



SANYO Semiconductors

DATA SHEET

LA4538M

Monolithic Linear IC For 1.5V Headphone Stereos with Ripple Filter Stereo Power Amplifier

Overview

The LA4538M is a 1.5V Headphone Stereo power amplifier with ripple filter.

Features

- Low current dissipation.
- Excellent reduced voltage characteristics.
- Minimum number of external parts required.
- On-chip power switch function.
- Power amplifier section
 - Output power 8mW typ ($V_{CC} = 1.5V$, $R_L = 16\Omega$, $f = 1kHz$, THD = 10%)
 - Ripple rejection 46dB typ ($V_{CC} = 1.0V$, $V_R = -30dBm$, $f_R = 100Hz$)
 - Built-in mute function
- Ripple filter section
 - Ripple rejection 39dB typ ($V_{CC} = 1.0V$, $V_R = -35dBm$, $f_R = 100Hz$)
 - Less output voltage loss
 - Pin 8 can be used to perform the muting current.

Specifications

Maximum Ratings at $T_a = 25^\circ C$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\ max}$	Quiescent	4.5	V
Maximum output current	I_{O7}	Pin 7 flow-out current	5.0	mA
Allowable power dissipation	$P_d\ max$		300	mW
Operating temperature	T_{opr}		-20 to +75	$^\circ C$
Storage temperature	T_{stg}		-40 to +125	$^\circ C$

■ Any and all SANYO Semiconductor Co.,Ltd. products described or contained herein are, with regard to "standard application", intended for the use as general electronics equipment (home appliances, AV equipment, communication device, office equipment, industrial equipment etc.). The products mentioned herein shall not be intended for use for any "special application" (medical equipment whose purpose is to sustain life, aerospace instrument, nuclear control device, burning appliances, transportation machine, traffic signal system, safety equipment etc.) that shall require extremely high level of reliability and can directly threaten human lives in case of failure or malfunction of the product or may cause harm to human bodies, nor shall they grant any guarantee thereof. If you should intend to use our products for applications outside the standard applications of our customer who is considering such use and/or outside the scope of our intended standard applications, please consult with us prior to the intended use. If there is no consultation or inquiry before the intended use, our customer shall be solely responsible for the use.

■ Specifications of any and all SANYO Semiconductor Co.,Ltd. products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

SANYO Semiconductor Co., Ltd.

www.semiconductor-sanyo.com/network

LA4538M

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended operating voltage	V _{CC}		1.5	V
Operating voltage range	V _{CC op}		0.9 to 4.0	V
Recommended load resistance	R _L		16 to 32	Ω

