

## Description

The PAM8100 is a 3-VRMS pop-free stereo line driver designed to allow the removal of the output DC-blocking capacitors for reduced component count and cost. The device is ideal for single-supply electronics where size and cost are critical design parameters.

The PAM8100 is capable of driving 3Vrms into a 2.5-kΩ load with 5-V supply voltage. The device has differential inputs and uses external gain-setting resistors to support a gain range of  $\pm 1$  V/V to  $\pm 10$  V/V. The PAM8100 has built-in mute control for pop-free on/off control. The PAM8100 has an external and internal undervoltage detector that mutes the output.

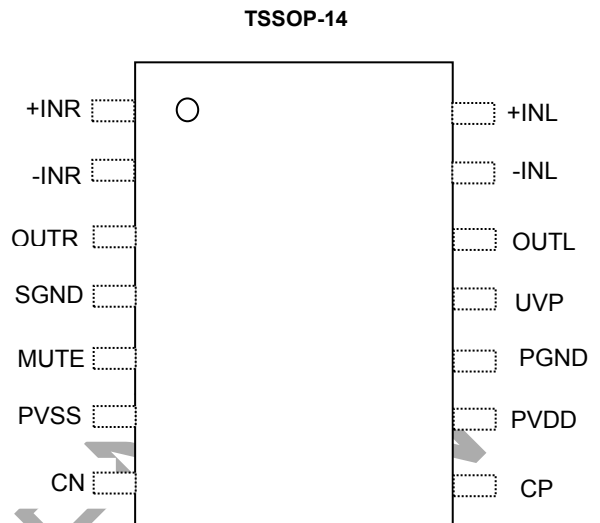
Using the PAM8100 in audio products can reduce component count considerably compared to traditional methods of generating a 3-Vrms output.

The PAM8100 is available in a 14-pin TSSOP.

## Features

- Eliminates Pop/Clicks
  - Eliminates Output DC-Blocking Capacitors
  - Provides Flat Frequency Response 20Hz-20kHz
- Low Noise and THD
  - SNR > 105 dB
  - Typical  $V_n < 13\mu\text{Vrms}$
  - THD+N < 0.005%
- Output Voltage Into 2.5-kΩ Load
  - 2 Vrms With 3.3V Supply Voltage
  - 3 Vrms With 5V Supply Voltage
- Differential Input
  - External Undervoltage Mute
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

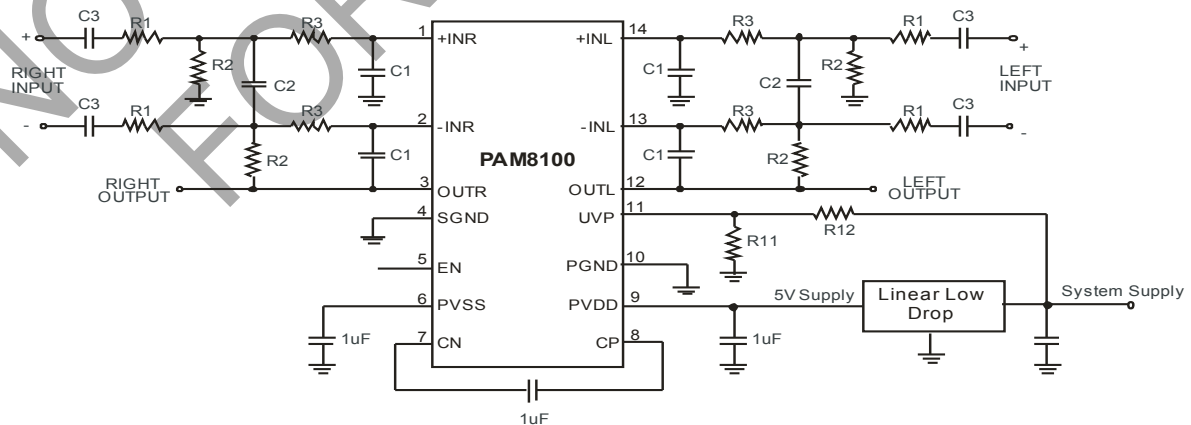
## Pin Assignments



## Applications

- PDP / LCD TVs
- Blue-ray Disc™, DVD Players
- Home Theater in a Box
- Set-Top Boxes

## Typical Applications Circuit



- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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

