Ordering number : EN2871C

SANYO Semiconductors
DATA SHEET

Monolithic Linear IC

LA3550M — 1.5V Low-Frequency Reproduction (Autoloudness) IC

Overview

The LA3550M is a low-frequency reproduction IC for use with 1.5V power supply systems and achieves optimal sound field playback in headphone stereo systems. This IC can provide 24dB of boost in the low-frequency components in the range 30 to 50Hz using external resistor and capacitor components. It also provides a boost gain control function using an external input signal and a fixed high-band boost that allow the LA3550M to provide a natural boost that gives depth to the sound appropriate to the level as well as a feeling of spaciousness. The LA3550M also provides a boost function on/off switch for easy external control.

Features

- Includes both a control function that vary the low-band boost gain from 5.5 to 23.5dB and an output signal detection circuit, and can provide a boost effect (autoloudness) that varies with the output level simply by connecting the LA3550M to the headphone output pin.
- Superlative reduced voltage characteristics.
- Low output noise voltage.
- Low power consumption.
- Minimal number of external components.

Functions

- Variable low-band (30 to 50Hz) boost of up to 23.5dB plus fixed 6dB high-band boost.
- Low-band boost gain control circuit.
- Output signal detection circuit.
- Built-in AGC circuit prevents clipping high-amplitude inputs during boost operation.
- Boost on/off switching function.

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Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max	No signal	4.5	V
Allowable power dissipation	Pd max		150	mW
Operating temperature	Topr		-20 to +75	°C
Storage temperature	Tstg		-40 to +125	°C

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		1.5	V
Operating supply voltage range	V_{CC} op		0.9 to 3.0	V
Recommended load resistance	R_L		10	kΩ

Operating Characteristics at Ta = 25°C, Rg = 600Ω, R_L = 10kΩ, f_{DET} = 1kHz, in the specified test circuit

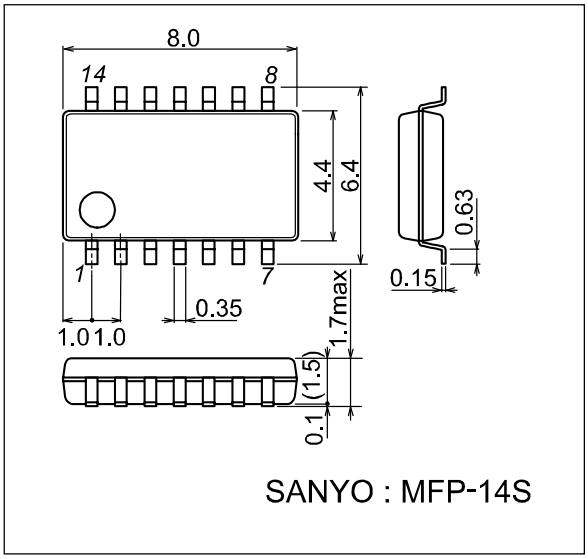
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current	$I_{CCO}1$	No signal, V_{CC} = 1.5V, boost off		1.4	2.0	mA
	$I_{CCO}2$	No signal, V_{DET} = -10dBm, V_{CC} = 1.5V, boost on		2.1	3.0	mA
Voltage gain	VG1	V_{CC} = 1.1V, f = 1kHz, boost off	-3.2	-1.7	-0.2	dB
	VG2	V_{CC} = 1.1V, f = 1kHz, boost on	-3.2	-1.7	-0.2	dB
Boost amount *	Boost1	V_{CC} = 1.1V, f = 50Hz, boost on, V_{DET} = -30dBm	21.0	23.5	26.0	dB
	Boost2	V_{CC} = 1.1V, f = 50Hz, boost on, V_{DET} = -15dBm	10.0	12.5	15.0	dB
	Boost3	V_{CC} = 1.1V, f = 50Hz, boost on, V_{DET} = -10dBm	3.0	5.5	8.0	dB
Output voltage	V_O	V_{CC} = 1.5V, f = 50Hz, boost on, V_{IN} = -18dBm	120	170	220	mV
Total harmonic distortion	THD	V_{CC} = 1.1V, f = 1kHz, boost on, V_O = -20dBm		0.1	1.0	%
Crosstalk	CT	V_{CC} = 1.1V, f = 1kHz, boost on, V_O = -20dBm, Rg = 0		26		dB
Output noise voltage	V_{NO}	V_{CC} = 1.5V, boost off, Rg = 0, BW = 20 to 20kHz		3.5	5.5	μV
Ripple rejection	S_{VRR}	V_{CC} = 1.0V, boost on, Rg = 0, fR = 100Hz, V_R = -30dBm	20	28		dB

*: Assuming VG(2)→0dB.

