



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.

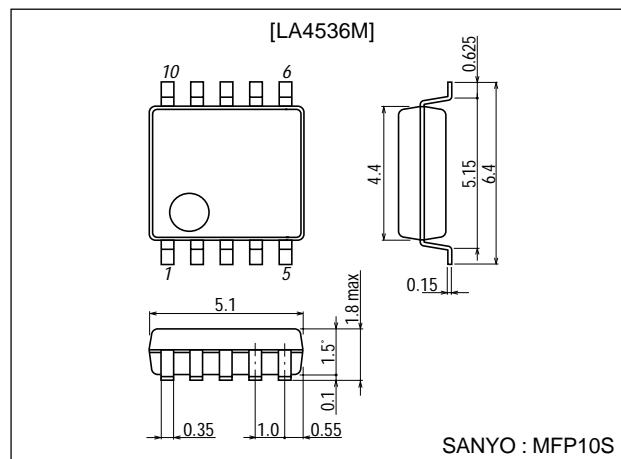
Features

- 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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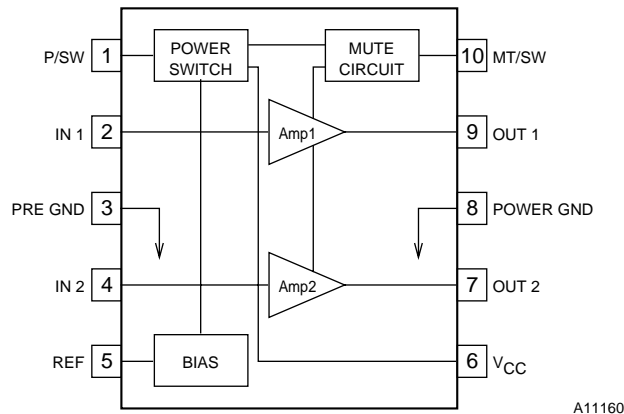
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Operating Characteristics at Ta = 25°C, RL=16Ω, Rg=600Ω

Parameter	Symbol	Conditions	Ratings			Unit	Note
			min	typ	max		
Quiescent current	ICCO1	VCC=5.0V, no signal		1.0	20	mA	
	ICCO2	VCC=6.0V, pin 10, GND		1.1	4.0	mA	
	ICCO3	VCC=6.0V, pin 1, GND			1.0	μA	
Voltage gain	VG	VCC=5.0V, f=1kHz, VO=-10dBm	9	11	13	dB	
Voltage gain variations	ΔVG1	VCC=5.0V, f=1kHz, VO=-10dBm			1.0	dB	
	ΔVG2	VCC=4.0V, f=1kHz, VO=-20dBm			1.0	dB	
Total harmonic distortion	THD	VCC=5.0V, f=1kHz, PO=1mW		0.02	0.24	%	
Output power	PO	VCC=5.0V, f=1kHz, THD=10%	40	100		mW	
Crosstalk	CT	VCC=5.0V, f=1kHz, Rg=1kΩ, VO=-10dBm	40	60		dB	
Ripple rejection	SVRR	VCC=4.0V, f=100Hz, Rg=1kΩ, VO=-20dBm, BPF=100Hz	45	65		dB	
Output noise voltage	VNO	VCC=6.0V, Rg=1kΩ, BPF=20Hz to 20Hz		7	20	μV	
Power off effect	VO(off)	VCC=4.0V, f=100Hz, Pin 1 to GND, VIN=-10dBm			-80	dBm	
Mute effect	VO(MT)	VCC=4.0V, f=100Hz, Pin 1 to GND, VIN=-10dBm			-80	dBm	
Power on current sensitivity	I1(on)	VCC=5.0V, V5≥0.85V		0.05	2.0	μA	
Power off voltage sensitivity	V1(off)	VCC=5.0V, V5≤0.1V	0.5	0.6		V	
Mute off current sensitivity	I10(off)	VCC=5.0V, V5≥0.85V		0.2	2.0	μA	
Mute on voltage sensitivity	V10(on)	VCC=5.0V, V5≤0.1V	0.5	0.65		V	

