Texas Instruments

PMP4317 REVA Test Procedure

China Power Reference Design

REVA

9/16/11

1 General

1.1 PURPOSE

To provide detailed data for evaluating and verifying the PMP4317.

1.2 REFERENCE DOCUMENTATION

Schematic PMP4317_REVA_SCH.PDF
Assembly PMP4317_REVA_PCB.PDF
BOM

1.3 TEST EQUIPMENTS

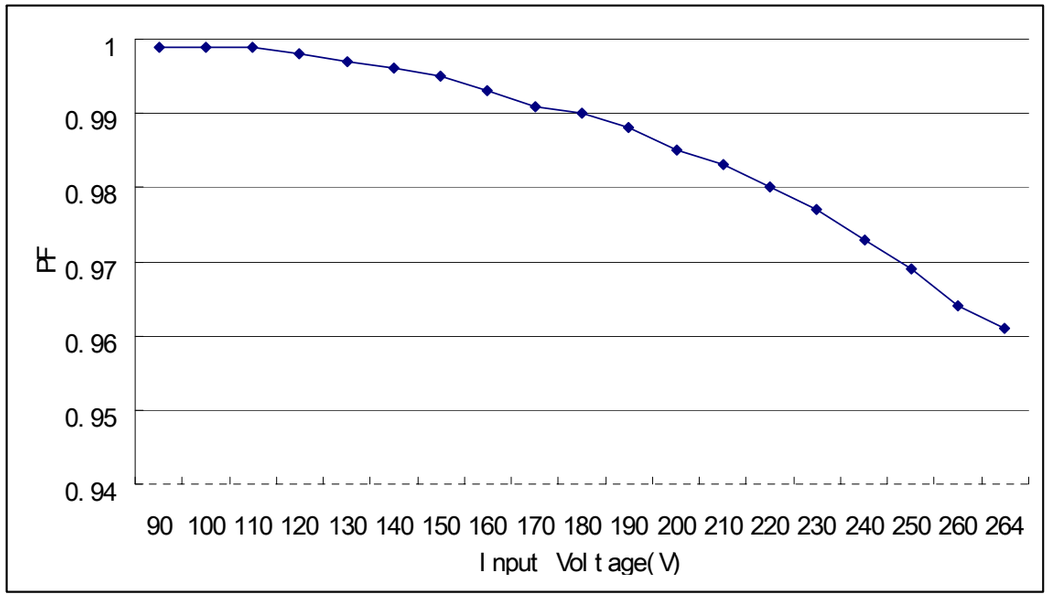
Multi-meter: Fluke 289
Power Analyser:PM100
AC Source: Agilent 6813B
Ambient Temperature at 25DegC

2: INPUT CHARACTERISTICS

2.1 Power Factor

Pass/Fail criteria: 0.99 typical at 100% load.

Vin(Vac)	Freq(Hz)	PF	Io(Arms)
90	60	**0.999**	Full Load
110	60	**0.999**	Full Load
230	50	**0.977**	Full Load
264	50	**0.961**	Full Load



The test was executed under the condition of full load.

2.2: Efficiency

Pass/Fail criteria: 90% minimum with 230V AC input at 100% load

Vin(Vac)	Freq(Hz)	Pin	Po	Eff(%)	Pass/Fail
90	60	153.13	139.40	91.0	**PASS**
110	60	151.22	139.41	92.2	**PASS**
230	50	147.76	139.48	94.4	**PASS**
264	50	147.61	139.56	94.5	**PASS**

The test was executed under the condition of full load.

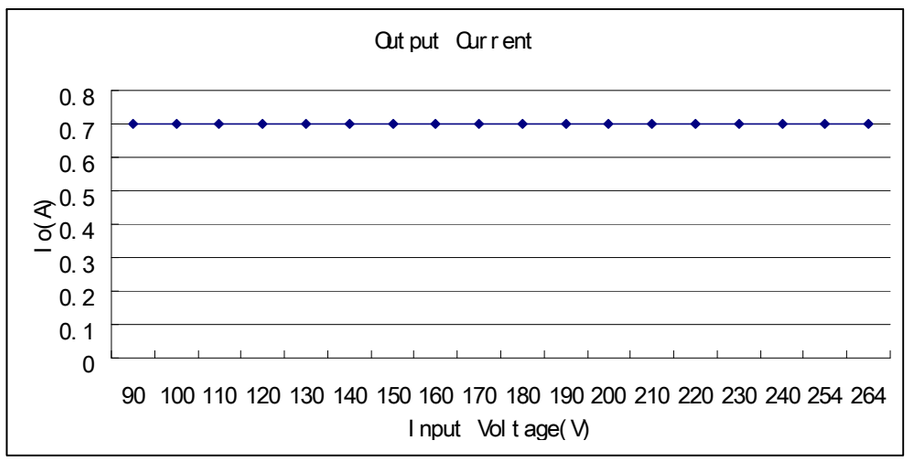
2.3: Maximum input current

Pass/Fail criteria: XX Amps RMS maximum at low line, full load.

