

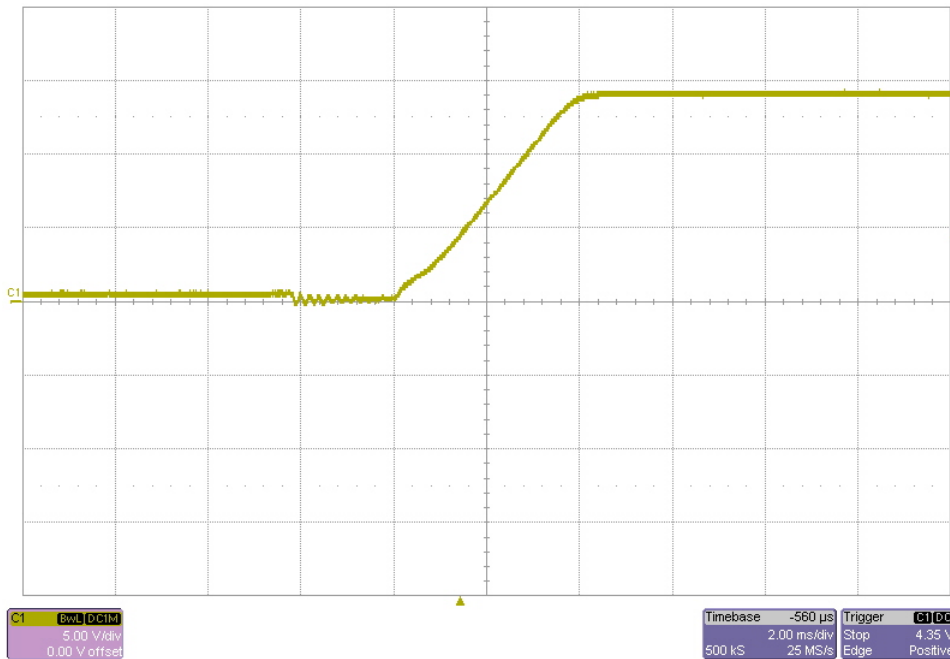
1 Photo

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



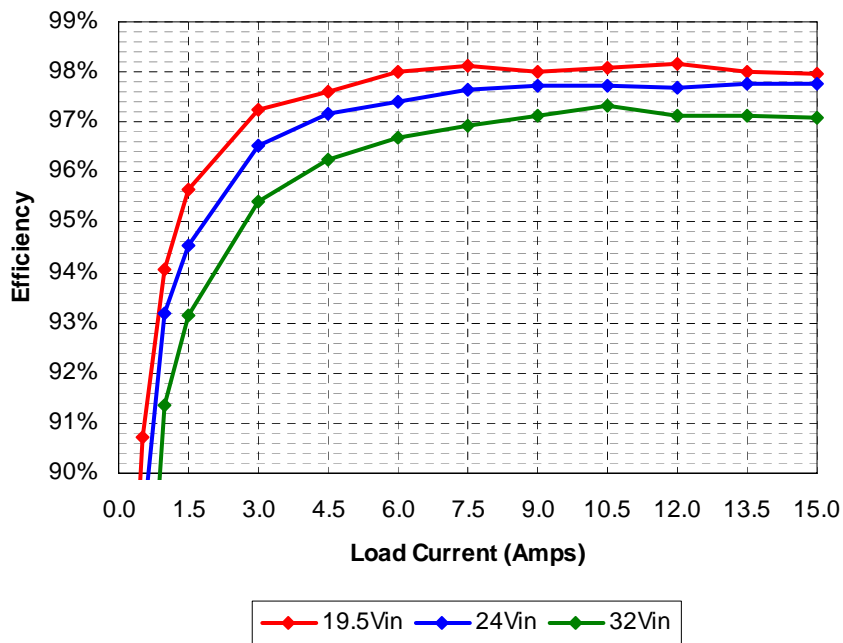
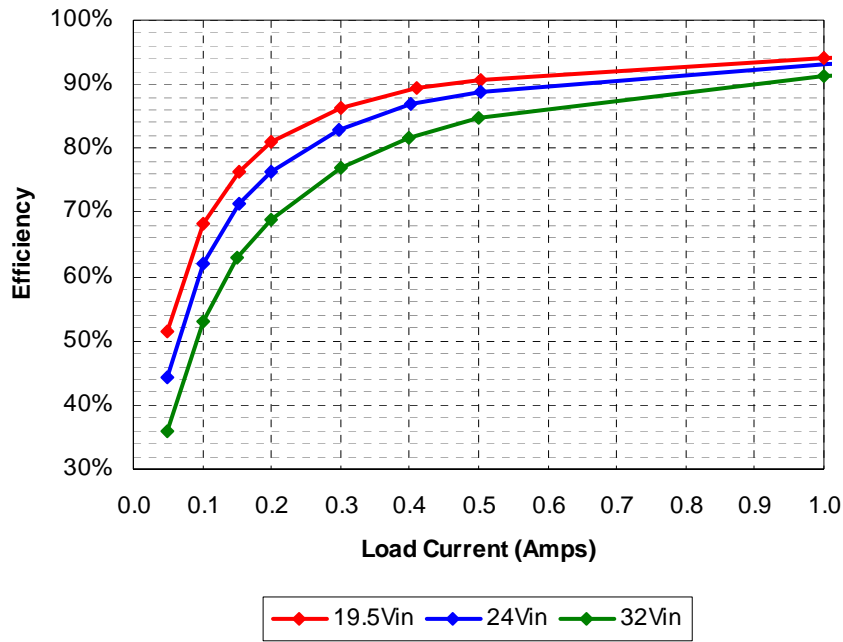
2 Startup