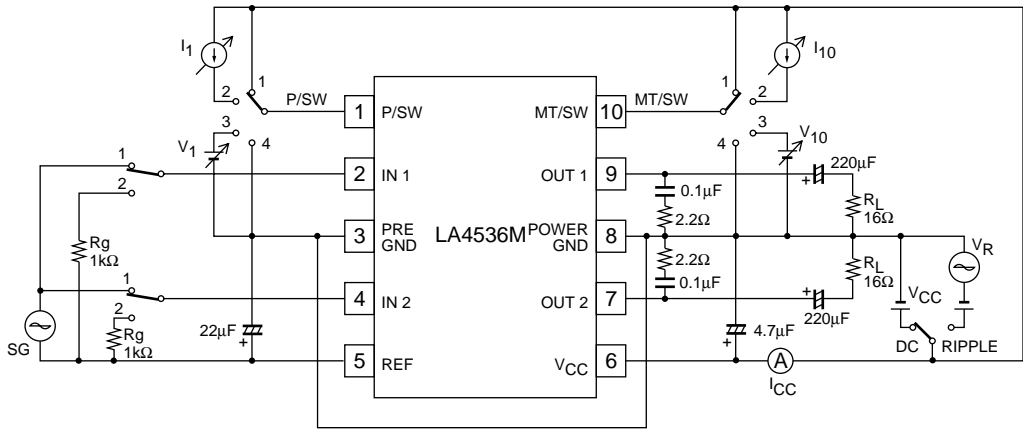
*1 : Quiescent current is the current flowing into pin 6. The current flowing into pin 1 and pin 10 is at the maximum value and calculated from the equation $(V_{pin}-0.5V)/16[V/k\Omega]$, increasing total current.

Equivalent Circuit Block Diagram



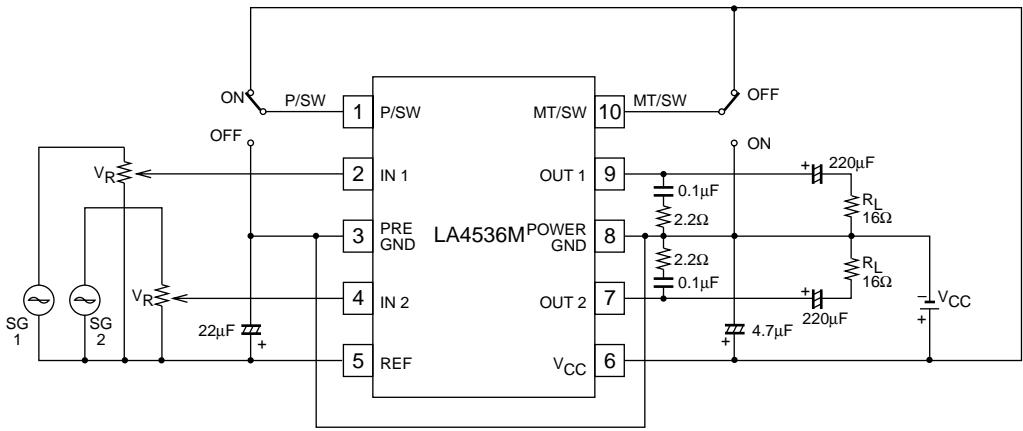
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Test Circuit



