TDF8597

I²C-bus controlled dual channel 43 W/2 Ω, single channel
85 W/1 Ω class-D power amplifier with full diagnostics

Rev. 1 — 17 November 2011   **Preliminary short data sheet**

1. General description

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 I²C. I²C 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 I²C 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-I²C mode, and no I²C communication is possible.
Use pins EN and ON to switch to operating and mute modes.

2. Features and benefits

- 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 Ω or 2 Ω capable stereo BTL channels or 1 Ω capable mono BTL channel
- Differential inputs
- Fast-mode I²C-bus
- I²C-bus mode with 6 I²C-bus addresses or non-I²C-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
- I²C-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
General; V_P = 14.4 V						
V_P	supply voltage		6	14.4	24	V
I_P	supply current	off state; V_{EN} < 0.8 V	-	2	10	μA
I_q	quiescent current	no load, snubbers and output filter connected	-	90	120	mA
Stereo mode; V_P = 14.4 V						
P_o	output power	R_L = 4 Ω; THD = 10 %	24	26	-	W
		R_L = 2 Ω; THD = 10 %	39	43	-	W
Stereo mode; V_P = 24 V						
P_o	output power	R_L = 4 Ω; THD = 10 %	-	70	-	W
		R_L = 2 Ω; THD = 10 %	-	100	-	W
Parallel mode; V_P = 14.4 V						
P_o	output power	R_L = 1 Ω; THD = 10 %	-	85	-	W
Parallel mode; V_P = 24 V						
P_o	output power	R_L = 2 Ω; THD = 10 %	-	138	-	W
		R_L = 1 Ω; THD = 1 %	135	150	-	W

4. Ordering information

Table 2.   Ordering information

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

5.   Block diagram

Fig 1.   Block diagram

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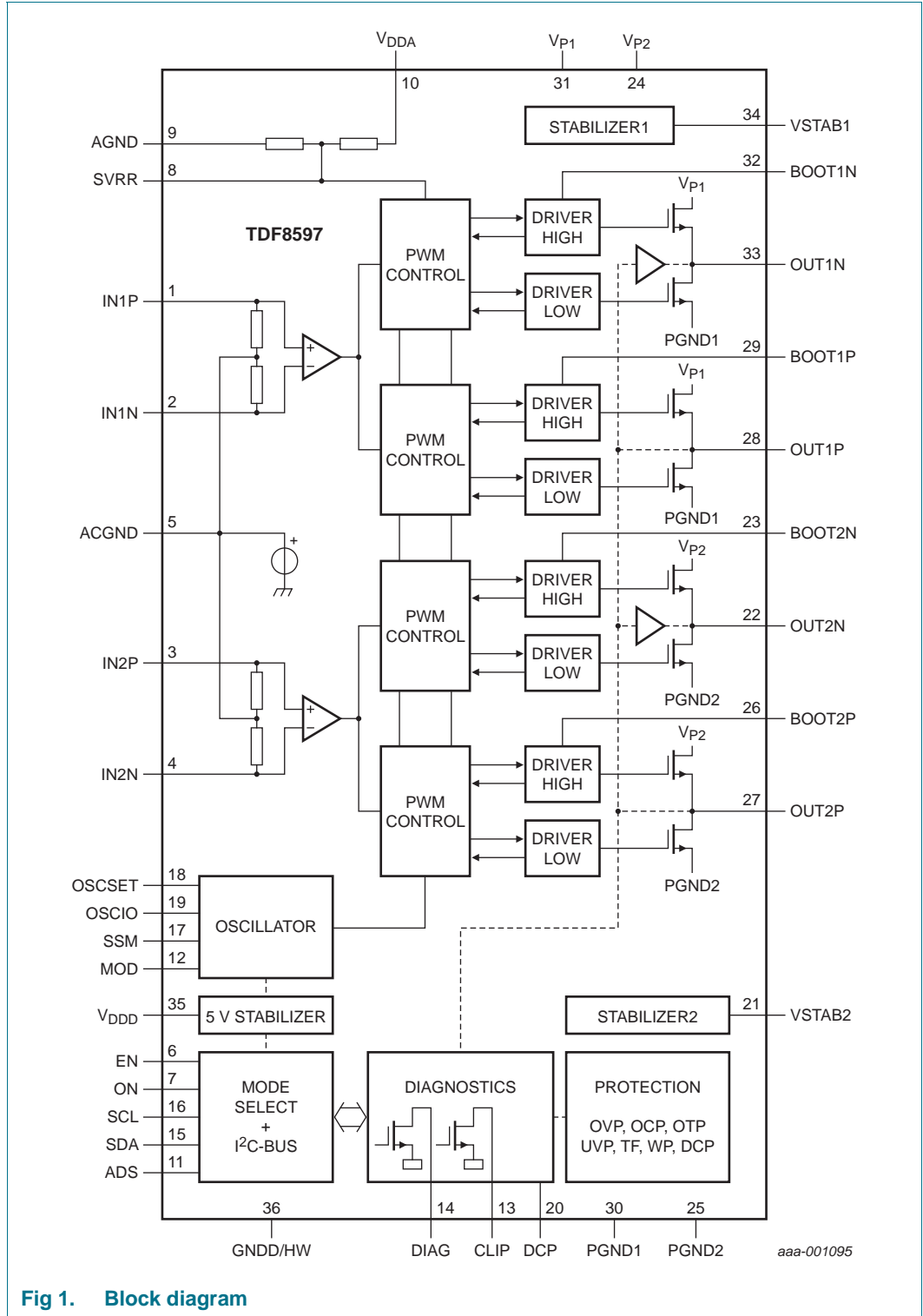
6. Limiting values

Table 3.   Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
V_P	supply voltage	Operating mode		-	29	V
		off state	[1]	−1	+50	V
		load dump; duration 50 ms; t_r > 2.5 ms		-	50	V
I_{ORM}	repetitive peak output current	maximum output current limiting	[2]	8	-	A
I_{OM}	peak output current	non-repetitive:				
		Stereo mode		-	18	A
		Parallel mode		-	12	A
$I_{sink(max)}$	maximum sink current	pins DIAG and CLIP		0	5	mA
V_i	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
$V_{i(dif)}$	differential input voltage	RMS; pins IN1P, IN1N, IN2P, and IN2N		0	3	V
R_{ESR}	equivalent series resistance	as seen between pins V_P and PGNDn		-	350	mΩ
T_j	junction temperature			-	150	°C
T_{stg}	storage temperature			−55	+150	°C
T_{amb}	ambient temperature			−40	+85	°C
V_{ESD}	electrostatic discharge voltage	HBM	[3]			
		C = 100 pF; R_s = 1.5 kΩ		-	2000	V
		CDM	[4]			
		non-corner pins (except pin 10, V_{DDA})		-	500	V
		pin 10, V_{DDA}		-	300	V
		corner pins		-	750	V
$V_{(prot)}$	protection voltage	AC and DC short-circuit voltage of output pins across load and to supply and ground	[5]	0	V_P	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.

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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	-	-

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Preliminary short data sheet

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8. Legal information

8.1 Data sheet status

Document status[1][2]	Product status[3]	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.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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