

T-33-15

MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

MRF848

Advance Information

The RF Line

NPN SILICON RF POWER TRANSISTOR

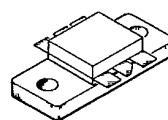
... designed for 12.5 Volt UHF large-signal, common base amplifier applications in industrial and commercial FM equipment operating in the range of 804-960 MHz.

- 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



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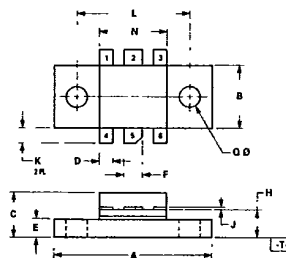
MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	16	Vdc
Collector-Base Voltage	V_{CBO}	36	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector-Current — Continuous	I_C	14	Adc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	175 1.0	Watts W/°C
Storage Temperature Range	T_{sto}	-65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.00	$^{\circ}\text{C/W}$

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



NOTES

- NOTES
- 1 D MENS'ONS A AND B ARE DATUMS AND T IS A DATUM PLANE.
 - 2 POSITIONAL TOLERANCE FOR O HOLES
-   
1. DIMENSION - D: FOUR PLACES
2. DIMENSION - F: TWO PLACES
3. DIMENSIONING AND TOLERANCING PER Y14.6M, 1982
4. CONTROLLING D.MENSION INCH
- STYLE 1
- PIN 1. BASE
 2. EMITTER
 3. BASE
 4. BASE
 5. COLLECTOR
 6. BASE

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	0.110	0.130
H	3.94	4.44	0.155	0.175
J	0.10	0.15	0.004	0.006
K	2.29	2.94	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

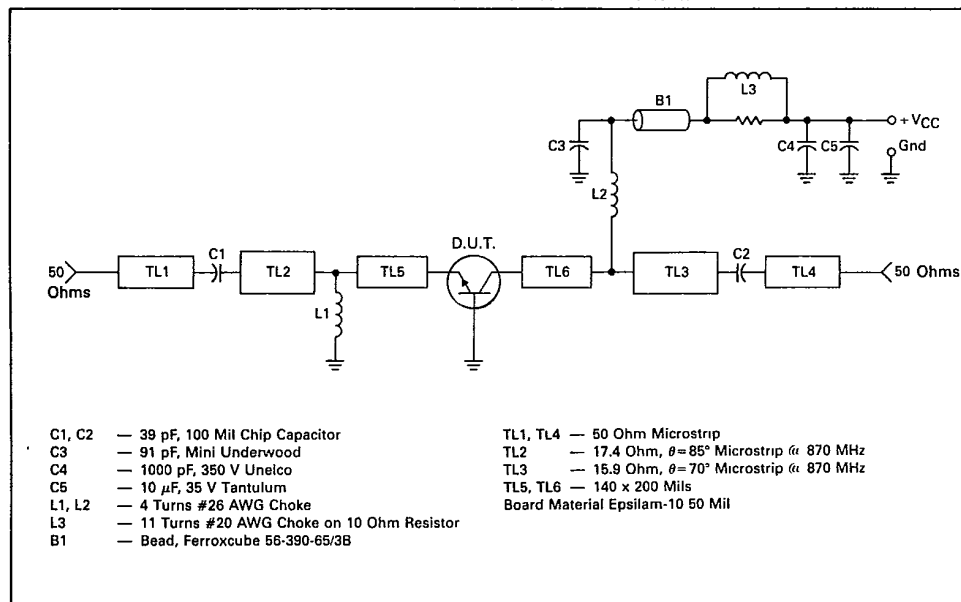
MRF848

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
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
ON CHARACTERISTICS					
DC Current Gain ($I_C = 2.0\text{ Adc}$, $V_{CE} = 5.0\text{ Vdc}$)	h_{FE}	20	50	150	—
DYNAMIC CHARACTERISTICS					
Output Capacitance ($V_{CB} = 12.5\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{ob}	—	88	110	pF
FUNCTIONAL TESTS					
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 ($V_{CC} = 12.5\text{ Vdc}$, $P_{out} = 60\text{ W}$, $f = 870\text{ MHz}$)	η	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)	ψ	No degradation in output power			

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FIGURE 1 — 800-870 MHz BROADBAND TEST CIRCUIT



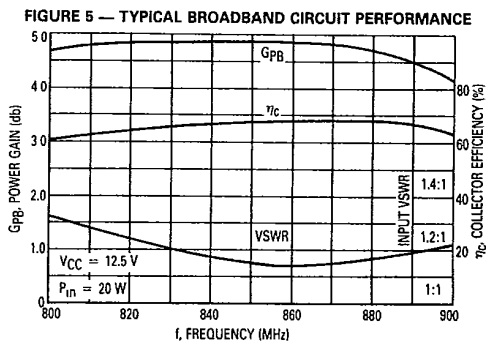
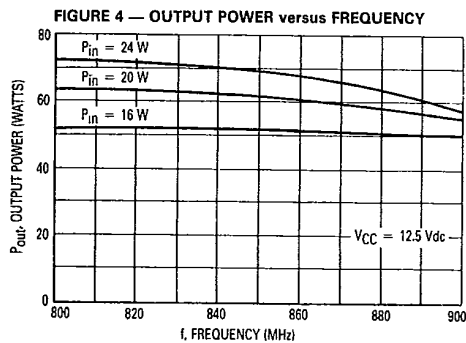
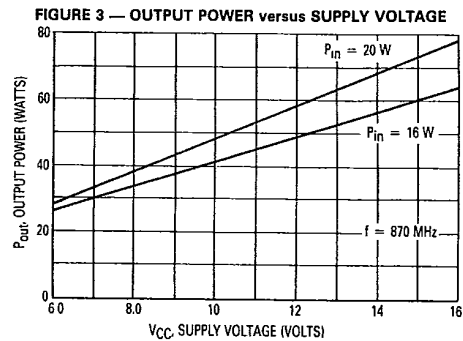
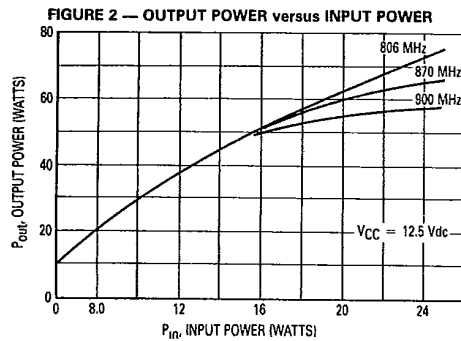


FIGURE 6 — INPUT/OUTPUT IMPEDANCE

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

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.