Pin Number	Name	I/O	Description
1	+INR	I	Right-channel OPAMP positive input
2	-INR	I	Right-channel OPAMP negative input
3	OUTR	O	Right-channel OPAMP output
4	SGND	P	Signal ground
5	MUTE	I	Mute, active-high
6	PVSS	P	Supply voltage
7	CN	I/O	Charge-pump flying capacitor negative terminal
8	CP	I/O	Charge-pump flying capacitor positive terminal
9	PVDD	P	Positive supply
10	PGND	P	Power ground
11	UVP	I	Under voltage protection input
12	OUTL	O	Left-channel OPAMP output
13	-INL	I	Left-channel OPAMP negative input
14	+INL	I	Left-channel OPAMP positive input

## Absolute Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Symbol	Description	VALUE	UNIT
V <sub>DD</sub>	Supply Voltage	-0.3 to 6.0	V
V <sub>I</sub>	Input Pins	GND-0.3 to VDD + 0.3	V
T <sub>A</sub>	Operating Free-Air Temperature Range	-40 to +85	°C
T <sub>J</sub>	Operating Junction Temperature Range	-40 to +150	°C
T <sub>STG</sub>	Storage Temperature Range	-65 to +150	°C

## Recommended Operating Conditions (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Symbol	Parameter	Min	Nom	Max	Unit
V <sub>IN</sub>	Supply Voltage	-	2.5	5	V
R <sub>L</sub>	Load Impedance	-	0.6	10	kΩ
V <sub>IH</sub>	High-Level Input Voltage	MUTE	1.2	V <sub>IN</sub>	V
V <sub>IL</sub>	Low-Level Input Voltage	MUTE	-0.3	0.4	V
T <sub>A</sub>	Operating Free-Air Temperature	-40	25	+85	°C

## Thermal Information

Parameter	Symbol	Package	Maximum	Unit
Thermal Resistance (Junction to Ambient)	θ <sub>JA</sub>	TSSOP-14	35	°C/W
Thermal Resistance (Junction to Case)	θ <sub>JC</sub>	TSSOP-14	14	°C/W

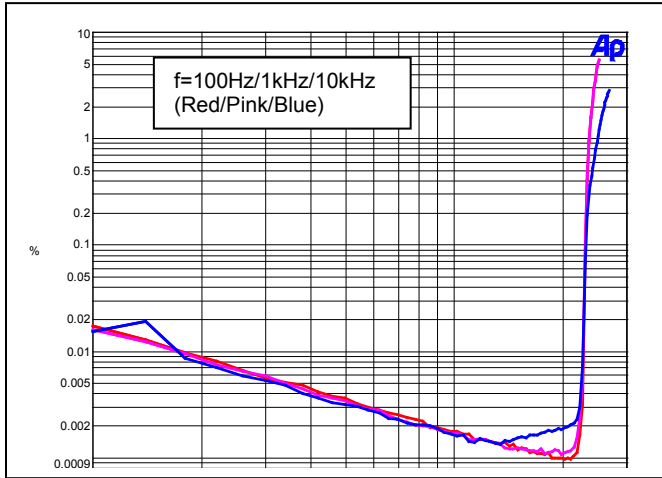
**Electrical Characteristics** (@VDD=3.3V, TA=+25°C, RL=10kΩ, C(PUMP)=C(PVSS) =1μF, CIN=2.2μF, RIN=15kΩ, Rfb=30kΩ, Unless otherwise specified.)

PARAMETER	Symbol	Conditions	Min	Typ	Max	Units
Output Offset Voltage	V <sub>OS</sub>	No load	-	-	3	mV
Power-Supply Rejection Ratio	P <sub>SRR</sub>	Input AC-GND, f=1kHz, V <sub>pp</sub> =200mV	-	70	-	dB
High-Level Output Voltage	V <sub>OH</sub>	VDD=3.3V	3.1	-	-	V
Low-Level Output Voltage	V <sub>OL</sub>	VDD=3.3V	-	-	-3.05	V
MUTE High	V <sub>IH</sub>	VDD=3.3V	1.5	-	-	V
MUTE Low	V <sub>IL</sub>	VDD=3.3V	-	-	0.4	V
Supply Current	I <sub>DD</sub>	No load, MUTE=VDD	-	10	-	mA
		No load, MUTE=GND	-	10	-	mA
Output Voltage (outputs in phase)	V <sub>o</sub>	THD=1%, VDD=3.3V, f=1kHz	2.0	2.4	-	Vrms
Total Harmonic Distortion Plus Noise	THD+N	VO=2Vrms, f=1kHz	-	0.0015	-	%
Crosstalk	CS	VO=1Vrms, f=1kHz	-	-110	-	dB
Maximum Capacitive Load	MCL	-	-	470	-	pF
Noise Output Voltage	V <sub>N</sub>	Input AC-GND, A-weighted	-	13	-	uVrms
Signal-to-Noise Ratio	SNR	VO=2Vrms, A-weighted	-	104	-	dB
External UnderVoltage Detection	V <sub>UVP</sub>	-	-	1.25	-	V
External Under-Voltage Detection Hysteresis Current	I <sub>HYSI</sub>	-	-	5	-	μA
Charge Pump Frequency	f <sub>CP</sub>	-	200	300	400	kHz

