TAA 611C

LINEAR INTEGRATED CIRCUIT

AUDIO AMPLIFIER

- OUTPUT POWER 3.3 W (15 V - 8 Ω)
- LOW DISTORTION
- LOW QUIESCENT CURRENT
- SELF CENTERING BIAS
- HIGH IMPEDANCE

The TAA 611C is a monolithic integrated circuit in a 14-lead quad in-line power plastic package.
It is particularly designed for use as audio amplifier in radio receivers, record players and portable TV sets. The usable range of supply voltage varies from 6 to 18 V, and the circuit requires a minimum number of external components.
The package has very low thermal resistance. To decrease the thermal resistance further an external heat-sink can easily be mounted by means of ordinary hardware.

ABSOLUTE MAXIMUM RATINGS

V_s	Supply voltage (no signal)	22	V
V_s	Operating supply voltage	18	V
V_i*	Input voltage	-0.5 to 20	V
I_o	Output peak current	1	A
→ P_{tot}	Power dissipation at $T_{amb} \leqq 25\ °C$ **	1.35	W
	at $T_{amb} \leqq 25\ °C$ ***	2	W
	at $T_{case} \leqq 100\ °C$	3.1	W
→ T_{stg}, T_j	Storage and junction temperature	-40 to 150	°C

* For $V_s < 20$ V, $V_{i\ max} = V_s$
** For TAA 611 C 72
*** For TAA 611 CX1 and TAA 611 C11

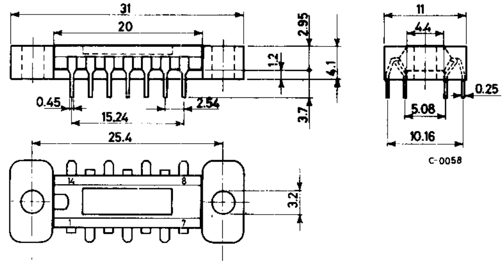
ORDERING NUMBERS:

TAA 611 C72 (for quad in-line plastic package with spacer)
TAA 611 CX1 (for quad in-line plastic package with external bar)
TAA 611 C11 (for quad in-line plastic package with inverted external bar)

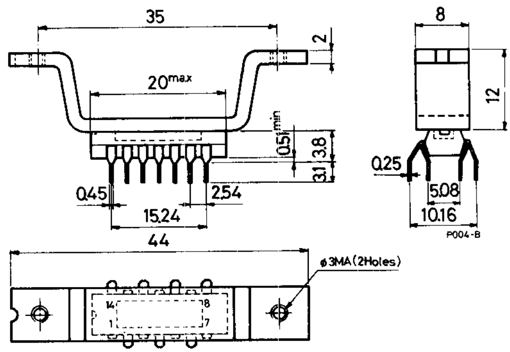
TAA 611C

MECHANICAL DATA (Dimensions in mm)

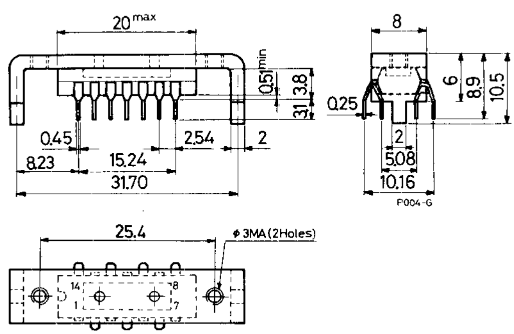
Quad in-line plastic package with spacer for TAA 611 C72 (see also "MOUNTING INSTRUCTIONS")



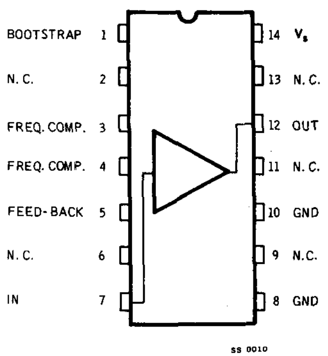
Quad in-line plastic package with external bar for TAA 611 CX1



