

Test Report: PMP21872 12-Vin, 1-Vout, 40-A Dual Phase Synchronous Buck Reference Design



Description

PMP21872 is a dual-phase synchronous buck solution using TPS53622 controller with 2-CSD95490 power-stage ICs. It takes a 12V input and converts it to 1V out at 40A; 20A per phase.



Test Prerequisites



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1.1 Voltage and Current Requirements

Table 1. Voltage and Current Requirements

PARAMETER	SPECIFICATIONS
Input Voltage Range	10.8-13.2V; nom 12VDCin
Switching Frequency	500kHz
Output Voltage/Current	1V/40A

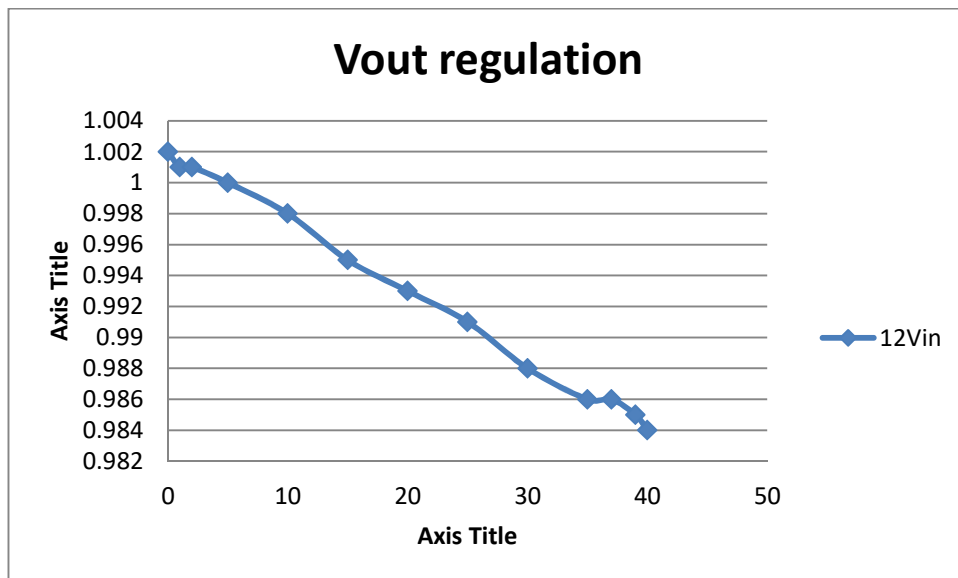
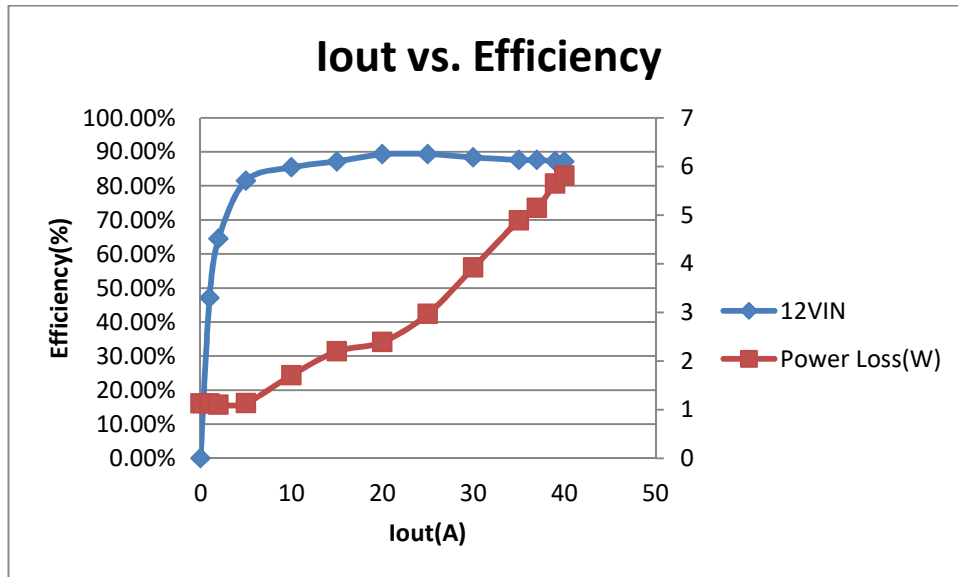
1.2 Required Equipment*

