Ordering number:ENN2871B

Monolithic Linear IC

LA3550M

Auto-Loudness Controller for Headphone Stereo Systems

Overview

The LA3550M Auto-Loudness Controller IC provides user-selectable boosting of up to approximately 24dB for low-frequency sound components in the range of 30 to 50Hz. Boosting gain for low frequencies can be controlled in proportion to the level of an external input signal. High frequencies are also boosted by a fixed 6dB. The result gives natural and dynamic boosting at all sound levels, and realistic audio reproduction.

The LA3550M operates on a 1.5V power supply and boosts a super bass adopting the external CR circuit. The boosting feature can be selected “ON/OFF” by means of an electronic switch on the chip.

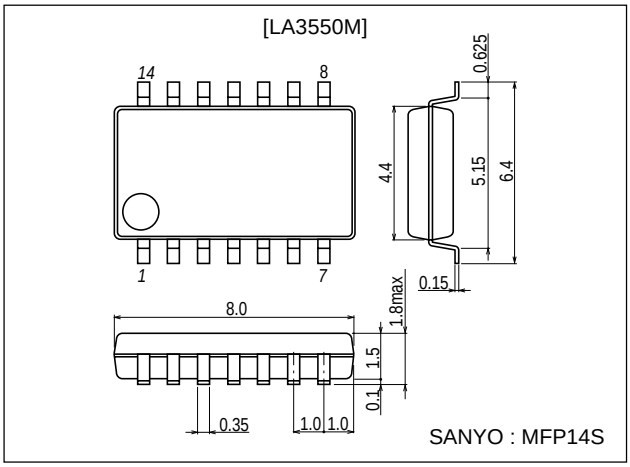
Features

- User-selectable low-frequency boost levels from 5.5 to 23.5dB (max).
- 6dB (fixed) high-frequency boosting.
- Low-frequency boost gain level control circuit on-chip.
- Output signal detection circuit on-chip.
- Boost select/deselect switching.
- Built-in AGC circuit prevents clipping.
- Reduced noise levels.
- Reduced parts’ count.
- Low-power operation.
- 14-pin MFP package (1mm pitch pins).

Package Dimensions

unit:mm

3111-MFP14S



Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum Supply Voltage	V_{CC} max	Quiescent	4.5	V
Allowable Power Dissipation	Pd max		150	mW
Operating Temperature	Topr		–20 to +75	˚C
Storage Temperature	Tstg		–40 to +125	˚C

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Operating Conditions at Ta = 25˚C

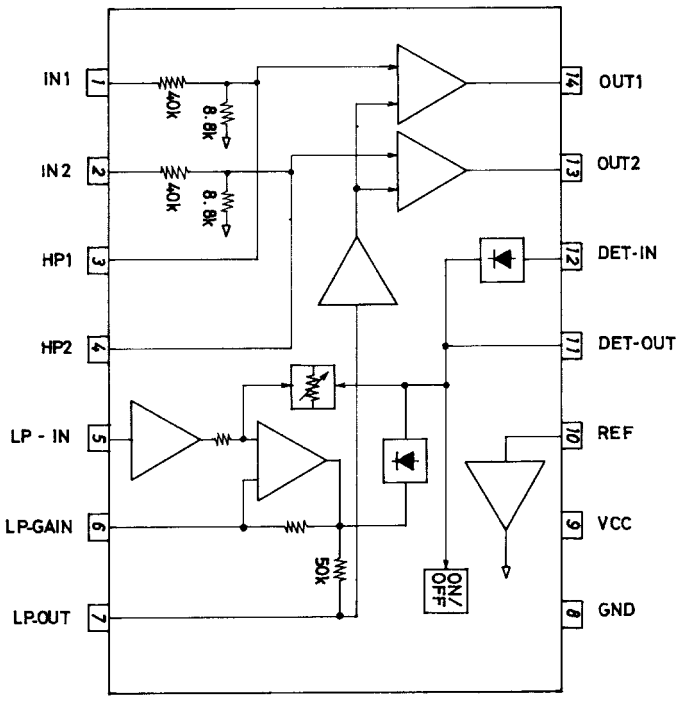
Parameter	Symbol	Conditions	Ratings	Unit
Recommended Supply Voltage	V_{CC}		1.5	V
Operating Voltage Range	V_{CC}		0.9 to 3.0	V
Recommended Load Resistance	R_L		10	kΩ

