DESIGN AND HARDWARE CONSTRUCTION OF HALF BRIDGE SERIES LOADED RESONANT CONVERTER

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ABSTRACT

This paper deals with the analysis, simulation and design of the half bridge series loaded resonant converters which includes both theoretical and practical aspects of this resonant converter design. The simulation was done in PSIM demo 7.1.2. Experimental results on a laboratory are shown to verify the design procedure.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The major thrusts in switching converter design are to achieve higher conversion efficiency. To increase the power packing density, the switching of the switching converter is often increased to reduce the size and weight of its reactive components. At higher switching frequencies, capacitive turn on losses in power MOSFETs become predominant switching losses.

Resonant conversion techniques may be employed to achieve DC-DC conversion for power supply applications, since it can offer Zero Current Switching (ZCS) or Zero Voltage Switching (ZVS) [1]. Resonant power converters contain resonant L-C networks whose voltage and current waveforms vary sinusoidal during one or more subintervals of each switching period. These sinusoidal variations are large in magnitude and the small ripple approximation does not apply.

There are many topological variations of the resonant converter. The load resonant converter can be classified as either a voltage source series resonant converter. In the series loaded resonant converter, the load is connected in series with the resonant circuit and the output voltage is obtained from the resonant current.

As such, the output voltage is sensitive to load variations. However, the series loaded resonant converter is inherently overload protected.