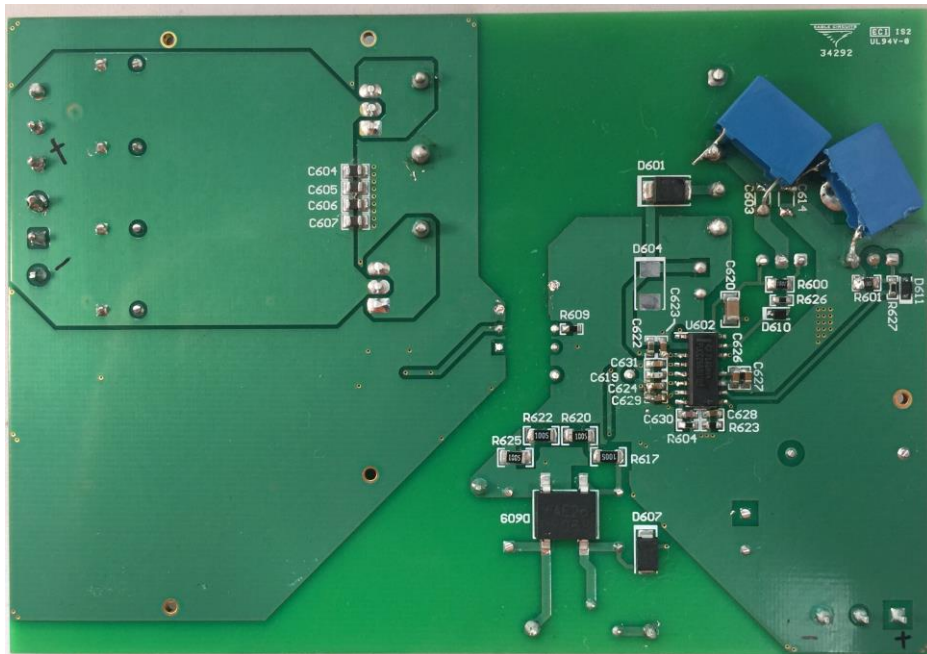
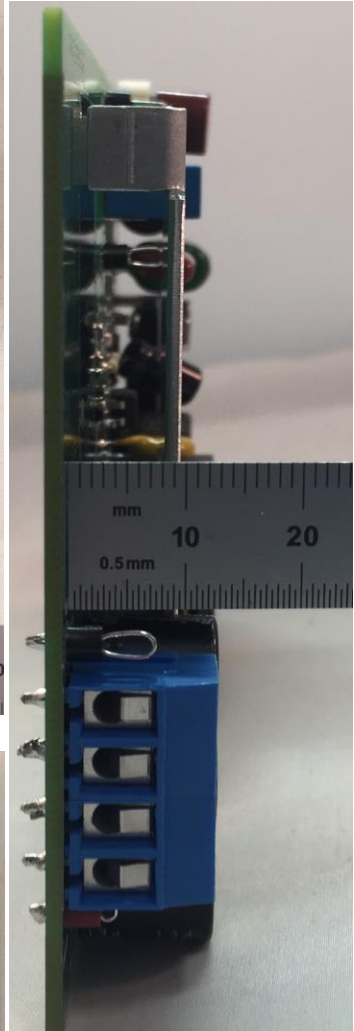
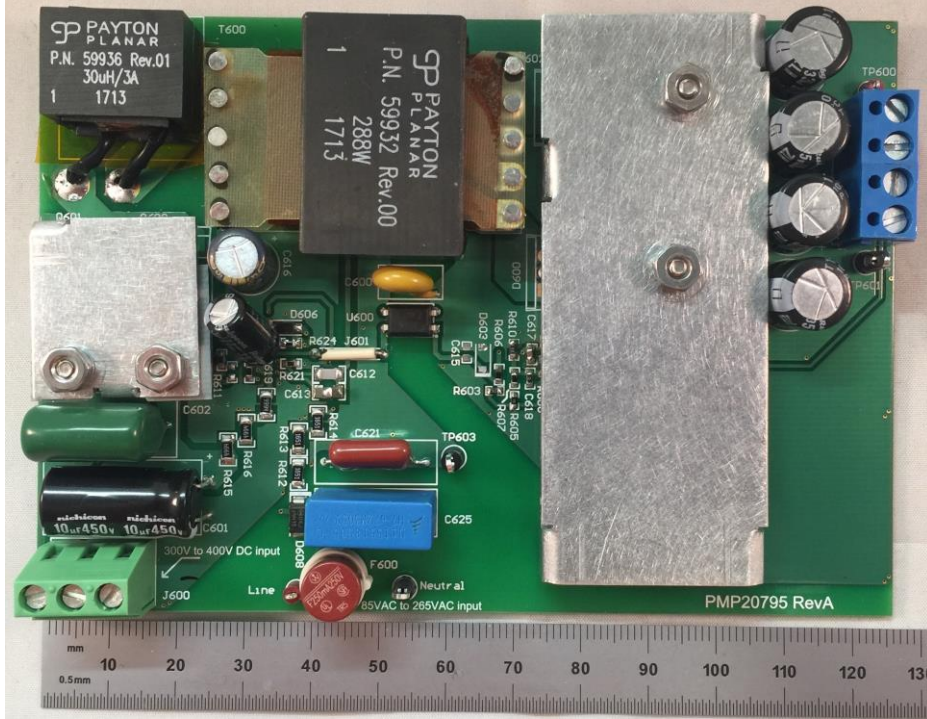


1 Photo

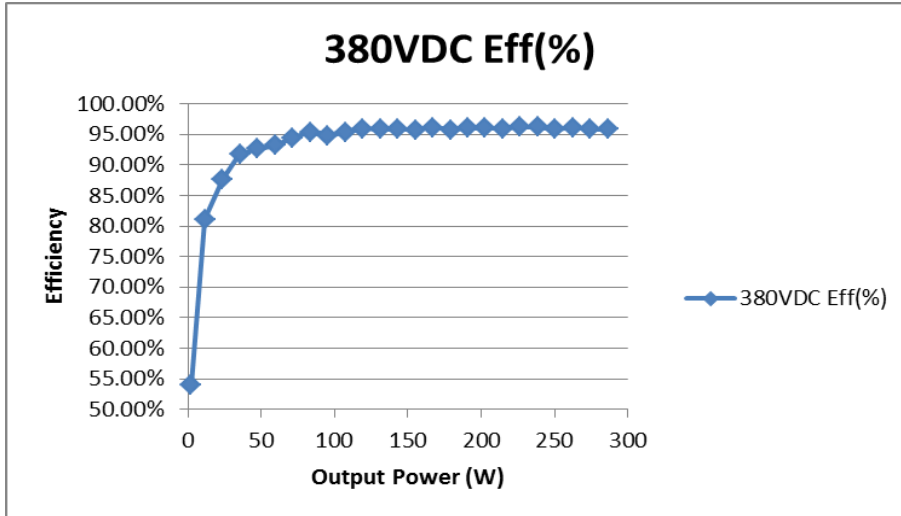
The photographs below show the top and bottom view of the PMP20795Rev A board, which is built on PMP20795 Rev A PCB.



2 Efficiency

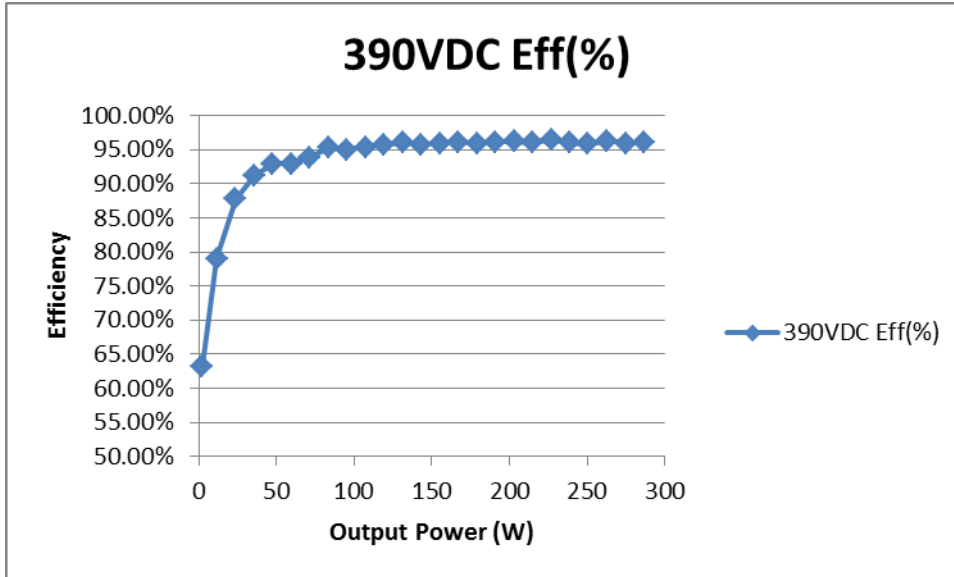
The efficiency curves of total supply are shown in the tables and graph below. During the test, 120VAC/60Hz was provided then a high voltage DC input was provided to power up the board. Once the converter is in normal operation, AC input was removed to process the efficiency tests.

2.1 380V_{DC} input



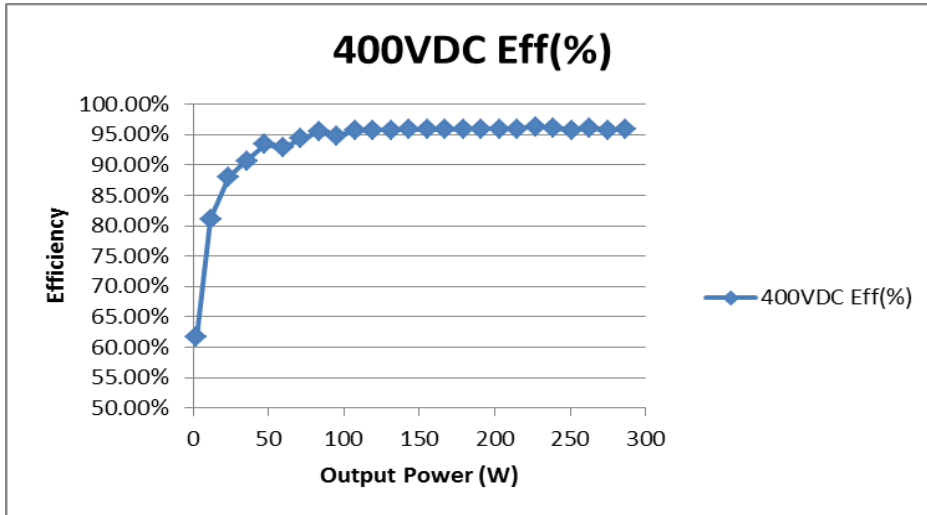
Vin(V)	Iin	Pin(W)	Vout (V)	Iout1(A)	Pout(W)	380VDC Eff(%)
380	0.79	298.99	23.89	12	286.68	95.88%
380	0.75	286.47	23.88	11.5	274.62	95.86%
380	0.72	273.22	23.88	11	262.68	96.14%
380	0.69	261.43	23.87	10.5	250.64	95.87%
380	0.65	248.18	23.87	10	238.7	96.18%
380	0.62	235.66	23.87	9.5	226.77	96.23%
380	0.59	223.88	23.87	9	214.83	95.96%
380	0.56	211.36	23.87	8.5	202.9	96.00%
380	0.52	198.84	23.87	8	190.96	96.04%
380	0.49	187.05	23.87	7.5	179.03	95.71%
380	0.46	173.8	23.87	7	167.09	96.14%
380	0.43	162.02	23.87	6.5	155.16	95.77%
380	0.39	149.5	23.87	6	143.22	95.80%
380	0.36	136.98	23.88	5.5	131.34	95.88%
380	0.33	124.46	23.88	5	119.4	95.94%
380	0.3	112.67	23.88	4.5	107.46	95.37%
380	0.27	100.89	23.88	4	95.52	94.68%
380	0.23	87.64	23.88	3.5	83.58	95.37%
380	0.2	75.85	23.88	3	71.64	94.45%
380	0.17	64.07	23.88	2.5	59.7	93.18%
380	0.14	51.55	23.88	2	47.76	92.65%
380	0.1	39.03	23.88	1.5	35.82	91.77%
380	0.07	27.25	23.88	1	23.88	87.64%
380	0.04	14.73	23.88	0.5	11.94	81.07%
380	0.01	4.42	23.88	0.1	2.39	54.04%

