

**LA4743B****45 W Four-Channel (Bridge Circuit) Power Amplifier****Overview**

The LA4743B is a 45 W 4-channel power amplifier IC for car stereo systems. It features a built-in bridge circuit and the ability to radically reduce the number of external components required. It is also pin compatible with the LA4743A, which differs in the amount of gain provided.

Features

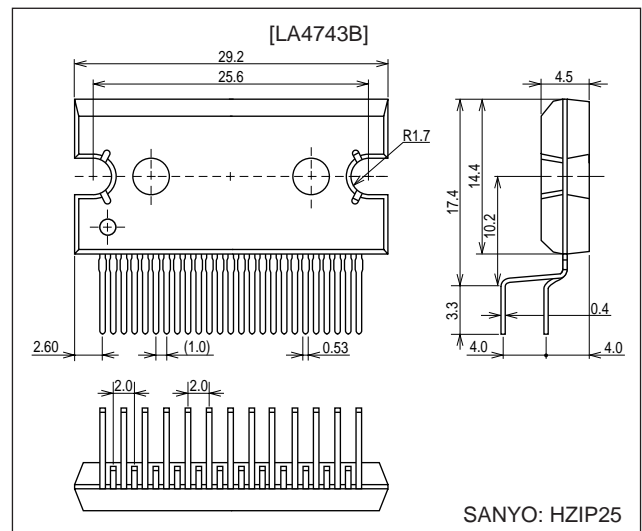
- Maximum output power: 45 W × 4 channels ($V_{CC} = 14.4$ V, 4 Ω load, 1 kHz)
- 40 W × 4 channels ($V_{CC} = 13.7$ V, 4 Ω load, 1 kHz)
- Requires only seven external components and does not require an oscillation prevention RC circuit, a noise filter, or a BS capacitor.

Functions

- Muting function
- Built-in standby switch
- Full complement of built-in protection circuits, including protection from shorting to V_{CC} , shorting to ground, load shorting, overvoltages, and overheating.

Package Dimensions

unit: mm

3236-HZIP25**Specifications****Maximum Ratings at $T_a = 25^\circ\text{C}$**

| Parameter | Symbol | Conditions | Ratings | Unit |
|-----------------------------|---------------|-------------------------------------|-------------|--------------------|
| Maximum supply voltage | V_{CC} max1 | Signal present | 18 | V |
| | V_{CC} max2 | No signal (for 1 minute) | 26 | V |
| Maximum output current | I_{Opeak} | | 4.5/ch | A |
| Allowable power dissipation | P_d max | With an arbitrarily large heat sink | 50 | W |
| Operating temperature | T_{opr} | | -40 to +85 | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | | -40 to +150 | $^\circ\text{C}$ |
| Package thermal resistance | θ_{jc} | | 1 | $^\circ\text{C/W}$ |

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Operating Conditions at $T_a = 25^\circ\text{C}$

