

PMP8861

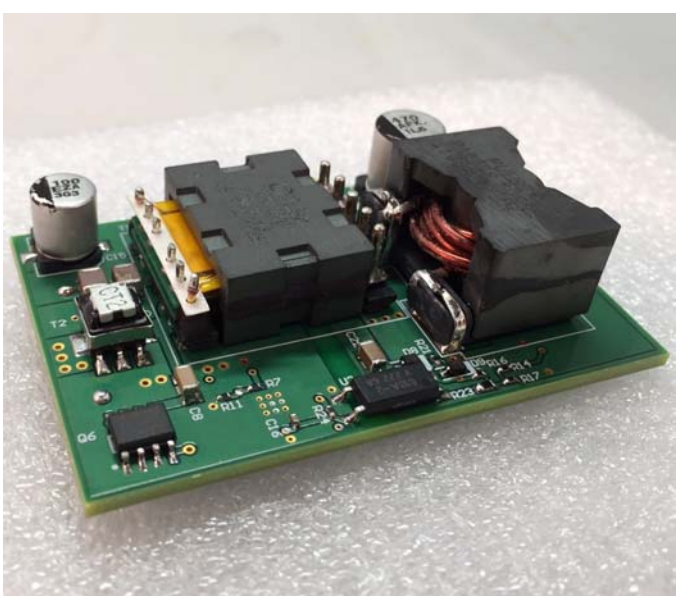
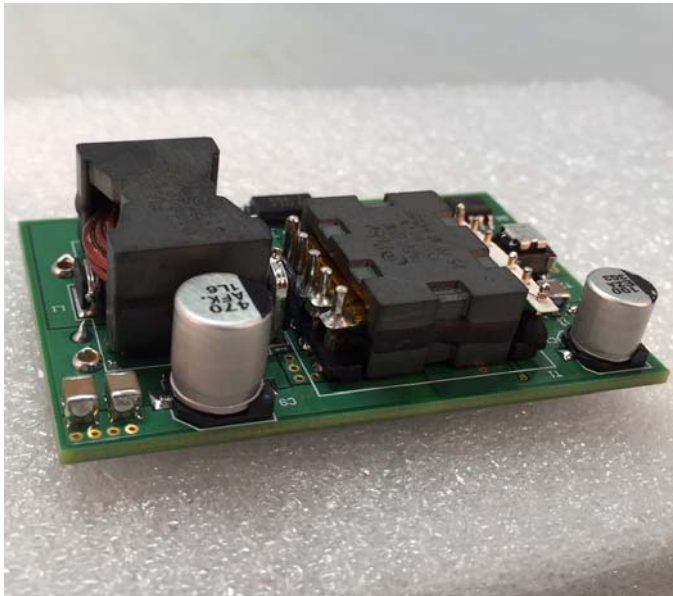
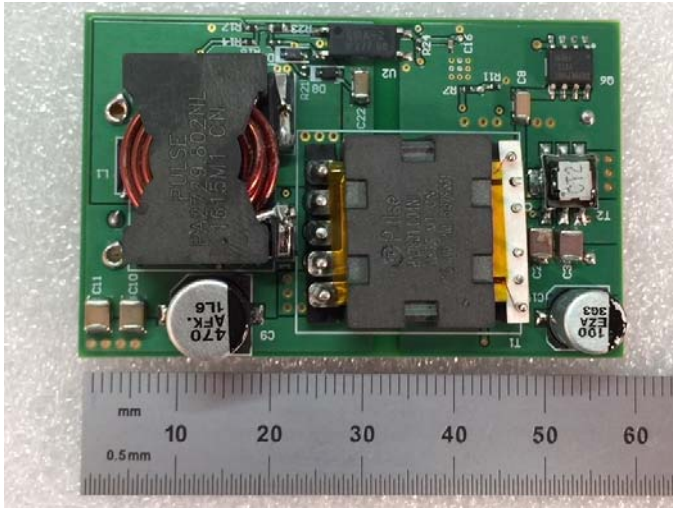
18V-72V Input 12V/10A

Active Clamp Forward

Contents

1	Photos	2
2	Input Under-Voltage Lock-Out	2
3	Efficiency	3
4	Thermal Images	5
5	Startup – 24V Input, No Load	7
6	Startup – 24V Input, 1Ω Load	7
7	Startup – 48V Input, No Load	8
8	Startup – 48V Input, 1Ω Load	8
9	Output Ripple Voltage	9
10	Frequency Response	10
11	Load Transients	11
12	Switching Waveforms	12

1 Photos



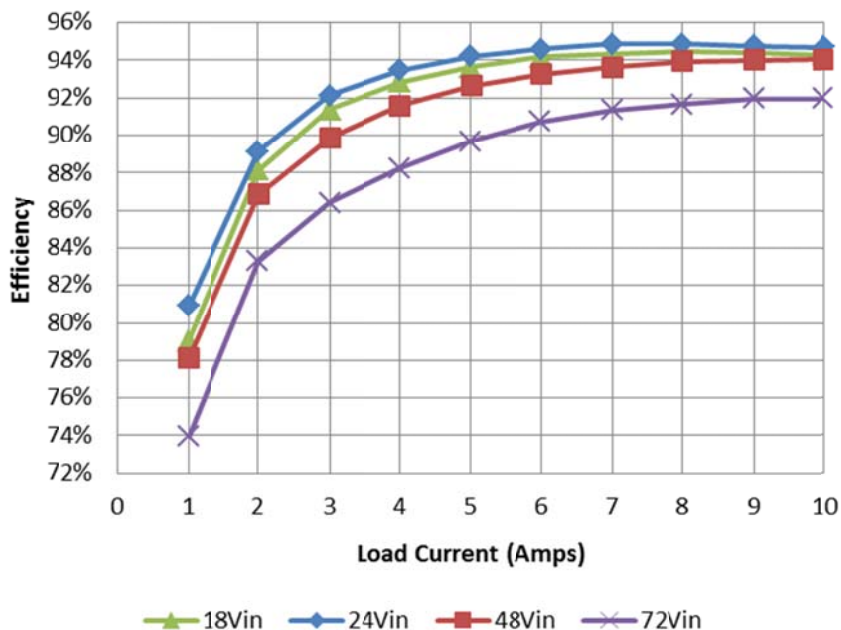
2 Input Under-Voltage Lock-Out

The turn-on and turn-off input voltages were measured and recorded below.

