

# TDA8920C

2 × 110 W class-D power amplifier

Rev. 02 — 11 June 2009

Product data sheet

## 1. General description

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The TDA8920C is a high-efficiency class-D audio power amplifier. The typical output power is 2 × 110 W with a speaker load impedance of 4 Ω.

The TDA8920C is available in both HSOP24 and DBS23P power packages. The amplifier operates over a wide supply voltage range from ±12.5 V to ±32.5 V and features low quiescent current consumption.

## 2. Features

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- Pin compatible with TDA8950/20B for both HSOP24 and DBS23P packages
- Symmetrical operating supply voltage range from ±12.5 V to ±32.5 V
- Stereo full differential inputs, can be used as stereo Single-Ended (SE) or mono Bridge-Tied Load (BTL) amplifier
- High output power in typical applications:
  - ◆ SE 2 × 110 W,  $R_L = 4 \Omega$  ( $V_P = \pm 30$  V)
  - ◆ SE 2 × 125 W,  $R_L = 4 \Omega$  ( $V_P = \pm 32$  V)
  - ◆ SE 2 × 120 W,  $R_L = 3 \Omega$  ( $V_P = \pm 29$  V)
  - ◆ BTL 1 × 220 W,  $R_L = 8 \Omega$  ( $V_P = \pm 30$  V)
- Low noise
- Smooth pop noise-free start-up and switch off
- Zero dead time switching
- Fixed frequency
- Internal or external clock
- High efficiency
- Low quiescent current
- Advanced protection strategy: voltage protection and output current limiting
- Thermal FoldBack (TFB)
- Fixed gain of 30 dB in SE and 36 dB in BTL applications
- Fully short-circuit proof across load
- BD modulation in BTL configuration

## 3. Applications

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- DVD
- Mini and micro receiver
- Home Theater In A Box (HTIAB) system
- High-power speaker system

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>General, <math>V_P</math> [1] = ±30 V</b>						
$V_P$	supply voltage	Operating mode	[2] ±12.5	±30	±32.5	V
$V_{P(ovp)}$	overvoltage protection supply voltage	Standby, Mute modes; $V_{DD} - V_{SS}$	65	-	70	V
$I_{q(tot)}$	total quiescent current	Operating mode; no load; no filter; no RC-snubber network connected	-	50	75	mA
<b>Stereo single-ended configuration</b>						
$P_o$	output power	$T_j = 85\text{ °C}$ ; $L_{LC} = 22\text{ }\mu\text{H}$ ; $C_{LC} = 680\text{ nF}$ (see <a href="#">Figure 10</a> )	[3]	-	110	- W
		THD + N = 10 %; $R_L = 4\text{ }\Omega$ ; $V_P = \pm 30\text{ V}$	-	90	-	W
		THD + N = 10 %; $R_L = 4\text{ }\Omega$ ; $V_P = \pm 27\text{ V}$	-	90	-	W
<b>Mono bridge-tied load configuration</b>						
$P_o$	output power	$T_j = 85\text{ °C}$ ; $L_{LC} = 22\text{ }\mu\text{H}$ ; $C_{LC} = 680\text{ nF}$ (see <a href="#">Figure 10</a> ); $R_L = 8\text{ }\Omega$ ; THD + N = 10 %; $V_P = \pm 30\text{ V}$	[3]	-	220	- W

[1]  $V_P$  is the supply voltage on pins VDDP1, VDDP2 and VDPA.

[2] The circuit is DC adjusted at  $V_P = \pm 12.5\text{ V}$  to  $\pm 32.5\text{ V}$ .

