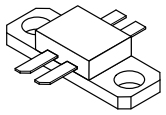
The RF Line
NPN Silicon
RF Power Transistor

MRF897

Designed for 24 Volt UHF large–signal, common emitter, class–AB linear amplifier applications in industrial and commercial FM/AM equipment operating in the range 800–970 MHz.

- Specified 24 Volt, 900 MHz Characteristics
  - Output Power = 30 Watts
  - Minimum Gain = 10 dB @ 900 MHz, class–AB
  - Minimum Efficiency = 30% @ 900 MHz, 30 Watts (PEP)
  - Maximum Intermodulation Distortion –30 dBc @ 30 Watts (PEP)
- Characterized with Series Equivalent Large–Signal Parameters from 800 to 960 MHz
- Silicon Nitride Passivated
- 100% Tested for Load Mismatch Stress at all Phase Angles with 5:1 VSWR @ 26 Vdc, and Rated Output Power
- Gold Metalized, Emitter Ballasted for Long Life and Resistance to Metal–Migration
- Circuit board photomaster available upon request by contacting RF Tactical Marketing in Phoenix, AZ.

30 W, 900 MHz
RF POWER
TRANSISTOR
NPN SILICON



CASE 395B–01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	30	Vdc
Collector–Emitter Voltage	V_{CES}	60	Vdc
Emitter–Base Voltage	V_{EBO}	4.0	Vdc
Collector–Current — Continuous	I_C	4.0	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	105 0.60	Watts W/°C
Storage Temperature Range	T_{stg}	–65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.67	°C/W

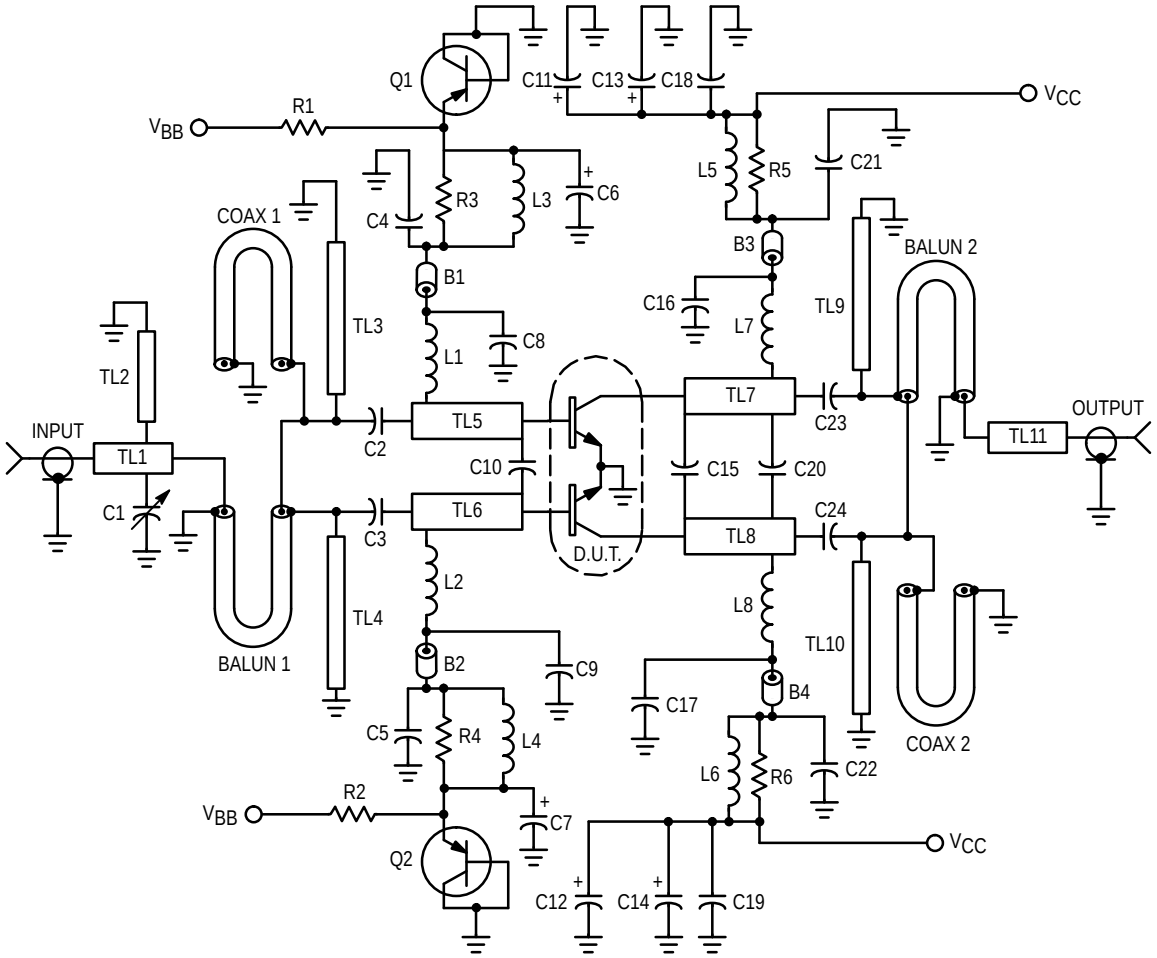
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I_C = 50 mAdc, I_B = 0)	$V_{(BR)CEO}$	30	33	—	Vdc
Collector–Emitter Breakdown Voltage (I_C = 50 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	60	80	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 5 mAdc, I_C = 0)	$V_{(BR)EBO}$	4.0	4.7	—	Vdc
Collector Cutoff Current (V_{CE} = 30 Vdc, V_{BE} = 0)	I_{CES}	—	—	10.0	mAdc
ON CHARACTERISTICS					
DC Current Gain (I_{CE} = 1.0 Adc, V_{CE} = 5 Vdc)	h_{FE}	30	80	120	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 24 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	14	21	28	pF

