

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 |

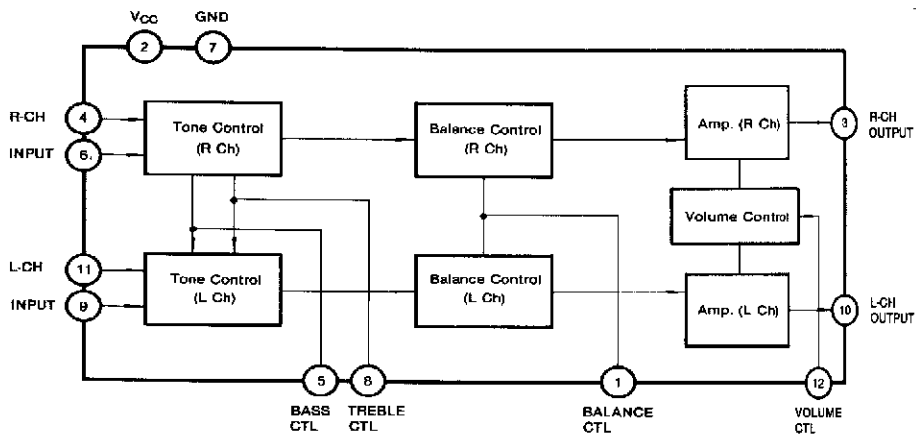


Fig. 1

ABSOLUTE MAXIMUM RATINGS (T_A =25°C)

| Characteristic | | Symbol | Value | 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 | 64 | mA |
| | Circuit Current | I _{3,10} | -40 — | mA |
| Power Dissipation | | P _D | 920 | mW |
| Temperature | Operating Temperature | T _{OPR} | -20~+70 | °C |
| | Storage Temperature | T _{STG} | -55~+150 | °C |

ELECTRICAL CHARACTERISTICS (V_{CC}=12V, T_A =25°C)

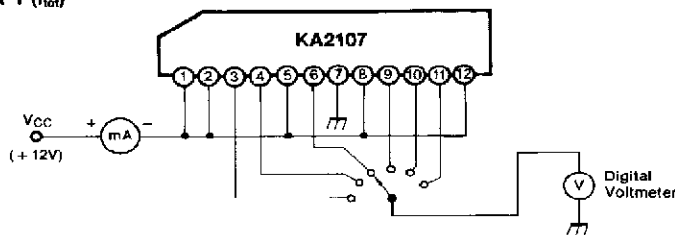
| Characteristic | | Symbol | Condition | Min | Typ | Max | Unit | Test Circuit |
|----------------|------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------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

ELECTRICAL CHARACTERISTICS (Continued)

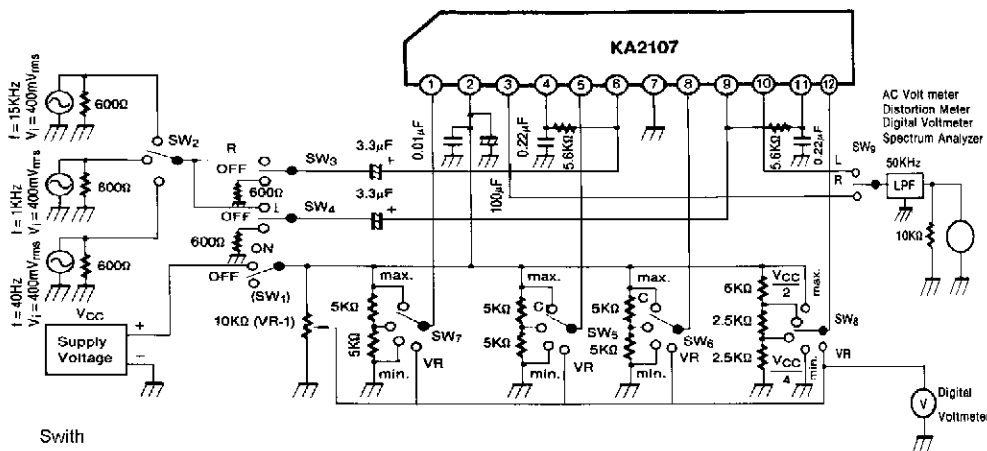
| Characteristic | Symbol | Condition | Min | Typ | Max | Unit | Test Circuit |
|---------------------------|-----------------|------------------------------------------------------------------------------------------------------------|------|------|------|----------------------------|--------------|
| 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_{NO} | No input, $V_{1,2} = V_{CC}$, $V_1 = V_5 = V_8 = V_{CC}/2$ | | 80 | 120 | μV_{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 | Ω | |
| | $R_{i(4),(11)}$ | | 11.0 | 16.0 | 22.0 | Ω | |
| Output Resistance | $R_{O(3),(10)}$ | $f = 1\text{KHz}$ | 60 | 110 | 160 | Ω | |

