MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

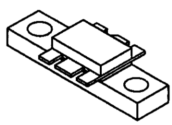
TP3021

The RF Line
UHF Power Transistor

The TP3021 is designed for 24 V common emitter base station amplifiers. Operating in the 820–960 MHz bandwidth, it has been specifically designed for use in analog and digital (GSM) systems as a medium power output device.

- Specified 24 Volts, 960 MHz Characteristics
  Output Power = 10 Watts
  Minimum Gain = 10 dB
  Class AB
  I_Q = 60 mA

10 W, 960 MHz
UHF POWER
TRANSISTOR
NPN SILICON



CASE 319, STYLE 2

2

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	27	Vdc
Collector-Base Voltage	V_{CBO}	48	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	2.0	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	35 0.35	Watts W/°C
Storage Temperature Range	T_{stg}	−65 to +150	°C
Operating Junction Temperature	T_J	200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case (1) at 70°C Case	$R_{\theta JC}$	5.0	°C/W

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

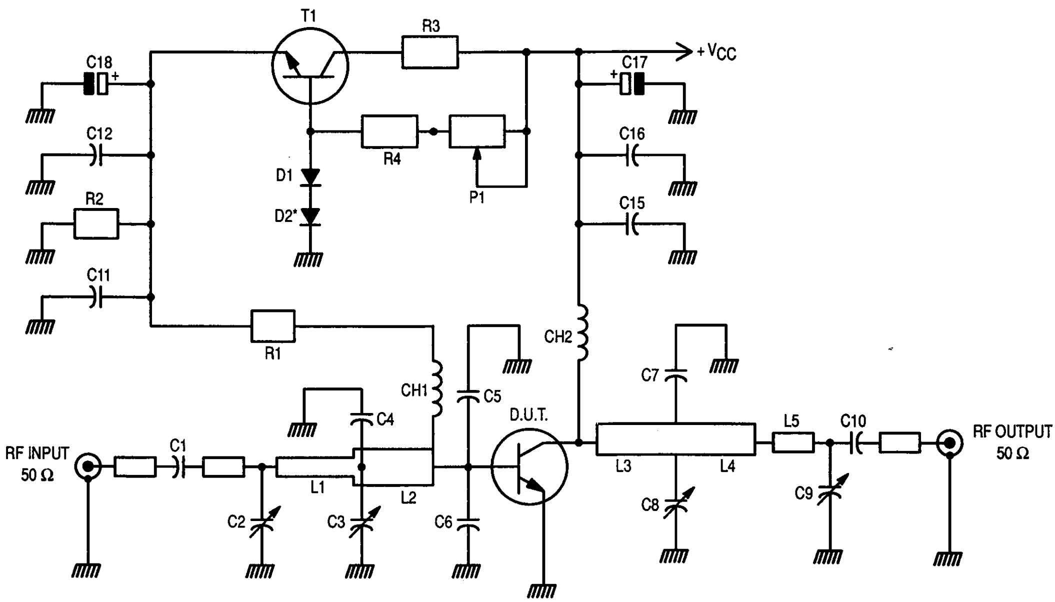
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 25 mA, R_{BE} = 75 Ω)	$V_{(BR)CER}$	40	—	—	Vdc
Emitter-Base Breakdown Voltage (I_C = 5.0 mAdc)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector-Base Breakdown Voltage (I_E = 50 mAdc)	$V_{(BR)CBO}$	48	—	—	Vdc
Collector-Emitter Leakage (V_{CE} = 26 V, R_{BE} = 75 Ω)	I_{CER}	—	—	5.0	mA
ON CHARACTERISTICS					
DC Current Gain (I_C = 1.0 Adc, V_{CE} = 10 Vdc)	h_{FE}	15	—	100	—

NOTE:
1. Thermal resistance is determined under specified RF operating condition.

(continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 24 V, I_E = 0, f = 1.0 MHz)	C_{ob}	15	—	25	pF
FUNCTIONAL TESTS					
Common-Emitter Amplifier Power Gain (V_{CC} = 24 V, P_{out} = 10 W, I_{CQ} = 60 mA, f = 960 MHz)	G_p	10	—	—	dB
Load Mismatch (V_{CC} = 26 V, P_{out} = 10 W, I_{CQ} = 60 mA, Load VSWR = 20:1, at all phase angles)	ψ	No Degradation in Output Power Before and After Test			
Collector Efficiency (V_{CC} = 24 V, P_{out} = 10 W, f = 960 MHz)	η_c	50	55	—	%



*D2 is in Physical Contact with RF Transistor
C1, C10, C11, C15 — Capacitor Chip 0805 330 pF 5%
C2, C4, C8, C9 — Trimmer Capacitor 0.5–4.0 pF
C4 — Capacitor Chip 0805 3.9 pF 5%
C5, C6 — Capacitor Chip 15 pF HQ
C7 — Chip Resistor 0805 8.2 pF
C12, C16 — Capacitor Chip 0805 15 nF 5%
C17, C18 — Capacitor Chip 0805 6.0, 8.0 μF 35 V
CH1 — Microstrip Line 80 Ω L = 40 mm
CH2 — Microstrip Line 80 Ω L = 23 mm
D1, D2 — Diode 1N4148
L1 — Microstrip Line 50 Ω L = 20 mm
L2 — Microstrip Line 25 Ω L = 13 mm
L3 — Microstrip Line 25 Ω L = 10 mm
L4 — Microstrip Line 50 Ω L = 5 mm
L5 — Microstrip Line 50 Ω L = 7 mm
P1 — Trimmer 5.0 kΩ
R1 — Chip Resistor 2.2 Ω 1206 5%
R2 — Chip Resistor 75 Ω 0805 5%
R3 — Resistor 100 Ω 2.0 W
R4 — Resistor 1.0 kΩ 5%
T1 — Transistor BD135 or Similar
Board Material — 1/50″, Teflon Glass, Cu Clad 2 Sides, 35 μm Thick

Figure 1. 960 MHz Test Circuit

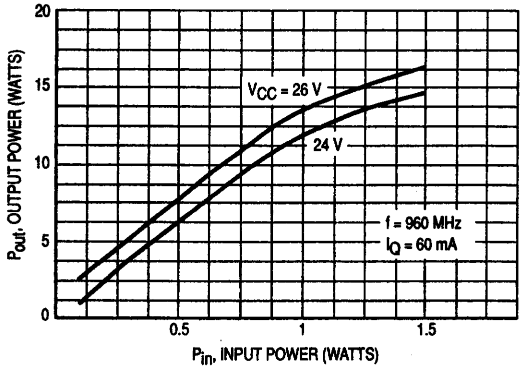
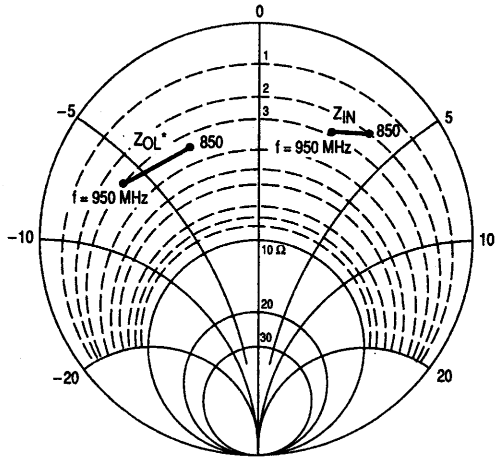