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Sample Application Circuit

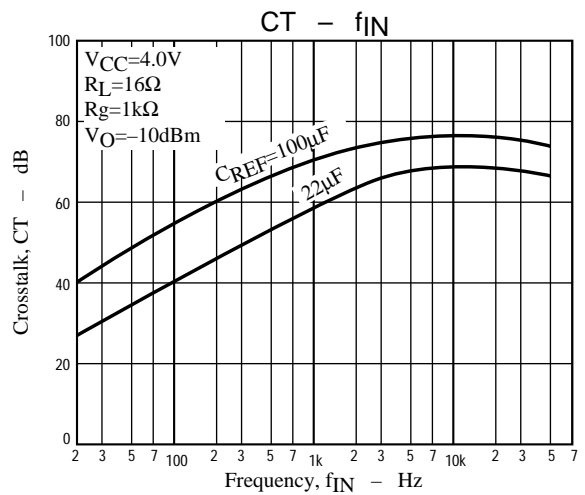
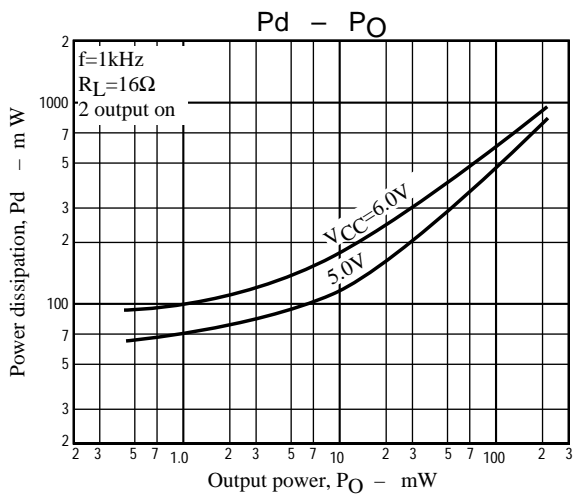
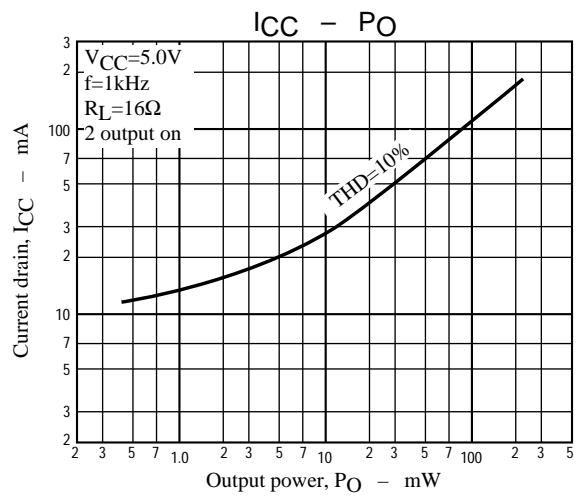
