



# TP5228

Class AB Stereo Headphone  
Driver with Mute

## *DataSheet*

*Version: 1.0*

*Apr/2002*

<http://www.topro.com.tw>

**HQ:**

5 F, No.10, Prosperity Road 1, Science-Based Industrial Park, Hsinchu 300, Taiwan, R.O.C  
300 新竹科學工業園區展業一路 10 號 5 樓

**TPE:**

5 F, No.27, Min Chuan W. Rd. Taipei 104, Taiwan, R.O.C  
104 台北市民權西路 27 號 5 樓

**SHENZHEN:**

Room 802, Tower A, World Trade Plaza, Fahong Rd., Fatian, Shenzhen, China  
深圳市福田區福虹路 9 號世貿廣場 A 座 802 室(郵編: 518033)

TEL: 886-3-5632515 Fax: 886-3-5641728

TEL: 886-2-25856858 Fax: 886-2-25941104

SHENZHEN: TEL: 755-3679985 Fax: 755-3679518





# TP5228

## Class AB Stereo Headphone Driver with Mute

### General Specification

The TP5228 is an integrated class AB stereo headphone driver contained in an SO-8 or a DIP-8 plastic package with Mute feature. The TP5228 operates in low power mode to reduce supply current to  $600\ \mu A$  and keep no switch ON/OFF clicks. Besides the common Mute feature, the TP5228 further integrates a voltage divider inside the chip. Thus, the external resistors can be eliminated. The device is fabricated in a CMOS process and has been primarily developed for portable digital audio applications.

### Features

- ◆ High Signal- to- Noise Ratio
- ◆ High Slew Rate
- ◆ Low Distortion
- ◆ Large Output Voltage Swing
- ◆ Flexible Mute Function
- ◆ Excellent Power Supply Ripple Rejection
- ◆ Low Power Consumption
- ◆ Short – circuit Elimination
- ◆ Wide Temperature Range
- ◆ No Switch ON/OFF Clicks
- ◆ Integrated Voltage Divider ( $\frac{V_{DD}}{2}$ ) to Eliminate External Resistors

### Applications

- ◆ Portable Digital Audio



# TP5228

Class AB Stereo Headphone  
Driver with Mute

## Contents :

<b>1. General Specification</b>	<i>P. 2</i>	<i>--- P. 2</i>
<b>2. Pin Configurations and Package Type</b>	<i>P. 4</i>	<i>--- P. 7</i>
<b>3. Functional Block Diagram</b>	<i>P. 8</i>	<i>--- P. 8</i>
<b>4. Absolute Maximum Ratings</b>	<i>P. 9</i>	<i>--- P. 9</i>
<b>5. Electrical Characteristic</b>	<i>P. 10</i>	<i>--- P. 10</i>
<b>6. Application Diagrams</b>	<i>P. 11</i>	<i>--- P. 11</i>
<b>7. Application Notes</b>	<i>P. 12</i>	<i>--- P. 12</i>

