MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

TPM4040

The RF Line
UHF Power Transistor

40 W — 400 MHz
UHF POWER TRANSISTOR

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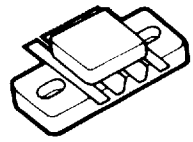
The TPM4040 is an internally matched transistor in a push-pull package specially designed for multi-octave bandwidth high gain and power applications. Its internal matching and package configuration lead to high input and output impedances.

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.

- 30–400 MHz
- 40 W — P_{out}
- 28 V — V_{CC}
- Gold Metallization for Reliability
- Push-Pull Transistor
- Diffused Emitter Ballast Resistors for Ruggedness



MRP 7
CASE 827-01, STYLE 1

MAXIMUM RATINGS

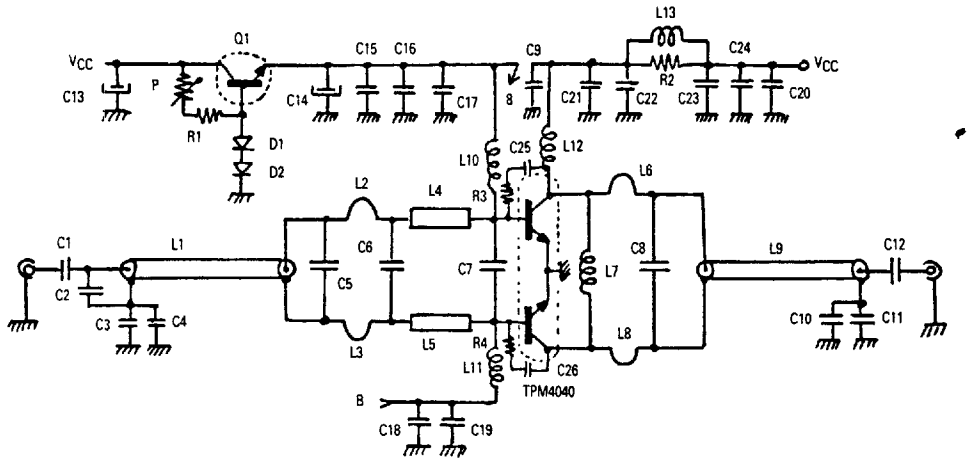
Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	30	Vdc
Collector-Base Voltage	V_{CBO}	45	Vdc
Emitter-Base Voltage	V_{EBO}	4	Vdc
Total Device Dissipation @ T_C = 25°C Derate above 25°C (T_{case} = 70°C)	P_D	65 0.5	Watts W/°C
Operating Junction Temperature	T_J	200	°C
Storage Temperature Range	T_{stg}	−65 to +200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case (T_{case} = 70°C)	$R_{\theta JC}$	2	°C/W

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 40 mA, I_B = 0)	$V_{(BR)CEO}$	30	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 20 mA, I_E = 0)	$V_{(BR)CBO}$	45	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 6 mA, I_C = 0)	$V_{(BR)EBO}$	4	—	—	Vdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 500 mA, V_{CE} = 20 V)	h_{FE}	10	—	—	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 28 V, I_E = 0, f = 1 MHz)	C_{ob}	—	—	20	pF
FUNCTIONAL TESTS					
Common-Emitter Amplifier Power Gain (V_{CE} = 28 V, P_{out} = 40 W, f = 400 MHz)	G_{PE}	10	—	—	dB
Collector Efficiency (V_{CC} = 28 V, P_{out} = 40 W, f = 400 MHz)	η_c	50	—	—	%
Load Mismatch (P_{out} = 40 W, I_{CQ} = 2 x 50 mA, f = 400 MHz, Load VSWR = ∞:1, All Phase Angles)	ψ	No Degradation in Output Power			



C1, C6, C12 — 39 pF chip capacitor
C2 — 3.9 pF chip capacitor
C3, C10, C15, C18, C21, C23 — 1000 pF chip capacitor
C4, C11, C16, C19, C22, C24 — 15 nF chip capacitor
C5 — 22 pF chip capacitor
C7 — 68 pF chip capacitor
C8 — 15 pF chip capacitor
C25, C26 — 10 nF ceramic disc capacitor
C14 — 10 μF 5 V Electrolytic capacitor
C13 — 100 μF 40 V Electrolytic capacitor
C9, C13, C17, C20 — 0.1 μF Tantal

