

NXP quad Class-AB amplifiers TDF854x for automotive

Seamless sound experience for start-stop 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

- Keeps operating without audible disturbance during engine start at a battery voltage as low as 6 V
- Low V_p mute level adjustable via I²C (6 V, 8 V)
- Optimized for low 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)
- Pin-to-pin compatible family approach with scalable output power and Best Efficiency Mode
- Compatible with Best Efficiency quad amplifier (25 W)
- Best Efficiency Mode with patented low switching distortion
- Best Efficiency Mode (uses information from 4 channels) with 17% less dissipation for uncorrelated signals compared to 2-channel high efficiency mode

APPLICATION

- Automotive Head Unit
- Automotive Hybrid Sound System

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

TDF854x family is quad Class-AB amplifiers with I²C-bus control. The TDF8541 and TDF8544 use an Asymmetrical or 'single ended' input configuration, delivers an output power of 25 W or 28 W, and are available in several bend variants of DBS27 or HSOP36 package.

All amplifier qualified in accordance with the Automotive Electronics Council (AEC) standard Q100.

All 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
- Internally fixed gain of 16 dB or 26 dB
- No hearable 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 are short-circuit proof to ground
- Low V_p mute for fast mute V_p drops
- Line driver mode (16 dB gain in BTL mode)
- Low gain mode for booster mode during engine start condition

The bus-controlled features are as follows:

- Diagnostic output gives clip information at selectable and programmable 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 thermal pre-warning
- Independent short-circuit protection per channel
- Soft thermal clipping to prevent audio holes

BEST EFFICIENCY MODE TDF8546 / TDF8546A

The TDF8546A is a redesign of the TDF8546 having a lower quiescent current and improved electromagnetic immunity (EMI) properties.

The TDF8546 and TDF8546A use an asymmetrical input configuration, delivers 25 W of output power, and is available in several bend variants of DBS27 or HSOP36 package.

Output power 14.4 V; 10% THD @ 4 Ω	Input configuration	Package Name	Class-AB amplifier with I²C control	Class-AB amplifier with Best Efficiency mode
25 W	Asymmetrical	DBS27	TDF8541J/JS/SD	TDF8546J/JS TDF8546AJ/SD
25 W	Asymmetrical	HSL-DBS27	TDF8541JV/SU	TDF8546JV/SU, TDF8546AJV/SU
25 W	Asymmetrical	HSOP36	TDF8541TH*	TDF8546ATH* TDF8546TH*
28 W	Asymmetrical	DBS27	TDF8544AJ/SD TDF8544J/SD	
28 W	Asymmetrical	HSOP36	TDF8544TH*	

* Input and output pins use opposite configuration.

Package letters	Name	Description	Version
J	DBS27P	Plastic DIL-bent-SIL (special bent) power package; 27 leads	SOT827-1
JV	HSL-DBS27	Heat slug less -Plastic DIL-bent-SIL (special bent) power package; 27 leads	SOT-1866-1
JS	DBSMS27P	Plastic dual bent surface mounted SIL power package; 27 leads	SOT1154-1
SD	RDBS27P	Plastic rectangular-DIL-bent-SIL (reverse bent) power package; 27 leads	SOT878-1
SU	HSL-RDBS27	Heat slug less - Plastic rectangular-DIL-bent-SIL (reverse bent) power package; 27 leads	SOT-1961-1
TH	HSOP36	Plastic heat sink small outline package; 36 leads; low standoff height	SOT851-1

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