- DC voltage source
- Electronic load
- Multi-meters
- Oscilloscope

2 Testing and Results

2.1 Efficiency and Voltage Regulation

2.1.1 1V output;12Vin;3.3Vin Bias



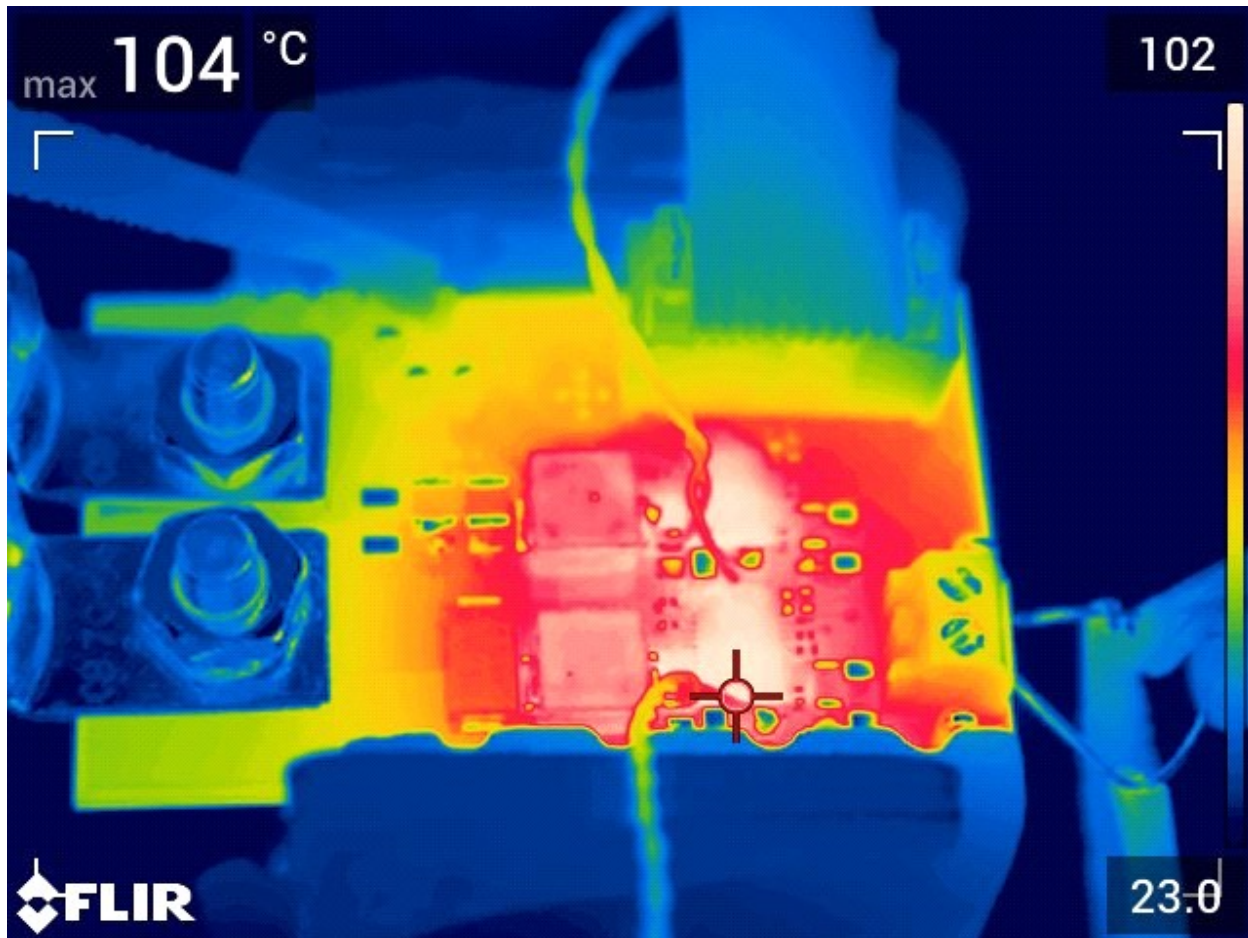
Vin(V)	Iin(A)	Pin(W)	Vout(V)	Iout(A)	Pout(W)	Eff(%)	Ploss(W)
12.025	0.095	1.1666	1.002	0	0	0.00%	1.1666
12.002	0.176	2.1646	1.001	1	1.001	46.24%	1.1636
12.08	0.258	3.1436	1.001	2	2.002	63.68%	1.1416
12.006	0.511	6.1746	1	5	5	80.98%	1.1746
12.083	0.968	11.7246	0.998	10	9.98	85.12%	1.7446
11.955	1.432	17.1596	0.995	15	14.925	86.98%	2.2346
12.031	1.849	22.2896	0.993	20	19.86	89.10%	2.4296
11.999	2.311	27.7796	0.991	25	24.775	89.18%	3.0046
12.076	2.779	33.5996	0.988	30	29.64	88.22%	3.9596
12.029	3.275	39.4396	0.986	35	34.51	87.50%	4.9296
12.186	3.415	41.6696	0.986	37	36.482	87.55%	5.1876
12.11	3.649	44.0996	0.985	39	38.415	87.11%	5.6846
12.094	3.735	45.2096	0.984	40	39.36	87.06%	5.8496

