$\psi$	No Degradation in Output Power			

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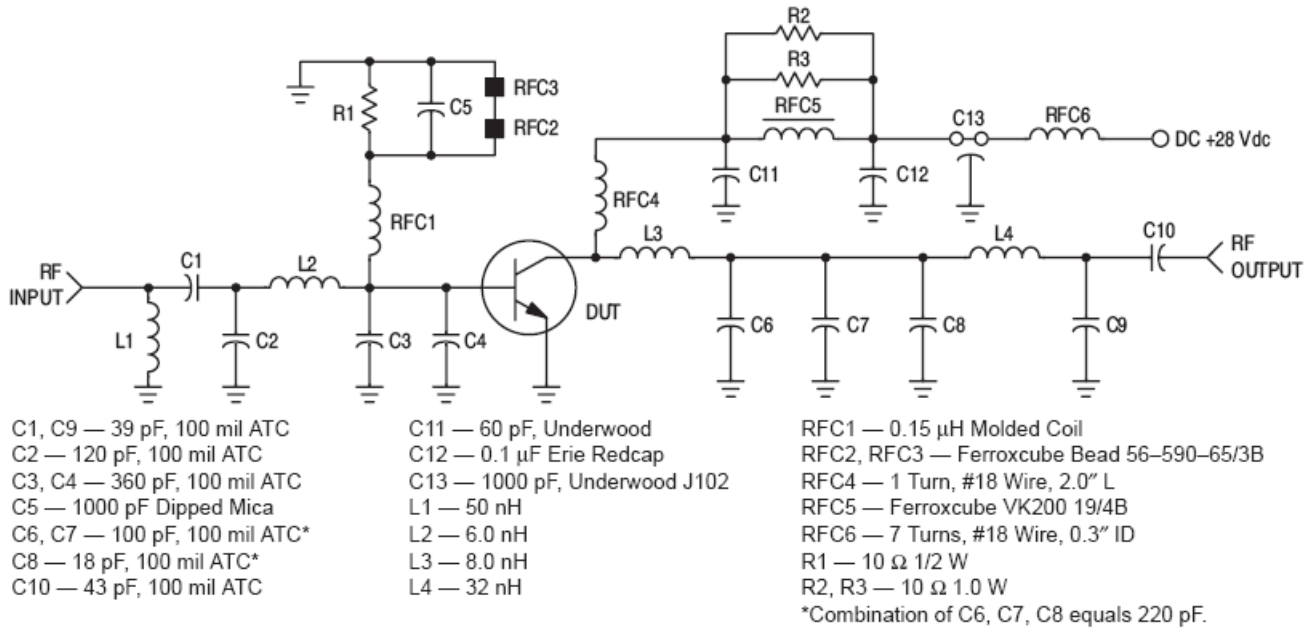


