



LA4536M

5V CD Headphone-stereo Power Amplifier

The LA4536M is a low noise, low distortion headphone-stereo power IC designed for use on a portable CD.

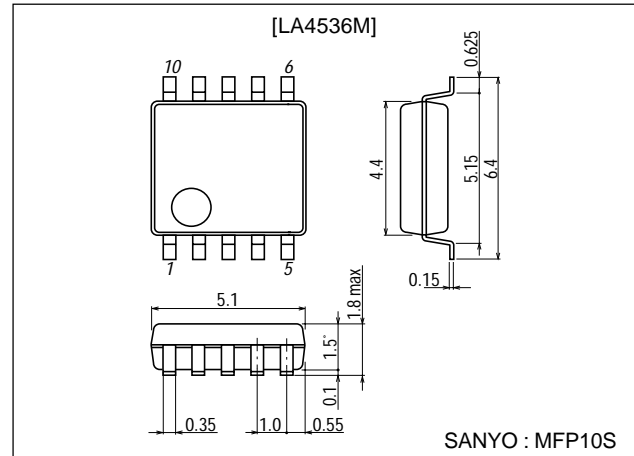
Features

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

Package Dimensions

unit:mm

3086A-MFP10S



Specifications

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC \text{ max}}$	No signal	6.0	V
Allowable power dissipation	$P_d \text{ max}$		300	mW
Operating temperature	T_{opr}		-20 to +75	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to +125	$^\circ\text{C}$

Operating Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		5.0	V
Operating supply voltage range	$V_{CC \text{ op}}$		4.0 to 6.0	V
Recommended load impedance	R_L		16 to 32	Ω

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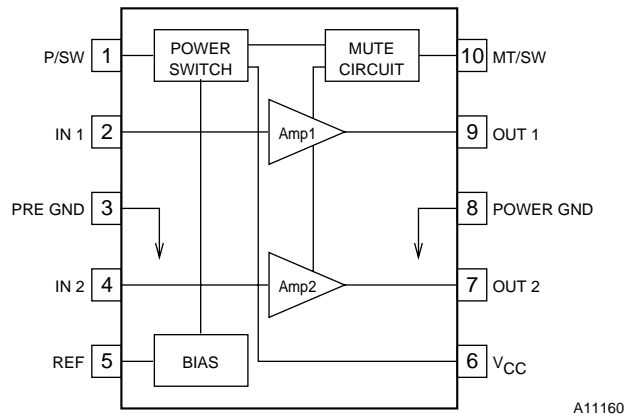
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Operating Characteristics at $T_a = 25^\circ\text{C}$, $R_L=16\Omega$, $R_g=600\Omega$

Parameter	Symbol	Conditions	Ratings			Unit	Note
			min	typ	max		
Quiescent current	I_{CCO1}	$V_{CC}=5.0\text{V}$, no signal		1.0	20	mA	
	I_{CCO2}	$V_{CC}=6.0\text{V}$, pin 10, GND		1.1	4.0	mA	
	I_{CCO3}	$V_{CC}=6.0\text{V}$, pin 1, GND			1.0	μA	
Voltage gain	VG	$V_{CC}=5.0\text{V}$, $f=1\text{kHz}$, $V_O=-10\text{dBm}$	9	11	13	dB	
Voltage gain variations	ΔV_{G1}	$V_{CC}=5.0\text{V}$, $f=1\text{kHz}$, $V_O=-10\text{dBm}$			1.0	dB	
	ΔV_{G2}	$V_{CC}=4.0\text{V}$, $f=1\text{kHz}$, $V_O=-20\text{dBm}$			1.0	dB	
Total harmonic distortion	THD	$V_{CC}=5.0\text{V}$, $f=1\text{kHz}$, $P_O=1\text{mW}$		0.02	0.24	%	
Output power	P_O	$V_{CC}=5.0\text{V}$, $f=1\text{kHz}$, THD=10%	40	100		mW	
Crosstalk	CT	$V_{CC}=5.0\text{V}$, $f=1\text{kHz}$, $R_g=1\text{k}\Omega$, $V_O=-10\text{dBm}$	40	60		dB	
Ripple rejection	SVRR	$V_{CC}=4.0\text{V}$, $f=100\text{Hz}$, $R_g=1\text{k}\Omega$, $V_O=-20\text{dBm}$, BPF=100Hz	45	65		dB	
Output noise voltage	V_{NO}	$V_{CC}=6.0\text{V}$, $R_g=1\text{k}\Omega$, BPF=20Hz to 20Hz		7	20	μV	
Power off effect	$V_{O(off)}$	$V_{CC}=4.0\text{V}$, $f=100\text{Hz}$, Pin 1 to GND, $V_{IN}=-10\text{dBm}$			-80	dBm	
Mute effect	$V_{O(MT)}$	$V_{CC}=4.0\text{V}$, $f=100\text{Hz}$, Pin 1 to GND, $V_{IN}=-10\text{dBm}$			-80	dBm	
Power on current sensitivity	$I_{1(on)}$	$V_{CC}=5.0\text{V}$, $V_5 \geq 0.85\text{V}$		0.05	2.0	μA	
Power off voltage sensitivity	$V_{1(off)}$	$V_{CC}=5.0\text{V}$, $V_5 \leq 0.1\text{V}$	0.5	0.6		V	
Mute off current sensitivity	$I_{10(off)}$	$V_{CC}=5.0\text{V}$, $V_5 \geq 0.85\text{V}$		0.2	2.0	μA	
Mute on voltage sensitivity	$V_{10(on)}$	$V_{CC}=5.0\text{V}$, $V_5 \leq 0.1\text{V}$	0.5	0.65		V	

