

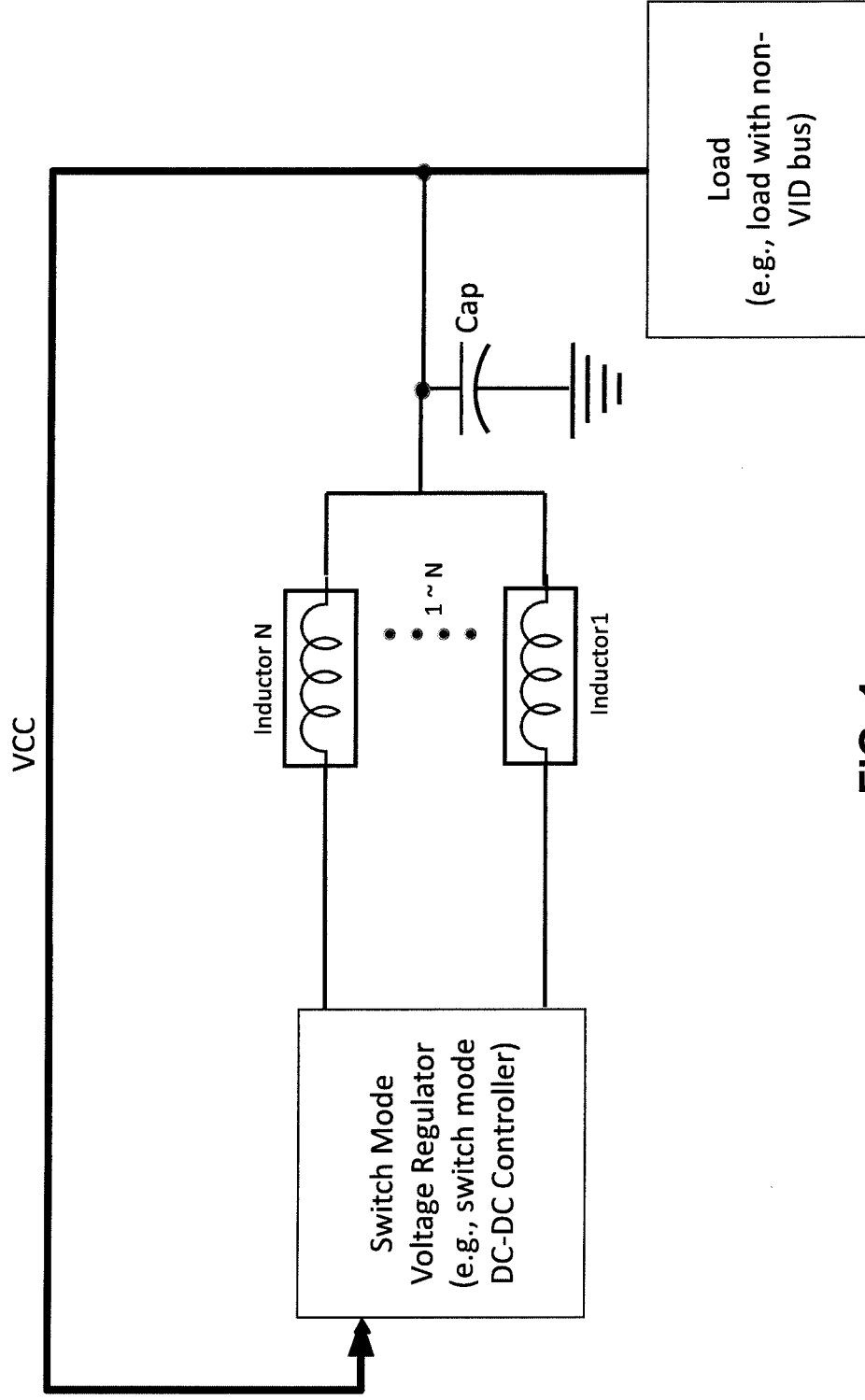


FIG. 1
PRIOR ART

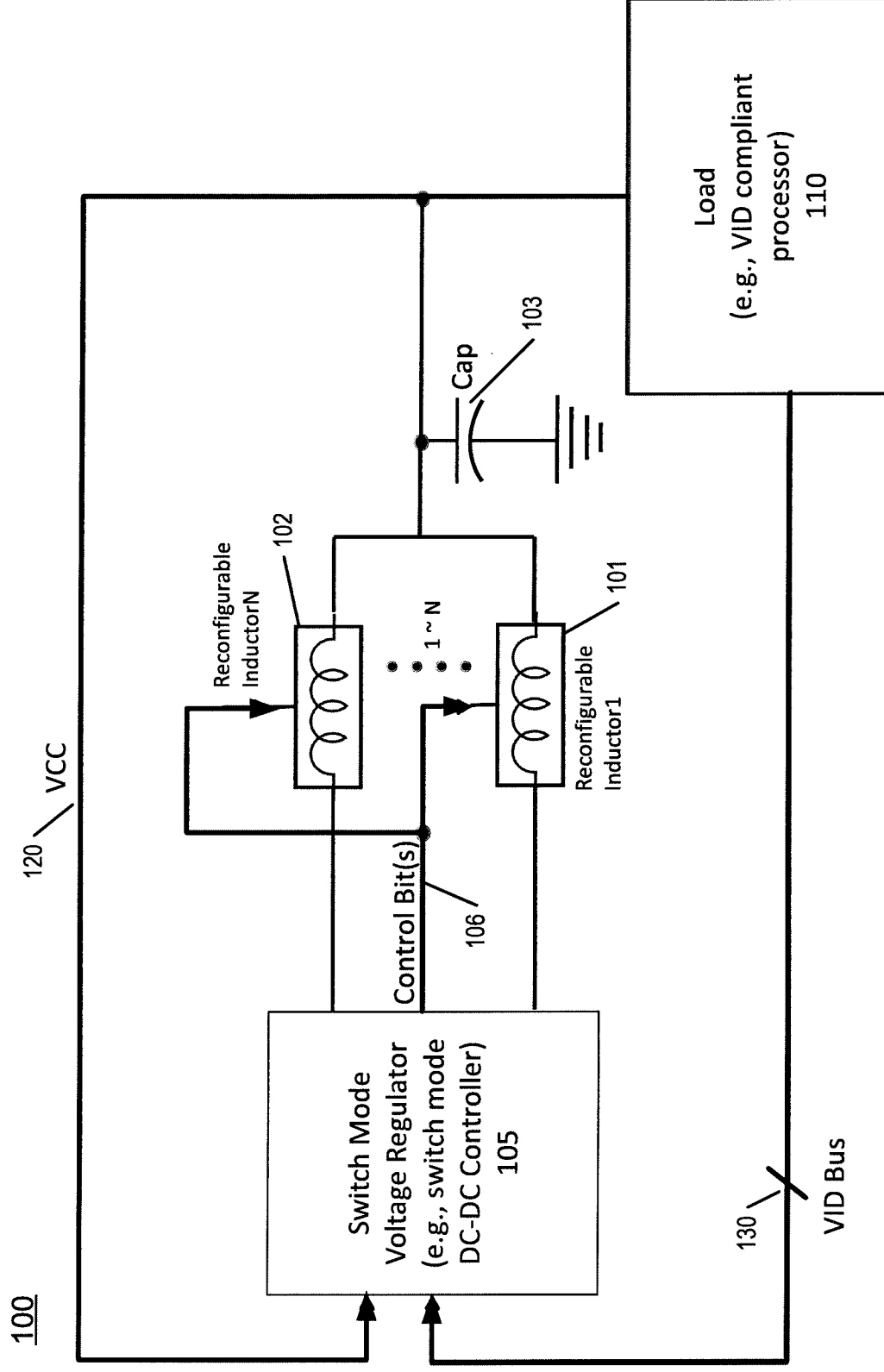


FIG. 2A

