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## Samsung Galaxy Fold smartphone

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### Patent Claims

1. An electronic device, comprising:

a power management circuit configured to supply power to the electronic device;

a first battery electrically connected with a power input port of the power management circuit;

a second battery electrically connected with the power input port;

a first charging circuit configured to charge the first battery;

a second charging circuit configured to charge the second battery;

a first current control circuit electrically connected between the first charging circuit and the first battery, and configured to control a first charging current supplied from the first charging circuit to the first battery and a leakage current due to a voltage difference between the first battery and the second battery; and

a second current control circuit electrically connected between the second charging circuit and the second battery, and configured to control a second charging current supplied from the second charging circuit to the second battery and the leakage current.

2. The electronic device of **claim 1**, wherein the first battery and the second battery have different characteristics.

3. The electronic device of **claim 1**, wherein the first charging circuit is connected to the second charging circuit.

4. The electronic device of **claim 1**, wherein, if a first current greater than an allowable current of the first battery flows in the first battery, the first current control circuit is further configured to decrease the first current to below the allowable current of the first battery, and

if a second current greater than an allowable current of the second battery flows in the second battery, the second current control circuit is configured to decrease the second current to below the allowable current of the second battery.

5. The electronic device of **claim 1**, further comprising:

a third current control circuit electrically connected between the first charging circuit and the first battery, and configured to control a first discharging current supplied from the first battery to the power management circuit and the leakage current due to the voltage difference between the first battery and the second battery; and

a fourth current control circuit electrically connected between the second charging circuit and the second battery, and configured to control a second discharging current supplied from the second battery to the power

management circuit and the leakage current.

**6.** The electronic device of **claim 5**, further comprising an output port of the first current control circuit connected to an output port of the third current control circuit, and an output port of the second current control circuit connected to an output port of the fourth current control circuit.

**7.** The electronic device of **claim 5**, further comprising:

a processor connected with the third current control circuit and the fourth current control circuit,

wherein the processor is configured to:

identify setting currents of the third current control circuit and the fourth current control circuit,

determine whether battery state information satisfies an update condition, and

if the battery state information satisfies the update condition, change the setting current of the third current control circuit or the fourth current control circuit.

**8.** The electronic device of **claim 7**, wherein the battery state information comprises at least one of power levels of the first battery and the second battery, temperatures of the first battery and the second battery, or a current flowing in the first battery and the second battery.

**9.** The electronic device of **claim 7**, wherein the update condition comprises at least one of a power level difference of the first battery and the second battery exceeding a threshold, or at least one temperature of the first battery and the second battery exceeding a reference temperature.

**10.** The electronic device of **claim 1**, further comprising:

a first power supply control circuit electrically connected between the first charging circuit and the power management circuit, and configured to control the leakage current due to the voltage difference between the first battery and the second battery; and

a second power supply control circuit electrically connected between the second charging circuit and the power management circuit, and configured to control the leakage current.

**11.** An electronic device, comprising:

a power management circuit configured to supply power to the electronic device;

a first battery electrically connected with a power input port of the power management circuit;

a second battery electrically connected with the power input port;

a first charging circuit configured to charge the first battery;

a second charging circuit configured to charge the second battery;

a first power supply control circuit electrically connected between the first charging circuit and the power management circuit, and configured to control a leakage current due to a voltage difference between the first battery and the second battery; and

a second power supply control circuit electrically connected between the second charging circuit and the power management circuit, and configured to control the leakage current.

**12.** The electronic device of **claim 11**, wherein the first battery and the second battery have different characteristics.

**13.** The electronic device of **claim 11**, wherein the first charging circuit is connected to the second charging circuit.

**14.** The electronic device of **claim 11**, further comprising:

a first current control circuit electrically connected between the first charging circuit and the first battery, and configured to control a first charging current supplied from the first charging circuit to the first battery and the leakage current due to the voltage difference between the first battery and the second battery; and

a second current control circuit electrically connected between the second charging circuit and the second battery, and configured to control a second charging current supplied from the second charging circuit to the second battery and the leakage current.

**15.** The electronic device of **claim 11**, further comprising:

a third current control circuit electrically connected between the first charging circuit and the first battery, and configured to control a first discharging current supplied from the first battery to the power management circuit and the leakage current due to the voltage difference between the first battery and the second battery; and

a fourth current control circuit electrically connected between the second charging circuit and the second battery, and configured to control a second discharging current supplied from the second battery to the power management circuit and the leakage current.

**16.** The electronic device of **claim 11**, further comprising:

a processor connected with the first charging circuit, the second charging circuit, the first power supply control circuit, and the second power supply control circuit,

wherein the processor is configured to:

detect a connection of the electronic device to an external charging device,

compare a power level of the first battery with a power level of the second battery,

if the power level of the first battery is greater than the power level of the second battery, turn off the second power supply control circuit, and

if the power level of the first battery is less than the power level of the second battery, turn off the first power supply control circuit.

**17.** The electronic device of **claim 16**, wherein the processor is further configured to:

determine whether to supply power to the electronic device if the first power supply control circuit is turned on, and

discharge the first battery if the electronic device requires power.

**18.** The electronic device of **claim 16**, wherein the processor is further configured to:

determine whether to supply power to the electronic device if the second power supply control circuit is turned on, and

discharge the second battery if the electronic device requires power.

**19.** The electronic device of **claim 16**, wherein the processor is further configured to:

discharge the first battery and charge the second battery if the second power supply control circuit is turned off and the electronic device requires power, and

charge the first battery and discharge the second battery if the first power supply control circuit is turned off and the electronic device requires power.