

## 2.5W/CH Stereo Filter-less Class-D Audio Amplifier

### Features

- Supply voltage range: 2.5 V to 5.5 V
- Support single-ended or differential analog input
- Low static operation current
- Low shut-down current
- Short power-on transient time
- Two volume control modes
  - DC volume control from -38dB to +20dB
  - 4-step volume gain of +6, +12, +18, +24dB
- Independent shut-down control for left or right channel
- Short-circuit and thermal protection
- Loudspeaker power within 10% THD+N
  - 1.5W/ch into 8Ω loudspeaker
  - 2.5W/ch into 4Ω loudspeaker
- Loudspeaker efficiency
  - 90% @ 8Ω, P<sub>o,10% THD+N</sub>
  - 85% @ 4Ω, P<sub>o,10% THD+N</sub>

### Applications

- Monitor audio
- PDA
- Portable multimedia devices
- Notebook computer
- Mobile phone

### Description

The AD52650 is a stereo, filter-less class-D audio amplifier. Operating with 5.0V loudspeaker driver supply, it can deliver 2.5W/CH output power into 4 Ω loudspeaker within 10% THD+N.

The AD52650 has two volume control modes by setting MODE pin. While MODE pin is set logic high, AD52650 is in DC volume control mode with 31-step volume gain from -38 dB to +20dB, adjusted by the DC voltage applied on G0 pin. Otherwise, AD52650 is the 4-step volume gain mode with +6dB, +12dB, +18dB, and +24dB gain, selected by setting G0 and G1 pins. The two volume adjustment modes are designed to fit the different volume control requirements in various applications.

The AD52650 packaged as E-TSSOP 24L is a stereo audio amplifier with high efficiency, which leads to longer battery life, less heat sink requirement, smaller board size and lower system cost, and suitable for the notebook computer, and portable multimedia devices. With the independent shut-down control for left or right channel, the AD52650 is more convenient to control the left and right channels.

### Ordering Information

Product ID	Package	Packing	Comments
AD52650-QE24NAT	E-TSSOP 24L	Tube	Green

### Marking Information

#### AD52650

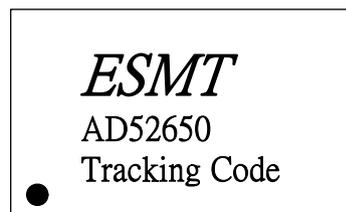
- Marking Information

Line 1 : LOGO

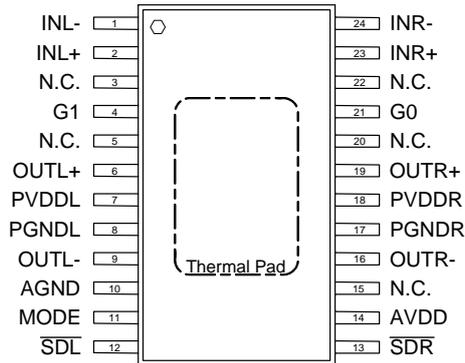
Line 2 : Product ID No.

