TAS2572 6.6 W Digital Input smart amp with I/V sense and integrated 13 V Class-H Boost

1 Features

- Powerful class-D amplifier
  - 6.6 W 1% THD+N
  - 13V boost with 4.0A max current limit
- Best in class efficiency
  - Upto 90% efficiency at system level
  - 4.8mW idle channel power
  - Integrated Y-bridge
  - Advanced 33mV step size class-H boost
- High performance audio channel
  - 7µV A-wt. idle channel noise
  - 109dB Dynamic Range
  - -90dB THDN
  - Low EMI performance
- Advanced integrated features
  - Integrated Speaker IV sense
  - Signal detection high efficiency modes
  - High accuracy voltage monitor & temp sensor
  - Programmable battery input current limit
- Ease of use features
  - 1cell, 2cell and 3cell Li-ion battery support
  - Clock based power up/down
  - Auto clock rate detection: 16kHz to 192kHz
  - Integrated ultrasonic tone generator
  - External 14V PVDD supply support
  - MCLK free operation
  - Thermal and over current protection
  - Programmable drive strength IO buffers
- Power Supplies and user interface
  - VBAT: 2.5 V to 5.5 V
  - VDD: 1.65 V to 1.95 V
  - IOVDD: 1.2V or 1.8V
  - I^2S/TDM: 8 channels
  - I^2C: 4 selectable addresses
- WCSP package

2 Applications

- Mobile phone, Tablets & Wearables
- Smart Speakers with Voice Assistance
- Bluetooth and Wireless speakers

3 Description

The TAS2572 is a digital input Class-D audio amplifier with an integrated Boost for higher power delivery in battery-operated systems. The device has integrated speaker voltage and current sense (IV-Sense) for real-time monitoring of the loudspeakers. IV-sense data can be used to run speaker protection algorithms on a host DSP to enable high output SPL while keeping speakers in a safe operating region.

The device is optimized for delivering the best battery life for real use cases of Music playback and Voice calls. Advanced efficiency optimization features like Class-H, Y-bridge and algorithms enable the device to produce best-in-class efficiency across all power regions of operation. The Class-D amplifier is capable of delivering 6.6 W output power using the integrated Class-H 13 V Boost.

A battery tracking peak voltage limiter and a battery voltage monitor ADC enables advanced battery monitoring algorithms on the host processor to manage peak output power delivery while avoiding any audio distortion when battery capacity is depleting.

Up to four devices can share a common bus via I^2S/TDM + I^2C interfaces.