Figure 2. Output Power versus Input Power



P_{out} = 10 W V_{CE} = 24 V

f MHz	Z_{IN} OHMS	Z_{OL}* OHMS
850	2.4 + j3.5	3.4 – j3.2
900	2.6 + j3.4	3.1 – j4.4
950	2.8 + j3.4	2.7 – j6.2

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

Figure 3. Series Equivalent Input/Output Impedances

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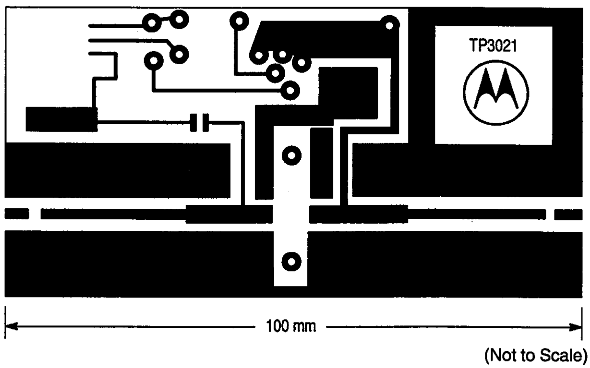


Figure 4. Test Circuit — Photomaster

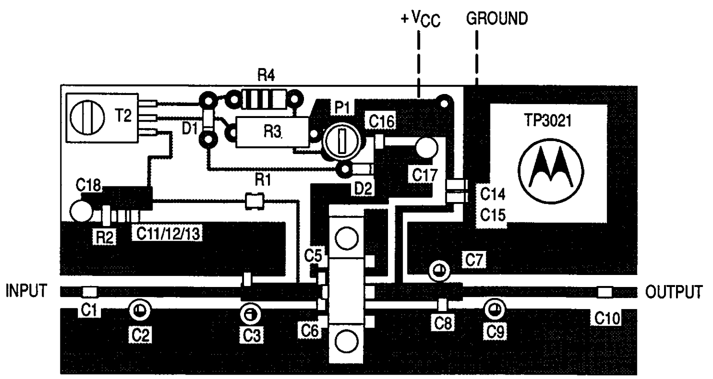


Figure 5. Test Circuit — Component Locations

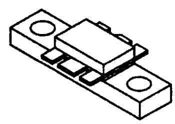
TP3032

The RF Line
NPN Silicon
RF Power Transistor

The TP3032 is designed for 26 volts, common emitter, 960 MHz base station amplifiers, for use in analog and digital systems.

- Specified 26 Volts, 960 MHz Characteristics
  Output Power — 21 Watts
  Gain — 7.5 dB min
- Silicon Nitride Passivated
- Gold Metallized, Emitter Ballasted for Long Life and Resistance to Metal Migration
- Class AB Operation

**21 W, 960 MHz
RF POWER TRANSISTOR
NPN SILICON**



CASE 319, STYLE 2

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MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CER}	40	Vdc
Collector-Base Voltage	V_{CBO}	48	Vdc
Emitter-Base Voltage	V_{EBO}	3.5	Vdc
Collector-Current — Continuous	I_C	4	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	52.5 0.3	Watts W/°C
Storage Temperature Range	T_{stg}	– 65 to +150	°C
Operating Junction Temperature	T_J	200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case (1)	$R_{\theta JC}$	3.3	°C/W

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

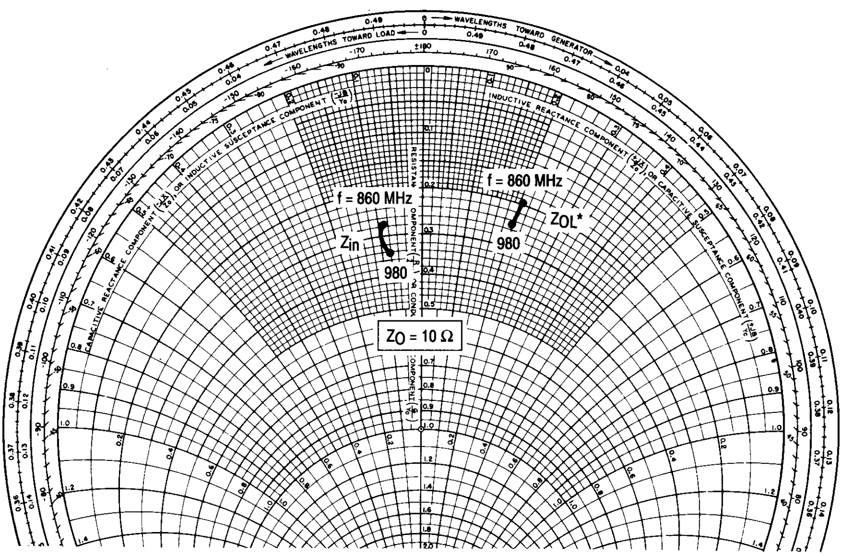
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 30 mA, R_{BE} = 75 Ω)	$V_{(BR)CER}$	40	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 5 mAdc)	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 30 mAdc)	$V_{(BR)CBO}$	48	—	—	Vdc
Collector-Emitter Leakage (V_{CE} = 26 V, R_{BE} = 75 Ω)	I_{CER}	—	—	8	mA
ON CHARACTERISTICS					
DC Current Gain (I_C =1 Adc, V_{CE} = 10 Vdc)	h_{FE}	15	—	80	—

NOTE:
1. Thermal resistance is determined under specified RF operating condition.

(continued)

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

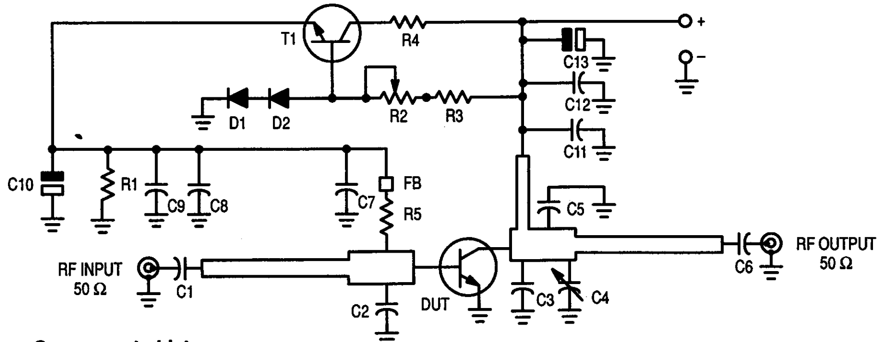
Characteristic	Symbol	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 26 V, I_E = 0, f = 1 MHz)	C_{ob}	—	30	—	pF
FUNCTIONAL TESTS					
Common-Emitter Amplifier Gain (V_{CC} = 26 V, P_{out} = 21 W, I_{CQ} = 100 mA, f = 960 MHz)	G_p	7.5	8.5	—	dB
Load Mismatch (V_{CC} = 26 V, P_{out} = 21 W, I_{CQ} = 100 mA, Load VSWR = 5:1, at All Phase Angles at Frequency of Test)	ψ	No Degradation in Output Power			
Collector Efficiency (V_{CC} = 26 V, P_{out} = 21 W, f = 960 MHz)	η	50	55	—	%
Over Drive (V_{CC} = 26 V, P_{in} = 6 W, f = 960 MHz)	OD	No Degradation in Output Power			



