Texas Instruments

PMP4337 Test Procedure

China Power Reference Design

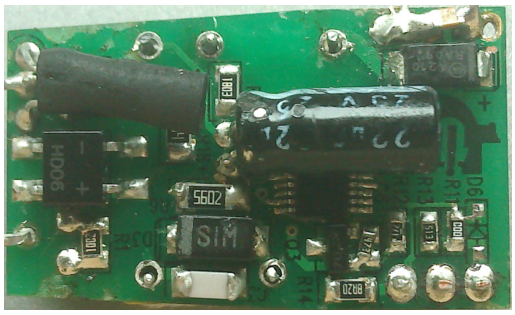
REV A

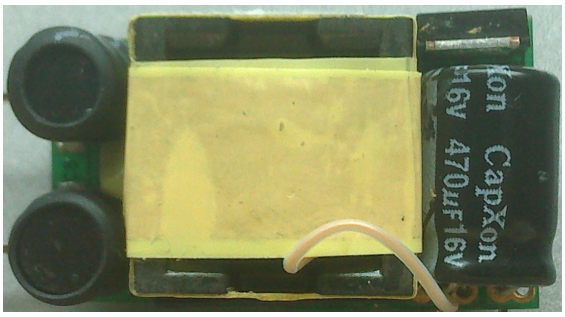
3/31/2012

1 GENERAL

1.1 PURPOSE

To provide detailed data for evaluating and verifying the PMP4337 in a single stage flyback with PFC function, which uses TI new Primary Side Controller TPS92310 for GU10 light standard form factor with 30mmx18mmx11mm. The below photo shows this demo board.





1.2 REFERENCE DOCUMENTATION

Schematic PMP4337_SCH.PDF
Assembly PMP4337_PCB.PDF
BOM

1.3 TEST EQUIPMENTS

Power-meter: YOKOGAWA WT210
Multi-meter(current): Fluke 8845A
Multi-meter(voltage): Fluke 187
AC Source: Chroma 61530
LED load: Chroma 63110A module

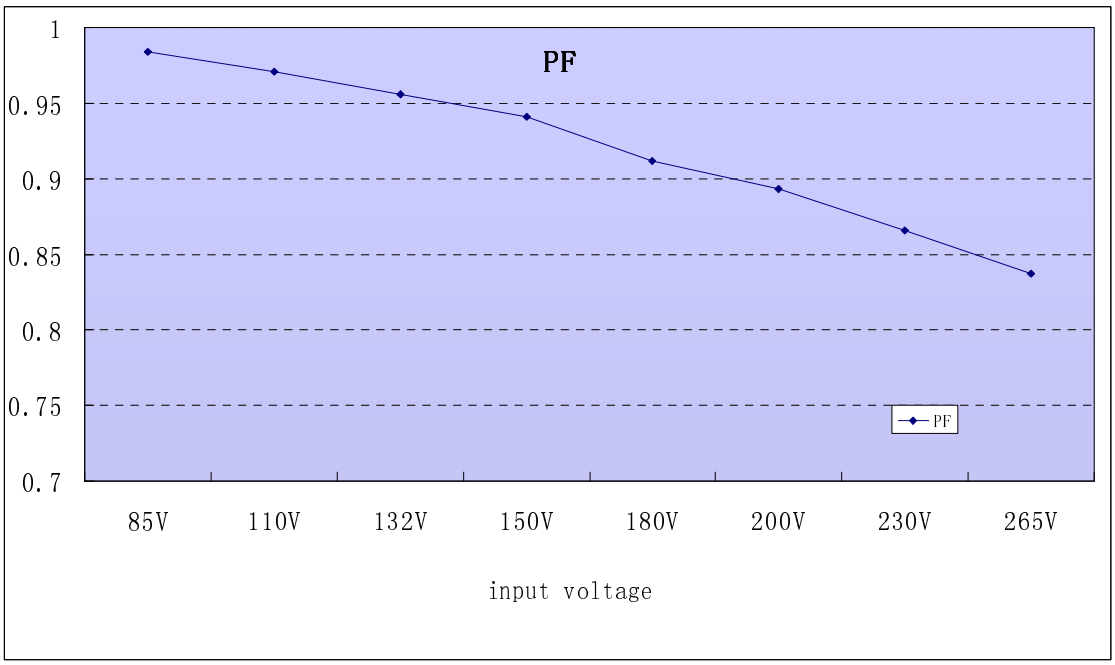
2 INPUT CHARACTERISTICS

Otherwise Specified, the test is under the condition With LED lamp Load (12V, 0.35A).

