



LM5020-2 Boost Converter for 4 LED Strings

TI reference design number: PMP10505 REV C

**Input: 58VDC to 68VDC
Output: 71 VDC @ 260mA**

DC – DC Test Results

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1 Test Specifications

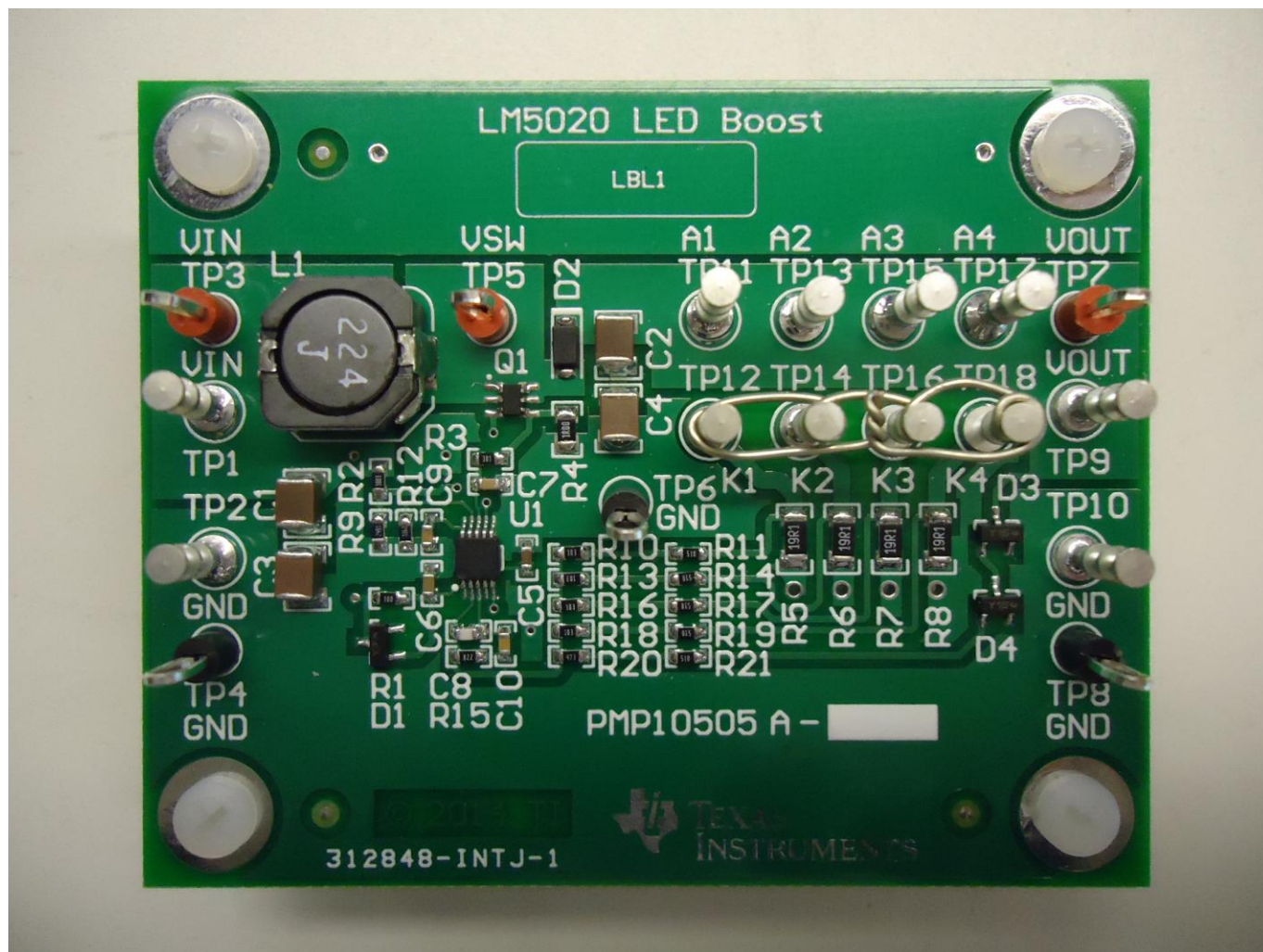
Vin Minimum	58 VDC
Vin Maximum	68 VDC
Vout	71 VDC
Iout	260mA

