



Texas Instruments

PMP4392 REVA Test Procedure

China Power Reference Design

REVA

12/20/2013

1 General

1.1 PURPOSE

Provide the detailed data for evaluating and verifying the PMP4392.

1.2 REFERENCE DOCUMENTATION

[Schematic PMP4392_SCH.PDF](#)

[Assembly PMP4392_PCB.PDF](#)

BOM

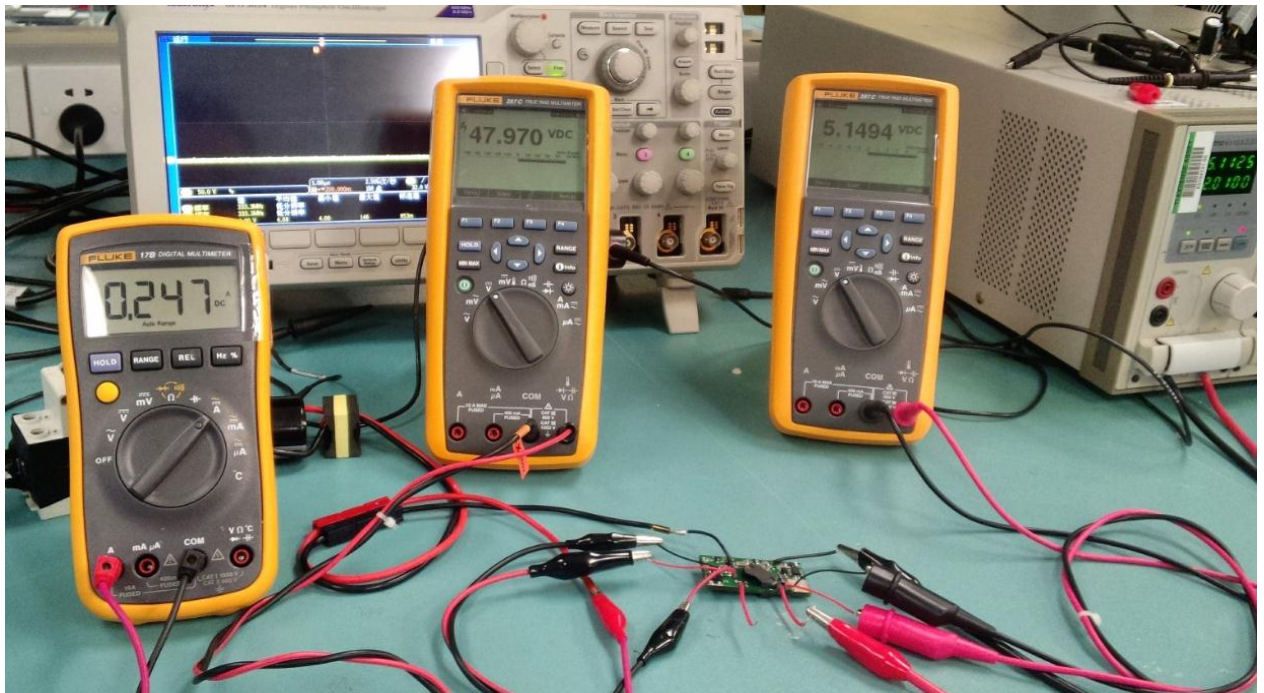
1.3 TEST EQUIPMENTS

Multi-meter: Fluke

DC Source: TDK-Lambda

Ambient Temperature at 25DegC, convectional cooling

1.3 Testing Setup Photos



Top View



Bottom View

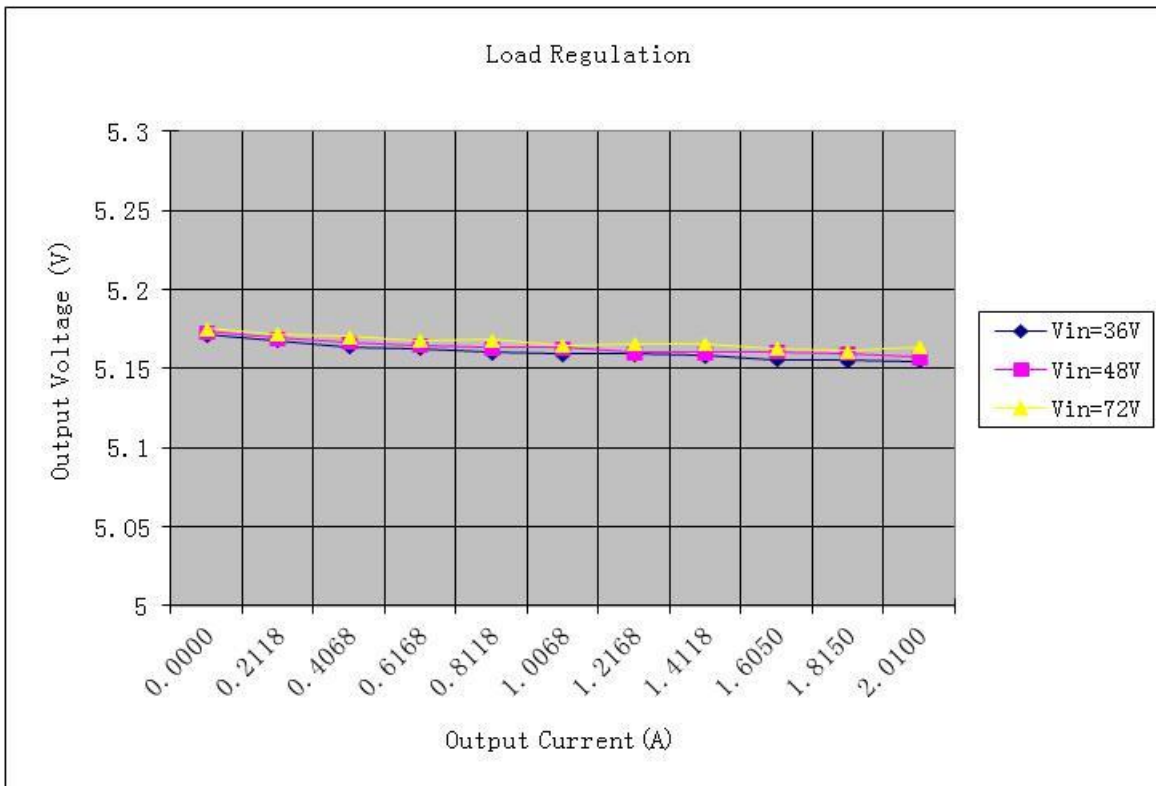