2.1 POWER FACTOR

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

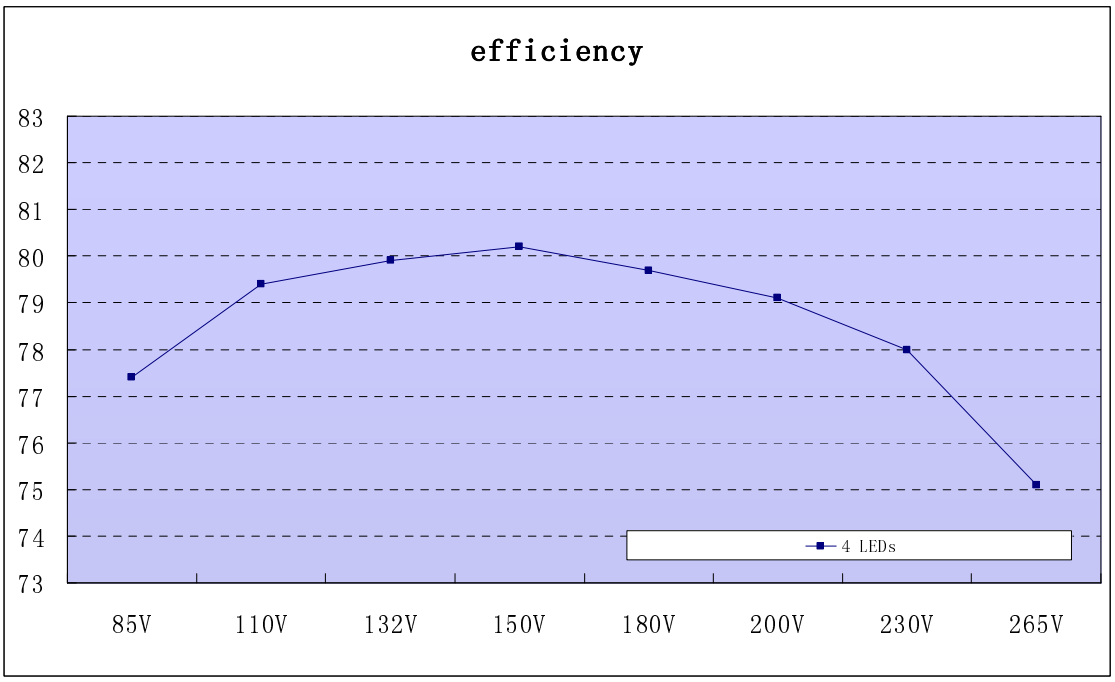
Vin(Vac)	Freq(Hz)	PF	Io(Arms)	THD(%)	Pass/Fail
85	60	**0.984**	**0.355**		
110	60	**0.971**	**0.357**		
132	60	**0.956**	**0.356**		
150	60	**0.941**	**0.351**		
180	50	**0.912**	**0.349**		
200	50	**0.893**	**0.349**		
230	50	**0.866**	**0.352**		
265	50	**0.837**	**0.355**		



2.2 EFFICIENCY

Pass/Fail criteria: 78% minimum with 230v input at 100% load.

Vin(Vac)	Freq(Hz)	Pin(W)	Vo(Vrms)	Io(Arms)	Eff(%)	Pass/Fail
85	60	**5.57**	**12.15**	**0.355**	**77.4**	
110	60	**5.47**	**12.17**	**0.357**	**79.4**	
132	60	**5.42**	**12.17**	**0.356**	**79.9**	
150	60	**5.32**	**12.16**	**0.351**	**80.2**	
180	50	**5.32**	**12.15**	**0.349**	**79.7**	
200	50	**5.36**	**12.15**	**0.349**	**79.1**	
230	50	**5.49**	**12.16**	**0.352**	**78.0**	
265	50	**5.71**	**12.17**	**0.355**	**75.7**	



