

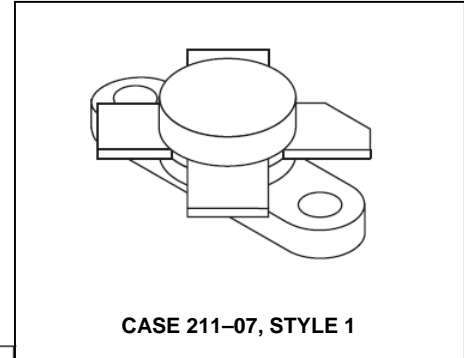
The RF Line NPN Silicon Power Transistor 30W, 30-200MHz, 28V

M/A-COM Products
Released - Rev. 05202009

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

- Guaranteed performance at 150 MHz, 28 Vdc
Output power = 30 W
Minimum gain = 10 dB
- 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	I_C	3.4	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1) Derate above 25°C	P_D	82 0.47	Watts $\text{W}/^\circ\text{C}$
Storage Temperature Range	T_{stg}	–65 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

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

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 ($I_C = 30 \text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	35	—	—	Vdc
Collector–Emitter Breakdown Voltage ($I_C = 30 \text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	65	—	—	Vdc
Collector–Base Breakdown Voltage ($I_C = 30 \text{ mAdc}$, $I_E = 0$)	$V_{(BR)CBO}$	65	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 3.0 \text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 30 \text{ Vdc}$, $I_E = 0$)	I_{CBO}	—	—	3.0	mAdc

ON CHARACTERISTICS

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

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

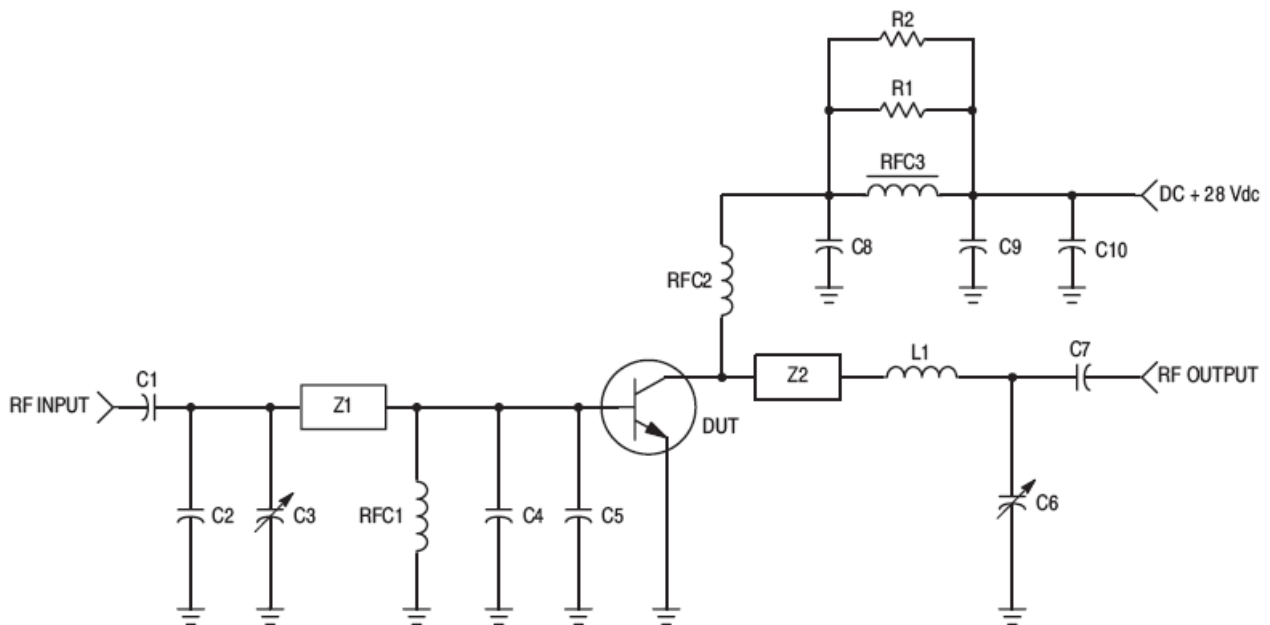
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ELECTRICAL CHARACTERISTICS — continued ($T_C = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS					
Output Capacitance ($V_{CB} = 30 \text{ Vdc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)	C_{ob}	—	30	40	pF
FUNCTIONAL TESTS (Figure 1)					
Common-Emitter Amplifier Power Gain ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 30 \text{ W}$, $f = 150 \text{ MHz}$)	G_{PE}	10	13.5	—	dB
Collector Efficiency ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 30 \text{ W}$, $f = 150 \text{ MHz}$)	η	50	—	—	%
Load Mismatch ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 30 \text{ W}$, $f = 150 \text{ MHz}$, $VSWR = 30:1$ all phase angles)	ψ	No Degradation in Power Output			