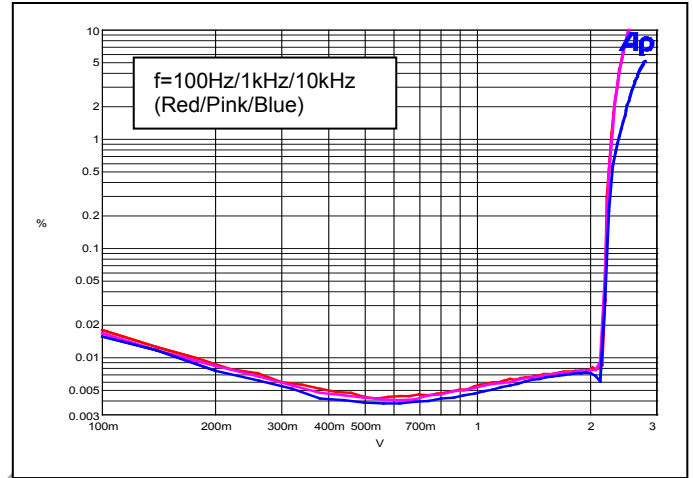
NOT RECOMMENDED FOR NEW DESIGN

**Performance Characteristics** (@ $T_A=+25^\circ\text{C}$ ,  $V_{DD}=3.3\text{V}$ ,  $C(\text{PUMP})=C(\text{PVSS})=1\mu\text{F}$ ,  $C_{IN}=2.2\mu\text{F}$ ,  $R_{IN}=15\text{k}\Omega$ ,  $R_{fb}=30\text{k}\Omega$ , unless otherwise specified.)

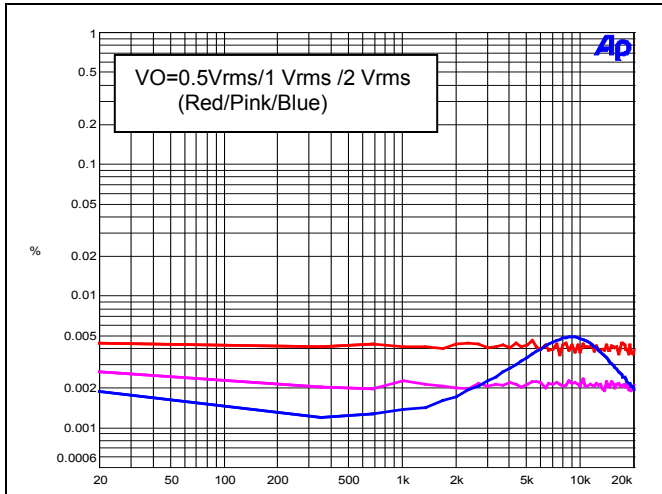
THD+N vs. Output Voltage (RL=10kΩ)



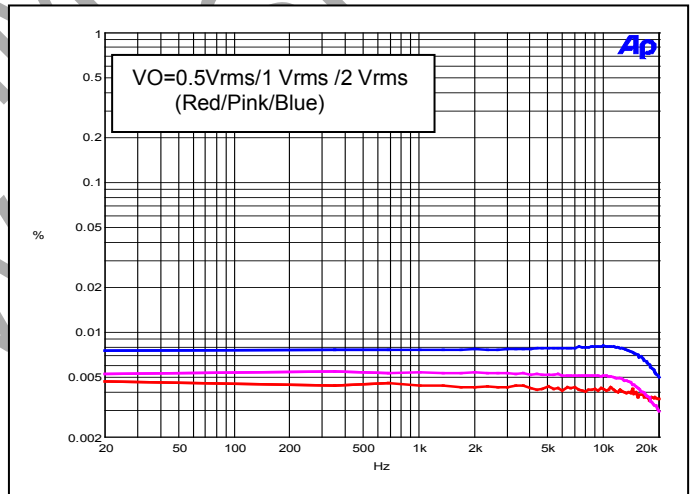
THD+N vs. Output Voltage (RL=600Ω)



