Freescale Semiconductor
Application Note

Document Number: AN3249
Rev. 1.0, 05/2006

Voltage Drop Compensation on the MC13783 Switchers Line

by: Power Management and Audio Applications Team

1 Introduction

This document proposes a typical and recommended solution to compensate the voltage drop on the MC13783 power management IC switchers line due to the PCB wire resistance. The PCB wire resistance needs to be placed inside the closed loop of the switcher. The goal is to stabilize the voltage on that switcher line output.

2 Typical Configuration

The typical placement and layout of a switcher (single/dual mode) for the MC13783 is shown in Figure 1 on page 2.

Contents

1 Introduction 1
2 Typical Configuration 1
3 Recommended Configuration 2

© Freescale Semiconductor, Inc., 2006. All rights reserved.

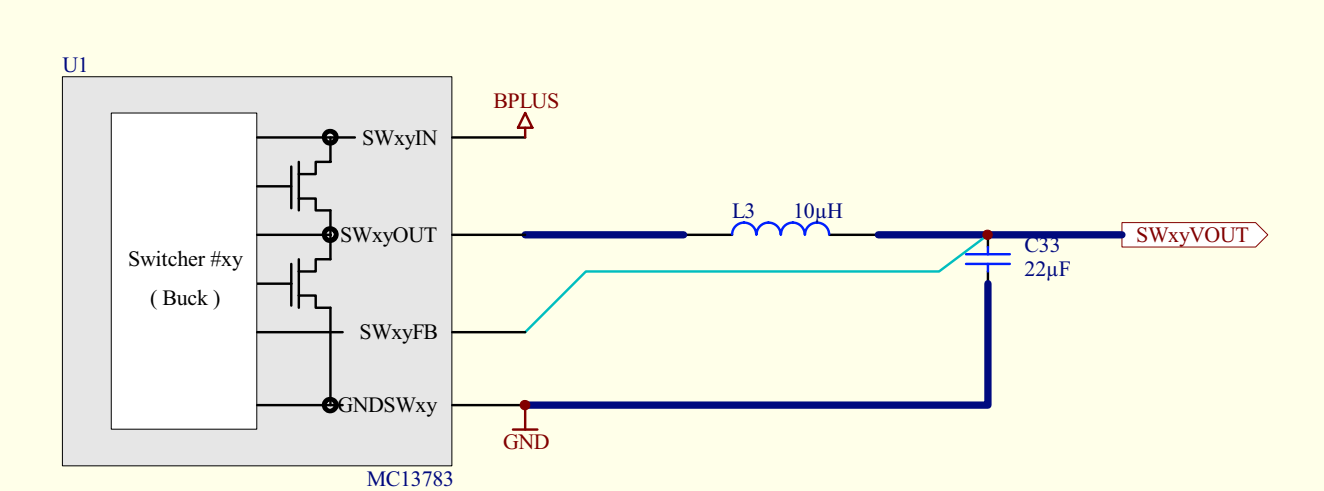

Figure 1. Typical Placement and Layout of a Switcher for the MC13783

The capacitor and coil components L and C are usually placed close to the MC13783 package. The voltage, SWxyVOUT, is equal to the programmed output switcher voltage minus the dropout caused by the PCB trace. This dropout is also dependent of the DC load current on SWxyVOUT. In a typical configuration, the feedback loop is not usually shielded.

3 Recommended Configuration

As shown in Figure 2 on page 3, Freescale recommends following the L and C configuration designated. The output capacitor should be placed near the point where the current is drawn on the output side of the PCB wire resistance as shown in Figure 2. The PCB wire resistance is now inside the closed loop of the switcher so it does not impact the DC voltage at SWxyVOUT.

NOTE

The switcher feedback trace must be shielded as this line is attaching to a high impedance point in the MC13783. Any perturbation on this line must be minimized to ensure stability of the switcher.

The output capacitor can be placed far from the MC13783. The SWxyFB pin is a high impedance input, care must be taken in the layout of this signal as stated in the note. This is the recommended configuration for the MC13783 power management IC to stabilize the voltage on the switcher line.

