

A Constant ON-Time 3-Level Buck Converter for Low Power Applications

Brian Michael Cassidy

Thesis submitted to the faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

Master of Science
In
Electrical Engineering

Dong S. Ha, Chair

Qiang Li, Co-Chair

Kwang-Jin Koh

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Blacksburg, VA

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Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Brian Cassidy

Description of item under review for fair use: K. Aldana, "U.S. DOT Proposes Broader Use of Event Data Recorders to Help Improve Vehicle Safety," 7- Dec- 2012. [Online]. Available: <http://www.nhtsa.gov/About+NHTSA/Press+Releases/U.S.+DOT+Proposes+Broader+Use+of+Event+Data+Recorders+to+Help+Improve+Vehicle+Safety>. [Accessed 14- Oct- 2014].

Report generated on: 03-29-2015 at : 22:23:56

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

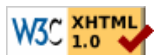
Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*



Draft 09/01/2009

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Virginia Tech ETD Fair Use Analysis Results

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Name: Brian Cassidy

Description of item under review for fair use: D. Maric and R. Monteiro, "20V MOSFETs for DC-DC Converters in Desktop Computers and Servers," [Online]. Available: <http://www.irf.com/technical-info/whitepaper/20vapec2002.pdf>. [Accessed 20- Jan- 2015].

Report generated on: 03-29-2015 at : 22:34:48

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

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Virginia Tech ETD Fair Use Analysis Results

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Name: Brian Cassidy

Description of item under review for fair use: D. Reusch, High Frequency, High Power Density Integrated Point of Load and Bus Converters, Ph.D. dissertation, ECE, Virginia Tech, Blacksburg, VA, 2012.

Report generated on: 03-29-2015 at : 22:37:09

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *in favor of fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *against fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

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Virginia Tech ETD Fair Use Analysis Results

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Name: Brian Cassidy

Description of item under review for fair use: X. Zhou, M. Donati, L. Amoroso, and F. C. Lee, "Improved Light-Load Efficiency for Synchronous Rectifier Voltage Regulator Module," in IEEE Transactions on Power Electronics, Vol. 15, No. 5, pp. 826-834, 2000.

Report generated on: 03-29-2015 at : 22:39:04

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *in favor of fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *against fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

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Name: Brian Cassidy

Description of item under review for fair use: R. W. Erickson and D. Maksimovie, Fundamentals of Power Electronics, 2nd ed. New York: Springer Publishing, 2001.

Report generated on: 03-29-2015 at : 22:41:09

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

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Factor 4

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Name: Brian Cassidy

Description of item under review for fair use: O. Semiconductor, "LC Selection Guide for the DC-DC Synchronous Buck Converter," [Online]. Available: <http://www.onsemi.com/pub/Collateral/AND9135-D.PDF>. [Accessed 17- Dec-2014].

Report generated on: 03-29-2015 at : 22:46:31

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *in favor of fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

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Name: Brian Cassidy

Description of item under review for fair use: J. Ejury and I. Technologies, "Buck Converter Design," [Online]. Available: <http://www.mouser.com/pdfdocs/buckconverterdesignnote.pdf>. [Accessed 17- Dec- 2014].

Report generated on: 03-29-2015 at : 22:47:54

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

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Name: Brian Cassidy

Description of item under review for fair use: P. Xu, Multiphase Voltage Regulator Modules with Magnetic Integration to Power Microprocessors, Ph.D. dissertation, ECE, Virginia Tech, Blacksburg, VA, 2002.

Report generated on: 03-29-2015 at : 22:49:46

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *in favor of fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

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Name: Brian Cassidy

Description of item under review for fair use: P. Vivek, Extending Efficiency in a DC/DC converter with automatic mode switching from PFM to PWM, M.S. Thesis, ECE, Arizon Statue University, Phoenix, AZ, 2014.

Report generated on: 03-29-2015 at : 22:57:21

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *in favor of fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

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Name: Brian Cassidy

Description of item under review for fair use: S. Keeping, "The Advantages of Pulse Frequency Modulation for DC/DC Switching Voltage Converters," Hearst Electronic Products, 25- Mar- 2014. [Online]. Available: <http://www.digikey.com/en/articles/techzone/2014/mar/the-advantages-of-pulse-frequency-modulation-for-dc-dc-switching-voltage-converters>. [Accessed 10- Nov- 2014].

