



Texas Instruments

PMP4325 Test Procedure

China Power Reference Design

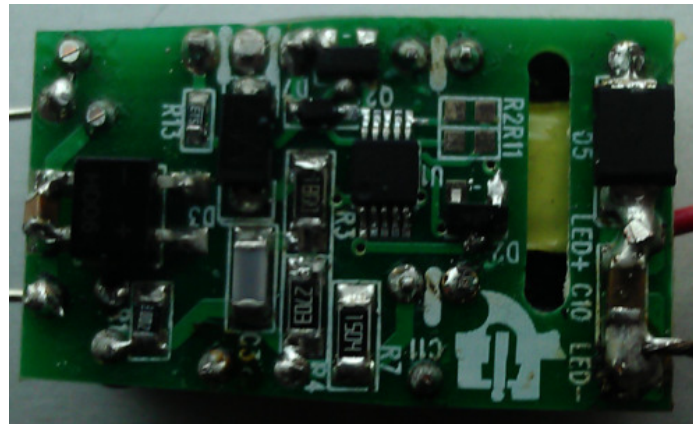
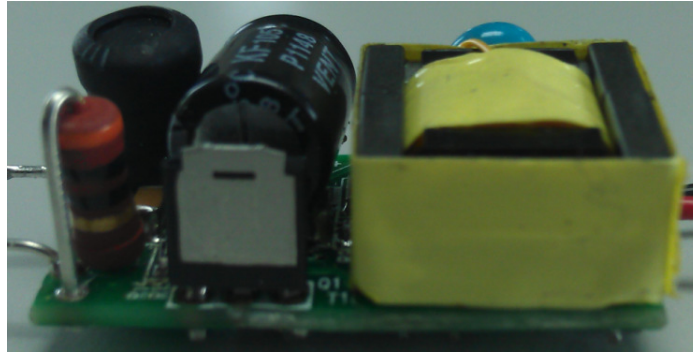
REV A

12/20/2011

1 GENERAL

1.1 PURPOSE

To provide detailed data for evaluating and verifying the PMP4325, which uses TI new Primary Side Controller TPS92310 for GU10 light standard form factor with 30mmx18mmx18mm. The below photo shows this demo board.



1.2 REFERENCE DOCUMENTATION

Schematic PMP4325_SCH.PDF
Assembly PMP4325_PCB.PDF
BOM

1.3 TEST EQUIPMENTS

Power-meter: YOKOGAWA WT210
Multi-meter(current): Agilent 34401A
Multi-meter(voltage): Fluke 187
AC Source: Chroma 61530
LED load: Chroma 63110A module
Testing demoboard: without line regulation circuit

2 INPUT CHARACTERISTICS

Otherwise Specified, the test is under the condition With LED lamp Load (4 LEDs in series).

2.1 POWER FACTOR

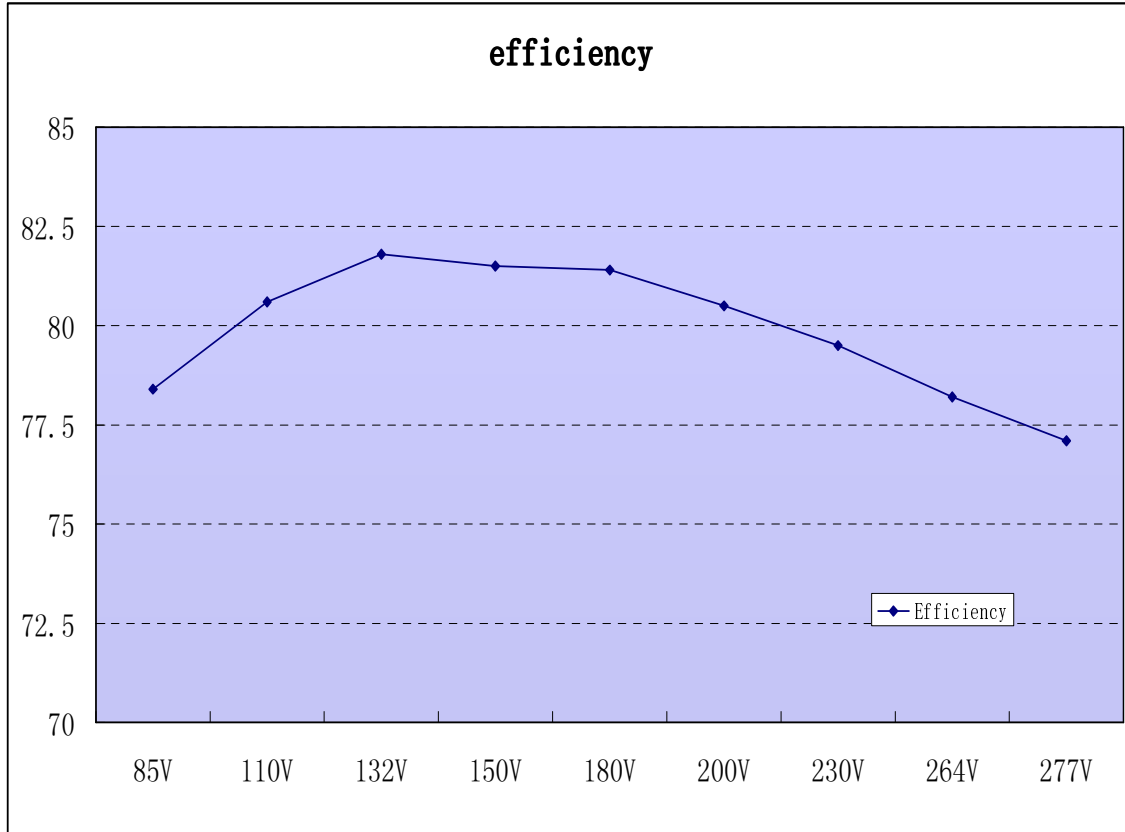
Pass/Fail criteria: THD meets to IEC61000-3-2 with 230Vac input at 100% load.