Bias supply(V)	Iin	Pin
3.3	0.012	0.0396

2.2 Thermal Images

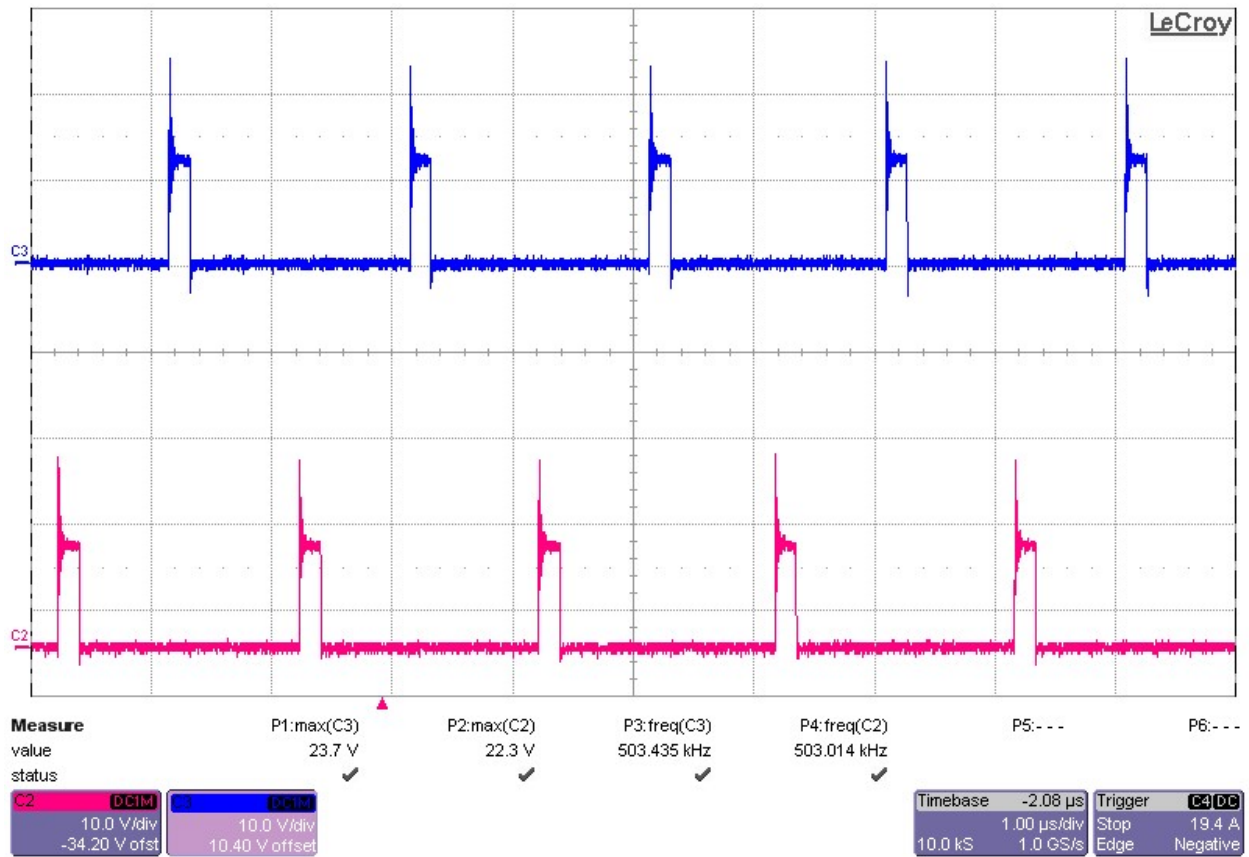
All images were taken after a 10 minute soak and at 25C. These were taken open frame and not in any case