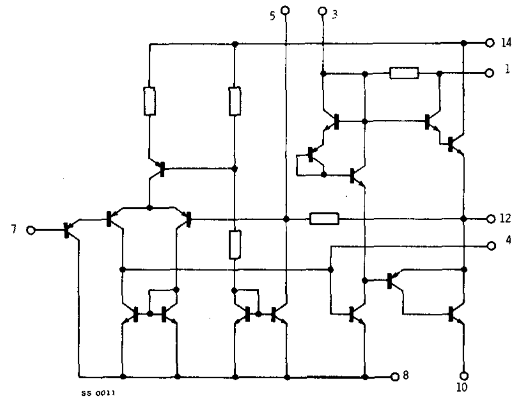
Quad in-line plastic package with inverted external bar for TAA 611 C11



CONNECTION DIAGRAM

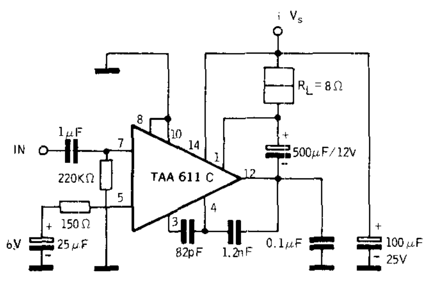


SCHEMATIC DIAGRAM

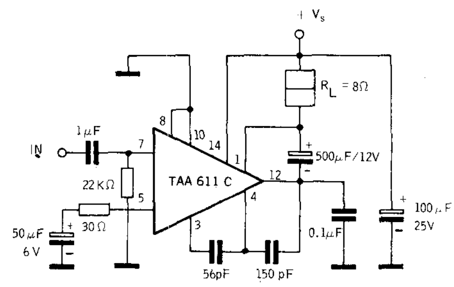


TEST CIRCUITS

Circuit No. 1 ($G_v = 50$)



Circuit No. 2 ($G_v = 250$)



TAA 611C

THERMAL DATA		TAA 611 C72	TAA 611 CX1 TAA 611 C11
→ $R_{th\ j\text{-}case}$ Thermal resistance junction-case	max	16 °C/W	16 °C/W
→ $R_{th\ j\text{-}amb}$ Thermal resistance junction-ambient	max	93 °C/W	63 °C/W

ELECTRICAL CHARACTERISTICS

(T_{amb} = 25 °C, refer to the test circuit no. 2 unless otherwise specified)

	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_o	Quiescent output voltage	V_s = 12 V			6.3		V
		V_s = 15 V			7.9		V
I_d	Total quiescent drain current	V_s = 12 V			3.5		mA
		V_s = 15 V			4		mA
I_d	Quiescent drain current of output transistors	V_s = 12 V			1.2		mA
		V_s = 15 V			1.8		mA
I_d	Drain current	V_s = 12 V, R_L = 8 Ω	P_o = 2.1 W		235		mA
		V_s = 15 V, R_L = 8 Ω	P_o = 3.3 W		300		mA
→ I_b	Input bias current	V_s = 12 V			75		nA
		V_s = 15 V			0.1	1	μA
→ P_o*	Output power	d = 2%	f = 1 kHz				
		V_s = 9 V	R_L = 4 Ω		1.4		W
		V_s = 9 V	R_L = 8 Ω		0.9		W
		V_s = 12 V	R_L = 8 Ω		1.7		W
		V_s = 15 V	R_L = 8 Ω		2.8		W
		V_s = 15 V	R_L = 16 Ω		1.6		W
		d = 10%	f = 1 kHz				
		V_s = 9 V	R_L = 4 Ω		1.8		W
		V_s = 9 V	R_L = 8 Ω		1.15		W
		V_s = 12 V	R_L = 8 Ω		2.1		W
		V_s = 15 V	R_L = 8 Ω	2.5	3.3		W
		V_s = 15 V	R_L = 16 Ω		1.9		W

* External heatsink not required except for the conditions V_s = 15 V, R_L = 8 Ω

ELECTRICAL CHARACTERISTICS (continued)