Vin(Vac)	Freq(Hz)	PF	Io(Arms)	THD(%)	Pass/Fail
85	60	0.611	0.332	89.8	
110	60	0.589	0.337	114.6	
132	60	0.557	0.339	132.7	
150	60	0.533	0.341	145.4	
180	50	0.514	0.346	154.2	
200	50	0.495	0.350	167.9	
230	50	0.472	0.358	180.0	
264	50	0.448	0.365	196.0	
277	50	0.442	0.368	200.0	

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	5.08	11.99	0.332	78.4	
110	60	5.00	12.00	0.337	80.6	
132	60	4.98	12.01	0.339	81.8	
150	60	5.03	12.02	0.341	81.5	
180	50	5.12	12.04	0.346	81.4	
200	50	5.24	12.05	0.350	80.5	
230	50	5.42	12.07	0.358	79.5	
264	50	5.65	12.10	0.365	78.2	
277	50	5.78	12.11	0.368	77.1	



2.3 INPUT CURRENT

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

Vin(Vac)	Freq(Hz)	Iin(Arms)	Pass/Fail
85	60	0.092	

3 OUTPUT CHARACTERISTICS

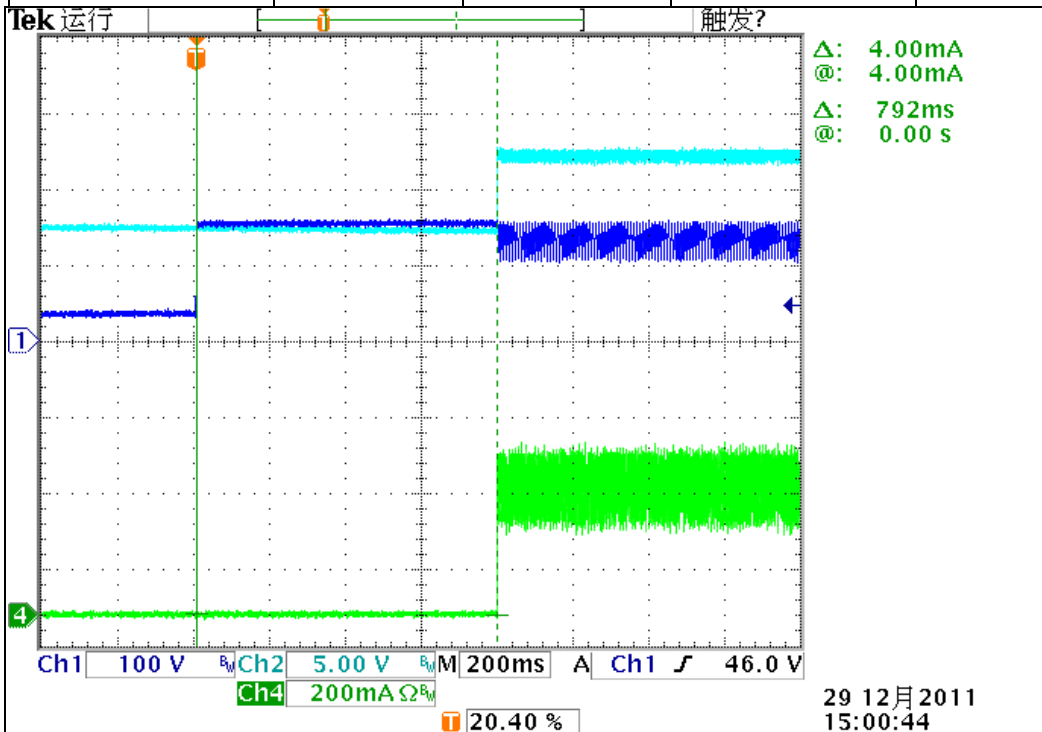
3.1 OUTPUT VOLTAGE RANGE (11V~13Vdc)

ITEM	Vout (V)	Iout(A)	Pass/Fail
Vin=110Vac	11	0.339	
	13	0.333	
Vin=230Vac	11	0.362	
	13	0.353	

