

Power Management Applications Solutions

Literature Reference Guide

Key Power Management Documents

ISSUE 1, 2004



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All product-specific documents listed may be found at: power.ti.com. Enter the literature identifier into the keyword search box.
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PWM Control Techniques

Title/Description	Literature Identifier
Current Mode Control	
Switching Power Supply Topology: Voltage vs. Current Mode	SLUA119
Modeling, Analysis and Compensation of the Current Mode Converter	SLUA101
A New Integrated Circuit for Current Mode Control	SLUA075
A More Accurate Current Mode Control Model	SEM1300 Topic A2*
Practical Considerations in Current Mode Power Supplies	SLUA110
Average Current Mode Control	
Average Current Mode Control of Switching Power Supplies	SLUA079
The UC3848 Average Current Mode Controller Squeezes Maximum Performance from Single Switch Converters	SLUA126
Voltage Mode Control	
Switching Power Supply Topology Voltage Mode vs. Current Mode	SLUA119
Control Loop Cookbook	SEM1100 Topic 5*
Simple Circuit Modifications Enhance Optocoupler Performance	SLUA135
Control Loop Design	
Designing Stable Control Loops	SEM1400 Topic 5
Control Loop Cookbook	SEM1100 Topic 5*
An Analytical Comparison of Alternative Control Techniques for Powering Next Generation Microprocessors	SEM1400 Topic 1*
Op Amps for Everyone Design Guide	SLOD006B

Topology Overview

Title/Description	Literature Identifier
Buck (Step-Down) and Synchronous Buck Regulators	
Understanding Buck Power Stages in Switchmode Power Supplies	SLVA057
Predictive Gate Drive™ Technology Boosts Converter Efficiency	SLUA281
TPS40000/1 Controllers Enable High Power Synchronous Step-Down Converter	SLUU120A
Under the Hood of Low Voltage DC/DC Converters	SEM1500 Topic 5*
TPS40002/3 Controllers Enable Miniature Synchronous Step Down Converter	SLUU123A
Designing for Small-Size, High-Frequency Applications with the TPS54xxx Family of SWIFT Converters	SLVA107
Fast Response Synchronous Buck Converter Design Using the TI TPS56xx Family	SLVU007
Boost (Step-Up) Regulator	
Understanding Boost Power Stages in Switchmode Power Supplies	SLVA061
High Voltage Power Supply Using a Highly Integrated DC/DC Converter	SLVA137
3.3-V to 12-V High Efficiency Boost Converter	SLUA267
Dual Output Boost Converter	SLUA288
Buck-Boost	
Understanding Buck-Boost Power Stages in Switchmode Power Supplies	SLUA059A
TPS6755 Evaluation Using the TPS673xxEVM	SLVA010
SEPIC	
Versatile Low Power SEPIC Converter Accepts Wide Input Voltage Range	SLUA158
High Power Factor Preregulator Using the SEPIC Converter	SEM900 Topic 6*
Flyback	
Design of Flyback Transformers and Inductors	SEM400 Topic 1*
Discontinuous Current Flyback Converter Design	SEM300 Appendix C*
10-W Flyback Converter Utilizing the UCC3809	SLUU087B
Elegant Simple Off-Line Bias Supply for Very Low Power Applications	SLUA116
Design Review: 50-W Flyback Converter Using the UCC3809 and UCC3965	SLUA086
Design Review: 150-W Current Mode Flyback	SEM400 Topic 6*
UCC38C44 12-V Isolated Bias Supply	SLUA274
Forward	
25-W Forward Converter Design Review	SLUA276
Multiple Output High Density Converter Design	SEM1200
UCC38C42 Controlled 25-W Forward Converter	SLUA276



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Topology Overview (continued)

Title/Description	Literature Identifier
Forward (continued)	
UCC3800/1/2/3/4/5 BiCMOS Current Mode Control ICs	SLUA149
Applying the UCC3570 Voltage Mode PWM Controller to Both Off-Line and DC/DC Converter Designs	SLUA077
50-W Forward Converter with Synchronous Rectification and Secondary Side Control	SEM1300 Topic 4*
The Use of Synchronous Rectifiers to the Design of Single Ended Forward Converters	SEM1400 Topic 7*
Two Switch Forward	
250-W Off-Line Forward Converter Design Review	SEM100 Topic 4*
Practical Considerations in Current Mode Power Supplies	SLUA110
Active Clamp/ Reset Forward and Flyback	
Active Clamp and Reset Technique Enhances Forward Converter Performance	SEM1000 Topic 3*
Design Considerations for Active Clamp and Reset Technique	SEM1100 Topic 3*
Half-Bridge	
Practical Considerations in Current Mode Power Supplies	SLUA110
Zero Voltage Switching Resonant Power Conversion	SLUA159
The UC3823A, B and UC3825A, B Enhanced Generation of PWM Controllers	SLUA125
Push – Pull and Current Fed Push-Pull	
1.5 MHz Current Mode IC Controlled 50-W Power Supply	SLUA053
The UC3823A, B and UC3825A, B Enhanced Generation of PWM Controllers	SLUA125
140-W Multiple Output Very High Density DC/DC Converter Design Review	SEM1200 Topic 6*
Full Bridge and Phase Shifted Zero Voltage Transition Converter (ZVT)	
Designing a Phase Shifted Zero Voltage Transition Power Converter	SEM900 Topic 3*
Design Review: 500-W, 40 W/in ³ Phase Shifted ZVT Power Converter	SEM900 Topic 4*
Phase Shifted Zero Voltage Transition Design Considerations and the UC3875 PWM Controller	SLUA107
100-W, 400 kHz High Efficiency DC/DC Converter Design Review	SEM1100 Topic 2*
Configuring the UCC3895 for Direct Control Driven Synchronous Rectifiers	SLUU109A

