

AN5835, AN5836

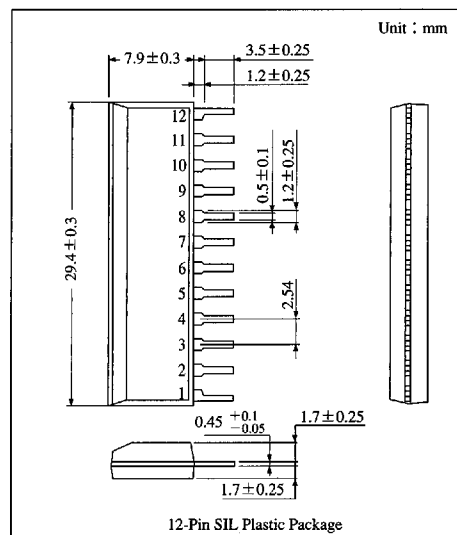
DC Volume, Tone Control IC

Overview

The AN5835 and the AN5836 are the integrated circuits designed for 2-channel volume and tone control circuits.

Features

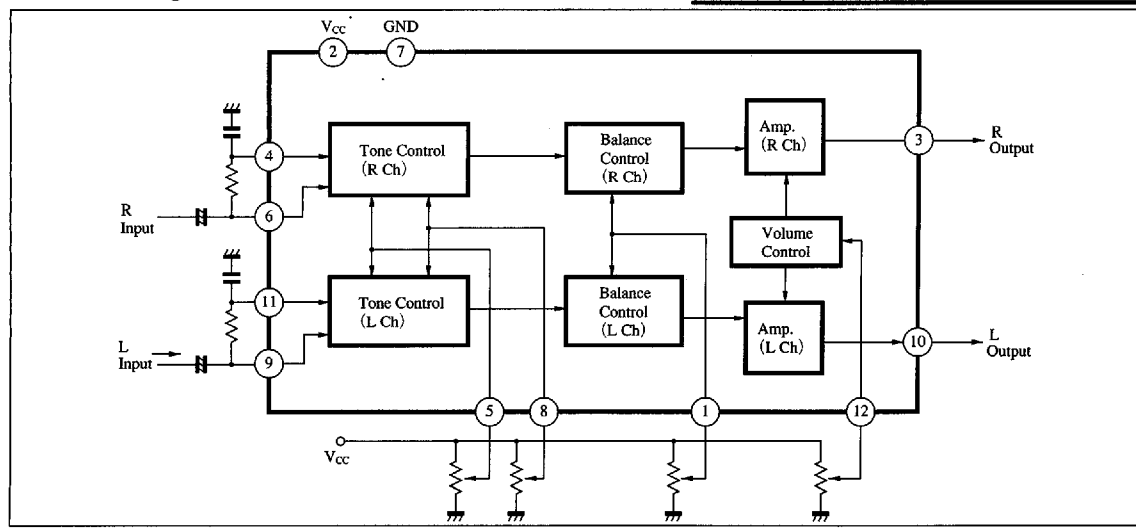
- Easier compact set design
- 2-Ch Bass and Treble control available
- Balance control circuit built-in
- DC volume control circuit (AN5836) with linear audibility.
- DC control for all functions



Pin Descriptions

Pin No.	Pin name
1	Balance control
2	V _{CC}
3	R Ch. output
4	R Ch. low freq. input
5	Bass control
6	R Ch. input
7	GND
8	Treble control
9	L Ch. input
10	L Ch. output
11	L Ch. low freq. input
12	Volume control

Block Diagram



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

Parameter		Symbol	Rating		Unit
Voltage	Supply voltage	V_{CC}	14.4		V
	Circuit voltage	$V_{1,4,5,6-7}$ $V_{8,9,11,12-7}$	0	V_{2-7}	V
Current	Supply current	I_2	60		mA
	Circuit current	I_3, I_{10}	-40	—	mA
Power dissipation ($T_a=70^{\circ}\text{C}$)		P_D	920		mW
Temperature	Operating ambient temperature	T_{opr}	-20 to +70		$^{\circ}\text{C}$
	Storage temperature	T_{stg}	-55 to +150		$^{\circ}\text{C}$

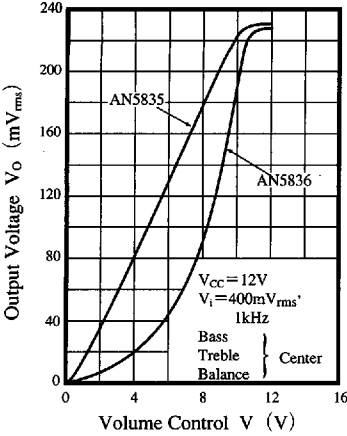
Electrical Characteristics ($V_{CC}=12, T_a=25^{\circ}\text{C}$)