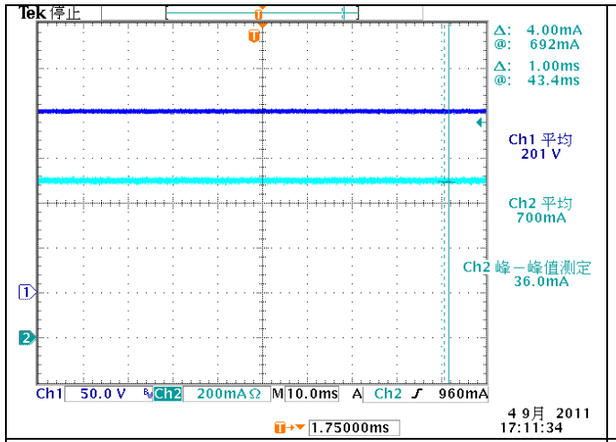
Vin(Vac)	Freq(Hz)	Iin(Arms)	Pass/Fail
90	60	1.701	**PASS**

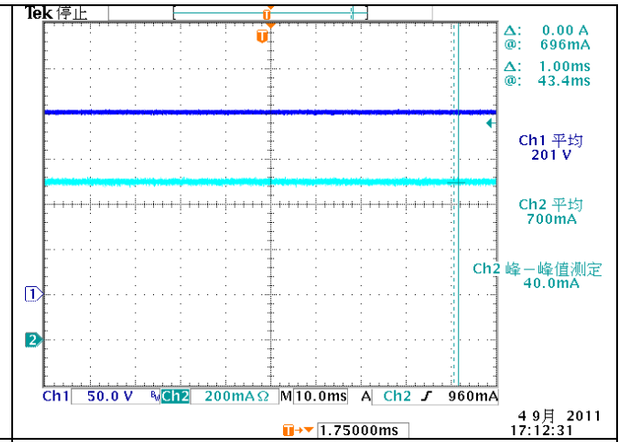
2.4: Output Current

Vin	Io
90	0.7000
100	0.7000
110	0.7000
120	0.7000
130	0.7000
140	0.7000
150	0.7000
160	0.7000
170	0.7000
180	0.7000
190	0.7000
200	0.7000
210	0.7000
220	0.7000
230	0.7000
240	0.7000
254	0.7000
264	0.7000

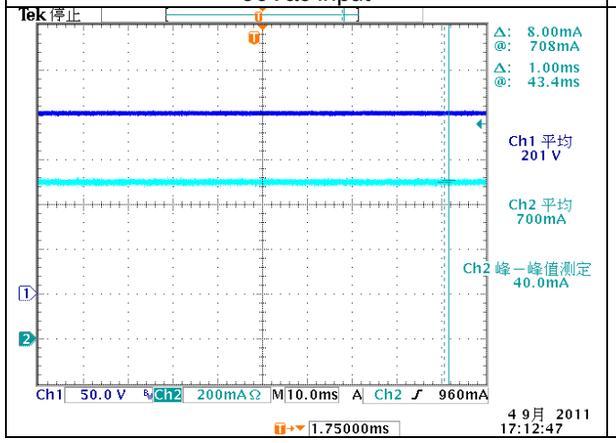


Output current ripple waveforms at 230V input
CH2: LED Output Voltage 10V/Div
CH3: LED Output Current 100mA/Div

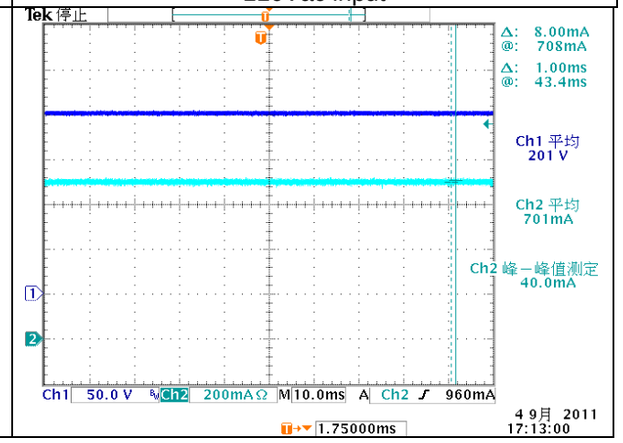




90Vac input



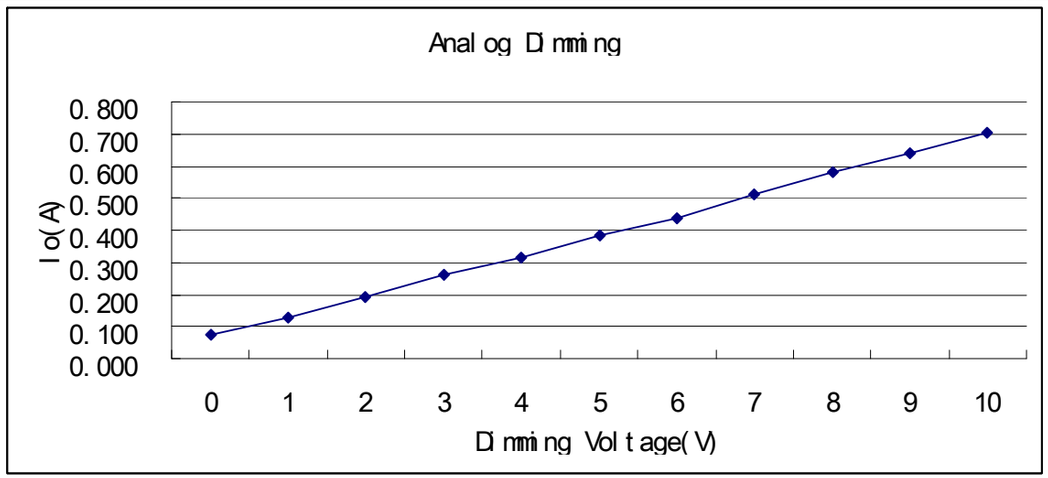
110Vac input



230Vac input	264Vac input

2.5: <u>Output Analog Dimming Control</u>

Dimming Voltage	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V
Io(A)	0.074	0.130	0.190	0.260	0.315	0.382	0.316	0.512	0.581	0.639	0.703

