

***Expiry Date for Power Supply?
Sensor-less Life Prediction of Switching Power Supply***

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Abstract

Power supply is a critical component in all electronic products. Unexpected failure of a power supply may lead to enormous consequential loss. However life prediction of a power supply has never been accurate because the electronic component life varies greatly with operating conditions. Among the electronic parts in a power supply the electrolytic capacitor is the weakest. The power supply life can be predicted by the life of the electrolytic capacitor. To predict the life of the electrolytic capacitor the ripple current must be known. The present work proposes a sensor-less life prediction method for switching power supply. The popular current mode control platform makes the power converter switching current available. The current is digitized by a novel method that requires no expensive high speed ADC or sample and hold device. The capacitor ripple current is then computed in real time and the result is presented through a pulsating signal channel. Experiments on AC to DC forward converter and flyback converter are presented. Favorable comparison with direct measurement verified the method.

Biography

Dr. Bryan M.H. Pong graduated from Birmingham University and obtained his PhD degree from Cambridge University in England. After graduation he joined National Semiconductor HK where he was a Senior Design Engineer and then Chief Design Engineer. Afterwards he joined ASTEC International where he was a Principal Engineer and later Division Engineering Manager. At ASTEC he led an Engineering Department to develop high frequency switching power supplies, battery chargers, and various power converters. Now he is an Associate Professor at the Hong Kong University. His research interest is Power Electronics & Switching Power Supply. His research interests are power converter reliability, low voltage converter like those for LEDs, magnetic component design and Electromagnetic Interference (EMI) of switching power supplies. He focuses on applied research and aims to advance switching power converter technologies and foster cooperation with the industry. Dr. Pong is a co-inventor of over 25 patents and has authored and co-authored a number of technical publications. Dr. Pong was a past chairman and now a committee member of the Institute of Electronic & Electrical Engineers Hong Kong Section (IEEE), PES/IAS/PELS Joint Chapter. He also served the Electrical Division of the Hong Kong Institution of Engineers.