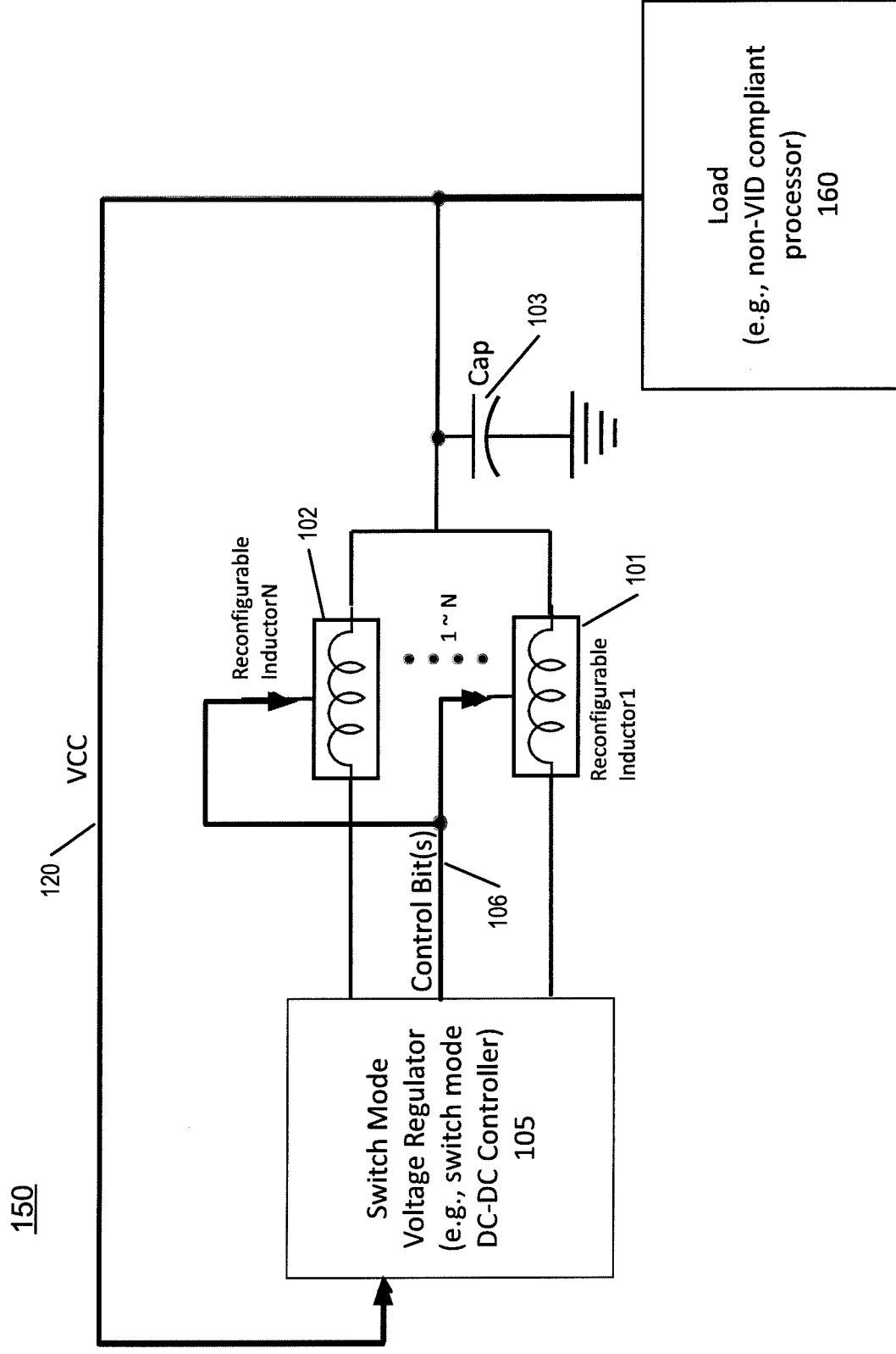


FIG. 2B

300

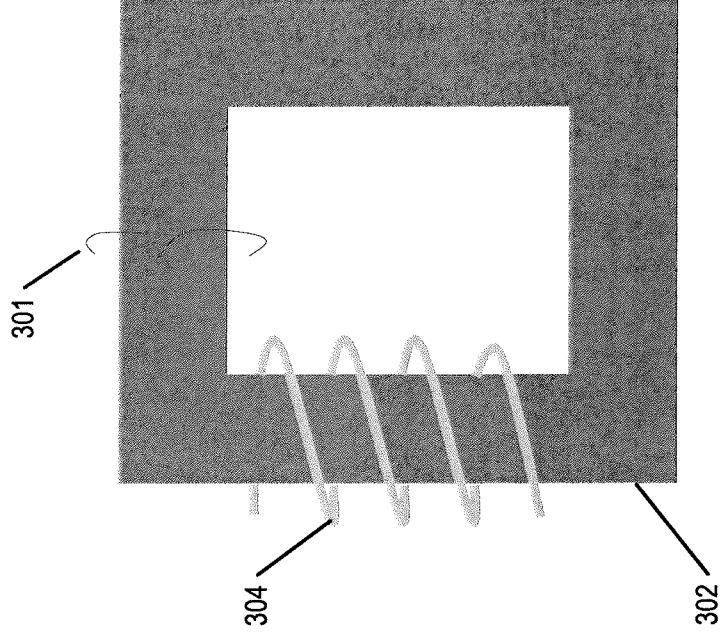


FIG. 3

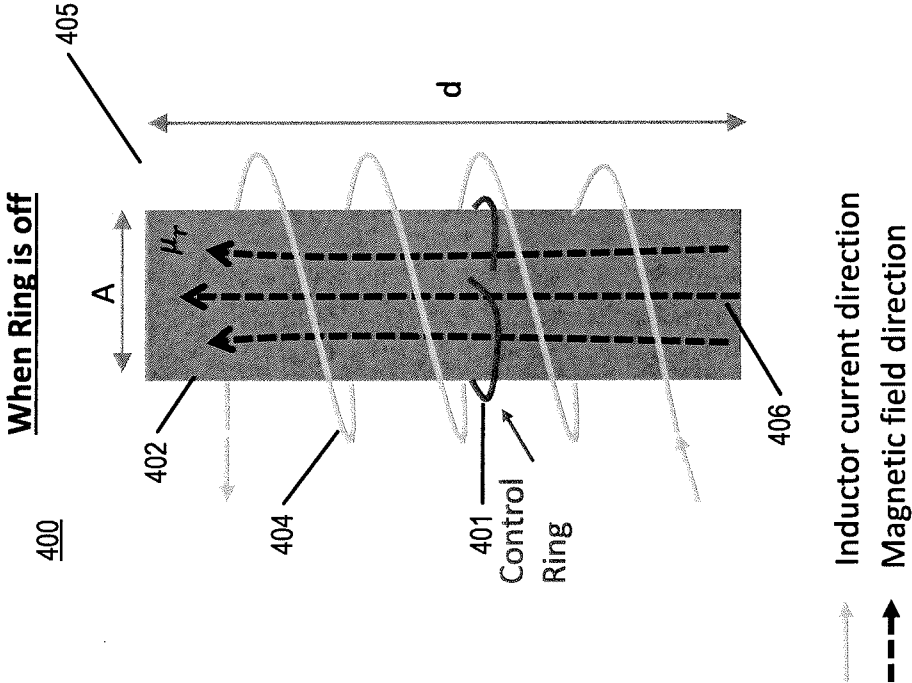


