

NXP quad Class-AB amplifiers TDF854x for automotive

Continuous sound experience for stop/start cars

Designed for use in stop/start cars, these advanced Class-AB amplifiers support listening to audio streams while the car's internal power supply is down for engine start. They operate in the range of 6 to 18 V.

Key features

- Supports stop/start cars by operating voltage range of: 6 -18 V
- Low V_p mute level adjustable via I²C (6, 8 V)
- Optimized for low pop (switch-on pop guaranteed in test program)
- Full (start-up) diagnostics with flexible read-out
- Programmable DIAG pin
- Second clip-detect pin for additional front/rear detection (mid-tone/bass)
- Family approach with graduated output power (25, 28 W)
- Compatible with Best-Efficiency quad amplifier (25, 28 W)

Application

- Automotive infotainment

The TDF854x family reflects NXP's ongoing commitment to improving functionality and performance in automotive infotainment systems. Available in configurations with I²C-bus control or a Best Efficiency mode, they operate over a wide voltage range and reduce dissipation.

I²C-bus control

The TDF8541, TDF8542, and TDF8544 are quad Class-AB amplifiers with I²C-bus control. The TDF8541 uses an asymmetrical input configuration, delivers an output power of 25 W, and is available in a DBS27 or HSOP36 package. The TDF8542 uses a symmetrical input configuration, delivers an output power of 25 W, and is housed in an HSOP36 package. The TDF8544 uses an asymmetrical input configuration, delivers an output power of 28 W, and is available in a DBS27 or HSOP36 package.

All three devices offer the following features:

- Load dump/over voltage protection
- All amplifier outputs short circuit proof to ground, supply voltage and across the load, independent per channel
- All pins short circuit proof to ground
- Thermal protection to avoid thermal breakdown
- Selectable gain 16/26 dB
- No plops when switching:
  - Switch on/switch off
  - Standby and mute
  - Mute and operating
- Single mode control pin (standby, operating: mute/on)
- Low standby current
- Low power dissipation in any short-circuit condition
- Outputs short-circuit proof to ground
- Low V_p mute for fast mute V_p drops
- Line driver mode (16 dB gain in BTL mode)
- Line driver mode supports engine start down to 6 V (16 dB and midtap voltage 0.25 V_p).

The bus-controlled features are as follows:

- Diagnostic output gives clip information at selectable THD levels (2, 5 and 10%)
- Indication of a short circuit at an amplifier output, short to battery and ground
- DC-load detection: open, short and present (woofer)
- AC-load detection: for tweeters via series capacitors
- Programmable clip detection: 2, 5 and 10%.
- Programmable thermal pre-warning
- Independent short-circuit protection per channel
- Soft thermal clipping to prevent audio holes

Best Efficiency mode

The TDF8546 and TDF8548 are compatible I²C bus controlled Class-AB amplifiers with the added intelligence of a Best Efficiency mode. In this mode, the devices will have 62% less dissipation compared to standard Class-AB amplifiers with correlated signals between front and rear channels. There is a 4 channel best efficiency mode built in which will have 17% less dissipation than the commonly used 2*2 channel high efficiency mode when there is uncorrelated signals between the front and the rear speakers. A patented best efficiency control will have a low distortion at higher signals.

The TDF8546 uses an asymmetrical input configuration, delivers 25 W of output power, and is available in a DBS27 or HSOP36 package. The TDF8548 uses an asymmetrical input configuration, delivers an output power of 28 W, and is available in a DBS27 or HSOP36 package.

Output power 14.4 V; 10% THD @ 4 Ω	Input configuration	Package	Class-AB amplifier with I²C control	Class-AB amplifier with Best Efficiency mode
25 W	Asymmetrical	DBS27 (Best Watt)	TDF8541J/JS/SD	TDF8546J/JS/SD
25 W	Asymmetrical	HSOP36	TDF8541TH*	TDF8546TH*
25 W	Symmetrical	HSOP36	TDF8542TH*	
28 W	Asymmetrical	DBS27 (Best Watt)	TDF8544J/JS/SD	TDF8548J/JS/SD
28 W	Asymmetrical	HSOP36	TDF8544TH*	TDF8548TH*

* input pins and output pins on opposite configuration

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Date of release: February 2011
Document order number: 9397 750 17062
Printed in the Netherlands