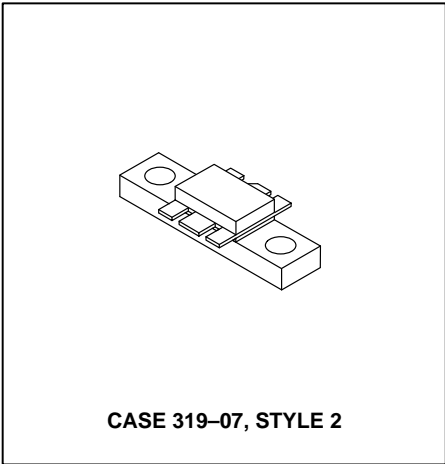
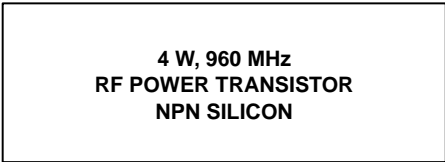
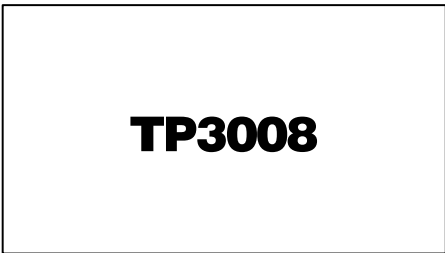


## The RF Line RF Power Transistor

The TP3008 is designed for 960 MHz cellular radio 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.

- Specified 24 Volts, 960 MHz Characteristics
  - Output Power — 4 Watts
  - Gain — 11.5 dB min
  - Efficiency — 45% min
- Class AB Operation
- 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	$V_{CBO}$	50	Vdc
Emitter-Base Voltage	$V_{EBO}$	4	Vdc
Collector-Current — Continuous	$I_C$	1	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	35 0.2	Watts W/ $^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	- 65 to +150	$^\circ\text{C}$
Operating Junction Temperature	$T_J$	200	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	5	$^\circ\text{C}/\text{W}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ( $I_C = 15 \text{ mA}$ , $R_{BE} = 75 \Omega$ )	$V_{(BR)CER}$	40	—	—	Vdc
Collector-Emitter Breakdown Voltage ( $I_C = 3 \text{ mAdc}$ )	$V_{(BR)CBO}$	45	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 2 \text{ mA}$ , $I_C = 0$ )	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector-Emitter Leakage ( $V_{CE} = 26 \text{ V}$ , $R_{BE} = 75 \Omega$ )	$I_{CER}$	—	—	2	mA

### ON CHARACTERISTICS

DC Current Gain ( $I_C = 0.2 \text{ Adc}$ , $V_{CE} = 5 \text{ Vdc}$ )	$h_{FE}$	15	—	120	—
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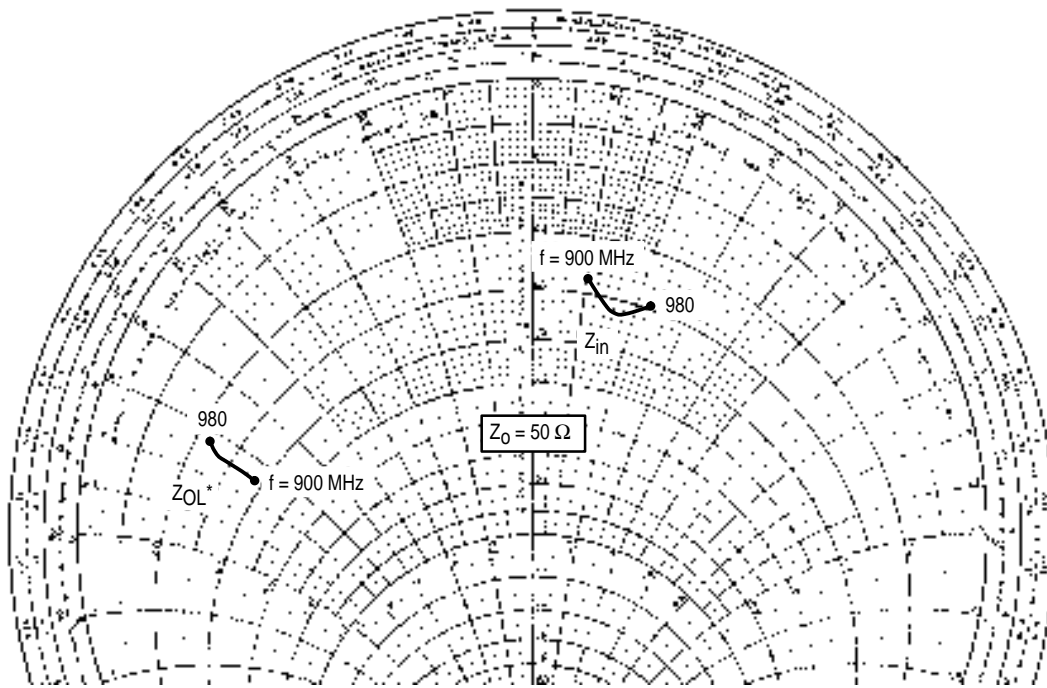
### DYNAMIC CHARACTERISTICS