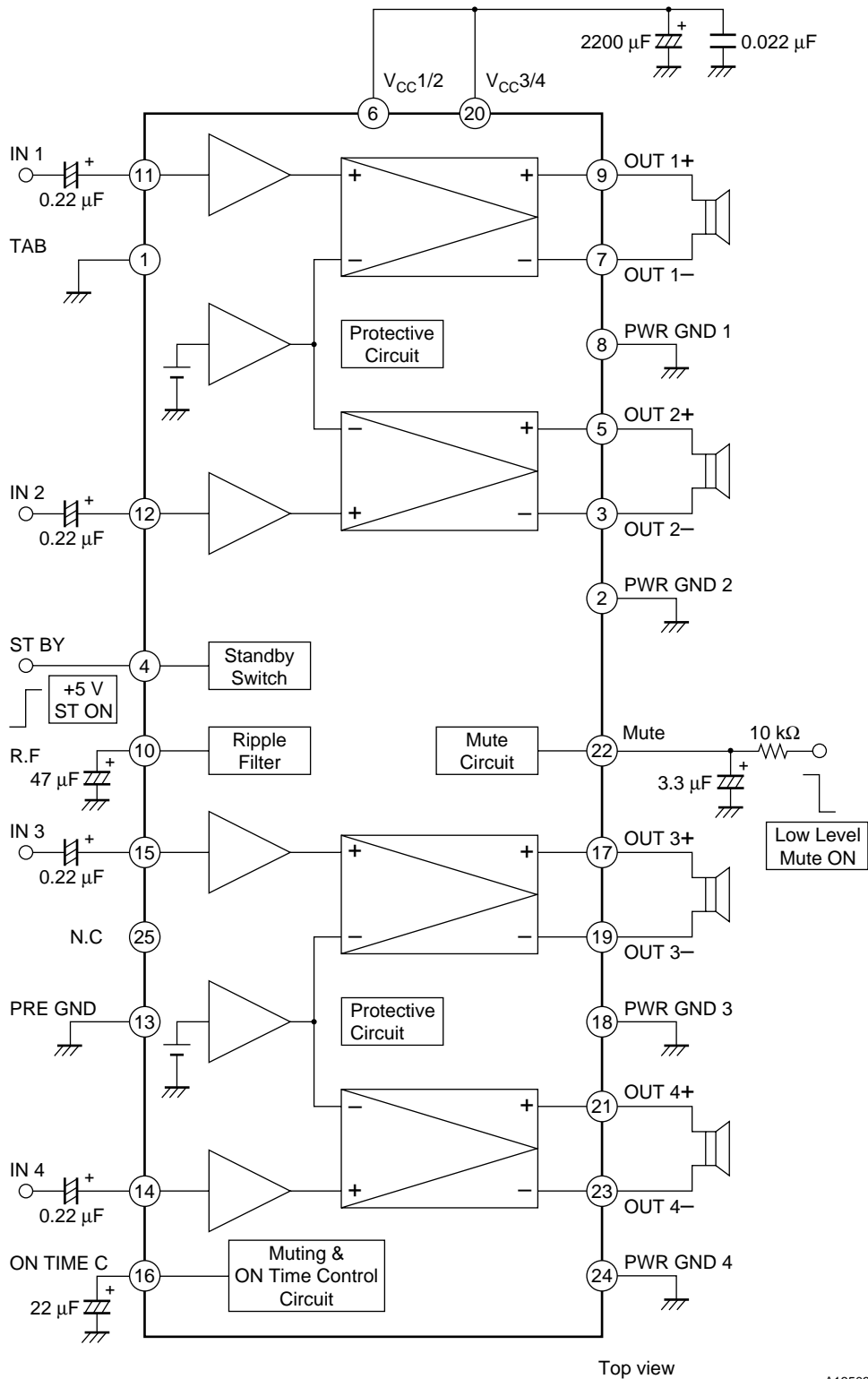
| Parameter | Symbol | Conditions | Ratings | Unit |
|--------------------------------|--------------|------------|---------|----------|
| Recommended supply voltage | V_{CC} | | 14.4 | V |
| Recommended load resistance | R_L | | 4 | Ω |
| Operating supply voltage range | $V_{CC\ op}$ | | 9 to 18 | V |

Operating Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 14.4\text{ V}$, $f = 1\text{ kHz}$, $R_L = 4\ \Omega$, $R_g = 600\ \Omega$

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---------------------------|-------------------|--|---------|-----|------|------------------|
| | | | min | typ | max | |
| Quiescent current | I_{CCO} | $R_L = \infty$, $R_g = 0$ | 100 | 200 | 350 | mA |
| Standby current | I_{st} | $V_{st} = 0\text{ V}$ | | | 10 | μA |
| Output offset voltage | $V_{Noffset}$ | $R_g = 0$ | -150 | | +150 | mV |
| Voltage gain | VG | $V_O = 0\text{ dBm}$ | 31 | 32 | 33 | dB |
| Voltage gain difference | ΔVG | | -1 | | +1 | dB |
| Output power | P_{O1} | THD = 10 % | 23 | 28 | | W |
| | $P_{O\ max1}$ | $V_{CC} = 13.7\text{ V}$, $V_{IN} = 5\text{ Vrms}$ | | 40 | | W |
| | $P_{O\ max2}$ | $V_{IN} = 5\text{ Vrms}$ | | 45 | | W |
| Total harmonic distortion | THD | $P_O = 4\text{ W}$ | | 0.1 | 0.4 | % |
| Channel separation | CHsep | $V_O = 0\text{ dBm}$, $R_g = 10\text{ k}\Omega$ | 50 | 60 | | dB |
| Ripple rejection ratio | SVRR | $f_r = 100\text{ Hz}$, $V_R = 0\text{ dBm}$, $R_g = 0$ | 43 | 50 | | dB |
| Output noise voltage | V_{NO} | $R_g = 0$, B.P.F. = 20 Hz to 20 kHz | | 250 | 450 | μVrms |
| Muting attenuation | Mute(att) | $V_O = 20\text{ dBm}$ | 70 | 80 | | dB |