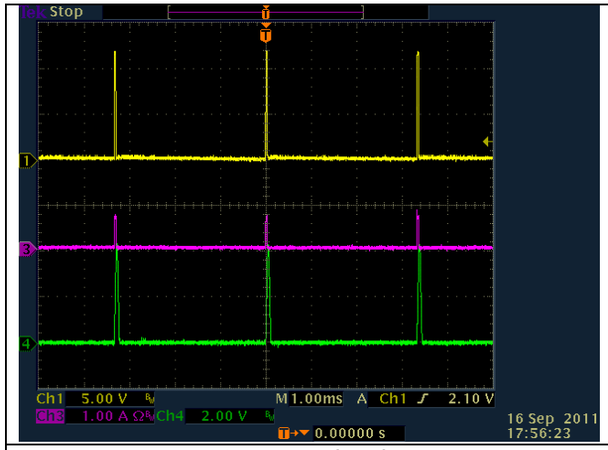


2.6: <u>Output Dimming Control</u>

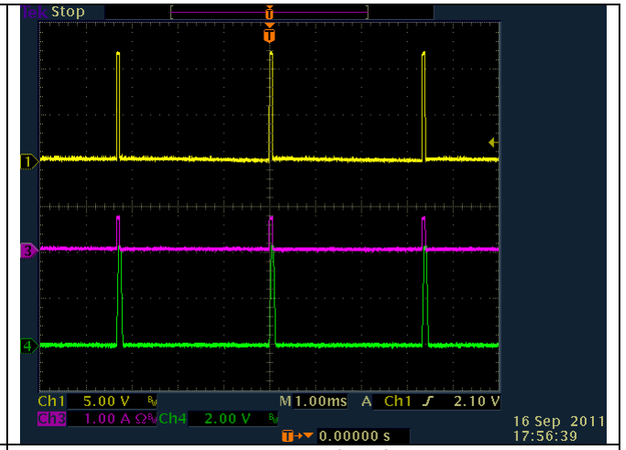
230Vin		
Dimming	Io(mA)	%
1%	66.1	9.4
2%	93.2	13.3

5%	150.1	21.4
10%	216.2	30.9
20%	310	44.3
30%	381.5	54.5
40%	441.3	63.0
50%	494	70.6
60%	541.6	77.4
70%	585.2	83.6
80%	625.9	89.4
90%	664.1	94.9
99%	698	99.7
100%	702	100.3

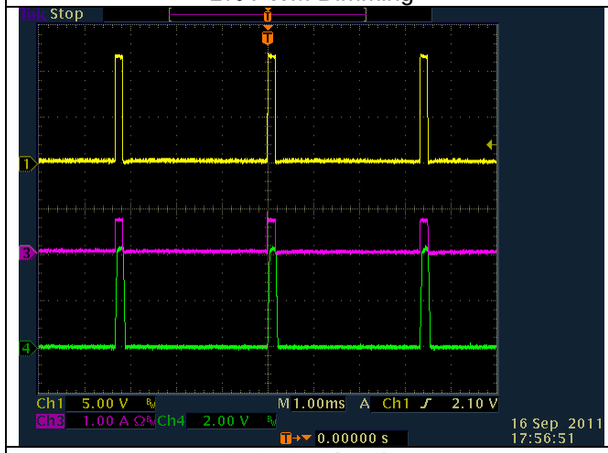
1. Waveform from LED Output Current is controlled by 300Hz PWM dimming.
It was tested under the condition of 230Vac input.
CH1: LEDSW MOSFET Vgs 5V/Div CH3: LED Output Current 1A/Div
CH4: DSR 2V/Div



