

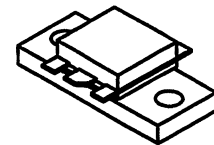
**TP3064**

**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.

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

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



**CASE 333A**  
**Style 2**

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V <sub>CER</sub>	40	Vdc
Collector-Base Voltage	V <sub>CBO</sub>	48	Vdc
Emitter-Base Voltage	V <sub>EBO</sub>	4	Vdc
Collector-Current — Continuous	I <sub>C</sub>	10	Adc
Total Device Dissipation @ T <sub>C</sub> = 25°C Derate above 25°C	P <sub>D</sub>	145 0.8	Watts W/°C
Storage Temperature Range	T <sub>stg</sub>	- 65 to +150	°C
Operating Junction Temperature	T <sub>J</sub>	200	°C

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case (1)	R <sub>θJC</sub>	1.2	°C/W

**ELECTRICAL CHARACTERISTICS** (T<sub>C</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

**OFF CHARACTERISTICS**

Collector-Emitter Breakdown Voltage (I <sub>C</sub> = 60 mA, R <sub>BE</sub> = 75 Ω)	V <sub>(BR)CER</sub>	40	—	—	Vdc
Emitter Base Breakdown Voltage (I <sub>E</sub> = 15 mAdc)	V <sub>(BR)EBO</sub>	3.5	—	—	Vdc
Collector-Emitter Breakdown Voltage (I <sub>C</sub> = 50 mAdc)	V <sub>(BR)CBO</sub>	48	—	—	Vdc
Collector-Emitter Leakage (V <sub>CE</sub> = 26 V, R <sub>BE</sub> = 75 Ω)	I <sub>CER</sub>	—	—	15	mA

**ON CHARACTERISTICS**

DC Current Gain (I <sub>C</sub> = 1 Adc, V <sub>CE</sub> = 10 Vdc)	h <sub>FE</sub>	15	—	100	—
---	-----------------	----	---	-----	---

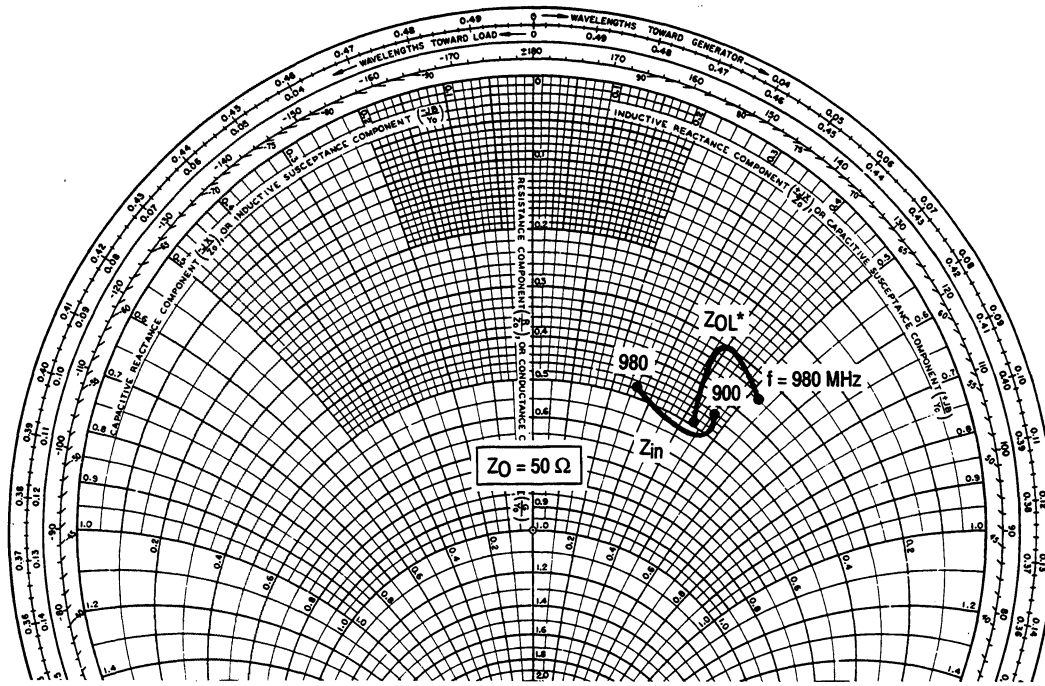
(1) Thermal resistance is determined under specified RF operating condition.

