



DESCRIPTION

The A2410 is a 10W/ch efficient, Class D audio amplifier. The high efficiency of the A2410, 88%, eliminates the need for external heat sink when playing music.

The A2410 has short-circuit protection and thermal protection includes an auto-recovery feature.

The A2410 is available in PTSSOP28 package.

ORDERING INFORMATION

| Package Type | Part Number | |
|--------------------------------|---|---------------|
| PTSSOP28 | TMXP28 | A2410TMXP28U |
| | | A2410TMXP28VU |
| Note | V: Halogen free Package U: Tube SPQ: 50pcs/Tube | |
| AiT provides all RoHS products | | |

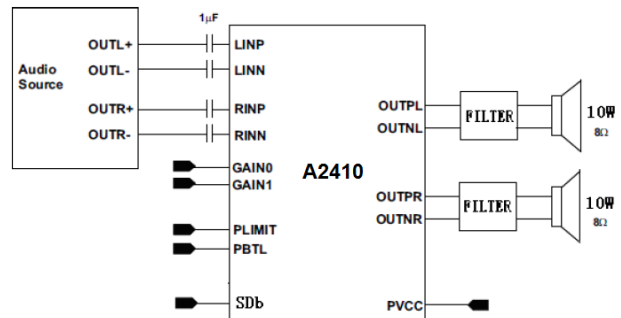
FEATURES

- 10W/ch into an 8Ω loads at 10% THD+N from a 12V supply.
- Four selectable, fixed gain setting.
- Wide supply voltage range: 4V~12V.
- 88% efficient at $R_L=8\Omega$, THD+N=10%.
- Short-circuit protection and thermal protection.
- Available in PTSSOP28 Package