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Sample Application Circuit and Block Diagram



A13503

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Pin Functions and Equivalent Circuits at $V_{CC} = 14.4\text{ V}$, $ST-BY = 5\text{ V}$

| Pin No. | Function | DC voltage [V] | Notes | Internal equivalent circuit |
|--|--|----------------|---|--|
| 1 | TAB | | | |
| 2 8 18 24 | POWER GND | | | |
| 3 5 7 9 17 19 21 23 | -OUT2 +OUT2 -OUT1 +OUT1 +OUT3 -OUT3 +OUT4 -OUT4 | 2.7 | | <p style="text-align: right;">A13504</p> |
| 4 | ST-BY | | <ul style="list-style-type: none"> The amplifier will be on when the applied voltage is between 2 V and V_{CC}. | <p style="text-align: right;">A13505</p> |
| 6 20 | $V_{CC}1/2$ $V_{CC}3/4$ | | | |
| 10 | SVR | 13.2 | <ul style="list-style-type: none"> Low ripple power supply line for all internal IC blocks | <p style="text-align: right;">A13506</p> |

Continued on next page.

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| Pin No. | Function | DC voltage [V] | Notes | Internal equivalent circuit |
|----------------------|--------------------------|----------------|---|--|
| 11 12 14 15 | IN1 IN2 IN4 IN3 | 3.1 | <ul style="list-style-type: none"> Input amplifiers that require no capacitor in the input noise filter. | <p style="text-align: right;">A13507</p> |
| 16 | ON TIME MUTE | 2.6 | <ul style="list-style-type: none"> Amplifier turn-on time control circuit Impulse noise prevention circuit With a 22 μF capacitor, the turn-on time will be 0.6 s. | <p style="text-align: right;">A13508</p> |
| 22 | MUTE | 4.1 | <ul style="list-style-type: none"> The muting function is activated when the applied voltage is under 1 V. | <p style="text-align: right;">A13509</p> |
| 25 | N.C. | | | |

Notes on Usage and Handling

• Oscillator stabilization time

In some cases, details of the printed circuit board layout may lead to induced parasitic oscillation. This oscillation can be prevented by adding any one of the following components. Verify the optimal values for these capacitors by testing in actual end products.

Technique 1 ... Connect Mylar capacitors (0.1 μF) between the BTL amplifier outputs.

Technique 2 ... Connect an RC circuit (2.2 Ω and 0.1 μF in series) between each output and ground.

• Audio quality (low band)

The low-band frequency characteristics can be improved by adjusting the values of the input capacitors. The recommended value is 2.2 μF .

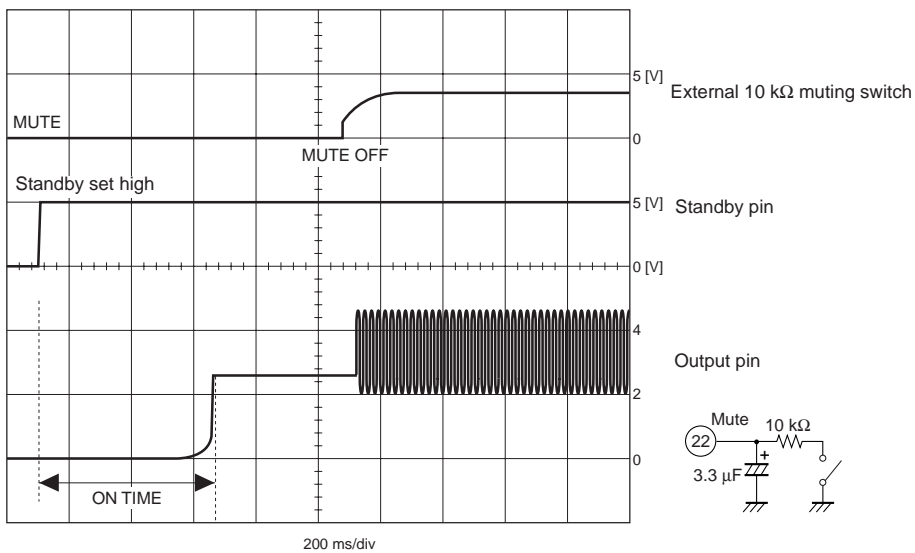
• Impulse noise

The LA4743B includes a built-in impulse noise suppression circuit. However, further improvement can be achieved by using the muting circuit. When first applying power, activate the muting function at the same time as applying power. Then, after the output DC potential has stabilized, turn off the muting function. When turning off the power, first activate the muting function and then turn off the power. Sample transient responses are attached (see the timing charts).

