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Nota di contenuto	Front cover; Title page; Copyright Page; Contents; Preface; Acknowledgements; CHAPTER 1 - The Principles of Switching Power Conversion; Introduction; Overview and Basic Terminology; Understanding the Inductor; Evolution of Switching Topologies; CHAPTER 2 - DC-DC Converter Design and Magnetics; DC Transfer Functions; The DC Level and the "Swing" of the Inductor Current Waveform; De.ning the AC, DC, and Peak Currents; Understanding the AC, DC and Peak Currents; Defining the "Worst-case" Input Voltage; The Current Ripple Ratio 'r'; Relating r to the Inductance; The Optimum Value of r Do We Mean Inductor? Or Inductance?How Inductance and Inductor Size Depend on Frequency; How Inductance and Inductor Size Depend on Load Current; How Vendors Specify the Current Rating of an Off-the-shelf Inductor and How to Select It; What Is the Inductor Current Rating We Need to Consider for a Given Application?; The Spread and Tolerance of the Current Limit; Worked Example (1); Worked Examples (2, 3, and 4); Worked Example (5)-When Not to Increase the Number of

Turns; Worked Example (6)-Characterizing an Off-the-shelf Inductor in a Specific Application
Calculating the "Other" Worst-case StressesCHAPTER 3 - Off-line Converter Design and Magnetics; Flyback Converter Magnetics; Forward Converter Magnetics; CHAPTER 4 - The Topology FAQ; Questions and Answers; CHAPTER 5 - Conduction and Switching Losses; Switching a Resistive Load; Switching an Inductive Load; Switching Losses and Conduction Loss; A Simplified Model of the Mosfet for Studying Inductive Switching Losses; The Parasitic Capacitances Expressed in an Alternate System; Gate Threshold Voltage; The Turn-on Transition; The Turn-off Transition; Gate Charge Factors; Worked Example
Applying the Switching Loss Analysis to Switching TopologiesWorst-case Input Voltage for Switching Losses; How Switching Losses Vary with the Parasitic Capacitances; Optimizing Driver Capability vis-a-vis Mosfet Characteristics; CHAPTER 6 - Printed Circuit Board Layout; Introduction; Trace Section Analysis; Some Points to Keep in Mind During Layout; Thermal Management Concerns; CHAPTER 7 - Feedback Loop Analysis and Stability; Transfer Functions, Time Constant and the Forcing Function; Understanding 'e' and Plotting Curves on Log Scales; Time Domain and Frequency Domain Analysis
Complex RepresentationNonrepetitive Stimuli; The s-plane; Laplace Transform; Disturbances and the Role of Feedback; Transfer Function of the RC Filter; The Integrator Op-amp ("pole-at-zero" filter); Mathematics in the Log Plane; Transfer Function of the LC Filter; Summary of Transfer Functions of Passive Filters; Poles and Zeros; Interaction of Poles and Zeros; Closed and Open Loop Gain; The Voltage Divider; Pulse Width Modulator Transfer Function (gain); Voltage Feedforward; Power Stage Transfer Function; Plant Transfer Functions of All the Topologies; Boost Converter
Feedback Stage Transfer Functions

Sommario/riassunto

The design of Switching Power Supplies has become one of the most crucial aspects of power electronics, particularly in the explosive market for portable devices. Unfortunately, this seemingly simple mechanism is actually one of the most complex and under-estimated processes in Power Electronics. Switching power conversion involves several engineering disciplines: Semiconductor Physics, Thermal Management, Control Loop theory, Magnetics etc, and all these come into play eventually, in ways hard for non-experts to grasp. This book grows out of decades of the author's experience designi