APPLICATION

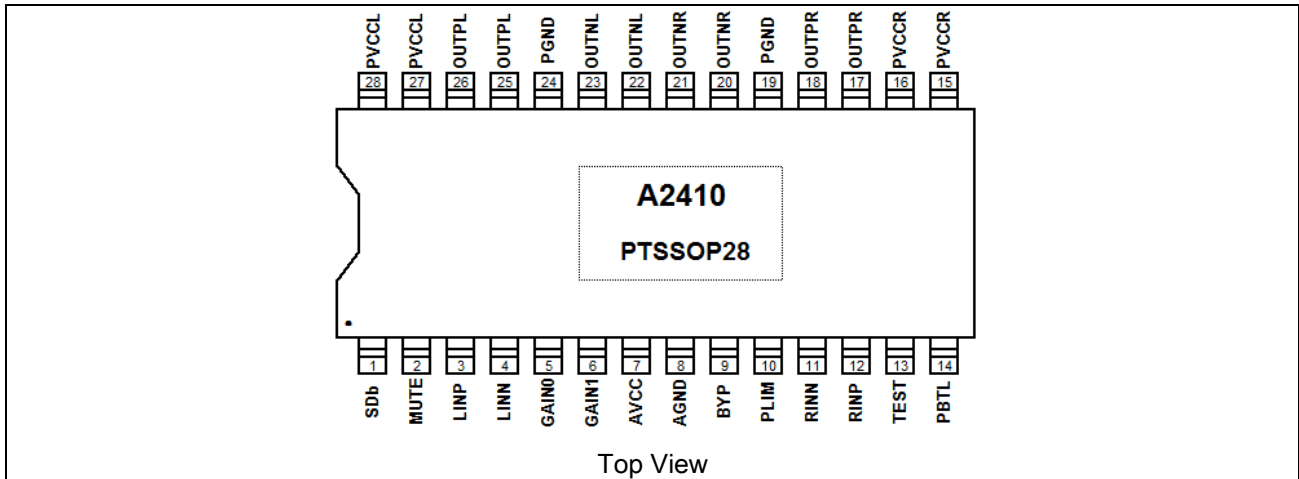
- Consumer Audio Equipment

TYPICAL APPLICATION





PIN DESCRIPTION



| Pin # | Symbol | I/O | Function |
|--------|------------------|-----|---|
| 1 | Sdb | I | Shutdown mode input, Sdb=LOW: enters shutdown mode, Sdb=HIGH enables the amplifier. 300k pull-down resistor is built in. |
| 2 | MUTE | I | Mute pin |
| 3 | LINP | I | Positive input signal for L channel |
| 4 | LINN | I | Negative input signal for L channel |
| 5 | GAIN0 | I | Gain select least significant bit |
| 6 | GAIN1 | I | Gain select most significant bit |
| 7 | AV _{CC} | P | Analog power supply pin |
| 8 | AGND | - | Analog signal ground |
| 9 | BYP | I | Bypass capacitor pin |
| 10 | PLIM | I | Power limit level adjust. Connect a resistor divider from AV _{CC} to AGND to set power limit. Floating for no power limit. |
| 11 | RINN | I | Negative input signal for R channel |
| 12 | RINP | I | Positive input signal for R channel |
| 13 | TEST | I | Test pin |
| 14 | PBTL | I | Parallel BTL mode switch. H for Parallel. |
| 15, 16 | PVCCR | P | Power supply for R channel H-bridge. |
| 17, 18 | OUTPR | O | Class-D H-bridge positive output for R channel |
| 19, 24 | PGND | - | Power ground for H-bridges |
| 20, 21 | OUTNR | O | Class-D H-bridge negative output for R channel |
| 22, 23 | OUTNL | O | Class-D H-bridge negative output for L channel |
| 25, 26 | OUTPL | O | Class-D H-bridge positive output for L channel |
| 27, 28 | PVCCl | P | Power supply for L channel H-bridge. |



ABSOLUTE MAXIMUM RATINGS

| | |
|---|-------------|
| Supply Voltage | -0.3V~15V |
| T _J , Operating Junction Temperature Range | -40°C~125°C |
| T _A , Operating Free-Air Temperature Range | -40°C~85°C |
| T _{STG} , Storage Temperature Range | -55°C~150°C |

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

T_A=25°C, V_{DD}=12V, R_L=8Ω, unless otherwise noted

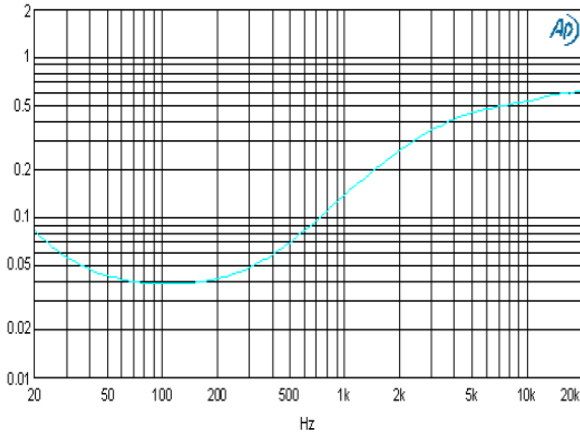
| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|----------------------------------|---------------------|---|-----------|------|------|------|
| Supply Voltage | V _{DD} | | 4 | 12 | 13 | V |
| Quiescent Current | I _{CC} | No load | | 25 | | mA |
| Shutdown Current | I _{SD} | V _{DD} =4V to 12V | | 70 | | uA |
| Output Power | P _O | THD+N=10% , f=1kHz, R _L =8Ω | | 10 | | W |
| Voltage Gain | A _v | Gain<1:0>=00 | | 20 | | dB |
| | | Gain<1:0>=01 | | 26 | | |
| | | Gain<1:0>=10 | | 32 | | |
| | | Gain<1:0>=11 | | 36 | | |
| Total Harmonic Distortion | THD+N | V _{DD} =12V,P _O =5W, R _L =8Ω , f=1kHz | | 0.14 | | % |
| Turn on time | ton | | | 120 | | ms |
| Switching Frequency | f _{SW} | V _{DD} =4V to 12V | | 300 | | kHz |
| Drain-source on-state Resistance | R _{DS(ON)} | V _{CC} =12V, I _O =500mA | High side | | 460 | mΩ |
| | | | Low side | | 380 | |
| Signal-to-noise Ratio | SNR | Maximum output at THD+N <1%, f=1kHz, Gain = 20dB, A-weighted | | 95 | | dB |
| Crosstalk | | Gain = 20dB, f = 1 kHz | | 94 | | dB |
| Output Integrated Noise | V _n | 20Hz to 22kHz, A-weighted filter | | 126 | | uV |