2.2 390V_{DC} input



Vin(V)	Iin(A)	Pin(W)	Vout (V)	Iout1(A)	Pout(W)	390VDC Eff(%)
390	0.77	298.55	23.89	12	286.68	96.03%
390	0.73	286.45	23.89	11.5	274.74	95.91%
390	0.7	272.85	23.89	11	262.79	96.31%
390	0.67	261.51	23.88	10.5	250.74	95.88%
390	0.64	248.66	23.88	10	238.8	96.03%
390	0.6	235.06	23.88	9.5	226.86	96.51%
390	0.57	223.72	23.88	9	214.92	96.07%
390	0.54	210.87	23.88	8.5	202.98	96.26%
390	0.51	198.78	23.88	8	191.04	96.11%
390	0.48	186.69	23.88	7.5	179.1	95.94%
390	0.45	173.84	23.88	7	167.16	96.16%
390	0.41	161.74	23.88	6.5	155.22	95.97%
390	0.38	149.65	23.88	6	143.28	95.74%
390	0.35	136.8	23.88	5.5	131.34	96.01%
390	0.32	124.71	23.88	5	119.4	95.74%
390	0.29	112.62	23.88	4.5	107.46	95.42%
390	0.26	100.52	23.88	4	95.52	95.02%
390	0.22	87.67	23.88	3.5	83.58	95.33%
390	0.2	76.34	23.88	3	71.64	93.85%
390	0.16	64.24	23.88	2.5	59.7	92.93%
390	0.13	51.4	23.89	2	47.78	92.97%
390	0.1	39.3	23.89	1.5	35.84	91.18%
390	0.07	27.21	23.89	1	23.89	87.80%
390	0.04	15.12	23.89	0.5	11.95	79.02%
390	0.01	3.78	23.89	0.1	2.39	63.22%

2.3 400V_{DC} input



Vin(V)	Iin(A)	Pin(W)	Vout (V)	Iout1(A)	Pout(W)	400VDC Eff(%)
400	0.75	299.22	23.89	12	286.68	95.81%
400	0.72	286.82	23.89	11.5	274.74	95.79%
400	0.68	273.64	23.9	11	262.9	96.07%
400	0.66	262.02	23.9	10.5	250.95	95.78%
400	0.62	248.84	23.89	10	238.9	96.01%
400	0.59	235.66	23.89	9.5	226.96	96.31%
400	0.56	224.03	23.89	9	215.01	95.97%
400	0.53	211.63	23.89	8.5	203.07	95.95%
400	0.5	199.22	23.89	8	191.12	95.93%
400	0.47	186.82	23.89	7.5	179.18	95.91%
400	0.44	174.42	23.89	7	167.23	95.88%
400	0.41	162.02	23.89	6.5	155.29	95.85%
400	0.37	149.61	23.89	6	143.34	95.81%
400	0.34	137.21	23.89	5.5	131.4	95.76%
400	0.31	124.81	23.89	5	119.45	95.71%
400	0.28	112.4	23.89	4.5	107.51	95.64%
400	0.25	100.78	23.89	4	95.56	94.82%
400	0.22	87.6	23.89	3.5	83.62	95.45%
400	0.19	75.97	23.89	3	71.67	94.34%
400	0.16	64.34	23.89	2.5	59.73	92.83%
400	0.13	51.16	23.89	2	47.78	93.39%
400	0.1	39.53	23.89	1.5	35.84	90.64%
400	0.07	27.13	23.89	1	23.89	88.05%
400	0.04	14.73	23.89	0.5	11.95	81.10%
400	0.01	3.88	23.89	0.1	2.39	61.64%

3 No Load Power consumption

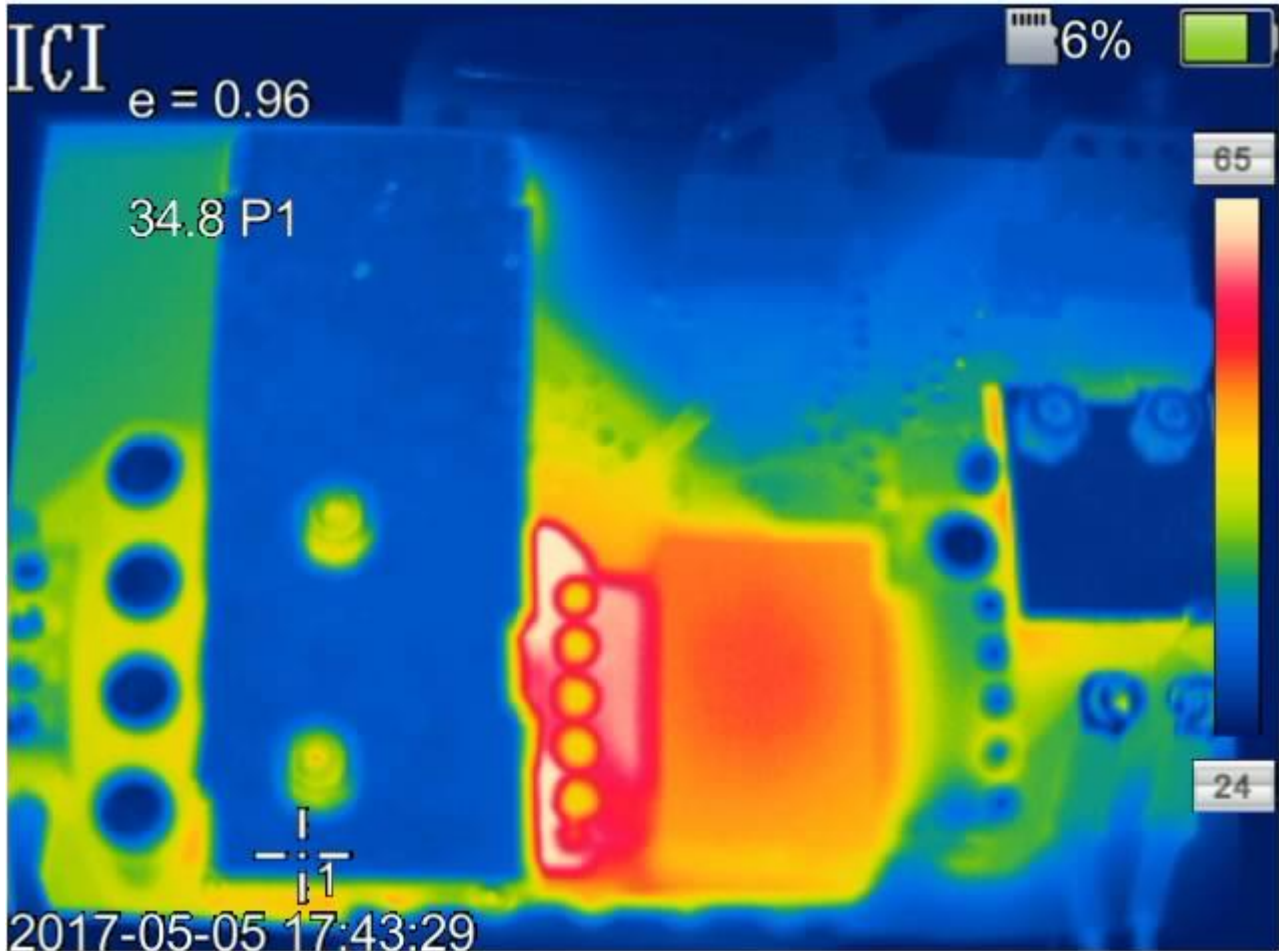
No load power consumption was tested with 390V_{DC} input, 0A output. AC input was removed after started up.
Vin = 390VDC, Iin=0.5mA, Vout=23.91V, Iout = 0A.

Vin (V)	Iin (mA)	Pin(W)	Vout(V)	Iout(A)	Pout(W)
390	0.48	0.1872	23.91	0	0

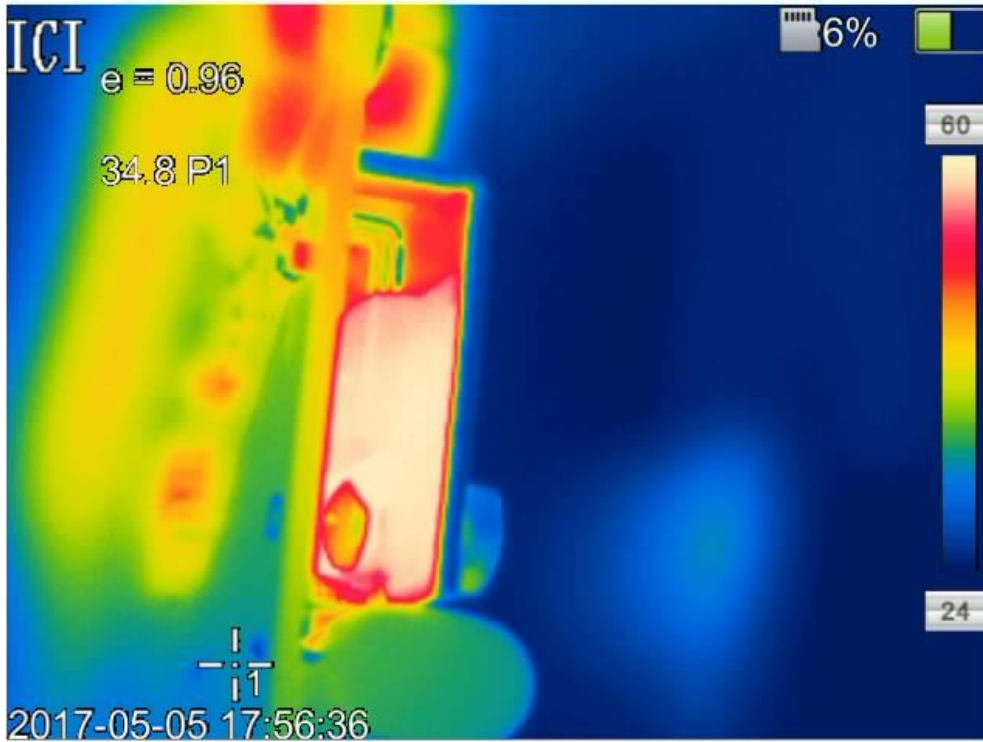
4 Thermal Images

The thermal images below show a top view and bottom view of the board. The board is placed vertically during the test. The ambient temperature was 25°C with no air flow. The output was loaded with 24V/12A.