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	**0.067**	

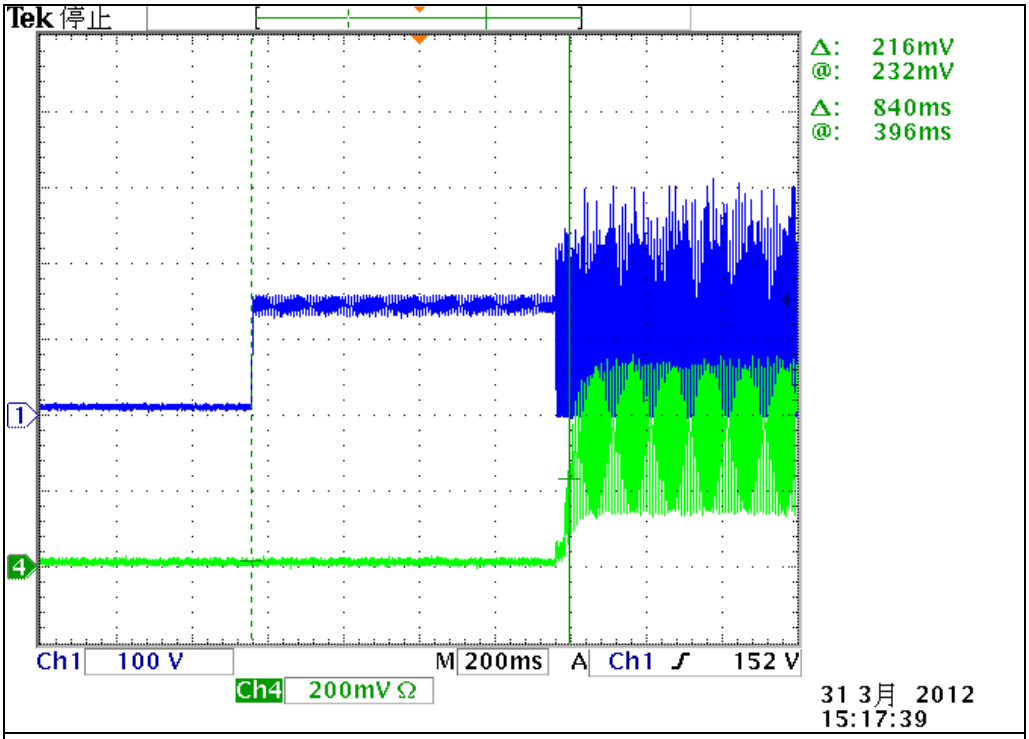
3 OUTPUT CHARACTERISTICS

3.1 OUTPUT VOLTAGE RANGE（11V~13Vdc）

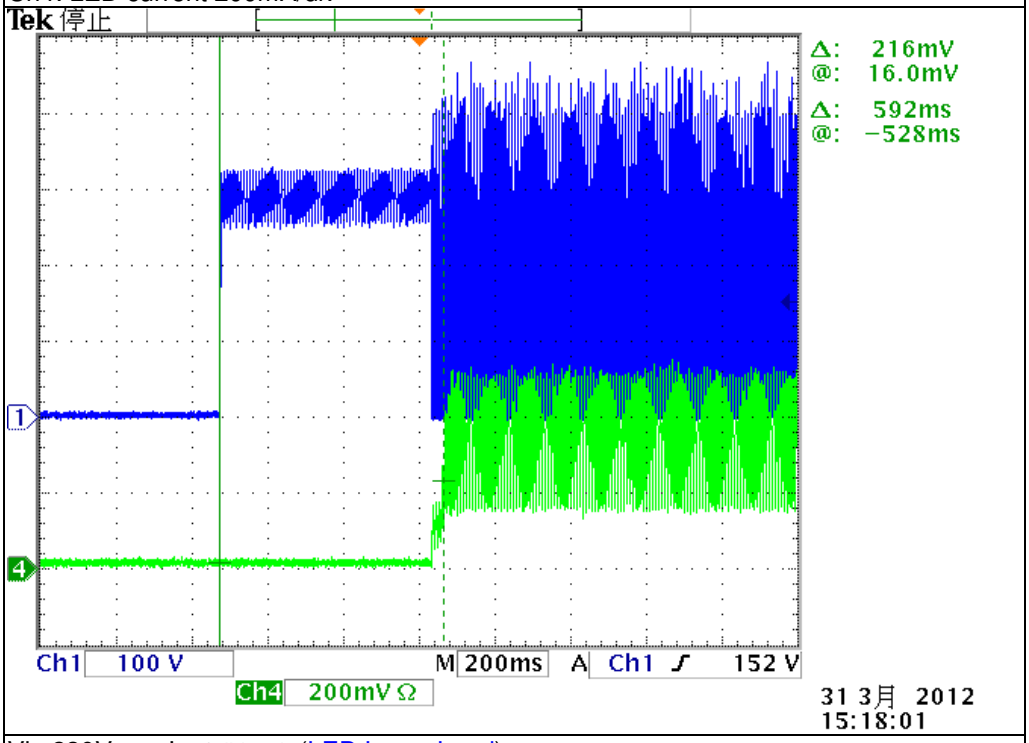
ITEM	Vout (V)	Iout(A)	Pass/Fail
Vin=110Vac	11	0.358	
	13	0.352	
Vin=230Vac	11	0.355	
	13	0.345	

3.2 TURN ON DELAY AND RIPPLE CURRENT

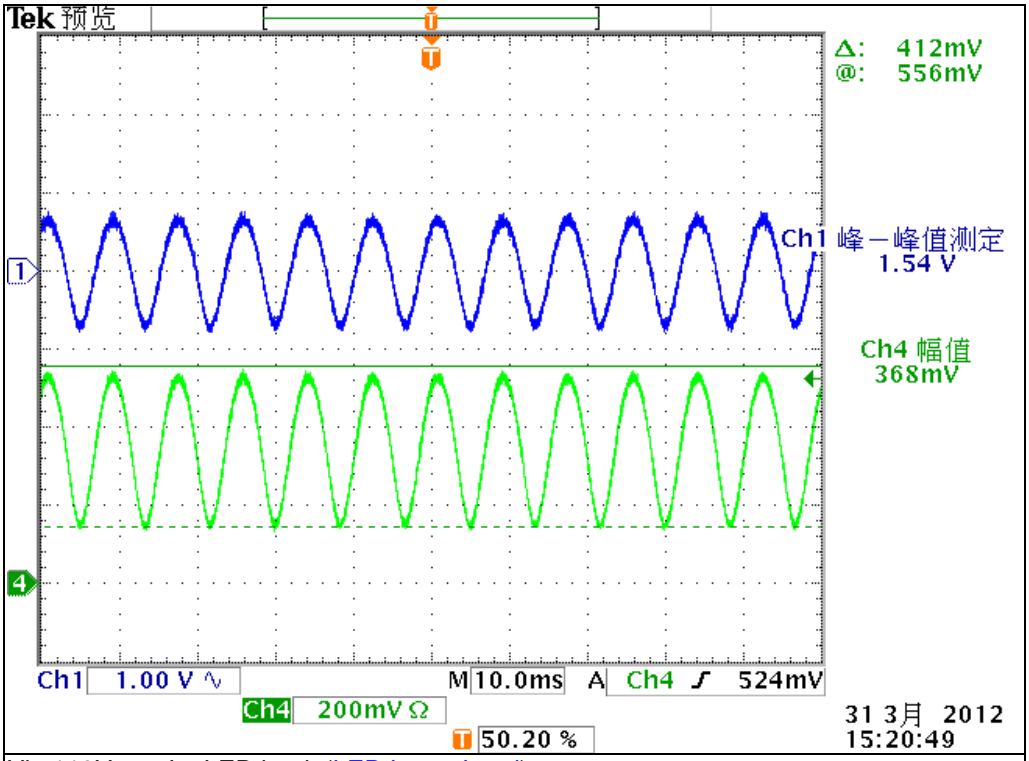
CONDITIONS		Delay time (S)	Ripple current（mA）	Pass/Fail
Vin (Vac)	Load			
110	Full load	0.840	368mA	
230	Full load	0.592	328mA	



