



LA4534M

3V CD Headphone-stereo Power Amplifier

The LA4534M is a low noise, low distortion headphone-stereo power IC designed for use in a portable CD.

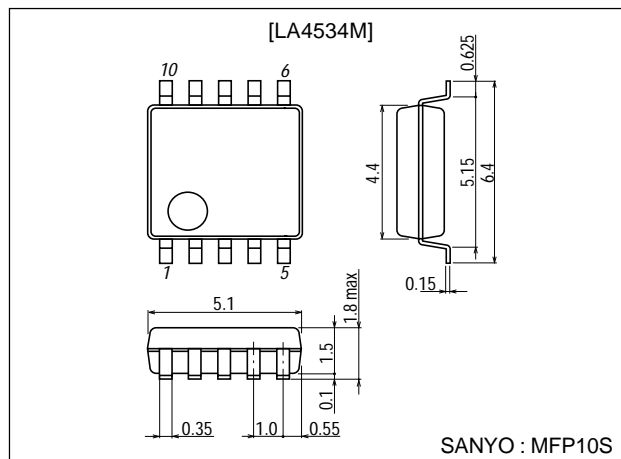
Features

- Less current drain.
- Accept 16Ω load drive.
- Excellent voltage reduction characteristic.
- Excellent ripple rejection.
- Power switch function and built-in muting circuit.
- Low noise (7μV), low gain (11dB).

Package Dimensions

unit:mm

3086A-MFP10S



Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V _{CC} max	Quiescent time	4.5	V
Allowable power dissipation	P _d max		300	mW
Operating temperature	T _{opr}		-20 to +75	°C
Storage temperature	T _{stg}		-40 to +125	°C

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V _{CC}		3.0	V
Operating supply voltage range	V _{CC op}		1.6 to 4.0	V
Recommended load impedance	R _L		16 to 32	Ω

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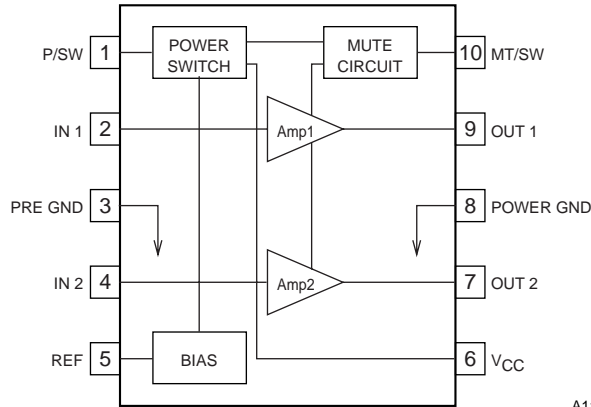
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Operating Characteristics at $T_a = 25^\circ\text{C}$, $R_L=16\Omega$, $R_g=600\Omega$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current	I_{CCO1}	$V_{CC}=2.4\text{V}$, Quiescent time		5.4	10	mA
	I_{CCO2}	$V_{CC}=4.5\text{V}$, pin 10 to GND		1.1	2.0	mA
	I_{CCO3}	$V_{CC}=4.5\text{V}$, pin 1 to GND			1.0	μA
Voltage gain	VG1	$V_{CC}=2.4\text{V}$, $f=1\text{kHz}$, $V_O=-10\text{dBm}$	9	11	13	dB
	VG2	$V_{CC}=1.6\text{V}$, $f=1\text{kHz}$, $V_O=-20\text{dBm}$	9	11	13	dB
Voltage gain variations	ΔVG1	$V_{CC}=2.4\text{V}$, $f=1\text{kHz}$, $V_O=-10\text{dBm}$			1.0	dB
	ΔVG2	$V_{CC}=1.6\text{V}$, $f=1\text{kHz}$, $V_O=-20\text{dBm}$			1.0	dB
Total harmonic distortion	THD	$V_{CC}=2.0\text{V}$, $f=1\text{kHz}$, $P_O=1\text{mW}$		0.08	0.24	%
Output power	P_O	$V_{CC}=3.0\text{V}$, $f=1\text{kHz}$, THD=10%	25	50		mW
Crosstalk	CT	$V_{CC}=2.4\text{V}$, $f=1\text{kHz}$, $R_g=1\text{k}\Omega$, $V_O=-10\text{dBm}$	40	50		mW
Ripple rejection	SVRR	$V_{CC}=1.6\text{V}$, $f=100\text{Hz}$, $R_g=1\text{k}\Omega$, $V_R=-20\text{dBm}$, BPF=100Hz	50	70		dB
Output noise voltage	V_{NO}	$V_{CC}=4.5\text{V}$, $R_g=1\text{k}\Omega$, BPF=20Hz to 20kHz		7	20	μV
Power off effect	$V_{O(\text{off})}$	$V_{CC}=1.6\text{V}$, $f=100\text{Hz}$, Pin 1 to GND, $V_{IN}=-10\text{dBm}$			-80	dBm
Mute effect	$V_{O(\text{MT})}$	$V_{CC}=1.6\text{V}$, $f=100\text{Hz}$, Pin 10 to GND, $V_{IN}=-10\text{dBm}$			-80	dBm
Power on current sensitivity	$I1(\text{on})$	$V_{CC}=1.5\text{V}$, $V_5 \geq 0.85\text{V}$		0.05	1.0	μA
Power off voltage sensitivity	$V1(\text{off})$	$V_{CC}=1.5\text{V}$, $V_5 \leq 0.1\text{V}$	0.5	0.6		V
Mute off current sensitivity	$I10(\text{off})$	$V_{CC}=1.5\text{V}$, $V_5 \geq 0.85\text{V}$		0.2	1.0	μA
Mute on voltage sensitivity	$V10(\text{on})$	$V_{CC}=1.5\text{V}$, $V_5 \leq 0.1\text{V}$	0.5	0.65		V

