



SANYO Semiconductors

## DATA SHEET

# LV1116N/NV — Bi-CMOS LSI Surround Processor ICs for Electronic Volume Control

## Overview

The LV1116N/NV are sound processor ICs developed for use in TV sets.

They incorporate the surround processing functions including (AViSS<sup>®</sup>), pseudo stereo function, (L+R) output, and the major functional blocks of an electronic volume control IC.

## Functions

- Input function SWs (stereo inputs [L, R]).
- LINE OUT pin (through output).
- Input gain control (-6dB, -4dB, 0dB, 4dB, 6dB: 5 positions).
- AViSS<sup>®</sup> (ON/OFF/4-stage level control).
- Tone control (BASS:  $\pm 20$ dB, TREBLE:  $\pm 18$ dB [in 2dB steps]).
- Master volume control (0dB~-14dB: 1dB steps/-14dB~-80dB: 2dB steps/- =-82dB).
- Balance control.
- THROUGH mode/MUTE mode.
- Pseudo stereo function (ON/OFF/MONO).
- L+R output with LPF (MUTE + 7-stage level control: 8 positions).
- I<sup>2</sup>C bus control.

\* Initial output gain of L+R can be controlled by the resistance value of external resistor.

## Specifications

### Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V <sub>CC</sub> max		10.5	V
Allowable power dissipation 1	Pd max1	Ta 70 (DIP)	700	mW
Allowable power dissipation 2	Pd max2	Ta 70 (SSOP)*	550	mW
Operating temperature	Topr		-25 to +70	
Storage temperature	Tstg		-40 to +125	

\* When mounted on a 76.1×114.3×1.6 mm glass epoxy board.

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# LV1116N/NV

## Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V <sub>CC</sub>		9.0	V
Operating supply voltage range 1	V <sub>CC.org1</sub>	DIP	5.0 to 10.0	V
Operating supply voltage range 2	V <sub>CC.org2</sub>	SSOP	5.0 to 9.0	V
Control data				
"H" level voltage	V <sub>IH</sub>		2.0 to 5.5	V
"L" level voltage	V <sub>IL</sub>		0.0 to 1.0	V
Pulse width	t <sub>pw</sub>		1.0	μs
Hold time	t <sub>hold</sub>		1.0	μs
Operating frequency	f <sub>opg</sub>		500	kHz