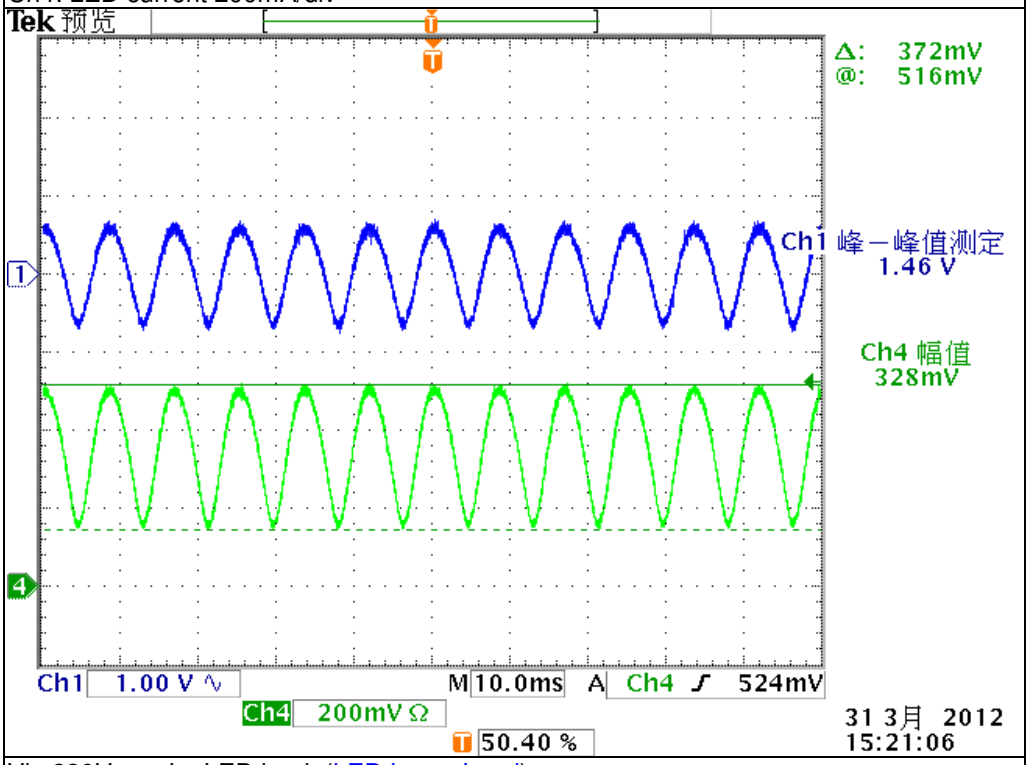
Vin:110Vac Io: full load (LED Lamp Load)
Ch1: Vds voltage of MOSFET 100V/div
Ch4: LED current 200mA/div



Vin:230Vac Io: full load (LED Lamp Load)
Ch1: Vds voltage of MOSFET, 100V/div
Ch4: LED current, 200mA/div



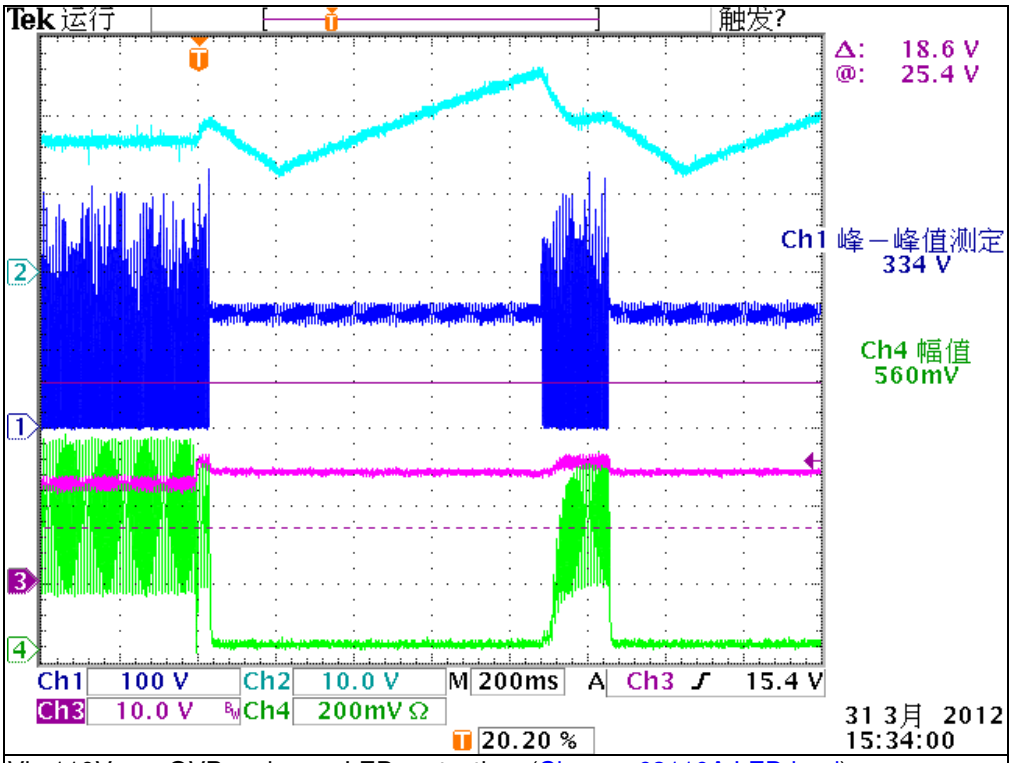
Vin:110Vac Io: LED load (LED Lamp Load)
Ch1: LED ripple voltage 1V/div
Ch4: LED current 200mA/div