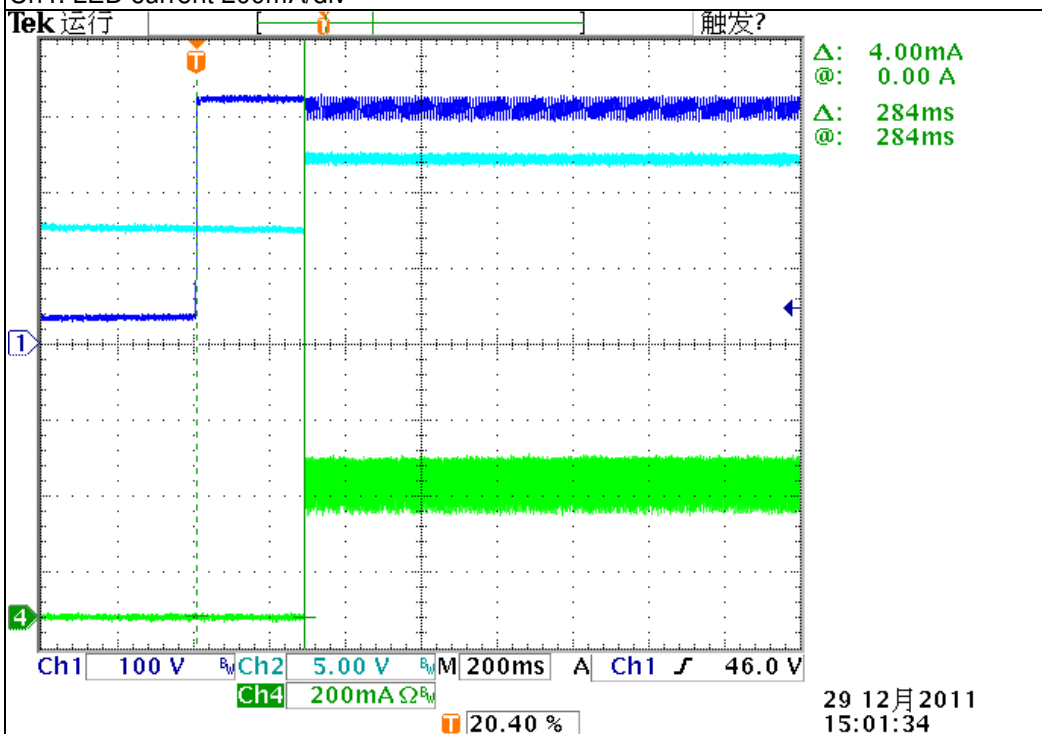
3.2 TURN ON DELAY AND RIPPLE CURRENT

CONDITIONS	Delay time (S)	Ripple current (mA)	Pass/Fail

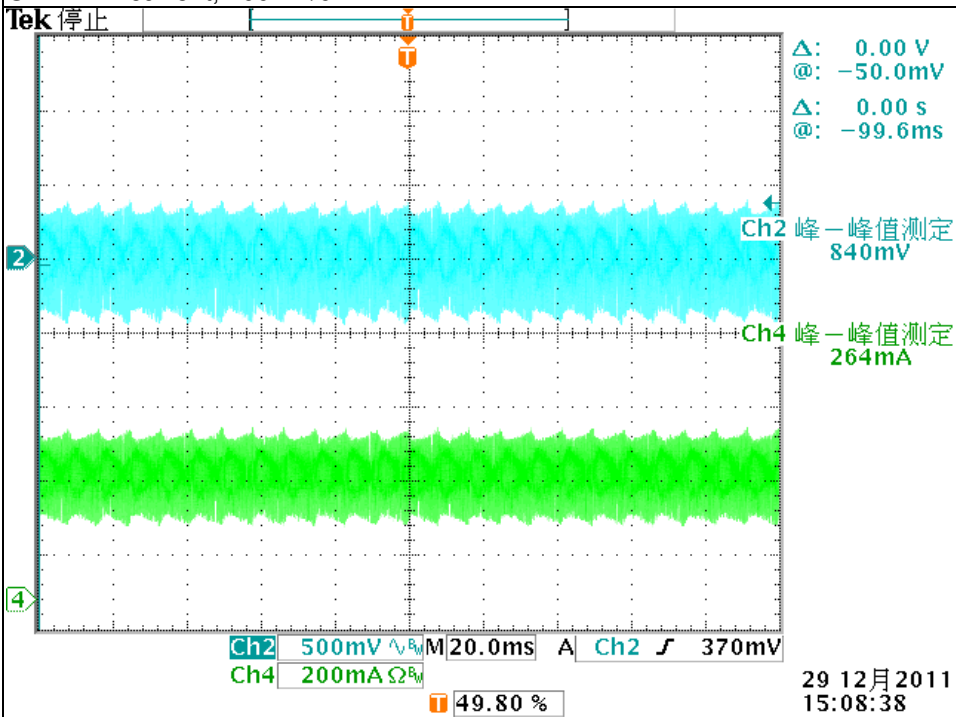
Vin (Vac)	Load		
110	Full load	0.792	230mA
230	Full load	0.284	140mA



