The RF Line

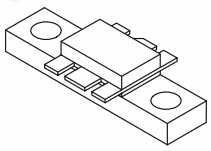
UHF Power Transistor

The TP3005 is designed for 960 MHz 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 26 Volts, 960 MHz Characteristics
  - Output Power = 4.0 Watts
  - Minimum Gain = 8.5 dB
  - Class AB
  - I_Q = 60 mA
- Circuit board photomaster available upon request by contacting RF Tactical Marketing in Phoenix, AZ.

TP3005

**4.0 W, 960 MHz
UHF 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}	48	Vdc
Emitter–Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	2.0	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	25 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 (1) at 70°C Case	$R_{\theta JC}$	7.0	°C/W

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

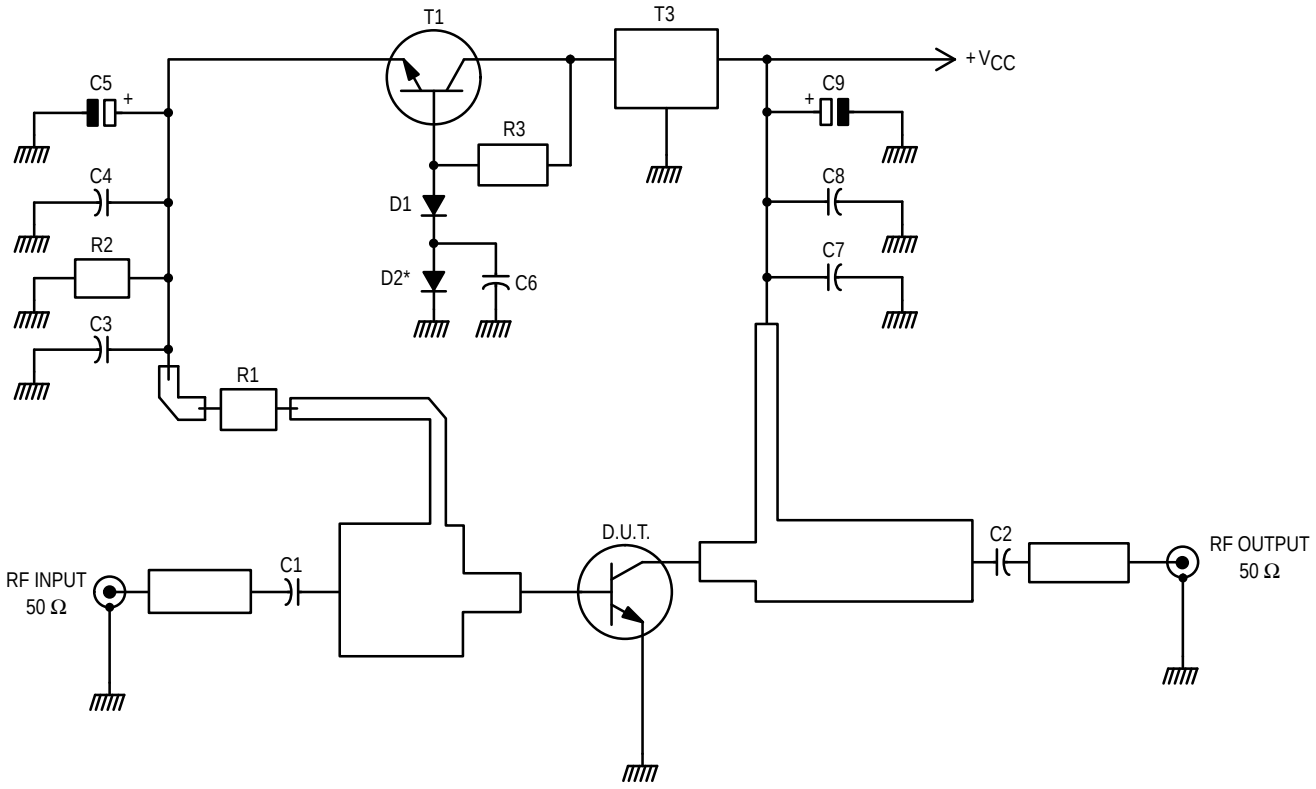
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I_C = 15 mA, R_{BE} = 75 Ω)	$V_{(BR)CER}$	45	—	—	Vdc
Emitter–Base Breakdown Voltage (I_C = 3.0 mAdc)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector–Base Breakdown Voltage (I_E = 15 mAdc)	$V_{(BR)CBO}$	55	—	—	Vdc
Collector–Emitter Leakage (V_{CE} = 26 V, R_{BE} = 75 Ω)	I_{CER}	—	—	3.0	mA
ON CHARACTERISTICS					
DC Current Gain (I_C = 0.5 Adc, V_{CE} = 10 Vdc)	h_{FE}	15	—	100	—