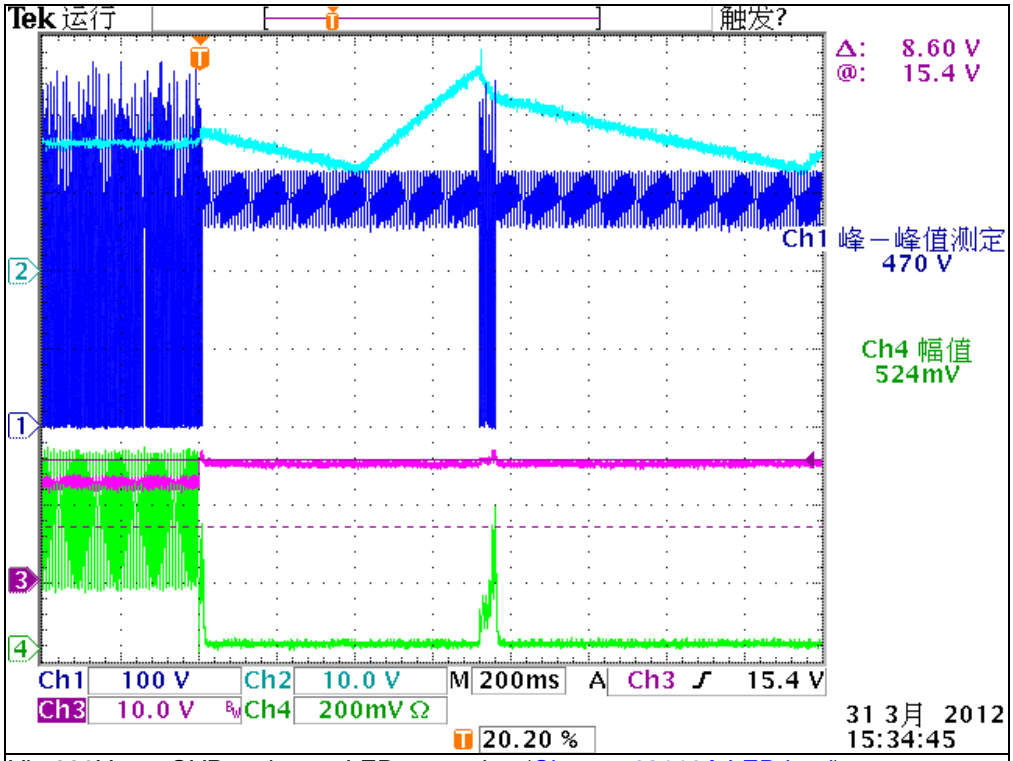
Vin:230Vac Io: LED load (LED Lamp Load)
Ch1: LED ripple voltage 1V/div
Ch4: LED current 200mA/div