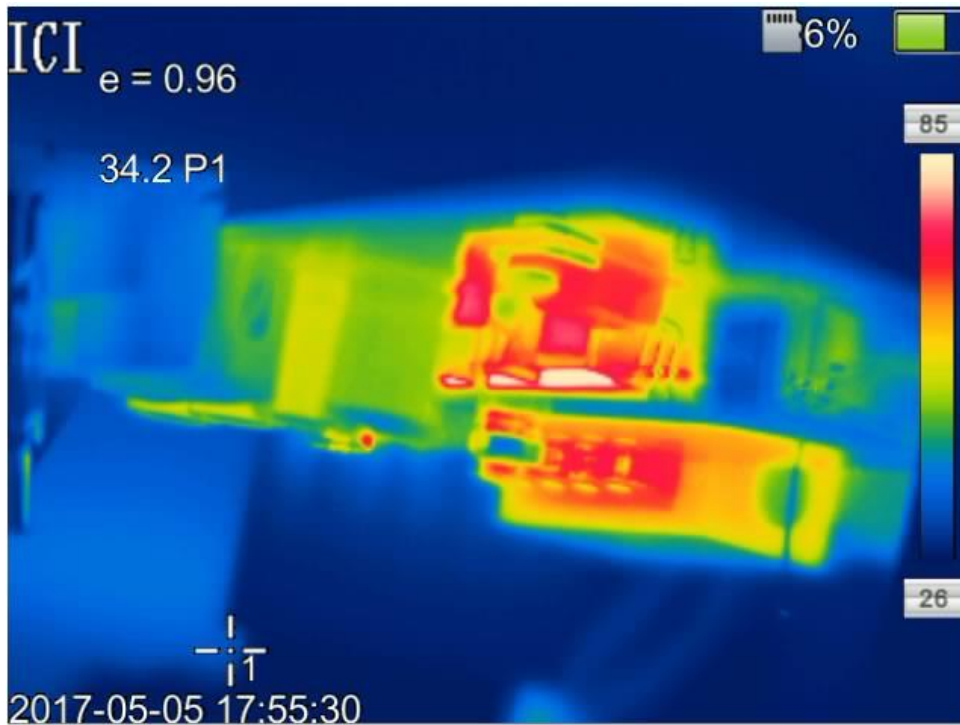
4.1 380V_{DC} input, Top Side



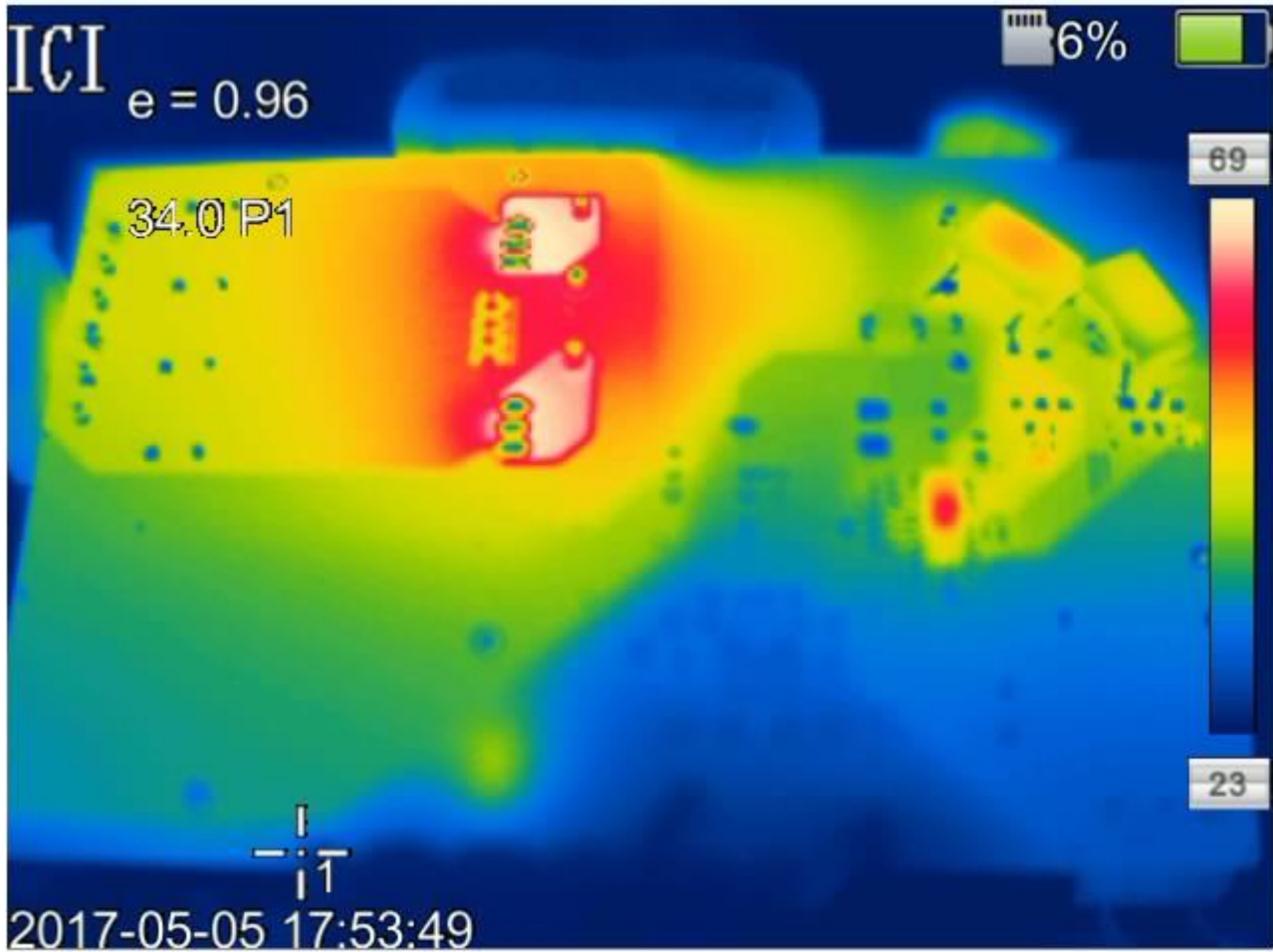
4.2 380V_{DC} input, Q601, Q602 thermal



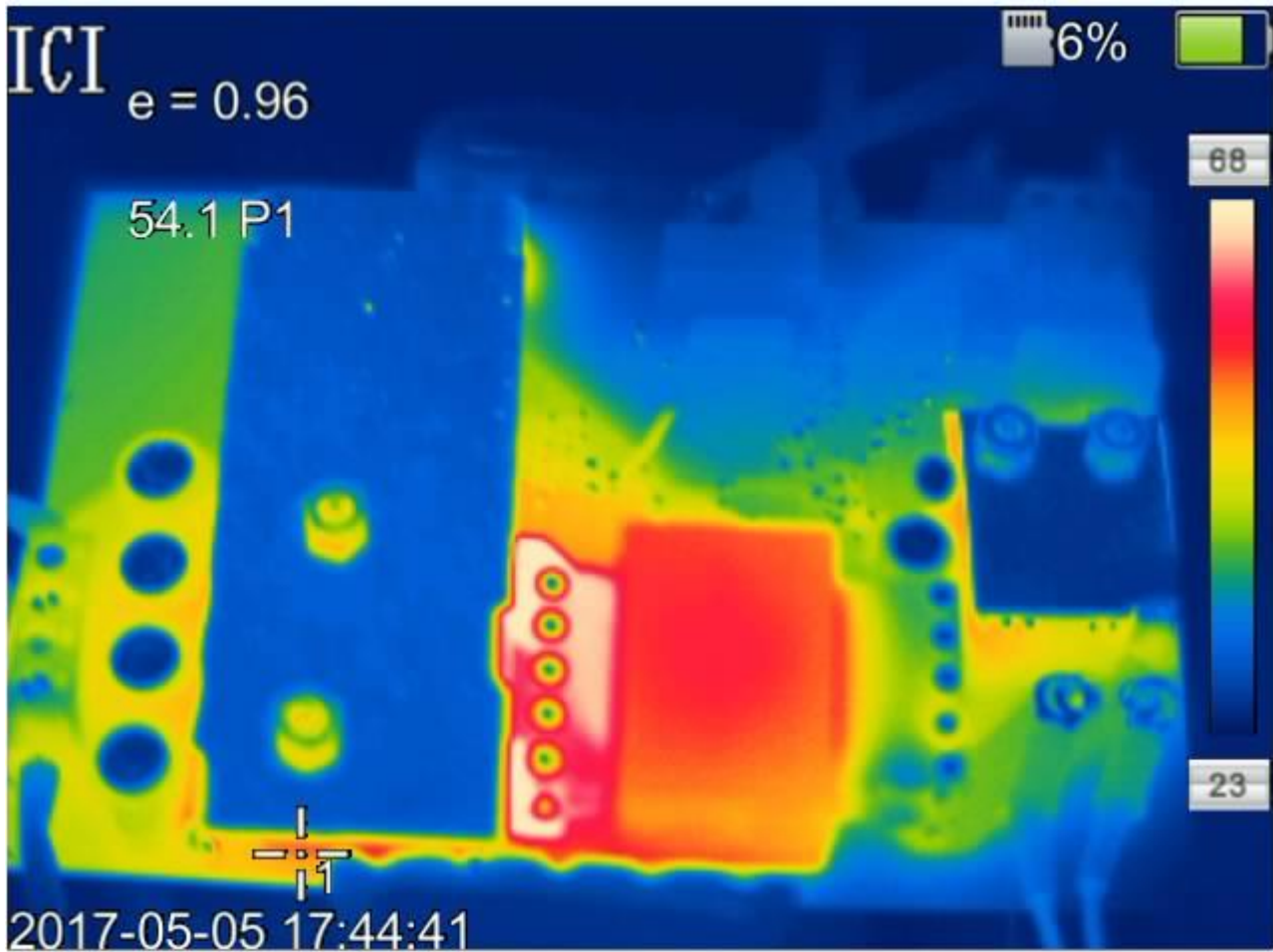
4.3 380V_{DC} input, D600, D602 thermal



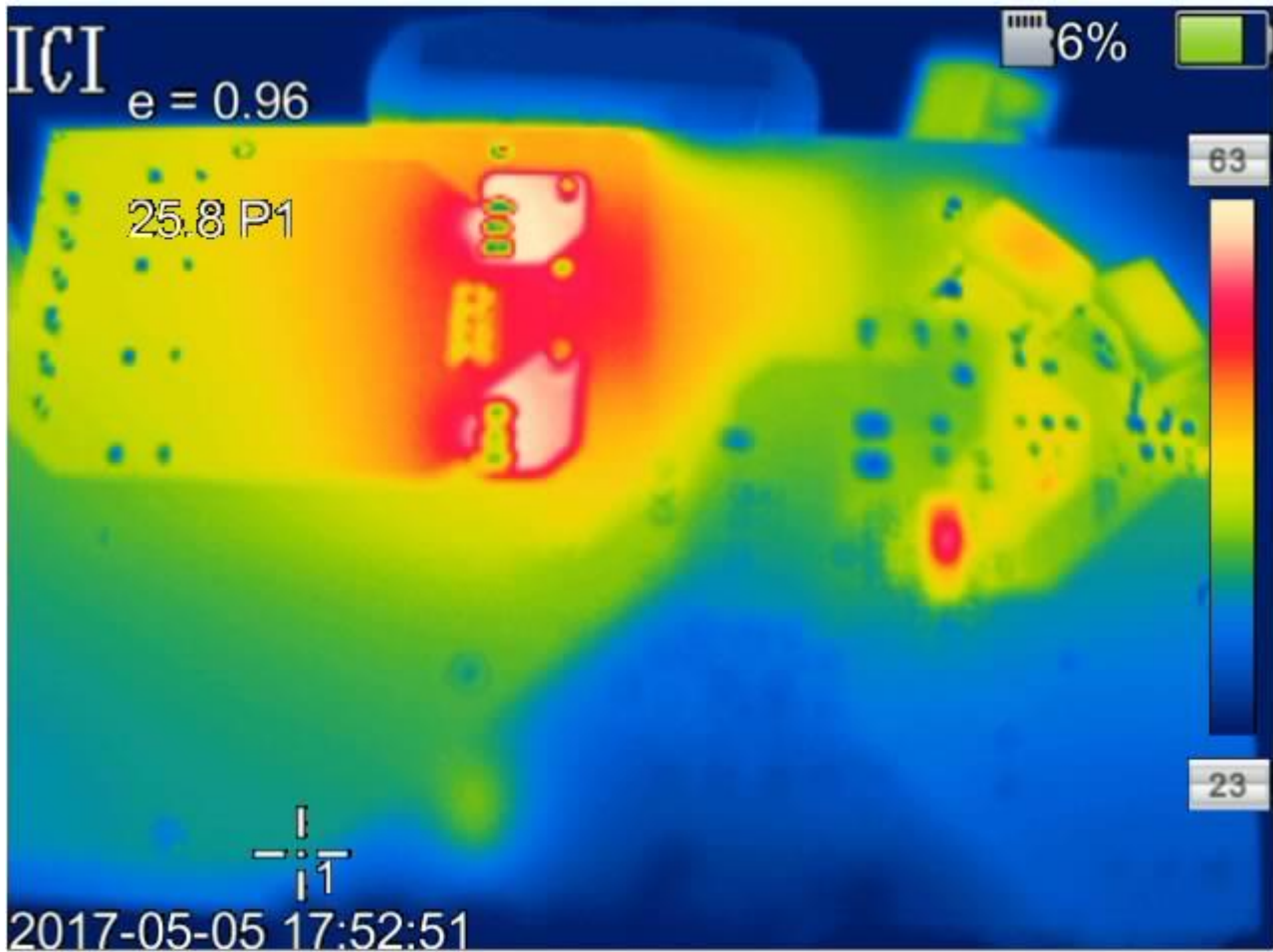
4.4 380V_{DC} input, Bottom Side



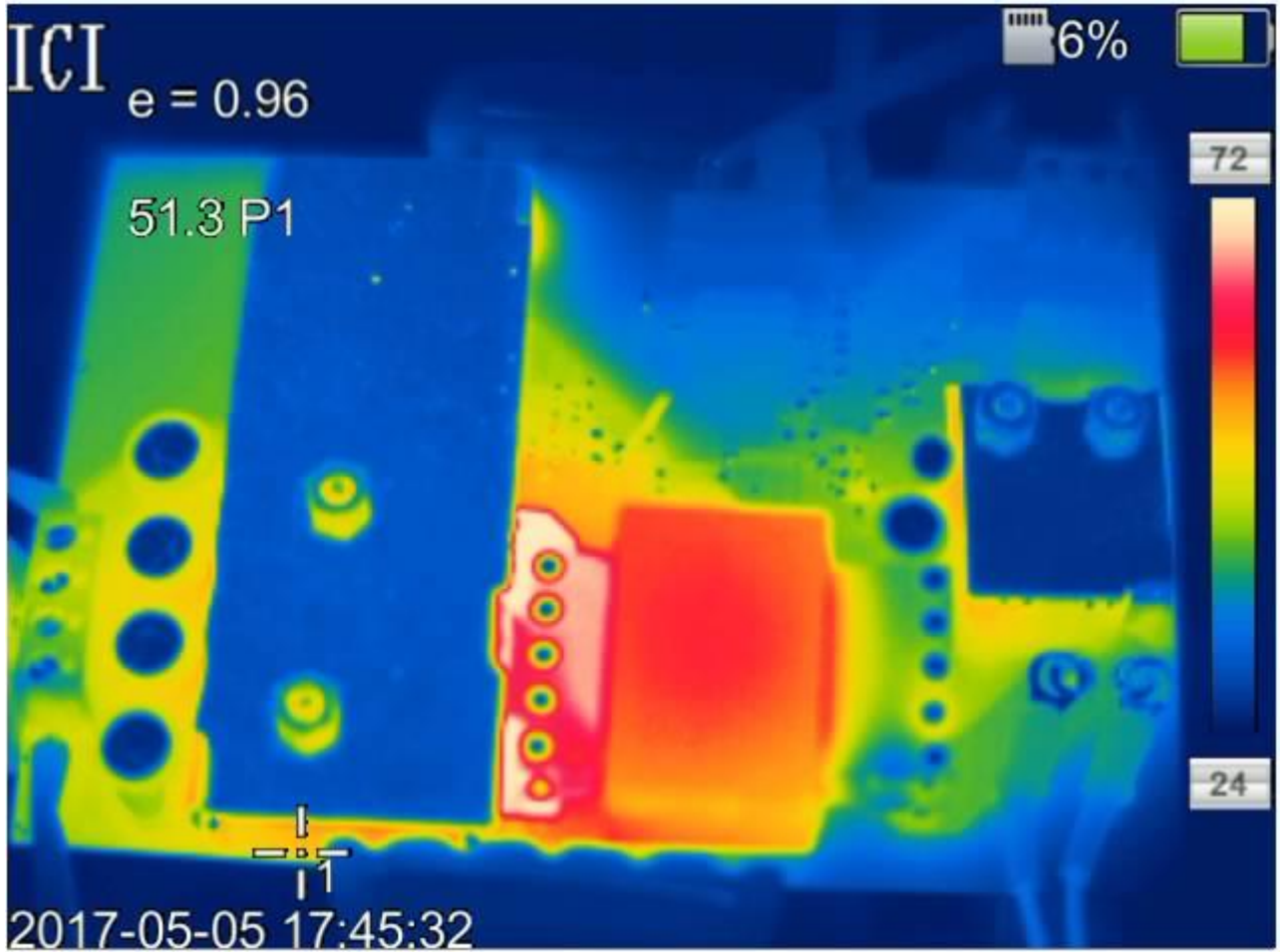
4.5 390V_{DC} input, Top Side



