

## The RF Line NPN Silicon RF Power Transistor

... designed primarily for wideband large-signal output and driver amplifier stages in 100 to 500 MHz frequency range.

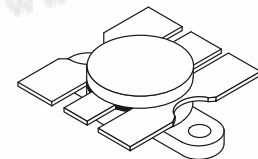
- Specified 28 Volt, 400 MHz Characteristics —  
Output Power = 30 Watts  
Minimum Gain = 8.5 dB  
Efficiency = 54% (Min)
- Built-In Matching Network for Broadband Operation Using Internal Matching Techniques
- 100% Tested for Load Mismatch at all Phase Angles with 30:1 VSWR
- Gold Metallization for High Reliability Applications

**MRF325**

30 W, 225 to 400 MHz  
CONTROLLED "Q"  
BROADBAND RF POWER  
TRANSISTOR  
NPN SILICON

### 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	$I_C$	3.4 4.5	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1) Derate above $25^\circ\text{C}$	$P_D$	82 0.47	Watts W/ $^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-65 to +150	$^\circ\text{C}$



CASE 316-01, STYLE 1

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.13	$^\circ\text{C/W}$

### 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 ( $I_C = 30$ mAdc, $I_B = 0$ )	$V_{(BR)CEO}$	33	—	—	Vdc
Collector-Emitter Breakdown Voltage ( $I_C = 30$ mAdc, $V_{BE} = 0$ )	$V_{(BR)CES}$	60	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 3.0$ mAdc, $I_C = 0$ )	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = 30$ mAdc, $I_E = 0$ )	$V_{(BR)CBO}$	60	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = 30$ Vdc, $I_E = 0$ )	$I_{CBO}$	—	—	3.0	mAdc

### ON CHARACTERISTICS

DC Current Gain ( $I_C = 1.5$ Adc, $V_{CE} = 5.0$ Vdc)	$h_{FE}$	20	—	80	—
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NOTE:

- 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** ( $T_C = 25^\circ\text{C}$  unless otherwise noted.)

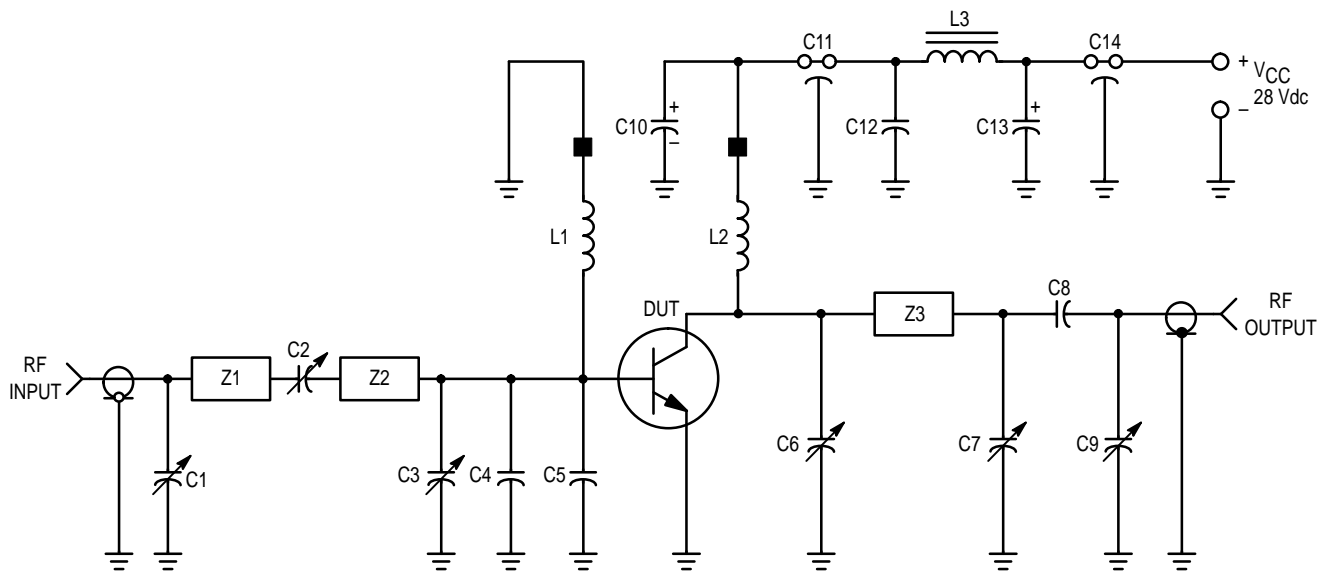
Characteristic	Symbol	Min	Typ	Max	Unit
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**DYNAMIC CHARACTERISTICS**

Output Capacitance ( $V_{CB} = 28\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ob}$	—	30	40	pF
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**FUNCTIONAL TESTS** (Figure 1)

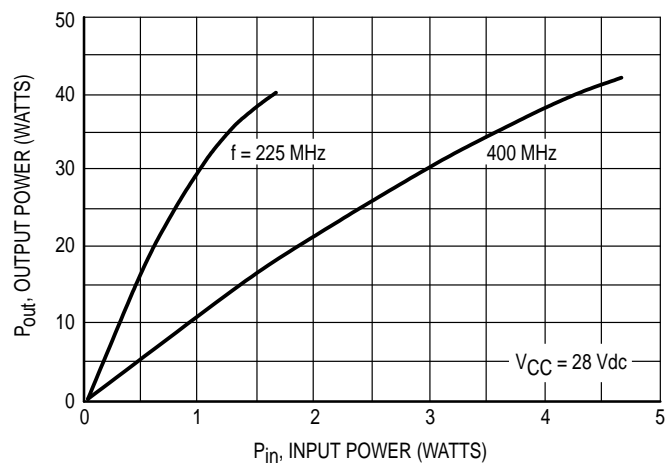
Common-Emitter Amplifier Power Gain ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 30\text{ W}$ , $f = 400\text{ MHz}$ )	$G_{PE}$	8.5	9.5	—	dB
Collector Efficiency ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 30\text{ W}$ , $f = 400\text{ MHz}$ )	$\eta$	50	60	—	%
Load Mismatch ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 30\text{ W}$ , $f = 400\text{ MHz}$ , $VSWR = 30:1$ all angles)	$\psi$	No Degradation in Output Power			