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
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 26 V, I_E = 0, f = 1.0 MHz)	C_{ob}	7.5	—	12.5	pF
FUNCTIONAL TESTS					
Common–Emitter Amplifier Power Gain (V_{CC} = 26 V, P_{out} = 4.0 W, I_{CQ} = 60 mA, f = 960 MHz)	G_p	8.5	9.5	—	dB
Load Mismatch (V_{CC} = 26 V, P_{out} = 4.0 W, I_{CQ} = 60 mA, Load VSWR = 5:1, at all phase angles)	ψ	No Degradation in Output Power Before and After Test			
Collector Efficiency (V_{CC} = 26 V, P_{out} = 4.0 W, f = 960 MHz)	η_c	50	55	—	%
Power Saturation P_{in} = 1.0 W	P_{sat}	7.0	—	—	W



*Contact with RF Transistor

C1 — Capacitor Chip 0805 22 pF 5%
C2, C3, C6, C8 — Capacitor Chip 0805 330 pF 5%
C4, C7 — Capacitor Chip 0805 15 nF 5%
C5, C9 — Capacitor Chip 0805 6.0, 8.0 nF 35 V
D1, D2 — SMD Diode

R1 — Chip Resistor 2.2 Ω 1206 5%
R2 — Chip Resistor 51 Ω 0805 5%
R3 — Chip Resistor 470 Ω 0805 5%
to be adjusted for I_Q = 60 mA
T1 — SMD Transistor BCX54 or Similar
T3 — Voltage Regulator 7805
Board Material — 0.8 mm, Epoxy Glass, Cu Clad, 2 Sides, 35 μm Thick