TEST CIRCUIT

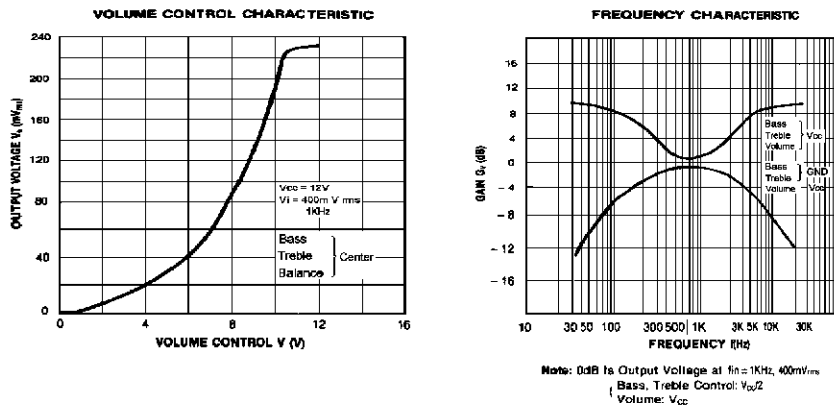
Test Circuit 1 (I_{tot})



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
- (SW₁) ... Supply Voltage
 - (SW₂) ... Input Signal
 - (SW₃) ... R Side Input
 - (SW₄) ... L Side Input
 - (SW₅) ... Bass Control
 - (SW₆) ... Treble Control
 - (SW₇) ... Treble Control
 - (SW₈) ... Treble Control
 - (SW₉) ... Treble Control



TYPICAL APPLICATION CIRCUIT

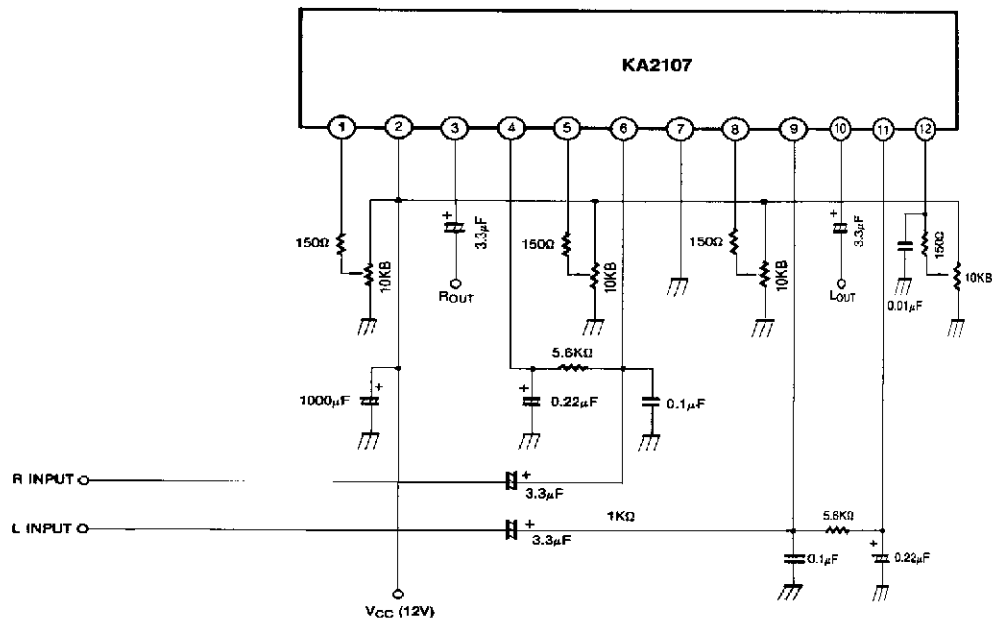


Fig.3

Dimensions in Millimeters