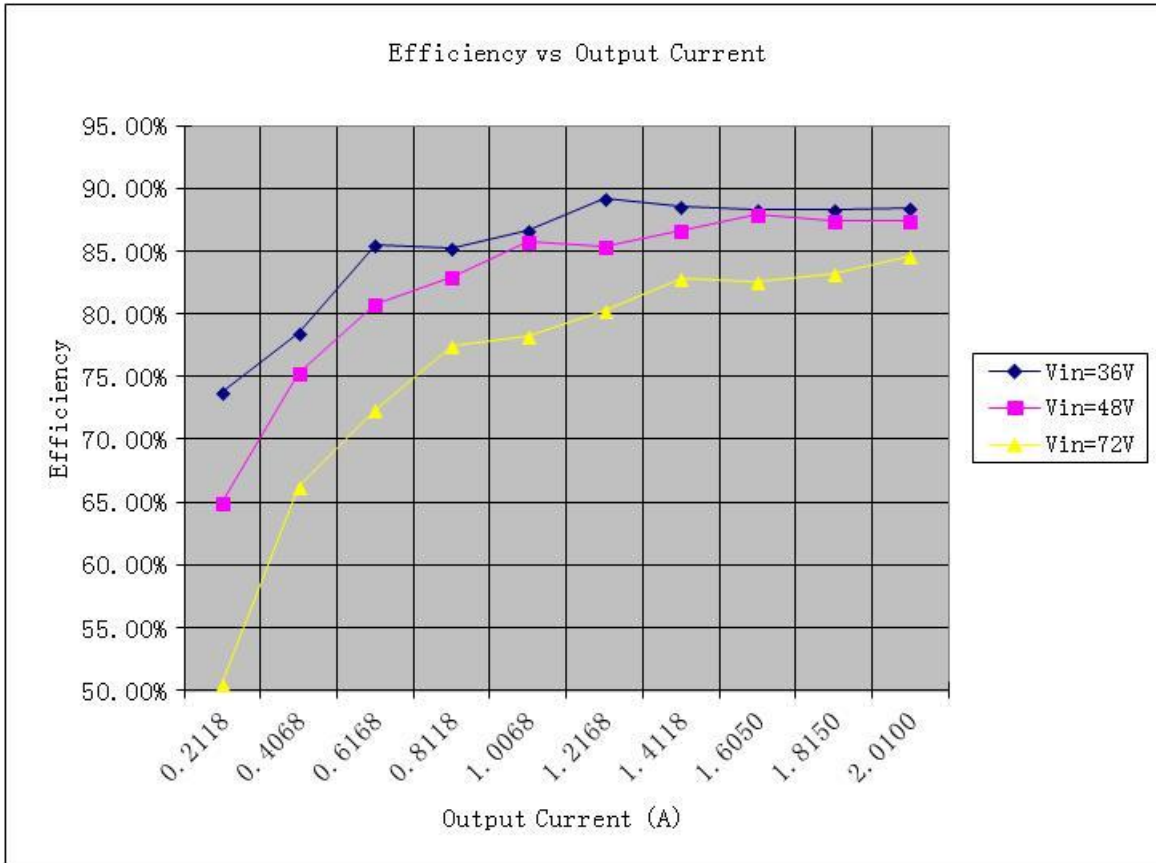
2 INPUT & Output CHARACTERISTICS

2.1: Efficiency

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Eff. (%)
36V Input				
36.19	0.013	5.1717	0.0000	0.00%
36.18	0.041	5.1677	0.2118	73.79%
36.16	0.074	5.1639	0.4068	78.51%
36.14	0.103	5.1629	0.6168	85.54%
36.12	0.136	5.1603	0.8118	85.27%
36.11	0.166	5.1591	1.0068	86.66%
36.09	0.195	5.1591	1.2168	89.19%
36.08	0.228	5.1581	1.4118	88.53%
36.06	0.26	5.1559	1.6050	88.27%
36.04	0.294	5.1554	1.8150	88.30%
36.03	0.325	5.1549	2.0100	88.50%