Turn-On	17.5 V
Turn-Off	17.0 V

3 Efficiency

3.1 Chart



3.2 Raw Data

Iout	Vout	Vin	Iin	Pout	Losses	Efficiency
0.000	11.97	18.00	0.185	0.00	3.330	0.0%
0.999	11.97	18.04	0.839	11.96	3.178	79.0%
2.001	11.97	17.97	1.512	23.95	3.219	88.2%
3.000	11.97	18.01	2.182	35.91	3.388	91.4%
4.006	11.97	18.03	2.864	47.95	3.686	92.9%
5.001	11.96	17.96	3.557	59.81	4.072	93.6%
6.010	11.96	17.99	4.243	71.88	4.452	94.2%
7.00	11.96	18.01	4.926	83.72	4.997	94.4%
8.00	11.96	18.01	5.623	95.68	5.590	94.5%
9.00	11.96	17.95	6.350	107.64	6.342	94.4%
9.99	11.96	18.00	7.04	119.48	7.240	94.3%

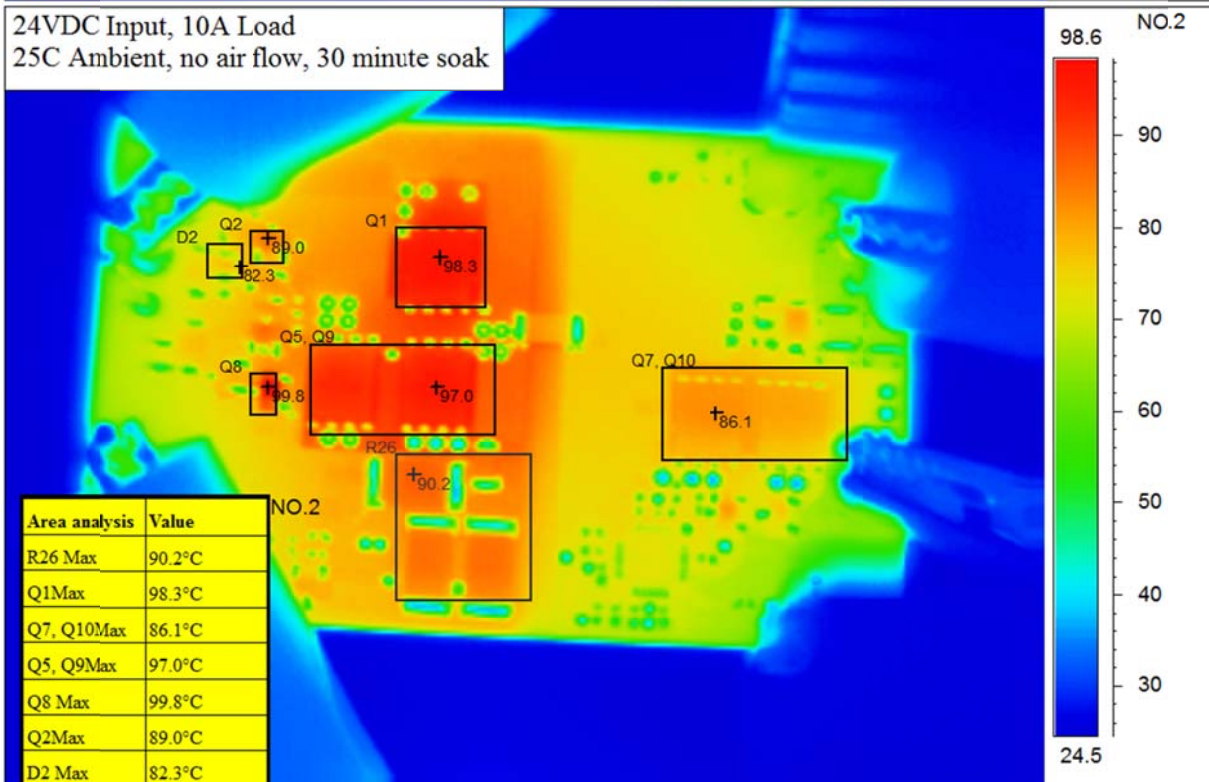
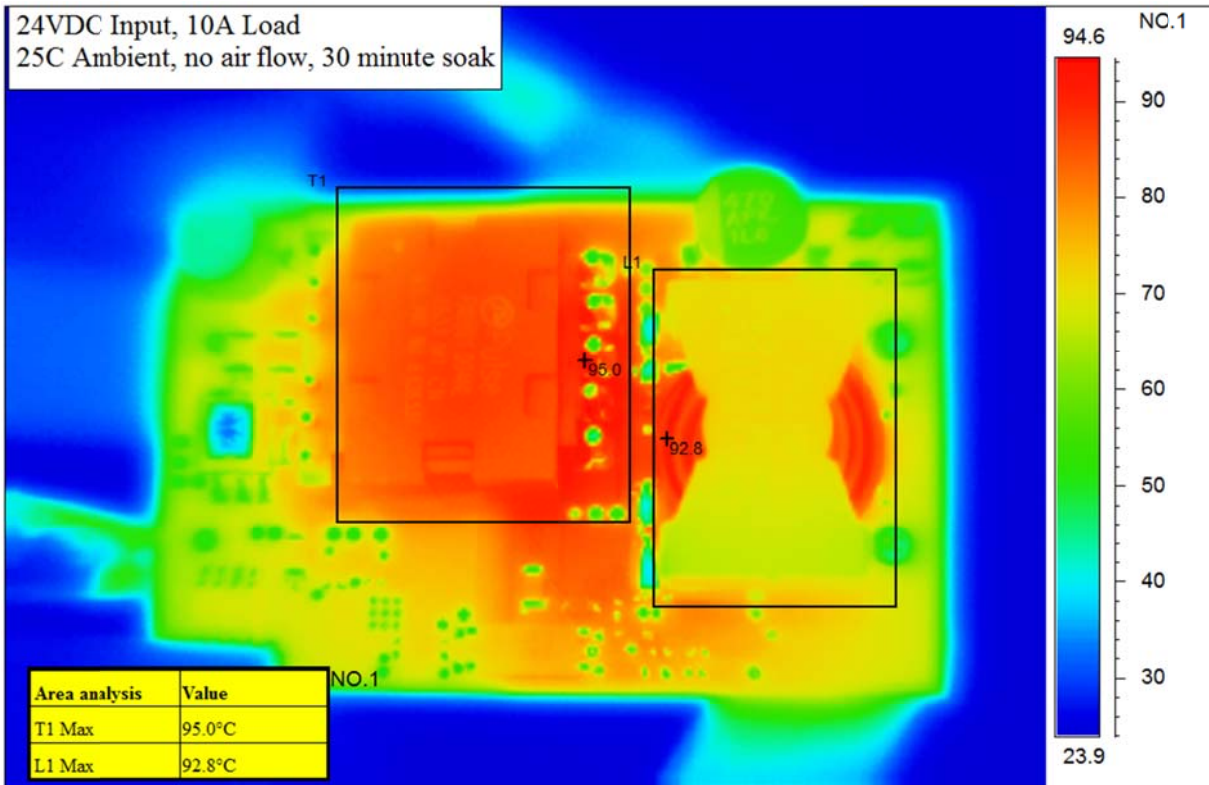
Iout	Vout	Vin	Iin	Pout	Losses	Efficiency
0.000	11.97	24.01	0.124	0.00	2.977	0.0%
1.001	11.97	23.95	0.618	11.98	2.819	81.0%
1.996	11.97	24.02	1.116	23.89	2.914	89.1%
3.002	11.97	23.99	1.626	35.93	3.074	92.1%
4.001	11.97	24.00	2.135	47.89	3.348	93.5%
4.998	11.97	24.00	2.646	59.83	3.678	94.2%
6.000	11.97	24.00	3.164	71.82	4.116	94.6%
7.00	11.97	24.00	3.680	83.79	4.530	94.9%
8.00	11.97	24.00	4.206	95.76	5.184	94.9%
9.00	11.96	24.00	4.733	107.64	5.952	94.8%
10.00	11.96	24.00	5.263	119.60	6.712	94.7%