Output Capacitance ( $V_{CE} = 24 \text{ V}$ , $I_E = 0$ , $f = 1 \text{ MHz}$ )	$C_{ob}$	—	6	—	pF
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(continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
<b>FUNCTIONAL TESTS</b> ( $V_{CC} = 24\text{ V}$ , $f = 960\text{ MHz}$ )					
Common-Emitter Amplifier Gain ( $P_{out} = 4\text{ W}$ , $I_{CQ} = 50\text{ mA}$ )	$G_p$	11.5	—	—	dB
Collector Efficiency ( $P_{out} = 4\text{ W}$ , $I_{CQ} = 50\text{ mA}$ )	$h$	45	50	—	%
Load Mismatch ( $P_{out} = 4\text{ W}$ , $I_{CQ} = 50\text{ mA}$ , Load VSWR = 5:1, all phase angles at frequency of test)	$\Psi$	No Degradation in Output Power			

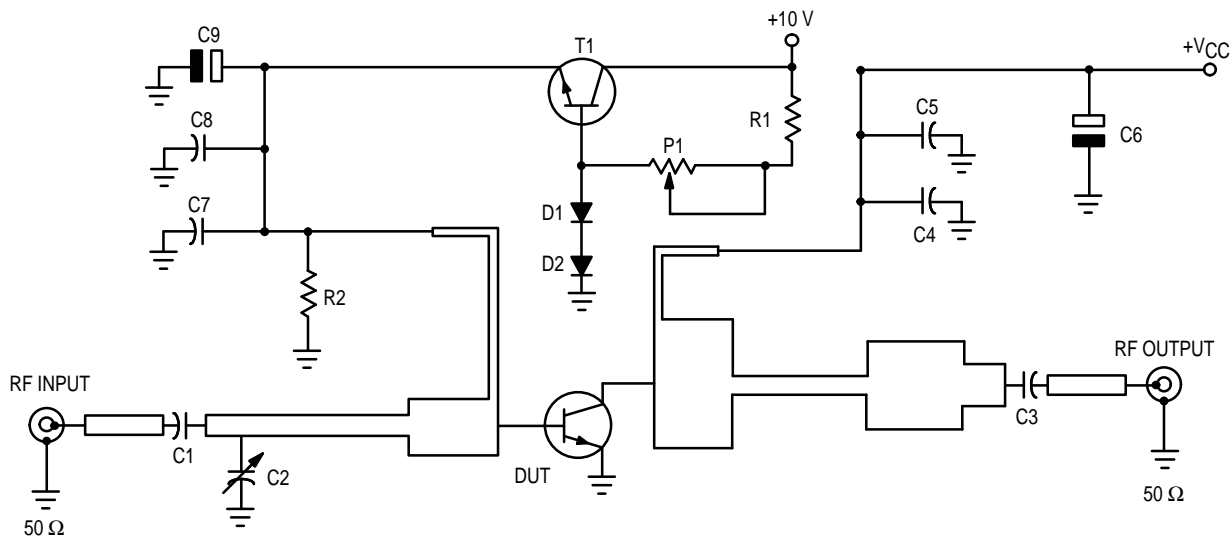


Output impedance with circuit tuned for maximum gain  
@  $P_{out} = 4\text{ W}$ ,  $V_{CE} = 24\text{ V}$

f (MHz)	$Z_{in}$ ( $\Omega$ )	$Z_{OL}^*$ ( $\Omega$ )
900	$6 + j5$	$7.6 - j15$
935	$6.2 + j4.7$	$5.5 - j13.5$
960	$6.8 + j3.6$	$5.5 - j13.5$
980	$7.2 + j2$	$5.3 - j13.5$

