Test Data
For PMP10558
12/22/2014

Power Specification Transformer 750314461

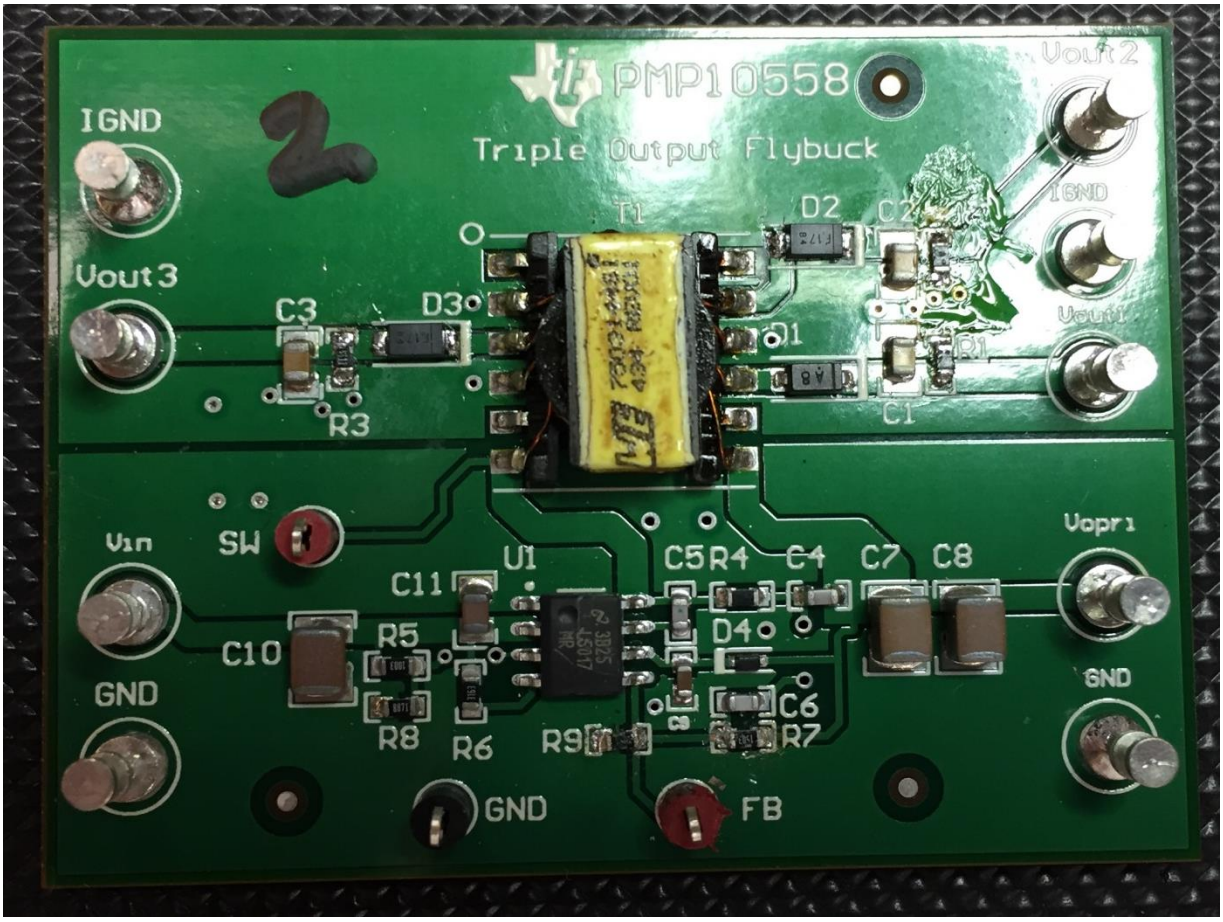
Vin range: 18V – 30V

Nominal Vin = 24V

Quad Isolated Outputs: ±5V@100mA, +15V@50mA

Fsw = 350kHz

Board Photo

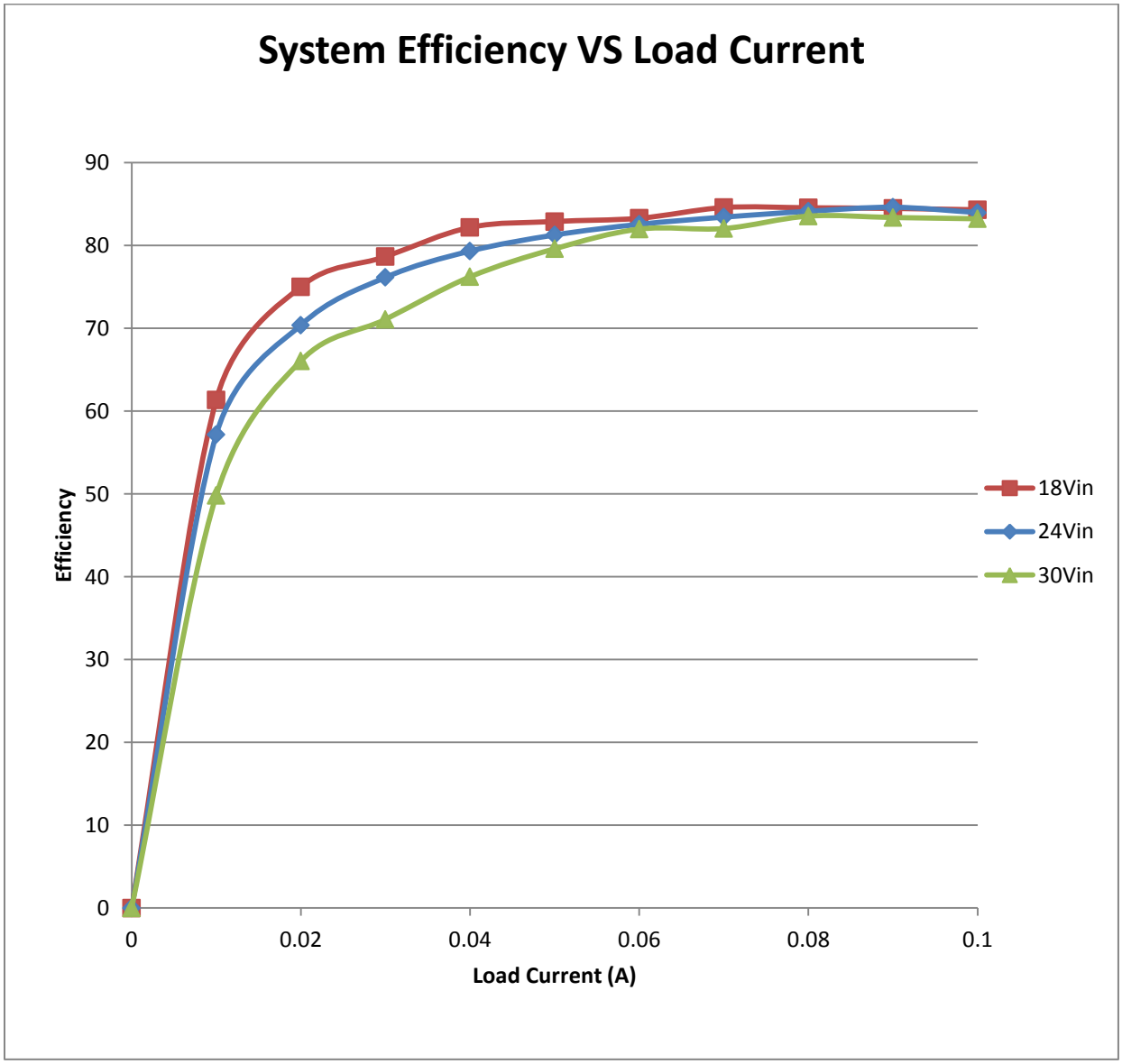


Size: 56x43mm

Vout1: +15V output, Vout2: +5V output, Vout3: -5V output

Efficiency

The efficiency is calculated for all outputs; the load current is incremented at 10mA interval.

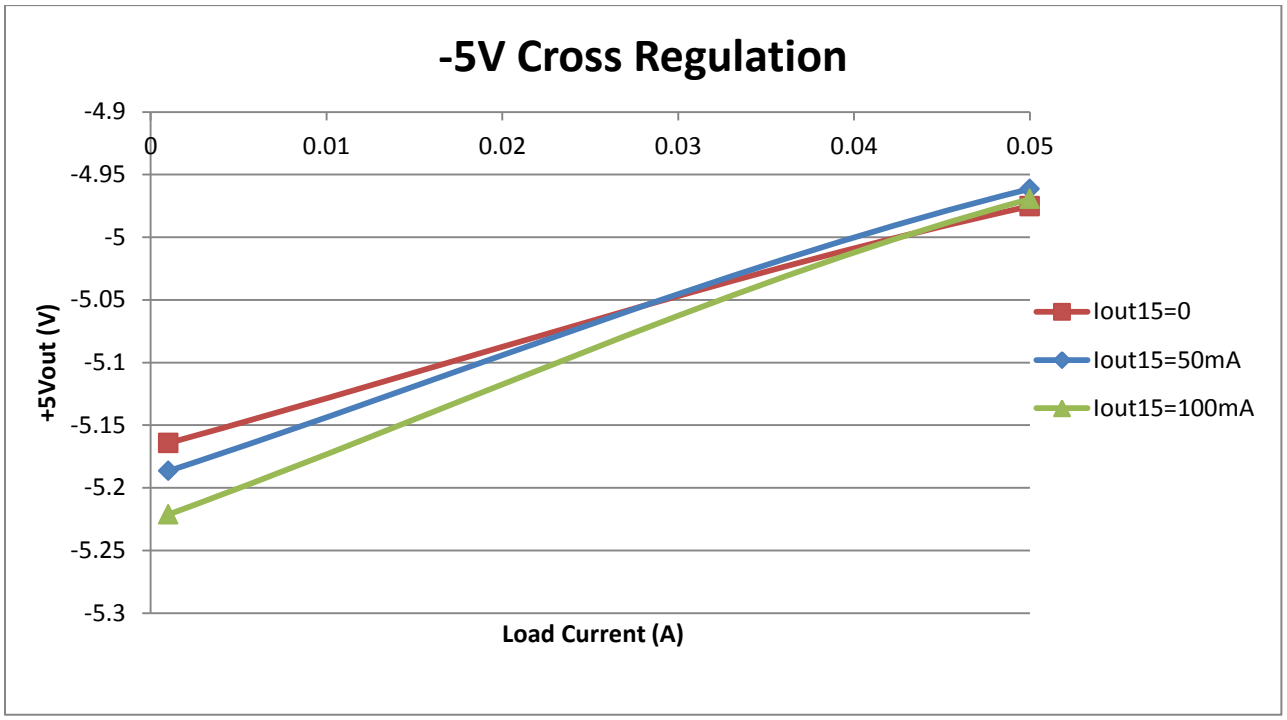


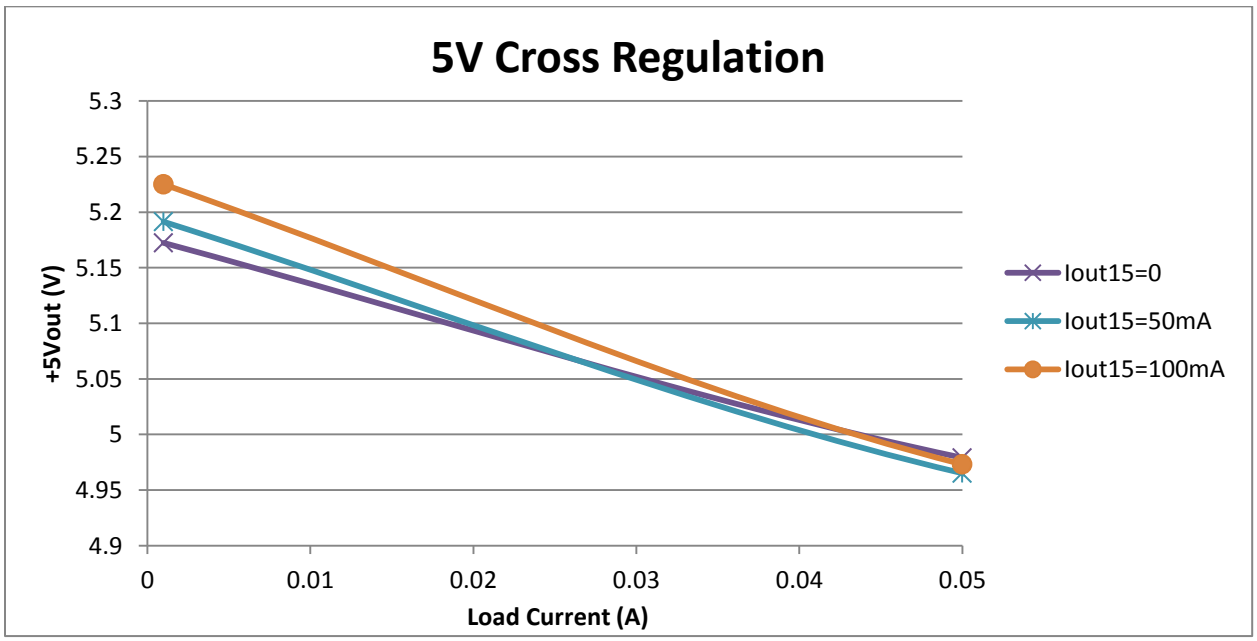
For more data at different Vin, see the Appendix.

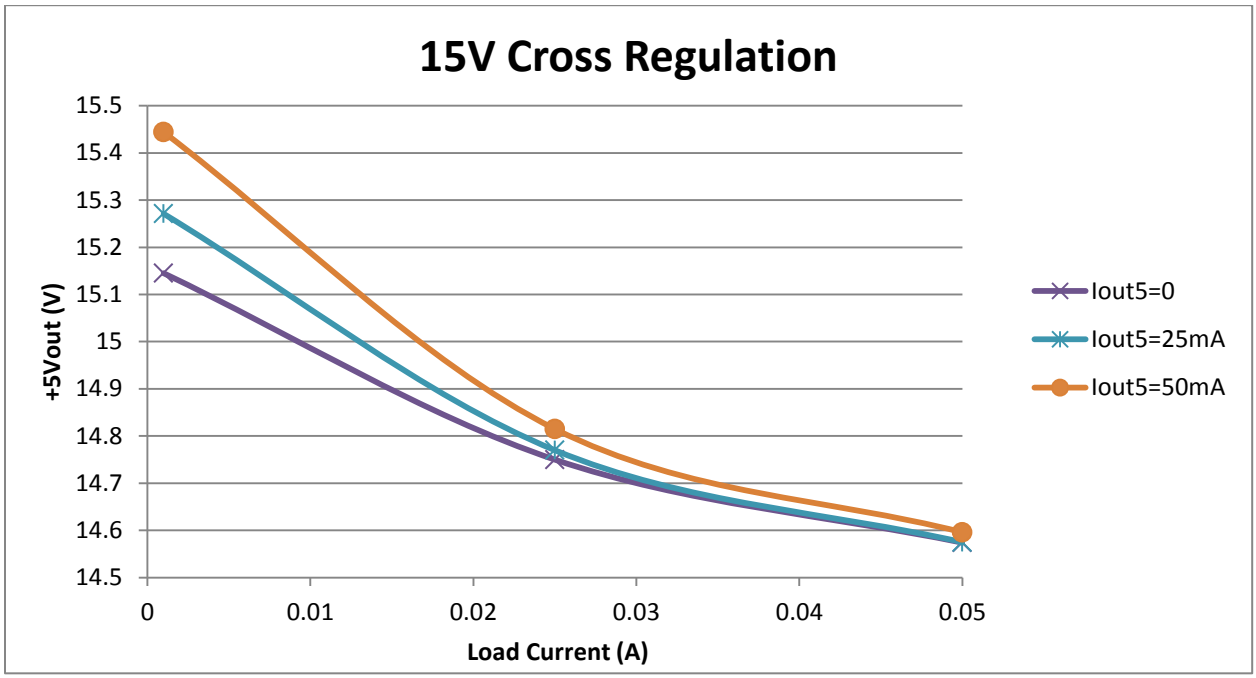
Cross Regulation

The cross regulation was tested by sweeping different load condition on four outputs.

Vin=24V



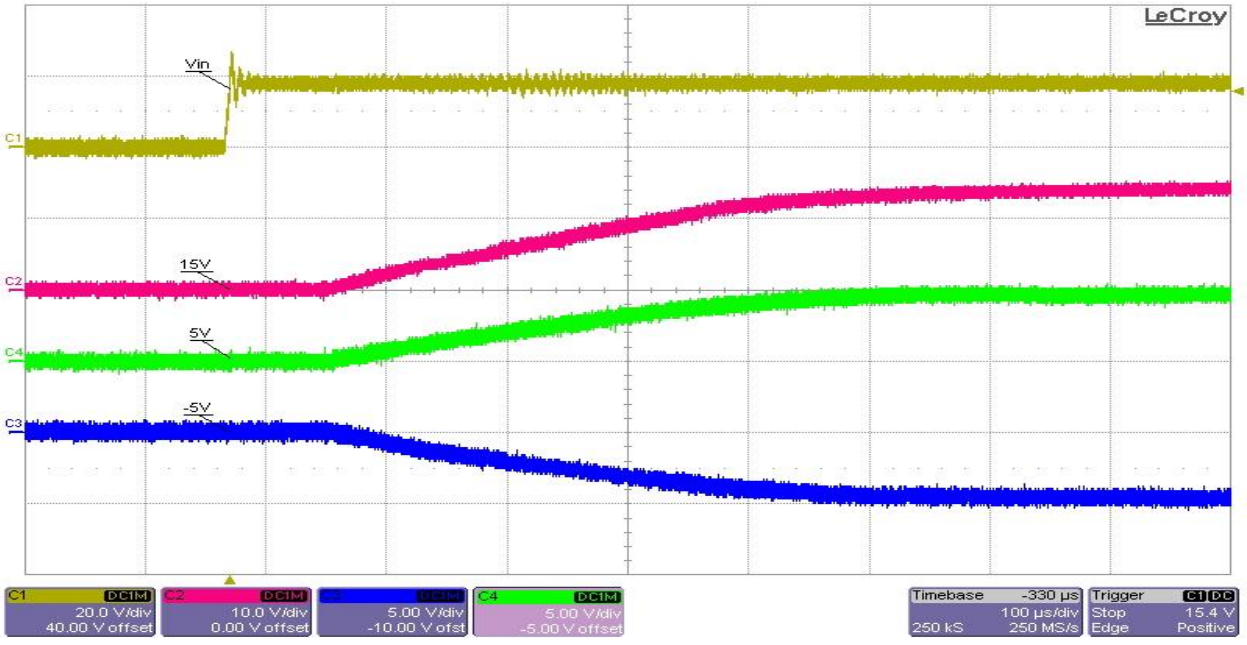




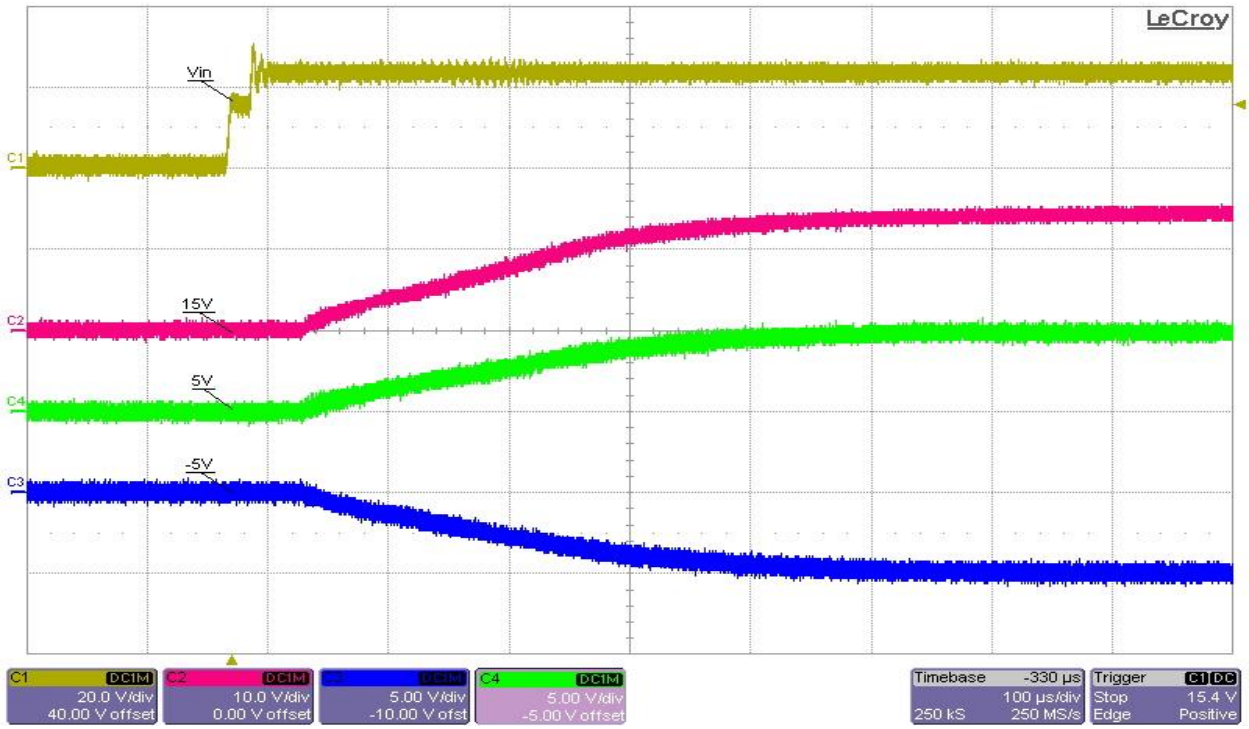
For more data of different rails, see the Appendix.

