

**DC VOLUME, TONE CONTROL CIRCUIT**

The KA2107 is a monolithic integrated circuit designed for 2 channel volume and tone control.

12- SIP

**FUNCTIONS**

- DC Volume Control
- DC Tone Control (Bass & Treble)
- Balance Control (R, L-Ch)



**FEATURES**

- Easier compact set design
- All function enable DC controllable

**BLOCK DIAGRAM**

**ORDERING INFORMATION**

Device	Package	Operating Temperature
KA2107	12-SIP	-20°C~+70°C

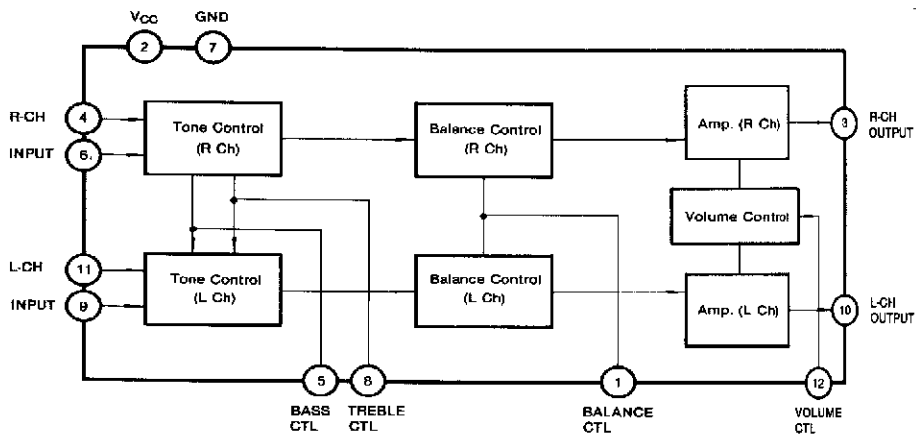


Fig. 1

**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> =25°C)**

Characteristic		Symbol	Value	Unit
Voltage	Supply Voltage	V <sub>CC</sub>	14.4	V
	Circuit Voltage	V <sub>1,4,5,6,7</sub> V <sub>8,9,11,12,7</sub>	0      V <sub>2,7</sub>	V
Current	Supply Current	I <sub>2</sub>	64	mA
	Circuit Current	I <sub>3,10</sub>	-40      —	mA
Power Dissipation		P <sub>D</sub>	920	mW
Temperature	Operating Temperature	T <sub>OPR</sub>	-20~+70	°C
	Storage Temperature	T <sub>STG</sub>	-55~+150	°C