Iout	Vout	Vin	Iin	Pout	Losses	Efficiency
0.000	11.98	48.0	0.065	0.00	3.120	0.0%
1.002	11.98	48.0	0.320	12.00	3.356	78.2%
2.004	11.98	48.0	0.576	24.01	3.640	86.8%
3.009	11.97	48.0	0.835	36.02	4.062	89.9%
4.007	11.97	48.0	1.091	47.96	4.404	91.6%
5.005	11.97	48.0	1.347	59.91	4.746	92.7%
6.006	11.97	48.0	1.606	71.89	5.196	93.3%
7.01	11.97	48.0	1.867	83.91	5.706	93.6%
8.00	11.97	48.0	2.124	95.76	6.192	93.9%
9.01	11.97	48.0	2.390	107.85	6.870	94.0%
9.99	11.97	48.0	2.649	119.58	7.572	94.0%

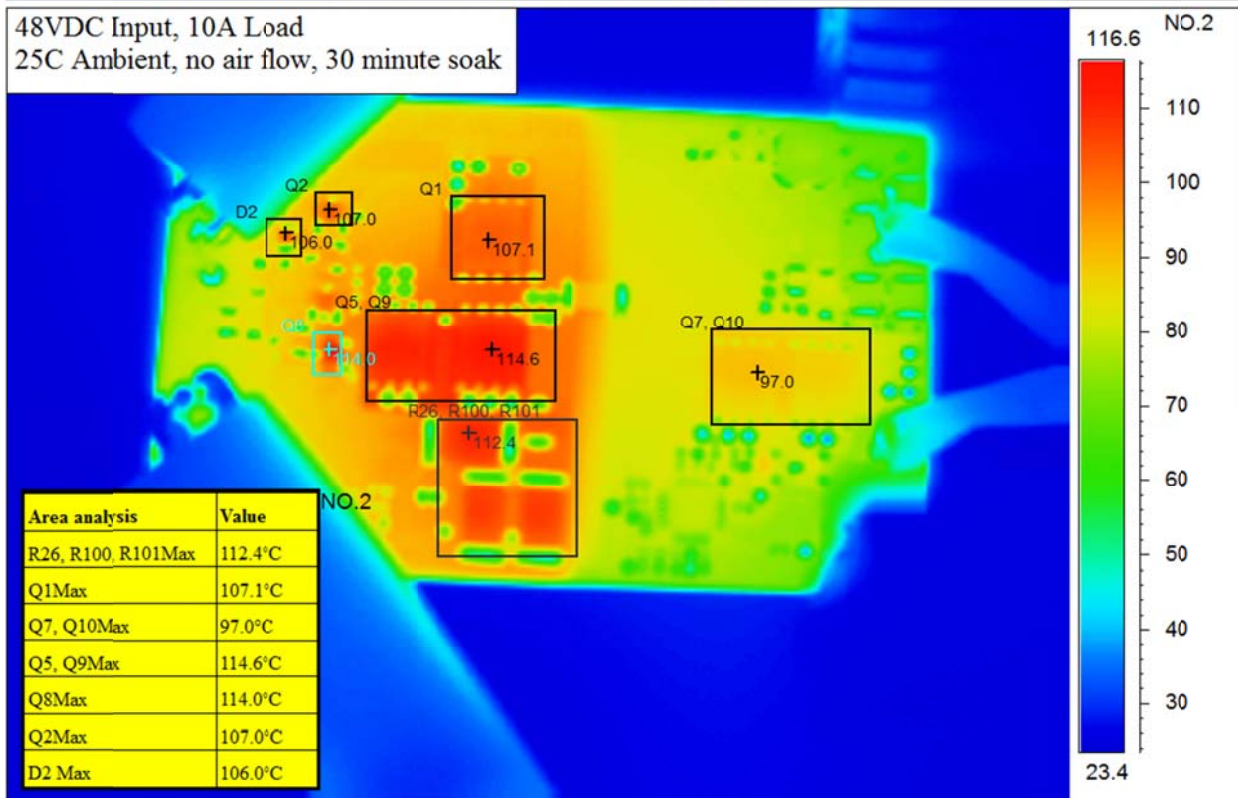
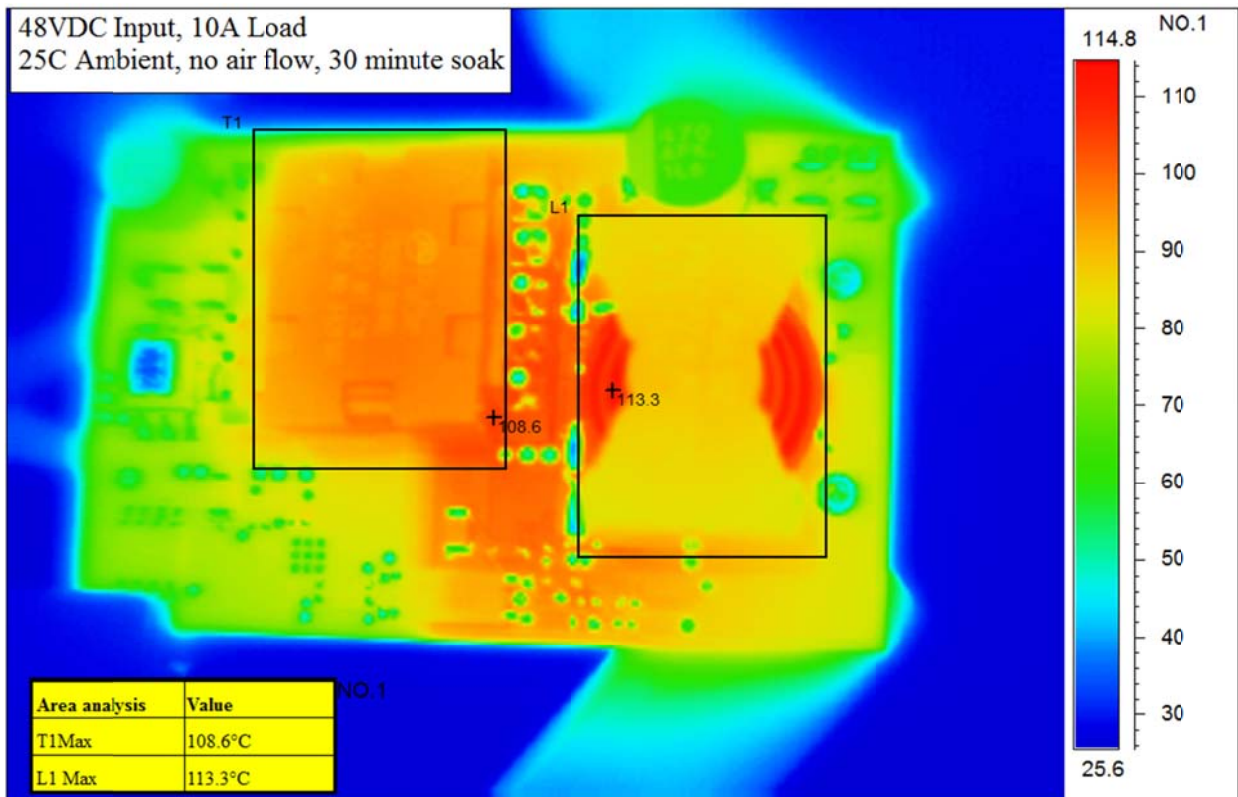
Iout	Vout	Vin	Iin	Pout	Losses	Efficiency
0.000	11.98	72.0	0.053	0.00	3.816	0.0%
1.005	11.98	72.0	0.226	12.04	4.232	74.0%
2.002	11.98	72.0	0.400	23.98	4.816	83.3%
3.006	11.98	72.0	0.579	36.01	5.676	86.4%
4.004	11.98	72.0	0.755	47.97	6.392	88.2%
5.002	11.98	72.0	0.928	59.92	6.892	89.7%
5.998	11.98	72.0	1.100	71.86	7.344	90.7%
7.00	11.97	72.0	1.274	83.79	7.938	91.3%
8.00	11.97	72.0	1.451	95.76	8.712	91.7%
9.00	11.97	72.0	1.627	107.73	9.414	92.0%
9.99	11.97	72.0	1.806	119.58	10.452	92.0%

