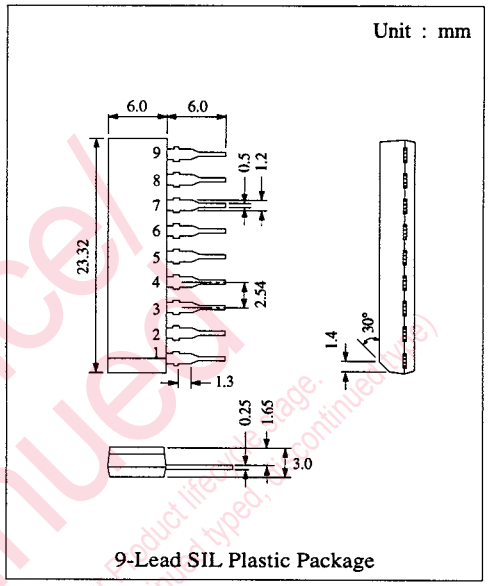
AN5733

TV Volume Control Circuit

■ Description

The AN5733 is an integrated circuit designed for TV volume control circuit.



9-Lead SIL Plastic Package

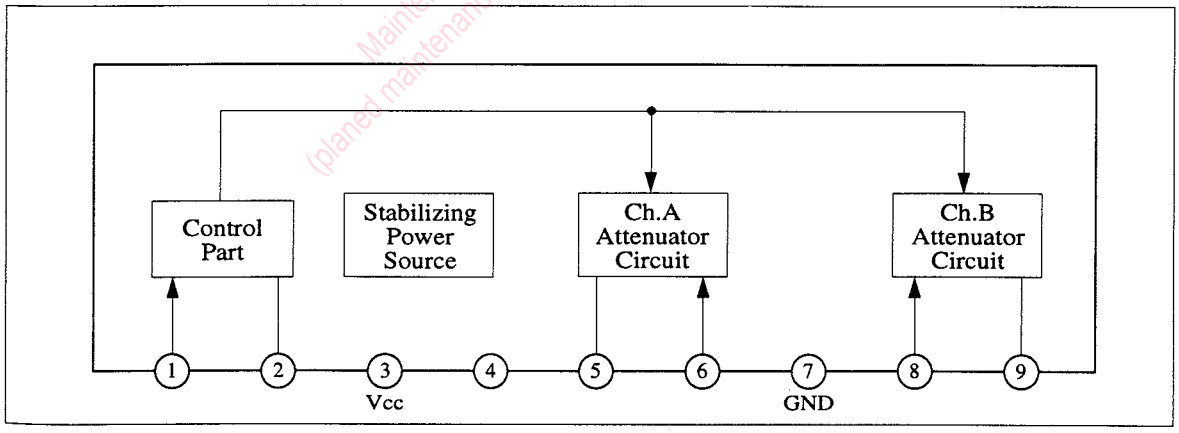
■ Features

- Dual attenuator
- 9-lead SIL plastic package

■ Pin Descriptions

Pin No.	Pin Name
1	Control Voltage Input
2	Control Reference Voltage Output
3	Power Source (Vcc)
4	Decoupling
5	Ch.A Output Signal
6	Ch.A Input Signal
7	GND
8	Ch.B Input Signal
9	Ch.B Output Signal

■ Block Diagram



■ Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Rating	Unit
Supply Voltage	V_{CC}	14.4	V
Supply Current	I_3	13.7	mA
Power Dissipation (Ta = 70°C)	P_D	197	mW
Operating Ambient Temperature	Topr	-40 ~ +150	°C
Storage Temperature	Tstg	-20 ~ +70	°C

■ Electrical Characteristics (Ta=25°C)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Supply Voltage	I_3		Table 1 (V_{CC}=12V)	9.5	11.3	13.5	mA
Terminal Voltage	V_{2-7}		Table 1 (V_{CC}=12V)	3.8	4.1	4.45	V
Terminal Voltage	V_{4-7}		Table 1 (V_{CC}=12V)	2.9	3.2	3.5	V
Terminal Voltage	$V_{6-7,\ 8-7}$		Table 1 (V_{CC}=12V)	2.0	2.4	2.8	V
Terminal Voltage	$V_{5-7,\ 9-7}$		Table 1 (V_{CC}=12V)	2.9	3.4	3.9	V
Circuit Gain (1) (VR=10kΩ)	G_V⑤-1	1	f=1kHz, V_L=500mVrms	4	6	7.6	dB
Circuit Gain (1) Ch. Relative Gain	ΔG_{-1}	1	f=1kHz, V_L=500mVrms	-1.5		1.5	dB
Circuit Gain (1) O/P Dist. Factor	THD	1	f=1kHz, V_L=500mVrms		0.2		%
Circuit Gain (2) (VR=5kΩ)	G_V⑤-2	1	f=1kHz, V_L=500mVrms	-2	0	2.2	dB
Circuit Gain (2) Ch. Relative Gain	ΔG_{-2}	1	f=1kHz, V_L=500mVrms	-2		2	dB
Circuit Gain (2) O/P Dist. Factor	THD	1	f=1kHz, V_L=500mVrms		0.2		%
Circuit Gain (3) (VR=1kΩ)	G_V⑤-3	1	f=1kHz, V_L=500mVrms	-20	-16	-12	dB
Circuit Gain (3) Ch. Relative Gain	ΔG_{-3}	1	f=1kHz, V_L=500mVrms	-2.5		2.5	dB
Maximum Attenuation (VR=0)	Att	1	f=1kHz, V_L=500mVrms	75			dB
Channel Separation	Sep	2	f=1kHz, V_L=500mVrms	70			dB
Input Impedance	R_{in}	3	f=1kHz		25		kΩ
Output Impedance	R_{out}	4	f=1kHz		1.7		kΩ
Hum Rejection	Hr		Table 1	34			dB
Noise Output Voltage	N_O	1				180	μVrms
DC Output Voltage Fluctuation	$\Delta V_{5-7,\ 9-7}$		Table 1 (V_{CC}=12V)	-0.2		0.3	V

