TBA 641B

LINEAR INTEGRATED CIRCUIT

AUDIO AMPLIFIER

- OUTPUT POWER 4.5 W (14 V - 4 Ω)
- LOW DISTORTION
- LOW QUIESCENT CURRENT
- HIGH INPUT IMPEDANCE

The TBA 641 B is a monolithic integrated circuit in a 14-lead quad in-line power plastic package. It is particularly designed for use as audio power amplifier in radio and television receivers, and in industrial applications which require high output power, low distortion and high reliability performance. Special features of the circuit include a low quiescent current, self centering bias for operation at supply voltage ranging from 6 V to 16 V, direct coupling of the input. The circuit requires a minimum of external components.

ABSOLUTE MAXIMUM RATINGS

V_s	Supply voltage (no signal)	18	V
V_s	Operating supply voltage	16	V
V_i	Input voltage	-0.5 to $+V_s$	V
I_o	Peak output current	2.5	A
→ P_{tot}	Power dissipation at $T_{amb} \leq 25\ °C$ *	1.5	W
	$T_{amb} \leq 25\ °C$ **	2.3	W
	$T_{case} \leq 70\ °C$	6	W
T_{stg}, T_j	Storage and junction temperature	-40 to 150	°C

* For TBA 641 B72
** For TBA 641 BX1 and TBA 641 B11

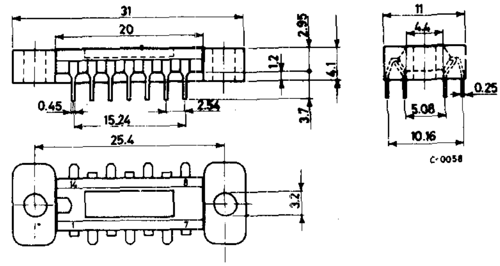
ORDERING NUMBERS:

TBA 641 B72 for quad in-line plastic package with spacer
TBA 641 BX1 for quad in-line plastic package with external bar
TBA 641 B11 for quad in-line plastic package with inverted external bar

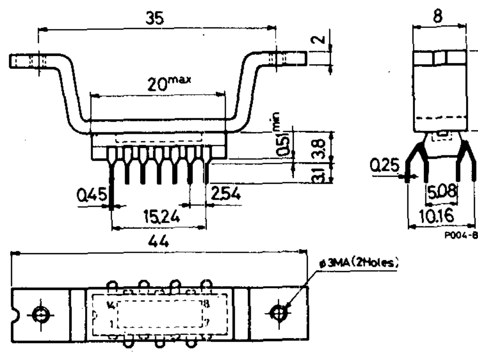
TBA 641B

MECHANICAL DATA (Dimensions in mm)

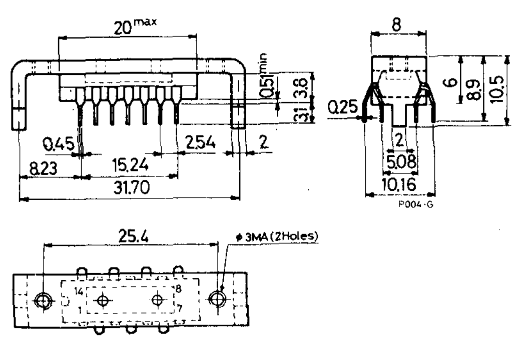
Quad in-line plastic package with spacer for TBA 641 B72 (see also "MOUNTING INSTRUCTIONS")



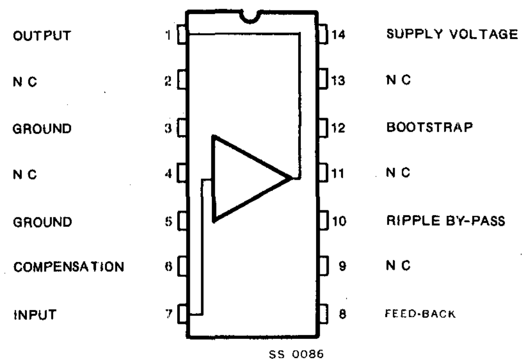
Quad in-line plastic package with external bar for TBA 641 BX1