Figure 1. 110–160 MHz Broadband Amplifier — Test Fixture Schematic

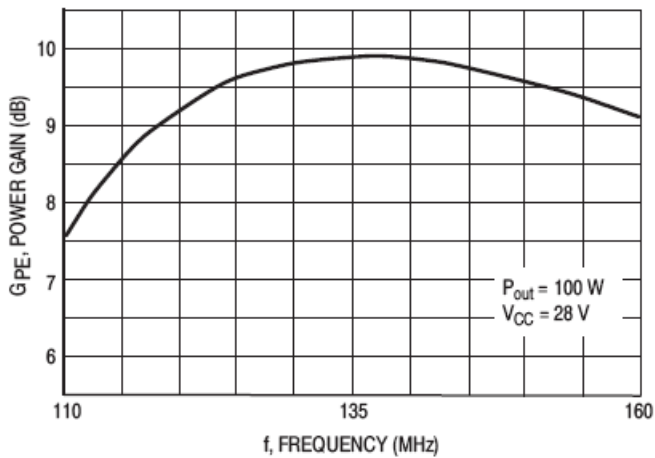


Figure 2. Power Gain versus Frequency  
Broadband Test Fixture

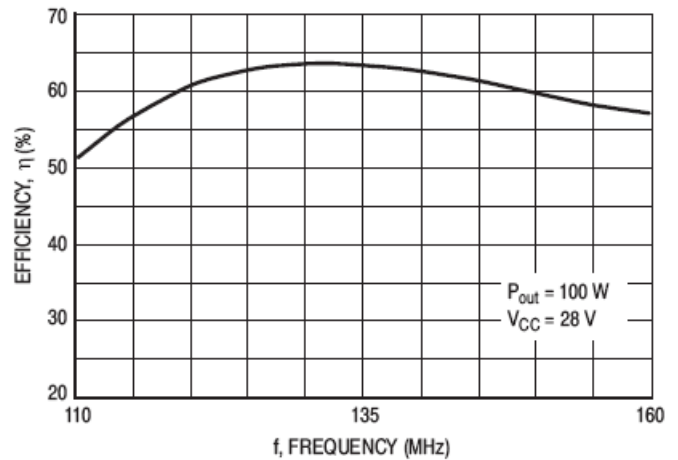


Figure 3. Efficiency versus Frequency  
Broadband Test Fixture

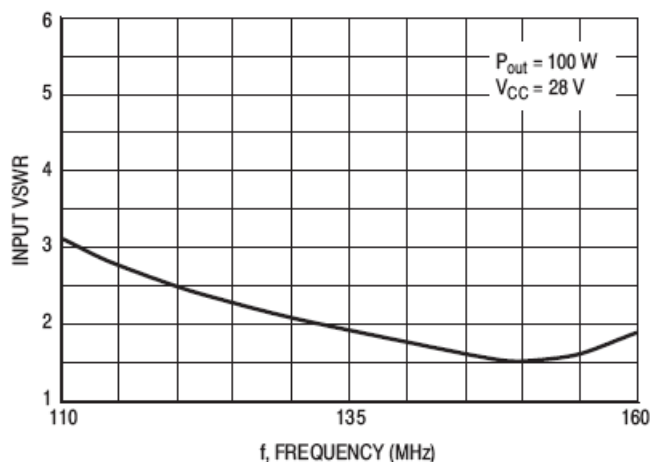


Figure 4. Input VSWR versus Frequency  
Broadband Test Fixture

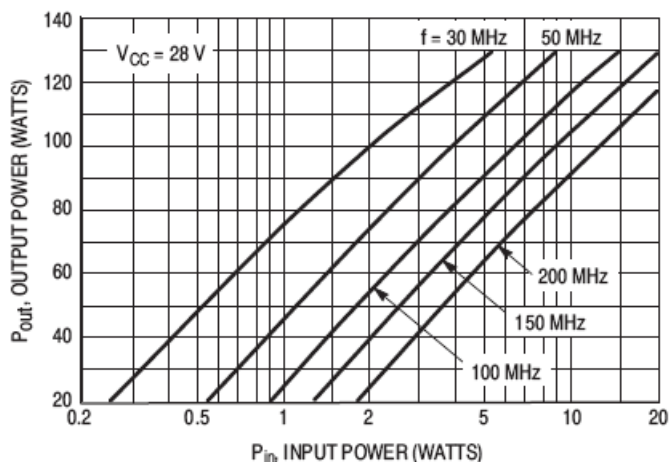