Note : Quiescent current is the current flowing into pin 6. The current flowing into pin 1 and pin 10 is at the maximum value and calculated from the equation $(V_{\text{pin}} - 0.5\text{V}) / 16[\text{V}/\text{k}\Omega]$, increasing total current.

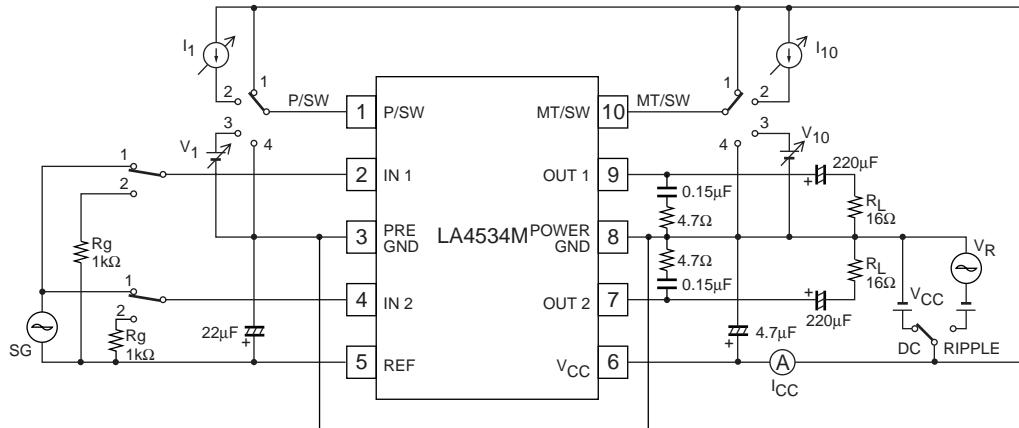
Equivalent Circuit Block Diagram



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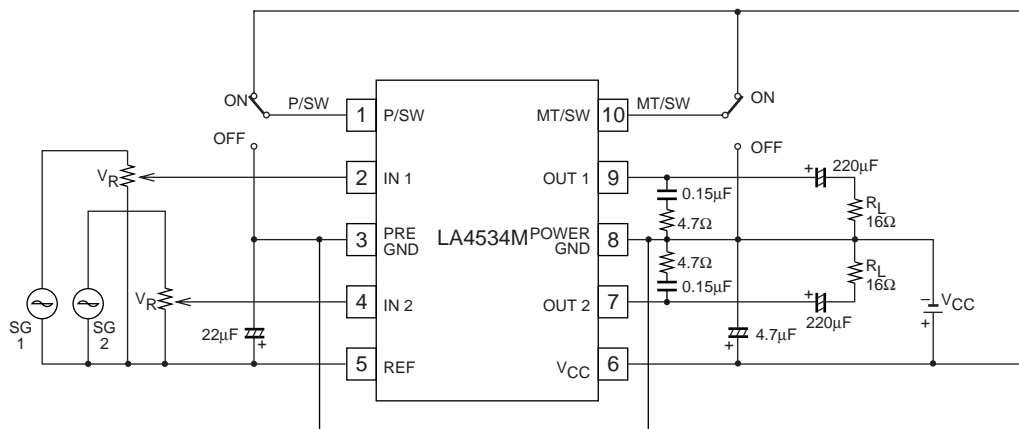
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Test Circuit



