DATA SHEET

TDA7056
3 W mono BTL audio output amplifier

Product specification
File under Integrated Circuits, IC01

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Philips
Semiconductors

PHILIPS

3 W mono BTL audio output amplifier TDA7056

FEATURES

- No external components
- No switch-on/off clicks
- Good overall stability
- Low power consumption
- Short circuit proof
- ESD protected on all pins.

GENERAL DESCRIPTION

The TDA7056 is a mono output amplifier contained in a 9 pin medium power package.
The device is designed for battery-fed portable mono recorders, radios and television.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_P	supply voltage		3	11	18	V
P_O	output power in 16 Ω	V_P = 11 V	2.5	3	–	W
G_V	internal voltage gain		39	40.5	42	dB
I_P	total quiescent current	V_P = 11 V; $R_L = \infty$	–	5	7	mA
THD	total harmonic distortion	P_O = 0.5 W	–	0.25	1	%

ORDERING INFORMATION

EXTENDED TYPE NUMBER	PACKAGE			
	PINS	PIN POSITION	MATERIAL	CODE
TDA7056	9	SIL	plastic	SOT110(1)

Note

1. SOT110-1; 1996 August 21.

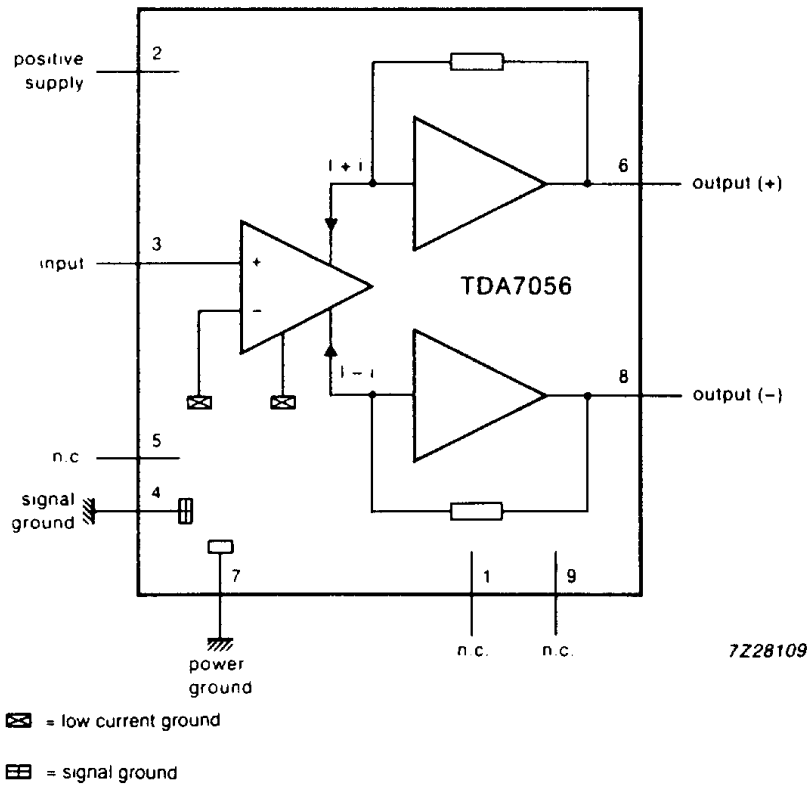


Fig.1 Block diagram.

PINNING

PIN	DESCRIPTION
1	n.c.
2	V_P
3	input (+)
4	signal ground
5	n.c.
6	output (+)
7	power ground
8	output (–)
9	n.c.

FUNCTIONAL DESCRIPTION

The TDA7056 is a mono output amplifier, designed for battery-fed portable radios and mains-fed equipment such as television. For space reasons there is a trend to decrease the number of external components. For portable applications there is also a trend to decrease the number of battery cells, but still a reasonable output power is required.

The TDA7056 fulfills both of these requirements. It needs no peripheral components, because it makes use of the Bridge-Tied-Load (BTL) principle. Consequently it has, at the same supply voltage, a higher output power compared to a conventional Single Ended output stage. It delivers an output power of 1 W into a loudspeaker load of 8 Ω with 6 V supply or 3 W into 16 Ω loudspeaker at 11 V without need of an external heatsink. The gain is internally fixed at 40 dB. Special attention is given to switch-on/off click suppression, and it has a good overall stability. The load can be short circuited at all input conditions.