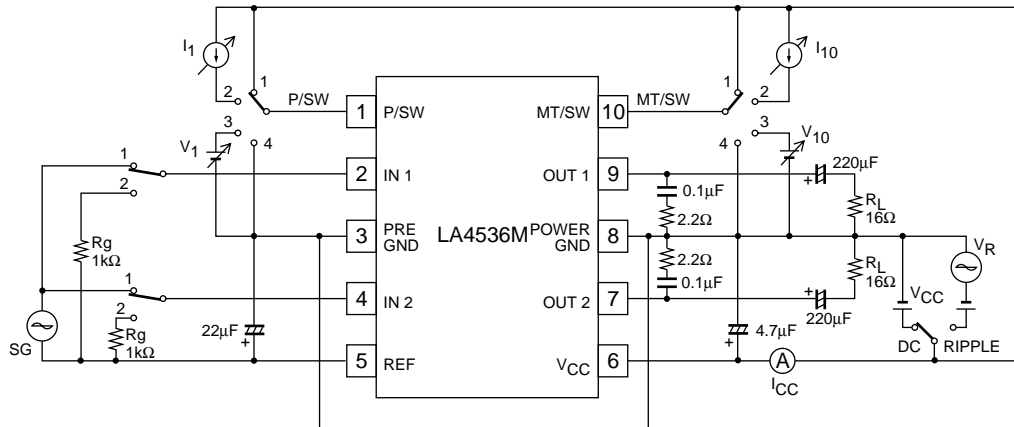
*1 : Quiescent current is the current flowing into pin 6. The current flowing into pin 1 and pin 10 is at the maximum value and calculated from the equation $(V_{\text{pin}} - 0.5\text{V}) / 16[\text{V}/\text{k}\Omega]$, increasing total current.

Equivalent Circuit Block Diagram



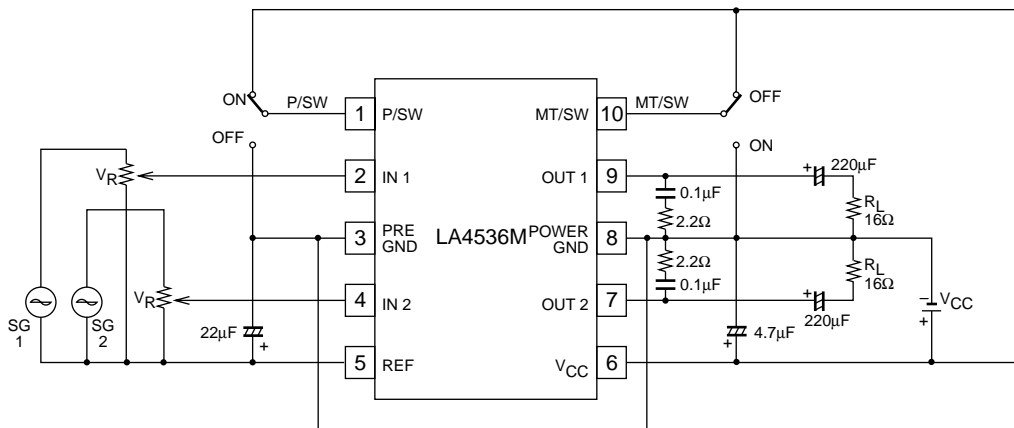
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Test Circuit



