3-VRMS Line Driver with Adjustable Gain

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.

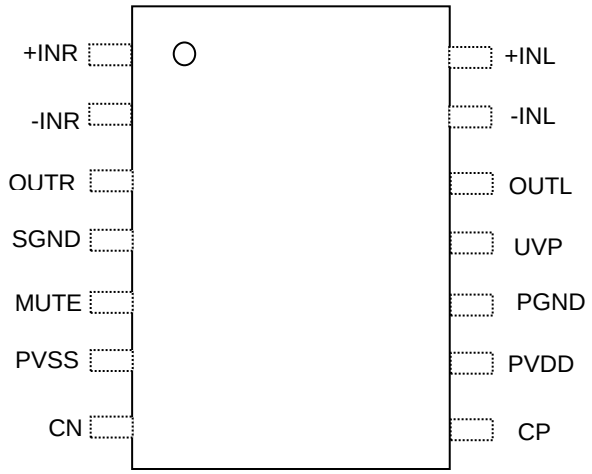
The PAM8100 is capable of driving 3Vrms into a 2.5-kΩ load with 5-V supply voltage. The device has differential inputs and uses external gain-setting resistors to support a gain range of ±1 V/V to ±10 V/V. The PAM8100 has built-in mute control for pop-free on/off control. The PAM8100 has an external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

Pin Assignments

TSSOP-14



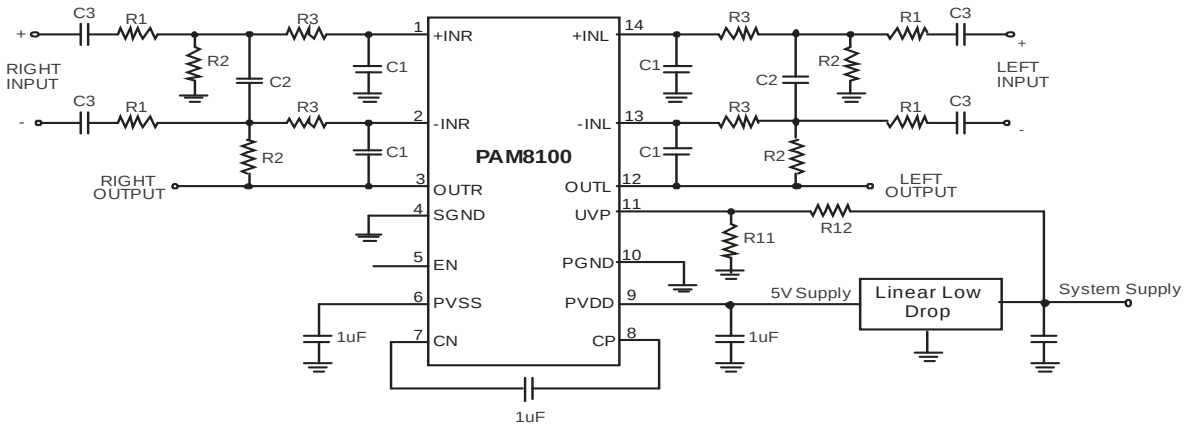
Features

- Eliminates Pop/Clicks
  - Eliminates Output DC-Blocking Capacitors
  - Provides Flat Frequency Response 20Hz-20kHz
- Low Noise and THD
  - SNR > 105 dB
  - Typical Vn < 13uVms
  - 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)**

Applications

- PDP / LCD TVs
- Blu-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 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.

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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_A = +25°C, unless otherwise specified.)

Symbol	Description	VALUE	UNIT
V_{DD}	Supply Voltage	–0.3 to 6.0	V
V_I	Input Pins	GND-0.3 to VDD + 0.3	V
T_A	Operating Free-Air Temperature Range	–40 to +85	°C
T_J	Operating Junction Temperature Range	–40 to +150	°C
T_{STG}	Storage Temperature Range	–65 to +150	°C

Recommended Operating Conditions (@T_A = +25°C, unless otherwise specified.)