	Parameter	Test conditions		Min.	Typ.	Max.	Unit
R'_f	Internal feedback resistance (see schematic diagram)				7.5		Ω
→ Z_i	Input impedance	open loop			5		MΩ
d	Distortion	Circuit No. 1					
		$R_L = 8\,\Omega$	$f = 1$ kHz				
		$V_s = 12$ V	$P_o = 50$ mW		0.3		%
		$V_s = 15$ V	$P_o = 50$ mW		0.3		%
		$V_s = 12$ V	$P_o = 1$ W		0.2		%
		$V_s = 15$ V	$P_o = 1$ W		0.2		%
		Circuit No. 2					
		$R_L = 8\,\Omega$	$f = 1$ kHz				
		$V_s = 12$ V	$P_o = 50$ mW		1.5		%
		$V_s = 15$ V	$P_o = 50$ mW		1.5		%
		$V_s = 12$ V	$P_o = 1$ W		1		%
		$V_s = 15$ V	$P_o = 1$ W		1		%
G_v	Voltage gain (open loop)	$V_s = 12$ V	$R_L = 8\,\Omega$		70		dB
		$V_s = 15$ V	$R_L = 8\,\Omega$		72		dB

Fig. 1 - Typical distortion vs output power

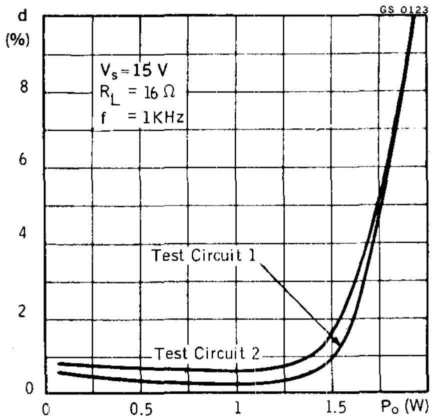


Fig. 2 - Typical distortion vs output power

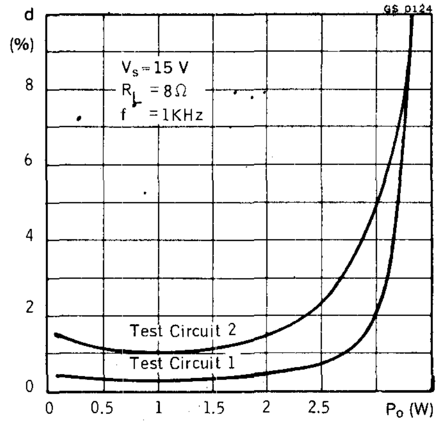


Fig. 3 - Typical distortion vs output power

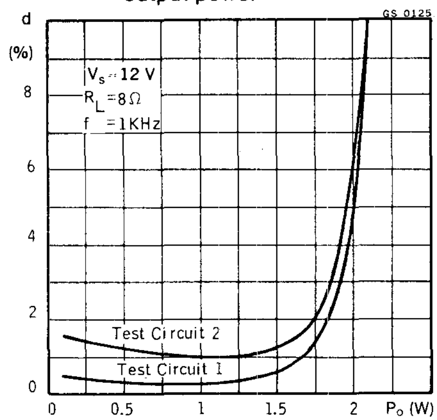


Fig. 4 - Typical output power vs load resistance

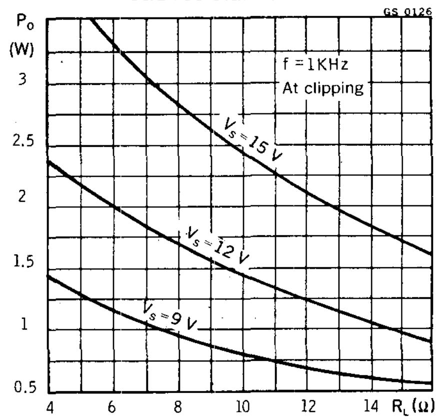


Fig. 5 - Typical output power vs load resistance

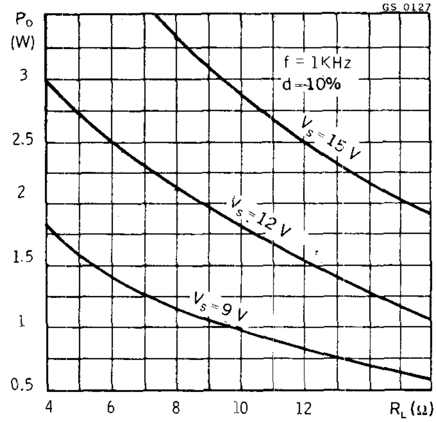


Fig. 6 - Maximum power dissipation vs load resistance

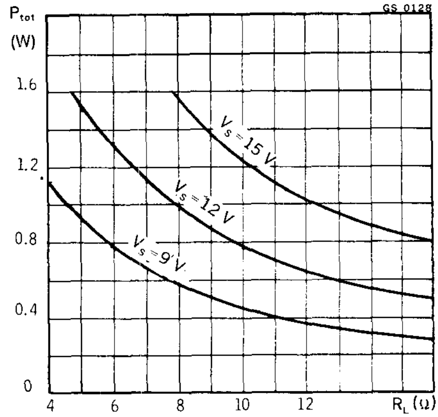


Fig. 7 - Typical voltage gain (open loop) vs frequency

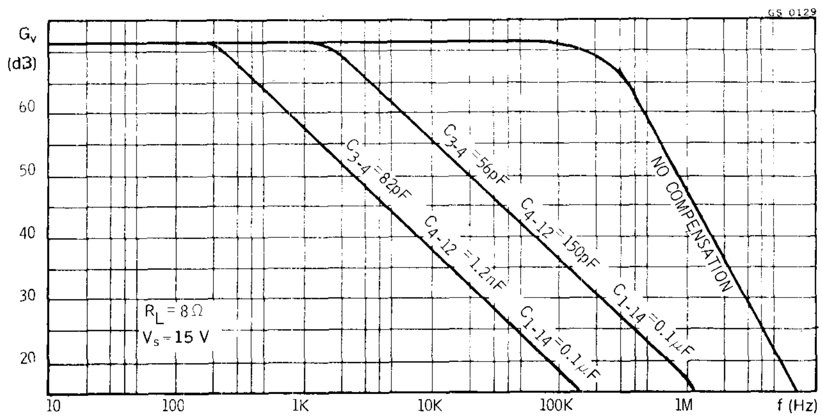


Fig. 8 - Typical relative frequency response

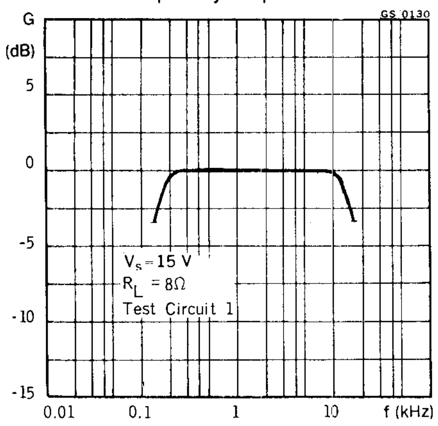


