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United States Patent [19]

Bazinet et al.

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- [54] **DC/DC CONVERTER HAVING A BOOTSTRAPPED HIGH SIDE DRIVER**
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- [73] Assignee: **Unitrode Corporation**, Billerica, Mass.
- [21] Appl. No.: **365,349**
- [22] Filed: **Dec. 28, 1994**
- [51] Int. Cl.⁶ **G05F 1/618**
- [52] U.S. Cl. **323/288; 323/224; 323/266; 323/284**
- [58] Field of Search **323/223, 225, 323/283-288, 266; 327/108**

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Primary Examiner—Peter S. Wong
 Assistant Examiner—Shawn Riley
 Attorney, Agent, or Firm—Weingarten, Schurgin, Gagnebin & Hayes LLP

[57] ABSTRACT

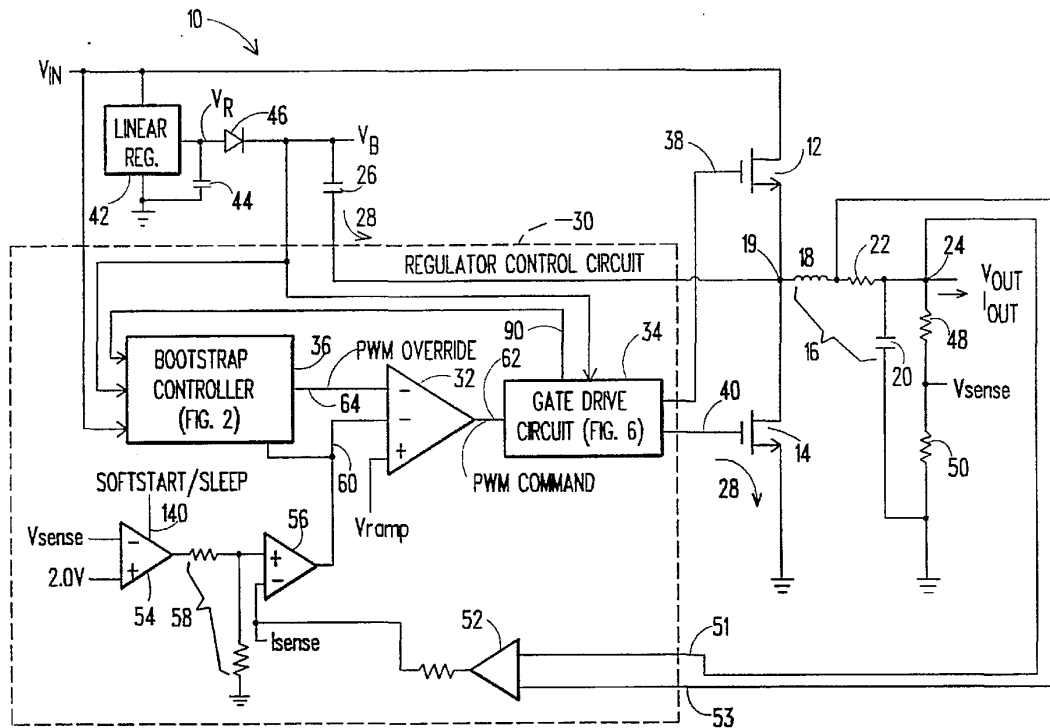
A synchronous step-down DC to DC converter includes a bootstrap capacitor monitored by a controller for maintaining a desired bootstrap voltage to drive a high side NMOS switch. The controller temporarily increases the duty cycle of the low side NMOS switch when the bootstrap voltage decreases below a predetermined level to maintain a minimum level of charge on the bootstrap capacitor.

