



1.0 Design Specifications

Inputs	Outputs #1
VinMin=3.3	Vout1=1.2
VinMax=3.3	Iout1=1.5

2.0 Design Description

The design uses a LM2743 synchronous controller utilizing external high side and low side N-channel MOSFETs operating at frequency from 100kHz - 500kHz nominal based upon the frequency set resistor value (R8). Careful PC board layout is critical to achieve low switching losses and clean, stable operation. The switching power stage requires particular attention. Few points to note for this design are:

1) Decoupling capacitors are close to IC pins as possible. Keep separate power ground plane.

2) Input and output capacitors are connected to the power ground plane; all other capacitors are connected to the signal ground plane.

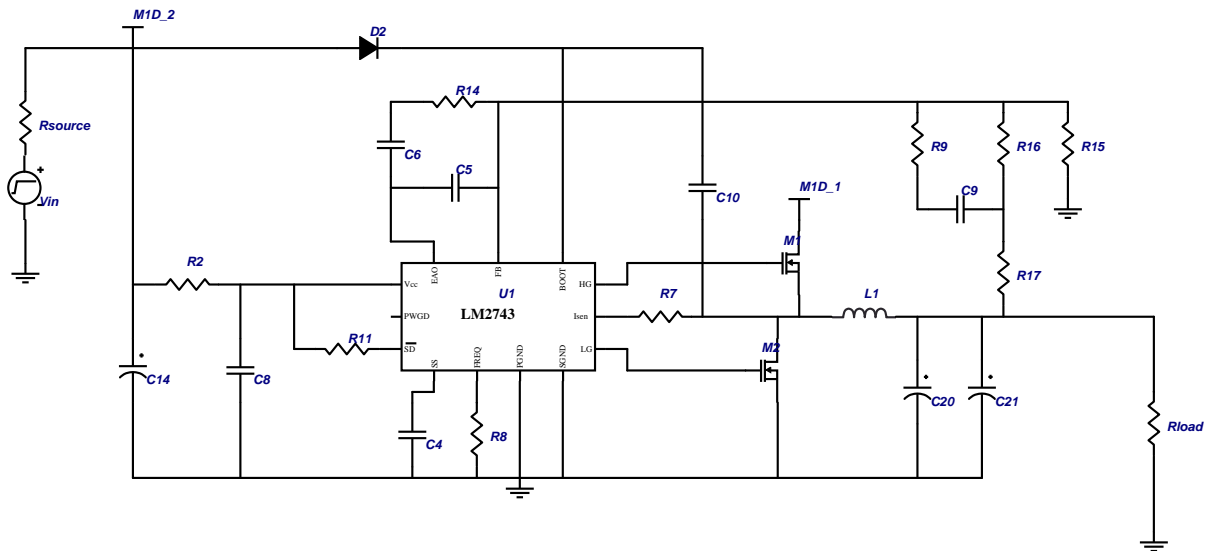
3) High current paths are very short.

4) Multiple MOSFETs have been used to reduce the conduction and switching losses.

5) Feedback connections are short and direct and routed away from any noisy traces (i.e. switch node).

6) High-side MOSFETs are as close as possible to the controller

3.0 Schematic



689758_657_0

FIGURE 1. Example Schematic Showing Connection for all Components.

4.0 Bill Of Materials

Part	Manufacturer	Part#	Attributes
C10	Vishay	VJ0805Y104KXXAT	0.1u F
C14	TDK	C2012X5R0J106M	10u F
C20	Sanyo	4CV470EX	470u F
C21	TDK	C2012X5R0J106M	10u F
C4	Vishay	VJ0805Y103KXXAT	0.01u F
C5	Vishay	VJ0805A101KXXAT	100p F

