MRF435

MOTOROLA

The RF Line

150 W (LINEAR) 30 MHz

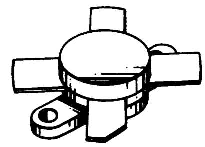
RF POWER TRANSISTOR

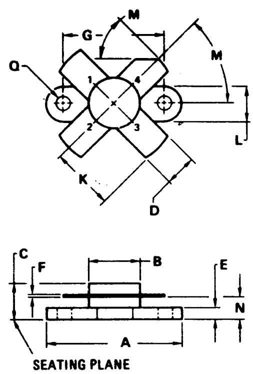
NPN SILICON

NPN SILICON RF POWER TRANSISTOR

. . . designed primarily for high-voltage applications as a high-power linear amplifier from 2.0 to 30 MHz. Ideal for marine and base station equipment.

- Specified 28 Volt, 30 MHz Characteristics
  Output Power = 150 W
  Minimum Gain = 10 dB
  Efficiency = 40%
- Intermodulation Distortion @ 150 W(PEP) —
  IMD = -30 dB (Max)
- Diffused Emitter Resistors for Superior Ruggedness
- 100% Tested for Load Mismatch at all Phase Angles with 30:1 VSWR @ 150 W CW





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

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	24.38	25.15	0.960	0.990
B	11.81	12.95	0.465	0.510
C	5.82	6.98	0.229	0.275
D	5.46	5.97	0.216	0.235
E	2.13	2.79	0.084	0.110
F	0.08	0.18	0.003	0.007
G	18.29	18.54	0.720	0.730
K	11.05	–	0.435	–
L	6.22	6.48	0.246	0.255
M	45° NOM		45° NOM	
N	3.66	4.52	0.144	0.178
Q	2.92	3.30	0.115	0.130

CASE 211-11

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	30	Vdc
Collector-Base Voltage	V_{CBO}	60	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	16	Adc
Withstand Current — 10 s	—	20	Adc
Total Device Dissipation @ T_C = 25°C Derate Above 25°C	P_D	320 1.33	Watts W/°C
Storage Temperature Range	T_{stg}	-65 to +200	°C

THERMAL CHARACTERISTICS

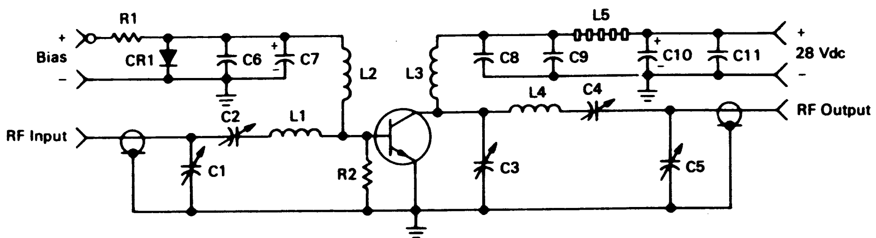
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.75	°C/W

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 200 mAdc, I_B = 0)	$V_{(BR)CEO}$	30	—	—	Vdc
Collector-Emitter Breakdown Voltage (I_C = 100 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	60	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 100 mAdc, I_E = 0)	$V_{(BR)CBO}$	60	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 mAdc, I_C = 0)	$V_{(BR)EBO}$	4.0	—	—	Vdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 5.0 mAdc, V_{CE} = 5.0 Vdc)	h_{FE}	15	35	80	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 28 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	—	350	450	pF
FUNCTIONAL TEST					
Common-Emitter Amplifier Gain (V_{CC} = 28 Vdc, P_{out} = 150 W (PEP) I_C(max) = 6.7 Adc, f = 30; 30.001 MHz)	G_{PE}	10	13	—	dB
Collector Efficiency (V_{CC} = 28 Vdc, P_{out} = 150 W (PEP), I_C(max) = 6.7 Adc, f = 30; 30.001 MHz)	η	40	—	—	%
Intermodulation Distortion (1) (V_{CE} = 28 Vdc, P_{out} = 150 W (PEP))	IMD	—	-33	-30	dB
Electrical Ruggedness (V_{CC} = 28 Vdc, P_{out} = 150 W CW, f = 30 MHz, VSWR 30:1 at all Phase Angles)	No Degradation in Output Power				

(1) To Mil Std 1311 Version A, Test Method 2204B, Two Tone, Reference Each Tone.

FIGURE 1 — 30 MHz TEST CIRCUIT SCHEMATIC



C1, 2, 3, 5 — 170–680 pF, ARCO 469
C4 — 80–480 pF, ARCO 466
C6, 8, 11 — ERIE 0.1 µF, 100 V
C7 — MALLORY 500 µF, 15 V Electrolytic
C9 — Underwood 1000 pF, 350 V
C10 — 100 µF, 35 V Electrolytic
R1 — 10 Ω, 25 Watt Wire Wound
R2 — 10 Ω, 1 Watt Carbon

CR1 — 1N4997
L1 — 3 Turns, #16 Wire, 5/16" I.D., 5/16" Long
L2 — 10 µH Molded Choke
L3 — 12 Turns, #16 Enamaled Wire, Close Wound, 1/4" Dia.
L4 — 5 Turns, 1/8" Copper Tubing, 1/2" I.D., 3/4" Long
L5 — 10 Ferrite Beads — FERROXCUBE #56-590-65/3B

