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.

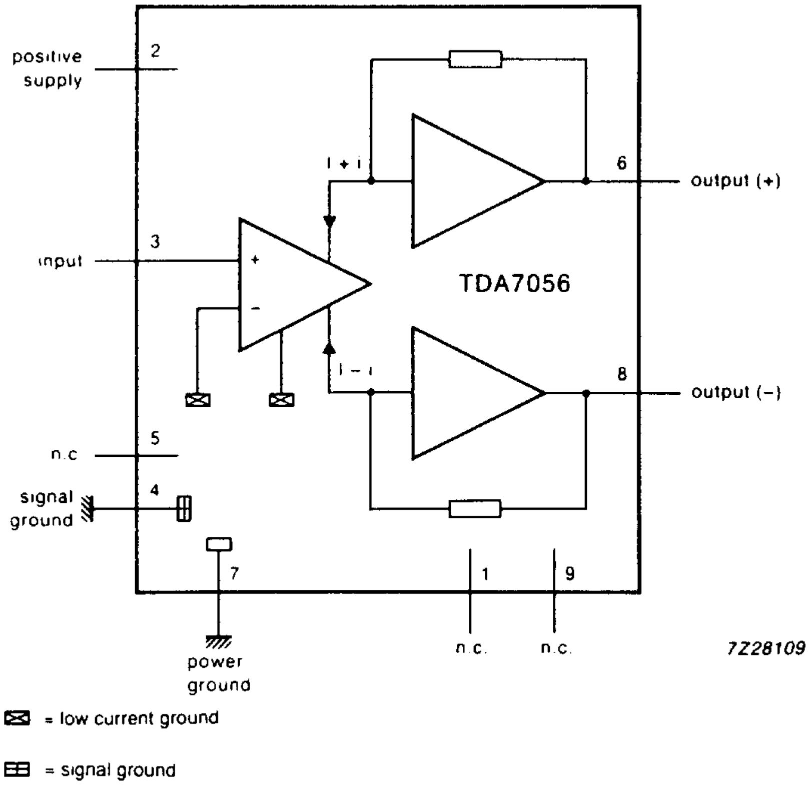


Fig.1 Block diagram.

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
$R_{th\ j-c}$	from junction to case	10	K/W
$R_{th\ j-a}$	from junction to ambient in free air	55	K/W

POWER DISSIPATION

Assume: $V_P = 11$ V; $R_L = 16\ \Omega$.
The maximum sine-wave dissipation is 1.52 W.
The $R_{th\ j-a}$ 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).

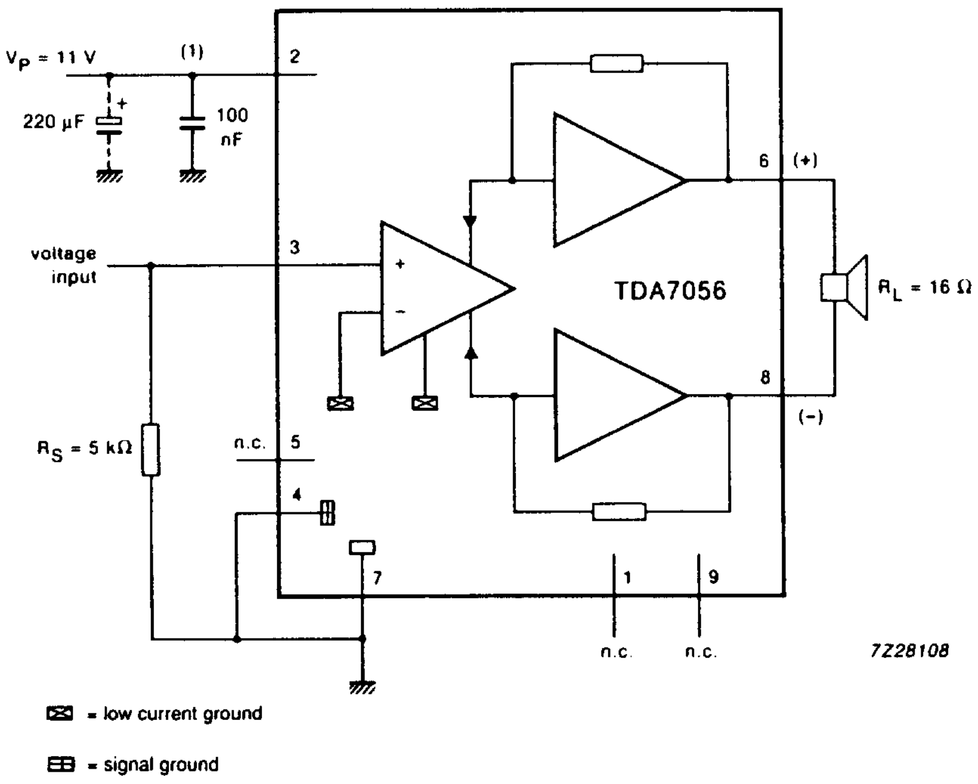
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_P	operating supply voltage		3	11	18	V
I_{ORM}	repetitive peak output current		–	–	0.6	A
I_P	total quiescent current	note 1 $R_L = \infty$	–	5	7	mA
P_O	output power	THD = 10%	2.5	3	–	W
THD	total harmonic distortion	P_O = 0.5 W	–	0.25	1	%
G_v	voltage gain		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
$\lvert Z_i \rvert$	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.