Part	Manufacturer	Part#	Attributes
C6	Vishay	VJ0805Y472KXXAT	4.7n F
C8	TDK	C2012X5R1A225K	2.2u F
C9	Vishay	VJ0805Y153KXXAT	15n F
D2	ONSEMI	BAT54H	0.32 V
L1	Pulse	P1169.153	11.3u H, 0.04 Ohms
M1	Siliconix	SI3460DV	
M2	Siliconix	SI3460DV	
R11	Vishay	CRCW08051003FRT6	100k Ohms
R14	Vishay	CRCW08051742FRT6	17.4k Ohms
R15	Vishay	CRCW08051002FRT6	10k Ohms
R16	Vishay	CRCW08051002FRT6	10k Ohms
R17	Vishay	CRCW08050000FRT6	0 Ohms
R2	Vishay	CRCW080510R0FRT6	10 Ohms
R7	Vishay	CRCW08051431FRT6	1.43k Ohms
R8	Vishay	CRCW0805XXXXFRT6	49.9k - 267k Ohms
R9	Vishay	CRCW08055110FRT6	511 Ohms
U1	National Semiconductor	LM2743	

5.0 Waveforms

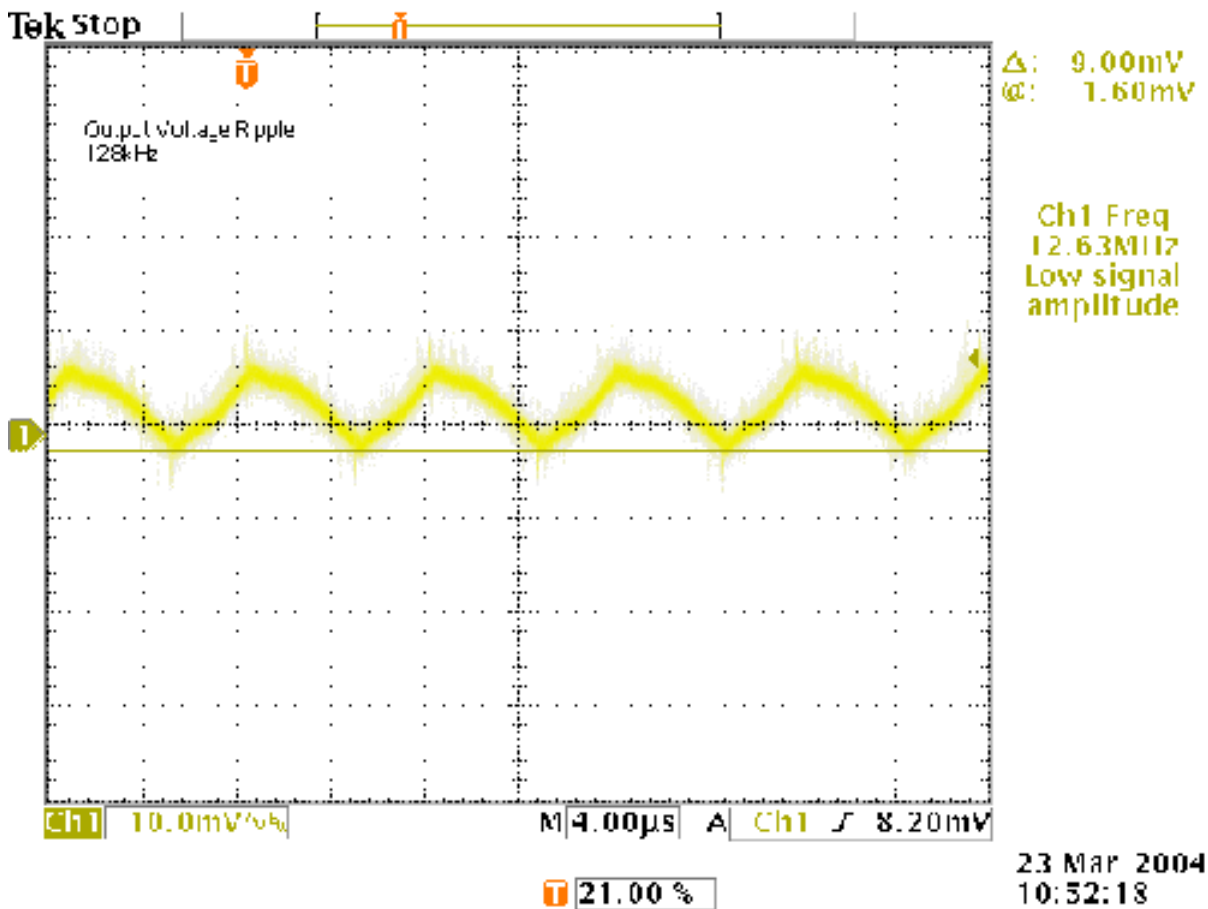


FIGURE 2. NSC0314-Output Voltage Ripple-128kHz

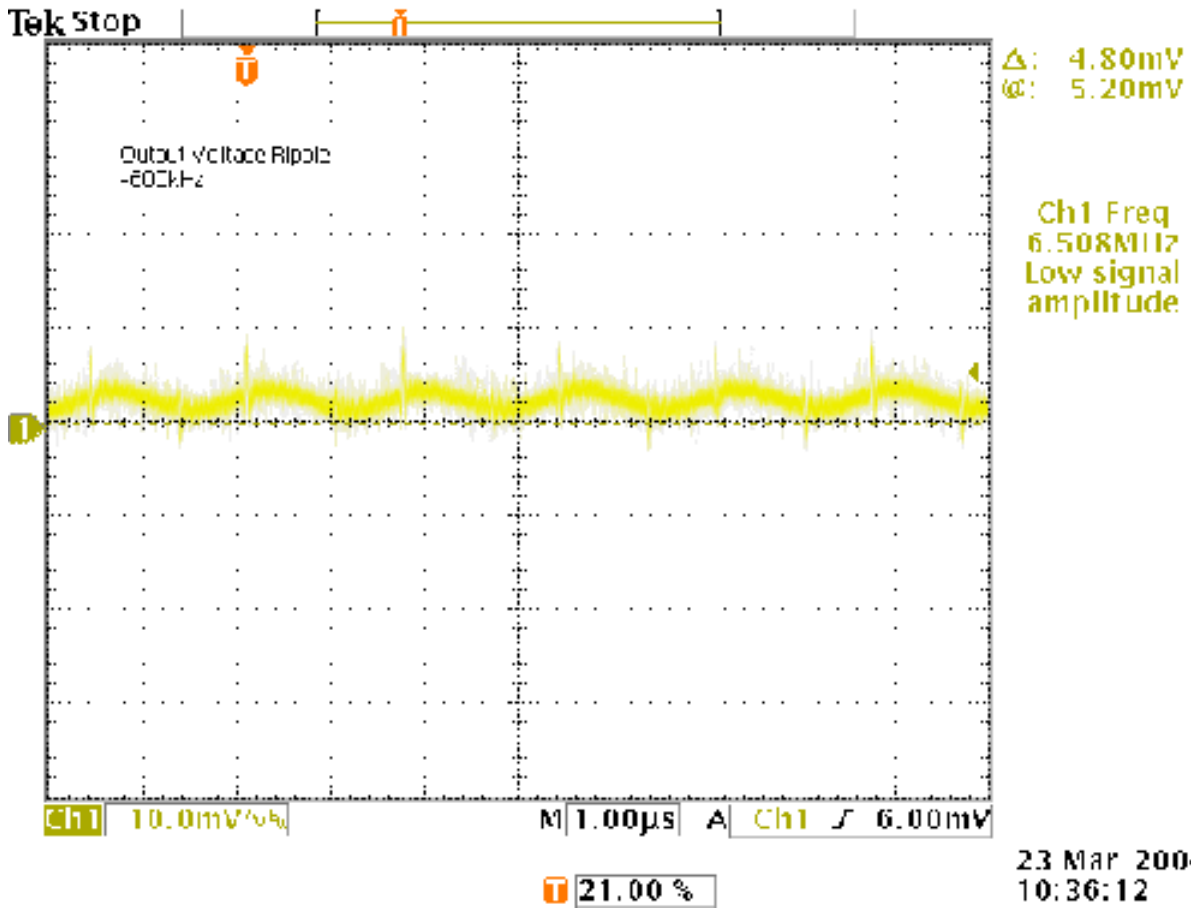


FIGURE 3. NSC0314-Output Voltage Ripple-600kHz

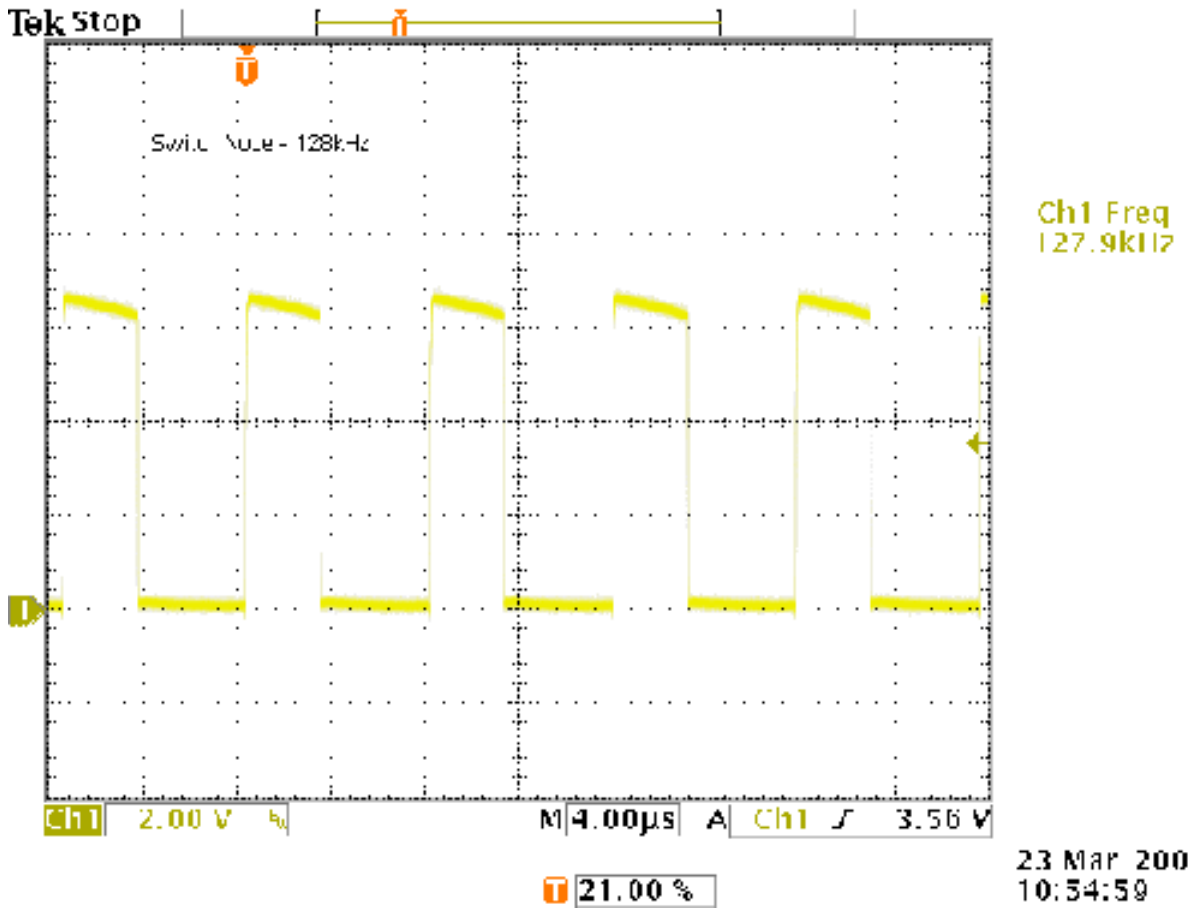


FIGURE 4. NSC0314-Switch Node-128kHz

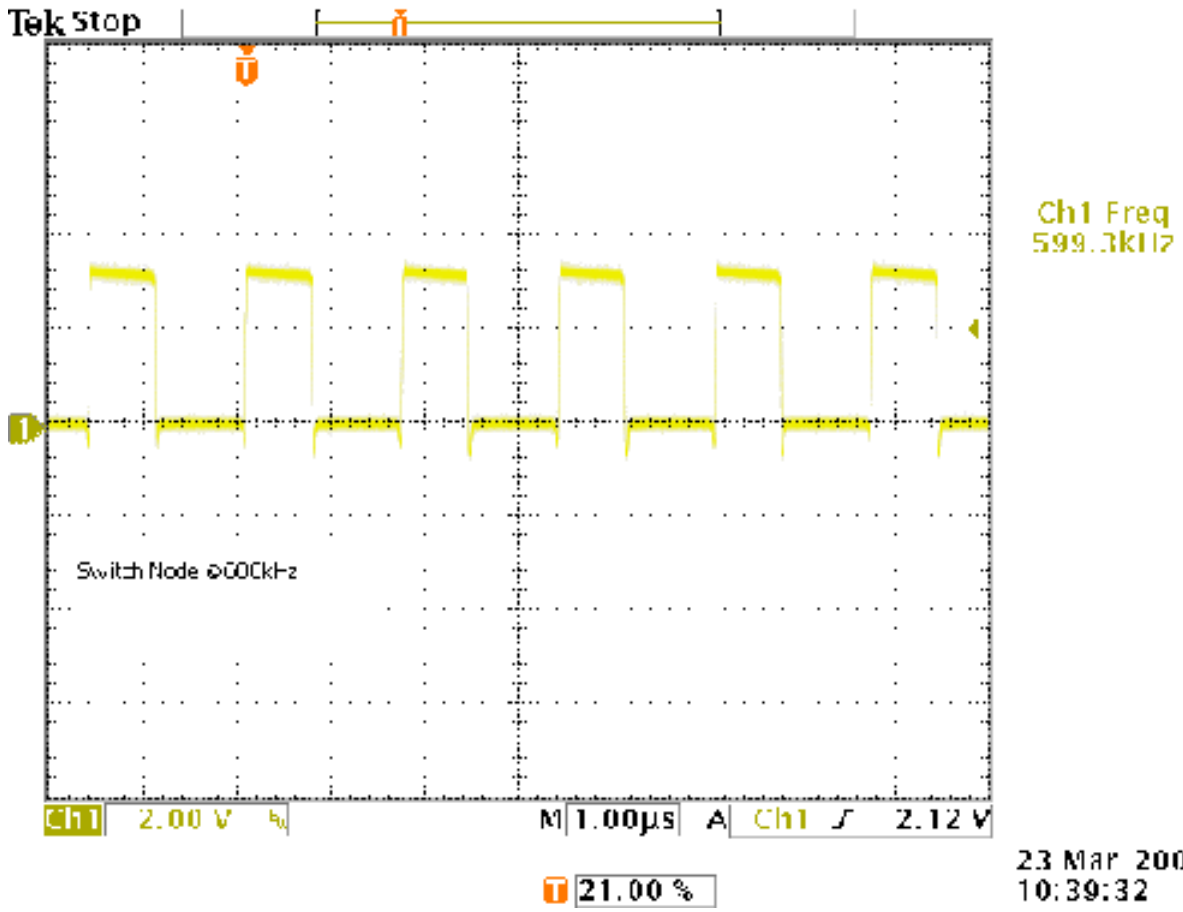


FIGURE 5. NSC0314-Switch Node-600kHz

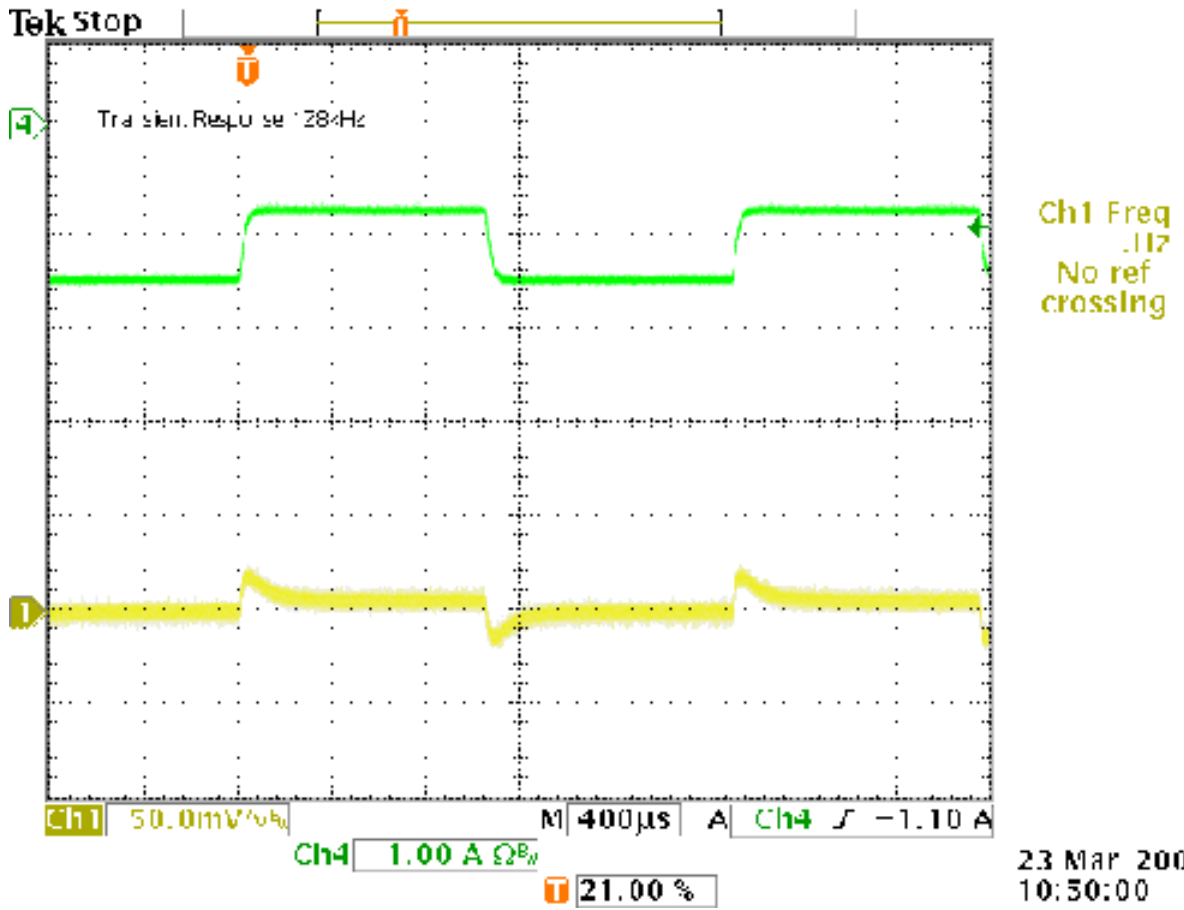


FIGURE 6. NSC0314-Transient Response-128kHz

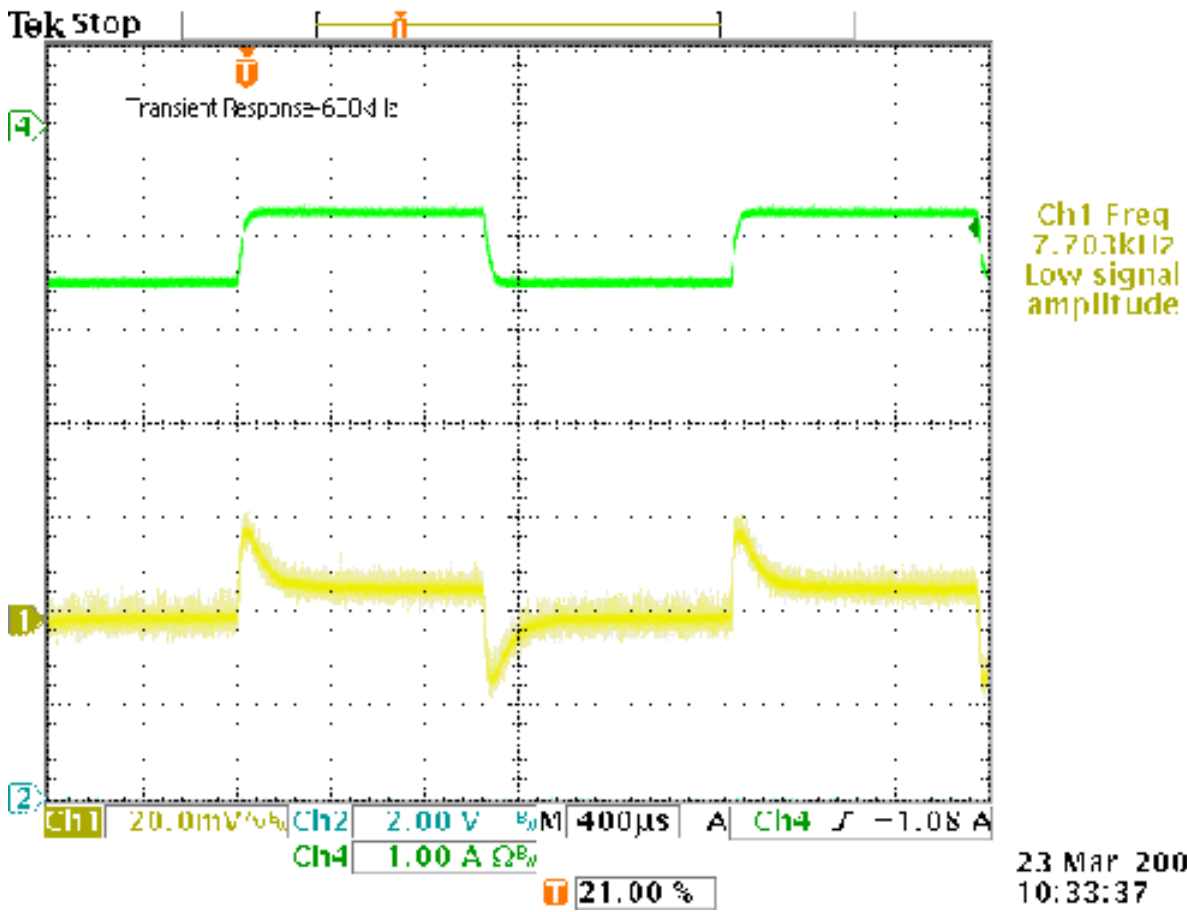


