Efficiency and Regulation

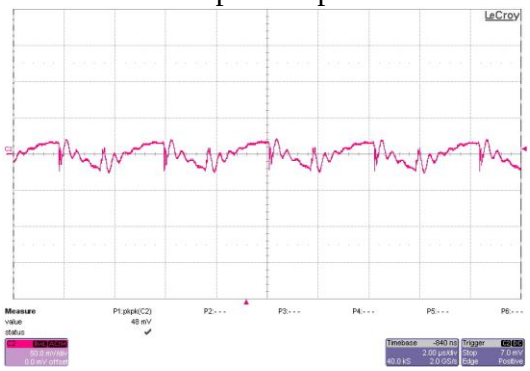
The efficiency and regulation are shown below:

Iout	Vout	Iout	Vout	Iout	Vout	Iin	Vin	Eff	
0.880	3.325	0.350	5.005	0.110	9.498	0.1784	36.0	**89.1%**	
0.880	3.325	0.350	5.011	0.000	10.369	0.1464	36.0	88.8%	
0.880	3.325	0.000	5.029	0.110	9.497	0.1247	36.0	88.4%	
0.000	3.326	0.350	4.949	0.110	9.343	0.0878	36.0	87.3%	
0.880	3.325	0.000	5.035	0.000	10.251	0.0930	36.0	87.4%	
0.000	3.326	0.000	4.971	0.110	9.336	0.0361	36.0	79.0%	
0.440	3.326	0.175	4.992	0.055	9.565	0.0897	36.0	88.7%	
0.000	3.326	0.000	4.976	0.000	10.004	0.0053	36.0	0.0%	
						J3	**J3**	**J3**	
Iout	**Vout**	**Iout**	**Vout**	**Iout**	**Vout**	**Iin**	**Vin**	**Eff**	
0.880	3.325	0.350	4.999	0.110	9.501	0.1323	48.0	**90.1%**	
0.880	3.325	0.350	5.005	0.000	10.326	0.1090	48.0	89.4%	
0.880	3.325	0.000	5.021	0.110	9.504	0.0931	48.0	88.9%	
0.000	3.326	0.350	4.952	0.110	9.372	0.0660	48.0	87.3%	
0.880	3.325	0.000	5.025	0.000	10.220	0.0696	48.0	87.6%	
0.000	3.326	0.000	4.972	0.110	9.370	0.0277	48.0	77.5%	
0.440	3.326	0.175	4.989	0.055	9.568	0.0674	48.0	88.5%	
0.000	3.326	0.000	4.976	0.000	10.011	0.0046	48.0	0.0%	
						J3	**J3**	**J3**	
Iout	**Vout**	**Iout**	**Vout**	**Iout**	**Vout**	**Iin**	**Vin**	**Eff**	
0.880	3.325	0.350	4.997	0.110	9.511	0.1113	57.0	**90.2%**	
0.880	3.325	0.350	5.002	0.000	10.306	0.0918	57.0	89.4%	
0.880	3.325	0.000	5.017	0.110	9.508	0.0786	57.0	88.7%	
0.000	3.326	0.350	4.954	0.110	9.387	0.0559	57.0	86.8%	
0.880	3.325	0.000	5.021	0.000	10.208	0.0587	57.0	87.5%	
0.000	3.326	0.000	4.972	0.110	9.385	0.0237	57.0	76.4%	
0.440	3.326	0.175	4.987	0.055	9.570	0.0569	57.0	88.3%	
0.000	3.326	0.000	4.975	0.000	10.020	0.0044	57.0	0.0%	
Max Load Efficiency without bridge									
Iout	**Vout**	**Iout**	**Vout**			**Iin**	**Vin**	**Eff**	
0.880	3.325	0.350	5.005	0.110	9.498	0.1784	35.37	90.7%	36.0V J3
0.880	3.325	0.350	4.999	0.110	9.501	0.1323	47.45	91.1%	48.0V J3
0.880	3.325	0.350	4.997	0.110	9.511	0.1113	56.47	91.0%	57.0V J3
Vin measured at FB1/FB2									

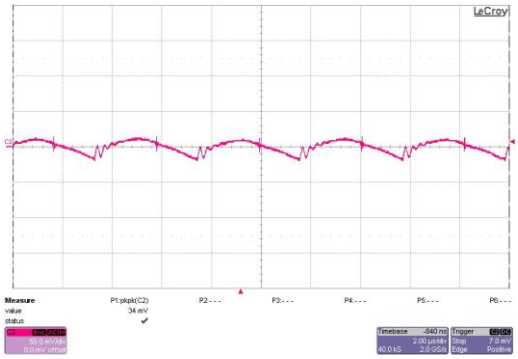
Ripple and Noise

48V input; 3.3V/880mA, 5V/350mA, and 10V/110mA loads; 20MHz BWL.