C1, C7 — 18 pF, 100 mil ATC
 C2 — 68 pF, 100 mil ATC
 C3, C6 — Johanson #JMC 5501
 C4 — 270 pF, 100 mil ATC
 C5 — 240 pF, 100 mil ATC
 C8, C9 — 100 pF Underwood
 C10 — 1.0 μF Tantalum
 L1 — 2 Turns, 2.5" #20 Wire, ID = 0.275"

R1, R2 — 10 Ω , 1.0 W
 RFC1 — 15 μH Molded Coil
 RFC2 — 2 Turns, 2.5" #20 Wire, ID = 0.2"
 RFC3 — Ferroxcube VK200-19/4B
 Z1 — Microstrip, 0.168" W x 1.6" L
 Z2 — Microstrip, 0.168" W x 1.2" L
 Board — Glass Teflon $\epsilon_r = 2.55$

Figure 1. 150 MHz Test Circuit

TYPICAL PERFORMANCE CURVES

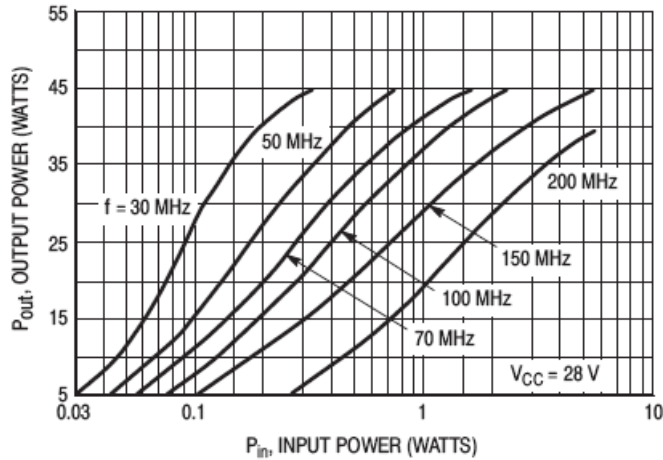


Figure 2. Output Power versus Input Power

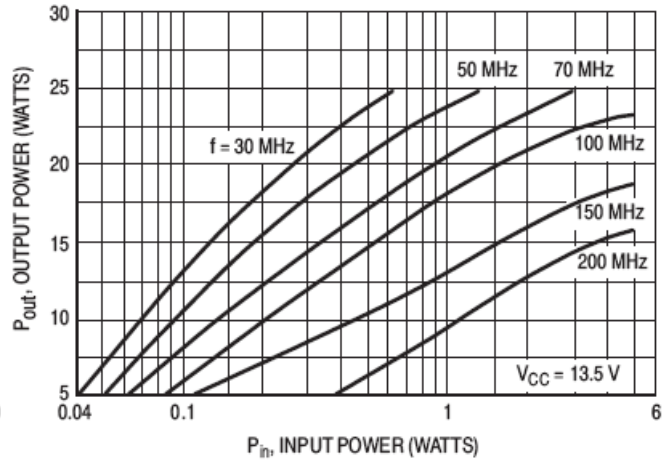


Figure 3. Output Power versus Input Power

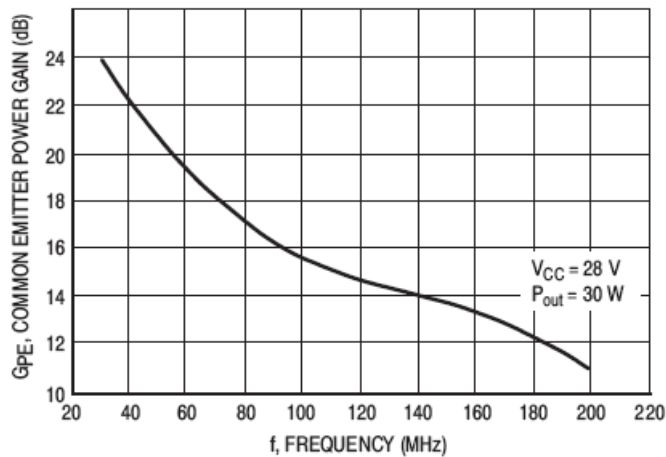


Figure 4. Power Gain versus Frequency

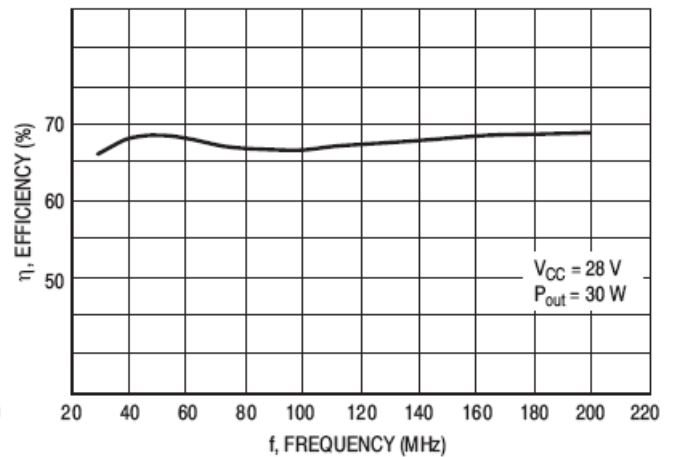


