TEXAS INSTRUMENTS

Texas Instruments

PMP4330 Test Procedure

China Power Reference Design
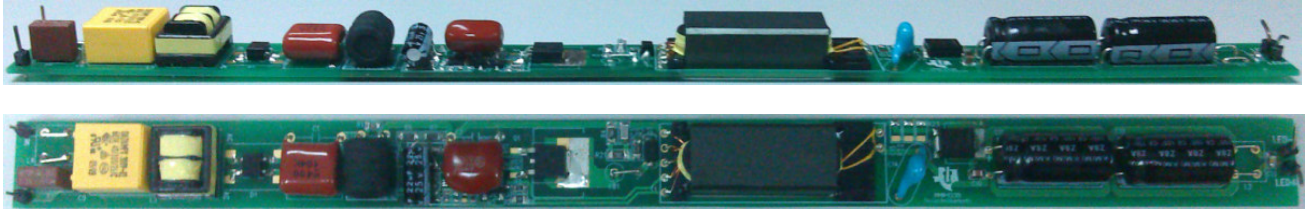

REV A

3/30/2012

1 GENERAL

1.1 PURPOSE

To provide detailed data for evaluating and verifying the PMP4330, which uses TI new Primary Side Controller TPS92310 for GU10 light standard form factor with 256mmx17.6mmx11mm. The below photo shows this demo board.

1.2 REFERENCE DOCUMENTATION

Schematic PMP4330_SCH.PDF
Assembly PMP4330_PCB.PDF
BOM

1.3 TEST EQUIPMENTS

Power-meter: YOKOGAWA WT210
Multi-meter(current): Fluke 3345A
Multi-meter(voltage): Fluke 187
AC Source: Chroma 61530
LED load: Chroma 63110A module

2 INPUT CHARACTERISTICS

Otherwise Specified, the test is under the condition With LED electric Load (Chroma 63310A, 40V, 0.42A).

2.1 POWER FACTOR

**Pass/Fail criteria:** THD meets to IEC61000-3-2 with 230Vac input at 100% load.

Vin(Vac)	Freq(Hz)	PF	Io(Arms)	THD(%)	Pass/Fail
85	60	**0.990**	**0.426**	11.6	
110	60	**0.983**	**0.429**	14.4	
132	60	**0.975**	**0.430**	16.9	
150	60	**0.968**	**0.428**	19.1	
180	50	**0.947**	**0.428**	23.9	
200	50	**0.933**	**0.429**	25.9	
230	50	**0.913**	**0.431**	28.8	
265	50	**0.887**	**0.435**	31.5	
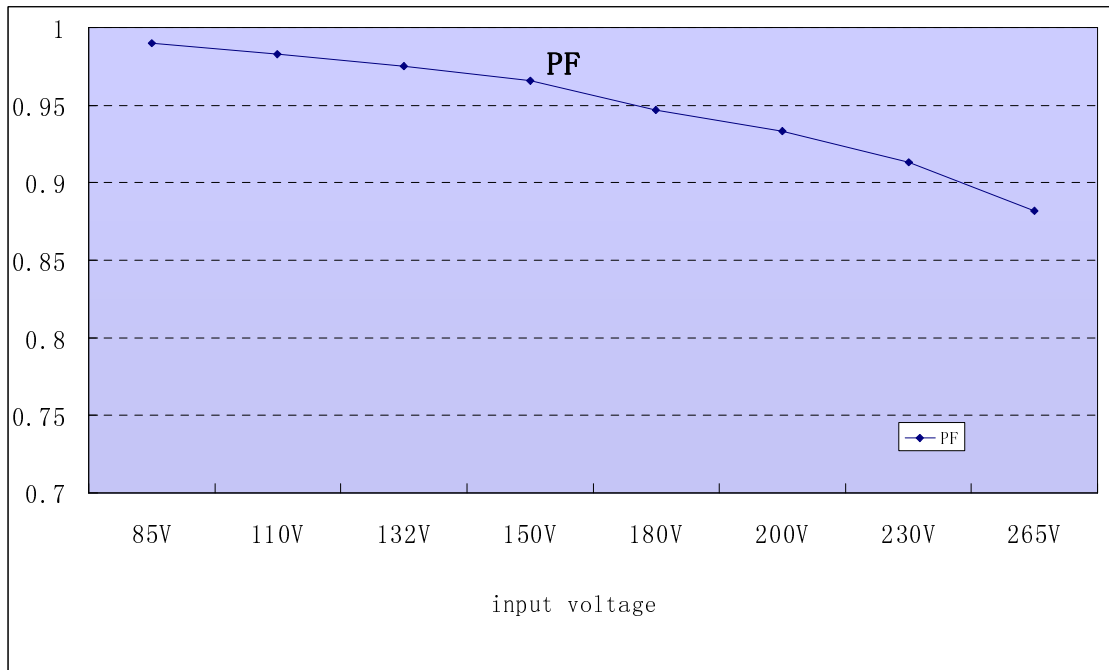
2.2 EFFICIENCY

Pass/Fail criteria: 82% minimum with 230v input at 100% load.