Start Up

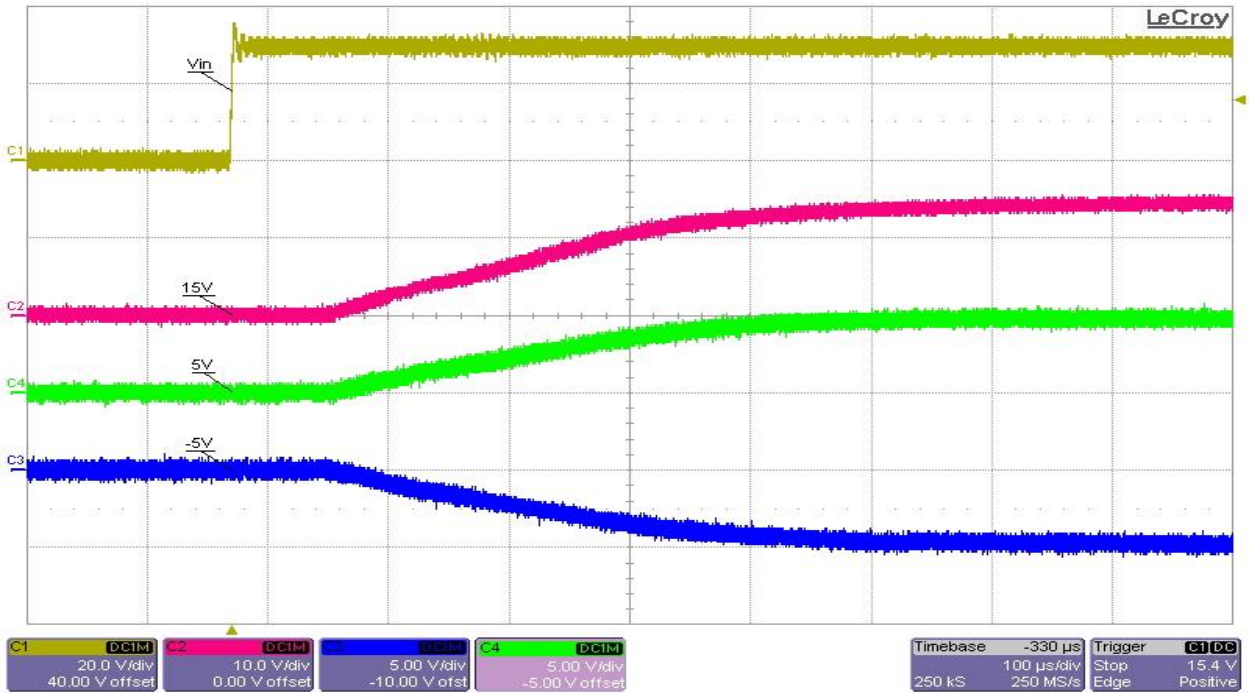
Test condition: The input voltage was set at 18V, and all outputs were set at full load.
Ch1 - Vin, Ch2 – 15VP (+15V), Ch3 – 5VN (-5V), Ch4 – 5VP (5V)



Test condition: The input voltage was set at 24V, and all outputs were set at full load.
Ch1 - Vin, Ch2 – 15VP (+15V), Ch3 – 5VN (-5V), Ch4 – 5VP (5V)



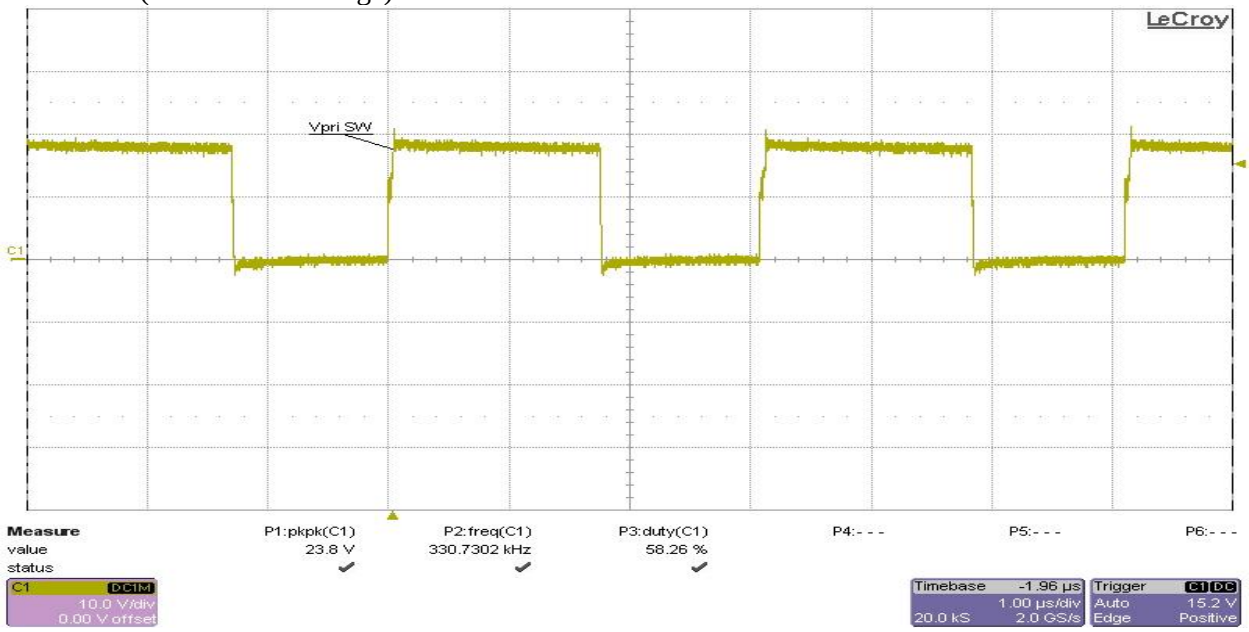
Test condition: The input voltage was set at 30V, and all outputs were set at full load.
Ch1 - Vin, Ch2 – 15VP (+15V), Ch3 – 5VN (-5V), Ch4 – 5VP (5V)



Switching Waveforms

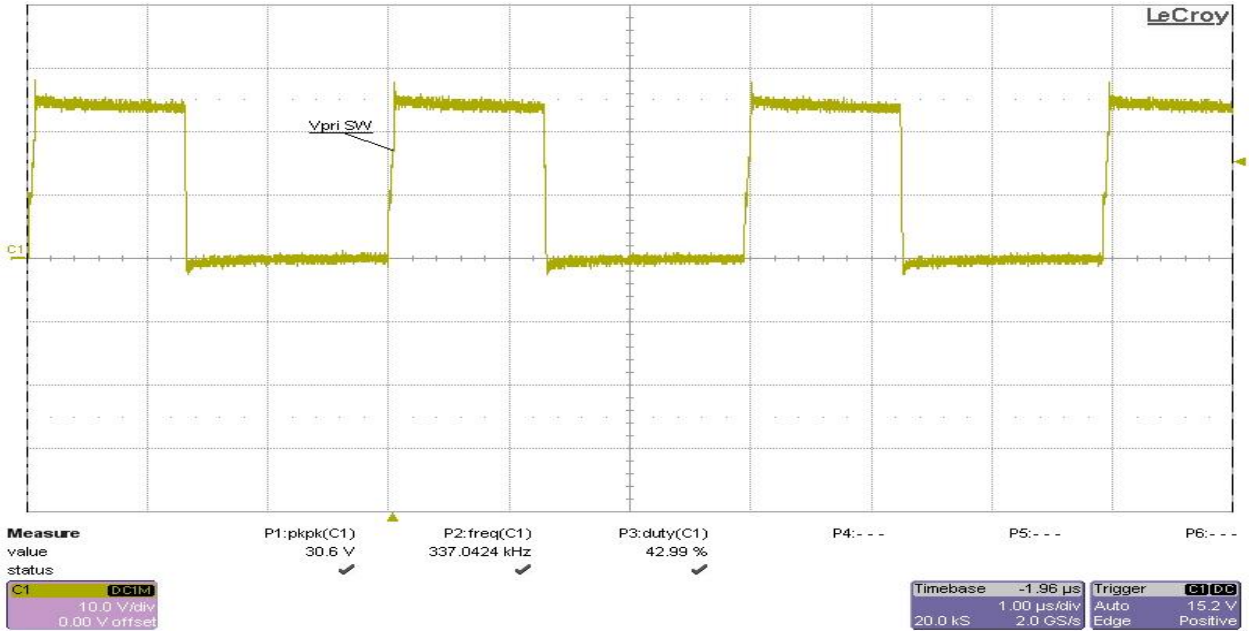
Test condition: The input voltage was set at 18V, and all outputs were set at full load.

Ch1 – Vsw (switch node voltage)



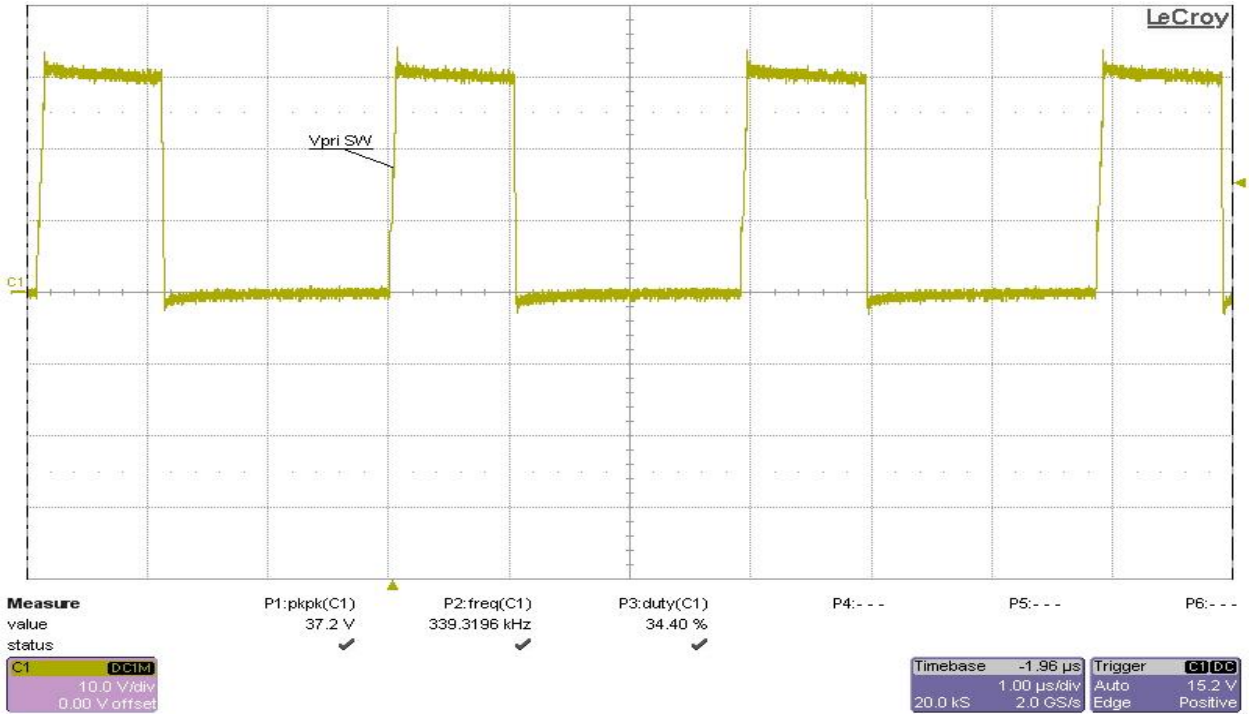
Test condition: The input voltage was set at 24V, and all outputs were set at full load.

Ch1 – Vsw (switch node voltage)



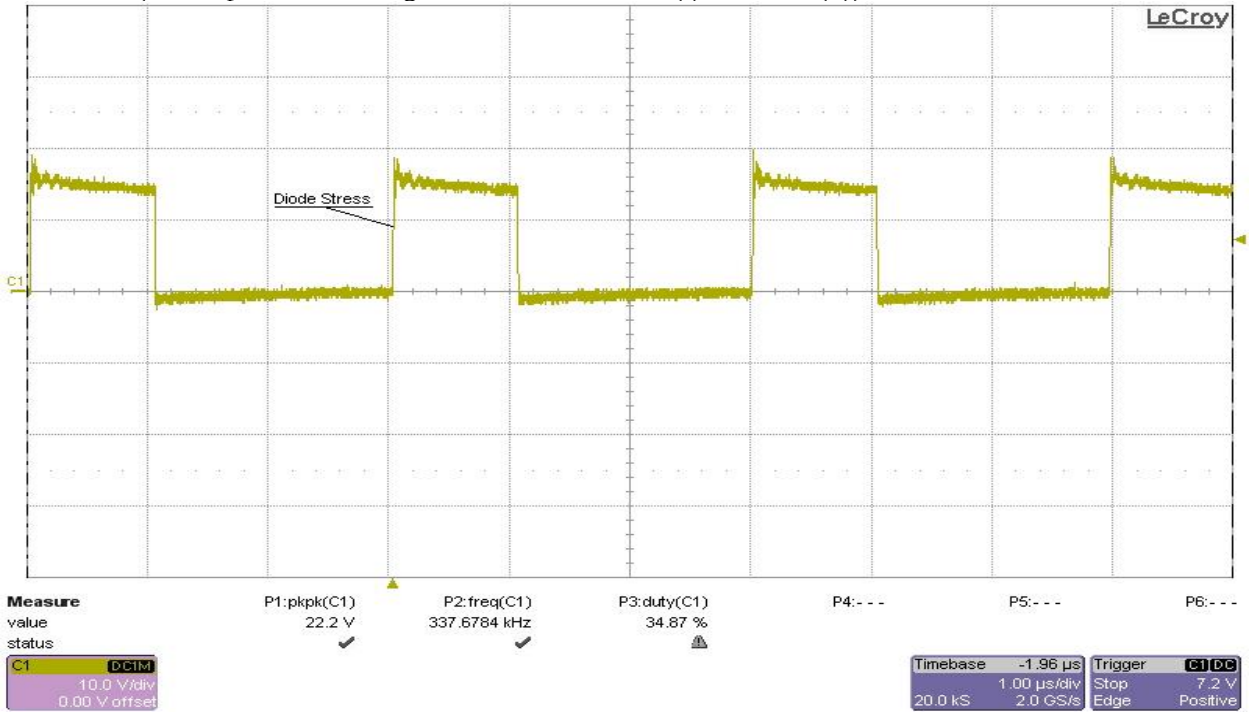
Test condition: The input voltage was set at 30V, and all outputs were set at full load.

Ch1 – Vsw (switch node voltage)



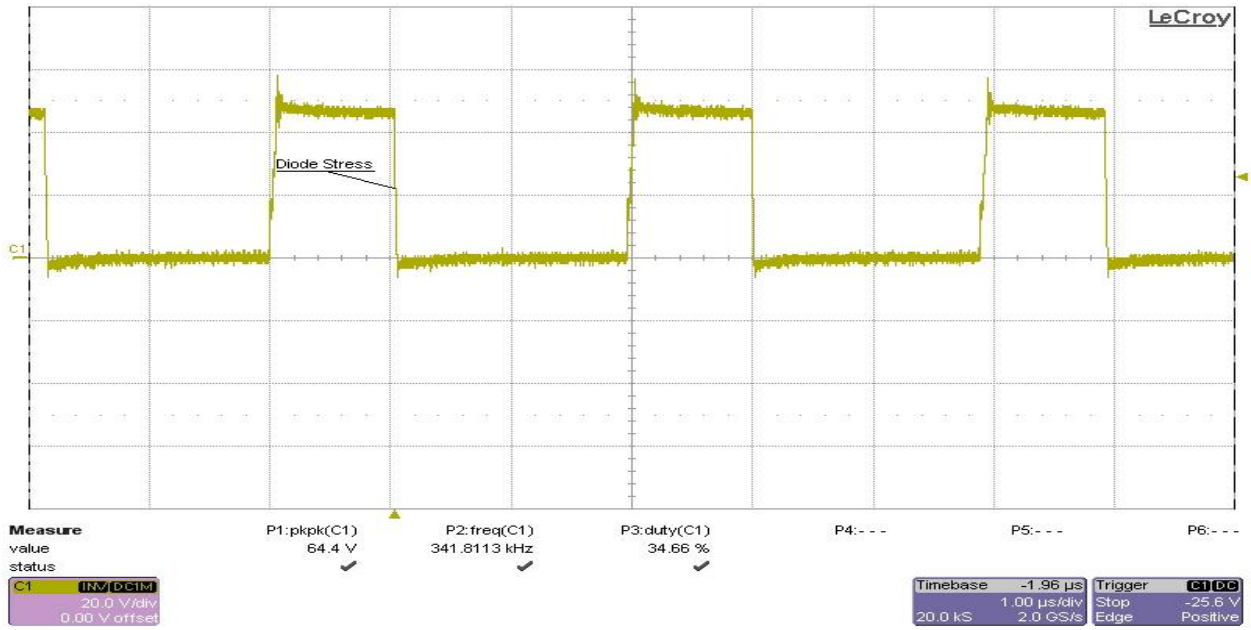
Test condition: The input voltage was set at 30V, and all outputs were set at full load.

Ch1 – Vd5 (5V output diode voltage stress from cathode (-) to anode (+))



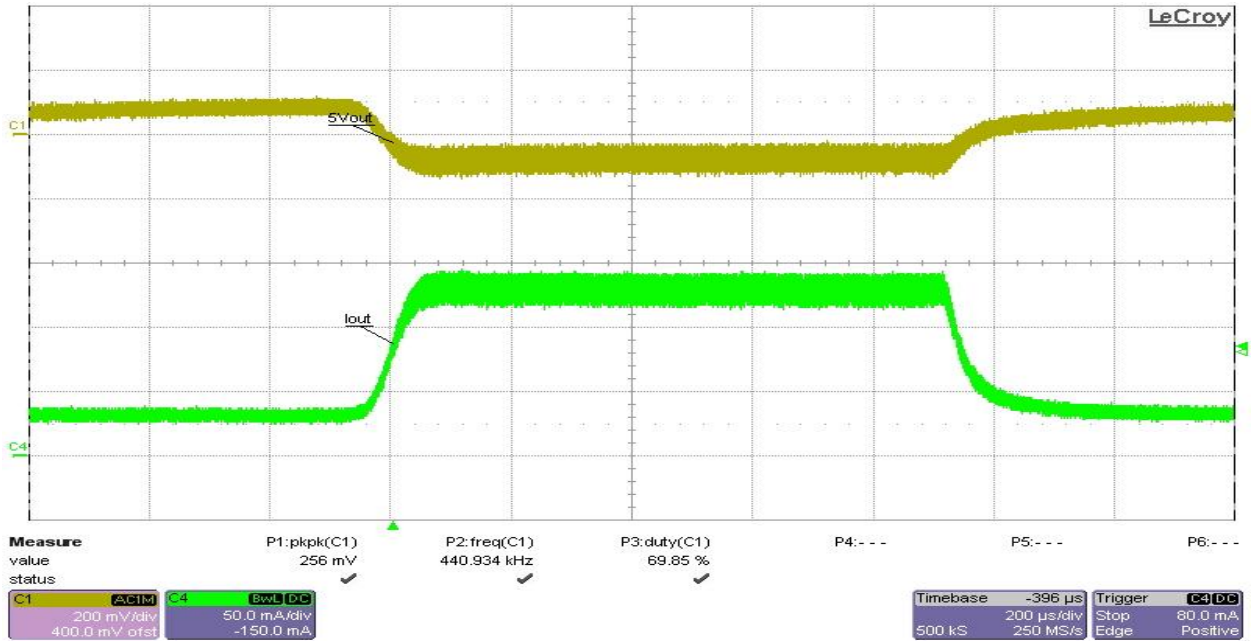
Test condition: The input voltage was set at 30V, and all outputs were set at full load.

Ch1 – Vd15 (15V output diode voltage stress from cathode (-) to anode (+))

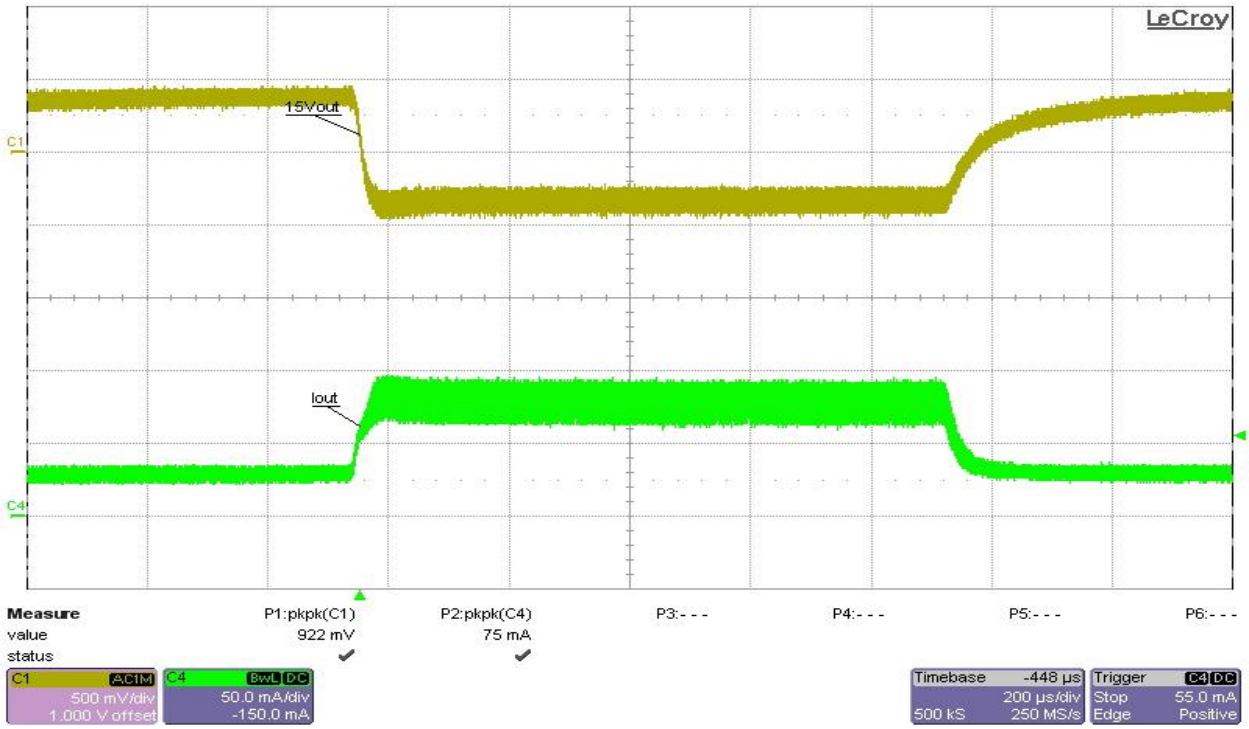


Load Transients

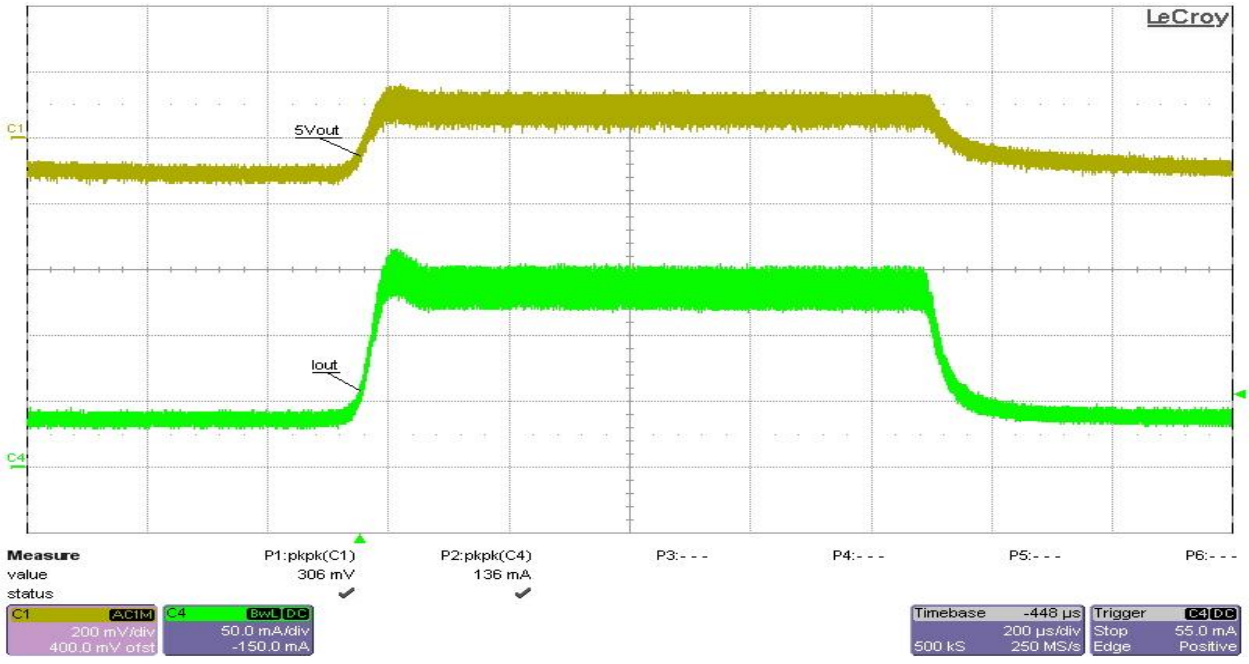
Test condition: Vin = 24V, 5VP (+5V) load from 0A to 100mA, no load at the other outputs.
Ch1- 5VP (+5V) (AC mode), Ch4- Io (+5V output current)