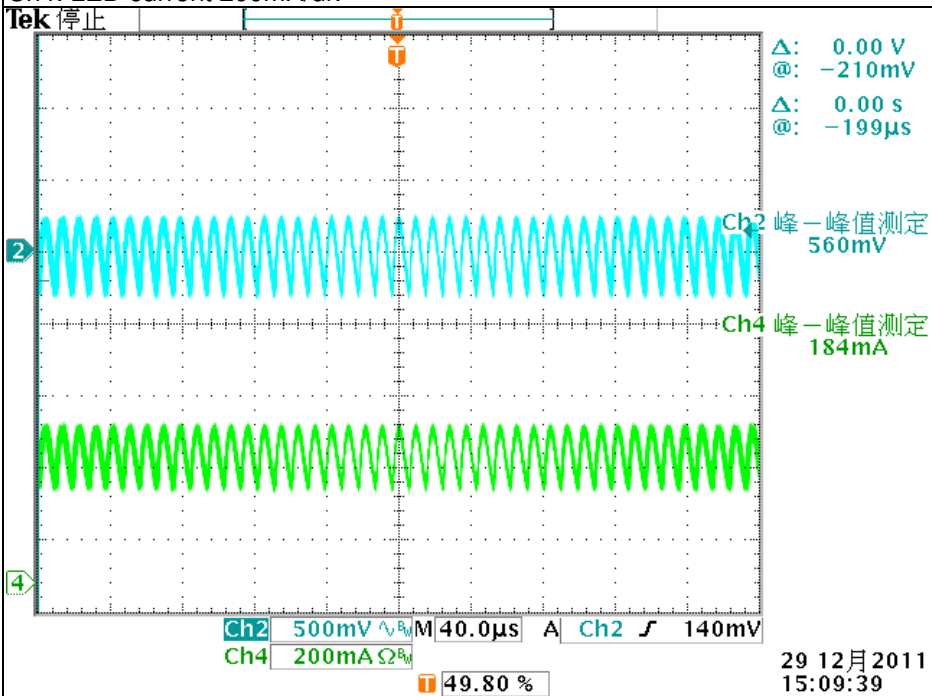
Vin:110Vac Io: full load (LED Lamp Load)
 Ch1: Input bulk CAP voltage 100V/div
 Ch2: LED voltage, 5V/div
 Ch4: LED current 200mA/div



Vin:230Vac Io: full load (LED Lamp Load)
Ch1: input bulk CAP voltage, 100V/div
Ch2: LED voltage, 5V/div
Ch4: LED current, 200mA/div



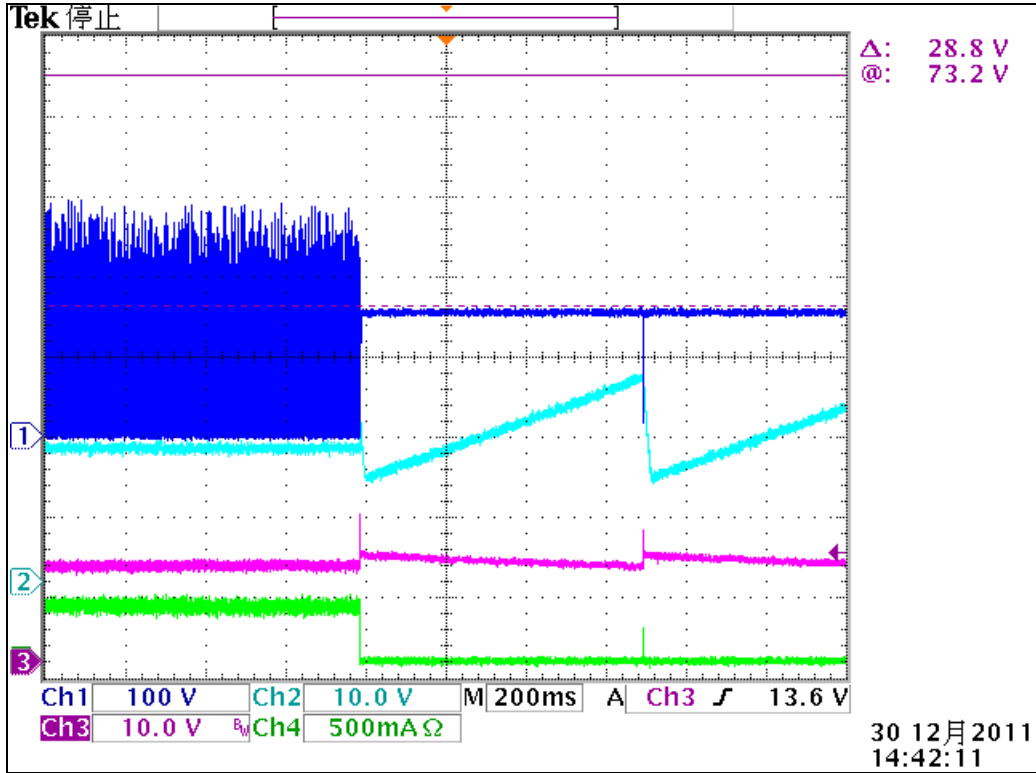
Vin:110Vac Io: LED load (LED Lamp Load)
Ch2: LED ripple voltage 500mV/div
Ch4: LED current 200mA/div



Vin:230Vac Io: LED load (LED Lamp Load)
Ch2: LED ripple voltage 500mV/div
Ch4: LED current 200mA/div