(continued)

ELECTRICAL CHARACTERISTICS — continued (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
FUNCTIONAL CHARACTERISTICS					
Common–Emitter Amplifier Power Gain (V_{CC} = 24 Vdc, P_{out} = 30 Watts (PEP), I_{cq} = 125 mA, f_1 = 900 MHz, f_2 = 900.1 MHz)	G_{pe}	10.0	12.0	—	dB
Collector Efficiency (V_{CC} = 24 Vdc, P_{out} = 30 Watts (PEP), I_{cq} = 125 mA, f_1 = 900 MHz, f_2 = 900.1 MHz)	η	35	38	—	%
Intermodulation Distortion (V_{CC} = 24 Vdc, P_{out} = 30 Watts (PEP), I_{cq} = 125 mA, f_1 = 900 MHz, f_2 = 900.1 MHz)	IMD	—	–37	–30	dBc
Output Mismatch Stress (V_{CC} = 26 Vdc, P_{out} = 30 Watts (PEP), I_{cq} = 125 mA, f_1 = 900 MHz, f_2 = 900.1 MHz, Load VSWR = 5:1 (all phase angles))	ψ	No Degradation in Output Power Before and After Test			



B1, B2, B3, B4 — Ferrite Bead, Fair Rite #2743019447
C1 — 0.8–8.0 pF Trimmer Capacitor, Johanson
C2, C3, C23, C24 — 43 pF, 100 mil, ATC Chip Capacitor
C4, C5, C18, C19, C21, C22 — 820 pF, 100 mil, Chip Capacitor, Kemet
C6, C7, C11, C12 — 10 μF, Lytic Capacitor, Panasonic
C8, C9, C16, C17 — 100 pF, 100 mil, Chip Capacitor, Murata Erie
C10 — 13 pF, 50 mil, ATC Chip Capacitor
C13, C14 — 250 μF Lytic Capacitor, Mallory
C15 — 1.1 pF, 50 mil, ATC Chip Capacitor
C20 — 6.8 pF, 100 mil, ATC Chip Capacitor
L1, L2, L3, L4, L5, L6 — 5 Turns 20 AWG, IDIA 0.126″ choke
N1, N2 — Type N Flange Mount, Omni Spectra 3052–1648–10
Q1 — Bias Transistor BD136 PNP
R1, R12 — 39 Ohm, 2.0 W
R3, R4, R5, R6 — 4.0 x 39 Ohm, 1/8 W, Chips in Parallel, Rohm 390–J
TL1–TL11 — See Photomaster
Balun1, Balun2, Coax 1, Coax 2 — 2.20″ 50 Ohm, 0.088″ o.d. semi–rigid coax, Micro Coax UT–85–M17
Board — 1/32″ Glass Teflon, Arlon GX–0300–55–22, ε_r = 2.55