2 Circuit Description

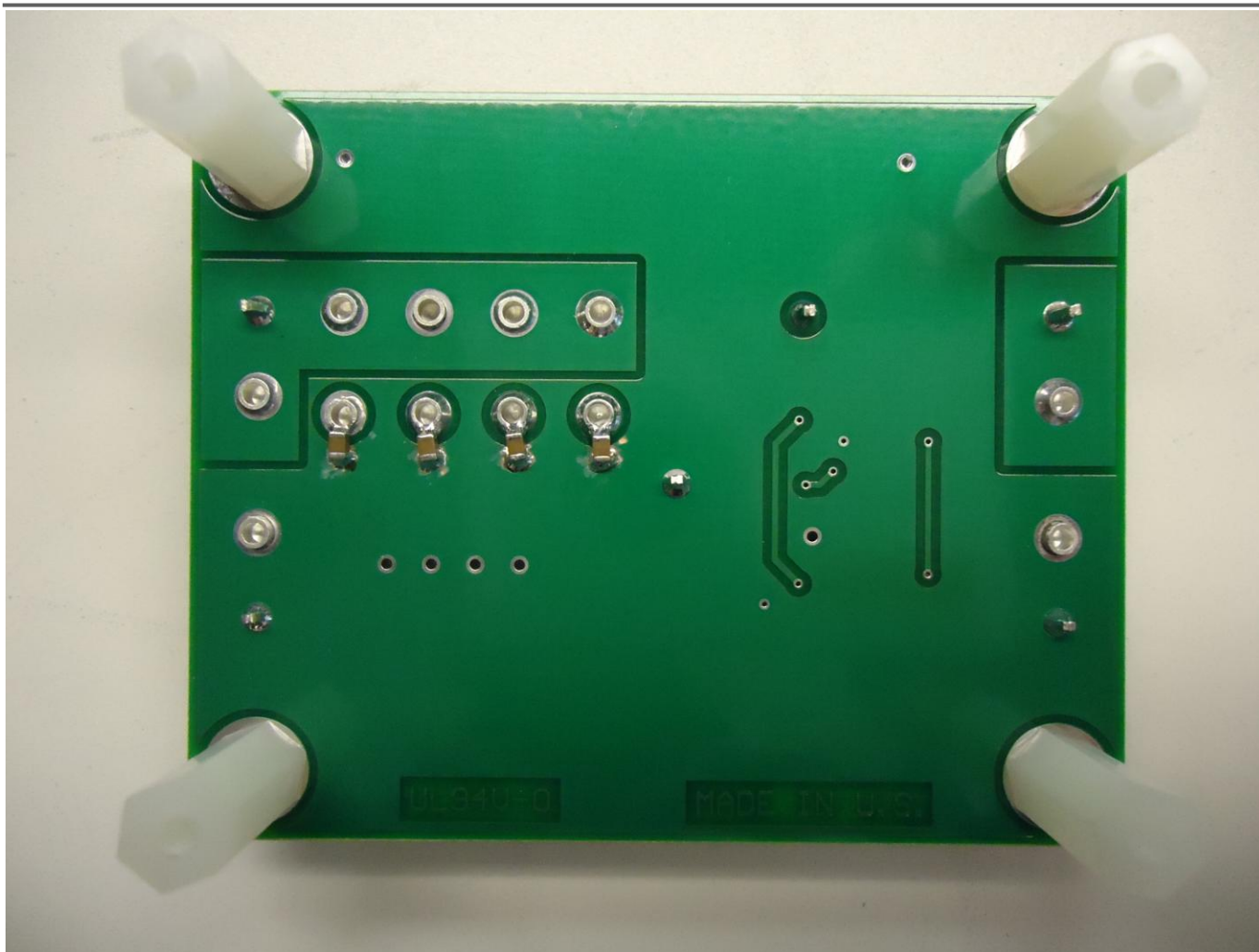
PMP10505 is a boost converter for LEDs which utilizes the LM5020-2 controller. The switching frequency is set to 100 kHz for high efficiency at a nominal output power of 18.5W. The design features switch current limiting, output over-voltage limiting and summing feedback for multiple LED strings. Constant current regulation allows for wide variation of output voltage.

3 Board Photos

The design is built on PMP10505 Rev A printed circuit board. This is a 2-layer PCB with 1 oz. copper. PCB dimensions are 2.75 x 2.2 inch.