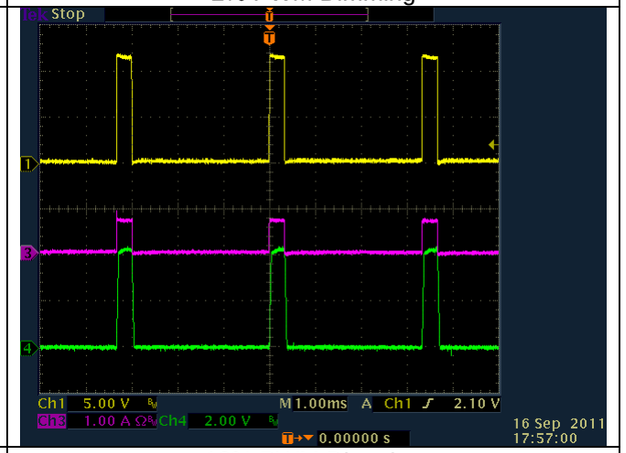
1% PWM Dimming



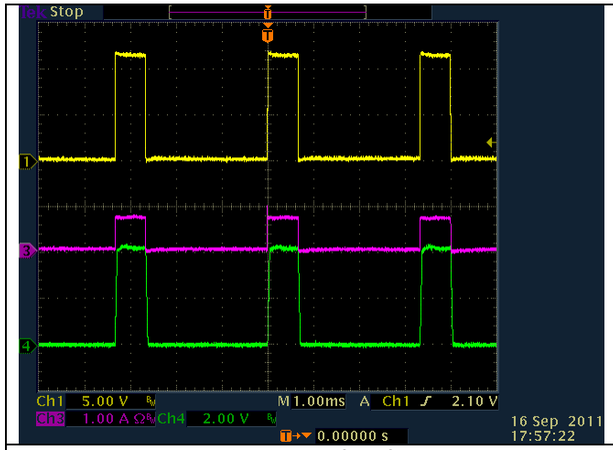
2% PWM Dimming



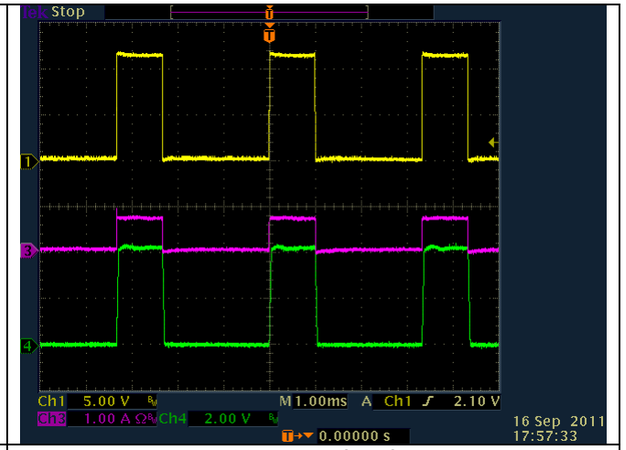
5% PWM Dimming



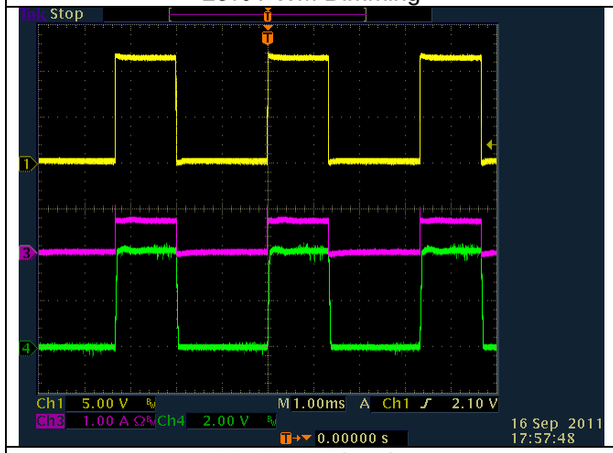
10% PWM Dimming



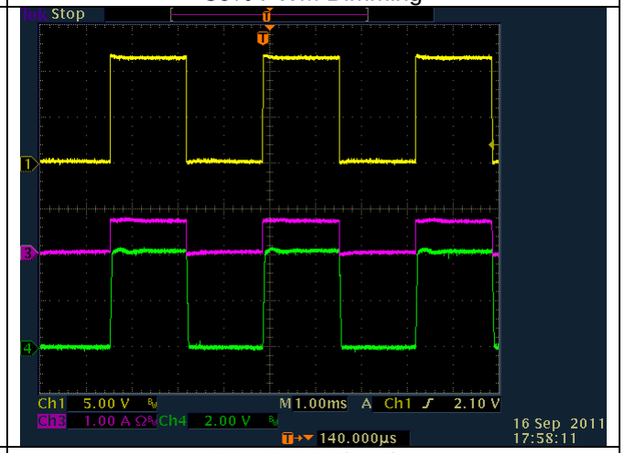
20% PWM Dimming



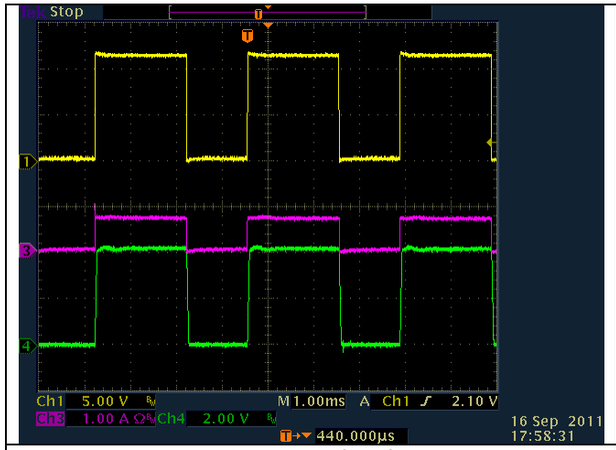
30% PWM Dimming



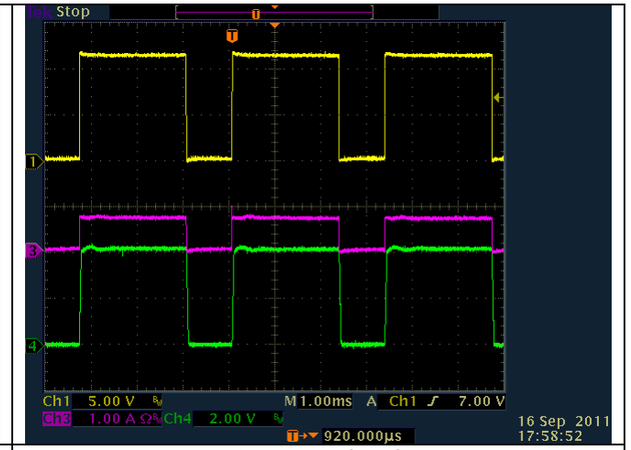
40% PWM Dimming



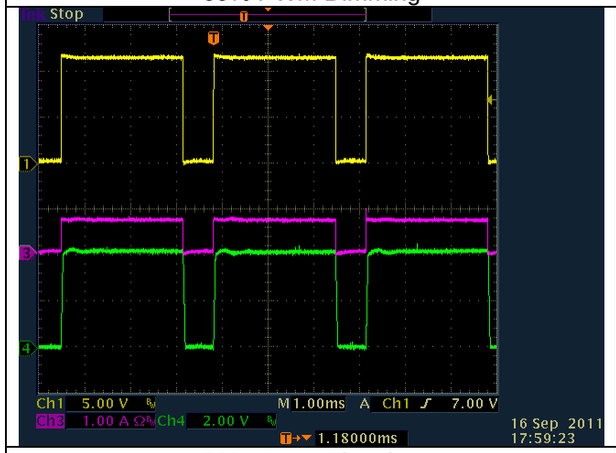
50% PWM Dimming



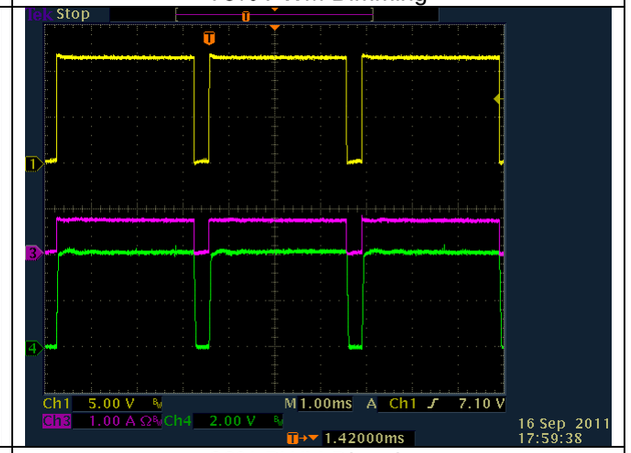
60% PWM Dimming



70% PWM Dimming



80% PWM Dimming



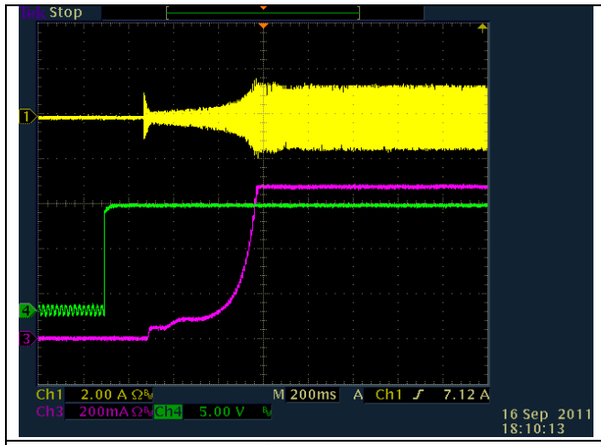