Vin(Vac)	Freq(Hz)	Pin(W)	Vo(Vrms)	Io(Arms)	Eff(%)	Pass/Fail
85	60	**19.57**	**40.23**	**0.426**	**87.6**	
110	60	**19.30**	**40.27**	**0.429**	**89.5**	
132	60	**19.20**	**40.28**	**0.430**	**90.2**	
150	60	**19.01**	**40.25**	**0.428**	**90.6**	
180	50	**18.98**	**40.25**	**0.428**	**90.7**	
200	50	**19.05**	**40.26**	**0.429**	**90.6**	
230	50	**19.23**	**40.28**	**0.431**	**90.2**	
265	50	**19.53**	**40.31**	**0.435**	**89.8**	
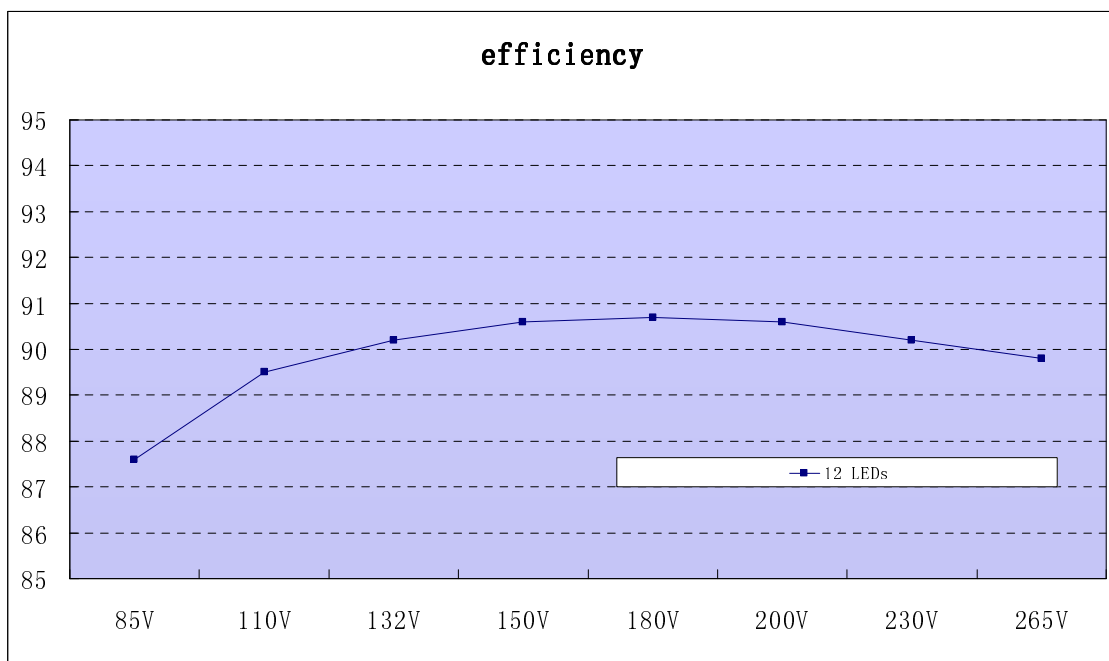
2.3 INPUT CURRENT

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

Vin(Vac)	Freq(Hz)	Iin(Arms)	Pass/Fail
110	60	**0.178**	
230	5	**0.091**	

3 OUTPUT CHARACTERISTICS

3.1 OUTPUT VOLTAGE RANGE（38Vdc-42Vdc）

ITEM	Vout (V)	Iout(A)	Pass/Fail
Vin=110Vac	38	0.426	
	42	0.422	
Vin=230Vac	38	0.428	
	42	0.424	

3.2 TURN ON DELAY AND RIPPLE CURRENT

CONDITIONS		Delay time (S)	Ripple current（mA）	Pass/Fail
Vin (Vac)	Load			
110	Full load	0.928	220mA, <+/-30%	
230	Full load	0.648	204mA, <+/-30%	