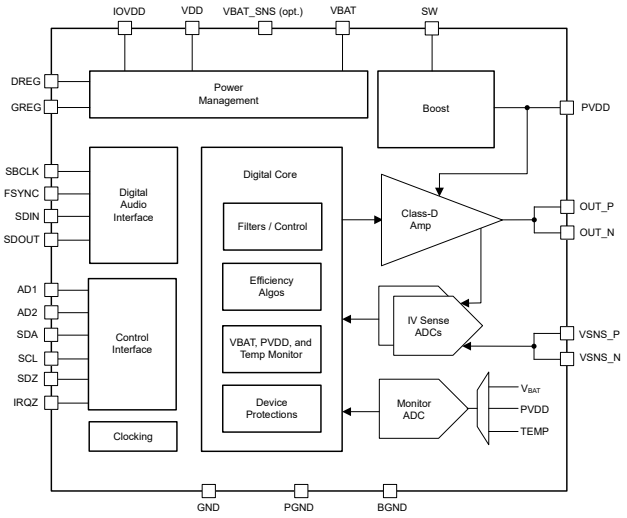

Figure 3-1. Functional block diagram

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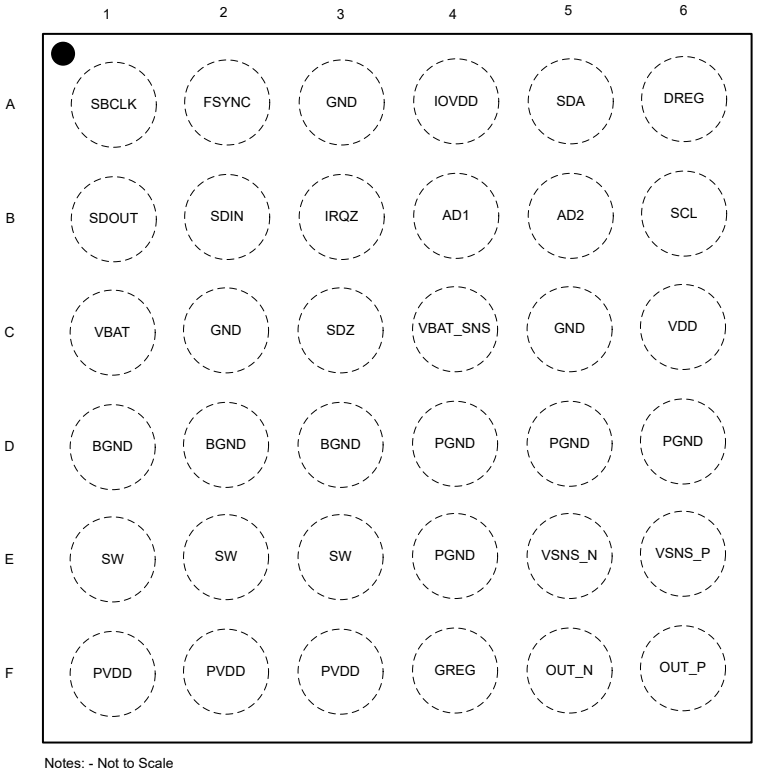
4 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

DATE	REVISION	NOTES
Nov, 2022	v0.1	Initial Release

5 Pin Configuration and Functions



Notes: - Not to Scale

Figure 5-1. Package Top Level View Pinout

Pin Functions

PIN		I/O[1]	DESCRIPTION
NAME	NO.		
AD1	B4	I	I²C address pin LSB.
AD2	B5	I	I²C address pin LSB+1.
BGND	D1	P	Boost ground. Connect to PCB GND plane strongly with multiple vias.
	D2		
	D3		
DREG	A6	P	Digital core voltage regulator output. Bypass to GND with a capacitor. Do not connect to external load.
FSYNC	A2	I	I²S word clock or TDM frame sync.
GREG	F4	P	High-side gate CP regulator output. Do not connect to external load.
GND	A3	P	Digital ground. Connect to PCB GND plane. Strong connection to ground plane required through multiple vias.
	C2		
	C5		
IOVDD	A4	P	1.2-V or 1.8-V Digital IO supply. Decouple to GND with capacitor.
IRQZ	B3	O	Open drain, active low interrupt pin. Pull up to IOVDD with resistor if optional internal pullup is not used.
OUT_N	F5	O	Class-D negative output.
OUT_P	F6	O	Class-D positive output.
PGND	D4	P	Class-D Power stage ground. Connect to PCB GND plane strongly through multiple vias.
	D5		
	D6		
	E4		
PVDD	F1	P	Integrated boost output and Class-D power stage supply.
	F2		
	F3		
SBCLK	A1	I	I²S/TDM serial bit clock.
SCL	B6	I	I²C Clock Pin. Pull up to IOVDD with a resistor.
SDA	A5	IO	I²C Data Pin. Pull up to IOVDD with a resistor.
SDIN	B2	I	I²S or TDM serial data input.
SDOUT	B1	IO	I²S or TDM serial data output.
SDZ	C3	I	Active low hardware shutdown.
SW	E1	P	Boost converter switch input.
	E2		
	E3		
VBAT	C1	P	Battery power supply input. Connect to 2.5-V to 5.5-V supply and decouple with a cap.
VBAT_SNS	C4	I	Battery sense terminal. Connect to 1S or 2S battery supply for remote battery sensing. Ground the pin if remote sensing is not used.
VDD	C6	P	Analog, digital power supply. Connect to 1.8-V supply and decouple to GND with cap.
VSNS_N	E5	I	Voltage sense negative input. Connect to speaker negative terminal as close to speaker as possible. Add series resistor if EMI filter is used.
VSNS_P	E6	I	Voltage sense positive input. Connect to speaker positive terminal as close to speaker as possible. Add series resistor if EMI filter is used.

1. I = Input, O = Output, I/O = Input or Output, G = Ground, P = Power.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
PTAS2572YCGR	ACTIVE	DSBGA	YCG	36	3000	TBD	Call TI	Call TI	-40 to 85		Samples
TAS2572YCGR	ACTIVE	DSBGA	YCG	36	3000	RoHS & Green	SNAGCU	Level-1-260C-UNLIM	-40 to 85	TAS257X	Samples

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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