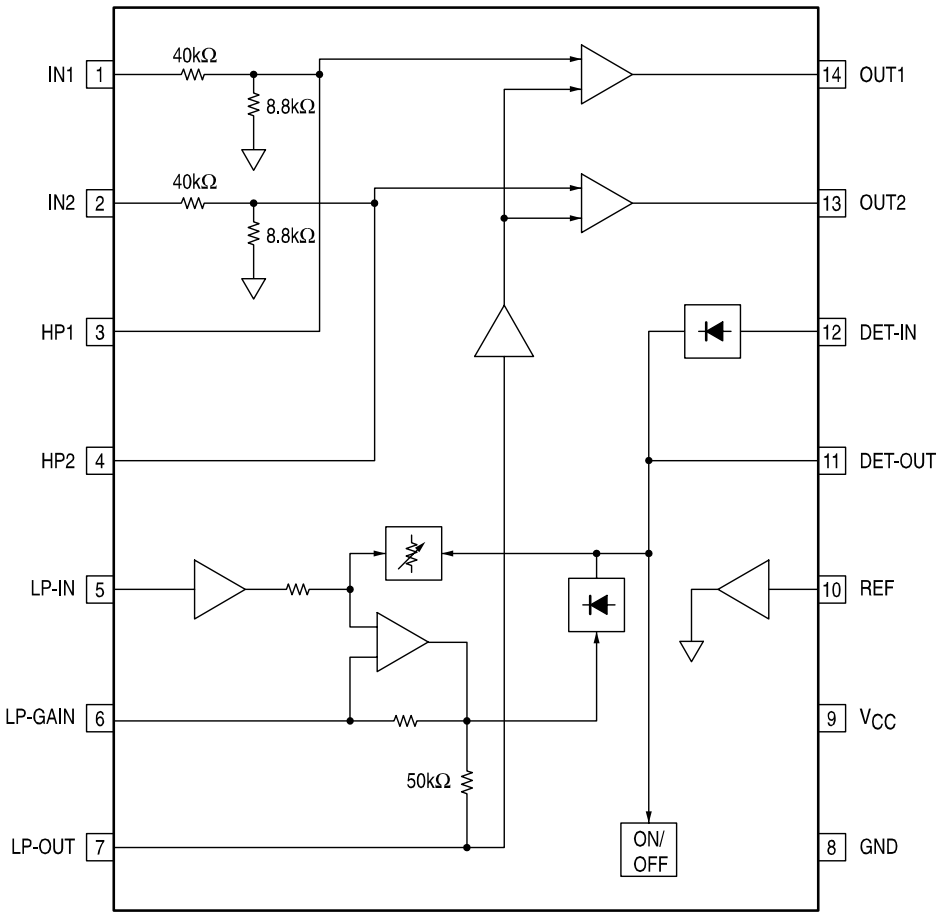
Package Dimensions

unit : mm

3111A



Block Diagram



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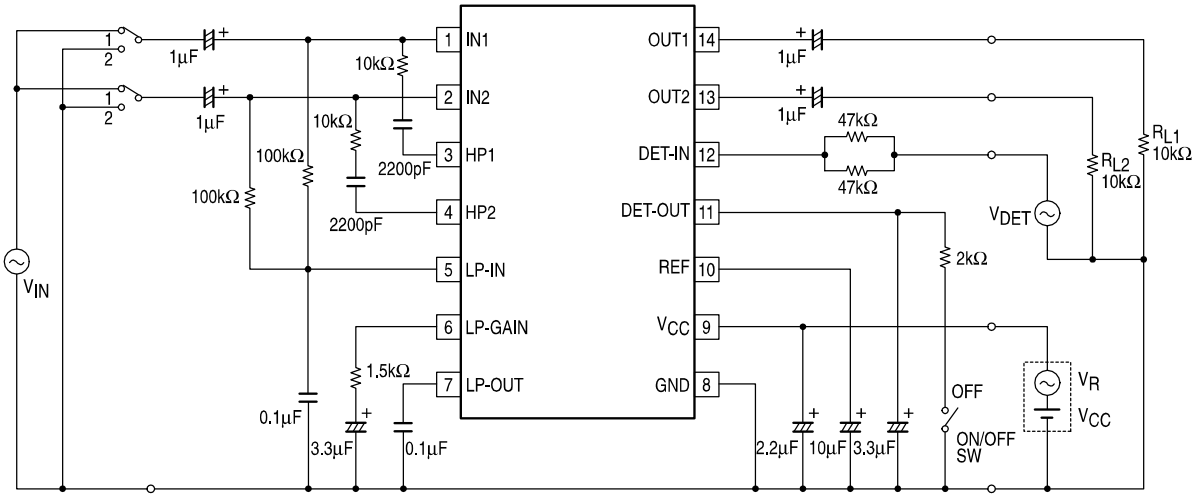
Test Circuit Diagram