4 Thermal Images

4.1 24V Input

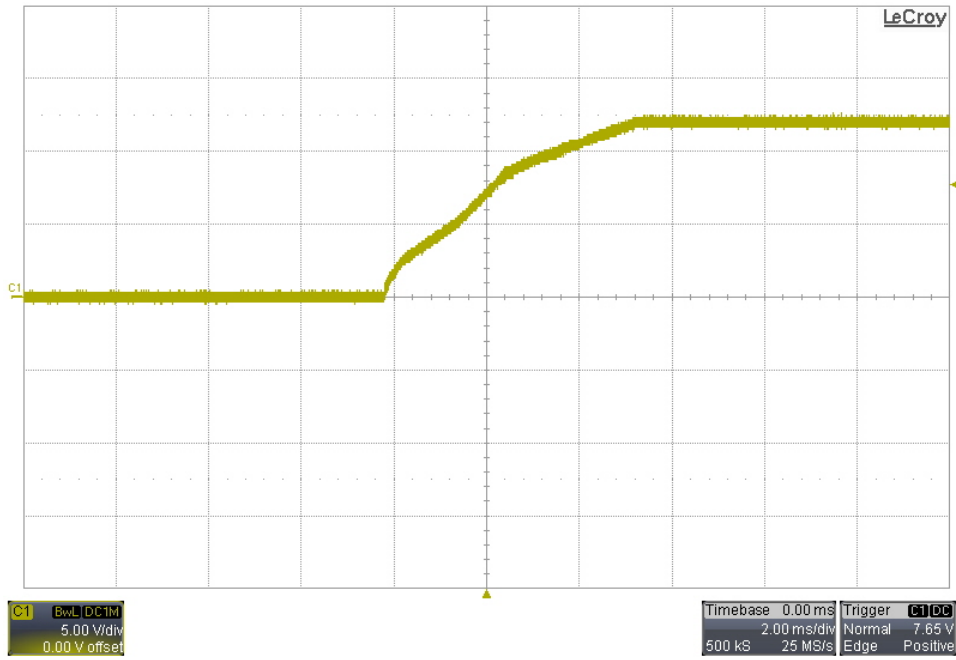


4.2 48V Input

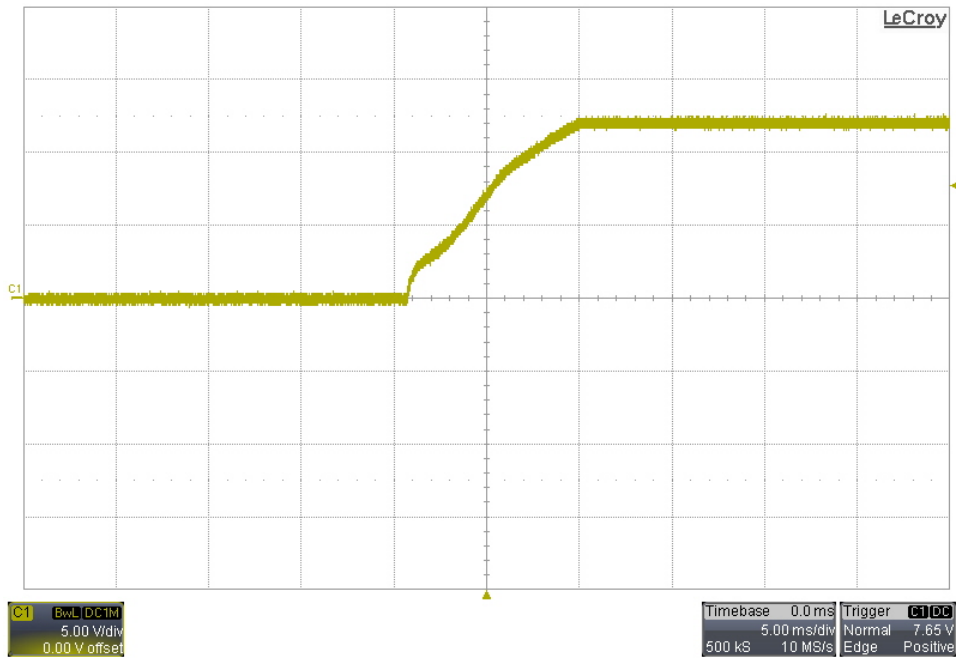


5 Startup

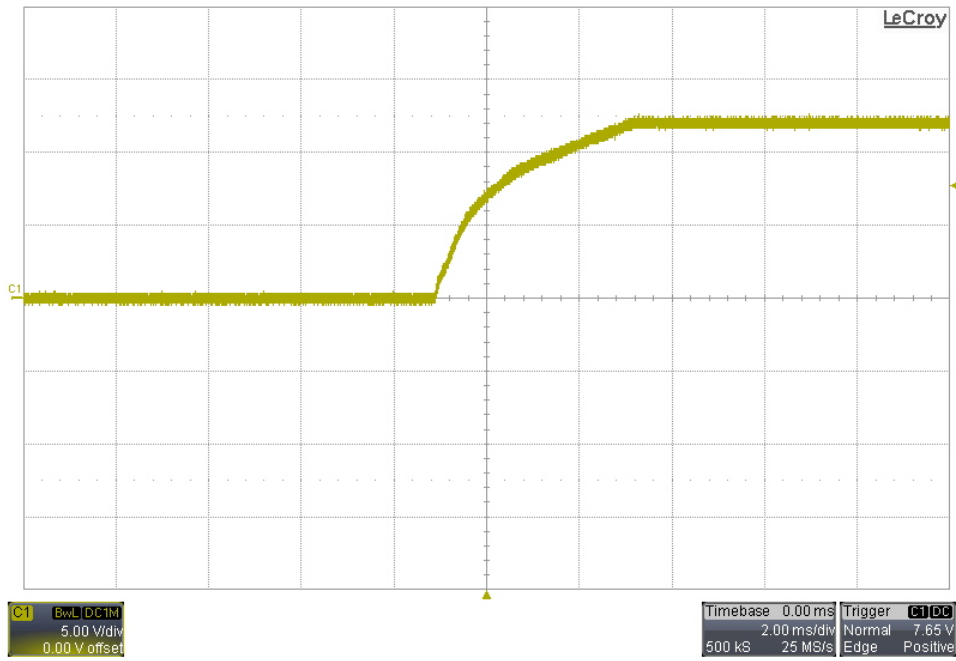
5.1 24V Input, No Load



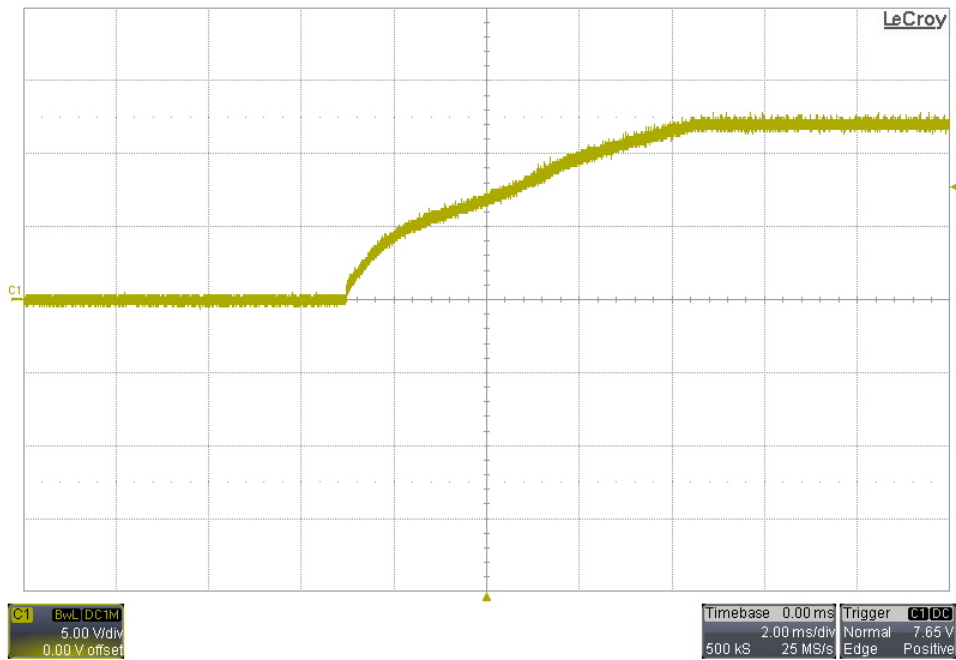
5.2 24V Input, 1Ω Load



