

[PBE] CLASS-D AMPLIFIER DESIGN OPTIONS

1. MODULATOR

1.1 (C). Pulse Width Modulation (PWM) with 555. Using a fast 555 (<http://www.ti.com/lit/ds/symlink/lmc555.pdf>; LMC555 CMOS Timer) + clock input.

Schematic: p.13 (<http://www.ti.com/lit/ds/symlink/ne555.pdf>), TI 555 datasheet.

1.2 (B). PWM with precision triangular-wave + comparator.

Schematic: Fig. 1 (<http://pdfserv.maximintegrated.com/en/an/AN4362.pdf>), MAXIM Application Note 4362.

Observations: use **MAX9005** (<http://www.maximintegrated.com/datasheet/index.mvp/id/1838>) + comparator **LM319** (<http://www.ti.com/product/lm319-n>)

1.3 (B+). PWM with high-speed op amps + comparator.

Schematic: Fig. 1 (<http://pdfserv.maximintegrated.com/en/an/AN3201.pdf>), MAXIM Application Note 3201.

Observations: use dual op-amps **AD826AR** (<http://www.analog.com/en/all-operational-amplifiers-op-amps/operational-amplifiers-op-amps/ad826/products/product.html>) and rail-to-rail comparator **LT1711** (<http://www.linear.com/product/LT1711>)

1.4 (A). Pulse Density Modulation (PDM) based on Delta-sigma Modulator with discrete components.

Schematic: First-order delta-sigma modulator (p.23 &116, [1]; Figs. 2.12 & 2.16 (p.30&33) [2]), Second-order delta-sigma modulator (p.118, [1]; Figs. 3.1 & 3.15 (p.64&80) [2])

References

[1] Morey, B. et al. (2008). *Class D Audio Amplifier*. The design of a live audio Class D audio amplifier with greater than 90% efficiency and less than 1% distortion. Available at: <http://www.wpi.edu/Pubs/E-project/Available/E-project-041808-145643/unrestricted/report.pdf>.

[2] Schreier, R. and Temes, G. C. (2004). *Understanding Delta-Sigma Data Converters*. New York: Wiley. Available at: <http://eu.wiley.com/WileyCDA/WileyTitle/productCd-0471465852.html>.

2. H-Bridges, GATE DRIVERS + MOSFETS

2.1 Gate Drivers

- (B) <http://es.farnell.com/intersil/hip4081aipz/driver-full-bridge-4081-dip20/dp/9664130>
- (A) <http://es.farnell.com/international-rectifier/irs20124spbf/driver-audio-high-low-smd-20124/dp/1080637?Ntt=IRS20124>
- (C) <http://es.farnell.com/rohm/bd6221f-e2/ci-h-bridge-driver-18v-1a-sop8/dp/1716261>

2.2. Mosfets

- (B) <http://es.farnell.com/diodes-inc/zxmn4a06k/mosfet-n-d-pak/dp/1251236>
- (B) <http://es.farnell.com/diodes-inc/zxmn4a06gta/mosfet-n-sot-223/dp/7564910RL>

2.3. H-Bridges with integrated gate driver

- (C) <http://es.farnell.com/international-rectifier/irf6645tr1pbf/mosfet-n-directfet-100v-sj/dp/1436927RL>
- (B) <http://es.farnell.com/vishay-siliconix/si9986dy-t1-e3/ci-controlador-motor-13-3v-1-oa/dp/1469440>

3. FILTER

3.1 Inductors

3.1.1 (B) Drum core

<http://es.farnell.com/epcos/b82422h1334k/inductor-caja-1210-simid-h-330uh/dp/1299983RL>

3.1.2 (A) Toroidal core

<http://es.farnell.com/bourns-jw-miller/2107-h-rc/toroidal-inductor-33uh-5a-15/dp/1183437>

<http://es.farnell.com/bourns-jw-miller/2105-v-rc/toroidal-inductor-22uh-7a-15/dp/1103689>

3.2 Capacitor

3.2.1 (B) Polyester

<http://es.farnell.com/epcos/b32521c1334j/condensador-poliester-330-nf/dp/2113930>

3.2.2 (A) Polypropylene

<http://es.farnell.com/vishay-roederstein/mkp1840510254/capacitor-pp-film-1uf-250v-radial/dp/1605644>

<http://es.farnell.com/vishay-roederstein/mkp1840510404m/capacitor-mkp-1uf-400v-5/dp/1413875>

<http://es.farnell.com/vishay-bc-components/bfc237842105/capacitor-1uf-250v/dp/1215552>