Symbol	Parameter		Min	Nom	Max	Unit
VIN	Supply Voltage	-	2.5	-	5	V
RL	Load Impedance	-	0.6	10	-	kΩ
V_{IH}	High-Level Input Voltage	MUTE	1.2	-	V_{IN}	V
V_{IL}	Low-Level Input Voltage	MUTE	-0.3	-	0.4	V
T_A	Operating Free-Air Temperature		-40	25	+85	°C

Thermal Information

Parameter	Symbol	Package	Maximum	Unit
Thermal Resistance (Junction to Ambient)	θ_{JA}	TSSOP-14	35	°C/W
Thermal Resistance (Junction to Case)	θ_{JC}	TSSOP-14	14	°C/W

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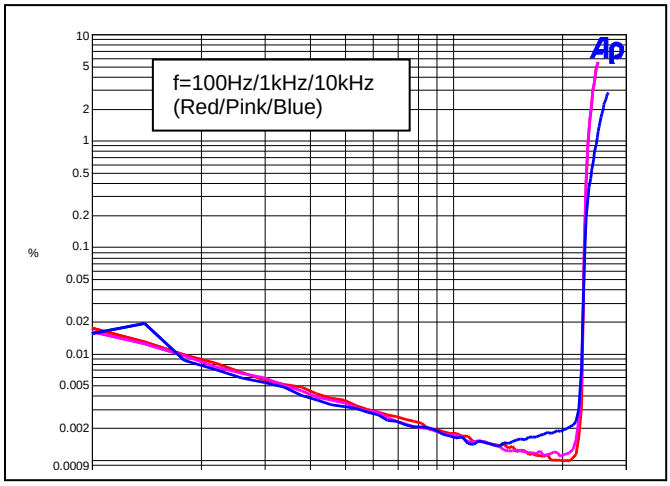
Electrical Characteristics (@VDD=3.3V, TA=+25°C, RL=10kΩ, C(PUMP)=C(PVSS) =1μF , CIN=2.2μF, RIN=15kΩ, Rfb=30kΩ, Unless otherwise specified.)

PARAMETER	Symbol	Conditions	Min	Typ	Max	Units
Output Offset Voltage	V_{OS}	No load	-	-	3	mV
Power-Supply Rejection Ratio	P_{SRR}	Input AC-GND, f=1kHz,Vpp=200mV	-	70	-	dB
High-Level Output Voltage	V_{OH}	VDD=3.3V	3.1	-	-	V
Low-Level Output Voltage	V_{OL}	VDD=3.3V	-	-	-3.05	V
MUTE High	V_{IH}	VDD=3.3V	1.5	-	-	V
MUTE Low	V_{IL}	VDD=3.3V	-	-	0.4	V
Supply Current	I_{DD}	No load, MUTE=VDD	-	10	-	mA
		No load, MUTE=GND	-	10	-	mA
Output Voltage (outputs in phase)	Vo	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_N	Input AC-GND, A-weighted	-	13	-	uVrms
Signal-to-Noise Ratio	SNR	VO=2Vrms, A-weighted	-	104	-	dB
External UnderVoltage Detection	V_{UVP}	-	-	1.25	-	V
External Under-Voltage Detection Hysteresis Current	IHYSI	-	-	5	-	μA
Charge Pump Frequency	f_{CP}	-	200	300	400	kHz

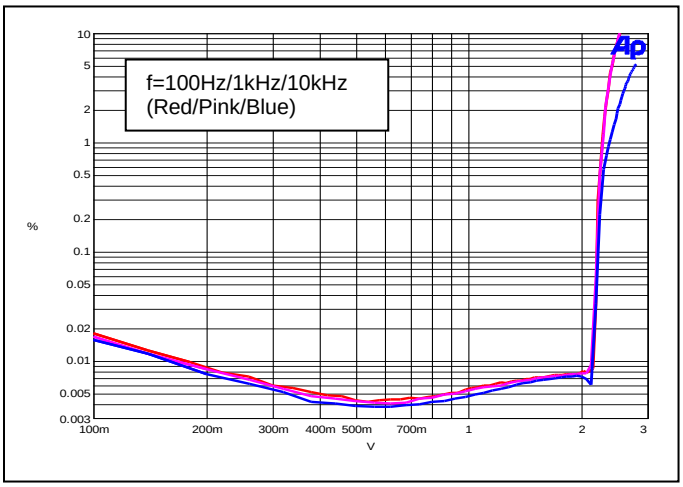
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Performance Characteristics (@T_A=+25°C, VDD=3.3V, C(PUMP)=C(PVSS) =1μF , CIN=2.2μF, RIN=15 kΩ, Rfb=30kΩ,unless otherwise specified.)

