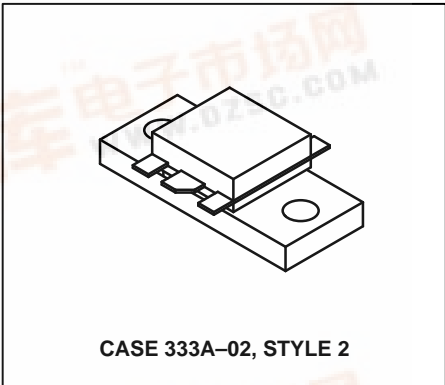
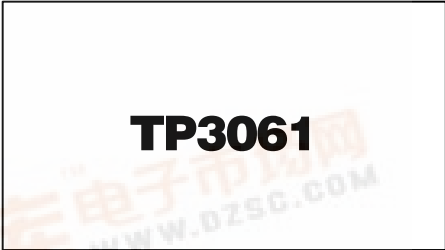


## The RF Line UHF Power Transistor

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 TP3061 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%
- Circuit board photomaster available upon request by contacting RF Tactical Marketing in Phoenix, AZ.



### 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 @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	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 $70^\circ\text{C}$ Case	$R_{\theta JC}$	1.2	°C/W

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

Characteristic	Symbol	Min	Typ	Max	Unit
Collector–Emitter Breakdown Voltage ( $I_C = 60\text{ mA}$ , $R_{BE} = 75\ \Omega$ )	$V_{(BR)CER}$	40	—	—	Vdc
Emitter–Base Breakdown Voltage ( $I_C = 6.0\text{ mAdc}$ )	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector–Base Breakdown Voltage ( $I_E = 60\text{ mAdc}$ )	$V_{(BR)CBO}$	48	—	—	Vdc
Collector–Emitter Leakage ( $V_{CE} = 26\text{ V}$ , $R_{BE} = 75\ \Omega$ )	$I_{CER}$	—	—	15	mA

NOTE:

1 Thermal resistance is determined under specified RF operating condition.

(continued)



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

Characteristic	Symbol	Min	Typ	Max	Unit
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**ON CHARACTERISTICS**

DC Current Gain ( $I_C = 1.0 \text{ Adc}$ , $V_{CE} = 10 \text{ Vdc}$ )	$h_{FE}$	15	—	100	—
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**DYNAMIC CHARACTERISTICS**

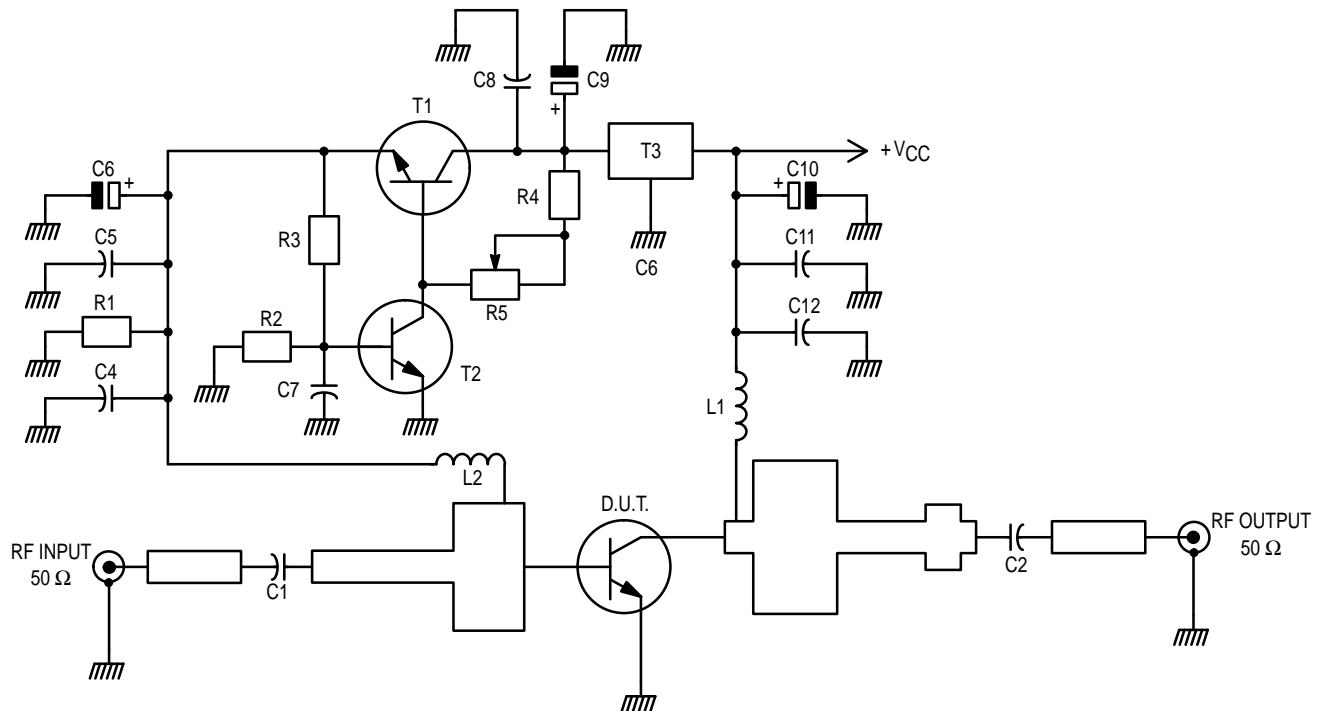
Output Capacitance (2) ( $V_{CB} = 26 \text{ V}$ , $I_E = 0$ , $f = 1.0 \text{ MHz}$ )	$C_{ob}$	45	60	—	pF
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**FUNCTIONAL TESTS**