Figure 1. MRF897 Broadband Test Circuit

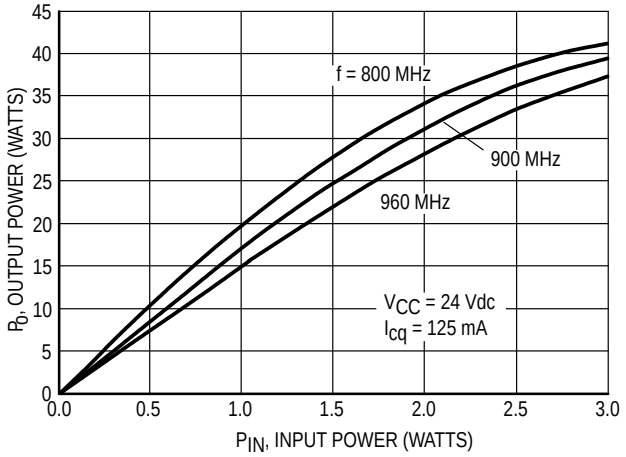


Figure 2. Output Power versus Input Power

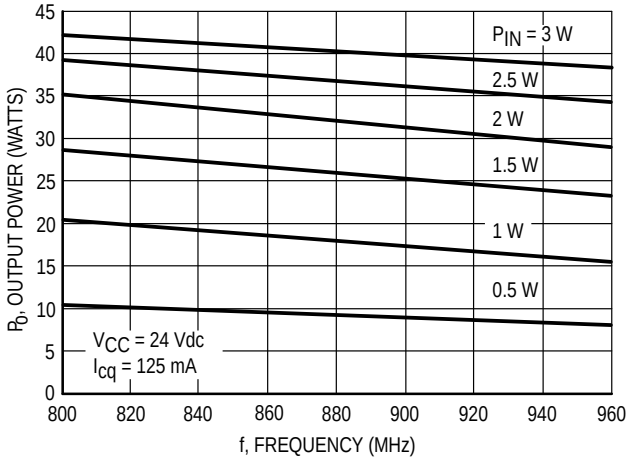


Figure 3. Output Power versus Frequency

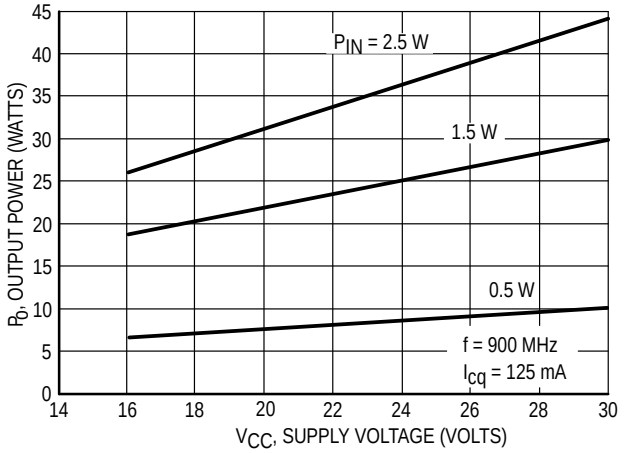


Figure 4. Output Power versus Supply Voltage