Figure 5. Output Power versus Input Power

### TYPICAL PERFORMANCE CURVES

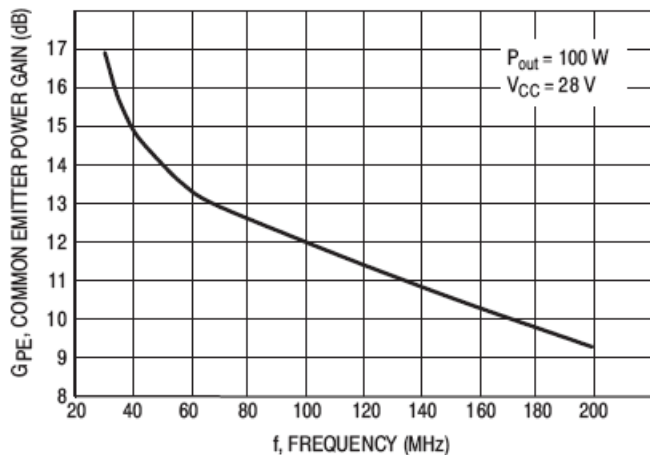


Figure 6. Power Gain versus Frequency

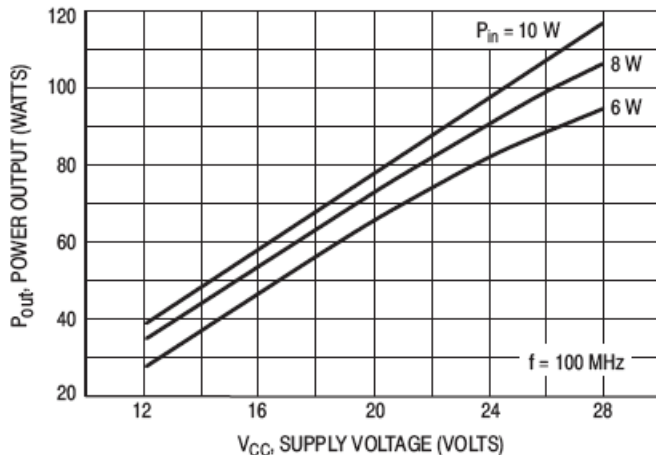


Figure 7. Power Output versus Supply Voltage

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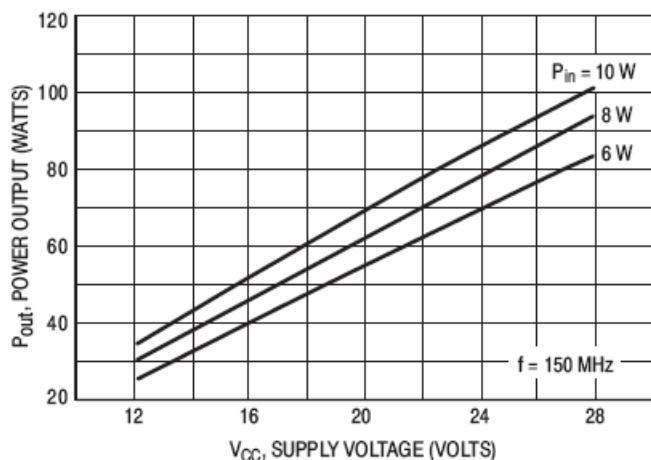


Figure 8. Power Output versus Supply Voltage

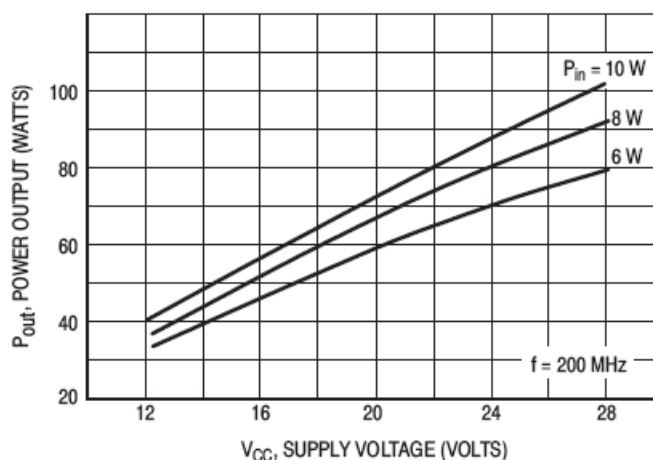
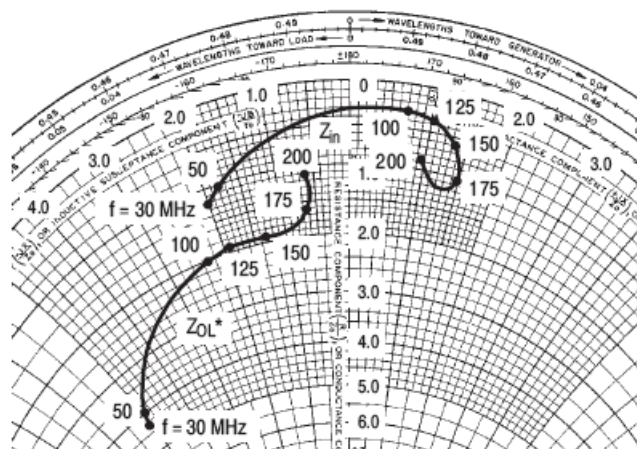