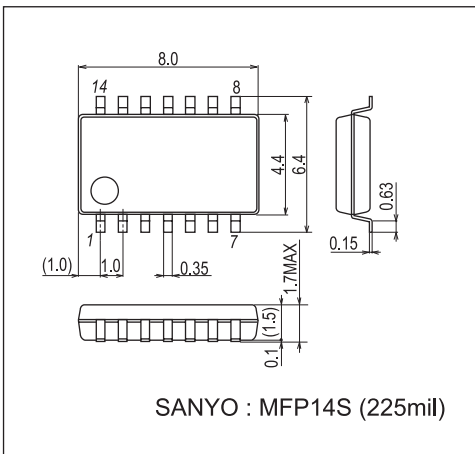
Electrical Characteristics at Ta = 25°C, R_L = 16Ω, R_g = 600Ω, See specified Test Circuit.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current	I _{CCO1}	V _{CC} = 1.20V, quiescent, R _{L3} → OFF		4.5	7.0	mA
	I _{CCO2}	V _{CC} = 2.50V, pin 14 → GND, R _{L3} → OFF		1.5	2.5	mA
	I _{CCO3}	V _{CC} = 2.50V, pin 1 → GND, R _{L3} → OFF			1.0	μA
Voltage gain	VG	V _{CC} = 0.90V, f = 1kHz, V _O = -20dBm	27.5	29	31.5	dB
Voltage gain difference	ΔVG	V _{CC} = 0.90V, f = 1kHz, V _O = -20dBm			1.0	dB
Total harmonic distortion	THD	V _{CC} = 1.20V, f = 1kHz, P _O = 0.5mW		0.9	1.5	%
Output power	P _O	V _{CC} = 1.50V, f = 1kHz, THD = 10%	5	8		mW
Crosstalk	CT	V _{CC} = 1.20V, f = 100Hz, R _g = 1kΩ, V _O = -20dB	40	45		dB
Ripple rejection (amplifier section)	SVRR1	V _{CC} = 1.00V, f = 100Hz, R _g = 1kΩ, V _R = -30dBm, BPF = 100Hz	40	46		dB
Ripple rejection (filter section)	SVRR2	V _{CC} = 1.00V, f = 100Hz, V _R = -35dBm	34	39		dB
Output noise voltage	V _{NO}	V _{CC} = 2.50V, R _g = 1kΩ, BPF = 20Hz to 20kHz		55	80	μV
Power on current sensitivity	I _{1(on)}	V _{CC} = 0.85V, V _{pin 5} ≥ 0.5V		0.1	1.0	μA
Power off voltage sensitivity	V _{1(off)}	V _{CC} = 0.85V, V _{pin 5} ≤ 0.1V	0.5	0.6		V
Muting off current sensitivity	I _{14(off)}	V _{CC} = 0.85V, V _{pin 5} ≥ 0.5V		0.1	1.0	μA
Muting on voltage sensitivity	V _{14(on)}	V _{CC} = 0.85V, V _{pin 5} ≤ 0.1V	0.5	0.6		V
Ripple filter output voltage	V _F	V _{CC} = 1.00V, R _L = 68Ω	0.90	0.94		V

Package Dimensions

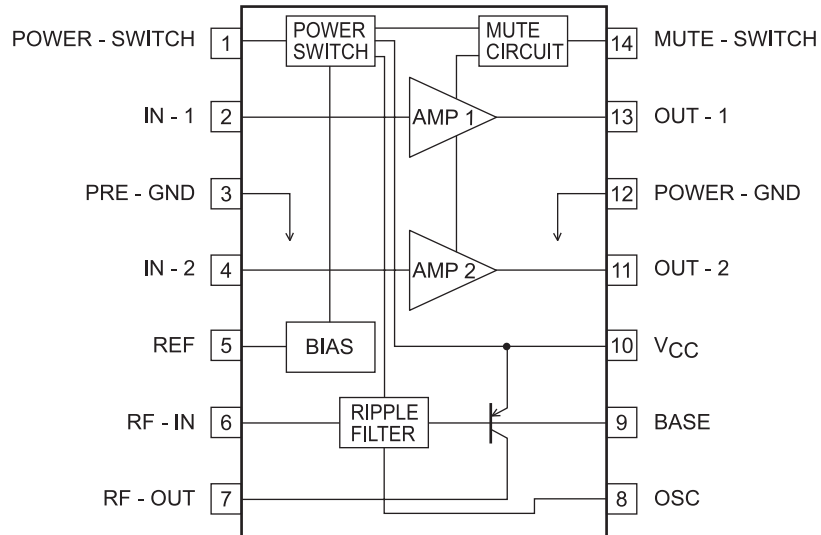
unit : mm (typ)