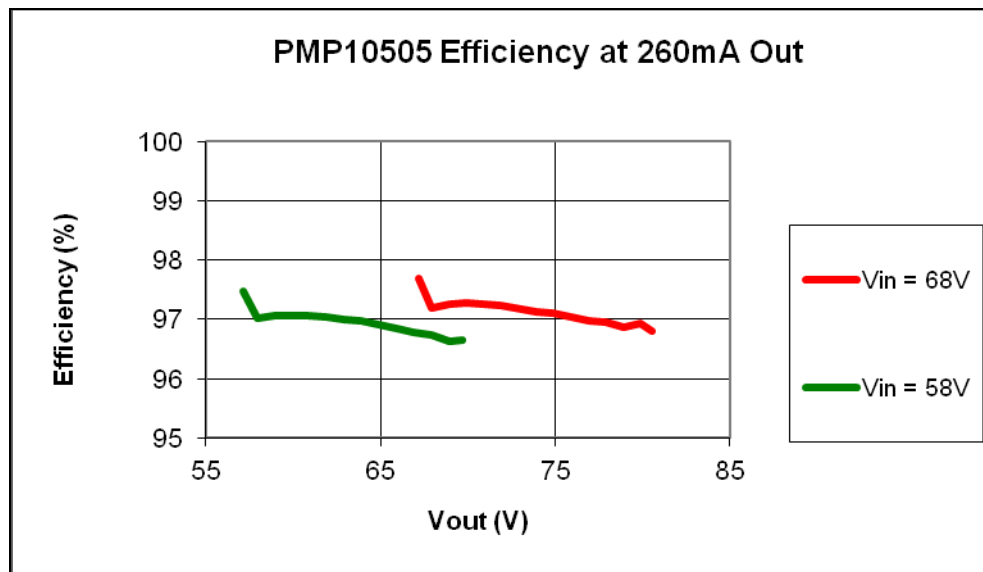


PMP10505 Test Results



4 Efficiency

4.1 Efficiency Results



4.2 Efficiency Data

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
68.055	0.2743	67.216	0.2713	18.67	18.24	0.43	97.687
68.058	0.2686	67.923	0.2616	18.28	17.77	0.51	97.201
68.058	0.2723	68.922	0.2615	18.53	18.02	0.51	97.253
68.058	0.2762	69.920	0.2615	18.80	18.28	0.51	97.268
68.057	0.2802	70.924	0.2615	19.07	18.55	0.52	97.258
68.056	0.2842	71.920	0.2615	19.34	18.81	0.53	97.237
68.049	0.2925	73.925	0.2615	19.90	19.33	0.57	97.122
68.048	0.2965	74.922	0.2615	20.18	19.59	0.58	97.105
68.047	0.3007	75.926	0.2615	20.46	19.85	0.61	97.033
68.046	0.3048	76.922	0.2615	20.74	20.12	0.63	96.985
68.046	0.3089	77.926	0.2615	21.02	20.38	0.64	96.947
68.045	0.3131	78.922	0.2615	21.30	20.64	0.67	96.870
68.044	0.3133	79.844	0.2588	21.32	20.66	0.65	96.930
68.046	0.3034	80.529	0.2482	20.65	19.99	0.66	96.813