**ELECTRICAL CHARACTERISTICS (V<sub>CC</sub>=12V, T<sub>A</sub>=25°C)**

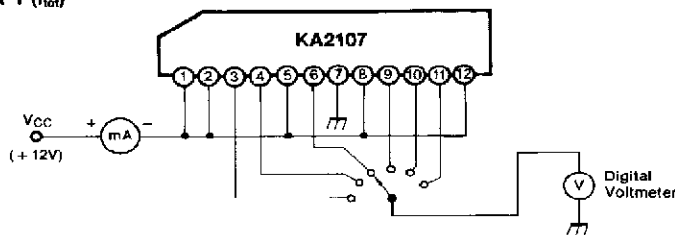
Characteristic		Symbol	Condition	Min	Typ	Max	Unit	Test Circuit
Supply Current		I <sub>CC</sub>	V <sub>CC</sub> =12V	24	38	50	mA	1
Supply Voltage		V <sub>3,10,7</sub>	No input, V <sub>12</sub> =V <sub>CC</sub> , V <sub>1</sub> =V <sub>5</sub> =V <sub>8</sub> =V <sub>CC</sub> /2	8.0	8.4	8.8	V	2
Volume	Max Output Voltage	V <sub>OH/V<sub>OL</sub></sub>	f=1KHz, V <sub>i</sub> =400mV <sub>rms</sub>	190	230	270	μV <sub>rms</sub>	2
	Channel Balance	CB	V <sub>12</sub> =V <sub>CC</sub> , V <sub>1</sub> =V <sub>5</sub> =V <sub>8</sub> =V <sub>CC</sub> /2		+0.2	±1.0	dB	2
	Output Starting Voltage	V <sub>ISO1</sub>	f=1KHz, V <sub>i</sub> =400mV <sub>rms</sub> V <sub>12</sub> =V <sub>R</sub> , V <sub>1</sub> =V <sub>5</sub> =V <sub>8</sub> =V <sub>CC</sub> /2	0.40	0.85	0.90	V	2
	Residual Noise Level	V <sub>RM</sub>	f=1KHz, V <sub>i</sub> =400mV <sub>rms</sub> V <sub>12</sub> =0V, V <sub>1</sub> =V <sub>5</sub> =V <sub>8</sub> =V <sub>CC</sub> /2	—	25	50	μV <sub>rms</sub>	2
Balance	Attenuation (R-Ch)	ATT <sub>R</sub>	f=1KHz, V <sub>i</sub> =400mV <sub>rms</sub> , V <sub>12</sub> =V <sub>CC</sub> , V <sub>5</sub> =V <sub>8</sub> =V <sub>CC</sub> /2, V <sub>3,10</sub> :V <sub>1</sub> =(5.5/12) · V <sub>CC</sub> (at V <sub>R</sub> · 1), V <sub>OR2</sub> :V <sub>1</sub> =0V	-32	-45	—	dB	2
	Attenuation (L-Ch)	ATT <sub>L</sub>	f=1KHz, V <sub>i</sub> =400mV <sub>rms</sub> , V <sub>12</sub> =V <sub>CC</sub> , V <sub>5</sub> =V <sub>8</sub> =V <sub>CC</sub> /2, V <sub>3,10</sub> :V <sub>1</sub> :(5.5/12) · V <sub>CC</sub> (at V <sub>R</sub> · 1), V <sub>OR2</sub> :V <sub>1</sub> =V <sub>CC</sub>	-32	-45	—	dB	2
Tone	Low Frequency Boost Control	V <sub>40</sub> /V <sub>1K</sub>	V <sub>1K</sub> : Output Voltage at f=1KHz, V <sub>i</sub> =400mV <sub>rms</sub> V <sub>12</sub> =V <sub>CC</sub> , V <sub>1</sub> =V <sub>5</sub> =V <sub>8</sub> =V <sub>CC</sub> /2 V <sub>40</sub> : Output Voltage at f=40Hz, V <sub>i</sub> =40mV <sub>rms</sub> V <sub>12</sub> =V <sub>CC</sub> , V <sub>5</sub> =V <sub>8</sub> =V <sub>CC</sub>	8	10	12	dB	2
	Low Frequency Cut Control	V <sub>40</sub> /V <sub>1K</sub>	V <sub>1K</sub> : Output Voltage at f=1KHz, V <sub>i</sub> =400mV <sub>rms</sub> V <sub>12</sub> =V <sub>CC</sub> , V <sub>1</sub> =V <sub>5</sub> =V <sub>8</sub> =V <sub>CC</sub> /2 V <sub>40</sub> : Output Voltage at f=40Hz, V <sub>i</sub> =40mV <sub>rms</sub> V <sub>12</sub> =V <sub>CC</sub> , V <sub>5</sub> =V <sub>8</sub> =0V	-7.5	-12	-16	dB	2
	High Frequency Boost Control	V <sub>15K</sub> /V <sub>1K</sub>	V <sub>1K</sub> : Output Voltage at f=1KHz, V <sub>i</sub> =400mV <sub>rms</sub> V <sub>12</sub> =V <sub>CC</sub> , V <sub>1</sub> =V <sub>5</sub> =V <sub>8</sub> =V <sub>CC</sub> /2 V <sub>15K</sub> : Output Voltage at f=15KHz, V <sub>i</sub> =40mV <sub>rms</sub> V <sub>12</sub> =V <sub>CC</sub> , V <sub>5</sub> =V <sub>8</sub> =V <sub>CC</sub>	7.5	10	13	dB	2
	High Frequency Cut Control	V <sub>15K</sub> /V <sub>1K</sub>	V <sub>1K</sub> : Output Voltage at f=1KHz, V <sub>i</sub> =400mV <sub>rms</sub> V <sub>12</sub> =V <sub>CC</sub> , V <sub>1</sub> =V <sub>5</sub> =V <sub>8</sub> =V <sub>CC</sub> /2 V <sub>15K</sub> : Output Voltage at f=40Hz, V <sub>i</sub> =40mV <sub>rms</sub> V <sub>12</sub> =V <sub>CC</sub> , V <sub>5</sub> =V <sub>8</sub> =0V	-7.5	-12	-18	dB	2

