REPLACEMENT SHEET 18 JUN 2002

CHARGE PUMP SYSTEM HAVING MULTIPLE INDEPENDENTLY ACTIVATED CHARGE PUMPS AND CORRESPONDING METHOD

ABSTRACT

A charge pump generator system (10) and method is provided which more precisely maintains the level of an internally generated voltage supply (Vout) by operating some or all of the available charge pumps (20, 30) depending upon the voltage level reached by the voltage supply (Vout) When the voltage supply (Vout) is far from its target level, a first group and a second group of charge pumps (20, 30) are operated. The first group (20) may preferably have a faster pumping rate or greater number of charge pumps than the second group (30). When the voltage supply exceeds a first predetermined level (V1), the first group of charge pumps (20) is switched off while the second group (30) remains on, such that the rate of charge transfer slows. The second group (30) continues operating until a second, e.g. target, voltage level (V2) is exceeded. The slower rate of charge transfer then effective reduces overshoot, ringing and noise coupled onto the voltage supply line.

FIG 1

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