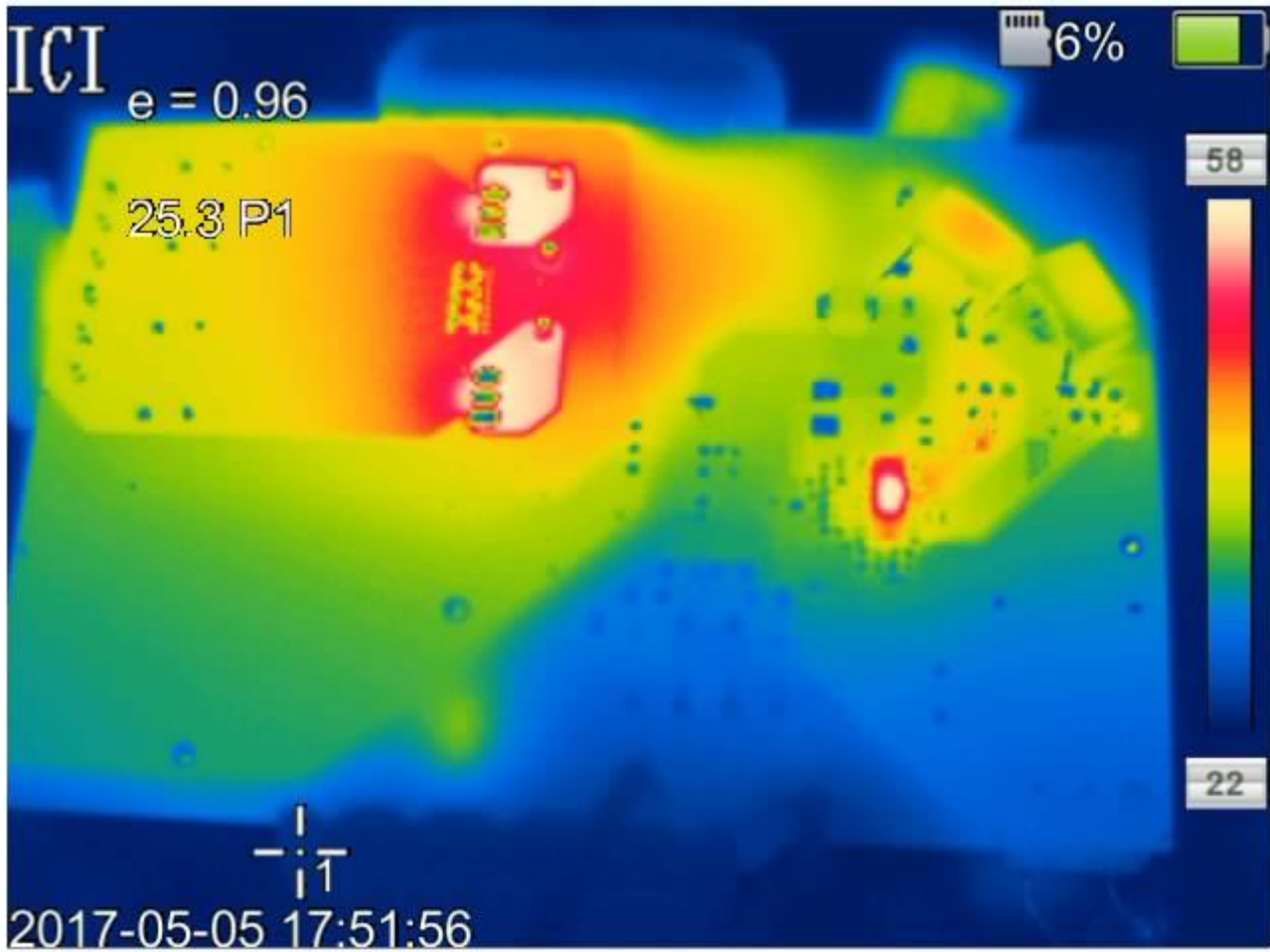
4.6 390V_{DC} input, Bottom Side



4.7 400V_{DC} input, Top Side



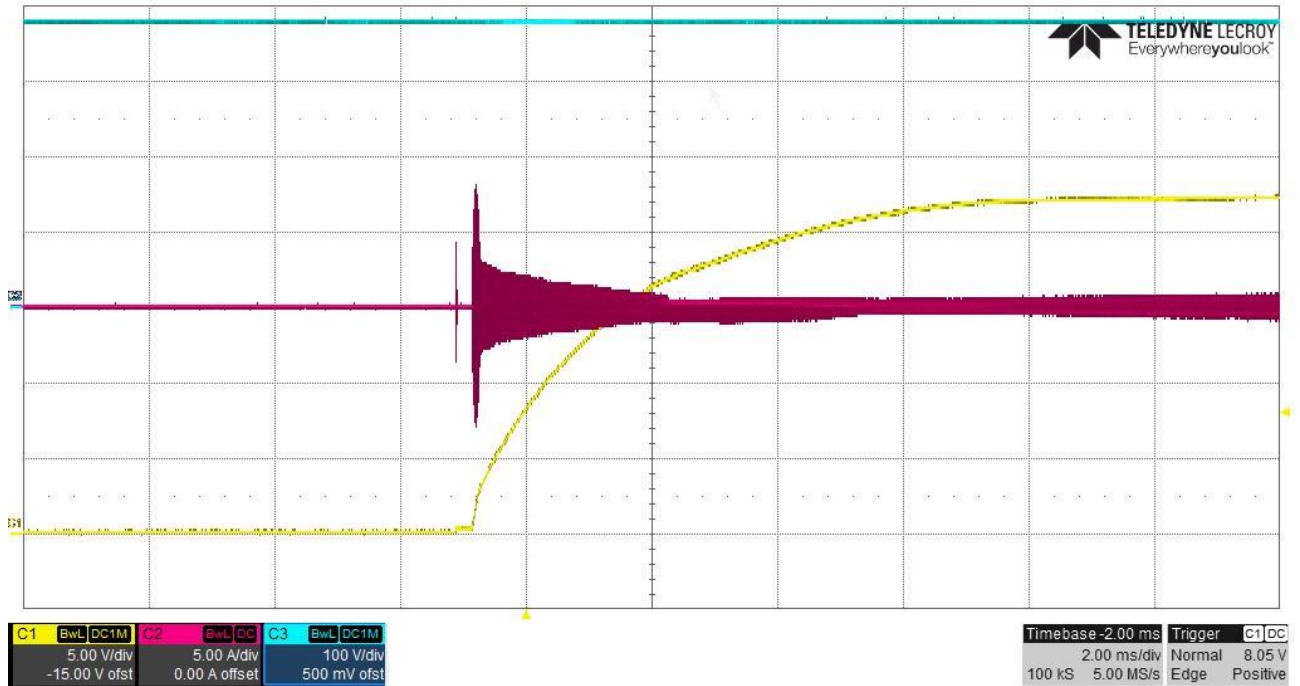
4.8 400V_{DC} input, Bottom Side



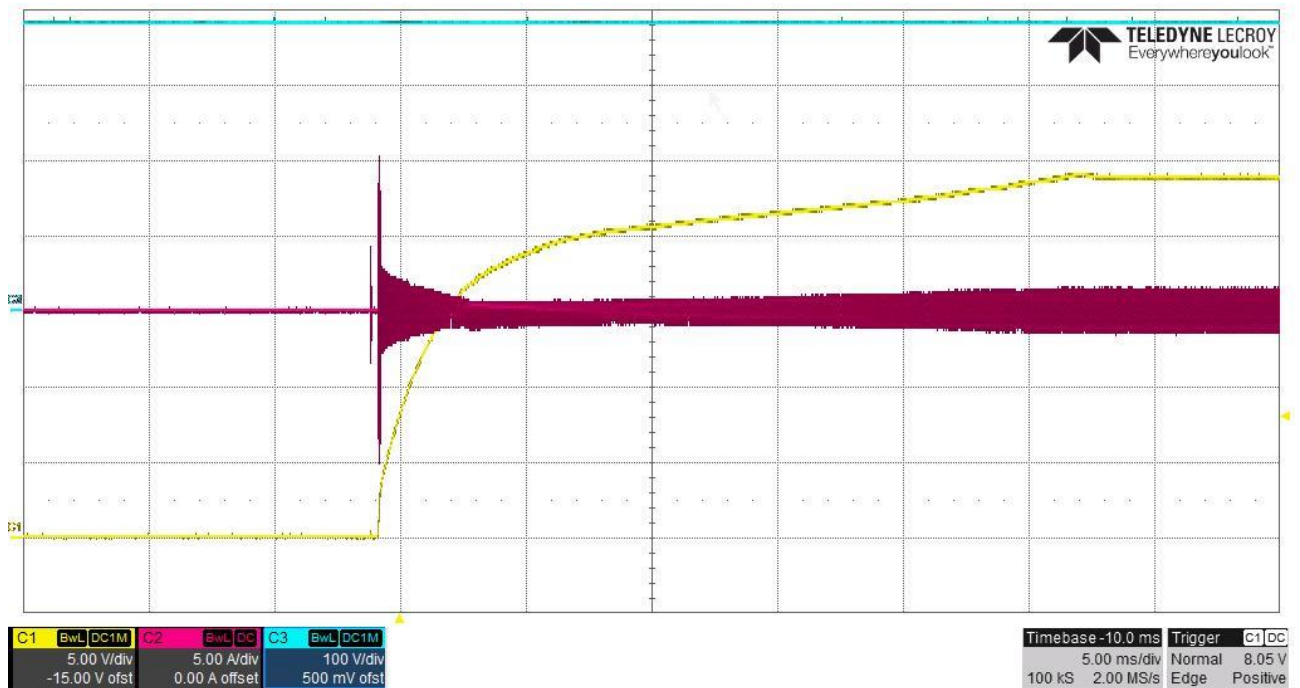
5 Startup

The voltages at startup are shown in the images below, where C1 is V_{out} , C2 is the inductor current of L600, and C3 is DC input voltage. DC supply voltage level is set at $380V_{DC}$.

