

2×33W STEREO | 1×51W MONO

DIGITAL INPUT CLASS-D AUDIO AMPLIFIER WITH RICH AUDIO EFFECT TUNING

Description

The PAMS5825 is a fully integrated, high-efficiency, stereo Class-D audio amplifier with digital inputs. The application circuit requires few passive components to operate with 4.5V to 21V PVDD supply, 3.3V or 1.8V DVDD supply. It can drive 2×33W output power into BTL 6Ω and 1×51W into PBTL 4Ω@1% THD+N.

The PAMS5825 features one novel PWM modulation architecture, which adjusts PWM common duty cycle during startup phase to avoid startup pop click.

Spread spectrum technology provides lower EMI radiated emissions. It allows inductor-free application with specified output power situation with PAMS5825.

The advanced audio effect tuning capability inside PAMS5825 provides one highly integrated solution. It allows turning on/off each block with highly free operations. Both pre and post BQs/volume help a lot to maintain audio headroom. Furthermore, 3 band DRC with time delay buffer and post compensation BQs is available to implement flexible and flat multiple band control.

The PAMS5825 supports the TSSOP-28EP (Type TH-1) package.

Applications

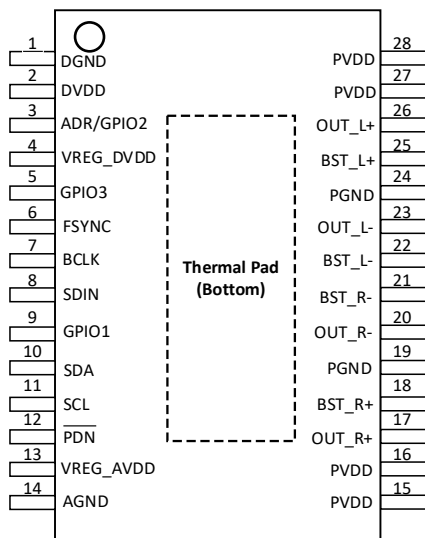
- Portable speakers: Bluetooth, smart speakers with voice assistant
- Home audio: TV, soundbar, STB (set top box), HTiB (home theatre in a box)
- Smart appliances
- PCs and laptops

Features

- Flexible Power-Supply Configurations
 - PVDD: 4.5V to 21V
 - DVDD and I/O: 3.3V or 1.8V
- Various Output Configurations
 - 2×33W, Stereo Mode (6Ω, 21V, THD+N = 1%)
 - 1×51W, Mono Mode (4Ω, 21V, THD+N = 1%)
- Excellent Audio Performance
 - THD+N ≤ 0.04% at 1W, 1kHz, PVDD = 12V
 - 112 dB A-Weighted Signal-to-Noise Ratio (SNR)
 - Idle Switching A-Weighted Noise ≤ 35μVRMS
 - 23.5mA Low Quiescent Current
 - 90% Efficiency into 6Ω Load at 12V
- Configurable Digital Audio Interface
 - I2C Control with up to 4 Selectable Addresses
 - I2S, Left-Justified, Right-Justified, TDM Audio Format
 - 3-Wire Digital Audio Interface Without MCLK Required
 - 32kHz, 44.1kHz/48kHz, 88.2kHz/96kHz, 176.4kHz/192kHz Input Sample Rate
 - SDOUT for Acoustic Echo Cancellation – AEC or 1.1/2.1 System Sub-Channel Signal Routing
- Advanced Audio Effect Tuning
 - Flexible Digital and Analog Gain Adjustment
 - Highpass Filter for DC Blocking
 - Input Signal Router for Left and Right Channel
 - 2×15 Pre BQs & 2×5 Post BQs to Support Enhanced Audio Frequency Tuning
 - Pre Volume & Post Volume for Dynamic Headroom and Loudness Control
 - 3 Band Dynamic Range Control (DRC) with Time Delay Buffer & Post Compensation BQs for Flexible and Flat Multiple Band Control
- Analog Protections
 - FAULT Status Report Through GPIO and I2C Registers
 - Overcurrent and Direct Current Protection
 - Overtemperature Protection
 - Undervoltage and Overvoltage Protection
 - Clock Error Protection
- TSSOP-28EP (Type TH-1) Package
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. “Green” Device (Note 3)
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative.
<https://www.diodes.com/quality/product-definitions/>