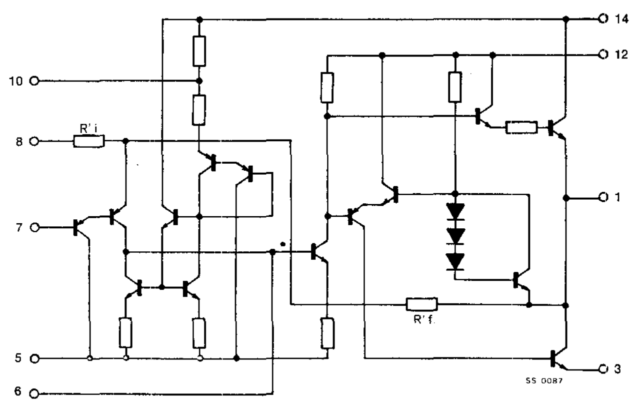
Quad in-line plastic package with inverted external bar for TBA 641 B11



CONNECTION DIAGRAM

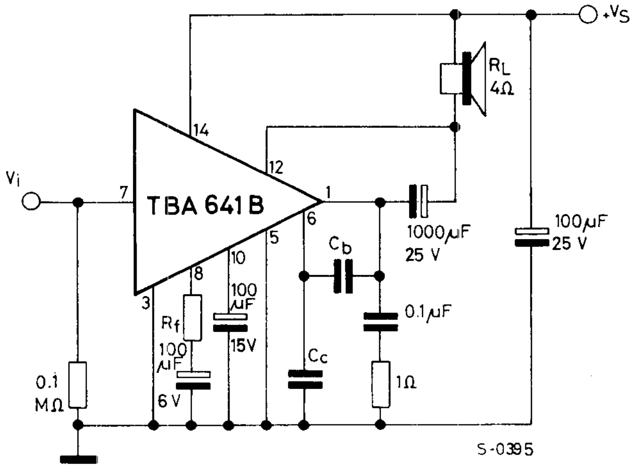


SCHEMATIC DIAGRAM



TBA 641B

TEST AND APPLICATION CIRCUIT



THERMAL DATA

			TBA 641 B72	TBA 641 BX1 TBA 641 B11
→ $R_{th\ j\text{-}case}$	Thermal resistance junction-case	max	13 °C/W	13 °C/W
→ $R_{th\ j\text{-}amb}$	Thermal resistance junction-ambient	max	83 °C/W	55 °C/W

ELECTRICAL CHARACTERISTICS

(See test circuit; T_{amb} = 25 °C, V_s = 14 V and R_L = 4 Ω unless otherwise specified)

Parameter		Test conditions	Min.	Typ.	Max.	Unit
V_o	Quiescent output voltage (pin 1)		6.5	7	8	V
I_d	Total quiescent drain current	$P_o = 0$		16	32	mA
I_d	Quiescent drain current of output transistors	$P_o = 0$		13		mA
I_d	Drain current	P_o = 4.5 W		485		mA
I_b	Bias current (pin 7)			250		nA

ELECTRICAL CHARACTERISTICS (continued)

	Parameter	Test conditions	Min.	Typ.	Max.	Unit
P_o	Output power	d = 10% f = 1 kHz G_v = 46 dB	4	4.5		W
R'_f	Internal feedback resistance	See schematic diagram		7		kΩ
R'_i	Internal feedback resistance	See schematic diagram		35		Ω
Z_i	Input impedance (pin 7)	f = 1 kHz G_v = 46 dB		3		MΩ
d	Distortion	f = 1 kHz G_v = 46 dB P_o = 50 mW P_o = 2 W		 0.3 0.8		 % %
G_v	Voltage gain	R_f = 0		46		dB
e_N	Input noise voltage	R_s = 22 kΩ B = 10 kHz		3.4		µV