FIGURE 7. NSC0314-Transient Response-600kHz

Notes

National Semiconductor's design tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Reference designs are created using National's published specifications as well as the published specifications of other device manufacturers. While National does update this information periodically, this information may not be current at the time the reference design is built. National and/or its licensors do not warrant the accuracy or completeness of the specifications or any information contained therein. National and/or its licensors do not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. National and/or its licensors do not warrant that the designs are production worthy. You should completely validate and test your design implementation to confirm the system functionality for your application.

National does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and National reserves the right at any time without notice to change said circuitry and specifications.

For the most current product information visit us at www.national.com.

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT AND GENERAL COUNSEL OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which,
 - (a) are intended for surgical implant into the body, or
 - (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

BANNED SUBSTANCE COMPLIANCE

National Semiconductor certifies that the products and packing materials meet the provisions of the Customer Products Stewardship Specification (CSP-9-111C2) and the Banned Substances and Materials of Interest Specification (CSP-9-111S2) and contain no "Banned Substances" as defined in CSP-9-111S2.

Leadfree products are RoHS compliant.



National Semiconductor Americas Customer Support Center
 Email: new.feedback@nsc.com
 Tel: 1-800-272-9959

National Semiconductor Europe Customer Support Center
 Fax: +49 (0) 180-530-85-86
 Email: europe.support@nsc.com
 Deutsch Tel: +49 (0) 69 9508 6208
 English Tel: +49 (0) 870 24 0 2171
 Français Tel: +33 (0) 1 41 91 8790

National Semiconductor Asia Pacific Customer Support Center
 Email: ap.support@nsc.com

National Semiconductor Japan Customer Support Center
 Fax: 81-3-5639-7507
 Email: jpn.feedback@nsc.com
 Tel: 81-3-5639-7560