Common-Emitter Amplifier Power Gain ( $V_{CC} = 26 \text{ V}$ , $P_{out} = 45 \text{ W}$ , $I_{CQ} = 200 \text{ mA}$ , $f = 960 \text{ MHz}$ )	$G_p$	8.0	8.8	—	dB
Collector Efficiency ( $V_{CC} = 26 \text{ V}$ , $P_{out} = 45 \text{ W}$ , $f = 960 \text{ MHz}$ )	$\eta$	50	53	—	%
Load Mismatch ( $V_{CC} = 26 \text{ V}$ , $P_{out} = 45 \text{ W}$ , $I_{CQ} = 200 \text{ mA}$ , Load VSWR = 5:1, at all phase angles)	$\psi$	No Degradation in Output Power Before and After Test			
Overdrive ( $V_{CC} = 26 \text{ V}$ , $P_{in} = 15 \text{ W}$ , $f = 960 \text{ MHz}$ )	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.



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  $\mu\text{F}$  35 V  
 L1, L2 — 1.5 Turns #18 AWG Choke  
 R1 — Chip Resistor 47  $\Omega$  1206 5%  
 R2 — Chip Resistor 270  $\Omega$  0805 5%

R3 — Chip Resistor 47  $\Omega$  0805 5%  
 R4 — Chip Resistor 100  $\Omega$  0805 5%  
 R5 — Trimmer 1.0 k $\Omega$   
 T1 — SMD Transistor MJD31C or Similar  
 T2 — SMD Transistor  
 T3 — Voltage Regulator 7805  
 Board Material — 1/50", Teflon Glass,  $\epsilon_r = 2.5$ ,  
 Cu Clad 2 Sides, 35  $\mu\text{m}$  Thick