5.3 48V Input, No Load



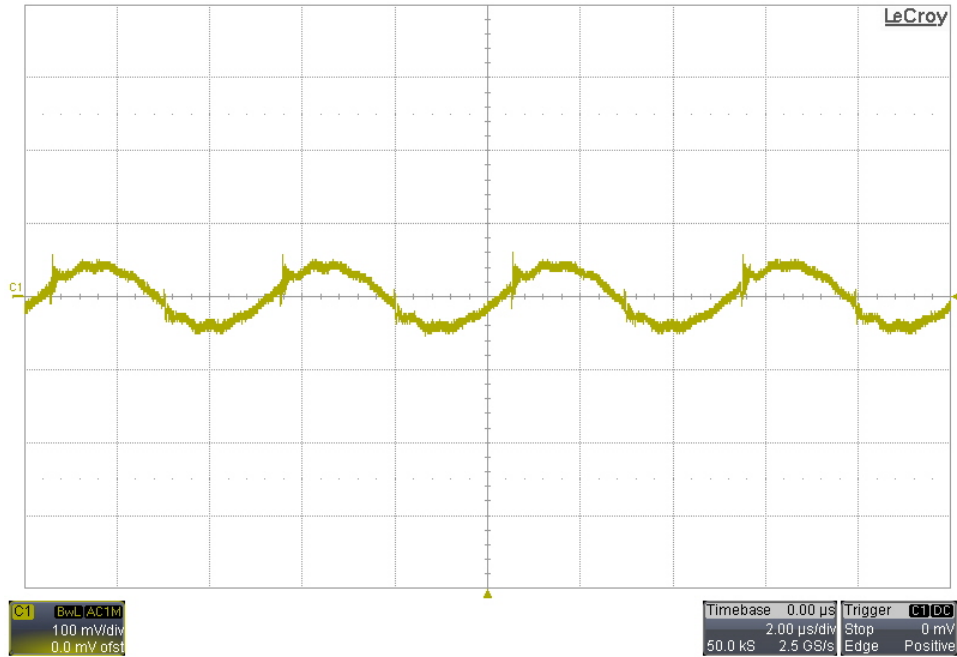
5.4 48V Input, 1Ω Load



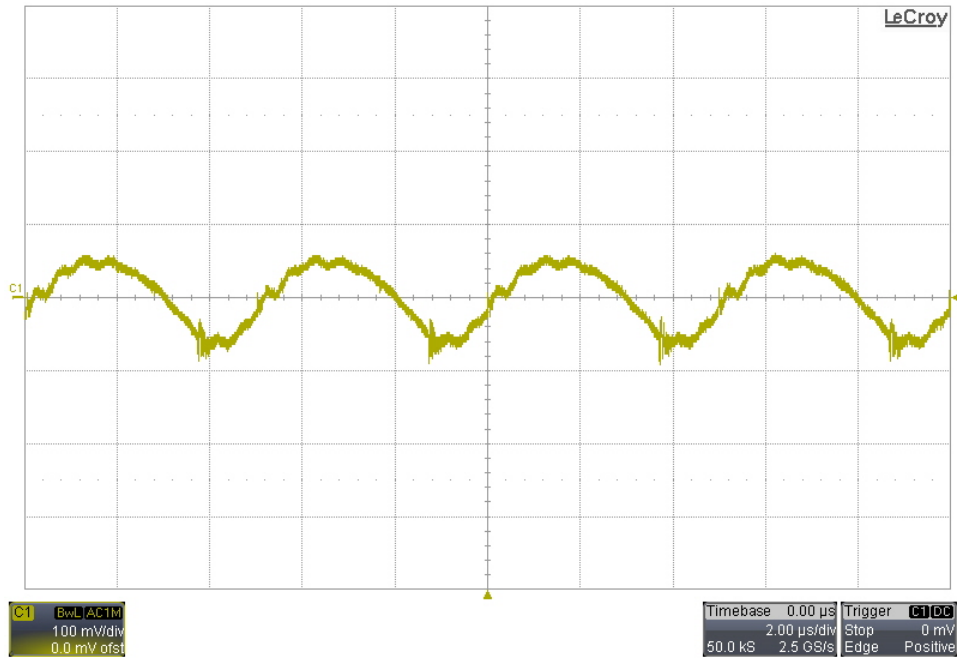
6 Output Ripple Voltage

The output ripple voltage is shown in the plots below. The output was loaded with 10A.

6.1 24V Input



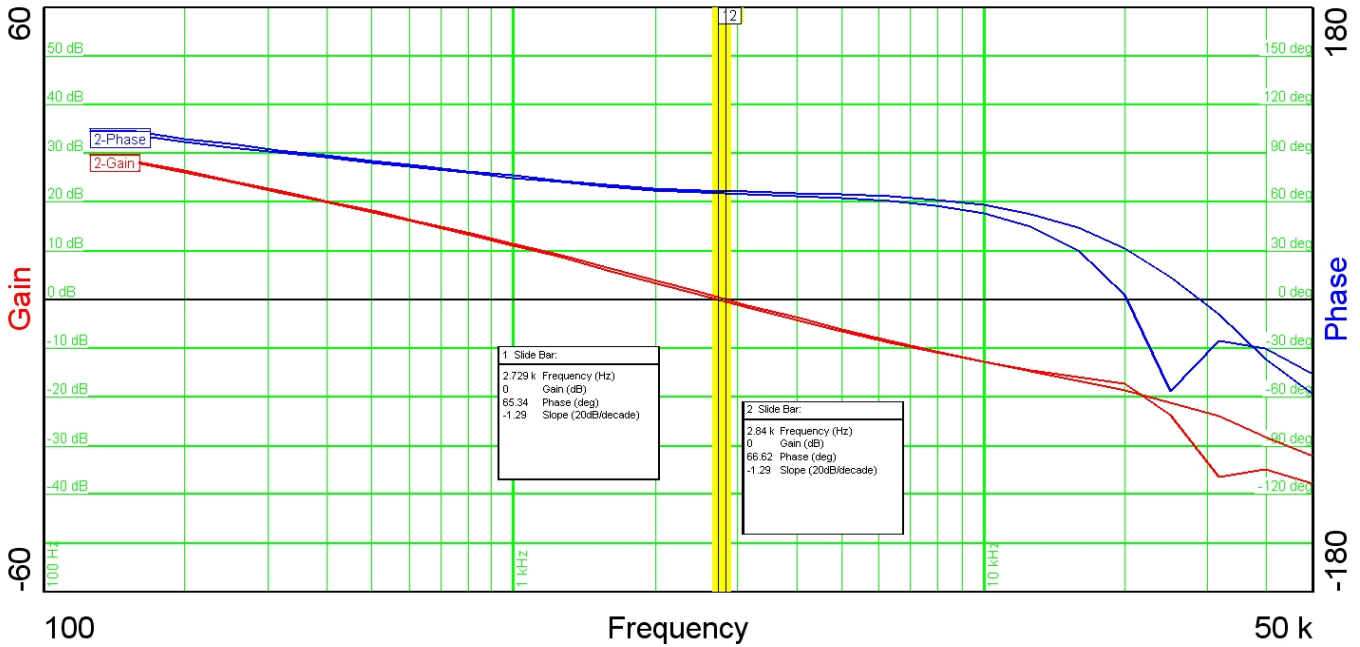