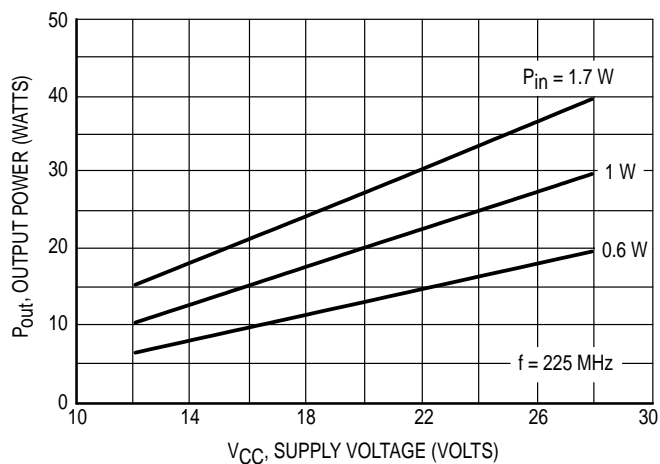
C1, C9 — 1.0–10 pF Johanson Capacitor (JMC 5201)  
 C2, C3, C6, C7 — 1.0–20 pF Johanson Capacitor (JMC 5501)  
 C4, C5 — 36 pF ATC 100-mil Chip Capacitor  
 C8 — 100 pF UNELCO  
 C10, C13 — 1.0  $\mu\text{F}$  50 V Tantalum  
 C11, C14 — 680 pF Feedthru  
 C12 — 0.1  $\mu\text{F}$  Erie Redcap  
 L1 — 8 Turns #26 AWG Enameled, 1/16" ID Closewound  
 with Ferroxcube Bead (#56–590–65/4B) on Ground End

L2 — 14 Turns, #22 AWG Enameled, Closewound on a 470  $\Omega$ ,  
 2.0 Watt Resistor with Ferroxcube Bead (#56–590–65/4B)  
 on Cold End of L2  
 L3 — Ferroxcube VK200–19/4B Ferrite Choke  
 Z1 — Microstrip 0.19" W x 0.88" L  
 Z2 — Microstrip 0.28" W x 1.0" L  
 Z3 — Microstrip 0.31" W x 1.25" L  
 Board — Glass Teflon  $\epsilon_r = 2.56$ ,  $t = 0.062$ "  
 Input/Output Connectors — Type N  
 DUT Socket Lead Frame Etched from 80-mil-Thick Copper

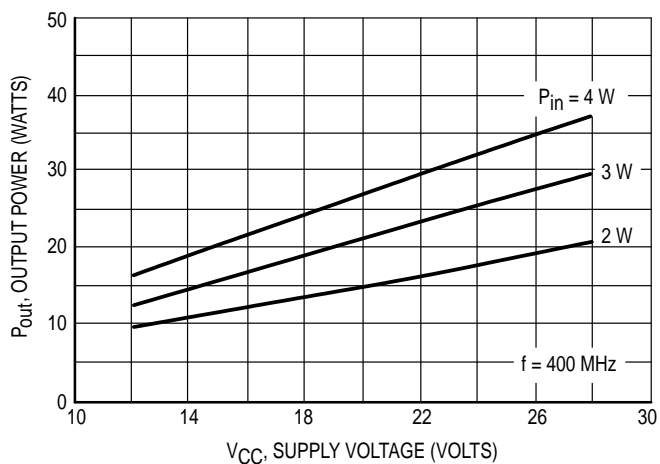
**Figure 1. 400 MHz Test Circuit**



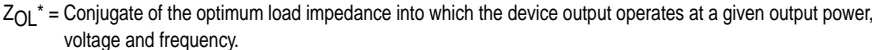
**Figure 2. Output Power versus Input Power**



**Figure 3. Output Power versus Supply Voltage**

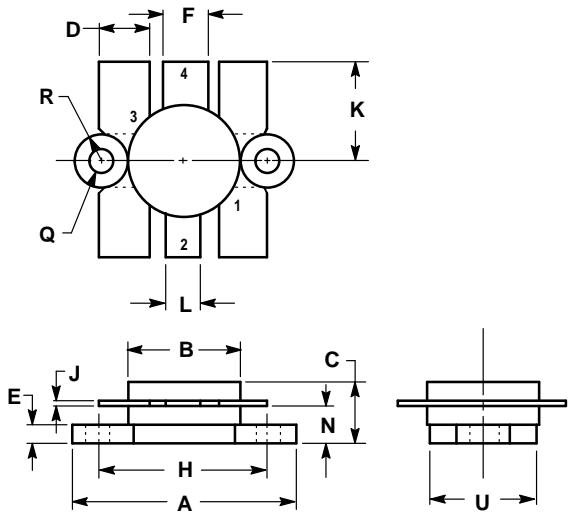


**Figure 4. Output Power versus Supply Voltage**



### Figure 5. Series Equivalent Impedance

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

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MP5005/D