Transient Responses at Power On

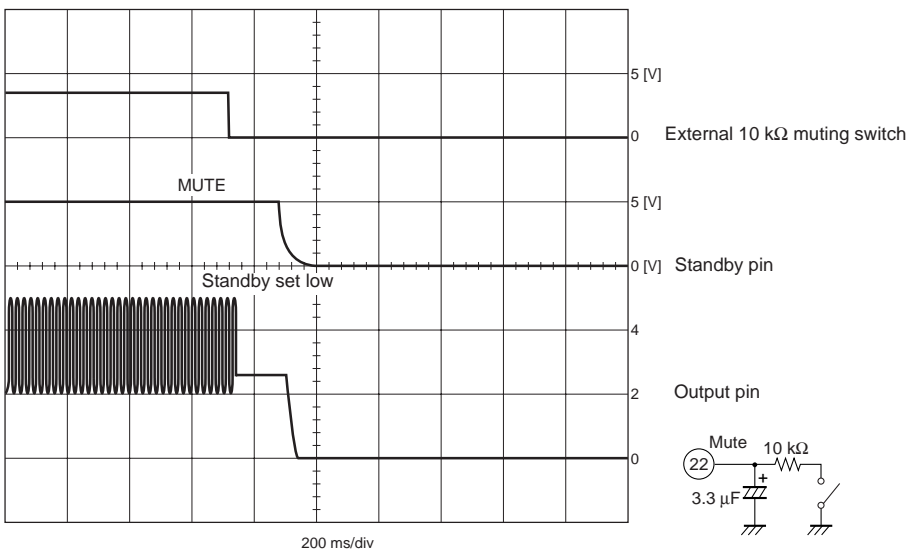
Power on: Standby and muting activated at the same time.

