INTEGRATED 1 WATT AUDIO AMPLIFIER

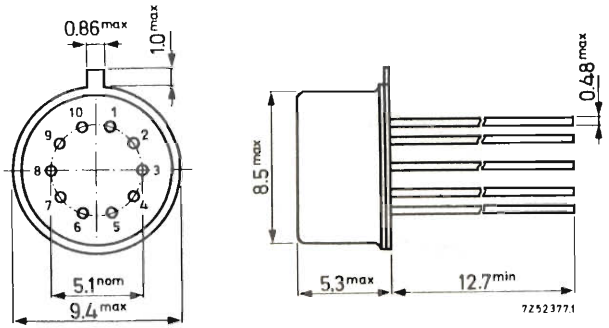
A complete a.f. amplifier in monolithic integrated form incorporating special measures to prevent cross-over distortion throughout an exceptionally wide usable range of supply voltage (4.5 V to 10 V. This, in combination with its low drain current, makes the TAA300 ideally suited for use in battery operated equipment. Due to the high a.c. feedback (≈ 20 dB) the distortion and spread in gain is very low.

QUICK REFERENCE DATA				
Supply voltage	V_B	nom.	9	V
Output power	P_o	typ.	1	W
Input signal for P_o = 1 W	V_i	typ.	8.5	mV
Input impedance	$\|Z_i\|$	typ.	15	kΩ
Load impedance	R_L		8	Ω
Total current (no signal)	I_{tot}	typ.	8	mA

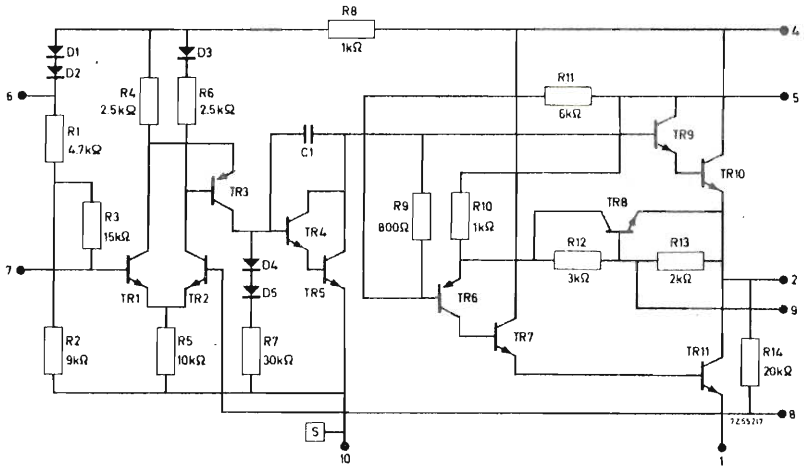
PACKAGE OUTLINE

Dimensions in mm

XA10 (TO-74; reduced height)



CIRCUIT DIAGRAM



RATINGS Limiting values in accordance with the Absolute Maximum System (IEC134)

Voltages (see test set-up on page 4)

V_{4-1}	max.	10.5	V
V_{7-8}	max.	6	V
V_{8-7}	max.	6	V
V_{2-9}	max.	6	V
V_{2-1}	max.	10.5	V
V_{4-2}	max.	10.5	V

Currents (see test set-up on page 4)

$-I_1$	max.	600	mA
$\pm I_2$	max.	600	mA
$+I_4$	max.	600	mA

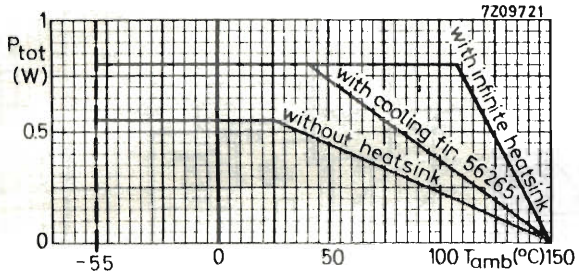
Total power dissipation P_{tot} see next page

Temperatures

Storage temperature	T_{stg}	−55 to +150	°C
Operating ambient temperature	T_{amb}	−55 to +150	°C

RATINGS (continued)