**ELECTRICAL CHARACTERISTICS** (Continued)

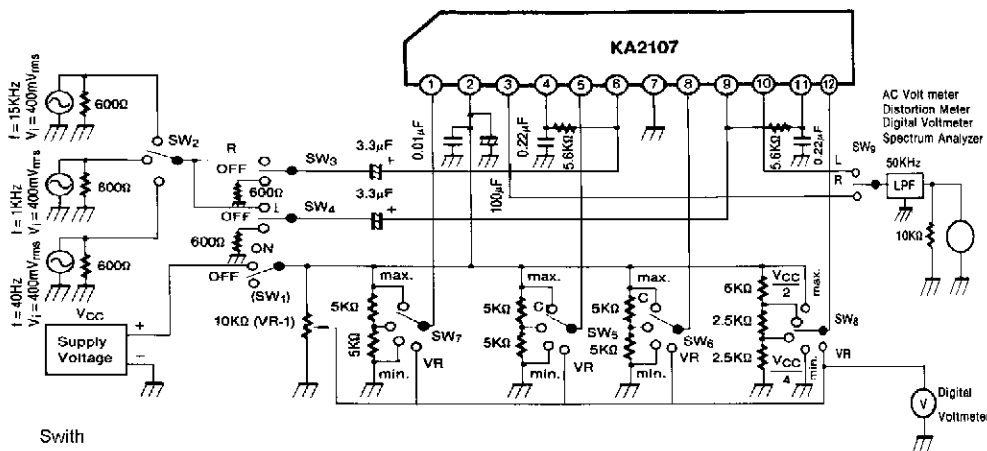
Characteristic	Symbol	Condition	Min	Typ	Max	Unit	Test Circuit
Cross Talk	CT	$f = 1\text{KHz}, V_i = 400\text{mV}_{\text{RMS}}$ $V_{1,2} = V_{CC}, V_1 = V_5 = V_8 = V_{CC}/2$	-65	-80		dB	2
Output Noise Voltage	$V_{\text{NO}}$	No input, $V_{1,2} = V_{CC}, V_1 = V_5 = V_8 = V_{CC}/2$		80	120	$\mu\text{V}_{\text{RMS}}$	2
Total Harmonic Distortion	THD	$f = 1\text{KHz}, V_i = 400\text{mV}_{\text{RMS}}$ $V_{1,2} = V_{CC}, V_1 = V_5 = V_8 = V_{CC}/2$	—	0.2	0.5	%	2
Input Resistance	$R_{i(6),(9)}$	$f = 1\text{KHz}$	8.2	11.0	13.5	$\Omega$	
	$R_{i(4),(11)}$		11.0	16.0	22.0	$\Omega$	
Output Resistance	$R_{O(3),(10)}$	$f = 1\text{KHz}$	60	110	160	$\Omega$	

