MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

TP2180

The RF Line
VHF Power Transistor

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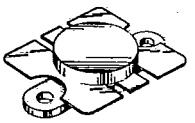
Designed for use in 12.5 V VHF amplifiers operating under Class A, B or C conditions. Its construction which incorporates gold metallization and diffused ballast resistors for longer life, enables the part to be used at its maximum ratings and be able to withstand an infinite VSWR at all phase angles.

- 88 MHz
- 80 W — P_{out}
- 12.5 V — V_{CC}
- Gold Metallization for Reliability
- Load Mismatch Capability at Rated Output Power

80 W — 88 MHz
VHF POWER TRANSISTOR
NPN SILICON



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

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	18	Vdc
Collector-Base Voltage	V_{CBO}	40	Vdc
Emitter-Base Voltage	V_{EBO}	4	Vdc
Collector Current — Continuous	I_C	16	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	140 0.8	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	$R_{\theta JC}$	1.25	°C/W

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 200 mA, I_B = 0)	$V_{(BR)CEO}$	18	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 100 mA, I_E = 0)	$V_{(BR)CBO}$	40	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 mA, I_C = 0)	$V_{(BR)EBO}$	4	—	—	Vdc
Collector Cutoff Current (V_{CB} = 20 V, I_E = 0)	I_{CBO}	—	—	5	mAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 1 A, V_{CE} = 5 V)	h_{FE}	10	—	—	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 20 V, I_E = 0, f = 1 MHz)	C_{ob}	—	—	180	pF

(continued)

ELECTRICAL CHARACTERISTICS — continued

Characteristic	Symbol	Min	Typ	Max	Unit
FUNCTIONAL TESTS					
Common-Emitter Amplifier Power Gain (V_{CE} = 12.5 V, P_{out} = 80 W, f = 88 MHz)	G_{PE}	7	—	—	dB
Collector Efficiency (V_{CE} = 12.5 V, P_{out} = 80 W, f = 88 MHz)	η_C	60	70	—	%
Load Mismatch (V_{CE} = 12.5 V, P_{out} = 80 W, f = 88 MHz, Load VSWR = ∞:1, All Phase Angles)	ψ	No Degradation in Output Power			
Input Impedance, Common Emitter (Typ) (V_{CE} = 12.5 V, P_{in} = 16 W, f = 88 MHz)	Z_{in} = 0.3 − j0.4 Ohms				
Load Impedance, Common Emitter (Typ) (V_{CE} = 12.5 V, P_{out} = 80 W, f = 88 MHz)	Z_{Load} = 0.6 − j0.44 Ohms				

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TYPICAL CHARACTERISTICS

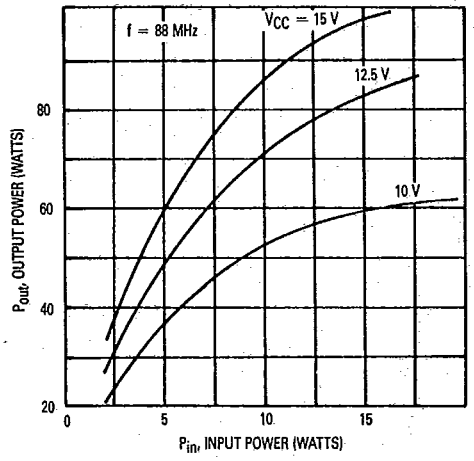

Figure 1. Output Power versus Input Power

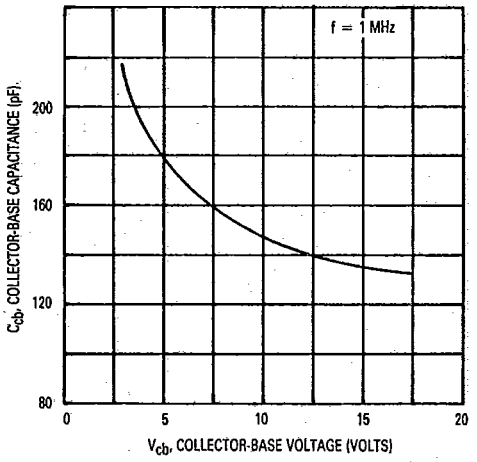

Figure 2. Collector-Base Capacitance versus Voltage

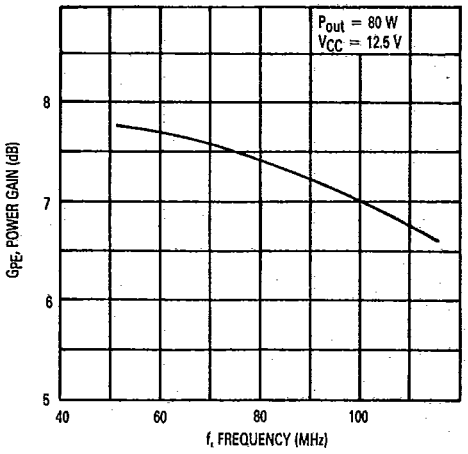

Figure 3. Power Gain versus Frequency

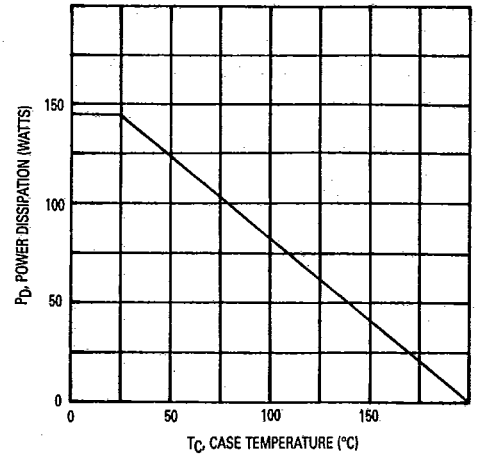

Figure 4. Power Dissipation Rating versus Temperature

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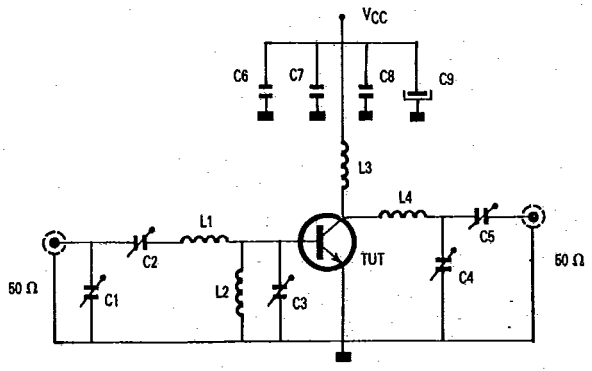

C1, C4 — 24–200 pF trimmer capacitor ARCO 425
C2, C3 — 55–300 pF trimmer capacitor ARCO 427
C5 — 7–100 pF trimmer capacitor ARCO 423
C6 — 1000 pF mica capacitor UNELCO
C7 — 10 nF ceramic disc
C8 — 0.1 μF ceramic disc
C9 — 470 μF/40 V

L1 — 3 turns, 12/10 mm silvered wire, 5 mm I.D.
L2 — 0.68 μH molded coil
L3 — 5 turns, 12/10 mm silvered wire, 12 mm I.D.
L4 — 1 turn, 12/10 mm silvered wire, 6 mm I.D.

Figure 5. 88 MHz Test Circuit