3111A

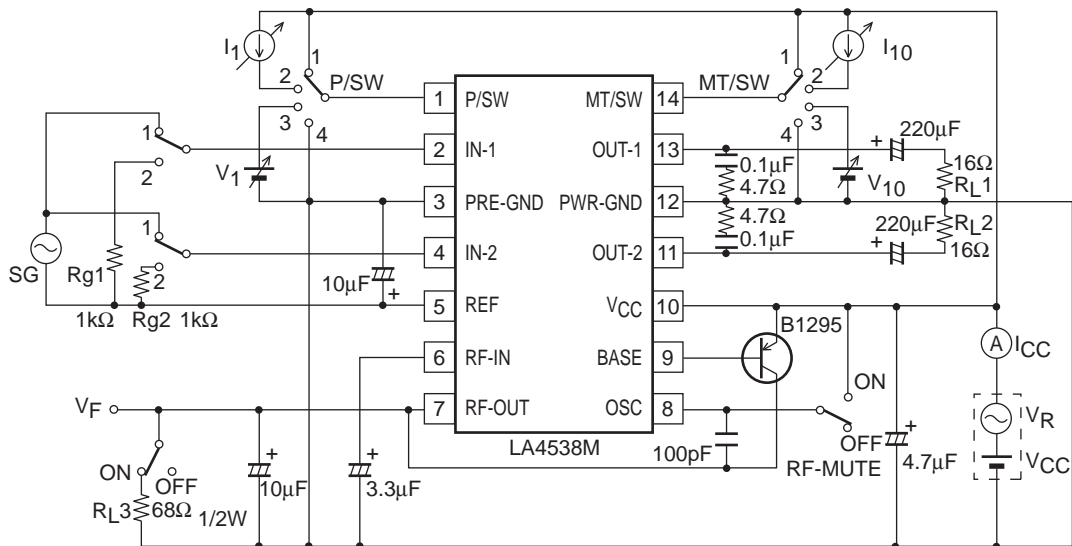


LA4538M

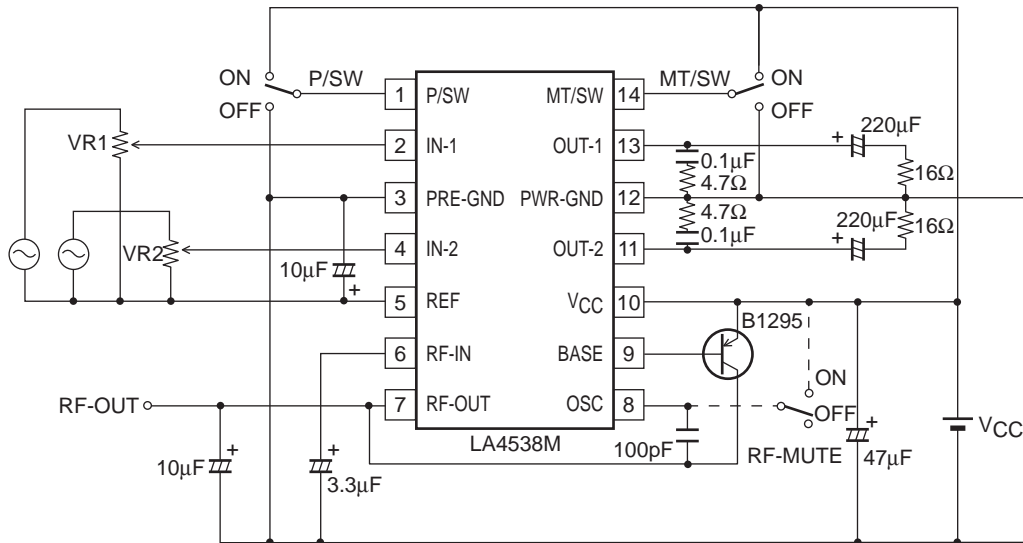
Block Diagram



Test Circuit



Application Circuit Example



- SANYO Semiconductor Co.,Ltd. assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO Semiconductor Co.,Ltd. products described or contained herein.
- SANYO Semiconductor Co.,Ltd. strives to supply high-quality high-reliability products, however, any and all semiconductor products fail or malfunction with some probability. It is possible that these probabilistic failures or malfunction could give rise to accidents or events that could endanger human lives, trouble that could give rise to smoke or fire, or accidents that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all SANYO Semiconductor Co.,Ltd. products described or contained herein are controlled under any of applicable local export control laws and regulations, such products may require the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written consent of SANYO Semiconductor Co.,Ltd.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO Semiconductor Co.,Ltd. product that you intend to use.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production.
- Upon using the technical information or products described herein, neither warranty nor license shall be granted with regard to intellectual property rights or any other rights of SANYO Semiconductor Co.,Ltd. or any third party. SANYO Semiconductor Co.,Ltd. shall not be liable for any claim or suits with regard to a third party's intellectual property rights which has resulted from the use of the technical information and products mentioned above.

This catalog provides information as of September, 2008. Specifications and information herein are subject to change without notice.