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Sample Application Circuit



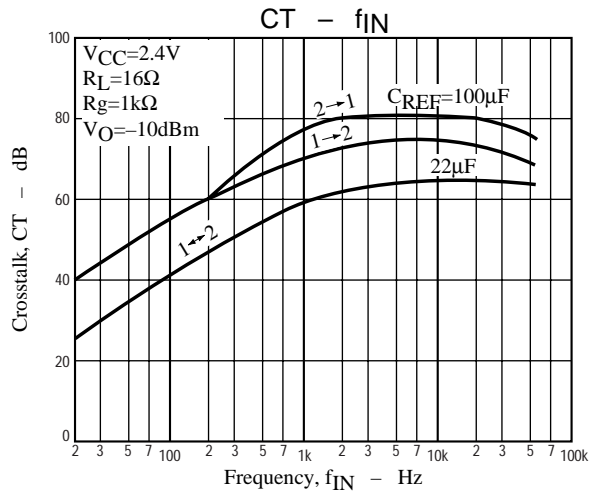
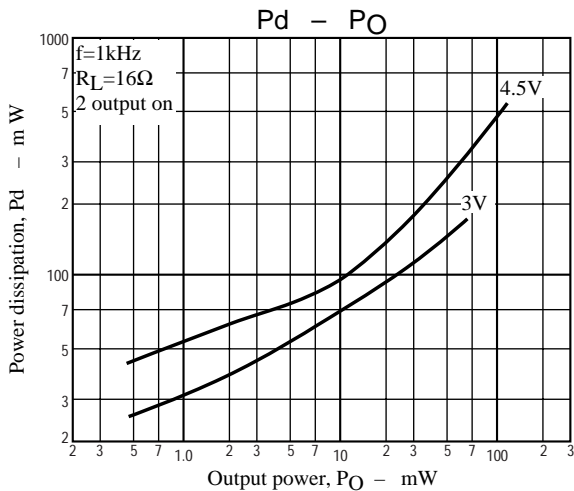
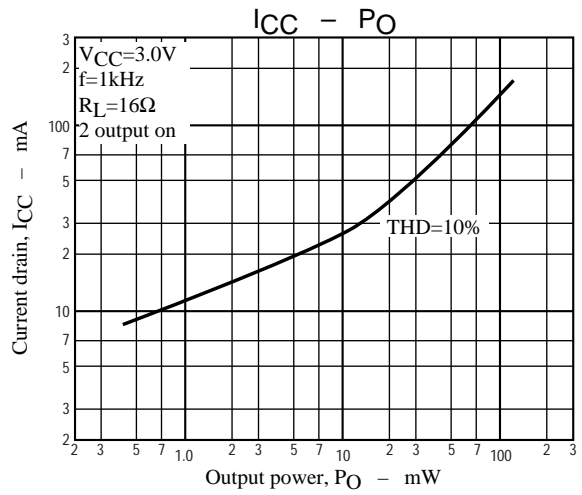