Notes: 1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

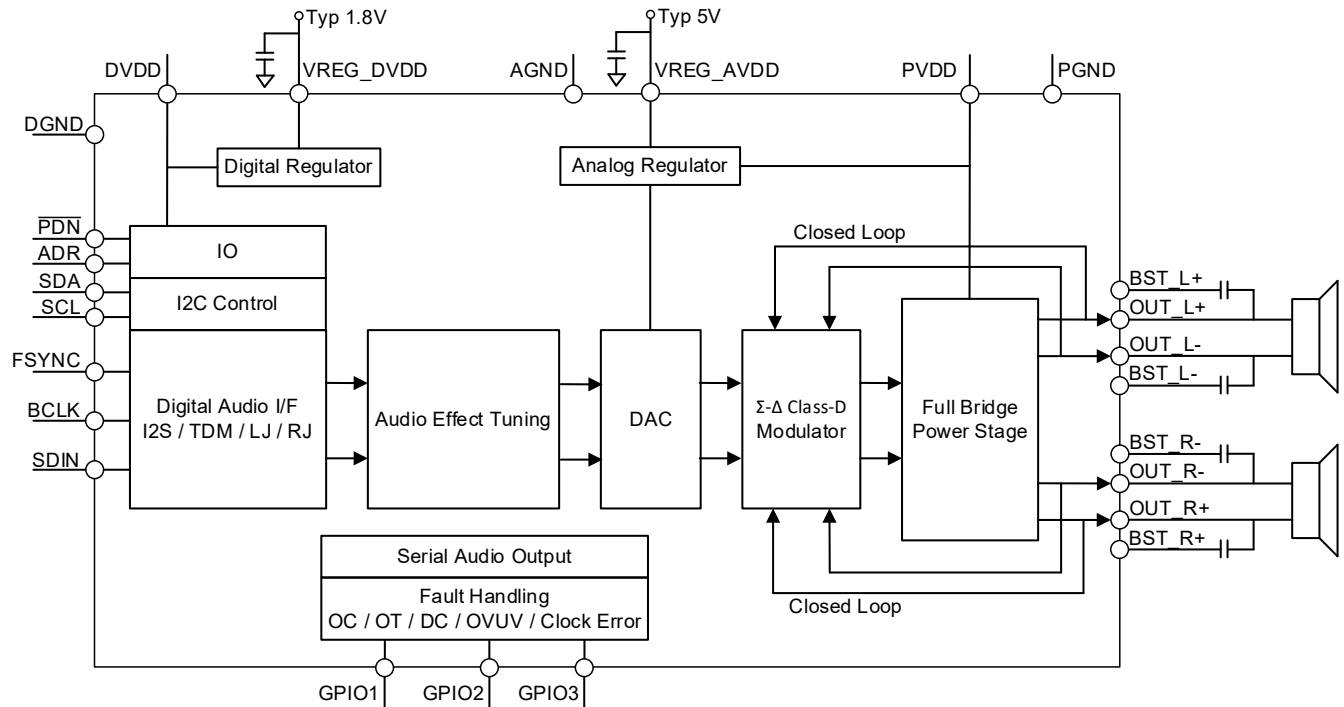
Pin Descriptions



TSSOP-28EP (Type TH-1) Top View

Pin Number	Pin Name	Type	Description
1	DGND	PWR	Digital Ground.
2	DVDD	PWR	Digital power-supply input: 3.3V or 1.8V.
3	ADR/GPIO2	DIO	I2C address selection / GPIO2: FAULT / WARNING / SDOUT...
4	VREG_DVDD	AOUT	Digital regulator output.
5	GPIO3	DIO	GPIO3: FAULT / WARNING / SDOUT... Default setting is allowed to directly short to GND.
6	FSYNC	DIN	Word select clock for the digital signal.
7	BCLK	DIN	Bit clock for the digital signal.
8	SDIN	DIN	Serial data input.
9	GPIO1	DIO	GPIO1: FAULT / WARNING / SDOUT...
10	SDA	DIO	I2C serial data.
11	SCL	DIN	I2C clock.
12	$\overline{\text{PDN}}$	DIN	Shutdown, low active.
13	VREG_AVDD	AOUT	Analog regulator output.
14	AGND	PWR	Analog ground.
15	PVDD	PWR	Power stage supply input.
16	PVDD	PWR	Power stage supply input.
17	OUT_R+	AOUT	Right channel positive output of H-bridge.
18	BST_R+	AIN	Bootstrap capacitor for OUT_R+.
19	PGND	PWR	Power stage ground.
20	OUT_R-	AOUT	Right channel negative output of H-bridge.
21	BST_R-	AIN	Bootstrap capacitor for OUT_R-.
22	BST_L-	AIN	Bootstrap capacitor for OUT_L-.
23	OUT_L-	AOUT	Left channel negative output of H-bridge.
24	PGND	PWR	Power stage ground.
25	BST_L+	AIN	Bootstrap capacitor for OUT_L+.
26	OUT_L+	AOUT	Left channel positive output of H-bridge.
27	PVDD	PWR	Power stage supply input.
28	PVDD	PWR	Power stage supply input.