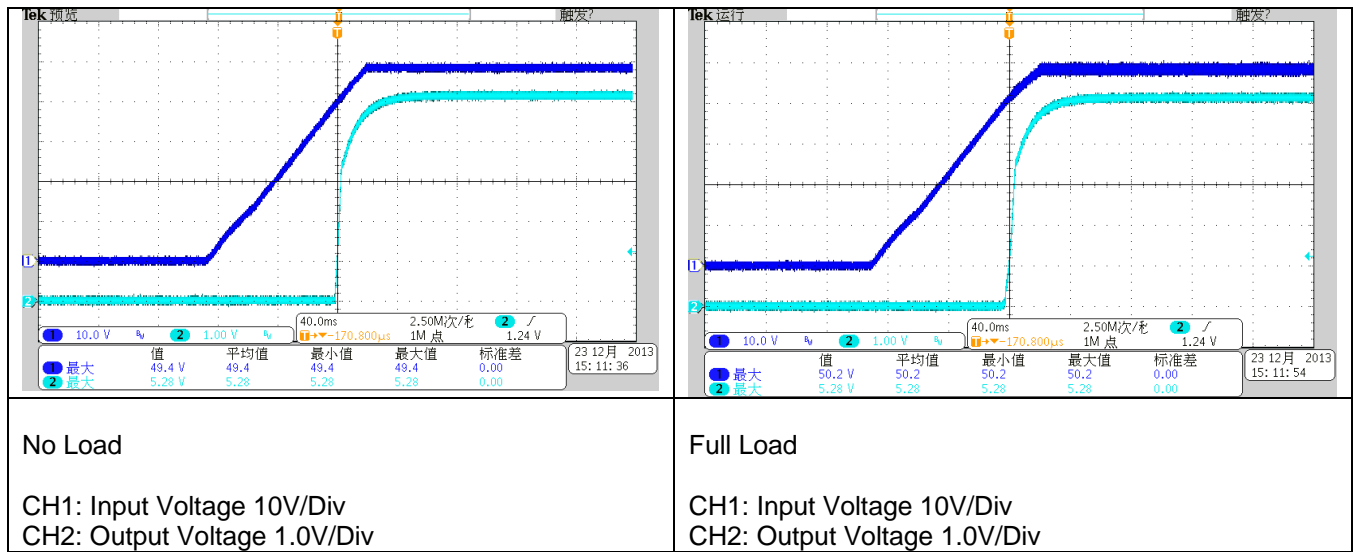
Vin (V)	Iin (A)	Vout (V)	Iout (A)	Eff. (%)
48V Input				
48.14	0.01	5.1735	0.0000	0.00%
48.13	0.035	5.1696	0.2118	65.00%
48.12	0.058	5.1668	0.4068	75.32%
48.10	0.082	5.1649	0.6168	80.77%
48.09	0.105	5.1632	0.8118	83.01%
48.08	0.126	5.1632	1.0068	85.82%
48.06	0.153	5.1602	1.2168	85.39%
48.05	0.175	5.1601	1.4118	86.64%
48.04	0.196	5.161	1.6050	87.98%
48.02	0.223	5.1596	1.8150	87.45%
48.01	0.247	5.1572	2.0100	87.41%

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Eff. (%)
72V Input				
72.26	0.009	5.1756	0.0000	0.00%
72.25	0.03	5.1719	0.2118	50.54%
72.24	0.044	5.1702	0.4068	66.17%
72.23	0.061	5.1681	0.6168	72.35%
72.22	0.075	5.1682	0.8118	77.46%
72.21	0.092	5.1647	1.0068	78.27%
72.20	0.107	5.1658	1.2000	80.24%
72.20	0.122	5.166	1.4118	82.80%
72.19	0.139	5.1629	1.6050	82.58%
72.18	0.156	5.1614	1.8150	83.20%
72.18	0.17	5.1637	2.0100	84.58%