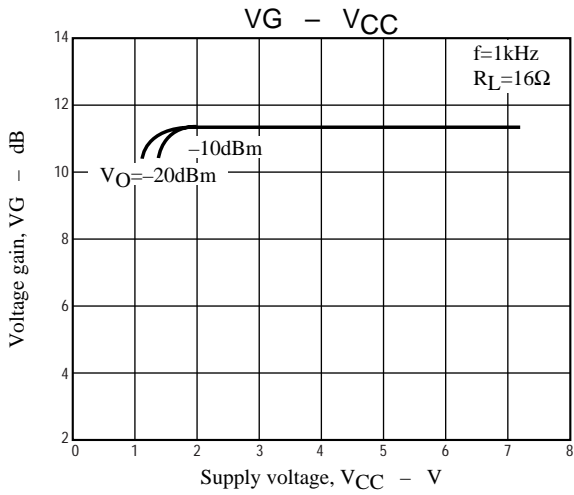
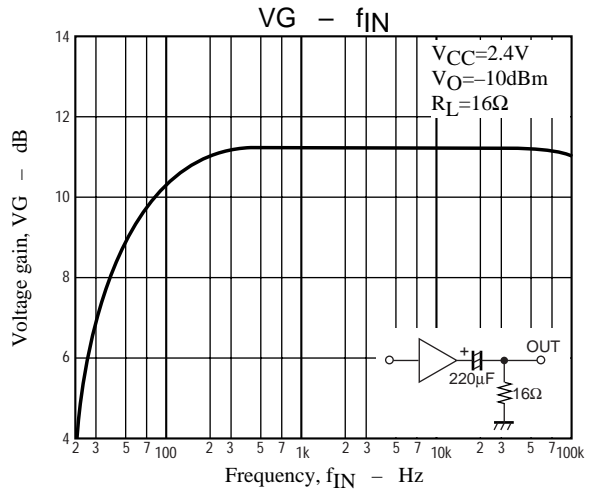
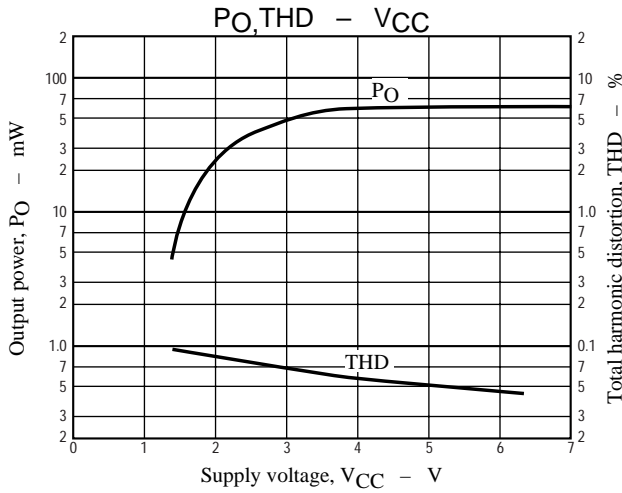
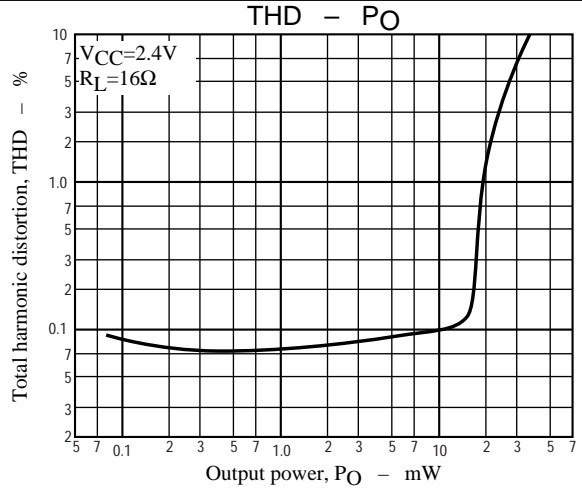
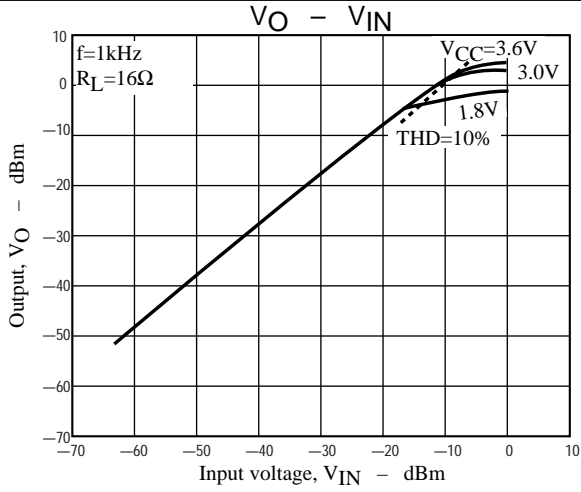
