

Hardware Unit Test Report

DCDC Power measurement

Hardware version	FW version	Sample No.	eMMC Flash P/N
V015	None	S/N: 2152001215-01S1	None

1. PCBA Setup

PCBA only SMT on some parts of power IC, so the test is achieved by vendor. Some detail will be ignored.

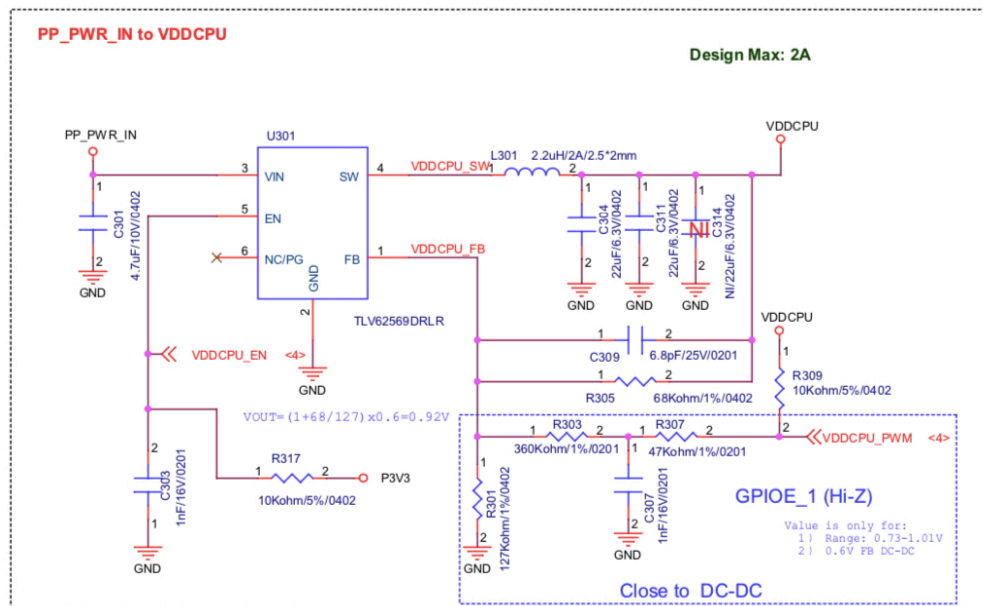
Measure circuits:

There are 4 power circuits need to measure and check the power efficiency can reach 80% and 85%.

The power circuits and DCDC consumption with full load notes are as below:

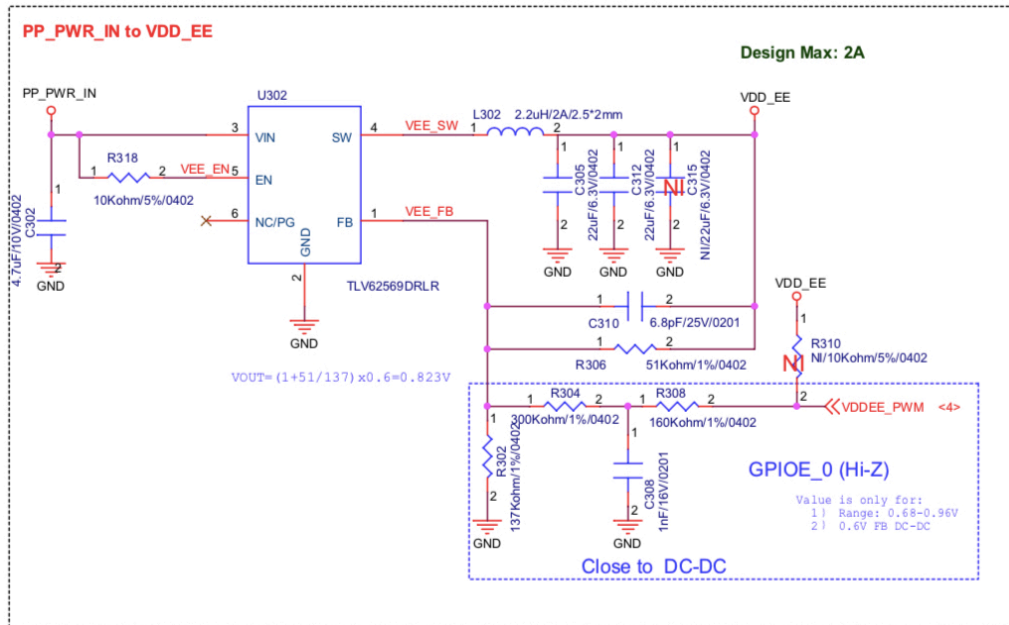
1. VDDCPU

VDDCPU is about **0.92V/368.5mA** usage in full load condition with playing 4Kp60 video from YouTube.



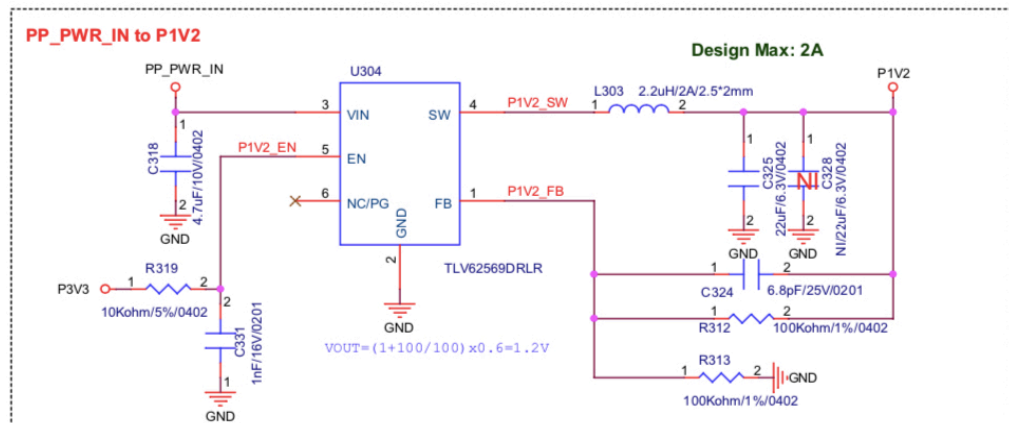
2. VDD_EE

VDD_EE is about **0.82V/688.8mA** usage in full load condition with playing 4Kp60 video from YouTube.



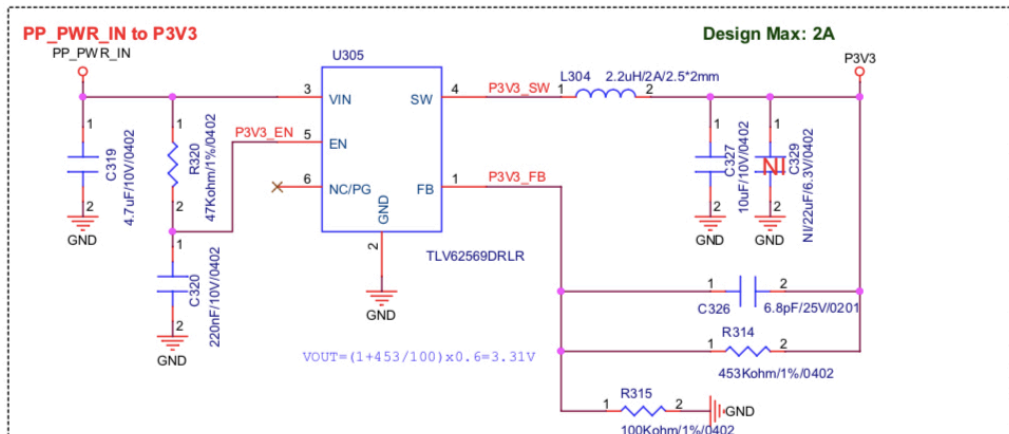
3. P1V2

P1V2 is about **1.2V/553.4mA** usage in full load condition with playing 4Kp60 video from YouTube.



4. P3V3

P3V3 is about **3.3V/280.5mA** usage in full load condition with playing 4Kp60 video from YouTube.



Criteria:

1. VDDCPU

Spec	Test result
Rail VDDCPU: Vout=0.92V, +/-100mV Ripple = +/-10% load transient = +/-10% Power efficiency=80% Power loss=20% Phase Margin>=45 degree Gain Margin>=12dB	Pass

2. VDD_EE

Spec	Test result
Rail VDD_EE: Vout=0.82V, +/-100mV Ripple = +/-10% load transient = +/-10% Power efficiency=80% Power loss=20% Phase Margin>=45 degree Gain Margin>=12dB	Pass

3. P1V2

Spec	Test result
Rail P1V2: Vout=1.2V, +/-100mV Ripple = +/-10% load transient = +/-10% Iout=2A maximum Power efficiency=85% Power loss=15% Phase Margin>=45 degree Gain Margin>=12dB	Pass

4. P3V3

Spec	Test result
Rail P3V3: Vout=3.3V, +/-100mV Ripple = +/-10% load transient = +/-10% Iout=2A maximum Power efficiency=90% Power loss=10% Phase Margin>=45 degree Gain Margin>=12dB	Pass