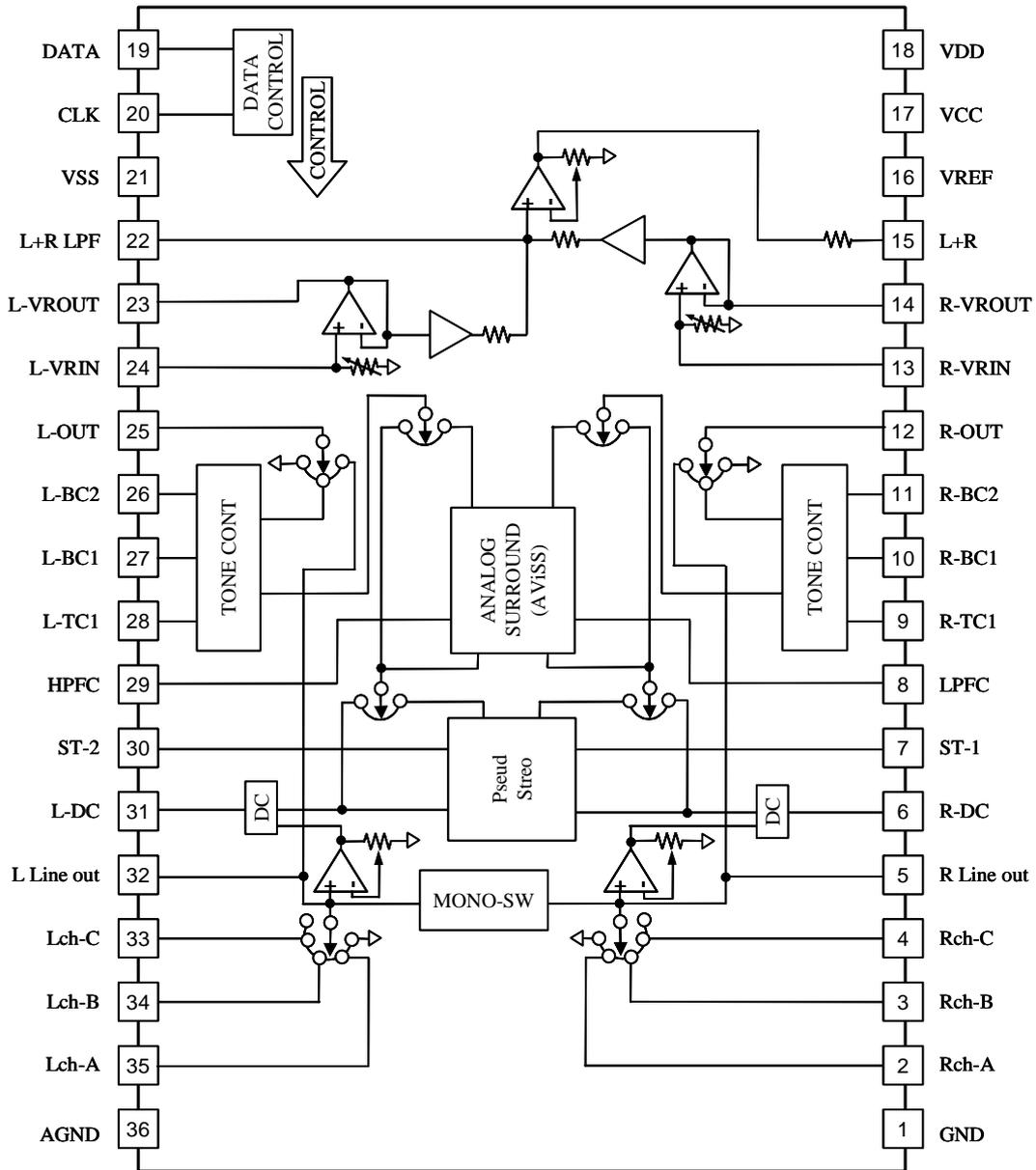
## Electrical Characteristics at Ta=25°C, V<sub>CC</sub>=9.0V, f<sub>in</sub>=1kHz, V<sub>IN</sub>=300mV<sub>rms</sub>=0dB, R<sub>L</sub>=10kΩ

(Input=L/R-A, Output=L/R-VROUT)

