MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

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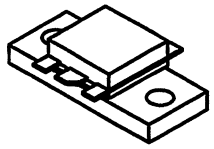
TP3064

The RF Line
RF Power Transistor

The TP3064 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. The TP3064 also features input and output matching networks and high impedances.

- Oxynitride Passivation
- Specified 26 Volts, 960 MHz Characteristics
  - Output Power — 50 Watts
  - Gain — 7.5 dB min
  - Efficiency — 50% typ
- Class AB Operation

50 W, 960 MHz
RF 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	Vdc
Collector-Current — Continuous	I_C	10	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	145 0.8	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)	$R_{\theta JC}$	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_E = 15 mAdc)	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector-Emitter Breakdown Voltage (I_C = 50 mAdc)	$V_{(BR)CBO}$	48	—	—	Vdc
Collector-Emitter Leakage (V_{CE} = 26 V, R_{BE} = 75 Ω)	I_{CER}	—	—	15	mA
ON CHARACTERISTICS					
DC Current Gain (I_C = 1 Adc, V_{CE} = 10 Vdc)	h_{FE}	15	—	100	—

(1) Thermal resistance is determined under specified RF operating condition.

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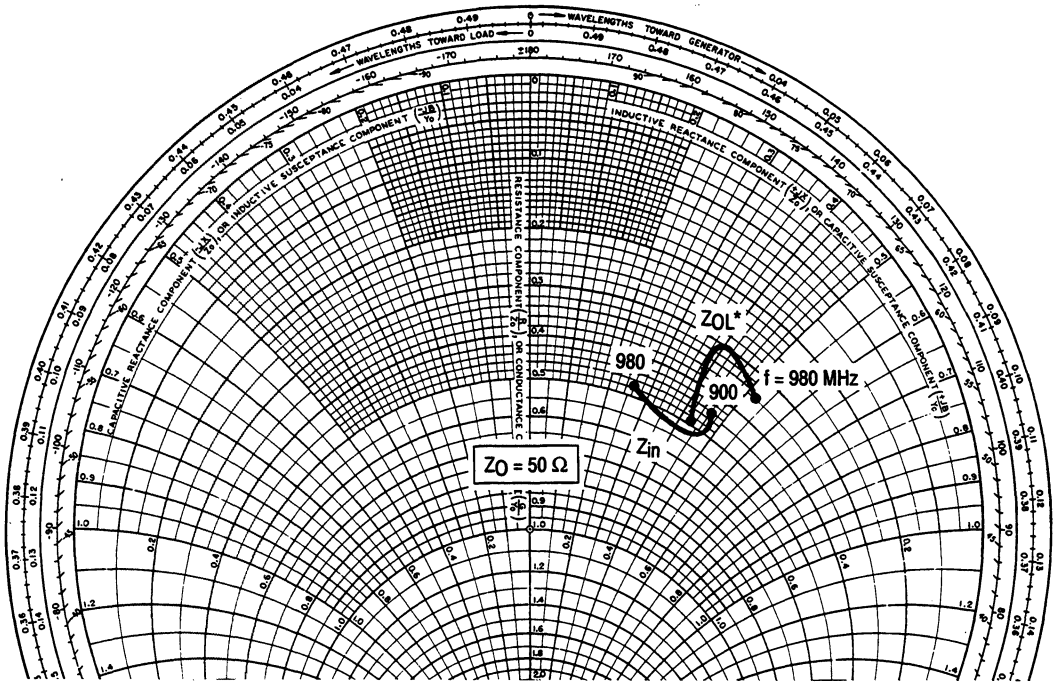
ELECTRICAL CHARACTERISTICS — continued (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS (V_{CB} = 26 V, f = 1 MHz)					
Output Capacitance (V_{CB} = 26 V, I_E = 0, f = 1 MHz)	C_{ob}	—	60	—	pF
FUNCTIONAL TESTS					
Common-Emitter Amplifier Gain (P_{out} = 50 W, I_{CQ} = 200 mA, V_{CC} = 26 V, f = 960 MHz)	G_{pa}	7.5	8.5	—	dB
Collector Efficiency (P_{out} = 50 W, V_{CC} = 26 V, f = 960 MHz)	η	48	50	—	%
Load Mismatch (P_{out} = 50 W, I_{CQ} = 200 mA, V_{CC} = 26 V, Load VSWR = 5:1, all phase angles at frequency of test)	Ψ	No Degradation in Output Power			