L1, L9 — 100 mm, 50 ohms teflon coaxial cable
L2, L3 — hair pin L = 17 mm, 0.8 mm wire
L4, L5 — 6 mm x 3 mm line on substrate
L6, L8 — hair pin L = 12 mm, 0.8 mm wire
L7 — 3 turns Ø 5 mm, 0.8 mm wire
L10, L11, L12 — 15 turns Ø 3 mm 0.5 mm craneled wire
L13 — 6 turns Ø 5 mm 1.2 mm wire

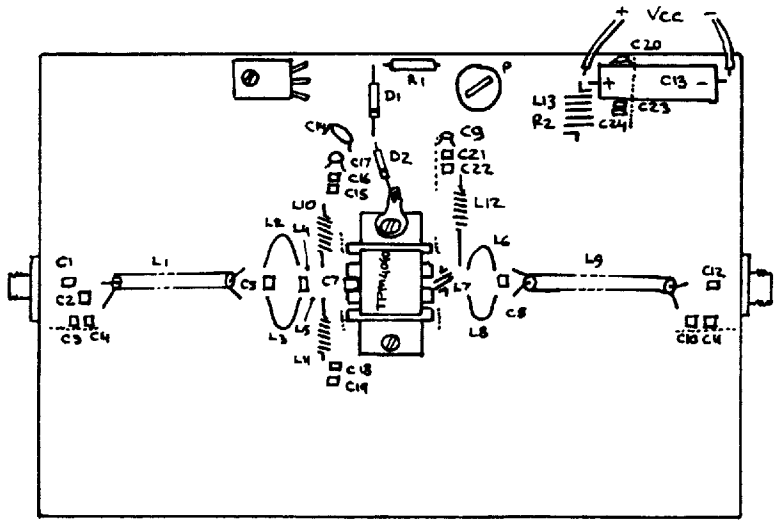
R1 — 1.2 k ohms 1/2 W
R2 — 15 ohms 1/2 W
R3, R4 — 1 k ohms 1/4 W

D1, D2 — 1N4007 or equivalent

Q1 — BD135 or equivalent

Substrate — teflon glass 1/50"

Figure 1. 100–400 MHz 40 W Amplifier (Class AB)



- - - - - = grounding foil

Figure 2. Components Layout

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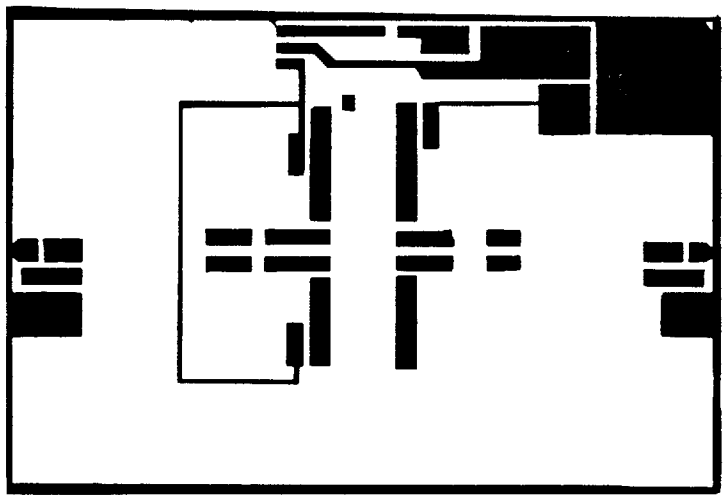

NOTE: The Printed Circuit Board shown is 75% of the original.

Figure 3. Printed circuit Board

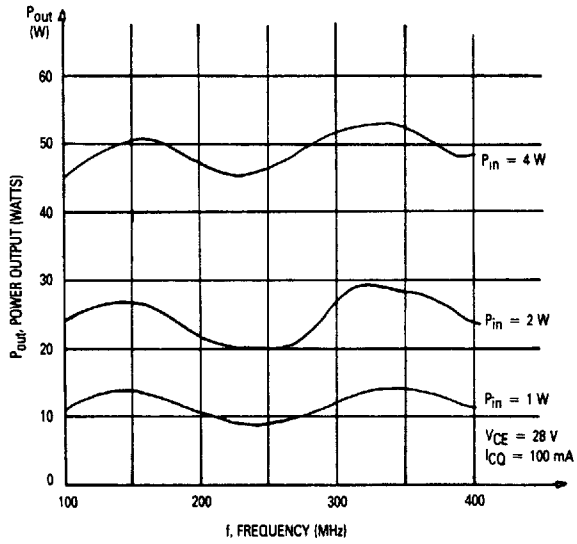

Figure 4. Typical Output Power versus Frequency