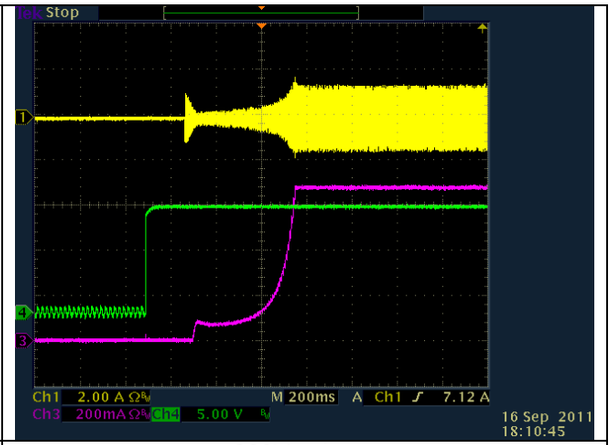
90% PWM Dimming

2.7: Start-up waveform

CH1: Primary Current 2A/Div

CH3: LED Output Current 200mA/Div

CH4: LEDSW MOSFET Vgs 5V/Div

<table>
<tr><td> 
</td><td> 
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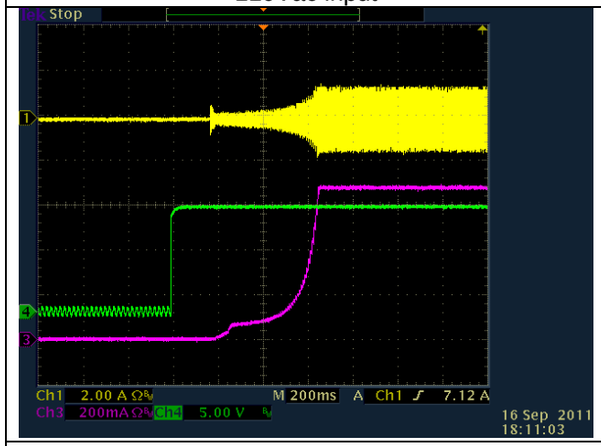
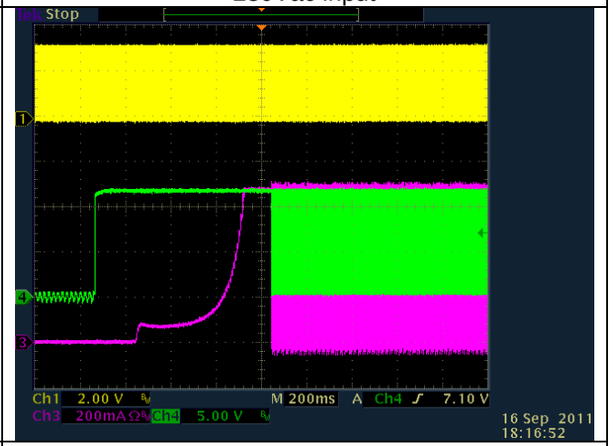
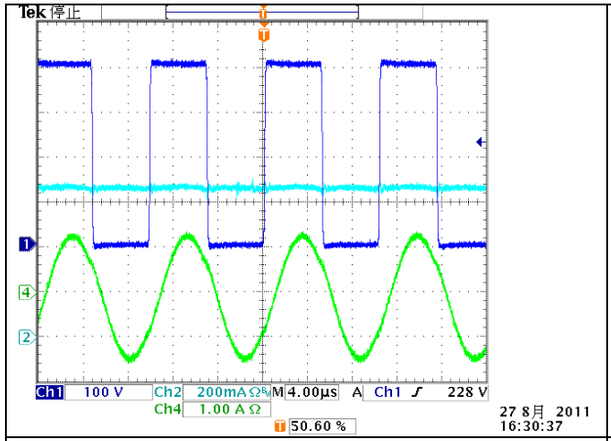
<tr><td>110Vac input</td><td>230Vac input</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>264Vac input</td><td>Start up with 50% dimming 230Vac input
CH1: Input Dimming signal 2V/Div
CH3: LED Output Current 200mA/Div</td></tr>
</table>

