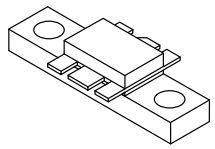
The RF Line
RF Power Transistor

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.

TP3008

4 W, 960 MHz
RF POWER TRANSISTOR
NPN SILICON



CASE 319–07, STYLE 2

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°C Derate above 25°C	P_D	35 0.2	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	$R_{\theta JC}$	5	°C/W

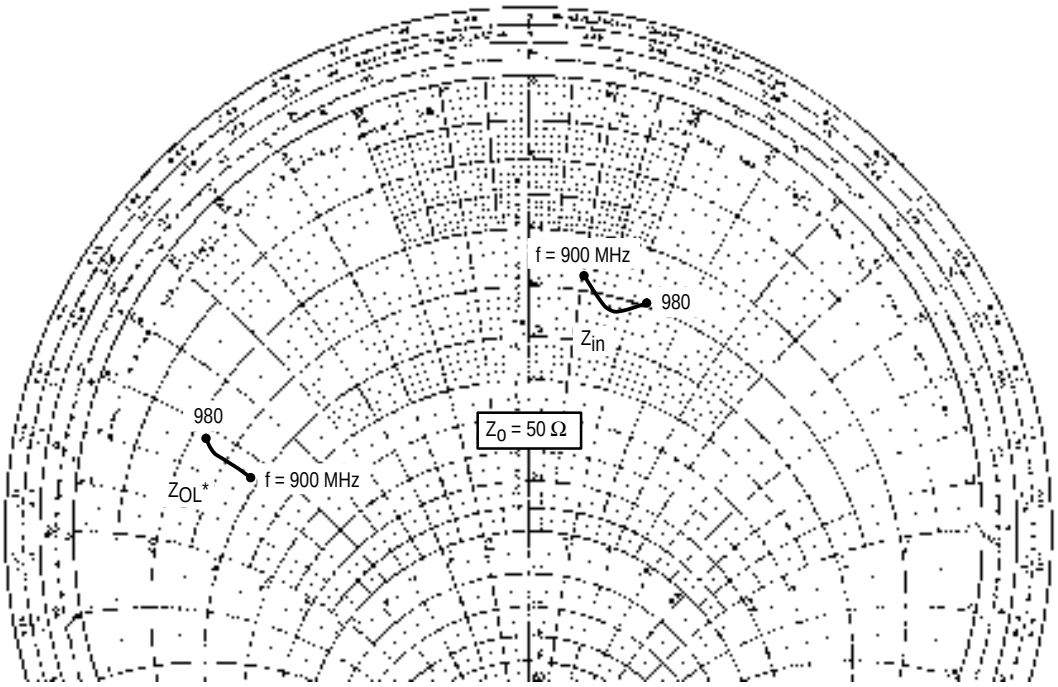
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I_C = 15 mA, R_{BE} = 75 Ω)	$V_{(BR)CER}$	40	—	—	Vdc
Collector–Emitter Breakdown Voltage (I_C = 3 mAdc)	$V_{(BR)CBO}$	45	—	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 2 mA, I_C = 0)	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector–Emitter Leakage (V_{CE} = 26 V, R_{BE} = 75 Ω)	I_{CER}	—	—	2	mA
ON CHARACTERISTICS					
DC Current Gain (I_C = 0.2 Adc, V_{CE} = 5 Vdc)	h_{FE}	15	—	120	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CE} = 24 V, I_E = 0, f = 1 MHz)	C_{ob}	—	6	—	pF

(continued)