3.3 OUTPUT VOLTAGE PROTECTION

CONDITIONS Vin (Vac)	Protection voltage（V）	Pass/Fail
110&230	15	

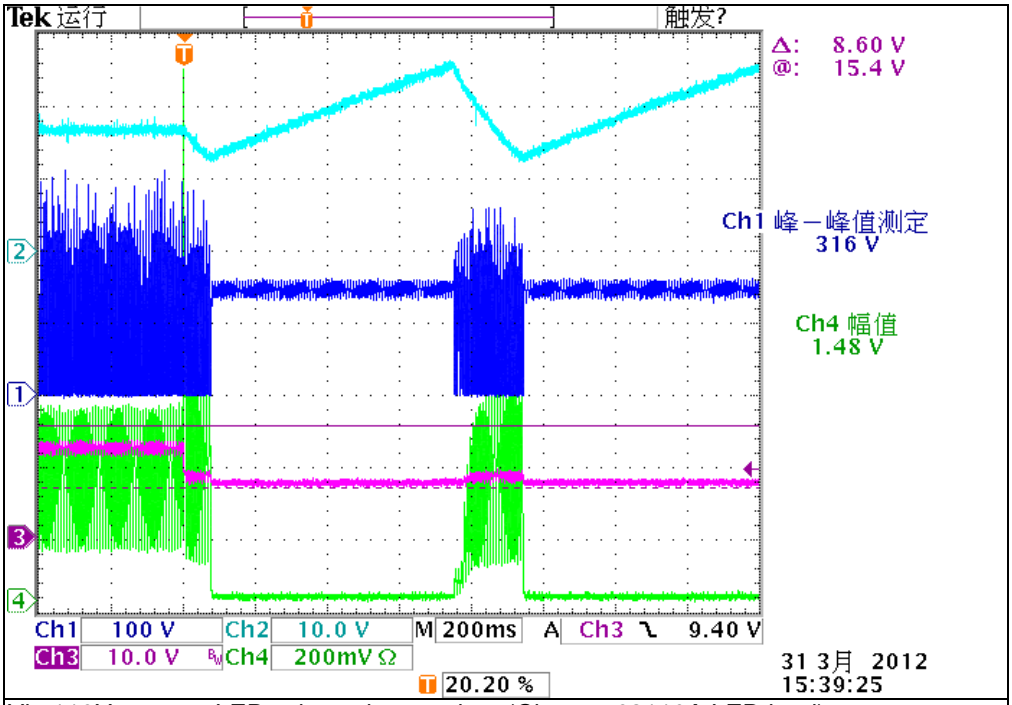


Vin:110Vac　OVP and open LED protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 10V/div
Ch4: LED current, 200mA/div

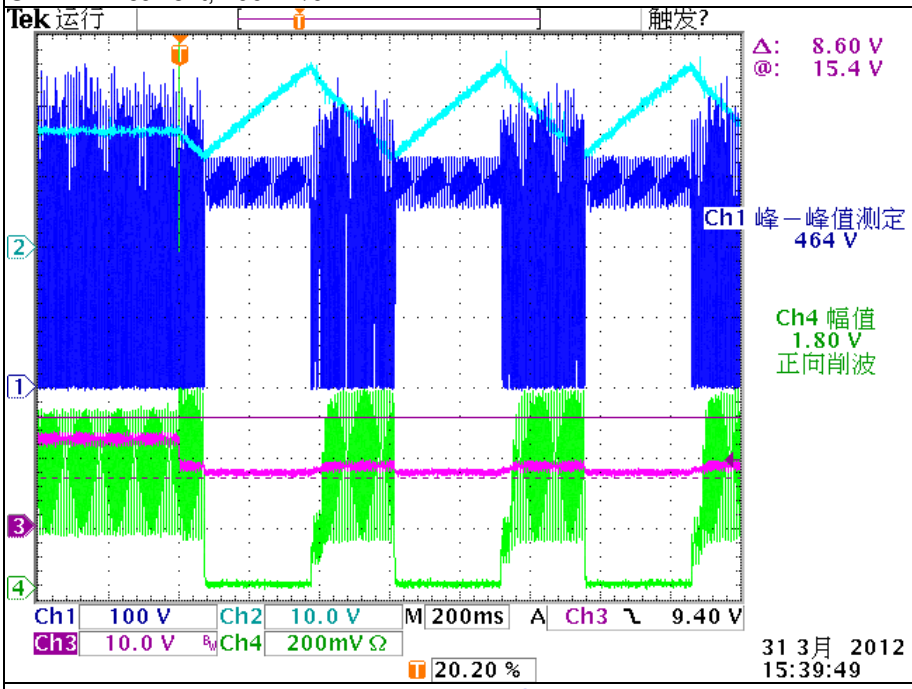


Vin:230Vac OVP and open LED protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 10V/div
Ch4: LED current, 200mA/div