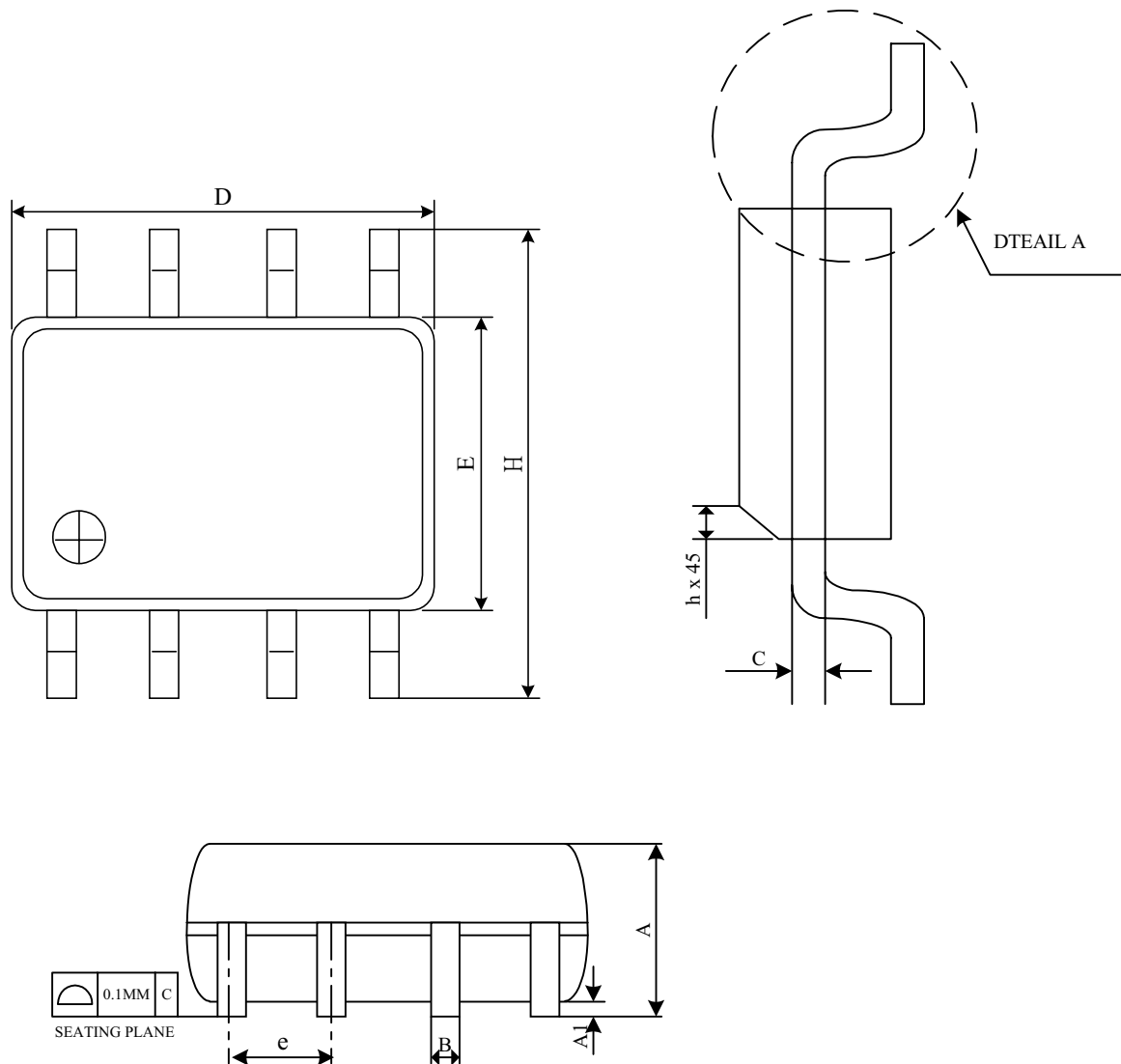
# TP5228

Class AB Stereo Headphone  
 Driver with Mute

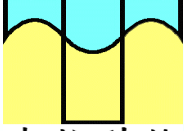
## Pin Configurations and Package Type

### Package Information

SOP-8



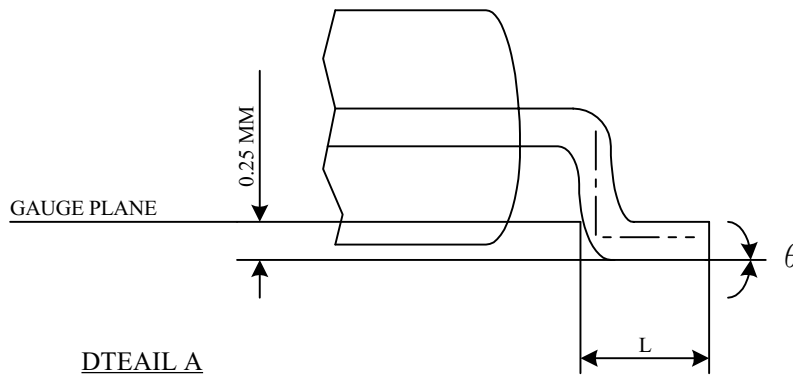
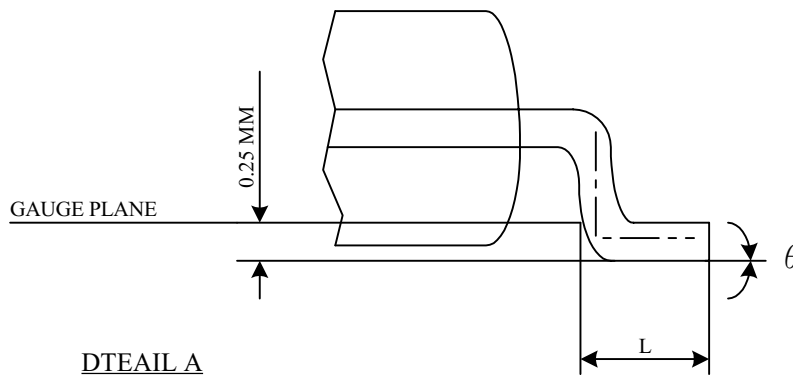
**TOPRO**



凌越科技  
Topro Technology Inc.

# TP5228

Class AB Stereo Headphone  
Driver with Mute