	V_{CE} = 26 V	P_{out} = 21 W
f (MHz)	**Z_{in} (Ω)**	**Z_{OL}* (Ω)**
860	2.9 - j0.4	2 + j2.2
880	2.9 - j0.9	2.1 + j2.2
900	2.9 - j1.45	2.25 + j2.5
935	3.2 - j0.95	2.4 + j2.3
960	3.25 - j1.5	2.5 + j2
980	3.55 - j1.1	2.6 + j2.15

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

Figure 1. Series Equivalent Input and Output Impedances



Components List

C1	300 pF, ATC Chip Capacitor 100B	D1,D2	Diode, 1N4148
C2	12 pF, ATC Chip Capacitor 100A	FB	Ferrite Bead
C3	10 pF, ATC Chip Capacitor 100A	R1	75 Ω, Chip Resistor 1206
C4	1−4.5 pF, Johanson Capacitor 9410-0	R2	10 kΩ, Trimmer Resistor
C5	6.8 pF, ATC Chip Capacitor 100A	R3	1 kΩ, 1/2 W, Resistor
C6	82 pF, ATC Chip Capacitor 100B	R4	82 Ω, 3 W, Resistor
C7,C8,C11	330 pF, Chip Capacitor	R5	1 Ω, 1/4 W, Resistor
C9,C12	15 nF, Chip Capacitor	T1	Transistor, BD135
C10,C13	6.8 μF, 35 V, Tantalum Capacitor		

Figure 2. 960 MHz Test Circuit Schematic

TYPICAL CHARACTERISTICS

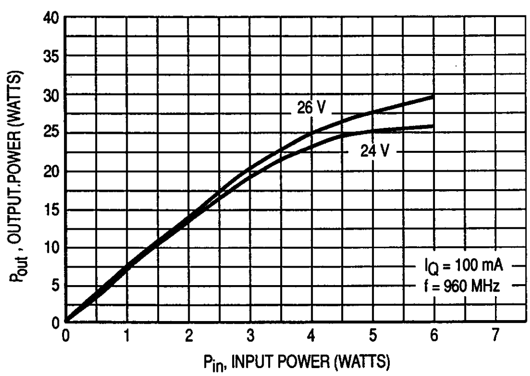


Figure 3. Output Power versus Input Power

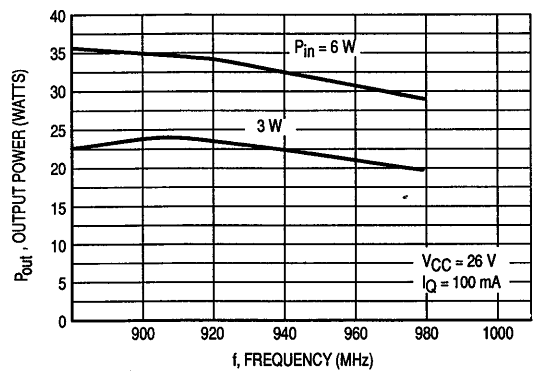


Figure 4. Output Power versus Frequency

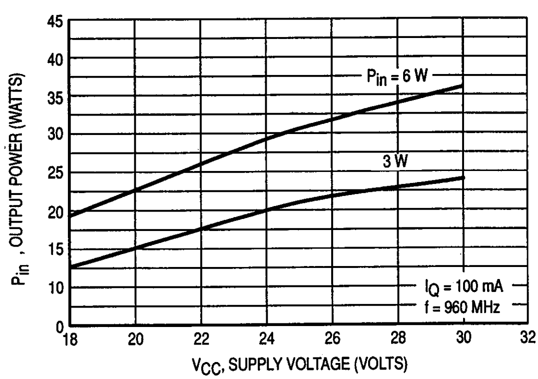
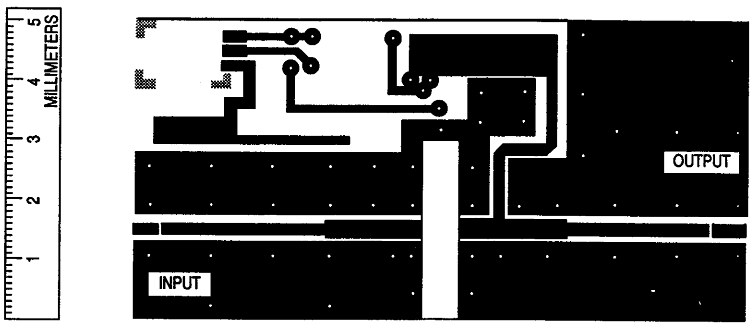


Figure 5. Output Power versus Supply Voltage



SCALE 0.75:1

TEFLON® GLASS 0.5 mm - DOUBLE SIDE 35 μm CU.

Figure 6. Photomaster

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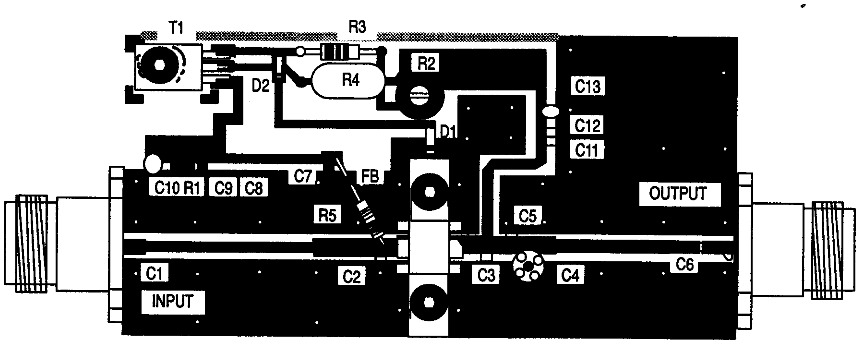


Figure 7. Test Circuit Components View

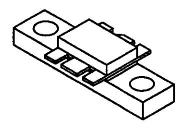
TP3034

The RF Line
NPN Silicon RF Power Transistor

35 W, 960 MHz
RF POWER TRANSISTOR
NPN SILICON

The TP3034 is designed for 960 MHz cellular radio base stations in both analog and digital applications. It incoporates high value emitter ballast resistors, gold metallizations and offers a high degree of reliability and ruggedness.