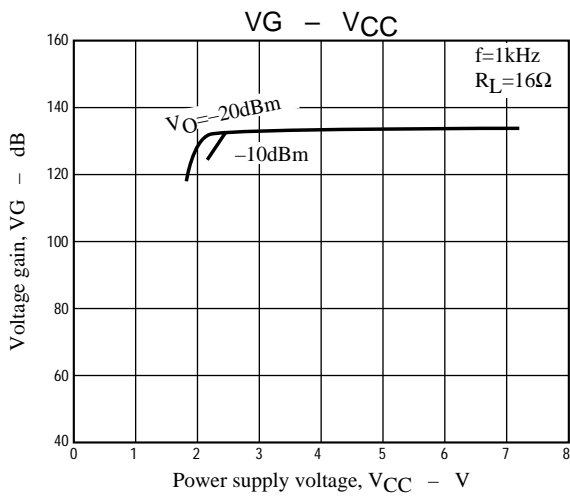
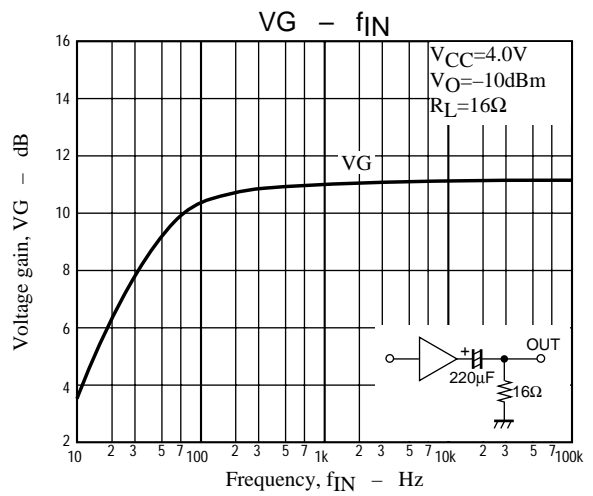
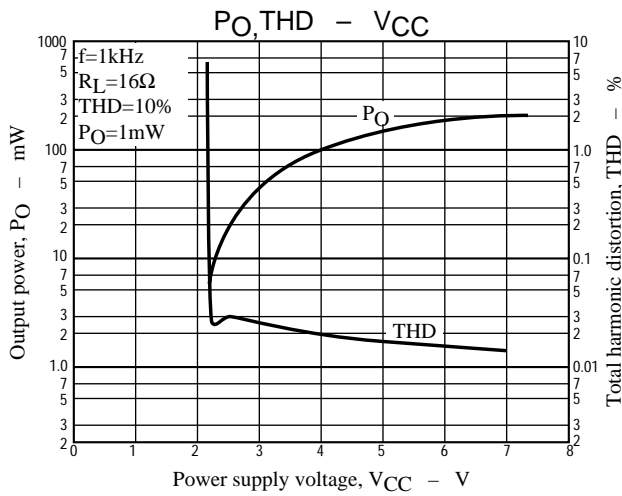
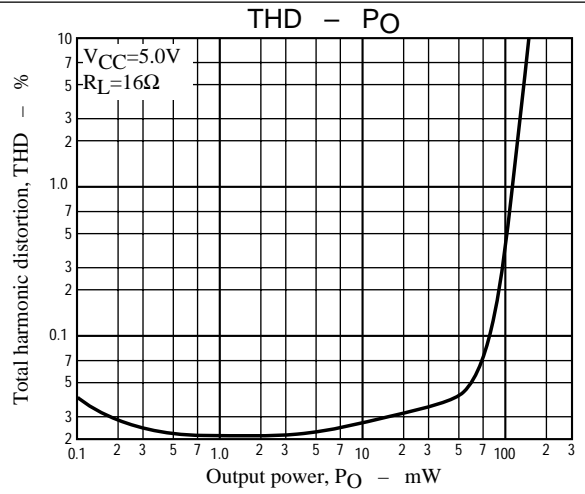
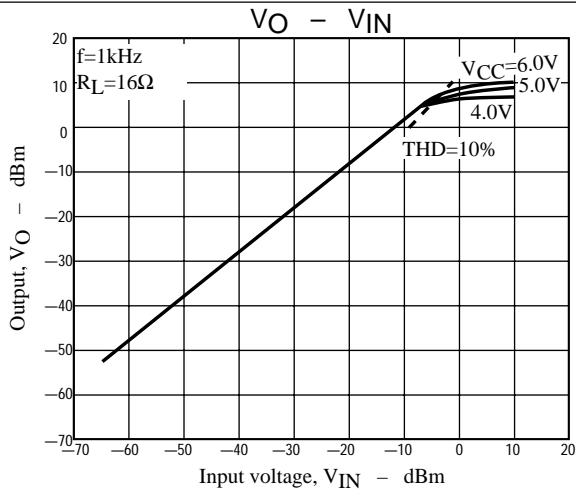