$Z_{OL}^*$  = 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 Impedance**



### Components List

C1,C3	100 pF, ATC Chip Capacitor 100A	D1,D2	Diode, BAS16
C2	1 to 5 pF, Trimmer Capacitor	P1	1 k $\Omega$ , Trimmer
C4,C7	330 pF, Chip Capacitor 0805	R1	1 k $\Omega$ , Resistor
C5,C8	10 nF, Chip Capacitor 0805	R2	56 $\Omega$ , 0805 Resistor
C6	15 $\mu$ F, 63 V, Capacitor	T1	Transistor, NPN Type, MJD31C
C9	100 $\mu$ F, 16 V, Capacitor		

Figure 2. 960 MHz Electrical Schematic

### TYPICAL CHARACTERISTICS

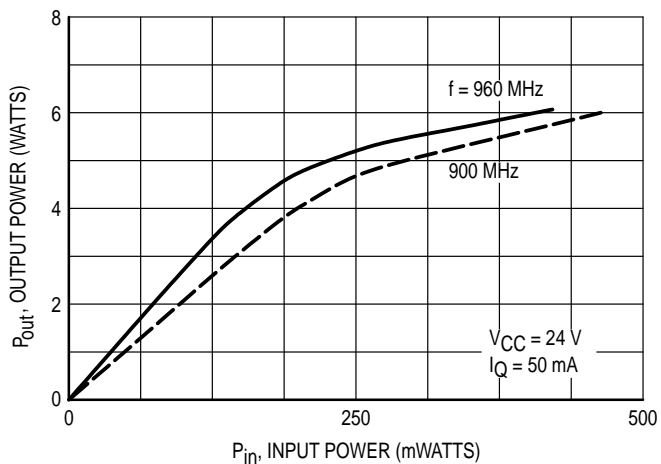


Figure 3. Output Power versus Input Power

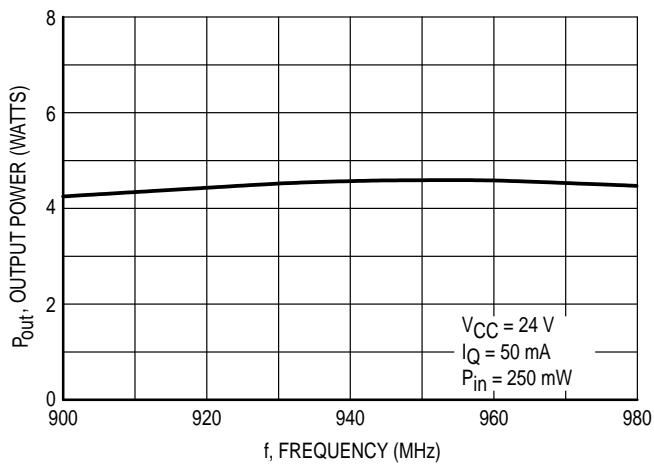


Figure 4. Output Power versus Frequency

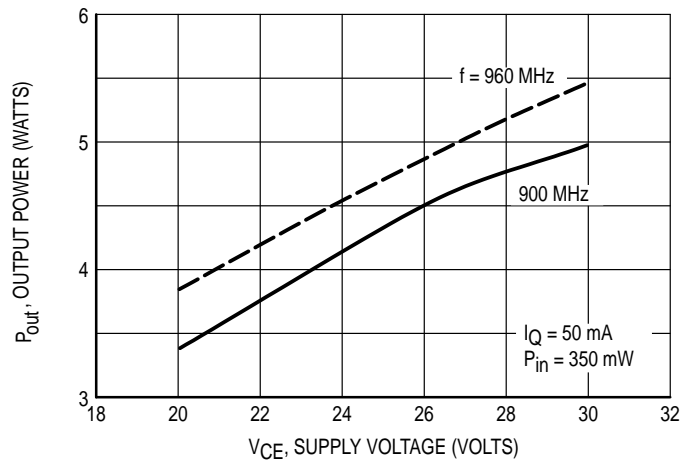


Figure 5. Output Power versus Supply Voltage

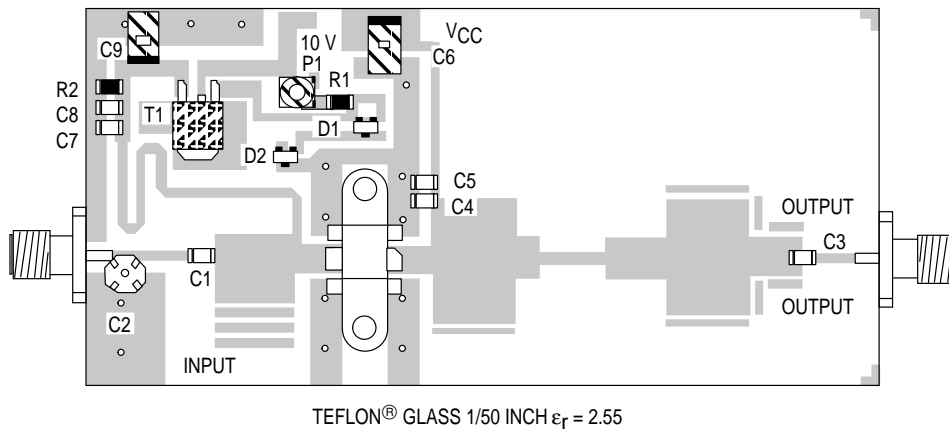
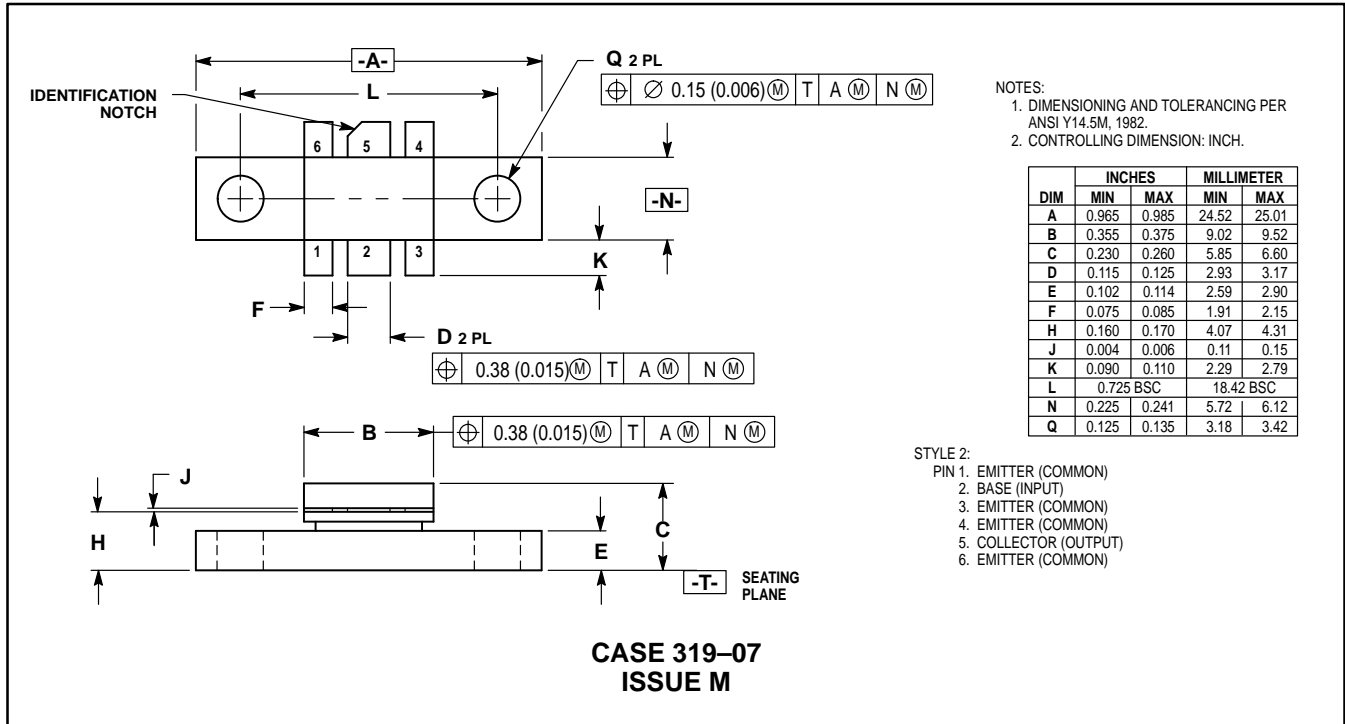



Figure 6. 960 MHz Test Circuit Components View

# PACKAGE DIMENSIONS



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