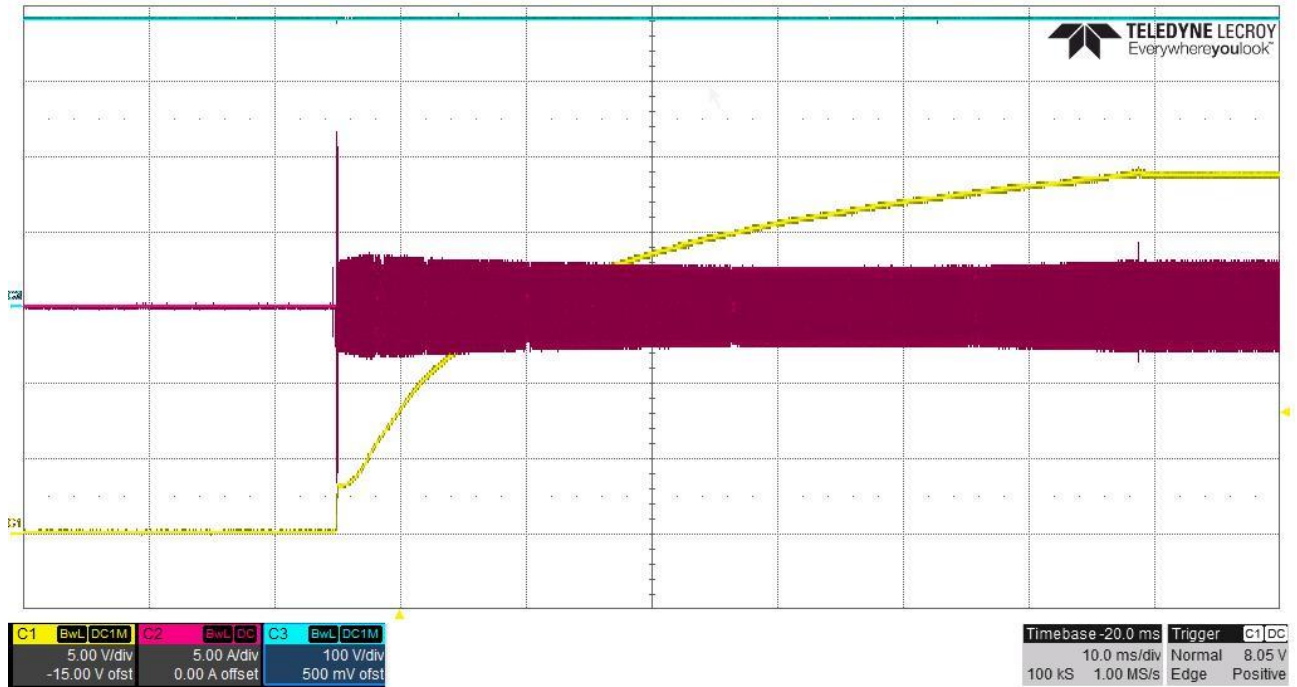
5.1 No Load



5.2 24V/1A Load

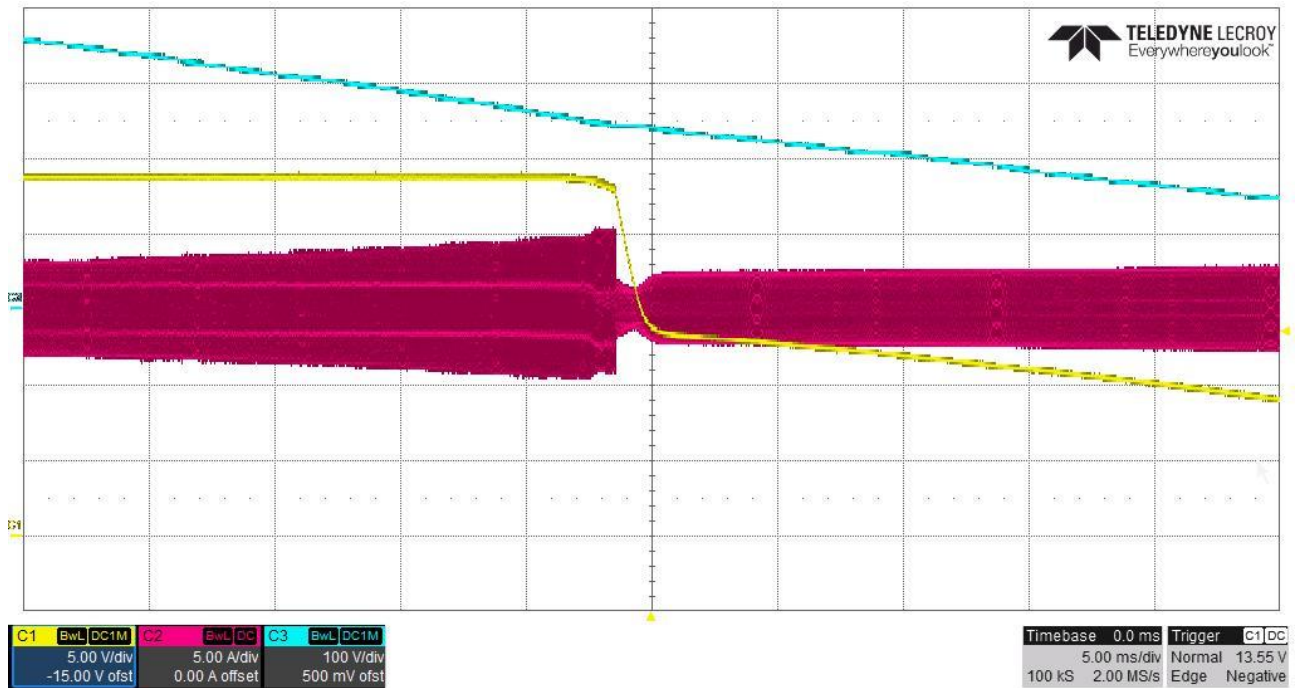


5.3 Full Load (24V/12A at output)



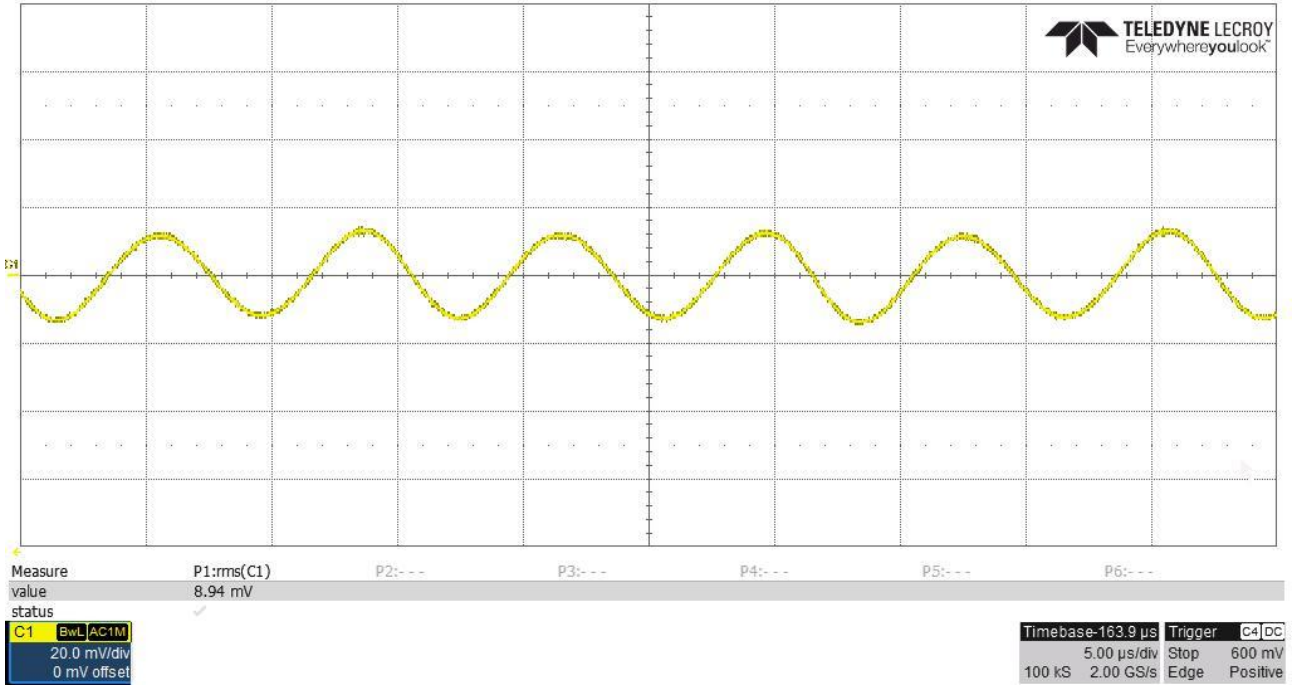
6 Turn-off

The voltages at turn-off are shown in the images below with 24V/12A load (Electronic load with CC mode), where C1 is