Functional Block Diagram

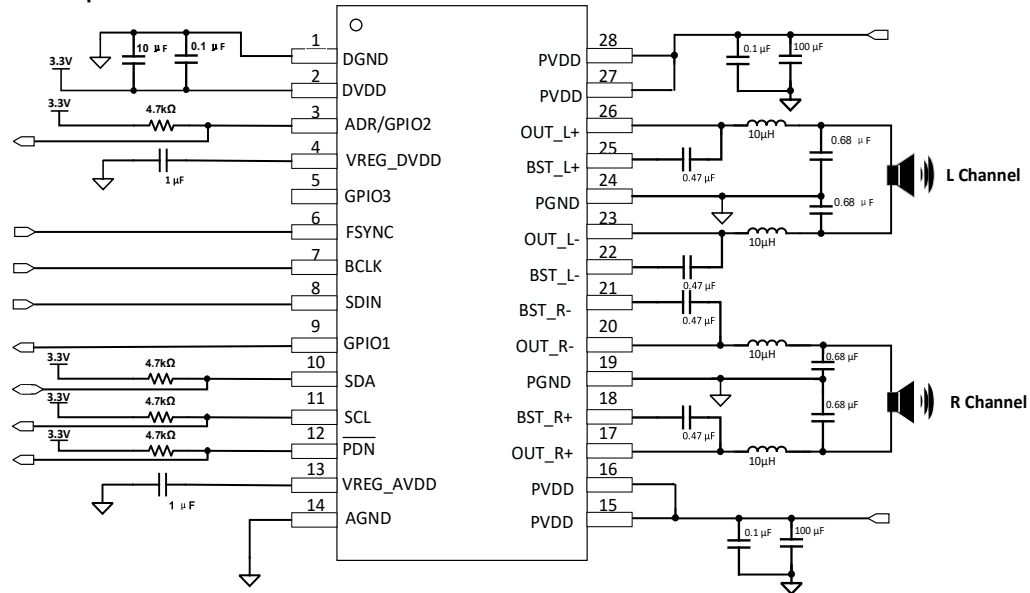


Device Family Comparison

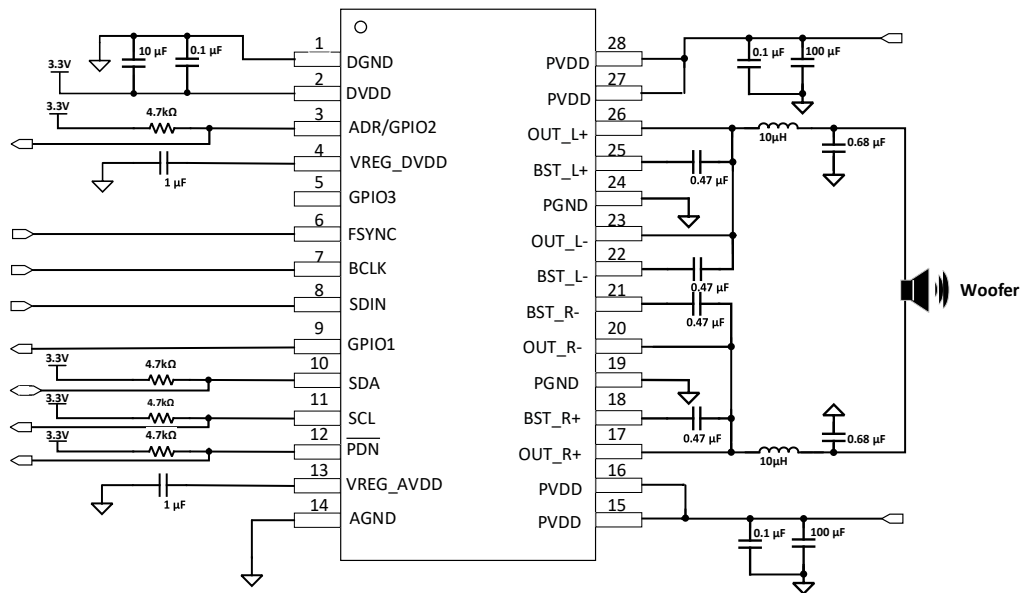
Device Name	$R_{DS(ON)}$	PVDD	Output Power
PAMS5803	110m Ω	4.5V to 17V	Stereo 2x24W (4 Ω , 16V, THD+N = 1%)
PAMS5804	135m Ω	4.5V to 26.4V	Stereo 2x33W (6 Ω , 22V, THD+N = 1%)
PAMS5825	75m Ω	4.5V to 21V	Stereo 2x33W (6 Ω , 21V, THD+N = 1%)
PAMS5826	95m Ω	4.5V to 26.4V	Stereo 2x40W (6 Ω , 24V, THD+N = 1%)
PAMS5827	75m Ω	4.5V to 26.4V	Stereo 2x41W (6 Ω , 24V, THD+N = 1%)