PMP10505 Test Results

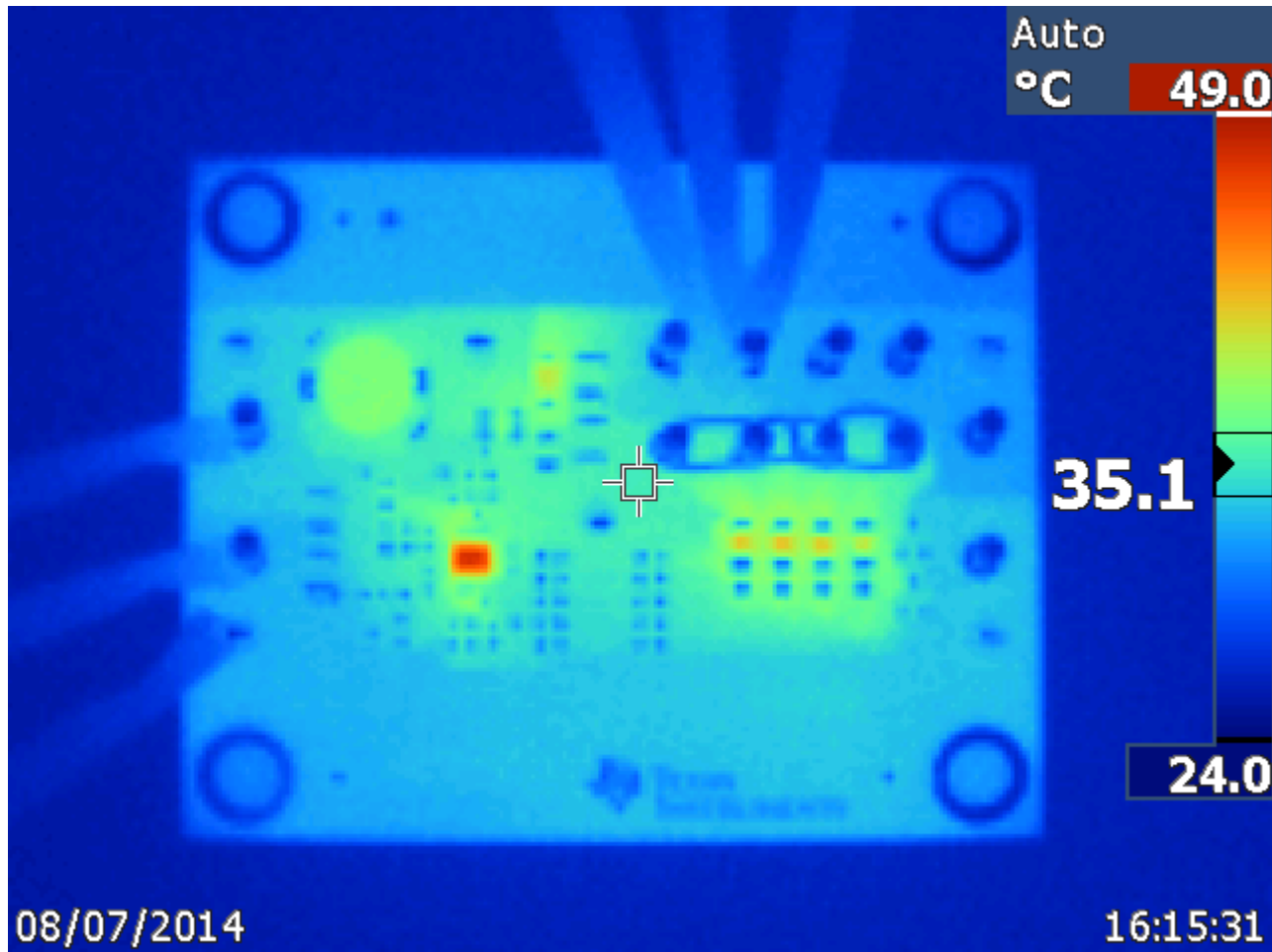


Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
58.025	0.2734	57.187	0.2704	15.86	15.46	0.40	97.474
58.026	0.2692	57.929	0.2616	15.62	15.15	0.47	97.014
58.025	0.2737	58.924	0.2616	15.88	15.41	0.47	97.060
58.024	0.2784	59.932	0.2616	16.15	15.68	0.48	97.055
58.024	0.2830	60.927	0.2616	16.42	15.94	0.48	97.063
58.024	0.2877	61.922	0.2616	16.69	16.20	0.49	97.037
58.023	0.2925	62.927	0.2616	16.97	16.46	0.51	96.995
58.022	0.2972	63.922	0.2616	17.24	16.72	0.52	96.972
58.022	0.3021	64.928	0.2616	17.53	16.99	0.54	96.901
58.021	0.3069	65.924	0.2616	17.81	17.25	0.56	96.850
58.020	0.3118	66.928	0.2616	18.09	17.51	0.58	96.781
58.020	0.3166	67.923	0.2616	18.37	17.77	0.60	96.731
58.019	0.3216	68.928	0.2616	18.66	18.03	0.63	96.638
58.022	0.3161	69.711	0.2543	18.34	17.73	0.61	96.656

5 Thermal

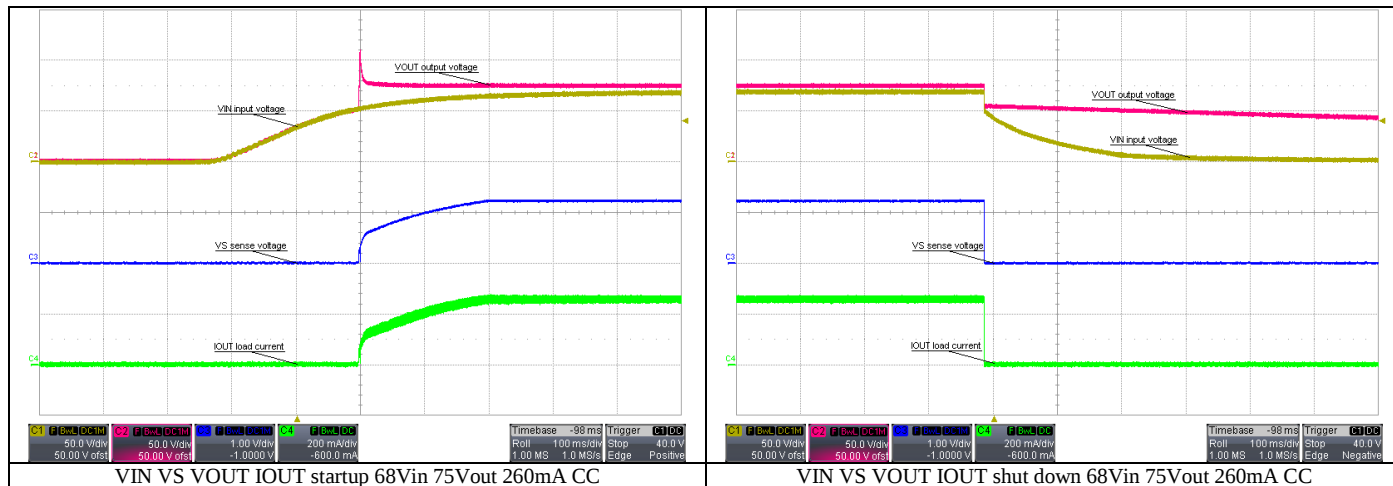
5.1 Thermal Image

68V input to 75V output 260mA load.



