US 20240213793A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2024/0213793 A1**

KIM et al. (43) **Pub. Date: Jun. 27, 2024**

(54) **VOLTAGE REGULATOR FOR COMPUTING DEVICE**

(71) Applicant: **Microsoft Technology Licensing, LLC**, Redmond, WA (US)

(72) Inventors: **Donghwi KIM**, Kirkland, WA (US); **Gregory Allen NIELSEN**, Kirkland, WA (US)

(73) Assignee: **Microsoft Technology Licensing, LLC**, Redmond, WA (US)

(21) Appl. No.: **18/601,081**

(22) Filed: **Mar. 11, 2024**

Related U.S. Application Data

(63) Continuation of application No. 17/454,754, filed on Nov. 12, 2021, now Pat. No. 11,936,230.

(60) Provisional application No. 63/261,010, filed on Sep. 8, 2021.

Publication Classification

(51) **Int. Cl.**

H02J 7/00 (2006.01)

G06F 1/28 (2006.01)

(52) **U.S. Cl.**

CPC ***H02J 7/00714*** (2020.01); ***G06F 1/28*** (2013.01); ***H02J 7/0029*** (2013.01); ***H02J 7/0047*** (2013.01); ***H02J 7/0063*** (2013.01); *H02J 2207/20* (2020.01)

(57) **ABSTRACT**

A computing device is provided, including a battery, a processor configured to receive electrical power from the battery via a voltage regulator, and one or more additional electronic components configured to receive electrical power from the battery. The computing device may further include a first current detector configured to detect a total battery discharge current. The voltage regulator may be configured to receive a first analog current signal from the first current detector, convert the first analog current signal into first digital current data, and transmit the first digital current data to the processor. The processor may be further configured to determine a difference between the total battery discharge current and an available electric current limit for the battery. In response to at least determining the difference, the processor may be further configured to adjust one or more performance parameters of the processor such that the difference is reduced.