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Sample Application Circuit



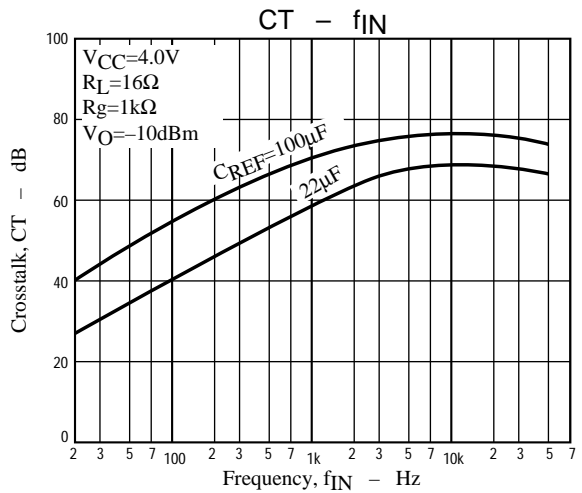
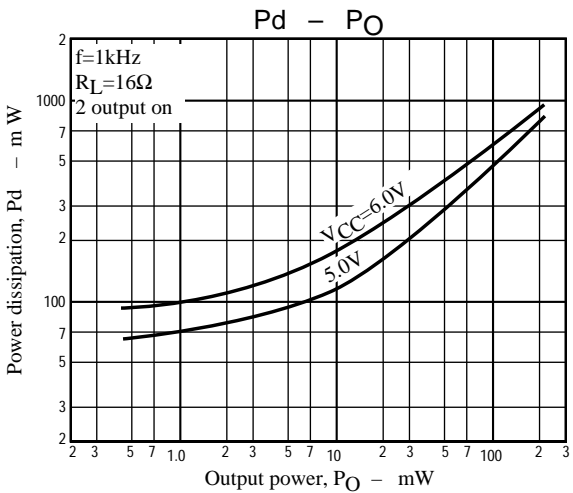
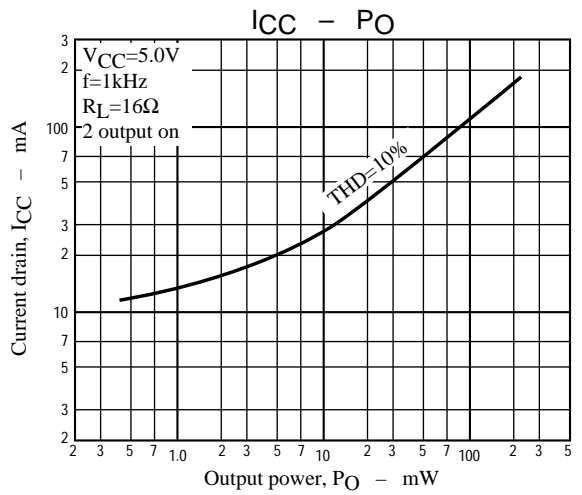
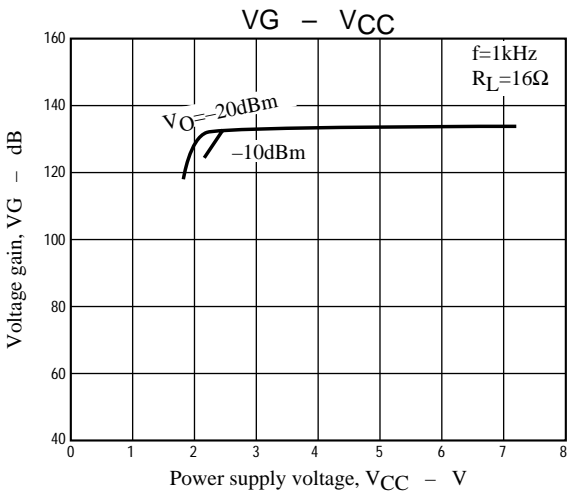
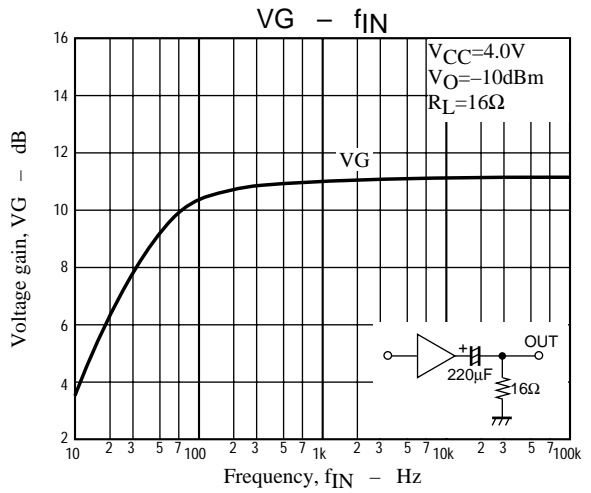