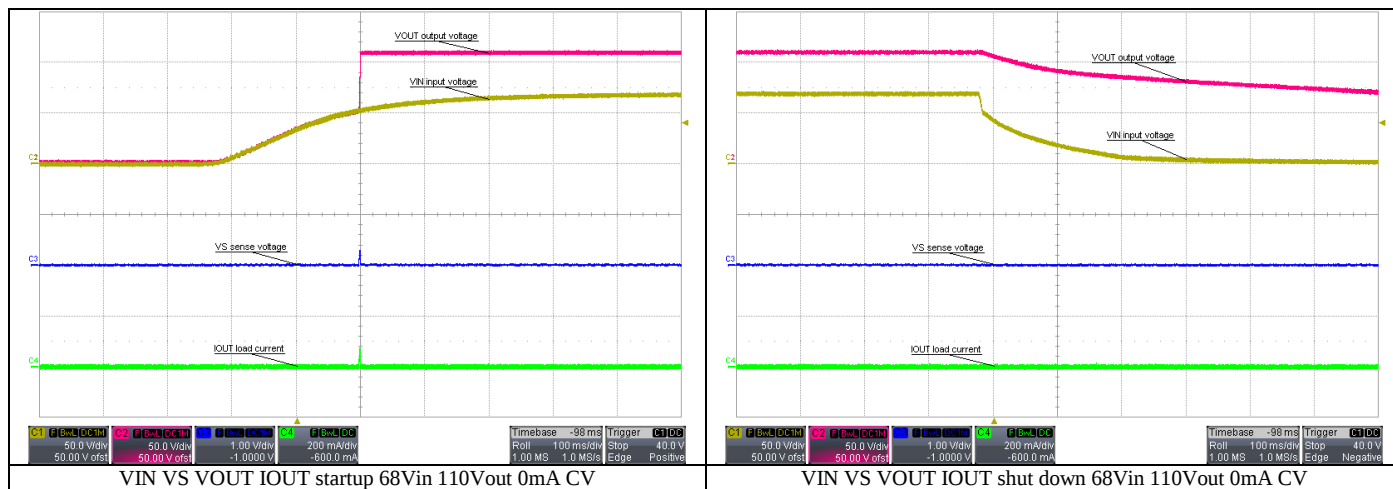
6 Startup and Shut Down

6.1 Startup and Shut Down into 260mA Load



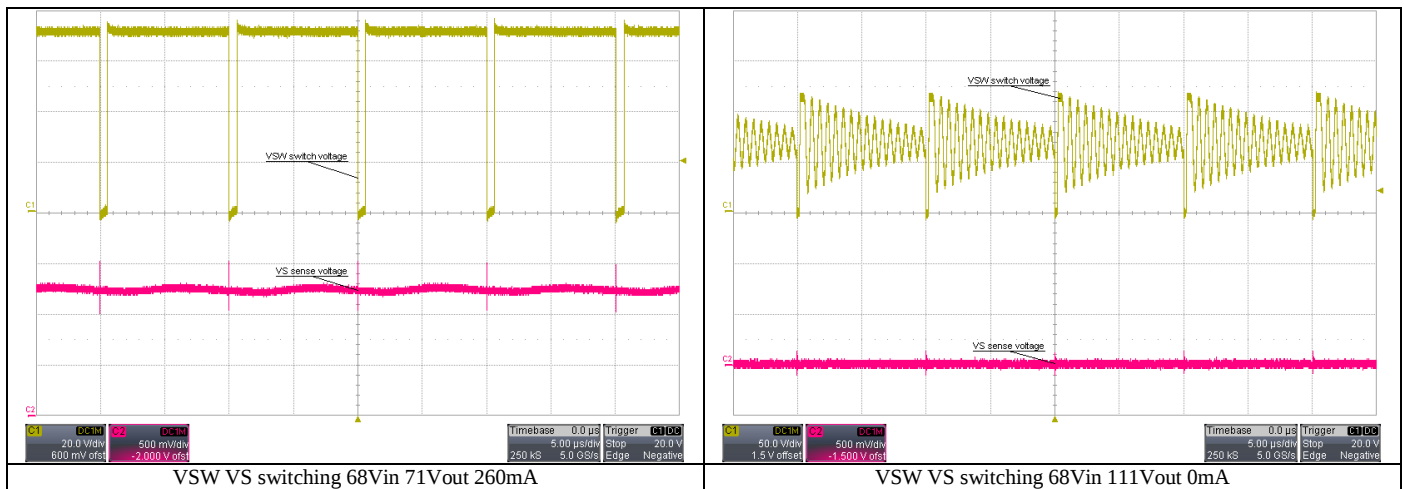
6.1 Startup and Shut Down into No Load

This demonstrates output over-voltage limiting at 110V.