Tek 停止

△: 12.0 V
@: 0.00 V

△: 928ms
@: 632ms

Ch1 100 V   M 400ms   A Ch1 ƒ   162 V
Ch4 200mV Ω

30 3月 2012
10:52:07
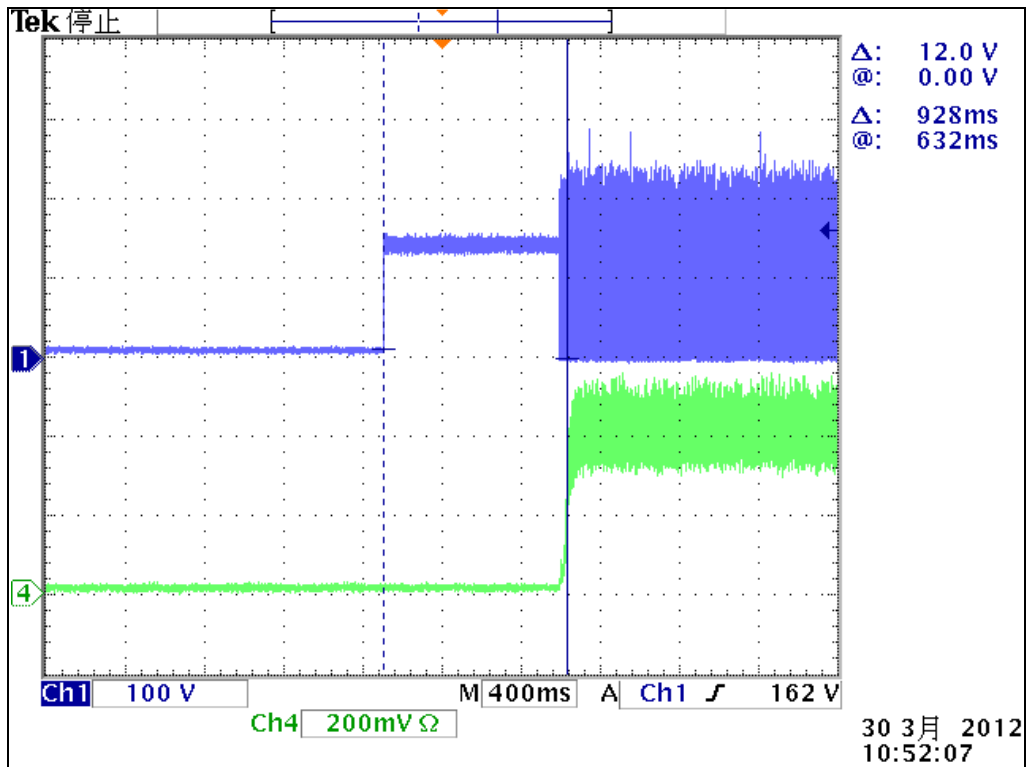
Vin:110Vac   Io: full load   (LED Lamp Load)
Ch1: Vds voltage of MOSFET, 100V/div
Ch4: LED current 200mA/div

