

## 4.2W Mono Class-K Audio Amplifier

### Features

- Supply voltage range: 2.8 V to 5.5 V
- Static operation current: 3.5mA
- Shutdown current: <1uA
- Loudspeaker peak power from 5V supply:
  - 4.2W @ 4Ω, Po,10% THD+N
  - 3.5W @ 4Ω, Po,1% THD+N
- Loudspeaker peak power from 4.2V supply:
  - 3W @ 4Ω, Po,10% THD+N
  - 2.6W @ 4Ω, Po,1% THD+N
  - 2.9W @ 8Ω, Po,10% THD+N
  - 2.3W @ 8Ω, Po,1% THD+N
- Gain setting: 27.5dB
- Integrated adaptive charge-pump circuit
- Non-Crack-Noise (NCN) Function
- Pop noise and click noise reduction
- Under-Voltage detection
- Short-Circuit protection with auto recovery
- Over temperature protection with auto recovery

### Applications

- Portable Multimedia Devices
- Mobile Phones
- GPS
- Handsets

### Description

The AD51653 is a mono, class-D audio amplifier with a built-in, adaptive charge pump circuit for better system power efficiency. Due to its design, AD51653 can provide a constant 3W peak output power with 4ohm speaker at 4.2V of battery output voltage. When the amplitude of the input audio signal is below a threshold, AD51653 operates in power-saving mode, which disables the charge-pump circuit to save power, and the amplifier is directly powered by the battery. When the amplitude of the audio signal exceeds the threshold level, AD51653 enables the charge-pump circuit to generate a regulated, 2xVDD (input power) power supply up to 6.5V, to drive the amplifier. Since most of time the audio signal is below the threshold level, this feature prolongs the battery life effectively without sacrificing the output quality.

The non-crack-noise (NCN) function is enabled to prevent output signal from distortion when the input signal exceeds a threshold level. All these functions are performed automatically. AD51653 features four control modes, controlled by a one-wire pulse signal, to achieve different NCN mode setting.

The output short circuit and over temperature protections provide auto-recovery feature. AD51653 is available in TQFN 4x4-28L, TQFN3x3-20L, E-TSSOP-14L and WLCSP-12L packages.

### Simplified Application Circuit