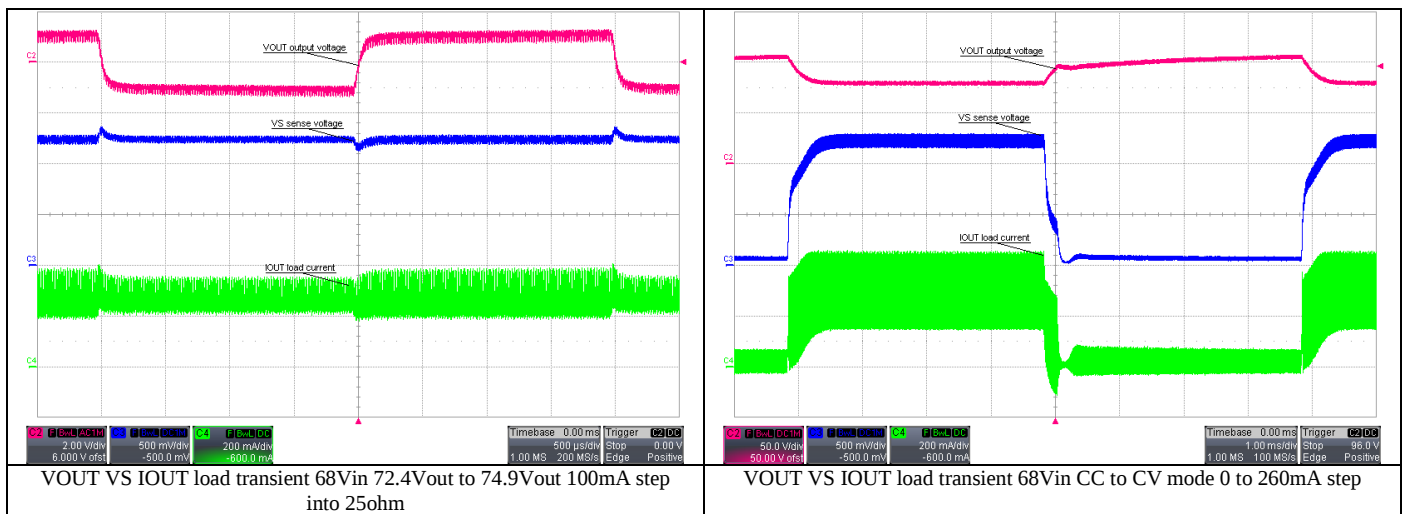


PMP10505 Test Results

7 Switch Voltage and Sense Voltage Ripple



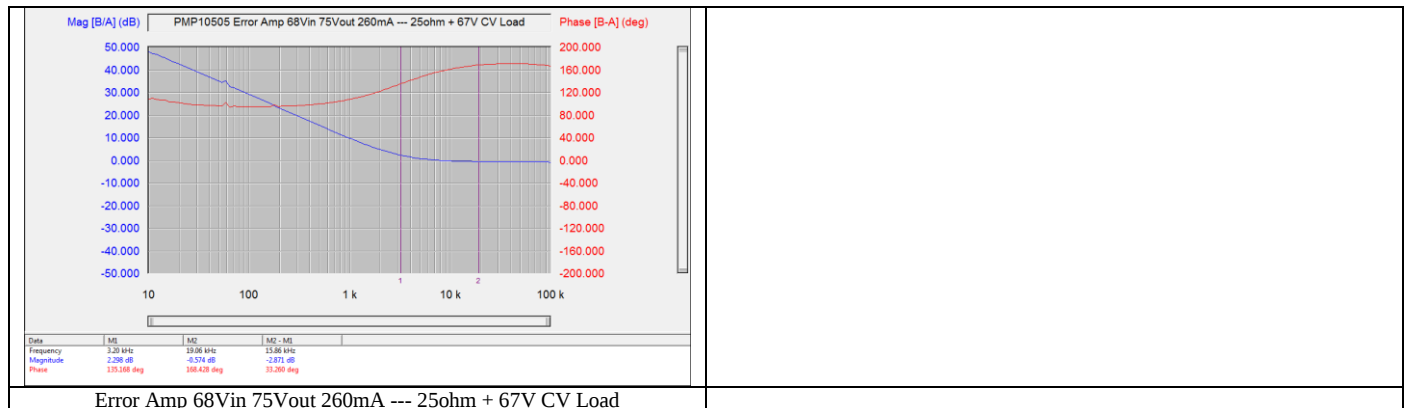
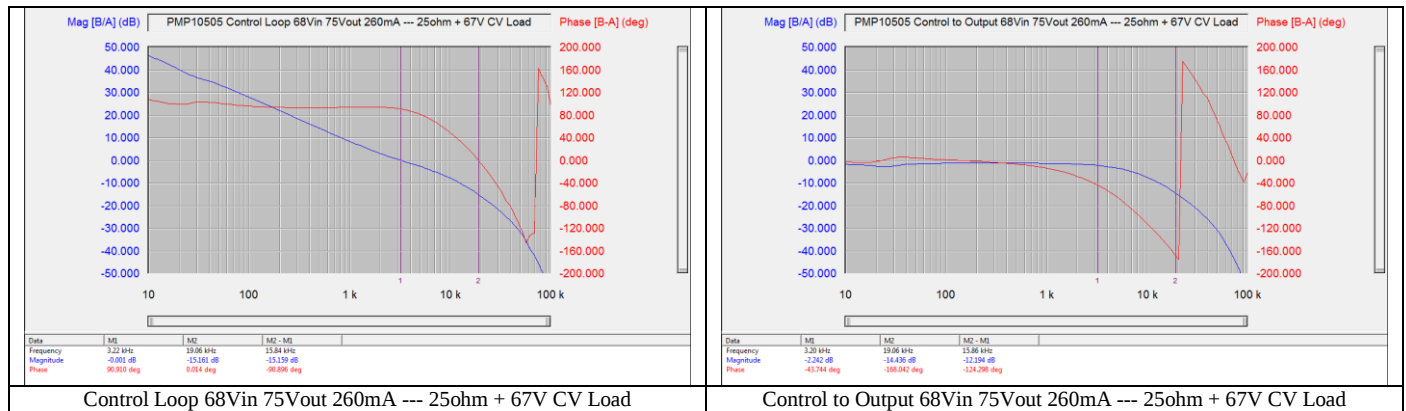
8 Load Transient Response