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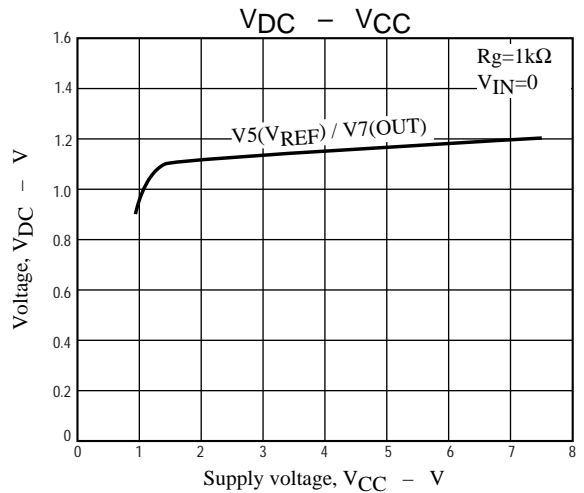
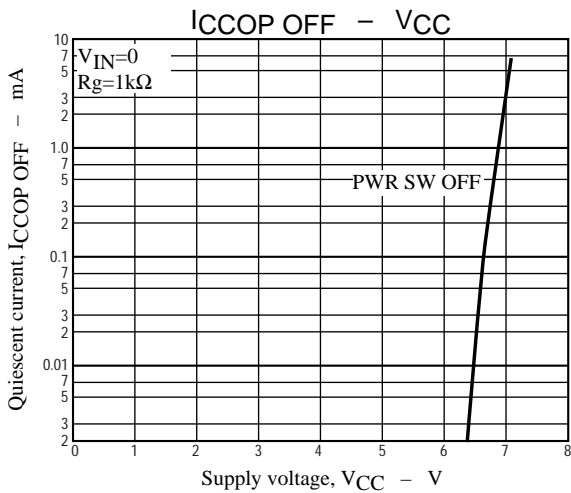
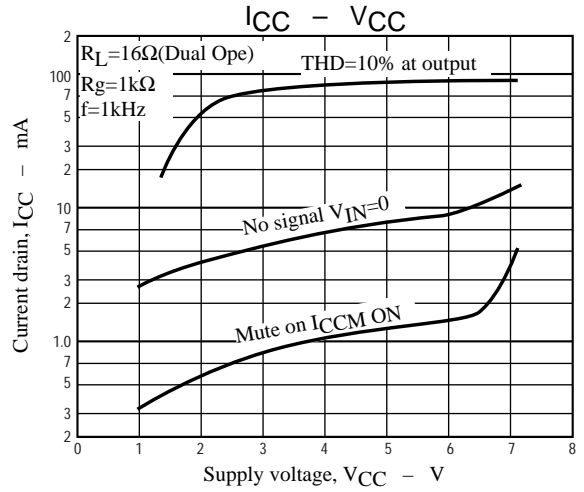
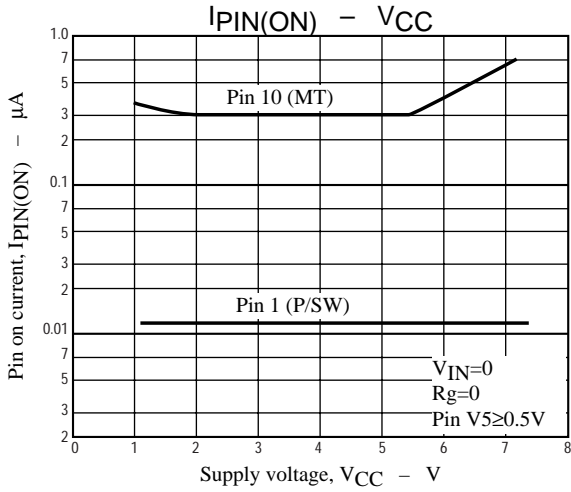
