

TDA8920B

2 × 100 W class-D power amplifier

Rev. 02 — 07 November 2005

Product data sheet

1. General description

The TDA8920B is a high efficiency class-D audio power amplifier with very low dissipation. The typical output power is 2 × 100 W.

The device is available in the HSOP24 power package and in the DBS23P through-hole power package. The amplifier operates over a wide supply voltage range from ±12.5 V to ±30 V (±32 V non operating) and consumes a very low quiescent current.

2. Features

- Zero dead time switching
- Advanced current protection: output current limiting
- Smooth start-up: no pop noise due to DC offset
- High efficiency
- Operating supply voltage from ±12.5 V to ±30 V
- Low quiescent current
- Usable as a stereo Single-Ended (SE) amplifier or as a mono amplifier in Bridge-Tied Load (BTL)
- Fixed gain of 30 dB in Single-Ended (SE) and 36 dB in Bridge-Tied Load (BTL)
- High output power
- High supply voltage ripple rejection
- Internal switching frequency can be overruled by an external clock
- Full short-circuit proof across load and to supply lines
- Thermally protected

3. Applications

- Television sets
- Home-sound sets
- Multimedia systems
- All mains fed audio systems
- Car audio (boosters)

PHILIPS

4. Quick reference data

Table 1: Quick reference data

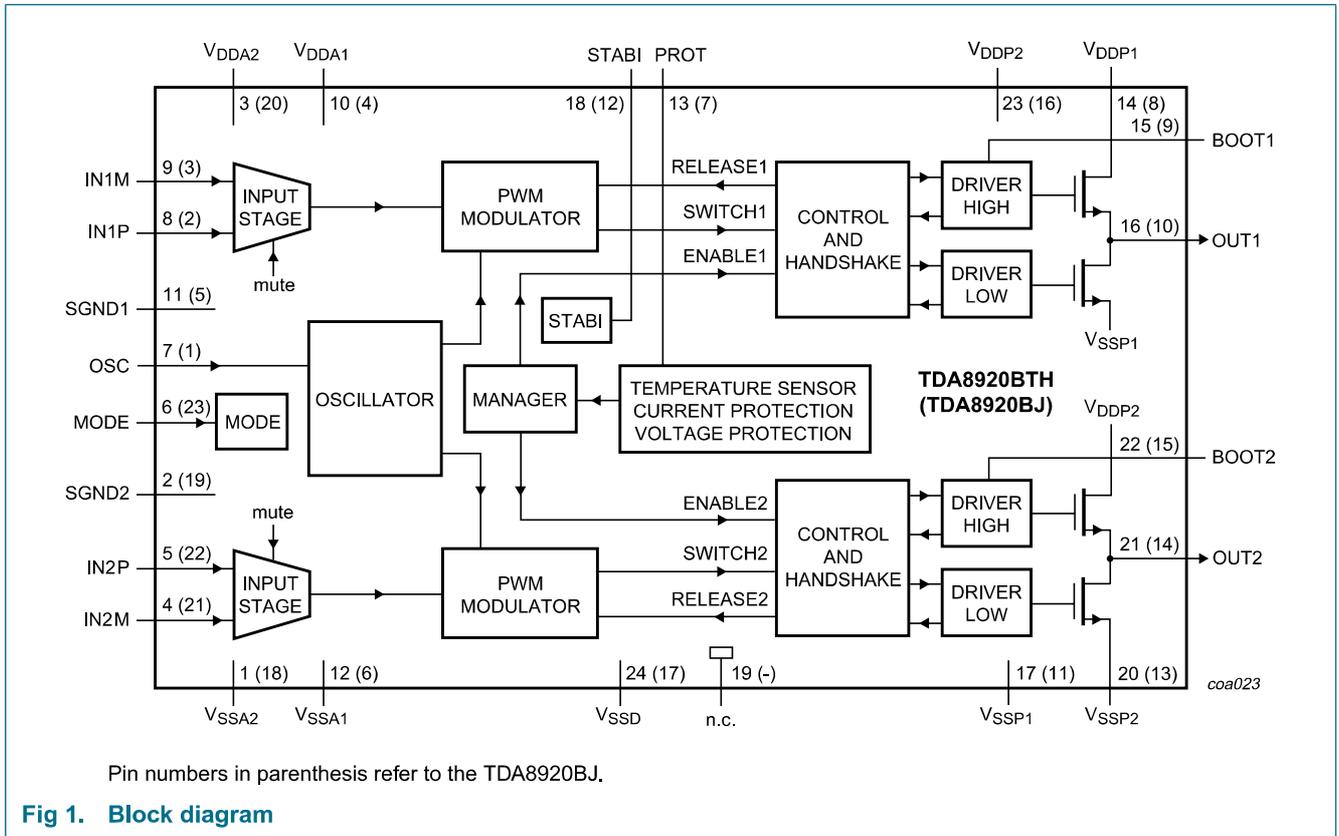
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
General; $V_P = \pm 27$ V						
V_P	supply voltage		± 12.5	± 27	± 30	V
$I_{q(\text{tot})}$	total quiescent supply current	no load; no filter; no RC-snubber network connected	-	50	65	mA
Stereo single-ended configuration						
P_o	output power	$R_L = 3 \Omega$; THD = 10 %; $V_P = \pm 27$ V	-	110	-	W
		$R_L = 4 \Omega$; THD = 10 %; $V_P = \pm 27$ V	-	86	-	W
Mono bridge-tied load configuration						
P_o	output power	$R_L = 6 \Omega$; THD = 10 %; $V_P = \pm 27$ V	-	210	-	W