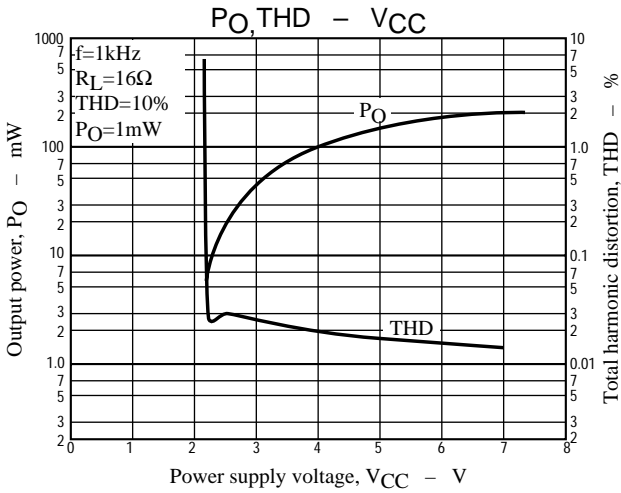
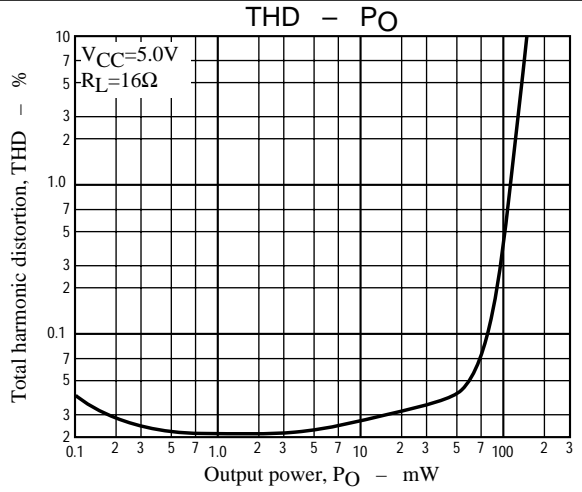
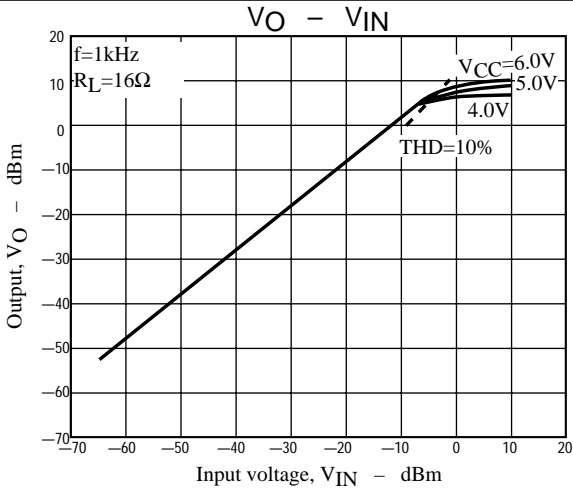
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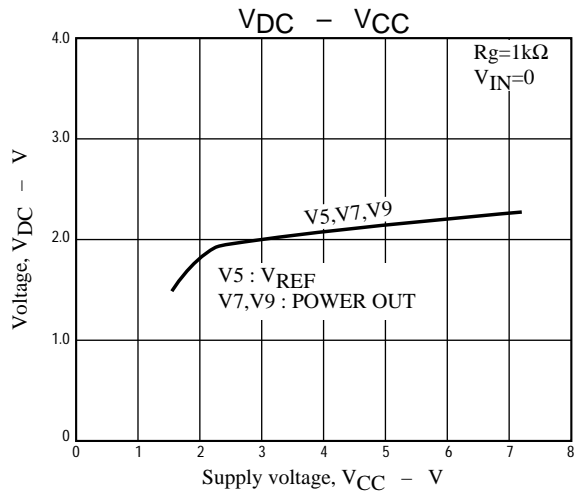
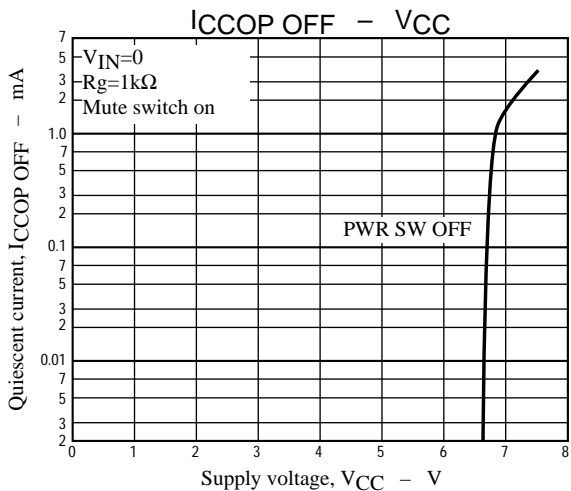