Figure 9. Power Output versus Supply Voltage



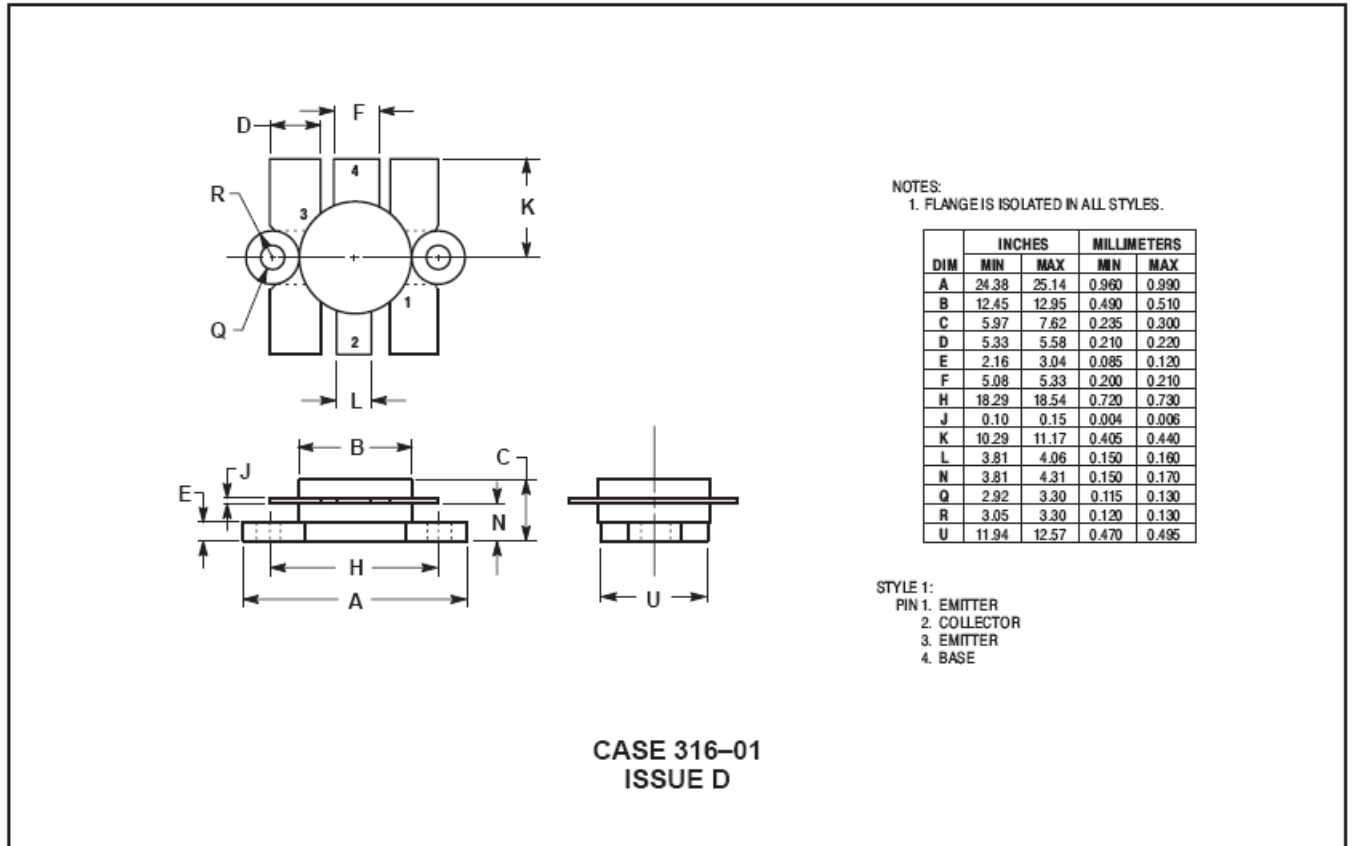
$V_{CC} = 28\text{ V}, P_{out} = 100\text{ W}$

f MHz	$Z_{in}$ OHMS	$Z_{OL}^*$ OHMS
30	1.2 - j2.0	4.3 - j5.0
50	1.0 - j1.8	4.0 - j4.9
100	0.3 + j0.7	2.0 - j2.3
125	0.3 + j1.0	1.9 - j1.9
150	0.6 + j1.3	1.9 - j1.3
175	1.0 + j1.5	1.6 - j0.6
200	0.9 + j1.0	1.1 - j0.6

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

Figure 10. Series Equivalent Input-Output Impedance

## PACKAGE DIMENSIONS



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