Parameter	Symbol	Conditions	min	typ	max	unit
Quiescent current	ICCO			48		mA
Total Through (Total Through mode, Volume control: 0dB)						
Volume gain	V <sub>G<sub>T</sub></sub>		-1.6	-0.6	+0.6	dB
Maximum output voltage	V <sub>O<sub>T</sub></sub>	THD=1%	2.0	2.6		V <sub>rms</sub>
Total harmonic distortion	THD <sub>T</sub>	DIN AUDIO		0.03	0.1	%
Output voltage noise	V <sub>N<sub>O<sub>T</sub></sub></sub>	DIN AUDIO		-99	-85	dBV
Cross talk	C <sub>T<sub>T</sub></sub>	DIN AUDIO	85	95		dB
Matrix through (Matrix mode, Input gain: 0dB, Volume control: 0dB)						
Volume gain	V <sub>G<sub>F</sub></sub>		-1.7	-0.7	+0.7	dB
Maximum output voltage	V <sub>O<sub>M</sub></sub>	THD=1%	1.5	2.0		V <sub>rms</sub>
Total harmonic distortion	THD <sub>M</sub>	DIN AUDIO		0.04	0.1	%
Output voltage noise	V <sub>N<sub>O<sub>M</sub></sub></sub>	DIN AUDIO		-95	-85	dBV
Cross talk	C <sub>T<sub>M</sub></sub>	DIN AUDIO	85	93		DB
MONO mode (MONO mode, Input gain: 0dB, Volume control: 0dB)						
Maximum output voltage	V <sub>O<sub>S</sub></sub>	THD=1%	1.5	2.0		V <sub>rms</sub>
Total harmonic distortion	THD <sub>S</sub>	DIN AUDIO		0.04	0.5	%
Output voltage noise	V <sub>N<sub>O<sub>S</sub></sub></sub>	DIN AUDIO		-95	-85	dBV
Surround (Surround mode-A, Input gain: 0dB, Volume control: 0dB)						
Maximum output voltage	V <sub>O<sub>S</sub></sub>	THD=1%	1.5	2.0		V <sub>rms</sub>
Total harmonic distortion	THD <sub>S</sub>	DIN AUDIO		0.2	0.5	%
Output voltage noise	V <sub>N<sub>O<sub>S</sub></sub></sub>	DIN AUDIO		-92	-85	dBV
Pseudo stereo (Pseudo stereo mode, Input gain: 0dB, Volume control: 0dB)						
Maximum output voltage	V <sub>O<sub>S</sub></sub>	THD=1%	1.5	2.0		V <sub>rms</sub>
Total harmonic distortion	THD <sub>S</sub>	DIN AUDIO		0.07	0.5	%
Output voltage noise	V <sub>N<sub>O<sub>S</sub></sub></sub>	DIN AUDIO		-92	-85	dBV
Bass band EQ (Matrix through mode, Input gain: 0dB, Volume control: 0dB)						
Maximum output voltage	Geq <sub>B</sub>	max.Boost/Cut	±17	±20	±23	dB
Step resolution	Estep <sub>B</sub>		1.0	2.0	3.0	dB
Treble band EQ (Matrix through mode, Input gain: 0dB, Volume control: 0dB)						
Maximum output voltage	Geq <sub>T</sub>	max.Boost/Cut	±15	±18	±21	dB
Step resolution	Estep <sub>T</sub>		1.0	2.0	3.0	dB
L+R output (Output=L+R-OUT, Step=0dB, L+R_Step=Step4)						
Gain	V <sub>G<sub>F</sub></sub>		-2.3	-1.3	-0.3	dB
Maximum output voltage	V <sub>O<sub>F</sub></sub>	THD=1%	2.0	2.5		V <sub>rms</sub>
Total harmonic distortion	THD <sub>F</sub>	DIN AUDIO		0.03	0.1	%
Output voltage noise	V <sub>N<sub>O<sub>F</sub></sub></sub>	DIN AUDIO		-99	-85	dBV

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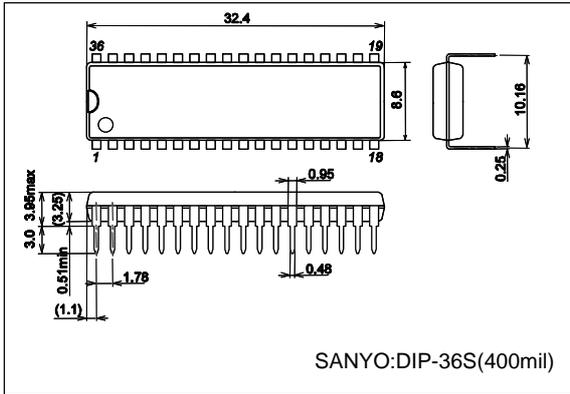
## Block Diagram



# LV1116N/NV

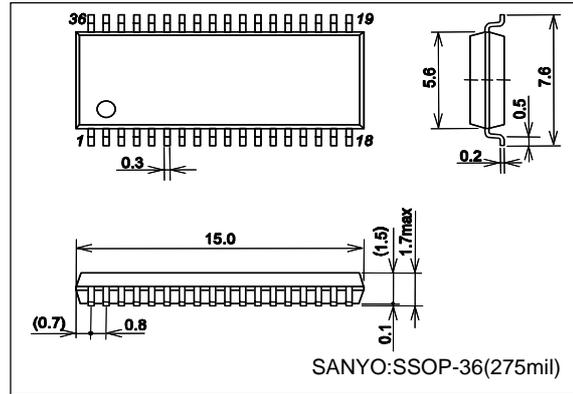
## LV1116N Package Dimensions

Unit: mm  
3061



## LV1116NV Package Dimensions

Unit: mm  
3247A



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