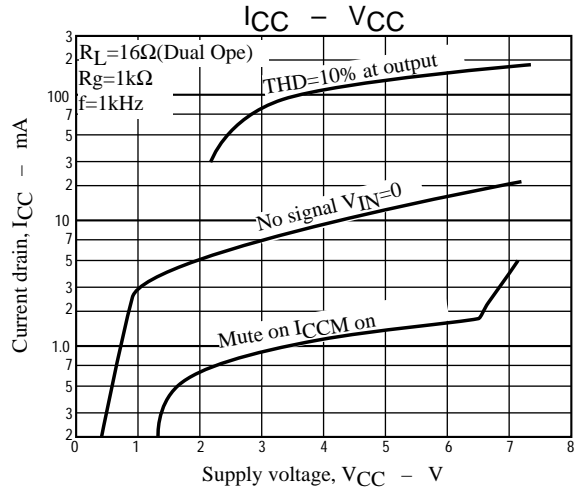
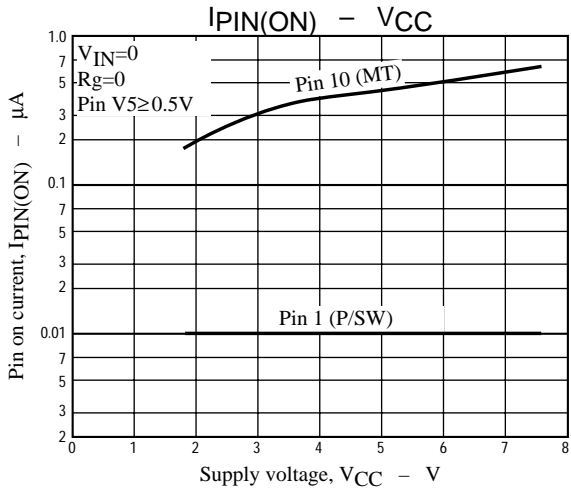
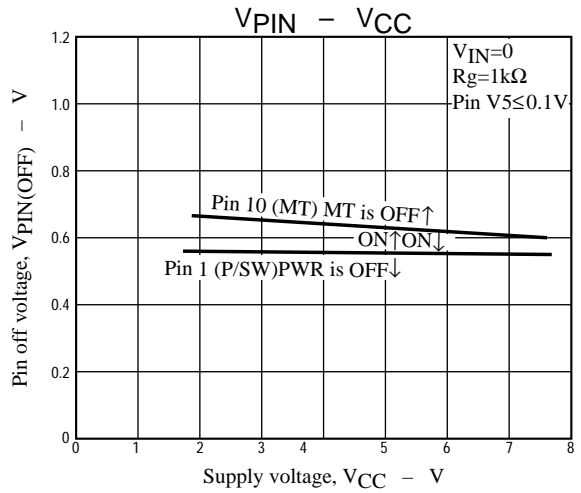
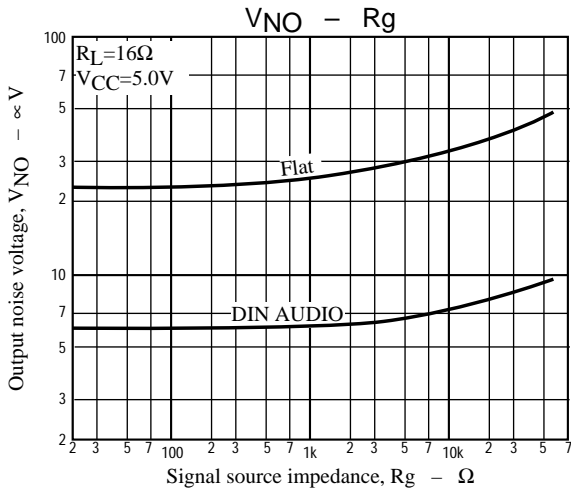
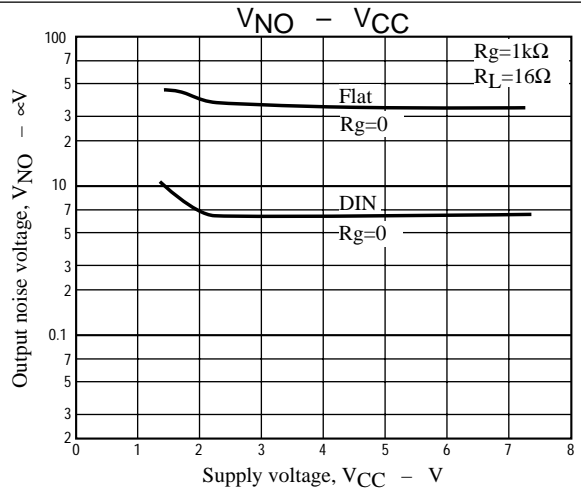
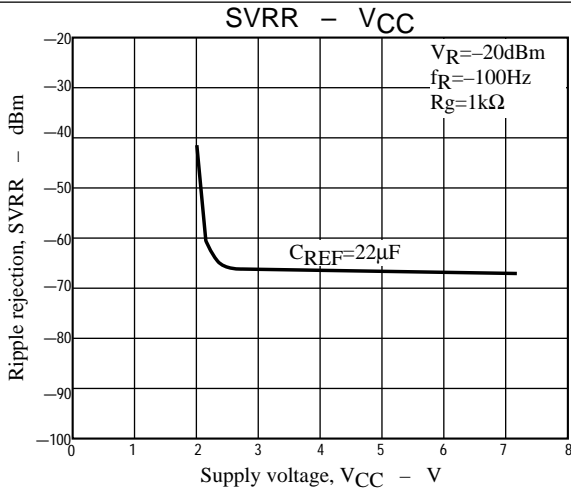
Pin Functions ($V_{CC}=5.0V$)

