[0013] Therefore, in view of the above-mentioned problems, an object of this invention is to provide a current detecting circuit, in which the current flowing to a switching device is enabled to be detected with high accuracy, with low power loss, with high voltage, and in an insulated form. Patent reference 1: JP,7-231650,A

DISCLOSURE OF THE INVENTION

[0014] This invention has instituted following technical means to accomplish the above-mentioned object.

[0015] Specifically, a circuit, in which a current flowing to a switch device also flows to a choke coil which is a component of the circuit, includes a charge circuit charging a capacitor through a current which is proportional to a voltage developed in the choke coil, and a discharge circuit setting the voltage of the capacitor to 0V when the current flowing to the switching device is 0, and the circuit is capable of detecting the voltage of the capacitor as a value which is proportional to the current flowing to the switching device.

[0016] According to another technical means of this invention, a circuit, in which a choke coil and a switching device are connected in series between output-terminals of a DC power supply and a series circuit of a diode and a capacitor is connected to both ends of the switching device in parallel, so that electromagnetic energy is accumulated to the choke coil by on-off operation of the switching device and emitted into the capacitor through the diode to obtain DC voltage, includes a charge circuit charging the capacitor through a current which is proportional to a voltage developed in the choke coil, and a discharge circuit setting the voltage of the capacitor to 0V when the current flowing to the switching device is 0, and the circuit is capable of detecting the voltage of the capacitor as a value which is proportional to the current flowing to the switching device.

[0017] In addition, according to another technical means of this invention, a circuit of a half-bridge type HID lighting circuit, in which a series circuit of a pair of switching devises is connected between output-terminals of a DC power supply and a series circuit of a pair of capacitors is also connected between them, and a choke coil and a HID lamp are connected between a midpoint of the pair of switching devices and a midpoint of the pair of capacitors, so that the HID lamp is lit up in high frequency by making the pair of switching devices perform on-off operation in an alternating sequence, includes a charge circuit charging the capacitor through a current which is proportional to a voltage developed in the choke coil, and a discharge circuit setting the voltage of the capacitor to 0V when both of the pair of switching devices are turned off, and the circuit is capable of detecting the voltage of the capacitor as a value which is proportional to the current flowing to the switching devices.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] FIG. **1** is a circuit diagram showing an embodiment of the invention;

[0019] FIG. **2** is a waveform diagram explaining an operation of the invention;

[0020] FIG. **3** is a circuit diagram showing another embodiment;

[0021] FIG. **4** is a waveform diagram explaining an operation of the invention;

[0022] FIG. **5** is another waveform diagram explaining an operation of the invention;

[0023] FIG. **6** is a circuit diagram showing a conventional example;

[0024] FIG. **7** is a circuit diagram showing another conventional example;

[0025] FIG. **8** is a circuit diagram showing another conventional example; and

[0026] FIG. **9** is a circuit diagram showing another conventional example.

BEST MODE FOR CARRYING OUT THE INVENTION

[0027] Hereafter, preferred embodiments of the invention is explained referring to the drawings.

[0028] FIG. **1** shows an embodiment employing this invention in a boosting chopper circuit utilizing an active-filter. In this diagram, **1** is a commercial AC power supply, and **2** is a full-wave rectifying circuit which rectifies the AC power supply (**1**) and is constituted by a diode-bridge. A DC power supply (**4**) is constituted by the AC power supply (**1**) and the full-wave rectifying circuit (**2**).

[0029] **5** is a choke coil and **6** is a switching device (a semiconductor switch), which are constituted by, for example, a metal oxide semiconductor field effect transistor (MOSFET). The choke coil (**5**) and the switching device (**6**) are connected between output-terminals of the DC power supply (**4**) in series. A series circuit of a diode (**7**) and a capacitor (**8**) is connected to both ends of the switching device (**6**) in parallel. The DC power supply (**4**), the choke coil (**5**), the switching device (**6**), the diode (**7**), and the capacitor (**8**) constitute an active filter, in which electromagnetic energy is accumulated to the choke coil (**5**) by performing on-off operations of the switching device (**6**) in high-frequency, and then the energy is emitted into the capacitor (**8**) through the diode (**7**), whereby a higher voltage than a voltage obtained by rectifying the AC power supply (**1**) through the full-wave rectifying circuit (**2**) is accumulated to the capacitor (**8**).

[0030] As shown by chain-dotted line in FIG. **1**, a discharge lamp lighting device, which brings a discharge lamp (**12**) into high frequency lighting, is constituted by connecting the discharge lamp (**12**) to the output-end side of the capacitor (**8**) through a inverter circuit (**11**) as a load of the boosting chopper circuit (active filter).

[0031] And, a switch control circuit (**15**) controlling on-off operation of the switching circuit (**6**), a charge circuit (**17**) charging a capacitor (**16**) through a current which is proportional to the voltage developed in the choke coil (**5**), and a discharge circuit (**18**) discharging to bring the voltage of the capacitor (**16**) to 0V when the current flowing to the switching device (**6**) is 0, are provided, and a secondary coil (**5***b*) is provided to the choke coil (**5**).