



TPS54240 + TPS2511 – 5V@2.1A
Universal USB Car Charger
PMP7388_REVA
3/20/12

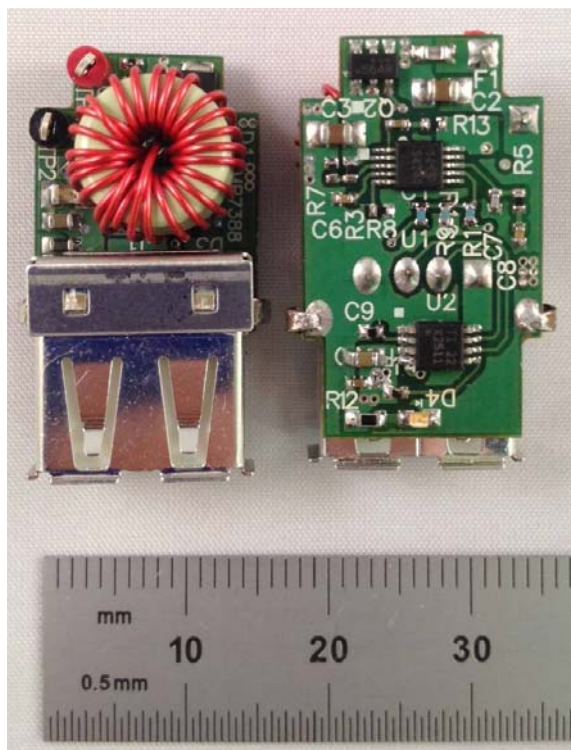
The tests performed were as follows:

A. TPS54240 – 5V@2.1A

1. Board Photo
2. Thermal Image
3. Turn-On (No Load)
4. Output Voltage Ripple
5. Transient Response
6. Switching Behavior
7. Efficiency
8. Load Regulation
9. Loop Response

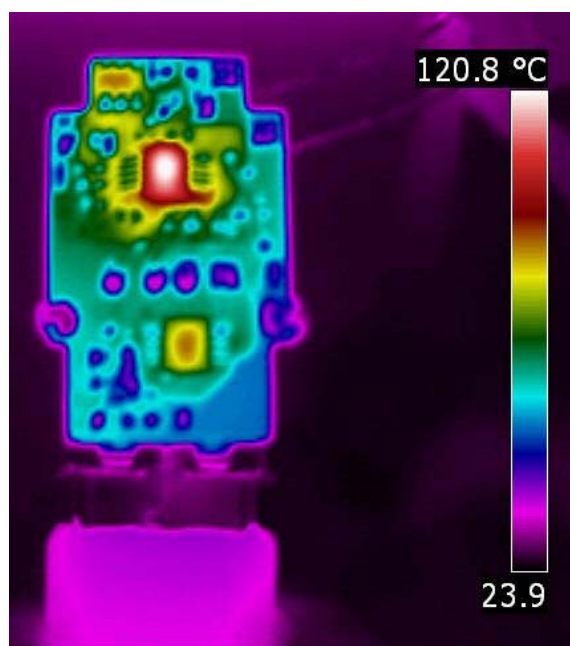
1 Board Photo

The photo below shows the front and back of the PMP7388 board.



2 Thermal Image

The thermal images of the board are taken with 2A load. The input voltage is 12V.

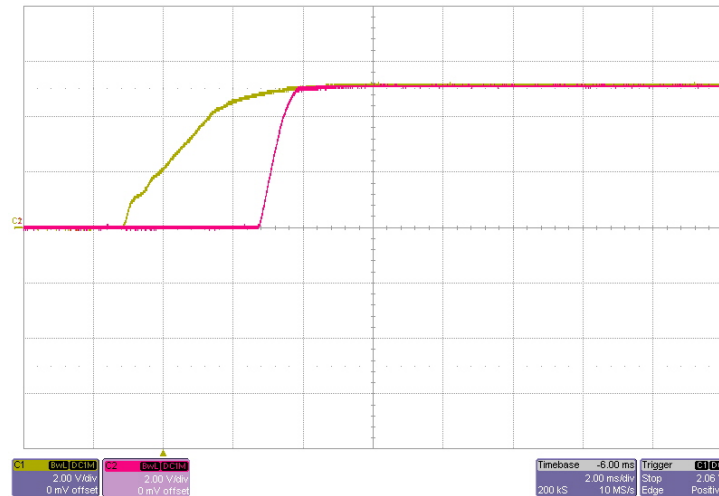


3 Turn-On – (TPS54240 : 5V@0A)

The photo below shows the startup waveforms. The output is not loaded. The timebase is set to 2ms/Division. The input voltage is 12V.

