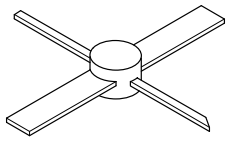
The RF Line
NPN Silicon RF Power Transistor

TP3007S

2 W, 960 MHz
RF POWER TRANSISTOR
NPN SILICON

The TP3007S is designed for 24 volts common emitter base station amplifiers, operating up to 1 GHz bandwidth. It has been specifically designed for use in analog and digital Global System Mobile (GSM) systems. The studless package offers a possibility for surface mounting.

- Specified 24 Volts, 960 MHz Characteristics
  - Output Power — 2 Watts
  - Gain — 9 dB min
  - Efficiency — 50% min, 2 Watts
- Characterized with Series Equivalent Large–Signal Parameters from 920–960 MHz
- Silicon Nitride Passivated
- Gold Metallized, Emitter Ballasted for Long Life and Resistance to Metal Migration
- Class AB Operation
- Circuit board photomaster available upon request by contacting RF Tactical Marketing in Phoenix, AZ.



CASE 305C–02, STYLE 1
SOE200 STUDLESS

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CER}	45	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	8.3 0.048	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) (Studless)	$R_{\theta JC}$	21	°C/W

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

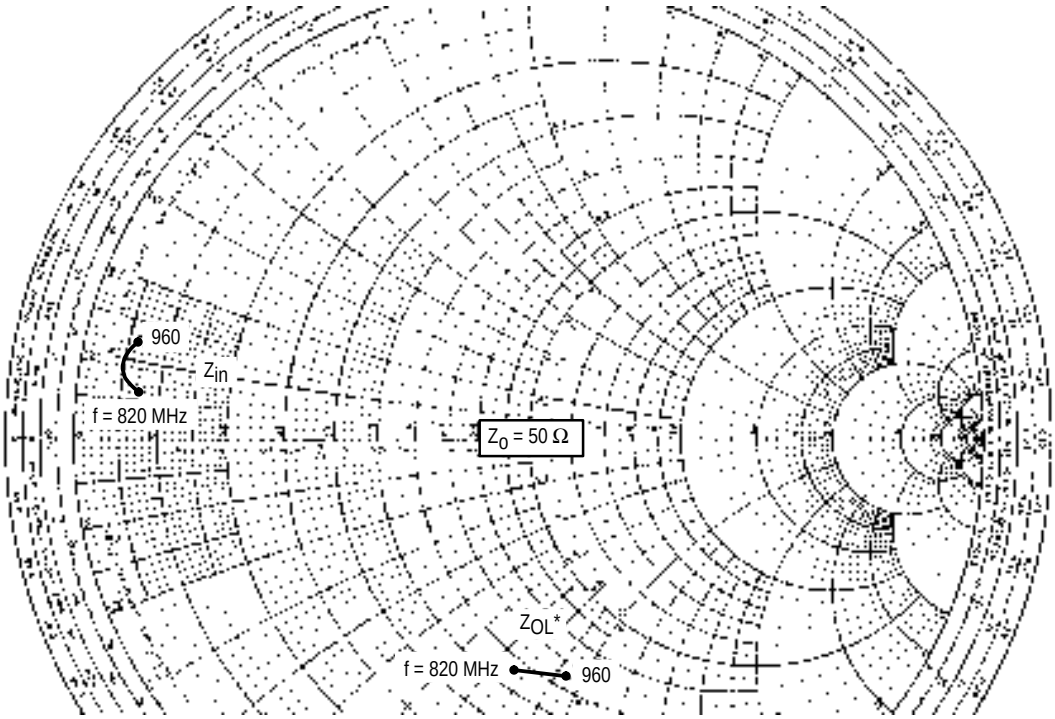
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I_C = 5 mAdc, R_{BE} = 75 Ω)	$V_{(BR)CER}$	45	—	—	Vdc
Collector–Base Breakdown Voltage (I_C = 5 mAdc, I_E = 0)	$V_{(BR)CBO}$	50	—	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 1 mAdc, I_C = 0)	$V_{(BR)EBO}$	3.5	—	—	Vdc

NOTE:
1. Thermal resistance is determined under specified RF operating condition.

(continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS					
DC Current Gain (I_{CE} = 0.1 Adc, V_{CE} = 5 Vdc)	h_{FE}	10	—	150	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 26 Vdc, I_E = 0, f = 1 MHz)	C_{ob}	—	2	—	pF
FUNCTIONAL TESTS					
Common–Emitter Amplifier Power Gain (V_{CC} = 24 Vdc, P_{out} = 2 W, I_{CQ} = 30 mA, f = 960 MHz)	G_p	9	10	—	dB
Collector Efficiency (V_{CC} = 24 Vdc, P_{out} = 2 W, I_{CQ} = 30 mA, f = 960 MHz)	h	50	56	—	%
Output Mismatch Stress (V_{CC} = 24 Vdc, P_{out} = 2 W, I_{CQ} = 30 mA, f = 960 MHz, Load VSWR = 10:1, all phase angles at frequency of test)	Ψ	No Degradation in Output Power			

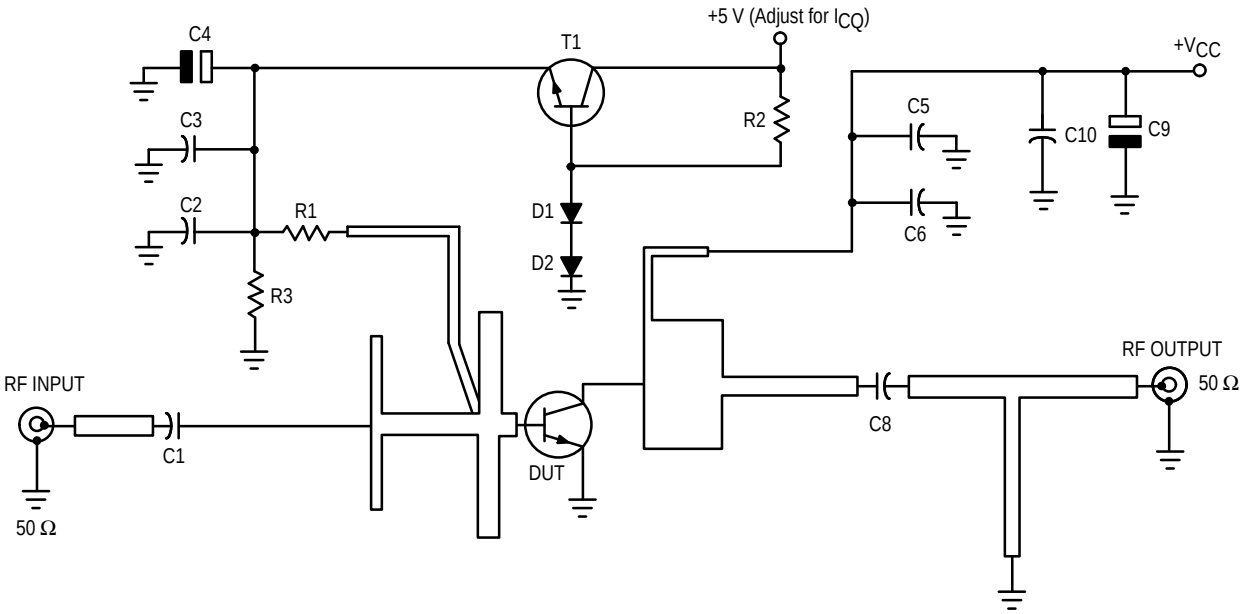


Output Impedances with circuit tuned for maximum gain
@ V_{CC} = 24 V, P_{out} = 2 W

f (MHz)	Z_{in} (Ω)	Z_{OL}* (Ω)
820	4 + j3.8	29 – j41
860	3.4 + j4.4	30 – j43
900	3.1 + j5.1	31 – j44
960	3.5 + j5.5	35 – j45

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	3.9 pF, ATC Chip Capacitor 100A	C10	15 nF, Chip Capacitor
C2,C6	100 pF, ATC Chip Capacitor 100A	D1,D2	Diode, BAS16
C3,C5	15 nF, Chip Capacitor 0805	R1	2.2 Ω, Chip Resistor 1206
C4	10 μF, 16 V, Capacitor	R2	1.2 kΩ, Chip Resistor 1206
C7	15 nF, Chip Capacitor 0805	R3	68 Ω, Chip Resistor 1206
C8	47 pF, Chip Capacitor 100A	T1	Transistor, MJD31C
C9	4.7 μF, 50 V, Capacitor		