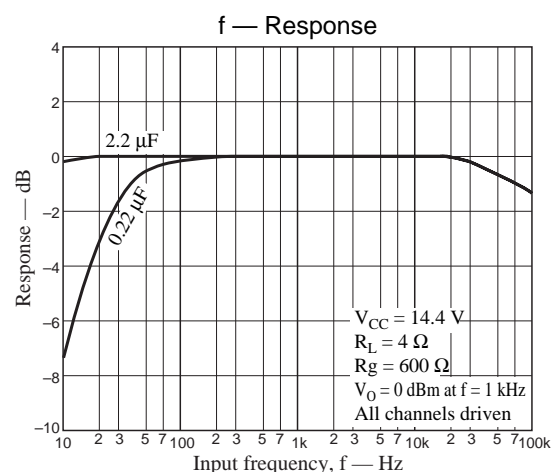
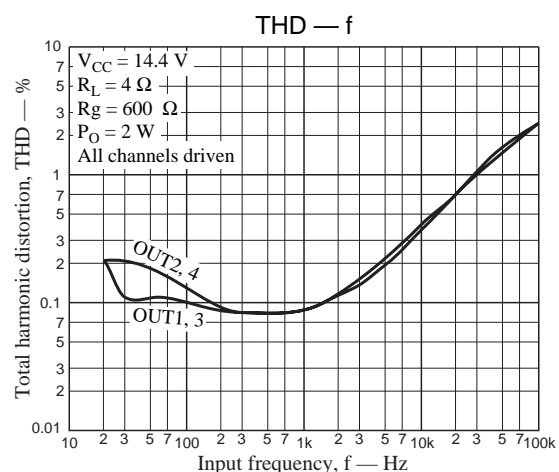
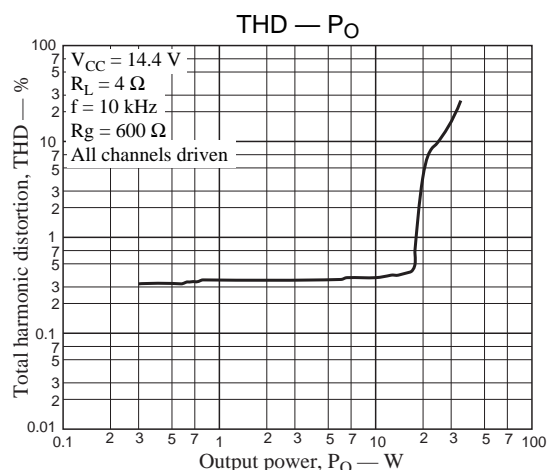
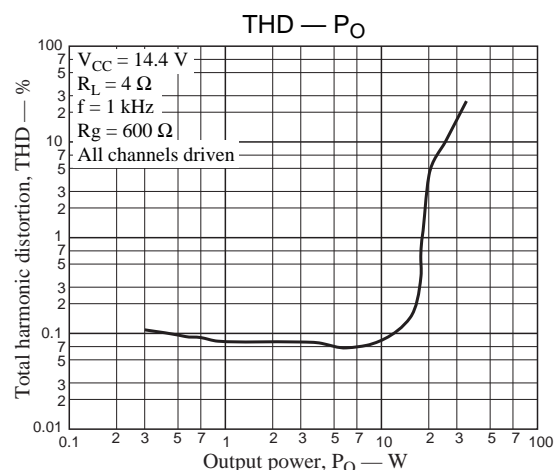
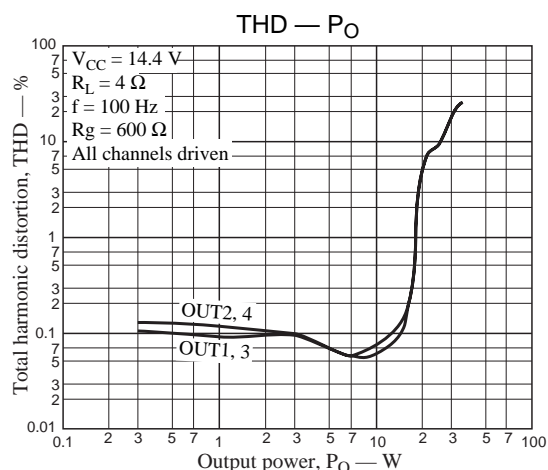
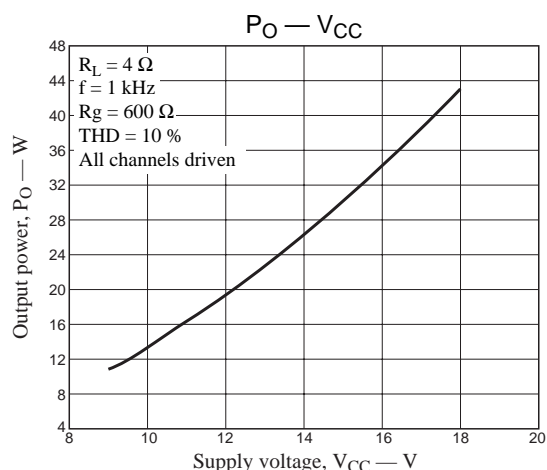
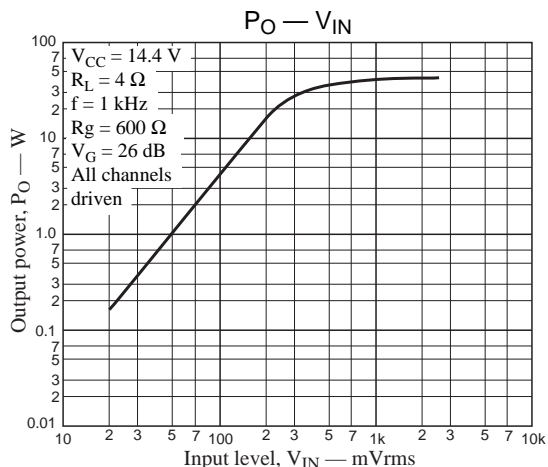
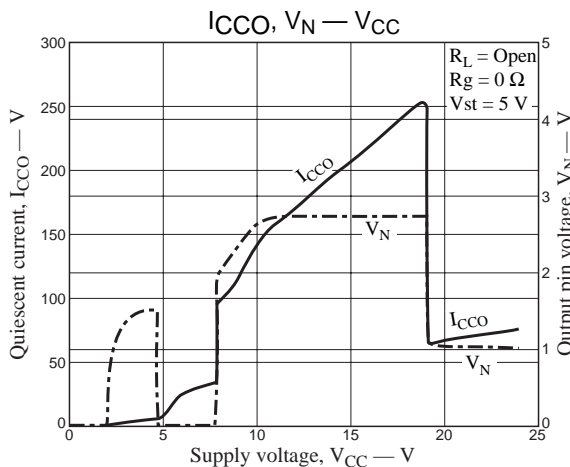
Muting is turned off after the output has stabilized.