3.3 OUTPUT VOLTAGE PROTECTION

CONDITIONS	Protection voltage (V)	Pass/Fail
Vin (Vac)		
110&230	19	



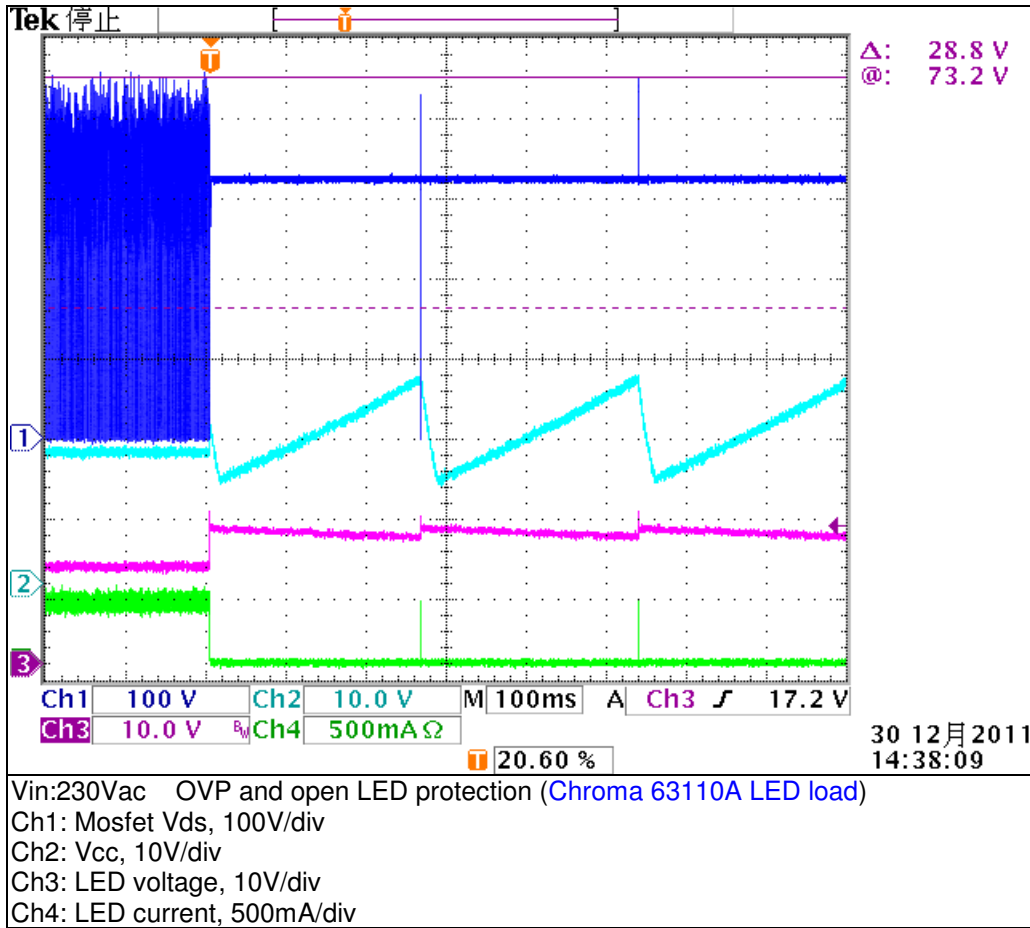
Vin:110Vac OVP and open LED protection (Chroma 63110A LED load)