5. Ordering information

Table 2: Ordering information

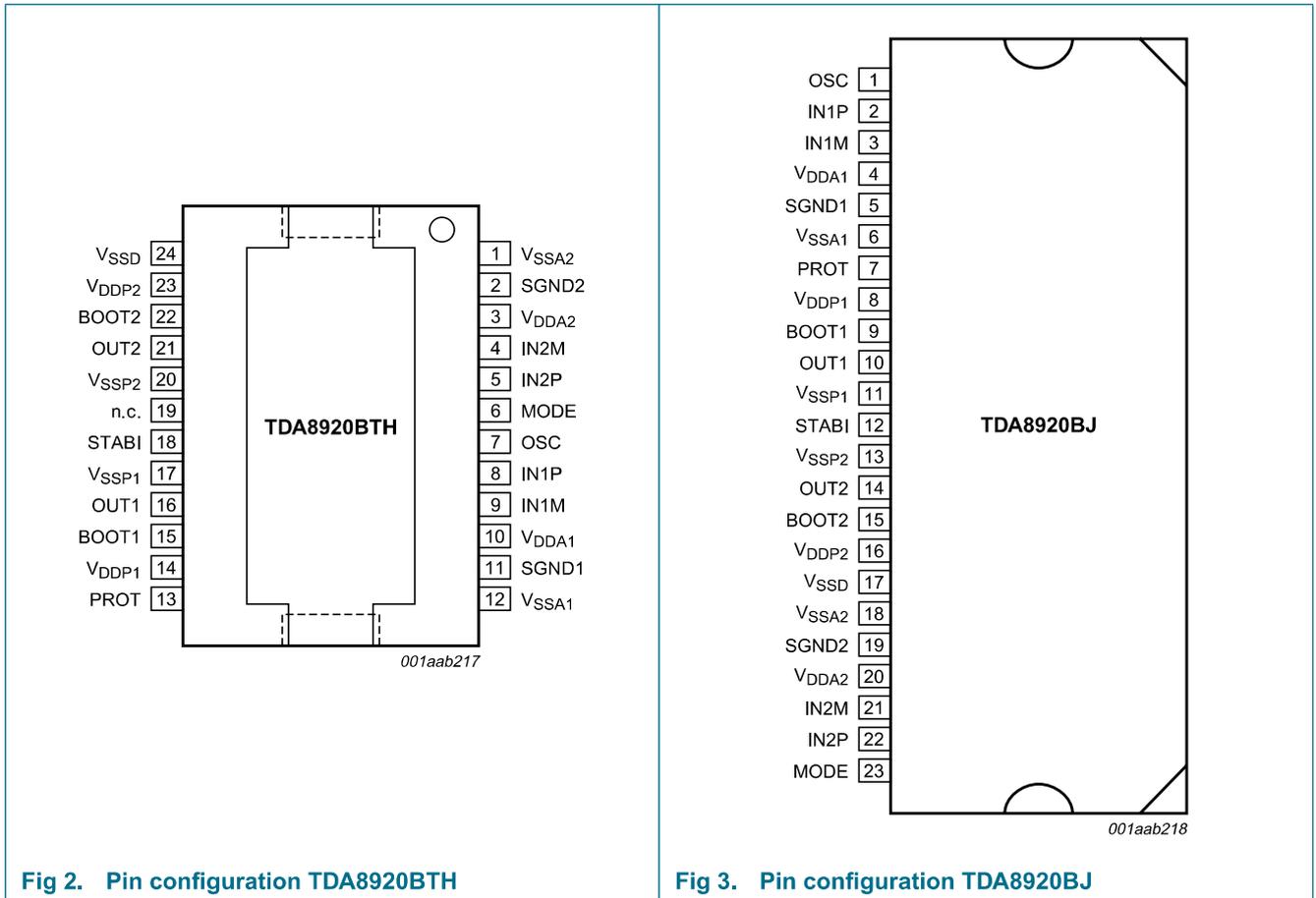
Type number	Package		
	Name	Description	Version
TDA8920BTH	HSOP24	plastic, heatsink small outline package; 24 leads; low stand-off height	SOT566-3
TDA8920BJ	DBS23P	plastic DIL-bent-SIL power package; 23 leads (straight lead length 3.2 mm)	SOT411-1