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



3 Efficiency

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



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%

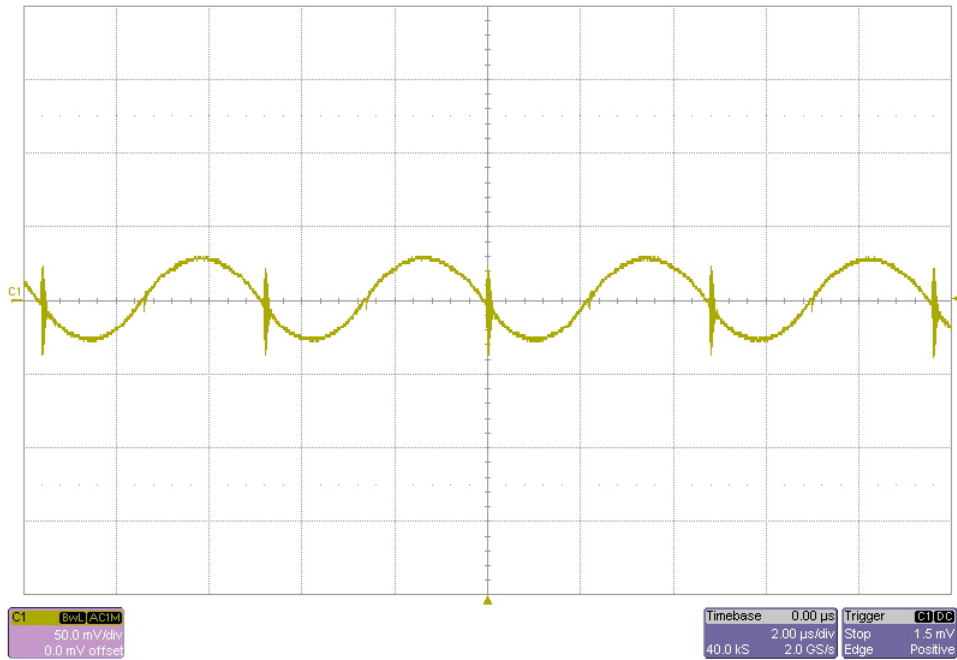
4 Thermal Image

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



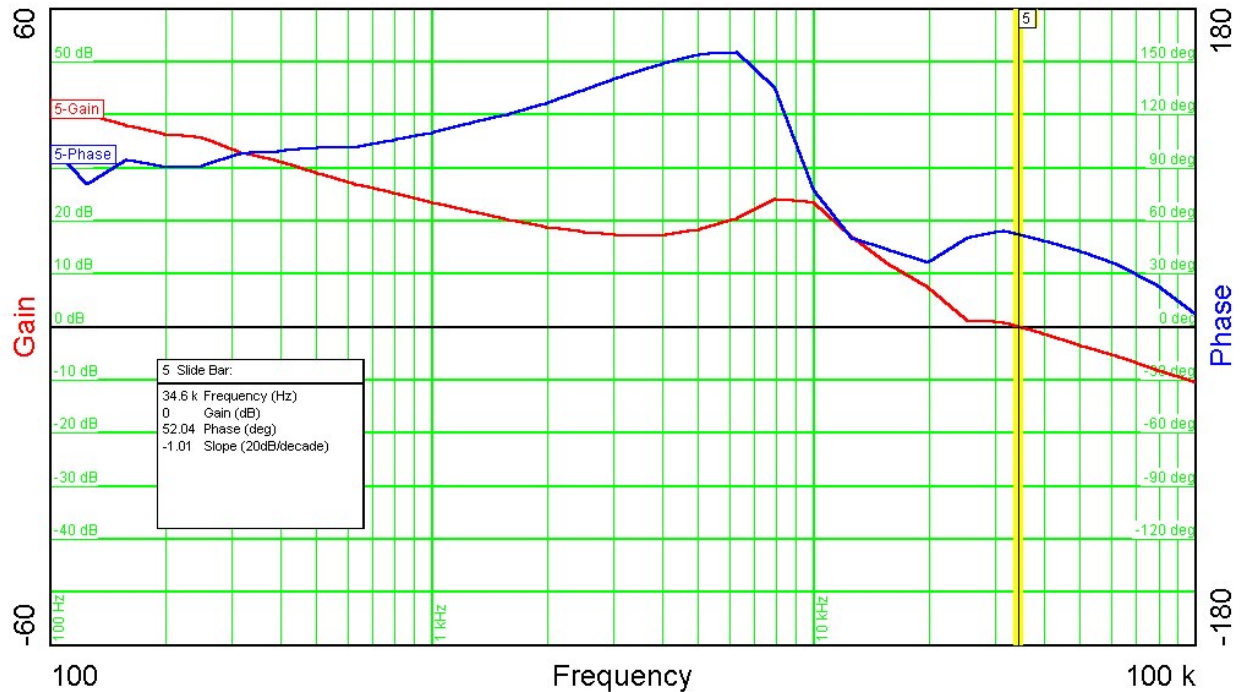
5 Output Ripple Voltage

