MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

TPM4130

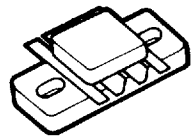
2

The RF Line
UHF Power Transistor

. . . specially designed for multi-octave bandwidth high power applications. Its internal matching and package configuration lead to high input and output impedances. Multi-cell die design and ultra thin beryllium oxide header allow optimum heat dissipation and operating efficiency. Long term reliability and ruggedness are guaranteed by use of diffused silicon ballast resistors and gold metallization.

- 225–400 MHz
- 130 W — P_{out}
- 28 V — V_{CC}
- Push-Pull Transistor

130 W — 400 MHz
UHF POWER TRANSISTOR



MRP 7
CASE 827-01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	30	Vdc
Collector-Base Voltage	V_{CBO}	65	Vdc
Emitter-Base Voltage	V_{EBO}	3.5	Vdc
Collector Current — Continuous	I_C	10	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	210 0.11	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 (T_{case} = 60°C)	$R_{\theta JC}$	0.85	°C/W

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 50 mA, I_B = 0)	$V_{(BR)CEO}$	30	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 100 mA, I_E = 0)	$V_{(BR)CBO}$	65	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 5 mA, I_C = 0)	$V_{(BR)EBO}$	3.5	—	—	Vdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 1 A, V_{CE} = 5 V)	h_{FE}	20	—	150	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 28 V, I_E = 0, f = 1 MHz)	C_{ob}	—	60	70	pF
FUNCTIONAL TESTS					
Common Emitter Amplifier Power Gain (V_{CE} = 28 V, P_{out} = 130 W, f = 400 MHz)	G_{PE}	7.2	—	—	dB
Collector Efficiency (V_{CC} = 28 V, P_{out} = 130 W, f = 400 MHz)	η_c	60	—	—	%

TYPICAL PERFORMANCE

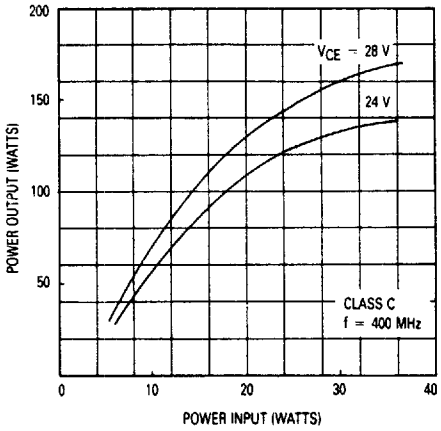


Figure 1. Power Output versus Power Input

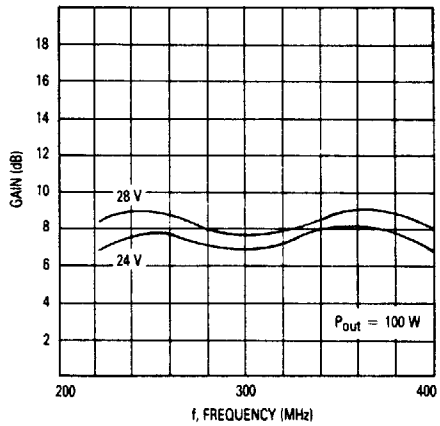


Figure 2. Gain versus Frequency

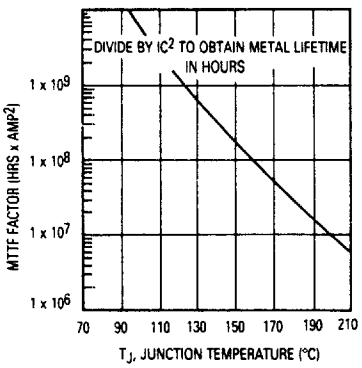


Figure 3. MTTF Factor versus T_j

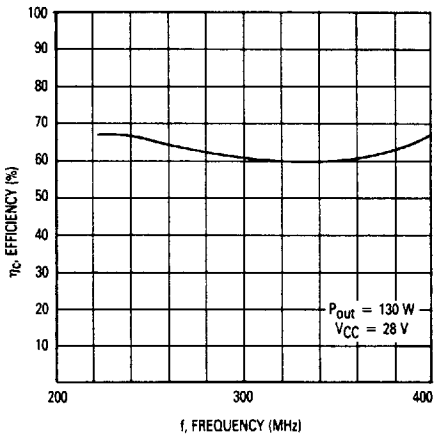
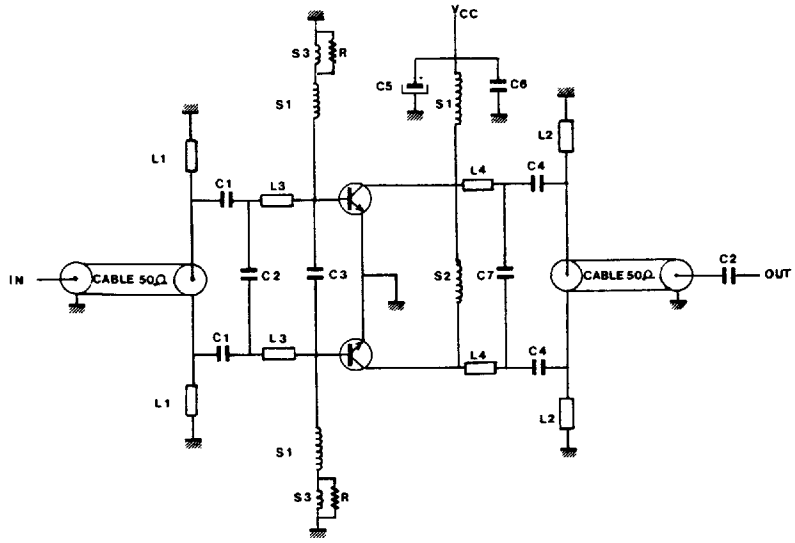


Figure 4. Efficiency versus Frequency

2



L1, L4 — 30 mm 50 Ω teflon coaxial cable soldered on L2 and L12
L2, L3 — 24 mm x 1,5 mm on substrate
L4, L6 — 6 x 2.5 mm on substrate
L9 — hair pin made with 24 mm of 5 mm wire (as close to the collectors as possible)
L8 — 0 1 μH
L10, L11 — 8 x 1 5 mm on substrate
L12, L13 — 30 mm x 2.5 mm on substrate

Substrate teflon-glass 1/16" (ϵ_r = 2 55)

C1 — ATC 100B 39 pF capacitors
C2 — ATC 100B 27 pF capacitors
C3 — ATC 100B 47 pF capacitor
C4 — ATC 100B 33 pF capacitor
C5 — Electrolytic capacitor 10 μF 63 V
C6 — Chip capacitor 100 nF
C7 — ATC 100B 22 pF capacitor
S1 — Inductor 0.8 mm wire 3 8 mm ID
S2 — Inductor 0.5 mm wire 24 mm long
S3 — Inductor 1 μH
R — Resistor 10 Ω ±10% 1/4 W
L1 — Microstrip lines 28 5 mm x 1.5 mm
L2 — Microstrip lines 30 mm x 2 5 mm
L3 — Microstrip lines 11 mm x 2 5 mm
L4 — Microstrip lines 12 mm x 2 mm

Teflon coaxial 50 Ω Ø 1 8 mm 27 5 mm

Figure 5. 225–400 MHz Test Circuit