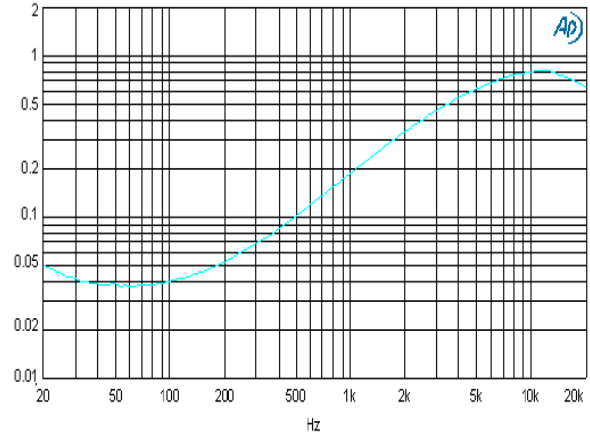
TYPICAL PERFORMANCE CHARACTERISTICS

f=1kHz, unless otherwise noted

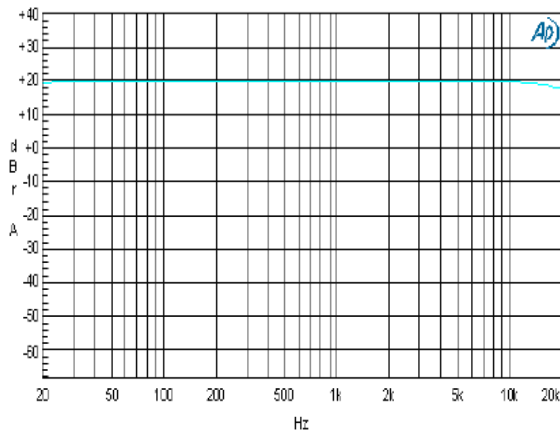
1. THDN_F@12V 8Ω 5W



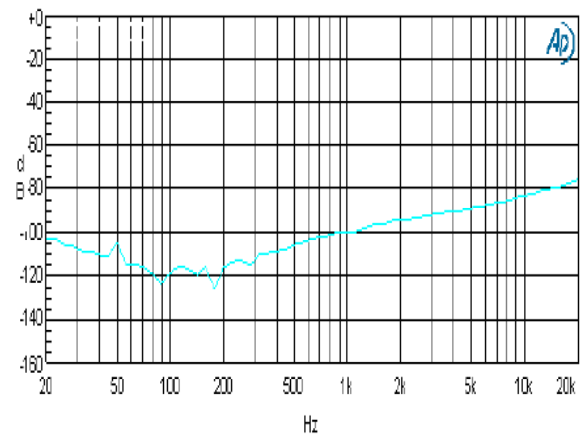
2. THDN_F@9V 4Ω 3W



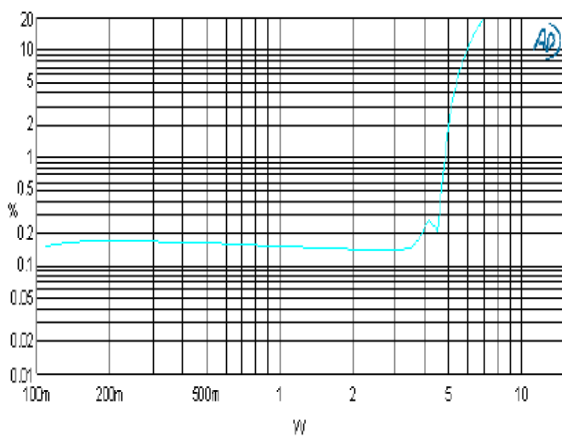
3. GAIN_F@12V 8Ω



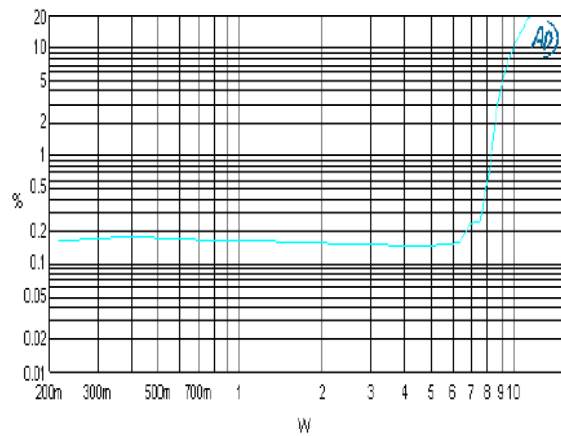
4. XTK_F@12V 8Ω



5. THDN_PO@9V 4Ω

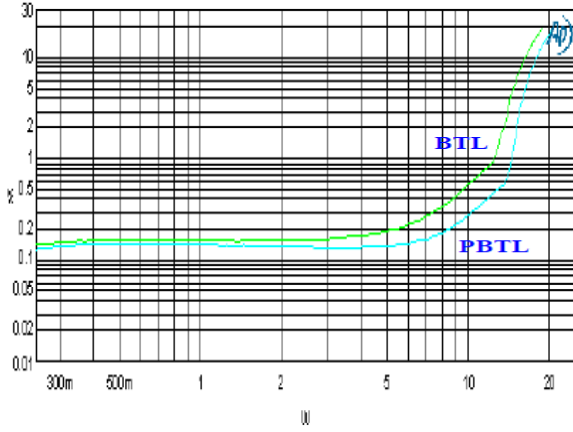


6. THDN_PO@12V 8Ω

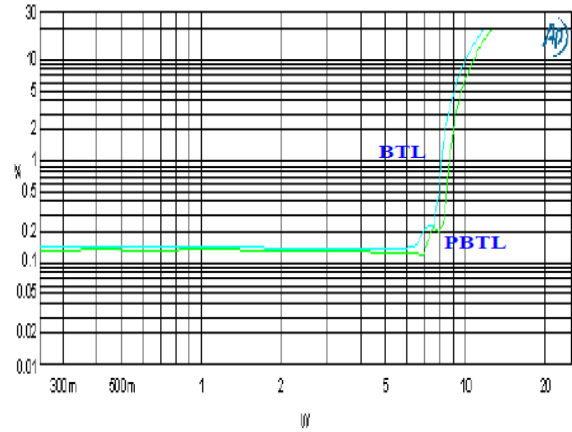




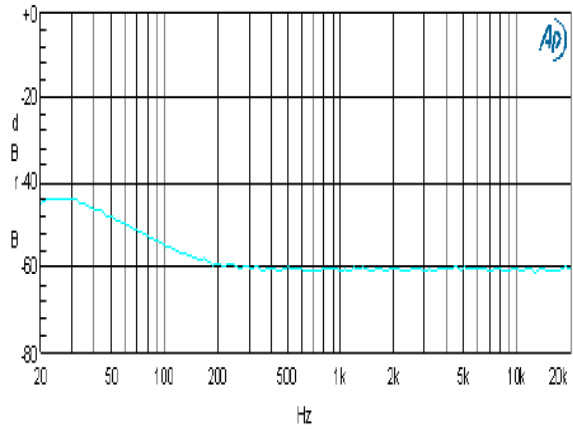