Maximum allowable total power dissipation versus ambient temperature

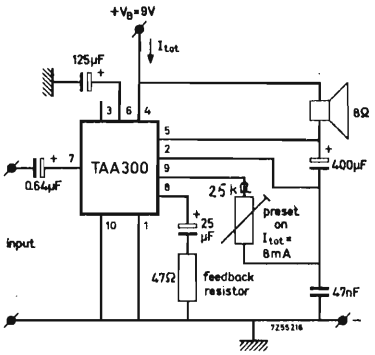


CHARACTERISTICS at T_{amb} = 25 °C; V_B = 9 V

Measured in the test set-up on page 4

Output power at d_{tot} = 10%	P_o	typ.	1	W
Bandwidth (−3 dB)	B	>	10	kHz
		typ.	25	kHz
Total current (d.c.)				
no signal and excluding output transistors:	I_{tot}	typ.	4	mA
with signal at P_o = 1 W:	I_{tot}	typ.	180	mA
Total distortion at P_o = 0.5 W	d_{tot}	typ.	0.7	%
		<	3	%
Input signal at P_o = 1 W	V_i	typ.	8.5	mV
P_o = 0.5 W	V_i	<	8.5	mV
Input impedance	$\|Z_i\|$	>	10	kΩ
		typ.	15	kΩ
Efficiency	η	typ.	60	%
Signal to noise ratio related to P_o = 1 W				
R_S = 2 kΩ; B = 30 Hz to 15 kHz	$\frac{S}{N}$	>	70	dB
		typ.	75	dB
Noise output power		typ.	10	nW
input short circuited; B = 30 Hz to 15 kHz	P_N	<	20	nW
Preset resistor for I_{tot} = 8 mA	R_{pr}	4 to	25	kΩ

TEST SET-UP



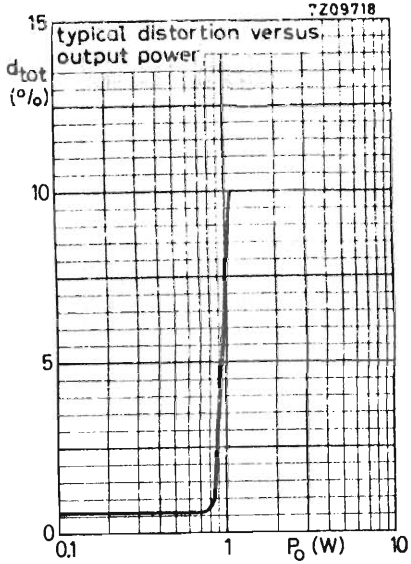
To prevent high-frequency instability, the following precautions must be taken.

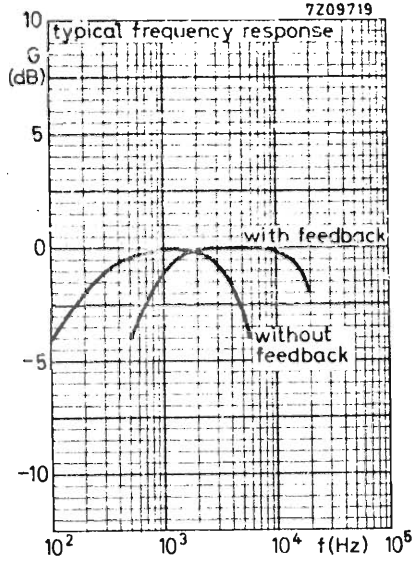
a. Keep the lead inductance from the positive voltage supply to pin 4 to a minimum.

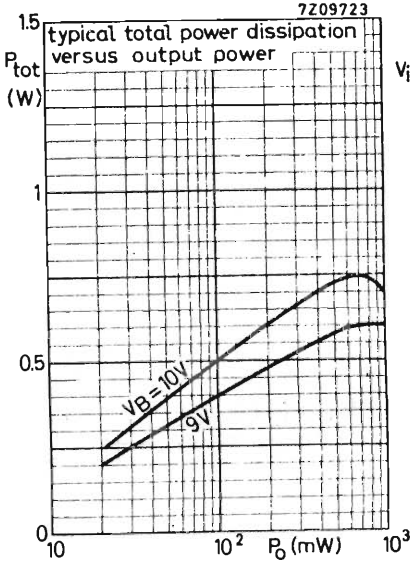
b. Because of the high internal resistance of batteries (especially at end of life) a large capacitance should be connected between pin 4 and ground.

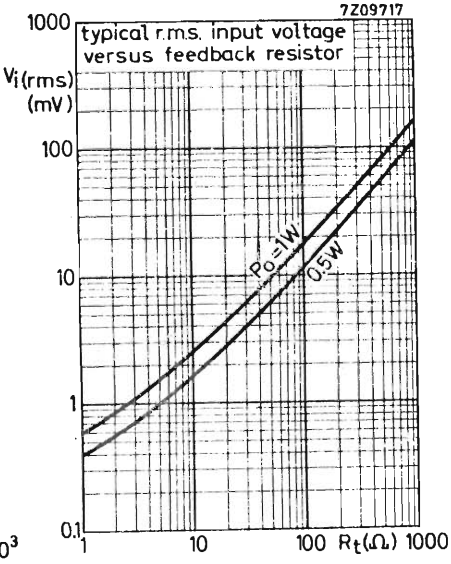
c. A capacitor of at least 47 nF should be connected between pin 2 and ground to prevent instability of the lower Darlington output transistor (see also test set-up).