Typical Applications Circuits

Application Circuit Example of Stereo



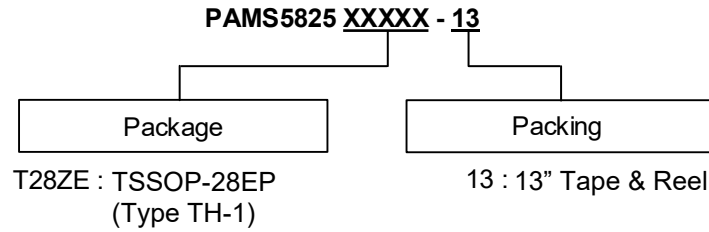
Application Circuit Example of Mono



Notes:

- (1) Both 0.47µF or 0.22µF are suitable for BST caps.
- (2) GPIO3 default setting is allowed to directly short to GND.

Ordering Information (Note 6)

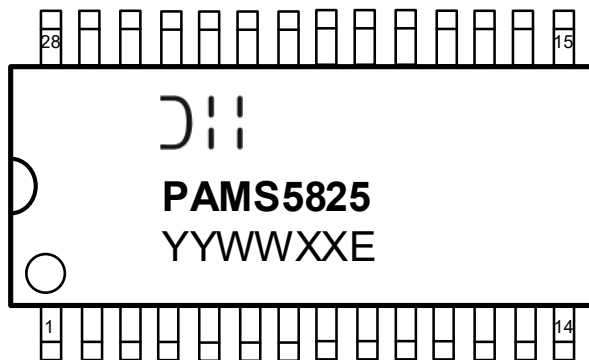


Orderable Part Number	Package Code	Package	Packing	
			Qty.	Carrier
PAMS5825T28ZE-13	T28ZE	TSSOP-28EP (Type TH-1)	3,000	13" Tape and Reel