Teflon is a registered trademark of du Pont de Nemours & Co., Inc.



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

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

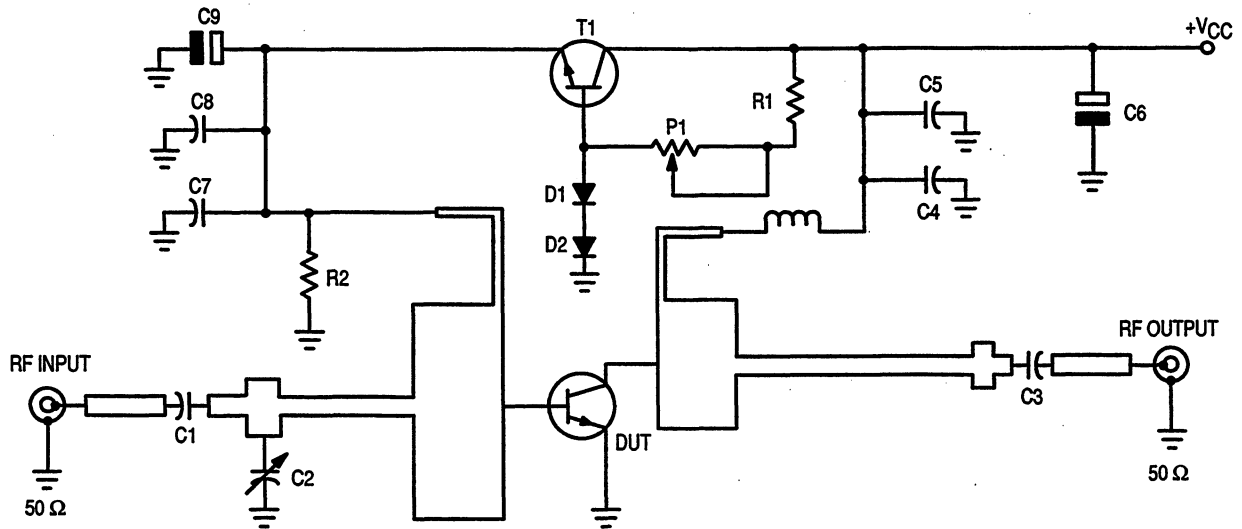


Output impedance with circuit tuned for maximum gain  
@  $P_{out} = 50\text{ W}$ ,  $V_{CE} = 26\text{ V}$

f (MHz)	$Z_{in}$ ( $\Omega$ )	$Z_{OL}^*$ ( $\Omega$ )
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 k $\Omega$ , Trimmer      |
| C5,C6 | 10 nF, Chip Capacitor 0805      | R1 | 1 k $\Omega$ , Resistor     |
| C6    | 15 $\mu$ F, 63 V, Capacitor     | R2 | 56 $\Omega$ , Resistor 0805 |
| C9    | 100 $\mu$ F, 16 V, Capacitor    | T1 | Transistor, NPN Type, BD135 |
| D1,D2 | Diode, 1N4007                   |    |                             |