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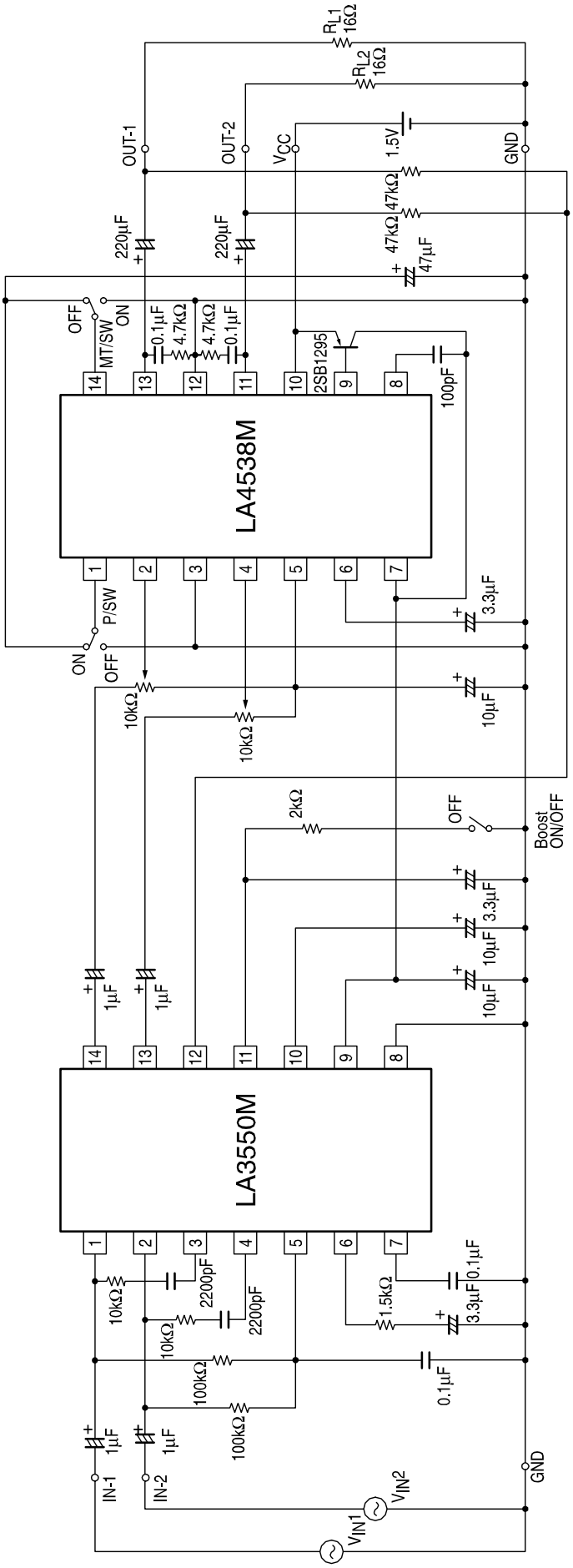
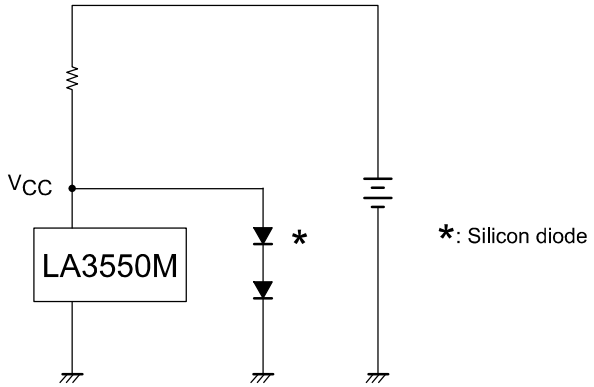
Application Circuit Example



Usage Notes

When used in an end product with a 3V V_{CC}, the supply voltage must be dropped to 1.7V or lower using a circuit such as on of the following.



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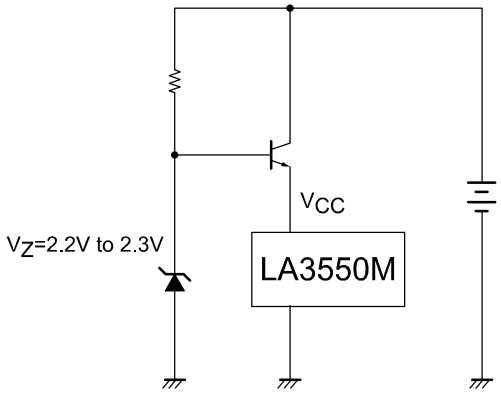

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