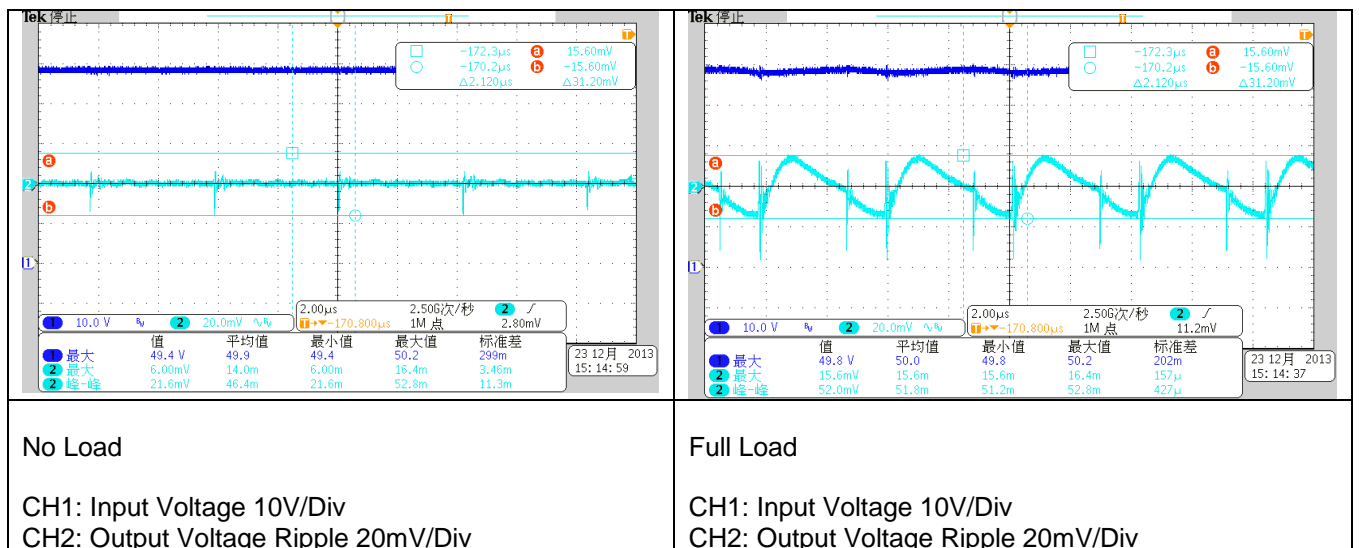


2.2: Start Up Waveforms & Output Ripple

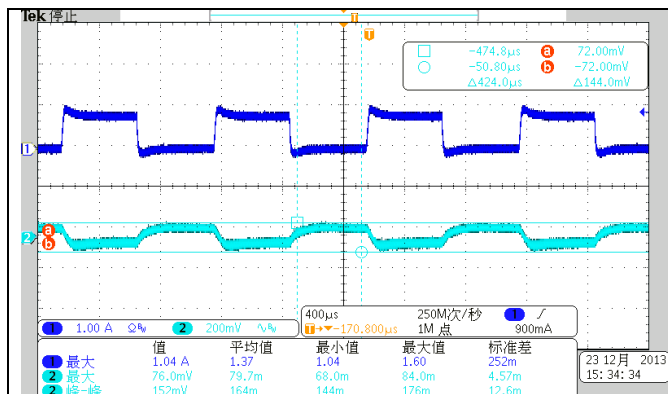
48V Input Start-up curves



48V Input Ripple & Noise

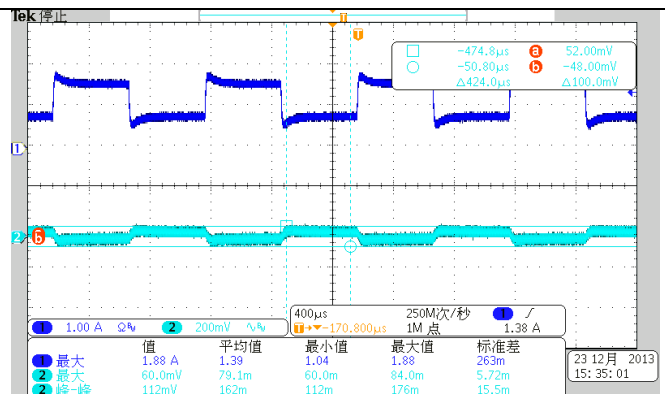


2.3: Dynamic Load Waveforms



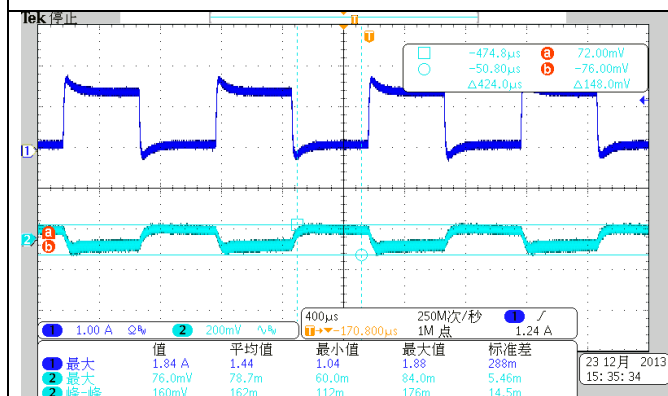
Step Load (0% – 50%)

CH1: Output Current 1A/Div
CH2: Output Voltage 200mV/Div



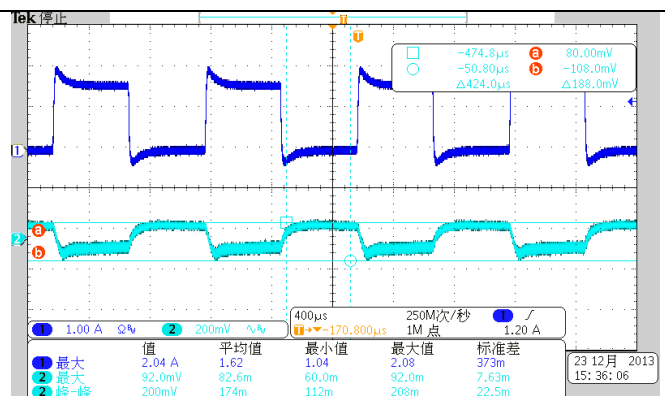
Step Load (50% – 100%)

CH1: Output Current 1A/Div
CH2: Output Voltage 200mV/Div



Step Load (10% – 90%)

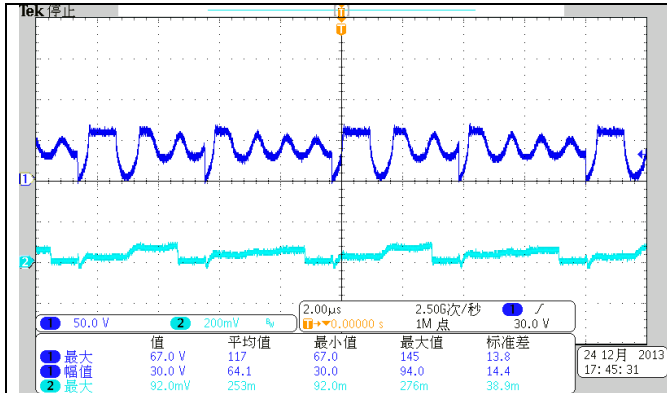
CH1: Output Current 1A/Div
CH2: Output Voltage 200mV/Div



Step Load (0% – 100%)