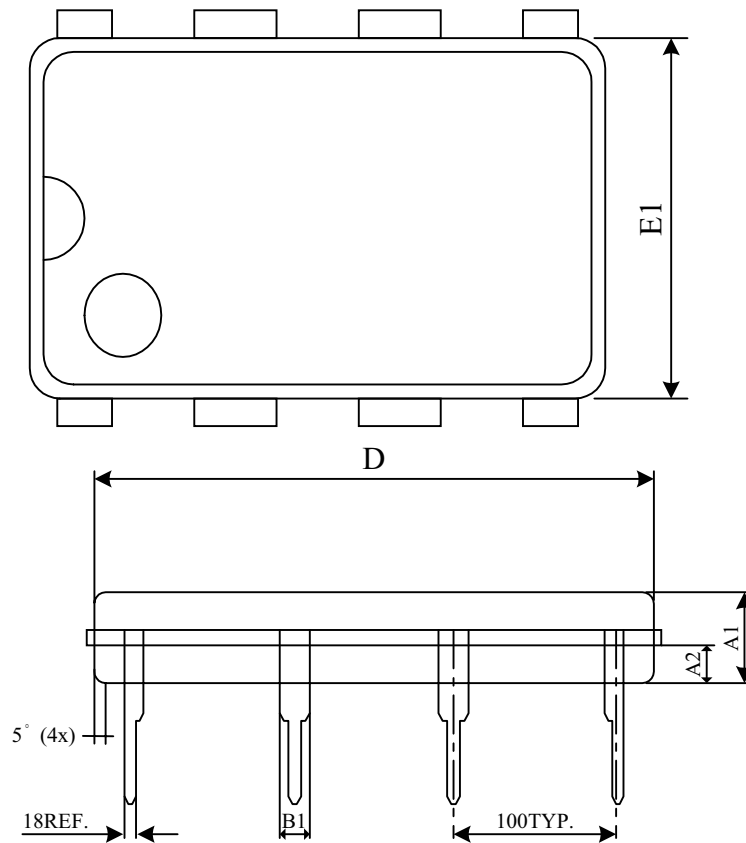
SYMBOL	DIMENSION IN MM		DIMENSION IN INCH	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.0532	0.0688
A1	0.10	0.25	0.0040	0.0098
B	0.33	0.51	0.013	0.020
C	0.19	0.25	0.0075	0.0098
e	1.27 BSC		0.050 BSC	
D	4.80	5.00	0.1890	0.1968
H	5.80	6.20	0.2284	0.2440
E	3.80	4.00	0.1497	0.1574
L	0.40	1.27	0.016	0.050
h	0.25	0.50	0.0099	0.0196
$\theta$	0°	8°	0°	8°
JEDEC	MS-012(AA)			