FIGURE 2 — OUTPUT POWER versus INPUT POWER

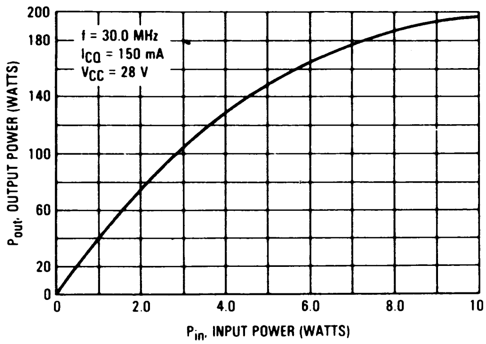


FIGURE 3 — POWER GAIN versus FREQUENCY

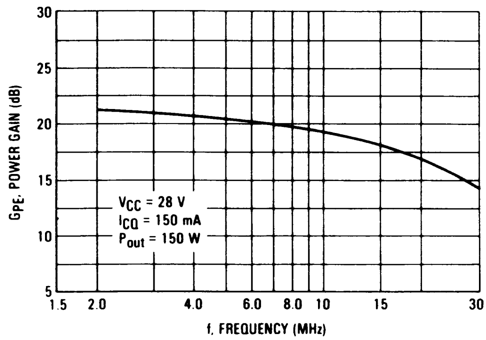


FIGURE 4 — OUTPUT POWER versus SUPPLY VOLTAGE

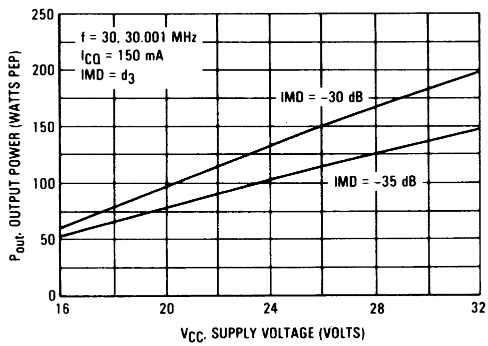


FIGURE 5 — IMD versus P_{out}

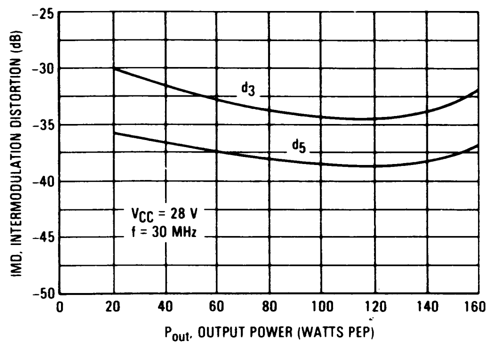


FIGURE 6 — RF SOAR (CLASS AB)
P_{out} versus OUTPUT VSWR

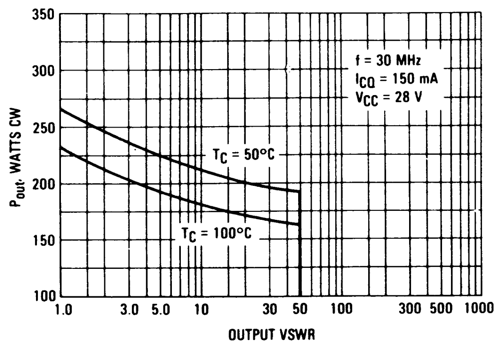


FIGURE 7 — f_T versus COLLECTOR CURRENT

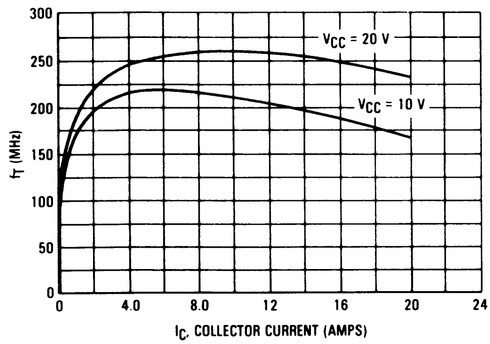


FIGURE 8 — OUTPUT RESISTANCE versus FREQUENCY

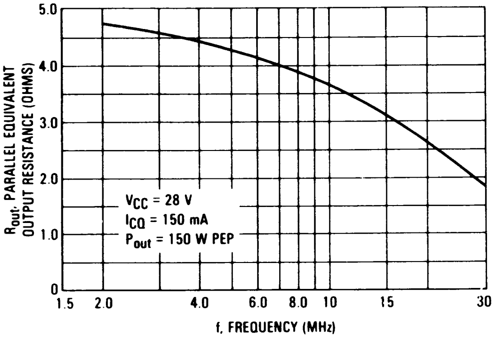
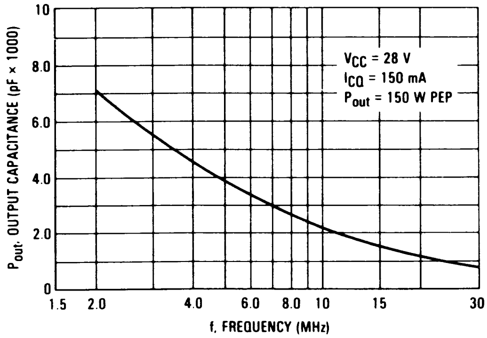
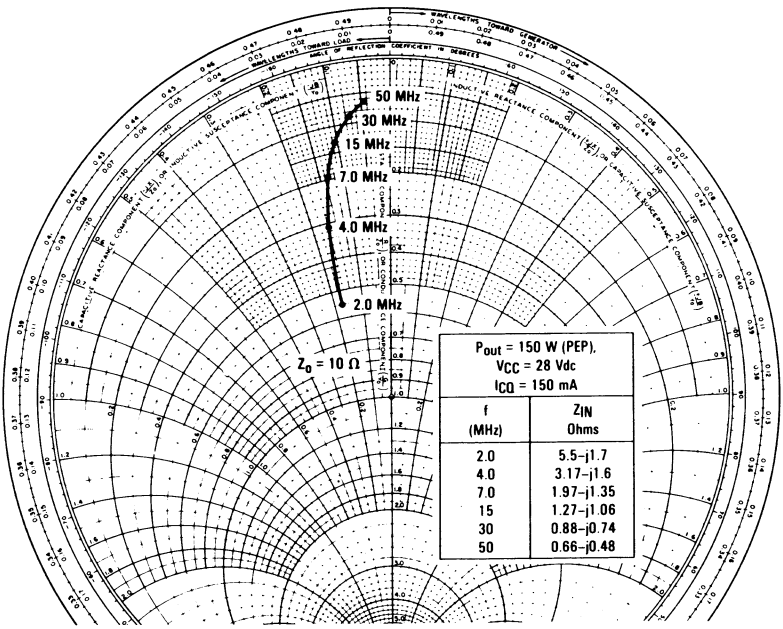


FIGURE 9 — OUTPUT CAPACITANCE versus FREQUENCY



4.1

FIGURE 10 — SERIES EQUIVALENT INPUT IMPEDANCE



f (MHz)	Z_{IN} Ohms
2.0	5.5−j1.7
4.0	3.17−j1.6
7.0	1.97−j1.35
15	1.27−j1.06
30	0.88−j0.74
50	0.66−j0.48

MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

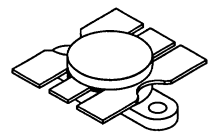
MRF650

The RF Line
NPN Silicon
RF Power Transistor

. . . designed for 12.5 Volt UHF large-signal amplifier applications in industrial and commercial FM equipment operating to 520 MHz.