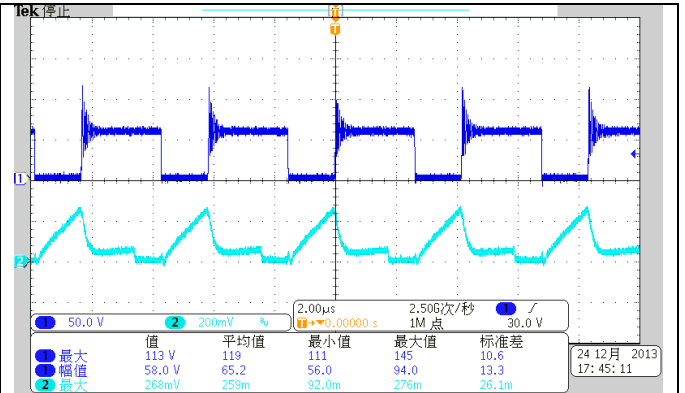
CH1: Output Current 1A/Div
CH2: Output Voltage 200mV/Div

2.4: Operating waveform (Primary MOSFET VDS, CS)



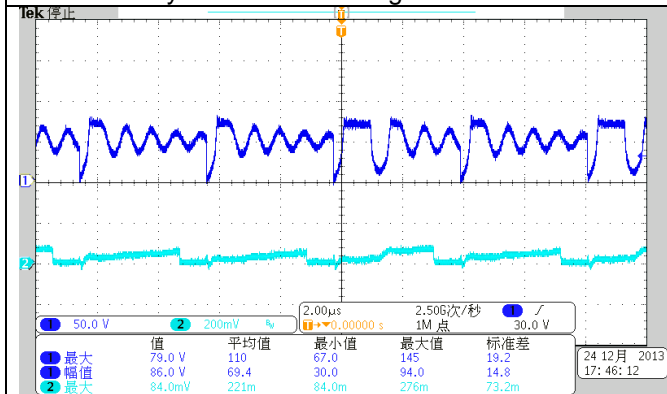
36V Input No Load

CH1: Primary MOSFET VDS 50V/Div
CH2: Primary Current Sense Signal 200mV/Div



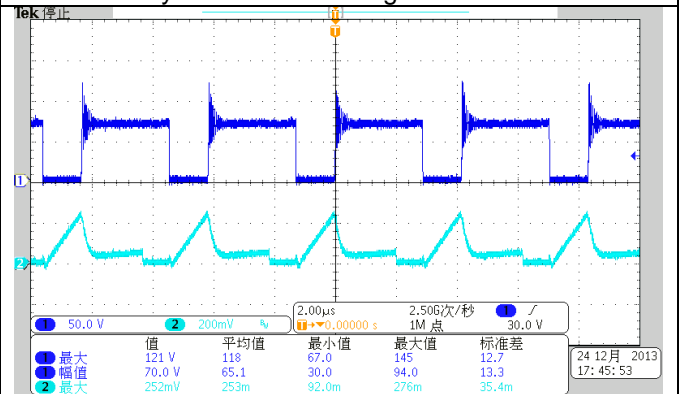
36V Input Full Load

CH1: Primary MOSFET VDS 50V/Div
CH2: Primary Current Sense Signal 200mV/Div



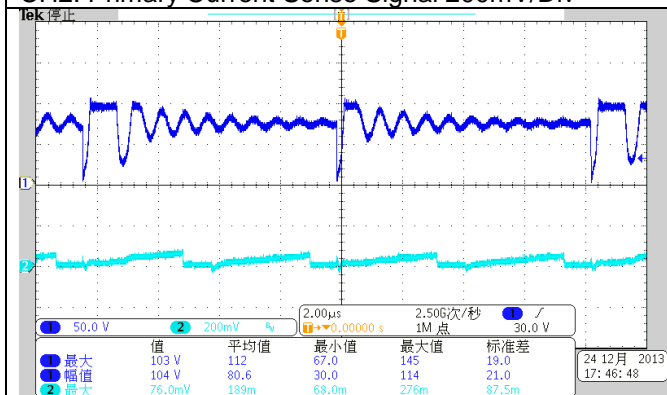
48V Input No Load

CH1: Primary MOSFET VDS 50V/Div
CH2: Primary Current Sense Signal 200mV/Div



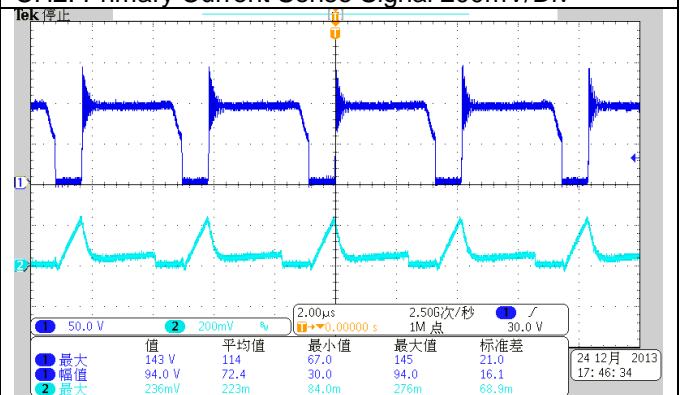
48V Input Full Load

CH1: Primary MOSFET VDS 50V/Div
CH2: Primary Current Sense Signal 200mV/Div



72V Input No Load

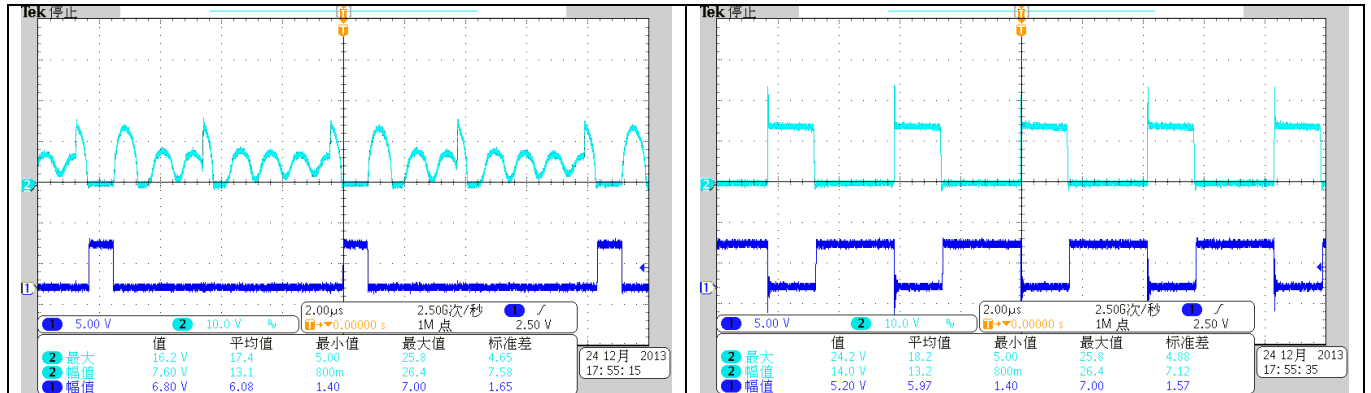
CH1: Primary MOSFET VDS 50V/Div
CH2: Primary Current Sense Signal 200mV/Div



72V Input Full Load

CH1: Primary MOSFET VDS 50V/Div
CH2: Primary Current Sense Signal 200mV/Div

2.5: Operating waveform (Secondary MOSFET VDS, Driver Signal)