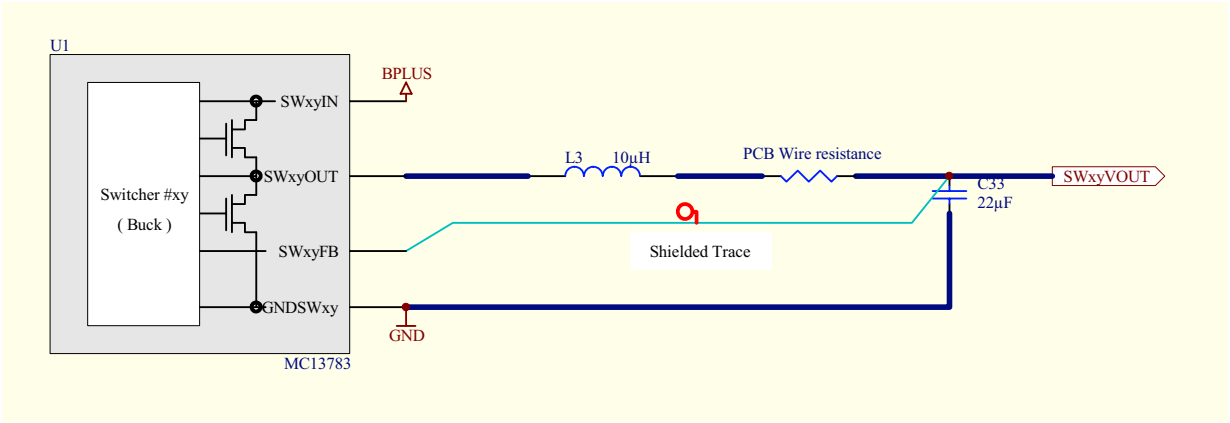

Figure 2. Recommended Configuration

How to Reach Us:

Home Page:
www.freescale.com

E-mail:
support@freescale.com

USA/Europe or Locations Not Listed:
Freescale Semiconductor
Technical Information Center, CH370
1300 N. Alma School Road
Chandler, Arizona 85224
+1-800-521-6274 or +1-480-768-2130
support@freescale.com

Europe, Middle East, and Africa:
Freescale Halbleiter Deutschland GmbH
Technical Information Center
Schatzbogen 7
81829 Muenchen, Germany
+44 1296 380 456 (English)
+46 8 52200080 (English)
+49 89 92103 559 (German)
+33 1 69 35 48 48 (French)
support@freescale.com

Japan:
Freescale Semiconductor Japan Ltd.
Headquarters
ARCO Tower 15F
1-8-1, Shimo-Meguro, Meguro-ku,
Tokyo 153-0064, Japan
0120 191014 or +81 3 5437 9125
support.japan@freescale.com

Asia/Pacific:
Freescale Semiconductor Hong Kong Ltd.
Technical Information Center
2 Dai King Street
Tai Po Industrial Estate
Tai Po, N.T., Hong Kong
+800 2666 8080
support.asia@freescale.com

***For Literature Requests Only*:**
Freescale Semiconductor Literature Distribution Center
P.O. Box 5405
Denver, Colorado 80217
1-800-521-6274 or 303-675-2140
Fax: 303-675-2150
LDCForFreescaleSemiconductor@hibbertgroup.com

Document Number: AN3249
Rev. 1.0
05/2006

Information in this document is provided solely to enable system and software implementers to use Freescale Semiconductor products. There are no express or implied copyright licenses granted hereunder to design or fabricate any integrated circuits or integrated circuits based on the information in this document.

Freescale Semiconductor reserves the right to make changes without further notice to any products herein. Freescale Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Freescale Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. “Typical” parameters that may be provided in Freescale Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including “Typicals”, must be validated for each customer application by customer’s technical experts. Freescale Semiconductor does not convey any license under its patent rights nor the rights of others. Freescale Semiconductor products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Freescale Semiconductor product could create a situation where personal injury or death may occur. Should Buyer purchase or use Freescale Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold Freescale Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Freescale Semiconductor was negligent regarding the design or manufacture of the part.

Freescale™ and the Freescale logo are trademarks of Freescale Semiconductor, Inc. All other product or service names are the property of their respective owners.

© Freescale Semiconductor, Inc. 2006. All rights reserved.

freescale™
semiconductor