Ch1: Mosfet Vds, 100V/div

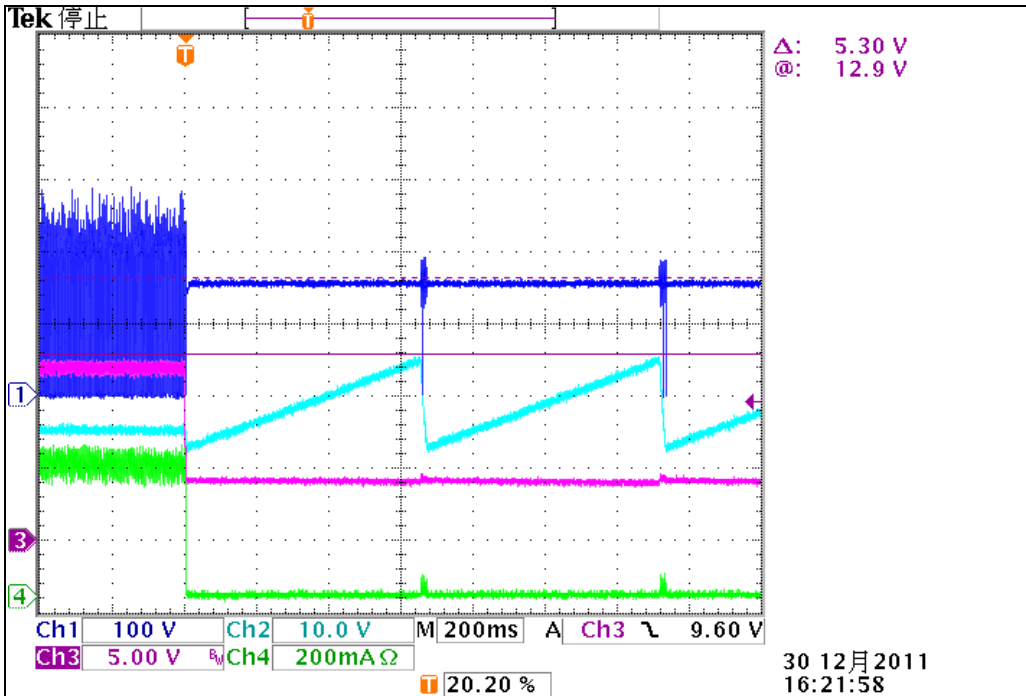
Ch2: Vcc, 10V/div

Ch3: LED voltage, 10V/div

Ch4: LED current, 500mA/div



3.4 SHORT TWO LEDs PROTECTION



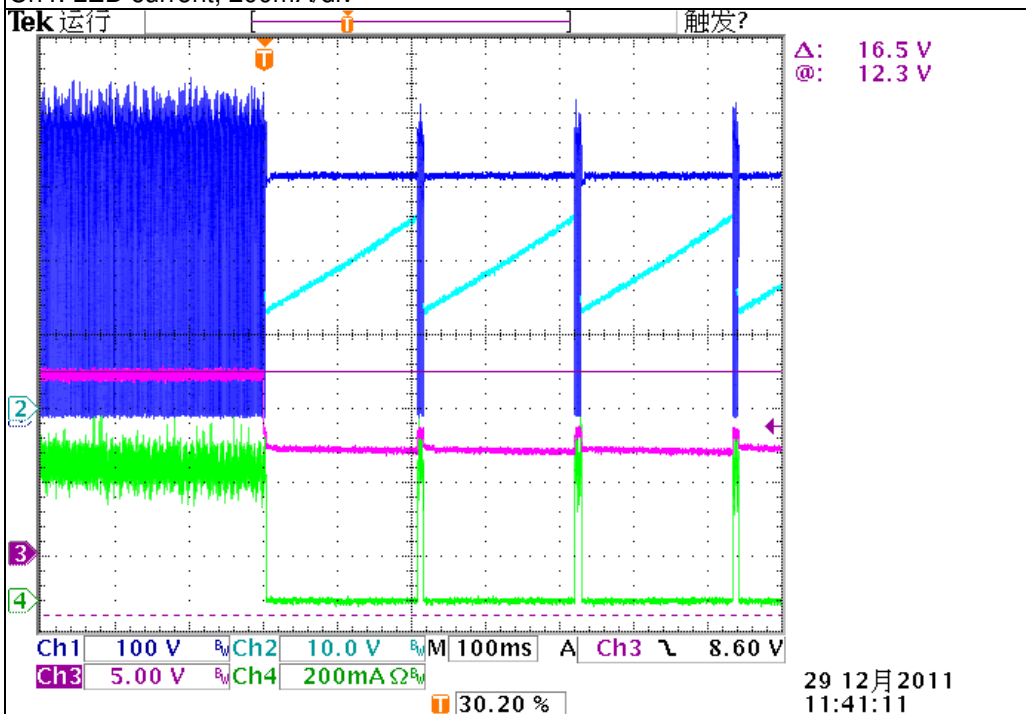
Vin:110Vac two LEDs shorted protection (Chroma 63110A LED load)

Ch1: Mosfet Vds, 100V/div

Ch2: Vcc, 10V/div

Ch3: LED voltage, 5V/div

Ch4: LED current, 200mA/div



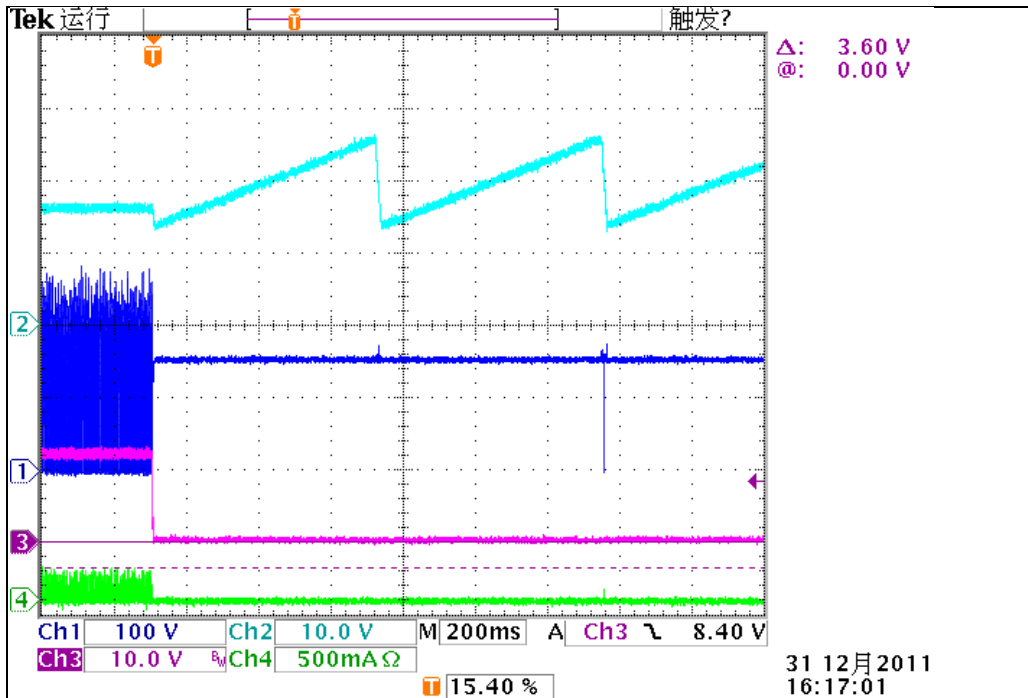
Vin:230Vac two LEDs shorted protection (Chroma 63110A LED load)