Figure 1. 960 MHz Test Circuit

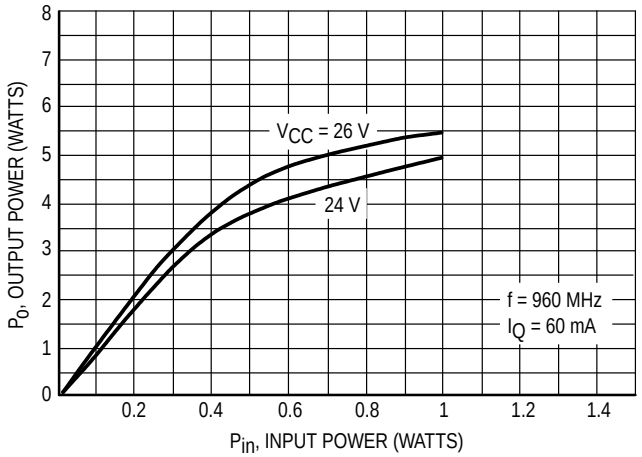


Figure 2. Output Power versus Input Power

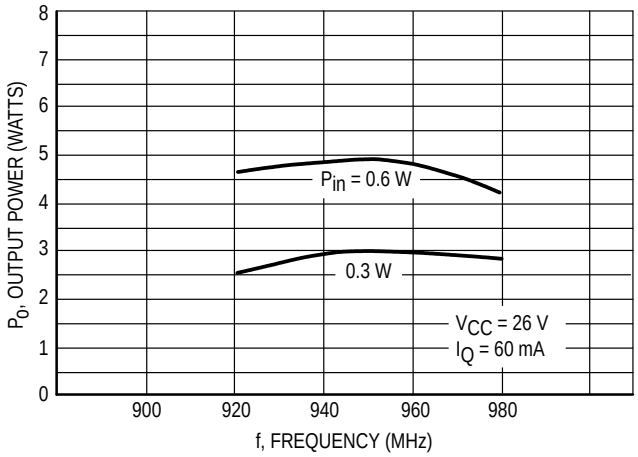


Figure 3. Output Power versus Frequency

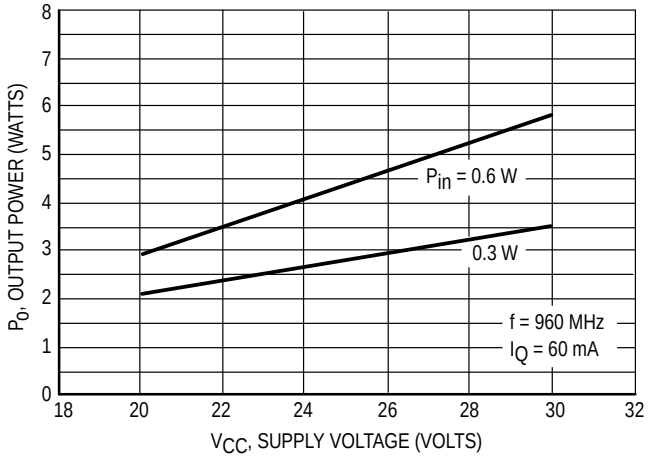


Figure 4. Output Power versus Supply Voltage

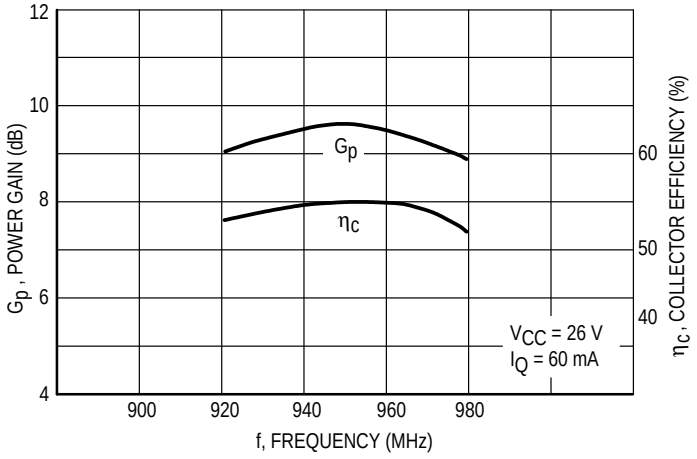
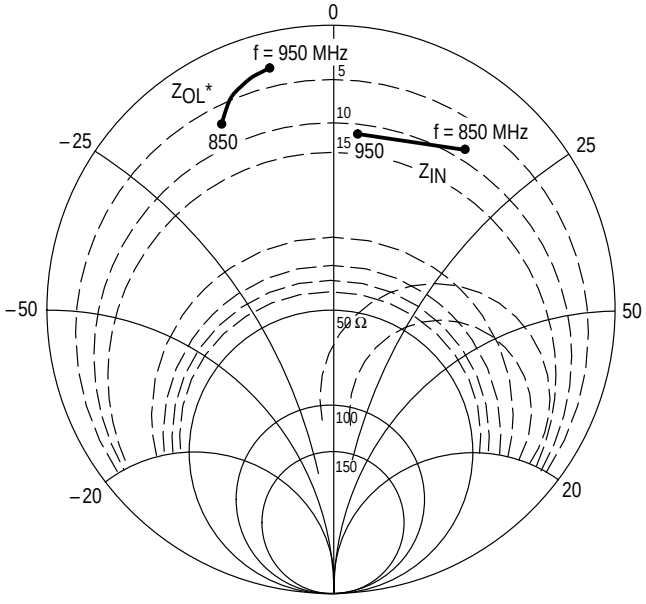