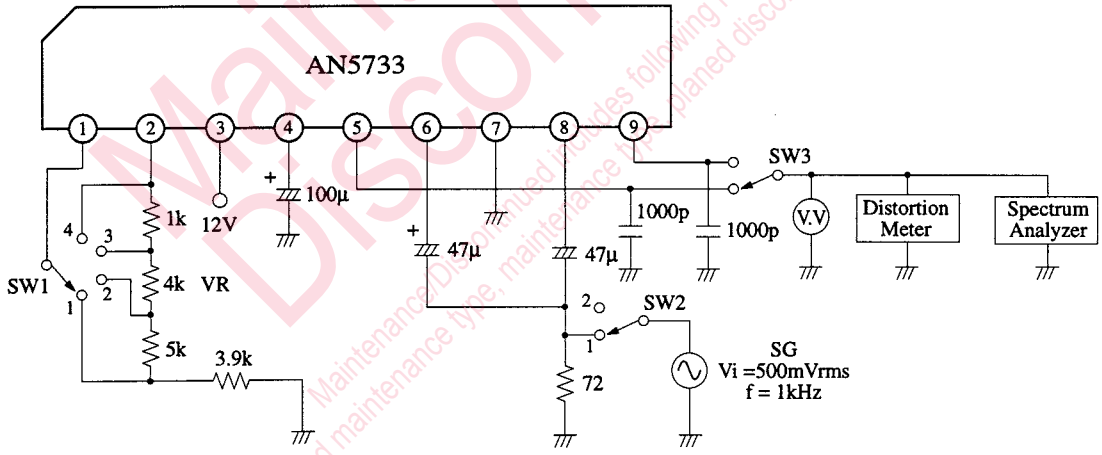
Table 1

Item	Symbol	Measuring Pin No.	Pin No. 1	2	3	4	5	6	7	8	9	Note
Supply Voltage	I_3	3	8.9kΩ 0V	5kΩ CON①	12V				0V			
Terminal Voltage	$V_{2\text{-}7}$	2	8.9kΩ 0V	5kΩ CON①	12V				0V			
Terminal Voltage	$V_{4\text{-}7}$	4	8.9kΩ 0V	5kΩ CON①	12V				0V			
Terminal Voltage	$V_{6\text{-}7}$	6	8.9kΩ 0V	5kΩ CON①	12V				0V			
Terminal Voltage	$V_{8\text{-}7}$	8	8.9kΩ 0V	5kΩ CON①	12V				0V			
Terminal Voltage	$V_{5\text{-}7}$	5	8.9kΩ 0V	5kΩ CON①	12V				0V			
Terminal Voltage	$V_{9\text{-}7}$	9	8.9kΩ 0V	5kΩ CON①	12V				0V			
Hum Rejection	Hr_5	5	8.9kΩ 0V	5kΩ CON①	14V				0V			1
Hum Rejection	ΔHr_5	5	8.9kΩ 0V	5kΩ CON①	10V				0V			1
Hum Rejection	Hr_g	9	8.9kΩ 0V	5kΩ CON①	14V				0V			2
Hum Rejection	ΔHr_g	9	8.9kΩ 0V	5kΩ CON①	10V				0V			2
DC Output Voltage	$V_{5\text{-}7,\ 9\text{-}7}$	5, 9	3.9kΩ 0V	10kΩ CON①	12V				0V			3,4
DC Output Voltage Fluctuation	$\Delta V_{5\text{-}7,\ 9\text{-}7}$	5, 9	CON②	13.9kΩ 0V	12V				0V			3,4

Obtain Hr of Pin No.5 by taking ratio of difference between changes of DC voltage of pin No. 5, i.e. Hr_5 and ΔHr_5 against change in supply voltage (4V). Similarly, obtain Hr of Pin No.9.