Vout, C2 is the inductor current of L600, and C3 is DC input voltage.

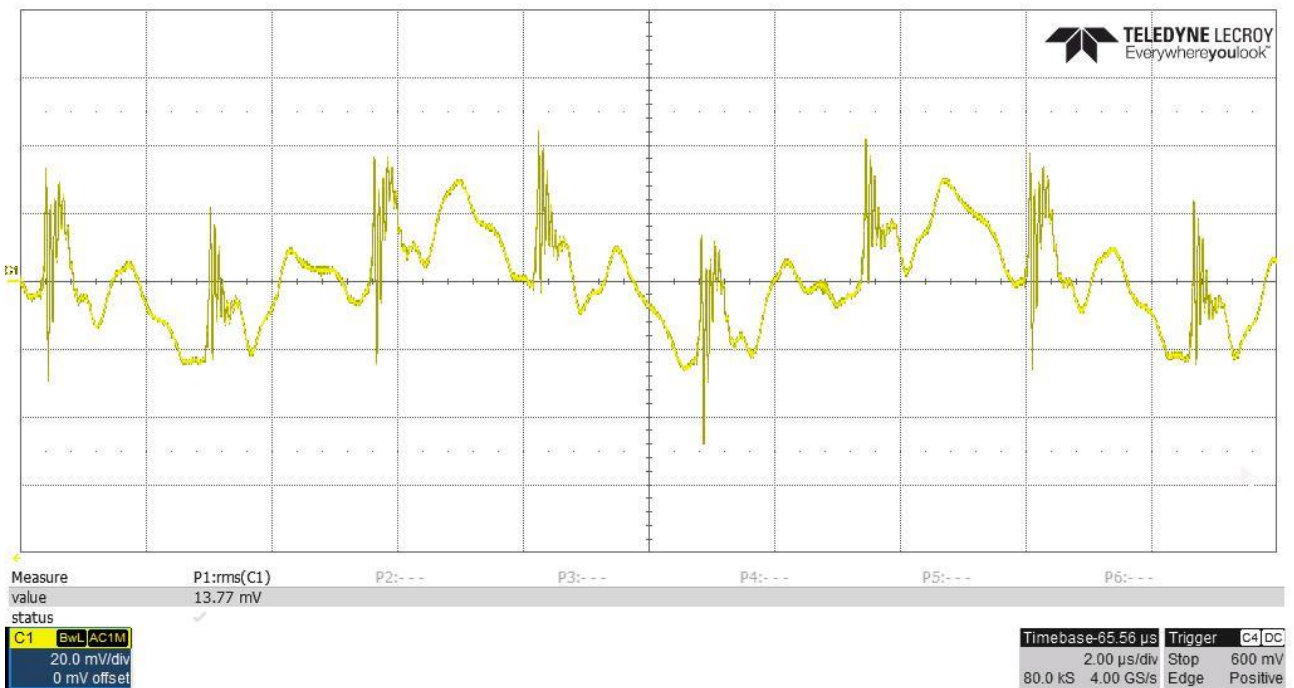


7 Ripple Voltage

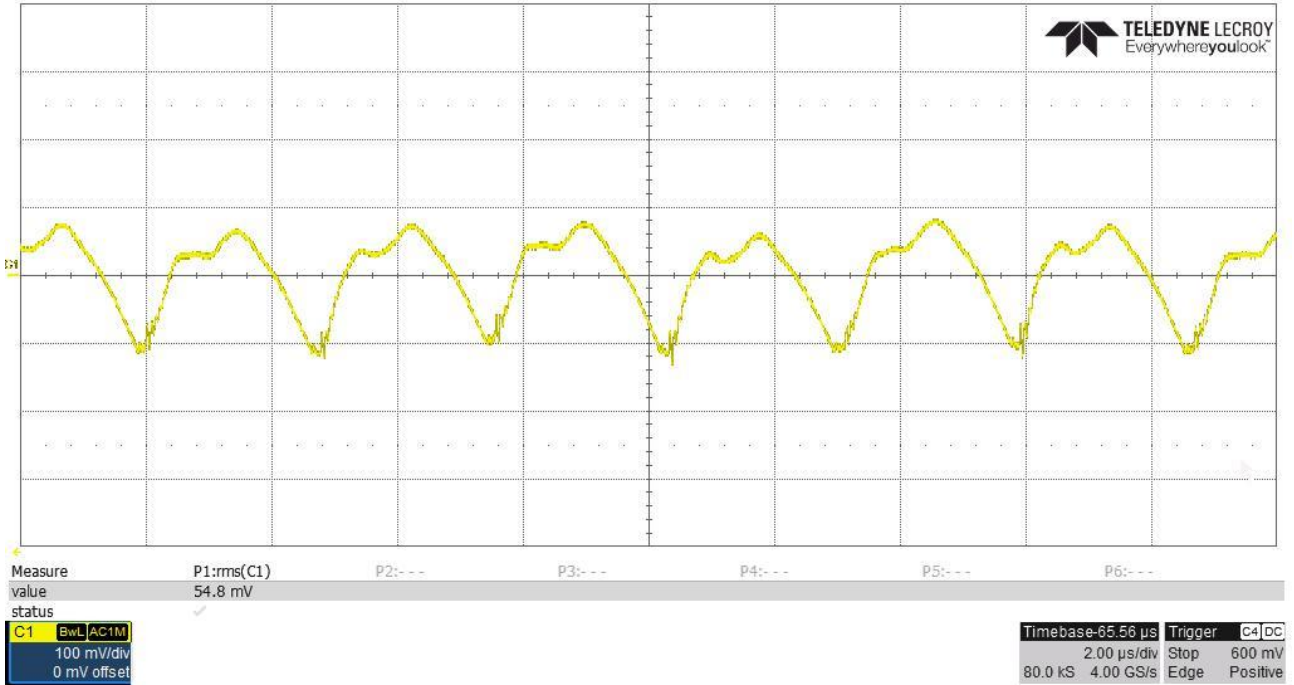
7.1 24V output ripple at no load



7.2 24V output ripple at 1A load

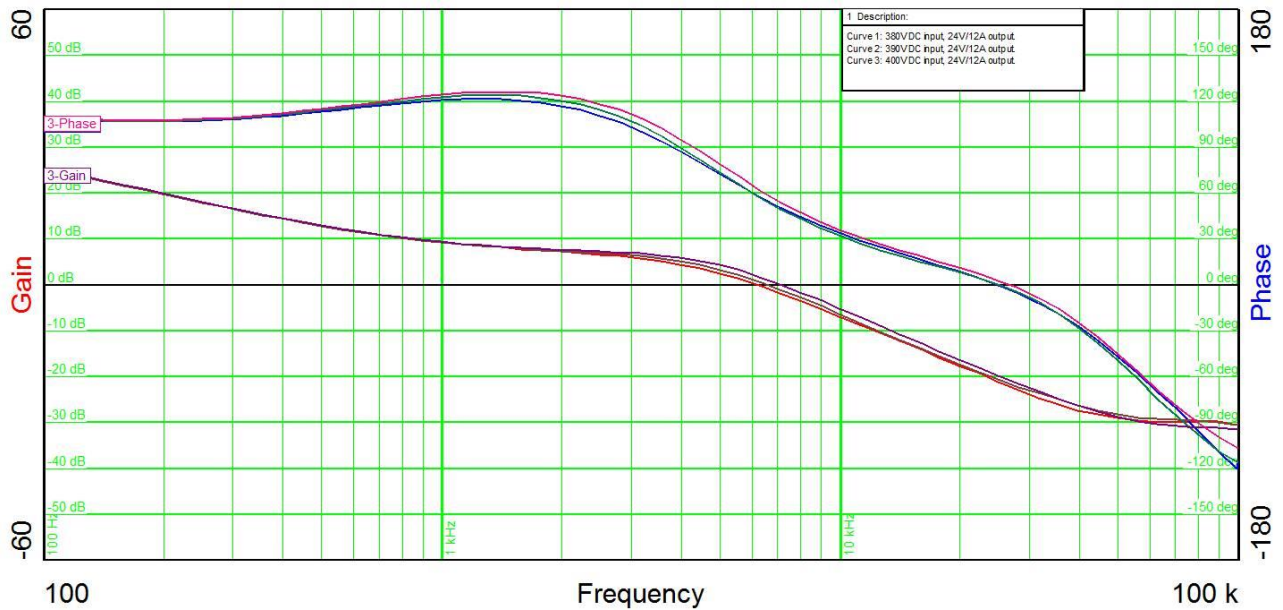


7.3 24V output ripple at full load (12A)