**Figure 1. 960 MHz Test Circuit**

## TYPICAL CHARACTERISTICS

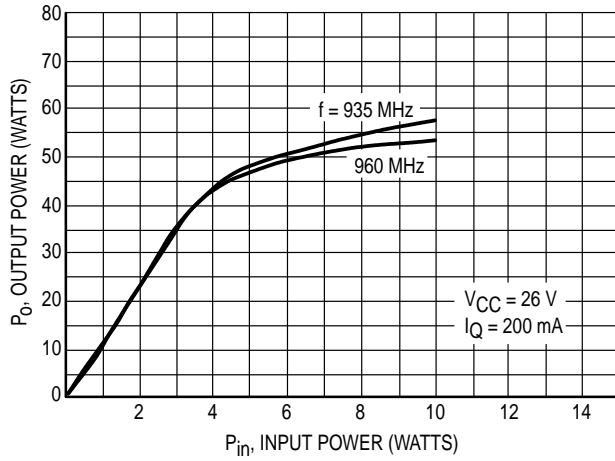


Figure 2. Output Power versus Input Power

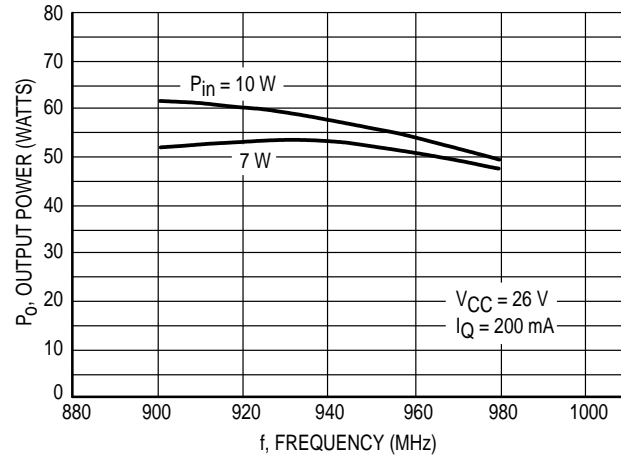


Figure 3. Output Power versus Frequency

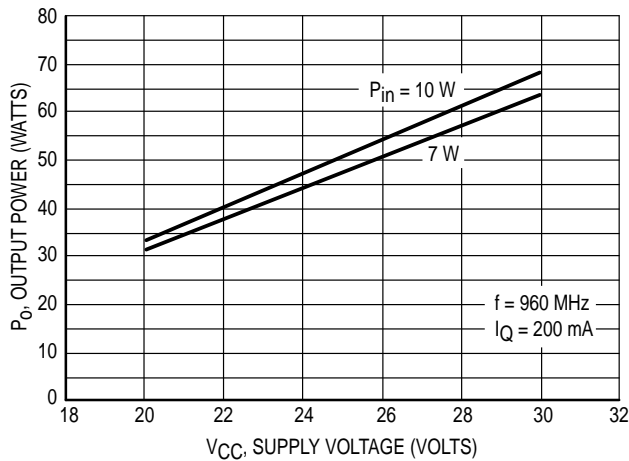


Figure 4. Power Output versus Supply Voltage

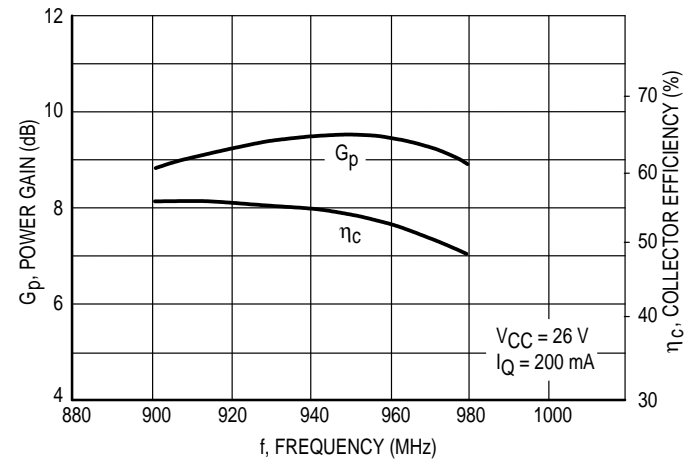
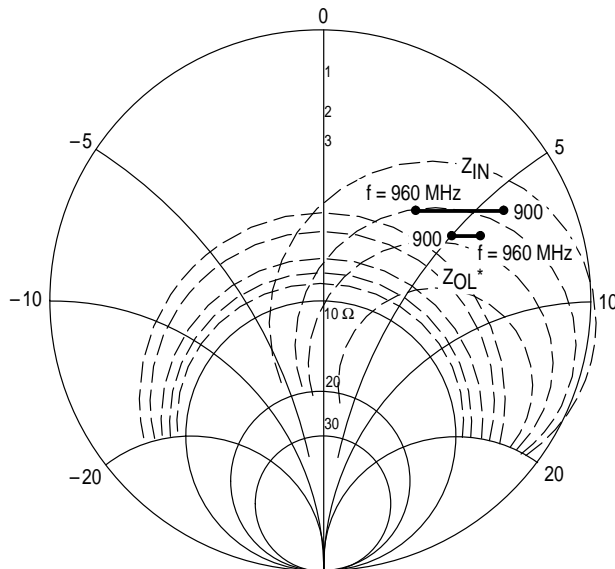