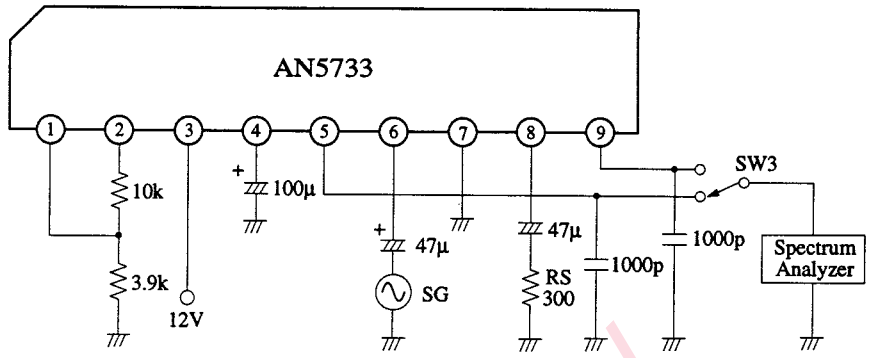
Note) 1. (18-2) - (18-1) : H_5 3. (20 upper) - (5 upper) : $V_{5\text{-}7}$
2. (18-4) - (18-3) : H_9 4. (20 below) - (5 below) : $V_{9\text{-}7}$

Test Circuit 1



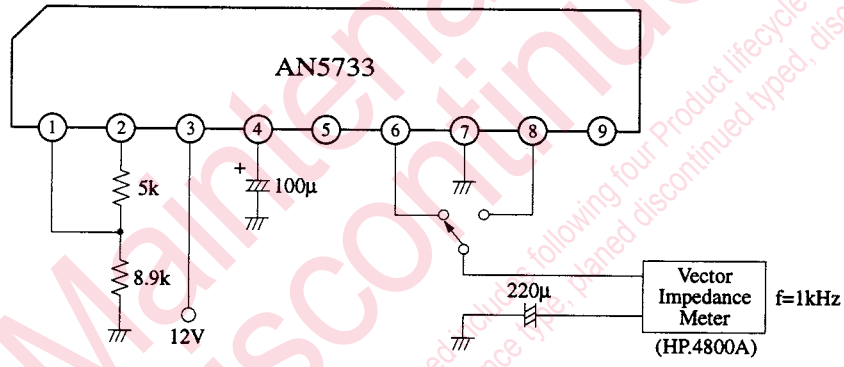
Item	Symbol	SW1	SW2
Circuit Gain (1) Ch. Relative Gain	$\Delta G_{\text{-}1}$	1	1
Circuit Gain (1) O/P Dist. Factor	THD	1	1
Circuit Gain (2) (VR=5kΩ)	$Gv_{⑤\text{-}2}$	1	1
Circuit Gain (2) Ch. Relative Gain	$\Delta G_{\text{-}2}$	2	1
Circuit Gain (2) O/P Dist. Factor	THD	2	1
Circuit Gain (3) (VR=1kΩ)	$Gv_{⑤\text{-}3}$	2	1
Circuit Gain (3) Ch. Relative Gain	$\Delta G_{\text{-}3}$	3	1
Maximum Attenuation (VR=0)	Att	3	1
Channel Separation	Sep	4	1
Input Impedance	R_{in}	2	2

Test Circuit 2

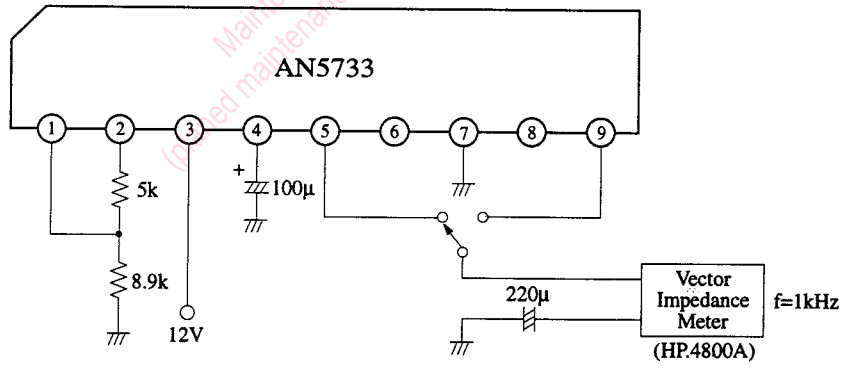


Note) Read level difference between Pin No.5 and Pin No.9 on the Spectrum Analyzer.
Read level difference of Pin No.5 and Pin No.9, similarly after changing SG and RS.

Test Circuit 3



Test Circuit 4



Request for your special attention and precautions in using the technical information and semiconductors described in this book

(1) If any of the products or technical information described in this book is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially, those with regard to security export control, must be observed.

(2) The technical information described in this book is intended only to show the main characteristics and application circuit examples of the products. No license is granted in and to any intellectual property right or other right owned by Panasonic Corporation or any other company. Therefore, no responsibility is assumed by our company as to the infringement upon any such right owned by any other company which may arise as a result of the use of technical information described in this book.

(3) The products described in this book are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
- Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
- Any applications other than the standard applications intended.

(4) The products and product specifications described in this book are subject to change without notice for modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.

(5) When designing your equipment, comply with the range of absolute maximum rating and the guaranteed operating conditions (operating power supply voltage and operating environment etc.). Especially, please be careful not to exceed the range of absolute maximum rating on the transient state, such as power-on, power-off and mode-switching. Otherwise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.

(6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.

20080805