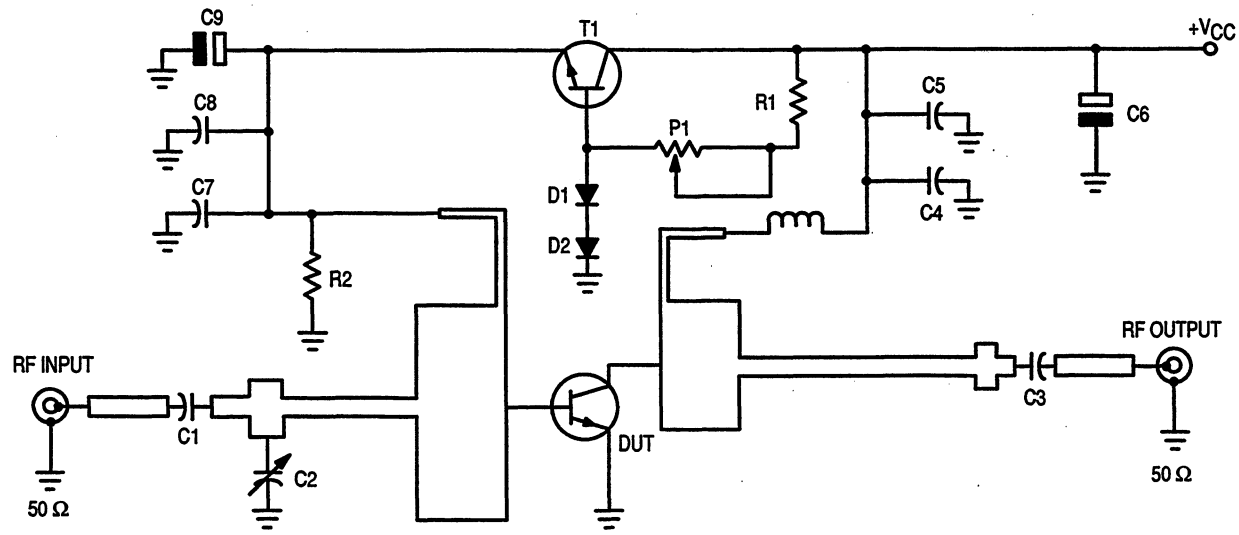


Output impedance with circuit tuned for maximum gain
@ P_{out} = 50 W, V_{CE} = 26 V

f (MHz)	Z_{in} (Ω)	Z_{OL}^* (Ω)
900	4.4 + j4.6	5 + j4.4
935	5.1 + j4.8	3 + j4.1
960	5.4 + j3.6	3.1 + j4.6
980	4.7 + j2.5	3.5 + j5

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



C1,C3	100 pF, ATC Chip Capacitor 100A	L1	1.5 Turns, 18 AWG Choke
C4,C7	330 pF, Chip Capacitor 0805	P1	1 kΩ, Trimmer
C5,C6	10 nF, Chip Capacitor 0805	R1	1 kΩ, Resistor
C6	15 µF, 63 V, Capacitor	R2	56 Ω, Resistor 0805
C9	100 µF, 16 V, Capacitor	T1	Transistor, NPN Type, BD135
D1,D2	Diode, 1N4007		