Test condition: Vin = 24V, 15VP (+15V) load from 0A to 50mA, no load at the other outputs.
Ch1- 15VP (+15V) (AC mode), Ch4- Io (+15V output current)

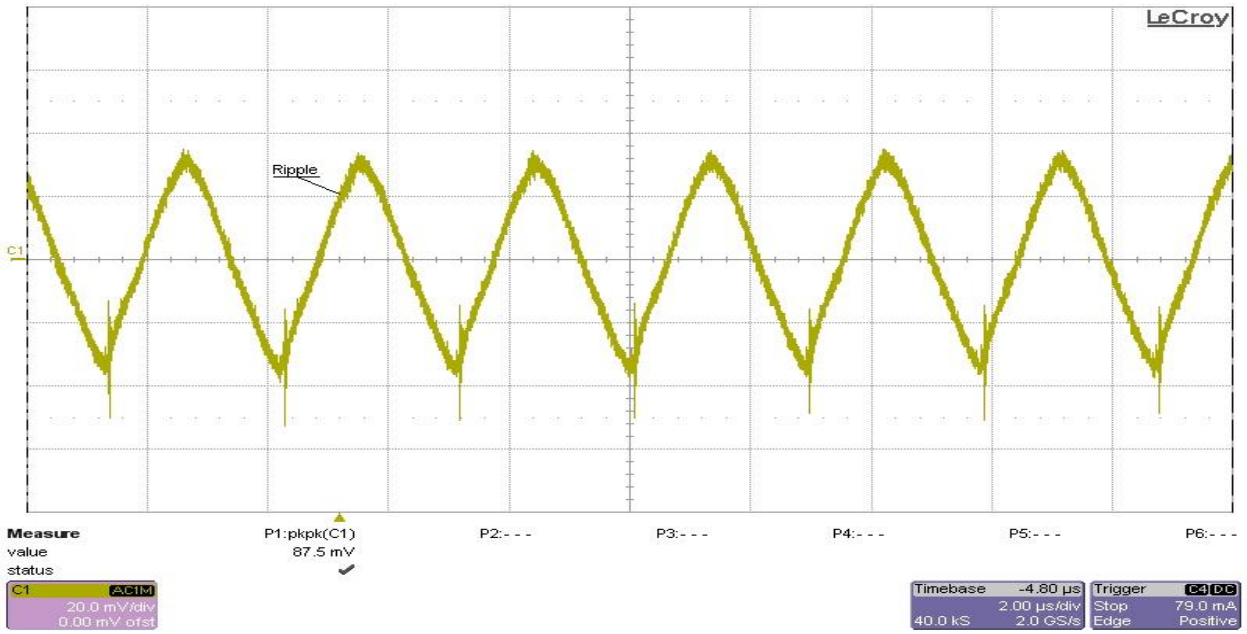


Test condition: Vin = 24V, 5VN (-5V) load from 0A to 100mA, no load at the other outputs.
Ch1- 5VN (-5V) (AC mode), Ch4- Io (-5V output current)

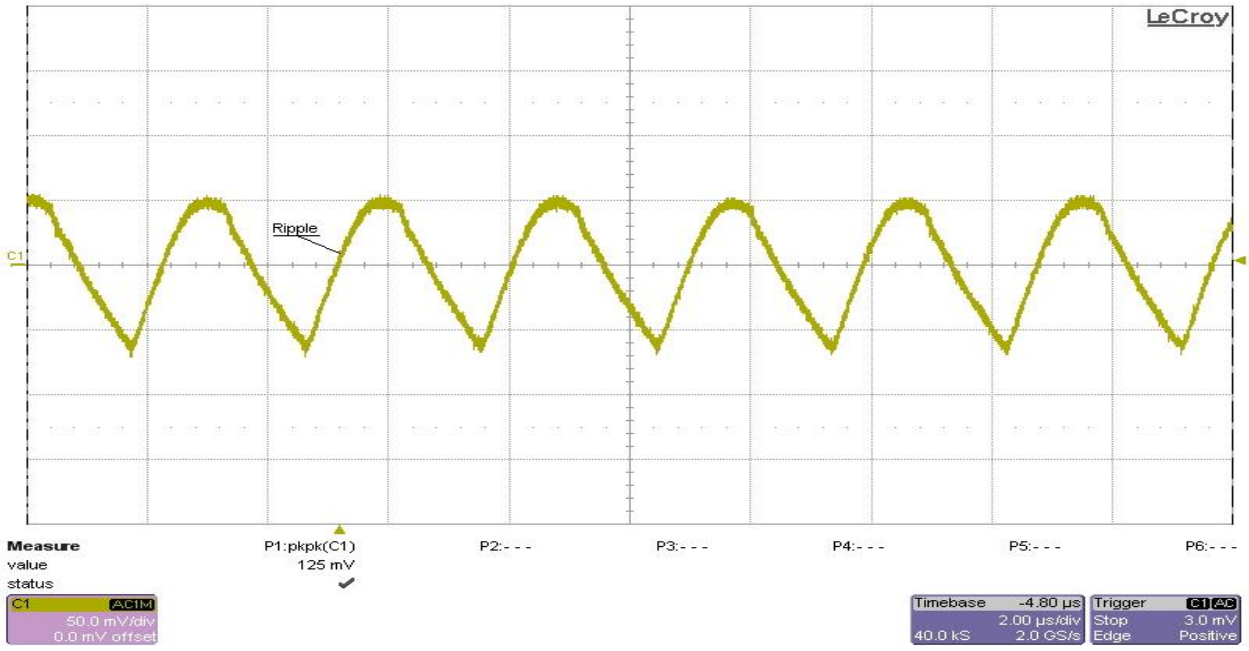


Output Voltage Ripples

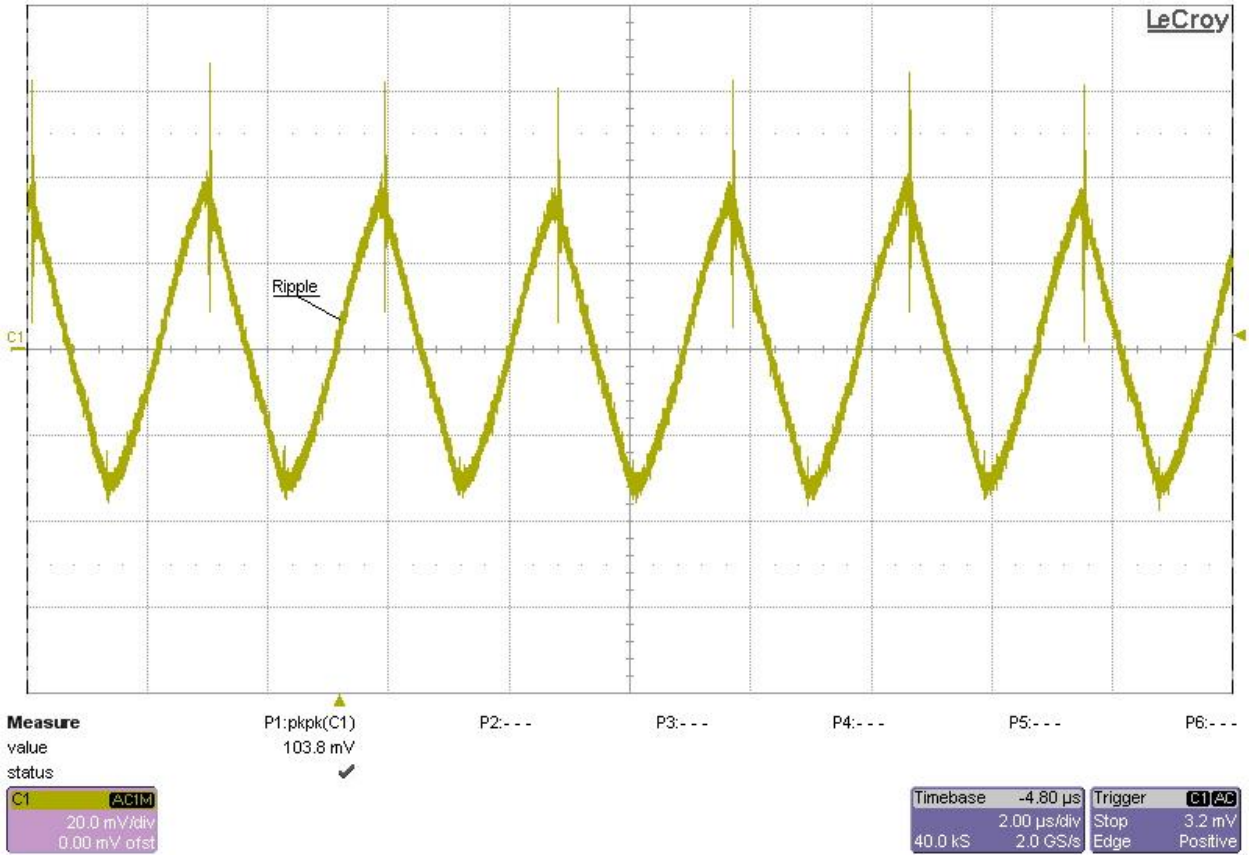
Test condition: The input voltage was set at 24V, and all outputs were set at full load.
Ch1 – 5VP (+5V) (AC coupled)



Test condition: The input voltage was set at 24V, and all outputs were set at full load.
Ch1 – 15VP (+15V) (AC coupled)



Test condition: The input voltage was set at 24V, and all outputs were set at full load.
Ch1 – 5VN (-5V) (AC coupled)



Power Specification Transformer 750314462

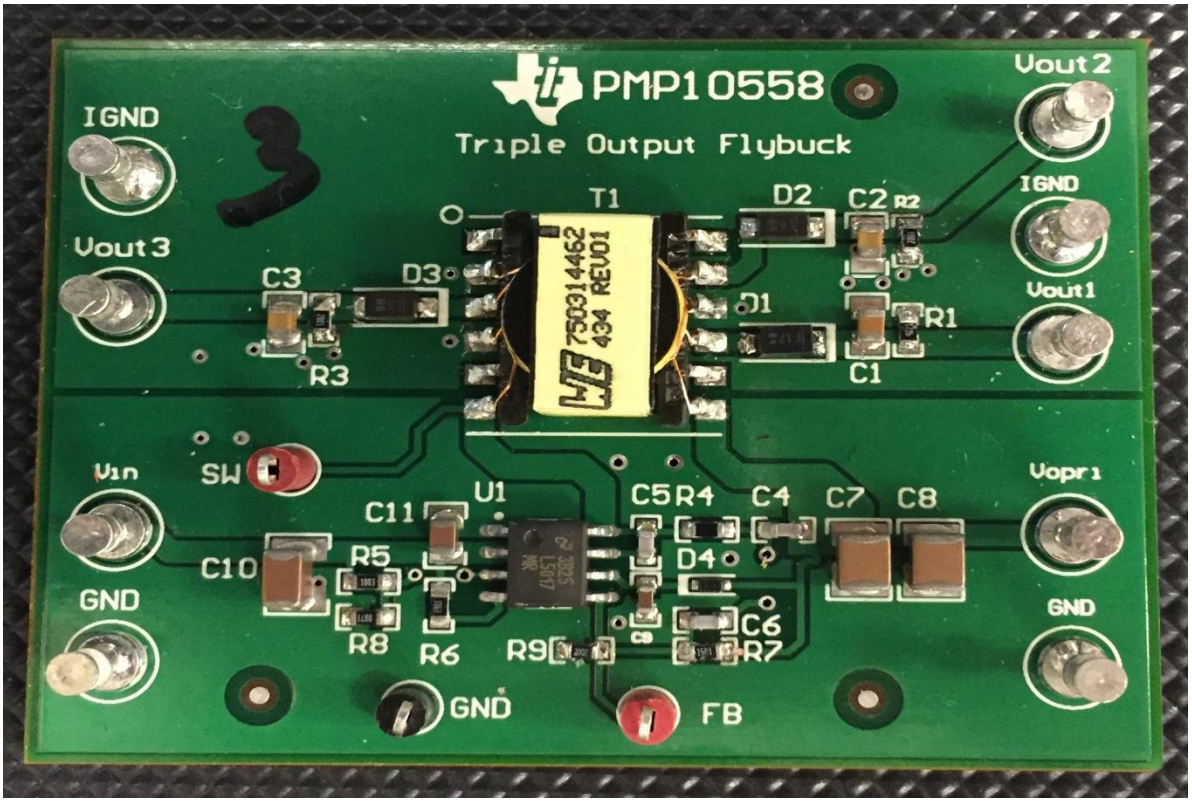
Vin range: 18V – 30V

Nominal Vin = 24V

Quad Isolated Outputs: ±12V@50mA, +5V@100mA

Fsw = 350kHz

Board Photo

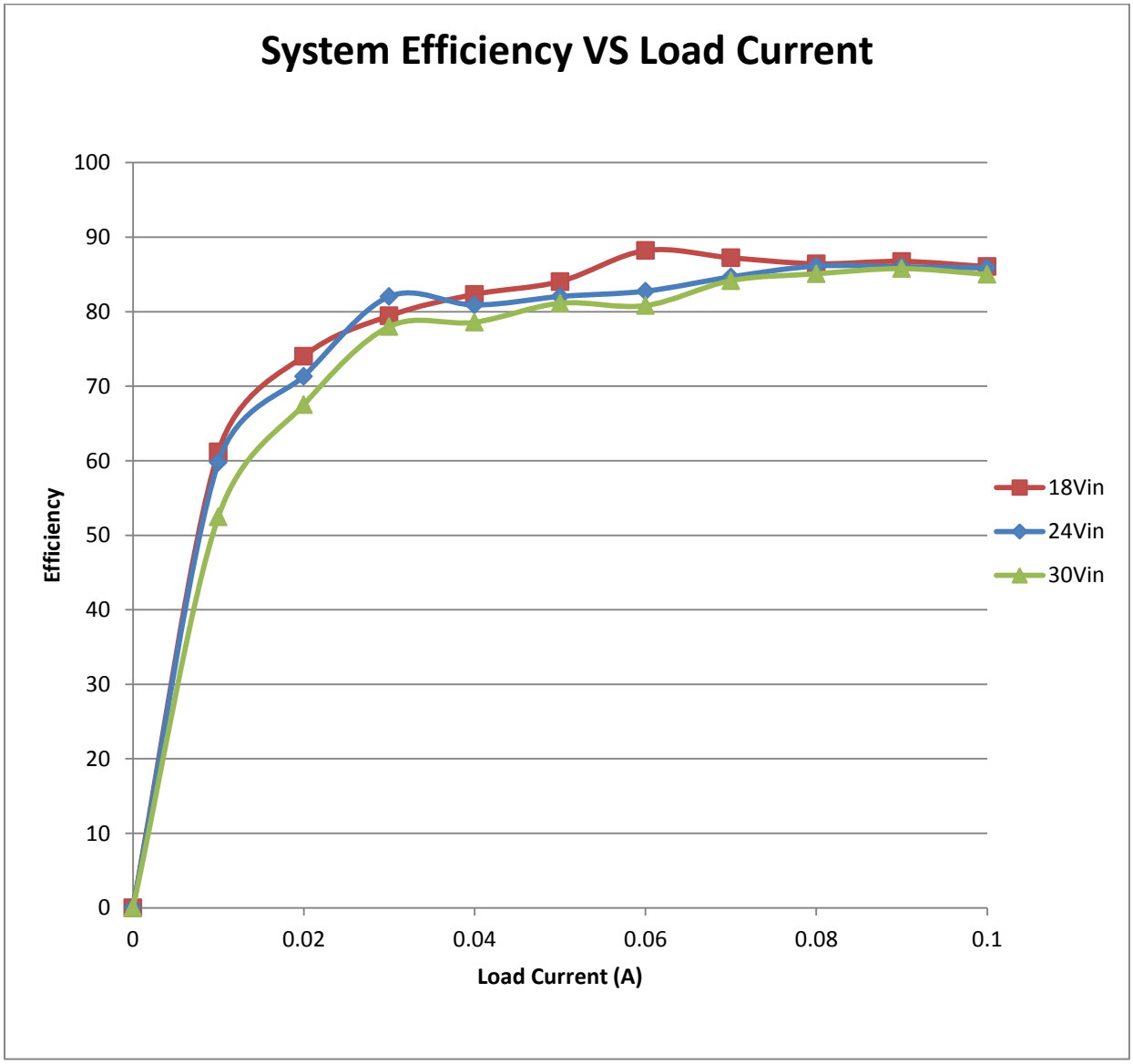


Size: 56x43mm

Vout1: +5V output, Vout2: +12V output, Vout3: -12V output

Efficiency

The efficiency is calculated for all outputs; the load current is incremented at 10mA interval.

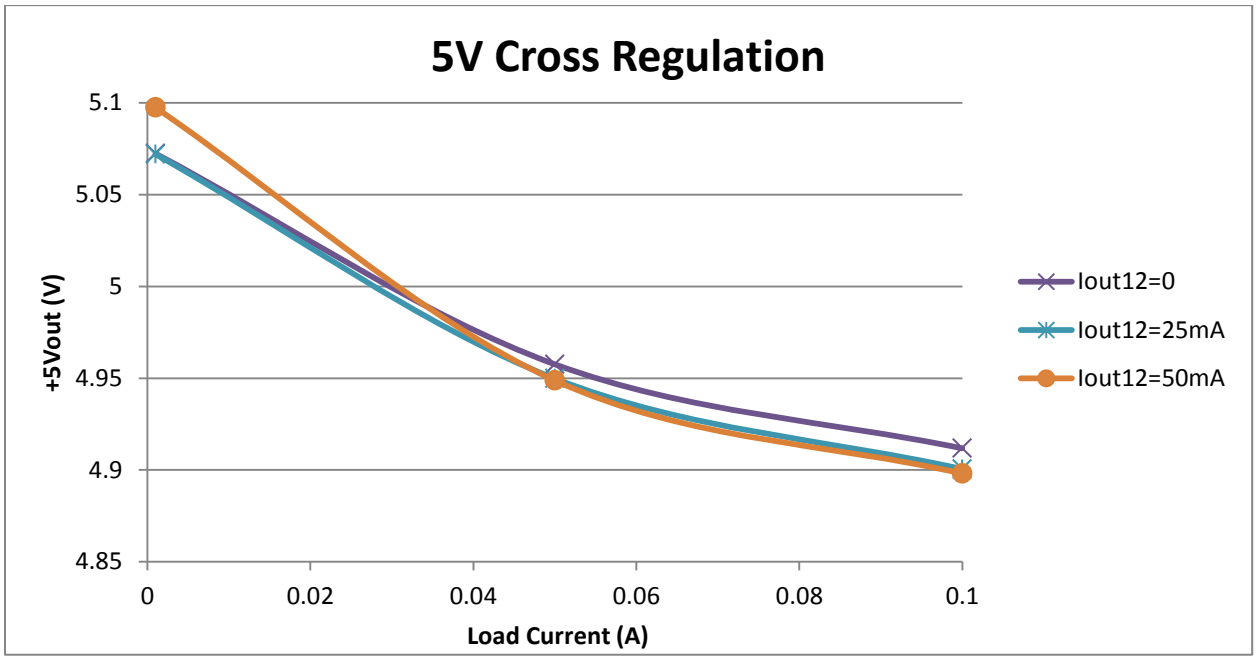


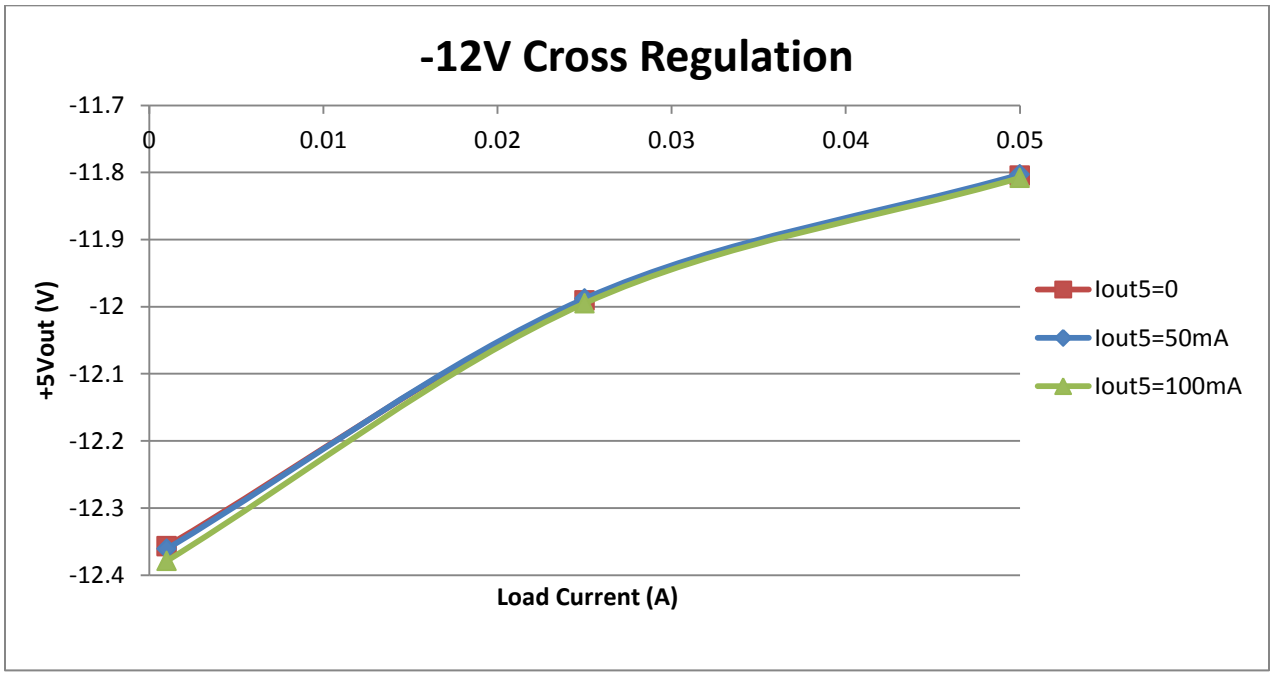
For more data at different Vin, see the Appendix.

