PMP3970 Rev C Test Results

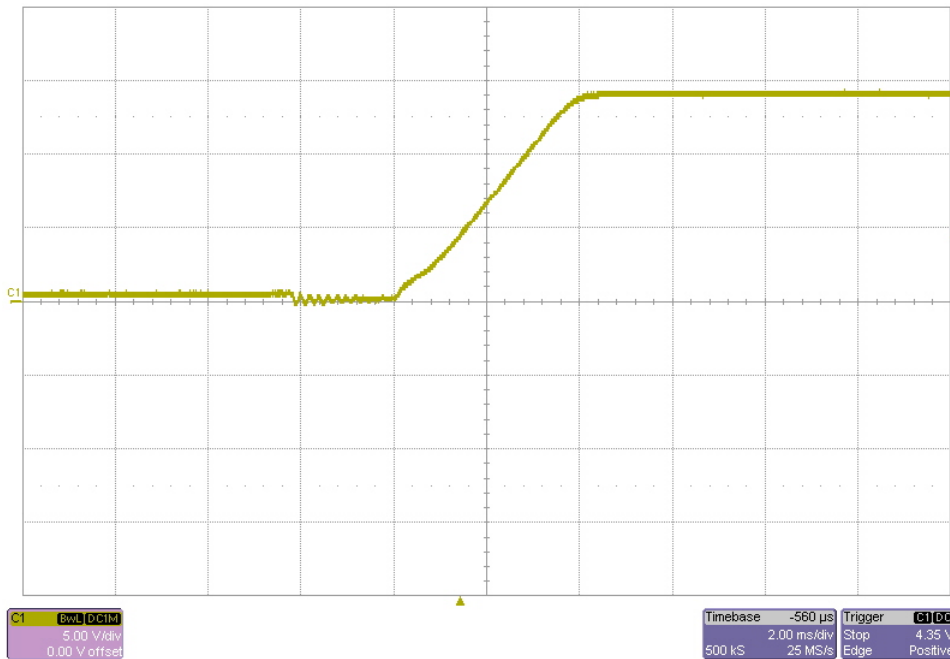![Texas Instruments logo]

1   Photo

The photograph below shows the top view of the PMP3970 Rev C demo board. The circuit is built on a PMP506 Rev A PWB.
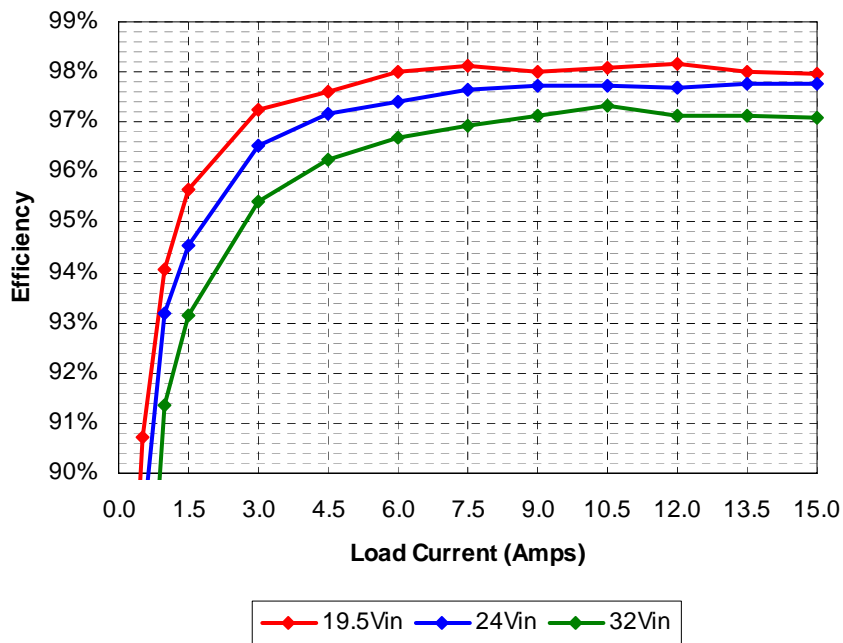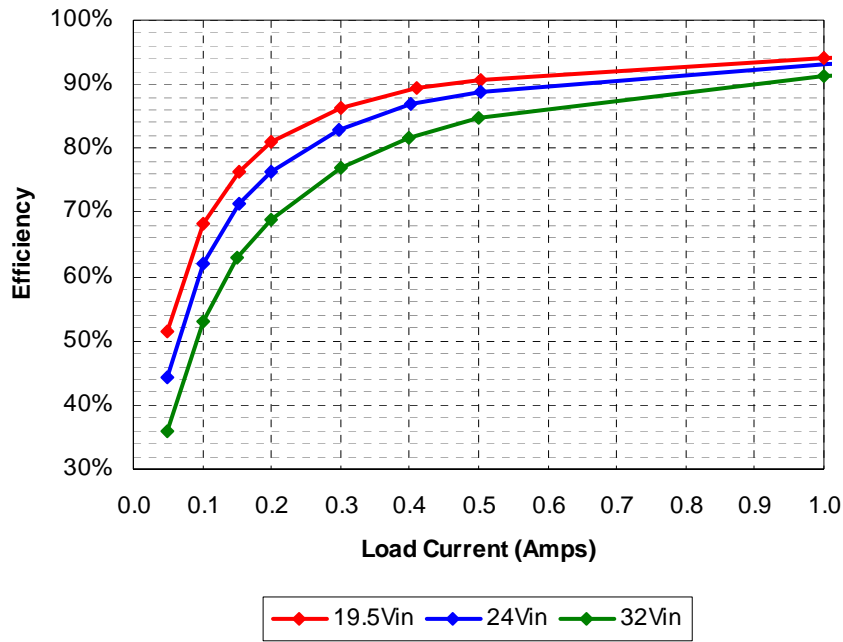