7. PBTL@12V 4Ω



8. PBTL@12V 8Ω

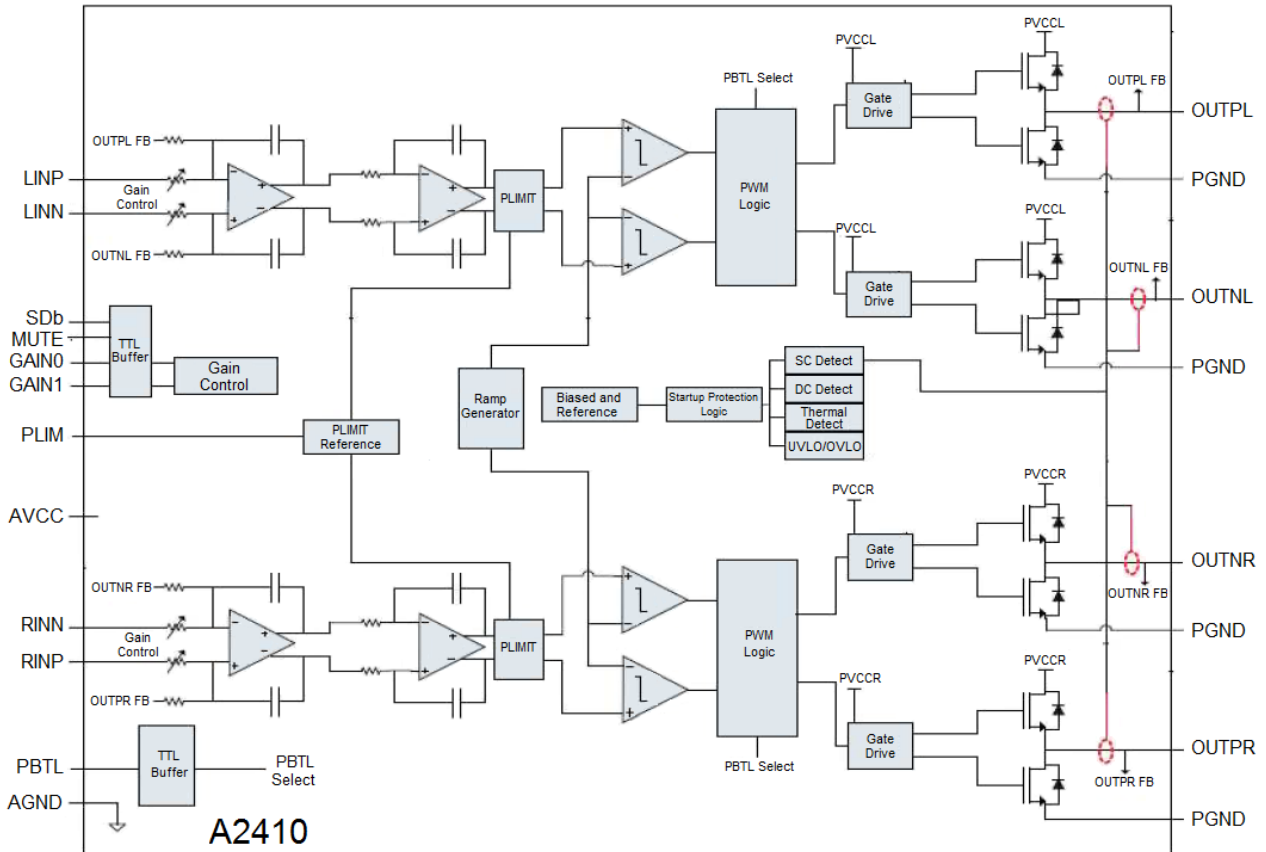


9. PSRR_F@12V 8Ω





BLOCK DIAGRAM





DETAILED INFORMATION

Shutdown Operation

The A2410 supports shutdown mode. The SDb input terminal should be held high during normal operation when the amplifier is in use. Pulling SDb low to enter shutdown mode

PBTL Select

A2410 offers the feature of parallel BTL operation with two outputs of each channel connected directly. If the PBTL pin is tied high, the positive and negative outputs of each channel (left and right) are synchronized and phase.

To operate in this PBTL mode , apply the input signal to the Right input and place the speaker between the Left and Right outputs. Connect the positive and negative output together for best efficiency.

PLIMIT Function

The voltage at pin “PLIM” can used to limit the power to levels below that which is possible on supply rail. Add a resistor divider from AV_{CC} to ground to set the voltage at the PLIM pin.

PLIMIT typical values :