Figure 5. Typical Broadband Circuit Performance



$P_{out} = 45 \text{ W}$   $V_{CE} = 26 \text{ V}$

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

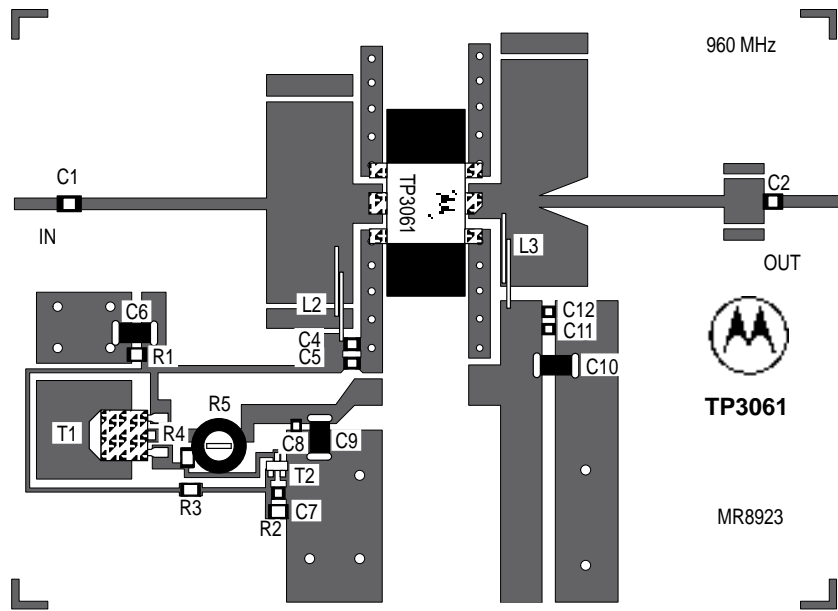
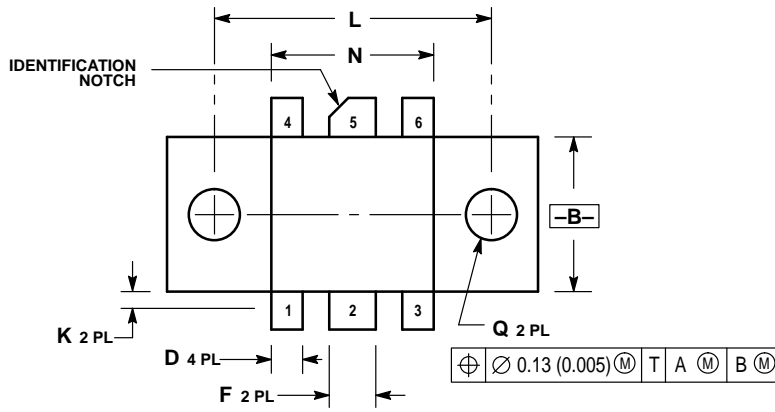


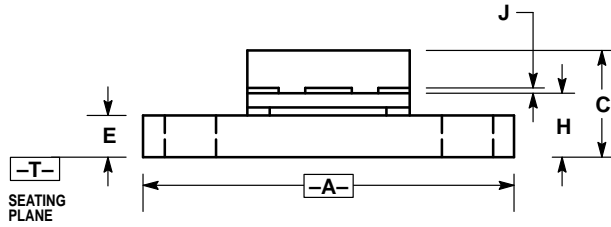
Figure 7. Test Circuit — Component Locations

# PACKAGE 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:
- PIN 1. EMITTER
  - BASE
  - EMITTER
  - EMITTER
  - COLLECTOR
  - EMITTER

**CASE 333A-02  
ISSUE C**

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