14 Claims, 4 Drawing Sheets

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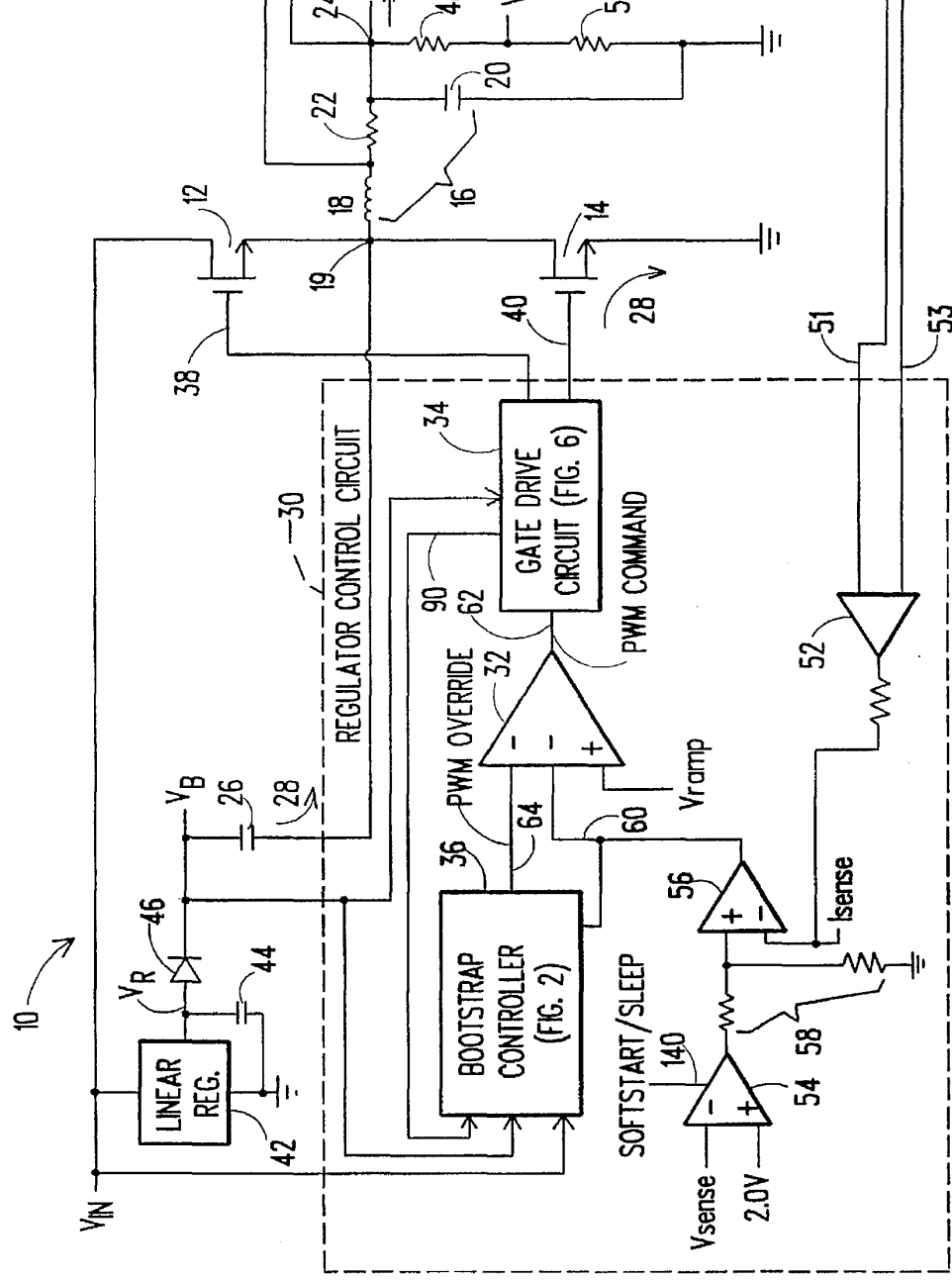