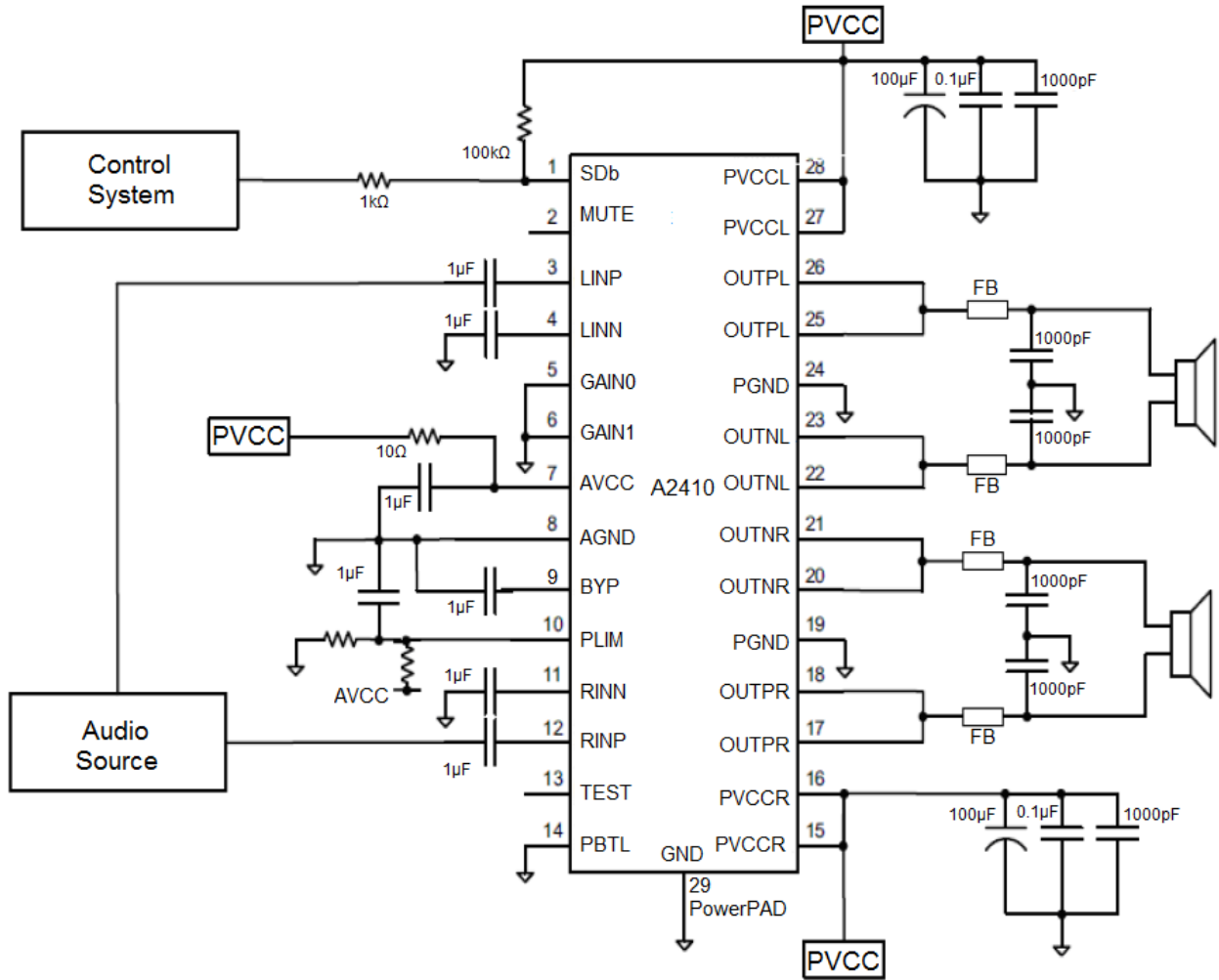
| Test condition | PLIMIT Voltage | Output Power(W) | Output Voltage Amplitude(Vp-p) |
|---|----------------|-----------------|--------------------------------|
| PV _{CC} =12V, V _{IN} =1.1Vrms, R _L =8Ω, Gain=20dB | 4 | 10.38 | 22.9 |
| PV _{CC} =12V, V _{IN} =1.1Vrms, R _L =8Ω, Gain=20dB | 3 | 9.4 | 22.7 |
| PV _{CC} =12V, V _{IN} =1.1Vrms, R _L =8Ω, Gain=20dB | 2.5 | 6.7 | 17.8 |
| PV _{CC} =12V, V _{IN} =1.1Vrms, R _L =8Ω, Gain=20dB | 2 | 4.6 | 14.6 |
| PV _{CC} =12V, V _{IN} =1.1Vrms, R _L =8Ω, Gain=20dB | 1.5 | 3 | 13.6 |
| PV _{CC} =12V, V _{IN} =1.1Vrms, R _L =8Ω, Gain=20dB | 1 | 2.2 | 13.6 |