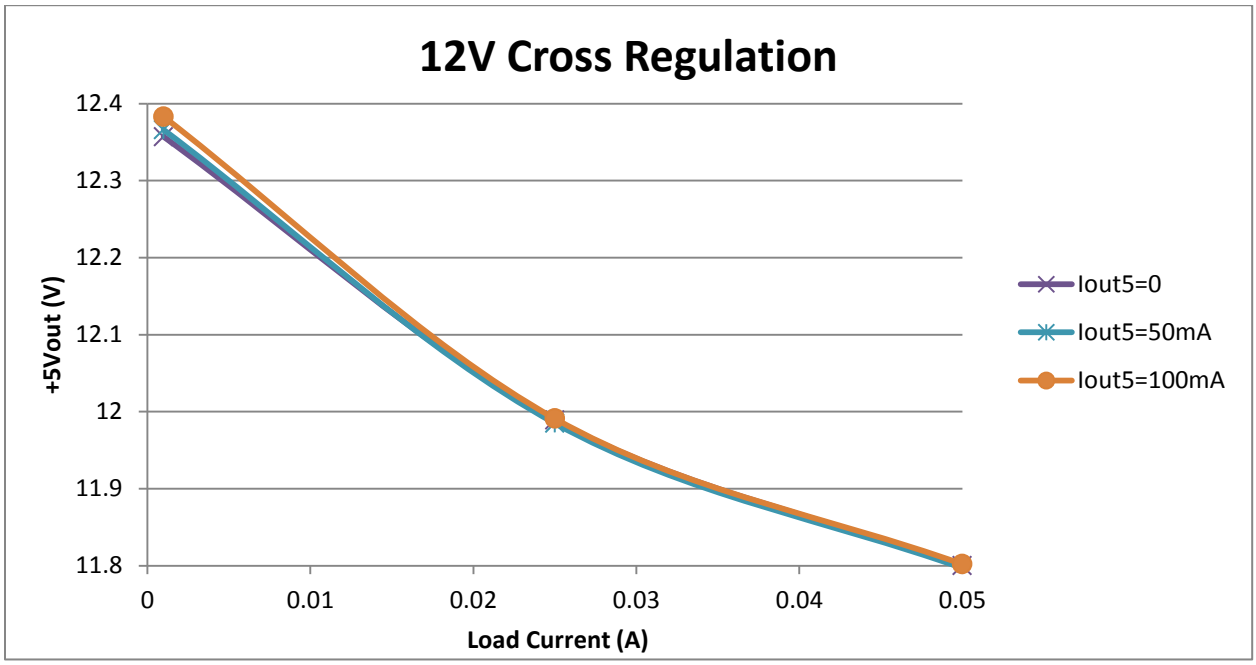
Cross Regulation

The cross regulation was tested by sweeping different load condition on four outputs.

Vin=24V



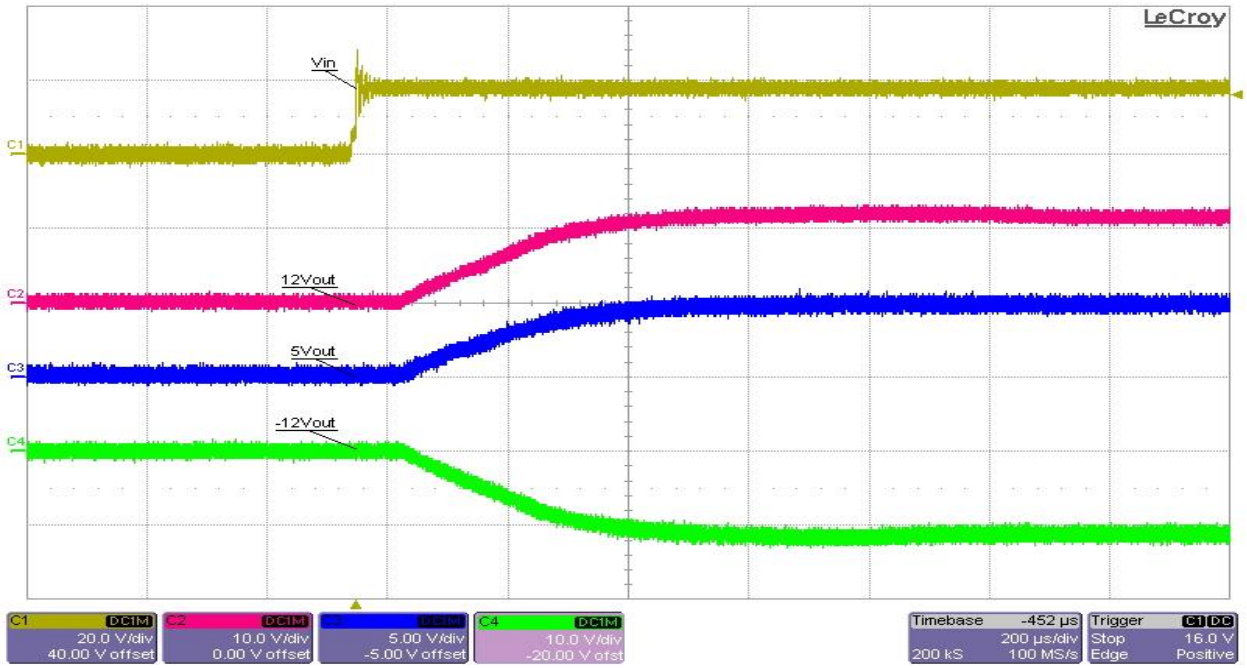




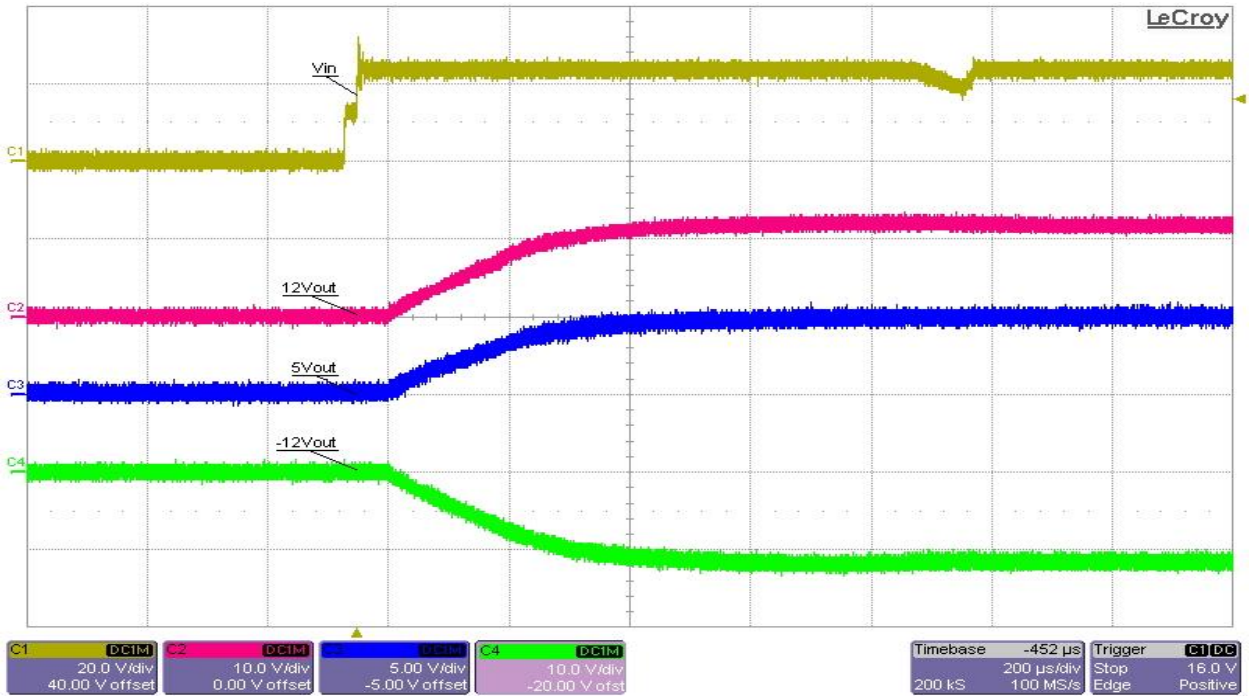
For more data of different rails, see the Appendix.

Start Up

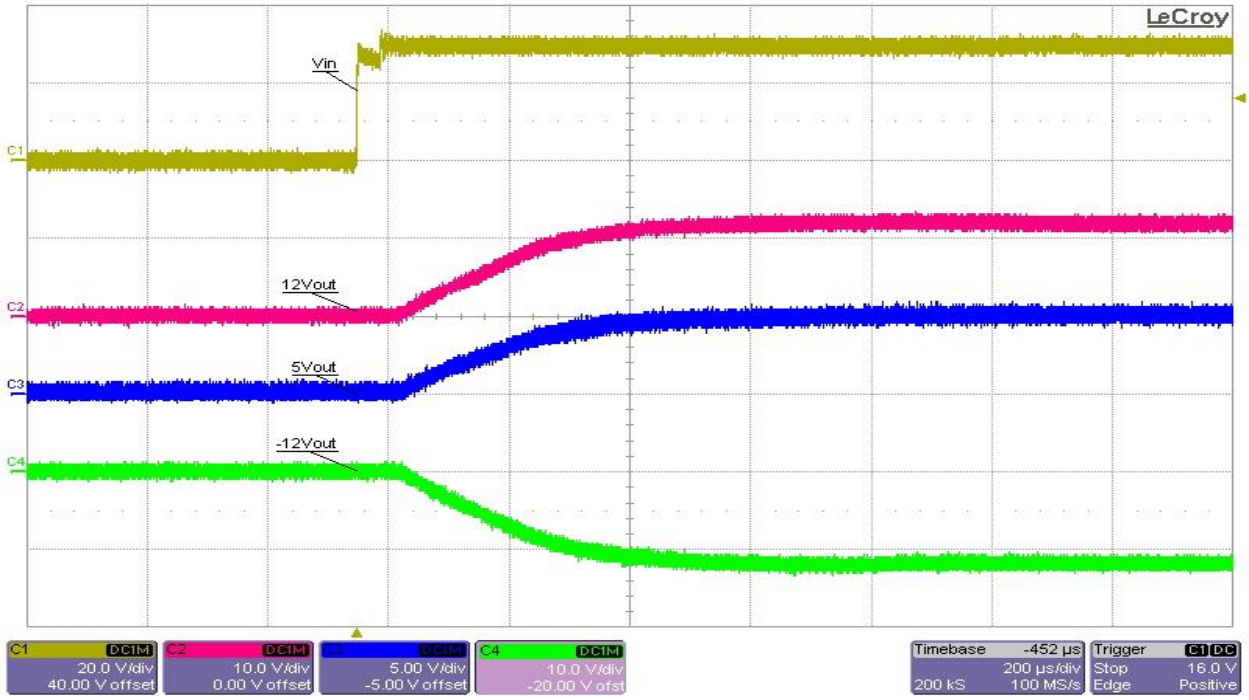
Test condition: The input voltage was set at 18V, and all outputs were set at full load.
Ch1 - Vin, Ch2 – 12VP (+12V), Ch3 – 5VP (+5V), Ch4 – 12VN (-12V)



Test condition: The input voltage was set at 24V, and all outputs were set at full load.
Ch1 - Vin, Ch2 – 12VP (+12V), Ch3 – 5VP (+5V), Ch4 – 12VN (-12V)



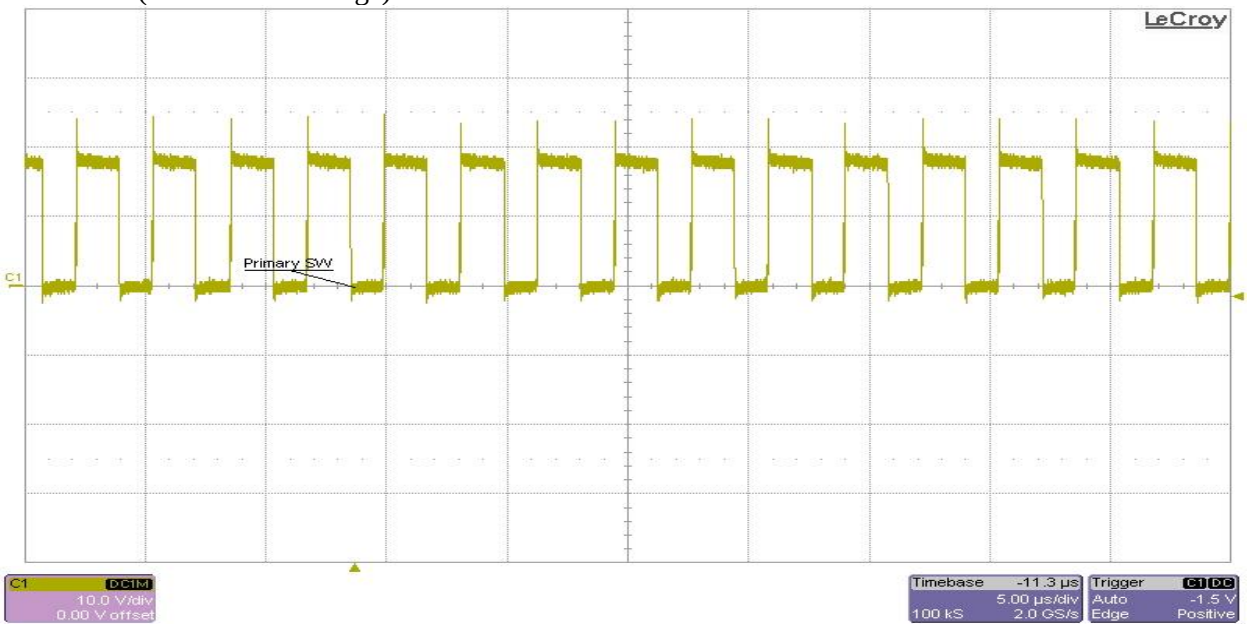
Test condition: The input voltage was set at 30V, and all outputs were set at full load.
Ch1 - Vin, Ch2 – 12VP (+12V), Ch3 – 5VP (+5V), Ch4 – 12VN (-12V)



Switching Waveforms

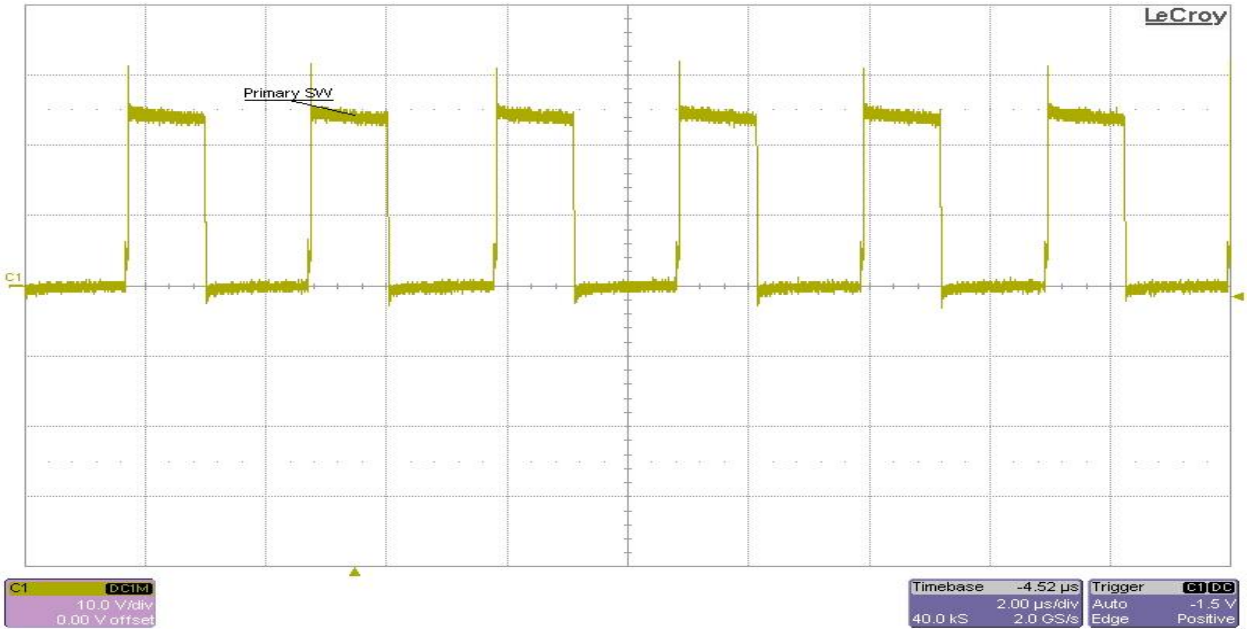
Test condition: The input voltage was set at 18V, and all outputs were set at full load.

Ch1 – Vsw (switch node voltage)



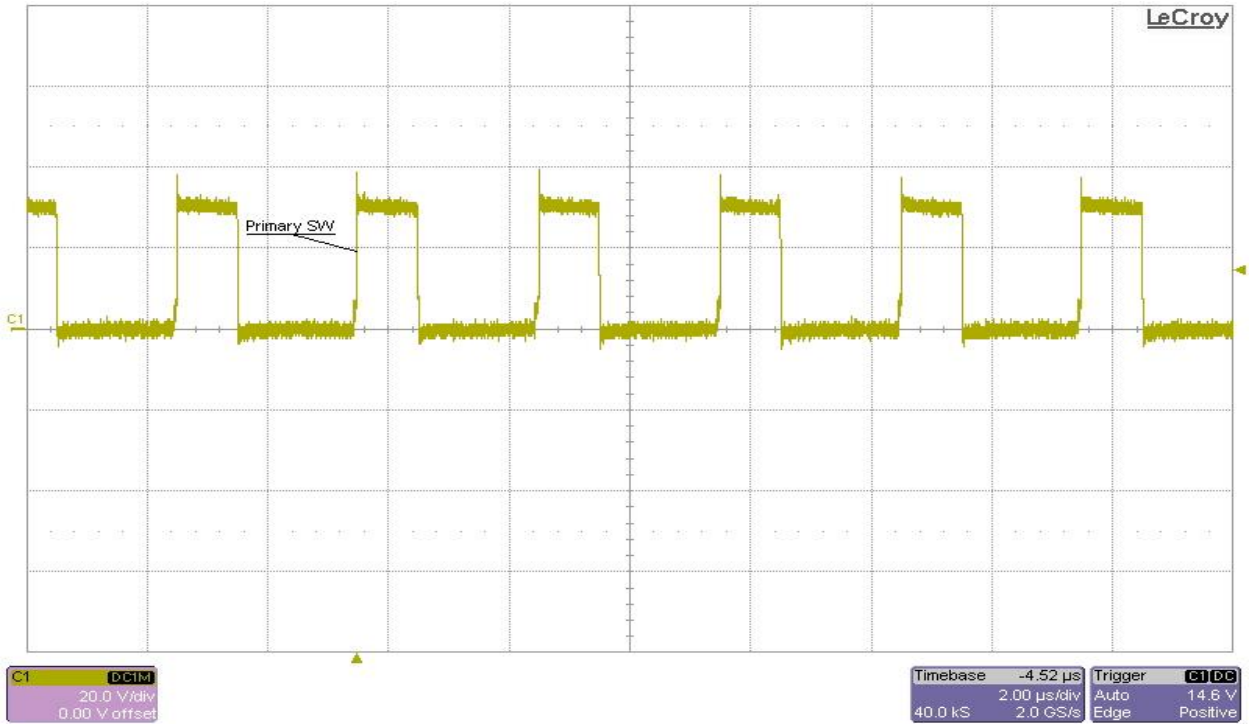
Test condition: The input voltage was set at 24V, and all outputs were set at full load.