8 LLC Resonant Converter Frequency Response

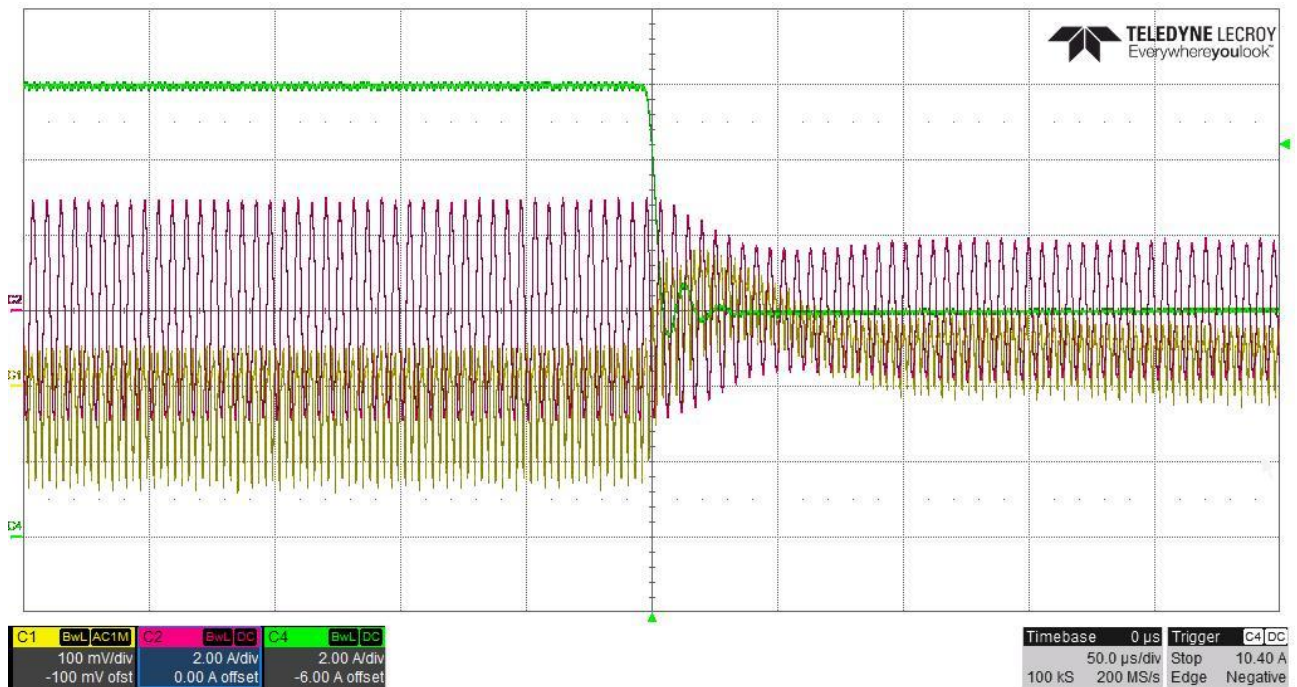
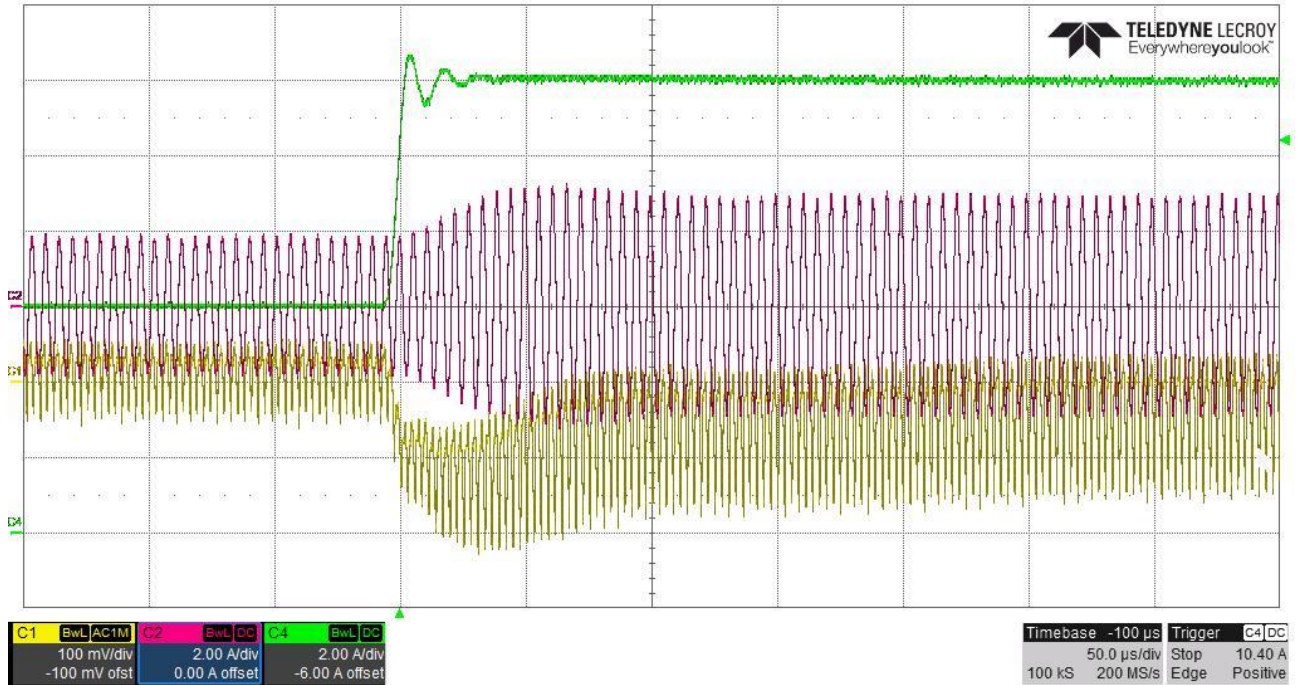
Frequency responses during full load operation (24V/12A at output) are shown in the plots below.



9 Load Response

Load response is tested at 380V_{DC} input. C1 is V_{out}, C2 is the inductor current of L600, and C4 is the output current.

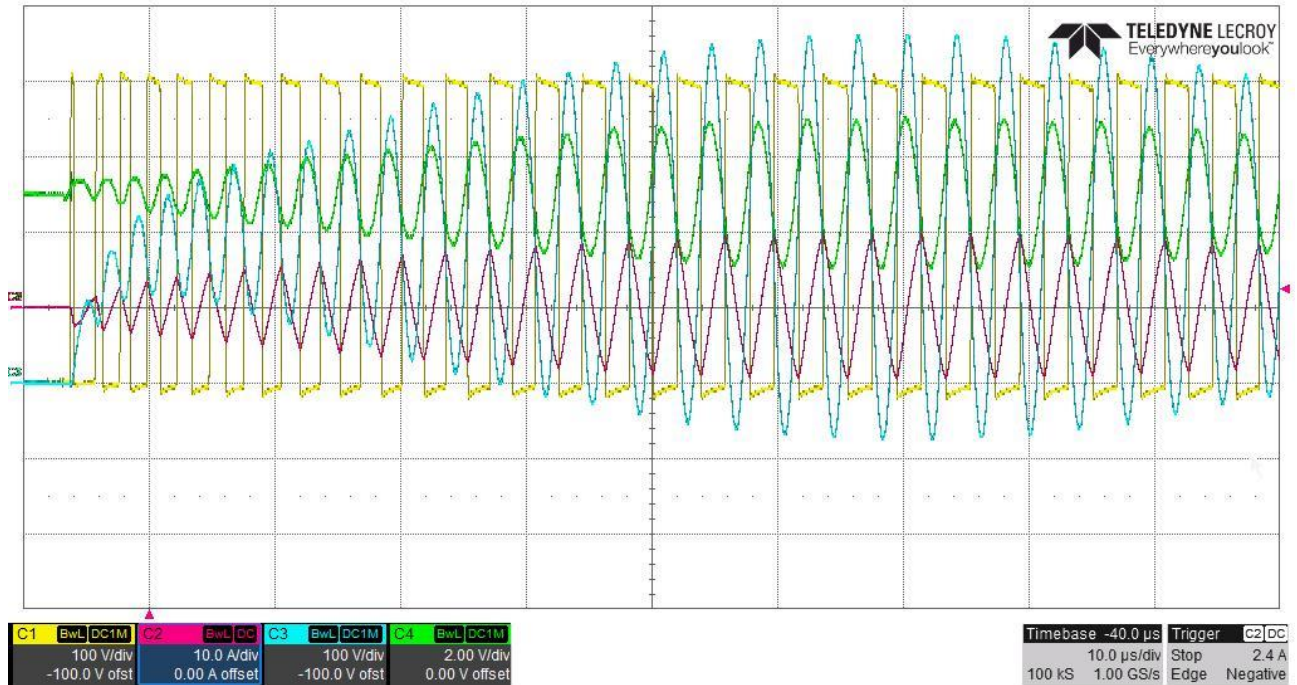
9.1 Load step from 6A to 12A:



10 Key Waveforms

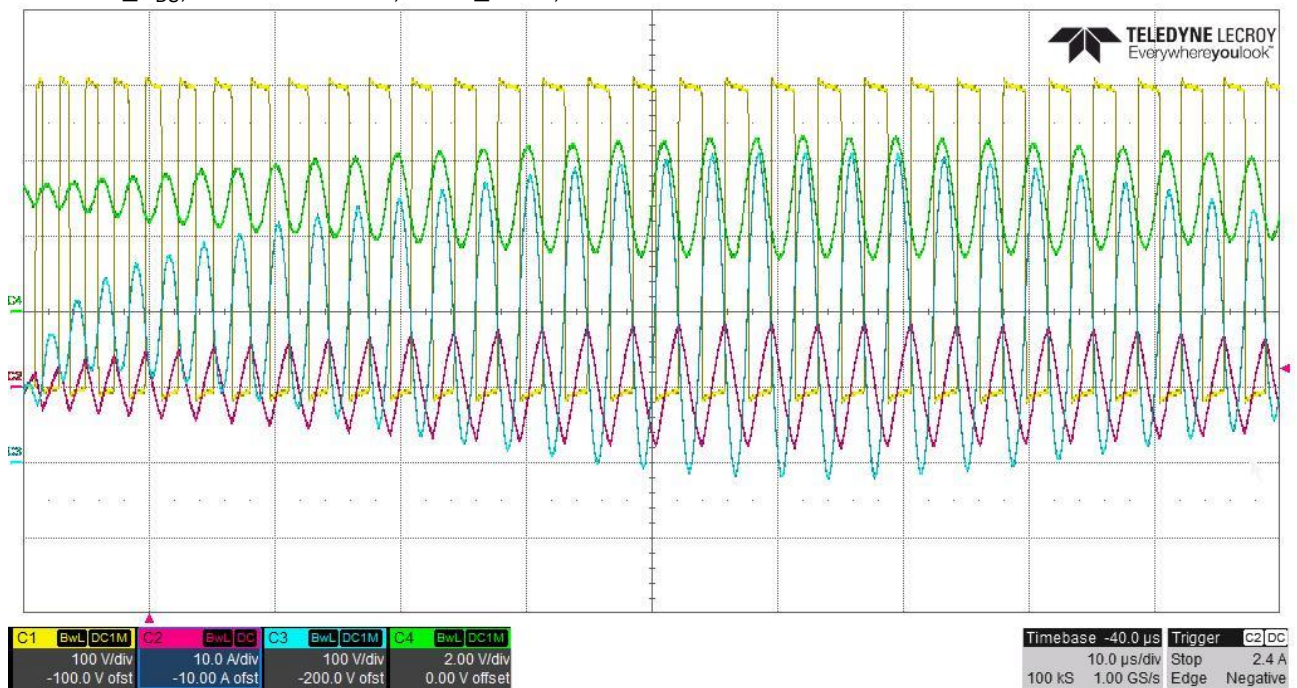
10.1 Startup (380VDC, 24V no load)

C1: Q601_V_{DS}, C2: L600 current, C3: V_C614, C4: VCR node.