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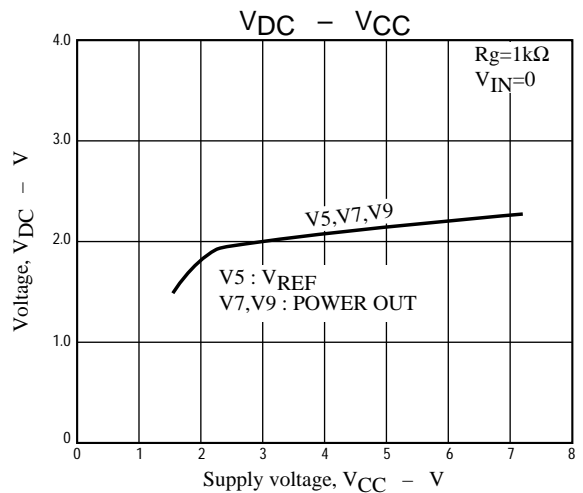
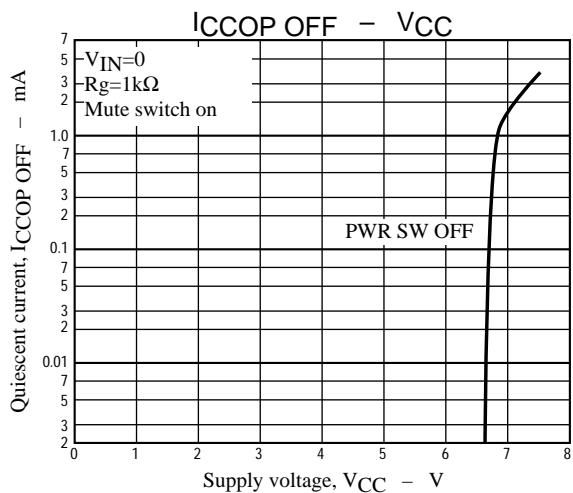
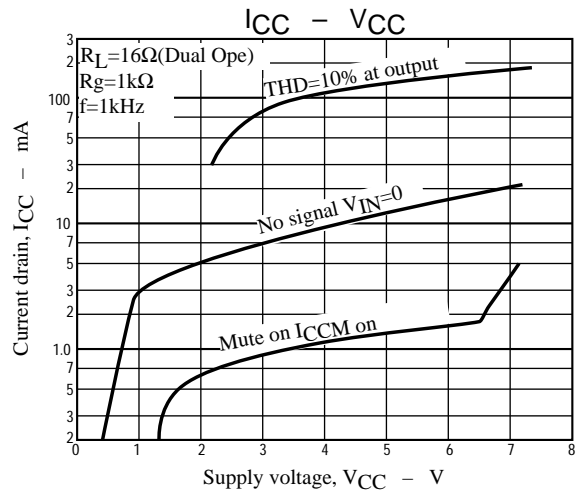
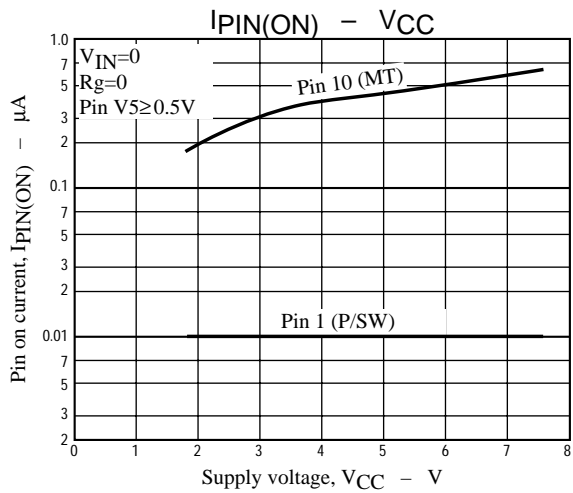
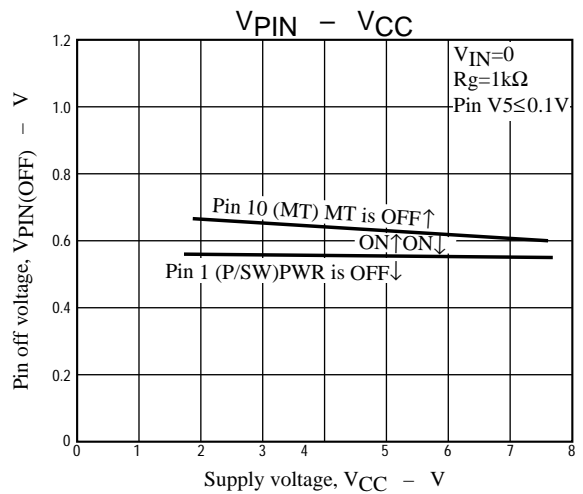
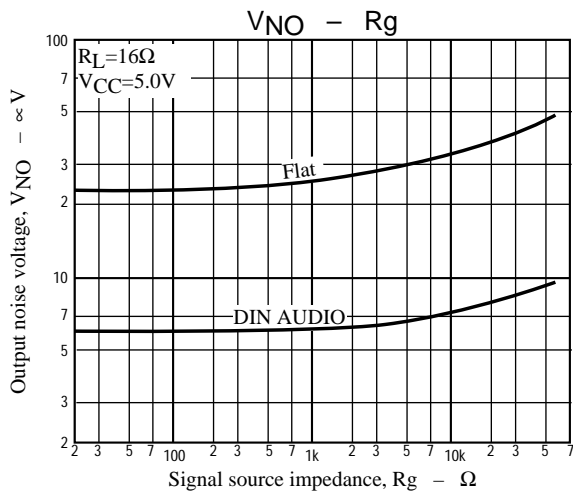
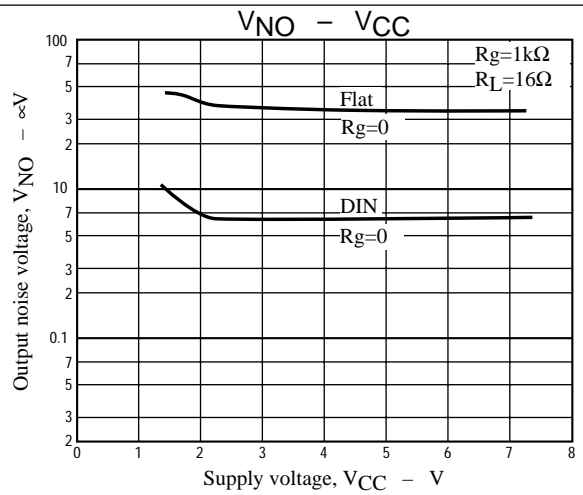
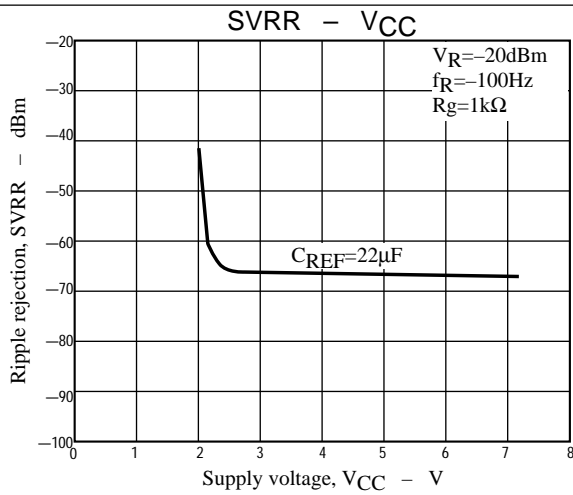
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Pin Functions ($V_{CC}=5.0V$)