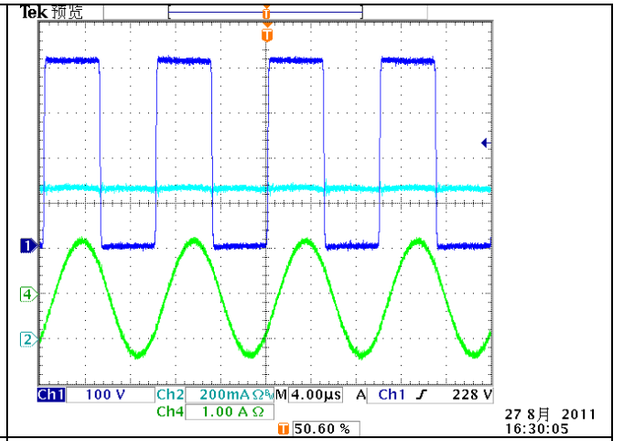
	CH4: LEDSW MOSFET Vgs 5V/Div

2.8: Operating waveform

CH1: Primary MOSFET Vds 100V/Div CH2: LED Output Current 200mA/Div
CH4: Primary Current 1A/Div

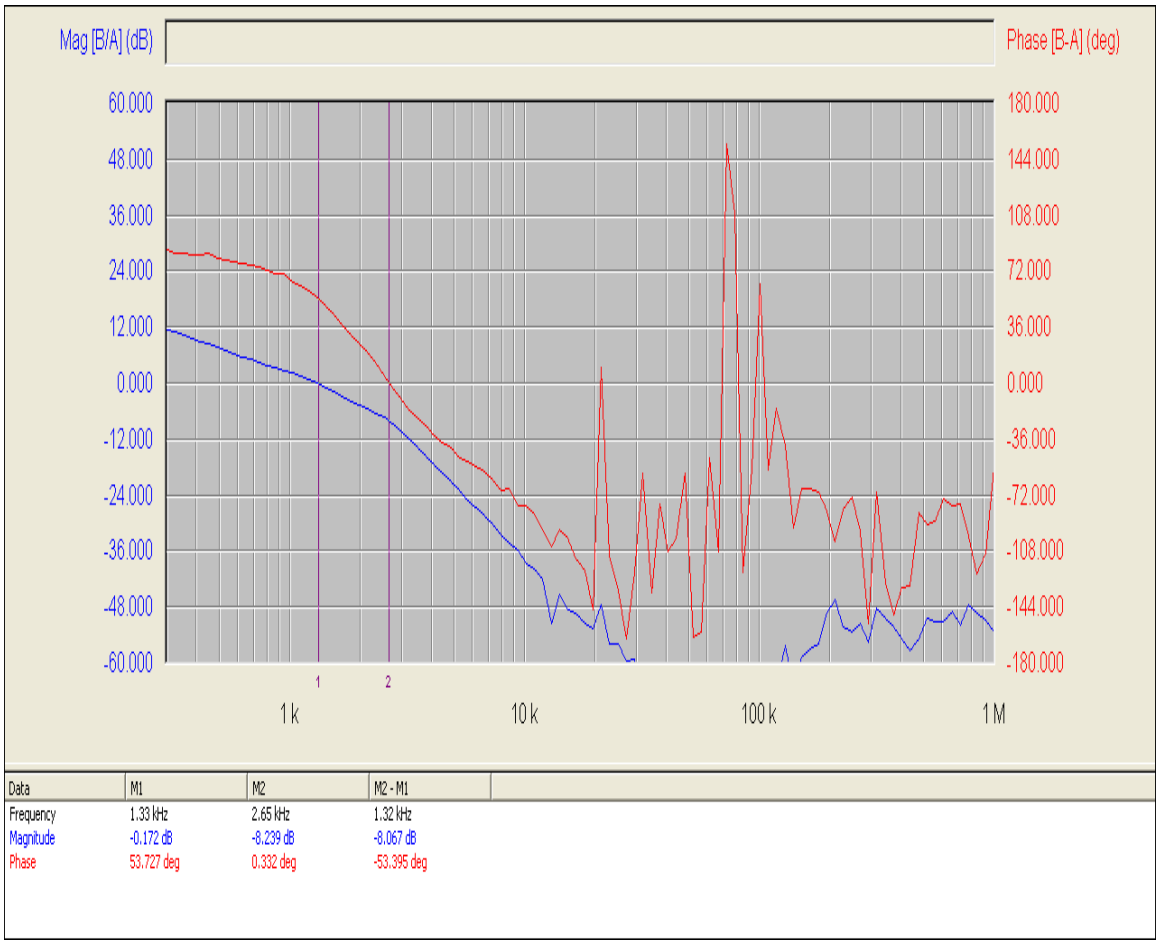


90Vac input