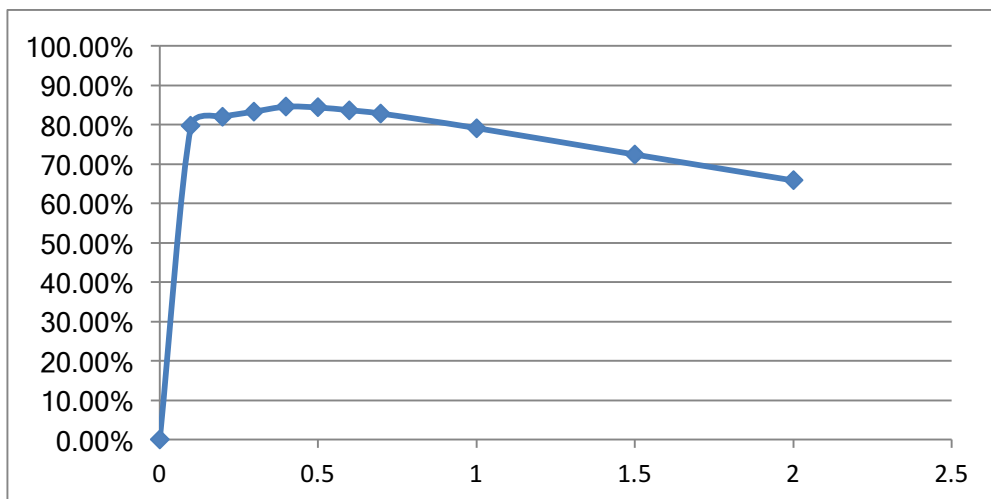
2. Test Results

1. VDDCPU

1. Efficiency

Vin	Iin	Vout	Iout	Eff	Loss	Pass/Fail
5.127	0.0011	0.882	0	0.00%	0.00%	--
5.122	0.0212	0.8765	0.0987	79.67%	20.33%	Fail
5.117	0.0414	0.874	0.1987	81.98%	18.02%	Pass
5.112	0.061	0.8697	0.2987	83.31%	16.69%	Pass
5.107	0.0802	0.8674	0.3993	84.56%	15.44%	Pass
5.102	0.1004	0.8653	0.4993	84.34%	15.66%	Pass
5.118	0.121	0.8654	0.5987	83.66%	16.34%	Pass
5.11	0.1426	0.8636	0.6987	82.81%	17.19%	Pass
5.075	0.2129	0.8549	1	79.12%	20.88%	Fail
5.043	0.3477	0.8459	1.5006	72.39%	27.61%	Fail
5.004	0.5079	0.8357	2.0012	65.80%	34.20%	Fail

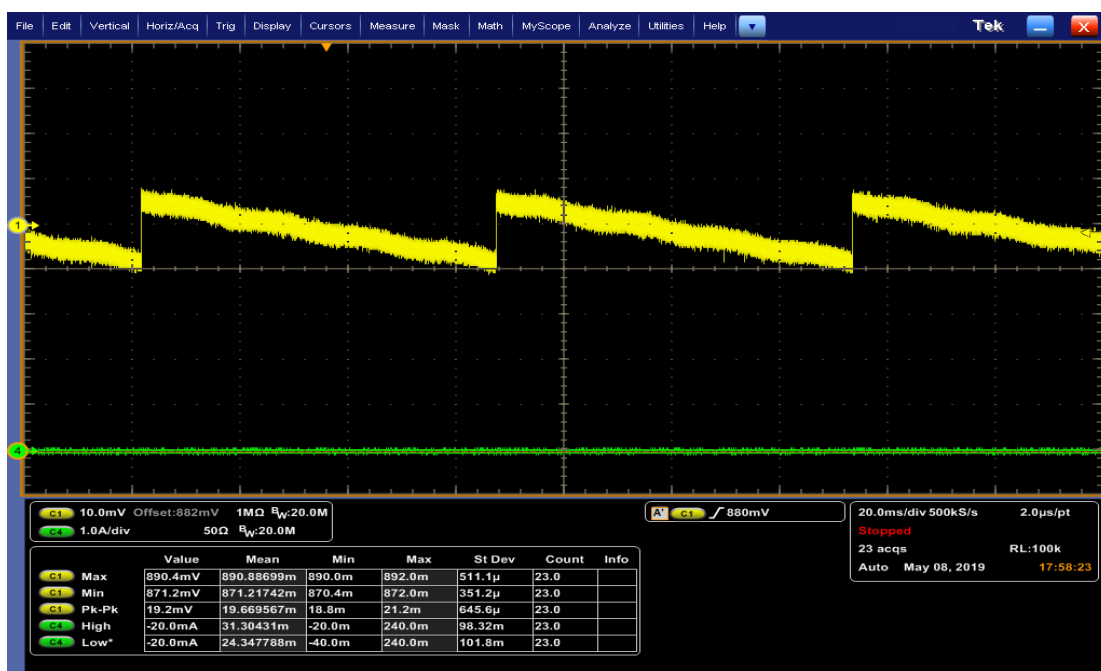
Efficiency Chart:



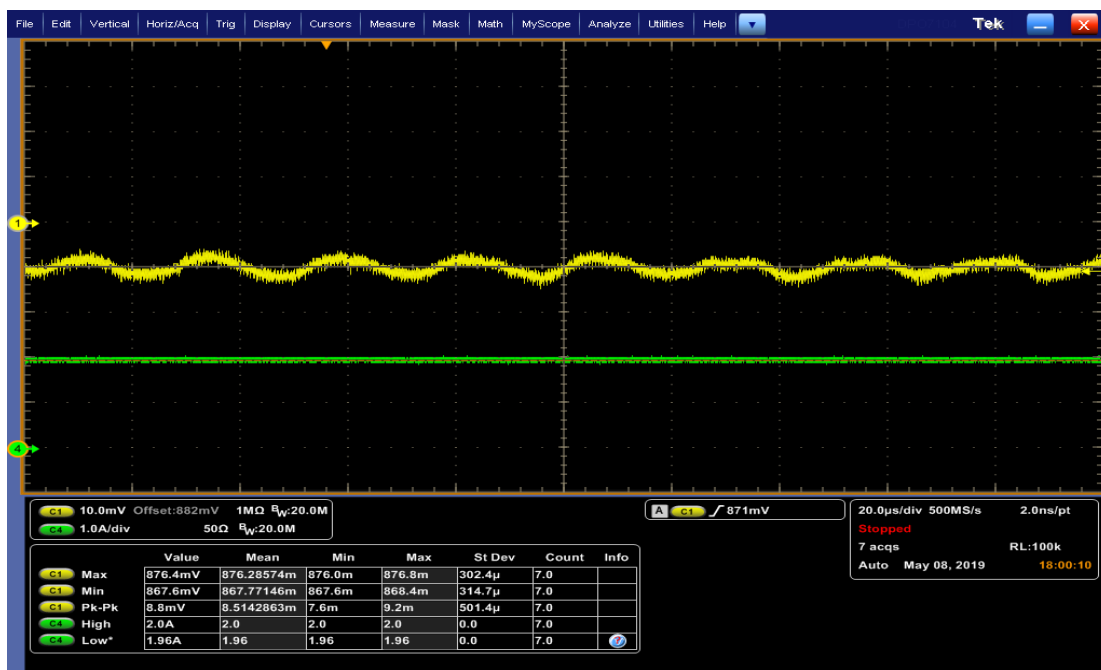
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2. Ripple

0A:



2A:



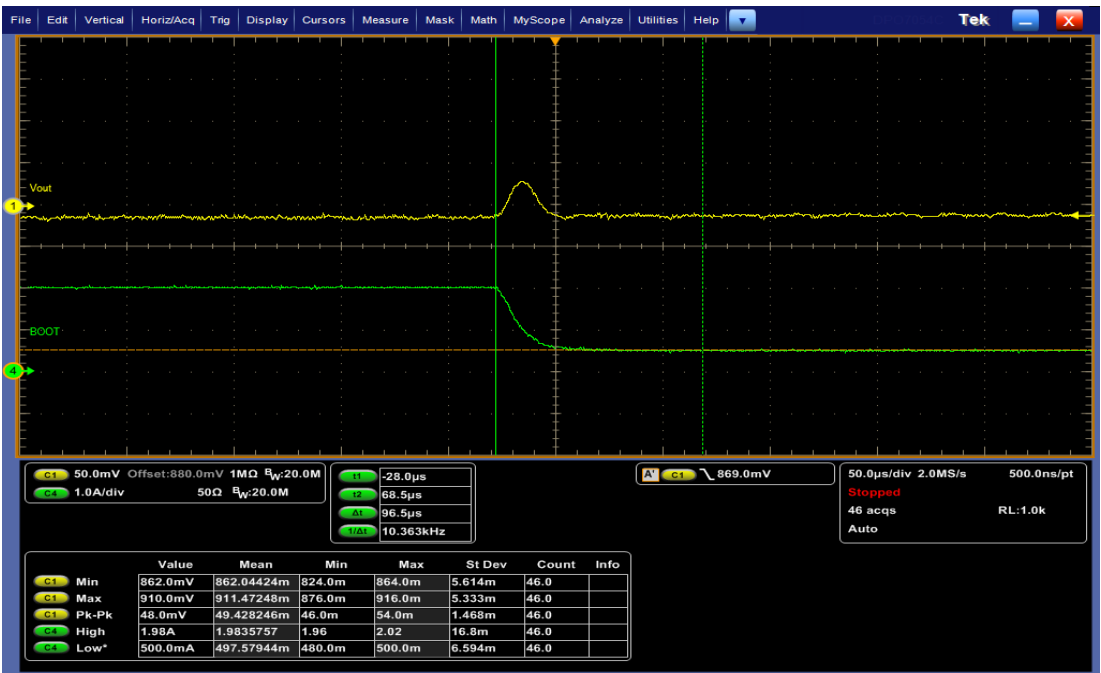
	Measure(V)	Spec(V)	Pass/Fail
10% --		0.092	
0A	0.8904	1.012	Pass
	0.8712	0.828	Pass
	0.0192	0.184	Pass
2A	0.8764	1.012	Pass
	0.8676	0.828	Pass
	0.0088	0.184	Pass