LIMITING VALUES

In accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_P	supply voltage		–	18	V
I_{ORM}	Peak output current repetitive		–	1	A
I_{OSM}	Peak output current non-repetitive		–	1.5	A
T_{stg}	storage temperature range		–55	150	°C
T_j	junction temperature		–	150	°C
P_{tot}	total power dissipation	T_{case} < 60 °C	–	9	W
T_{sc}	short circuiting time	see note 1	–	1	hr

Note

1. The load can be short-circuited at all input conditions.

THERMAL RESISTANCE

SYMBOL	PARAMETER	NOM.	UNIT
$R_{th\ j\text{-}c}$	from junction to case	10	K/W
$R_{th\ j\text{-}a}$	from junction to ambient in free air	55	K/W

POWER DISSIPATION

Assume: V_P = 11 V; R_L = 16 Ω.

The maximum sine-wave dissipation is 1.52 W.

The $R_{th\ j\text{-}a}$ of the package is 55 K/W.

T_{amb} max = 150 – 55 × 1.52 = 66.4 °C.

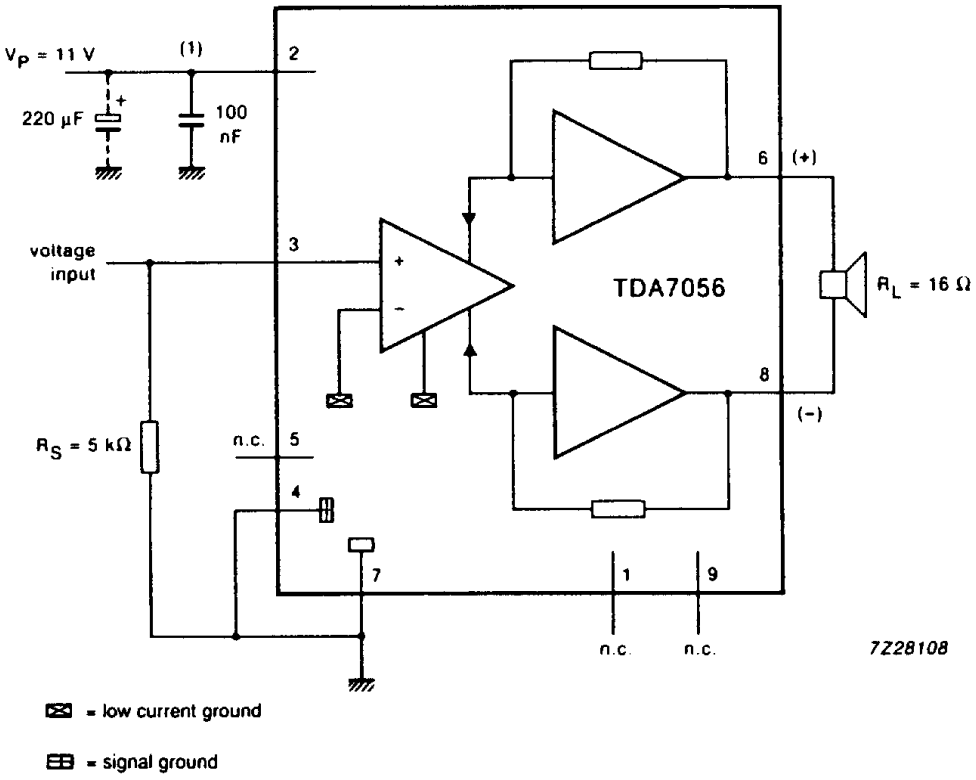
CHARACTERISTICS

At T_{amb} = 25 °C; f = 1 kHz; V_P = 11 V; R_L = 16 Ω (see Fig.2).

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_P	operating supply voltage		3	11	18	V
I_{ORM}	repetitive peak output current		–	–	0.6	A
I_P	total quiescent current	note 1 $R_L = \infty$	–	5	7	mA
P_O	output power	THD = 10%	2.5	3	–	W
THD	total harmonic distortion	P_O = 0.5 W	–	0.25	1	%
G_v	voltage gain		39	40.5	42	dB
V_{no}	noise output voltage	note 2	–	180	300	μV
V_{no}	noise output voltage	note 3	–	60	–	μV
	frequency response		–	20 to 20.000	–	Hz
RR	ripple rejection	note 4	36	50	–	dB
ΔV	DC-output offset voltage	note 5	–	–	200	mV
$\|Z_i\|$	input impedance		–	100	–	kΩ
I_i	input bias current		–	100	300	nA

Notes to the characteristics

1. With a load connected to the outputs the quiescent current will increase, the maximum value of this increase being equal to the DC output offset voltage divided by R_L.
2. The noise output voltage (RMS value) is measured with R_S = 5 kΩ unweighted (20 Hz to 20 kHz).
3. The noise output voltage (RMS value) at f = 500 kHz is measured with R_S = 0 Ω and bandwidth = 5 kHz.
   With a practical load (R_L = 16 Ω, L_L = 200 μH) the noise output current is only 50 nA.
4. The ripple rejection is measured with R_S = 0 Ω and f = 100 Hz to 10 kHz.
   The ripple voltage (200 mV) is applied to the positive supply rail.
5. R_S = 5 kΩ.