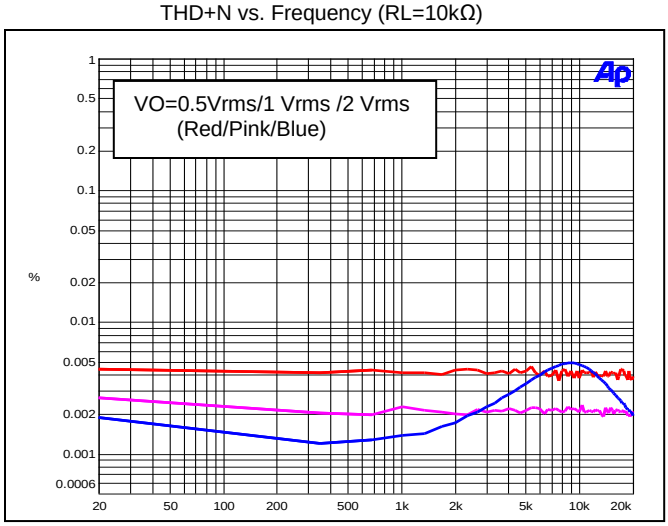
THD+N vs. Output Voltage (RL=10kΩ)



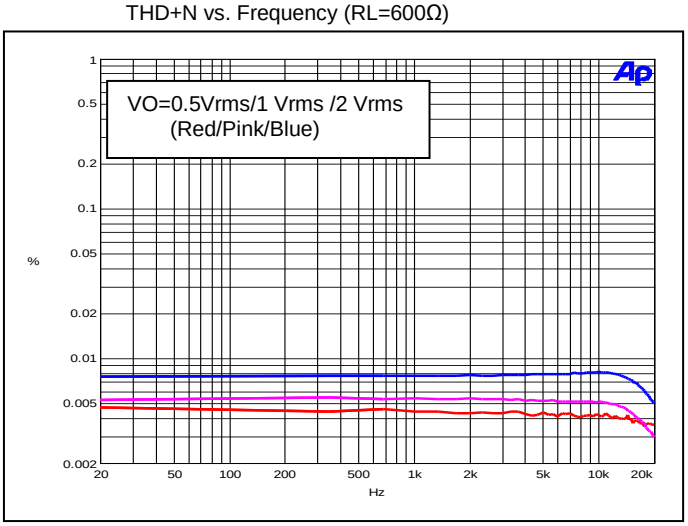
THD+N vs. Output Voltage (RL=600Ω)



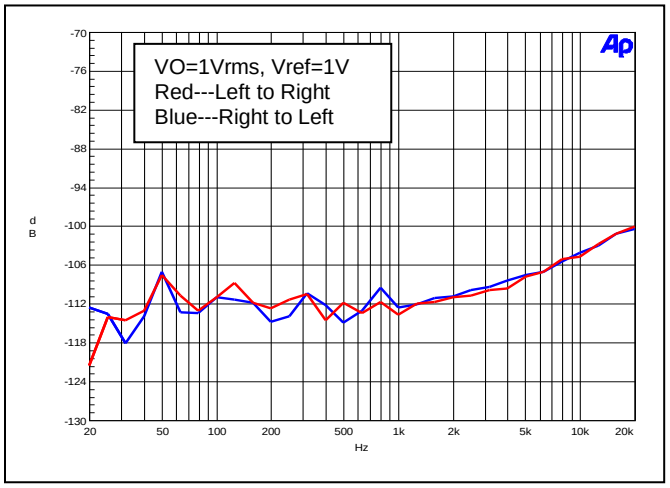
THD+N vs. Frequency (RL=10kΩ)