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

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

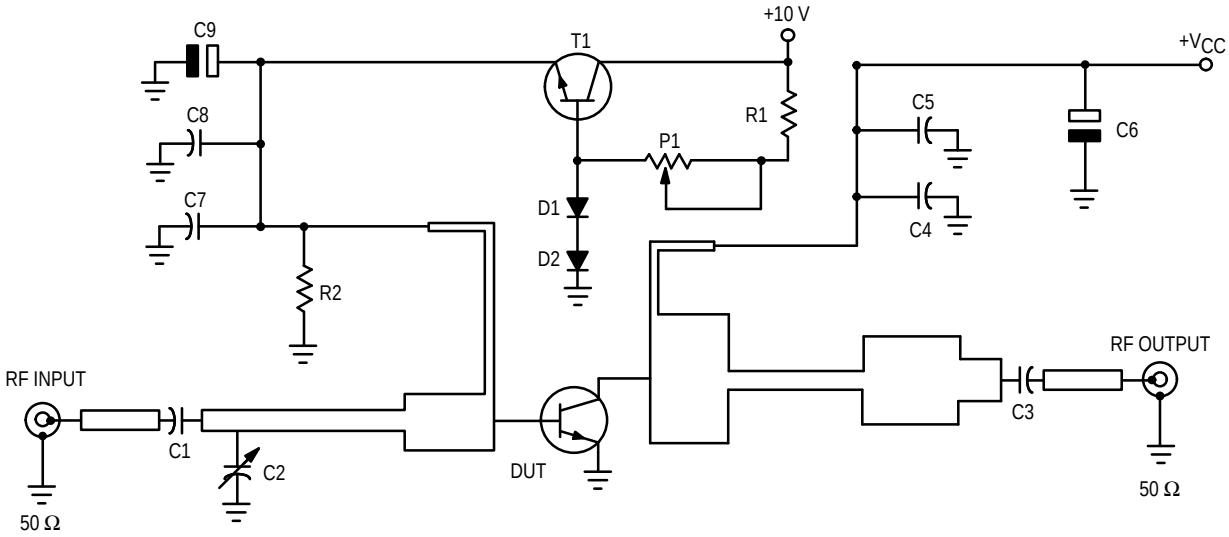


Output impedance with circuit tuned for maximum gain
@ P_{out} = 4 W, V_{CE} = 24 V

f (MHz)	Z_{in} (Ω)	Z_{OL}* (Ω)
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 kΩ, Trimmer
C4,C7	330 pF, Chip Capacitor 0805	R1	1 kΩ, Resistor
C5,C8	10 nF, Chip Capacitor 0805	R2	56 Ω, 0805 Resistor
C6	15 µF, 63 V, Capacitor	T1	Transistor, NPN Type, MJD31C
C9	100 µF, 16 V, Capacitor		