Fig. 1 - Typical output power vs supply voltage

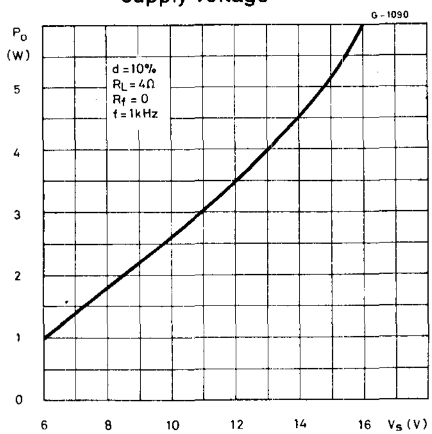


Fig. 2 - Typical distortion vs output power

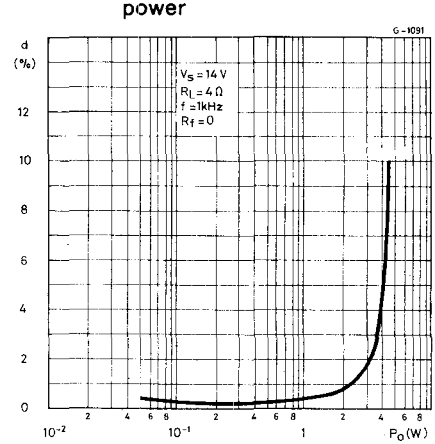


Fig. 3 - Typical voltage gain vs feedback resistance (R_f)