- Specified 24 Volts, 960 MHz Characteristics
  Output power — 35 Watts
  Gain — 7 dB Min
  Efficiency — 50% Min
- Class AB Operation



CASE 319, STYLE 2

2

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CER}	40	Vdc
Collector-Base Voltage	V_{CBO}	48	Vdc
Emitter-Base Voltage	V_{EBO}	3.5	Vdc
Collector Current — Continuous	I_C	4	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	76 0.43	Watts W/°C
Storage Temperature Range	T_{stg}	– 65 to +150	°C
Operating Junction Temperature	T_J	200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.3	°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 mA, R_{BE} = 75 Ω)	$V_{(BR)CER}$	40	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 50 mAdc)	$V_{(BR)CBO}$	48	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 6 mA, I_C = 0)	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector-Emitter Leakage (V_{CE} = 26 V, I_C = 1 A, R_{BE} = 75 Ω)	I_{CER}	—	—	10	mA
ON CHARACTERISTICS					
DC Current Gain (I_C = 1 Adc, V_{CE} = 10 Vdc)	h_{FE}	15	—	100	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 24 Vdc, I_E = 0, f = 1 MHz)	C_{ob}	—	40	—	pF

(continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
FUNCTIONAL TESTS					
Common-Emitter Amplifier Gain (P_{out} = 35 W, I_{CQ} = 60 mA, V_{CC} = 24 V, f = 960 MHz)	G_{p1}	7	8	—	dB
Collector Efficiency (P_{out} = 35 W, V_{CC} = 24 V, f = 960 MHz)	η_{c1}	50	55	—	%
Load Mismatch (P_{out} = 35 W, I_{CQ} = 60 mA, V_{CC} = 24 V, f = 960 MHz, Load VSWR = 20:1, All Phase Angles at frequency of test)	ψ	—	No Degradation in Output Power		
Input Return Loss (P_{out} = 35 W, I_{CQ} = 60 mA, V_{CC} = 24 V, f = 960 MHz)	IRL	12	—	—	dB
Common-Emitter Amplifier Gain (P_{out} = 15 W, I_{CQ} = 100 mA, V_{CC} = 25 V, f = 960 MHz)	G_{p2}	8	—	—	dB
Collector Efficiency (P_{out} = 15 W, I_{CQ} = 100 mA, V_{CC} = 25 V, f = 960 MHz)	η_{c2}	40	—	—	%

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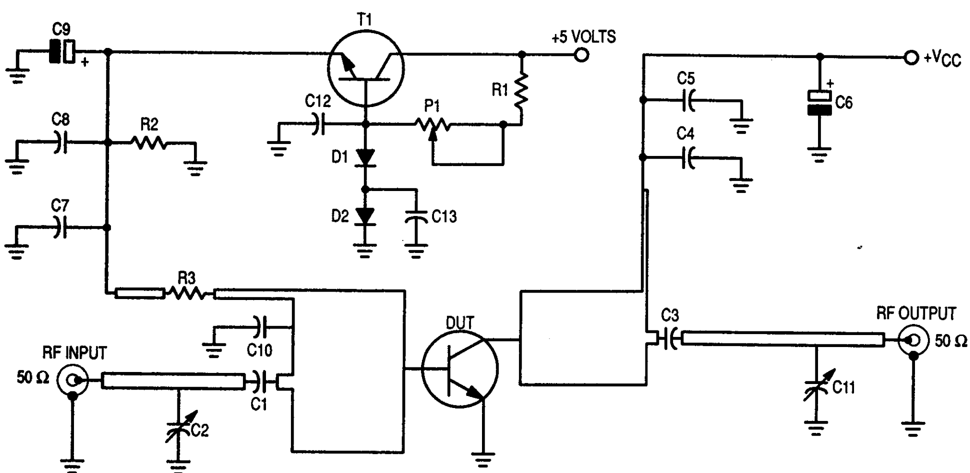


C1, C3	100 pF, ATC Chip Capacitor 100A	D1, D2	Diode, Type BAS16
C2, C11	0.5–20 pF, Trimmer Capacitor	P1	1 kΩ, Trimmer
C4, C7	330 pF, Chip Capacitor 0805	R1	1 kΩ, Resistor 0805
C5, C6, C12, C13	10 nF, Chip Capacitor 0805	R2	56 Ω, Resistor 0805
C6	4.7 μF, 50 Volts, Capacitor	R3	2.2 Ω, Resistor 0805
C9	10 μF, 16 Volts, Capacitor	T1	Transistor, NPN Type MJD31C
C10	5.6 pF, ATC Chip Capacitor 100A		

Figure 1. 960 MHz Electrical Schematic

TYPICAL CHARACTERISTICS

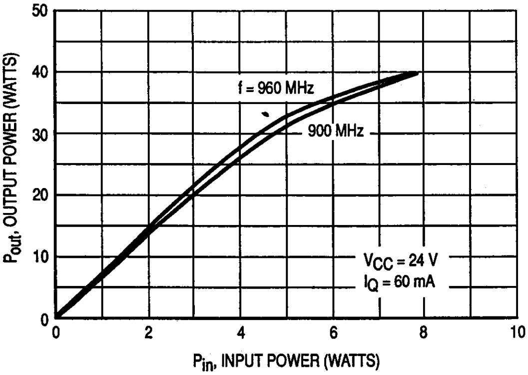


Figure 2. Output Power versus Input Power

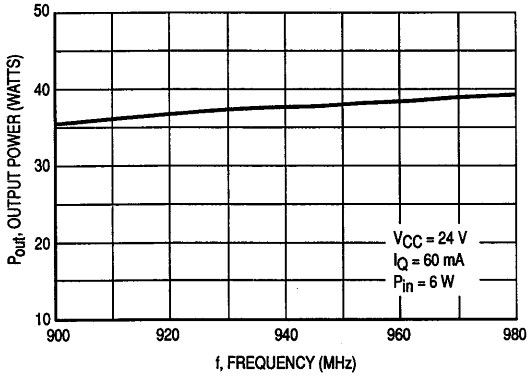


Figure 3. Output Power versus Frequency

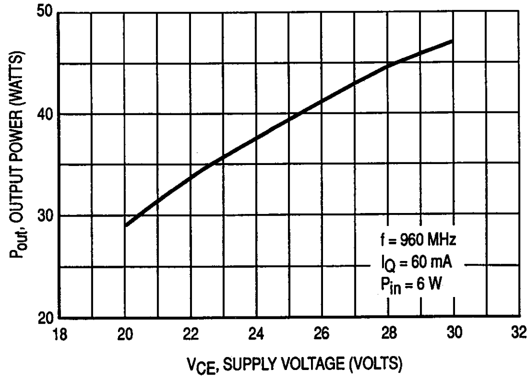
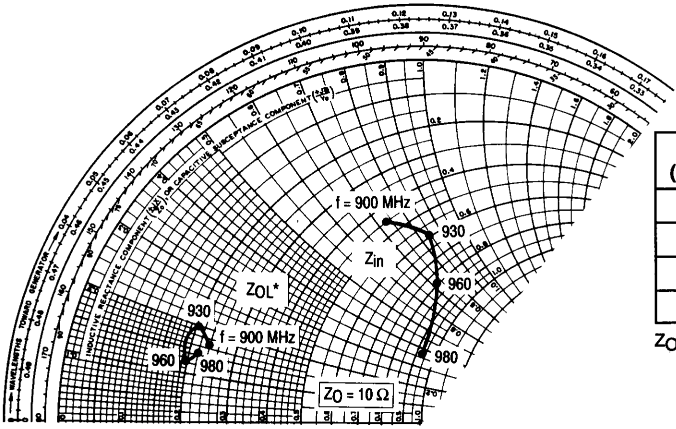