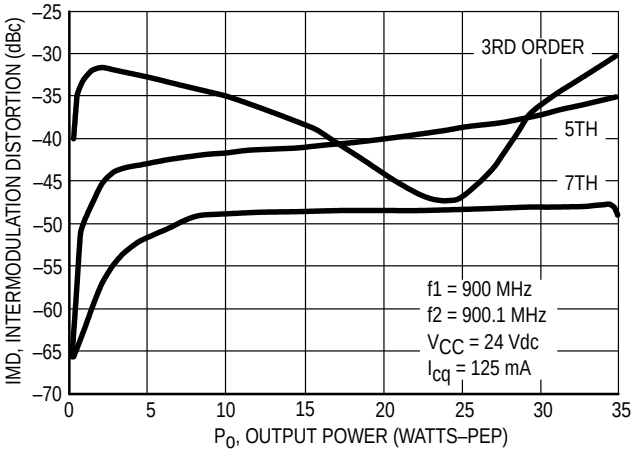


Figure 5. Intermodulation versus Output Power

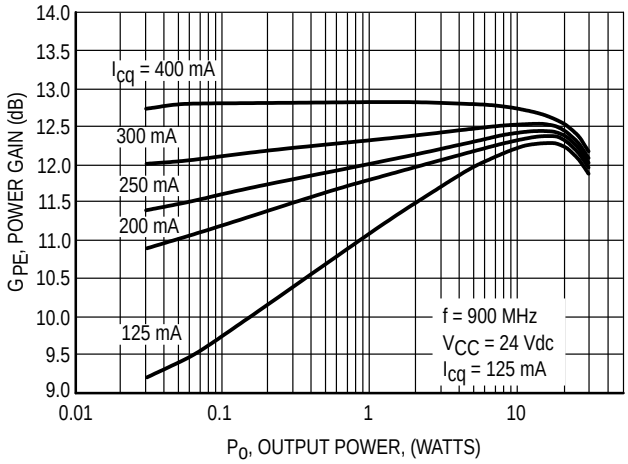


Figure 6. Power Gain versus Output Power

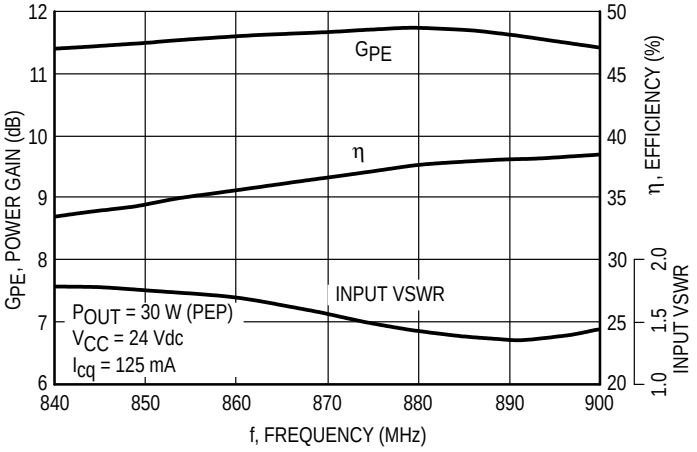
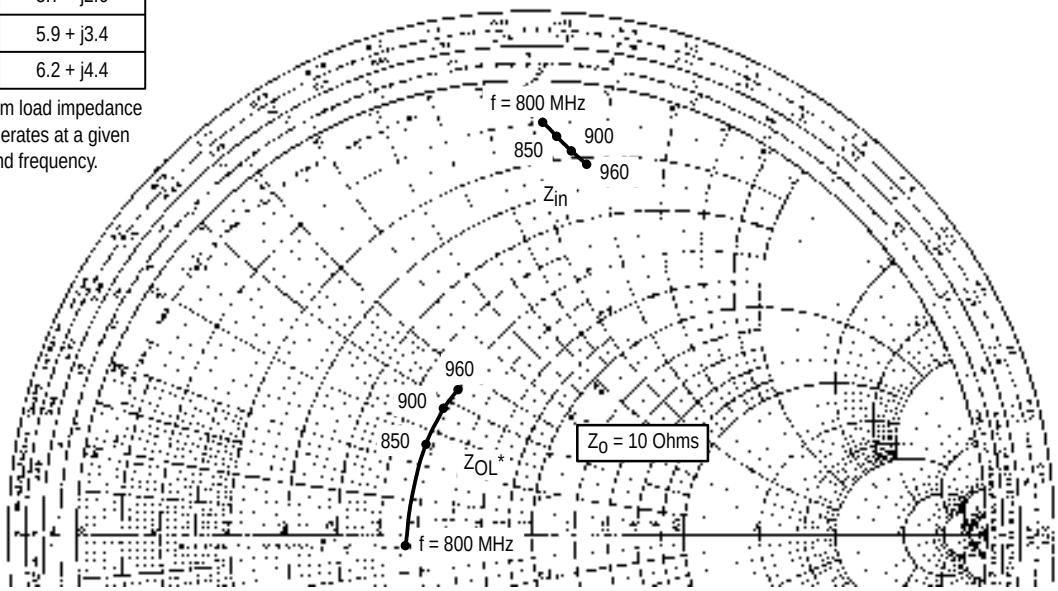