Short Circuit Protection

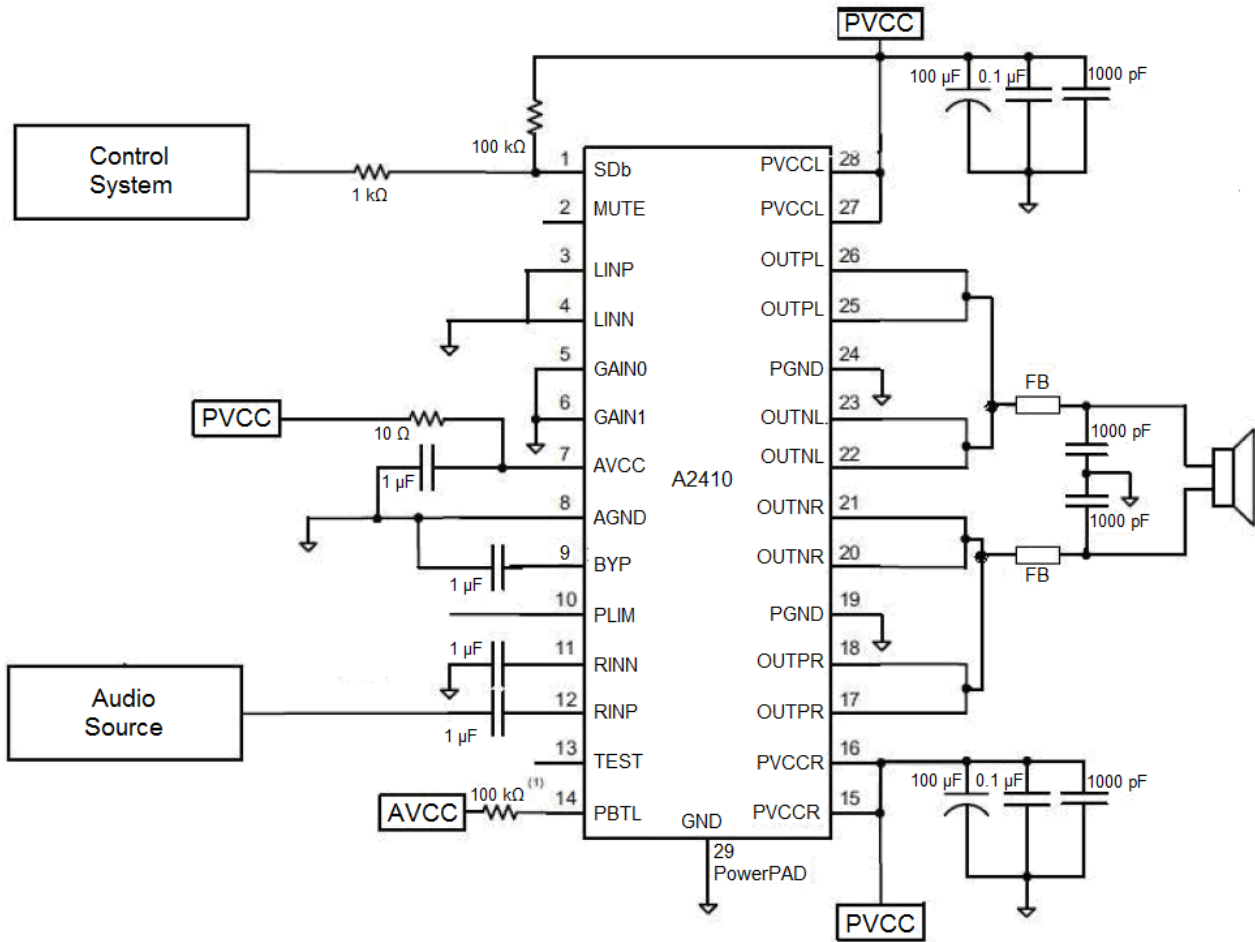
The A2410 has short-circuit protection circuitry on the outputs to prevent damage to the device during output-to-output shorts. The short-circuit protection includes an auto-recovery feature.



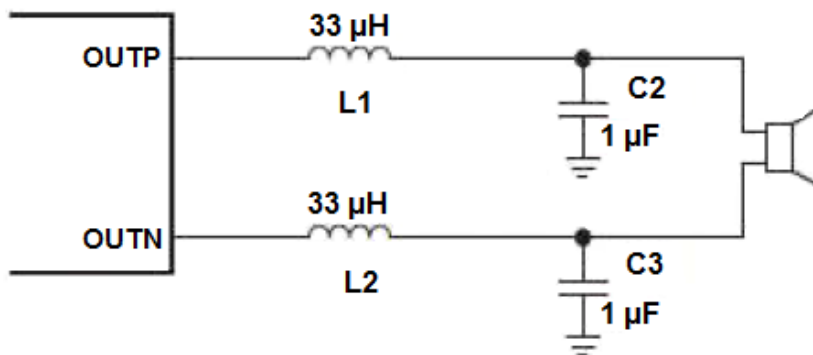
Application Information



Stereo Class-D Amplifier with BTL Output and Single-Ended inputs with power Limiting