FIG. 4A

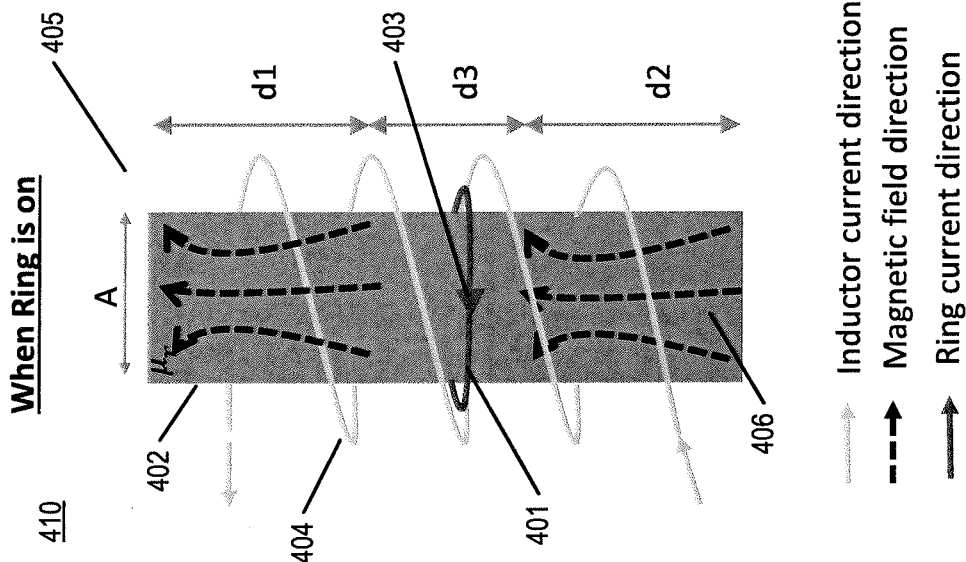


FIG. 4B

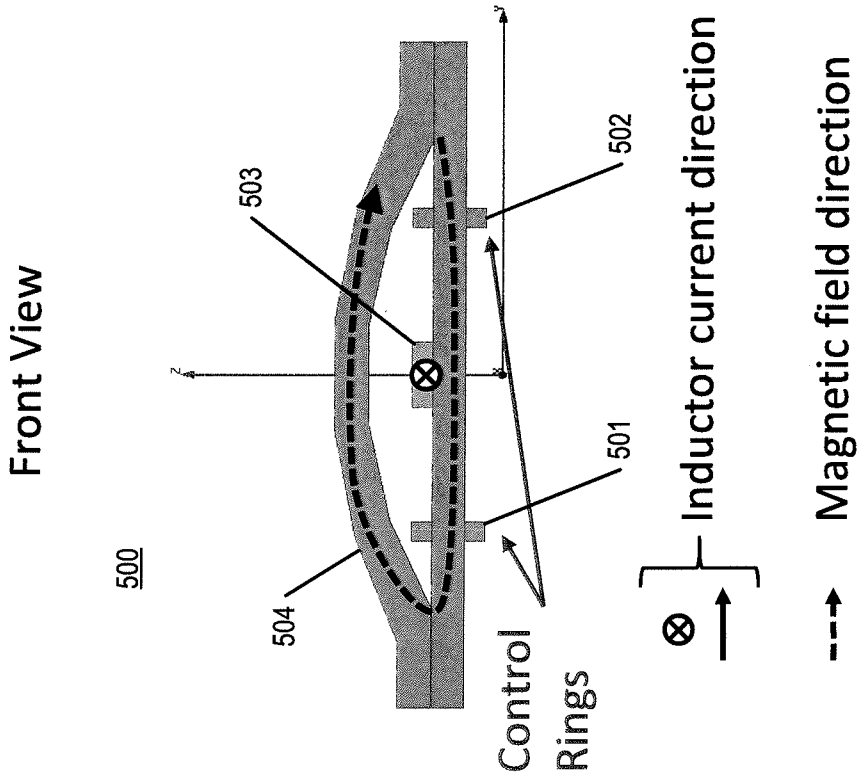


FIG. 5A