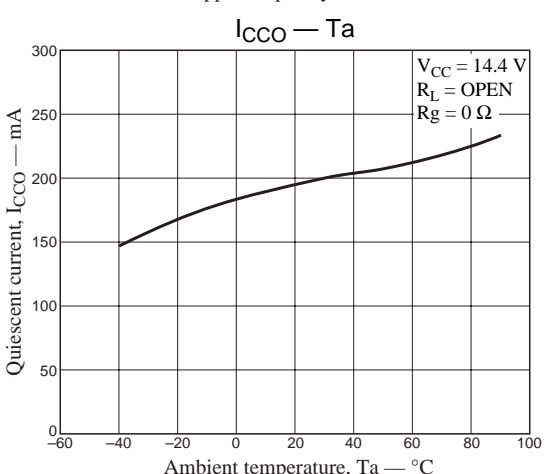
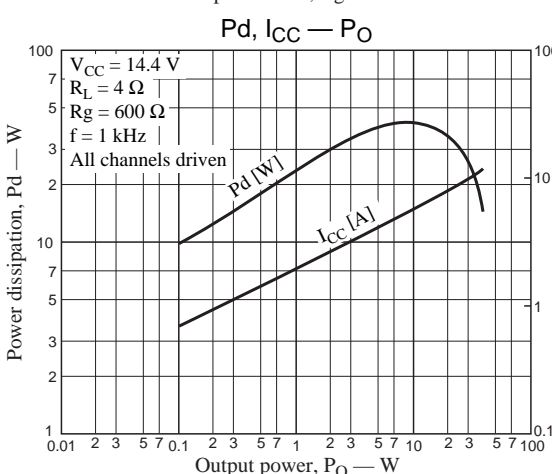
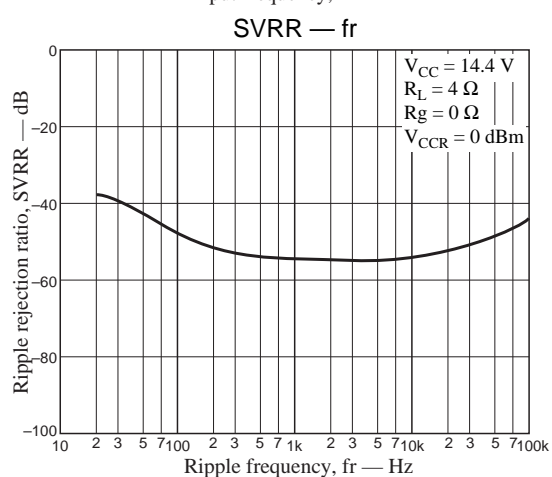
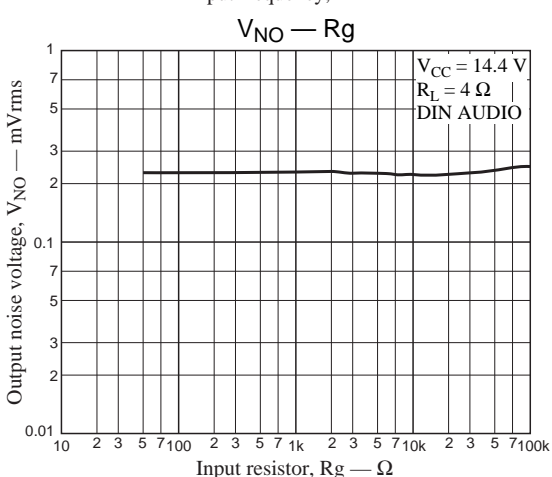
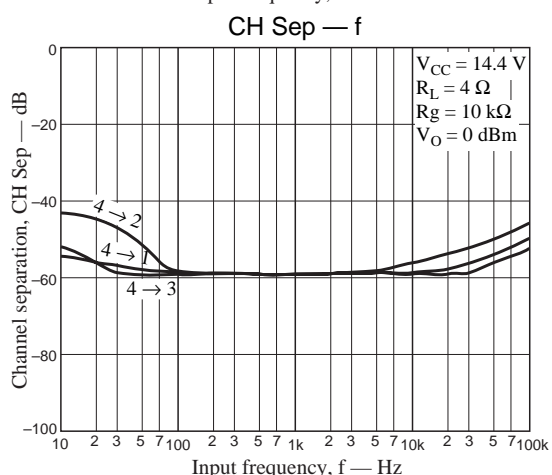
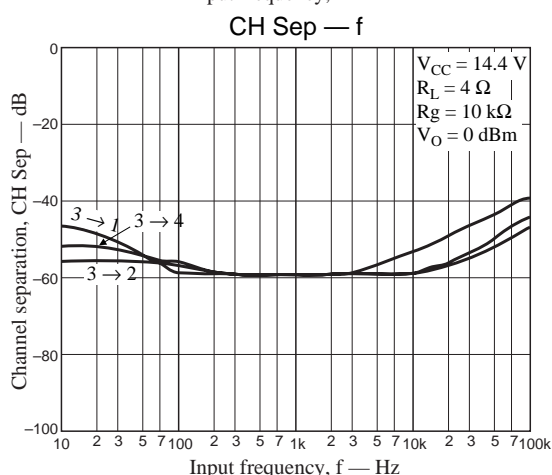
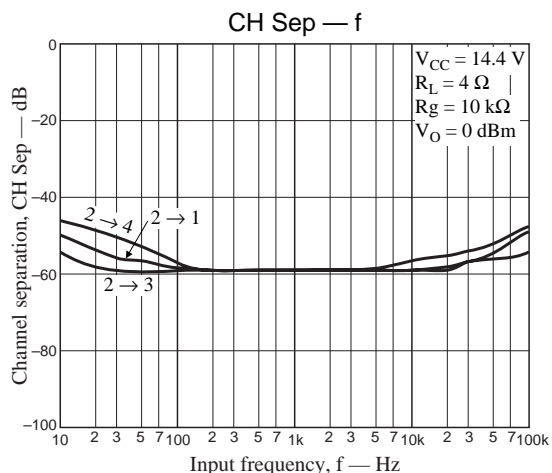