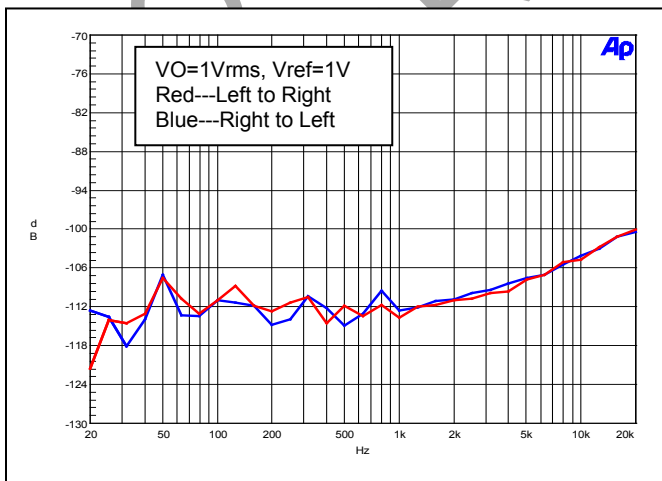
THD+N vs. Frequency (RL=10kΩ)



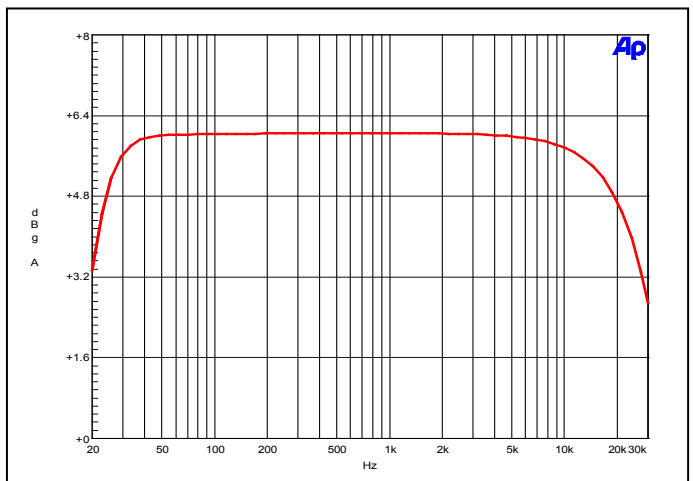
THD+N vs. Frequency (RL=600Ω)



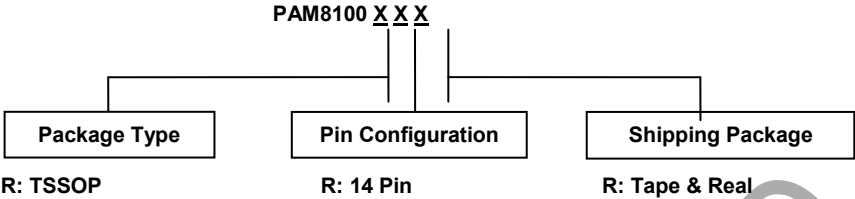
Crosstalk vs. Frequency (RL=10kΩ)



Gain vs. Frequency (RL=10kΩ)



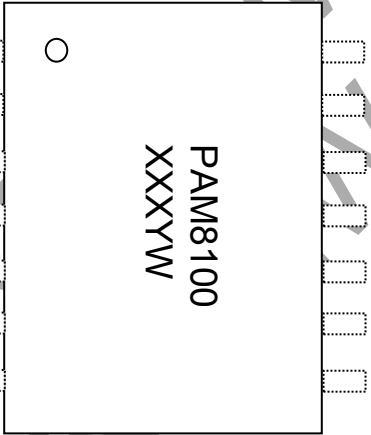
**Ordering Information**



Part Number	Package Type	Shipping
PAM8100RRR	TSSOP-14	2,500/Tape & Real

**Marking Information**

TSSOP-14

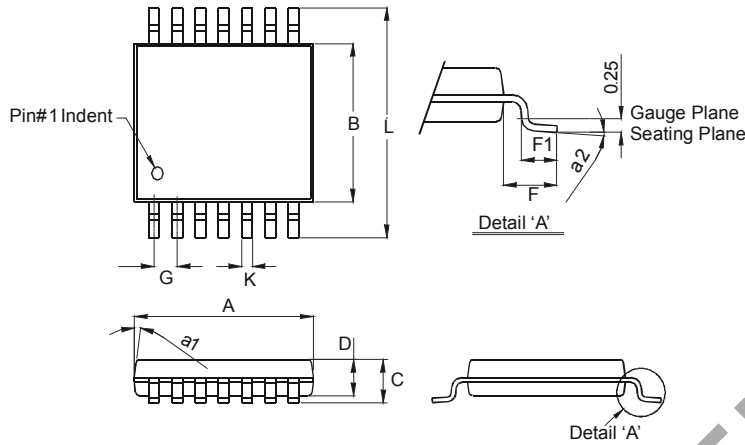


XXX: Internal Code  
 Y: Year: 1, 2, 3 ~  
 W: Week: "A~Z" means week 1 to week 26; "a~y" mean week 27 to 51, "z" means 52 and 53