Report generated on: 03-29-2015 at : 22:59:11

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

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Name: Brian Cassidy

Description of item under review for fair use: Y. Yan, F. C. Lee, and P. Mattavelli, "Comparison of Small Signal Characteristics in Current Mode Control Schemes for Point-of-Load Buck Converter Applications," IEEE Transactions on Power Electronics, vol. 28, no. 7, pp. 3405-3414, Jul 2013.

Report generated on: 03-29-2015 at : 23:08:39

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

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Name: Brian Cassidy

Description of item under review for fair use: L. Technology, "Fast Accurate Step-Down DC/DC Contoller with Differential Output Sensing," LTC3833 datasheet. [Online]. Available: <http://cds.linear.com/docs/en/datasheet/3833f.pdf>. [Accessed 10-Jun- 2014].

Report generated on: 04-02-2015 at : 10:03:02

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

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Virginia Tech ETD Fair Use Analysis Results

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Name: Brian Cassidy

Description of item under review for fair use: T. Instrument, "Dual Positive-Edge-Triggered D-Type Flip-Flop with Clear and Preset," 74AC11074 datasheet . [Online]. Available: <http://www.ti.com/lit/ds/symlink/74ac11074.pdf>. [Accessed 15-Jul- 2014].

Report generated on: 04-02-2015 at : 10:04:32

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

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Name: Brian Cassidy

Description of item under review for fair use: T. Instruments, "High-Speed CMOS Logic Quad 2-Input AND Gate," AND gate datasheet, 2004. [Online]. Available: <http://www.ti.com/lit/ds/symlink/cd54hc08.pdf>. [Accessed 10- Jun- 2014].

Report generated on: 04-02-2015 at : 10:05:01

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

Draft 09/01/2009

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Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Brian Cassidy

Description of item under review for fair use: N. Semiconductors, "Quad 2-Input OR Gate," 74HCT32 datasheet. [Online]. Available: http://www.nxp.com/documents/data_sheet/74HC_HCT32.pdf. [Accessed 15- Jun- 2014].

Report generated on: 04-02-2015 at : 10:05:58

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

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Name: Brian Cassidy

Description of item under review for fair use: L. Technology, "High Speed, High Voltage, High Side Gate Driver," LTC4440-5 datasheet. [Online]. Available: <http://cds.linear.com/docs/en/datasheet/44405fb.pdf>. [Accessed 15- April- 2014].

Report generated on: 04-02-2015 at : 10:06:24

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

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Name: Brian Cassidy

Description of item under review for fair use: L. Technology, "Precision, Extended Input Range Current Sense Amplifier," LT6105 datasheet. [Online]. Available: <http://cds.linear.com/docs/en/datasheet/6105fa.pdf>. [Accessed 09- July- 2014].

Report generated on: 04-02-2015 at : 10:07:12

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

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Name: Brian Cassidy

Description of item under review for fair use: L. Technology, "Ultralow Power Single/Dual Comparator with Reference," LTC1440 datasheet. [Online]. Available: <http://cds.linear.com/docs/en/datasheet/144012fd.pdf>. [Accessed 09- July- 2014].

Report generated on: 04-02-2015 at : 10:07:38

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

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Name: Brian Cassidy

Description of item under review for fair use: L. Technology, LTPower CAD II, Milpitas, CA, 2014.

Report generated on: 04-02-2015 at : 10:08:02

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

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Description of item under review for fair use: A. Semi, "Wide Input 3A Step Down Conveter," ACT4070B datasheet, 2013. [Online]. Available: http://www.active-semi.com/sheets/ACT4070B_Datasheet.pdf. [Accessed 15- May- 2014].

Report generated on: 04-02-2015 at : 10:08:34

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *in favor of fair use*

Factor 2

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Factor 3

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Name: Brian Cassidy

Description of item under review for fair use: Coilcraft, "Shielded Power Inductors - EPL7040," EPL7040-332ME datasheet. [Online]. Available: <http://www.coilcraft.com/pdfs/epl7040.pdf>. [Accessed 20- Jun- 2014].