Channel 1 – Yellow : 5V Output Before the USB Switch – (2V/Division)

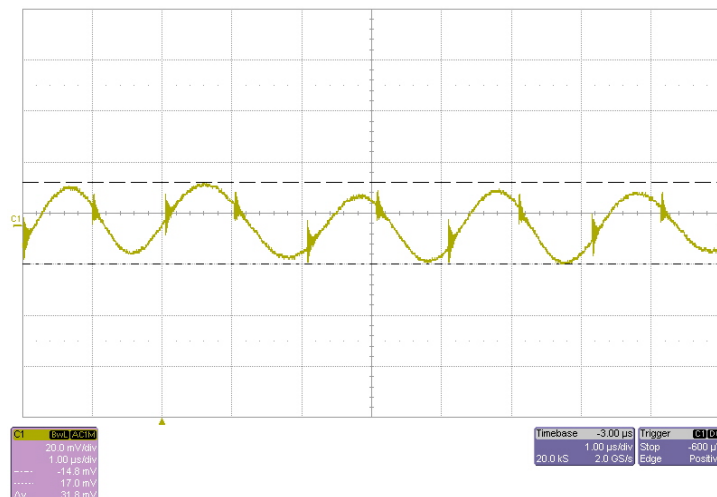
Channel 2 – Pink : Output Voltage After the USB Switch – (2V/Division)



4 Output Voltage Ripple – (TPS54240 : 5V@2.1A)

The photo below shows the output voltage ripple. The input voltage is 12V. The timebase is set to 1us/division.

Channel 1 – Yellow : Output Voltage Ripple – (20mV/Division; AC Coupled)



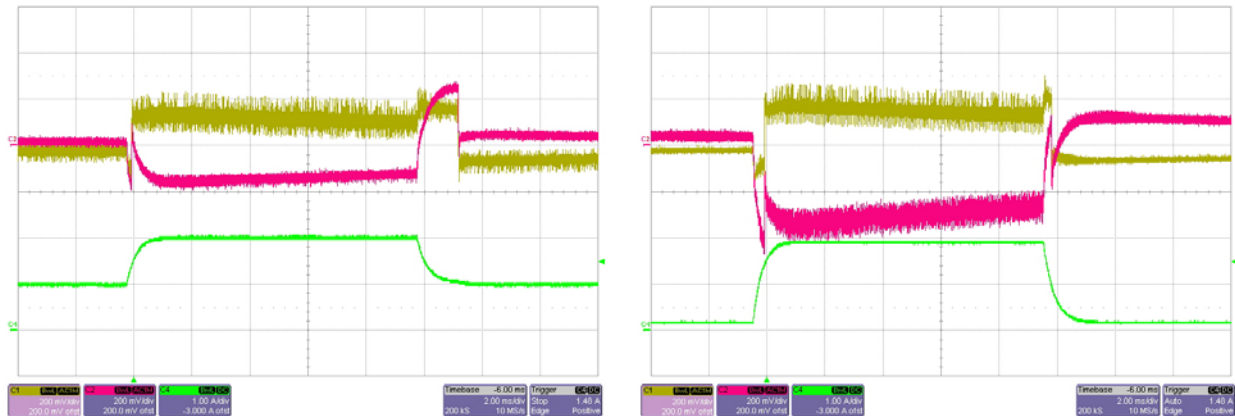
5 Transient Response – (TPS54240 : 5V@2.1A)