NOT FOR IMMEDIATE DESIGN

**Package Outline Dimensions** (All dimensions in mm.)

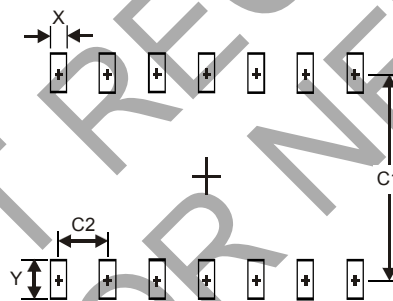
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



TSSOP-14		
Dim	Min	Max
a1	7° (4X)	
a2	0°	8°
A	4.9	5.10
B	4.30	4.50
C	1.2	
D	0.8	1.05
F	1.00 Typ	
F1	0.45	0.75
G	0.65 Typ	
K	0.19	0.30
L	6.40 Typ	
All Dimensions in mm		

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
X	0.45
Y	1.45
C1	5.9
C2	0.65

**IMPORTANT NOTICE**

1. DIODES INCORPORATED AND ITS SUBSIDIARIES (“DIODES”) MAKE NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO ANY INFORMATION CONTAINED IN THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).
2. The Information contained herein is for informational purpose only and is provided only to illustrate the operation of Diodes products described herein and application examples. Diodes does not assume any liability arising out of the application or use of this document or any product described herein. This document is intended for skilled and technically trained engineering customers and users who design with Diodes products. Diodes products may be used to facilitate safety-related applications; however, in all instances customers and users are responsible for (a) selecting the appropriate Diodes products for their applications, (b) evaluating the suitability of the Diodes products for their intended applications, (c) ensuring their applications, which incorporate Diodes products, comply the applicable legal and regulatory requirements as well as safety and functional-safety related standards, and (d) ensuring they design with appropriate safeguards (including testing, validation, quality control techniques, redundancy, malfunction prevention, and appropriate treatment for aging degradation) to minimize the risks associated with their applications.
3. Diodes assumes no liability for any application-related information, support, assistance or feedback that may be provided by Diodes from time to time. Any customer or user of this document or products described herein will assume all risks and liabilities associated with such use, and will hold Diodes and all companies whose products are represented herein or on Diodes’ websites, harmless against all damages and liabilities.
4. Products described herein may be covered by one or more United States, international or foreign patents and pending patent applications. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks and trademark applications. Diodes does not convey any license under any of its intellectual property rights or the rights of any third parties (including third parties whose products and services may be described in this document or on Diodes’ website) under this document.
5. Diodes products are provided subject to Diodes’ Standard Terms and Conditions of Sale (<https://www.diodes.com/about/company/terms-and-conditions/terms-and-conditions-of-sales/>) or other applicable terms. This document does not alter or expand the applicable warranties provided by Diodes. Diodes does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.
6. Diodes products and technology may not be used for or incorporated into any products or systems whose manufacture, use or sale is prohibited under any applicable laws and regulations. Should customers or users use Diodes products in contravention of any applicable laws or regulations, or for any unintended or unauthorized application, customers and users will (a) be solely responsible for any damages, losses or penalties arising in connection therewith or as a result thereof, and (b) indemnify and hold Diodes and its representatives and agents harmless against any and all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim relating to any noncompliance with the applicable laws and regulations, as well as any unintended or unauthorized application.
7. While efforts have been made to ensure the information contained in this document is accurate, complete and current, it may contain technical inaccuracies, omissions and typographical errors. Diodes does not warrant that information contained in this document is error-free and Diodes is under no obligation to update or otherwise correct this information. Notwithstanding the foregoing, Diodes reserves the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes.
8. Any unauthorized copying, modification, distribution, transmission, display or other use of this document (or any portion hereof) is prohibited. Diodes assumes no responsibility for any losses incurred by the customers or users or any third parties arising from any such unauthorized use.

Copyright © 2020 Diodes Incorporated

[www.diodes.com](http://www.diodes.com)