

T-33-15

**MOTOROLA  
SEMICONDUCTOR  
TECHNICAL DATA**

**MRF848**

**Advance Information**

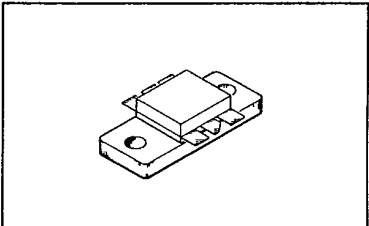
**The RF Line**

**NPN SILICON RF POWER TRANSISTOR**

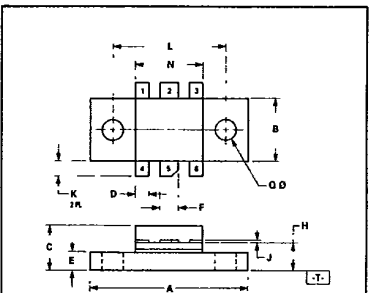
... designed for 12.5 Volt UHF large-signal, common base amplifier applications in industrial and commercial FM equipment operating in the range of 804-960 MHz.

- Motorola Advanced Amplifier Concept Package
- Specified 12.5 Volt, 870 MHz Characteristics  
Output Power = 60 Watts  
Minimum Gain = 4.0 dB  
Efficiency = 60%
- 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

60 W 800-960 MHz  
**RF POWER  
TRANSISTOR**  
NPN SILICON



MAXIMUM RATINGS			
Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	16	Vdc
Collector-Base Voltage	V <sub>CBO</sub>	36	Vdc
Emitter-Base Voltage	V <sub>EBO</sub>	4.0	Vdc
Collector-Current — Continuous	I <sub>C</sub>	14	Adc
Total Device Dissipation @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	175 1.0	Watts W/°C
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C
THERMAL CHARACTERISTICS			
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	1.00	°C/W



- NOTES
- 1 DIMENSIONS A AND B ARE DATUMS AND T IS A DATUM PLANE.
  - 2 POSITIONAL TOLERANCE FOR O HOLES  
 $\left[ \begin{matrix} \text{A} \\ \text{B} \end{matrix} \right] \pm 0.13 (0.005) \text{ @ } \left[ \begin{matrix} \text{A} \\ \text{B} \end{matrix} \right] \text{ @ } \left[ \begin{matrix} \text{A} \\ \text{B} \end{matrix} \right]$  STYLE 1  
 PIN 1, BASE  
 2, EMITTER  
 3, BASE  
 4, BASE  
 5, COLLECTOR  
 6, BASE
  - 3 DIMENSION -C- FOUR PLACES  
 DIMENSION -F- TWO PLACES
  - 4 DIMENSIONING AND TOLERANCING PER Y14.6M, 1982
  - 5 CONTROLLING DIMENSION INCH

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	24.51	25.02	0.965	0.985
B	9.91	10.41	0.390	0.410
C	6.86	7.36	0.270	0.290
D	1.91	2.28	0.075	0.090
E	2.42	2.92	0.095	0.115
F	5.47	5.96	0.210	0.230
H	3.94	4.44	0.155	0.175
J	0.10	0.15	0.004	0.006
K	2.29	2.54	0.090	0.116
L	18.41 BSC		0.725 BSC	
N	10.54	11.04	0.415	0.435
O	3.18	3.42	0.125	0.135

CASE 333A

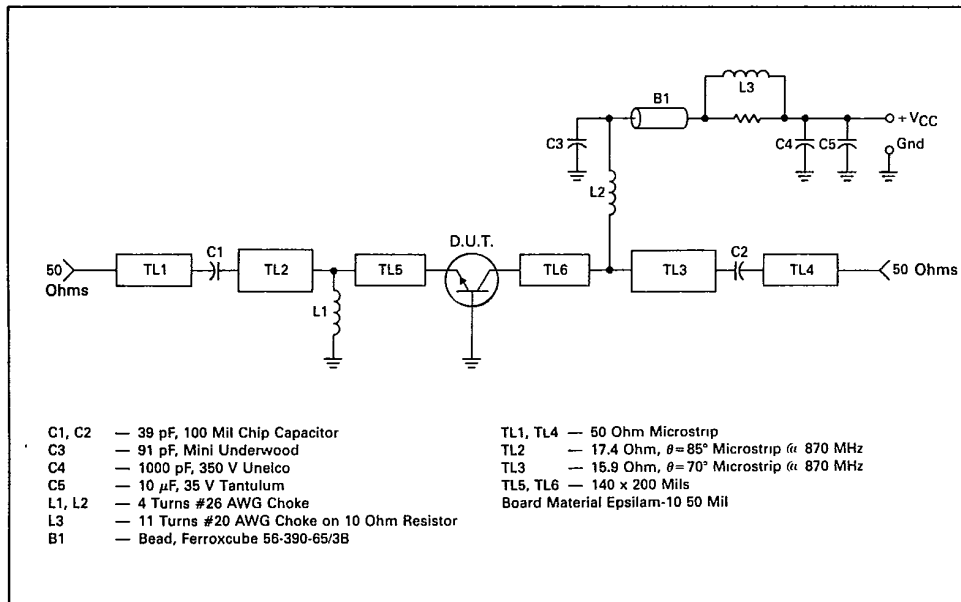
This document contains information on a new product. Specifications and information herein are subject to change without notice.