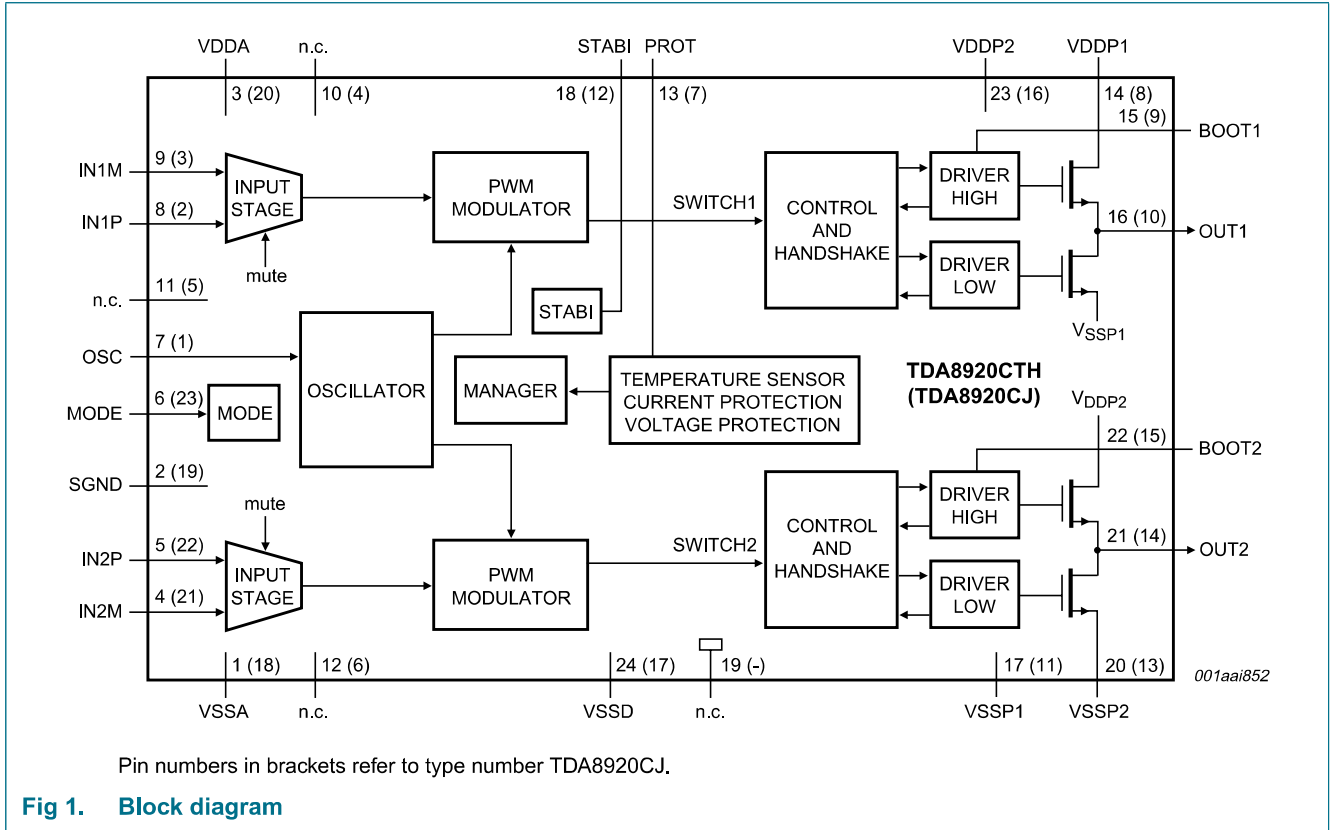
[3] Output power is measured indirectly; based on  $R_{DSon}$  measurement; see [Section 13.3](#).