Ch1: Mosfet Vds, 100V/div

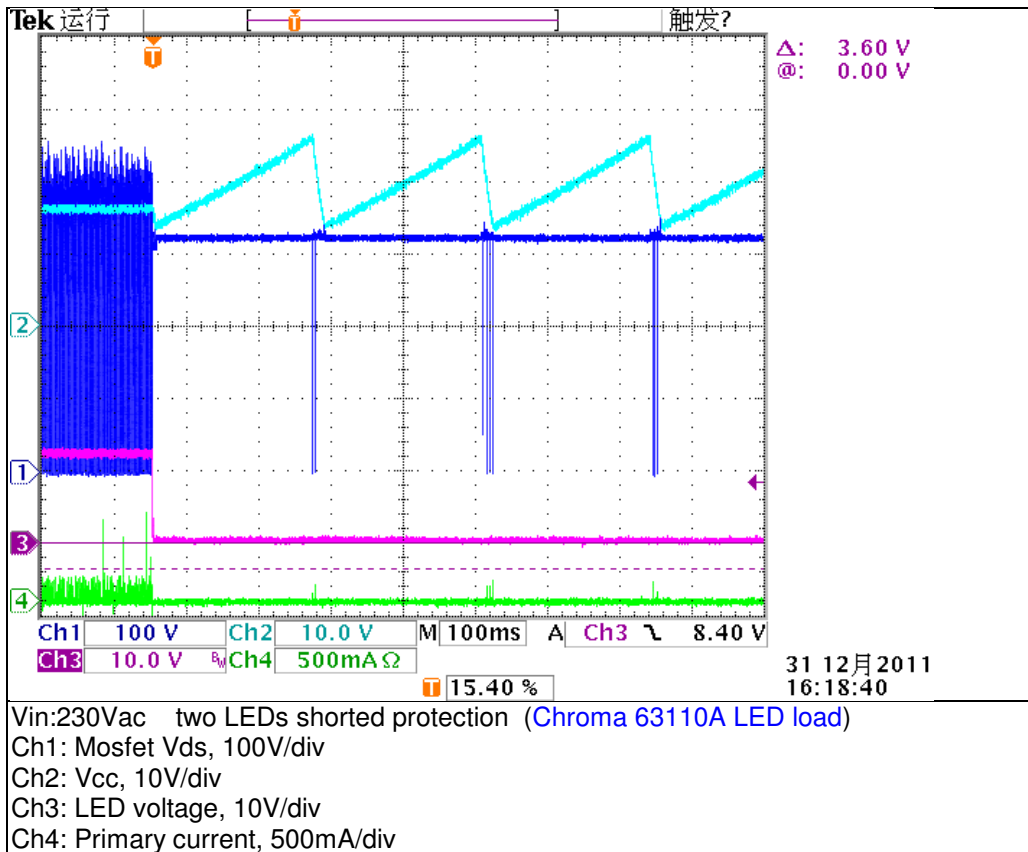
Ch2: Vcc, 10V/div

Ch3: LED voltage, 5V/div
Ch4: LED current, 200mA/div

3.5 OUTPUT SHORT PROTECTION



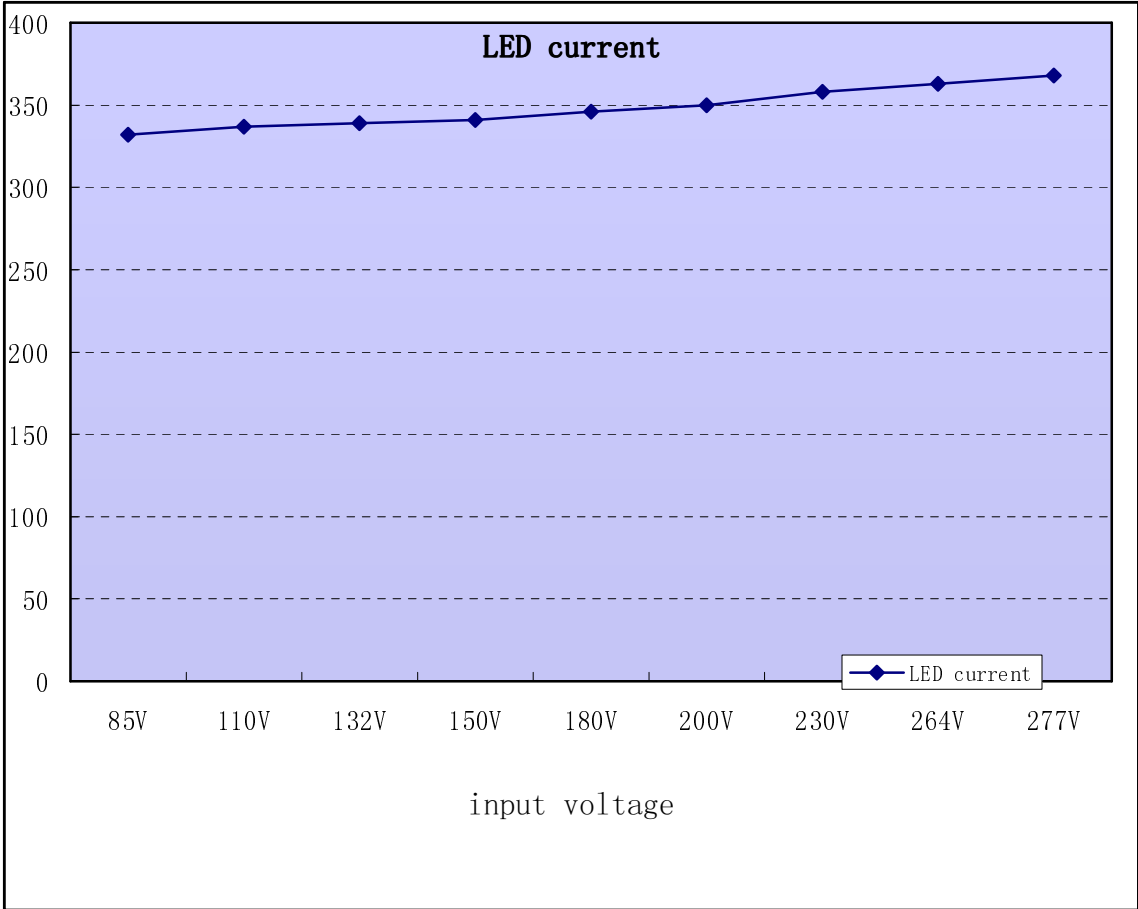
Vin:110Vac two LEDs shorted protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 10V/div
Ch4: Primary current, 500mA/div