Figure 2. 960 MHz Electrical Schematic

TYPICAL CHARACTERISTICS

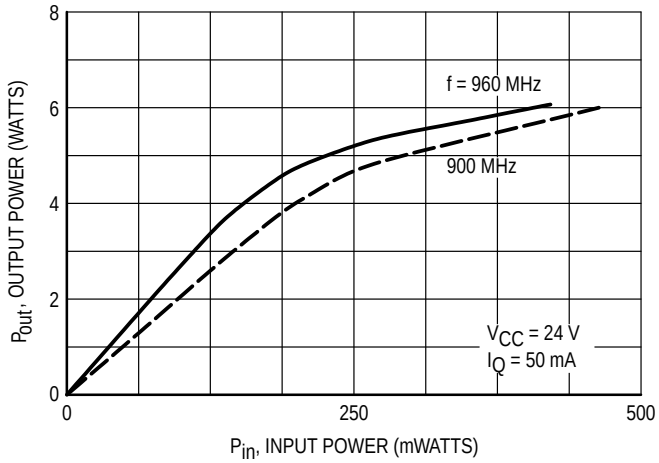


Figure 3. Output Power versus Input Power

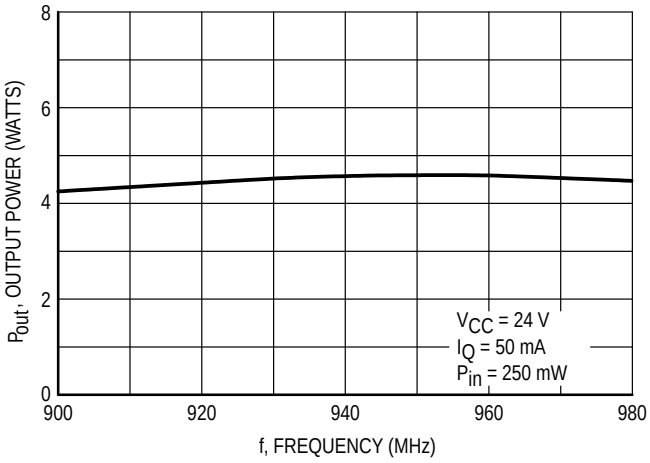


Figure 4. Output Power versus Frequency

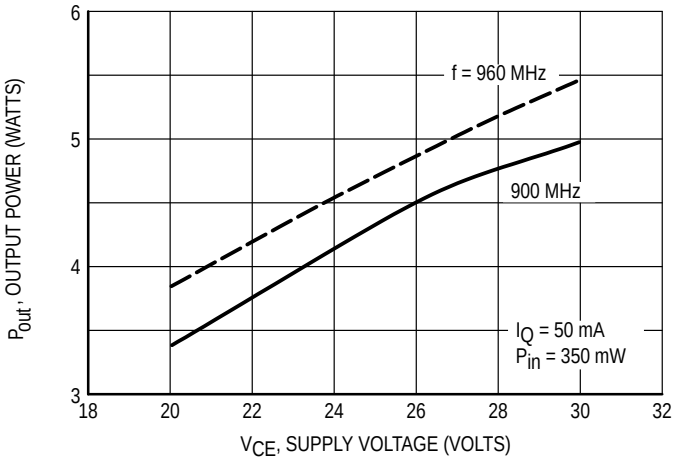
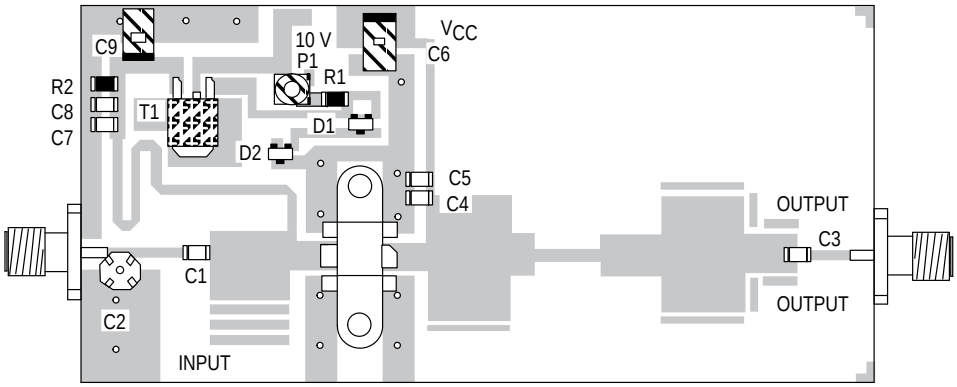


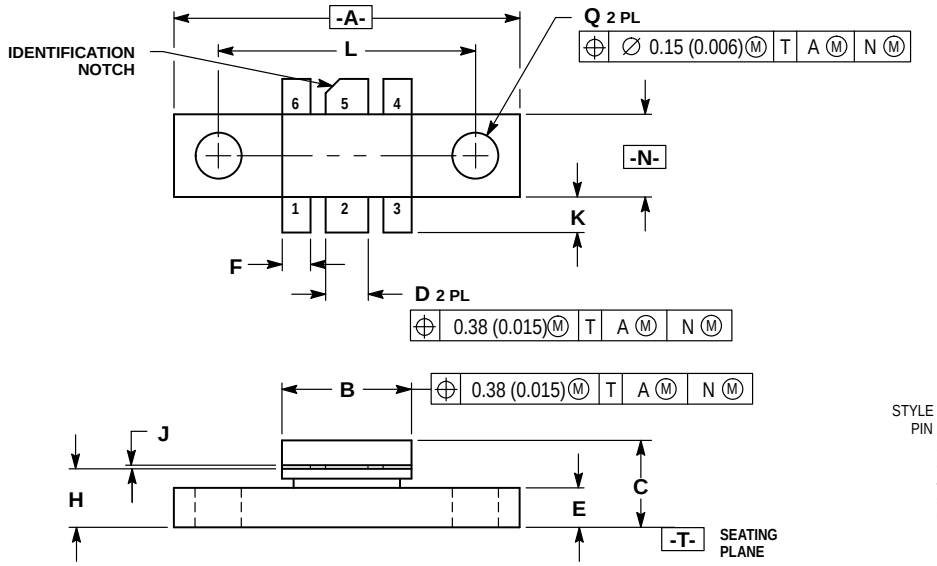
Figure 5. Output Power versus Supply Voltage



TEFLON® GLASS 1/50 INCH ε_r = 2.55

Figure 6. 960 MHz Test Circuit Components View

PACKAGE DIMENSIONS



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

	INCHES		MILLIMETER	
DIM	MIN	MAX	MIN	MAX
A	0.965	0.985	24.52	25.01
B	0.355	0.375	9.02	9.52
C	0.230	0.260	5.85	6.60
D	0.115	0.125	2.93	3.17
E	0.102	0.114	2.59	2.90
F	0.075	0.085	1.91	2.15
H	0.160	0.170	4.07	4.31
J	0.004	0.006	0.11	0.15
K	0.090	0.110	2.29	2.79
L	0.725 BSC		18.42 BSC	
N	0.225	0.241	5.72	6.12
Q	0.125	0.135	3.18	3.42

STYLE 2:
PIN 1. EMITTER (COMMON)
2. BASE (INPUT)
3. EMITTER (COMMON)
4. EMITTER (COMMON)
5. COLLECTOR (OUTPUT)
6. EMITTER (COMMON)

CASE 319–07
ISSUE M

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