3.4 SHORT TWO LEDS PROTECTION

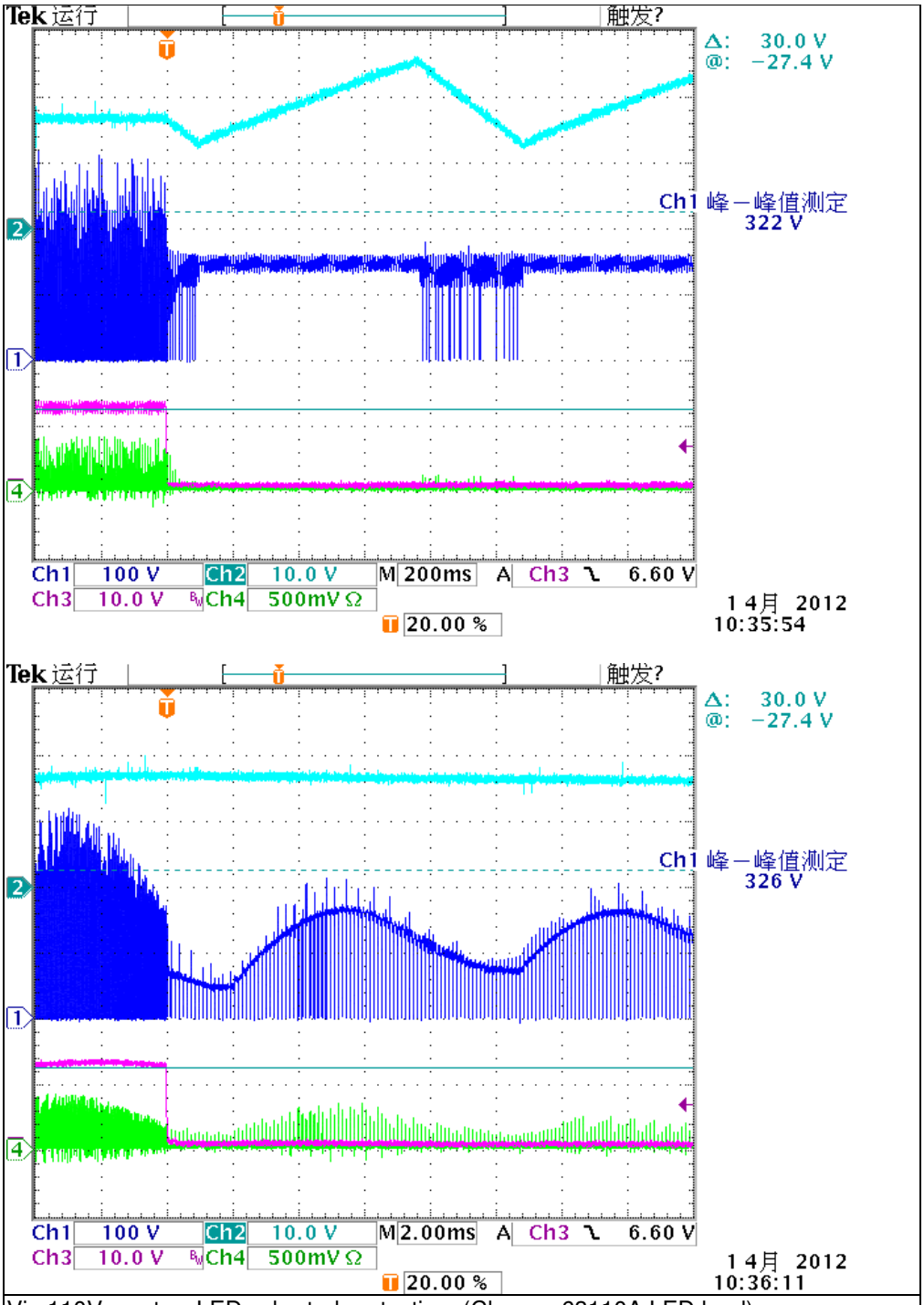


Vin:110Vac two LEDs shorted protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 5V/div
Ch4: LED current, 200mA/div