Line 3 : Tracking Code

  
 PIN1 DOT



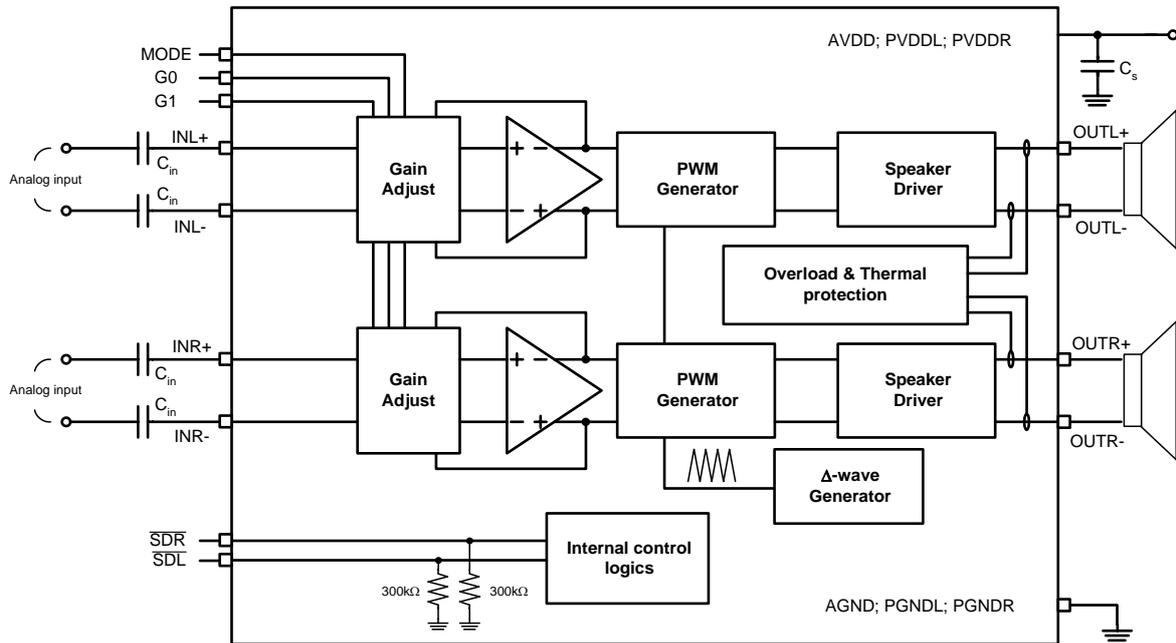
## Pin Assignments



## Pin Description

NAME	TYP	DESCRIPTION	CHARACTERISTIC	
1	INL-	I	Left channel Input (-)	
2	INL+	I	Left channel Input (+)	
3	N.C.	x	N.C.	
4	G1	I	Gain selection	with 300 kΩ pull-low resistor
5	N.C.	x	N.C.	
6	OUTL+	O	Left channel output (+)	
7	PVDDL	P	High current power supply	
8	PGNDL	G	High current ground	
9	OUTL-	O	Left channel output (-)	
10	AGND	G	Ground	
11	MODE	I	0: 4-gain control; 1:DC Vol. control	with 300 kΩ pull-low resistor
12	$\overline{\text{SDL}}$	I	Shut-down left channel (Low active)	with 300 kΩ pull-low resistor
13	$\overline{\text{SDR}}$	I	Shut-down right channel (Low active)	with 300 kΩ pull-low resistor
14	AVDD	P	Power supply	
15	N.C.	x	N.C.	
16	OUTR-	O	Right channel output (-)	
17	PGNDR	G	High current ground	
18	PVDDR	P	High current power supply	
19	OUTR+	O	Right channel output (+)	
20	N.C.	x	N.C.	
21	G0	I	Gain selection(mode=0) /DC vol. level(mode=1)	
22	N.C.	x	N.C.	
23	INR+	I	Right channel Input (+)	
24	INR-	I	Right channel Input (-)	
Thermal Pad	G	Must be soldered to PCB's ground plane		

## Functional Block Diagram



## Available Package

Package Type	Device no.	$\theta_{JA}$ ( $^{\circ}\text{C}/\text{W}$ )	Exposed Thermal Pad
E-TSSOP 24L	AD52650	32.3	Yes ( <b>Note1</b> )

**Note1:** The thermal pad is at the bottom of package. To optimize the performance of thermal dissipation, solder the thermal pad to PCB's ground plane is must be soldered.

## Absolute Maximum Ratings

SYMBOL	PARAMETER	MIN	MAX	UNIT
AVDD	Power supply for lower power analog cells	2.5	5.5	V
PVDDL(R)	Power supply for loudspeaker driver	2.5	5.5	V
	Input voltage	-0.3	AVDD	V
$T_{stg}$	Storage temperature	-65	150	$^{\circ}\text{C}$
$T_a$	Ambient operating temperature	0	70	$^{\circ}\text{C}$