Fig. 9 - Typical relative frequency response

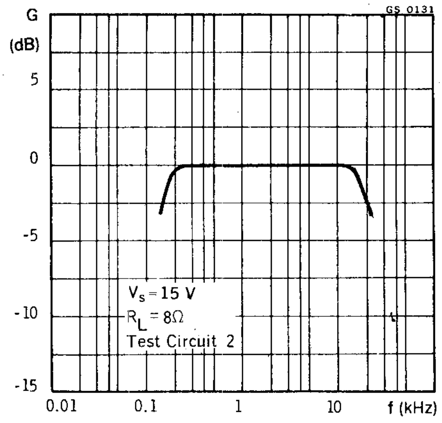


Fig. 10 - Typical output power vs input voltage

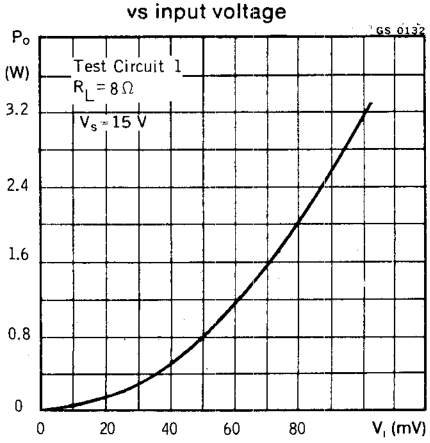


Fig. 11 - Typical output power vs input voltage

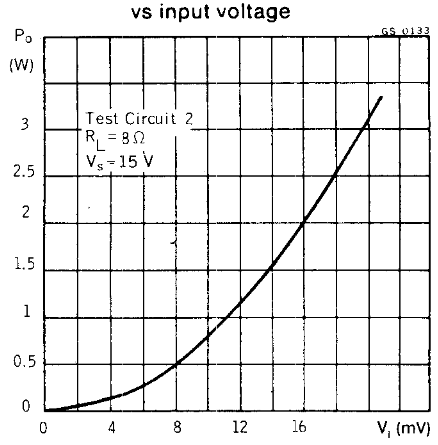


Fig. 12 - Typical power dissipation and efficiency vs output power

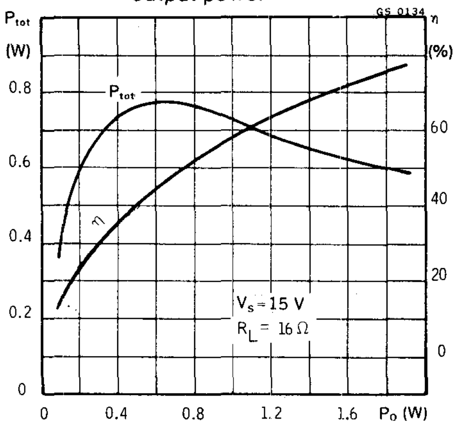


Fig. 13 - Typical power dissipation and efficiency vs output power

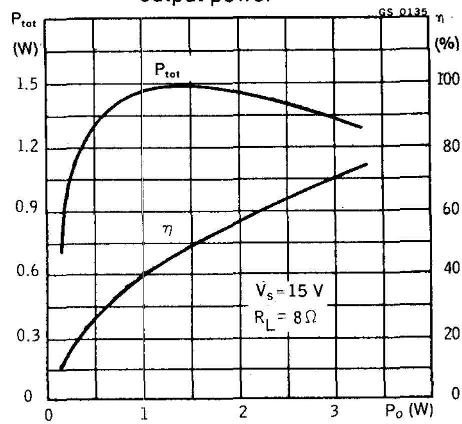


Fig. 14 - Typical power dissipation and efficiency vs output power

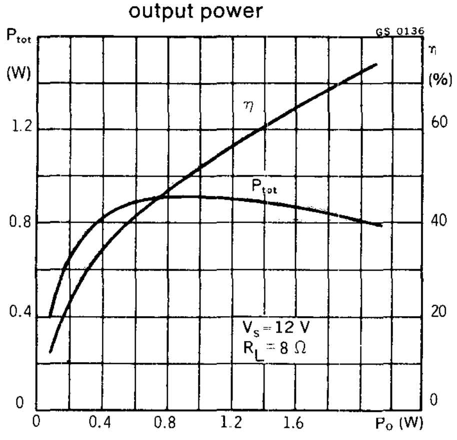


Fig. 15 - Typical power dissipation and efficiency vs output power

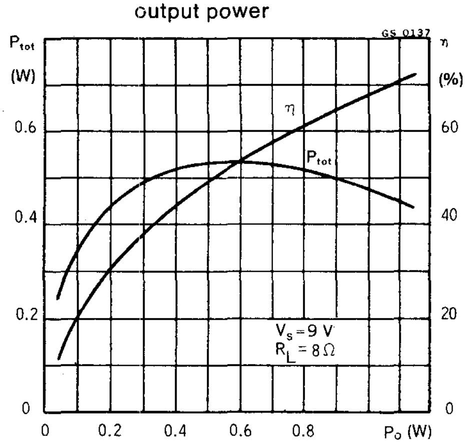