Parameter		Symbol	Condition	min	typ	max	Unit
Circuit current		I_{tot}	$V_{CC}=12\text{V}$	24	38	50	mA
Circuit voltage		$V_{3, 10-7}$	$V_i=\text{No signal}, V_{12}=V_{CC}/2, V_1=V_5=V_8=V_{CC}/2$	8.0	8.4	8.8	V
Volume circuit	Max. output	$V_{omax.}$	$f=1\text{kHz}, V_i=400\text{mV}_{rms}$	190	230	270	mV_{rms}
	Channel balance *1	CB	$V_{12}=V_{CC}, V_1=V_5=V_8=V_{CC}/2$	—	+0.2	± 1.0	dB
	Volume-start voltage *2	$V_{(st)}$	$f=1\text{kHz}, V_i=400\text{mV}_{rms}$ $V_{12}=V_R, V_1=V_5=V_8=V_{CC}/2$	AN5835 0.30 AN5836 0.40	0.45 0.60	0.70 0.90	V
	Residual-tone level (Volume Min.)	$V_{min.}$	$f=1\text{kHz}, V_i=400\text{mV}_{rms}$ $V_{12}=0\text{V}, V_1=V_5=V_8=V_{CC}/2$	—	25	50	μV_{rms}
Balance control circuit	Attenuation (R-ch) *3	A_{nBR}	$f=1\text{kHz}, V_i=400\text{mV}_{rms}, V_{12}=V_{CC}, V_5=V_8=V_{CC}/2, V_{OR1}: V_1=(5.5/12) \cdot V_{CC} (VR-1), V_{OR2}: V_1=0\text{V}$	-32	-45	—	dB
	Attenuation (L-ch) *4	A_{nBL}	$f=1\text{kHz}, V_i=400\text{mV}_{rms}, V_{12}=V_{CC}, V_5=V_8=V_{CC}/2, V_{OL1}: V_1=(6.5/12) \cdot V_{CC} (VR-1), V_{OL2}: V_1=V_{CC}$	-32	-45	—	dB
Tone control circuit	Low freq. boost control characteristics	V_{40}/V_{1k}	$V_{1k}: f=1\text{kHz}, V_i=400\text{mV}_{rms}$ Output voltage at $V_{12}=V_{CC}, V_1=V_5=V_8=V_{CC}/2$ $V_{40}: f=40\text{Hz}, V_i=400\text{mV}_{rms}$ Output voltage at $V_{12}=V_{CC}, V_5=V_8=V_{CC}$	8	10	12	dB
	Low freq. cut control characteristics	V_{40}/V_{1k}	$V_{1k}: f=1\text{kHz}, V_i=400\text{mV}_{rms}$ Output voltage at $V_{12}=V_{CC}, V_1=V_5=V_8=V_{CC}/2$ $V_{40}: f=40\text{Hz}, V_i=400\text{mV}_{rms}$ Output voltage at $V_{12}=V_{CC}, V_5=V_8=0\text{V}$	-7.5	-12	-16	dB
	High freq. boost control characteristics	V_{15k}/V_{1k}	$V_{1k}: f=1\text{kHz}, V_i=400\text{mV}_{rms}$ Output voltage at $V_{12}=V_{CC}, V_1=V_5=V_8=V_{CC}/2$ $V_{15k}: f=15\text{kHz}, V_i=400\text{mV}_{rms}$ Output voltage at $V_{12}=V_{CC}, V_5=V_8=V_{CC}$	7.5	10	13	dB
	High freq. cut control characteristics	V_{15k}/V_{1k}	$V_{1k}: f=1\text{kHz}, V_i=400\text{mV}_{rms}$ Output voltage at $V_{12}=V_{CC}, V_1=V_5=V_8=V_{CC}/2$ $V_{15k}: f=15\text{kHz}, V_i=400\text{mV}_{rms}$ Output voltage at $V_{12}=V_{CC}, V_5=V_8=0\text{V}$	-7.5	-12	-18	dB
Crosstalk		CT	$f=1\text{kHz}, V_i=400\text{mV}_{rms}$ $V_{12}=V_{CC}, V_1=V_5=V_8=V_{CC}/2$	-65	-80	—	dB
Output noise voltage		V_{no}	$V_i=\text{No signal}, V_{12}=V_{CC}, V_1=V_5=V_8=V_{CC}/2$	—	80	120	μV_{rms}
Distortion rate		THD	$f=1\text{kHz}, V_i=400\text{mV}_{rms}$ $V_{12}=V_{CC}, V_1=V_5=V_8=V_{CC}/2$	—	0.2	0.5	%
Input resistance	$R_{i(6),(9)}$	$f=1\text{kHz}$		8.2	11.0	13.5	$\text{k}\Omega$
	$R_{i(4),(11)}$			11.0	16.0	22.0	$\text{k}\Omega$
Output resistance		$R_{O(3),(10)}$	$f=1\text{kHz}$	60	110	160	Ω

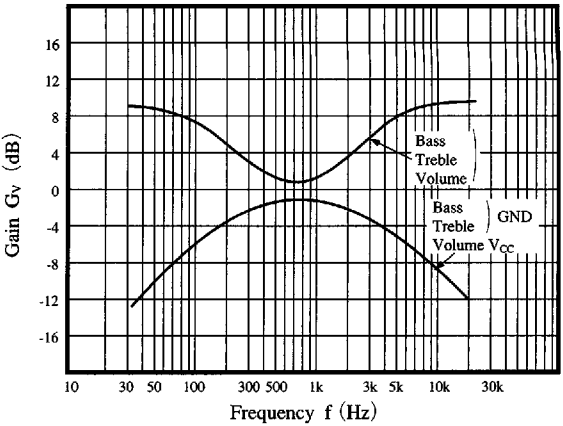
*1 Deviation between R and L-ch at max. output

*2 (AN5835 : V_{12} voltage when output voltage is 1mV_{rms}
AN5836 : V_{12} voltage when output voltage is 0.1mV_{rms} *3, 4 ($A_{nBR}: V_{OR2}/V_{OR1}$
 $A_{nBL}: V_{OL2}/V_{OL1}$ ICs for
TV

Volume Control Characteristics



Frequency Characteristics



■ Application Circuit

Note : The output voltage at $f_{in} = 1kHz, 400mV_{rms}$, (Bass, Treble control : $V_{CC}/2$) (Volume : V_{CC}) is regarded as 0dB