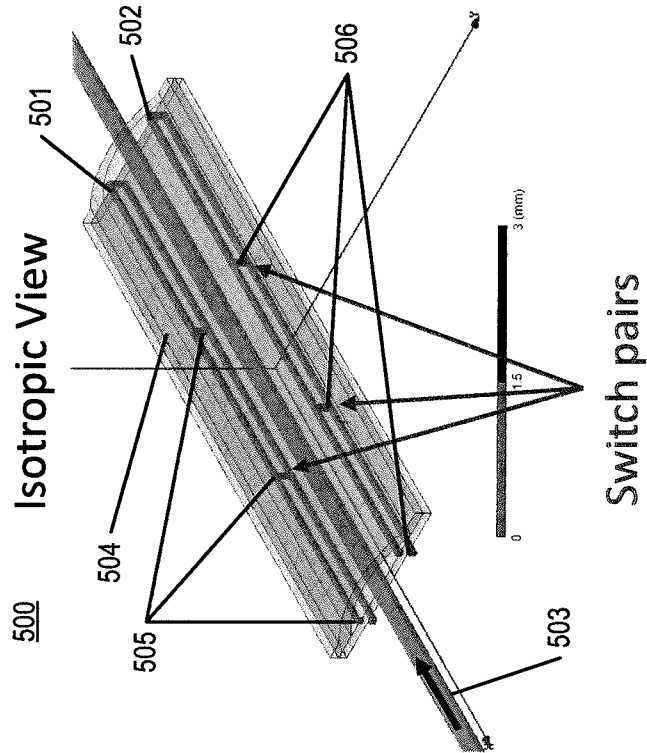


FIG. 5B

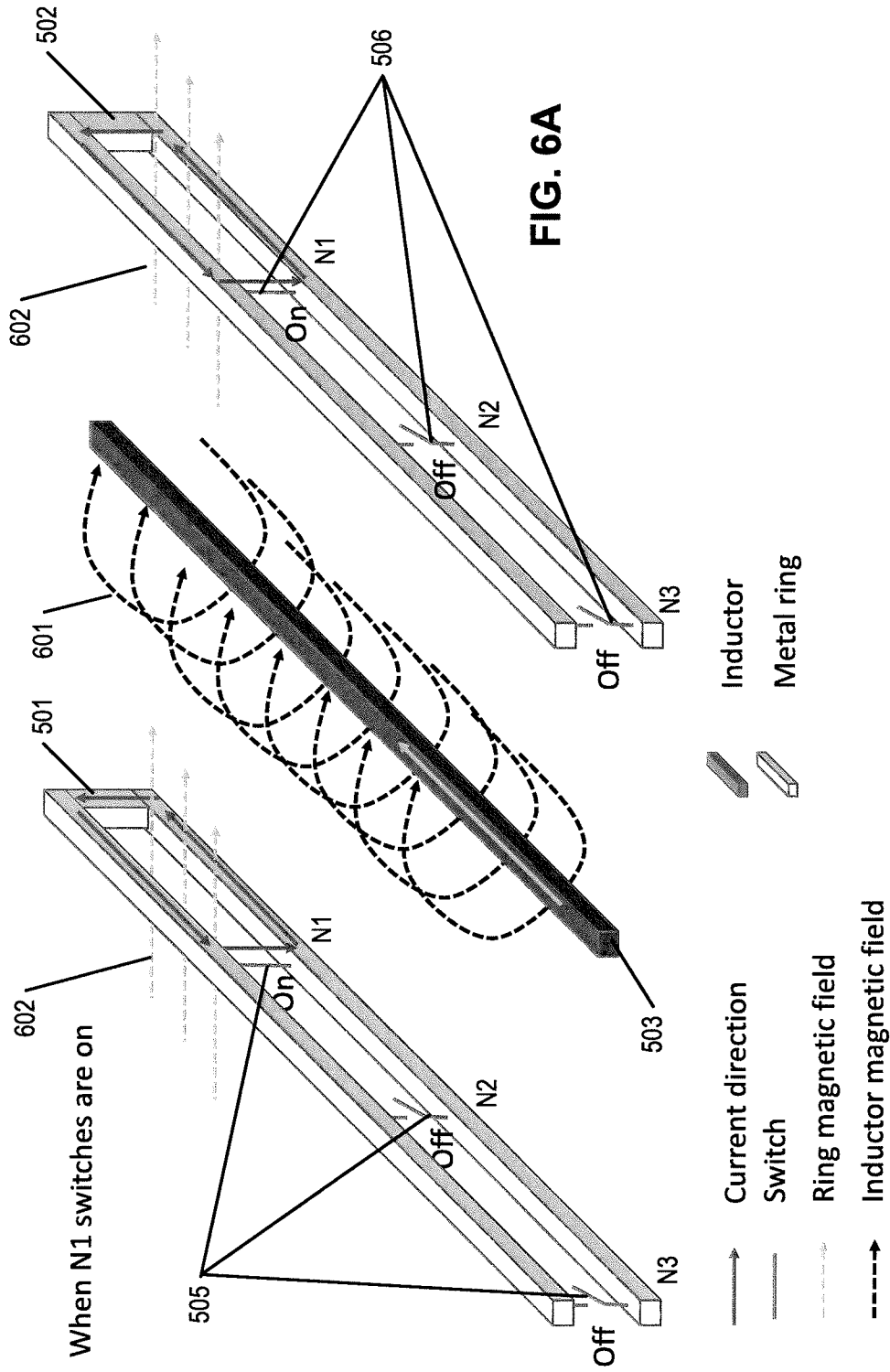
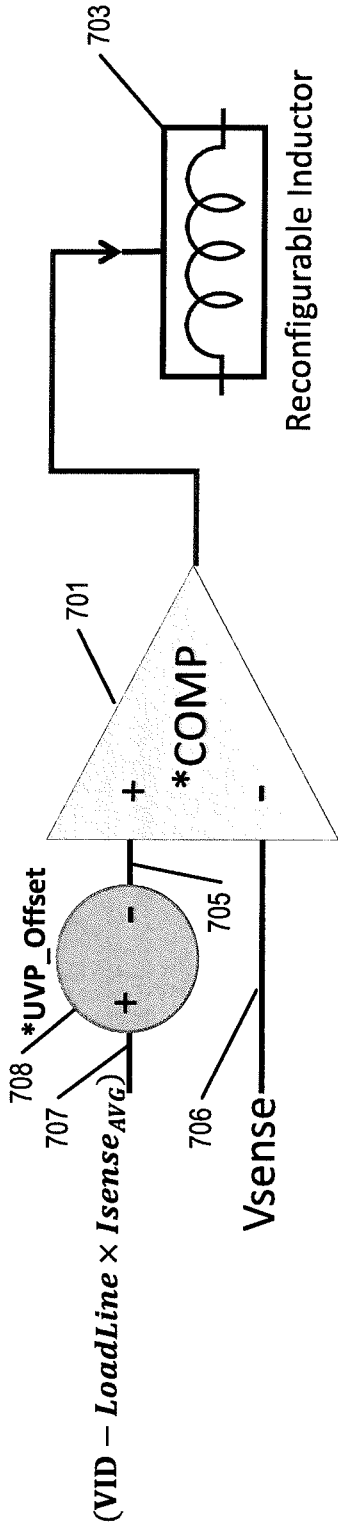