Applications

Title/Description	Literature Identifier
Battery and Battery Chargers	
Simple Switchmode Lead-Acid Battery Charger	SLUA055
Improved Charging Methods for Lead-Acid Batteries Using the UC3906	SLUA115
U-166 An Off-Line Lead Acid Charger Based on the UC3909	SLUA058
High Efficiency Dual Chemistry Charger Using the bq2000	SLUA013
Implementing a Practical Off-Line Lithium-Ion Charger Using the UCC3809	SLUA097
Coupled Inductors	
Coupled Inductor Design	SEM900 Topic 8*
Coupled Filter Inductors in Multiple Output Buck Regulators	SEM500 Topic 5*
Current Doubler Rectification	
The Current Doubler Rectifier: An Alternative Rectification Technique for Push-Pull and Bridge Converters	SLUA121
100-W, 400 kHz High Efficiency DC/DC Converter Design Review	SEM1100 Topic 2*
Synchronous Rectifiers of a Current Doubler	SLUA287
Current Sensing	
Current Sensing Solutions for Power Supply Designers	SEM1200 Topic 1*
Extend Current Transformer Range	SLUA174
Using Copper PCB Etch for Low Value Resistance	SLUA236
Conditioning a Switch-Mode Power Supply Current Signal Using TI Op Amps	SLOA044
Distributed Power	
Distributed Power Systems	SEM900 Topic 1*
Duty Cycle Clamp	
Accurate PWM Duty Cycle Clamp Circuit	SLUA253
Programming the UCC3809 for 90% Maximum Duty Cycle Clamp	SLUA251
The Effects of Oscillator Discharge Variations on Maximum Duty	SLUA173



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Applications (continued)

Title/Description	Literature Identifier
Electro-Magnetic Interference (EMI)	
EMI Considerations for DC to DC Converters and Integrated Switching Regulators	SLTA015
Understanding and Optimizing Electromagnetic Compatibility in Switchmode Power Supplies	SEM1500 Topic 1*
PCB Design Guidelines for Reduced EMI	SZZA009
Frequency Foldback	
The UCC3884 Frequency Foldback Pulse Width Modulator	SLUA114
Frequency Foldback Technique Provides Protection	SLUA165
Gate Drive	
Practical Considerations in High Performance MOSFET, IGBT and MCT Gate Drive Circuits	SLUA105
A Design and Application Guide for High Speed Power MOSFET Gate Drive Circuits	SEM1400 Topic 2*
Hot Swap	
A Universal Telecommunications Hot Swap Device Family	SLUA283
Lighting	
Powering a 35-W DC Metal Halide High-Intensity Discharge (HID) Lamp	SLUA078
UCC3972 BiCMOS Cold Cathode Fluorescent Lamp Driver Controller, EVM	SLUA160
Linear Regulators	
A High Performance Linear Regulator for Low Dropout Applications	SLUA072
Loadshare / Current Share	
Paralleling Power – Choosing and Applying the Best Technique for Loadsharing	SEM1500 Topic 6*
UC3907 Load Share IC Simplifies Parallel Power Supply Design	SLUA147
48-V _{IN} , 12-V _{OUT} Loadshare System Using the UCC39002 with Three DC/DC Modules	SLUA270A
Low Drop Out (LDO) Regulators	
Understanding the Terms and Definitions of LDO Voltage Regulators	SLVA079
Technical Review of Low Dropout Voltage Regulator Operation And Performance	SLVA072
Extending the Input Voltage Range of an LDO Regulator	SLVA119
ESR, Stability, and the LDO Regulator	SLVA115
Magnetic Amplifiers (Mag Amps)	
Magnetic Amplifier Control for Simple Low Cost Secondary Regulation	SEM500 Topic 7*
Magnetics Design	
Magnetics Design Handbook	MAG100A
Magnetics Definitions and Equations	MAG100A
Transformer and Inductor Design for Optimum Circuit Performance	MAG100A
Minimizing Winding Losses in Magnetic Devices	MAG100A
The Effects of Leakage Inductance on Multiple Output Flyback Circuits	MAG100A
Eddy Current Losses in Transformer Windings and Circuit Wiring	MAG100A
Multiple Outputs	
A Power Management Solution for Efficient, Multiple Output Applications	SLUA255
Achieving High Efficiency with a Multiple Output CCM Flyback Supply	SEM1500 Topic 3*
Unique Cascaded Power Converter Topology for High Current Low Output Voltage Applications	SEM1300 Topic 1*
140-W Multiple Output Very High Density DC/DC Converter Design Review	SEM1200 Topic 6*
The Effects of Leakage Inductance on Multiple Output Flyback Circuits	SEM500 Topic 2*
Coupled Filter Inductors in Multiple Output Buck Regulators	SEM500 Topic 5*
Optocoupler and Isolation Applications	
Simple Circuit Modifications Enhance Optocoupler Performance	SLUA135
Optocoupler Feedback Drive Techniques	SLUA167
Isolating the Control Loop	SEM700 Topic 2*
A Simple Isolation Amplifier Using the UC1901	SLUA161
Power Factor Correction (PFC)	
Optimizing the Design of a High Power Factor Switching Preregulator	SEM700 Topic 7*
UC3854 Controlled Power Factor Correction Circuit Design	SLUA144
Designing High Power Factor Off-Line Power Supplies	SEM1500 Topic 2*
Optimizing Performance in UC3854 Power Factor Correction Applications	SLUA172