Figure 2. 960 MHz Test Circuit Schematic

TYPICAL CHARACTERISTICS

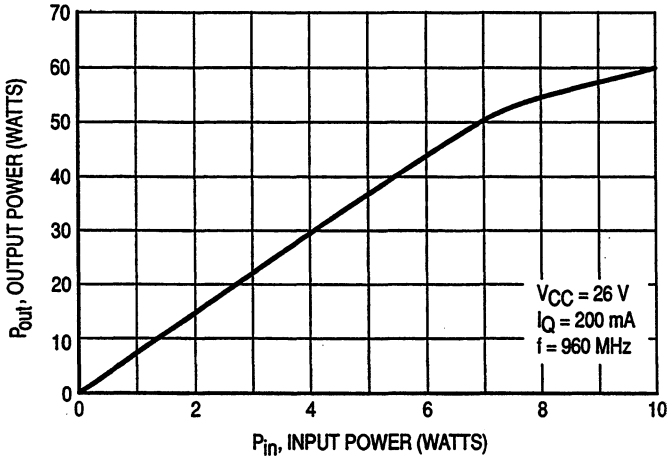


Figure 3. Output Power versus Input Power

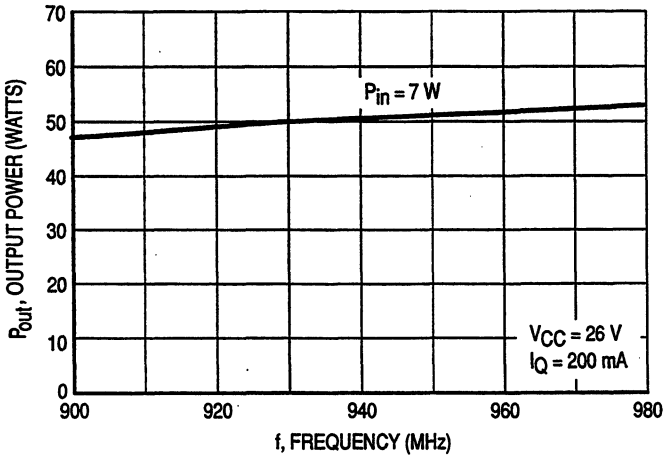


Figure 4. Output Power versus Frequency

TYPICAL CHARACTERISTICS

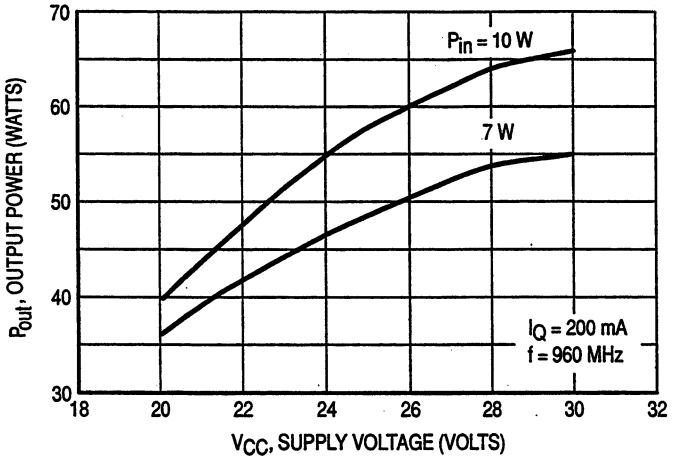


Figure 5. Output Power versus Supply Voltage

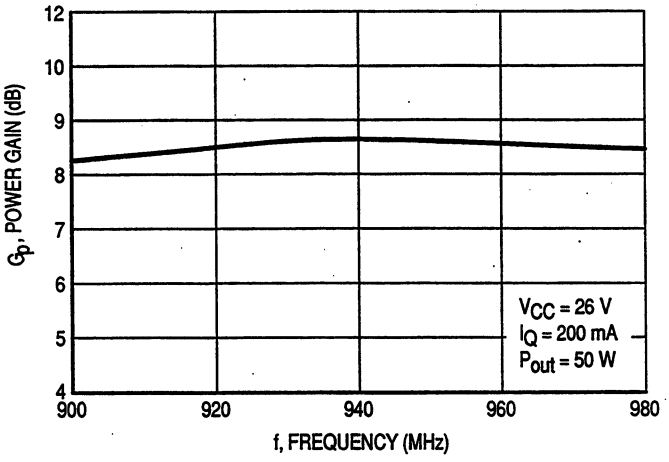


Figure 6. Broadband Amplifier

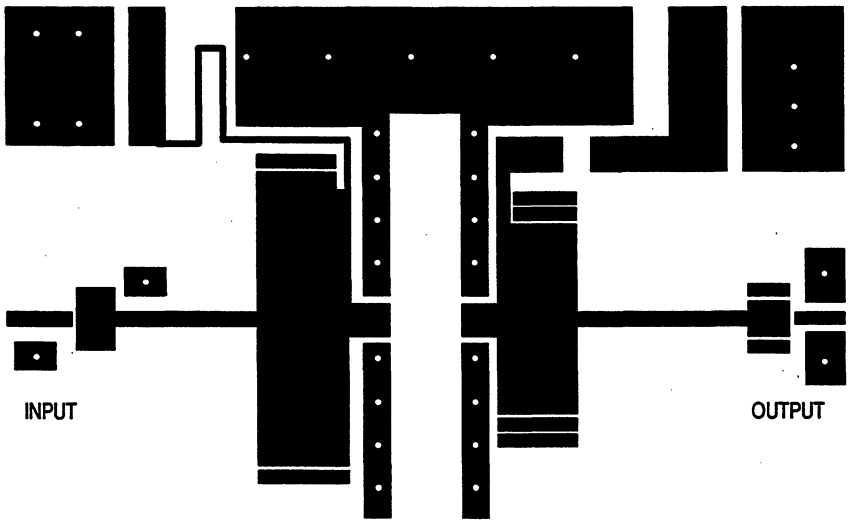
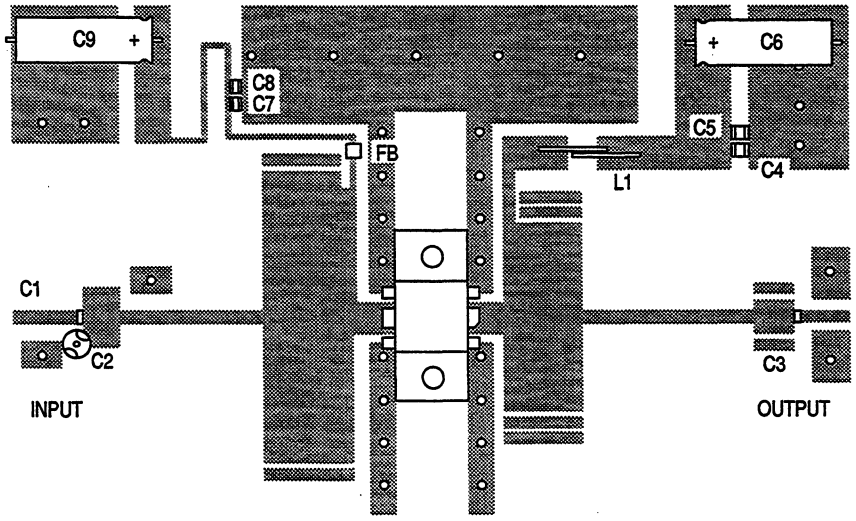


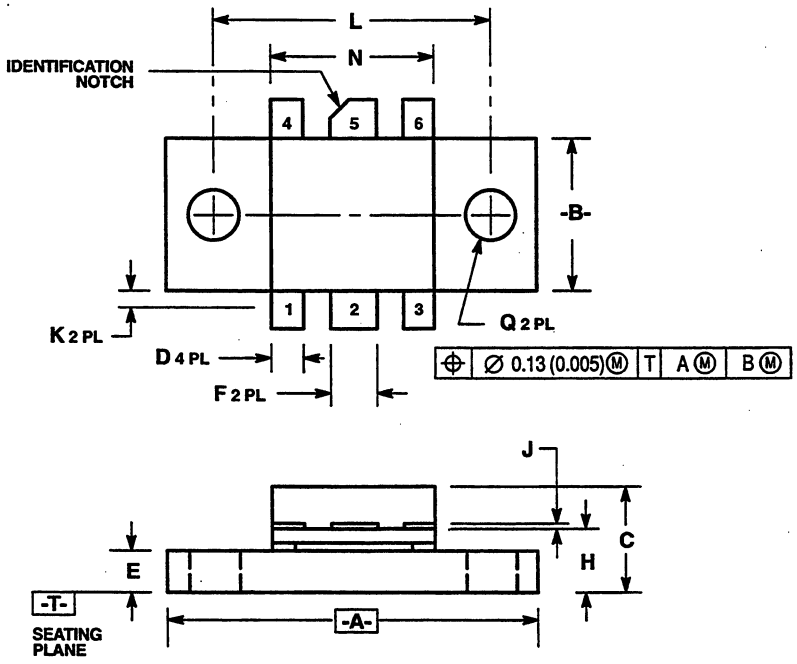
Figure 7. Photomaster Scale 1:1



TEFLON® GLASS 1/50 INCH $\varepsilon_r = 2.55$

Figure 8. 960 MHz Test Circuit Components View

OUTLINE DIMENSIONS



NOTES:

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

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.965	0.985	24.52	25.01
B	0.390	0.410	9.91	10.41
C	0.250	0.290	6.35	7.36
D	0.075	0.090	1.91	2.28
E	0.095	0.115	2.42	2.92
F	0.110	0.130	2.80	3.30
H	0.155	0.175	3.94	4.44
J	0.004	0.006	0.11	0.15
K	0.090	0.116	2.29	2.94
L	0.725 BSC		18.41 BSC	
N	0.415	0.435	10.55	11.04
Q	0.120	0.135	3.05	3.42

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

Case 333A-02

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2PHX33580Q-0 PRINTED IN USA (1994) MPS/POD RF YBACAA

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