Fig. 16 - Typical drain current vs output power

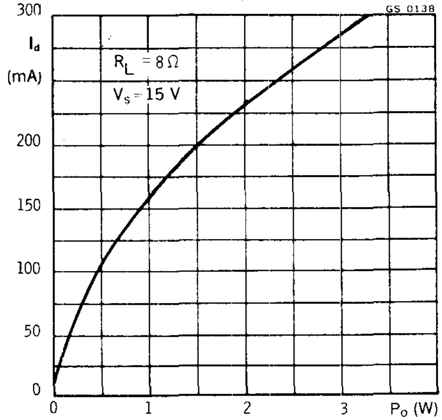


Fig. 17 - Typical quiescent drain current vs supply voltage

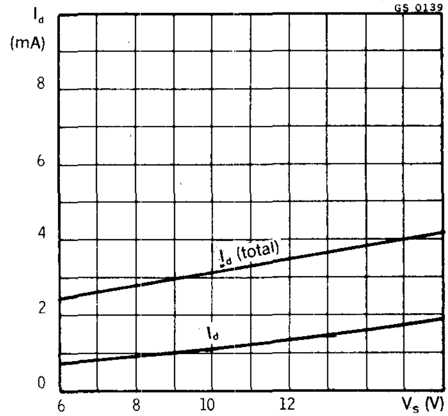


Fig. 18 - Typical total quiescent drain current vs ambient temperature

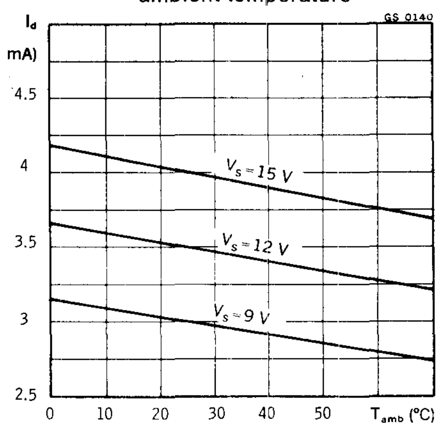


Fig. 19 - Typical quiescent drain current of output transistors vs ambient temperature

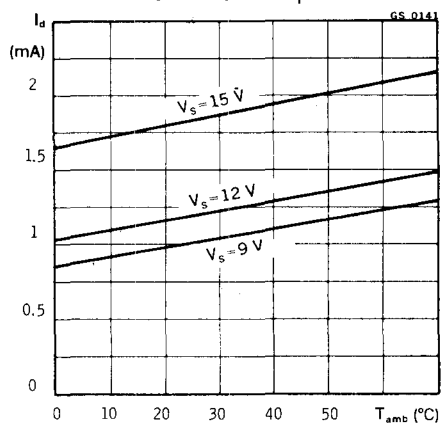


Fig. 20 - Typical output voltage variation vs ambient temperature

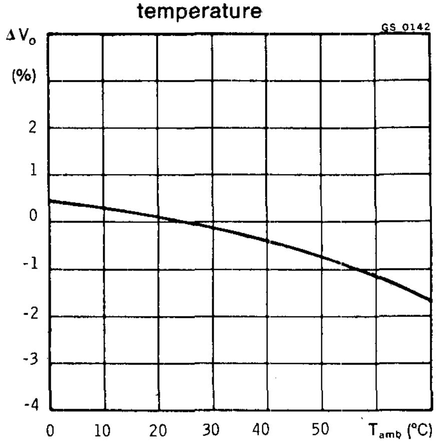


Fig. 21 - Power rating chart

(TAA 611 CX1 and TAA 611 C11)

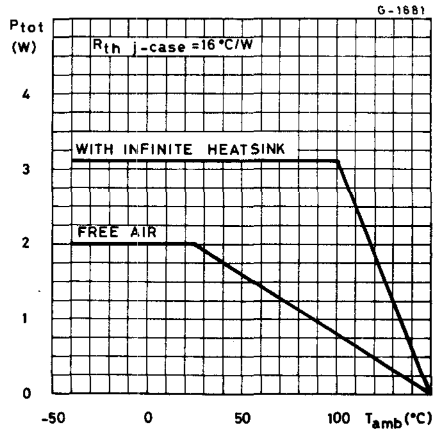
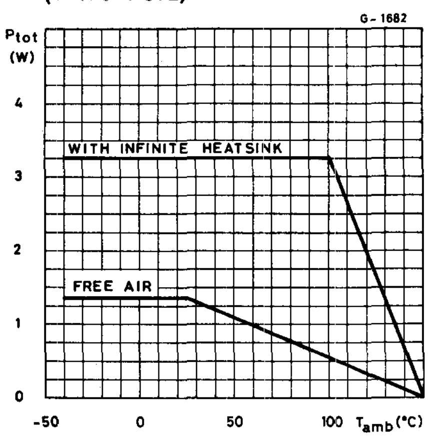