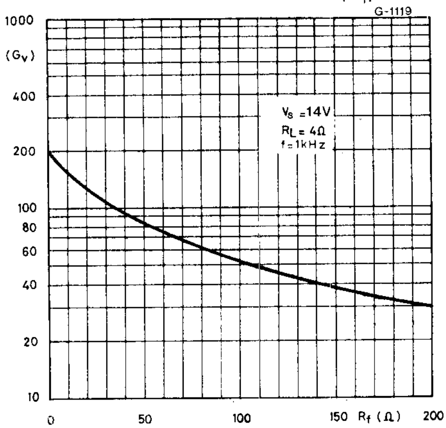


Fig. 4 - Typical value of C_b vs R_f for various values of B

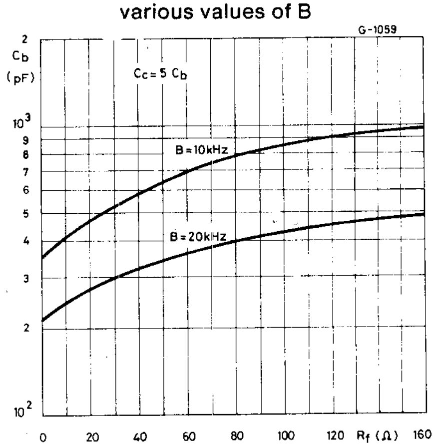


Fig. 5 - Typical output power vs input voltage

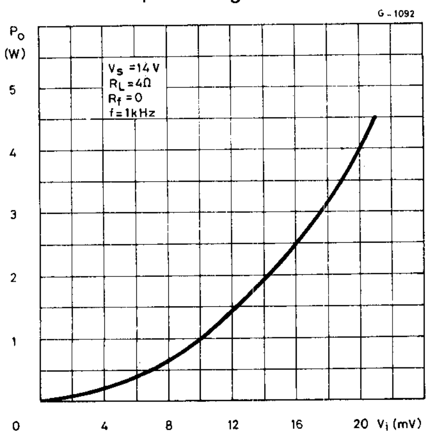


Fig. 6 - Typical power dissipation and efficiency vs output power

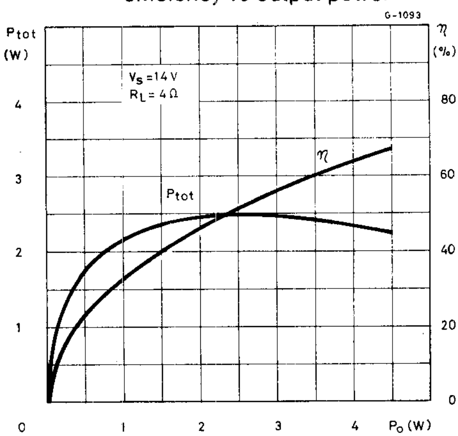


Fig. 7 - Typical drain current vs output power

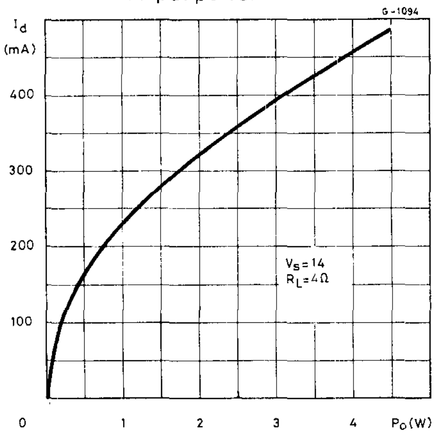


Fig. 8 - Maximum power dissipation vs supply voltage

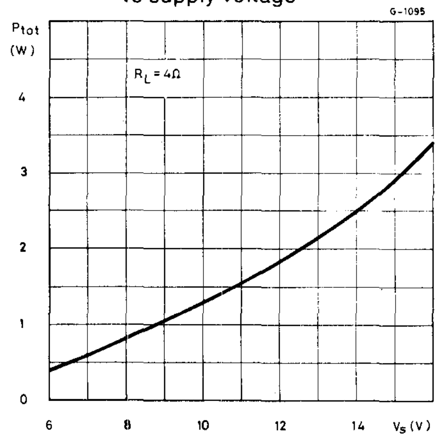


Fig. 9 - Power rating chart **(TBA 641 BX1** and **TBA 641 B11)**

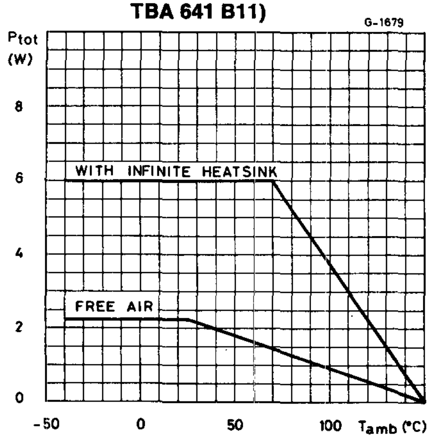


Fig. 10 - Power rating chart **(TBA 641 B72)**

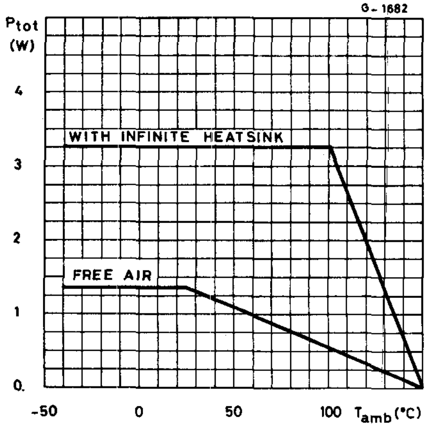


Fig. 11 - Typical quiescent drain current vs supply voltage

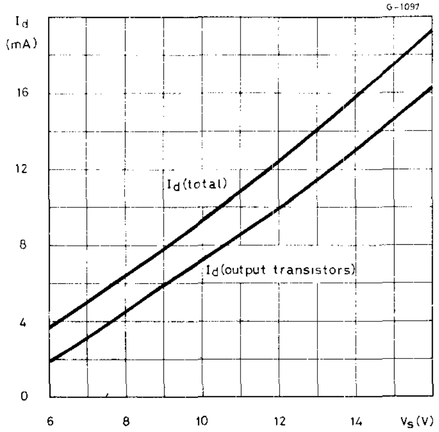


Fig. 12 - Typical quiescent drain current vs ambient temperature

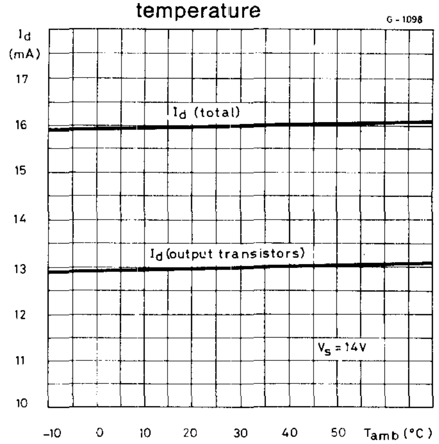


Fig. 13 - Typical quiescent output voltage vs ambient temperature

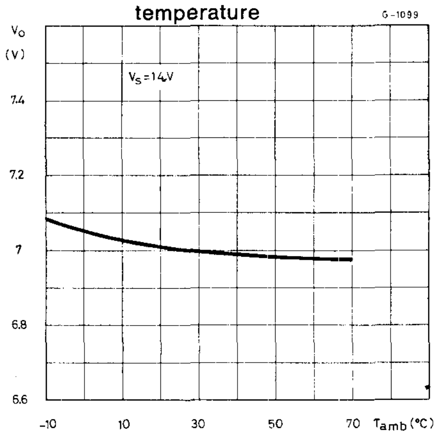
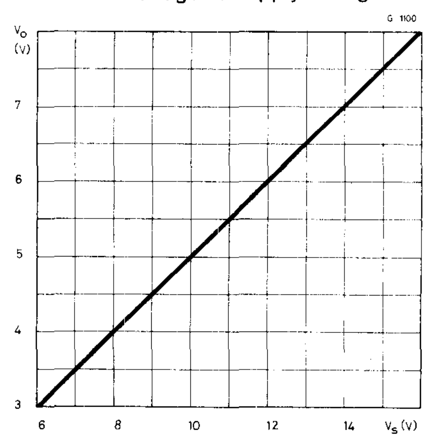
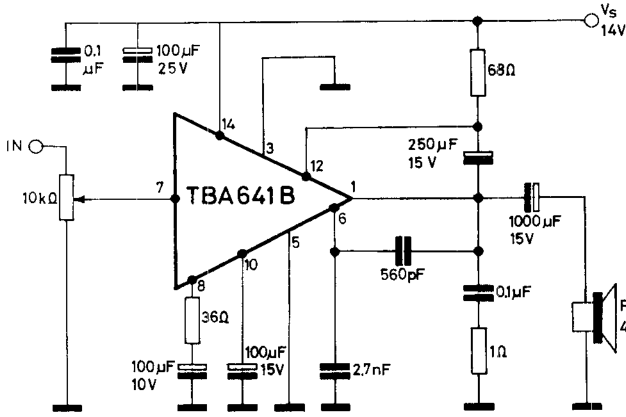


Fig. 14 - Typical quiescent output voltage vs supply voltage



TYPICAL APPLICATION



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MOUNTING INSTRUCTIONS