3. Load transient

0.5A→2A



2A→0.5A



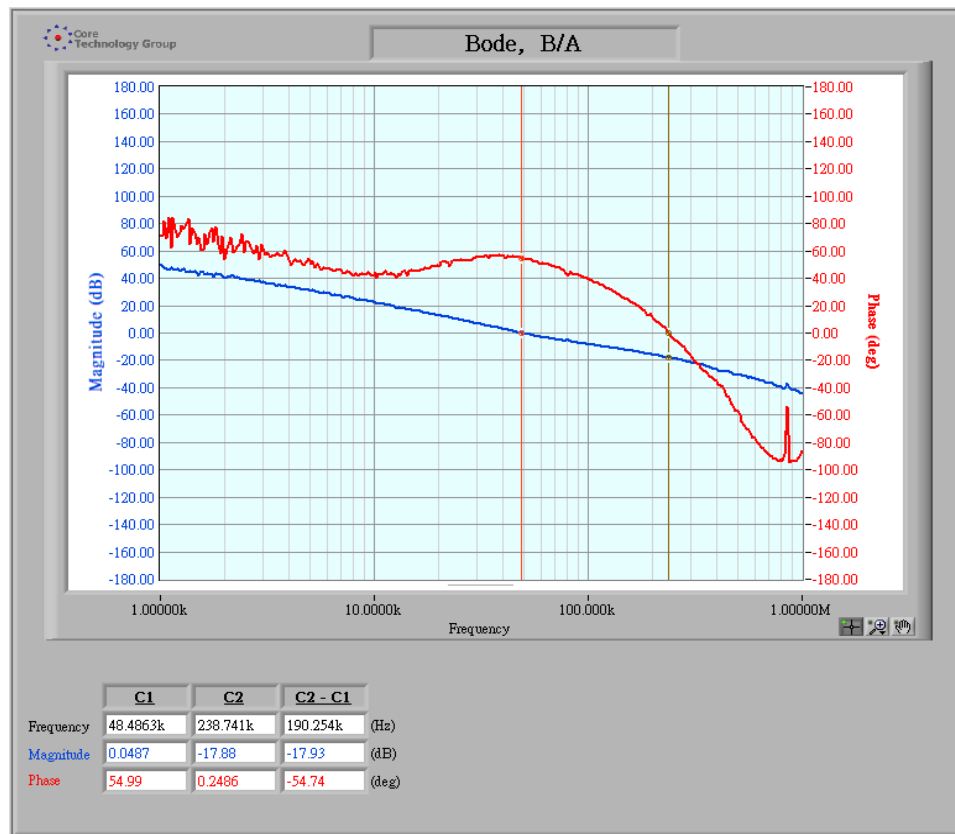
0.5A↔2A



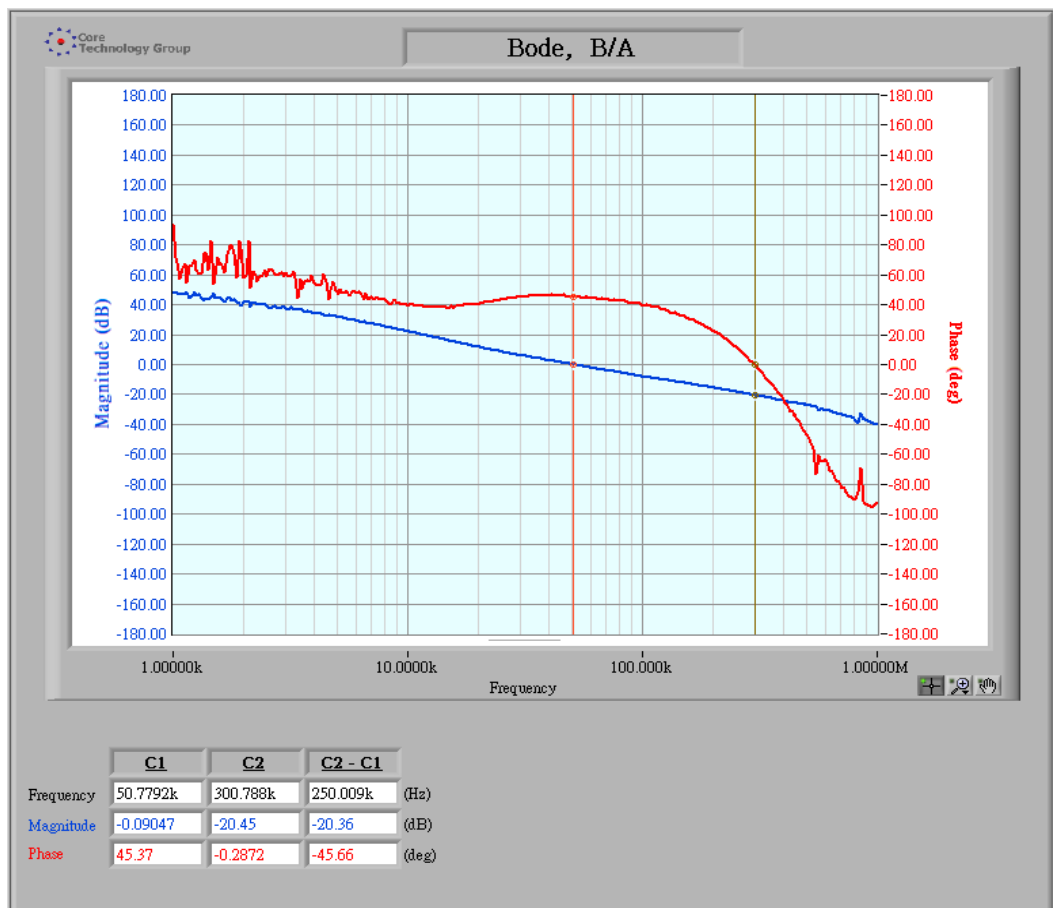
	Measure(V)	Spec(V)	Pass/Fail
0.5-->2A	0.872	1.012	Pass
	0.826	0.828	Pass
	0.046	0.184	Pass
2A-->0.5A	0.91	1.012	Pass
	0.862	0.828	Pass
	0.048	0.184	Pass
0.5<-->2A	0.912	1.012	Pass
	0.824	0.828	Pass
	0.088	0.184	Pass

4. bode plot

0.3A:



2A:



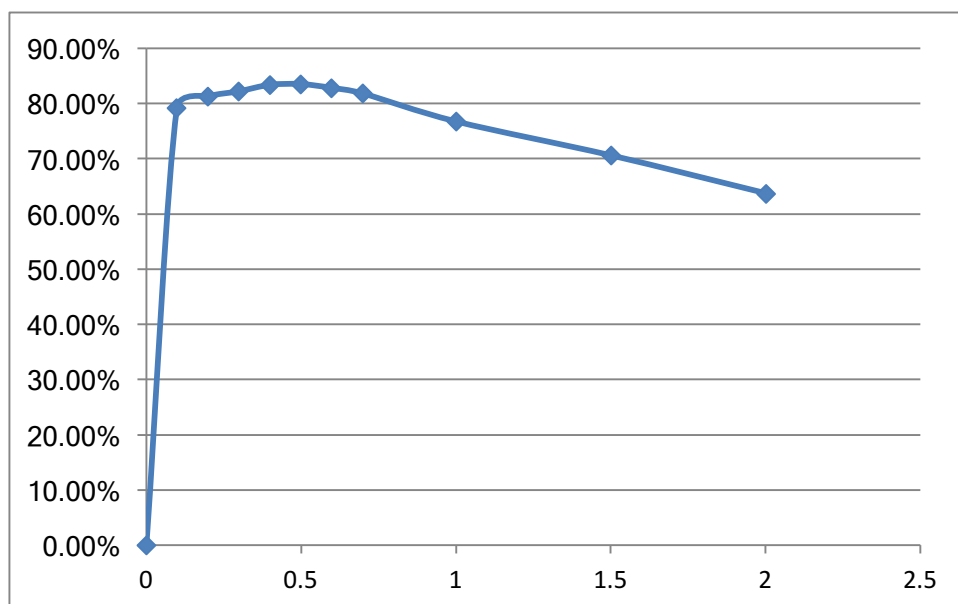
	Measure(V)	Spec(V)	Pass/Fail
0.5A	17.93dB	$\geq 12\text{dB}$	Pass
	54.74 degree	≥ 45 degree	Pass
2A	20.36dB	$\geq 12\text{dB}$	Pass
	45.66 degree	≥ 45 degree	Pass

2. VDD_EE

1. Efficiency:

Vin	Iin	Vout	Iout	Eff	Loss	Pass/Fail
5.1447	0.0011	0.825	0	0.00%	0.00%	--
5.1402	0.0199	0.821	0.0987	79.22%	20.78%	Fail
5.1357	0.039	0.8193	0.1987	81.28%	18.72%	Pass
5.1313	0.0577	0.8147	0.2987	82.19%	17.81%	Pass
5.1271	0.0758	0.8113	0.3993	83.36%	16.64%	Pass
5.116	0.0945	0.8094	0.4987	83.49%	16.51%	Pass
5.117	0.1141	0.8075	0.5987	82.80%	17.20%	Pass
5.113	0.1346	0.8057	0.6987	81.80%	18.20%	Pass
5.0985	0.2018	0.7894	1	76.72%	23.28%	Fail
5.0696	0.3306	0.7883	1.5006	70.58%	29.42%	Fail
5.0354	0.4858	0.7788	2.0012	63.71%	36.29%	Fail

Efficiency Chart:



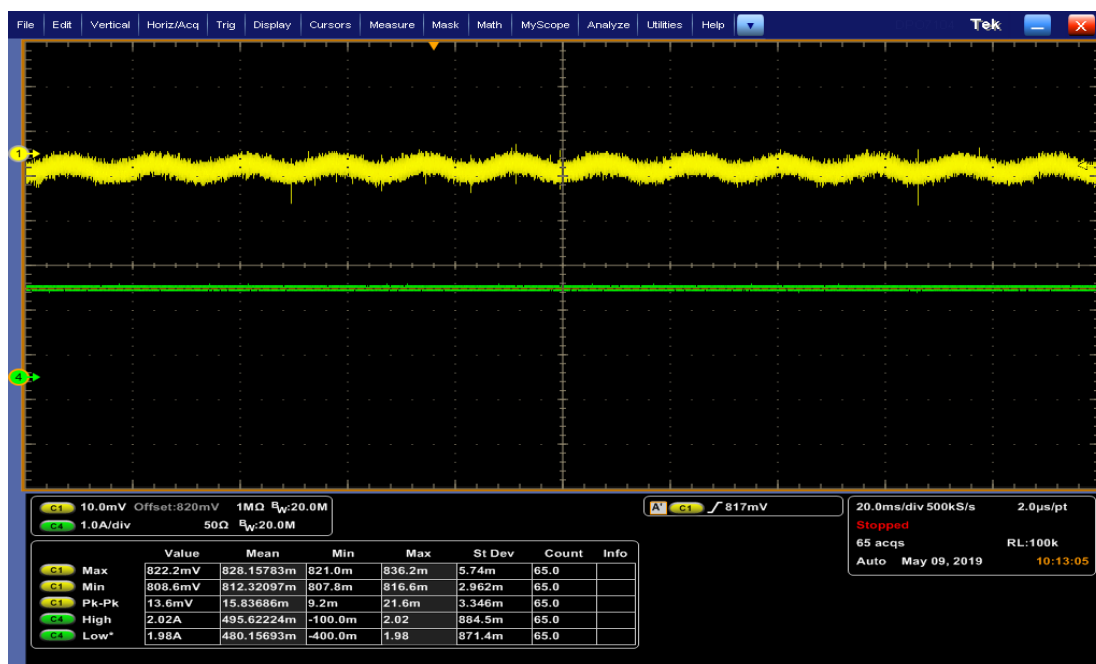
2. Ripple

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0A:



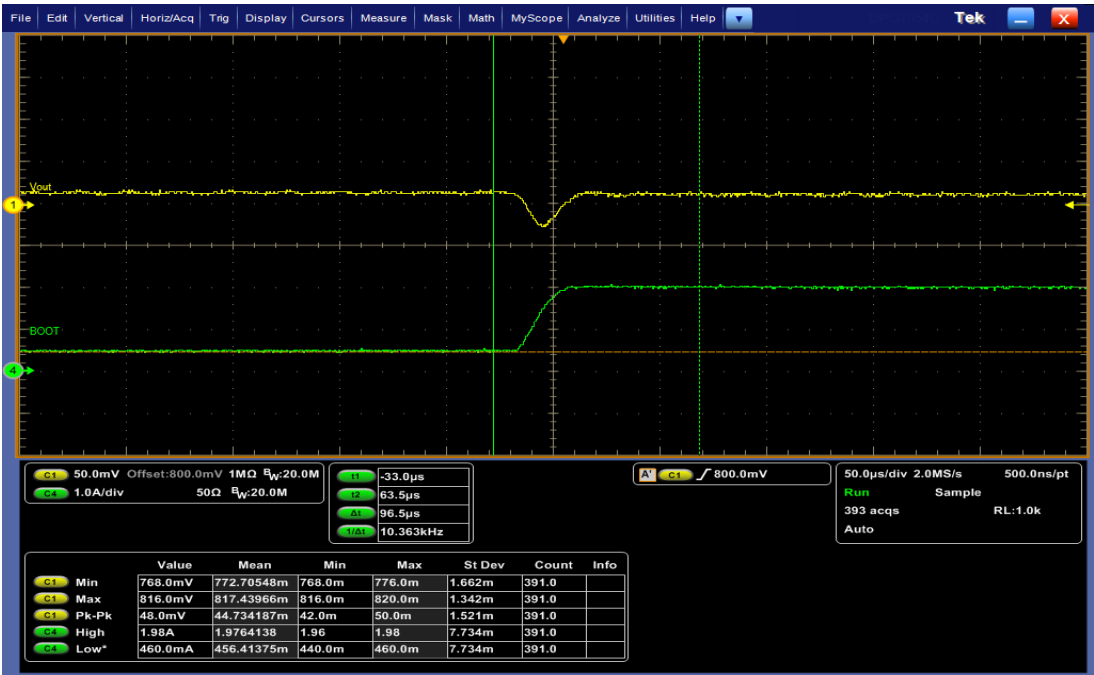
2A:



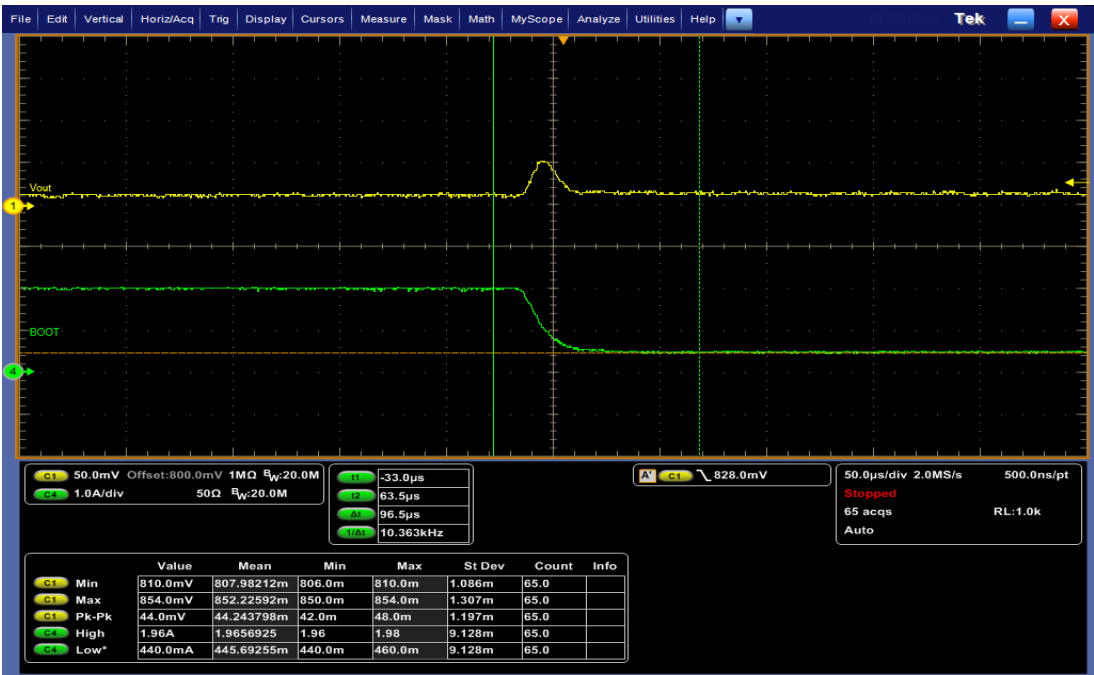
	Measure(V)	Spec(V)	Pass/Fail
10%		0.082	
0A	0.8354	0.902	Pass
	0.8158	0.738	Pass
	0.0196	0.164	Pass
2A	0.8222	0.902	Pass
	0.8086	0.738	Pass
	0.0136	0.164	Pass

3. Load transient

0.5A→2A:



2A→0.5A:



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0.5A↔2A:

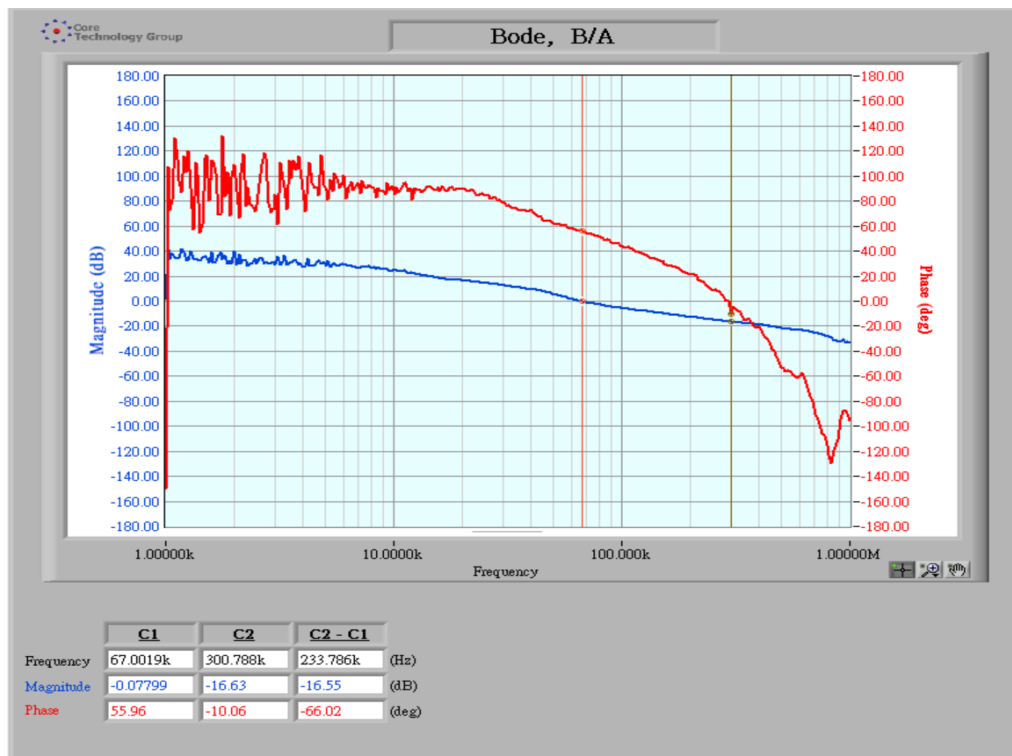


	Measure(V)	Spec(V)	Pass/Fail
0.5-->2A	0.816	0.902	Pass
	0.768	0.738	Pass
	0.048	0.164	Pass
2A-->0.5A	0.854	0.902	Pass
	0.81	0.738	Pass
	0.044	0.164	Pass
0.5<-->2A	0.85	0.902	Pass
	0.774	0.738	Pass
	0.076	0.164	Pass