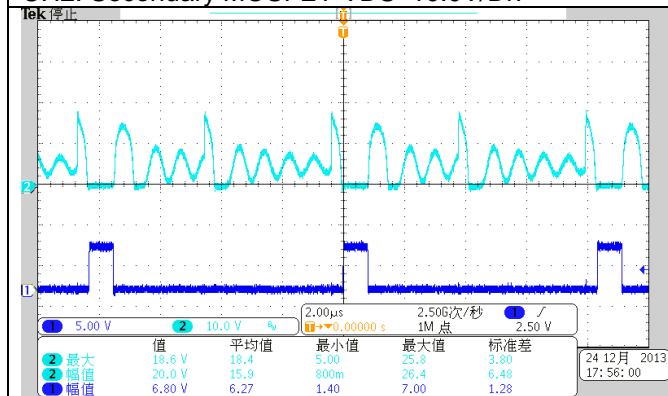


36V Input No Load

CH1: Secondary MOSFET Driver 5.0V/Div
CH2: Secondary MOSFET VDS 10.0V/Div

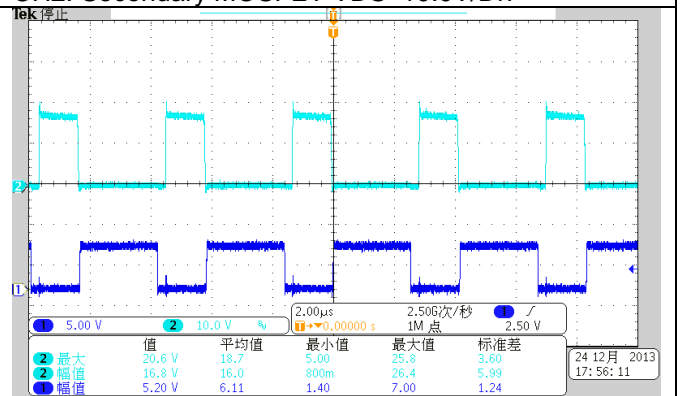
36V Input Full Load

CH1: Secondary MOSFET Driver 5.0V/Div
CH2: Secondary MOSFET VDS 10.0V/Div



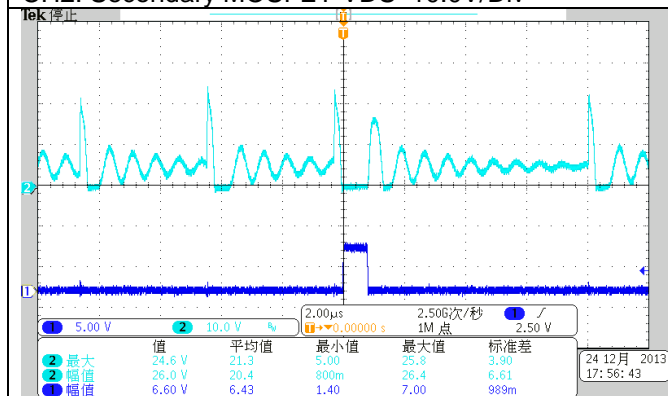
48V Input No Load

CH1: Secondary MOSFET Driver 5.0V/Div
CH2: Secondary MOSFET VDS 10.0V/Div



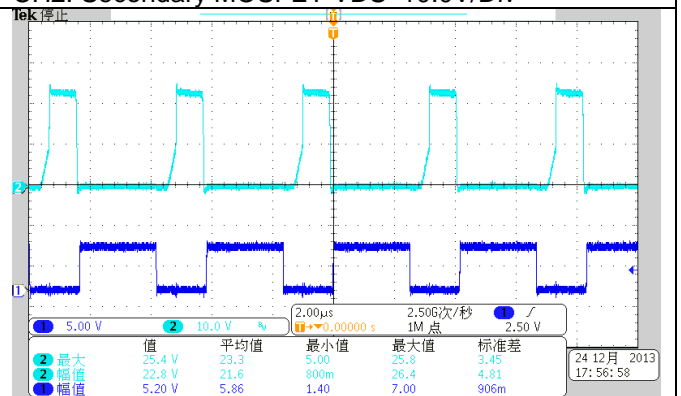
48V Input Full Load

CH1: Secondary MOSFET Driver 5.0V/Div