6.2 48V Input



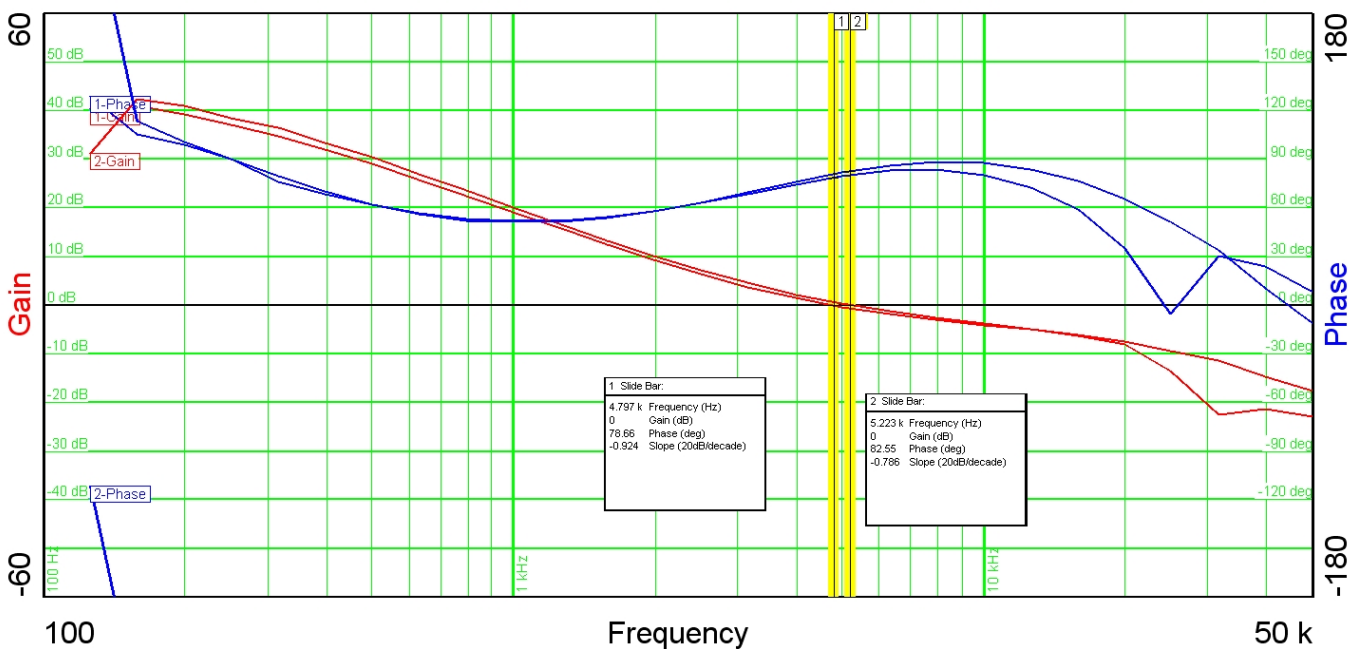
7 Frequency Response

The frequency response of the feedback loop is shown below. For the gain/phase plot #1, the input was set to 18V. For the gain/phase plot #2, the input was set to 60V. The output was loaded with 10A.