Figure 4. Output Power versus Supply Voltage

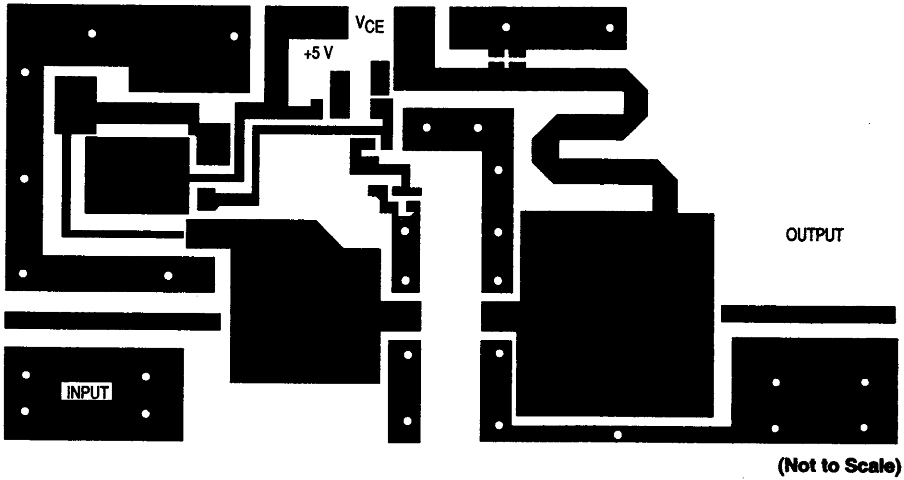


V_{CE} = 24 V P_{out} = 35 W

f (MHz)	Z_{in} (Ω)	Z_{OL}* (Ω)
900	4.5 + j7.4	2.4 + j1.7
930	5.8 + j8.4	2 + j2
960	7.9 + j7.2	2 + j1.3
980	9.4 + j3.8	2.2 + j1.5

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

Figure 5. Series Equivalent Input and Output Impedances



TEFLON® GLASS 1/50 INCH - DOUBLE SIDE 35 μ Cu. ε_r = 2.55

Figure 6. Photomaster

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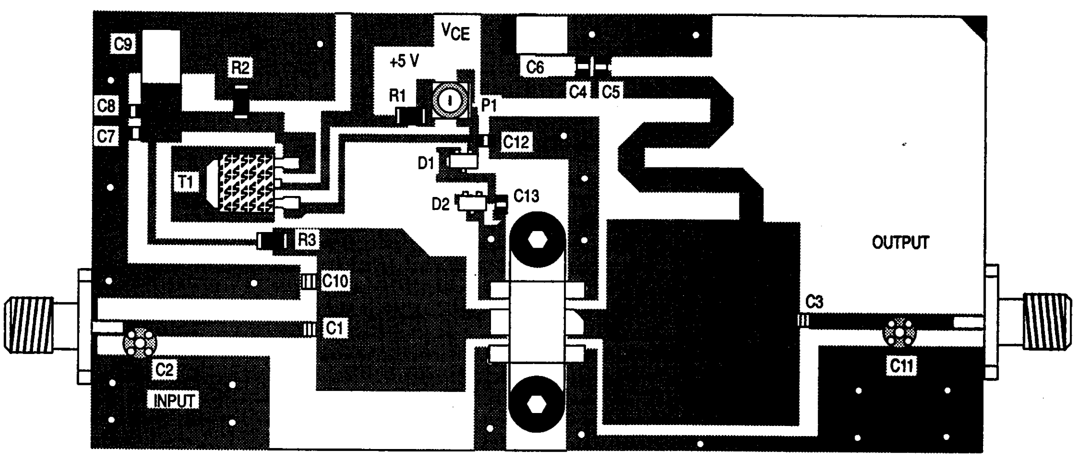


Figure 7. Test Circuit Components View

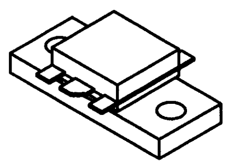
TP3061

The RF Line
UHF Power Transistor

The TP3061 is designed for 960 MHz mobile base stations in both analog and digital applications. It incorporates high value emitter ballast resistors, gold metallizations and offers a high degree of reliability and ruggedness. Including double input and output matching networks, the TP3060 features high impedances and is easy to match.

- Motorola Advanced Amplifier Concept Package
- Oxynitride Passivation
- Specified 26 Volts, 960 MHz Characteristics
  Output Power = 45 Watts
  Minimum Gain = 8.0 dB
  Efficiency = 50%

**45 W, 960 MHz
UHF POWER
TRANSISTOR
NPN SILICON**



CASE 333A, STYLE 2

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CER}	40	Vdc
Collector-Base Voltage	V_{CBO}	48	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	10	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
Operating Junction Temperature	T_J	200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case (1) at 70°C Case	$R_{\theta JC}$	1.2	°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 = 60 mA, R_{BE} = 75 Ω)	$V_{(BR)CER}$	40	—	—	Vdc
Emitter-Base Breakdown Voltage (I_C = 6.0 mAdc)	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector-Base Breakdown Voltage (I_E = 60 mAdc)	$V_{(BR)CBO}$	48	—	—	Vdc
Collector-Emitter Leakage (V_{CE} = 26 V, R_{BE} = 75 Ω)	I_{CER}	—	—	15	mA

NOTE:
1. Thermal resistance is determined under specified RF operating condition.

