



# TDF8597

I<sup>2</sup>C-bus controlled dual channel 43 W/2  $\Omega$ , single channel 85 W/1  $\Omega$  class-D power amplifier with full diagnostics

Rev. 1 — 17 November 2011

Preliminary short data sheet

## 1. General description

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The TDF8597 is a dual Bridge-Tied Load (BTL) car audio amplifier comprising an NDMOST-NDMOST output stage based on SOI BCDMOS technology. The TDF8597 fully supports start/stop systems as it can operate at a battery voltage as low as 6 V. The TDF8597 can be controlled with or without I<sup>2</sup>C. I<sup>2</sup>C allows control of load detection results and fault conditions to be read. The TDF8597 is a high efficiency class-D amplifier with low dissipation. Due to the low dissipation, the device can be used with a smaller heat sink than standard class AB amplifiers. Six different I<sup>2</sup>C addresses can be selected with external resistors connected to the ADS and MOD pins. If pin ADS is a short-circuit to ground, the TDF8597 operates in non-I<sup>2</sup>C mode, and no I<sup>2</sup>C communication is possible. Use pins EN and ON to switch to operating and mute modes.

## 2. Features and benefits

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- High-efficiency
- Low quiescent current
- Operating voltage from 6 V to 24 V
- Start/Stop ready: continues to operate without audible disturbance during engine start at a battery voltage as low as 6 V
- 4  $\Omega$  or 2  $\Omega$  capable stereo BTL channels or 1  $\Omega$  capable mono BTL channel
- Differential inputs
- Fast-mode I<sup>2</sup>C-bus
- I<sup>2</sup>C-bus mode with 6 I<sup>2</sup>C-bus addresses or non-I<sup>2</sup>C-bus mode operation
- Clip detect selectable at 0.2 % or 10 % THD
- Independent short-circuit protection for each channel
- Advanced short-circuit protection for load, GND and supply
- Thermal foldback and thermal protection
- DC-offset protection
- Selectable AD or BD modulation
- Advanced clocking:
  - ◆ Switchable oscillator clock source: internal for Master mode or external for Slave mode
  - ◆ Spread spectrum mode
  - ◆ Phase staggering
  - ◆ Frequency hopping
- No 'pop noise' caused by DC output offset voltage
- I<sup>2</sup>C-bus mode:



- ◆ Load diagnostics
  - Speaker load, open load and shorted load
  - Amplifier output to ground and to supply shorts
  - Tweeter detection
- ◆ Thermal pre-warning diagnostic level setting
- ◆ Identification of activated protection or warnings
- ◆ Selectable diagnostic information available on DIAG and CLIP pins
- Qualified in accordance with AEC-Q100

### 3. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>General; V<sub>P</sub> = 14.4 V</b>						
V <sub>P</sub>	supply voltage		6	14.4	24	V
I <sub>P</sub>	supply current	off state; V <sub>EN</sub> < 0.8 V	-	2	10	μA
I <sub>q</sub>	quiescent current	no load, snubbers and output filter connected	-	90	120	mA
<b>Stereo mode; V<sub>P</sub> = 14.4 V</b>						
P <sub>o</sub>	output power	R <sub>L</sub> = 4 Ω; THD = 10 %	24	26	-	W
		R <sub>L</sub> = 2 Ω; THD = 10 %	39	43	-	W
<b>Stereo mode; V<sub>P</sub> = 24 V</b>						
P <sub>o</sub>	output power	R <sub>L</sub> = 4 Ω; THD = 10 %	-	70	-	W
		R <sub>L</sub> = 2 Ω; THD = 10 %	-	100	-	W
<b>Parallel mode; V<sub>P</sub> = 14.4 V</b>						
P <sub>o</sub>	output power	R <sub>L</sub> = 1 Ω; THD = 10 %	-	85	-	W
<b>Parallel mode; V<sub>P</sub> = 24 V</b>						
P <sub>o</sub>	output power	R <sub>L</sub> = 2 Ω; THD = 10 %	-	138	-	W
		R <sub>L</sub> = 1 Ω; THD = 1 %	135	150	-	W

### 4. Ordering information

Table 2. Ordering information

Type number	Package		Version
	Name	Description	
TDF8597TH	HSOP36	HSOP36: plastic, heatsink small outline package; 36 leads; low stand-off height	SOT851-2