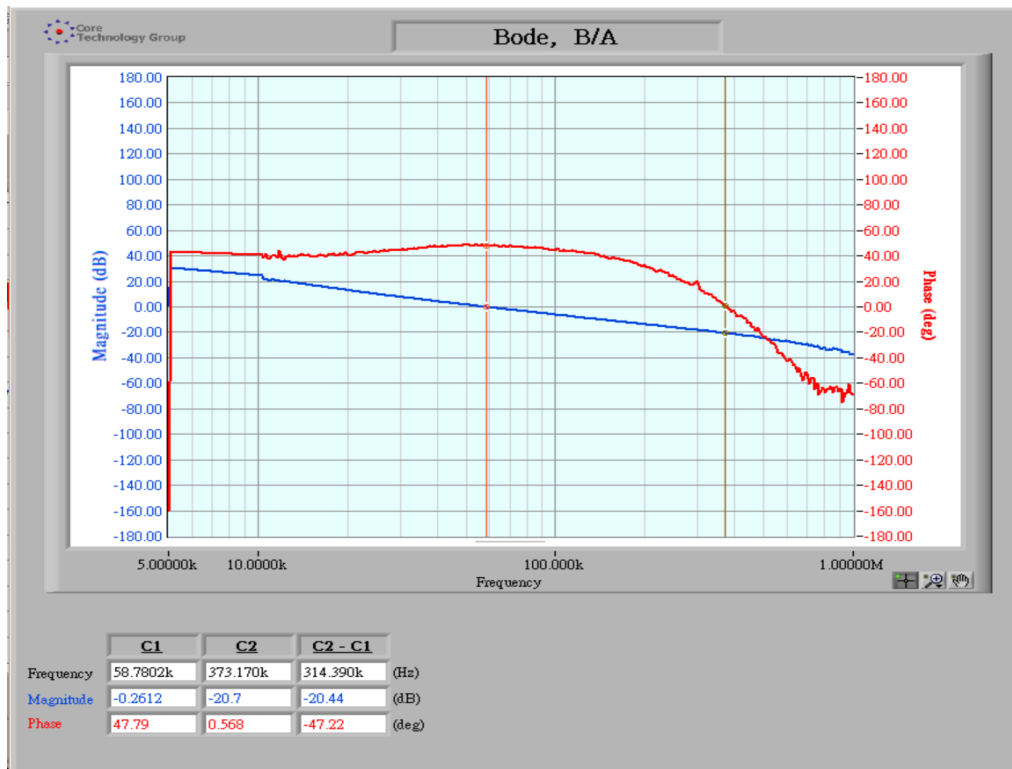
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4. bode plot

0.3A:



2A:



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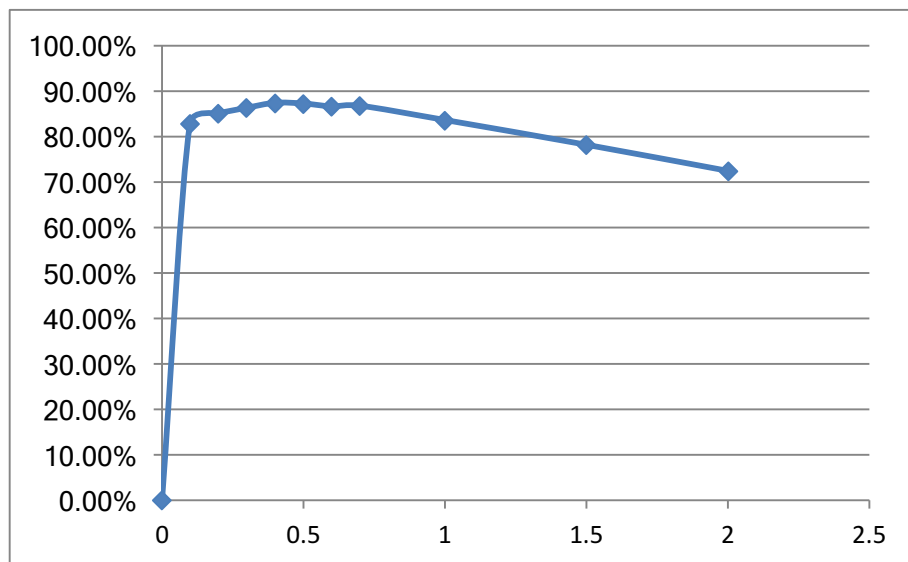
	Measure(V)	Spec(V)	Pass/Fail
0.5A	16.55dB	$\geq 12\text{dB}$	Pass
	66.02 degree	$\geq 45\text{ degree}$	Pass
2A	20.44dB	$\geq 12\text{dB}$	Pass
	47.22 degree	$\geq 45\text{ degree}$	Pass

3. P1V2

1. Efficiency

Vin	Iin	Vout	Iout	Eff	Loss	Pass/Fail
5.1637	0.0012	1.2001	0	0.00%	0.00%	--
5.1584	0.0277	1.1986	0.0987	82.79%	17.21%	Fail
5.1524	0.0543	1.1961	0.1987	84.95%	15.05%	Pass
5.1471	0.0803	1.193	0.2987	86.22%	13.78%	Pass
5.1418	0.1059	1.1908	0.3993	87.32%	12.68%	Pass
5.1364	0.1324	1.1887	0.4987	87.17%	12.83%	Pass
5.1068	0.1596	1.1783	0.5987	86.55%	13.45%	Pass
5.103	0.1876	1.1878	0.6987	86.69%	13.31%	Pass
5.1068	0.2762	1.1783	1	83.54%	16.46%	Fail
5.0727	0.4426	1.1683	1.5006	78.09%	21.91%	Fail
5.0328	0.637	1.1589	2.0012	72.34%	27.66%	Fail

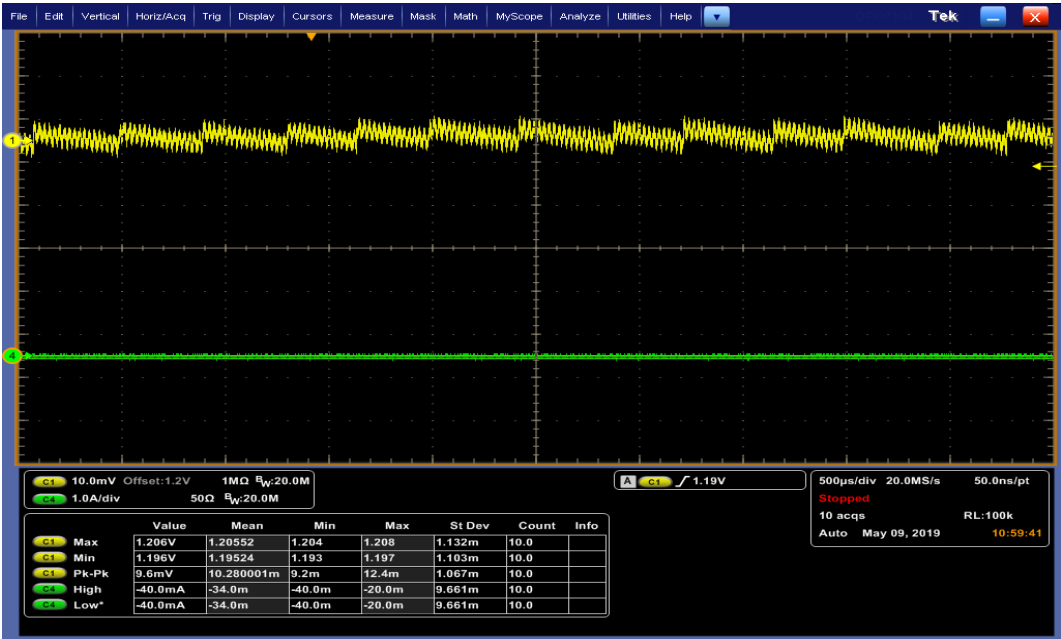
Efficiency Chart:



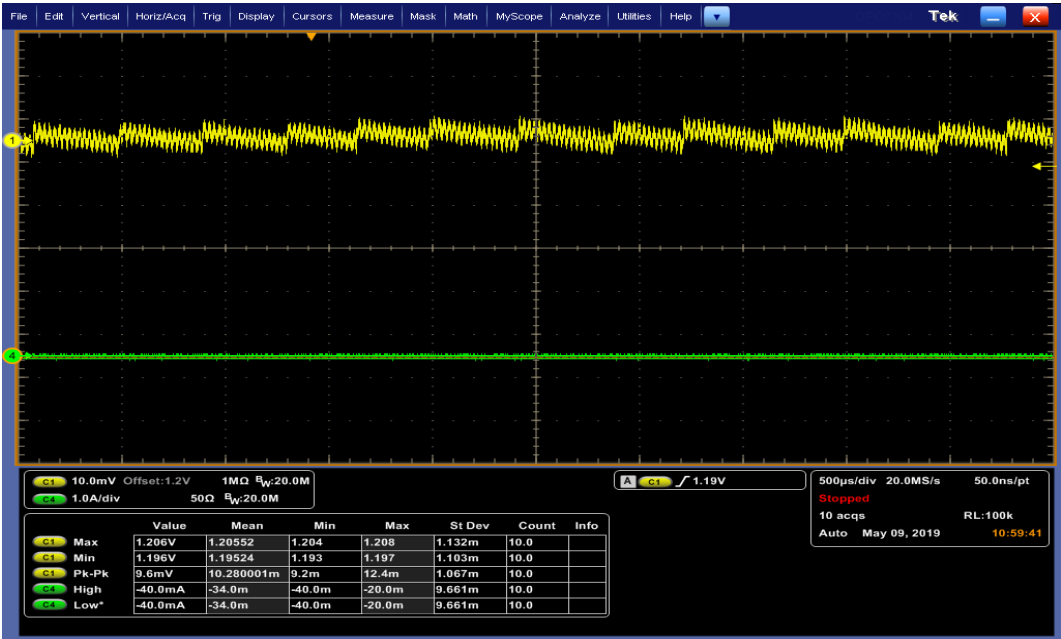
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2. Ripple