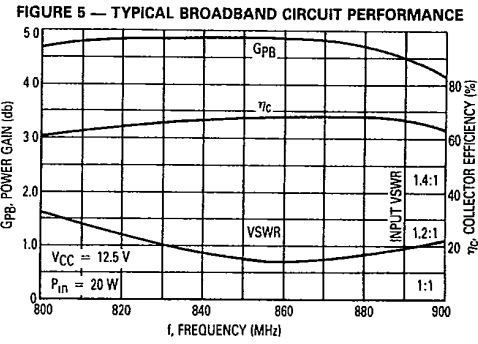
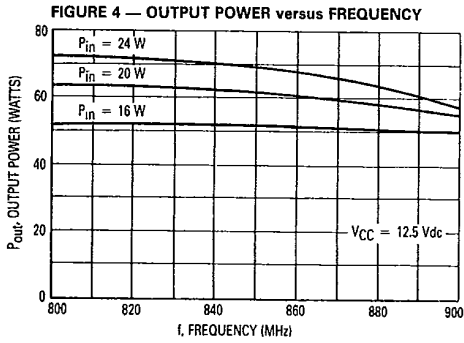
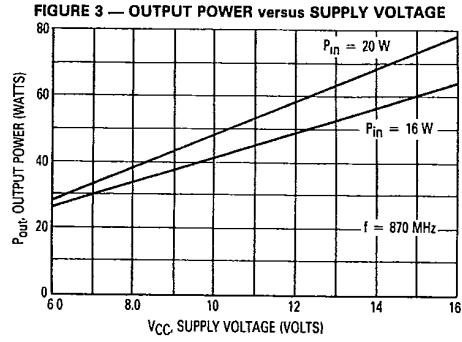
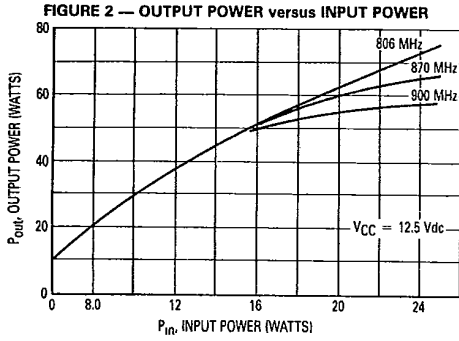
**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector-Emitter Breakdown Voltage ( $I_C = 50\text{ mAdc}$ , $I_B = 0$ )	$V_{(BR)CEO}$	16	—	—	Vdc
Collector-Emitter Breakdown Voltage ( $I_C = 50\text{ mAdc}$ , $V_{BE} = 0$ )	$V_{(BR)CES}$	36	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 5.0\text{ mAdc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ( $V_{CE} = 15\text{ Vdc}$ , $V_{BE} = 0$ , $T_C = 25^\circ\text{C}$ )	$I_{CES}$	—	—	10	mA
<b>ON CHARACTERISTICS</b>					
DC Current Gain ( $I_C = 2.0\text{ Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ )	$h_{FE}$	20	50	150	—
<b>DYNAMIC CHARACTERISTICS</b>					
Output Capacitance ( $V_{CB} = 12.5\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ob}$	—	88	110	pF
<b>FUNCTIONAL TESTS</b>					
Common-Base Amplifier Power Gain ( $V_{CC} = 12.5\text{ Vdc}$ , $P_{out} = 60\text{ W}$ , $f = 870\text{ MHz}$ )	$G_{pb}$	4.0	4.8	—	dB
Collector Efficiency ( $V_{CC} = 12.5\text{ Vdc}$ , $P_{out} = 60\text{ W}$ , $f = 870\text{ MHz}$ )	$\eta$	60	68	—	%
Output Mismatch Stress ( $V_{CC} = 15.5\text{ Vdc}$ , $P_{in} = 24\text{ W}$ , $f = 870\text{ MHz}$ , $VSWR = 10:1$ , all phase angles)	$\psi$	No degradation in output power			

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FIGURE 1 — 800-870 MHz BROADBAND TEST CIRCUIT





**FIGURE 6 — INPUT/OUTPUT IMPEDANCE**

$P_{out} = 60 \text{ Watts}, V_{CC} = 12.5 \text{ Vdc}$

f MHz	$Z_{in}$ Ohms	$Z_{OL}^*$ Ohms
800	$7.16 + j8.2$	$4.5 + j4.8$
835	$8.7 + j6.9$	$5.45 + j5.0$
870	$8.76 + j6.17$	$6.75 + j5.1$
900	$8.25 + j6.06$	$10.2 - j4.0$

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