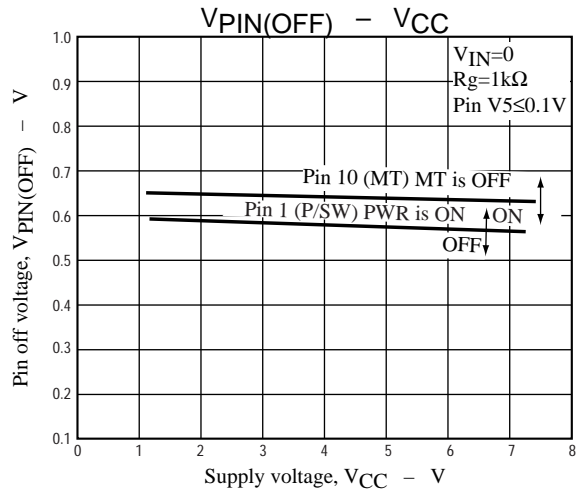
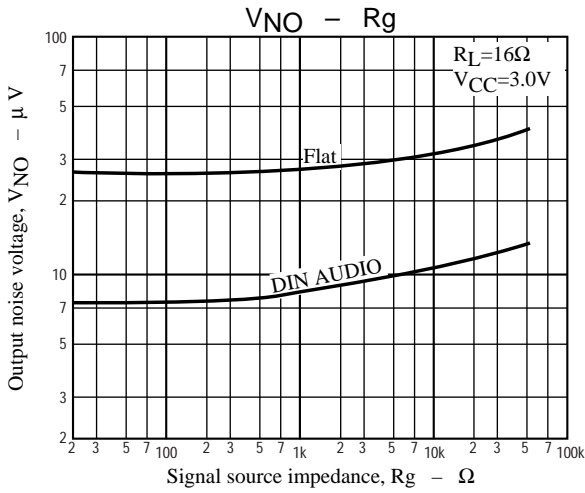
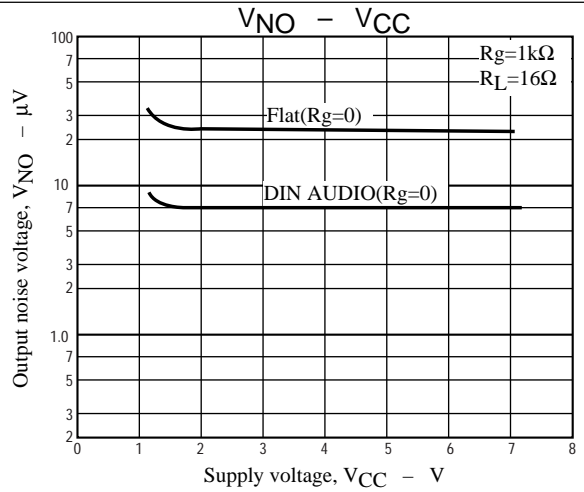
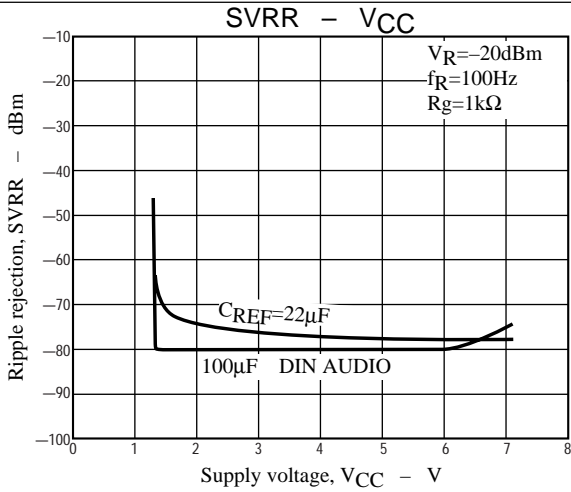
Pin Functions ($V_{CC}=3.0V$)