## 5. Ordering information

Table 2. Ordering information

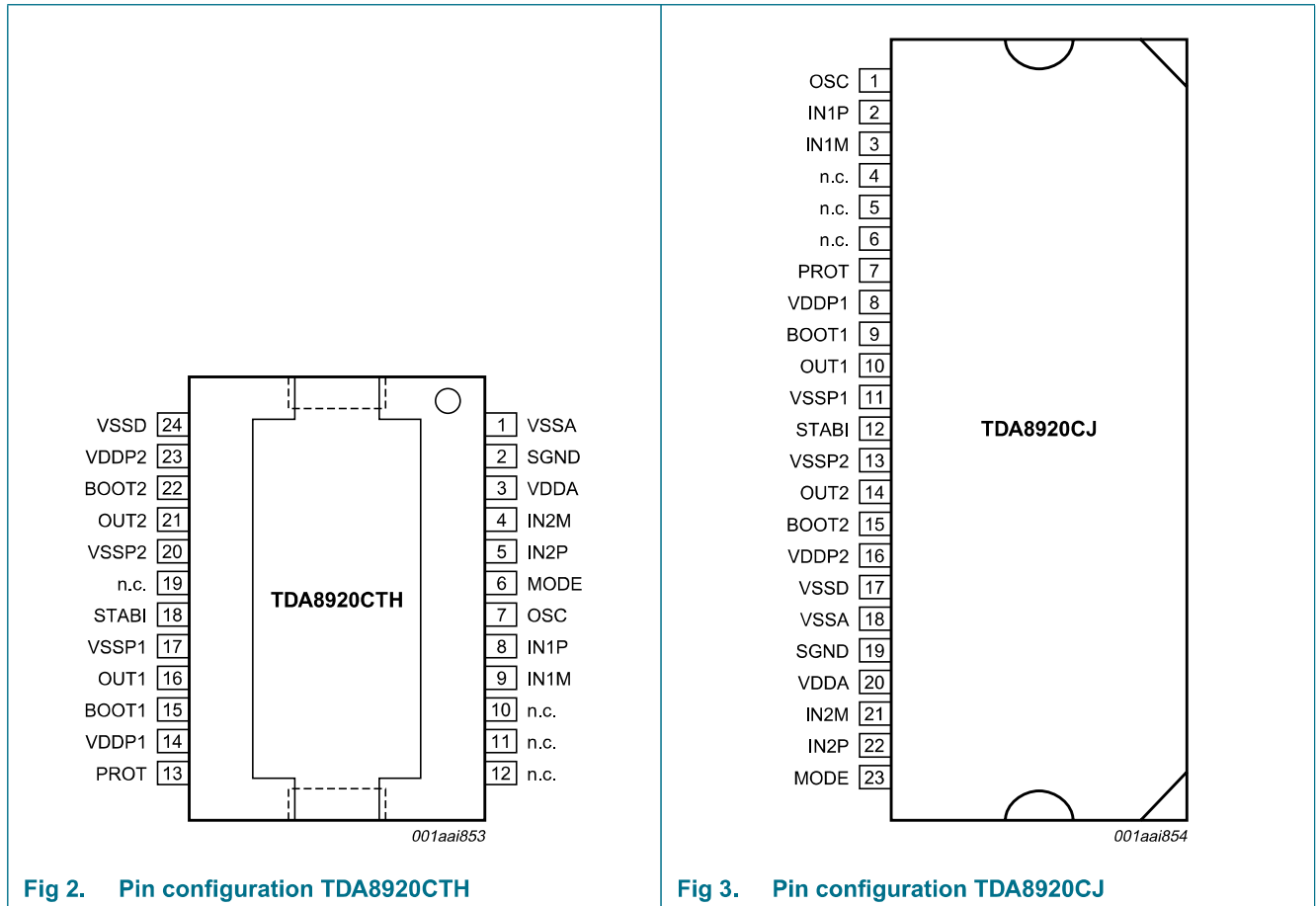
Type number	Package		Version
	Name	Description	
TDA8920CJ	DBS23P	plastic DIL-bent-SIL power package; 23 leads (straight lead length 3.2 mm)	SOT411-1
TDA8920CTH	HSOP24	plastic, heatsink small outline package; 24 leads; low stand-off height	SOT566-3

6. Block diagram



## 7. Pinning information

### 7.1 Pinning



## 7.2 Pin description

Table 3. Pin description

Symbol	Pin		Description
	TDA8920CTH	TDA8920CJ	
VSSA	1	18	negative analog supply voltage
SGND	2	19	signal ground
VDDA	3	20	positive analog supply voltage
IN2M	4	21	channel 2 negative audio input
IN2P	5	22	channel 2 positive audio input
MODE	6	23	mode selection input: Standby, Mute or Operating mode
OSC	7	1	oscillator frequency adjustment or tracking input
IN1P	8	2	channel 1 positive audio input
IN1M	9	3	channel 1 negative audio input
n.c.	10	4	not connected
n.c.	11	5	not connected
n.c.	12	6	not connected
PROT	13	7	decoupling capacitor for protection (OCP)
VDDP1	14	8	channel 1 positive power supply voltage
BOOT1	15	9	channel 1 bootstrap capacitor
OUT1	16	10	channel 1 PWM output
VSSP1	17	11	channel 1 negative power supply voltage
STABI	18	12	decoupling of internal stabilizer for logic supply
n.c.	19	-	not connected
VSSP2	20	13	channel 2 negative power supply voltage
OUT2	21	14	channel 2 PWM output
BOOT2	22	15	channel 2 bootstrap capacitor
VDDP2	23	16	channel 2 positive power supply voltage
VSSD	24	17	negative digital supply voltage

## 8. Functional description

### 8.1 General

The TDA8920C is a two-channel audio power amplifier that uses class-D technology.

For each channel, the audio input signal is converted into a digital PWM signal using an analog input stage and a PWM modulator; see [Figure 1](#). To drive the output power transistors, the digital PWM signal is fed to a control and handshake block and to high- and low-side driver circuits. This level-shifts the low-power digital PWM signal from a logic level to a high-power PWM signal switching between the main supply lines.

A 2nd-order low-pass filter converts the PWM signal to an analog audio signal that can be used to drive a loudspeaker.