



# LA4538M

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

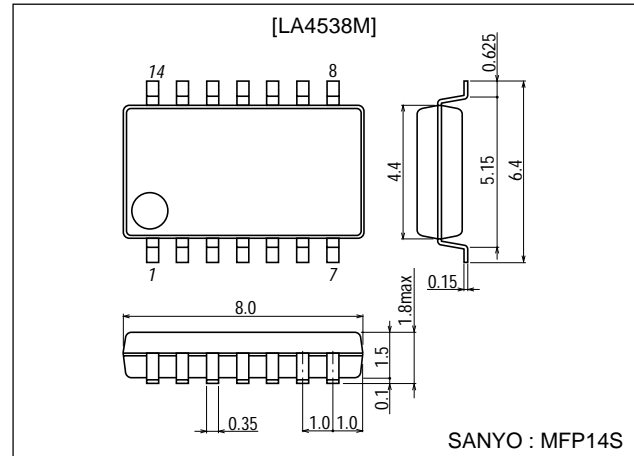
### Features

- 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 ( $V_{CC}=1.5V$ ,  $R_L=16\Omega$ ,  $f=1kHz$ ,  $THD=10\%$ )
  - Ripple rejection 46dB typ ( $V_{CC}=1.0V$ ,  $V_R=-30dBm$ ,  $f_R=100Hz$ )
- 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 $T_a = 25^\circ C$

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	$^\circ C$

#### Operating Conditions at $T_a = 25^\circ C$

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	$\Omega$

#### Operating Characteristics at $T_a = 25^\circ C$ , $R_L=16\Omega$ , $R_g=600\Omega$ , See specified Test Circuit.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current	$I_{cco1}$	$V_{CC}=1.20V$ , quiescent, $R_L3 \rightarrow OFF$		4.5	7.0	mA
	$I_{cco2}$	$V_{CC}=2.50V$ , pin 14 $\rightarrow GND$ , $R_L3 \rightarrow OFF$		1.5	2.5	mA
	$I_{cco3}$	$V_{CC}=2.50V$ , pin 1 $\rightarrow GND$ , $R_L3 \rightarrow OFF$			1.0	$\mu A$
Voltage gain	VG	$V_{CC}=0.90V$ , $f=1kHz$ , $V_O=-20dBm$	27.5	29	31.5	dB
Voltage gain difference	$\Delta VG$	$V_{CC}=0.90V$ , $f=1kHz$ , $V_O=-20dBm$			1.0	dB

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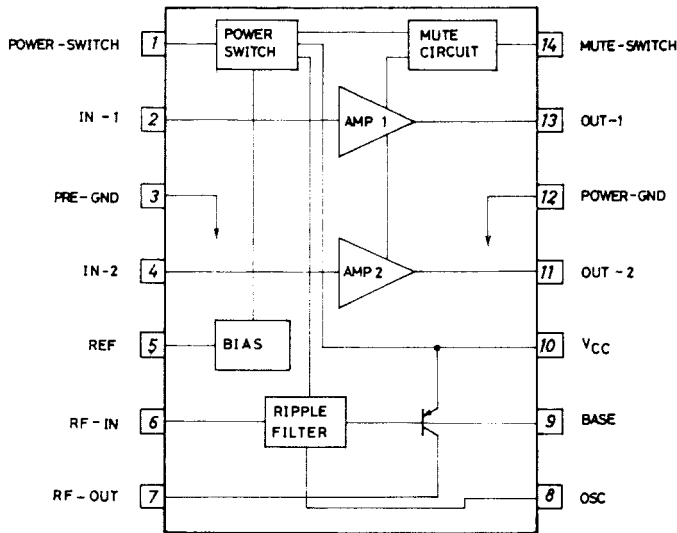
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Total harmonic distortion	THD	$V_{CC}=1.20V, f=1kHz, P_O=0.5mW$		0.9	1.5	%
Output power	$P_O$	$V_{CC}=1.50V, f=1kHz, THD=10\%$	5	8		mW
Crosstalk	CT	$V_{CC}=1.20V, f=100Hz, R_g=1k\Omega, V_O=-20dB$	40	45		dB
Ripple rejection (amplifier section)	SVRR1	$V_{CC}=1.00V, f=100Hz, R_g=1k\Omega, V_R=-30dBm, BPF=100Hz$	40	46		dB
Ripple rejection (filter section)	SVRR2	$V_{CC}=1.00V, f=100Hz, V_R=-35dBm$	34	39		dB
Output noise voltage	$V_{NO}$	$V_{CC}=2.50V, R_g=1k\Omega, BPF=20Hz \text{ to } 20kHz$		55	80	$\mu V$
Power on current sensitivity	$I_{1(on)}$	$V_{CC}=0.85V, V_{pin5} \geq 0.5V$		0.1	1.0	$\mu A$
Power off voltage sensitivity	$V_{1(off)}$	$V_{CC}=0.85V, V_{pin5} \leq 0.1V$	0.5	0.6		V
Muting off current sensitivity	$I_{14(off)}$	$V_{CC}=0.85V, V_{pin5} \geq 0.5V$		0.1	1.0	$\mu A$
Muting on voltage sensitivity	$V_{14(on)}$	$V_{CC}=0.85V, V_{pin5} \leq 0.1V$	0.5	0.6		V
Ripple filter output voltage	$V_F$	$V_{CC}=1.00V, R_L=68\Omega$	0.90	0.94		V

## Equivalent Circuit Block Diagram



## Test Circuit

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

