

AB stereo headphone amplifier

ILA1308D is an integrated class-AB stereo headphone amplifier with bipolar supply voltage and low value non-linear distortion of audio signal. This IC is used in modern stereo audio devices with built-in output to stereo headphones.

Performed functions: The suppression of "clicks" effect at switching on-off of the integrated circuit (IC) and power supply ripple rejection.

This IC is designed for devices with low current consumption and includes a scheme of short-circuit protection of output.

This IC consists of two separate amplifiers A and B.
IC is available in 8-pin SO-8 package (MS-012AA).

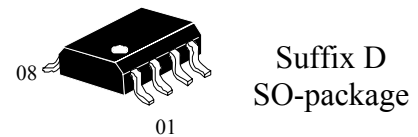


Fig 1 – View of IC in SO-package MS-012AA

Main features:

- Supply voltage
 - unipolar, U_{DD} 3,0 ... 7,0 V
 - bipolar, U_{DD} , U_{SS} $\pm 1,5$... $\pm 3,5$ V
- Consist of two separate amplifiers A & B
- Fabricated in Complementary Metal Oxide Semiconductor (CMOS) technology
- Contain short-circuit protection of output
- Low current consumption
- Operating temperature range from minus 10 to plus 85 °C

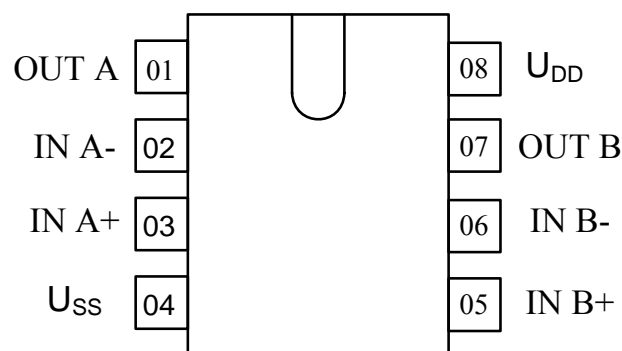


Fig. 2 – Pin layout

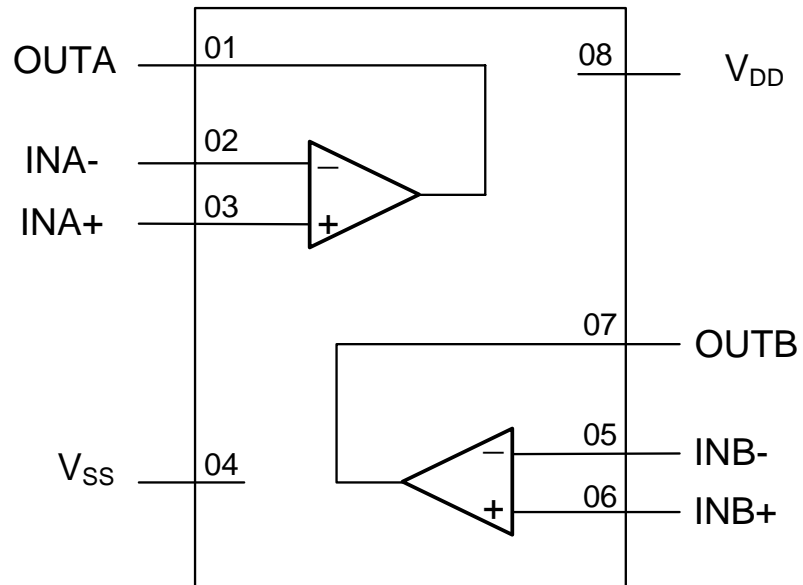


Fig. 3 – Block diagram

Table 1 – Pin description

Pin number	Sumbol	Description
01	OUTA	Output A
02	INA-	Inverting input A
03	INA+	Non-inverting input A
04	V _{SS}	Negative power supply
05	INB+	Non-inverting input B
06	INB-	Inverting input B
07	OUTB	Output B
08	V _{DD}	Positive power supply

Table 2 – Absolute maximum ratings

Symbol	Parameter	Norm		Unit
		Min	Max	
U_{DD}	Supply voltage - unipolar	0	8,0	V
U_{DD}, U_{SS}	- bipolar	–	±4,0	V
T_a	Ambient temperature	-40	85	°C

Table 3 – Recommended application mode

Symbol	Parameter	Norm		Unit
		Min	Max	
U_{DD}	Supply voltage - unipolar	3,0	7,0	V
U_{DD}, U_{SS}	- bipolar	±1,5	V	V
C_L	Load capacitance	–	200	pF
P_o	Max output power at $U_{CC} = 5,0$ V, $U_{SS} = 0$ V, THD < 0,1 %, $U_{O\ PP} = 3,5$ V	–	80	mW
T	Ambient operating temperature range	-10	85	°C

Table 4 – Electric parameters ($U_{DD} = 5,0 \text{ V}$, $U_{SS} = 0 \text{ V}$, $f = 1\text{kHz}$, $R_L = 32\Omega$, unless otherwise specified.)

