

The RF Line

NPN Silicon

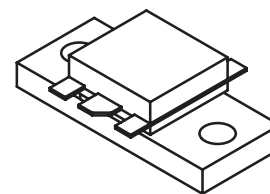
RF Power Transistor

Designed for 24 Volt UHF large-signal, common base amplifier applications in industrial and commercial FM equipment operating in the range of 850–960 MHz.

- Motorola Advanced Amplifier Concept Package
- Specified 24 Volt, 900 MHz Characteristics
 - Output Power = 60 Watts
 - Power Gain = 7.0 dB Min
 - Efficiency = 60% Min
- Double Input/Output Matched for Wideband Performance and Simplified External Matching
- Series Equivalent Large-Signal Characterization
- Gold Metallized, Emitter Ballasted for Long Life and Resistance to Metal Migration
- Silicon Nitride Passivated
- Circuit board photomaster available upon request by contacting RF Tactical Marketing in Phoenix, AZ.

MRF898

60 W, 850–960 MHz
RF POWER
TRANSISTOR
NPN SILICON



CASE 333A-02, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	30	Vdc
Collector–Base Voltage	V_{CBO}	55	Vdc
Emitter–Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	10	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	175 1.0	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	$R_{\theta JC}$	1.0	$^\circ\text{C}/\text{W}$

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 ($I_C = 50 \text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	30	—	—	Vdc
Collector–Emitter Breakdown Voltage ($I_C = 50 \text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	55	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 5.0 \text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ($V_{CE} = 30 \text{ Vdc}$, $V_{BE} = 0$, $T_C = 25^\circ\text{C}$)	I_{CES}	—	—	10	mAdc

(continued)

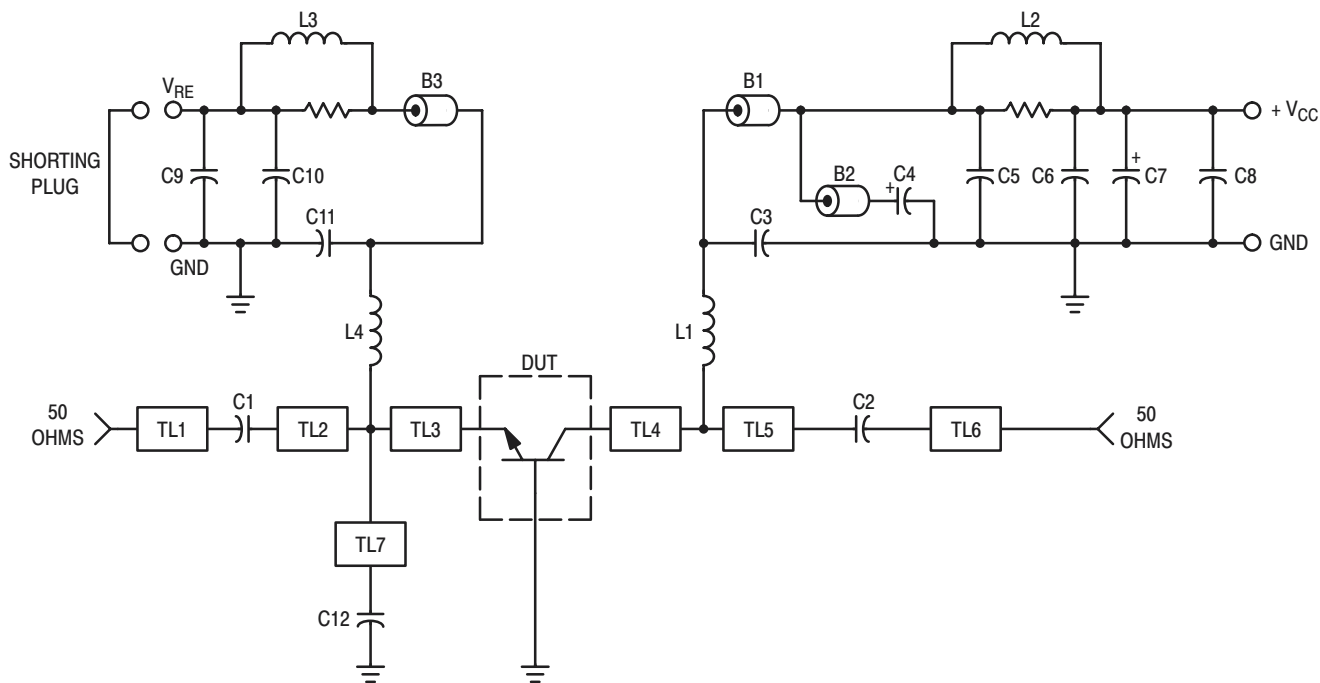


ELECTRICAL CHARACTERISTICS — continued ($T_C = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS					
DC Current Gain ($I_C = 2.0\text{ A dc}$, $V_{CE} = 5.0\text{ V dc}$)	h_{FE}	20	50	150	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (1) ($V_{CB} = 24\text{ V dc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{ob}	—	60	—	pF
FUNCTIONAL TESTS					
Common-Base Amplifier Power Gain ($V_{CC} = 24\text{ V dc}$, $P_{out} = 60\text{ W}$, $f = 900\text{ MHz}$)	G_{pb}	7.0	7.9	—	dB
Collector Efficiency ($V_{CC} = 24\text{ V dc}$, $P_{out} = 60\text{ W}$, $f = 900\text{ MHz}$)	η	60	65	—	%
Output Mismatch Stress ($V_{CC} = 24\text{ V dc}$, $P_{out} = 60\text{ W}$, $f = 900\text{ MHz}$, VSWR = 5:1, all phase angles)	ψ	No Degradation in Output Power			

