

# **LA4538M**

# Ripple Filter-Provided Stereo Power Amplifier for 1.5V Headphone Stereos

#### **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<sub>CC</sub>=1.5V, R<sub>L</sub>=16 $\Omega$ , f=1kHz, THD=10%)

Ripple rejection 46dB typ ( $V_{CC}$ =1.0V,  $V_{R}$ =-30dBm,  $f_{R}$ =100Hz)

• Ripple filter section

Ripple rejection 39dB typ ( $V_{CC}$ =1.0V,  $V_{R}$ =-35dBm,  $f_{R}$ =100Hz)

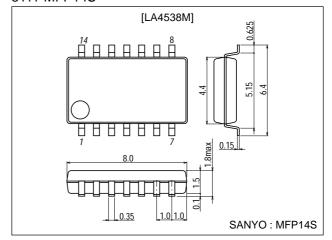
Less output voltage loss

Pin 8 can be used to perform the muting current.

# **Package Dimensions**

unit:mm

3111-MFP14S



## **Specifications**

#### **Absolute Maximum Ratings** at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V <sub>CC</sub> max	Quiescent	4.5	V
Maximum output current	I <sub>O</sub> 7	Pin 7 flow-out current	5.0	mA
Allowable power dissipation	Pd max		300	mW
Operating temperature	Topr		-20 to +75	°C
Storage temperature	Tstg		-40 to +125	°C

### **Operating Conditions** at $Ta = 25^{\circ}C$

Parameter	Symbol	Conditions	Ratings	Unit
Recommended oprating voltage	Vcc		1.5	V
Operating voltage range	V <sub>CC</sub> op		0.9 to 4.0	V
Recommended load resistance	RL		16 to 32	Ω

#### Operating Characteristics at Ta = $25^{\circ}$ C, R<sub>L</sub>= $16\Omega$ , Rg= $600\Omega$ , See specified Test Circuit.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	Offic
Quiescent current	Icco1	$V_{CC}$ =1.20V, quiescent, R <sub>L</sub> 3 $\rightarrow$ OFF		4.5	7.0	mA
	Icco2	$V_{CC}$ =2.50V, pin 14 $\rightarrow$ GND, R <sub>L</sub> 3 $\rightarrow$ OFF		1.5	2.5	mA
	Icco3	$V_{CC}$ =2.50V, pin 1 $\rightarrow$ GND, R <sub>L</sub> 3 $\rightarrow$ 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 <sub>CC</sub> =0.90V, f=1kHz, V <sub>O</sub> =-20dBm			1.0	dB

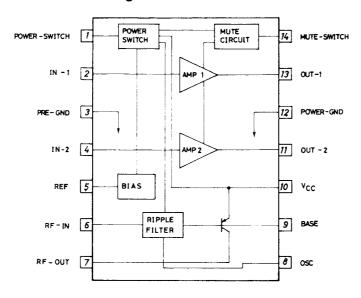
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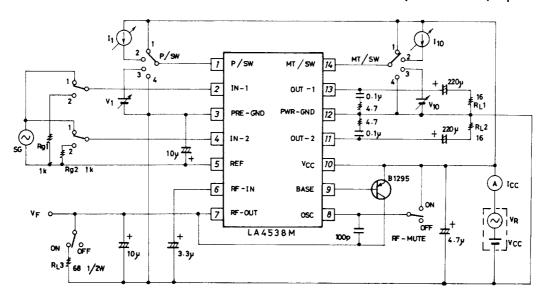
Parameter	Symbol	Conditions	Ratings			Unit
	Symbol		min	typ	max	Unit
Total harmonic distortion	THD	V <sub>CC</sub> =1.20V, f=1kHz, P <sub>O</sub> =0.5mW		0.9	1.5	%
Output power	PO	V <sub>CC</sub> =1.50V, f=1kHz, THD=10%	5	8		mW
Crosstalk	СТ	$V_{CC}$ =1.20V, f=100Hz, Rg=1k $\Omega$ , $V_{O}$ =-20dB	40	45		dB
Ripple rejection (amplifier section)	SVRR1	$V_{CC}$ =1.00V, f=100Hz, Rg=1k $\Omega$ , $V_{R}$ =-30dBm, BPF=100Hz	40	46		dB
Ripple rejection (filter section)	SVRR2	V <sub>CC</sub> =1.00V, f=100Hz, V <sub>R</sub> =-35dBm	34	39		dB
Output noise voltage	V <sub>NO</sub>	$V_{CC}$ =2.50V, Rg=1kΩ, BPF=20Hz to 20kHz		55	80	μV
Power on current sensitivity	I <sub>1(on)</sub>	V <sub>CC</sub> =0.85V, Vpin5 ≥ 0.5V		0.1	1.0	μΑ
Power off voltage sensitivity	V <sub>1(off)</sub>	V <sub>CC</sub> =0.85V, Vpin5 ≤ 0.1V	0.5	0.6		V
Muting off current sensitivity	I <sub>14(off)</sub>	V <sub>CC</sub> =0.85V, Vpin5 ≥ 0.5V		0.1	1.0	μΑ
Muting on voltage sensitivity	V <sub>14(on)</sub>	$V_{CC}$ =0.85V, $V_{Din5} \le 0.1V$	0.5	0.6		V
Ripple filter output voltage	V <sub>F</sub>	$V_{CC}$ =1.00V, $R_L$ =68 $\Omega$	0.90	0.94		V

## **Equivalent Circuit Block Diagram**

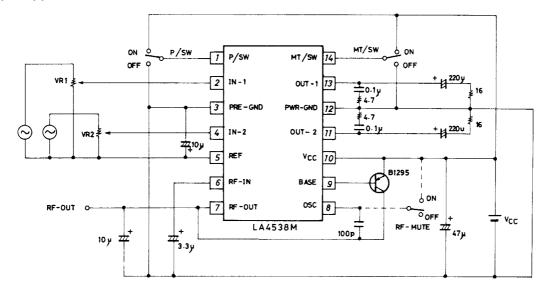


## **Test Circuit**

## Unit (resistance: $\Omega$ , capacitance: F)



#### **Sample Application Circuit**



Unit (resistance:  $\Omega$ , capacitance: F)

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