- Guaranteed 440, 470, 512 MHz 12.5 Volt Characteristics
  Output Power = 50 Watts
  Minimum Gain = 5.2 dB @ 440, 470 MHz
  Efficiency = 55% @ 440, 470 MHz
  IRL = 10 dB
- Characterized with Series Equivalent Large-Signal Impedance Parameters from 400 to 520 MHz
- Built-In Matching Network for Broadband Operation
- Triple Ion Implanted for More Consistent Characteristics
- Implanted Emitter Ballast Resistors
- Silicon Nitride Passivated
- 100% Tested for Load Mismatch Stress at all Phase Angles with 20:1 VSWR @ 15.5 Vdc, 2.0 dB Overdrive

50 W, 512 MHz
RF POWER
TRANSISTOR
NPN SILICON



CASE 316-01, STYLE 1

2

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	16.5	Vdc
Collector-Emitter Voltage	V_{CES}	38	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	12	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	135 0.77	Watts W/°C
Storage Temperature Range	T_{stg}	−65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.3	°C/W

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

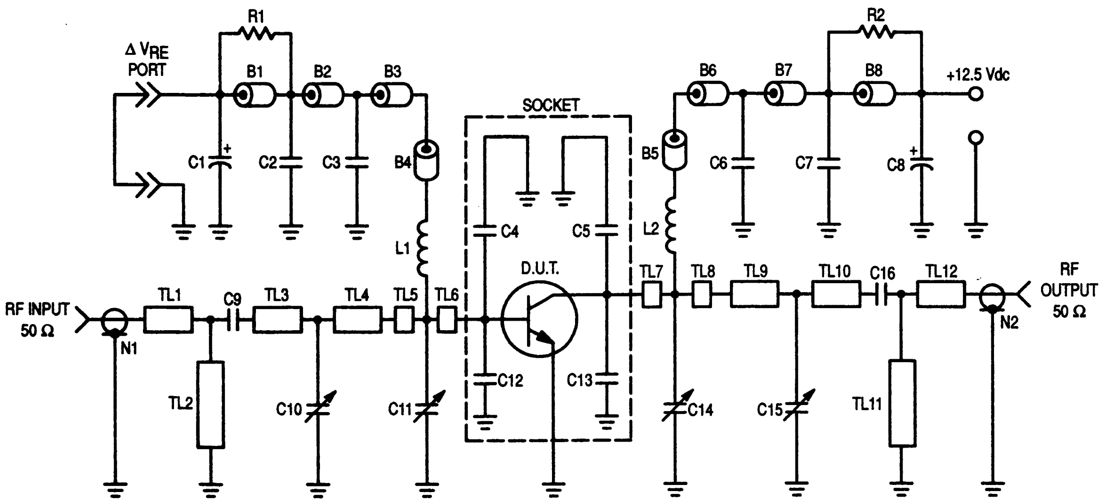
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 50 mAdc, I_B = 0)	$V_{(BR)CEO}$	16.5	—	—	Vdc
Collector-Emitter Breakdown Voltage (I_C = 50 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	38	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 mAdc, I_C = 0)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current (V_{CE} = 15 Vdc, V_{BE} = 0, T_C = 25°C)	I_{CES}	—	—	5.0	mAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 5.0 Adc, V_{CE} = 5.0 Vdc)	h_{FE}	20	70	120	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 12.5 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	—	135	170	pF

(continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
FUNCTIONAL TESTS (In Motorola Test Fixture. See Figure 1.)					
Common-Emitter Amplifier Power Gain (V_{CC} = 12.5 Vdc, P_{out} = 50 W, f = 440, 470 MHz)	G_{pe}	5.2	6.1	—	dB
Common-Emitter Amplifier Power Gain (V_{CC} = 12.5 Vdc, P_{out} = 50 W, f = 512 MHz)	G_{pe}	5.0	5.9	—	dB
Input Return Loss (V_{CC} = 12.5 Vdc, P_{out} = 50 W, f = 440, 470, 512 MHz)	IRL	10	15	—	dB
Collector Efficiency (V_{CC} = 12.5 Vdc, P_{out} = 50 W, f = 440, 470 MHz)	η	55	65	—	%
Collector Efficiency (V_{CC} = 12.5 Vdc, P_{out} = 50 W, f = 512 MHz)	—	50	60	—	%
Output Mismatch Stress (V_{CC} = 15.5 V, 2.0 dB Overdrive, f = 470 MHz, VSWR = 20:1, All Phase Angles) (1)	ψ (2)	No Degradation in Output Power			

NOTES:
1. P_{in} = 2.0 dB above drive requirement for 50 W output at 12.5 Vdc.
2. ψ = Mismatch stress factor — the electrical criterion established to verify the device resistance to load mismatch failure. The mismatch stress test is accomplished in the standard test fixture (Figure 1) terminated in a 20:1 minimum load mismatch at all phase angles.



B1, B8 — Ferrite Bead Ferroxcube VK200 20-4B
B2, B3, B4, B5, B6, B7 — Ferrite Bead Ferroxcube #56-590-3B
C1, C8 — 10 µF, 25 V, 25%, Electrolytic, ECS TE-1204
C2, C7 — 1000 pF, Chip Cap, 5%, ATC 100B102JC50
C3, C6 — 91 pF, 5%, Mica, SAHA 3HS0006-91
C4, C5, C12, C13 — 36 pF, 5%, SAHA 3HS0006-36
C9, C16 — 220 pF, Chip Cap, 5%, ATC 100B221JC200
C10, C11, C15 — 0.8–10 pF, Variable, Johanson JMC501 PG26J200
C14 — 1.0–20 pF, Variable, Johanson JMC5501 PG26J200
L1, L2 — 3 Turns, 18 AWG, 0.19″ ID — Total Length 3.5″
N1, N2 — N Coaxial Conn., Omni-Spectra 3052-1648-10
R1, R2 — 10 Ohm, 10%, 1.0 W, Carbon, RCA 831010

TL1, TL12 — Z_o = 50 Ohm
TL2 — See Photomaster
TL3 — See Photomaster
TL4 — See Photomaster
TL5 — See Photomaster
TL6 — See Photomaster
TL7 — See Photomaster
TL8 — See Photomaster
TL9 — See Photomaster
TL10 — See Photomaster
TL11 — See Photomaster

Transmission Line Boards: 1/16″ Glass-Teflon
Keene GX-0600-55-22
2 oz. Cu Clad Both Sides
ε_r = 2.55