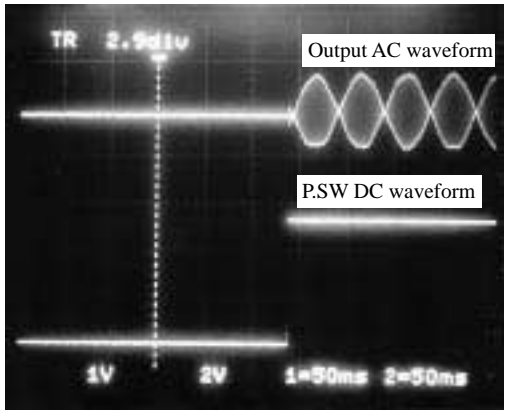
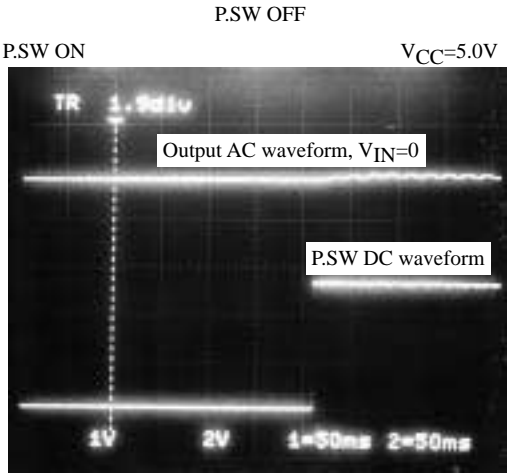
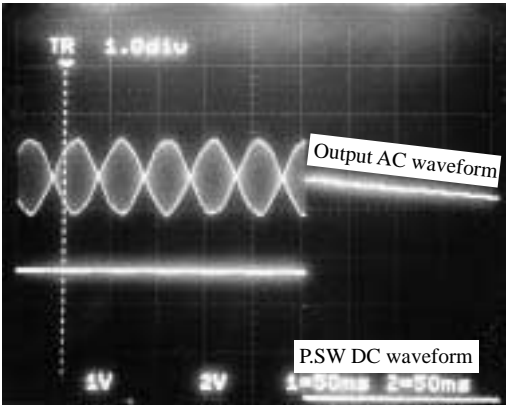
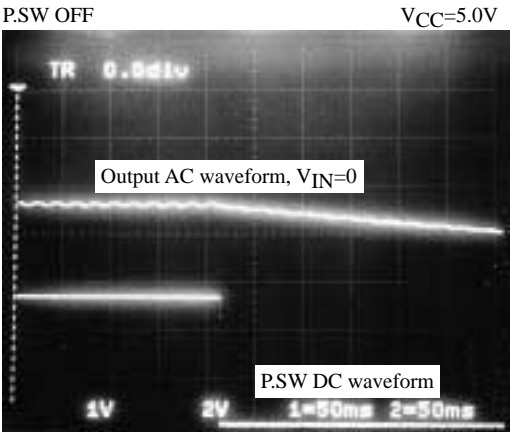
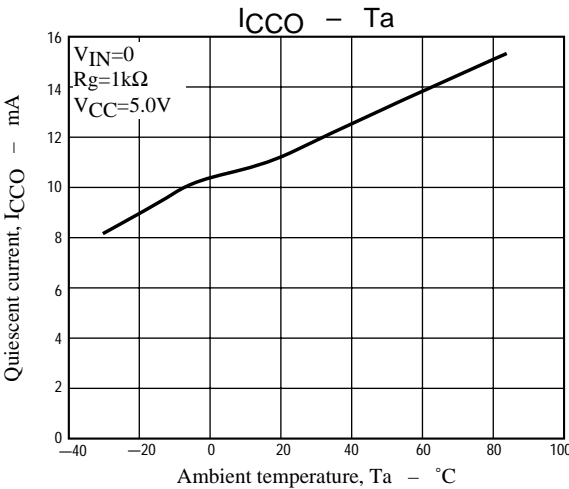
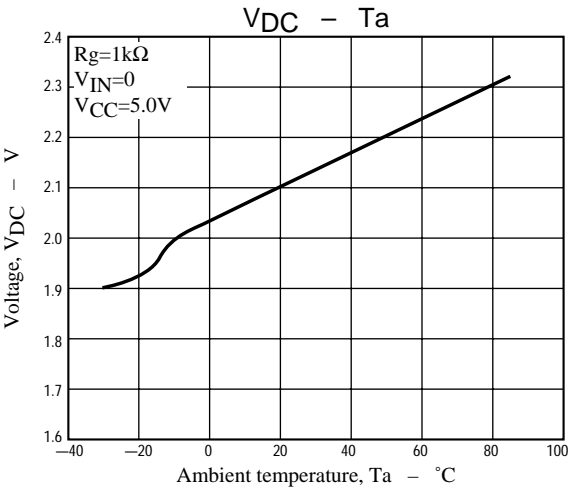
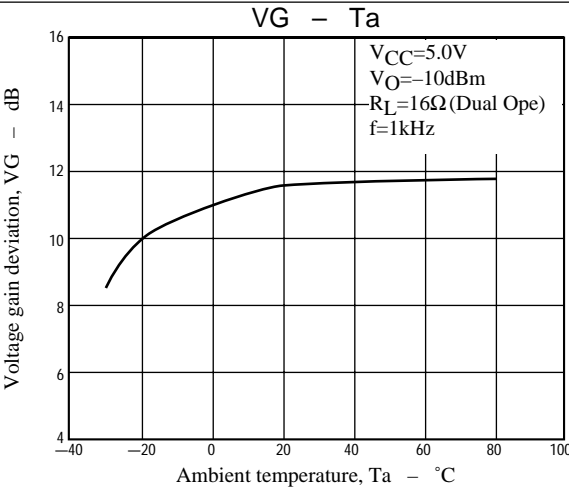
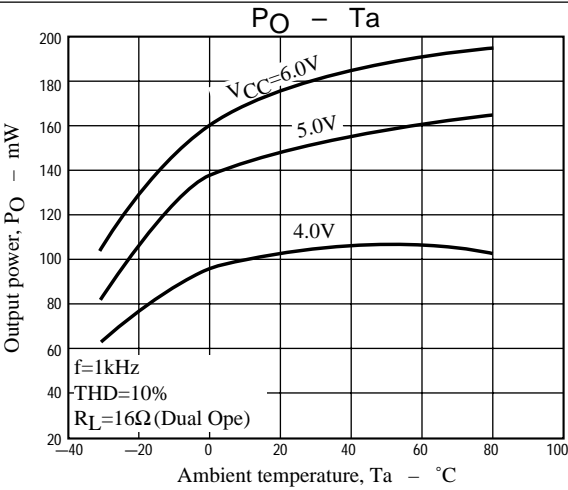
Pin No.	Symbol	Pin voltage	Equivalent circuit	Pin function
1	P/SW1			<ul style="list-style-type: none"> The system runs on when the V_{CC} is applied to this pin and turns off by connecting this pin to GND.
2 4	IN1 IN2	2.1 2.1		<ul style="list-style-type: none"> Input pin connection. Input impedance 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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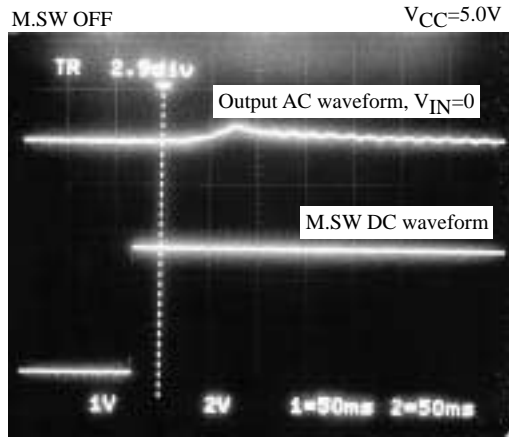