0A:



2A:



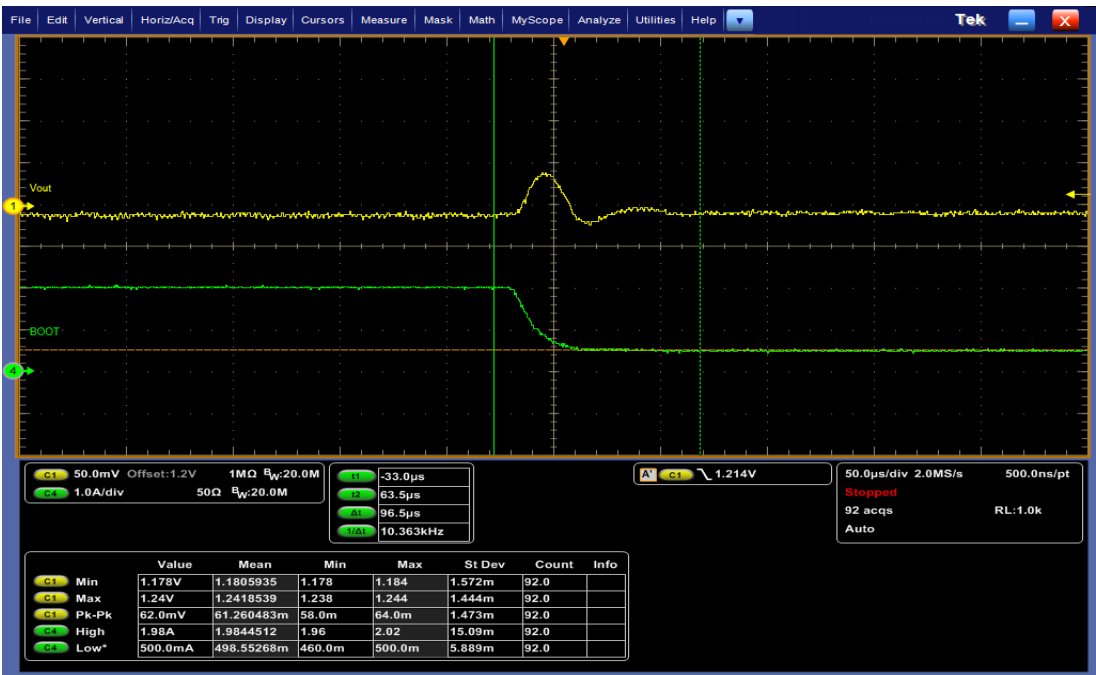
	Measure(V)	Spec(V)	Pass/Fail
0A	10%	0.12	
		1.206	1.32
		1.196	1.08
2A		0.010	0.240
		1.206	1.32
		1.196	1.08
		0.010	0.240
			Pass

3. Load transient

0.5A→2A:



2A→0.5A:



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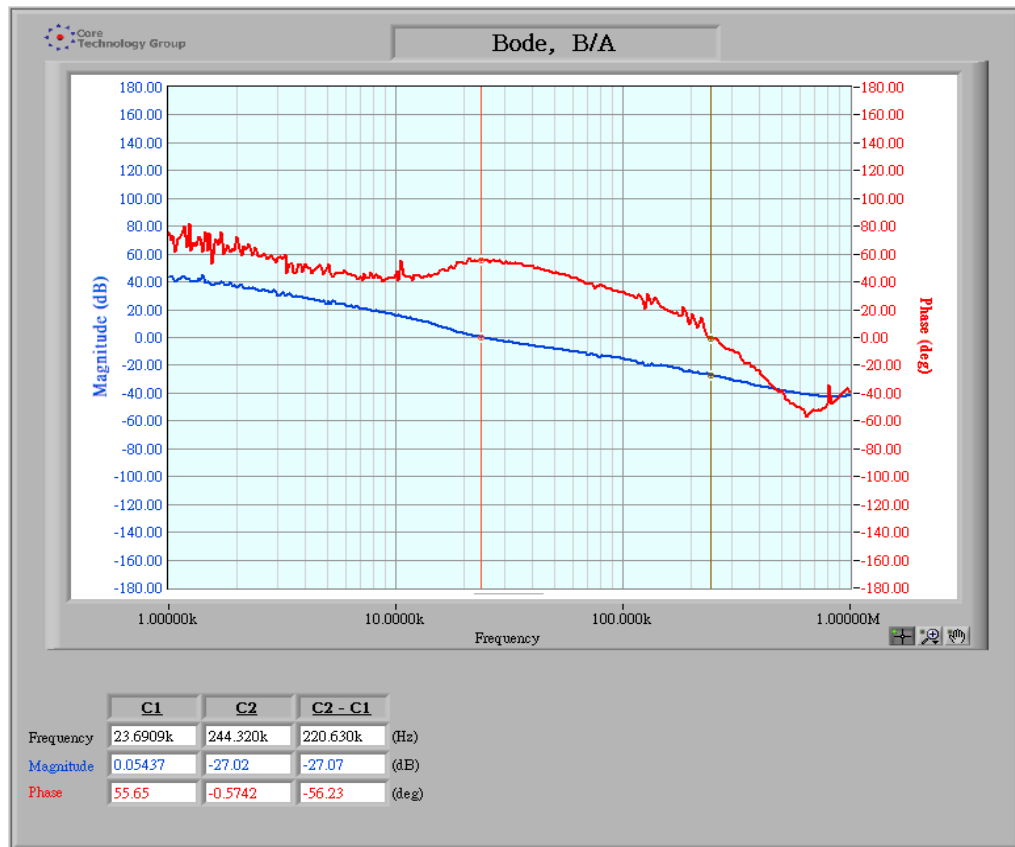
0.5A↔2A:



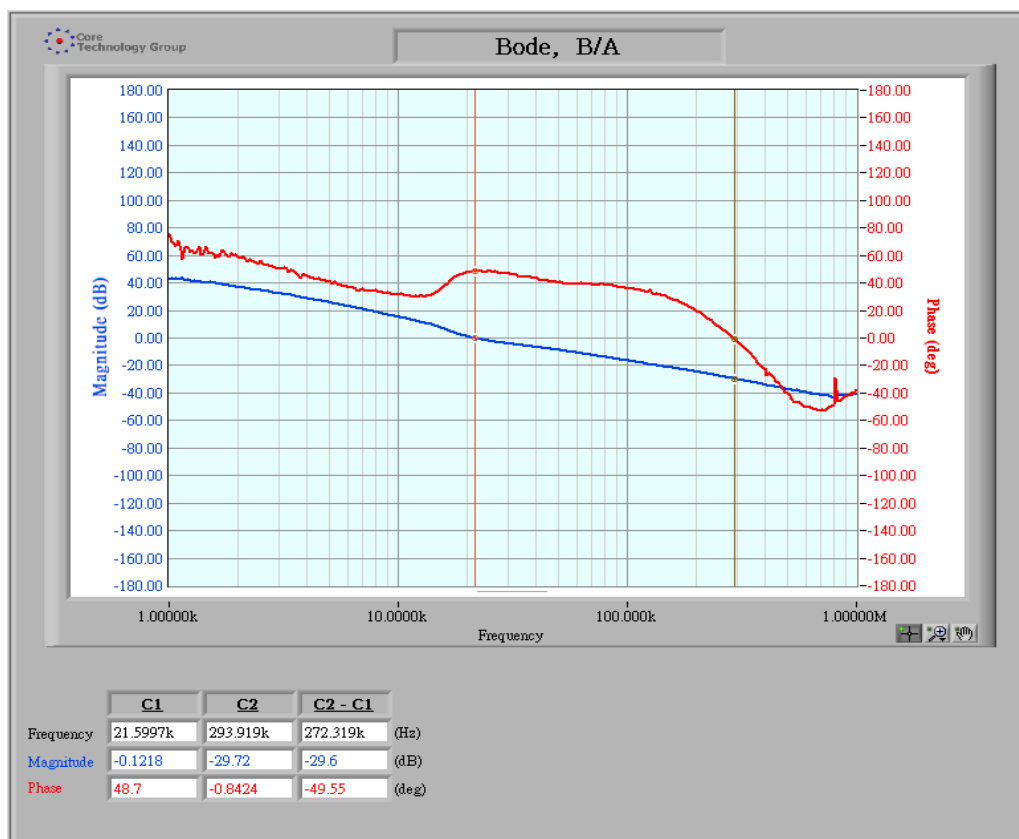
	Measure(V)	Spec(V)	Pass/Fail
0.5-->2A	1.208	1.32	Pass
	1.14	1.08	Pass
	0.068	0.240	Pass
2A-->0.5A	1.24	1.32	Pass
	1.178	1.08	Pass
	0.062	0.240	Pass
0.5<-->2A	1.24	1.32	Pass
	1.136	1.08	Pass
	0.104	0.240	Pass

4. bode plot

0.3A:



2A:



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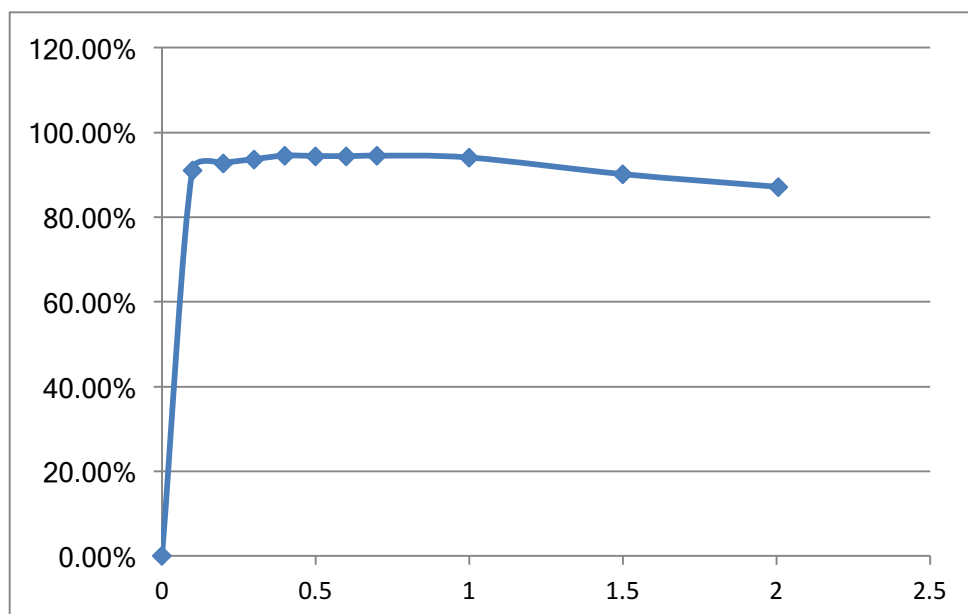
	Measure(V)	Spec(V)	Pass/Fail
0.5A	27.07	$\geq 12\text{dB}$	Pass
	56.23	$\geq 45\text{ degree}$	Pass
2A	29.6	$\geq 12\text{dB}$	Pass
	49.55	$\geq 45\text{ degree}$	Pass

4. P3V3

1. Efficiency

Vin	Iin	Vout	Iout	Eff	Loss	Pass/Fail
5.1648	0.001	3.326	0	0.00%	0.00%	--
5.1505	0.07	3.327	0.0987	91.08%	8.92%	Pass
5.1348	0.1385	3.3178	0.1987	92.70%	7.30%	Pass
5.1206	0.2064	3.3132	0.2987	93.64%	6.36%	Pass
5.1047	0.2742	3.3116	0.3993	94.47%	5.53%	Pass
5.0891	0.3436	3.31	0.4987	94.40%	5.60%	Pass
5.062	0.4153	3.3128	0.5987	94.35%	5.65%	Pass
5.05	0.4851	3.312	0.6987	94.46%	5.54%	Pass
5.0057	0.7017	3.3026	1	94.02%	5.98%	Pass
4.9136	1.1173	3.2963	1.5006	90.10%	9.90%	Pass
4.8255	1.5709	3.2912	2.006	87.10%	12.90%	Fail

Efficiency Chart:

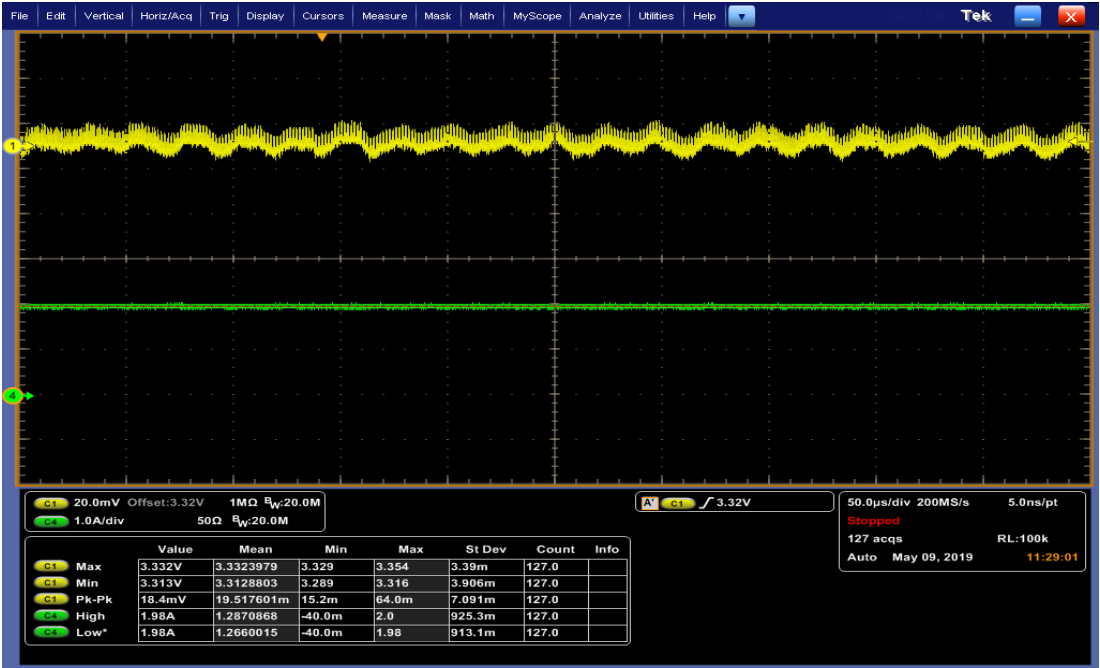


2. Ripple

0A:



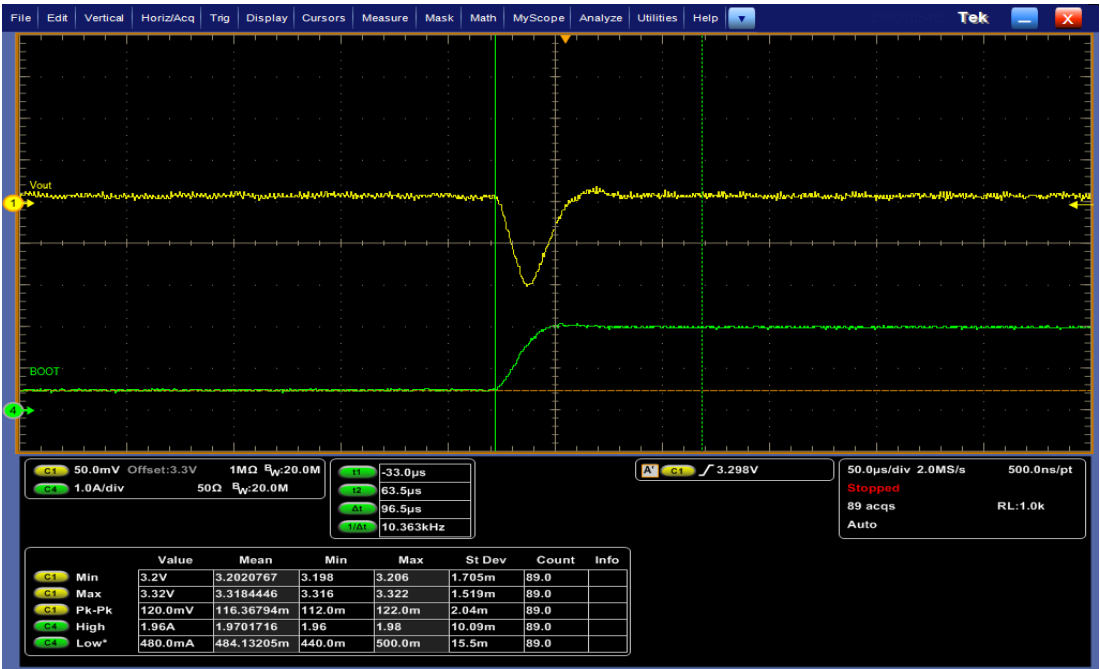
2A:



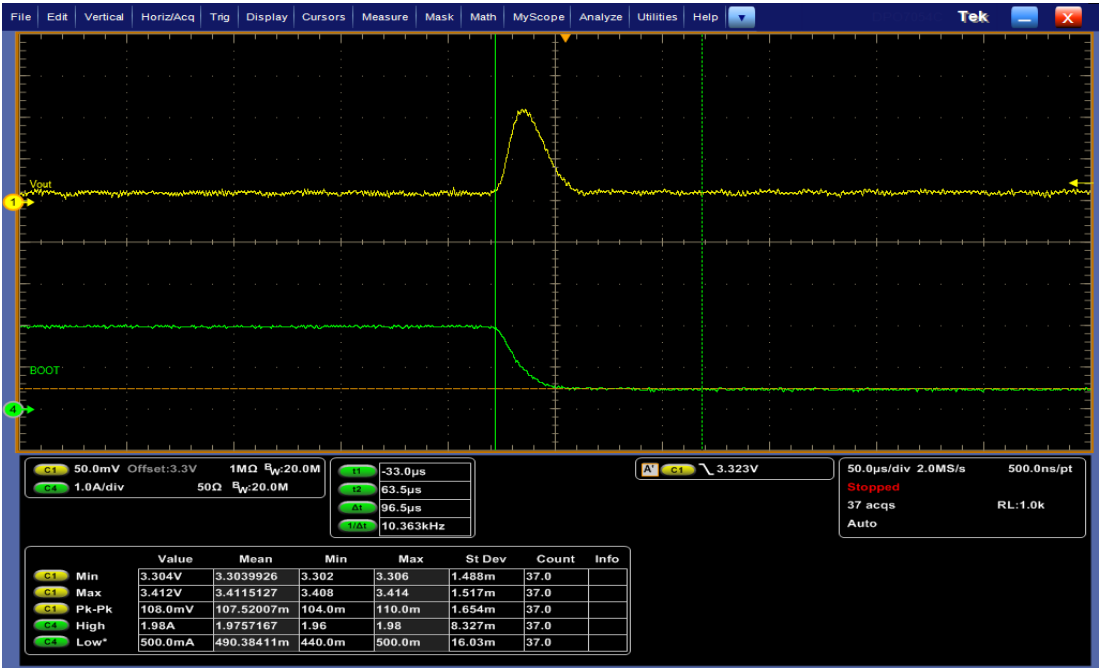
	Measure(V)	Spec(V)	Pass/Fail
10%		0.33	
0A	3.357	3.63	Pass
	3.318	2.97	Pass
	0.039	0.66	Pass
2A	3.332	3.63	Pass
	3.313	2.97	Pass
	0.019	0.66	Pass