CH2: Secondary MOSFET VDS 10.0V/Div



72V Input No Load

CH1: Secondary MOSFET Driver 5.0V/Div
CH2: Secondary MOSFET VDS 10.0V/Div



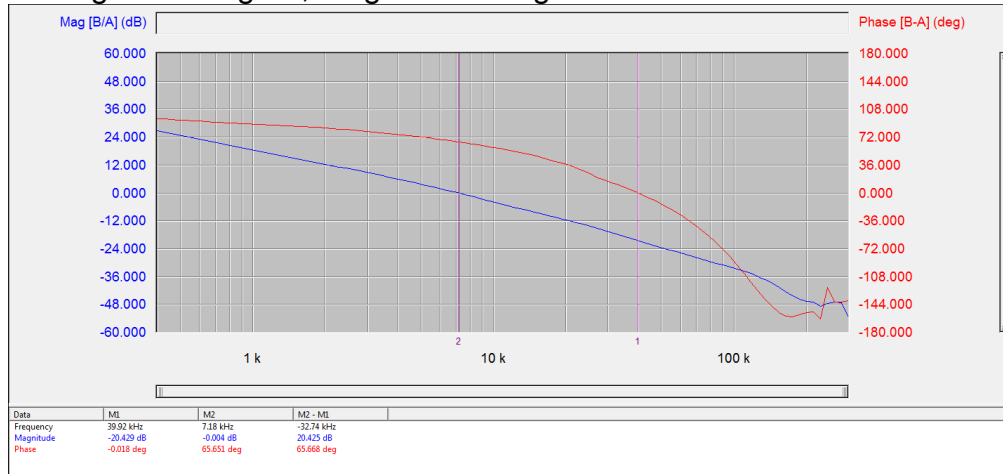
72V Input Full Load

CH1: Secondary MOSFET Driver 5.0V/Div
CH2: Secondary MOSFET VDS 10.0V/Div

3 Bode Plot

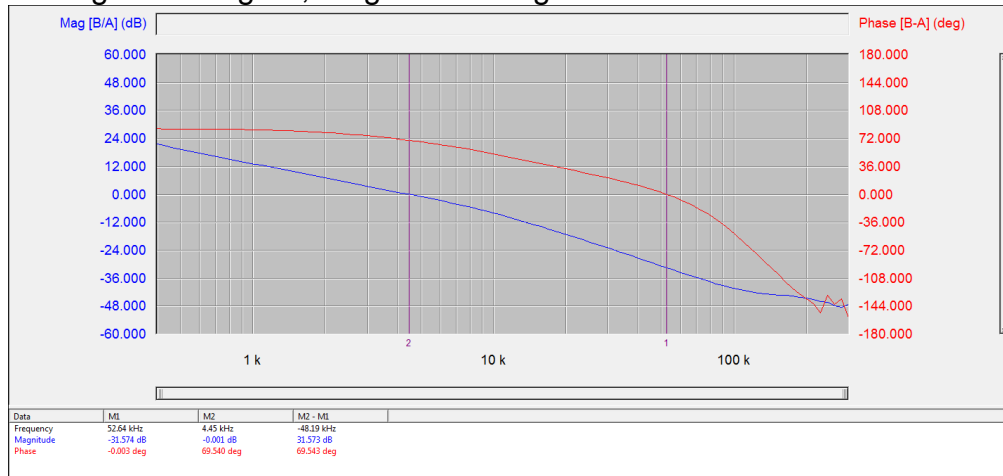
48V Input, Full Load (5.1V/2.0A).

Phase Margin: 65 Degree; Magnitude Margin: -20dB.



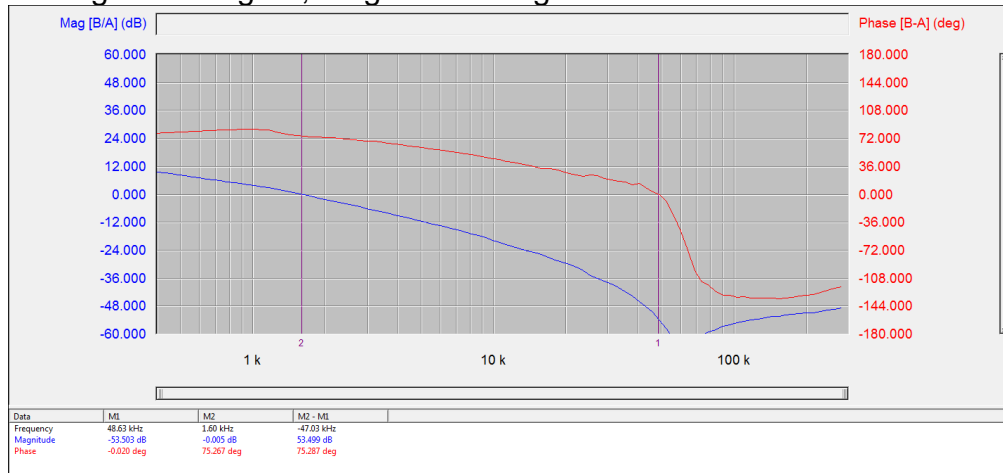
48V Input, Half Load (5.1V/1.0A).