6. Block diagram



7. Pinning information

7.1 Pinning



7.2 Pin description

Table 3: Pin description

Symbol	Pin		Description
	TDA8920BTH	TDA8920BJ	
V _{SSA2}	1	18	negative analog supply voltage for channel 2
SGND2	2	19	signal ground for channel 2
V _{DDA2}	3	20	positive analog supply voltage for channel 2
IN2M	4	21	negative audio input for channel 2
IN2P	5	22	positive audio input for channel 2
MODE	6	23	mode selection input: Standby, Mute or Operating mode
OSC	7	1	oscillator frequency adjustment or tracking input
IN1P	8	2	positive audio input for channel 1
IN1M	9	3	negative audio input for channel 1
V _{DDA1}	10	4	positive analog supply voltage for channel 1

Table 3: Pin description ...continued

Symbol	Pin		Description
	TDA8920BTH	TDA8920BJ	
SGND1	11	5	signal ground for channel 1
V _{SSA1}	12	6	negative analog supply voltage for channel 1
PROT	13	7	decoupling capacitor for protection (OCP)
V _{DDP1}	14	8	positive power supply voltage for channel 1
BOOT1	15	9	bootstrap capacitor for channel 1
OUT1	16	10	PWM output from channel 1
V _{SSP1}	17	11	negative power supply voltage for channel 1
STABI	18	12	decoupling of internal stabilizer for logic supply
n.c.	19	-	not connected
V _{SSP2}	20	13	negative power supply voltage for channel 2
OUT2	21	14	PWM output from channel 2
BOOT2	22	15	bootstrap capacitor for channel 2
V _{DDP2}	23	16	positive power supply voltage for channel 2
V _{SSD}	24	17	negative digital supply voltage

8. Functional description

8.1 General

The TDA8920B is a two channel audio power amplifier using class-D technology.

The audio input signal is converted into a digital pulse width modulated signal via an analog input stage and Pulse Width Modulation (PWM) modulator. To enable the output power transistors to be driven, this digital PWM signal is applied to a control and handshake block and driver circuits for both the high side and low side. In this way a level shift is performed from the low power digital PWM signal (at logic levels) to a high power PWM signal which switches between the main supply lines.

A 2nd-order low-pass filter converts the PWM signal to an analog audio signal across the loudspeakers.

The TDA8920B one-chip class-D amplifier contains high power D-MOS switches, drivers, timing and handshaking between the power switches and some control logic. For protection a temperature sensor and a maximum current detector are built-in.

The two audio channels of the TDA8920B contain two PWM modulators, two analog feedback loops and two differential input stages. It also contains circuits common to both channels such as the oscillator, all reference sources, the mode functionality and a digital timing manager.

The TDA8920B contains two independent amplifier channels with high output power, high efficiency, low distortion and a low quiescent current. The amplifier channels can be connected in the following configurations:

- Mono Bridge-Tied Load (BTL) amplifier
- Stereo Single-Ended (SE) amplifiers