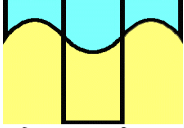
# TP5228

Class AB Stereo Headphone  
Driver with Mute

DIP-8



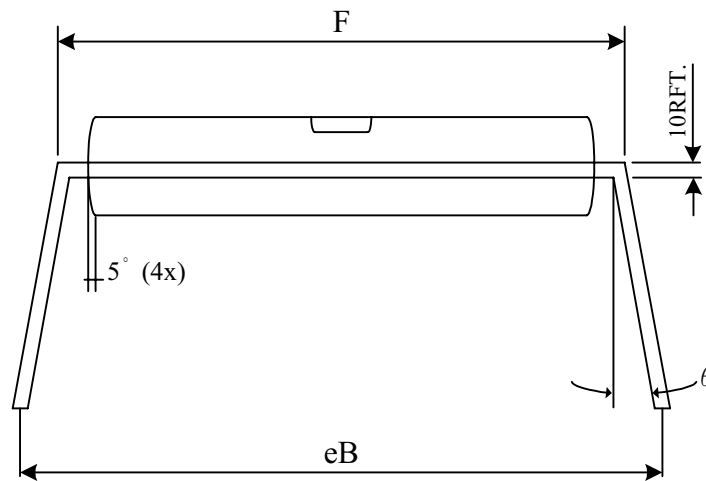
TOPRO



凌越科技  
Topro Technology Inc.

# TP5228

Class AB Stereo Headphone  
Driver with Mute



Symbol	Dimension in mils			Dimension in mm		
	Min	Non	Max	Min	Non	Max
A1	126	130	134	3.20	3.30	3.40
A2	58	60	62	1.473	1.524	1.575
B1	56	60	64	1.422	1.524	1.626
D	358	360	362	9.093	9.144	9.194
E1	258	260	262	6.553	6.604	6.655
F	295	300	305	7.493	7.620	7.747
eB	305	355	405	7.747	9.017	10.287
θ	0°	7.5°	15°	0°	7.5°	15°

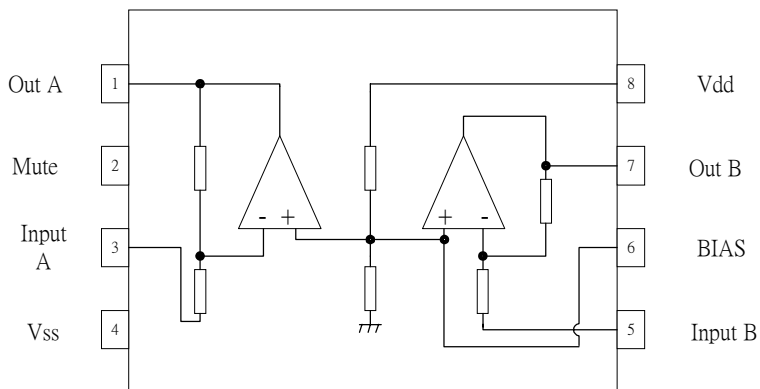


# TP5228

Class AB Stereo Headphone  
Driver with Mute

## Functional Block Diagram

TP5228





### Absolute Maximum Ratings

### Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
$V_{DD}$	Supply Voltage	8	V
$t_{SC(O)}$	Output Short-circuit Duration, at $T_A = 25^\circ\text{C}$ , $P_{tot} = 1W$	20	S
$T_A$	Operating Ambient Temperature range	-40 to 85	$^\circ\text{C}$
$T_J$	Maximum Junction Temperature	150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-65 to +150	$^\circ\text{C}$
$T_S$	Soldering Temperature, 10 seconds	300	$^\circ\text{C}$
$V_{ESD}$	Electrostatic Discharge	-3000 to -3000 <sup>-1</sup> -200 to 200 <sup>-2</sup>	V

Note : 1. Human body model : C = 100pF, R = 1500 $\Omega$ , 3 positive pulses plus 3 negative pulses

2. Machine model : C = 200pF, L = 0.5mH, R = 0 $\Omega$ , 3 positive pulses plus 3 negative pulses

### Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{THJA}$	Thermal Resistance from Junction to Ambient in Free Air		
	DIP-8	109	K/W
	SO-8	210	K/W