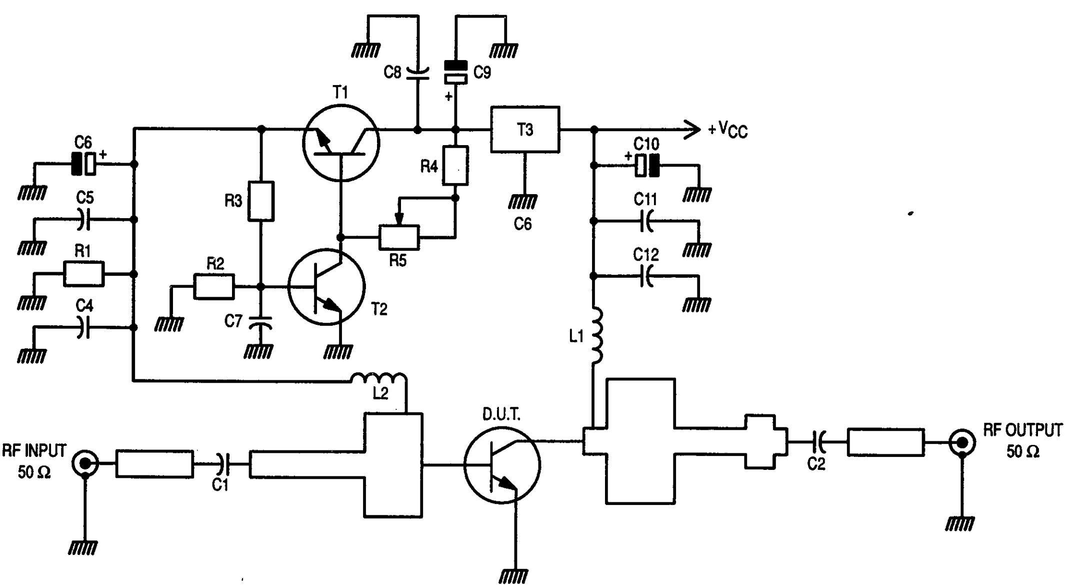
(continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS					
DC Current Gain (I_C = 1.0 Adc, V_{CE} = 10 Vdc)	h_{FE}	15	—	100	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (2) (V_{CB} = 26 V, I_E = 0, f = 1.0 MHz)	C_{ob}	45	60	—	pF
FUNCTIONAL TESTS					
Common-Emitter Amplifier Power Gain (V_{CC} = 26 V, P_{out} = 45 W, I_{CQ} = 200 mA, f = 960 MHz)	G_p	8.0	8.8	—	dB
Collector Efficiency (V_{CC} = 26 V, P_{out} = 45 W, f = 960 MHz)	η	50	53	—	%
Load Mismatch (V_{CC} = 26 V, P_{out} = 45 W, I_{CQ} = 200 mA, Load VSWR = 5:1, at all phase angles)	ψ	No Degradation in Output Power Before and After Test			
Overdrive (V_{CC} = 26 V, P_{in} = 15 W, f = 960 MHz)	OD	No Degradation in Output Power			

NOTE:
2. Value of "C_{ob}" is that of die only. It is not measurable in TP3061 because of internal matching network.

2



C1, C4, C7, C12 — Capacitor Chip 0805 330 pF 5%
C2 — Capacitor Chip 82 pF ATC
C5, C11, C8 — Capacitor Chip 0805 15 nF 5%
C6, C9, C10 — Capacitor Chip 0805 6.0, 8.0 µF 35 V
L1, L2 — 1.5 Turns #18 AWG Choke
R1 — Chip Resistor 47 Ω 1206 5%
R2 — Chip Resistor 270 Ω 0805 5%
R3 — Chip Resistor 47 Ω 0805 5%
R4 — Chip Resistor 100 Ω 0805 5%
R5 — Trimmer 1.0 kΩ
T1 — SMD Transistor MJD31C or Similar
T2 — SMD Transistor
T3 — Voltage Regulator 7805
Board Material — 1/50″, Teflon Glass, ε_r = 2.5, Cu Clad 2 Sides, 35 µm Thick

Figure 1. 960 MHz Test Circuit

TYPICAL CHARACTERISTICS

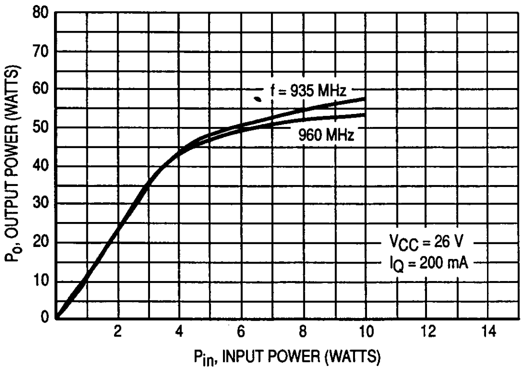


Figure 2. Output Power versus Input Power

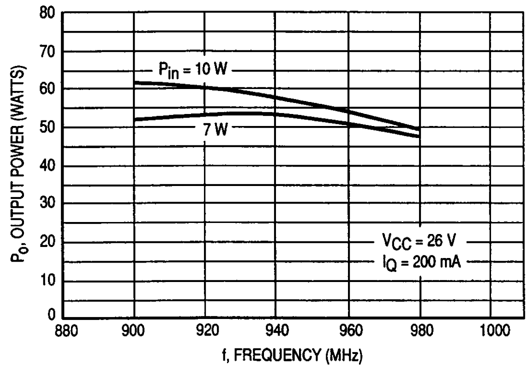


Figure 3. Output Power versus Frequency

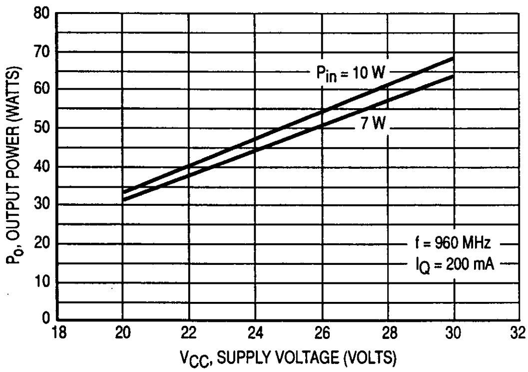


Figure 4. Power Output versus Supply Voltage

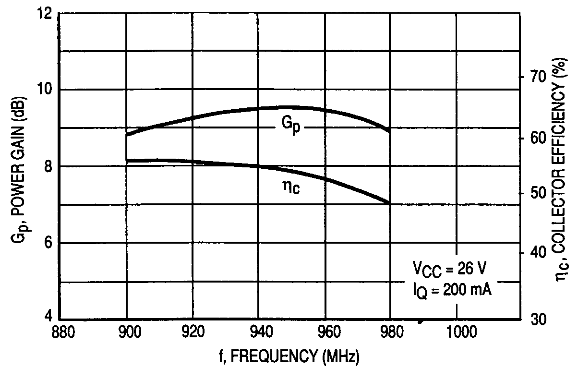
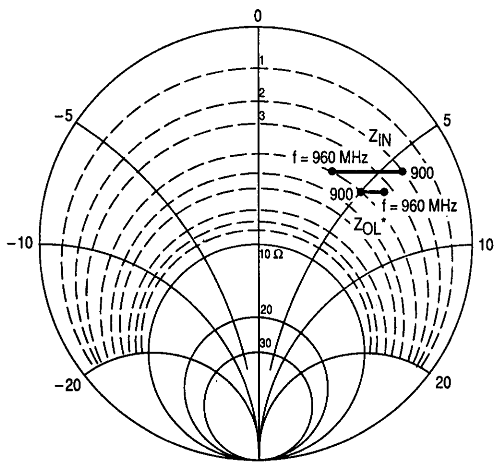