FIG. 6A

N (state level)	Freq (MHz)	Reconfigurable Inductor Inductance (nH)
0	1	303.03
1	1	225.36
2	1	142.92

FIG. 6B

FIG. 7A



1. Vsense: VR output voltage at package sense point.
2. Isense_AVG: sensed average inductor current from power stage.
3. LoadLine: $abs(\Delta V_{SENSE}/\Delta I_{LOAD})$
3. UVP_Offset is programmable and used for preventing faulty triggering.
4. *In addition to OVP_Threshold and UVP_Offset, COMP (a comparator) can be designed to have a hysteresis featuring a hysteretic rise/fall triggering threshold.
5. All implementation in this illustration can be in digital domain.
6. VID: Voltage Identification (ID)

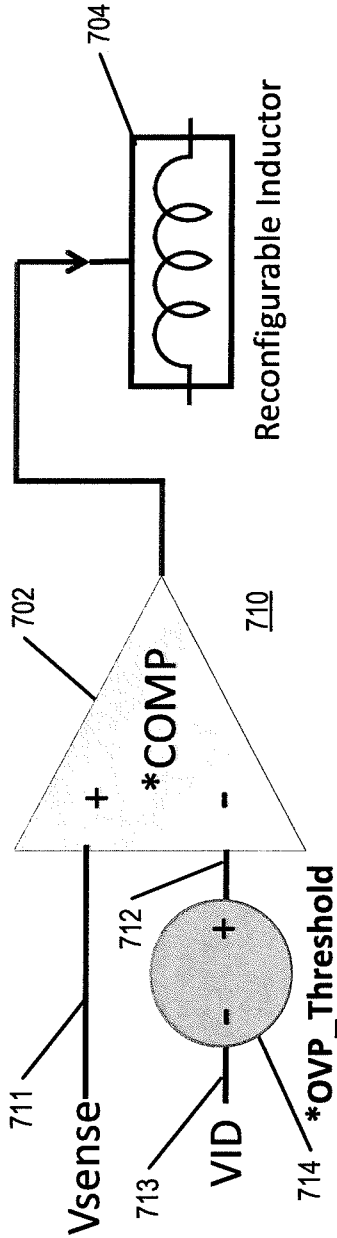
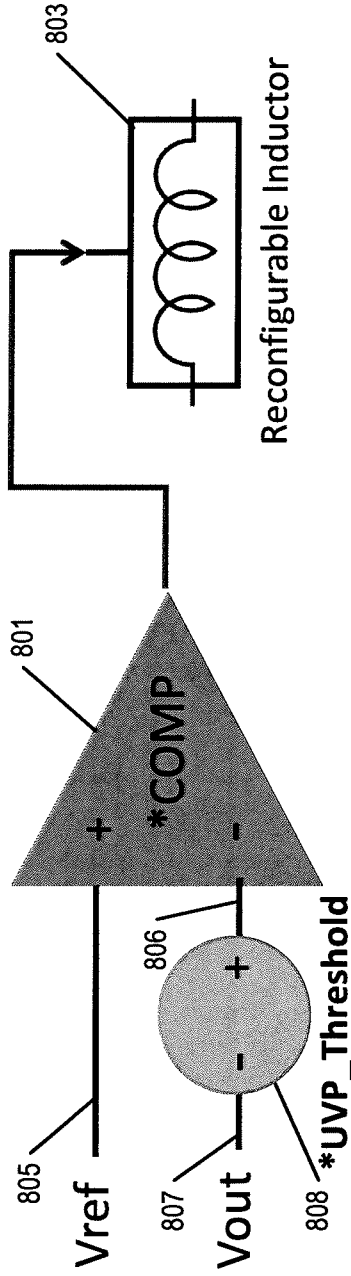


FIG. 7B

FIG. 8A

800



1. Vout: VR output voltage.
2. Vref: Reference voltage (ex. Target Vout).
3. * In addition to OVP_Threshold and UVP_Threshold, COMP (a comparator) can be designed to have a hysteresis featuring a hysteretic rise/fall triggering threshold.
4. All implementation in this illustration can be in digital domain.