Tek 停止

△: 180 V
@: 4.00 V

△: 648ms
@: −288ms

Ch1 100 V   M 400ms   A Ch1 ƒ   162 V
Ch4 200mV Ω

30 3月 2012
10:52:30
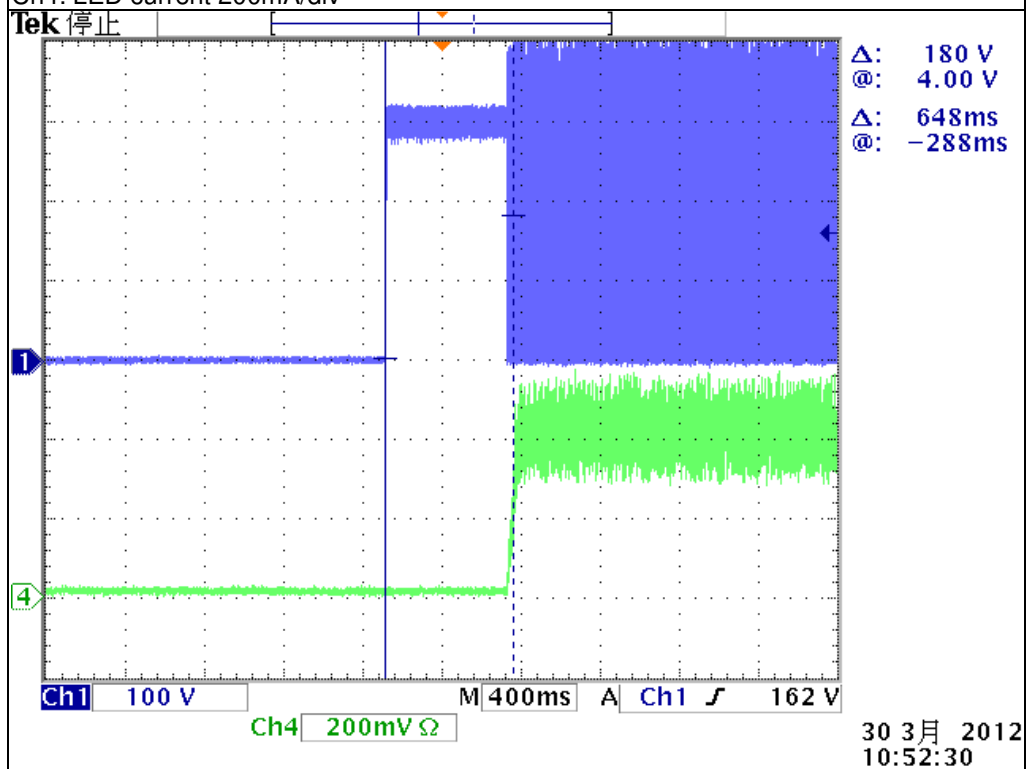
Vin:230Vac   Io: full load (LED electric Load)
Ch1: Vds voltage of MOSFET, 100V/div
Ch4: LED current, 200mA/div
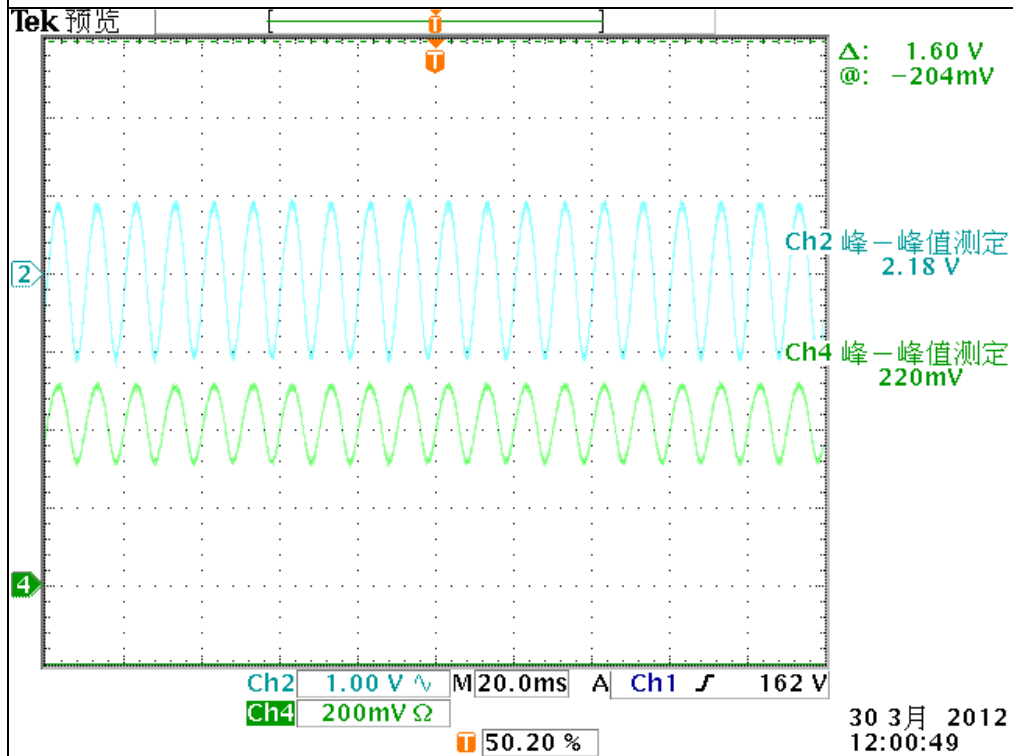
Vin:110Vac   Io: LED load (LED electric Load)
Ch2: LED ripple voltage 1V/div
Ch4: LED current 200mA/div