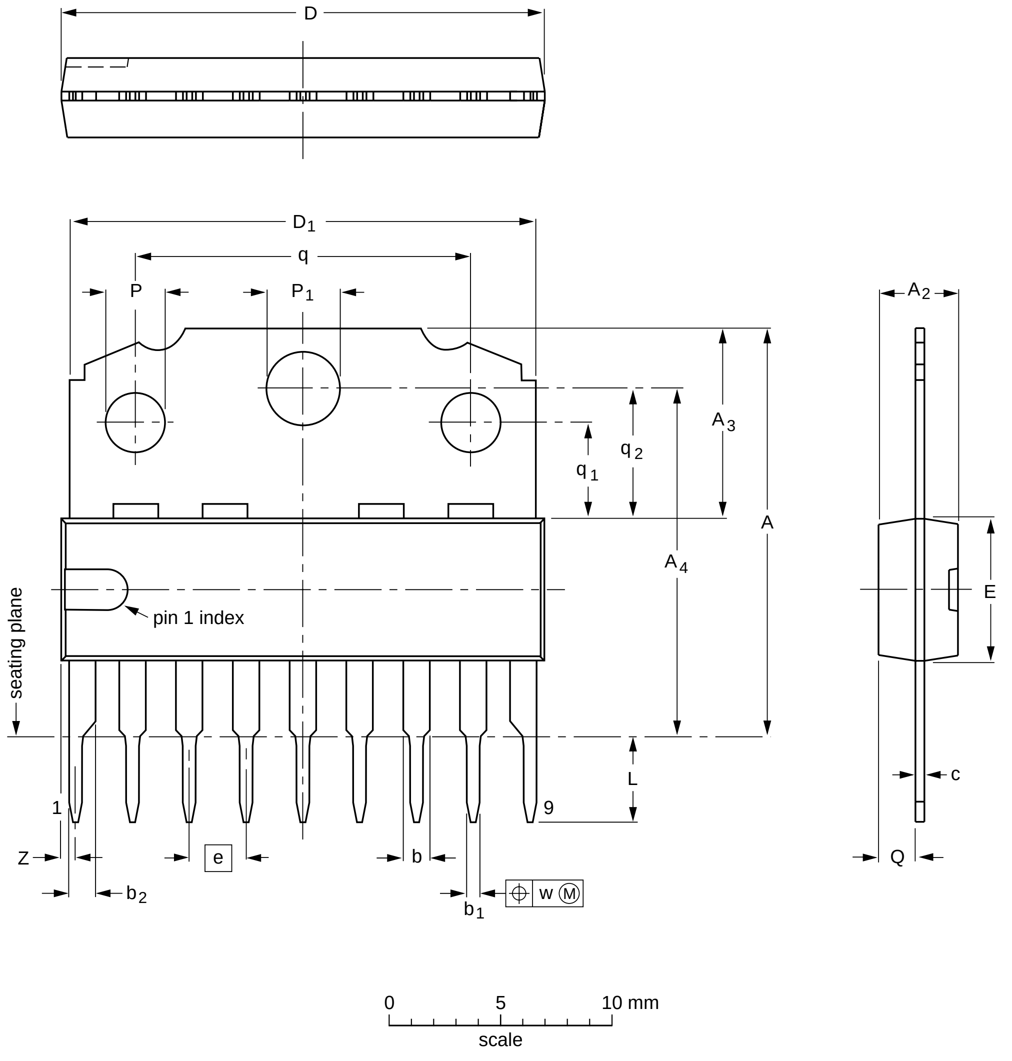


(1) This capacitor can be omitted if the supply electrolytic capacitor is placed closer to pin 2.

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

SOLDERING

Introduction

There is no soldering method that is ideal for all IC packages. Wave soldering is often preferred when through-hole and surface mounted components are mixed on one printed-circuit board. However, wave soldering is not always suitable for surface mounted ICs, or for printed-circuits with high population densities. In these situations reflow soldering is often used.

This text gives a very brief insight to a complex technology. A more in-depth account of soldering ICs can be found in our *"IC Package Databook"* (order code 9398 652 90011).

Soldering by dipping or by wave

The maximum permissible temperature of the solder is 260 °C; solder at this temperature must not be in contact with the joint for more than 5 seconds. The total contact time of successive solder waves must not exceed 5 seconds.

The device may be mounted up to the seating plane, but the temperature of the plastic body must not exceed the specified maximum storage temperature ($T_{stg\ max}$). If the printed-circuit board has been pre-heated, forced cooling may be necessary immediately after soldering to keep the temperature within the permissible limit.

Repairing soldered joints

Apply a low voltage soldering iron (less than 24 V) to the lead(s) of the package, below the seating plane or not more than 2 mm above it. If the temperature of the soldering iron bit is less than 300 °C it may remain in contact for up to 10 seconds. If the bit temperature is between 300 and 400 °C, contact may be up to 5 seconds.

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.