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Name: Brian Cassidy

Description of item under review for fair use: David Jauregui, Bo Wang, and Rengang Chen, "Power Loss Calculation With Common Source Inductance Consideration for Synchronous Buck Converters," Texas Instrument, 2011.

Report generated on: 03-30-2015 at : 21:27:13

Based on the information you provided:

Factor 1

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Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

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Report generated on: 04-02-2015 at : 10:09:44

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Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

Draft 09/01/2009

(Questions? Concerns? Contact Gail McMillan, Director of the Digital Library and Archives at Virginia Tech's University Libraries: gailmac@vt.edu)

(Please ensure that Javascript is enabled on your browser before using this tool.)

Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Brian Cassidy

Description of item under review for fair use: T. Instruments, "20V N-Channel NexFET™ Power MOSFETs," CSD15571Q2 datasheet. [Online]. Available: <http://www.ti.com/lit/ds/symlink/csd15571q2.pdf>. [Accessed 15- Jun- 2014].

Report generated on: 04-02-2015 at : 10:10:11

Based on the information you provided:**Factor 1**

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

Draft 09/01/2009

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Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Brian Cassidy

Description of item under review for fair use: T. Instruments, "N-Channel NexFET™ Power MOSFETs," CSD16301Q2 datasheet. [Online]. Available: <http://www.ti.com/lit/ds/symlink/csd16301q2.pdf>. [Accessed 10- May- 2014].

Report generated on: 04-02-2015 at : 10:10:40

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

Draft 09/01/2009

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Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Brian Cassidy

Description of item under review for fair use: H. Instruments, "http://www.testequipmentdepot.com/hameg/pdf/hm8143_manu.pdf," HM8143 datasheet. [Online]. Available: http://www.testequipmentdepot.com/hameg/pdf/hm8143_manu.pdf. [Accessed 11- Nov- 2014].

Report generated on: 03-30-2015 at : 21:43:38

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

Draft 09/01/2009

(Questions? Concerns? Contact Gail McMillan, Director of the Digital Library and Archives at Virginia Tech's University Libraries: gailmac@vt.edu)

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Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Brian Cassidy

Description of item under review for fair use: T. Power, "RBL488 SERIES 800 WATTS," RBL488 datasheet. [Online]. Available: http://www.tdipower.com/PDF/dynaload/rbl_488_series_800w.pdf. [Accessed 11- Nov- 2014].

Report generated on: 03-30-2015 at : 21:52:51

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

Draft 09/01/2009

(Questions? Concerns? Contact Gail McMillan, Director of the Digital Library and Archives at Virginia Tech's University Libraries: gailmac@vt.edu)

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Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Brian Cassidy

Description of item under review for fair use: D. Incorporated, "Surface Mount Schottky Barrier Rectifier," SK34 datasheet. [Online]. Available: http://www.diodes.com/datasheets/products_inactive_data/ds13006_R8.pdf. [Accessed 10- Dec- 2014].

Report generated on: 03-30-2015 at : 21:54:27

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

Draft 09/01/2009

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Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Brian Cassidy

Description of item under review for fair use: L. Technology, "40V, 1A Synchronous Step-Down Converter," LTC3646 datasheet. [Online]. Available: <http://cds.linear.com/docs/en/datasheet/36461fb.pdf>. [Accessed 10- Dec-2014].

Report generated on: 03-30-2015 at : 21:57:17

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *in favor of fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

Draft 09/01/2009

(Questions? Concerns? Contact Gail McMillan, Director of the Digital Library and Archives at Virginia Tech's University Libraries: gailmac@vt.edu)

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Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Brian Cassidy

Description of item under review for fair use: E. V. Mehta and E. P. Malik, "Comparison between Asynchronous and Synchronous Buck Converter Topology," International Journal of Applied Engineering Research, vol. 7, no. 11, 2012.

Report generated on: 03-30-2015 at : 22:00:01

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

Draft 09/01/2009

(Questions? Concerns? Contact Gail McMillan, Director of the Digital Library and Archives at Virginia Tech's University Libraries: gailmac@vt.edu)

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Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Brian Cassidy

Description of item under review for fair use: D. Baba, Benefits of a multiphase buck converter, Texas Instruments Application Note, 2012.

Report generated on: 03-30-2015 at : 22:02:50

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *against fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*