Symbol	Parameter	Test conditions	Norm		Ambient temperature	Unit
			Min	Max		
I_{DD}	Consumption current	No load	–	$\frac{5,0}{10}$	25 ± 10 $-10; 85$	mA
P_{tot}	Total dissipation	No load	–	$\frac{25}{35}$		mW
U_{CM}	Common mode voltage	–	$\frac{0}{0,5}$	$\frac{3,5}{3,0}$		V
(THD+N)/S	Total non-linear distortion of signal	$U_{OPP} = 3,5 \text{ V}$	–	$\frac{-65}{-45}$		dB
S/N	Signal/noise ratio	$U_{OPP} = 3,5 \text{ V}$	$\frac{100}{60}$	–		dB
U_{os}	Zero bias voltage	–	–16	16	25 ± 10	mV
G_v	Open-loop voltage gain	$R_L = 5 \text{ k}\Omega$	50	–		dB
Note – U_{OPP} – output voltage swing						

Reference data

Input capacitance for normal conditions $3 \text{ pF} \pm 50 \%$ at $U_{DD} = 5,0 \text{ V}$, $U_{SS} = 0 \text{ V}$.

Output voltage for normal conditions and $V_{DD} = 5,0\text{V}$, $V_{SS} = 0\text{V}$ is:

- from 0,75 to 4,25 V at $R_L = 32 \Omega$;
- from 1,5 to 3,5 V at $R_L = 16 \Omega$;
- from 0,1 to 4,9 V at $R_L = 5 \text{ k}\Omega$, $U_{DD} = 5,0 \text{ V}$, $U_{SS} = 0 \text{ V}$.

Table 5 – Typical parameters values $U_{DD} = 5,0 \text{ V}$
 ($U_{SS} = 0 \text{ V}$, $f = 1 \text{ kHz}$, $R_L = 32 \Omega$, $T_a = (25 \pm 10) ^\circ\text{C}$, unless otherwise specified)

Parameter, unit	Symbol	Test conditions	Typical value*
Power supply rejection ratio , dB	PSRR	$F_i = 100 \text{ Hz}$ $U_{\text{ripple}_{PP}} = 100 \text{ mV}$	90
Unity gain frequency, MHz	t_G	$R_L = 5 \text{ k}\Omega$	5,5
Bandwidth , kHz	B	–	20
Output resistance, Ω	R_o	–	0,25
Channel separation, dB	α_S	$R_L = 32 \Omega$	70
		$R_L = 5 \text{ k}\Omega$	105
Slew rate, $\text{V}/\mu\text{s}$, not less	SR	–	5
Max output current, mA	I_o	THD < 0,1 %	60
Input current, pA	I_B	–	10
<p>* Typical value means normal value of parameter measured on sampling of ICs</p> <p>Notes</p> <ol style="list-style-type: none"> 1. $U_{\text{ripple}_{PP}}$ – ripple voltage swing 2. F_i – ripple frequency of supply voltage 			