2.2.1 12Vin; 1Vout; 40Aout



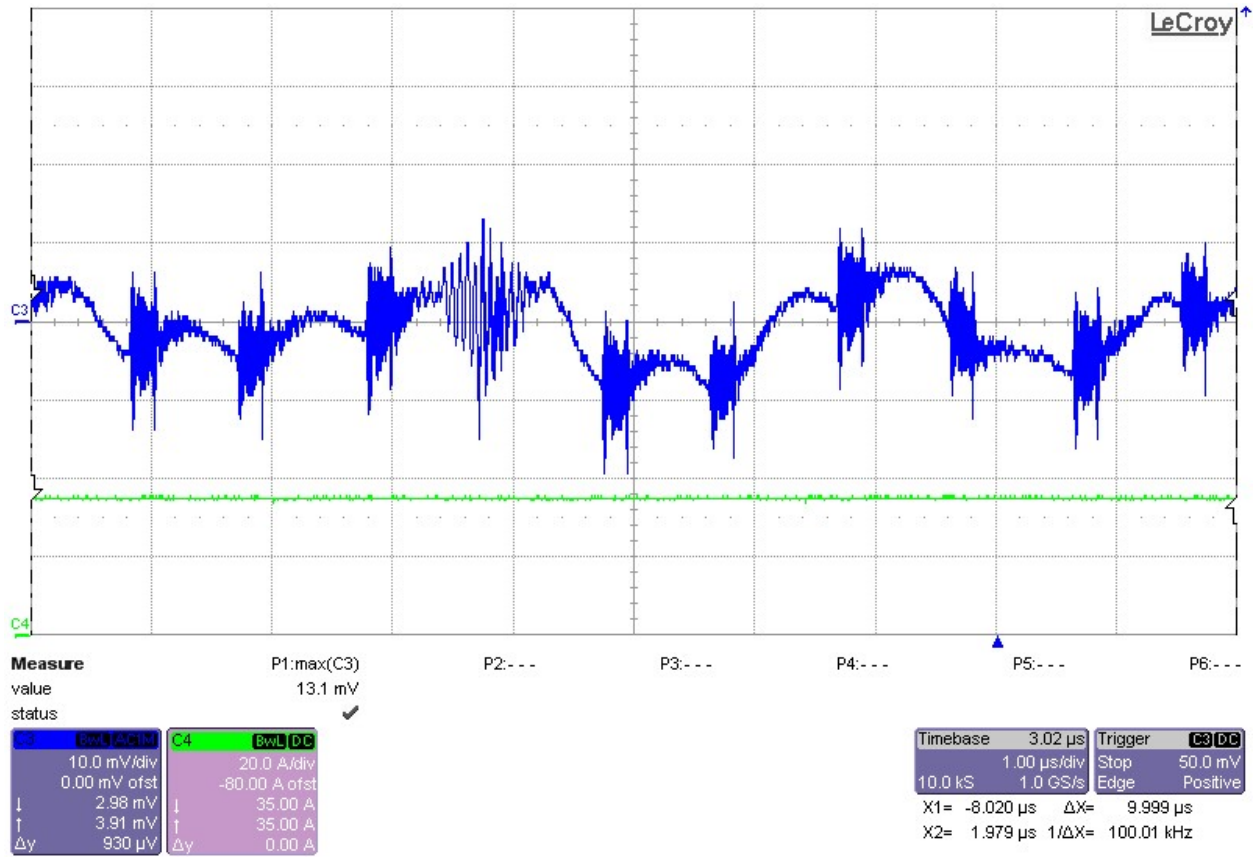
2.3 Switching Waveforms

2.3.1 12Vin; 1Vout; 40A out; dual-phase; 500kHz