Pin No.	Symbol	Pin voltage (V)	Equivalent circuit	Pin function
1	P/SW1			<ul style="list-style-type: none"> The system turns on when the V_{CC} is applied to this pin and turns off by connecting this pin to GND.
2 4	IN1 IN2	1.1 1.1		<ul style="list-style-type: none"> Input pin connection. Input impedance is 10kΩ.
3	PRE GND			
5	REF	1.1		<ul style="list-style-type: none"> 1.1V fixed bias is applied to this pin.
6	V_{CC}	3.0		
7 9	OUT2 OUT1	1.1 1.1		<ul style="list-style-type: none"> Output pin connection.
8	POWER GND			
10	MT/SW			<ul style="list-style-type: none"> The muting function turns on when this pin is connected to GND and turns off by applying the V_{CC} to this pin.

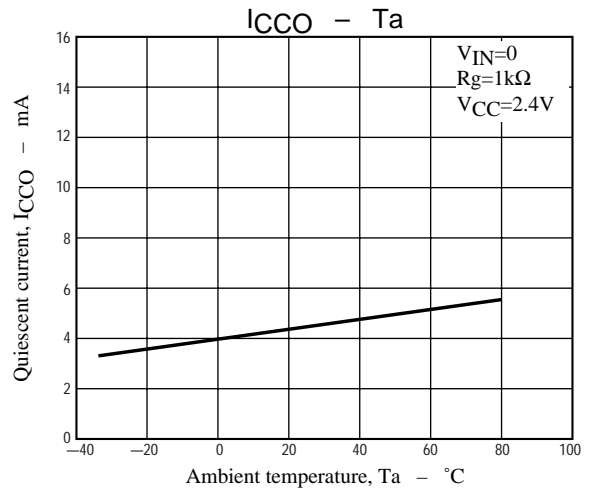
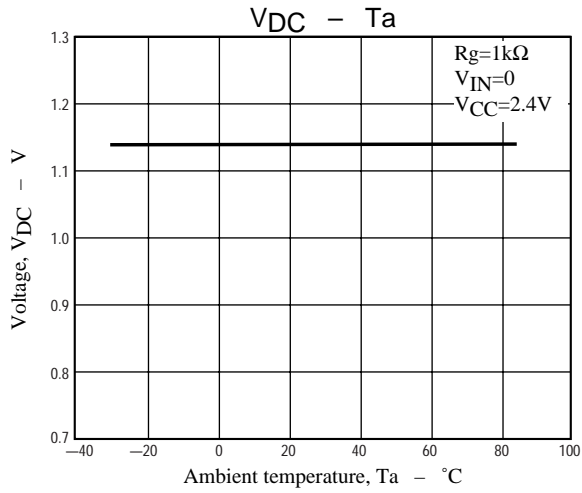
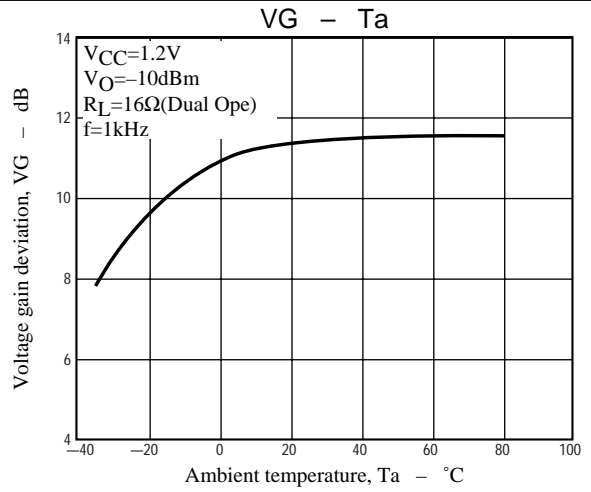
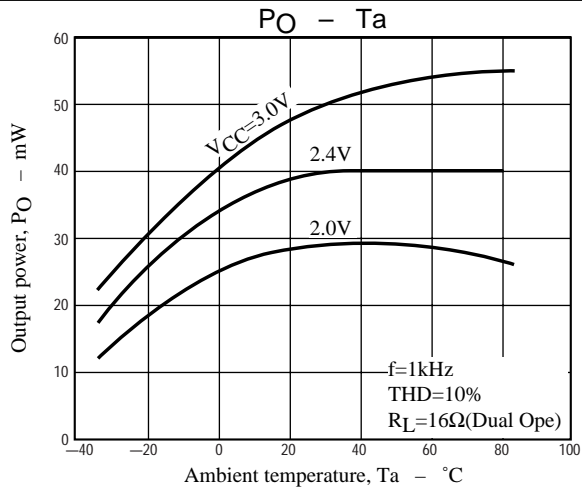
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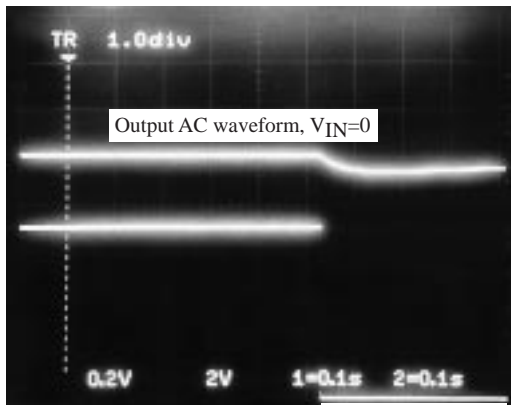
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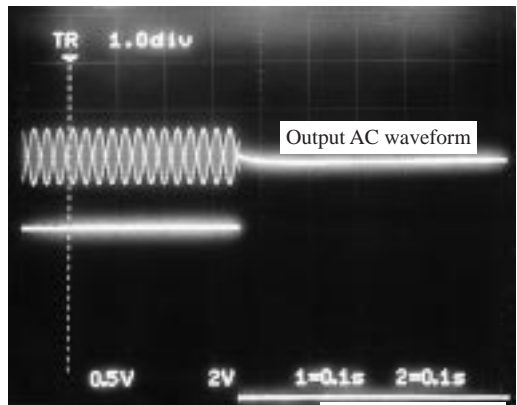