Pin No.	Symbol	Pin voltage	Equivalent circuit	Pin function
1	P/SW1			<ul style="list-style-type: none"> The system runs on when the V_{CC} is applied to this pin and turns off by connecting this pin to GND.
2 4	IN1 IN2	2.1 2.1		<ul style="list-style-type: none"> Input pin connection. Input impedance is 10kΩ.
3	PRE GND			
5	REF	2.1		<ul style="list-style-type: none"> 2.1V fixed bias is applied to this pin.
6	V_{CC}			
7 9	OUT2 OUT1	2.1 2.1		<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.

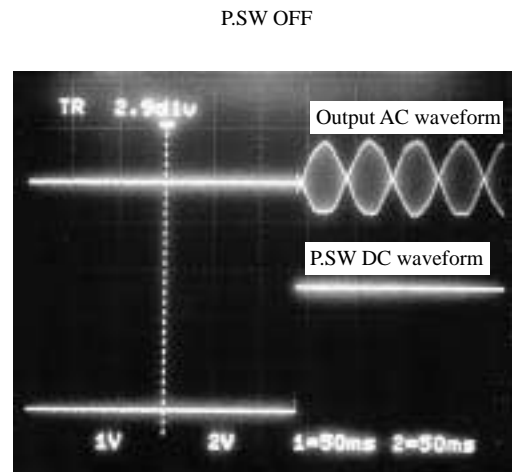
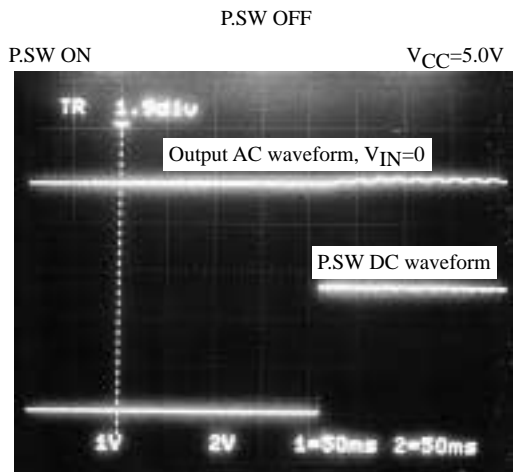
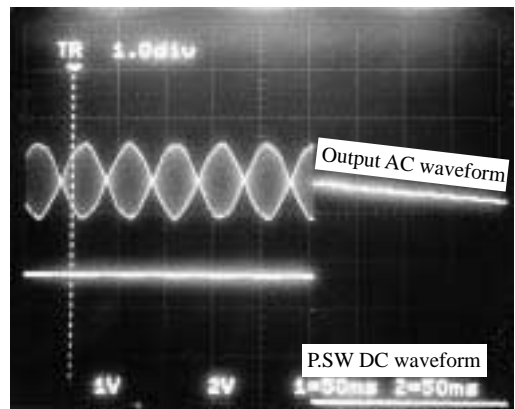
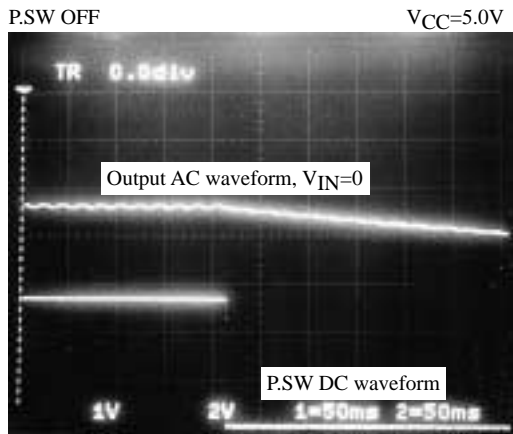
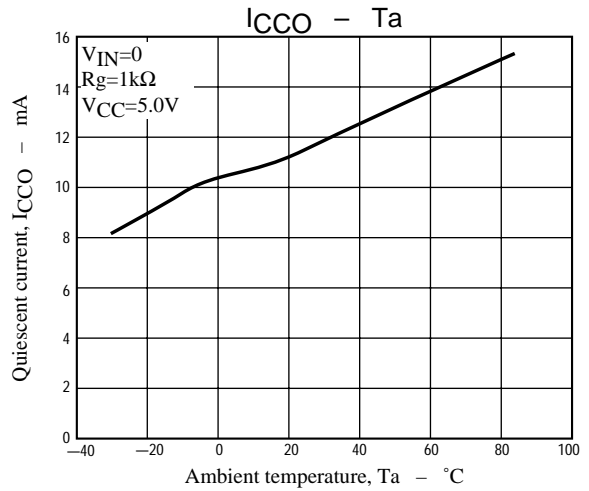
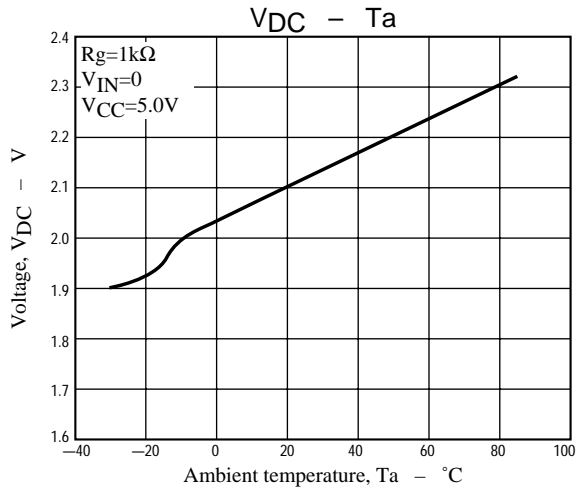
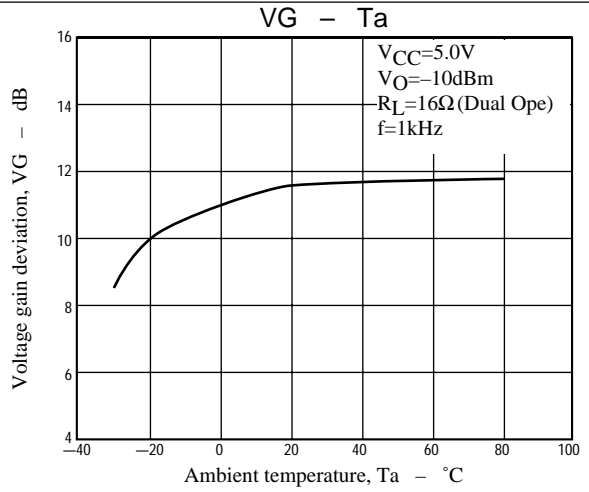
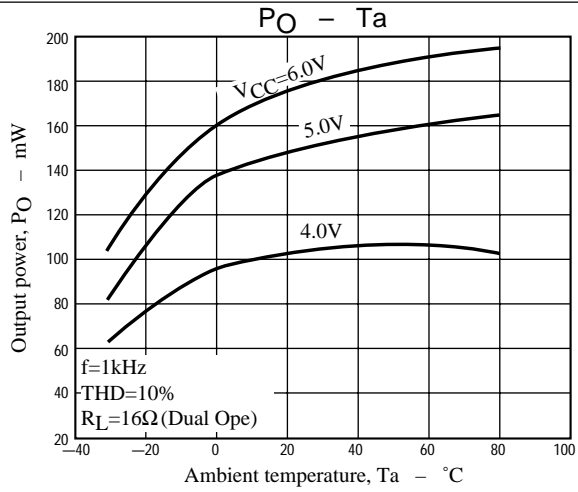
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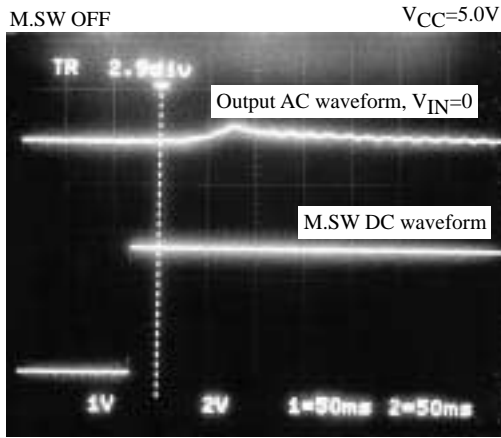
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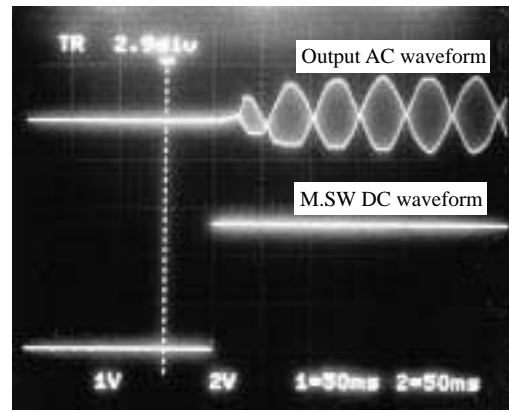
P.S.W ON

