

5-channel stereo graphic equalizer

BA3822LS / BA3822FS / BA3823LS / BA3824LS

The BA3822LS, BA3822FS, BA3823LS, and BA3824LS are monolithic, five-point stereo graphic equalizer ICs. Each IC has two channels, and the five center frequencies for each channel are independently set using external capacitors. These ICs feature a wide operating power supply voltage range ($V_{CC} = 3.5V$ to $14V$), and are available in compact 24-pin SZIP and SSOP packages, depending on the type. This makes them an ideal choice for home stereo systems, radio cassette players, and car stereos.

The difference between the ICs is the amount of boost and cut control. Choose according to the requirements of your application.

● Applications

Five-point stereo graphic equalizer for home and car stereo systems.

● Features

- 1) Allows construction of a five-point stereo graphic equalizer with a single IC.
- 2) Wide operating power supply voltage range ($V_{CC} = 3.5V$ to $14V$).
- 3) Low current dissipation ($I_Q = 7mA$).
- 4) Available in compact SZIP/SSOP-A24 packages.

● Absolute maximum ratings ($T_a = 25^\circ C$)

| Parameter | Symbol | Limits | Unit |
|-----------------------|-----------|-----------------------------|------------|
| Applied voltage | V_{CC} | 16 | V |
| Power dissipation | P_d | 500*1 (SZIP) , 800*2 (SSOP) | mW |
| Operating temperature | T_{opr} | $-25 \sim +75$ | $^\circ C$ |
| Storage temperature | T_{stg} | $-55 \sim +125$ | $^\circ C$ |

*1 Reduced by 5mW for each increase in T_a of $1^\circ C$ over $25^\circ C$.

*2 Reduced by 8mW for each increase in T_a of $1^\circ C$ over $25^\circ C$.

● Recommended operating conditions ($T_a = 25^\circ C$)

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|----------------------|----------|------|------|------|------|
| Power supply voltage | V_{CC} | 3.5 | 8 | 14 | V |

Audio ICs

BA3822LS / BA3822FS / BA3823LS / BA3824LS

●Electrical characteristics

BA3822LS and BA3822FS

(unless otherwise noted, $T_a = 25^\circ\text{C}$, $V_{CC} = 8\text{V}$, $V_{IN} = 100\text{mV}_{\text{rms}}$ (1kHz), $R_L = 20\text{k}\Omega$, and $F = \text{FLAT}$)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---------------------------|------------|---------|----------|----------|----------------------------|----------------------------|
| Circuit current | I_{CC} | 4.5 | 7 | 9.5 | mA | No input |
| Maximum input voltage | V_{INm} | 0.4 | 0.6 | — | V_{rms} | THD=1% |
| Total harmonic distortion | THD | — | 0.1 | 0.3 | % | |
| Output noise voltage | V_{ND} | — | 10 | 20 | μV_{rms} | $R_{IN}=2.2\text{k}\Omega$ |
| Input / output gain | G_V | -3 | -1.5 | 0 | dB | |
| Control range | CR | ± 9 | ± 11 | ± 14 | dB | |
| Stereo crosstalk | CT_{L-R} | 60 | 70 | — | dB | Between channels |
| Stereo balance | CB_{L-R} | -2 | 0 | 2 | dB | Between channels |

BA3823LS

(unless otherwise noted, $T_a = 25^\circ\text{C}$, $V_{CC} = 8\text{V}$, $V_{IN} = 100\text{mV}_{\text{rms}}$ (1kHz), $R_L = 20\text{k}\Omega$, and $F = \text{FLAT}$)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---------------------------|----------|---------|----------|----------|----------------------------|---|
| Circuit current | I_{CC} | 4.3 | 6.7 | 9.2 | mA | No input |
| Maximum input voltage | V_{Om} | 0.5 | 0.6 | — | V_{rms} | THD=1% |
| Total harmonic distortion | THD | — | 0.01 | 0.3 | % | |
| Output noise voltage | V_{ND} | — | 3 | 20 | μV_{rms} | $R_{IN}=2.2\text{k}\Omega$, DIN AUDIO |
| Input / output gain | G_V | -1.0 | 0.5 | 1.5 | dB | |
| Control range | CR | ± 7 | ± 10 | ± 13 | dB | |
| Crosstalk | CT | 60 | 73 | — | dB | Between channels |
| Channel balance | CB | -1.5 | 0 | 1.5 | dB | Between channels |
| Ripple rejection ratio | RR | 35 | 50 | — | dB | $f=100\text{Hz}$, $V_{IN}=-20\text{dBm}$ |

BA3824LS

(unless otherwise noted, $T_a = 25^\circ\text{C}$, $V_{CC} = 8\text{V}$, $V_{IN} = 100\text{mV}_{\text{rms}}$ (1kHz), $R_L = 20\text{k}\Omega$, and $F = \text{FLAT}$)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---------------------------|------------|---------|-----------|----------|----------------------------|----------------------------|
| Circuit current | I_{CC} | 4.5 | 7 | 9.5 | mA | No input |
| Maximum input voltage | V_{INm} | 0.4 | 0.6 | — | V_{rms} | THD=1% |
| Total harmonic distortion | THD | — | 0.1 | 0.3 | % | |
| Output noise voltage | V_{ND} | — | 10 | 20 | μV_{rms} | $R_{IN}=2.2\text{k}\Omega$ |
| Input / output gain | G_V | -3 | -1.5 | 0 | dB | |
| Control range | CR | ± 6 | ± 8.5 | ± 11 | dB | |
| Stereo crosstalk | CT_{L-R} | 60 | 70 | — | dB | Between channels |
| Stereo balance | CB_{L-R} | -2 | 0 | 2 | dB | Between channels |