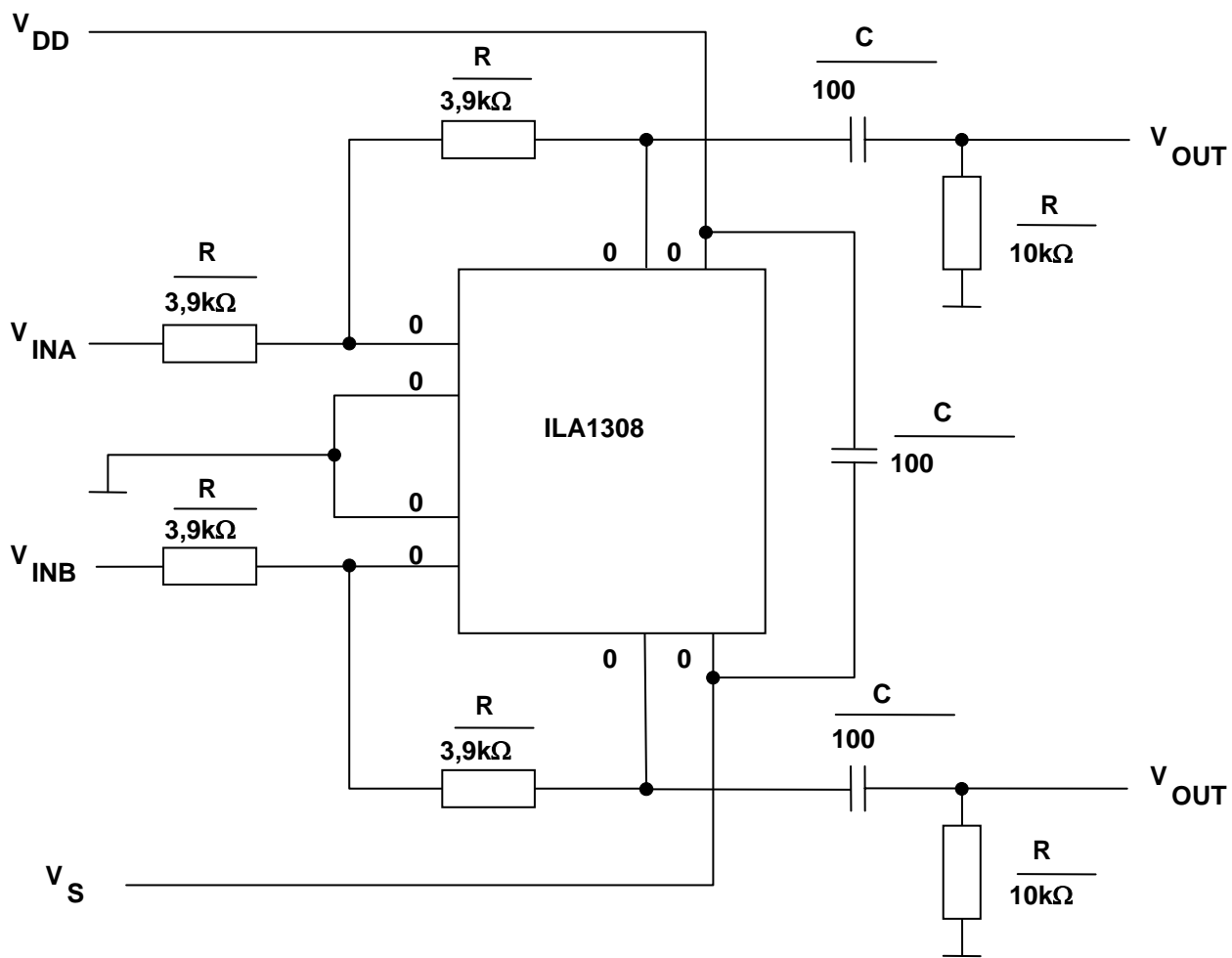
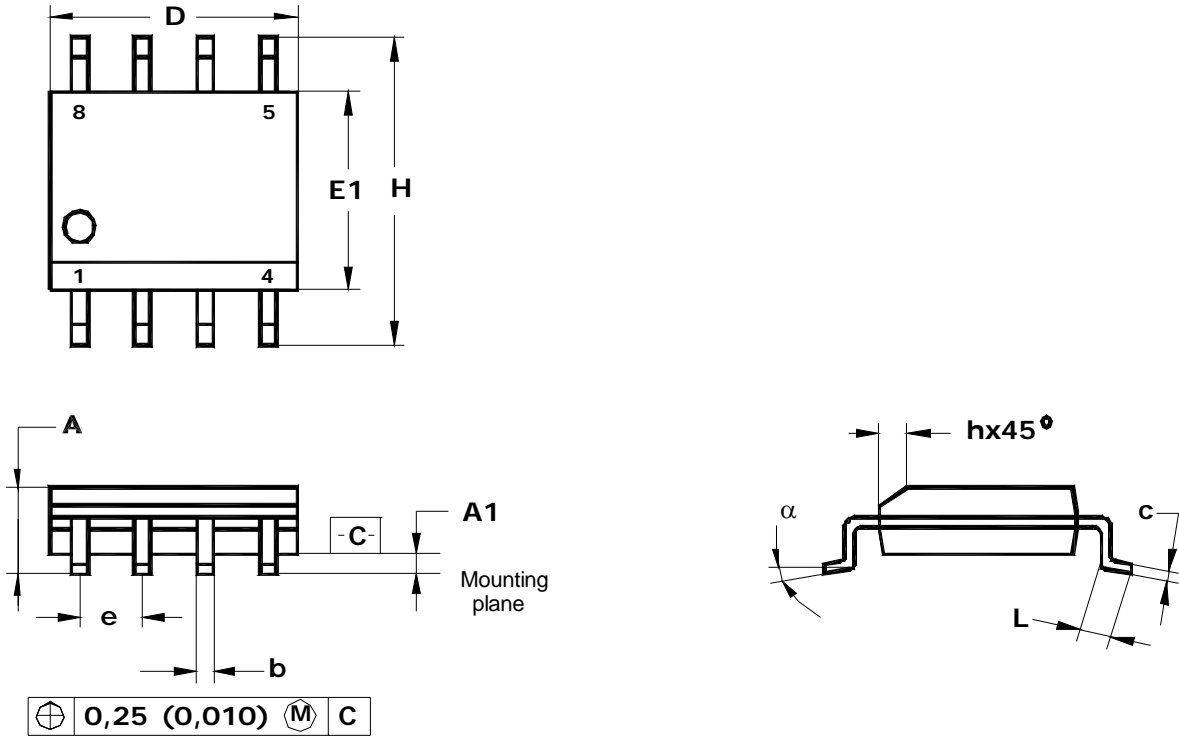


