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## **2x20W Stereo / 1x40W Mono Digital Audio Amplifier With 24 Bands EQ Functions**

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### **Features**

- 16/18/20/24-bits input with I<sup>2</sup>S, Left-alignment and Right-alignment data format
- PSNR & DR (A-weighting)  
Loudspeaker: 102dB (PSNR), 108dB (DR)  
@24V
- Multiple sampling frequencies (Fs)  
32kHz / 44.1kHz / 48kHz and  
64kHz / 88.2kHz / 96kHz and  
128kHz / 176.4kHz / 192kHz
- I<sup>2</sup>C control interface
- Channel mixing
- Volume control (+12dB ~ -103dB, 0.125dB/step)
- Power clipping function
- DRC and DTC function
- 24 bands parametric speaker EQ
- Bass/Treble tone control
- DRC and post scale boost
- Check-sum coefficient protection
- Noise gate function
- Pop noise less muting (Quick Mute/Quick Start)
- Sleep function
- X3 over sampling for 32kHz FS
- AM interference frequency switching
- Level meter
- Post-scale and DRC offset volume support
- Over current protection function (OCP)
- Over temperature protection function (OTP)
- Under voltage lock out (UVLO)
- Over voltage protection function (OVP)
- DC detection function (DCDET)
- Clock detection function (CKDET)
- Lead-free E-LQFP-48L

### **Applications**

- TV audio
- Boom-box, CD and DVD receiver, docking system
- Powered speaker
- Wireless audio

### **Description**

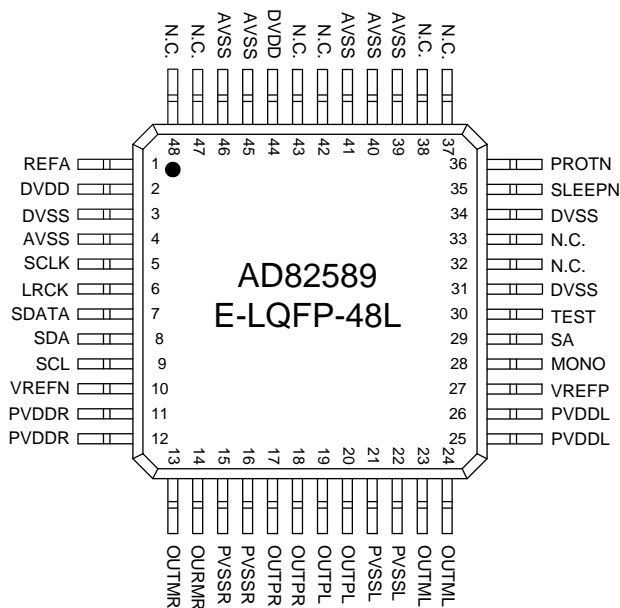
AD82589 is an integrated audio system solution, embedding digital audio processing power stage amplifier.

AD82589 has a programmable slew-rate controlled output buffer, which drives one (mono) or two (stereo) speakers directly. In addition, it is unsusceptible to supply voltage fluctuation due to the close-loop design.

AD82589 can provide advanced audio processing capabilities, such as volume control, 24 bands EQ, audio mixing and Dynamic Range Control (DRC). These functions are fully programmable via a simple I<sup>2</sup>C interface.

Robust protection circuits are provided to protect AD82589 from damage due to accidental erroneous operation. AD82589, being a digital circuit design, is more tolerant to noise and PVT (Process, Voltage, and Temperature) variation than the analog Class-AB or Class-D audio amplifier counterpart implemented by analog circuit design. Furthermore, AD82589 is pop free during instantaneous power switching because of its built-in, robust anti-pop circuit.

**Pin Assignment**



**Pin Description**

NAME	Pin no.	TYPE	DESCRIPTION	CHARACTERISTICS
REFA	1	O	1.8V Regulator voltage output.	
DVDD	2	P	3.3V Power supply for internal digital circuit.	
DVSS	3	P	Ground terminal for internal digital circuitry.	
AVSS	4	P	Ground terminal for internal analog circuitry.	
SCLK	5	I	Serial audio port bit clock.	
LRCK	6	I	Serial audio port word clock.	
SDATA	7	I	Serial audio port serial data in.	
SDA	8	I/O	I <sup>2</sup> C data input.	
SCL	9	I/O	I <sup>2</sup> C clock input.	
VREFN	10	O	Low side gate drive internal regulator output.	
PVDDR	11	P	RCH power supply for power stage.	
PVDDR	12	P	RCH power supply for power stage.	
OUTMR	13	O	Negative terminal for RCH differential speaker amplifier output.	
OUTMR	14	O	Negative terminal for RCH differential speaker amplifier output.	
PVSSR	15	P	RCH ground for power stage.	
PVSSR	16	P	RCH ground for power stage.	
OUTPR	17	O	Positive terminal for RCH PWM output.	
OUTPR	18	O	Positive terminal for RCH PWM output.	
OUTPL	19	O	Positive terminal for LCH PWM output.	
OUTPL	20	O	Positive terminal for LCH PWM output.	

PVSSL	21	P	LCH ground for power stage.	
PVSSL	22	P	LCH ground for power stage.	
OUTML	23	O	Negative terminal for LCH PWM output.	
OUTML	24	O	Negative terminal for LCH PWM output.	
PVDDL	25	P	LCH power supply for power stage.	
PVDDL	26	P	LCH power supply for power stage.	
VREFP	27	O	High side gate drive internal regulator output.	
MONO	28	I	MONO output control pin.	
SA	29	I	I <sup>2</sup> C address setup.	
TEST	30	I	This pin must be connected to GND.	
DVSS	31	P	Ground terminal for internal digital circuitry.	
NC	32	—	No connect.	
NC	33	—	No connect.	
DVSS	34	P	Ground terminal for internal digital circuitry.	
SLEEPN	35	I	Power down control (Low for power down).	
PROTN	36	O	Error indicator, Low stands for error signal.	
NC	37	—	No connect.	
NC	38	—	No connect.	
AVSS	39	P	Ground terminal for internal analog circuitry.	
AVSS	40	P	Ground terminal for internal analog circuitry.	
AVSS	41	P	Ground terminal for internal analog circuitry.	
NC	42	—	No connect.	
NC	43	—	No connect.	
DVDD	44	P	3.3V Power supply for internal digital circuit.	
AVSS	45	P	Ground terminal for internal analog circuitry.	
AVSS	46	P	Ground terminal for internal analog circuitry.	
NC	47	—	No connect.	
NC	48	—	No connect.	

Note:

P: Power or ground pins; I: Input pins; O: Output pins; I/O: The bidirectional pins.