2   Startup

The output voltage at startup is shown in the images below. The input was set to 24V, and the output was unloaded.

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3 Efficiency

The efficiency data is shown in the tables and graph below.

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Iout	Vout	Vin	Iin	Pout	Losses	Efficiency
0.00	14.10	19.54	0.033	0.00	0.645	0.0%
0.049	14.10	19.49	0.069	0.69	0.654	51.4%
0.100	14.10	19.48	0.106	1.41	0.655	68.3%
0.153	14.10	19.47	0.145	2.16	0.666	76.4%
0.200	14.10	19.47	0.179	2.82	0.665	80.9%
0.302	14.10	19.51	0.253	4.26	0.678	86.3%
0.410	14.10	19.50	0.332	5.78	0.693	89.3%
0.504	14.10	19.49	0.402	7.11	0.729	90.7%
1.000	14.10	19.49	0.769	14.10	0.888	94.1%
1.495	14.10	19.54	1.128	21.08	0.962	95.6%
3.002	14.10	19.49	2.233	42.33	1.193	97.3%
4.49	14.10	19.54	3.320	63.31	1.564	97.6%
6.00	14.10	19.53	4.42	84.60	1.723	98.0%
7.50	14.10	19.56	5.51	105.75	2.026	98.1%
9.00	14.10	19.50	6.64	126.90	2.580	98.0%
10.50	14.10	19.50	7.74	148.05	2.880	98.1%
12.00	14.10	19.50	8.84	169.20	3.180	98.2%
13.50	14.10	19.50	9.96	190.35	3.870	98.0%
15.00	14.10	19.50	11.07	211.50	4.365	98.0%

Iout	Vout	Vin	Iin	Pout	Losses	Efficiency
0.00	14.10	23.99	0.036	0.00	0.864	0.0%
0.049	14.10	23.99	0.065	0.69	0.868	44.3%
0.100	14.10	23.98	0.095	1.41	0.868	61.9%
0.153	14.10	24.03	0.126	2.16	0.870	71.3%
0.200	14.10	24.02	0.154	2.82	0.879	76.2%
0.299	14.10	24.02	0.212	4.22	0.876	82.8%
0.402	14.10	24.01	0.272	5.67	0.863	86.8%
0.502	14.10	24.00	0.332	7.08	0.890	88.8%
1.005	14.10	24.06	0.632	14.17	1.035	93.2%
1.501	14.10	24.02	0.932	21.16	1.223	94.5%
3.012	14.09	24.01	1.831	42.44	1.523	96.5%
4.50	14.09	23.99	2.720	63.41	1.848	97.2%
5.99	14.09	23.97	3.615	84.40	2.252	97.4%
7.50	14.09	24.05	4.50	105.68	2.550	97.6%
9.00	14.09	24.03	5.40	126.81	2.952	97.7%
10.50	14.09	23.99	6.31	147.95	3.432	97.7%
12.00	14.09	23.97	7.22	169.08	3.983	97.7%
13.50	14.10	24.04	8.10	190.35	4.374	97.8%
15.00	14.10	24.01	9.01	211.50	4.830	97.8%