NOTE:

1. Value of " C_{ob} " is that of die only. It is not measurable in MRF898 because of internal matching network.



B1, B2, B3 — Bead, Ferroxcube 56-390-65/3B
 C1, C2, C12 — 39 pF, 100 Mil Chip Capacitor
 C3, C11 — 91 pF, Mini Underwood or Equivalent
 C4, C7, C9 — 10 μF , 35 V Electrolytic
 C5 — 4000 pF, 1.0 kV Ceramic
 C6, C10 — 1000 pF, 350 V Unelco or Equivalent
 C8 — 47 pF, 100 Mil Chip Capacitor
 L1, L4 — 4 Turns #18 AWG Choke
 L2 — 11 Turns #20 AWG Choke on 10 Ohm, 1.0 Watt Resistor
 L3 — 3 Turns #18 AWG Choke on 10 Ohm, 1.0 Watt Resistor

TL1, TL6 — 50 Ohm Microstrip
 TL2 — 400 x 950 Mils
 TL3, TL4 — 140 x 200 Mils
 TL5 — 320 x 690 Mils
 TL7 — 260 x 230 Mils
 Board — 3M Epsilam-10, 50 Mil
 Bias Boards — 1/32" G10 or Equivalent

Figure 1. 850-960 MHz Broadband Test Circuit

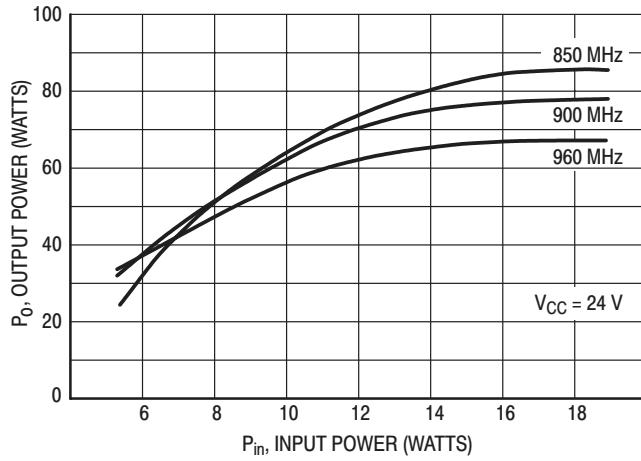


Figure 2. Output Power versus Input Power

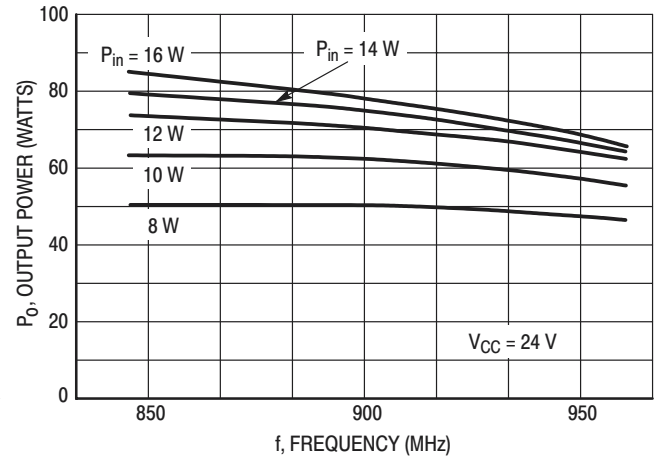