Ch1 – Vsw (switch node voltage)



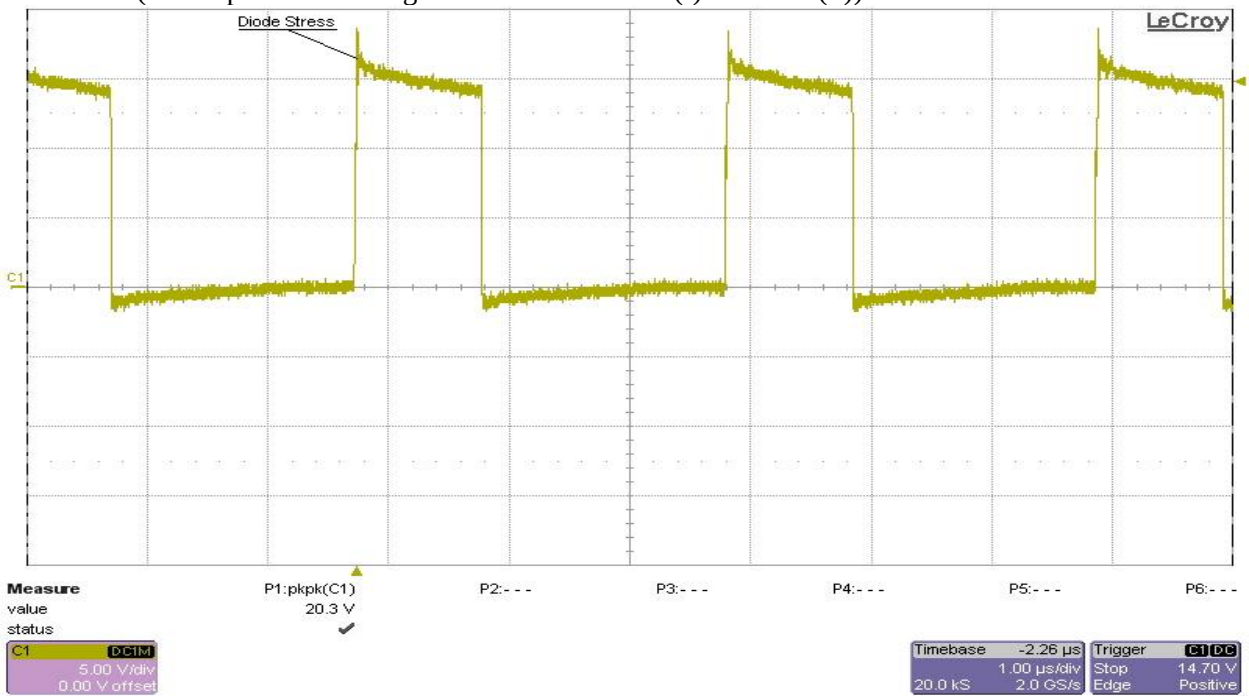
Test condition: The input voltage was set at 30V, and all outputs were set at full load.

Ch1 – Vsw (switch node voltage)



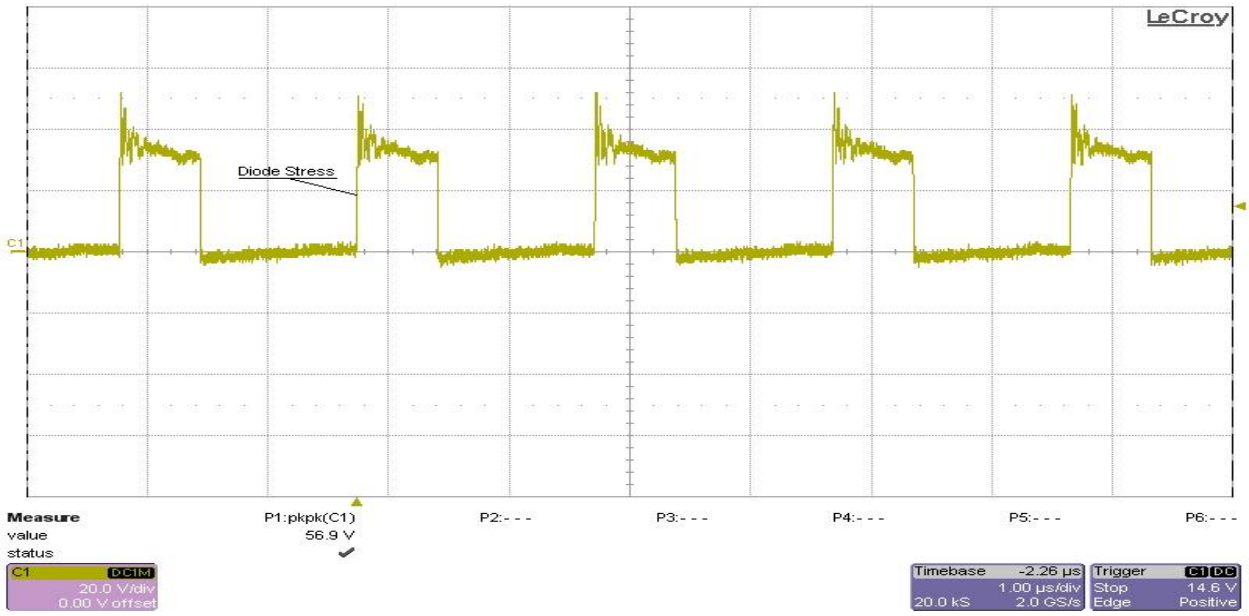
Test condition: The input voltage was set at 30V, and all outputs were set at full load.

Ch1 – Vd5 (5V output diode voltage stress from cathode (-) to anode (+))



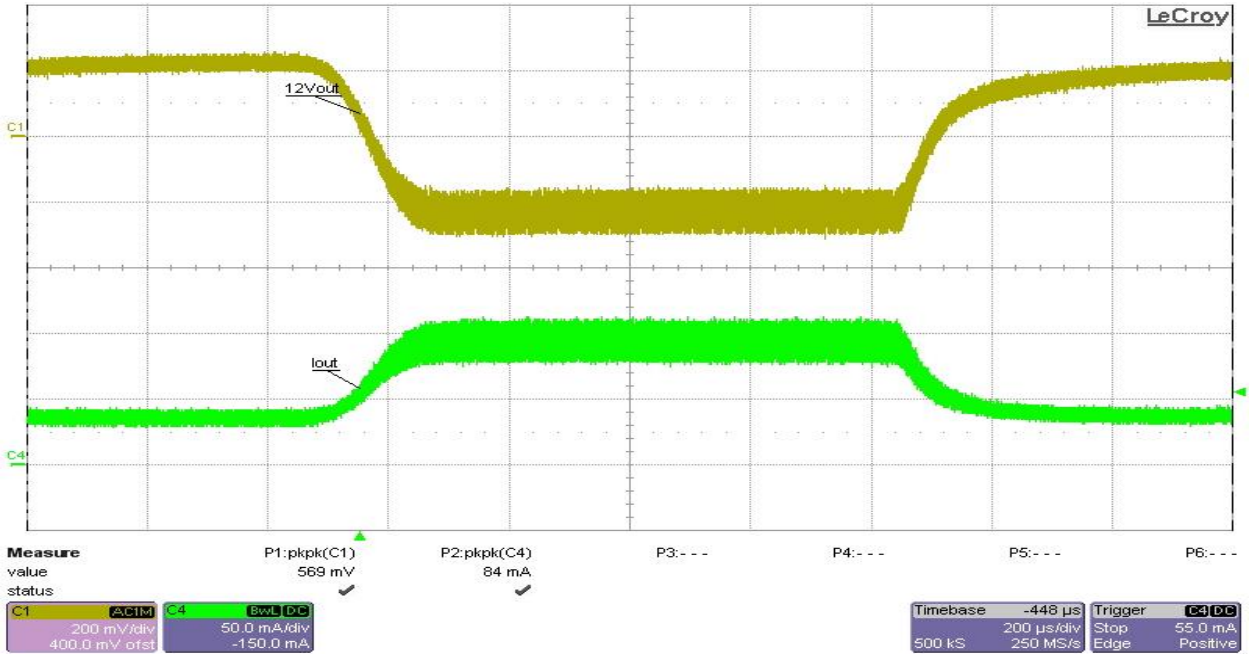
Test condition: The input voltage was set at 30V, and all outputs were set at full load.

Ch1 – Vd12 (12V output diode voltage stress from cathode (-) to anode (+))

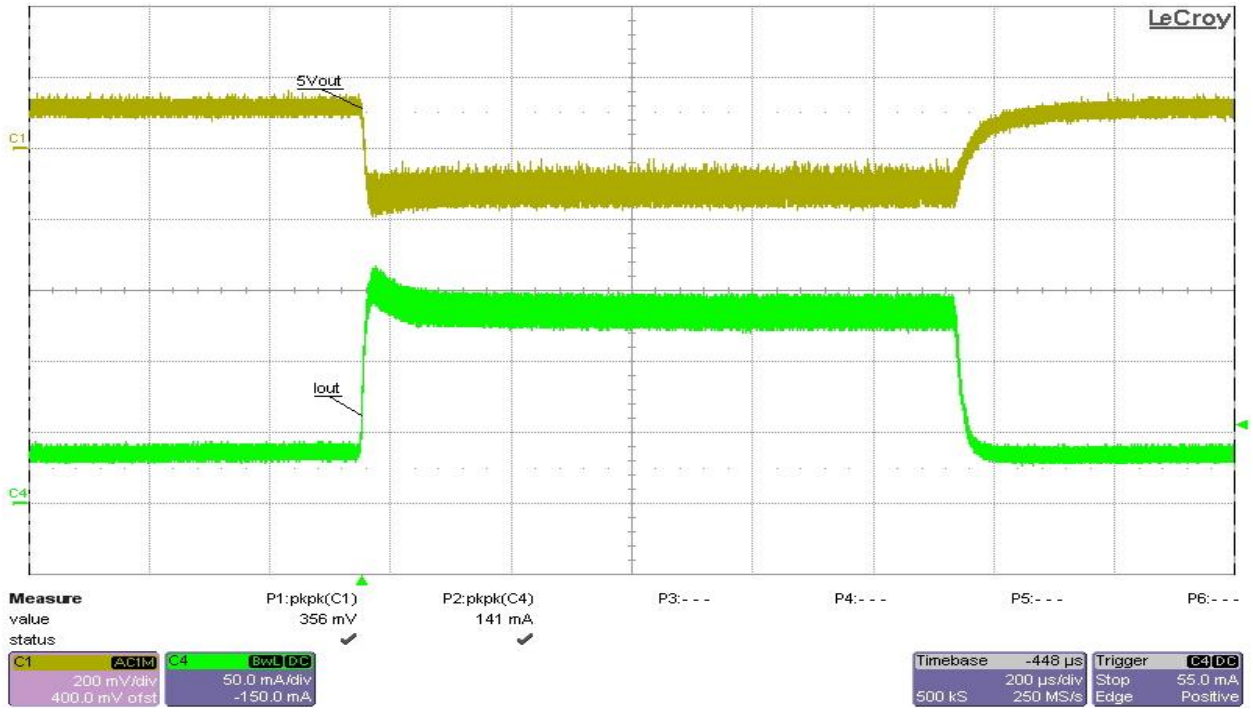


Load Transients

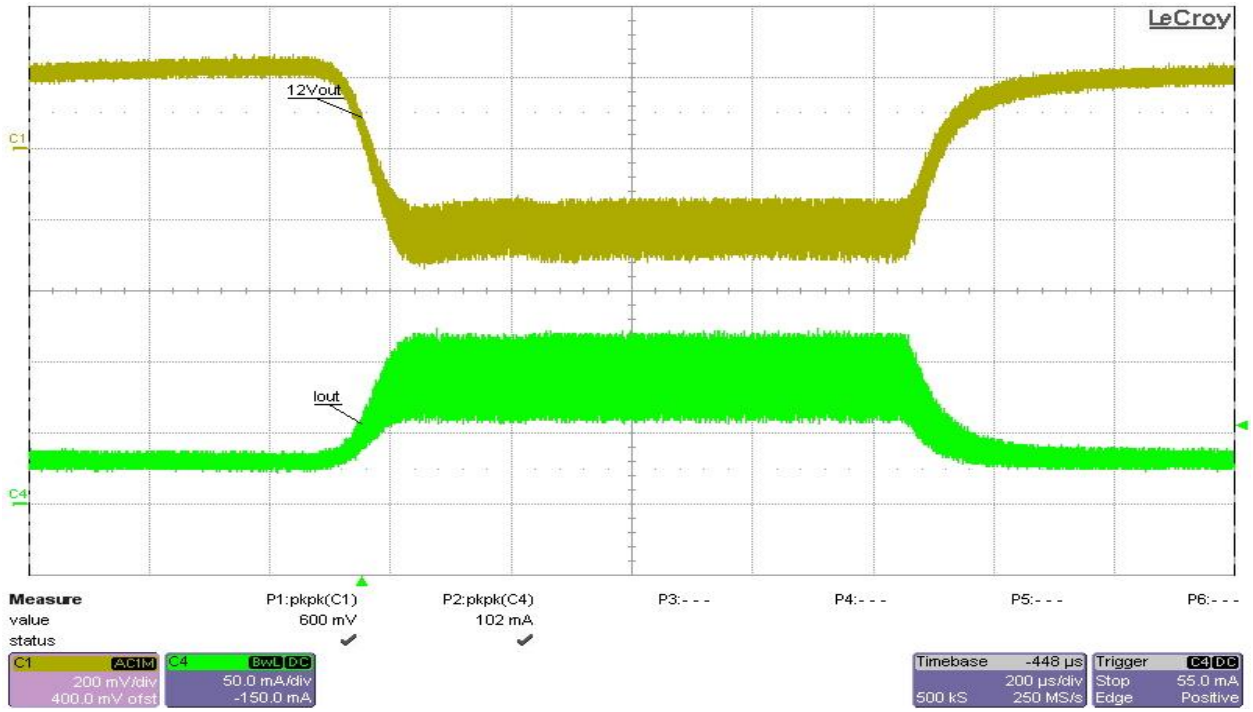
Test condition: Vin = 24V, 12VP (+12V) load from 0A to 50mA, no load at the other outputs.
Ch1- 12VP (+12V) (AC mode), Ch4- Io (+12V output current)



Test condition: Vin = 24V, 5VP (+5V) load from 0A to 100mA, no load at the other outputs.
Ch1- 5VP (+5V) (AC mode), Ch4- Io (+5V output current)

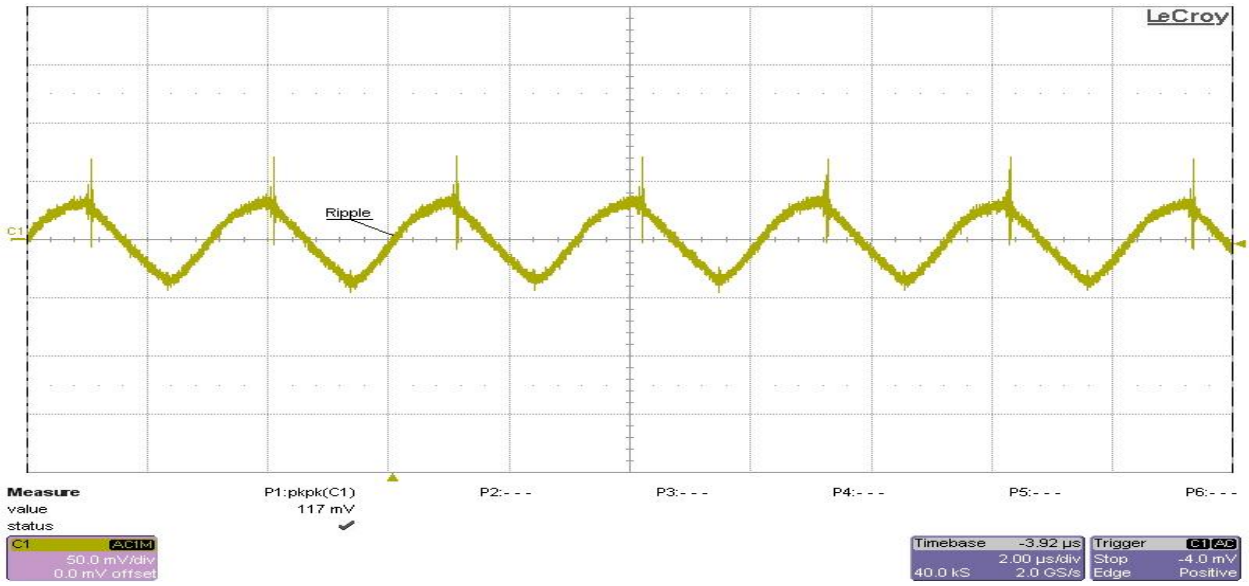


Test condition: Vin = 24V, 12VN (-12V) load from 0A to 50mA, no load at the other outputs.
Ch1- 12VP (-12V) (AC mode), Ch4- Io (-12V output current)

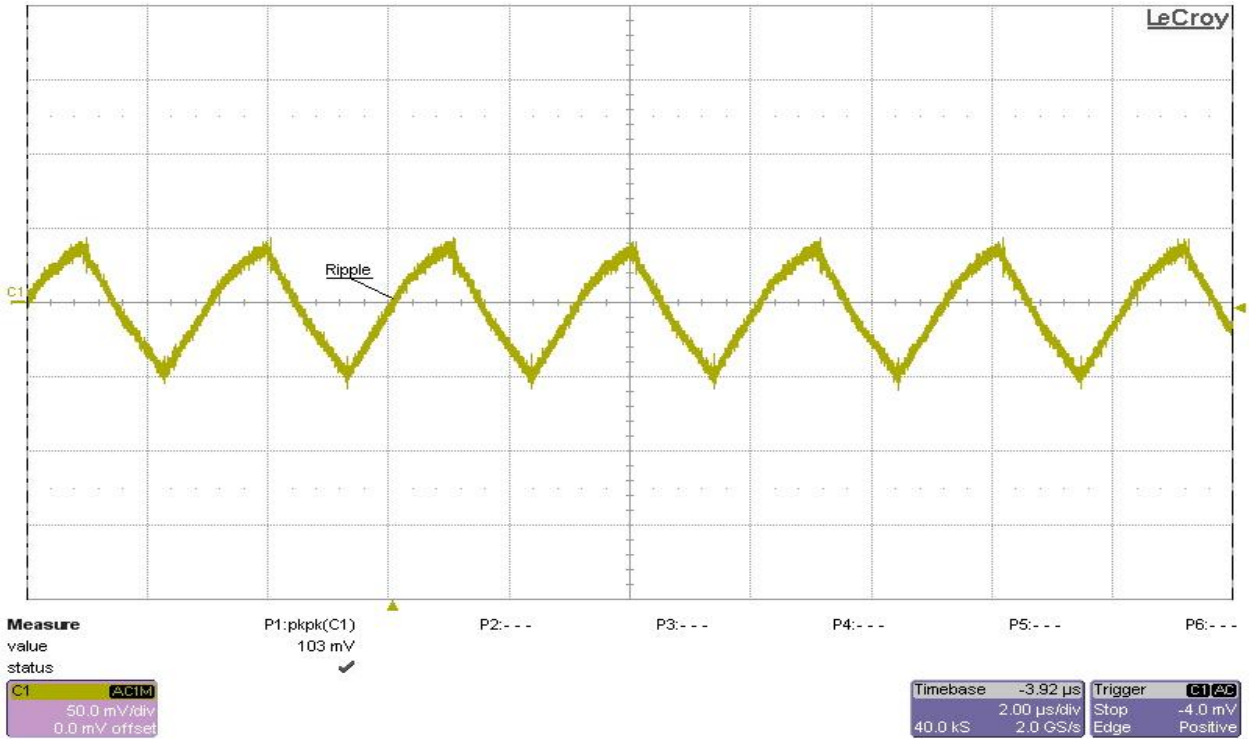


Output Voltage Ripples

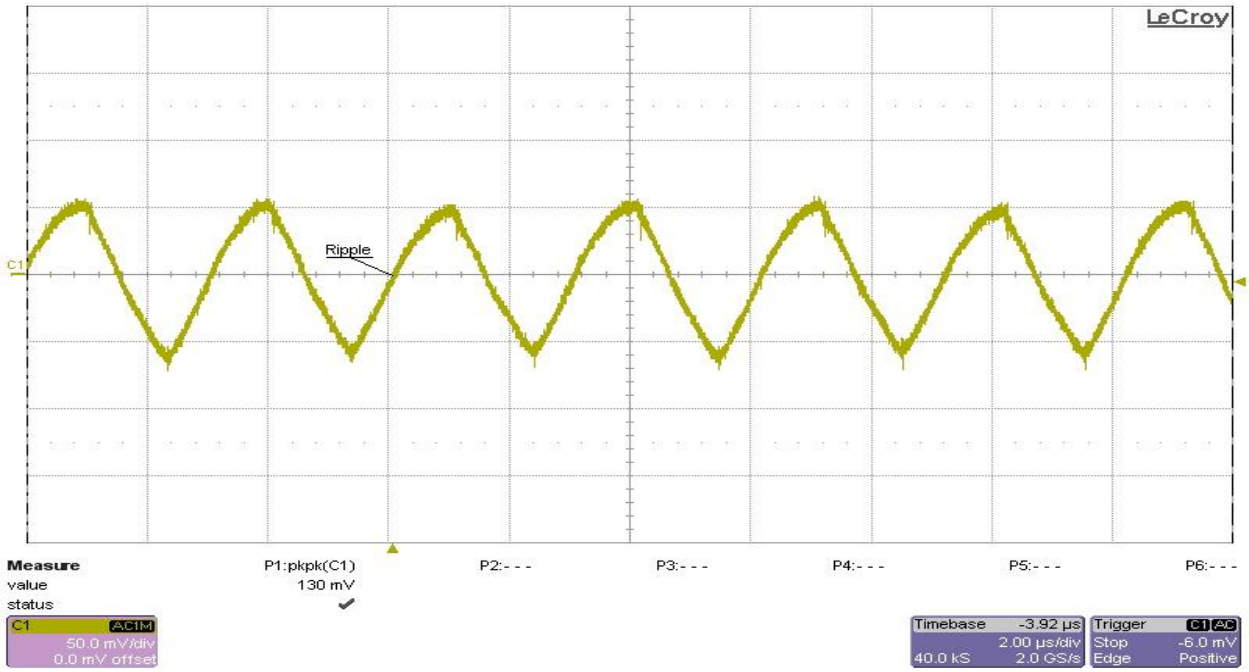
Test condition: The input voltage was set at 24V, and all outputs were set at full load.
Ch1 – 5VP (+5V) (AC coupled)



Test condition: The input voltage was set at 24V, and all outputs were set at full load.
Ch1 – 12VP (+12V) (AC coupled)



Test condition: The input voltage was set at 24V, and all outputs were set at full load.
Ch1 – 12VN (-12V) (AC coupled)