### 5. Block diagram

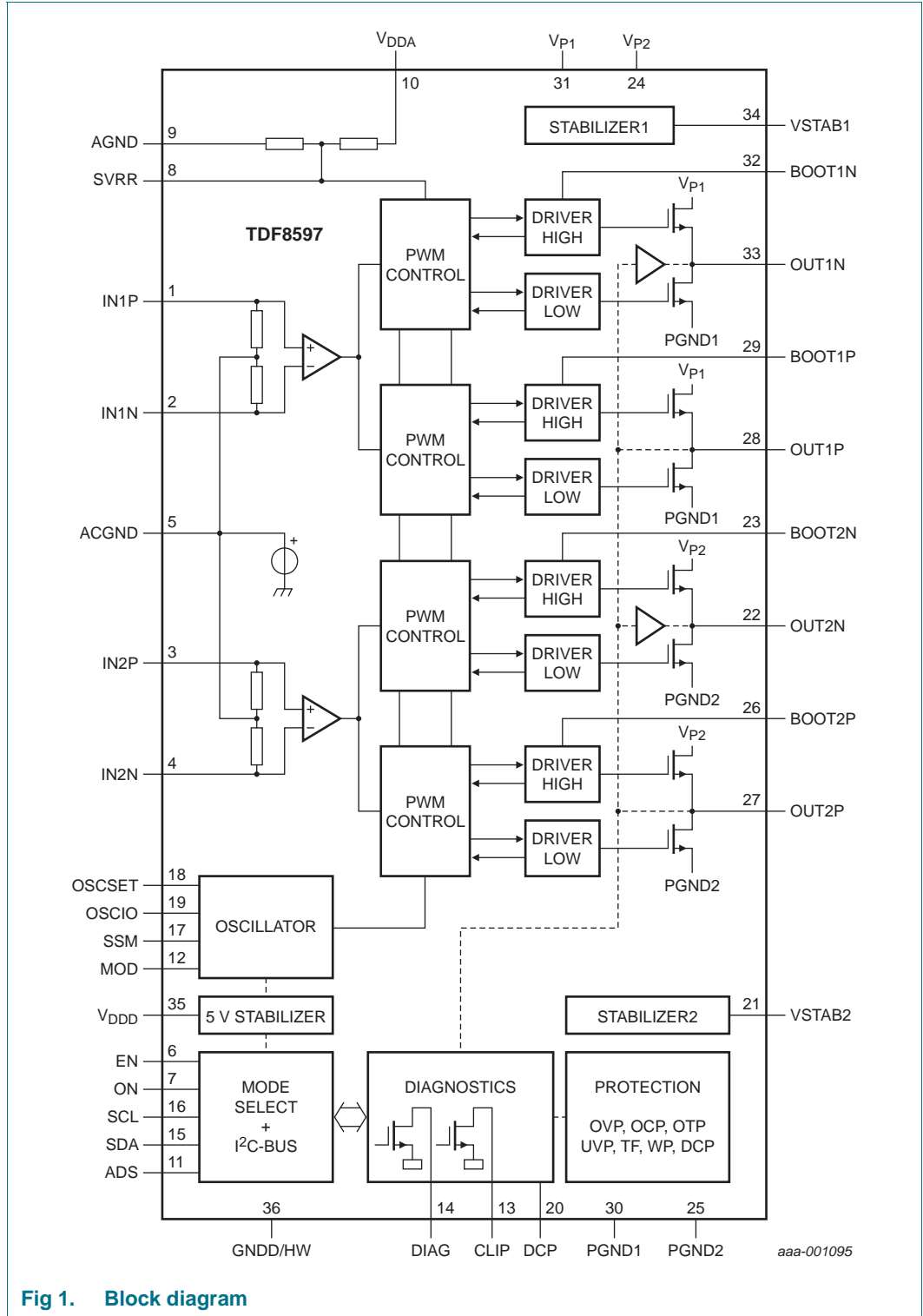


Fig 1. Block diagram

## 6. Limiting values

**Table 3. Limiting values**

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>P</sub>	supply voltage	Operating mode	-	29	V
		off state	[1] -1	+50	V
		load dump; duration 50 ms; t <sub>r</sub> > 2.5 ms	-	50	V
I <sub>ORM</sub>	repetitive peak output current	maximum output current limiting	[2] 8	-	A
I <sub>OM</sub>	peak output current	non-repetitive:			
		Stereo mode	-	18	A
		Parallel mode	-	12	A
I <sub>sink(max)</sub>	maximum sink current	pins DIAG and CLIP	0	5	mA
V <sub>i</sub>	input voltage	referred to GNDD:			
		pins SCL and SDA	0	5.5	V
		pins DIAG and CLIP	0	10	V
		pin OSCIO	0	5.5	V
		referred to AGND:			
		pins EN and ON	0	5.5	V
		pins ADS, MOD and SSM	0	5.5	V
		pins IN1P, IN1N, IN2P, and IN2N	0	10	V
V <sub>i(dif)</sub>	differential input voltage	RMS; pins IN1P, IN1N, IN2P, and IN2N	0	3	V
R <sub>ESR</sub>	equivalent series resistance	as seen between pins V <sub>P</sub> and PGNDn	-	350	mΩ
T <sub>j</sub>	junction temperature		-	150	°C
T <sub>stg</sub>	storage temperature		-55	+150	°C
T <sub>amb</sub>	ambient temperature		-40	+85	°C
V <sub>ESD</sub>	electrostatic discharge voltage	HBM	[3]		
		C = 100 pF; R <sub>s</sub> = 1.5 kΩ	-	2000	V
		CDM	[4]		
		non-corner pins (except pin 10, V <sub>DDA</sub> )	-	500	V
		pin 10, V <sub>DDA</sub>	-	300	V
	corner pins	-	750	V	
V <sub>(prot)</sub>	protection voltage	AC and DC short-circuit voltage of output pins across load and to supply and ground	[5] 0	V <sub>P</sub>	V

[1] Floating condition assumed for outputs.

[2] Current limiting concept.

[3] Human Body Model (HBM).

[4] Charged-Device Model (CDM).

[5] The output pins are defined as the output pins of the filter connected between the TDF8597 output pins and the load.

## 7. Revision history

Table 4. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
TDF8597_SDS v.1	20111117	Preliminary short data sheet	-	-

## 8. Legal information

### 8.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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Date of release: 17 November 2011

Document identifier: TDF8597\_SDS



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