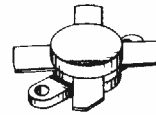


MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA
The RF Line**VHF Power Transistor**

... designed for use in the new generation of VHF-FM broadcast transmitters operating from a 28 V supply in Class A, B or C.

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

- 108 MHz
- 75 W — P_{out}
- 28 V — V_{CC}
- High Gain — 11 dB, Class C
- Gold Metallization for Improved Reliability
- Diffused Emitter Ballast Resistors for Ruggedness

TP9380
75 W to 108 MHz
VHF POWER
TRANSISTOR

CASE 211-11, STYLE 1
(.500 SOE F)

2

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	35	Vdc
Collector-Base Voltage	V _{CB0}	65	Vdc
Emitter-Base Voltage	V _{EBO}	4	Vdc
Collector Current — Continuous	I _C	10	Adc
Total Device Dissipation @ T _C = 25°C Derate above 70°C	P _D	100 0.67	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 _{θJC}	1.5	°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}	35	—	—	Vdc
Collector-Base Breakdown Voltage (I _C = 50 mA, I _E = 0)	V _{(BR)CBO}	65	—	—	Vdc
Emitter-Base Breakdown Voltage (I _E = 10 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}	20	—	150	—
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DYNAMIC CHARACTERISTICS

Output Capacitance (V _{CB} = 30 V, I _E = 0, f = 1 MHz)	C _{ob}	—	—	85	pF
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(continued)

ELECTRICAL CHARACTERISTICS — continued

Characteristic	Symbol	Min	Typ	Max	Unit
FUNCTIONAL TESTS					
Common-Emitter Amplifier Power Gain ($V_{CE} = 28\text{ V}$, $P_{out} = 75\text{ W}$, $f = 108\text{ MHz}$)	G _{PE}	10.3	—	—	dB
Collector Efficiency ($V_{CE} = 28\text{ V}$, $P_{out} = 75\text{ W}$, $f = 108\text{ MHz}$)	η_c	70	75	—	%
Load Mismatch ($V_{CE} = 28\text{ V}$, $P_{out} = 75\text{ W}$, $f = 108\text{ MHz}$, Load VSWR = 4:1, All Phase Angles)	ψ	No Degradation in Output Power			

TYPICAL CHARACTERISTICS

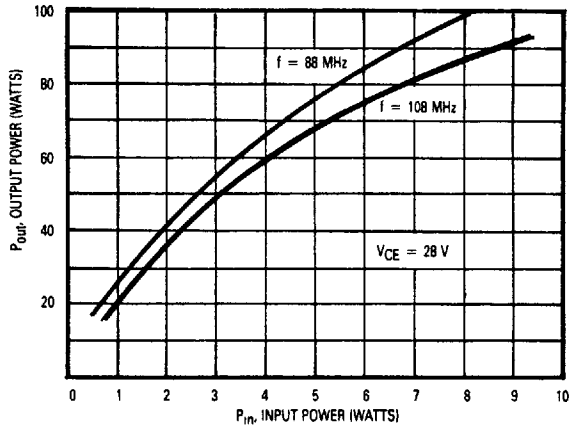


Figure 1. Power Output versus Power Input

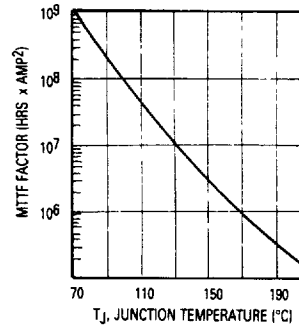


Figure 2. MTTF Factor versus Junction Temperature

Note: Divide by I_C^2 to obtain metal lifetime in hours

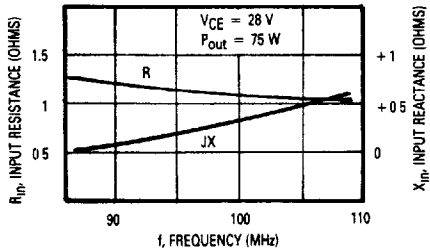


Figure 3. Series Input Impedance versus Frequency

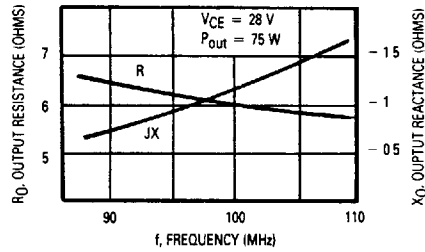


Figure 4. Series Output Impedance versus Frequency

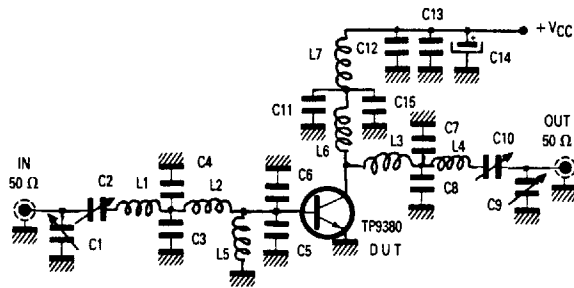


Figure 5. 88-108 MHz Narrowband Test Fixture

- C1 — Arco 425 Variable capacitor (24-200 pF)
- C2 — Arco 425 Variable capacitor (24-200 pF)
- C3 — 80 pF UNELCO
- C4 — 60 pF UNELCO (108 MHz)
100 pF UNELCO (88 MHz)
- C5 — 330 pF chip capacitor (closed to the transistor)
- C6 — 330 pF chip capacitor (closed to the transistor)
- C7 — 40 pF UNELCO
- C8 — 40 pF UNELCO (108 MHz)
80 pF UNELCO (88 MHz)
- C9 — Arco 423 Variable capacitor (7-100 pF)
- C10 — Arco 425 Variable capacitor (24-200 pF)
- C11 — 1000 pF UNELCO
- C12 — 1000 pF UNELCO
- C13 — 0.1 μ F disc capacitor
- C14 — 100 μ F/40 V capacitor
- C15 — 10 nF disc capacitor
- L1 — 3 turns ID = 6 mm 1 mm wire
- L2 — Hair pin made with a 1.4 mm wire L = 15 mm
- L3 — Hair pin made with a 2 mm wire L = 20 mm for 108 MHz
Hair pin made with a 2 mm wire L = 30 mm for 88 MHz
- L4 — 3 turns ID = 8 mm 1.4 mm wire
- L5 — 0.7 μ H choke
- L6 — 6 turns ID = 6 mm 1.2 mm wire L = 15 mm
- L7 — 4 turns 1.2 mm wire on ferrite