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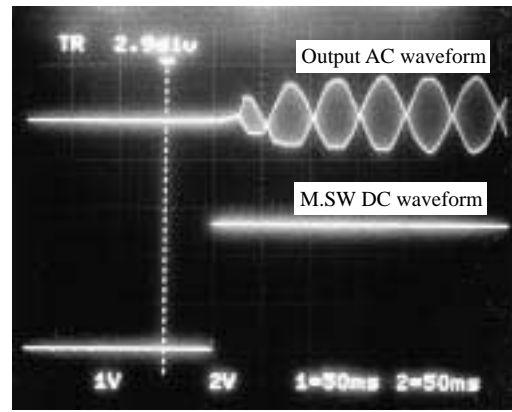


P.SW ON

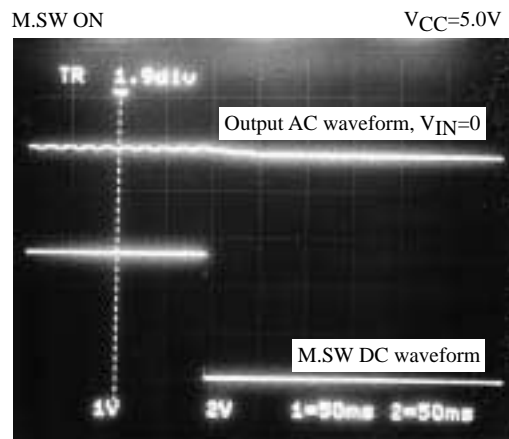
P.SW ON



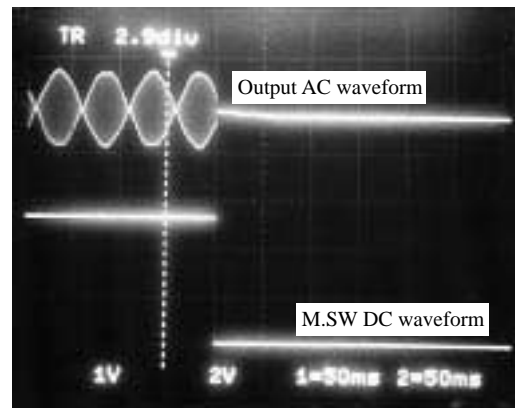
1V/div M.SW OFF



M.SW OFF



1V/div M.SW ON

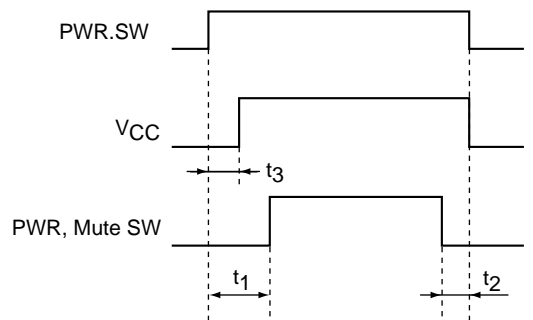


M.SW ON

Application Notes

Popping noise reduction

The switching sequence shown below can minimize the popping noise.



A11163

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 in no state.

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