P.S.W ON

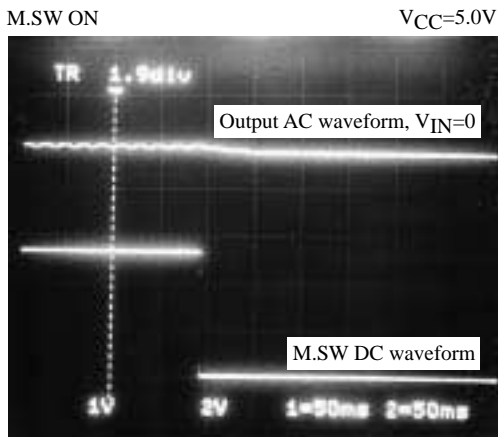
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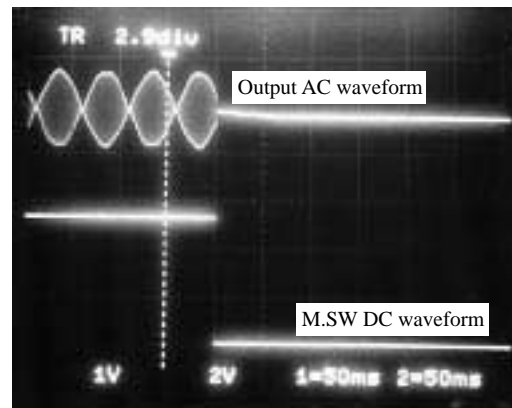
1V/div M.SW OFF



M.SW OFF



1V/div M.SW ON

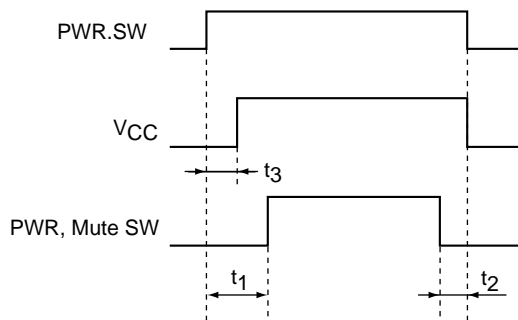


M.SW ON

Application Notes

Popping noise reduction

The switching sequence shown below can minimize the popping noise.



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To minimize popping noise, the PWR mute switch should be turned on t₁ (about 0.1s) after power-on and turned off t₂ (about 0.1s) before power-off. Turn on and off the PWR mute switch by applying V_{CC} with the PWR be in no state.

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