7.1 Measured Across R14



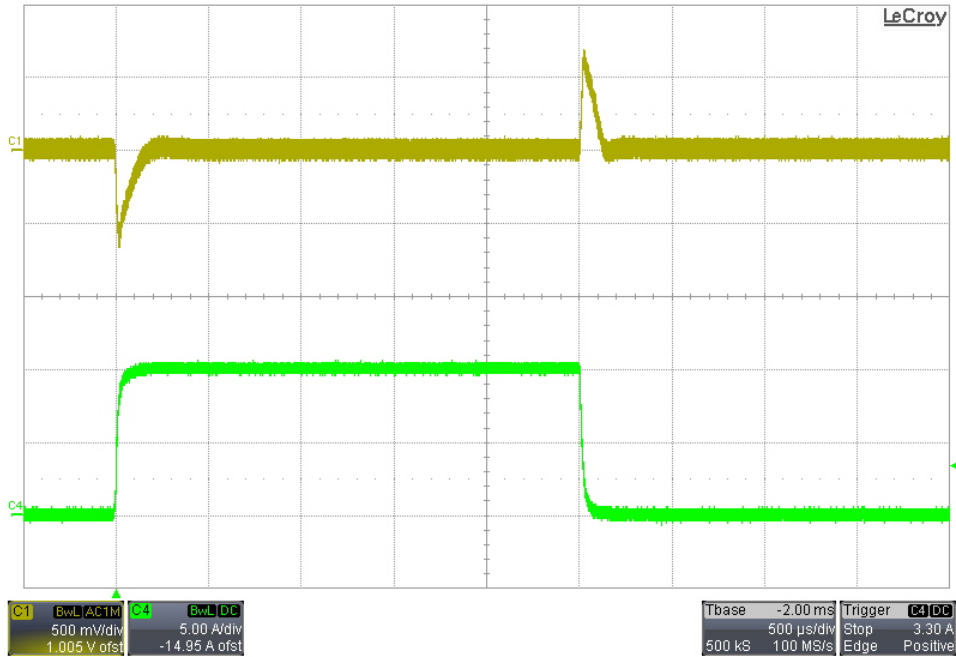
7.2 Measured Across R17



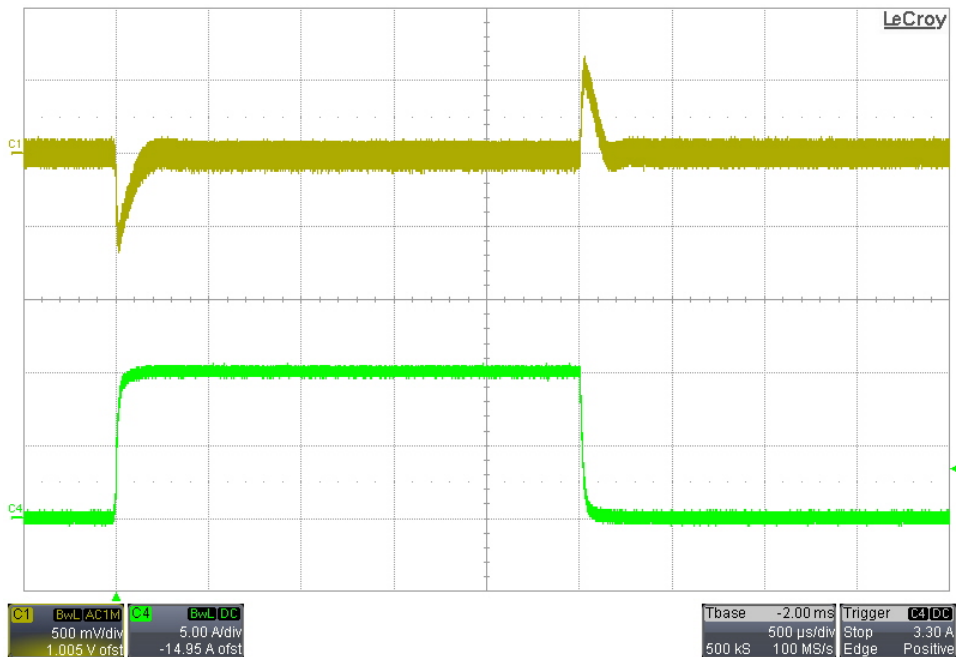
8 Load Transients

The response to a load step from 0A to 10A is shown in the images below. Channel 1: Vout (ac coupled); Channel 4: Iout

