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(54) **METHOD AND AN APPARATUS TO BIAS A CHARGE PUMP IN A PHASE LOCKED LOOP TO COMPENSATE A VCO GAIN**

(75) Inventors: **Chwei-Po Chew**, Cupertino, CA (US);
Paul H. Scott, San Jose, CA (US)

(73) Assignee: **Cypress Semiconductor Corporation**,
San Jose, CA (US)

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Primary Examiner—Joseph Chang
(74) *Attorney, Agent, or Firm*—Blakely, Sokoloff, Taylor & Zafman LLP

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(57) **ABSTRACT**

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H03L 7/099 (2006.01)
(52) **U.S. Cl.** **331/185; 331/176; 331/44; 327/157**
(58) **Field of Classification Search** **331/185, 331/176, 44, 16; 327/157**
See application file for complete search history.

A method and an apparatus to bias a charge pump in a phase locked loop (PLL) to compensate a voltage controlled oscillator (VCO) gain have been disclosed. One embodiment of the apparatus includes a PLL comprising a charge pump, the charge pump comprising an input and an output, and a bias circuit coupled to the input of the charge pump, the bias circuit comprising a sensor circuit to sense a temperature and at least one of a voltage and a process variation and a current reference circuit coupled to the sensor circuit.

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15 Claims, 13 Drawing Sheets