● Differences between the BA3822LS, BA3822FS, BA3823LS and BA3824LS

● Control range gain

| | Control range | | | Unit |
|-------------------|---------------|------|------|------|
| | Min. | Typ. | Max. | |
| BA3822LS/BA3822FS | ±9 | ±11 | ±14 | dB |
| BA3823LS | ±7 | ±10 | ±13 | dB |
| BA3824LS | ±6 | ±8.5 | ±11 | dB |

● External components

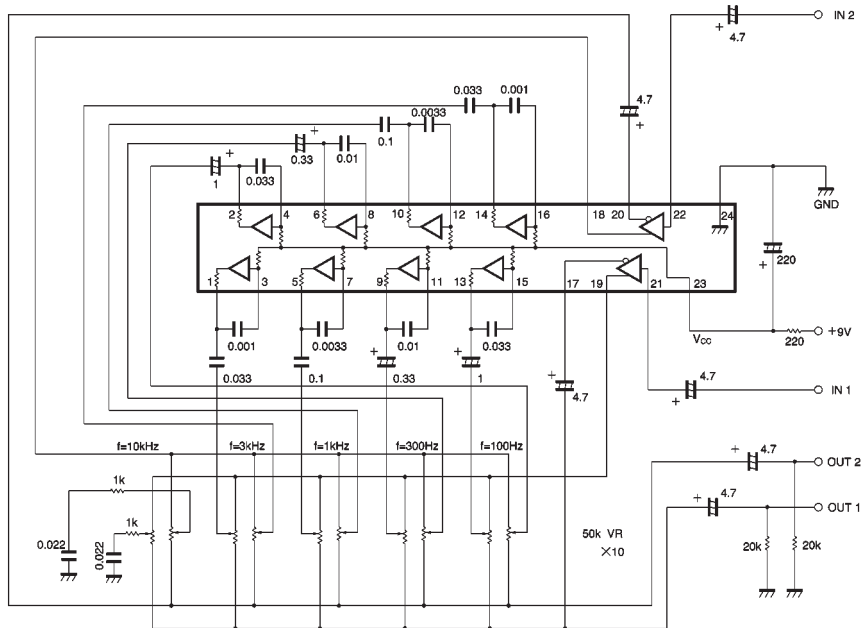
As the ICs have different control range gain, the external component values are different for the same center frequencies.

● Ripple rejection

The BA3823LS circuit design has excellent ripple rejection, and the external ripple filter can be omitted.

● Application examples

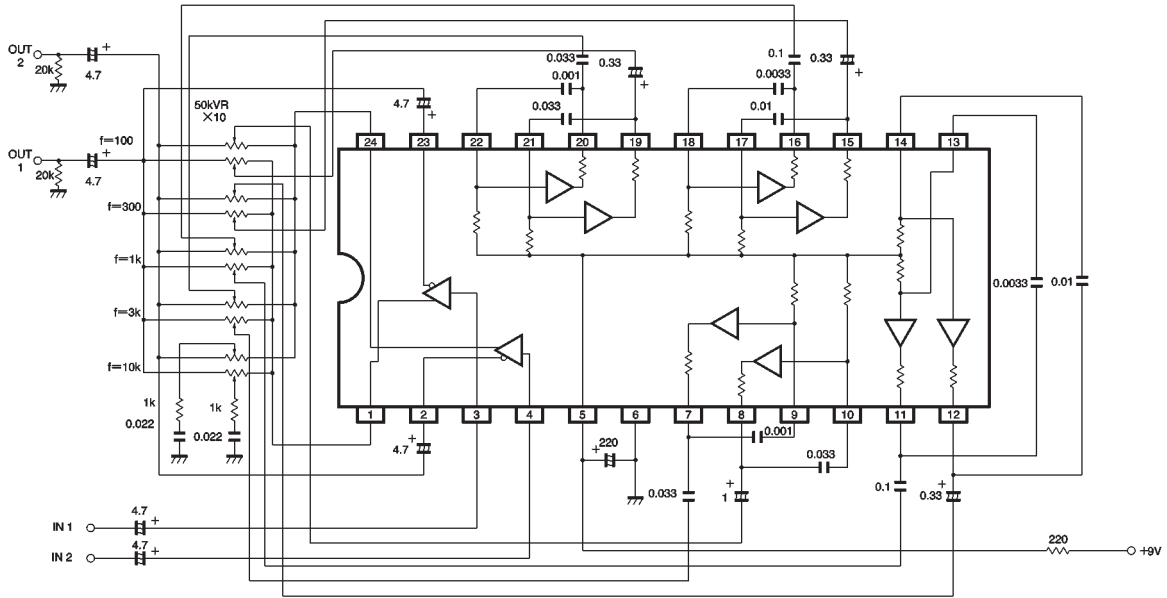
BA3822LS



Units:
 Resistance (carbon) : Ω (±5%)
 Capacitance (film) : μF (±10%)
 Capacitance (electrolytic) : μF (±20%)
 Capacitance (ceramic) : pF (±10%)(680pF)
 Potentiometer (carbon) : 50kΩ, B-type (±10%)

Fig.1

BA3822FS



Units:
 Resistance (carbon) : Ω ($\pm 5\%$)
 Capacitance (film) : μF ($\pm 10\%$)
 Capacitance (electrolytic) : μF ($\pm 20\%$)
 Potentiometer (carbon) : $50k\Omega$, B-type ($\pm 10\%$)

Fig.4

● External dimensions (Units: mm)