| Iout	Vout	Vin	Iin	Pout	Losses	Efficiency
0.00	14.10	32.03	0.039	0.00	1.249	0.0%
0.049	14.09	32.03	0.060	0.69	1.231	35.9%
0.100	14.09	32.03	0.083	1.41	1.249	53.0%
0.149	14.09	32.03	0.104	2.10	1.232	63.0%
0.199	14.09	32.02	0.127	2.80	1.263	69.0%
0.301	14.09	32.02	0.172	4.24	1.266	77.0%
0.399	14.09	32.01	0.215	5.62	1.260	81.7%
0.501	14.09	32.01	0.260	7.06	1.264	84.8%
1.001	14.09	32.03	0.482	14.10	1.334	91.4%
1.502	14.09	32.00	0.710	21.16	1.557	93.1%
3.002	14.09	32.01	1.385	42.30	2.036	95.4%
4.50	14.09	32.02	2.057	63.41	2.460	96.3%
6.00	14.09	32.03	2.730	84.54	2.902	96.7%
7.50	14.09	31.94	3.413	105.68	3.336	96.9%
9.00	14.09	32.00	4.08	126.81	3.750	97.1%
10.50	14.10	32.02	4.75	148.05	4.045	97.3%
12.00	14.10	32.02	5.44	169.20	4.989	97.1%
13.50	14.10	32.08	6.11	190.35	5.659	97.1%
15.00	14.10	31.99	6.81	211.50	6.352	97.1%

4   Thermal Image

A thermal image of the top side of the board is shown with a 15A load. The ambient temperature was 27ºC, with no forced air flow. The top MOSFET (Q100) was the hottest component on the board and measured 77.3ºC.
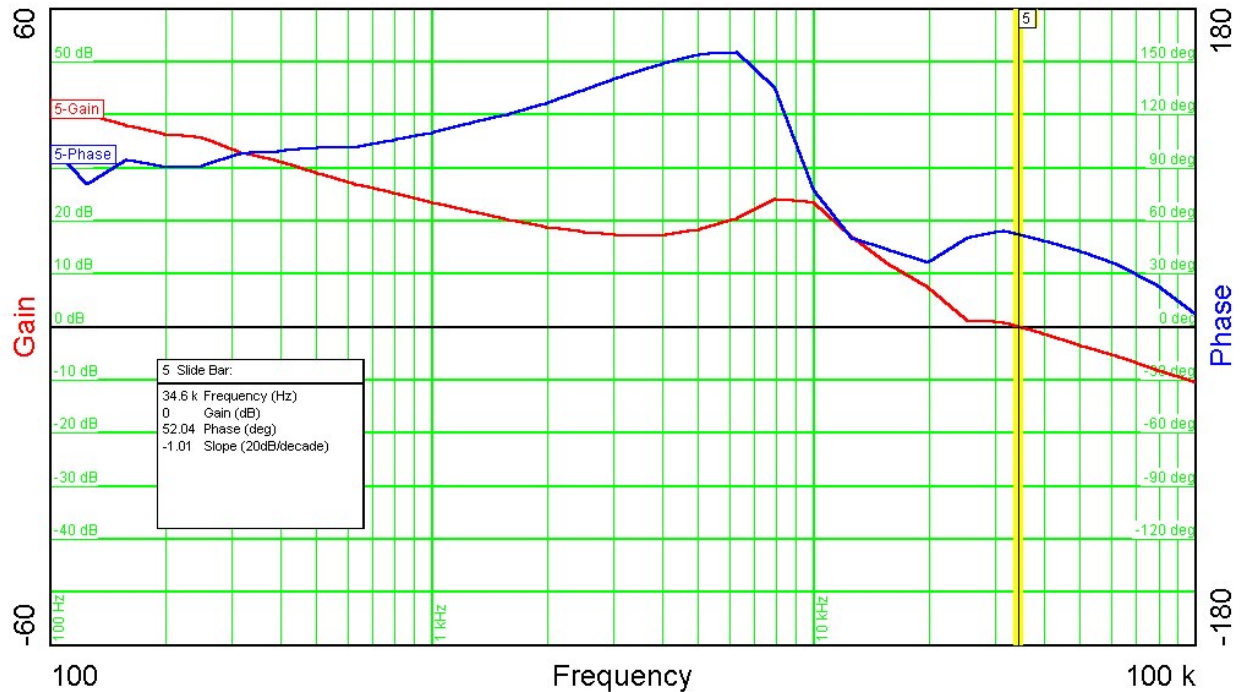
5   Output Ripple Voltage