3.6 LINE REGULATION CURVE(4 LEDs)

3.7

Vin(Vac)	Freq(Hz)	Io(Arms)	Pass/Fail
85	60	0.332	
110	60	0.337	
132	60	0.339	
150	60	0.341	
180	50	0.346	
200	50	0.350	
230	50	0.358	
264	50	0.365	
277	50	0.368	



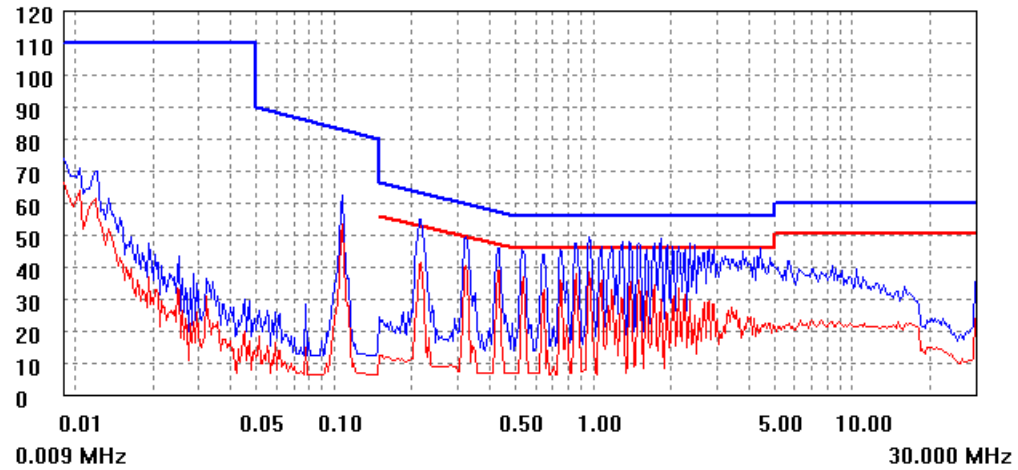
4 EMI Test

EMI TEST REPORT

Organization: Ti	Operator: david dou	EUT: GU10
Place:	Time: 2011/12/28/18:43	
Detector: PK+AV	Test-time(ms): 30	
Limit: EN55015	Transductor(PK/AV): PK1 / AV1	
Remark:		

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

dBuV



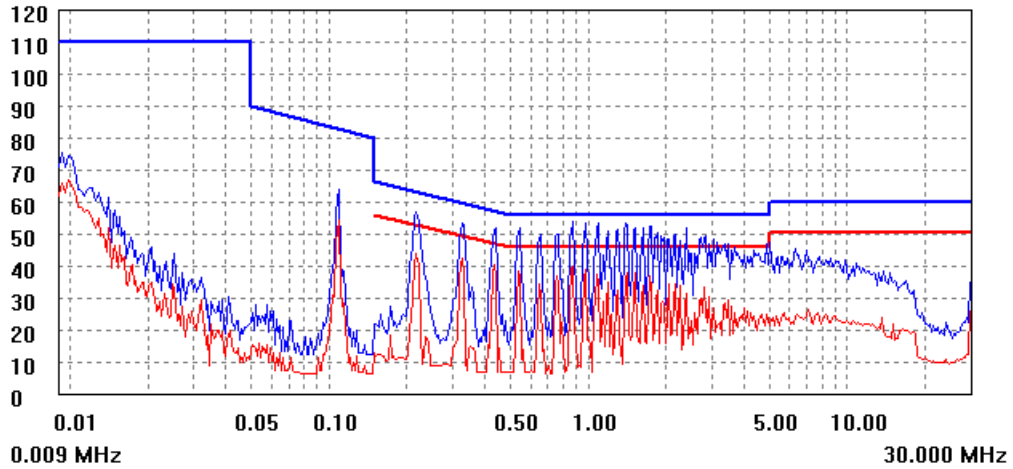
Vin: 230Vac, Line, Io: full load

EMI TEST REPORT

Organization: Ti Operator: david dou EUT: GU10
Place: Time: 2011/12/28/18:40
Detector: PK+AV Test-time(ms): 30
Limit: EN55015 Transductor(PK/AV): PK1 / AV1
Remark:

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

dBuV



Vin:230Vac, Neutral, Io: full load

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