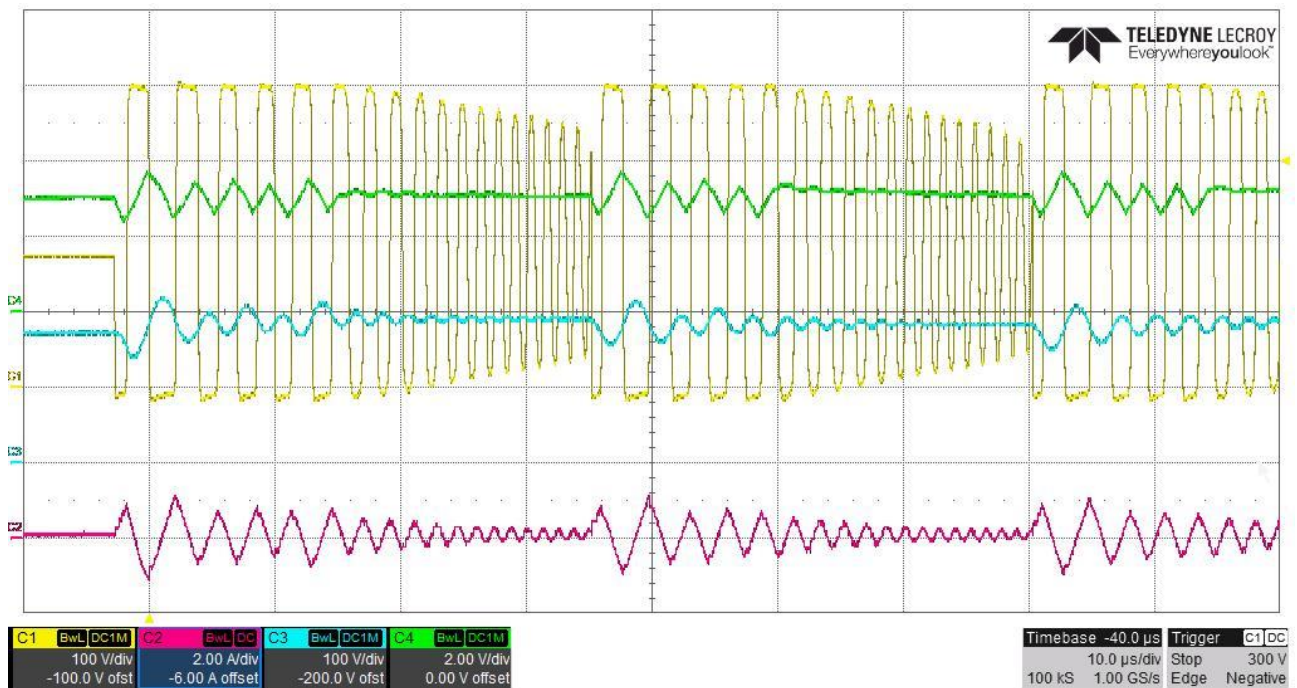
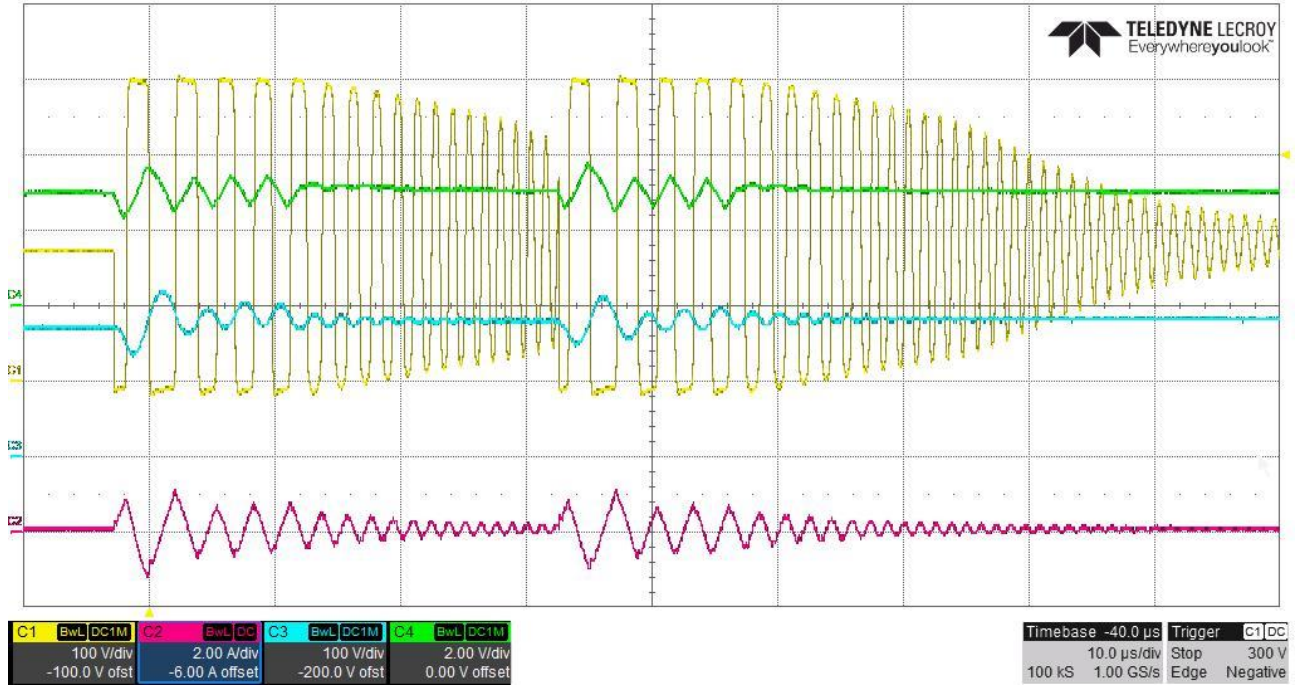
10.2 Startup (380VDC, 24V/12A load)

C1: Q601_V_{DS}, C2: L600 current, C3: V_C614, C4: VCR node.



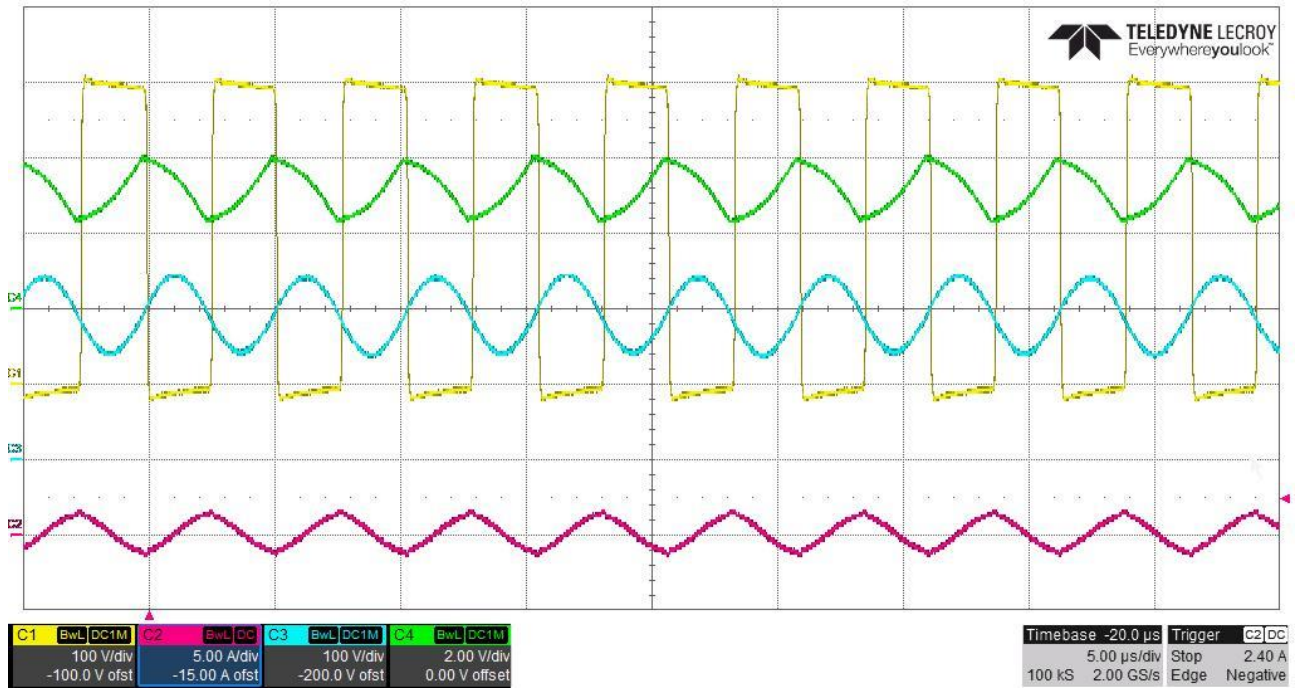
10.3 Normal operation (380VDC, 24V no load)

C1: Q601_V_{DS}, C2: L600 current, C3: V_C614, C4: VCR node.



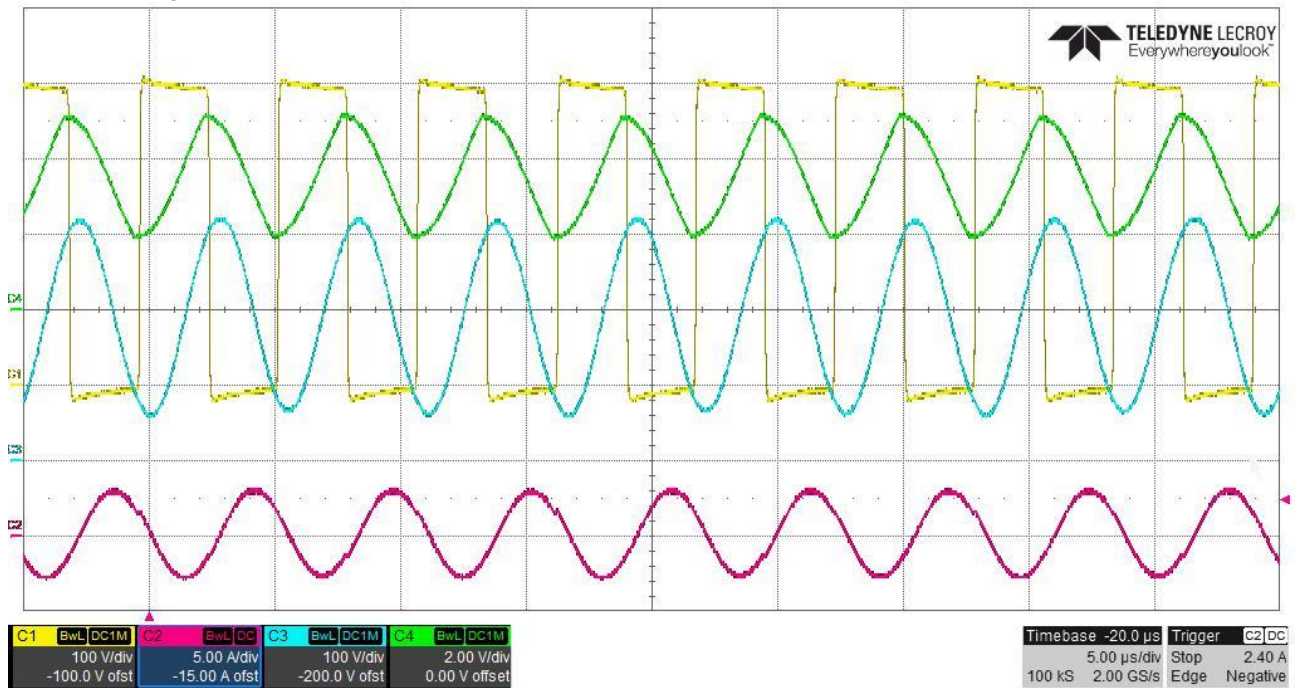
10.4 Normal operation (380VDC, 24V/1A load)

C1: Q601_V_{DS}, C2: L600 current, C3: V_C614, C4: VCR node.



10.5 Normal operation (380VDC, 24V/12A load)

C1: Q601_V_{DS}, C2: L600 current, C3: V_C614, C4: VCR node.



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