Phase Margin: 69 Degree; Magnitude Margin: -31dB.



48V Input, No Load (5.1V/0.0A).

Phase Margin: 75 Degree; Magnitude Margin: -53dB.



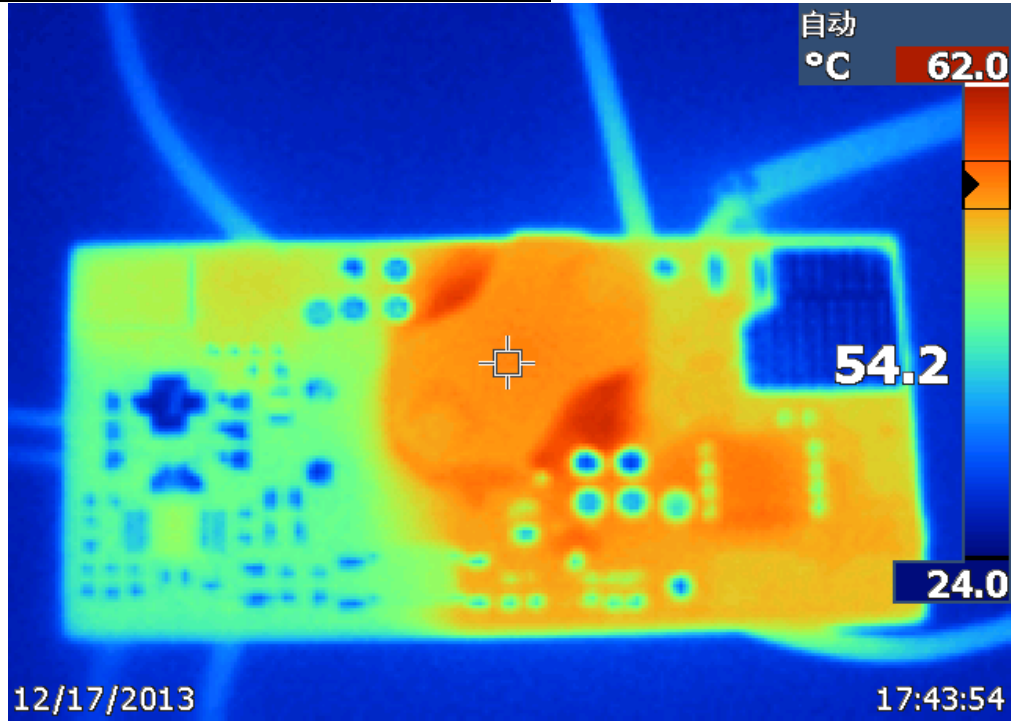
4 Thermal IR Scan

Testing condition:

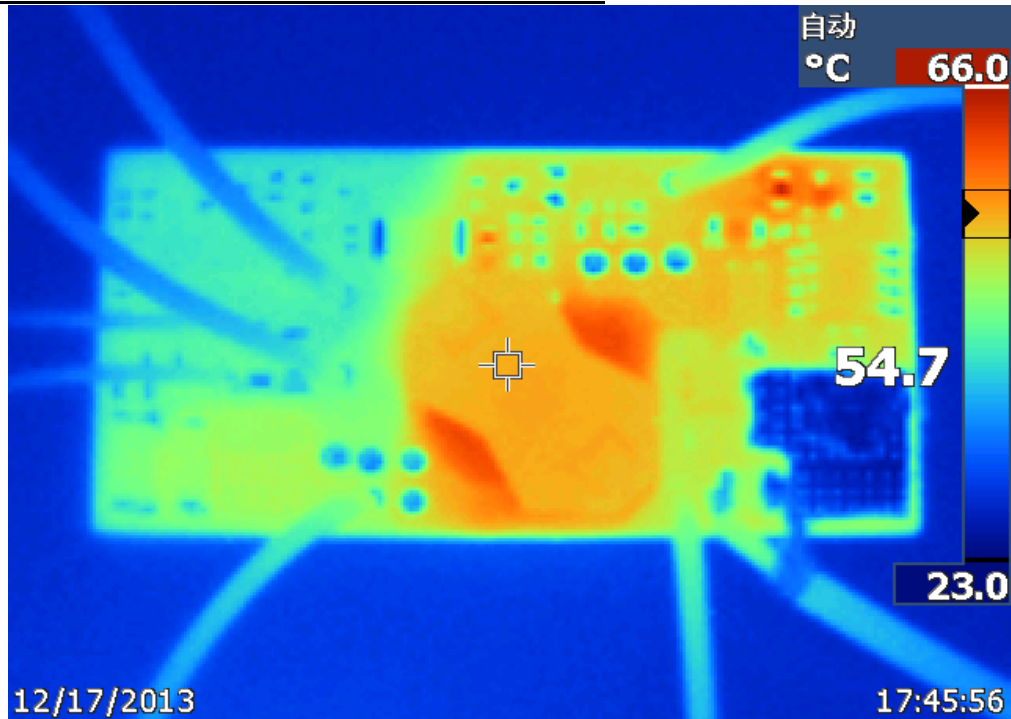
Ambient temperature without Fan cooling

48V input with full load (15 minutes warm up)

Top Side Thermal Gradient Overview



Bottom Side Thermal Gradient Overview



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