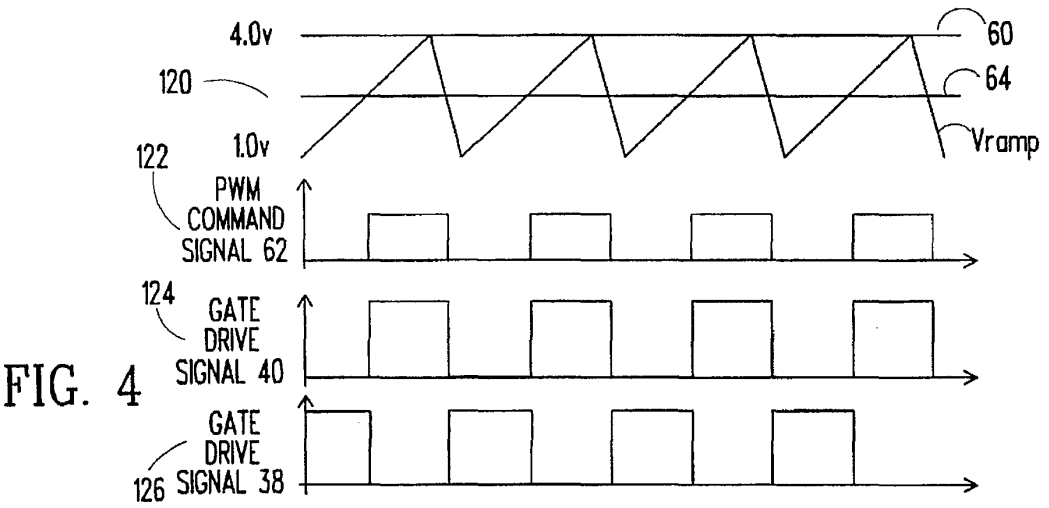
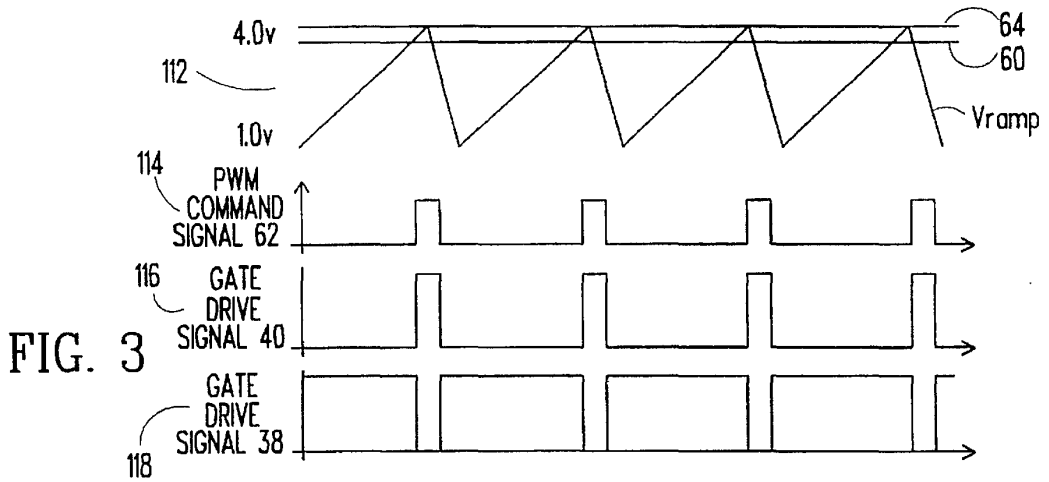
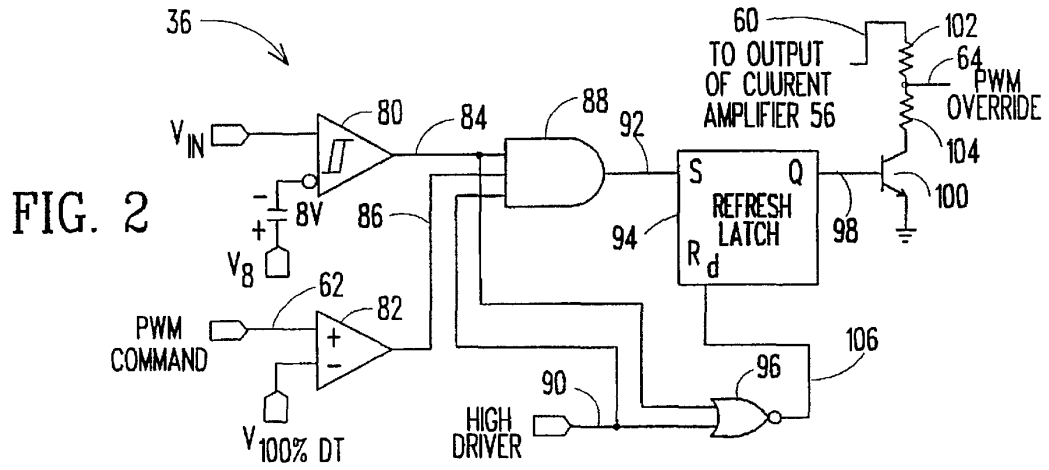