Stereo Class-D Amplifier with PBTL Output and Single-Ended input

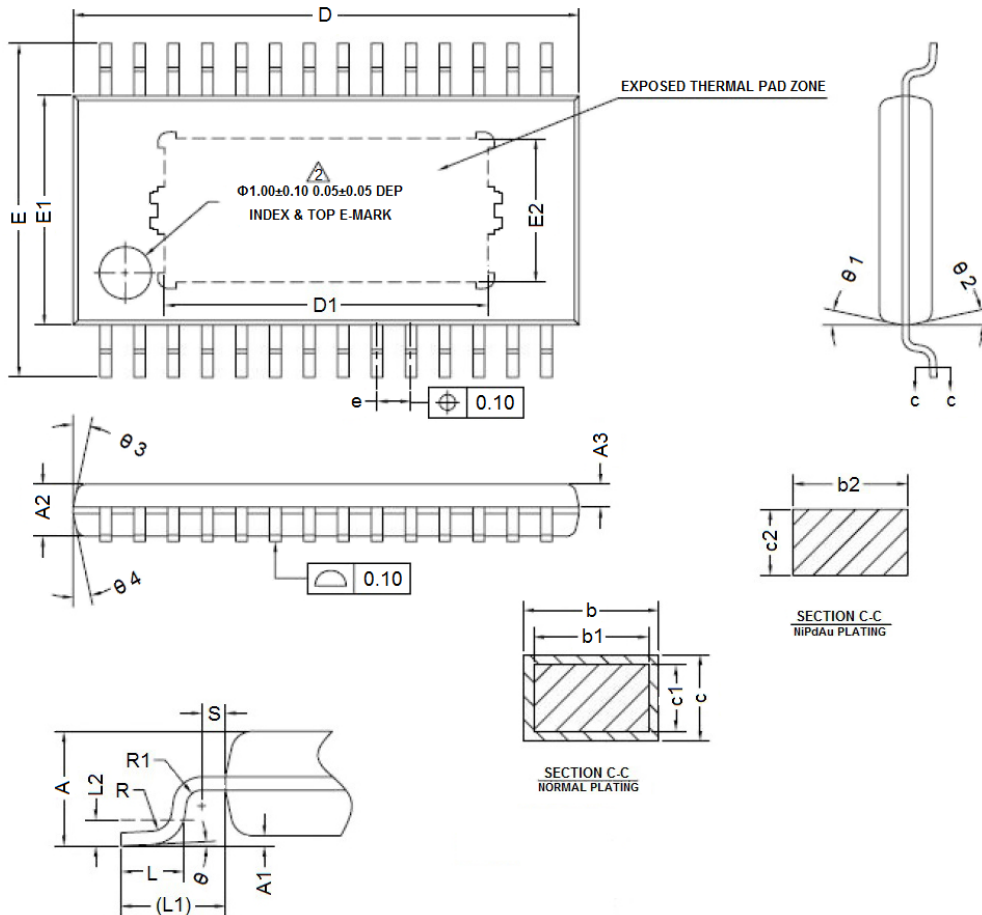


Typical LC Output filter



PACKAGE INFORMATION

Dimension in PTSSOP28 (Unit: mm)



| Symbol | Min | Max | Symbol | Min | Max |
|--------|---------|------|--------|---------|------|
| A | - | 1.20 | E2 | 2.75REF | |
| A1 | 0.05 | 0.15 | e | 0.55 | 0.75 |
| A2 | 0.90 | 1.10 | L | 0.45 | 0.75 |
| A3 | 0.34 | 0.54 | L1 | 1.00REF | |
| b | 0.20 | 0.29 | L2 | 0.25BSC | |
| b1 | 0.19 | 0.25 | R | 0.09 | - |
| b2 | 0.19 | 0.25 | R1 | 0.09 | - |
| c | 0.13 | 0.18 | S | 0.20 | - |
| c1 | 0.12 | 0.14 | θ | 0° | 8° |
| c2 | 0.12 | 0.14 | θ1 | 10° | 14° |
| D | 9.60 | 9.80 | θ2 | 10° | 14° |
| D1 | 6.20REF | | θ3 | 10° | 14° |
| E | 6.20 | 6.60 | θ4 | 10° | 14° |
| E1 | 4.30 | 4.50 | | | |



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