Vin:230Vac   Io: LED load (LED electric Load)
Ch2: LED ripple voltage 1V/div
Ch4: LED current 200mA/div
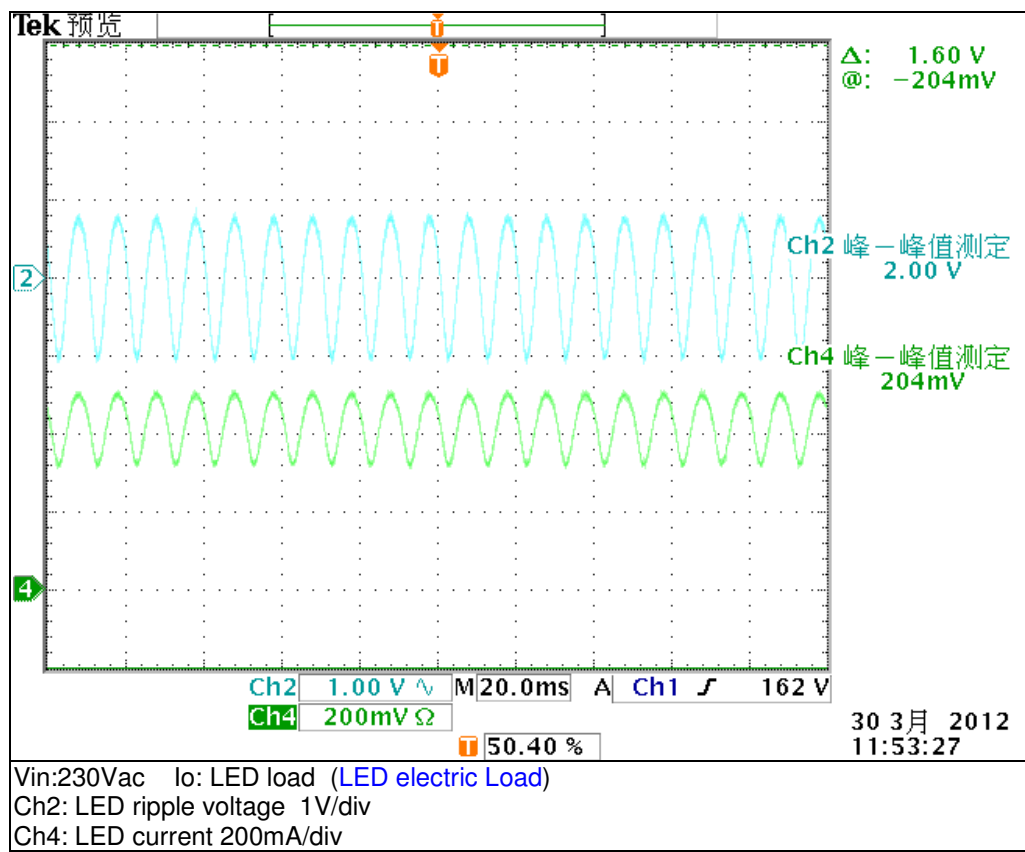
3.3 OUTPUT VOLTAGE PROTECTION

CONDITIONS	Protection voltage（V）	Pass/Fail
Vin (Vac)		
110&230	46	
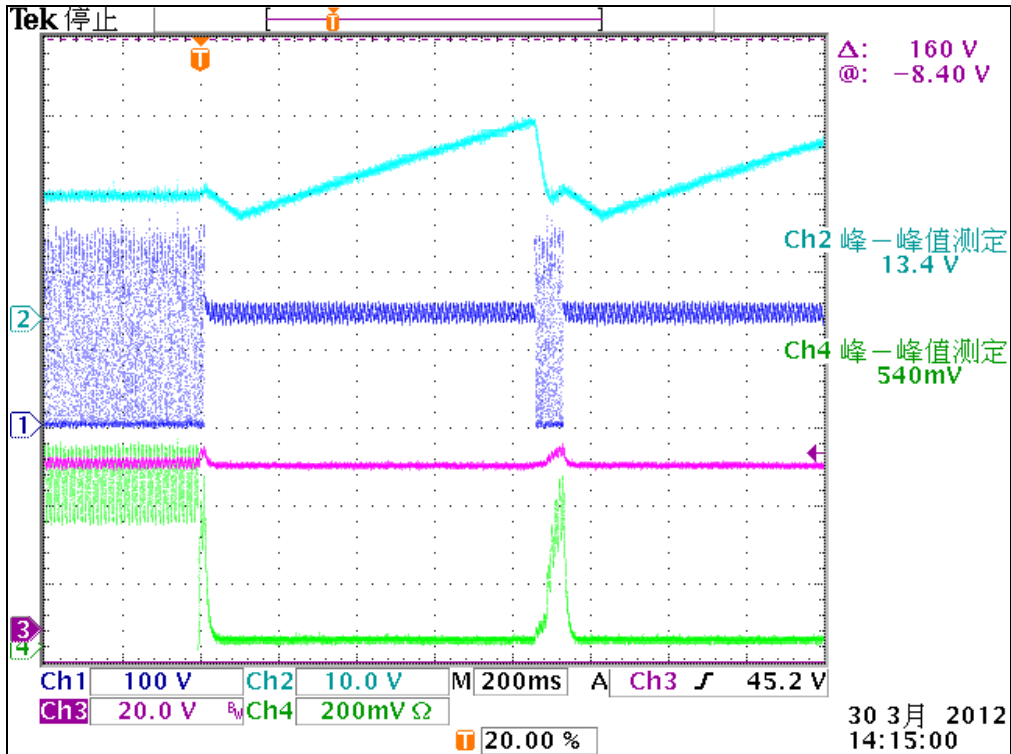
Vin:110Vac   OVP and open LED protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 20V/div
Ch4: LED current, 200mA/div
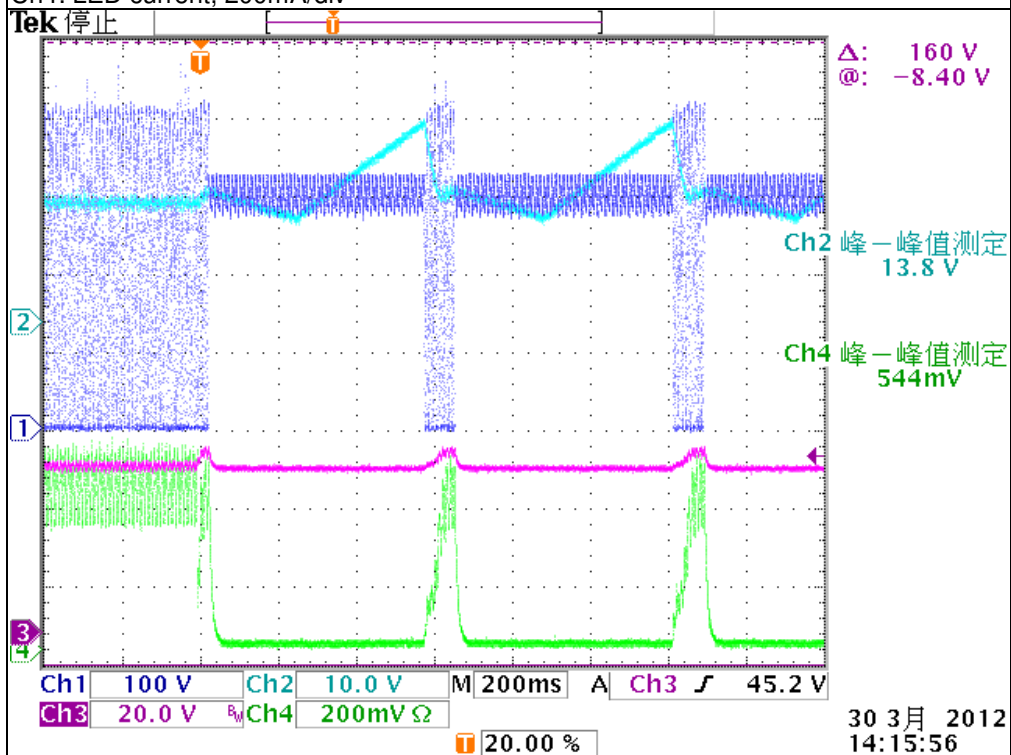
Vin:230Vac   OVP and open LED protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 20V/div
Ch4: LED current, 200mA/div