The transient response of the converter is shown in the figure below. The input voltage is 12V. The current is pulsed from 1A to 2A and 0.1A to 2A. The timebase is set to 2ms/Division. The cable droop compensation is set to increase the output voltage 200mV at ~1.4A

Channel 1 – Yellow : Output Voltage Before the USB Switch – (200mV/Division; AC Coupled)

Channel 2 – Pink : Output Voltage After the USB Switch – (200mV/Division; AC Coupled)

Channel 4 – Green : Output Current – (1A/Division)



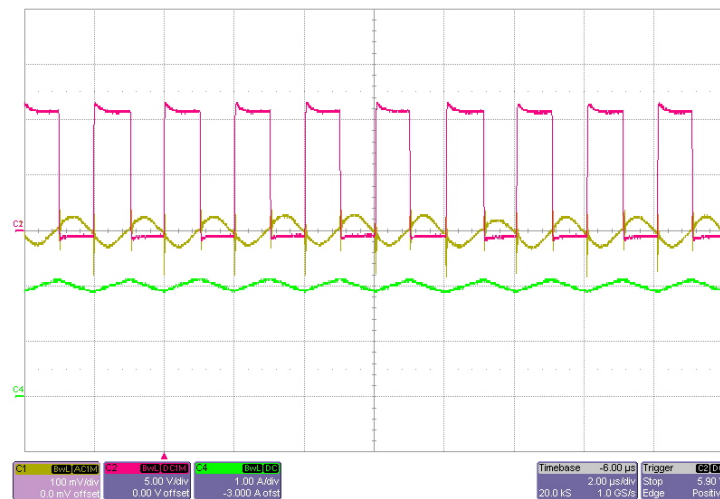
6 Switching Behavior – (TPS54240 : 5V@2.1A)

The switching behavior of the converter is shown in the figure below. The input voltage is set to 12V, the output current is set to 2A. The timebase is set to 2us/Division.

Channel 1 – Yellow : Output Voltage Before the USB Switch – (100mV/Division; AC Coupled)