Fig. 22 - Power rating chart

(TAA 611 C72)



TYPICAL APPLICATIONS

Fig. 23 - Audio amplifier for radio

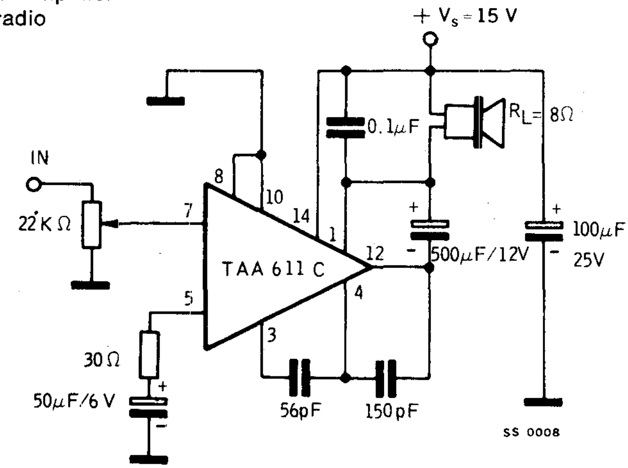
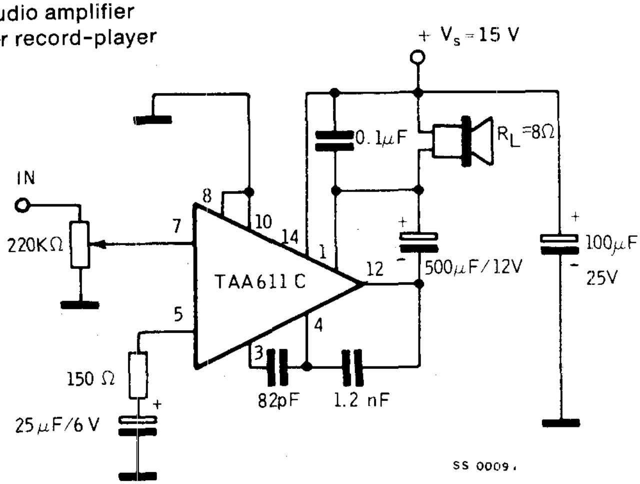


Fig. 24 - Audio amplifier for record-player

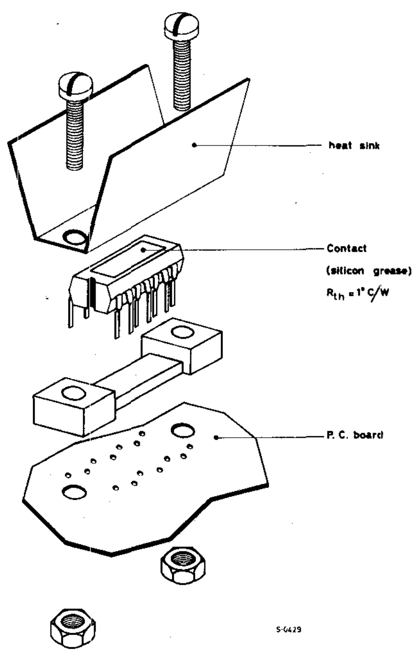


MOUNTING INSTRUCTIONS

Heat-sinking with spacer.

Fig. 25 shows a method of mounting the TAA 611C 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.

Fig. 25



MOUNTING INSTRUCTIONS (continued)

Heat-sinking with external bar.

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 (TAA 611 C11).

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 (TAA 611 C11) the diagrams enclosed give the maximum power dissipation as a function of copper area, with copper thickness 35 μ and ambient temperature 55 °C.