8.1 24V Input



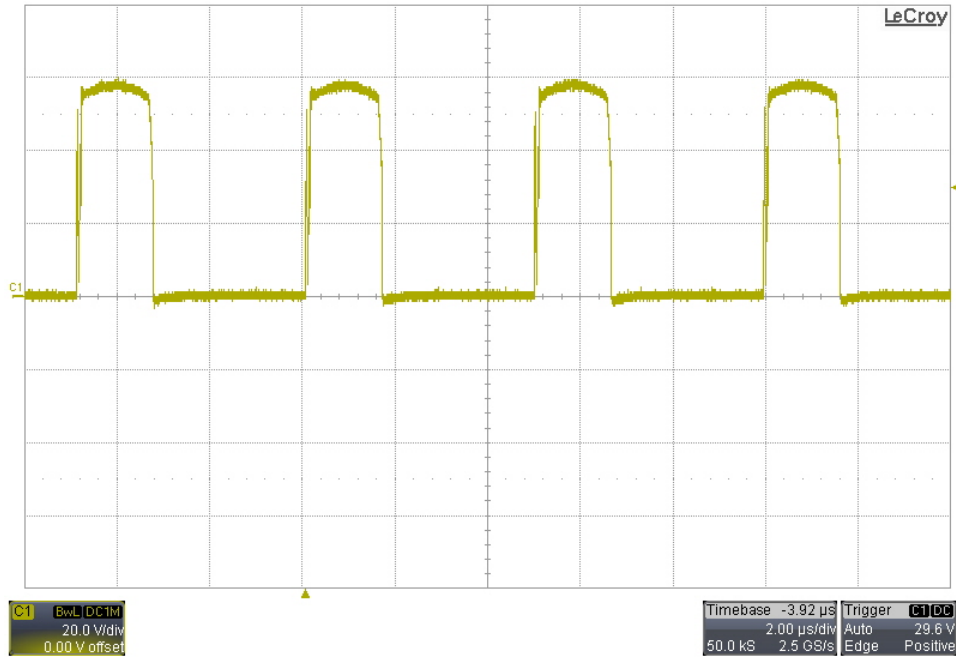
8.2 48V Input



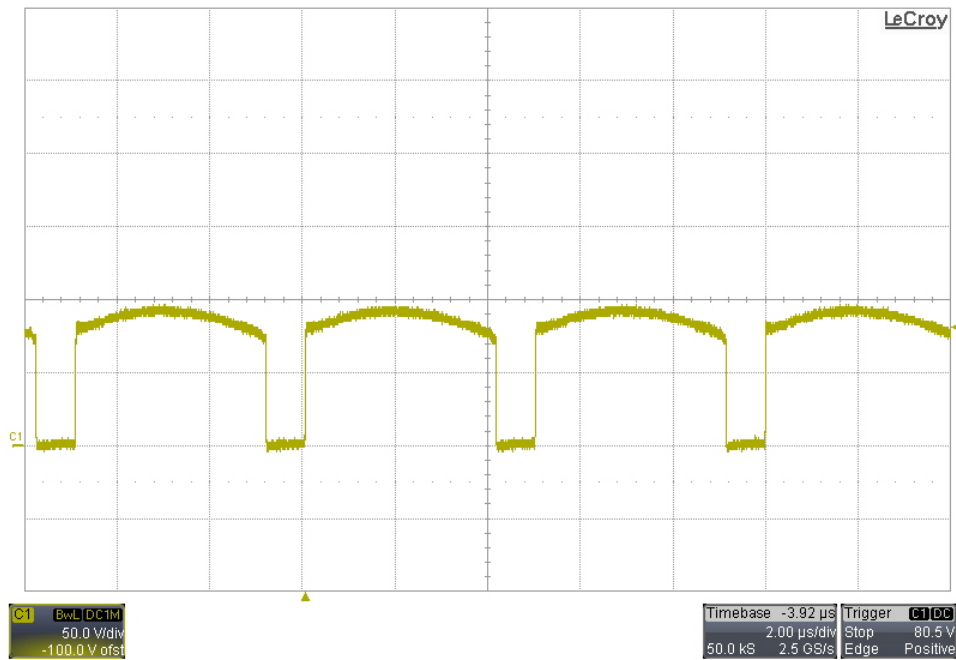
9 Switching Waveforms

For the images below show the output was loaded with 10A.

9.1 Primary FETs (Q7 & Q10) V_{ds} – 18V Input

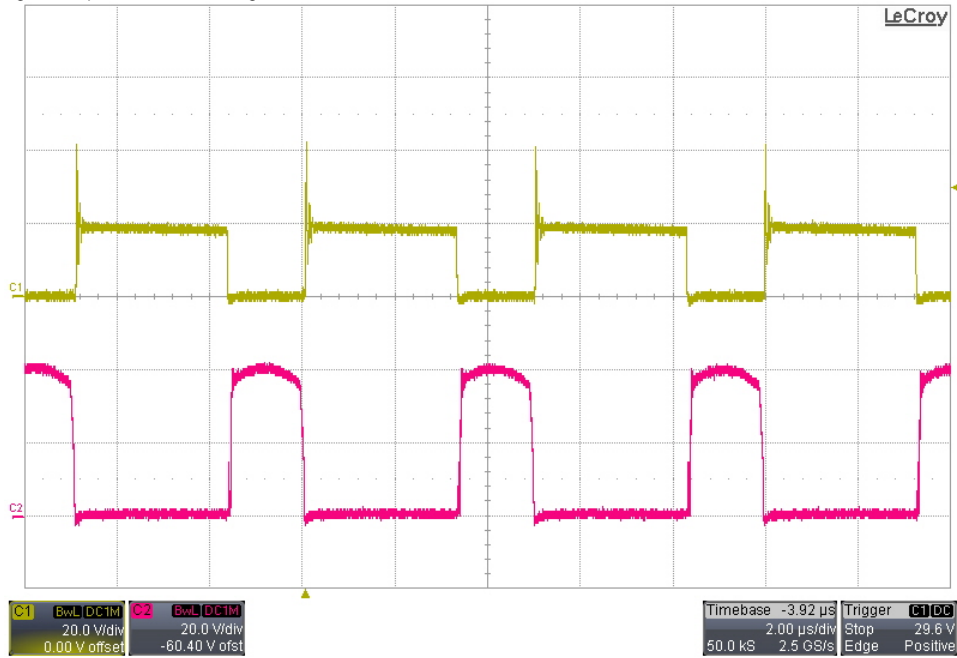


9.2 Primary FETs (Q7 & Q10) V_{ds} – 72V Input



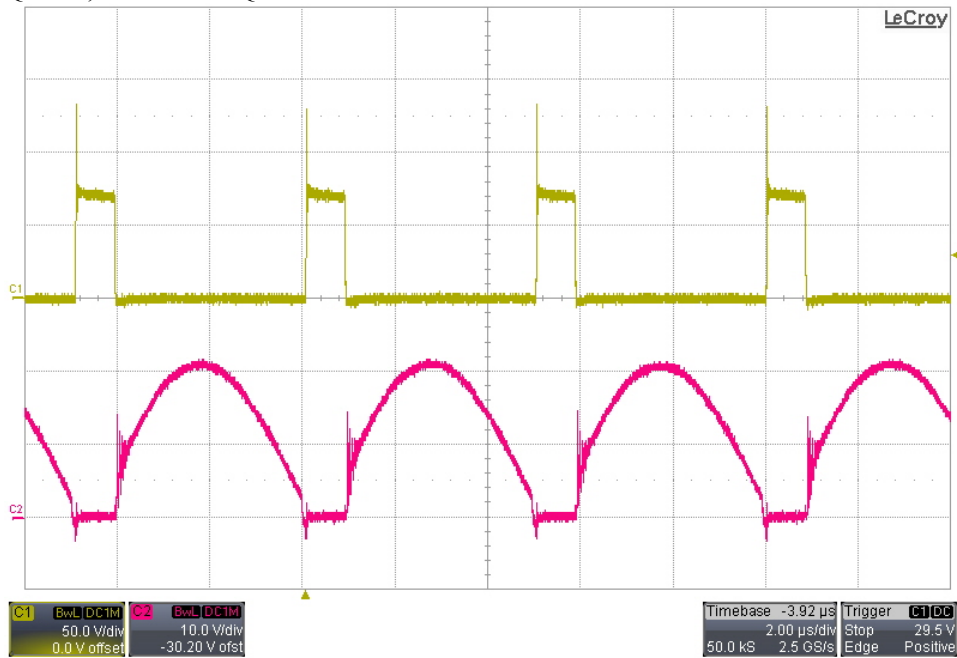
9.3 Synchronous FETs – 18V Input

Channel 1 – Q5 & Q9 Vds; Channel 2 – Q1 Vds



9.4 Synchronous FETs – 72V Input

Channel 1 – Q5 & Q9 Vds; Channel 2 – Q1 Vds



IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to TI's Terms of Sale (<https://www.ti.com/legal/termsofsale.html>) or other applicable terms available either on [ti.com](https://www.ti.com) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2021, Texas Instruments Incorporated