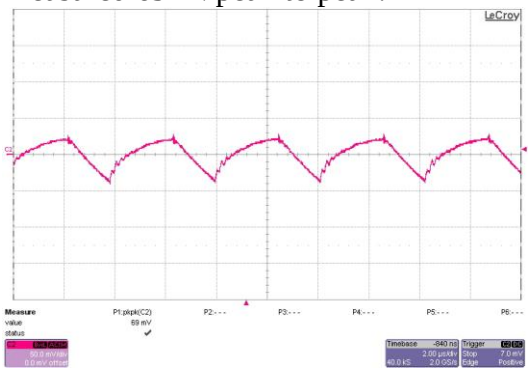
3.3V Output Ripple (C29), 50mV/div
Measured 48mVpeak to peak:



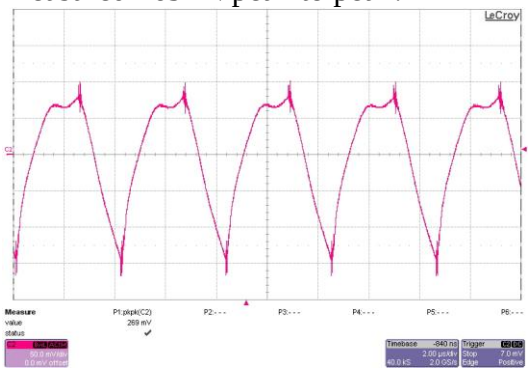
5V Output Ripple (C19), 50mV/div
Measured 34mV peak to peak:



10V Output Ripple (C13), 50mV/div
Measured 69mVpeak to peak:

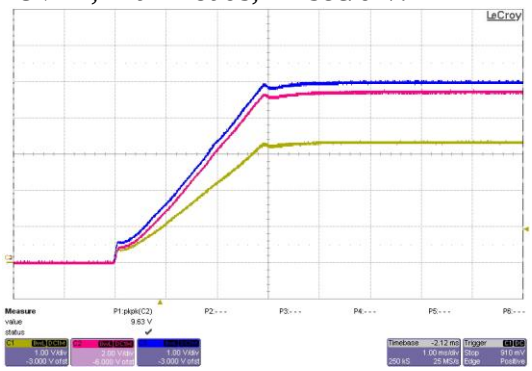


Input Ripple (C21), 50mV/div
Measured 269mVpeak to peak:

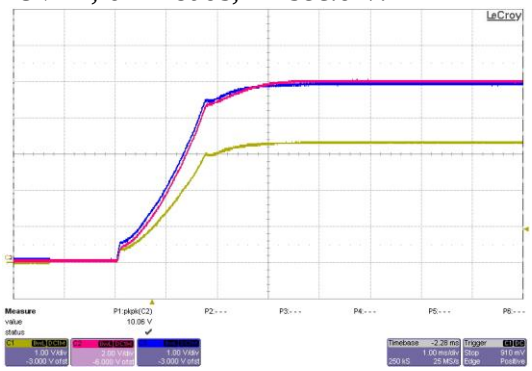


Turn On Response

48VIN, Max Loads, 1msec/div:



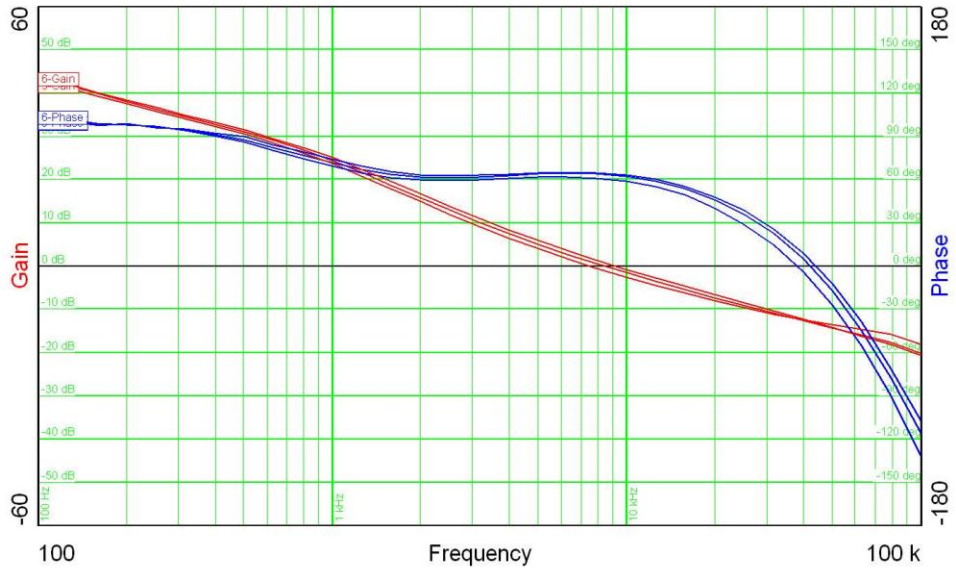
48VIN, 0A Loads, 1msec.div:



Top, 5V output, 1V/div; Middle, 10V output, 2V/div; Bottom, 3.3V output, 1V/div

Loop Stability

The measured Bode plot of the converter is shown below.



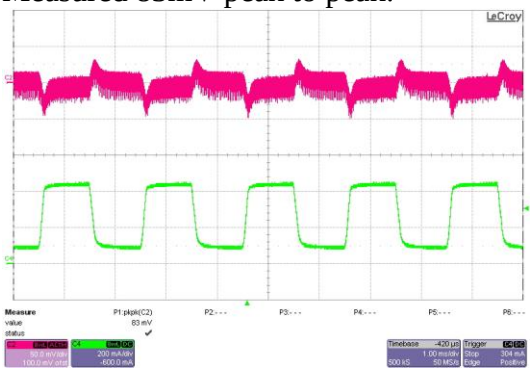
Volts	KHz	egrees	dB
Vin	BW	PM	GM
36.0	7.5	61.0	12.0
48.0	8.4	63.0	13.0
57.0	9.2	63.0	13.0

Dynamic Loading

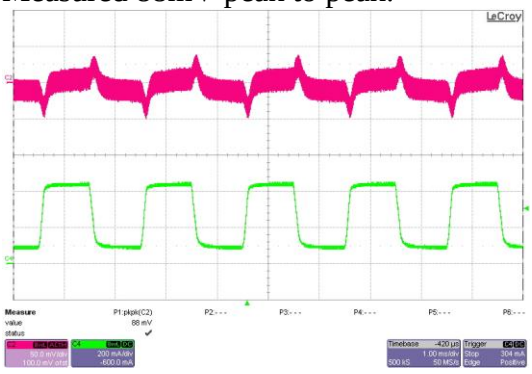
One output at a time was pulsed. The outputs not being pulsed were loaded to their maximum value. The input voltage is 48V at J3.

3.3V load step, 88mA to 440mA:

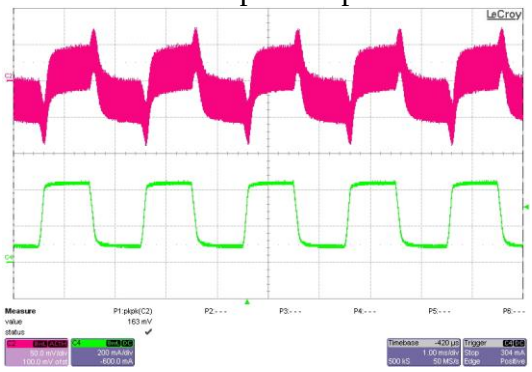
3.3V Response
50mV/div, 1msec/div
Measured 83mV peak to peak:



5V Response
50mV/div
Measured 88mV peak to peak:

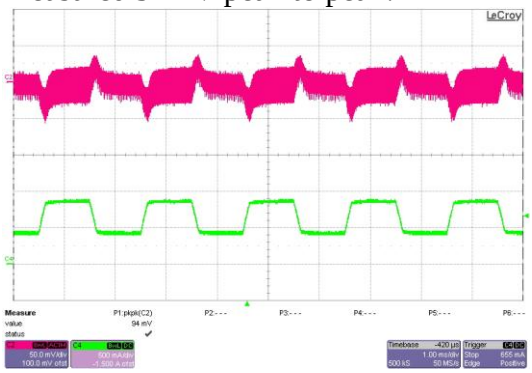


10V Response
100mV/div, 1msec/div
Measured 163mV peak to peak:

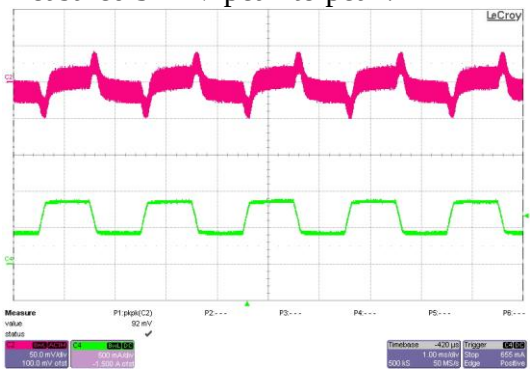


3.3V load step, 440mA to 880mA:

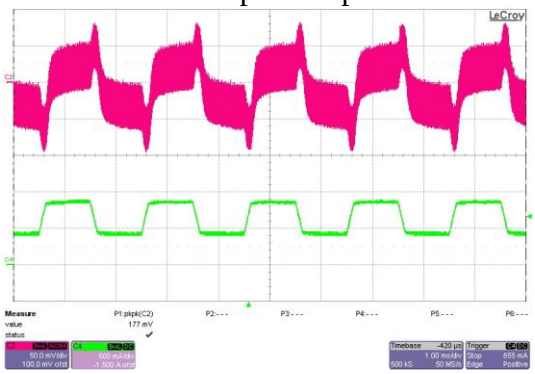
3.3V Response
50mV/div, 1msec/div
Measured 94mV peak to peak:



5V Response
50mV/div
Measured 92mV peak to peak:

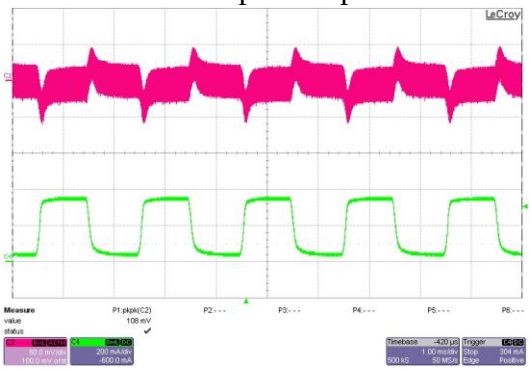


10V Response
100mV/div, 1msec/div
Measured 177mV peak to peak:

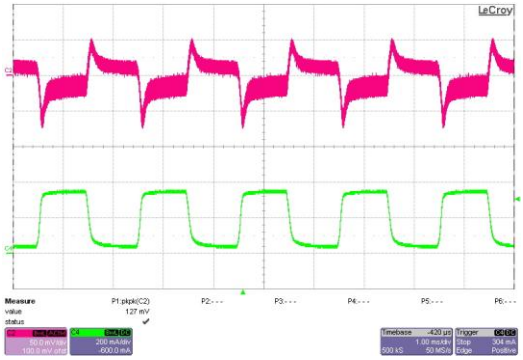


5V load step, 35mA to 350mA:

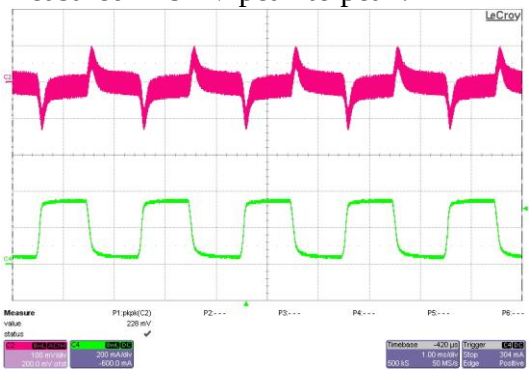
3.3V Response
50mV/div, 1msec/div
Measured 108mV peak to peak:



5V Response
50mV/div
Measured 127mV peak to peak:

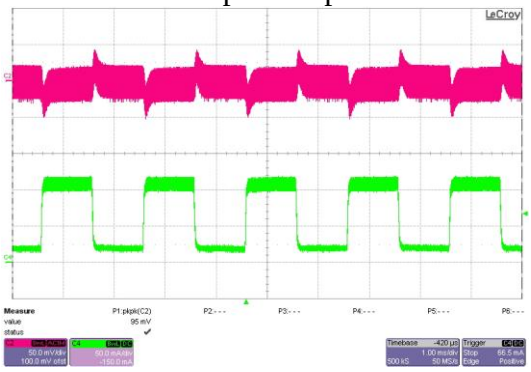


10V Response
50mV/div, 1msec/div
Measured 228mV peak to peak:

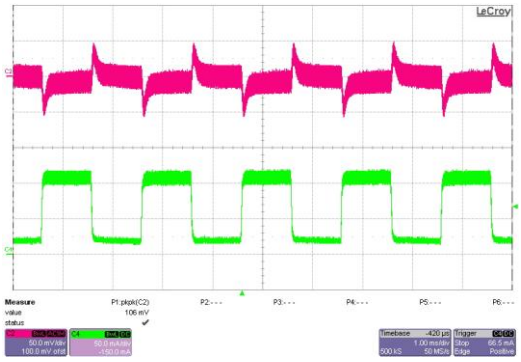


10V load step, 20mA to 110mA:

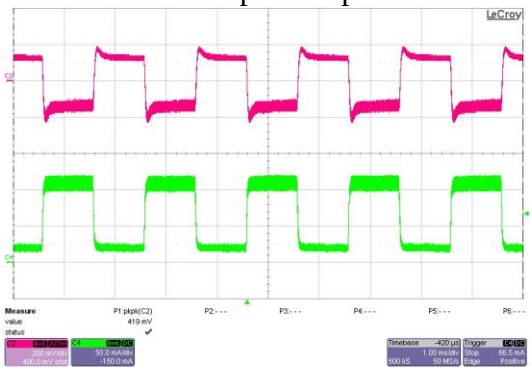
3.3V Response
50mV/div, 1msec/div
Measured 95mV peak to peak:



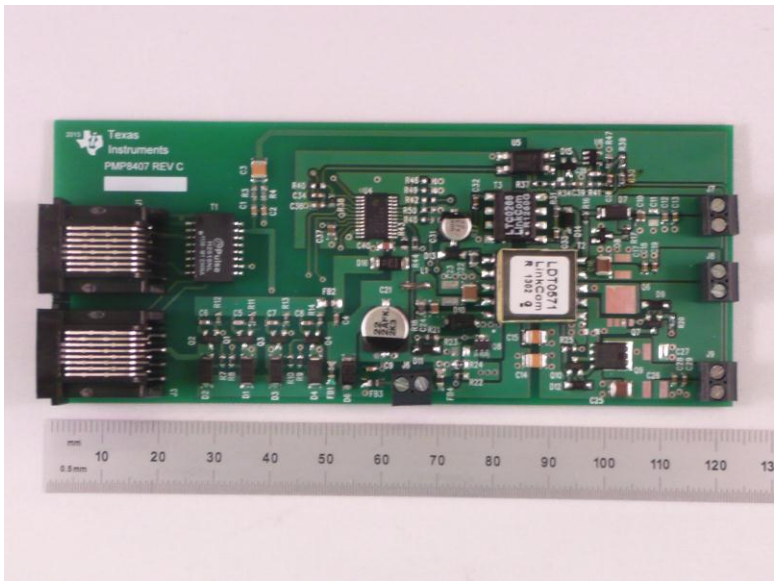
5V Response
50mV/div
Measured 106mV peak to peak:



10V Response
200mV/div, 1msec/div
Measured 419mV peak to peak:



Photo



IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as “components”) are sold subject to TI’s terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI’s terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

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

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license 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 significant portions 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. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

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

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI’s goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or “enhanced plastic” are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have ***not*** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products		**Applications**	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com		
OMAP Applications Processors	www.ti.com/omap	**TI E2E Community**	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconnectivity		

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265