Fig. 4 – Typical application diagram

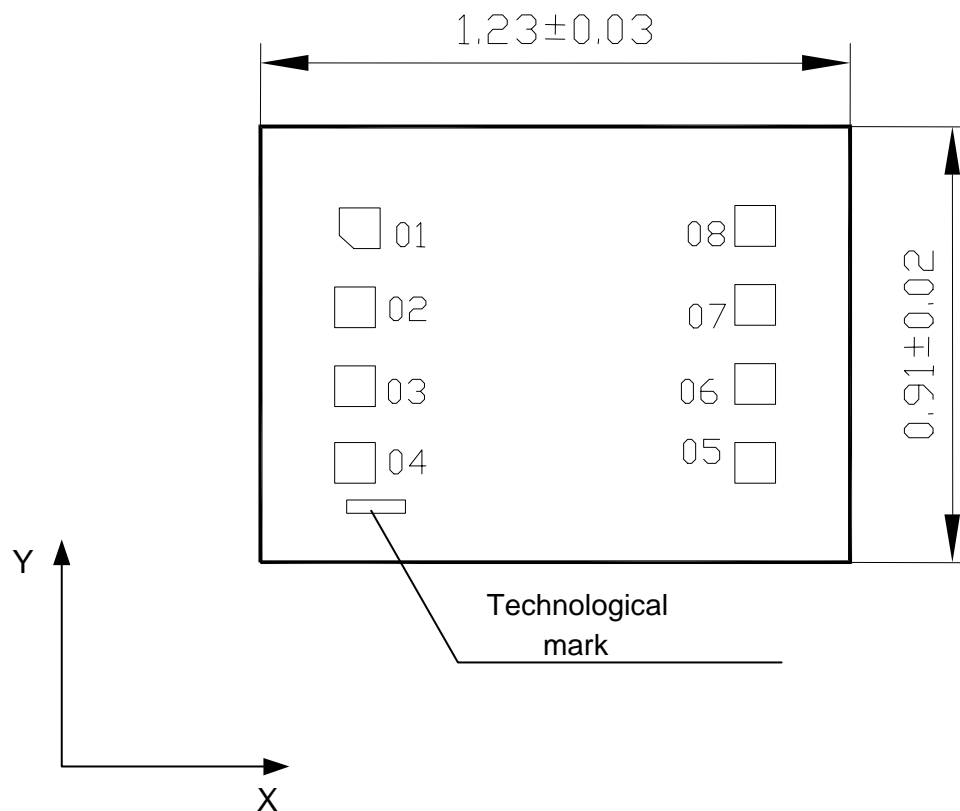
**D SUFFIX PLASTIC SOP
(MS-012AA)**



Note - Dimensions D, E1 not include burr value which has not to exceed 0,25 mm (0,010) each side.

	D	E1	H	b	e	α	A	A1	c	L	h
mm											
min	4.80	3.80	5.80	0.33		0°	1.35	0.10	0.19	0.41	0.25
max	5.00	4.00	6.20	0.51	1.27	8°	1.75	0.25	0.25	1.27	0.50
inches											
min	0.1890	0.1497	0.2284	0.013		0°	0.0532	0.0040	0.0075	0.016	0.0099
max	0.1968	0.1574	0.2440	0.020	0.100	8°	0.0688	0.0090	0.0098	0.050	0.0196

Fig. 5 - SO-package (MS-012AA) dimensions



Technological mark 1308 coordinates (mm): left bottom corner $x = 0,18$, $y = 0,13$
 Die thickness $0,46 \pm 0,02$ mm.

Contact pad number	Coordinates (left bottom corner), mm	
	X	Y
01	0,165	0,655
02	0,155	0,490
03	0,155	0,325
04	0,155	0,165
05	0,990	0,165
06	0,990	0,330
07	0,990	0,495
08	0,990	0,660

Note – Note: Contact pad coordinates and size (0,085 x 0,085 mm) are indicated under «Passivation» layer

Fig. 6 – Chip and contact pad layout