Bias Boards: 1/16″ G10 or Equivalent
2 oz. Cu Clad Double Sided

Figure 1. 440 to 512 MHz Broadband Test Circuit Schematic

2

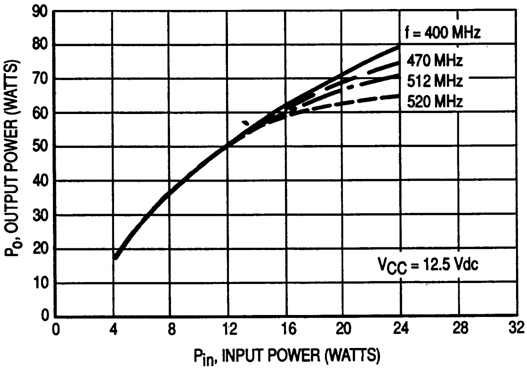


Figure 2. Output Power versus Input Power

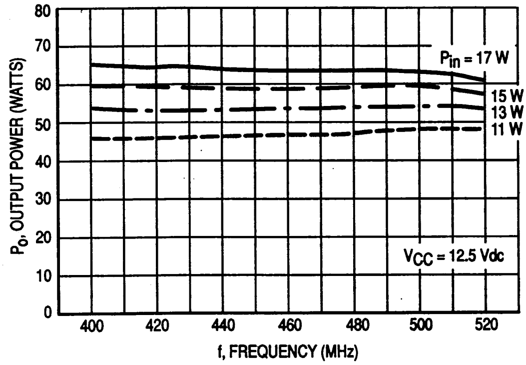


Figure 3. Output Power versus Frequency

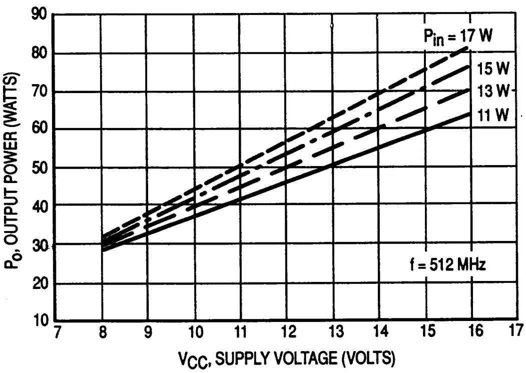


Figure 4. Output Power versus Supply Voltage

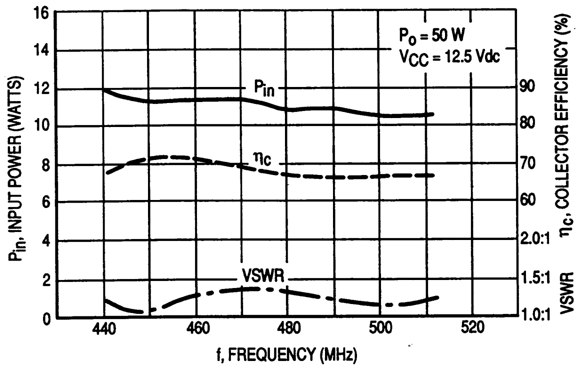
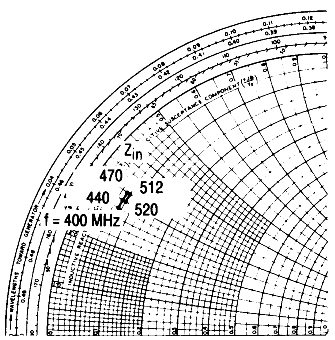


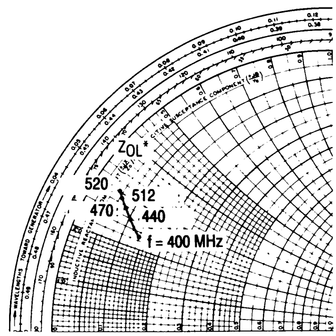
Figure 5. Broadband Performance for P_o = 50 W



P_o = 50 W, V_{CC} = 12.5 Vdc

TUNED FOR MAXIMUM GAIN AT P_o = 50 W

f (MHz)	Z_{in} Ω	Z_{OL}* Ω
400	0.7 + j2.8	1.4 + j2.3
440	0.7 + j3.2	1.1 + j2.6
470	0.8 + j3.3	0.8 + j2.7
512	0.8 + j3.2	0.7 + j2.9
520	0.7 + j3.0	0.6 + j3.0



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

Figure 6. Input and Output Impedance Normalized to 10 Ohms Circuit Tuned for Maximum Gain @ P_o = 50 W