3.4b SHORT ONE LED PROTECTION

CONDITIONS	Protection voltage（V）	Pass/Fail
Vin (Vac)		
110&230	35	ok
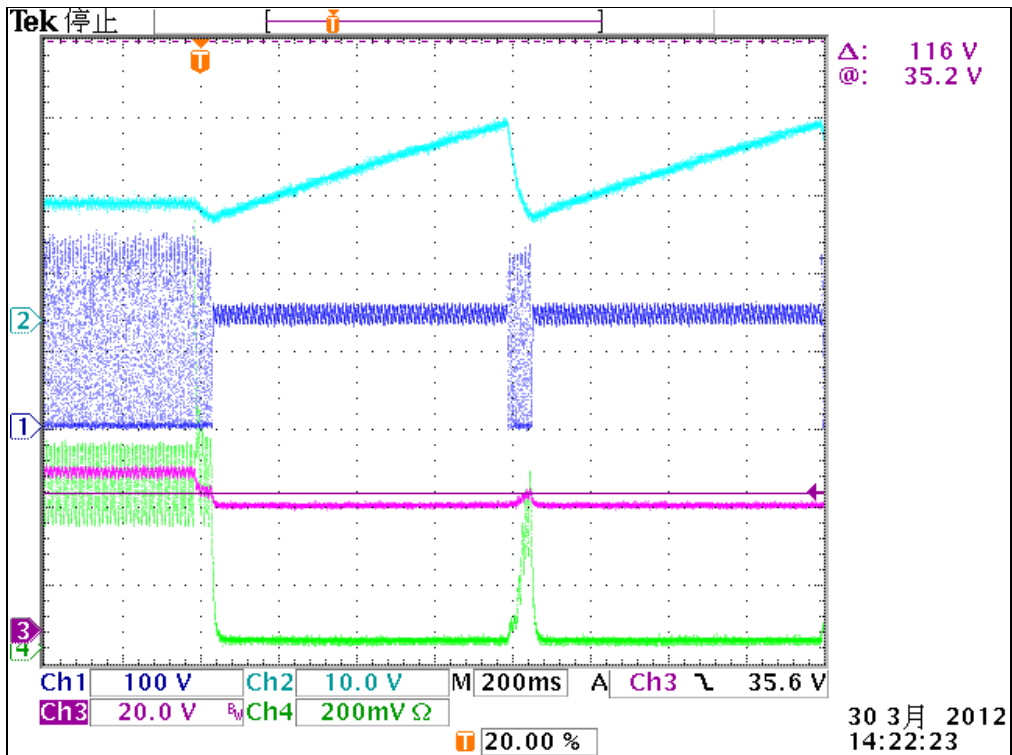
Vin:110Vac   one LEDs shorted protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 20V/div
Ch4: LED current, 200mA/div