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Applications (continued)

Title/Description	Literature Identifier
Power Factor Correction (PFC) (continued)	
UC3854A/B and UC3855A/B Provide Power Limiting with Sinusoidal Input Current for PFC Front Ends	SLUA196A
Power Factor Correction Using the UC3852 Controlled On-Time Zero Current Switching Technique	SLUA108
250-W PFC Boost Follower PreRegulator Design	SLUA269
Predictive Gate Drive™ Technology	
Predictive Gate Drive Boosts Converter Efficiency	SLUA281
Predictive Gate Drive™ Technology Frequently Asked Questions	SLUA285
Printed Circuit Board Layout	
Practical Considerations in Troubleshooting and Optimizing Power Supply Control Circuits	SEM1200 Topic 4*
Layout Guidelines for TPA300x Series Parts	SLOA103
High Speed Amplifier PCB Layout Tips	SLOA102
PCB Design Guidelines for Reduced EMI	SZZA009
Optimizing the Layout of the TPS5461x for Thermal Performance (Rev. A)	SLVA113A
Pulse Width Modulation	
Switching Power Supply Topology: Voltage vs. Current Mode	SLUA119
Understanding Buck Power Stages in Switchboard Power Supplies	SLVA057
Power Management Selection Guide	SLUA219
Resonant Power Conversion	
Zero Voltage Switching Resonant Power Conversion	SEM700 Topic 1*
Resonant Mode Converter Topologies – Additional Topics	SEM700 Topic 6*
Resonant Mode Converter Topologies	SEM600 Topic 1*
Sequencing and Tracking Outputs	
Dual Output Power Supply Sequencing for High Performance Processors	SLVA117
Sequencing the TPS54X80 and TPS54X73 DC/DC Converters	SLVA007
Power Supply Sequencing Solutions for Dual Supply Voltage DSPs	SLVA073A
TL5002 Provides DDR Bus Termination Power Supply Solution	SLVA095
Using the TPS54372 DDR Memory/Active Bus Termination Synchronous PWM Switcher	SLUA273
TI Power Solutions Power Up Altera FPGAs	SLUA278
Snubber Circuits	
Snubber Circuits: Theory, Design and Application	SEM900 Topic 2*
Source/Sink and Terminator Power	
Designing for Small-Size, High-Frequency Applications with the TPS54xxx Family	SLVA107
Synchronization	
Practical Considerations in Current Mode Power Supplies	SLUA110
A New Synchronization Circuit for Power Converters	SLUA296
Synchronizing a PFC Controller from a Down Stream Controller Gate Drive	SLUA245
Synchronous Rectifiers	
Synchronous Rectifiers of a Current Doubler	SLUA287
The Use of Synchronous Rectifiers to the Design of Single Ended Forward Converters	SEM1400 Topic 7*
50-W Forward Converter with Synchronous Rectification and Secondary Side Control	SEM1300 Topic 4*
Telephone Ring Generators	
A Complete Control Solution for a Four-Quadrant Flyback Converter	SLUA060
Transient Response	
Fast Response Synchronous Buck Converter Design Using the TI TPS56xx Family	SLVU007
Designing Fast Response Synchronous Buck Regulators Using the TPS5210	SLVA044
DC/DC Converter with Ceramic Output Capacitors Worst Case Analysis & Measurement	SLVA126
Troubleshooting	
Practical Considerations in Troubleshooting and Optimizing Power Supply Control Circuits	SEM1200 Topic 4*
Off-Line SMPS Failure Modes, PWM Switchers and DC/DC Converters	SLVA085

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