The output ripple voltage is shown in the plot below. The input was set to 32Vand the load was set to 15A.
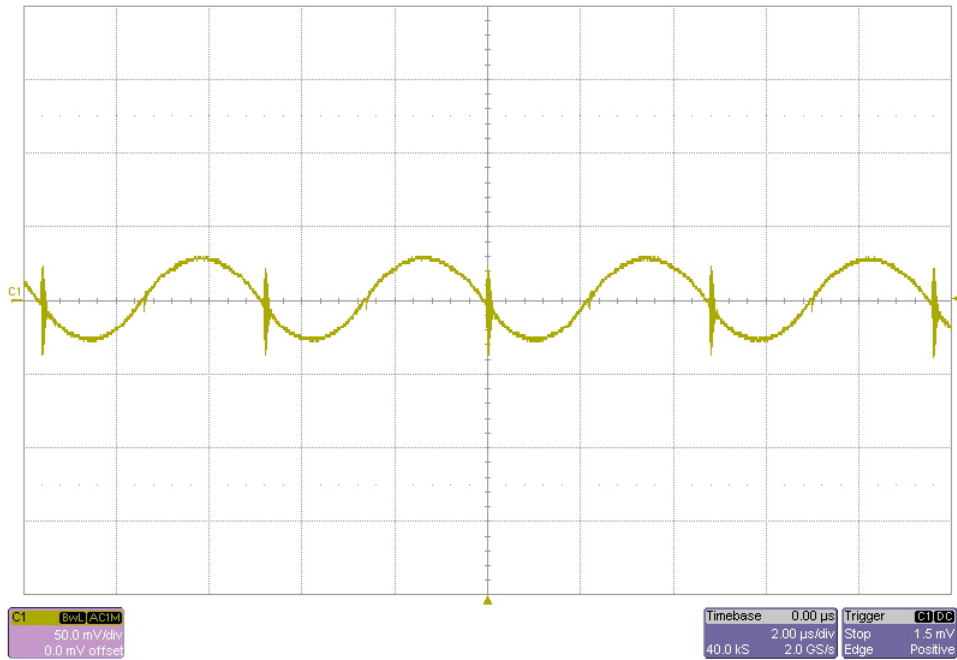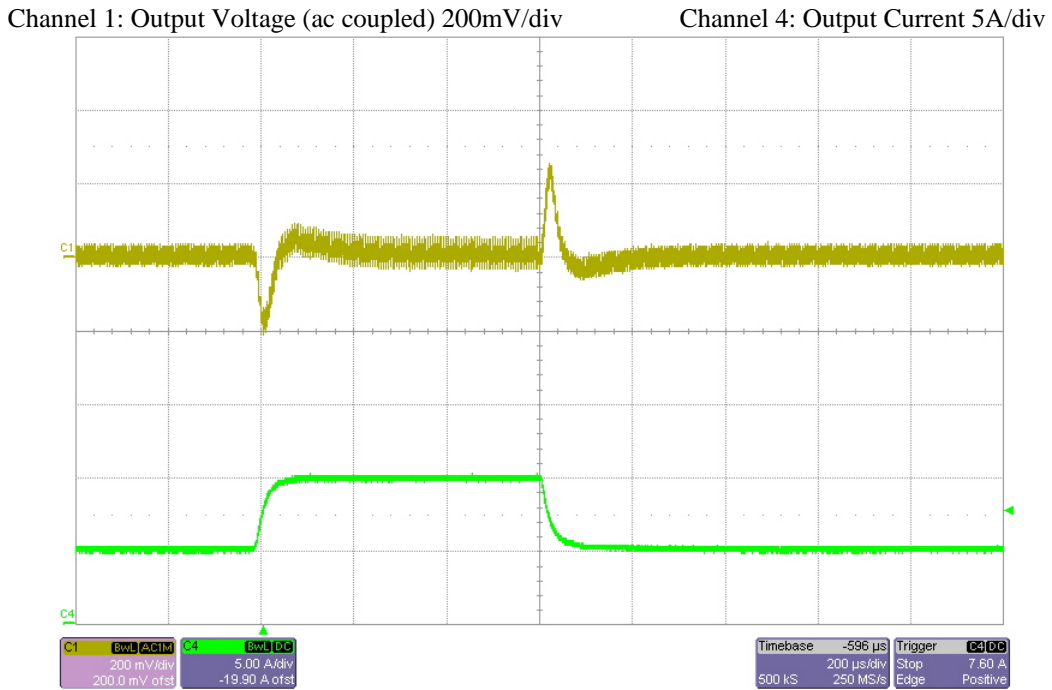