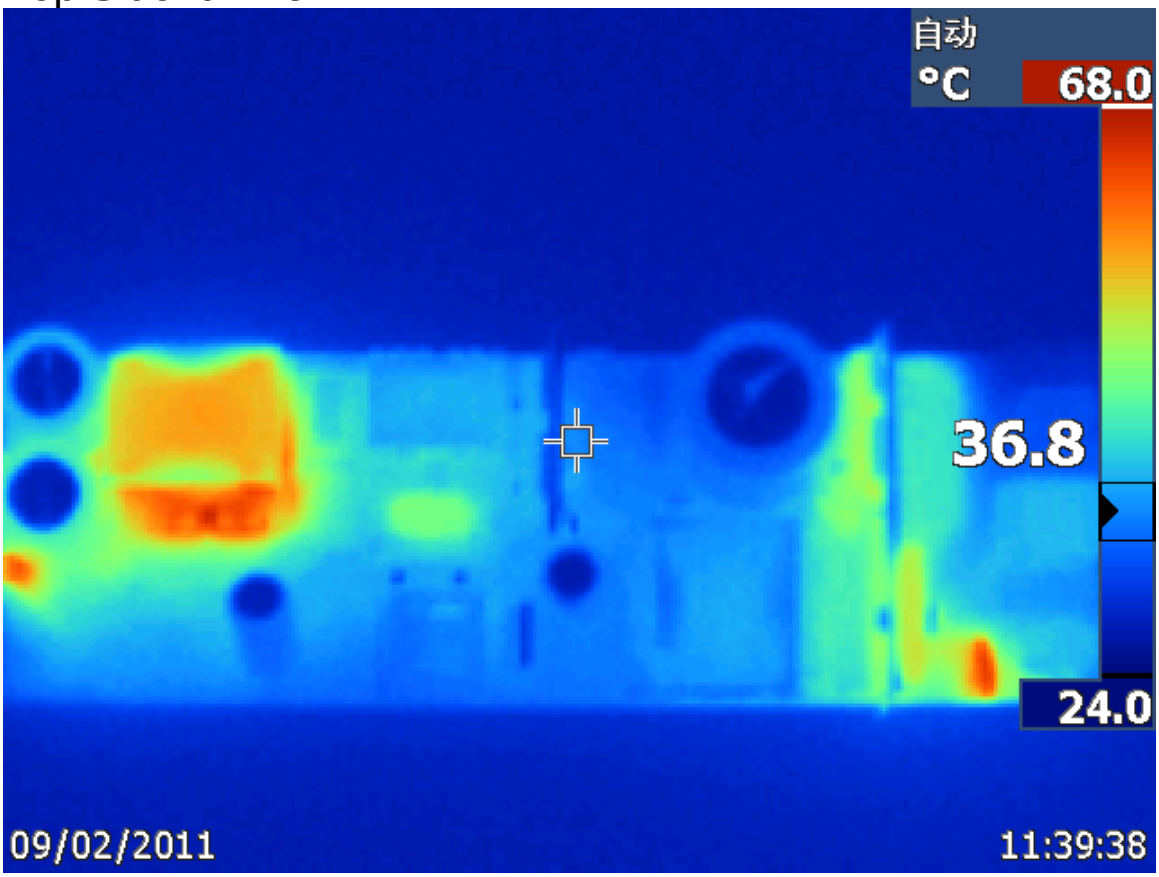
230Vac input

2.9: Bode Plot

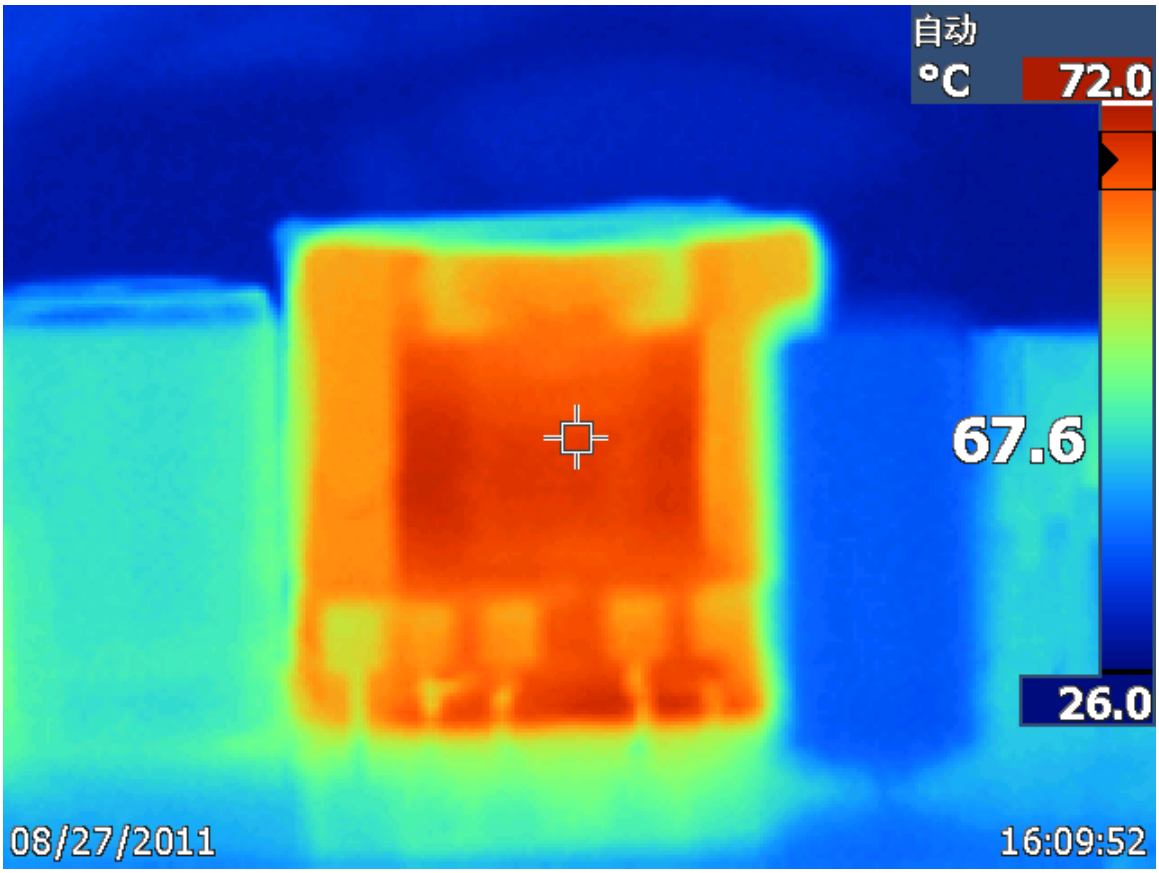


Data	M1	M2	M2 - M1
Frequency	1.33 kHz	2.65 kHz	1.32 kHz
Magnitude	-0.172 dB	-8.239 dB	-8.067 dB
Phase	53.727 deg	0.332 deg	-53.395 deg