FIG. 1



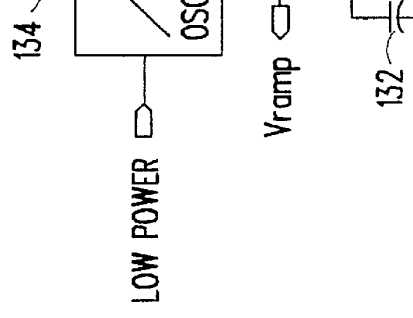
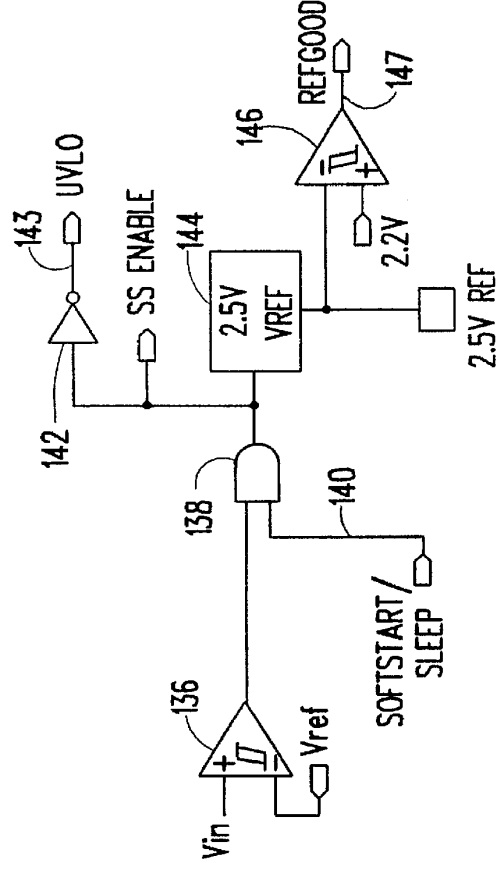
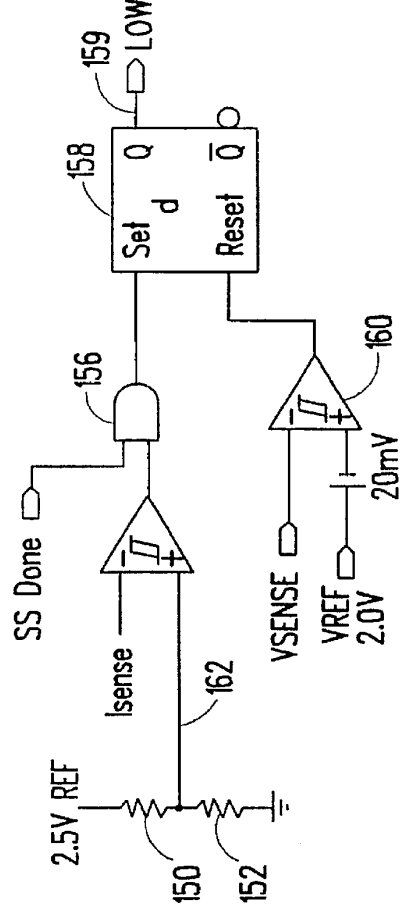