6   Frequency Response

The frequency response of the feedback loop is shown below. The input was 24V and the load was 15A.

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7 Load Transients

The image below shows the response to a 5A to 10A load transient with the input was set to 24V.

Channel 1: Output Voltage (ac coupled) 200mV/div   Channel 4: Output Current 5A/div

8 Switching Waveform

The image below shows the voltage on TP6 with a 24V input and a 15A load.
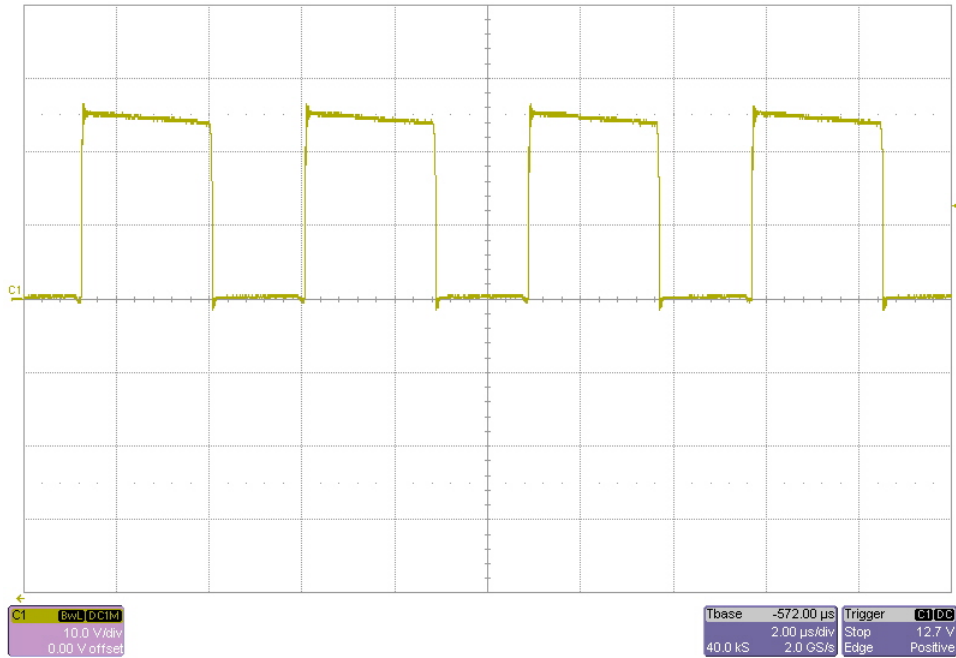
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