Figure 7. Broadband Test Fixture Performance

f MHz	Z_{in} Ohms	Z_{OL}* Ohms
800	1.0 + j10.3	5.9 – j0.4
850	1.5 + j10.5	5.7 + j2.6
900	1.8 + j11.0	5.9 + j3.4
960	2.2 + j11.4	6.2 + j4.4

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

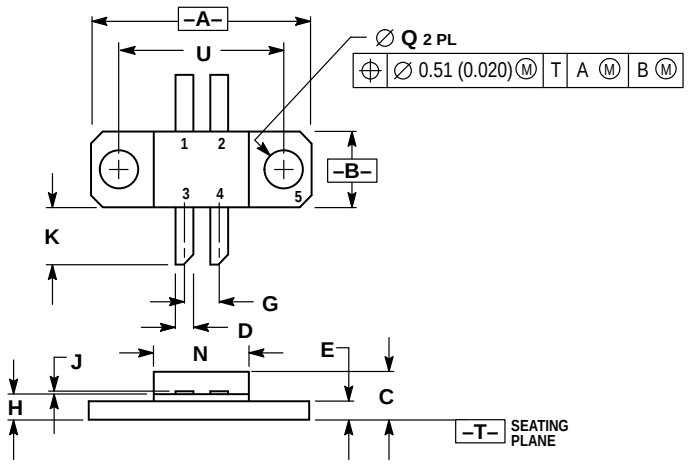


NOTE: Z_{in} & Z_{OL}* are given from base–to–base and collector–to–collector respectively.

P_0 = 300 W (PEP), V_{CC} = 24 V

Figure 8. Series Equivalent Input/Output Impedances

PACKAGE DIMENSIONS



STYLE 1:
PIN 1. BASE
2. BASE
3. COLLECTOR
4. COLLECTOR
5. EMITTER

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

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.739	0.750	18.77	19.05
B	0.240	0.260	6.10	6.60
C	0.165	0.198	4.19	5.03
D	0.055	0.065	1.40	1.65
E	0.055	0.070	1.40	1.78
G	0.110	0.130	2.79	3.30
H	0.079	0.091	2.01	2.31
J	0.003	0.005	0.08	0.13
K	0.180	0.220	4.57	5.59
N	0.315	0.330	8.00	8.38
Q	0.125	0.135	3.18	3.42
U	0.560 BSC		14.22 BSC	

CASE 395B–01
ISSUE A

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