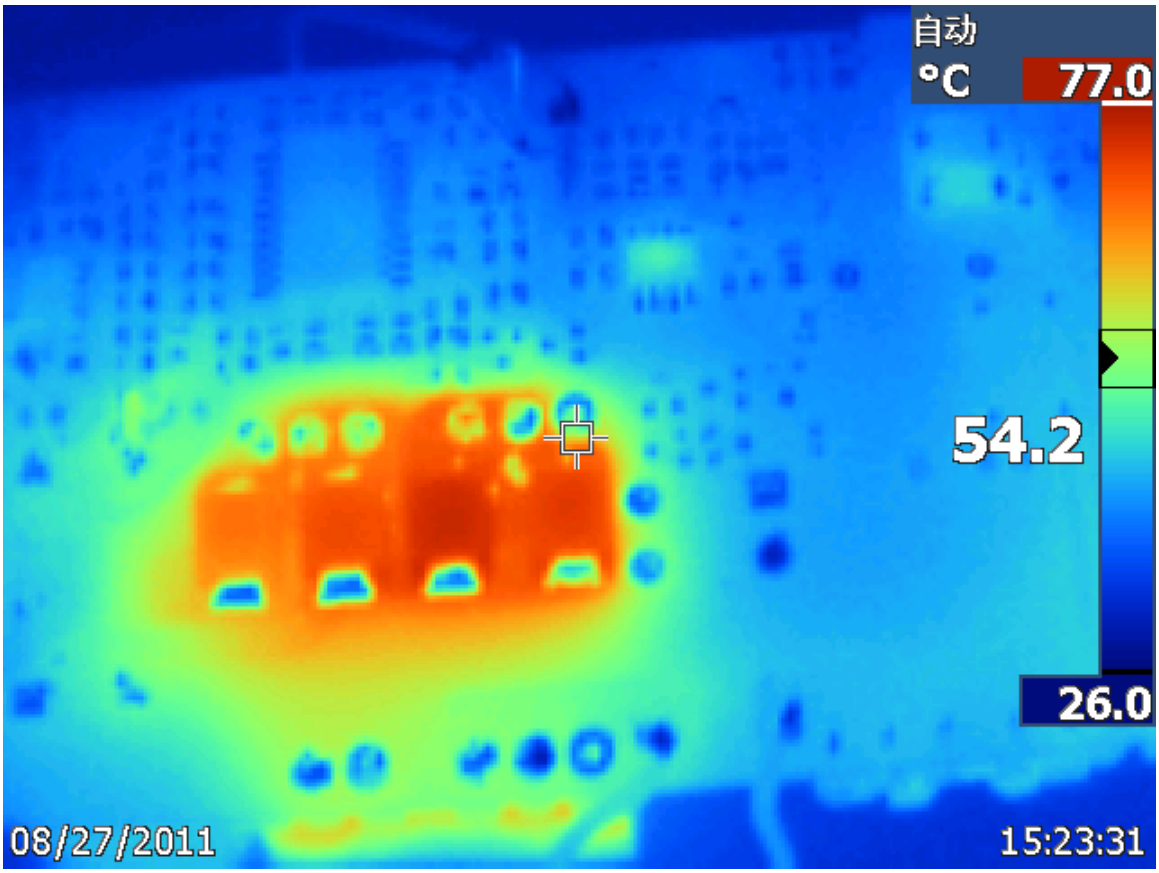
2.10: Thermal Test
Test condition: Room Temperature
Top Side full view



Main Transformer Temperature view



Bottom Output rectifier diode view



2.11: EMI test

Vin=230V
L5 changed to 47uH common mode choke (Wurth PN: 744841247)
L6 changed to 20mH common mode choke (Wurth PN: 744841247)
L1 changed to 300uH difference mode choke (Wurth PN: 7447060)
Rectifier bridge and PFC heatsink connected to PGND

EMI TEST REPORT

parameter

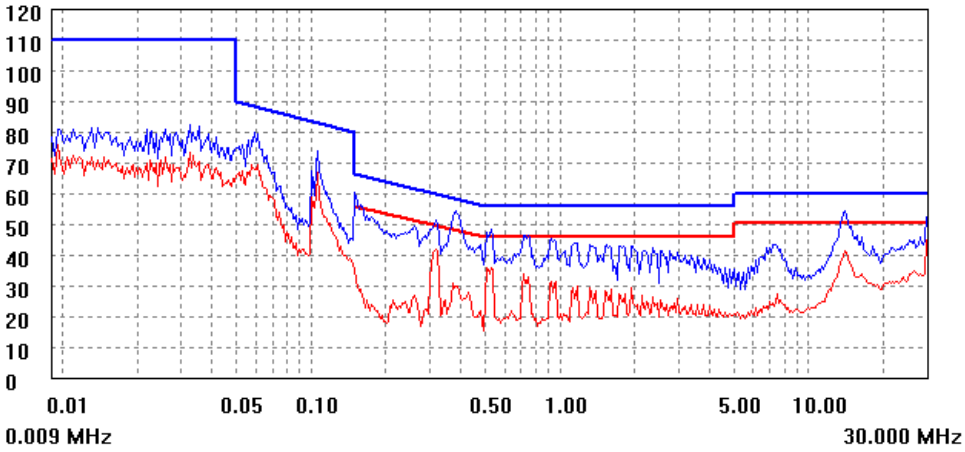
Organization:		Operator:		EUT:	
Place:		Time:	2011/9/7/17:35		
Detector:	PK+AV	Test-time(ms):	30		
Limit:	EN55015	Transductor(PK/AV):	PK1 / AV1		
Remark:					

freq, step

Start(MHz)	End(MHz)	Step(MHz)
0.009	0.150	0.000
0.150	2.000	0.002
2.000	10.000	0.010
10.000	30.000	0.025

scan result

dBuV



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