**TEST CIRCUIT**

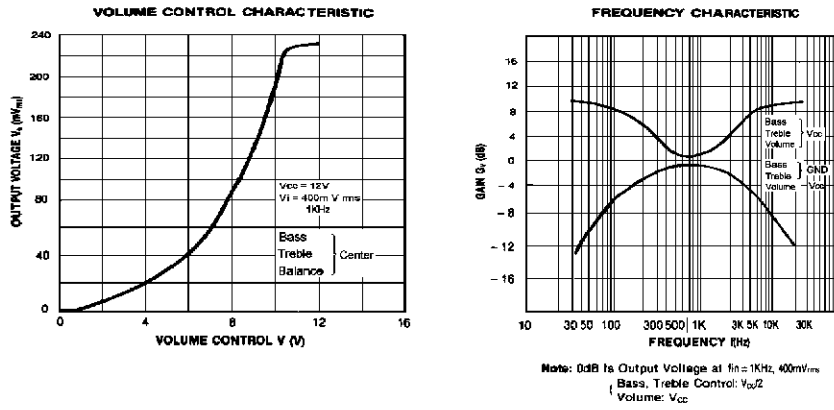
**Test Circuit 1 ( $I_{\text{tot}}$ )**



**Test Circuit 2 ( $V_3, 10-7, V_{\text{OMAX}}, \text{CB}, V_{\text{ST}}, V_{\text{MIN}}, \text{ATT}_R, \text{ATT}_L, V_{40}/V_{1K}, V_{15K}/V_{1K}, \text{CT}, V_{\text{NO}}, \text{THD}$ )**



- Switch  
 (SW<sub>1</sub>) ... Supply Voltage (SW<sub>6</sub>) ... Treble Control  
 (SW<sub>2</sub>) ... Input Signal (SW<sub>7</sub>) ... Treble Control  
 (SW<sub>3</sub>) ... R Side Input (SW<sub>8</sub>) ... Treble Control  
 (SW<sub>4</sub>) ... L Side Input (SW<sub>9</sub>) ... Treble Control  
 (SW<sub>5</sub>) ... Bass Control



TYPICAL APPLICATION CIRCUIT

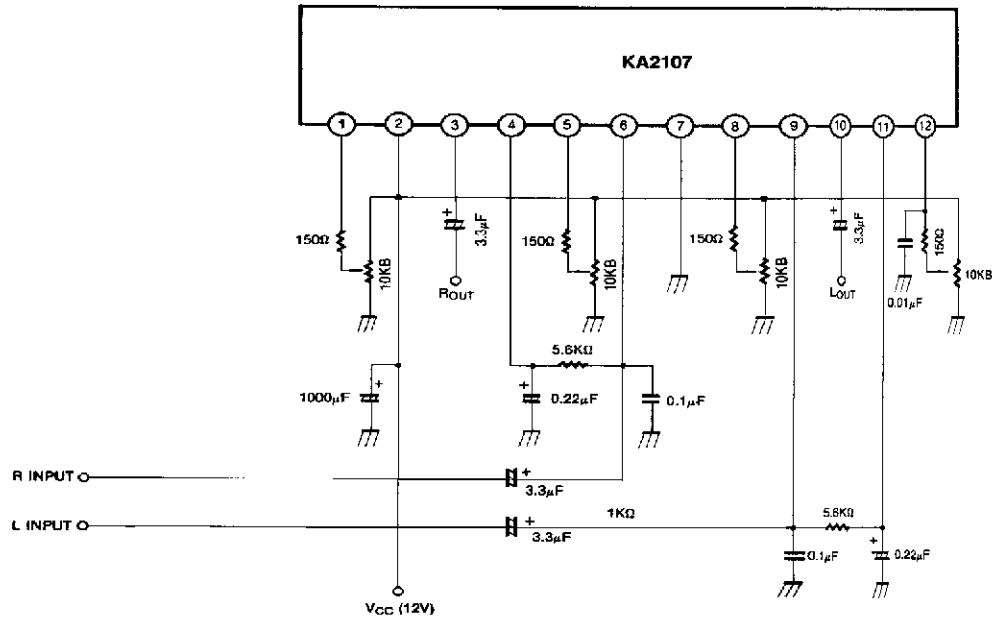


Fig.3

Dimensions in Millimeters