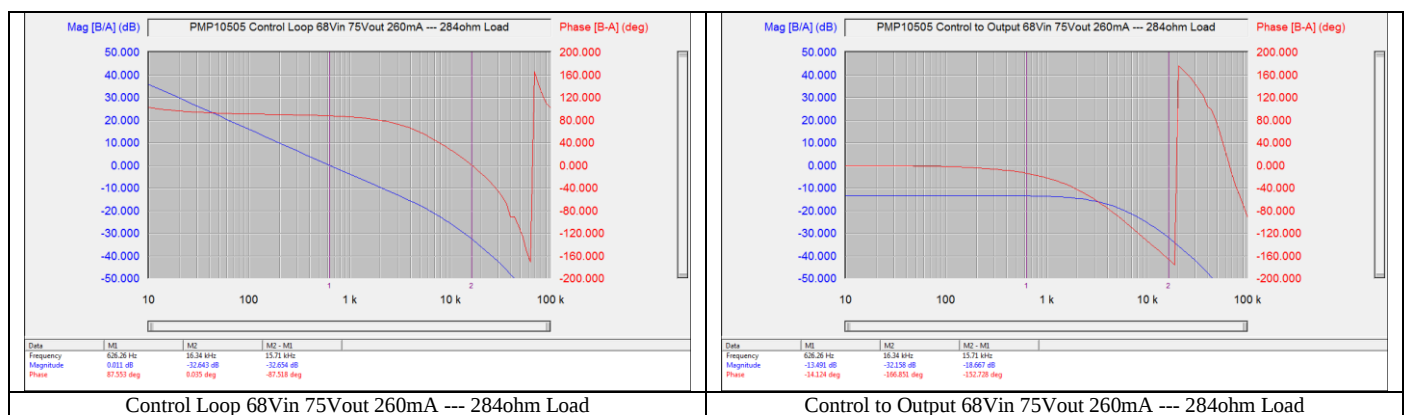
PMP10505 Test Results

9 Control Loop Frequency Response

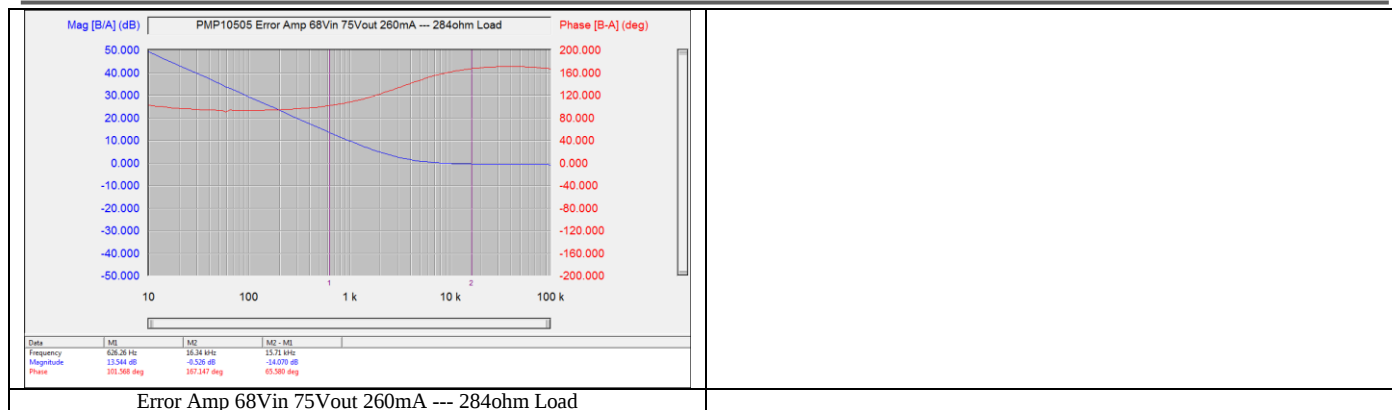
9.1 25Ω and 67V Constant Voltage Load



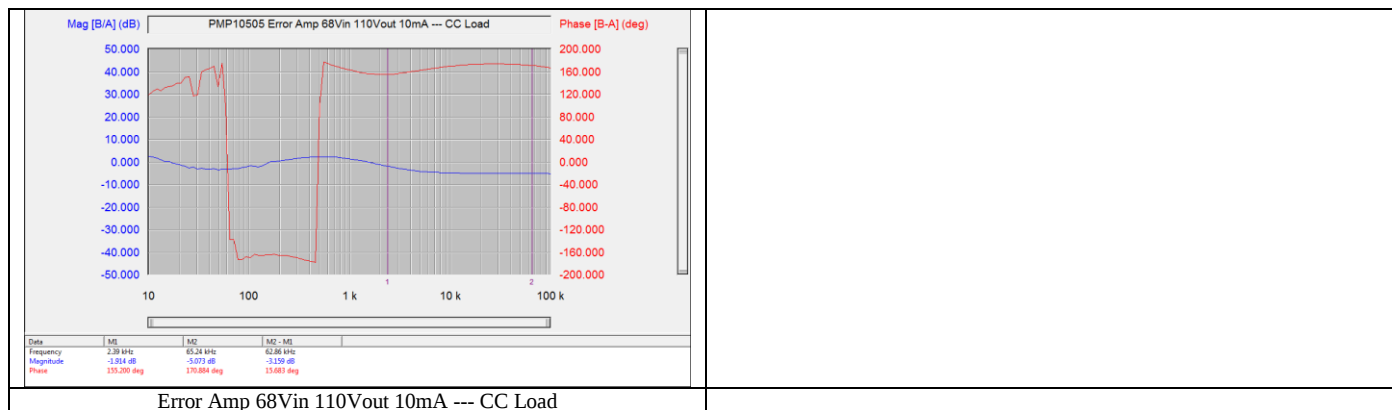
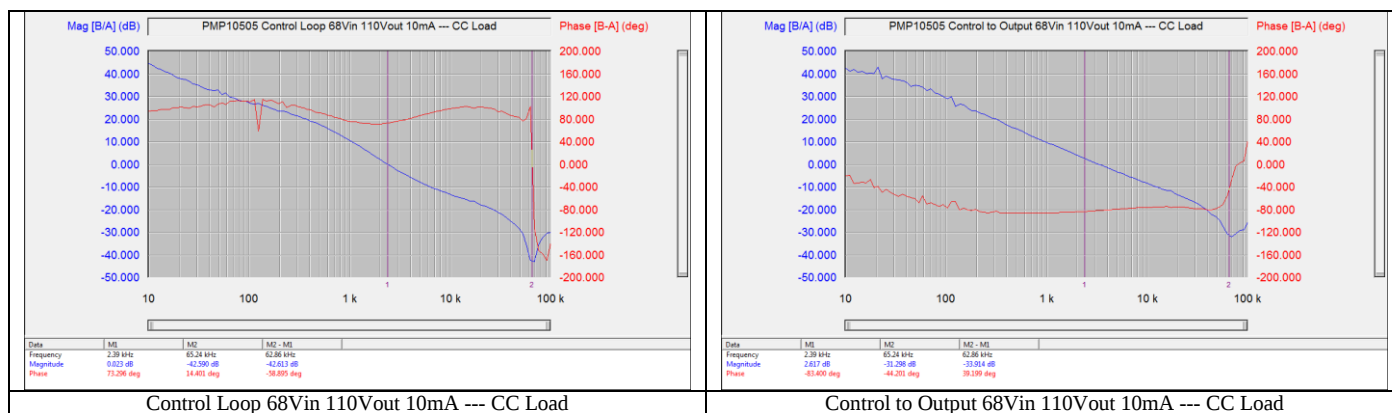
9.2 284Ω Resistive Load



PMP10505 Test Results



9.3 10mA Constant Current Load



10 Input Under-Voltage Lockout

Condition	Voltage (V)
Turn On – Rising Threshold	51.35
Turn Off – Falling Threshold	49.45

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