

# MOTOROLA SEMICONDUCTOR TECHNICAL DATA

## TP2317

### The RF Line

## VHF Power Transistor

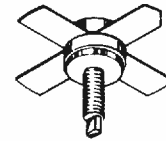
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The TP2317 is designed for use in 12.5 V VHF amplifiers operating under Class A, B or C conditions.

Its construction, which incorporates gold metallization and diffused ballast resistors, enables the part to be used at its maximum ratings and be able to withstand an infinite VSWR at all phase angles.

- 175 MHz
- 20 W —  $P_{out}$
- 12.5 V —  $V_{CC}$
- Gold Metallization for Reliability

20 W — 175 MHz  
VHF POWER  
TRANSISTOR  
NPN SILICON



CASE 145D-01, STYLE 1  
(.380 SOE)

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	16	Vdc
Collector-Base Voltage	$V_{CBO}$	36	Vdc
Emitter-Base Voltage	$V_{EBO}$	4	Vdc
Collector Current — Continuous	$I_C$	8	Adc
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	$R_{\theta JC}$	2.2	°C/W

### ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ( $I_C = 50$ mA, $I_B = 0$ )	$V_{(BR)CEO}$	16	—	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = 50$ mA, $I_E = 0$ )	$V_{(BR)CBO}$	36	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 5$ mA, $I_C = 0$ )	$V_{(BR)EBO}$	4	—	—	Vdc
Collector-Emitter Breakdown Voltage ( $I_C = 50$ mA, $R_{BE} = 10$ $\Omega$ )	$V_{(BR)CER}$	35	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = 15$ V, $I_E = 0$ )	$I_{CBO}$	—	—	25	mAdc

### ON CHARACTERISTICS

DC Current Gain ( $I_C = 1$ A, $V_{CE} = 5$ V)	$h_{FE}$	10	—	—	—
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### FUNCTIONAL TESTS

Common-Emitter Amplifier Power Gain ( $V_{CE} = 12.5$ V, $P_{out} = 20$ W, $f = 175$ MHz)	$G_{PE}$	7	—	—	dB
Collector Efficiency ( $V_{CE} = 12.5$ V, $P_{out} = 20$ W, $f = 175$ MHz)	$\eta_c$	55	—	—	%
Load Mismatch ( $V_{CE} = 12.5$ V, $P_{out} = 20$ W, $f = 175$ MHz, Load VSWR = $\infty:1$ , All Phase Angles)	$\psi$	No Degradation in Output Power			

TYPICAL CHARACTERISTICS

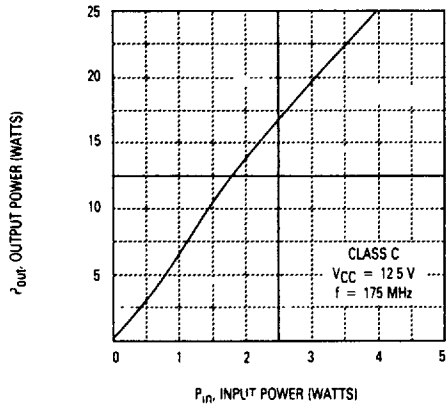


Figure 1. Power Transfer

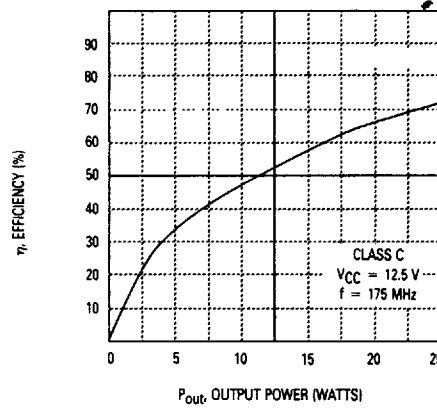


Figure 2. Collector Efficiency

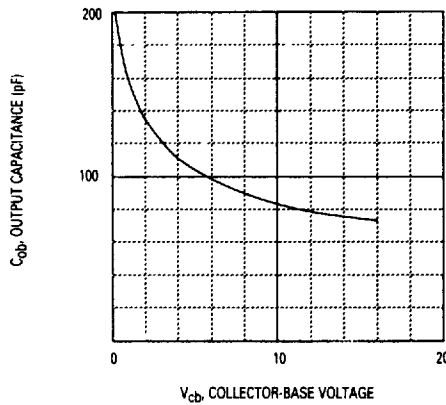


Figure 3. Output Capacitance (Typical)