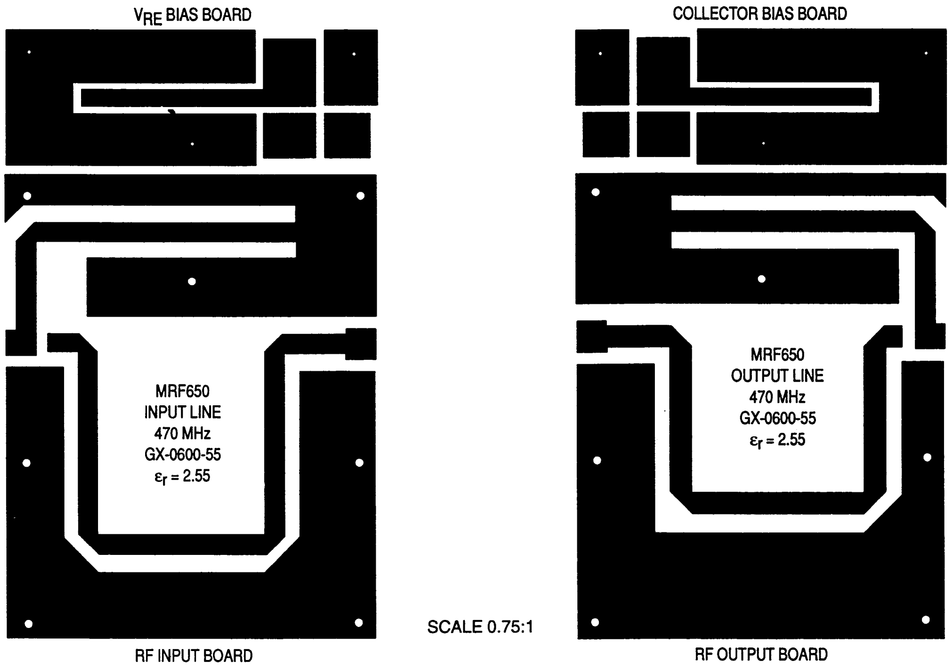


Figure 7. Photomaster for Broadband Test Circuit

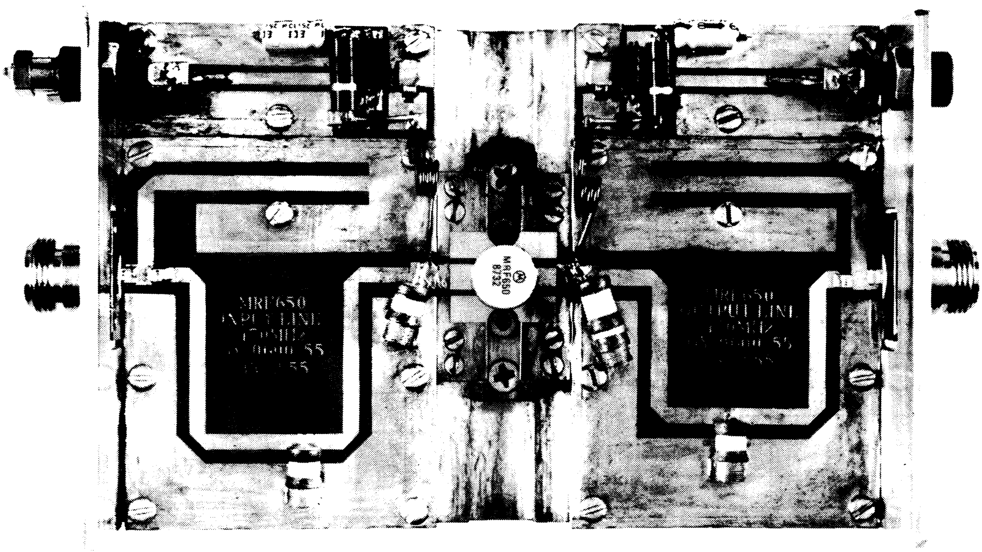
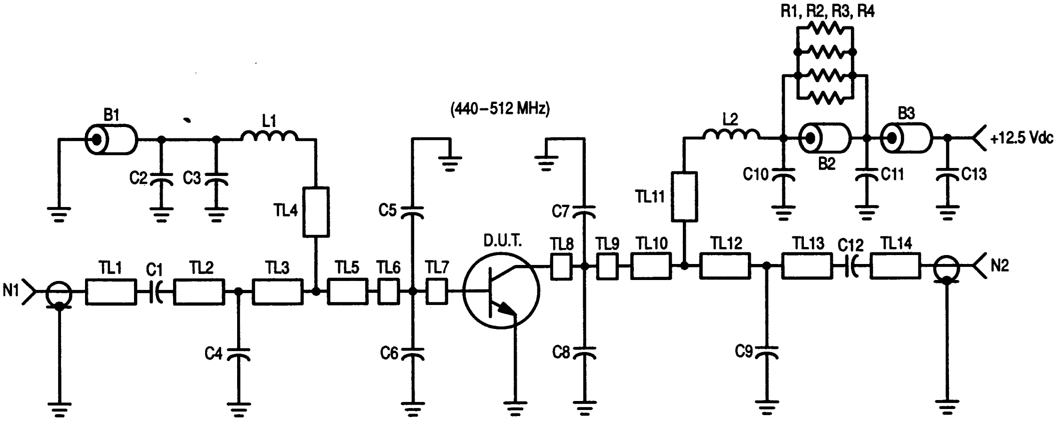


Figure 8. 440–512 MHz Broadband Test Circuit

2



B1, B2 — Ferrite Bead Fair Rite Products Corp.
B3 — Ferrite Bead Fair Rite Products Corp.
C2, C11 — 820 pF, 5%
C3, C10 — 91 pF, 5%, Mica, SAHA 3HS0006-91
C1, C12 — 220 pF, 5%, Murata Erie
C4 — 9.1 pF, 5%, Murata Erie
C5, C6, C7, C8 — 43 pF, 5%, Mica SAHA 3HS0006-43
C9 — 10 pF, 5%, Murata Erie
C13 — 10 μF, Electrolytic, 50 V, Panasonic
L1 — 7 Turns, 24 AWG, ID Dia. 0.116″
L2 — 5 Turns, 18 AWG, ID Dia. 0.165″
N1, N2 — SMA Flange Mount, Omni-Spectra 2052-1618-02

R1, R2, R3, R4 — 39 Ohm 1/8 W 5% Rohm
TL1 — Z_O = 50 Ohm
TL2 — Z_O = 50 Ohm
TL3 — Z_O = 50 Ohm
TL4 — See Photomaster
TL5 — Z_O = 50 Ohm
TL6 — See Photomaster
TL7 — See Photomaster
TL8 — See Photomaster
TL9 — See Photomaster
TL10 — Z_O = 50 Ohm
TL11 — See Photomaster
TL12 — Z_O = 50 Ohm
TL13 — Z_O = 50 Ohm
TL14 — Z_O = 50 Ohm
Board Material: 1/16″ G10, ε_r = 4.5
2 oz. Cu Clad Both Sides

Figure 9. Schematic of Broadband Demonstration Amplifier (3)

PERFORMANCE CHARACTERISTICS OF BROADBAND DEMONSTRATION AMPLIFIER

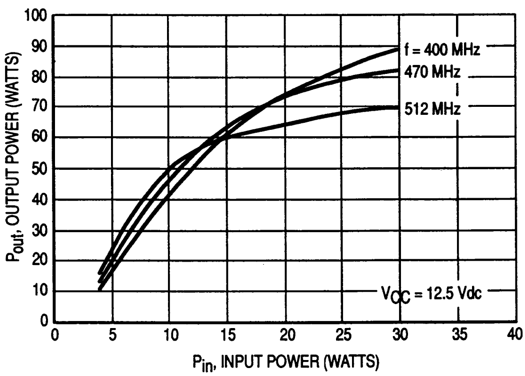


Figure 10. Output Power versus Input Power

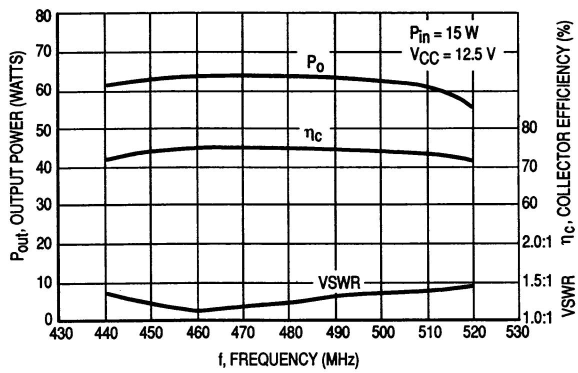


Figure 11. P_o, η_c and VSWR versus Frequency

(3) Detailed design and performance information available from Motorola upon request.

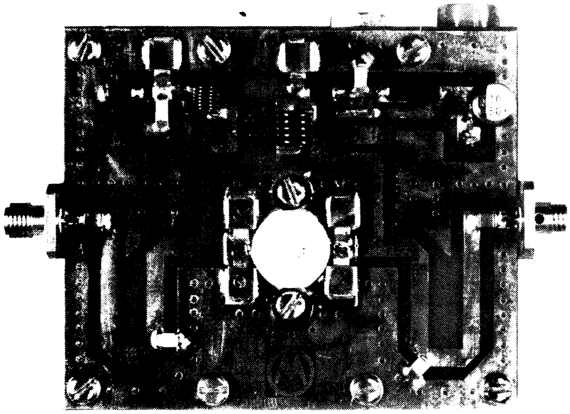
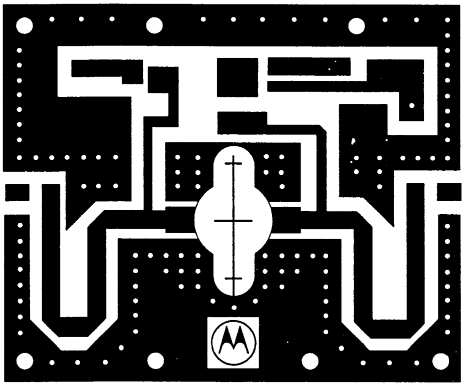


Figure 12. 440–512 MHz Broadband Demonstration Amplifier



SCALE 0.75:1

Figure 13. Photomaster for 440–512 MHz Broadband Demonstration Amplifier

MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

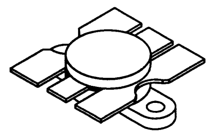
MRF658

The RF Line
NPN Silicon RF Power Transistor

Designed for 12.5 Volt UHF large-signal, common emitter, class-C amplifier applications in industrial and commercial FM equipment operating to 520 MHz.