Power Specification Transformer 750314463

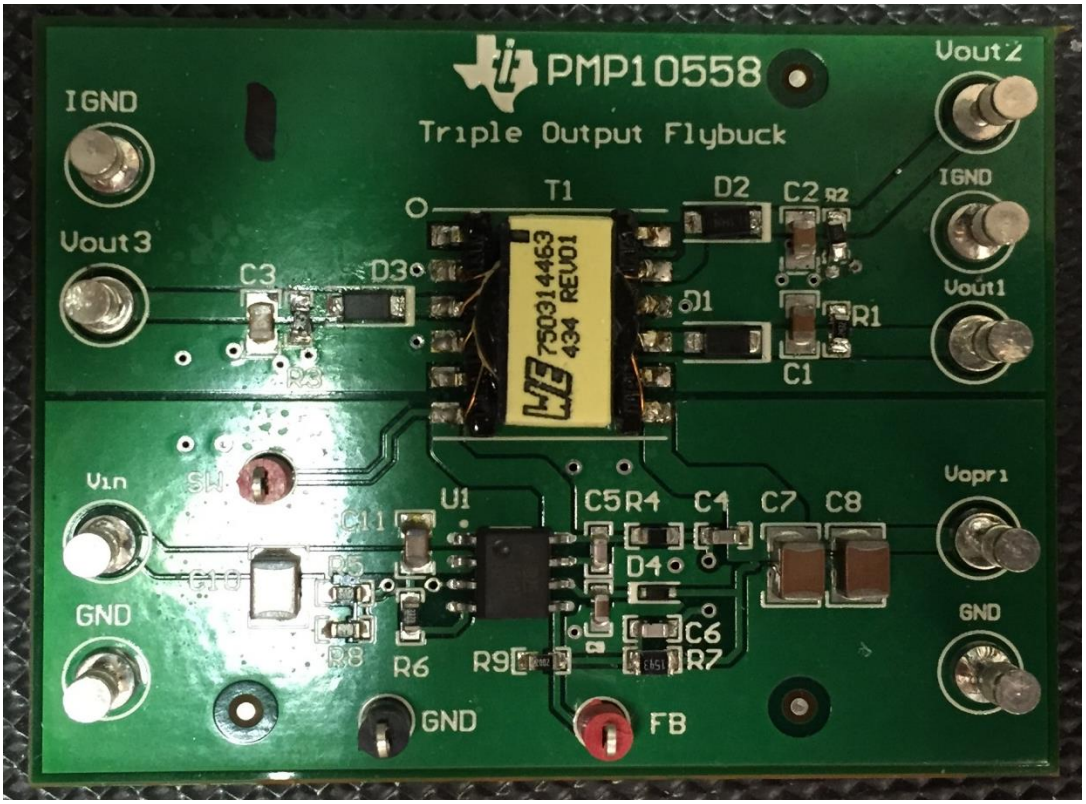
Vin range: 18V – 30V

Nominal Vin = 24V

Quad Isolated Outputs: ±12V@50mA, +24V@25mA

Fsw = 350kHz

Board Photo

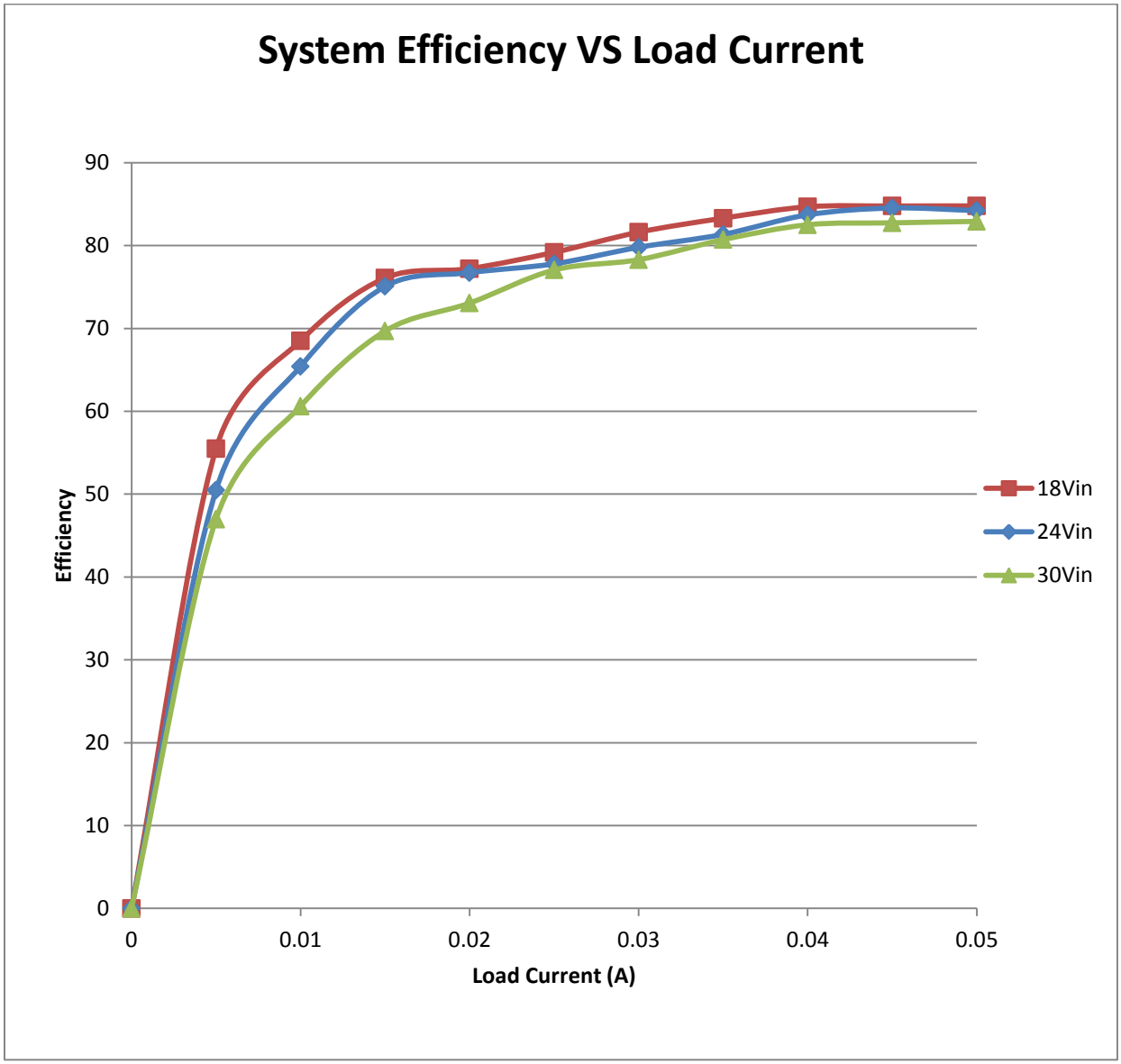


Size: 56x43mm

Vout1: +24V output, Vout2: +12V output, Vout3: -12V output

Efficiency

The efficiency is calculated for all outputs; the load current is incremented at 10mA interval.

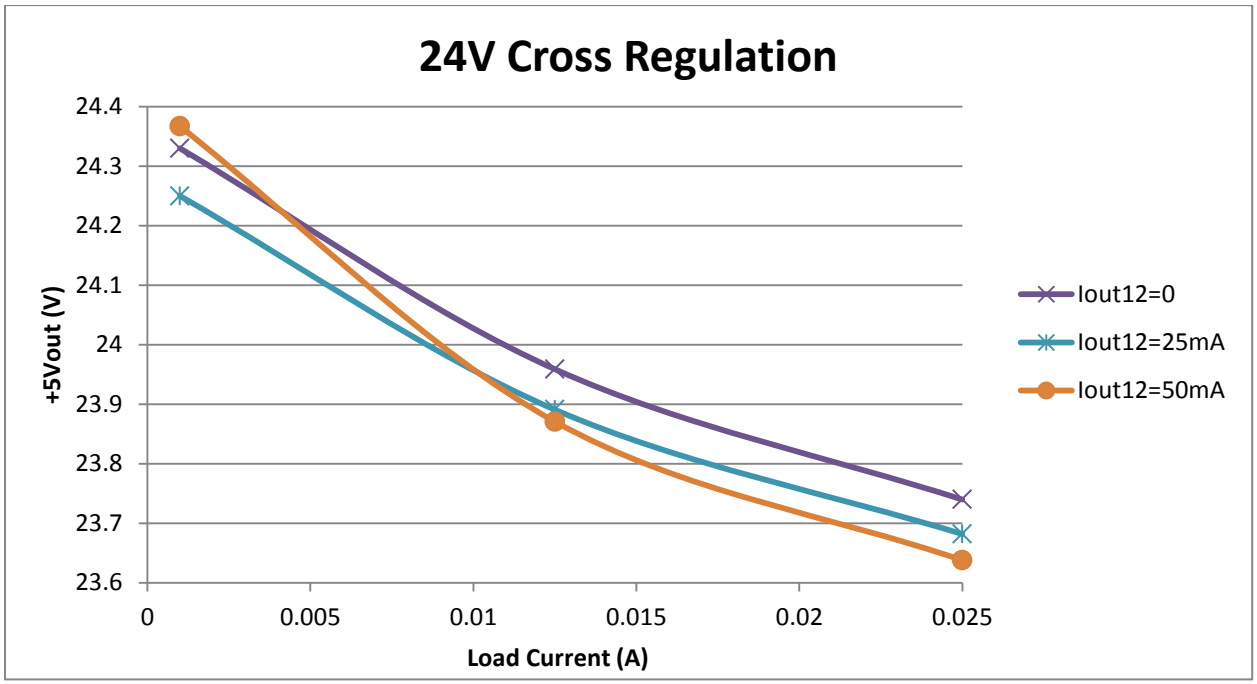


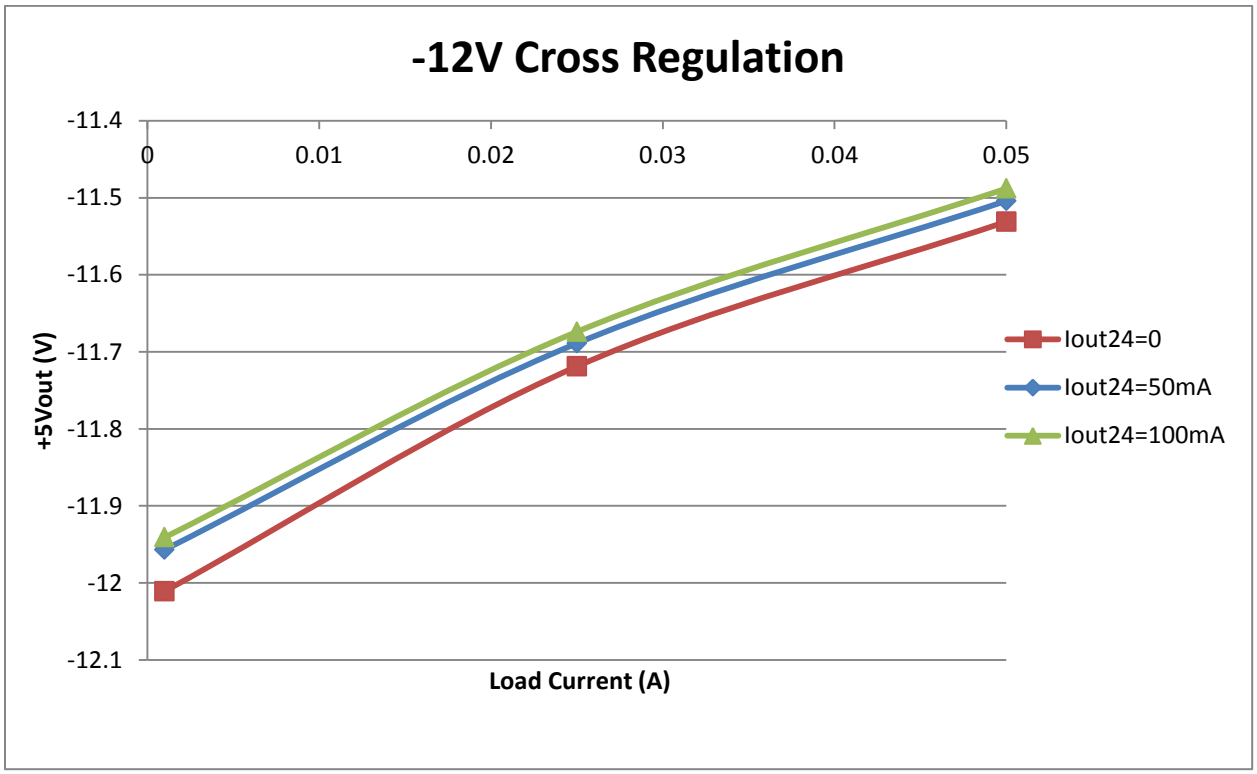
For more data at different Vin, see the Appendix.

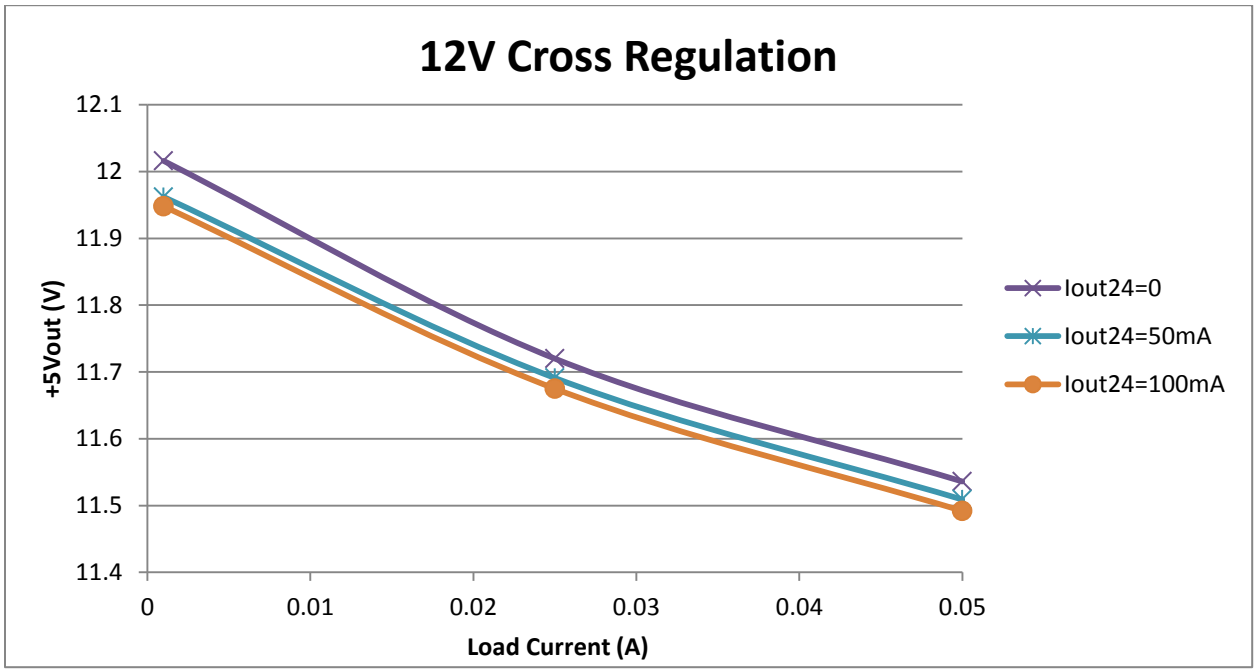
Cross Regulation

The cross regulation was tested by sweeping different load condition on four outputs.

Vin=24V



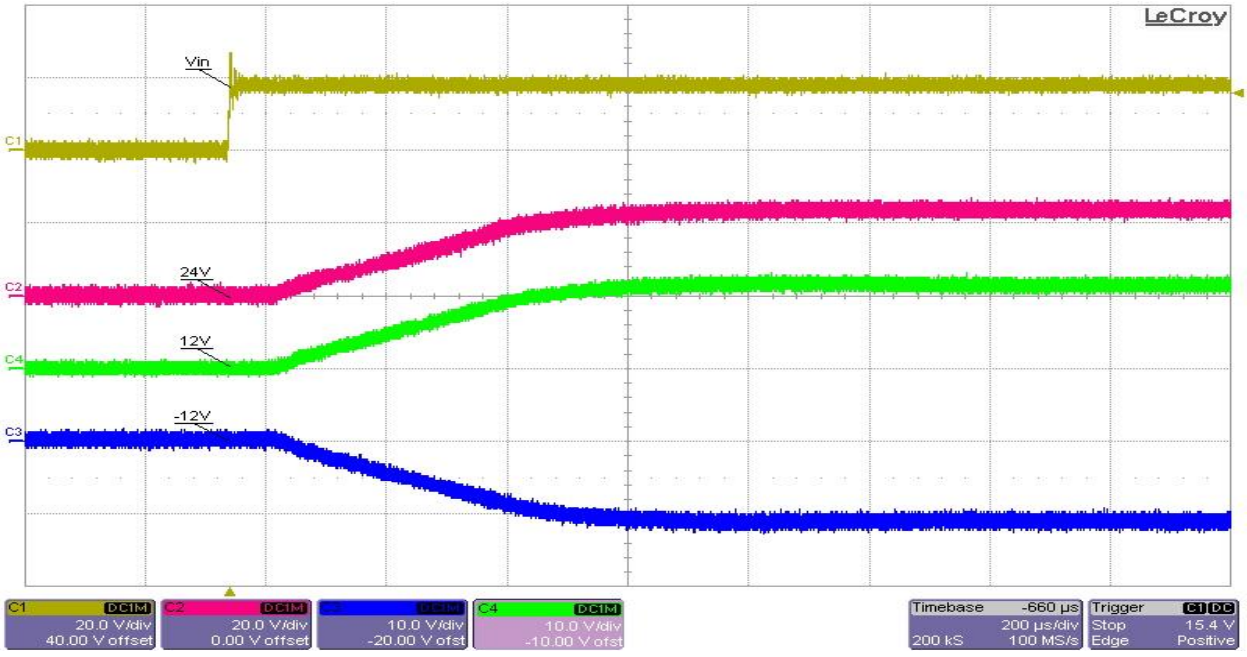




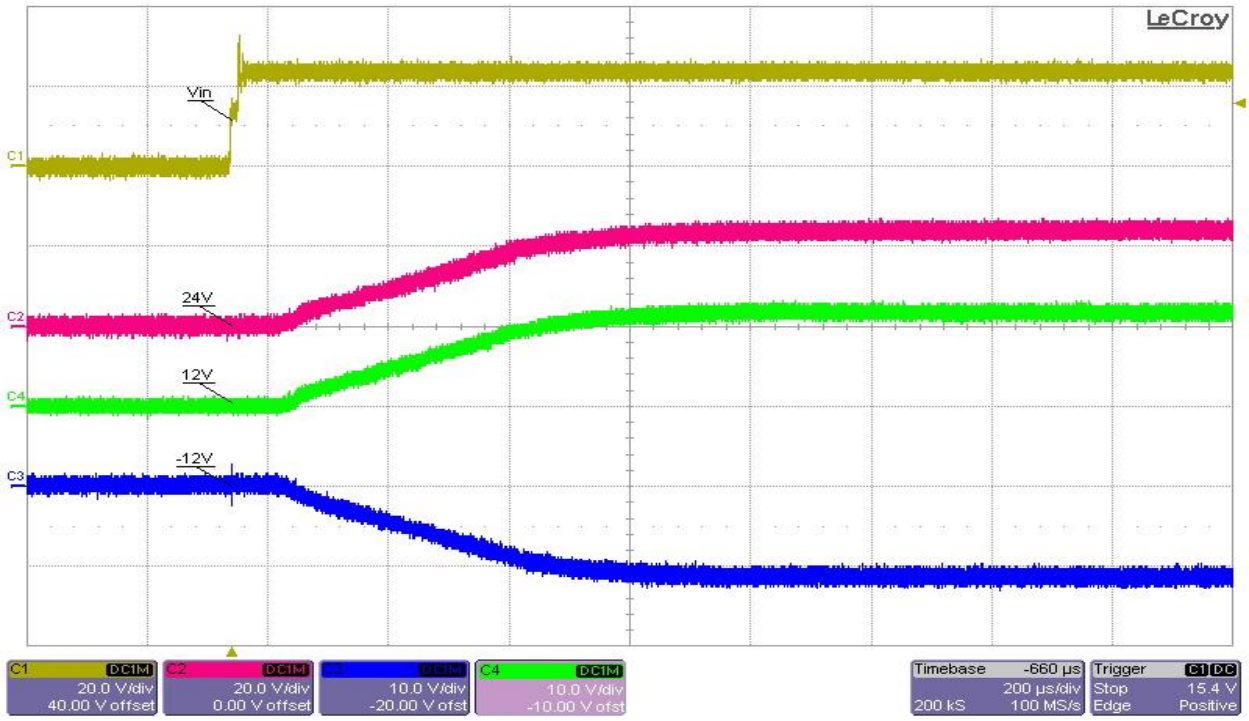
For more data of different rails, see the Appendix.