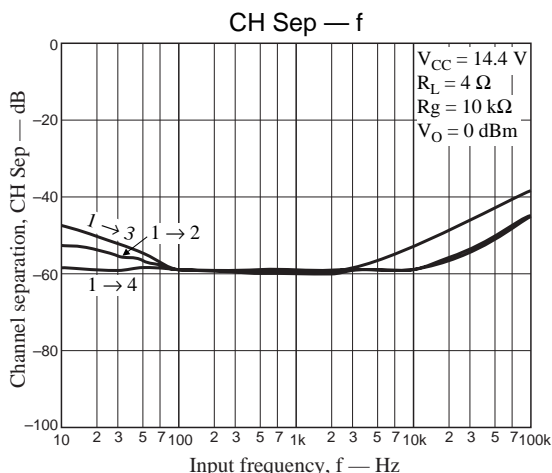


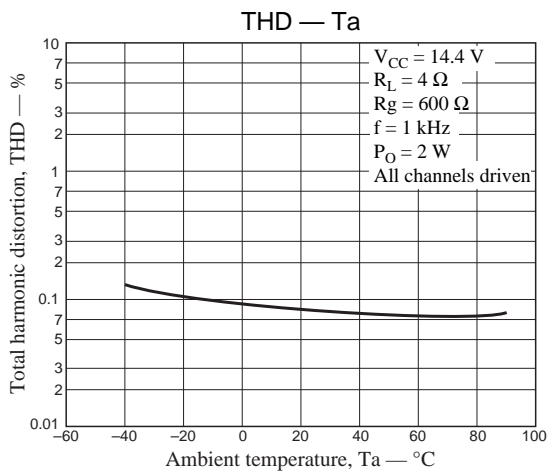
Transient Responses at Power Off

Power off: After activating the muting circuit, turn the power off.









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