Figure 5. Typical Broadband Circuit Performance



P_{out} = 45 W V_{CE} = 26 V

f MHz	Z_{IN} OHMS	Z_{OL}* OHMS
850	—	—
900	2.8 + j6	4.1 + j5
950	3.95 + j3.55	3.7 + j5.2

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

Figure 6. Series Equivalent Input/Output Impedances

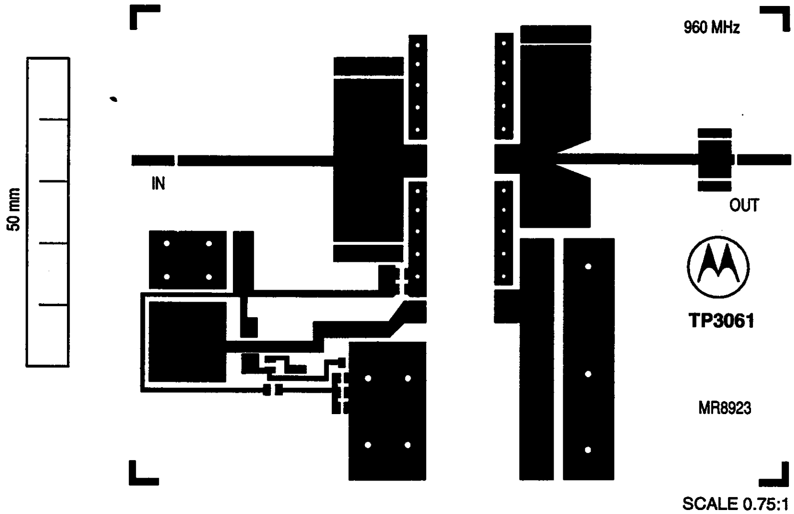


Figure 7. Test Circuit — Photomaster

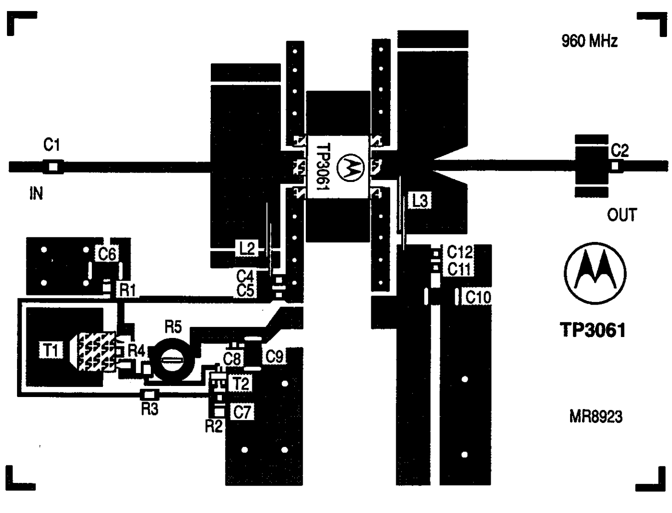


Figure 8. Test Circuit — Component Locations

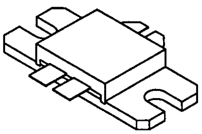
The RF Line
UHF Power Transistor

TP3062

**60 W, 960 MHz
UHF POWER
TRANSISTOR
NPN SILICON**

The TP3062 is designed for 960 MHz mobile base stations in both analog and digital applications. It incorporates high value emitter ballast resistors, gold metallizations and offers a high degree of reliability and ruggedness. Including double input and output matching networks, the TP3062 features high impedances. It can easily operate in a full 860 MHz to 960 MHz bandwidth in a single circuit and without any tuning.

- Motorola Advanced Amplifier Concept Package
- To Be Used Class AB for FM, GSM, Digital
- Specified 26 Volts, 960 MHz Characteristics
  Output Power = 60 Watts
  Minimum Gain = 7.5 dB
  Efficiency = 50%



CASE 398, STYLE 1

2

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CER}	40	Vdc
Collector-Base Voltage	V_{CBO}	48	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	10	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	145 1.0	Watts W/°C
Storage Temperature Range	T_{stg}	−65 to +150	°C
Operating Junction Temperature	T_J	200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case (1) at 70°C Case	$R_{\theta JC}$	1.2	°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 = 60 mA, R_{BE} = 75 Ω)	$V_{(BR)CER}$	40	—	—	Vdc
Emitter-Base Breakdown Voltage (I_C = 15 mAdc)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector-Base Breakdown Voltage (I_E = 50 mAdc)	$V_{(BR)CBO}$	48	—	—	Vdc
Collector-Emitter Leakage (V_{CE} = 26 V, R_{BE} = 75 Ω)	I_{CER}	—	—	15	mA

NOTE:
1. Thermal resistance is determined under specified RF operating condition.

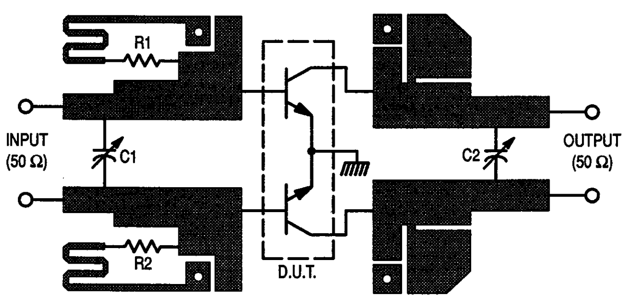
(continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS					
DC Current Gain (I_C = 1.0 Adc, $V_{CE} \approx$ 10 Vdc)	h_{FE}	15	—	100	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (2) (V_{CB} = 26 V, I_E = 0, f = 1.0 MHz)	C_{ob}	30	35	—	pF
FUNCTIONAL TESTS					
Common-Emitter Amplifier Power Gain (V_{CC} = 26 V, P_{out} = 60 W, I_{CQ} = 200 mA, f = 960 MHz)	G_p	7.5	8.0	—	dB
Collector Efficiency (V_{CC} = 26 V, P_{out} = 60 W, f = 960 MHz)	η	48	50	—	%
Load Mismatch (V_{CC} = 26 V, P_{out} = 60 W, I_{CQ} = 200 mA, Load VSWR = 5:1, at all phase angles)	ψ	No Degradation in Output Power Before and After Test			

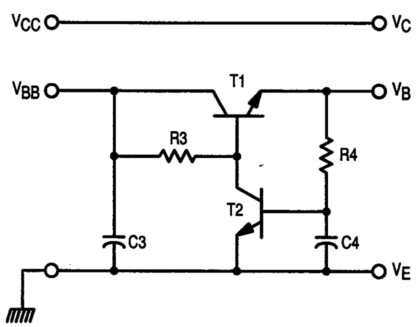
NOTE:
2. Value of "C_{ob}" is that of die only. It is not measurable in TP3062 because of internal matching network.