Figure 2. 960 MHz Test Circuit Schematic

TYPICAL CHARACTERISTICS

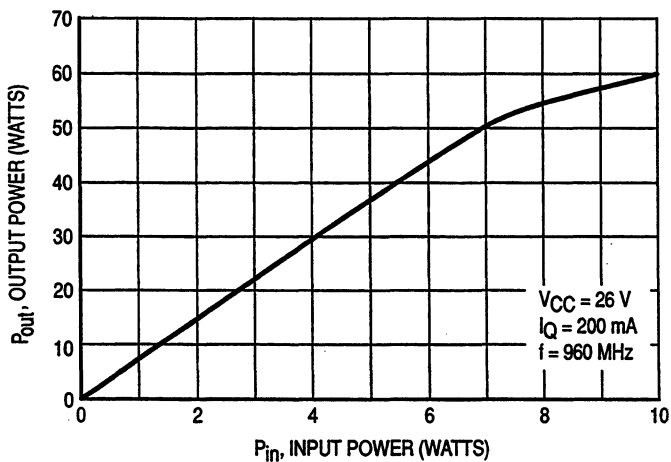


Figure 3. Output Power versus Input Power

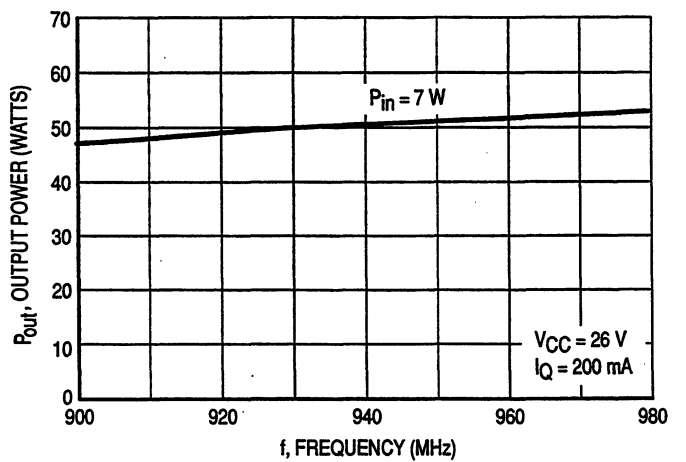
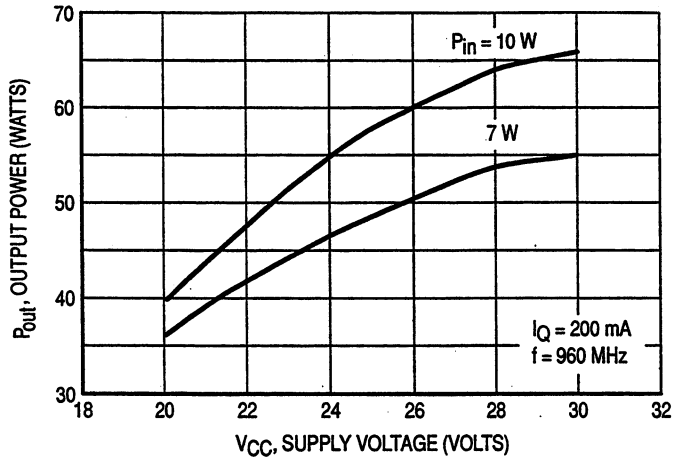
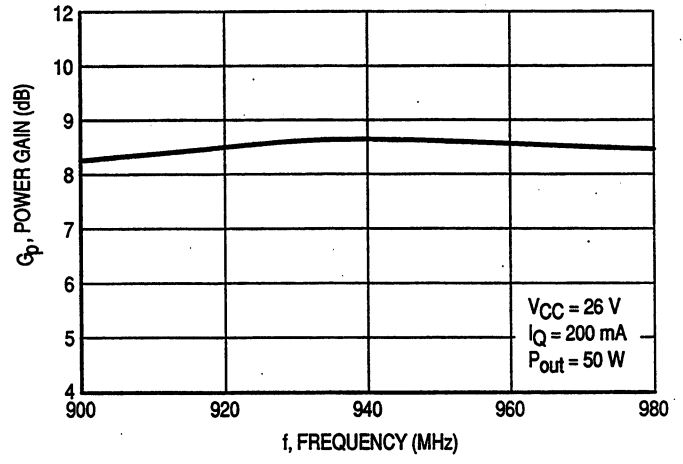


