MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

TP9386

2

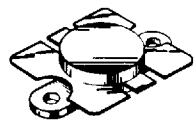
150 W — 175 MHz
VHF POWER
TRANSISTOR

The RF Line
VHF Power Transistor

. . . designed for use in VHF transmitters. Operation is in Class A, B or C from a 28 V supply.

Construction, which now incorporates gold metallization and diffused ballast resistors, ensures a long operational life even when run at its maximum ratings.

- 100–175 MHz
- 150 W — P_{out}
- 28 V — V_{CC}
- High Gain — 10 dB Min @ f = 175 MHz
- Gold Metallization for Reliability
- Diffused Emitter Ballast Resistors for Ruggedness



CASE 316A-01, STYLE 1
(.500 J ZERO)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	35	Vdc
Collector-Base Voltage	V_{CBO}	65	Vdc
Emitter-Base Voltage	V_{EBO}	4	Vdc
Collector Current — Continuous	I_C	15	Adc
Total Device Dissipation @ T_C = 25°C Derate above 70°C	P_D	250 1.43	Watts W/°C
Operating Junction Temperature	T_J	200	°C
Storage Temperature Range	T_{stg}	−65 to +200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.7	°C/W

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 50 mA, I_B = 0)	$V_{(BR)CEO}$	35	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 50 mA, I_E = 0)	$V_{(BR)CBO}$	65	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 20 mA, I_C = 0)	$V_{(BR)EBO}$	4	—	—	Vdc
Collector-Emitter Breakdown Voltage (I_C = 50 mA, R_{BE} = 10 Ω)	$V_{(BR)CER}$	60	—	—	Vdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 1 A, V_{CE} = 5 V)	h_{FE}	15	—	150	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 28 V, I_E = 0, f = 1 MHz)	C_{ob}	—	—	150	pF
FUNCTIONAL TESTS					
Common-Emitter Amplifier Power Gain (V_{CE} = 28 V, P_{out} = 150 W, f = 175 MHz, I_Q = 50 mA)	G_{PE}	10	—	—	dB
Collector Efficiency (V_{CE} = 28 V, P_{out} = 150 W, f = 175 MHz, I_Q = 50 mA)	η_c	60	—	—	%

TYPICAL CHARACTERISTICS

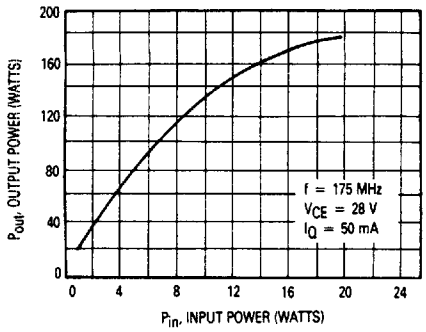


Figure 1. Output Power versus Input Power

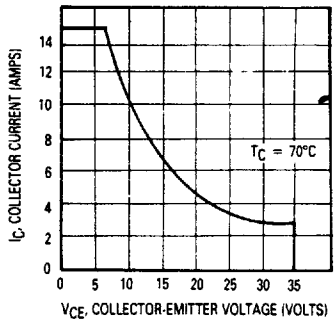
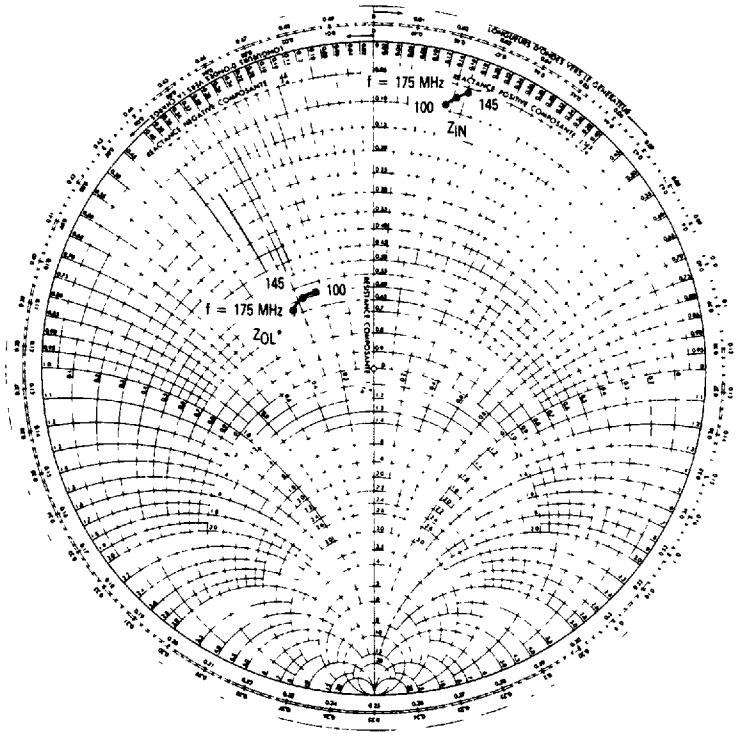


Figure 2. DC Safe Operating Area



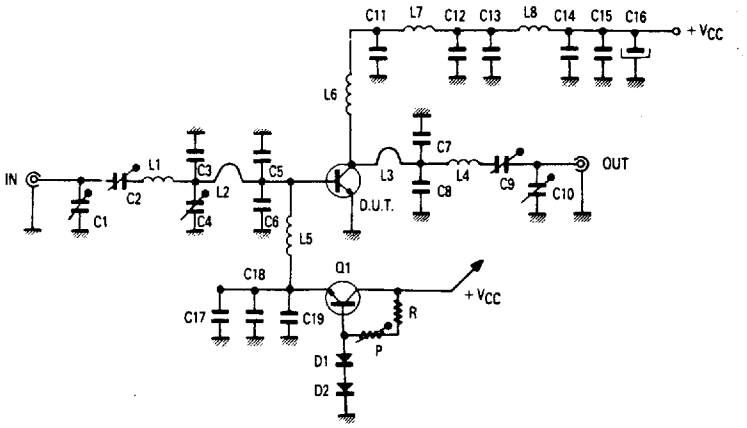
Conditions

V_{CE} = 28 V, I_Q = 50 mA, P_{out} = 150 W

f (MHz)	Z_{in} (Ω)	Z_{OL}* (Ω)
100	0.43 + j0.65	2.88 − j1.13
145	0.40 + j0.7	2.88 − j1.22
175	0.29 + j0.87	3.16 − j1.39

Figure 3. Series Equivalent Input/Output Impedances

Z_{OL}* = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and frequency



C1, C2 — ARCO 403
C3 — 30 pF
C4 — ARCO 404
C5, C6 — 80 pF
C7, C8 — 100 pF
C9, C10 — ARCO 425 (24–200 pF)
C11, C12, C14, C17 — 1000 pF
C13, C15, C18 — 10 nF
C16, C19 — 47 μF

L1 — 2 turns, ø 8 mm 1 mm wire
L2 — Hair pin, Copper foil 15 x 3 mm, 0.3 mm thick
L3 — Hair pin, Copper foil 12 x 5 mm, 0.3 mm thick
L4 — 3 turns, ø 5 mm, 1.5 mm wire
L5 — 10 turns, ø 5 mm, 0.5 mm wire
L6 — 3 turns, ø 6 mm, 1.5 mm wire
L7 — 3 turns, ø 6 mm, 1.5 mm wire
L8 — 10 turns, 1 mm wire on core (μi = 120)

R — 1.5 Ω 1/2 W
P — 5 kΩ
D1, D2 — 1N4007
Q1 — BD135

Figure 4. 175 MHz Test Fixture