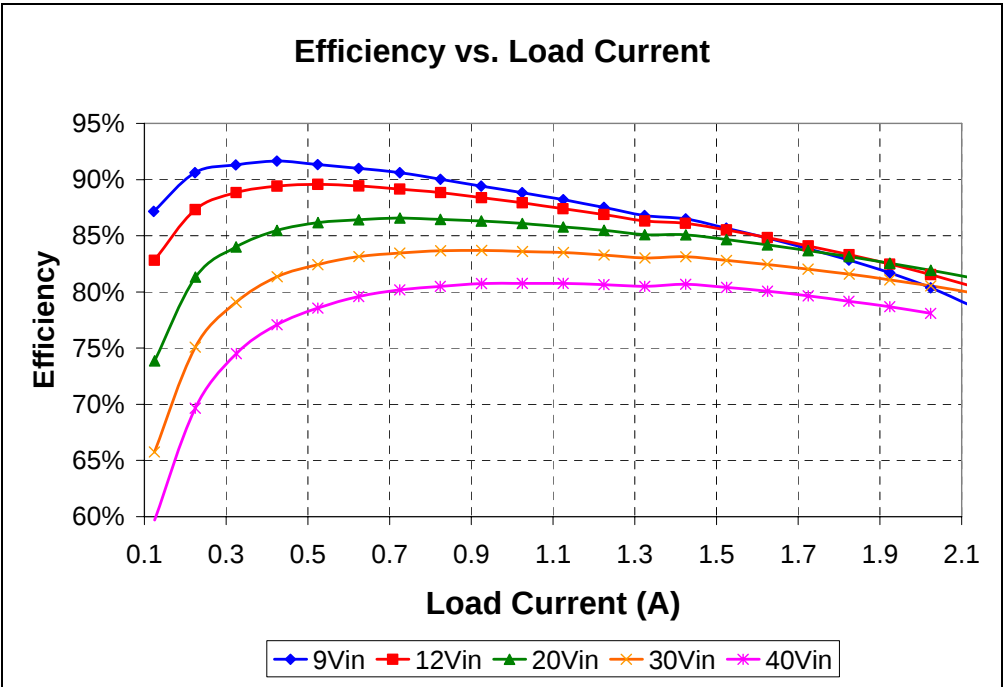
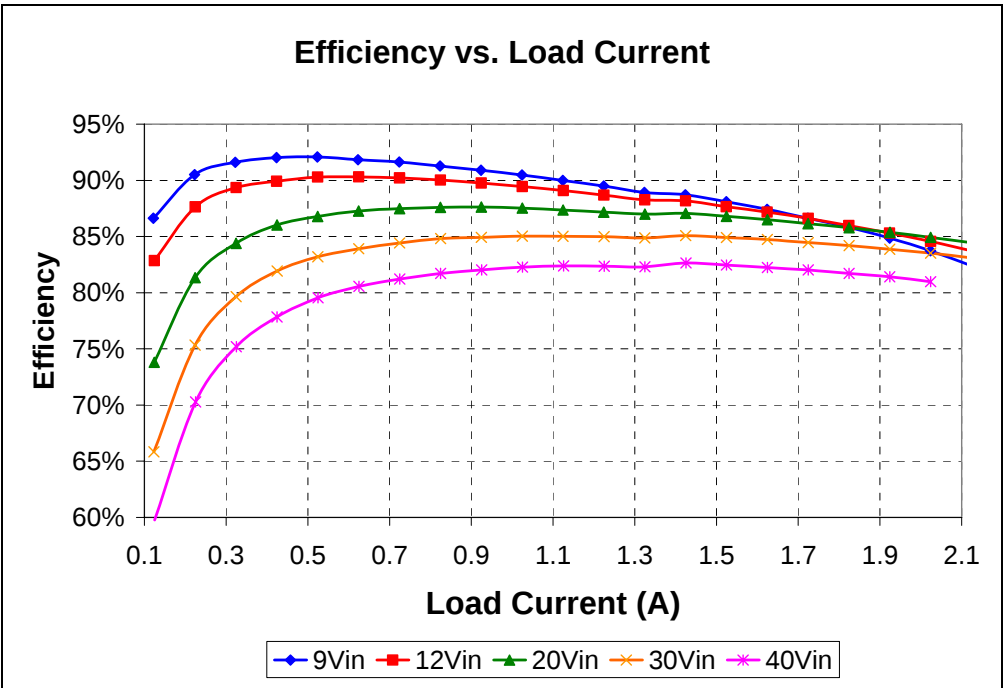
Channel 2 – Pink : Switch Node – (5V/Division)

Channel 4 – Green : Inductor Ripple Current – (1A/Division)