Figure 4. Output Power versus Frequency

## TYPICAL CHARACTERISTICS



**Figure 5. Output Power versus Supply Voltage**



**Figure 6. Broadband Amplifier**

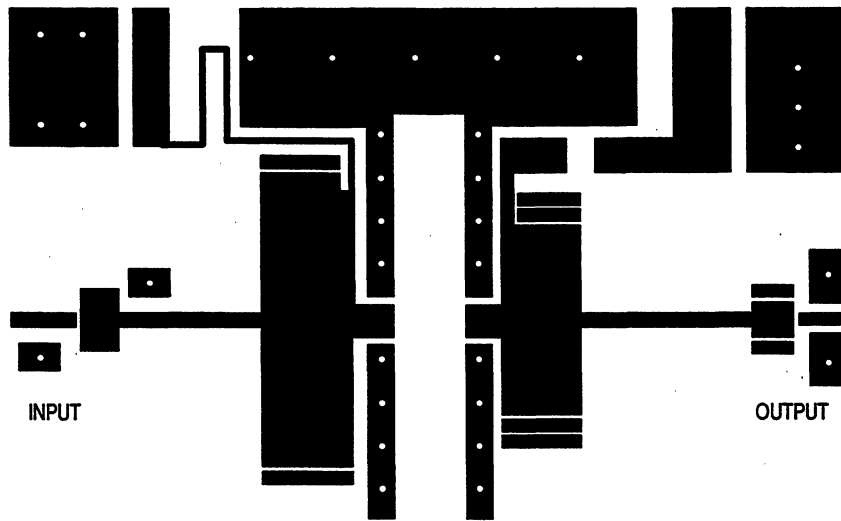
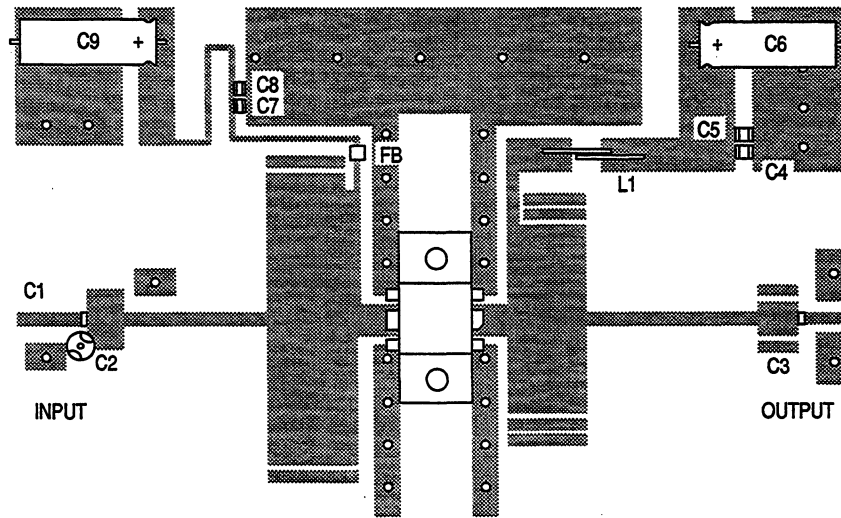


Figure 7. Photomaster

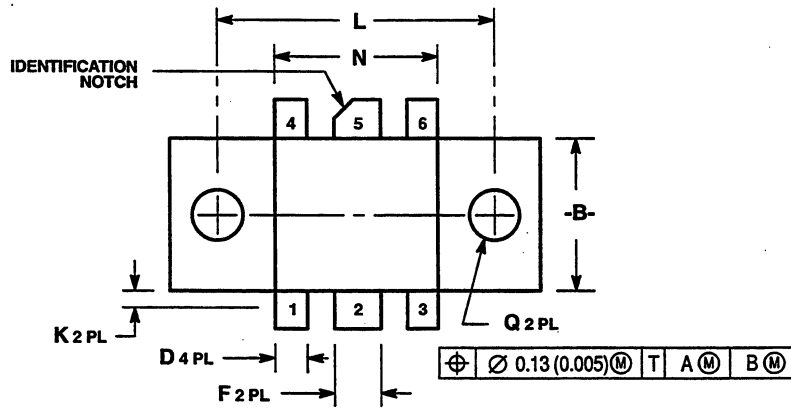
Scale 1:1



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

Figure 8. 960 MHz Test Circuit Components View

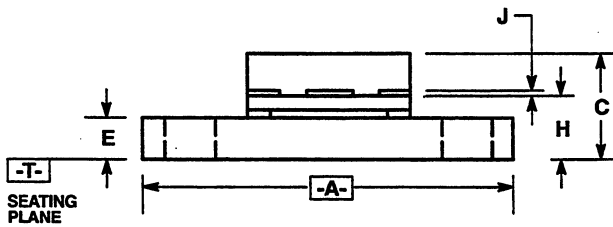
# OUTLINE DIMENSIONS



**NOTES:**

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

DIM	INCHES		MILLIMETERS	
	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:**
1. EMITTER
  2. BASE
  3. EMITTER
  4. EMITTER
  5. COLLECTOR
  6. EMITTER

Case 333A-02

This page intentionally left blank.



Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters can and do vary in different applications. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

**Literature Distribution Centers:**

USA: Motorola Literature Distribution; P.O. Box 20912; Phoenix, Arizona 85036.

EUROPE: Motorola Ltd.; European Literature Centre; 88 Tanners Drive, Blakelands, Milton Keynes, MK14 5BP, England.

JAPAN: Nippon Motorola Ltd.; 4-32-1, Nishi-Gotanda, Shinagawa-ku, Tokyo 141 Japan.

ASIA-PACIFIC: Motorola Semiconductors H.K. Ltd.; Silicon Harbour Center, No. 2 Dai King Street, Tai Po Industrial Estate, Tai Po, N.T., Hong Kong.



**MOTOROLA**