Vin:230Vac   two LEDs shorted protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 5V/div
Ch4: LED current, 200mA/div
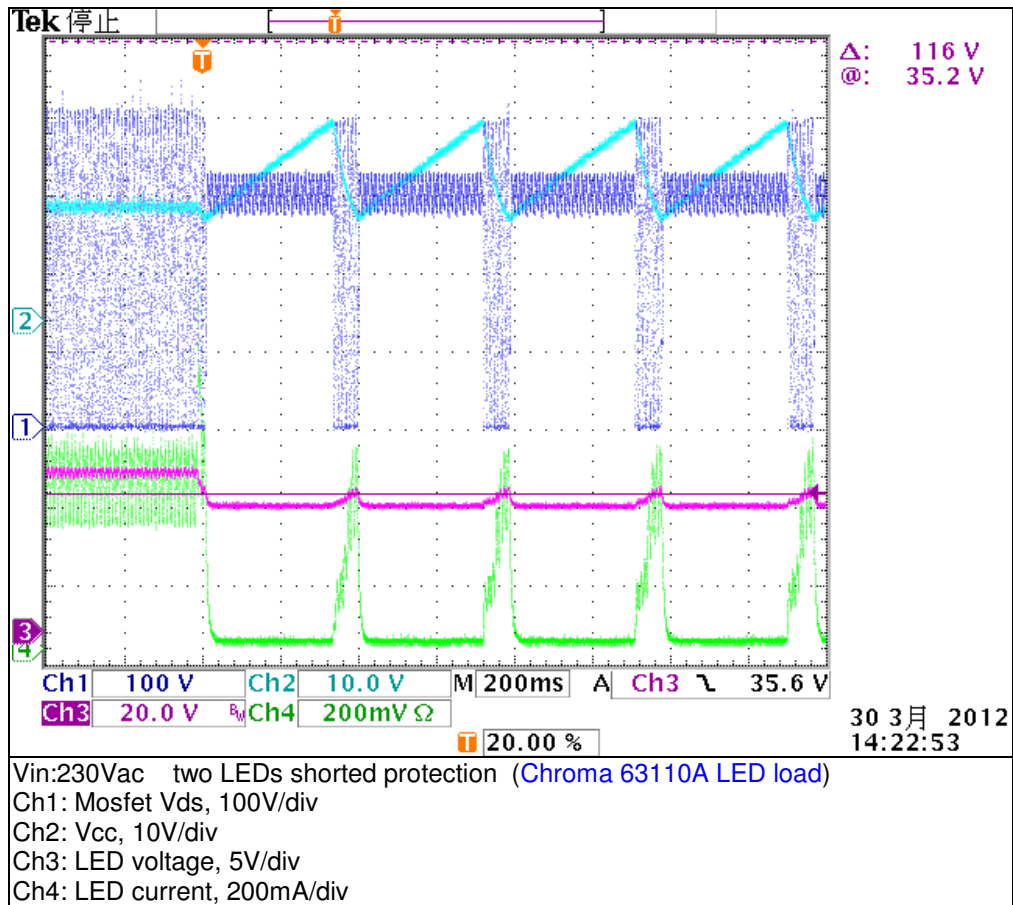
3.5 OUTPUT SHORT PROTECTION
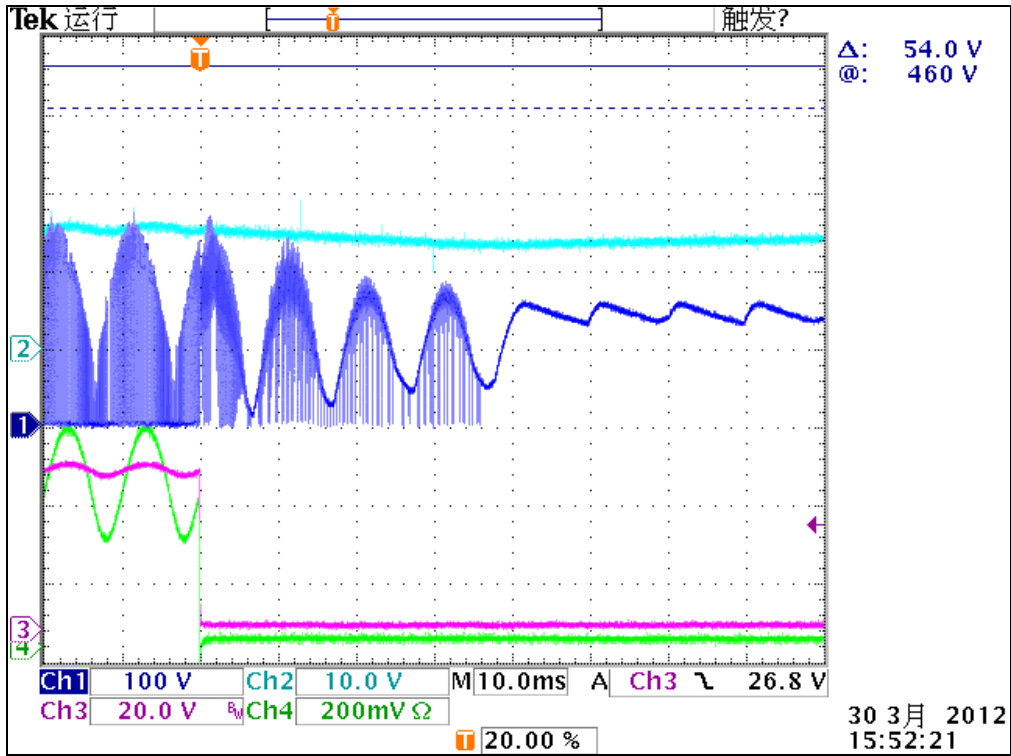
Vin:110Vac   two LEDs shorted protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 20V/div
Ch4: Primary current, 200mA/div
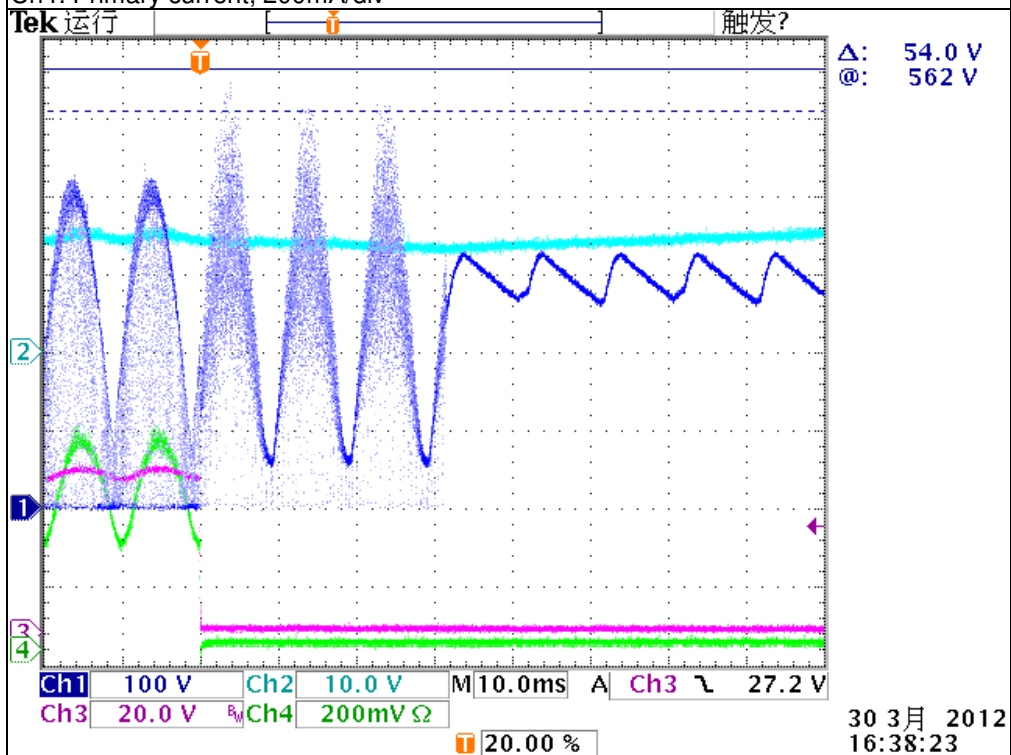
Vin:230Vac   two LEDs shorted protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 20V/div
Ch4: Primary current, 200mA/div

3.6 LINE REGULATION CURVE(4 LEDs)
3.7

Vin(Vac)	Freq(Hz)	Io(Arms)	Pass/Fail
85	60	**0.426**	
110	60	**0.429**	
132	60	**0.430**	
150	60	**0.428**	
180	50	**0.428**	
200	50	**0.429**	
230	50	**0.431**	
264	50	**0.435**	

4 EMI Test

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

0.009 MHz   30.000 MHz

Vin: 230Vac, Line,   Io: full load

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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

0.009 MHz   30.000 MHz

Vin:230Vac, Neutral,   Io: full load

IMPORTANT NOTICE