Figure 3. Output Power versus Frequency

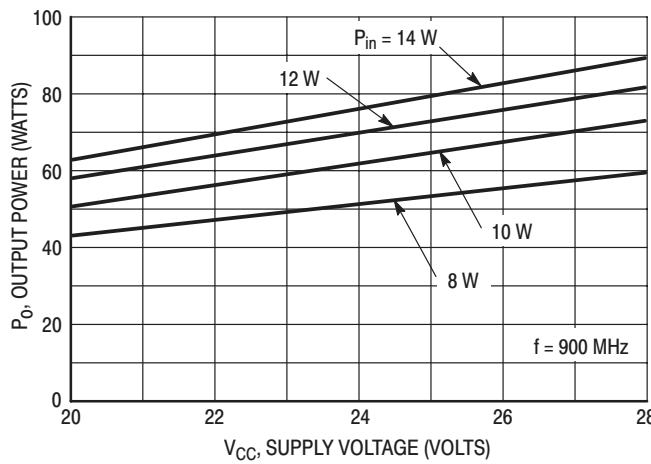


Figure 4. Output Power versus Supply Voltage

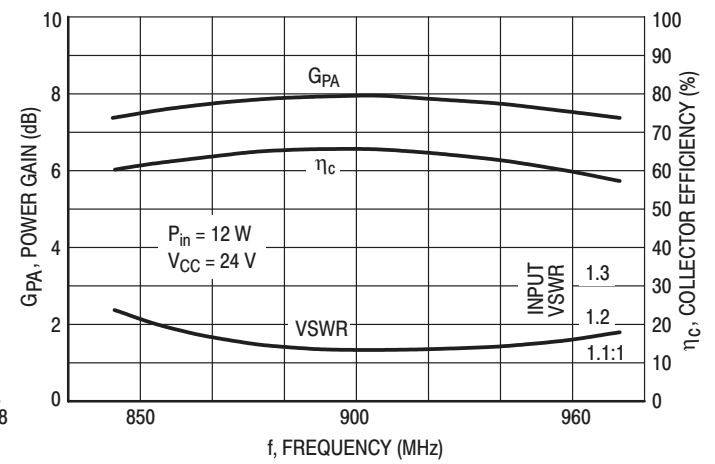


Figure 5. Typical Broadband Circuit Performance

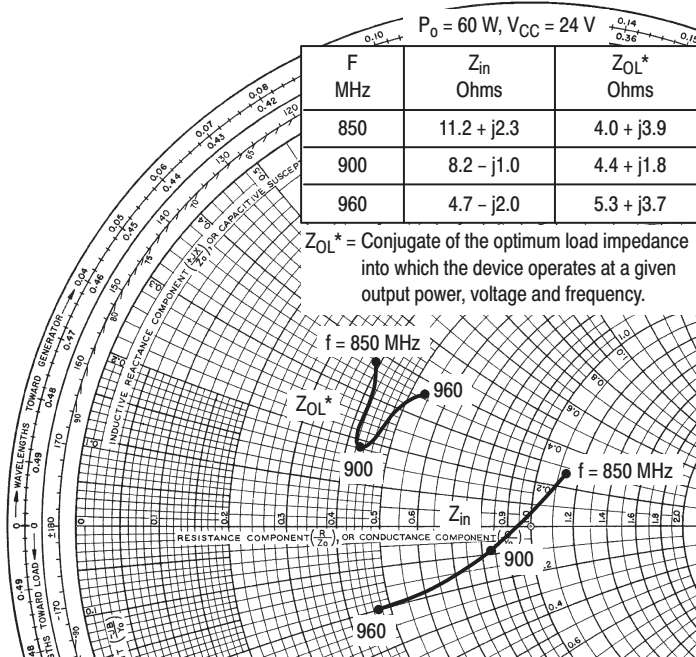
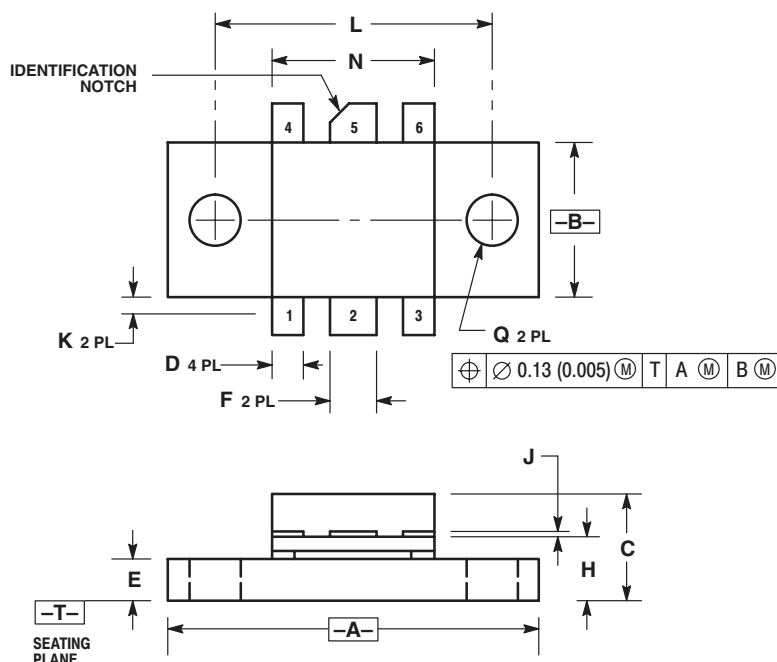


Figure 6. Input/Output Impedance versus Frequency

PACKAGE DIMENSIONS



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.965	0.985	24.52	25.01
B	0.390	0.410	9.91	10.41
C	0.250	0.290	6.35	7.36
D	0.075	0.090	1.91	2.28
E	0.095	0.115	2.42	2.92
F	0.110	0.130	2.80	3.30
H	0.155	0.175	3.94	4.44
J	0.004	0.006	0.11	0.15
K	0.090	0.116	2.29	2.94
L	0.725 BSC		18.41 BSC	
N	0.415	0.435	10.55	11.04
Q	0.120	0.135	3.05	3.42

- STYLE 1:
- PIN 1: BASE
 - EMITTER
 - BASE
 - BASE
 - COLLECTOR
 - BASE

CASE 333A-02 ISSUE C

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MOTOROLA



MRF898/D