

ANNEXURE

1A. A DC-DC voltage regulator (300) comprising:

switched mode regulator circuitry (301, 302, 304, 306) to generate a regulated voltage (V_{out}), having series and shunt switching elements (301, 302); and

voltage spike protection circuitry (303), arranged across the series and shunt switching elements at the input to the switched mode regulator circuitry for voltage-spike-protecting the switched mode regulator circuitry, comprising a dissipative element (R_{sp}) and a charge-storage circuit (C_{sp});

characterised in that:

said switched mode regulator circuitry (301, 302, 304, 306) and said voltage spike circuitry (303) are implemented by an integrated circuit (1930) in an integrated circuit package (1940);

said series and shunt switching elements (301, 302) of said switched mode regulator circuitry are subdivided into connected switching block segments (2120, 2130, 2140); and

said switching block segments (2120, 2130, 2140) are configured to operate within a single phase; and

said charge-storage circuit (C_{sp}) of said voltage-spike protection circuitry is subdivided into connected charge-storage circuit segments (2121, 2122) which are interleaved between said switching block segments.

1B. A DC-DC voltage regulator (300) comprising:

switched mode regulator circuitry (301, 302, 304, 306) to generate a regulated voltage (V_{out}), having series and shunt switching elements (301, 302); and

voltage spike protection circuitry (303), arranged across the series and shunt switching elements at the input to the switched mode regulator circuitry for voltage-spike-protecting the switched mode regulator circuitry, comprising a dissipative element (R_{sp}) and a charge-storage circuit (C_{sp}); and

an output inductor (L_{out}) to carry the output current (I_{out});

characterised in that:

said switched mode regulator circuitry (301, 302, 304, 306) and said voltage spike circuitry (303) are implemented by an integrated circuit (1930) in an integrated circuit package (1940);

said series and shunt switching elements (301, 302) of said switched mode regulator circuitry are subdivided into connected switching block segments (2120, 2130, 2140); and

said switching block segments (2120, 2130, 2140) of said switched mode regulator circuitry are connected in parallel such that each segment carries a portion of the total output current (I_{out}); and

said switching block segments (2120, 2130, 2140) are connected to the output inductor; and

said charge-storage circuit (C_{sp}) of said voltage-spike protection circuitry is subdivided into connected charge-storage circuit segments (2121, 2122) which are interleaved between said switching block segments.