Start Up

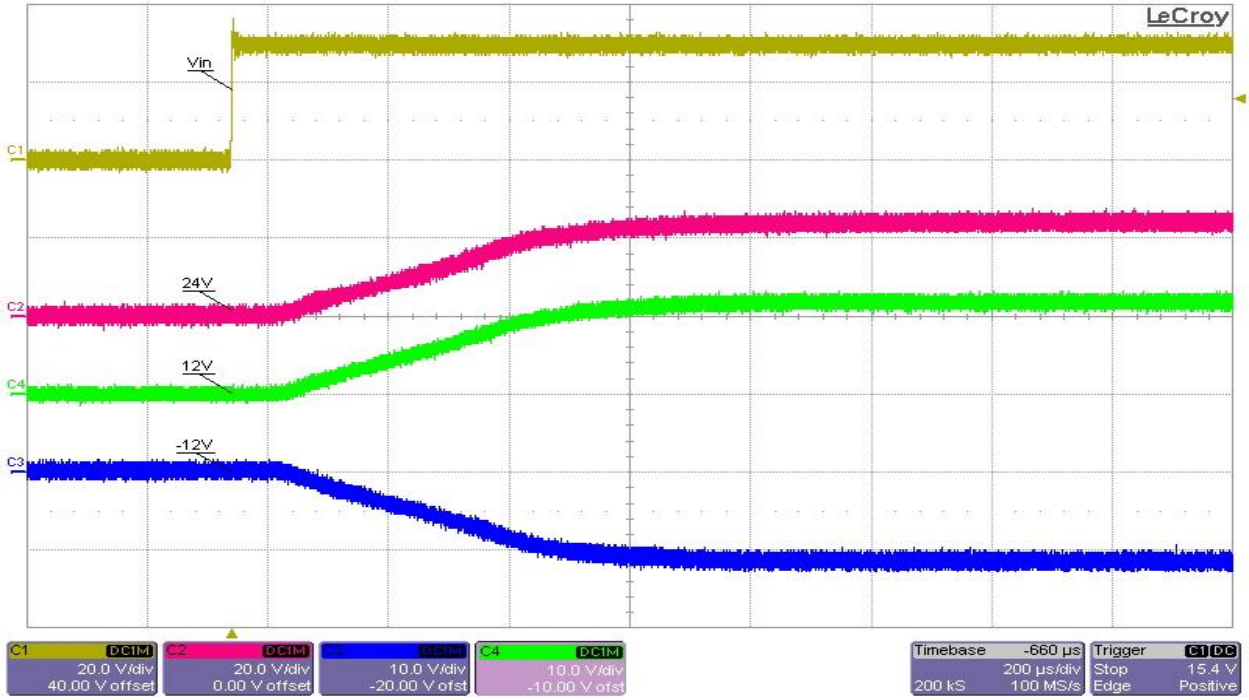
Test condition: The input voltage was set at 18V, and all outputs were set at full load.
Ch1 - Vin, Ch2 – 24VP (+24V), Ch3 – 12VN (-12V), Ch4 – 12VP (+12V)



Test condition: The input voltage was set at 24V, and all outputs were set at full load.
Ch1 - Vin, Ch2 – 24VP (+24V), Ch3 – 12VN (-12V), Ch4 – 12VP (+12V)



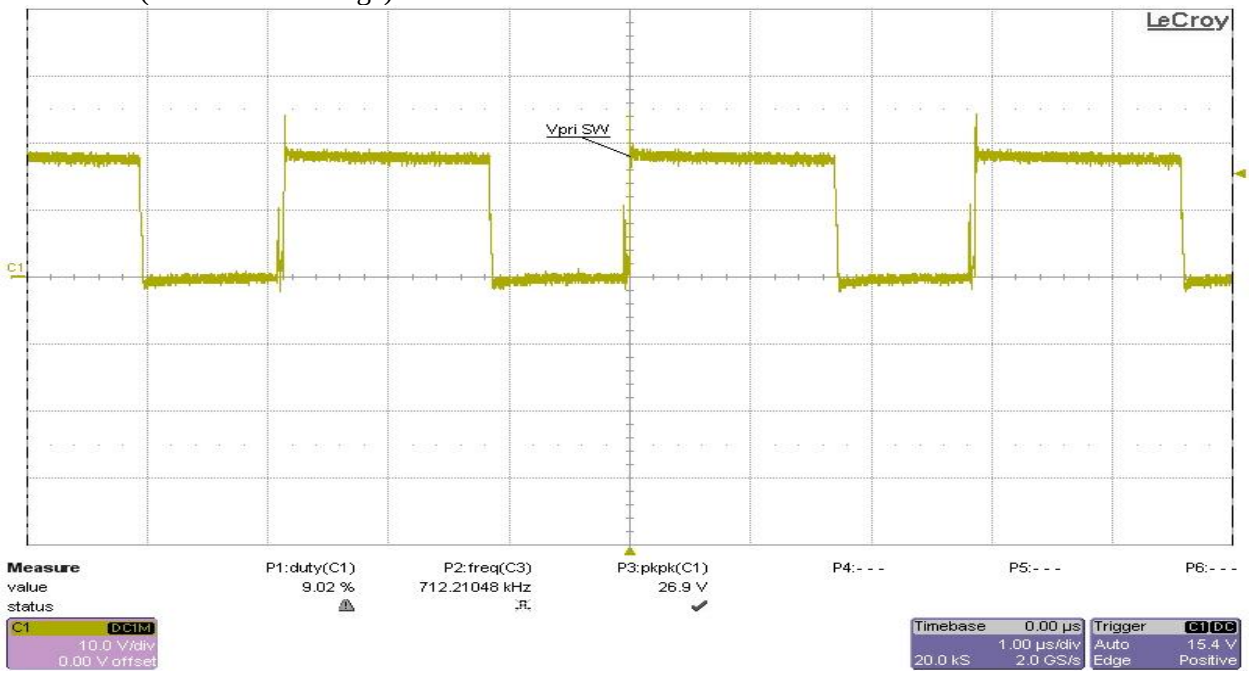
Test condition: The input voltage was set at 30V, and all outputs were set at full load.
Ch1 - Vin, Ch2 – 12VP (+12V), Ch3 – 5VP (+5V), Ch4 – 12VN (-12V)



Switching Waveforms

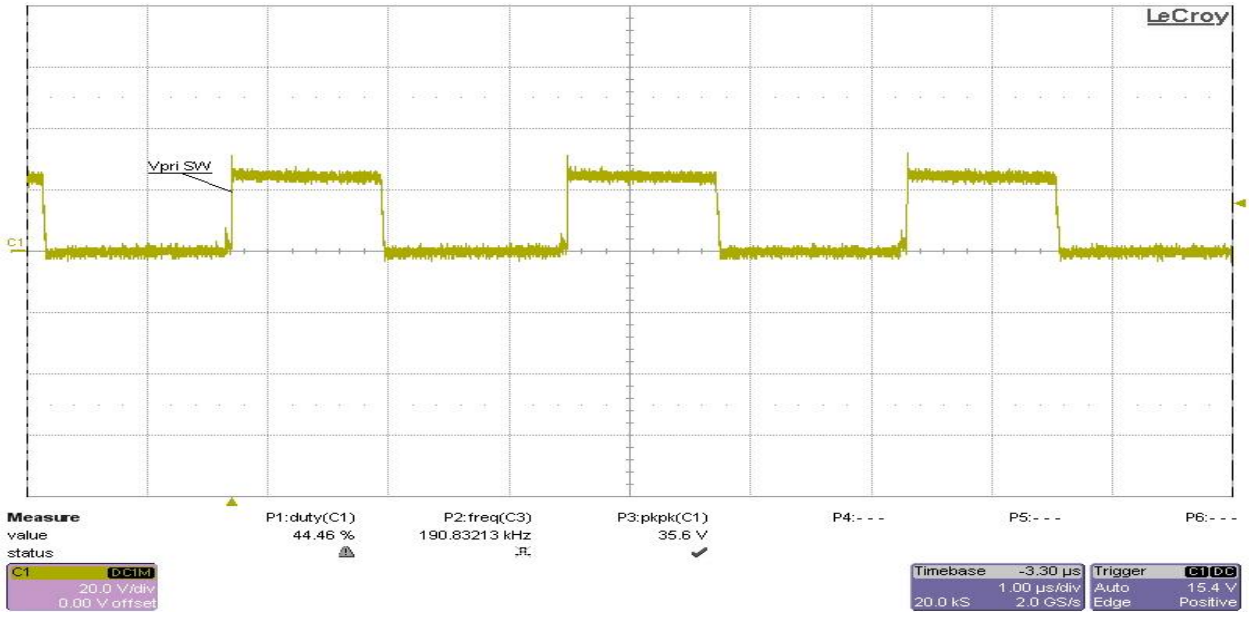
Test condition: The input voltage was set at 18V, and all outputs were set at full load.

Ch1 – Vsw (switch node voltage)



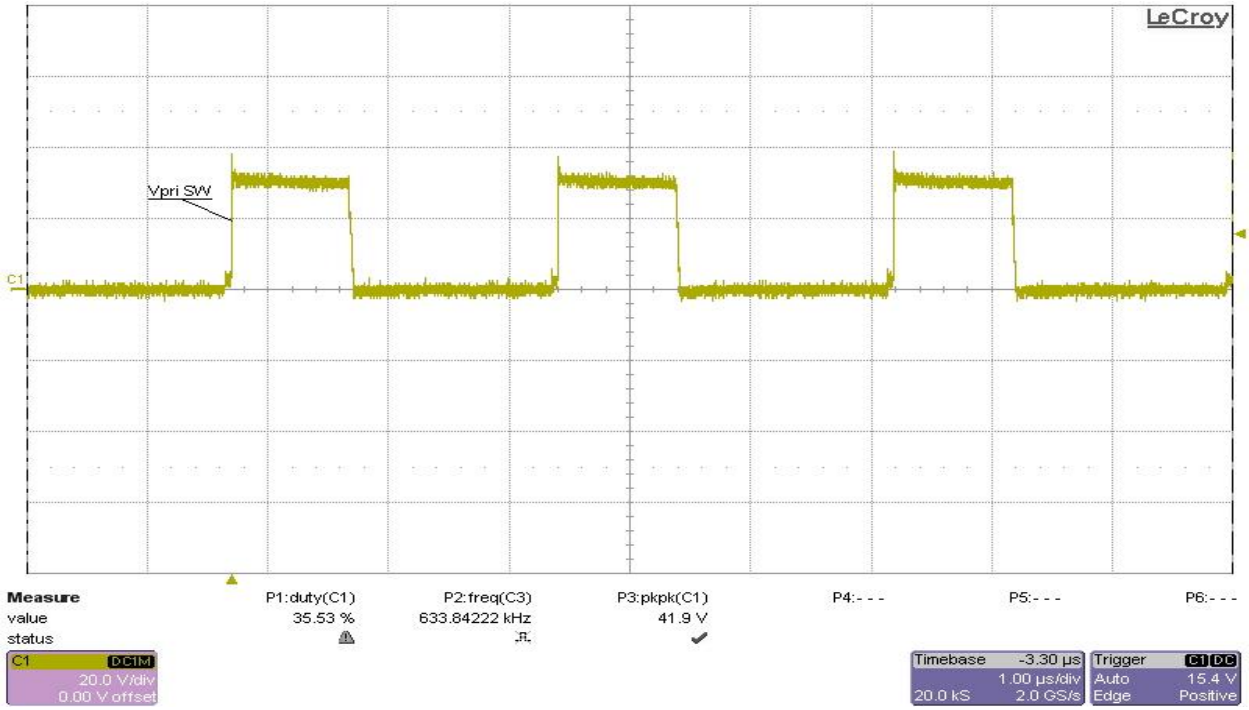
Test condition: The input voltage was set at 24V, and all outputs were set at full load.

Ch1 – Vsw (switch node voltage)



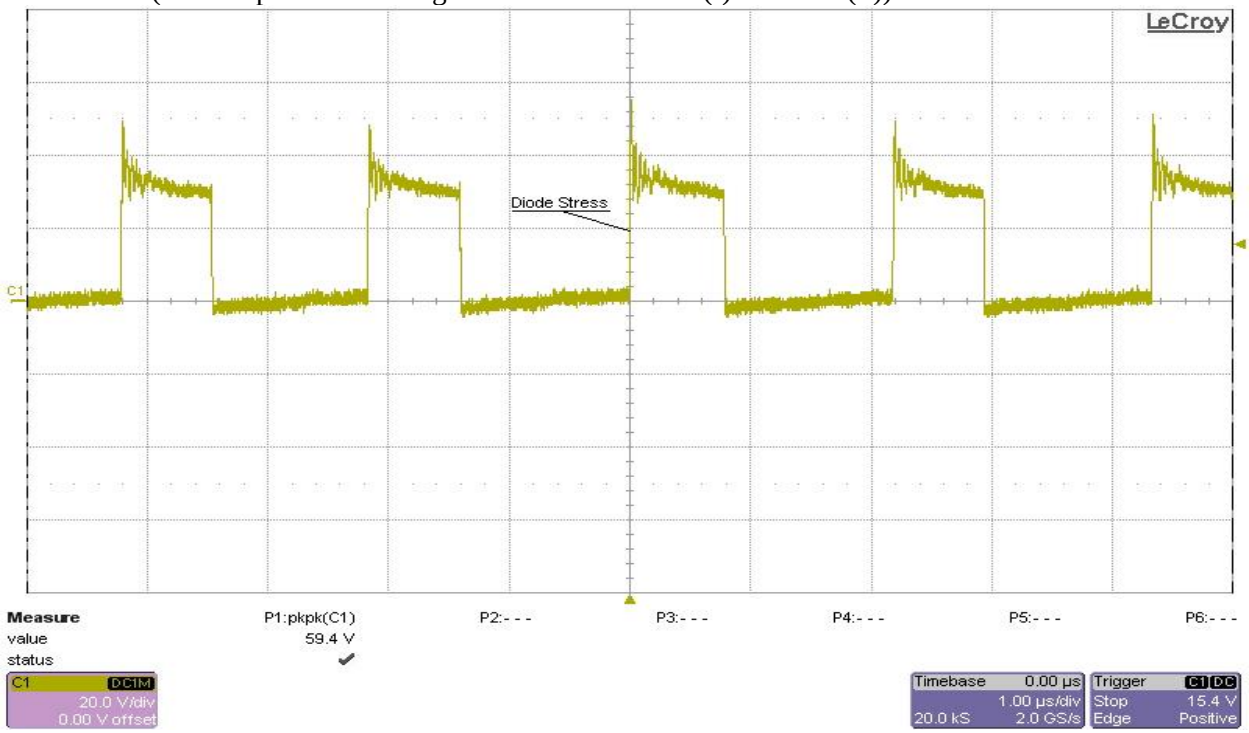
Test condition: The input voltage was set at 30V, and all outputs were set at full load.

Ch1 – Vsw (switch node voltage)



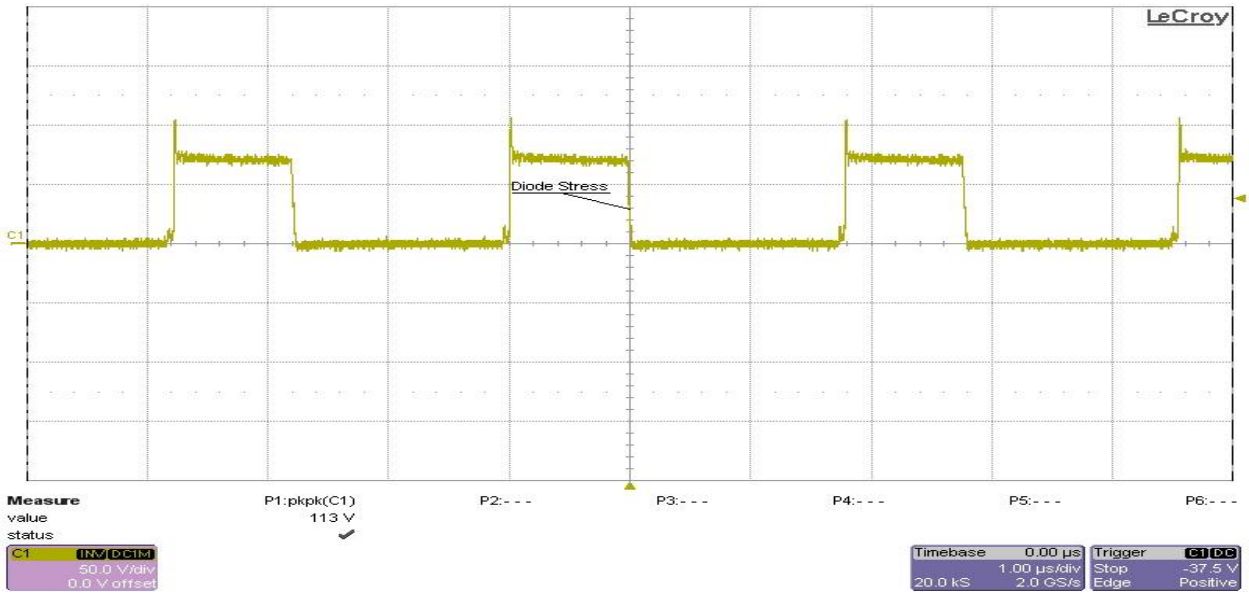
Test condition: The input voltage was set at 30V, and all outputs were set at full load.

Ch1 – Vd12 (12V output diode voltage stress from cathode (-) to anode (+))



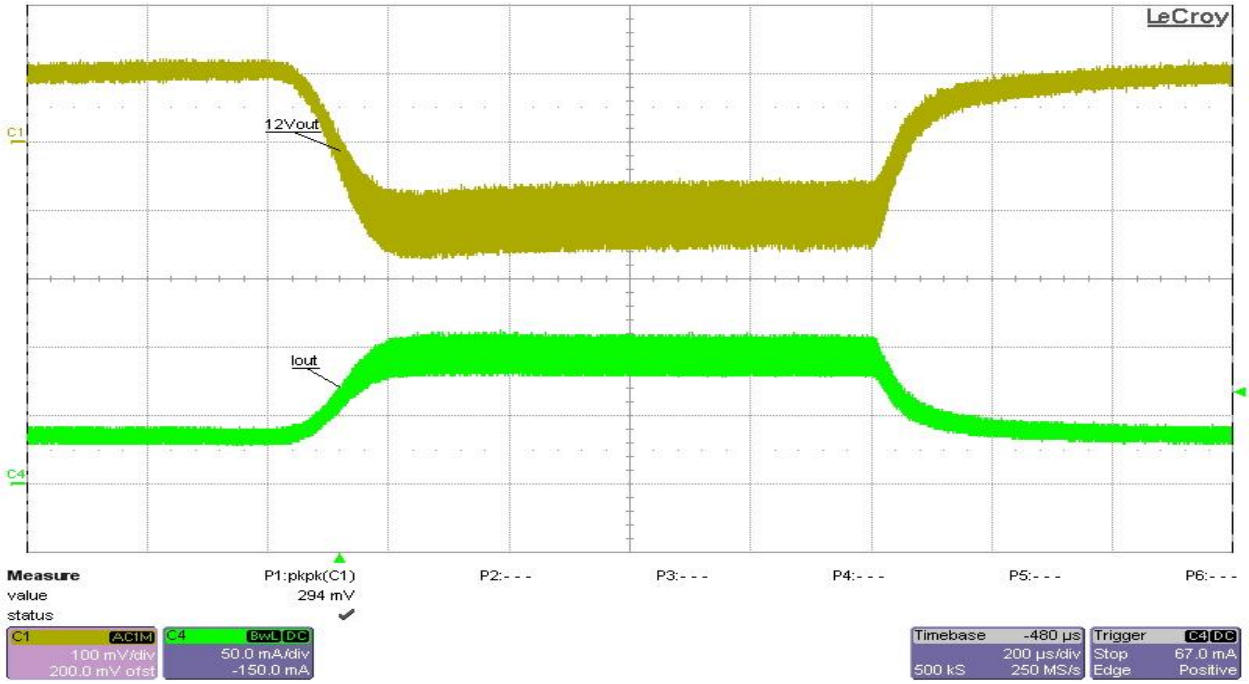
Test condition: The input voltage was set at 30V, and all outputs were set at full load.

Ch1 – Vd24 (24V output diode voltage stress from cathode (-) to anode (+))

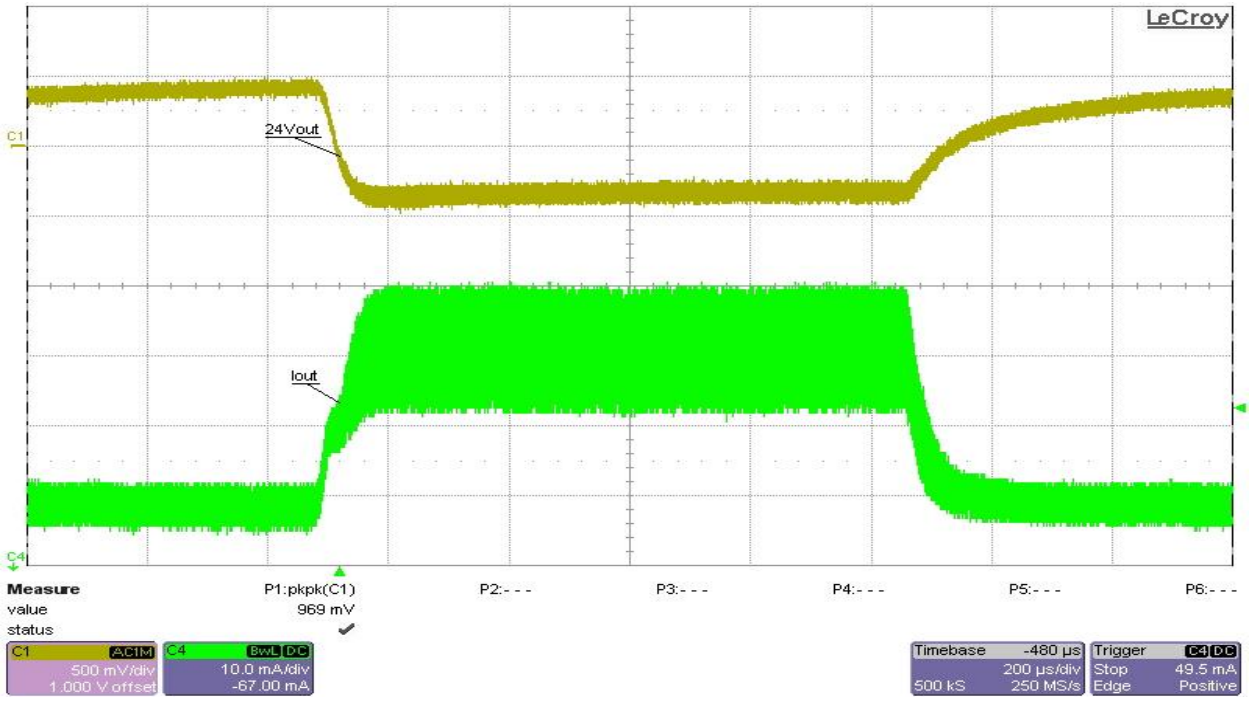


Load Transients

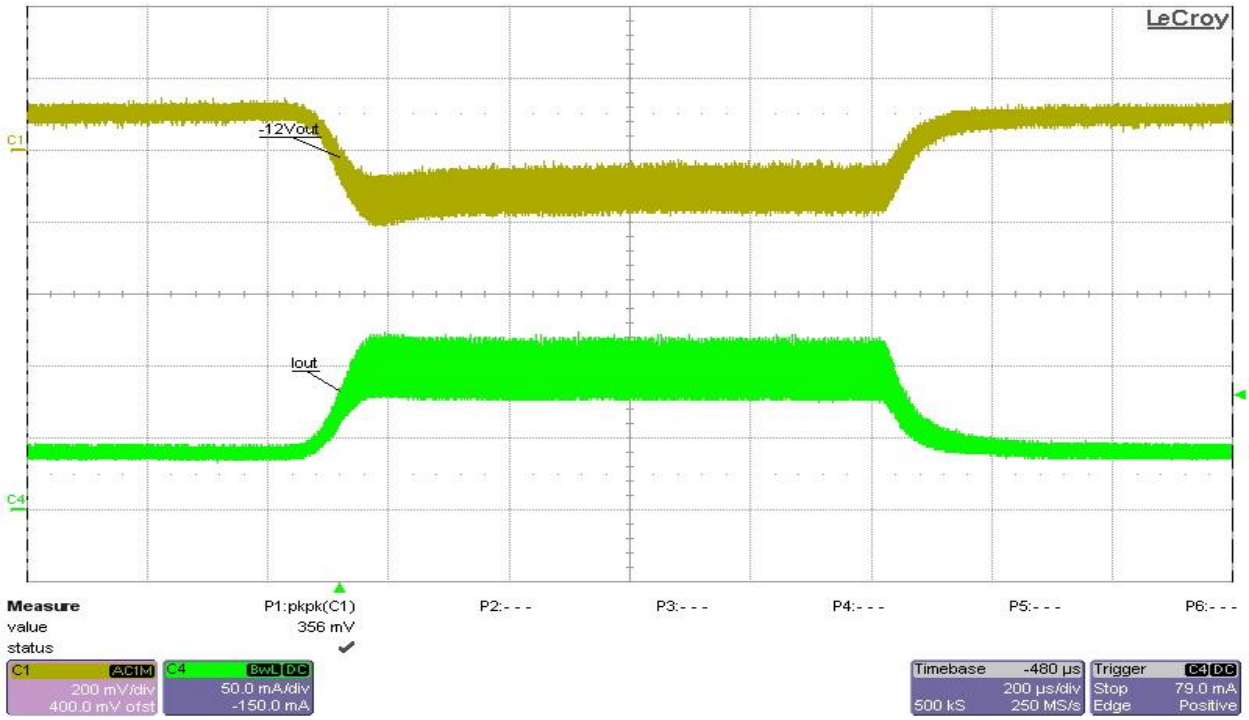
Test condition: Vin = 24V, 12VP (+12V) load from 0A to 50mA, no load at the other outputs.
Ch1- 12VP (+12V) (AC mode), Ch4- Io (+12V output current)