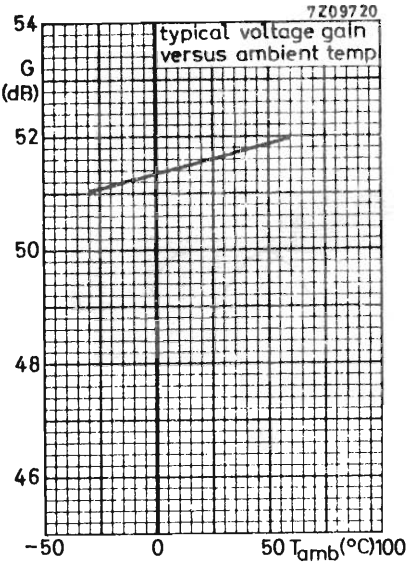
d. Avoid coupling between output and input leads (especially those carrying signals from a high-impedance source). This coupling can be reduced by using short leads, shielded input cable or by limiting the upper frequency to 15 kHz by means of a capacitor of 560 pF between pin 7 and ground.

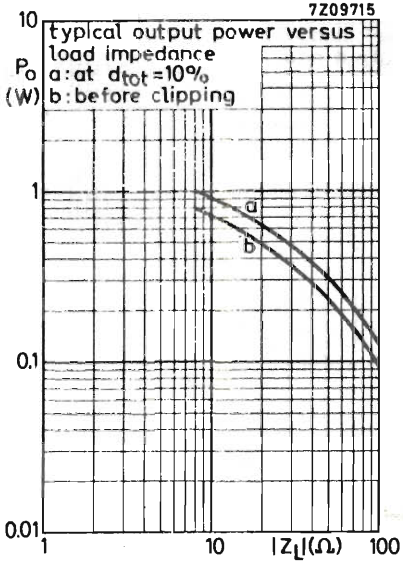

7Z09718
typical distortion versus output power
d_{tot} (%)
15
10
5
0
0.1
1
10
P_o (W)

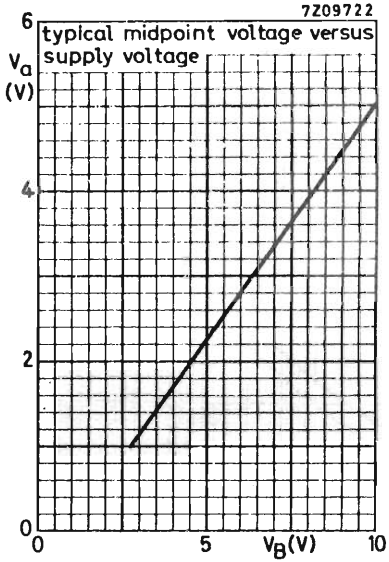

7Z09719
typical frequency response
G (dB)
10
5
0
−5
−10
with feedback
without feedback
10^2
10^3
10^4
f(Hz)
10^5

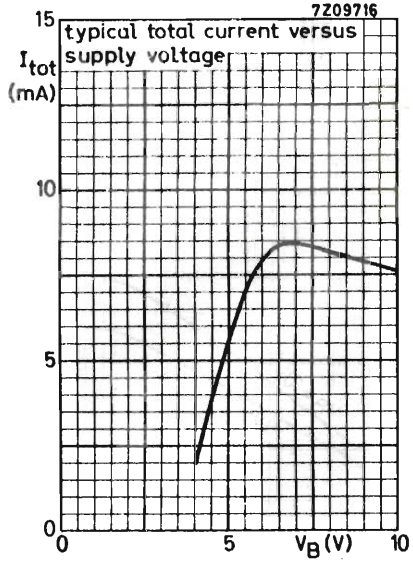

7Z09723
typical total power dissipation versus output power
P_{tot} (W)
1.5
1
0.5
0
V_B=10V
9V
10
10^2
P_o (mW)
10^3


7Z09717
typical r.m.s. input voltage versus feedback resistor
V_i(rms) (mV)
1000
100
10
1
0.1
P_o=1W
0.5W
1
10
100
R_f(Ω)
1000


7Z09720
typical voltage gain versus ambient temp
54
G (dB)
52
50
48
46
−50
0
50
T_{amb}(°C)
100


7Z09715
typical output power versus load impedance
a: at d_{tot} = 10%
b: before clipping
10
P_o (W)
1
0.1
0.01
a
b
1
10
$|Z_L|$(Ω)
100


7Z09722
typical midpoint voltage versus supply voltage
6
V_a (V)
4
2
0
0
5
V_B(V)
10


7Z09716
typical total current versus supply voltage
15
I_{tot} (mA)
10
5
0
0
5
V_B(V)
10