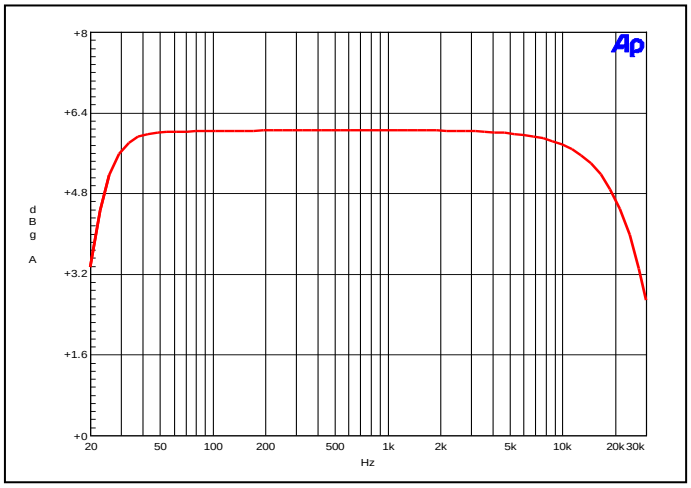
THD+N vs. Frequency (RL=600Ω)



Crosstalk vs. Frequency (RL=10kΩ)

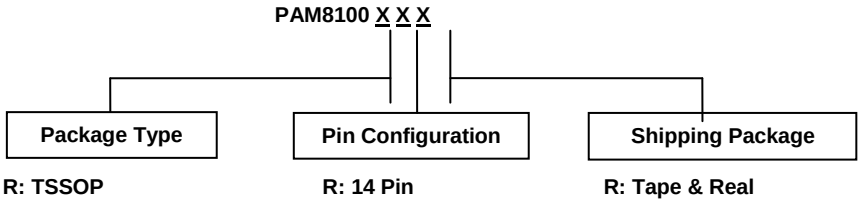


Gain vs. Frequency (RL=10kΩ)



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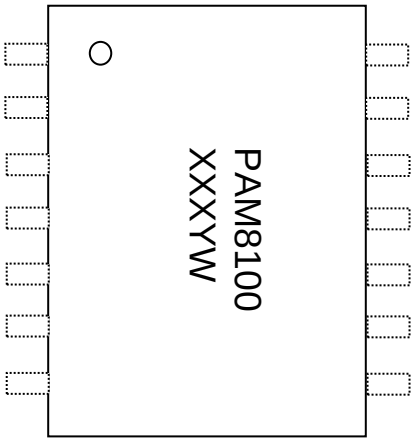
Ordering Information



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

Marking Information

TSSOP-14

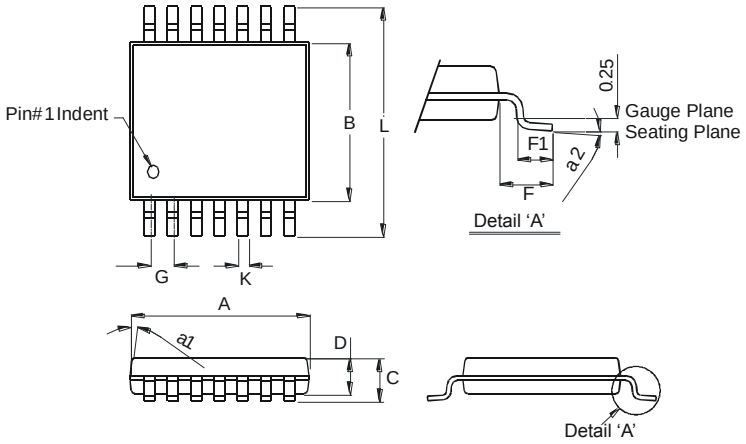


XXX: Internal Code
Y: Year: 1, 2, 3 ~
W: Week: "A~Z" means week 1 to week 26; "a~y" mean week 27 to 51, "z" means 52 and 53

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Package Outline Dimensions (All dimensions in mm.)

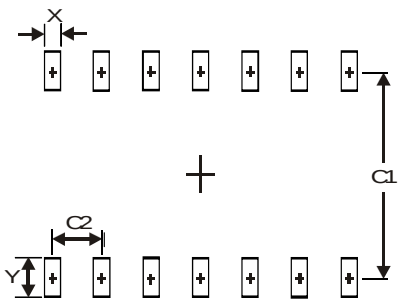
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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 Pay 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

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