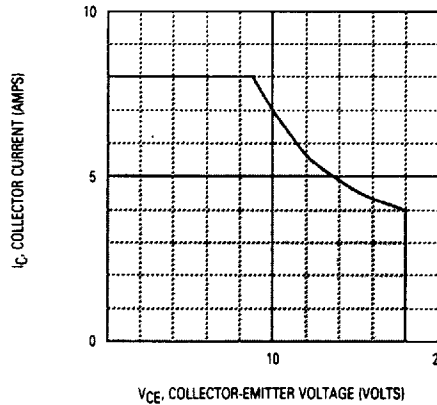


Figure 4. Safe Operating Area

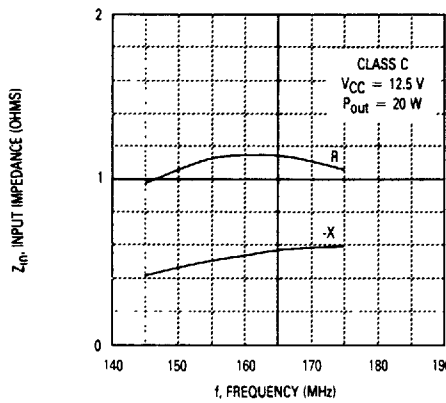


Figure 5. Input Series Impedance

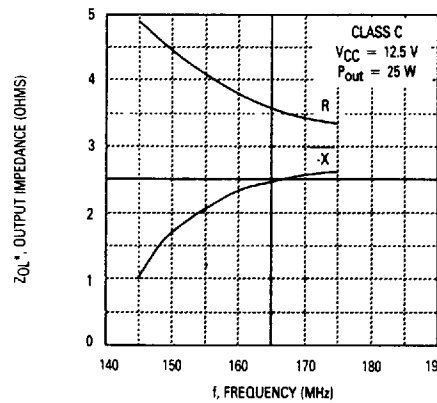
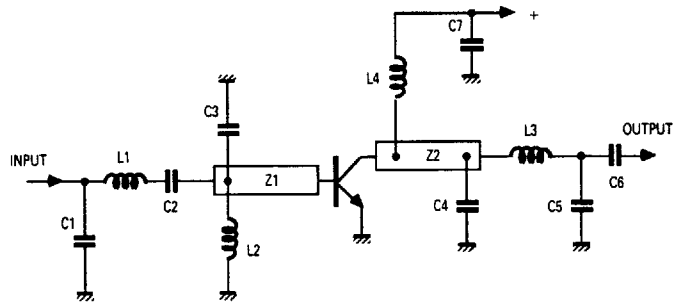


Figure 6. Output Series Impedance

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- C1 — ARCO 4-40 pF Trimmer Capacitor  
 C2 — ARCO 4-40 pF Trimmer Capacitor  
 C3 — UNELCO 200 pF  
 C4 — UNELCO 120 pF  
 C5 — ARCO 7-120 pF Trimmer Capacitor  
 C6 — ARCO 24-200 pF Trimmer Capacitor  
 C7 — 1 nF + 0.1  $\mu$ F + 47  $\mu$ F  
 L1 — 3 turns 16 AWG 0.16" I.D.  
 L2 — 0.47  $\mu$ H Molded Coil  
 L3 — 1 turn 16 AWG 0.16" I.D.  
 L4 — 6 turns 12 AWG On 380  $\Omega$  2 W Carbon  
 Z1 — Base pad 0.06" single sided PC board 0.55" Lx0.28" W  
 Z2 — Collector pad 0.06" single sided PC board 0.58" Lx0.28" W  
 PC Board: Double Sided PC Board 0.06"

Figure 7. 175 MHz Test Circuit