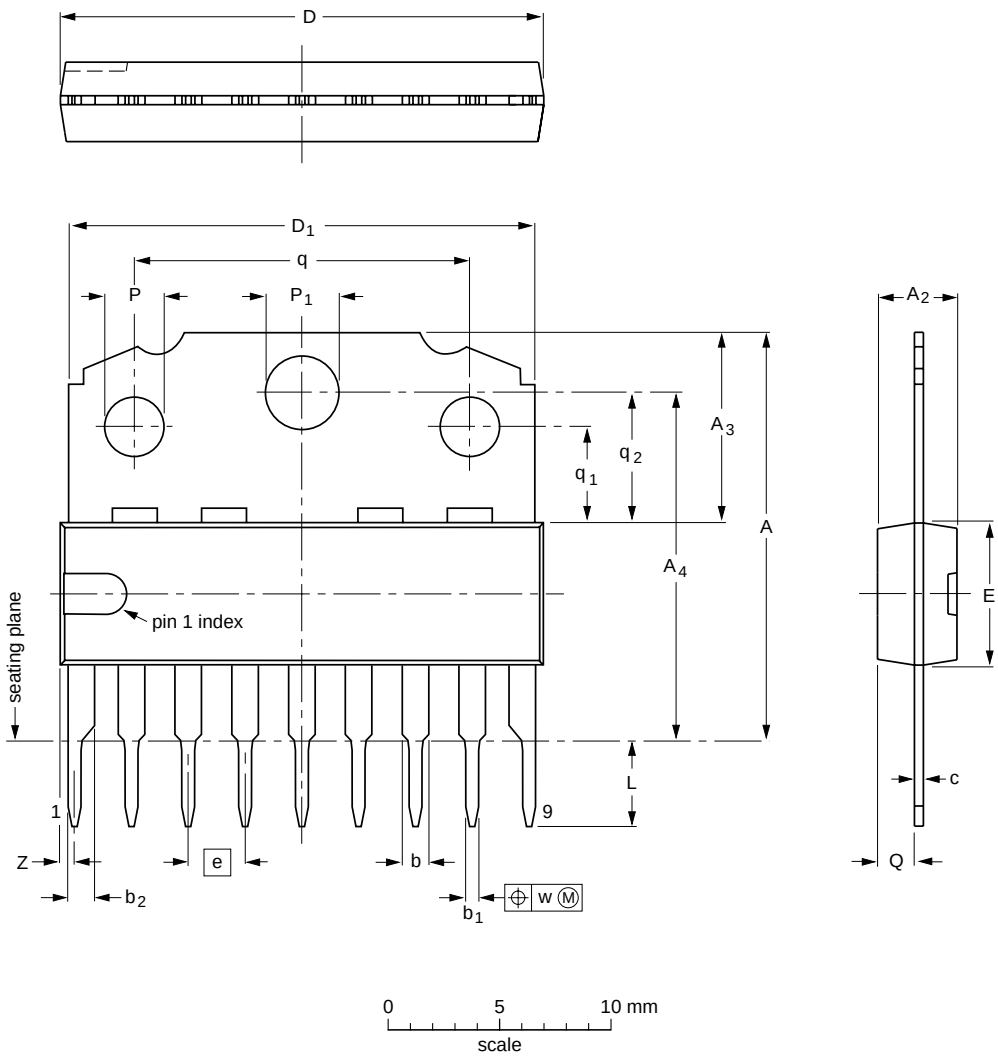


(1) This capacitor can be omitted if the supply electrolytic capacitor is placed closer to pin 2.

Fig.2 Test and application diagram.

PACKAGE OUTLINE

SIL9MPF: plastic single in-line medium power package with fin; 9 leads **SOT110-1**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_2 max.	A_3	A_4	b	b_1	b_2	c	$D^{(1)}$	D_1	$E^{(1)}$	e	L	P	P_1	Q	q	q_1	q_2	w	$Z^{(1)}$ max.
mm	18.5 17.8	3.7	8.7 8.0	15.8 15.4	1.40 1.14	0.67 0.50	1.40 1.14	0.48 0.38	21.8 21.4	21.4 20.7	6.48 6.20	2.54	3.9 3.4	2.75 2.50	3.4 3.2	1.75 1.55	15.1 14.9	4.4 4.2	5.9 5.7	0.25	1.0

Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT110-1						~~92-11-17~~ 95-02-25