Figure 5. Typical Broadband Circuit Performance



P_{out} = 4.0 W V_{CE} = 26 V

f MHz	Z_{IN} OHMS	Z_{OL}* OHMS
850	8.1 + j17	6.7 – j11
900	9.1 + j12.7	4.0 – j10
950	13.9 + j4.4	3.2 – j6.1

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

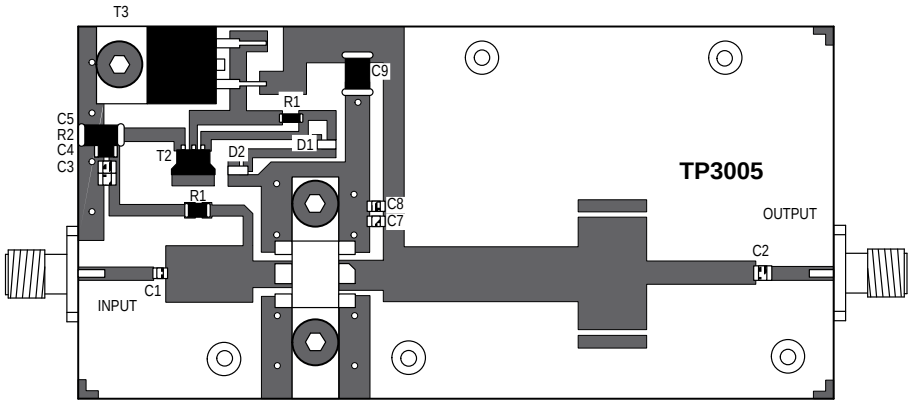
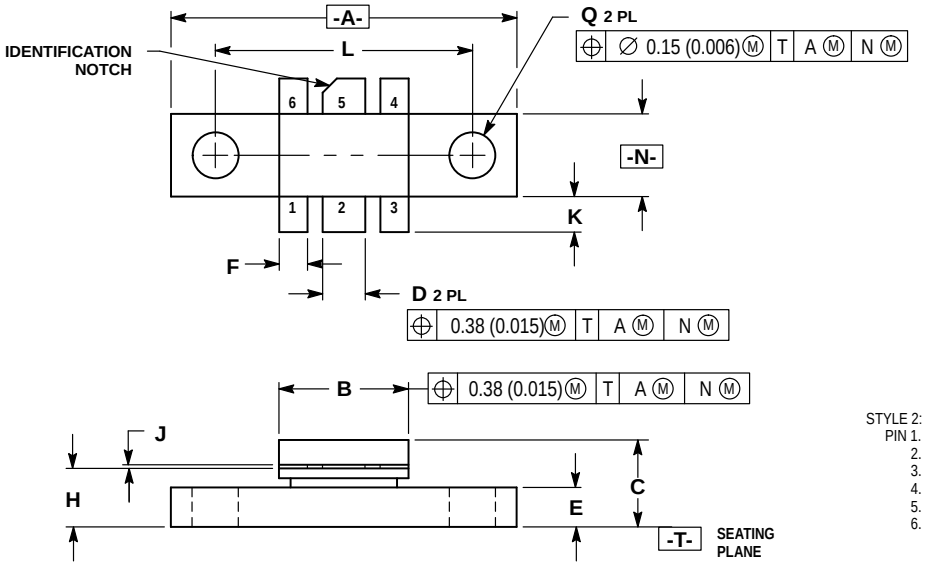


Figure 7. Test Circuit — Component Locations

PACKAGE DIMENSIONS



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

	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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