Test condition: Vin = 24V, 24VP (+24V) load from 0A to 25mA, no load at the other outputs.
Ch1- 24VP (+24V) (AC mode), Ch4- Io (+24V output current)

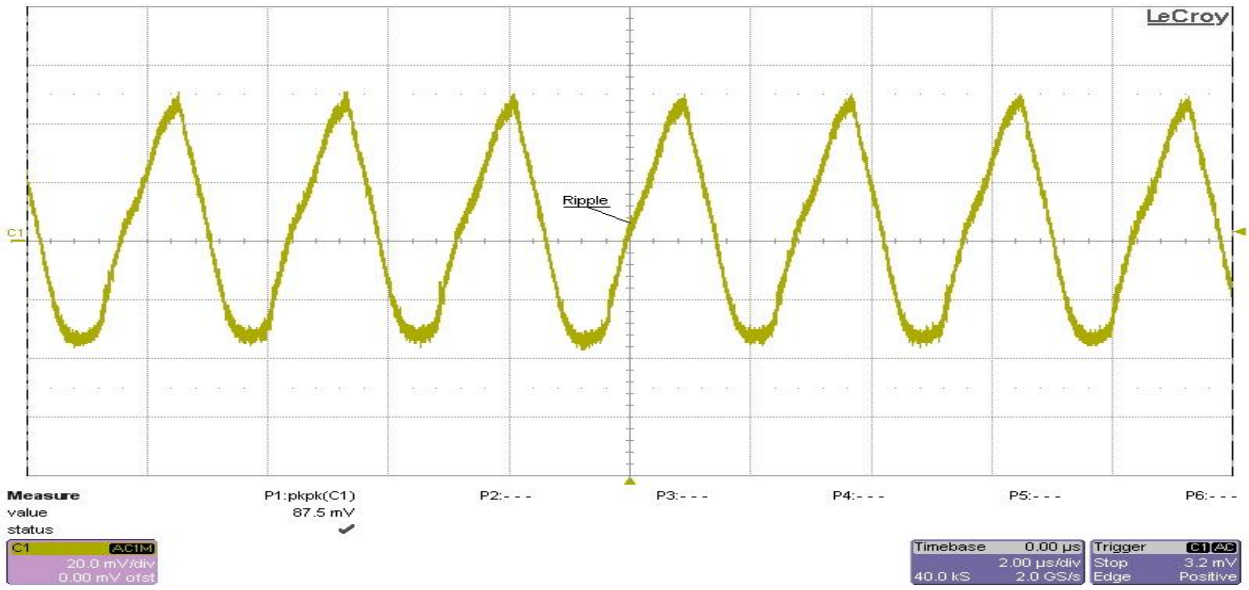


Test condition: Vin = 24V, 12VN (-12V) load from 0A to 50mA, no load at the other outputs.
Ch1- 12VP (-12V) (AC mode), Ch4- Io (-12V output current)

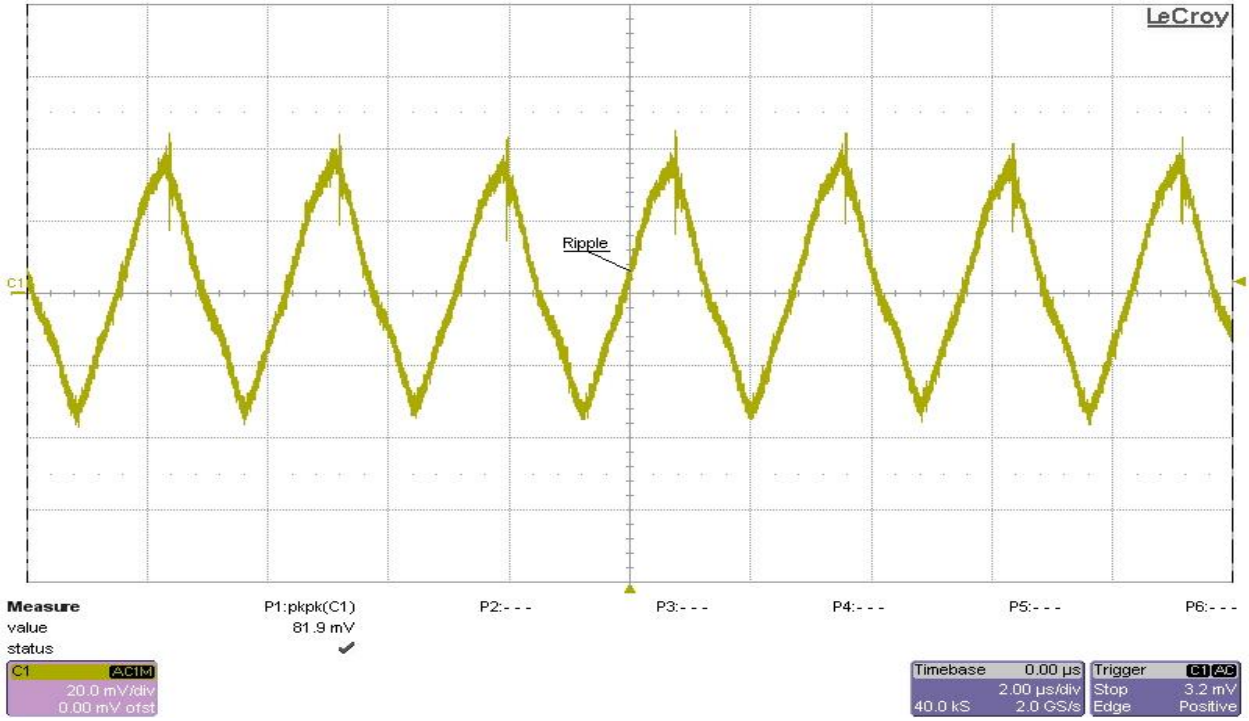


Output Voltage Ripples

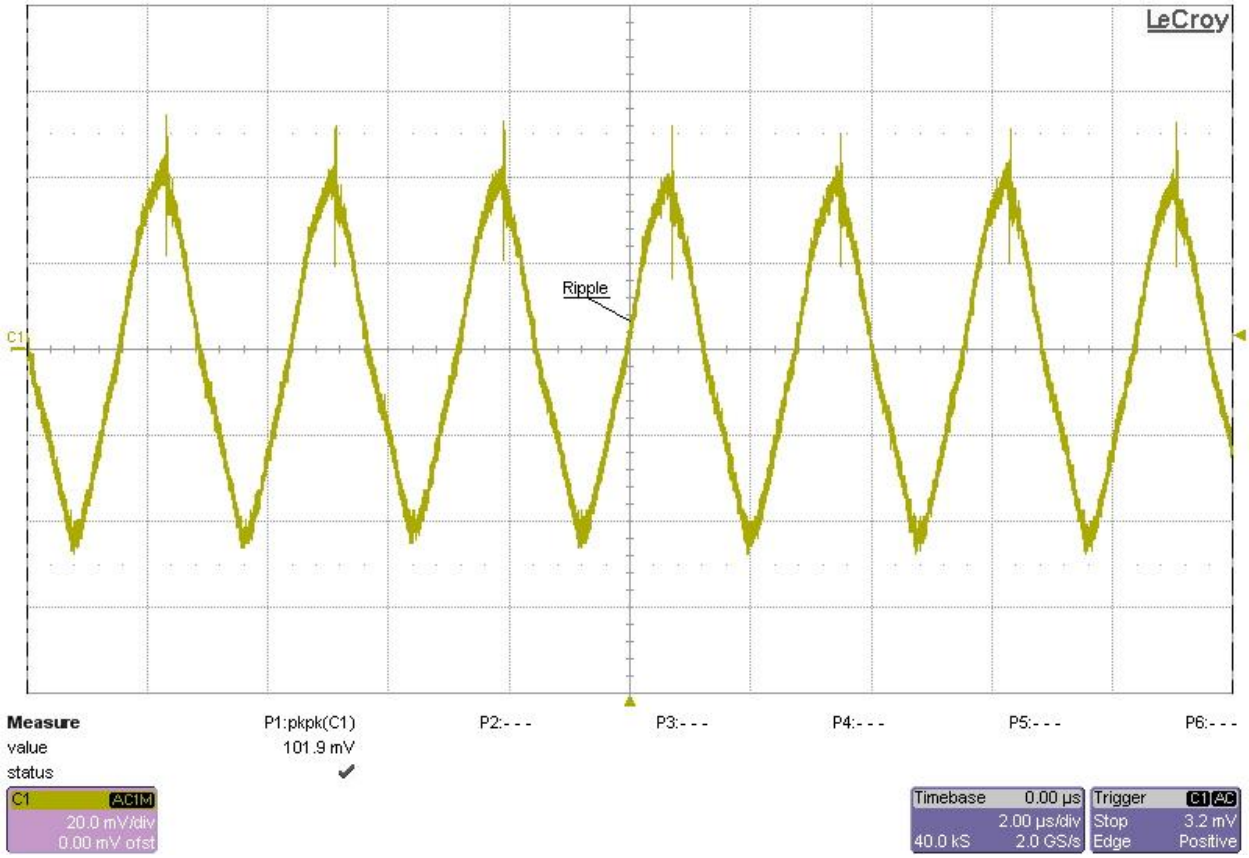
Test condition: The input voltage was set at 24V, and all outputs were set at full load.
Ch1 – 24VP (+24V) (AC coupled)



Test condition: The input voltage was set at 24V, and all outputs were set at full load.
Ch1 – 12VP (+12V) (AC coupled)



Test condition: The input voltage was set at 24V, and all outputs were set at full load.
Ch1 – 12VN (-12V) (AC coupled)



Appendix – Test Data

750314462:

Vin=24V

Iin	5Vout	Iout5	12Vout	12VoutN	Iout12	Eff
0.006	5.0898	0	12.36	12.359	0	0
0.012	5.019	0.01	12.207	12.198	0.005	59.79688
0.02	4.9942	0.02	12.128	12.126	0.01	71.33833
0.026	4.9775	0.03	12.086	12.084	0.015	82.03125
0.035	4.9636	0.04	12.026	12.025	0.02	80.90048
0.043	4.951	0.05	11.982	11.983	0.025	82.04215
0.051	4.9394	0.06	11.942	11.944	0.03	82.75686
0.058	4.9287	0.07	11.903	11.914	0.035	84.66983
0.065	4.9182	0.08	11.874	11.877	0.04	86.12154
0.073	4.908	0.09	11.835	11.839	0.045	86.01884
0.081	4.8979	0.1	11.794	11.798	0.05	85.87397

Vin=18V

Iin	5Vout	Iout5	12Vout	12VoutN	Iout12	Eff
0.006	5.0675	0	12.278	12.277	0	0
0.014	4.9952	0.01	12.14	12.132	0.005	61.18286
0.023	4.9691	0.02	12.061	12.058	0.01	74.03739
0.032	4.9507	0.03	11.999	11.997	0.015	79.44703
0.041	4.9341	0.04	11.944	11.943	0.02	82.32976
0.05	4.9197	0.05	11.891	11.892	0.025	84.056
0.057	4.919	0.06	11.84	11.842	0.03	88.21053
0.067	4.8945	0.07	11.804	11.807	0.035	87.23881
0.077	4.8823	0.08	11.755	11.758	0.04	86.43532
0.086	4.871	0.09	11.707	11.711	0.045	86.75581
0.096	4.8593	0.1	11.66	11.667	0.05	86.05625

Vin=30V

Iin	5Vout	Iout5	12Vout	12VoutN	Iout12	Eff
0.006	5.1122	0	12.459	12.458	0	0
0.011	5.0424	0.01	12.281	12.268	0.005	52.47545
0.017	5.0177	0.02	12.2	12.197	0.01	67.51451

0.022	5.002	0.03	12.158	12.156	0.015	77.99545
0.029	4.9893	0.04	12.102	12.102	0.02	78.58069
0.035	4.978	0.05	12.061	12.061	0.025	81.1381
0.042	4.949	0.06	12.023	12.024	0.03	80.82143
0.047	4.9574	0.07	11.996	11.998	0.035	84.17078
0.053	4.9477	0.08	11.962	11.965	0.04	85.0878
0.059	4.9386	0.09	11.931	11.934	0.045	85.78525
0.066	4.9292	0.1	11.9	11.904	0.05	85.00606

Iout5 =0

5Vout	12Vout	12VoutN	Iout12
5.0894	12.357	-12.357	0.001
5.1045	11.989	-11.991	0.025
5.1258	11.8	-11.805	0.05

Iout5 = 0.05

5Vout	12Vout	12VoutN	Iout12
4.9574	12.366	-12.361	0.001
4.9501	11.985	-11.988	0.025
4.9486	11.797	-11.803	0.05

Iout5 = 0.1

5Vout	12Vout	12VoutN	Iout12
4.912	12.383	-12.379	0.001
4.901	11.991	-11.995	0.025
4.8982	11.802	-11.808	0.05

Iout12=0

5Vout	12Vout	12VoutN	Iout5
5.0724	12.36	-12.359	0.001
4.9576	12.37	-12.371	0.05
4.9118	12.386	-12.389	0.1

Iout12 = 0.025

5Vout	12Vout	12VoutN	Iout5
5.0721	12.359	-12.359	0.001
4.9498	11.985	-11.987	0.05
4.9005	11.992	-11.995	0.1

Iout12 = 0.05

5Vout	12Vout	12VoutN	Iout5
5.0975	11.8	-11.805	0.001
4.9488	11.797	-11.803	0.05
4.898	11.802	-11.808	0.1

750314461:

18Vin						
Iin	15Vout	Iout5	5Vout	5VoutN	Iout5	Eff
0.006	15.145	0	5.1834	5.1852	0	0
0.016	14.975	0.005	5.0916	5.0902	0.01	61.35174
0.026	14.903	0.01	5.0515	5.0495	0.02	75.01068
0.037	14.852	0.015	5.0186	5.0162	0.03	78.65225
0.047	14.806	0.02	4.9913	4.9884	0.04	82.18771
0.058	14.767	0.025	4.9644	4.961	0.05	82.89703
0.069	14.73	0.03	4.94	4.9358	0.06	83.28889
0.079	14.694	0.035	4.92	4.9156	0.07	84.58383
0.09	14.659	0.04	4.8993	4.894	0.08	84.55704
0.101	14.626	0.045	4.878	4.8731	0.09	84.47574
0.112	14.592	0.05	4.8541	4.848	0.1	84.31597

24Vin						
Iin	15Vout	Iout5	5Vout	5VoutN	Iout5	Eff
0.006	15.307	0	5.2271	5.231	0	0
0.013	15.122	0.005	5.1367	5.1357	0.01	57.15833
0.021	15.055	0.01	5.1049	5.1036	0.02	70.38095
0.029	15.007	0.015	5.082	5.0803	0.03	76.14569
0.037	14.972	0.02	5.0633	5.0613	0.04	79.32703
0.045	14.941	0.025	5.043	5.0409	0.05	81.27037
0.053	14.914	0.03	5.0238	5.0215	0.06	82.55802
0.061	14.877	0.035	5.006	5.0035	0.07	83.42623
0.069	14.866	0.04	4.9925	4.9896	0.08	84.13092
0.077	14.844	0.045	4.9778	4.9755	0.09	84.61997
0.086	14.822	0.05	4.9623	4.9593	0.1	83.97578

30Vin						
Iin	15Vout	Iout5	5Vout	5VoutN	Iout5	Eff
0.006	15.418	0	5.2486	5.2532	0	0
0.012	15.222	0.005	5.1632	5.1623	0.01	49.82361
0.018	15.145	0.01	5.133	5.1321	0.02	66.06519
0.025	15.097	0.015	5.112	5.11	0.03	71.082
0.031	15.061	0.02	5.0957	5.0944	0.04	76.21763
0.037	15.033	0.025	5.0786	5.077	0.05	79.60405
0.043	15.009	0.03	5.0617	5.0598	0.06	81.9814
0.05	14.986	0.035	5.0457	5.0438	0.07	82.05167
0.056	14.966	0.04	5.0326	5.0304	0.08	83.55238
0.063	14.949	0.045	5.019	5.0164	0.09	83.38048
0.07	14.935	0.05	5.0067	5.004	0.1	83.22952

Iout15=0			
15Vout	5Vout	5VoutN	Iout5
15.142	5.1723	-5.1643	0.001
15.268	4.9791	-4.9752	0.05
15.442	4.8667	-4.8592	0.1

Iout15 = 0.025			
15Vout	5Vout	5VoutN	Iout5
14.748	5.1913	-5.1866	0.001
14.769	4.9652	-4.9614	0.05
14.813	4.8499	-4.8432	0.1

Iout15 = 0.05			
15Vout	5Vout	5VoutN	Iout5
14.572	5.225	-5.2213	0.001
14.574	4.9732	-4.9695	0.05
14.596	4.8541	-4.8475	0.1

Iout5 =0			
15Vout	5Vout	5VoutN	Iout15
15.145	5.1868	-5.1883	0.001
14.75	5.2143	-5.2161	0.025
14.574	5.26	-5.2611	0.05

Iout5 = 0.05

15Vout	5Vout	5VoutN	Iout15
15.271	4.9826	-4.9788	0.001
14.77	4.967	-4.9635	0.025
14.575	4.9744	-4.9709	0.05

Iout5 = 0.1			
15Vout	5Vout	5VoutN	Iout15
15.444	4.8689	-4.8615	0.001
14.815	4.8518	-4.845	0.025
14.596	4.8554	-4.8487	0.05

750314463:

18Vin						
Iin	24Vout	Iout24	12Vout	12VoutN	Iout12	Eff
0.009	24.5	0	12.051	12.058	0	0
0.018	24.2	0.0025	11.927	11.925	0.005	55.48148
0.029	24.1	0.005	11.856	11.855	0.01	68.50766
0.039	24	0.0075	11.806	11.801	0.015	76.08333
0.051	23.9	0.01	11.747	11.746	0.02	77.21786
0.062	23.9	0.0125	11.7	11.699	0.025	79.18683
0.072	23.9	0.015	11.656	11.653	0.03	81.61806
0.082	23.8	0.0175	11.619	11.613	0.035	83.30759
0.092	23.8	0.02	11.581	11.578	0.04	84.68357
0.103	23.7	0.0225	11.541	11.538	0.045	84.77913
0.114	23.6	0.025	11.5	11.498	0.05	84.79045

24Vin						
Iin	24Vout	Iout24	12Vout	12VoutN	Iout12	Eff
0.008	24.8	0	12.204	12.216	0	0
0.015	24.5	0.0025	12.047	12.046	0.005	50.47639
0.023	24.3	0.005	11.979	11.98	0.01	65.41486
0.03	24.3	0.0075	11.94	11.945	0.015	75.07292
0.039	24.2	0.01	11.905	11.906	0.02	76.73291
0.048	24.2	0.0125	11.875	11.876	0.025	77.80165
0.056	24.1	0.015	11.848	11.849	0.03	79.79241
0.064	24.1	0.0175	11.825	11.828	0.035	81.35449
0.071	24.1	0.02	11.806	11.806	0.04	83.71362

0.079	24.1	0.0225	11.783	11.785	0.045	84.53639
0.088	24.1	0.025	11.763	11.763	0.05	84.22348

30Vin						
Iin	24Vout	Iout24	12Vout	12VoutN	Iout12	Eff
0.008	25.2	0	12.383	12.398	0	0
0.013	24.7	0.0025	12.145	12.145	0.005	46.97436
0.02	24.5	0.005	12.06	12.062	0.01	60.62
0.026	24.4	0.0075	12.015	12.021	0.015	69.68462
0.033	24.4	0.01	11.982	11.983	0.02	73.06061
0.039	24.3	0.0125	11.956	11.957	0.025	77.05769
0.046	24.3	0.015	11.933	11.935	0.03	78.3
0.052	24.3	0.0175	11.915	11.914	0.035	80.72212
0.058	24.2	0.02	11.896	11.897	0.04	82.51264
0.065	24.2	0.0225	11.878	11.879	0.045	82.74692
0.072	24.2	0.025	11.861	11.862	0.05	82.92361

Iout24=0			
24Vout	12Vout	12VoutN	Iout12
24.437	12.016	-12.011	0.001
24.367	11.72	-11.719	0.025
24.552	11.536	-11.531	0.05

Iout24 = 0.0125			
24Vout	12Vout	12VoutN	Iout12
23.95	11.962	-11.957	0.001
23.888	11.691	-11.689	0.025
23.868	11.509	-11.504	0.05

Iout24 = 0.025			
24Vout	12Vout	12VoutN	Iout12
23.733	11.948	-11.941	0.001
23.679	11.675	-11.674	0.025
23.638	11.492	-11.488	0.05

Iout12=0			
24Vout	12Vout	12VoutN	Iout24
24.33	12.035	-12.042	0.001
23.959	11.986	-11.991	0.0125
23.74	11.973	-11.975	0.025

Iout12 = 0.025			
24Vout	12Vout	12VoutN	Iout24
24.25	11.721	-11.72	0.001
23.891	11.693	-11.692	0.0125
23.682	11.677	-11.676	0.025

Iout12 = 0.05			
24Vout	12Vout	12VoutN	Iout24
24.367	11.536	-11,531	0.001
23.871	11.511	-11.506	0.0125
23.638	11.492	-11.488	0.05

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