IBA Pack Selection Function

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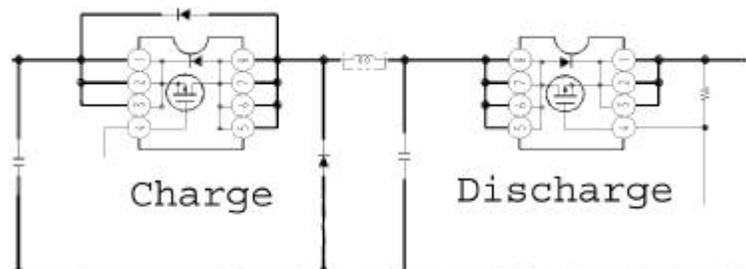
IBA battery selection is a process where power is switched between multiple sources based upon a priority and sequence programmed into the battery manager. This is accomplished by a simple sequence of commands designed to eliminate any undesired cross conduction current while transferring the source of power.

Each IBA source utilizes two power FET's for enabling charge and discharge. See Figure 1. These FET's are utilized in four modes to perform all of the required functionality: 1) Charge mode, 2) OR mode, 3) Discharge mode, and 4) OFF mode. In CHARGE mode the discharge FET is ON to reduce conduction loss and the charge FET is switched as a pass element in a buck regulator. OR mode configures all sources in a "diode-or" means onto the power bus when the charge FET is OFF and the discharge FET is ON. This mode is typically used for transition between the other two modes. DISCHARGE mode provides a low impedance direct connection to the cells by turning ON both charge and discharge FET's. OFF mode is simply both FET's OFF.

Switching between sources is directed by the BATTERY MANAGER. The BATTERY MANAGER is typically a program running on an embedded system controller (sometimes the keyboard controller). Changing sources begins with all sources placed in the OR state by disabling the present MASTER (discharging source). The host can disable MASTER by command or the battery may revoke its MASTER state as when it is fully depleted. A battery signal entitled MBAT indicates a low state during the OR mode. All sources monitor this signal and instantaneously change to the OR state when MBAT is low. An arbitration begins at the beginning of OR mode. The manager is given a few seconds to assign the next MASTER or turn OFF power to the system. If no assignment is made all sources will time out and disable discharge. Once another source has been assigned to be MASTER, the charge FET is switched ON to reduce conduction losses.

Conclusion

The description above indicates the simplicity of the IBA method of battery selection. This fact combined with the characteristic of no additional hardware when multiple battery operation is enabled on a system, demonstrates the value of this architecture. It is simple and low cost.

Figure 1: FET Switches