P.SW OFF



P.SW DC waveform

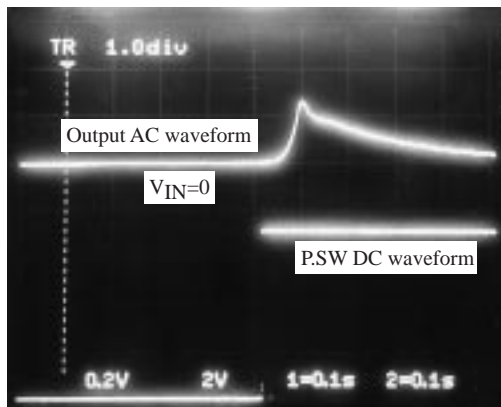
P.SW OFF



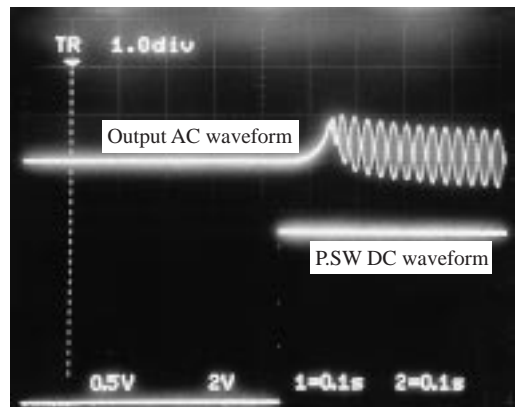
P.SW DC waveform

P.SW OFF

P.SW ON



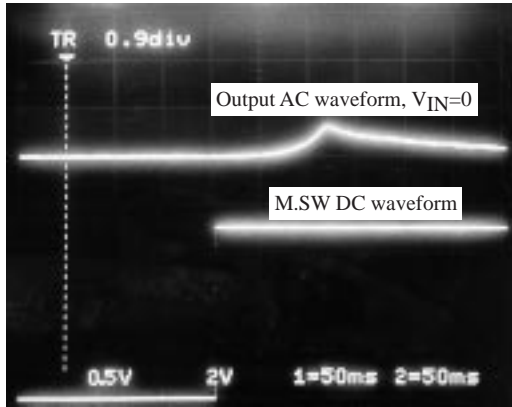
P.SW ON



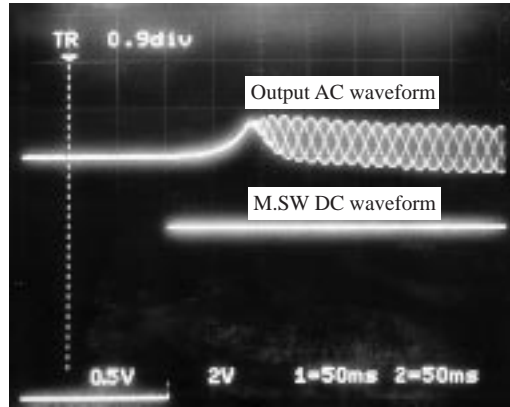
P.SW ON

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M.SW OFF

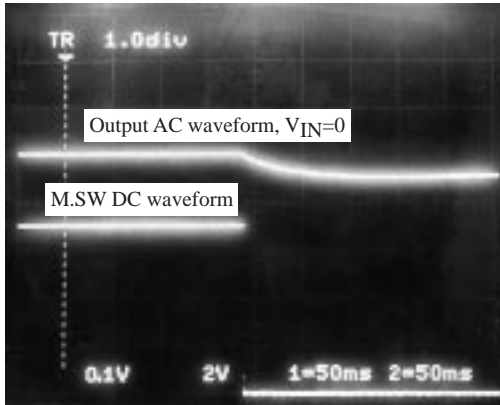


M.SW OFF

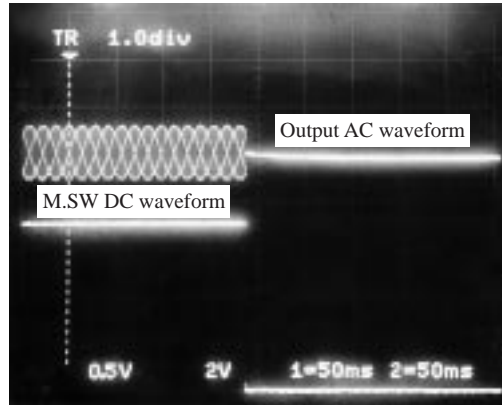


M.SW OFF

M.SW ON



M.SW ON

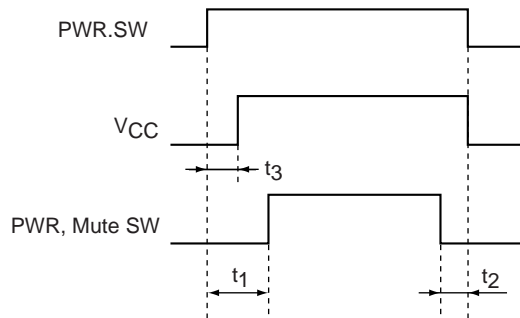


M.SW ON

Application Notes

- Popping noise reduction

The switching sequence shown below can minimize popping noise.



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To minimize popping noise, the PWR mute switch should be turned on t_1 (about 0.1s) after power-on and turned off t_2 (about 0.1s) before power-off. Turn on and off the PWR mute switch by applying V_{CC} with the PWR be is no state.

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