# TP5228

## Class AB Stereo Headphone Driver with Mute

### Electrical Characteristic

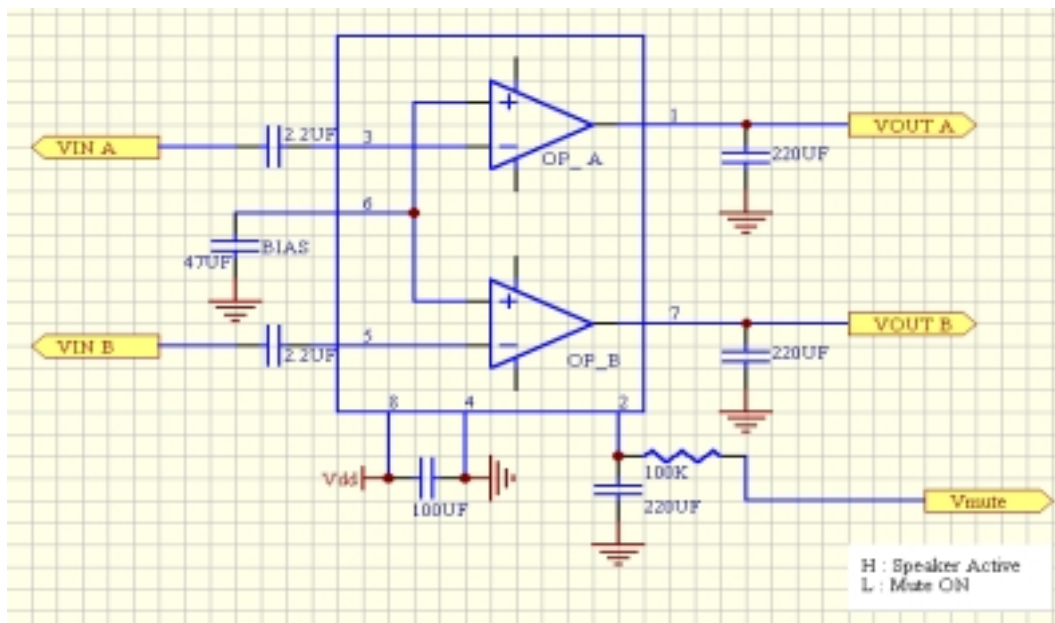
$V_{IN} = 0dBV, V_{CC} = 5V, T_A = 25^\circ C, f = 1KHz, R_L = 32\Omega$  ( Unless otherwise noted )

Symbol	Parameter	Test Conditions	TP5228			Unit
			Min.	Typ.	Max.	
$I_Q$	Quiescent Current	$V_{IN} = 0V_{rms}$		3	4	$mA$
		Muteing		600	1000	$\mu A$
$V_{TM}$	Mute Terminal Voltage		0.3	0.7	1.6	$V$
$G_{VCL}$	Voltage Gain		-1	-0.15	1	$dB$
$\Delta G_{VC}$	Differential Channel Voltage Gain		-0.5		0.5	$dB$
$THD$	Total Harmonic Channel Distortion Factor	BW = 20 ~ 30KHz		0.05	0.1	%
$P_{U1}$	Rated Output Power 1	$R_L = 32\Omega, THD < 0.1\%$	25	31		$mW$
$P_{U2}$	Rated Output Power 2	$R_L = 16\Omega, THD < 0.1\%$	50	62		$mW$
$V_{NO}$	Output Noise Voltage	BW = 20 ~ 20KHz, $R_G = 0\Omega$		-96	-87	$dBV$
$CS$	Channel Separation	$R_G = 0\Omega$	75	85		$dB$
$ATT$	Mute Attenuation	$R_G = 0\Omega$	80	90		$dB$
$RR$	Ripple Rejection	$F_{RR} = 100Hz, V_{RR} - 20dBV$	50	60		$dB$

# TP5228

Class AB Stereo Headphone  
 Driver with Mute

## Application Diagrams



# TP5228

Class AB Stereo Headphone  
 Driver with Mute

## Application Notes

Fig 1 Measurement circuit for inverting application