2



Bias is adjusted by varying V_{BB}
C1, C2 — Adjustable Capacitor 1.0–4.0 pF
C2, C4 — Capacitor Chip 15 nF 5%
R1 — Chip Resistor 22 Ω 0805 5%
R2 — Chip Resistor 22 Ω 0805 5%

Figure 1. 960 MHz Test Circuit



R3 — Chip Resistor 330 Ω 0805 5%
R4 — Chip Resistor 51 Ω 0805 5%
T1 — Transistor Type BD135
T2 — Transistor Type BD135
Board Material — 1/50″, Teflon Glass, ε_r = 2.5, Cu Clad 2 Sides, 35 μm Thick

Figure 2. Bias Current

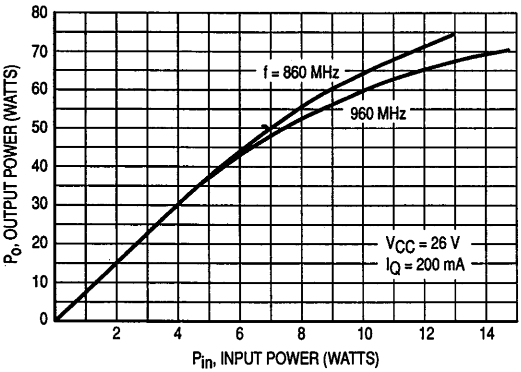


Figure 3. Output Power versus Input Power

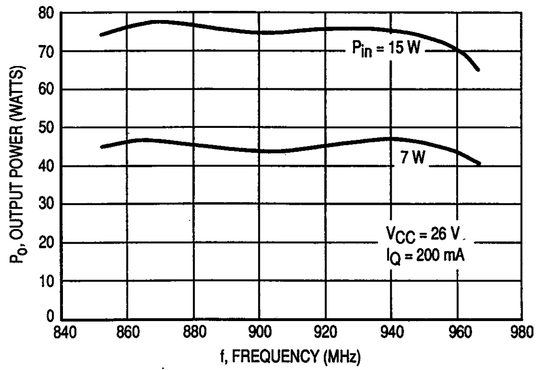


Figure 4. Output Power versus Frequency

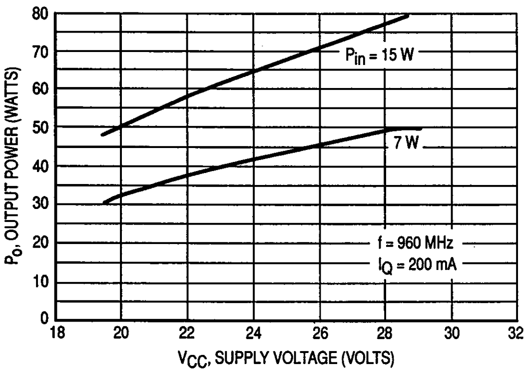


Figure 5. Power Output versus Supply Voltage

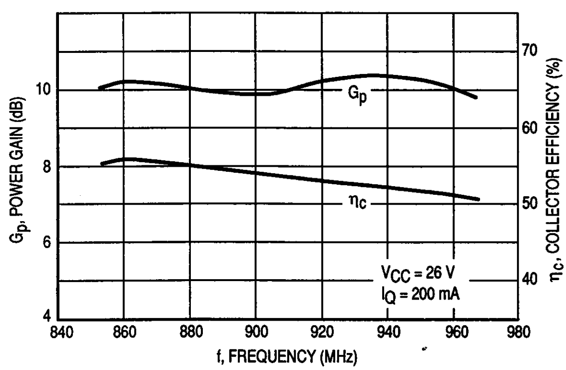
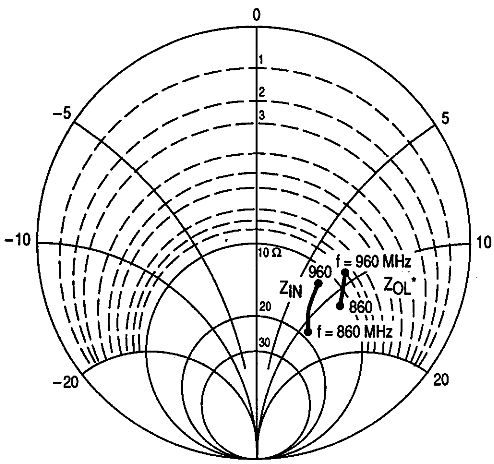


Figure 6. Typical Broadband Circuit Performance

2



P_{out} = 60 W V_{CE} = 26 V

f MHz	Z_{IN} OHMS	Z_{OL}* OHMS
860	17.3 + j10.4	11.5 + j11.5
910	15.0 + j9.50	10.2 + j10.2
960	12.7 + j8.10	8.70 + j8.90

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

Figure 7. Series Equivalent Input/Output Impedances

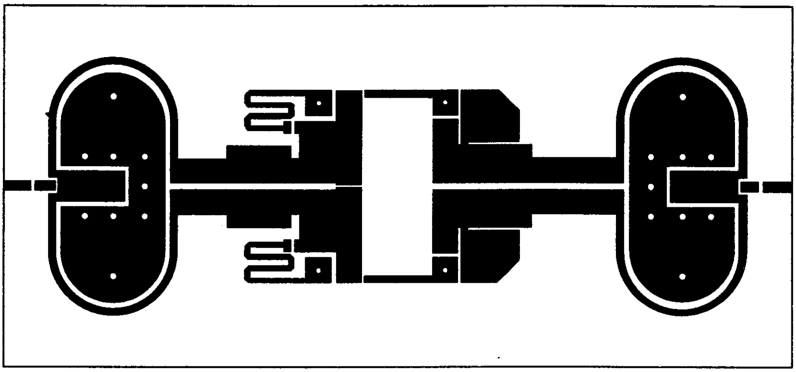


Figure 8. Test Circuit — Photomaster

Figure 9. Printed Circuit Board for Bias Current

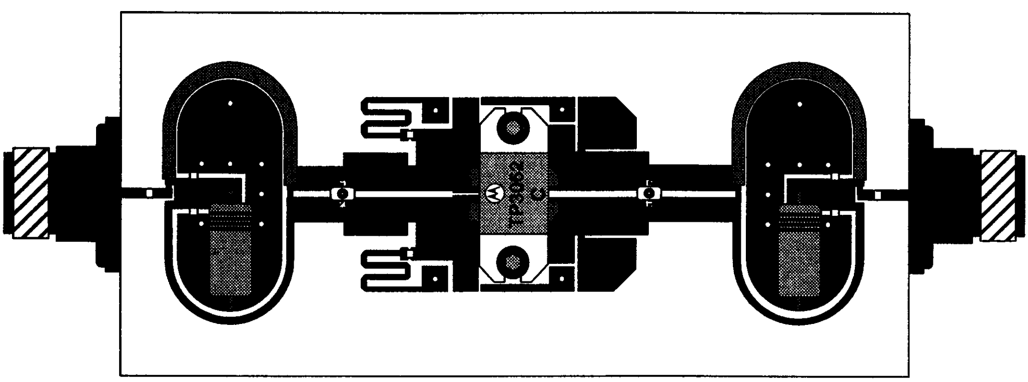


Figure 10. Test Circuit — Component Locations