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



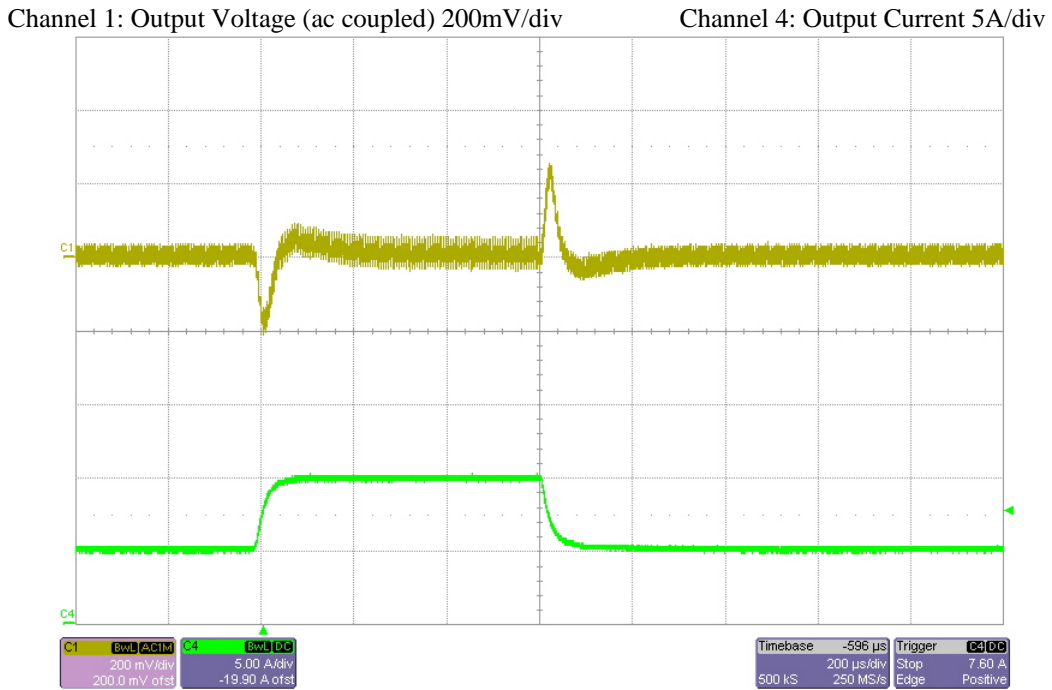
6 Frequency Response

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



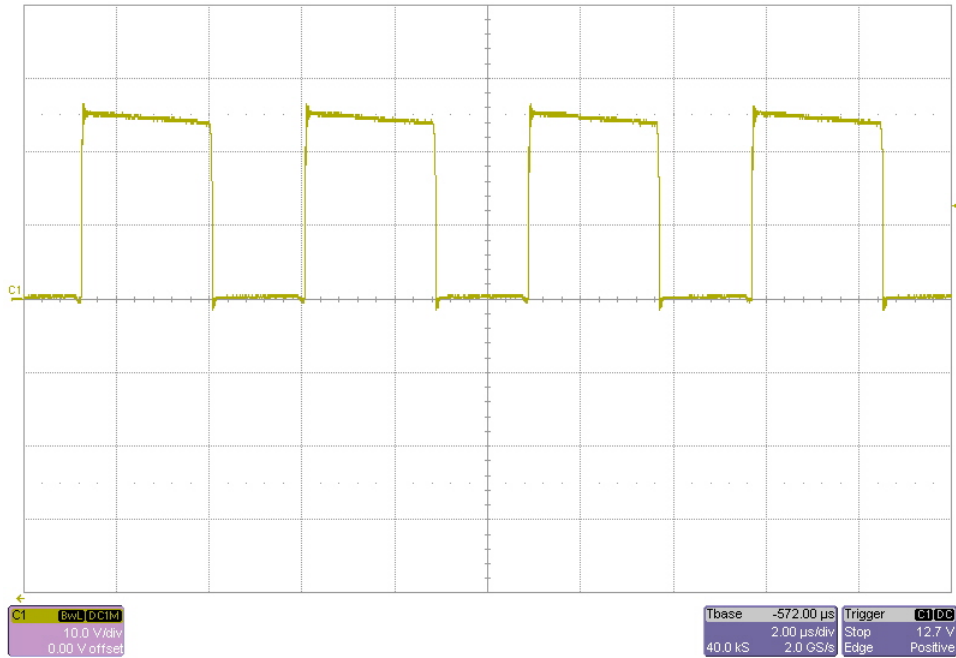
7 Load Transients

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



8 Switching Waveform

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



IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), 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, regulatory 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](#) or other applicable terms available either on [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.

TI objects to and rejects any additional or different terms you may have proposed.

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