3. Load transient

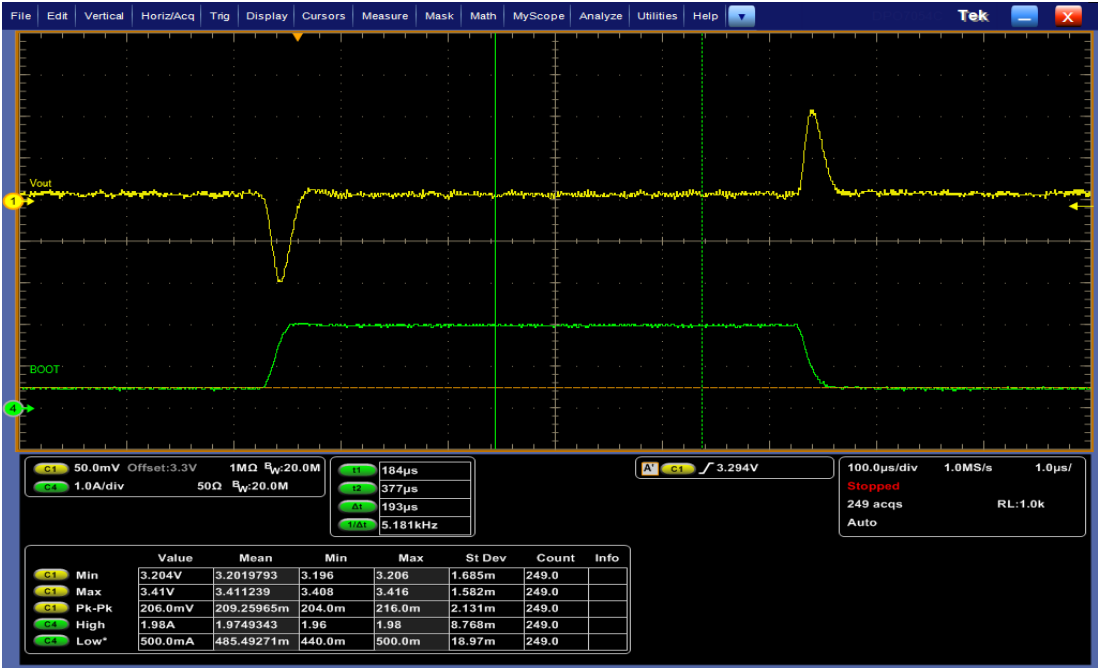
0.5A→2A:



2A→0.5A:



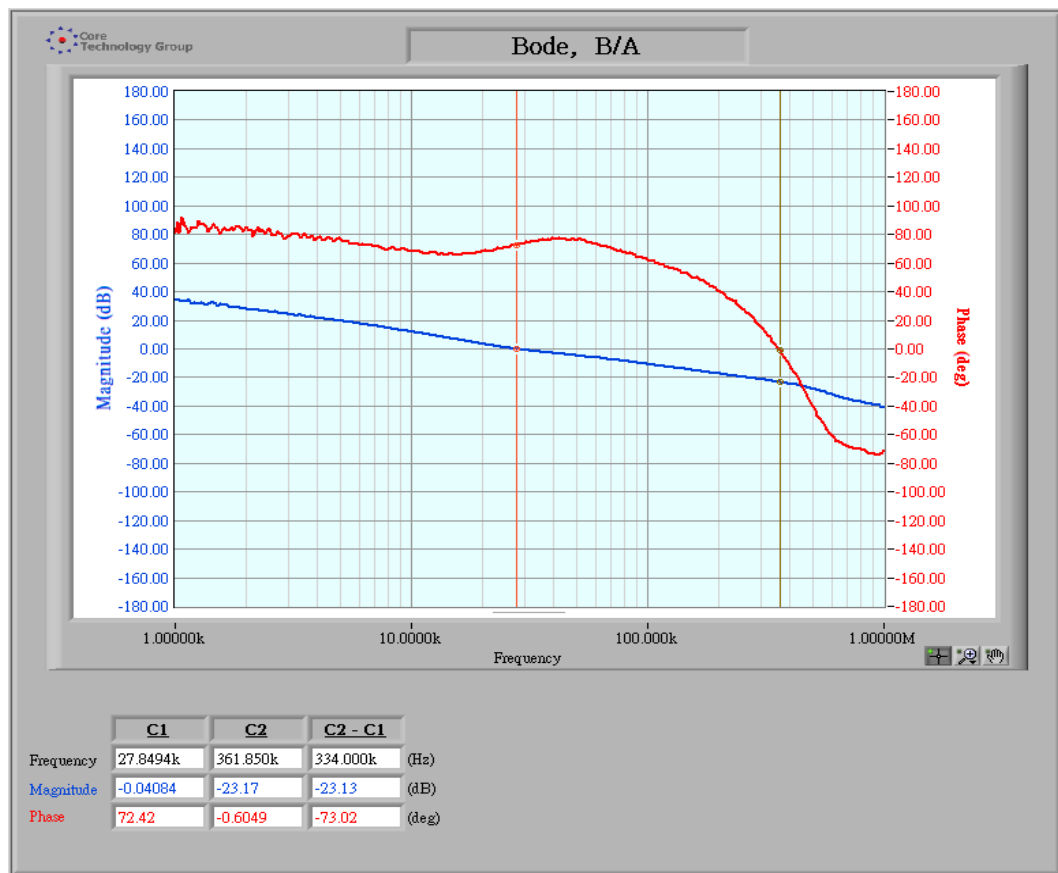
0.5A↔2A:



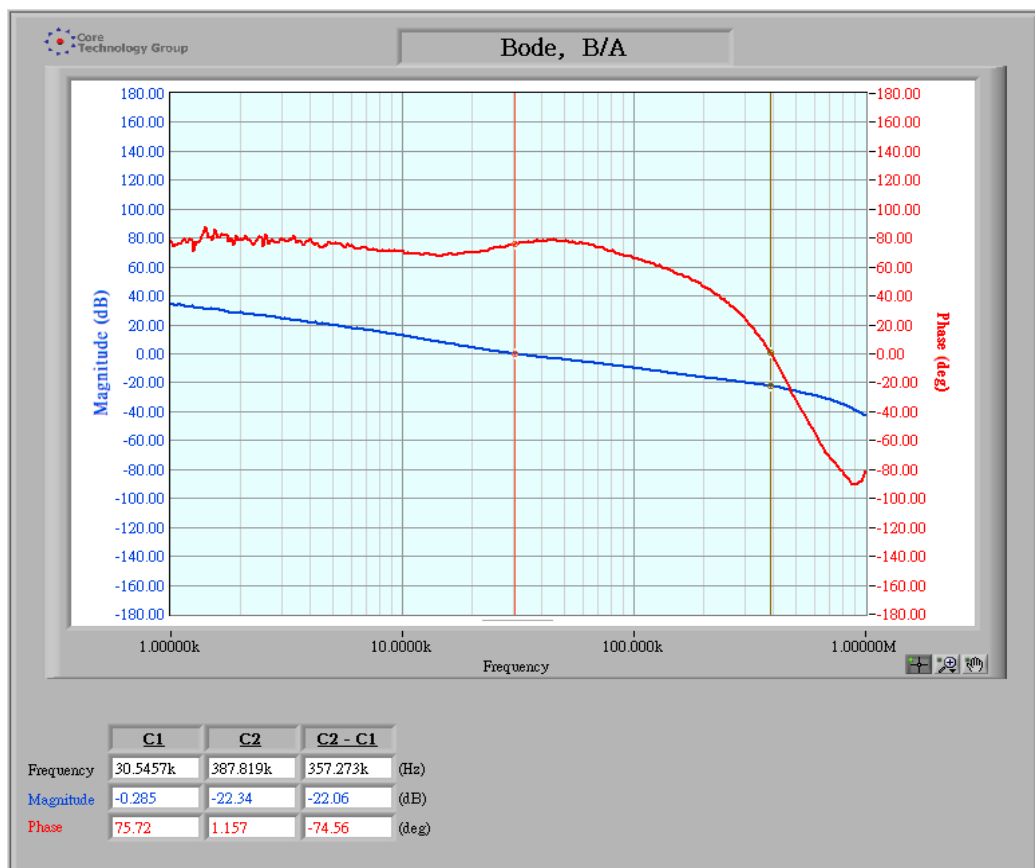
	Measure(V)	Spec(V)	Pass/Fail
0.5→2A	3.41	3.63	Pass
	3.204	2.97	Pass
	0.206	0.66	Pass
2A→0.5A	3.412	3.63	Pass
	3.304	2.97	Pass
	0.108	0.66	Pass
0.5↔2A	3.41	3.63	Pass
	3.204	2.97	Pass
	0.206	0.66	Pass

4. bode plot

0.3A:



2A:



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	Measure(V)	Spec(V)	Pass/Fail
0.5A	23.13	$\geq 12\text{dB}$	Pass
	73.02	$\geq 45\text{ degree}$	Pass
2A	22.06	$\geq 12\text{dB}$	Pass
	74.56	$\geq 45\text{ degree}$	Pass