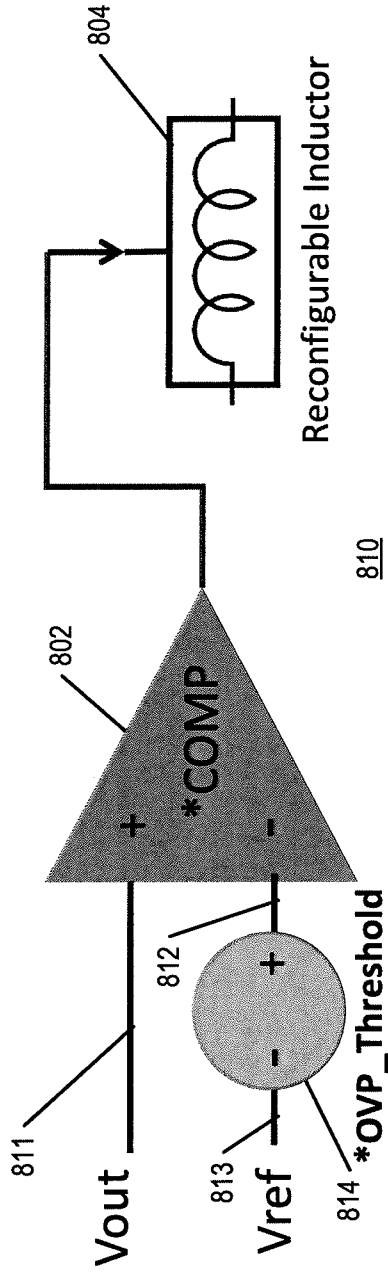


FIG. 8B

810

900

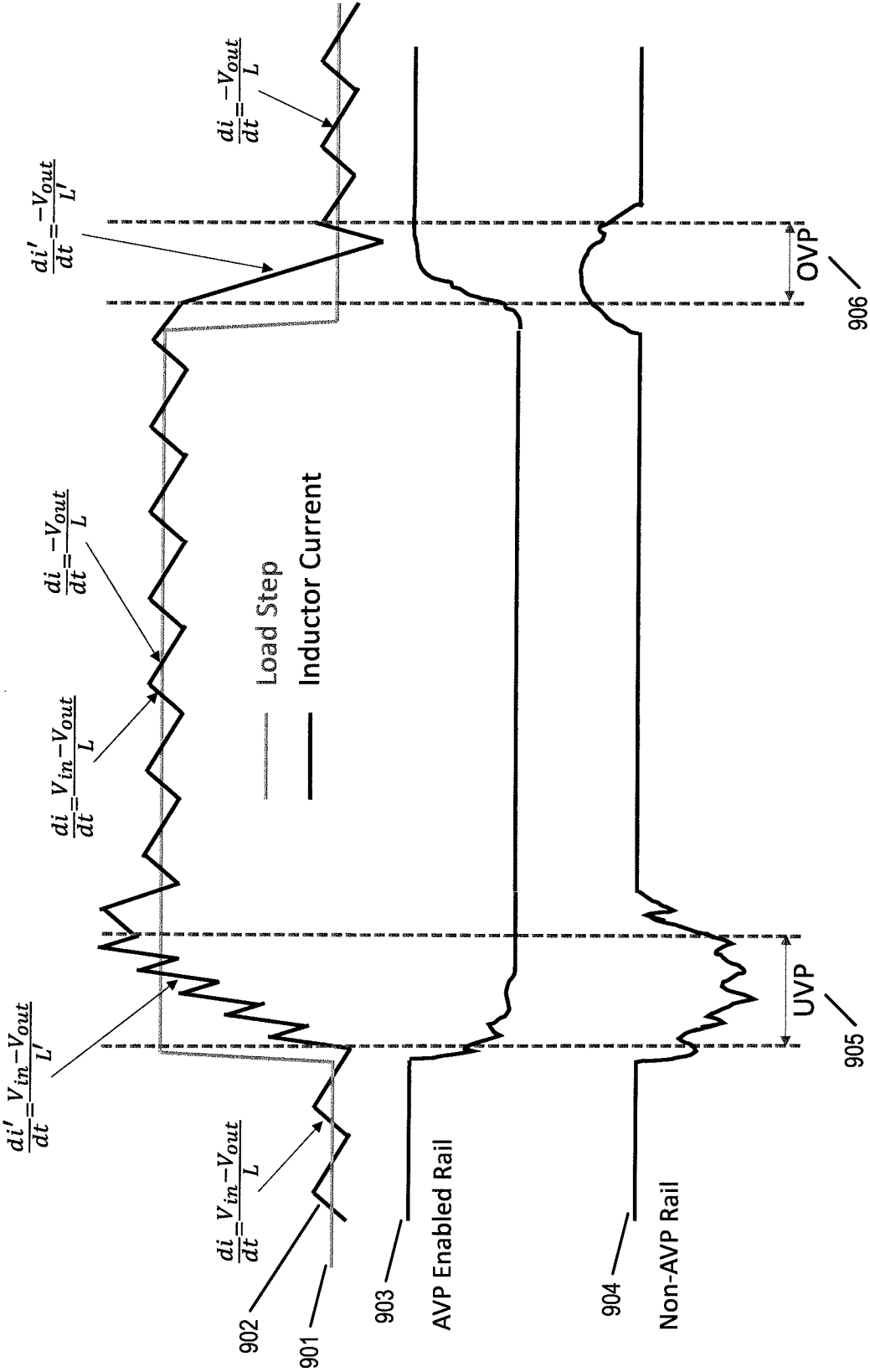


FIG. 9

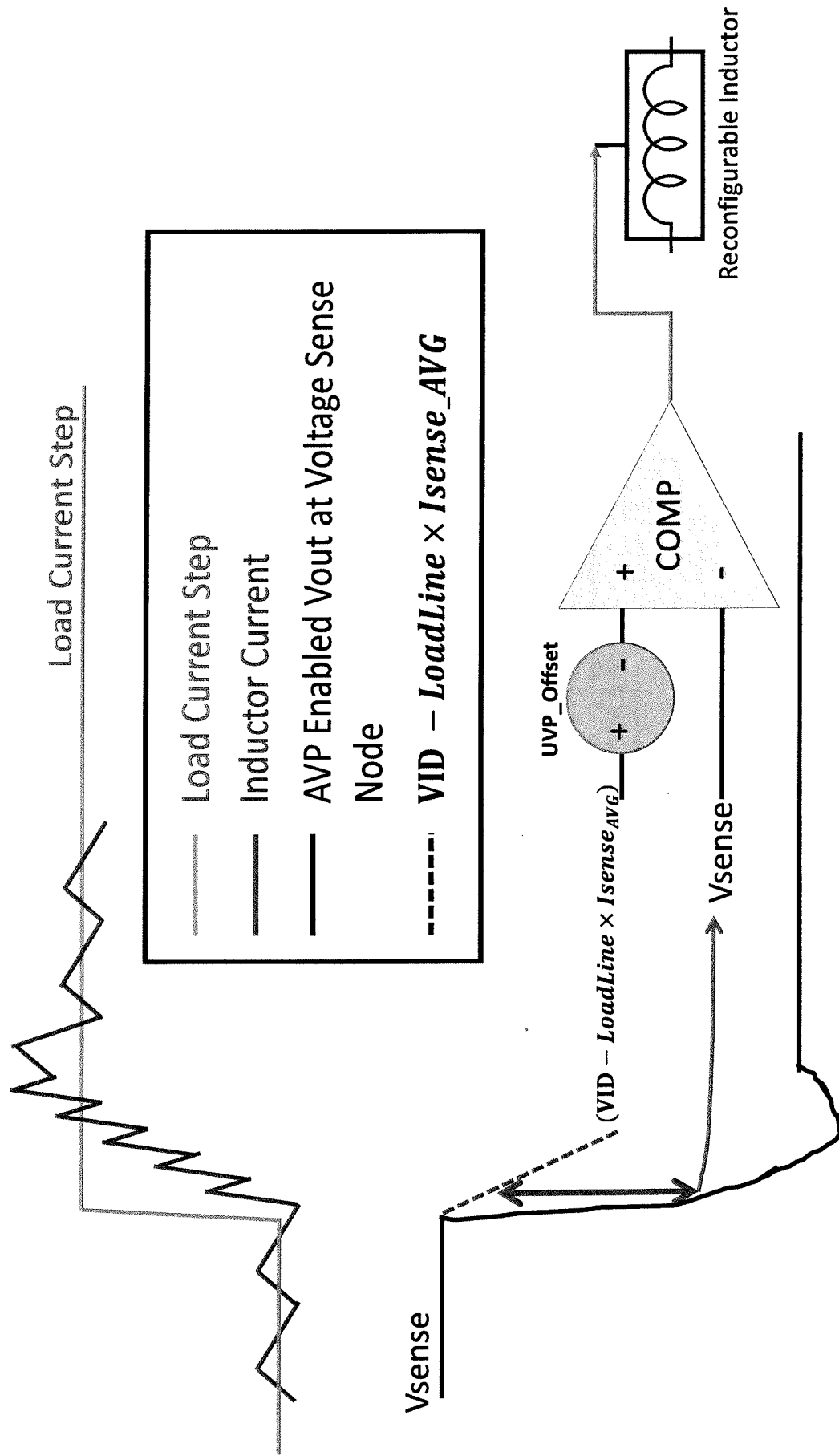


FIG. 10

When OVP CMP is triggered:

$$\Delta I'_L = \frac{V_{OUT} + V_D}{L'_L} \times D \times T_s, \text{ where } L'_L < L$$