- Specified 12.5 Volt, 512 MHz Characteristics
  Output Power = 65 Watts
  Minimum Gain = 4.15 dB
  Minimum Efficiency = 50%
- Characterized with Series Equivalent Large-Signal Impedance Parameters from 400 to 520 MHz
- Built-In Matching Network for Broadband Operation
- Triple Ion Implanted for More Consistent Characteristics
- Implanted Emitter Ballast Resistors for Improved Ruggedness
- Silicon Nitride Passivated
- Capable of Surviving Load Mismatch Stress at all Phase Angles with 20:1 VSWR @ 15.5 Vdc and 2.0 dB Overdrive

65 W, 512 MHz
RF POWER TRANSISTOR
NPN SILICON



CASE 316-01, STYLE 1

2

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	16.5	Vdc
Collector-Emitter Voltage	V_{CES}	38	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	15	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	175 1.0	Watts W/°C
Storage Temperature Range	T_{stg}	– 65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.0	°C/W

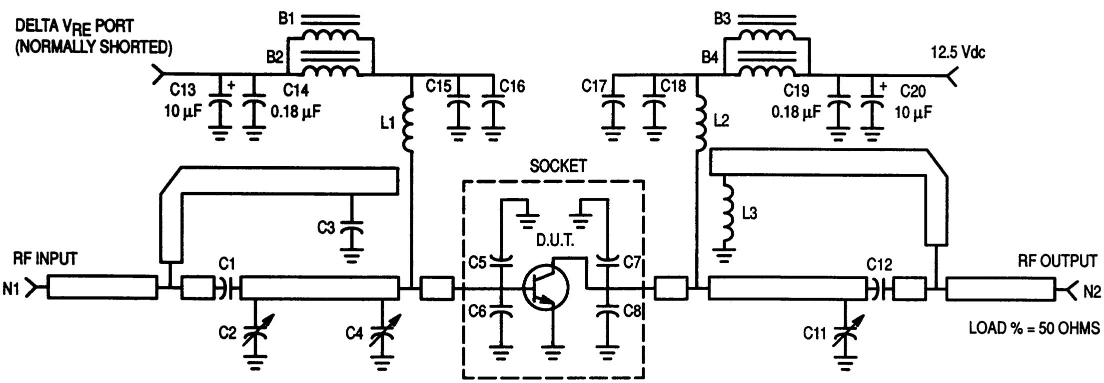
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 50 mAdc, I_B = 0)	$V_{(BR)CEO}$	16.5	29	—	Vdc
Collector-Emitter Breakdown Voltage (I_C = 50 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	38	45	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 mAdc, I_C = 0)	$V_{(BR)EBO}$	4.0	4.6	—	Vdc
Collector Cutoff Current (V_{CE} = 15 Vdc, V_{BE} = 0, T_C = 25°C)	I_{CES}	—	0.1	10	mAdc

(continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS					
DC Current Gain (I_C = 10 Adc, V_{CE} = 5.0 Vdc)	h_{FE}	40	85	120	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 12.5 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	—	170	220	pF
FUNCTIONAL TESTS (In Motorola Test Fixture. See Figure 1.)					
Output Power (V_{CC} = 12.5 Vdc, P_{in} = 25 W, f = 470 & 512 MHz)	P_{out}	65	—	—	W
Collector Efficiency (V_{CC} = 12.5 Vdc, P_{out} = 65 W, f = 470 & 512 MHz)	η	50	60	—	%
Output Mismatch Stress (V_{CC} = 15.5 Vdc, P_{in} = 32 W, f = 512 MHz, VSWR 20:1, All Phase Angles)	ψ	No Degradation in Output Power			
Input Return Loss (P_o = 65 W, f = 470 & 512 MHz, V_{CC} = 12.5 V)	IRL	10	15	—	dB



B1–B4 — Long Bead, Fair Rite (2743019446)
C1 — 56 pF, Chip Capacitor, Murata Erie
C2 — 1–20 pF Trimmer, Johanson-JMC 5501 PG26J200
C3 — 39 pF, Chip Capacitor, Murata Erie
C4 — 1–20 pF Trimmer, Johanson-JMC 5501
C5 — 33 pF, Miniature Clamped Mica, SAHA
C6 — 33 pF, Miniature Clamped Mica, SAHA
C7 — 33 pF, Miniature Clamped Mica, SAHA
C8 — 27 pF, Miniature Clamped Mica, SAHA
C11 — 1–20 pF Trimmer, Johanson-JMC 5501 PG26J200
C12 — 110 pF, Chip Capacitor, Murata Erie
C13 — 10 µF, 50 V Electrolytic, Panasonic-ECEV1HV100R
C14 — 0.18 µF Chip Capacitor
C15 — 130 pF, Chip Capacitor, Murata Erie
C16 — 130 pF, Chip Capacitor, Murata Erie
C17 — 130 pF, Chip Capacitor, Murata Erie
C18 — 130 pF, Chip Capacitor, Murata Erie
C19 — 0.18 µF Chip Capacitor
C20 — 10 µF, 50 V Electrolytic, Panasonic-ECEV1HV100R
Board — 1/16″ Glass Teflon, ε_r = 2.55, Keene (GX-0600-55-22)
L1, L2 — 5 Turns, 20 AWG, ID 0.126″
L3 — 2 Turns, 26 AWG, ID 0.073″
N1, N2 — Type N Flange, Omni Spectra (3052-1648-10)

Murata Erie Chip Capacitors —
GRH710COGxxxx100VBE
SAHA Mini Clamped Mica Capacitors — 3HS0006-xx

