

# Drive.A.2

## I2C/SPI-input dual 3W Class-D amplifier

The Drive.A.2 is a dual-channel audio output tile combining a DAC63202W 12-bit smart DAC with two TPA2028D1 Class-D audio power amplifiers. It provides two independent audio channels, each capable of delivering up to 3 W into 4 Ω or 880 mW into 8 Ω speakers.

The DAC63202W generates analog waveforms from digital data with 12-bit resolution and supports built-in waveform generation (sine, cosine, triangular, sawtooth) for processor-less tone generation. The DAC connects to a host processor via either I2C (up to 1 Mbps) or SPI (up to 50 MHz), auto-detected at power-on.

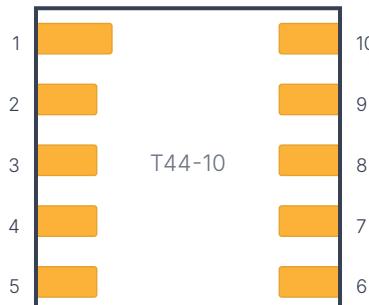
Each TPA2028D1 amplifier features I2C-programmable gain control (-28 dB to +30 dB in 1 dB steps), automatic gain control (AGC), and dynamic range compression (DRC) to prevent speaker overdrive and enhance perceived loudness. The amplifiers operate filter-free in Class-D mode for high efficiency and include thermal and short-circuit protection.

The tile operates from a 2.5 V to 5.5 V supply. All three ICs are controlled via a shared I2C bus, while the DAC can alternatively be driven over SPI for higher-bandwidth waveform updates.

## Overview

Revision	a
Package	T44-10
Supply	2.5–5.5V (logic inputs can go down to 1.8V)
Component	DAC63202W
Component	TPA2028D1
Interfaces	I2C, SPI

## Pad Assignments



(top view)

PAD	TYPE	FUNCTION	NOTE
1	power	GND	
2	digital	GPIO	an internal 100k pull-up
	interface	SPI.MISO	
3	digital	A0	an internal 100k pull sets the default I2C address to 0x49.
	interface	SPI.MOSI	
4	interface	I2C.CLK	
	interface	SPI.CS	

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5	interface	I2C.DAT
	interface	SPI.CLK
6	drive	OUT.0-
7	drive	OUT.0+
8	drive	OUT.1-
9	drive	OUT.1+
10	power	V+ 2.5-5.5V

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## Interfaces

I2C		I2C	SPI	
Mode	slave			
Max Clock	1MHz			
Addresses	0x49 (default), 0x48, 0x4A, 0x4B			
FUNCTION	REQ	PAD(S)	FUNCTION	REQ
I2C.CLK	Yes	4	SPI.MISO	Yes
I2C.DAT	Yes	5	SPI.MOSI	Yes
			SPI.CLK	Yes
			SPI.CS	Yes

## Application Notes

### Automatic Bus Detection

The DAC in the Drive.A.2 tile automatically detects whether it is connected via I2C or SPI.

### I2C Addresses

The Drive.A.2 can be configured for one of four I2C addresses by manipulating the connection of pad 3 (A0). Leaving the pad floating (or connecting to V+) uses the default address of 0x49. Connecting pad 3 to GND will change to address 0x48, while connecting to pad 3 to pad 4 (I2C.CLK) or pad 5 (I2C.DAT) will set the address to 0x4B or 0x4A, respectively.