Figure 5. Efficiency versus Frequency

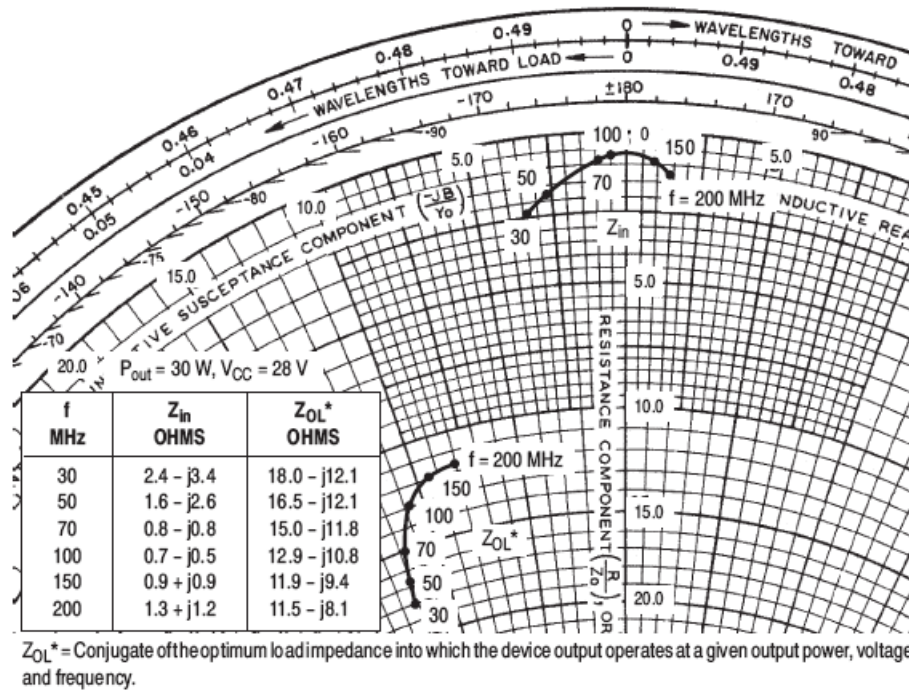


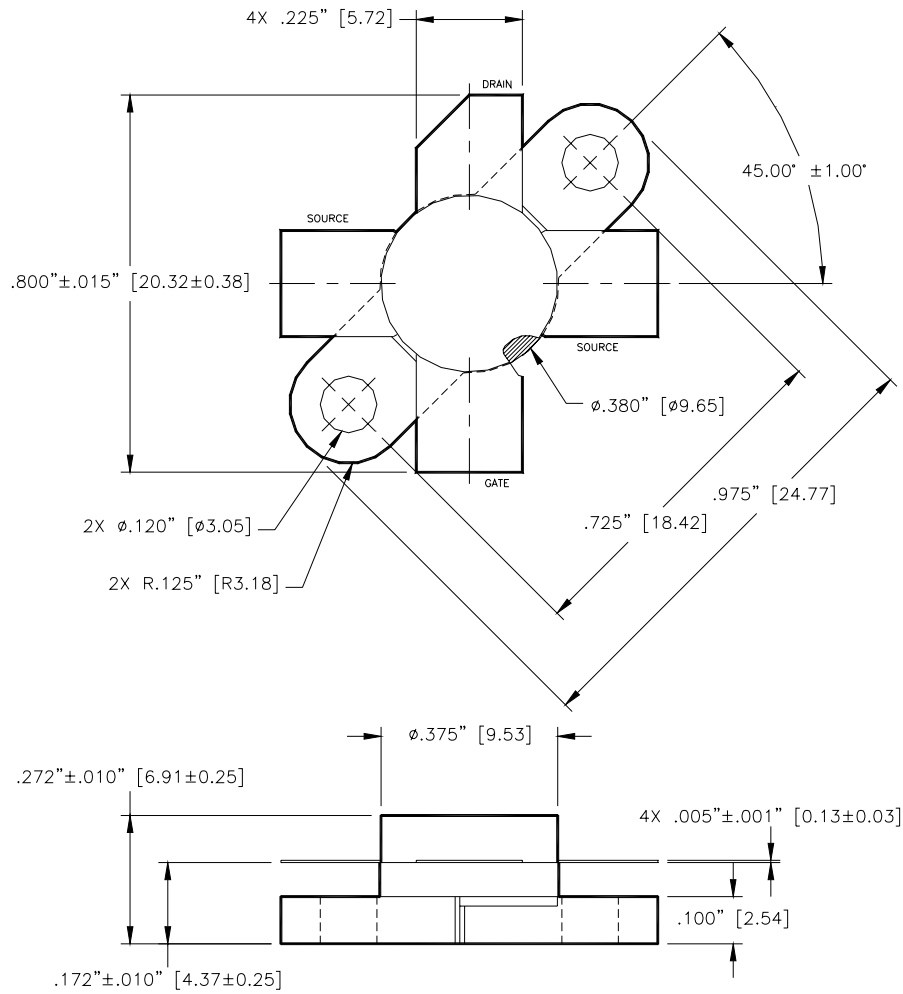
Figure 6. Series Equivalent Input/Output Impedance

MRF314



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Unless otherwise noted, tolerances are inches $\pm .005''$ [millimeters $\pm 0.13\text{mm}$]

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