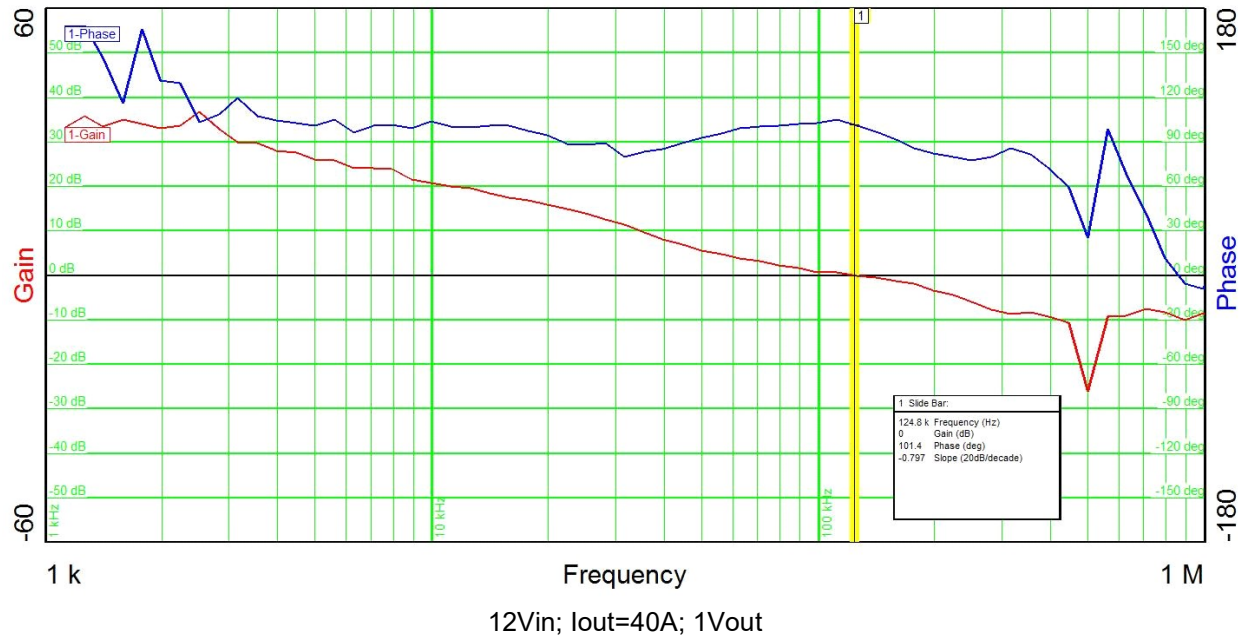


2.4 Output voltage ripple

IOut: 40A; 12vin; 1Vout

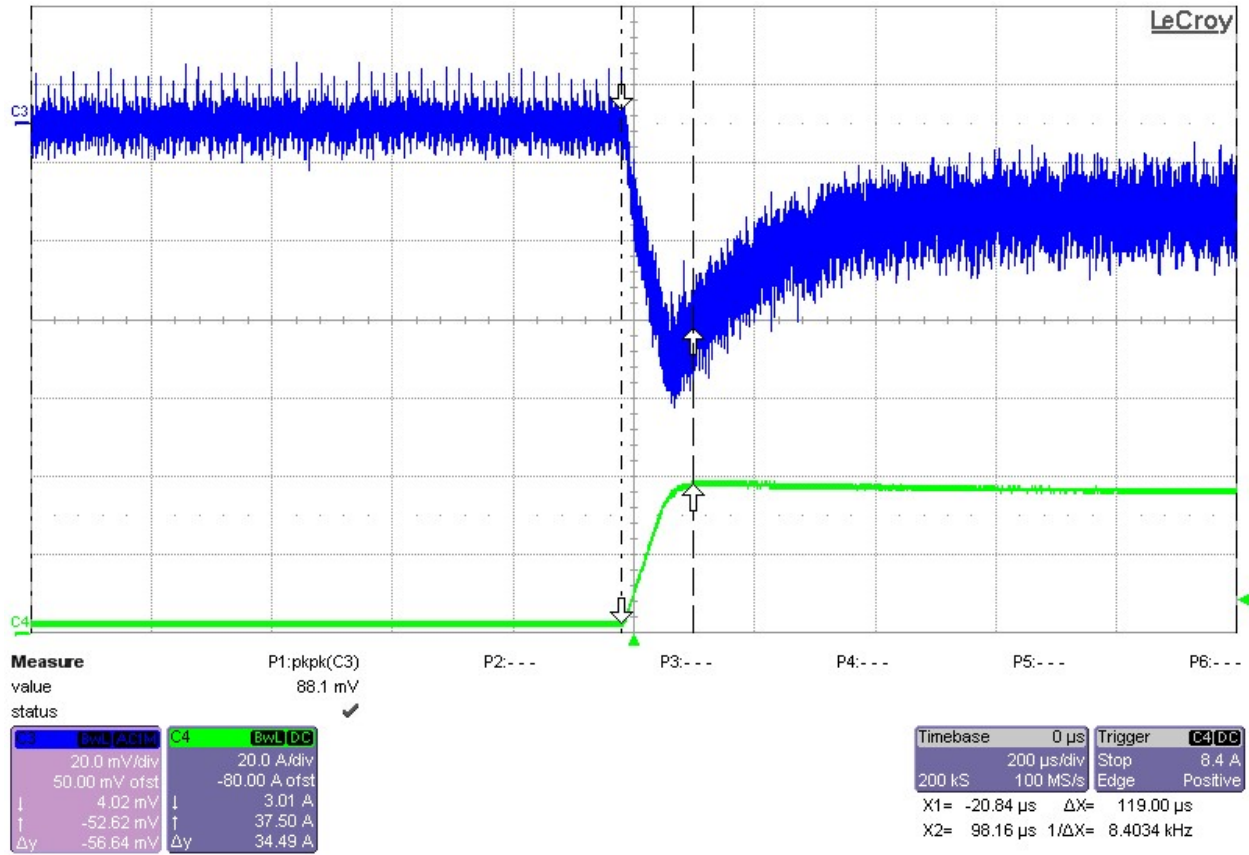


2.5 Bode Plot



2.6 load transients

2.6.1 1V output, 2.3A-37.8A



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