Figure 1. 512 MHz Test Circuit

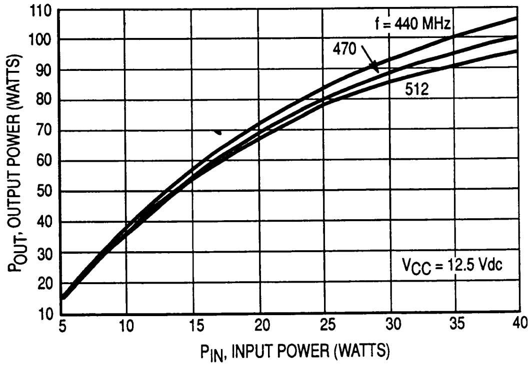


Figure 2. Output Power versus Input Power

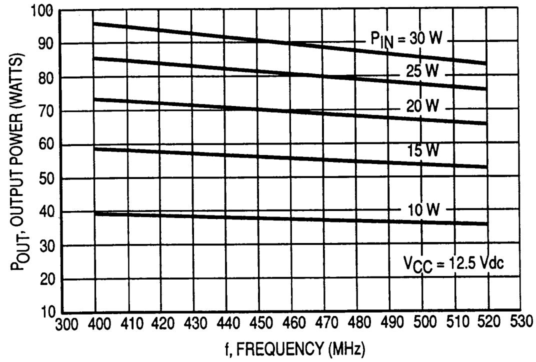


Figure 3. Output Power versus Frequency

2

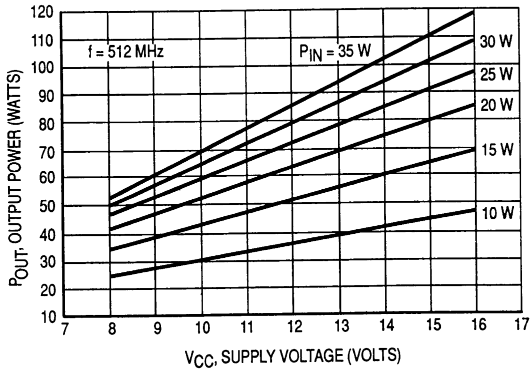
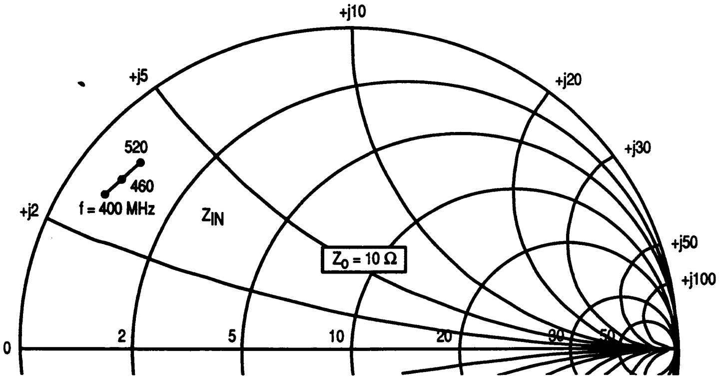
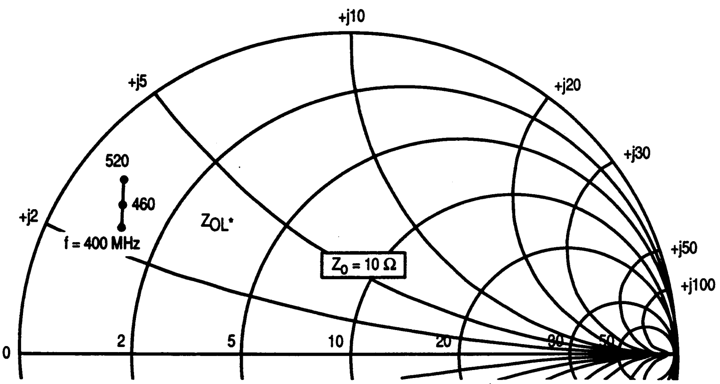


Figure 4. Output Power versus Supply Voltage



V_{CC} = 12.5 V P_o = 70 W

f MHz	ZIN OHMS	Z_{OL}* OHMS
400	0.62 + j2.8	1.20 + j2.5
440	0.72 + j3.1	1.10 + j2.8
480	0.81 + j3.3	0.94 + j3.1
520	0.90 + j3.6	0.80 + j3.4



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

Figure 5. Series Equivalent Input and Output Impedances

MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

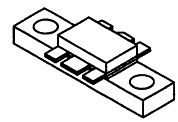
MRF847

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 806–960 MHz.

- Specified 12.5 Volt, 870 MHz Characteristics
  Output Power = 45 Watts
  Power Gain = 4.5 dB Min
  Efficiency = 60% Min
- Series Equivalent Large-Signal Characterization
- Internally Matched Input for Broadband Operation
- Tested for Load Mismatch Stress at All Phase Angles with 10:1 VSWR @ High Line and Rated Drive
- Gold Metallized, Emitter Ballasted for Long Life and Resistance to Metal Migration
- Silicon Nitride Passivated

45 W, 870 MHz
RF POWER TRANSISTOR
NPN SILICON



CASE 319, STYLE 1

2

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	16.5	Vdc
Collector-Base Voltage	V_{CBO}	38	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	12	Adc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	150 0.85	Watts W/°C
Storage Temperature Range	T_{stg}	−65 to +150	°C
Junction Temperature	T_J	200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.17	°C/W

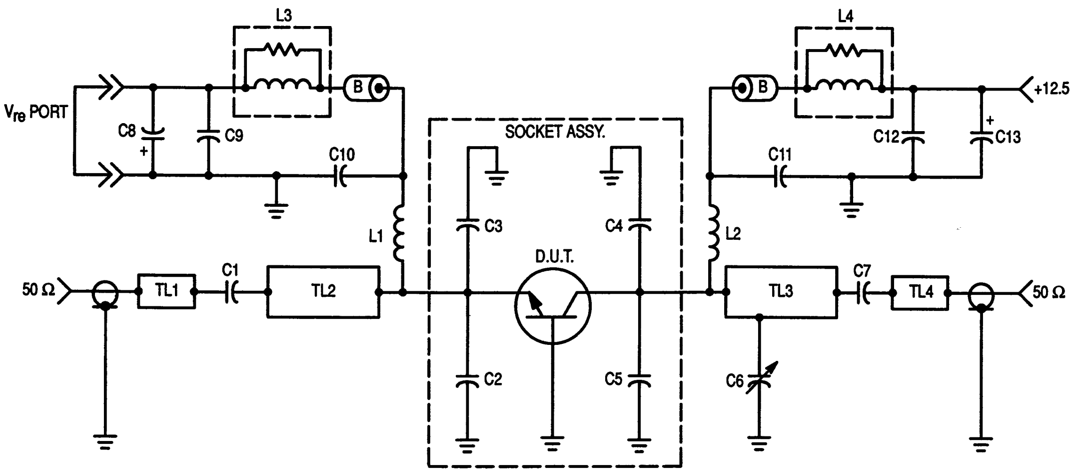
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Emitter-Base Breakdown Voltage (I_E = 5.0 mAdc, I_C = 0)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector-Emitter Breakdown Voltage (I_C = 50 mAdc, I_B = 0)	$V_{(BR)CEO}$	16.5	—	—	Vdc
Collector-Emitter Breakdown Voltage (I_C = 50 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	38	—	—	Vdc
Collector Cutoff Current (V_{CE} = 15 Vdc, V_{BE} = 0)	I_{CES}	—	—	10	mAdc

(continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS					
DC Current Gain (I_C = 2.0 Adc, V_{CE} = 5.0 Vdc)	h_{FE}	40	65	120	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 12.5 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	—	75	90	pF
FUNCTIONAL TESTS					
Common-Base Amplifier Power Gain (V_{CC} = 12.5 Vdc, P_{out} = 45 W, f = 870 MHz)	G_{PB}	4.5	5.5	—	dB
Collector Efficiency (V_{CC} = 12.5 Vdc, P_{out} = 45 W, f = 870 MHz)	η_c	60	68	—	%
Load Mismatch (V_{CC} = 15.5 Vdc, P_{in} = 16 W, f = 870 MHz, VSWR = 10:1, All Phase Angles)	ψ	No Degradation in Output Power			



C1 — 51 pF, 100 mil Chip Capacitor
C2 — 12 pF, Mini-Underwood
C3 — 11 pF, Mini-Underwood
C4, C5 — 21 pF, Mini-Underwood
C6 — 0.08–8.0 pF Johansen Gigatrim
C7 — 47 pF, 100 mil Chip Capacitor
C8, C13 — 10 µF, 25 WV Electrolytic Capacitor
C9, C12 — 1000 pF Unelco J101
C10, C11 — 91 pF Mini-Underwood
L1, L2 — 4 Turns #18 Enameled, 200 mil ID
L3, L4 — 12 Turns #22 Enameled, Wound Over 10 Ω Resistor
TL1, TL4 — 50 Ω Microstrip Line
TL2 — Microstrip (Z_o = 38 ohms, λ/4 @ 838 MHz)
TL3 — Microstrip (Z_o = 28 ohms, λ/4 @ 838 MHz)
Board Material — 0.032″ Glass-Teflon, 2 oz. cu. clad, ε_r = 2.56
B — Ferrite Bead, Ferroxcube 56-590-65-3B

Figure 1. 806–870 MHz Broadband Test Circuit

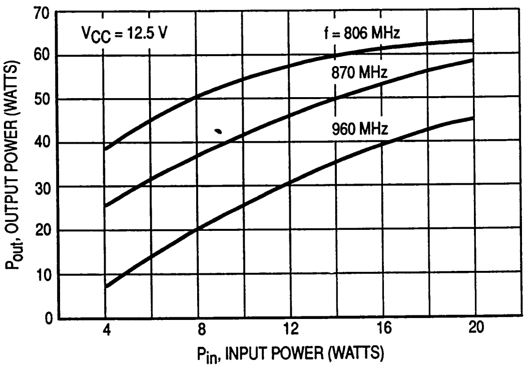


Figure 2. Output Power versus Input Power

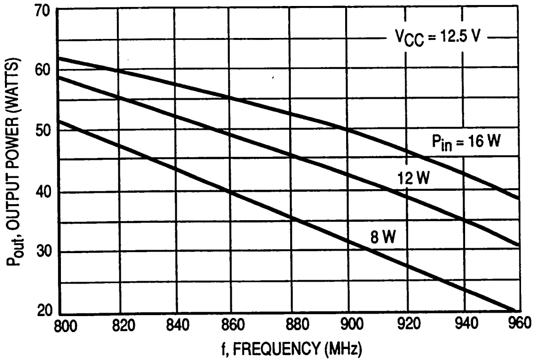


Figure 3. Output Power versus Frequency

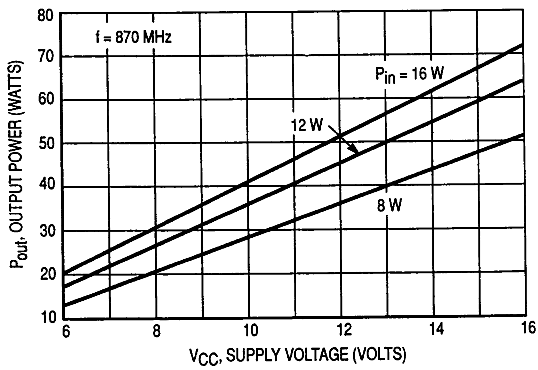


Figure 4. Output Power versus Supply Voltage

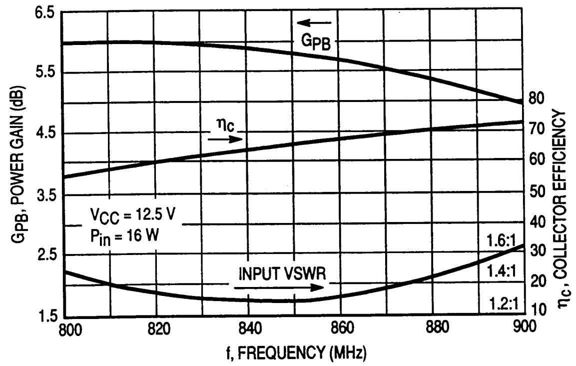
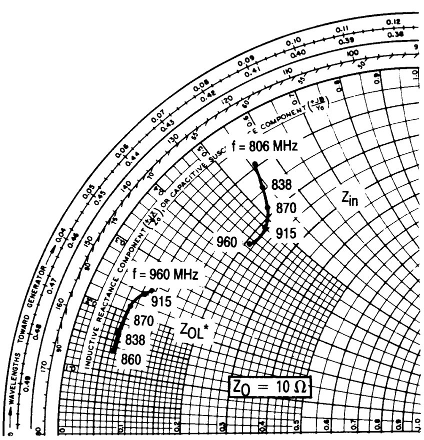


Figure 5. Typical Broadband Circuit Performance



V_{CC} = 12.5 Vdc, P_{in} = 16 W, P_{out} = 45 W

f MHz	Z_{in} (Ohms)		f MHz	Z_{OL}* (Ohms)	
806	0.99	+ j5.52	806	0.67	+ j1.33
838	1.48	+ j5.47	838	0.68	+ j1.66
870	1.79	+ j5.25	870	0.72	+ j2.16
915	2.12	+ j4.80	915	0.83	+ j2.40
960	2.11	+ j4.28	960	0.99	+ j2.50

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

Figure 6. Series Equivalent Input/Output Impedances