FIG. 5

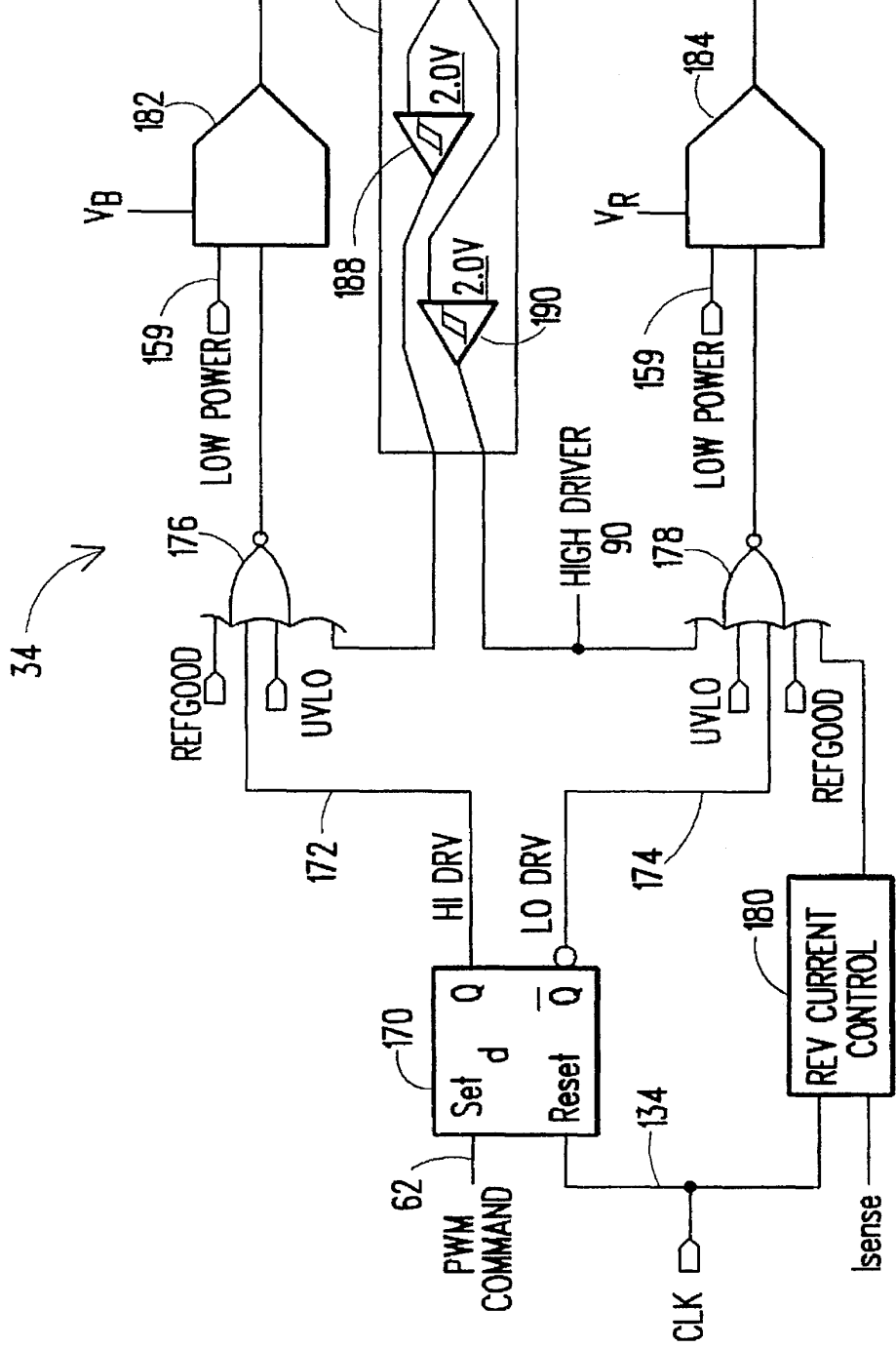


FIG. 6

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