[0012] As stated above, the present disclosure provides an energy storage device and a control method thereof, using a control charger module to achieve assisting the adapter to charge the electronic device. Therefore, the energy storage device according to the present disclosure does not require a buck circuit and a boost circuit as in the conventional energy storage device. Compared to the conventional energy storage device operating based on a control signal to control the switching between the buck circuit and the boost circuit, the energy storage device according to the present disclosure does not require the switching between the buck circuit and the boost circuit to respond to the request of an electronic device. In other words, the energy storage device according to the present disclosure exhibits less response time and good stability of operation.

[0013] In order to further understand the techniques, means and effects of the present disclosure, the following detailed descriptions and appended drawings are hereby referred to, such that, and through which, the purposes, features and aspects of the present disclosure can be thoroughly and concretely appreciated; however, the appended drawings are merely provided for reference and illustration, without any intention to be used for limiting the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The accompanying drawings are included to provide a further understanding of the present disclosure, and are incorporated in and constitute a part of this specification. The drawings illustrate exemplary embodiments of the present disclosure and, together with the description, serve to explain the principles of the present disclosure.

[0015] FIG. **1** is a schematic diagram of an energy storage device according to one embodiment of the present disclosure;

[0016] FIG. **2** is a schematic diagram of a charger module according to one embodiment of the present disclosure;

[0017] FIG. **3** is a waveform diagram of the voltage and the current of a charger module according to one embodiment of the present disclosure; and

[0018] FIG. **4** is a flowchart of a control method of an energy storage device according to one embodiment of the present disclosure.

DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

[0019] The detailed description set forth below in connection with the appended drawings is intended as a description of certain embodiments of the present disclosure, and is not intended to represent the only forms that may be developed or utilized. The description sets forth the various functions in connection with the illustrated embodiments, but it is to be understood, however, that the same or equivalent functions may be accomplished by different embodiments that are also intended to be encompassed within the scope of the present disclosure.

[0020] While such terms as "first," "second," etc., may be used to describe various components, such components must not be limited to the above terms. The above terms are used only to distinguish one component from another. For example, a second component may be referred to as a first component within the scope of the present disclosure, and similarly, the first component may be referred to as the second component. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items.

[0021] Referring to FIG. **1**, FIG. **1** is a schematic diagram of an energy storage device according to one embodiment of the present disclosure. The energy storage device **1** includes at least one energy input interface **10**, an adapter **11**, a charger module **12**, an energy storage unit **13** and at least one energy output interface **14**. The adapter **11** is coupled to the energy input interface **10** and the charger module **12**. The charger module **12** is coupled to the energy storage unit **13** and the energy output interface **14**. Moreover, the electronic device **2** is coupled to the energy output interface **14**. The energy storage device **1** is, for example, a mobile power pack compatible with the On-The-Go (OTG) standard. In other words, the energy storage device **1** receives electricity from the utility and stores energy therein. Also, the energy storage device **1** provides other electronic devices with electricity.

[0022] The electronic device **2** is, for example, a mobile phone, a tablet computer, a music player or an audio/video player and the like using universal serial bus (USB) interfaces, to which the present disclosure is not limited. The electronic device **2** receives an output current I_{SYS} provided by the charger module **12** through the energy output interface **14** and is charged according to the output current I_{SYS}.

[0023] The energy input interface **10** is, for example, a USB interface for receiving electricity from the utility and inputting the electricity from the utility into the adapter **11**. It should be noted that, in the present embodiment, the energy storage device **1** only includes an energy input interface **10**, to which, however, the present disclosure is not limited. In other embodiments, the energy storage device **1** may also include a plurality of energy input interfaces **10**. In other words, the energy storage device **1** may provide faster charging using the plurality of energy input interfaces **10**. For better understanding, the energy storage device **1** is exemplified by using an energy input interface **10**.

[0024] Similarly, the energy output interface **14** is, for example, a USB interface for outputting the energy stored in the energy storage device **1** to a corresponding electronic device **2**. In the present embodiment, the energy storage device **1** only includes an energy output interface **14**, to which, however, the present disclosure is not limited. In other embodiments, the energy storage device **1** may also include a plurality of energy output interfaces **14**. Each of the energy output interfaces **14** is coupled to an electronic device. In other words, the energy storage device **1** may charge a plurality of electronic devices **2** through a plurality of energy output interfaces **14** at the same time. For better understanding, the energy storage device **1** is exemplified by using an energy output interface **14**.

[0025] The energy storage unit **13** is, for example, a battery for storing the received energy or converting the energy stored therein into electricity to be supplied to the electronic device **2**.

[0026] The adapter **11** includes adequate logic circuits and/or coding for stepping up or stepping down the utility voltage according to Faraday's law of electromagnetic induction and generating an input current I_{CIC}.

[0027] The charger module **12** receives the input current I_{CIC} and charges the energy storage unit **13** or the electronic device **2** according to whether the energy storage device **1** operates in a boost mode or a buck mode. More particularly,