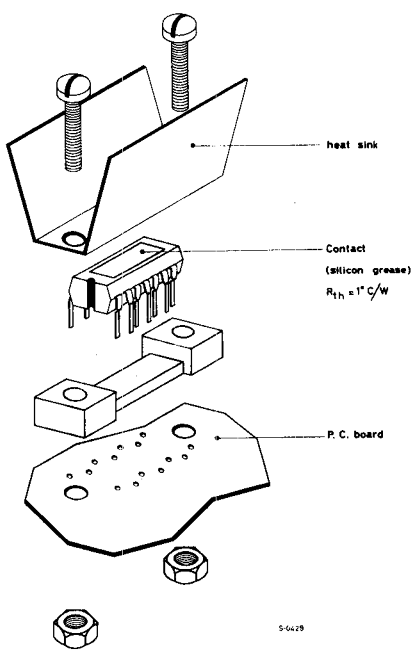

Fig. 15-Shows a method of mounting the TBA 641 B with the spacer, satisfactory both mechanically and from the point of view of heat dissipation. Better thermal contact between package and heat-sink can be obtained by using a small quantity of silicon grease. For heat dissipation the desired thermal resistance is obtained by fixing the elements shown to a heat-sink of suitable dimensions.

MOUNTING INSTRUCTIONS (continued)

Power dissipation can be achieved by means of an additional external heat-sink fixed with two screws (both packages) or by soldering the pins of the external bar to suitable copper areas on the p.c. board (TBA 641 B11)

A. In the former case, the thermal resistance case-ambient of the added heat-sink can be calculated as follows:

$$R_{th} = \frac{(T_{jmax} - T_{amb}) - P_{tot} \cdot R_{th\ j\text{-}case}}{P_{tot}}$$

where:

T_{jmax} = Max junction temperature

T_{amb} = Ambient temperature

P_{tot} = Power dissipation

$R_{th\ j\text{-}case}$ = Thermal resistance junction-case

B. If copper areas on the p.c. board are used (TBA 641 B11) the diagrams enclosed give the maximum power dissipation as a function of copper area, with copper thickness 35 μ and ambient temperature 55 °C.