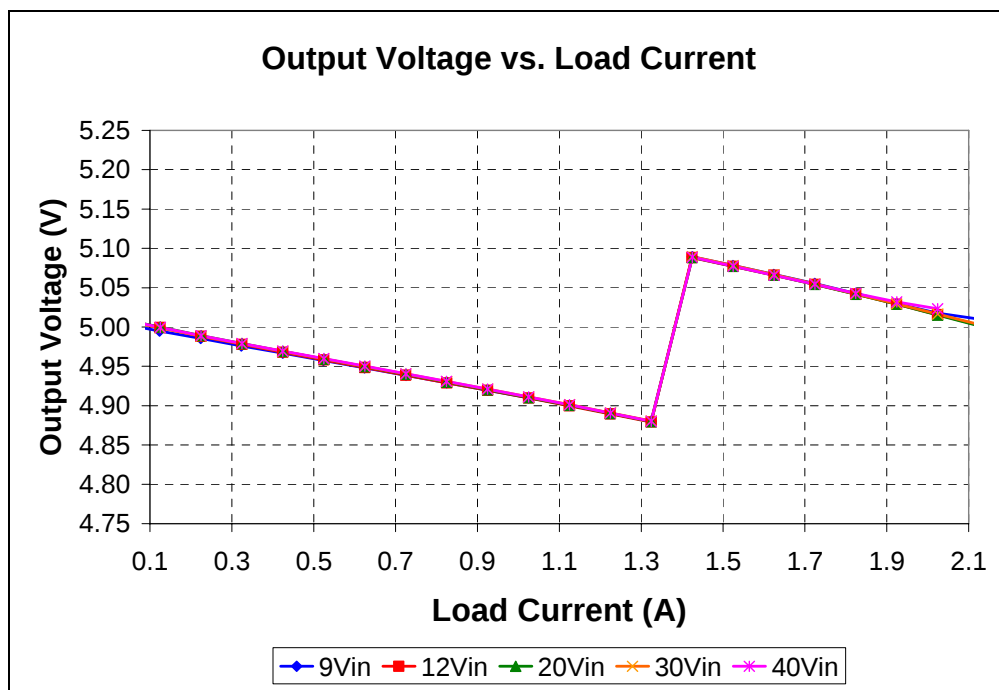
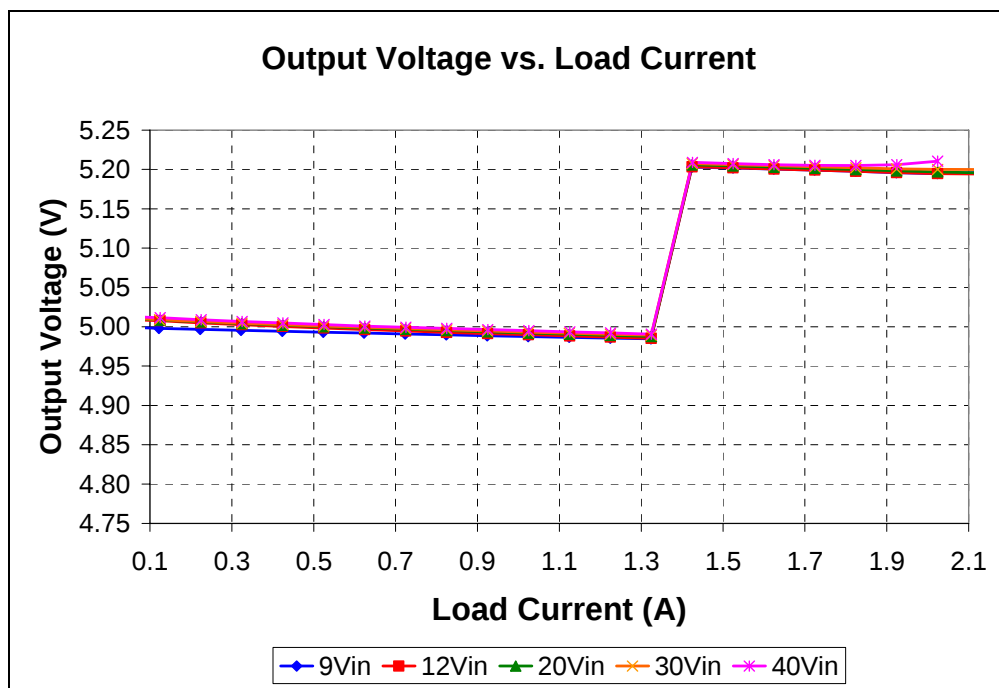
7 Efficiency – (TPS54240 : 5V@2.1A)

The efficiency of the converter is shown in the figures below.



8 Load Regulation – (TPS54240 : 5V@2.1A)

The load regulation of the converter is shown in the figure below.



IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products

Audio	www.ti.com/audio
Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DLP® Products	www.dlp.com
DSP	dsp.ti.com
Clocks and Timers	www.ti.com/clocks
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
OMAP Mobile Processors	www.ti.com/omap
Wireless Connectivity	www.ti.com/wirelessconnectivity

Applications

Automotive and Transportation	www.ti.com/automotive
Communications and Telecom	www.ti.com/communications
Computers and Peripherals	www.ti.com/computers
Consumer Electronics	www.ti.com/consumer-apps
Energy and Lighting	www.ti.com/energy
Industrial	www.ti.com/industrial
Medical	www.ti.com/medical
Security	www.ti.com/security
Space, Avionics and Defense	www.ti.com/space-avionics-defense
Video and Imaging	www.ti.com/video

TI E2E Community Home Page

e2e.ti.com

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2012, Texas Instruments Incorporated