Note: 6. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

(Top View)



Logo :

Marking : PAMS5825

YY : Year : 25, 26, 27~

WW : Week : 01~52 ; 52
represents 52 and 53 week

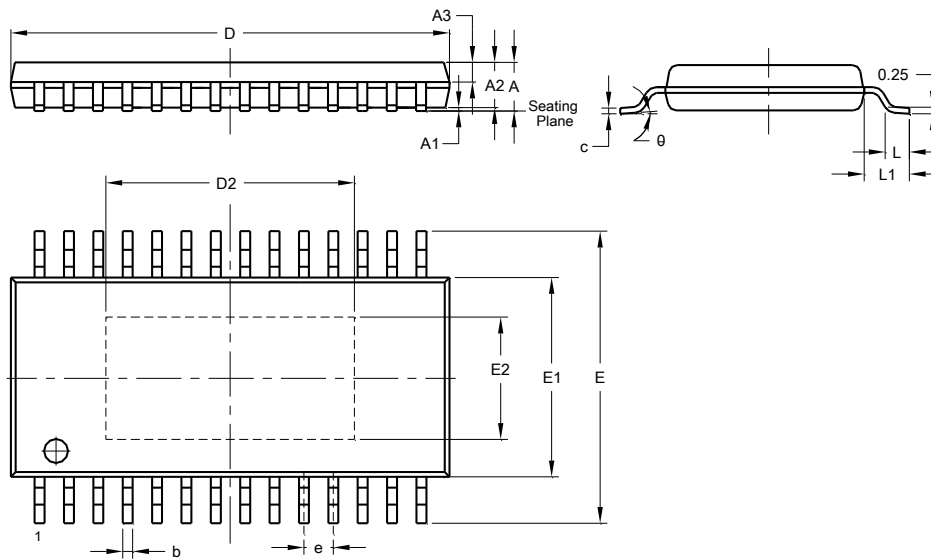
XX : Internal Code

E : Exposed Pad

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

TSSOP-28EP (Type TH-1)

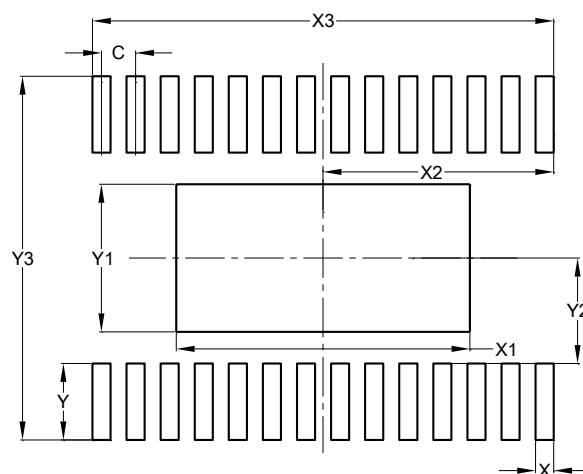


TSSOP-28EP (Type TH-1)			
Dim	Min	Max	Typ
A	--	1.20	--
A1	0.05	0.15	--
A2	0.80	1.00	--
A3	0.39	0.49	0.44
b	0.20	0.29	--
c	0.13	0.18	--
D	9.60	9.80	9.70
D2	5.40	5.60	5.50
E	6.20	6.60	6.40
E1	4.30	4.50	4.40
E2	2.60	2.80	2.70
e	0.65BSC		
L	0.45	0.75	0.60
L1	1.00BSC		
θ	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

TSSOP-28EP (Type TH-1)



Dimensions	Value (in mm)
C	0.650
X	0.345
X1	5.600
X2	4.398
X3	8.795
Y	1.450
Y1	2.800
Y2	2.000
Y3	6.900

Mechanical Data

- Moisture Sensitivity: Level 3 per J-STD-020
- Terminals: Finish – Sn, Solderable per J-STD-002, Test B1 (e3)
- Weight: 0.15 grams (Approximate)

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