Figure 2. 960 MHz Electrical Schematic

TYPICAL CHARACTERISTICS

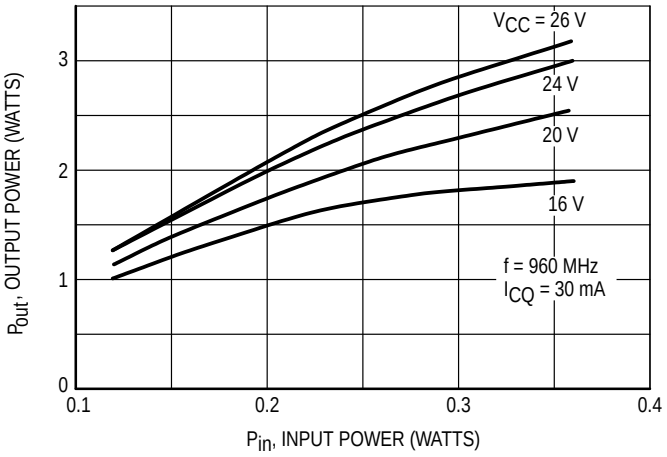


Figure 3. Output Power versus Input Power

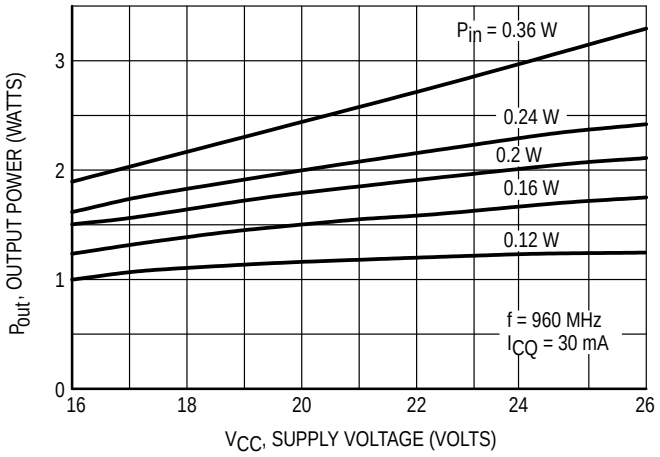


Figure 4. Output Power versus Supply Voltage

TYPICAL CHARACTERISTICS

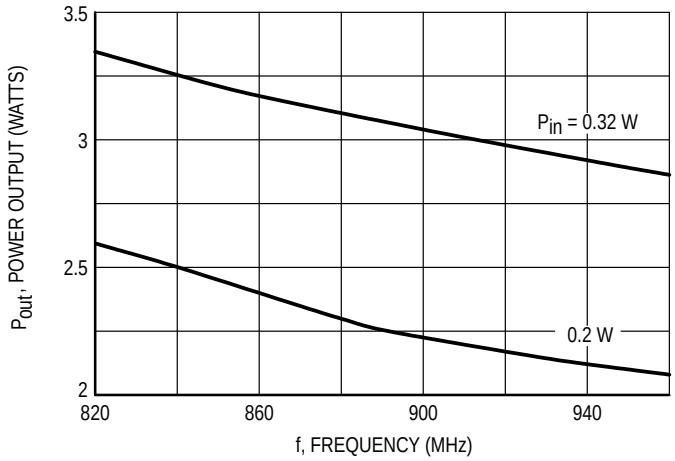


Figure 5. Output Power versus Frequency

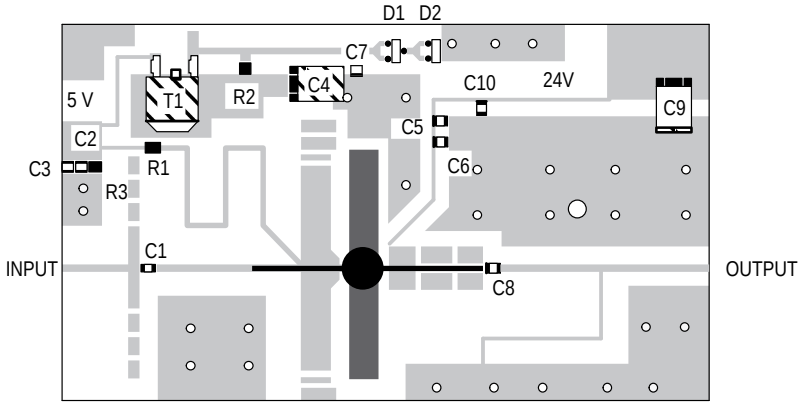
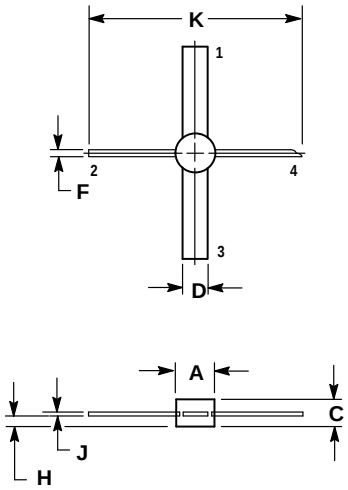


Figure 6. 960 MHz Test Circuit Components View

PACKAGE DIMENSIONS



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

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.200	0.210	5.08	5.33
C	—	0.125	—	3.17
D	0.120	0.130	3.05	3.30
F	0.025	0.035	0.64	0.88
H	0.035	0.045	0.88	1.14
J	0.004	0.006	0.11	0.15
K	0.970	1.030	24.64	26.16

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

CASE 305C–02
ISSUE A

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