Operating Characteristics at Ta = 25˚C, Rg=600Ω, R_L=10kΩ, f_{DET}=1kHz, See specified Test Circuit.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent Current	Icco1	Quiescent, V_{CC}=1.5V, Boost OFF		1.4	2.0	mA
	Icco2	Quiescent, 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	Boost1	V_{DET}=–30dBm, V_{CC}=1.1V, f=50Hz, Boost ON	21.0	23.5	26.0	dB
	Boost2	V_{DET}=–15dBm, V_{CC}=1.1V, f=50Hz, Boost ON	10.0	12.5	15.0	dB
	Boost3	V_{DET}=–10dBm, V_{CC}=1.1V, f=50Hz, Boost ON	3.0	5.5	8.0	dB
Output Voltage	Vo	V_{IN}=–18dBm, V_{CC}=1.5V, f=50Hz, Boost ON	120	170	220	mV
Total Harmonic Distortion	THD	Vo=–20dBm, V_{CC}=1.1V, f=1kHz, Boost ON		0.1	1.0	%
Crosstalk	CT	Vo=–20dBm, Rg=0, V_{CC}=1.1V, f=1kHz, Boost ON		26		dB
Output Noise Voltage	V_{NO}	Rg=0, B.P.F=20Hz to 20kHz, V_{CC}=1.5V, Boost OFF		3.5	5.5	µV
Ripple Rejection	SVRR	Rg=0, f_R=100Hz, V_R=–30dBm, V_{CC}=1.0V, Boost ON	20	28		dB

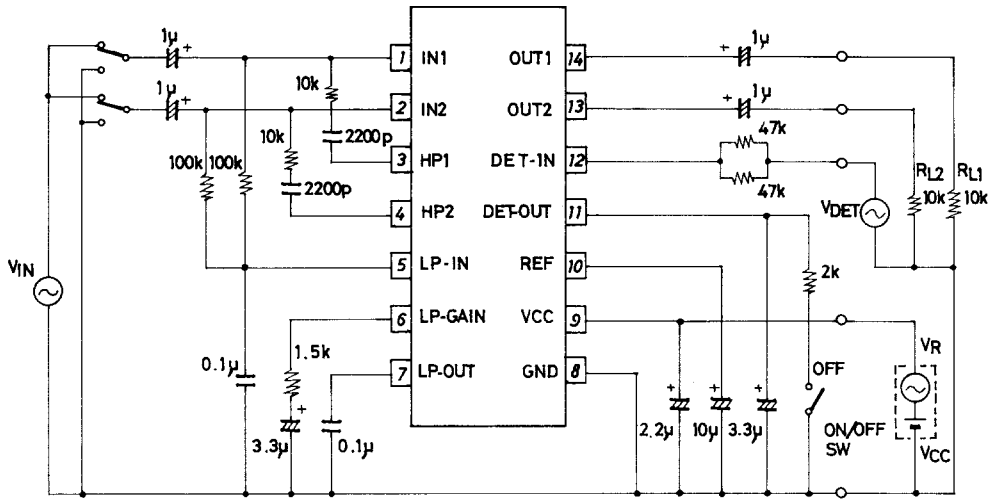
Note) *VG2 → 0dB

Equivalent Circuit Block Diagram



Unit (resistance: Ω)

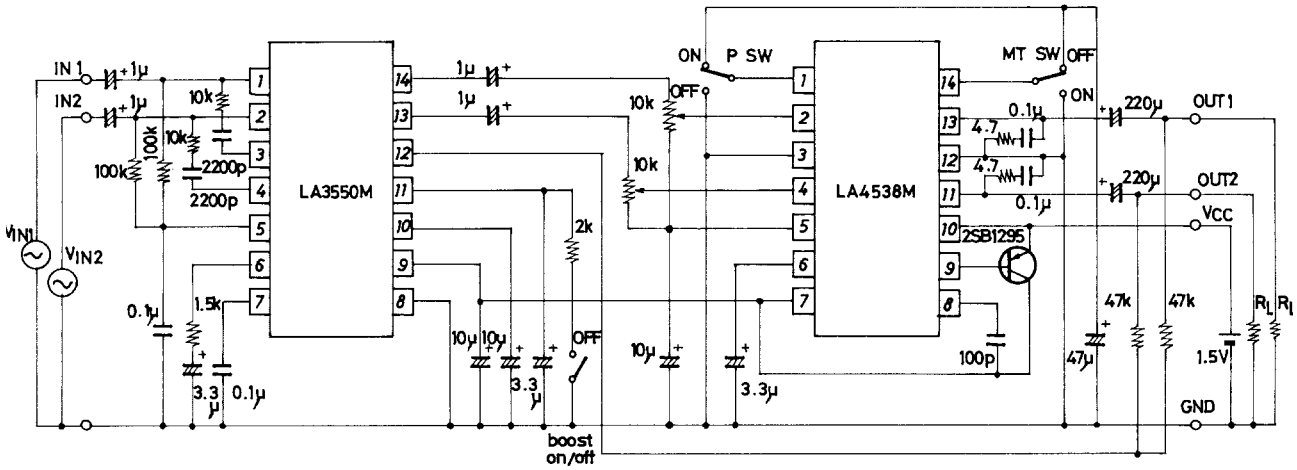
Test Circuit



Unit (resistance: Ω, capacitance: F)

Sample Application Circuit (1)

LA3550M+LA4538M



Sample Application Circuit (2)

When using with the V_{CC}=3V set, lower the power supply voltage to less than 1.7V as shown in the figure below.