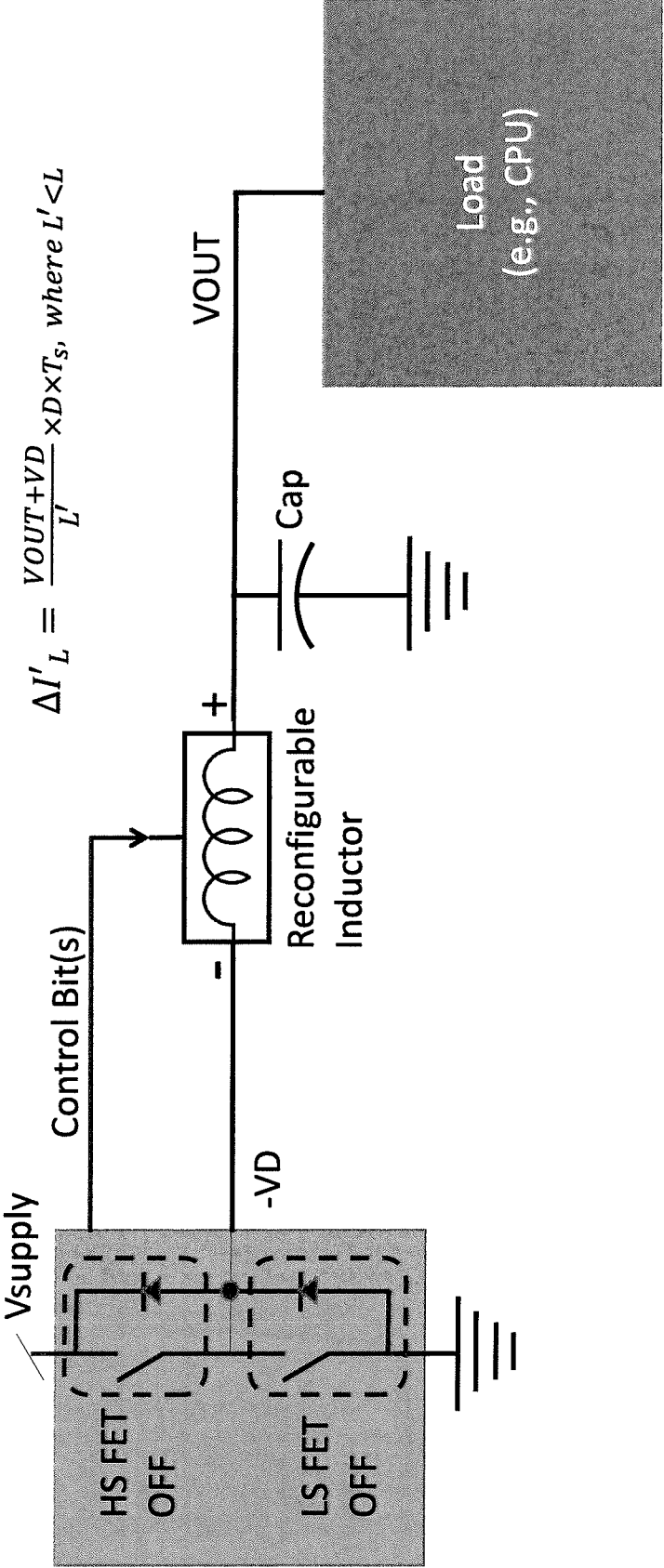


FIG. 11

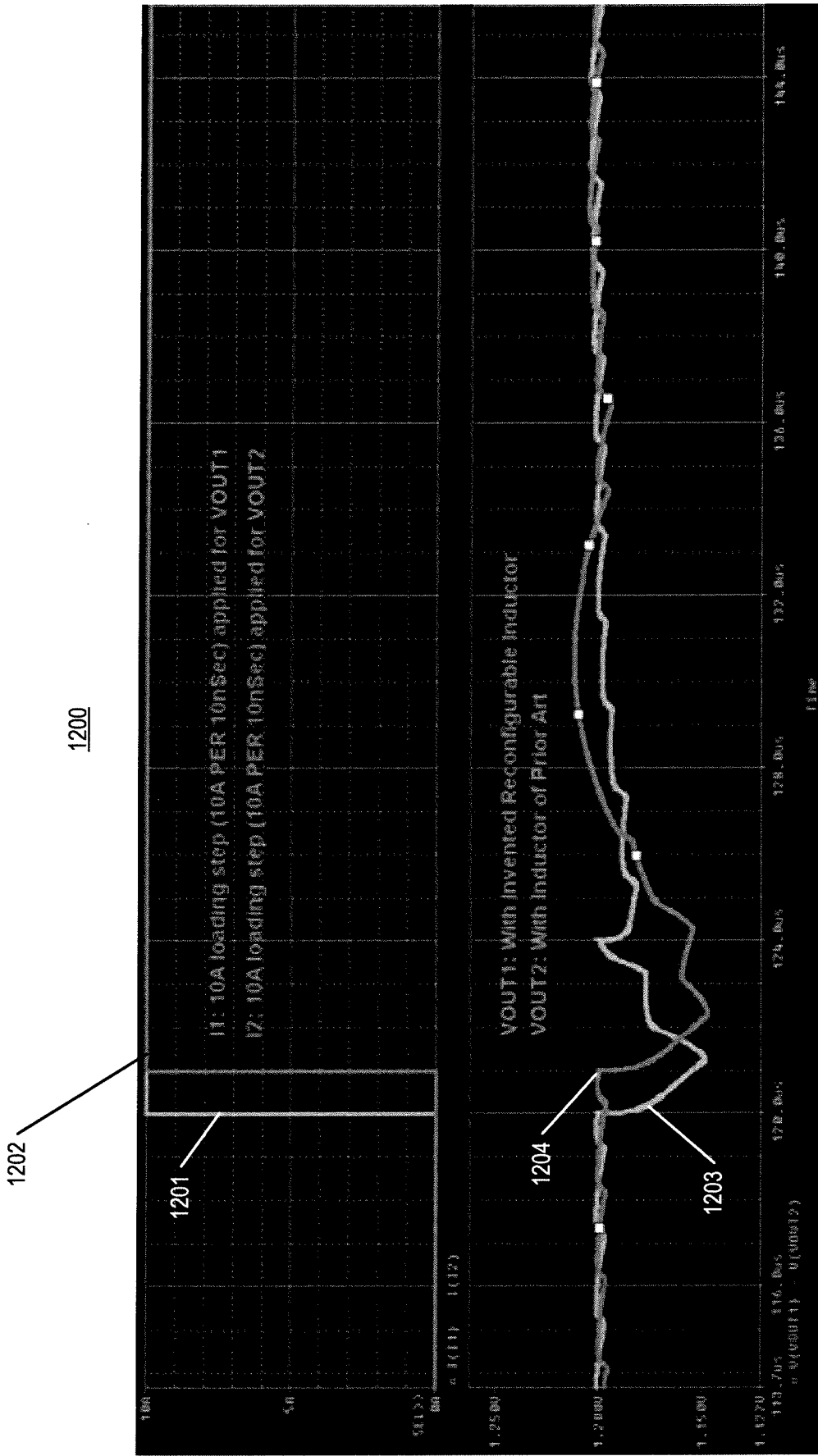


FIG. 12

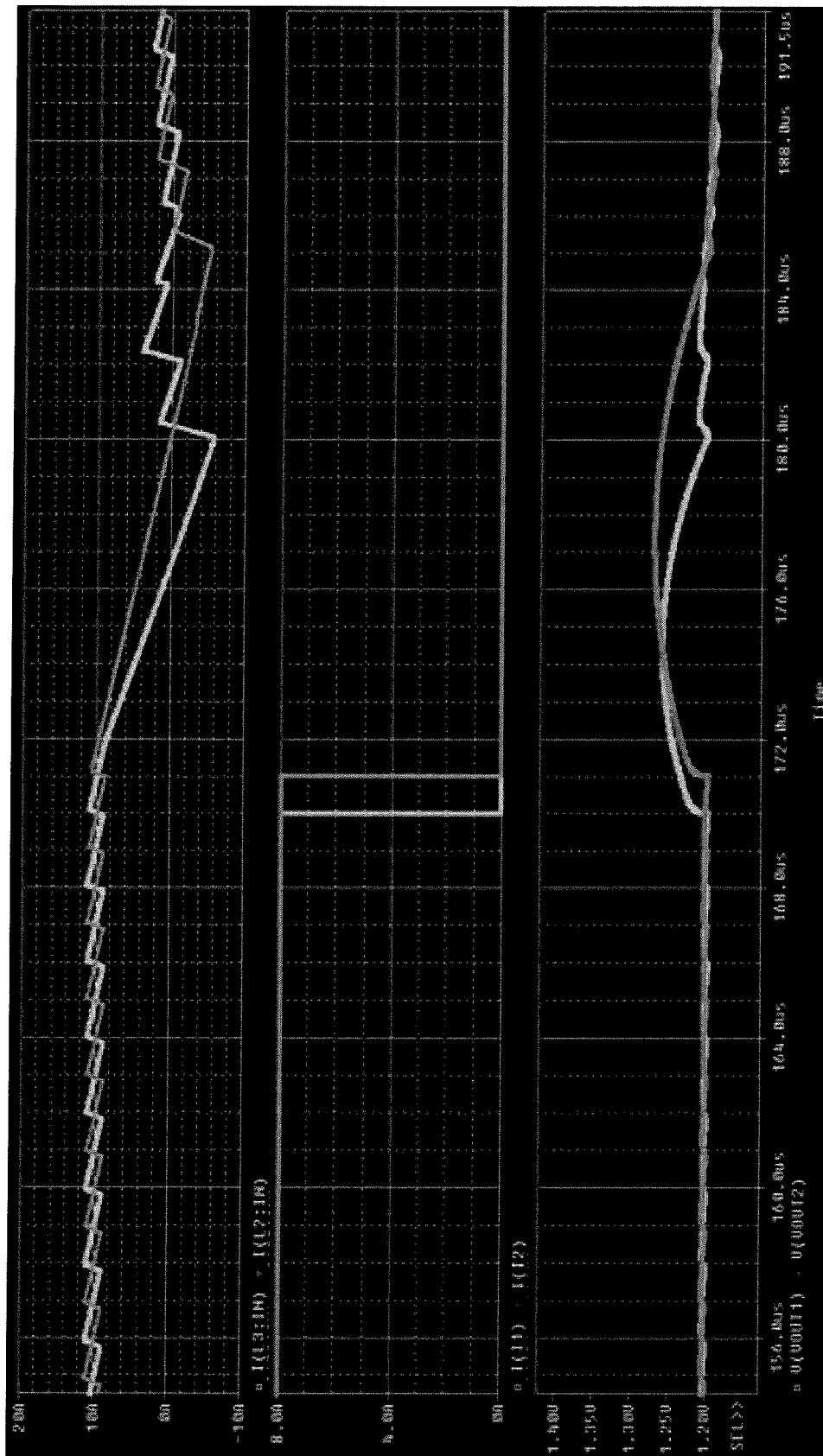


FIG. 13

1400

	1.1uH (No reconfiguration)	1.1uH to 0.7uH	1.1uH to 0.5uH	1.1uH to 0.3uH
1401 Overshoot Voltage (V)	1.2718	1.2609	1.254	1.25
1402 Overshoot Duration (uSec)	14	10	8	6

FIG. 14