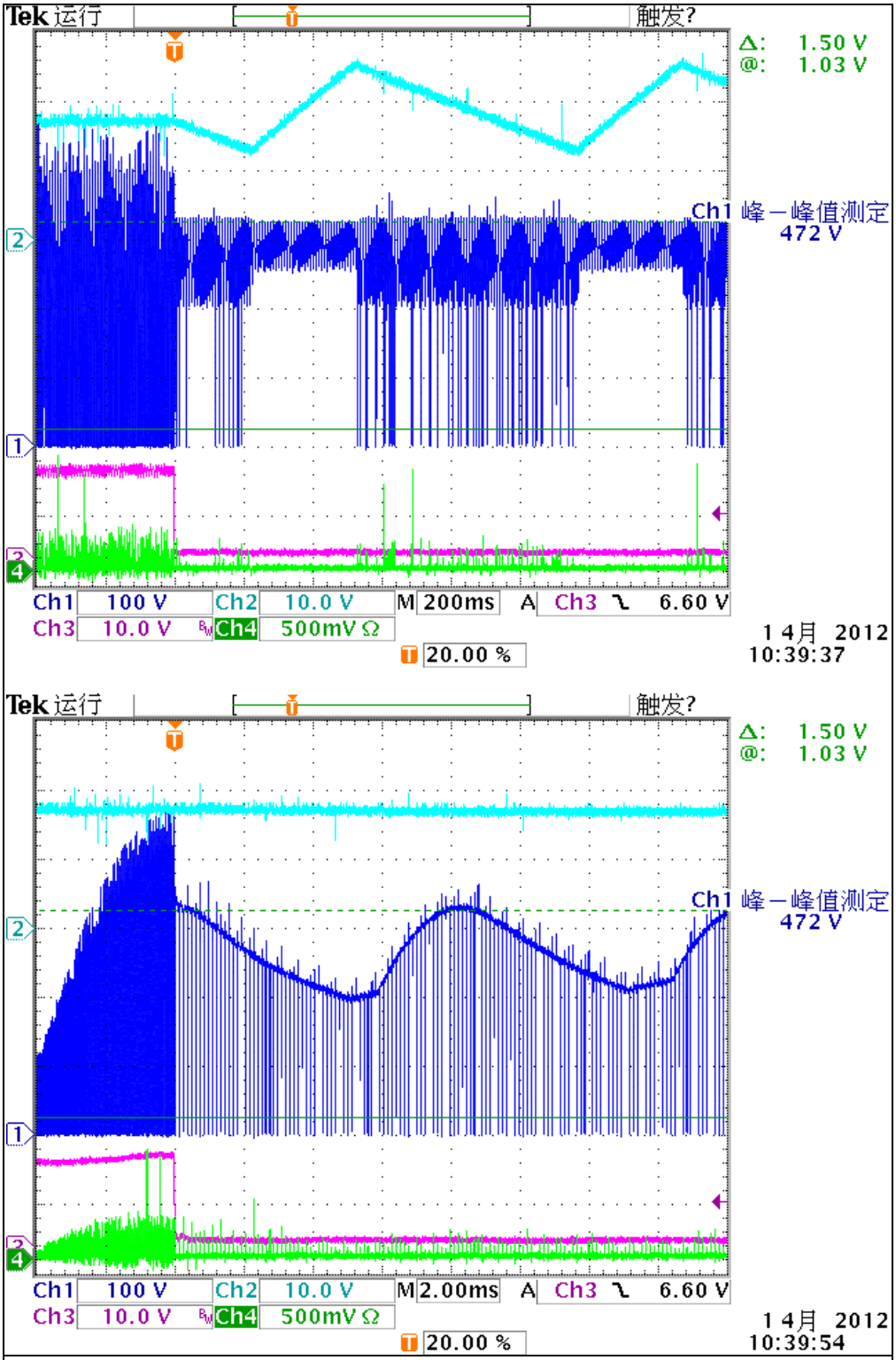


Vin:230Vac two LEDs shorted protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 5V/div
Ch4: LED current, 200mA/div

3.5 OUTPUT SHORT PROTECTION



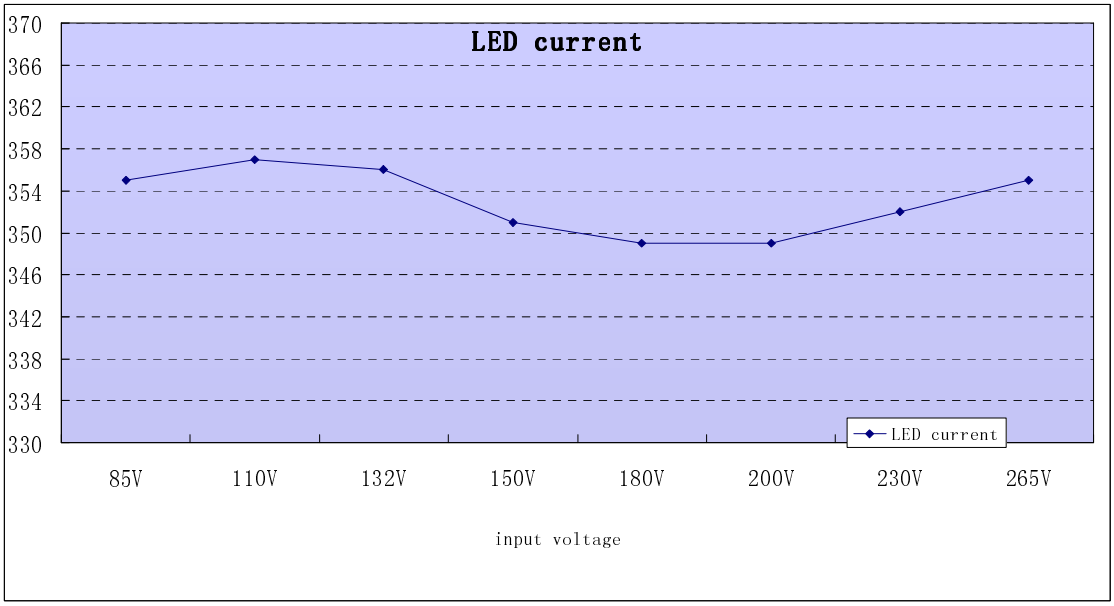
Vin:110Vac two LEDs shorted protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 10V/div
Ch4: Primary current, 500mA/div



Vin:230Vac 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)

Vin(Vac)	Freq(Hz)	Io(Arms)	Pass/Fail
85	60	**0.355**	
110	60	**0.357**	
132	60	**0.356**	
150	60	**0.351**	
180	50	**0.349**	
200	50	**0.349**	
230	50	**0.352**	
265	50	**0.355**	



4 EMI Test

EMI TEST REPORT

parameter

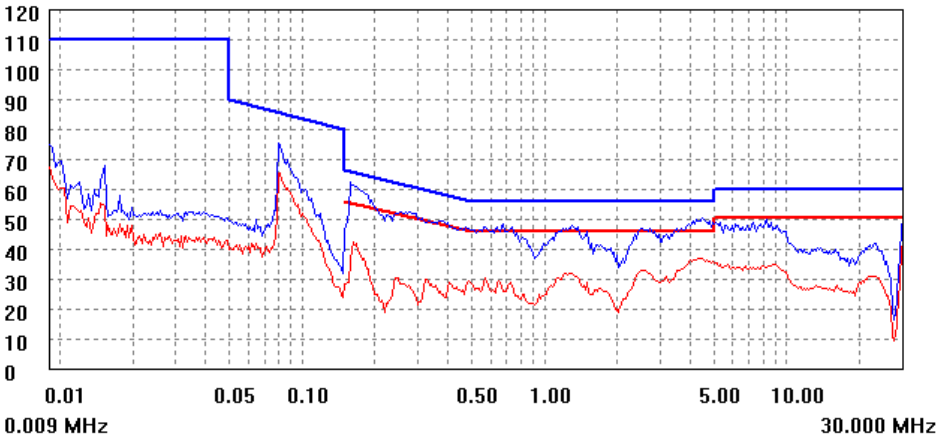
Organization:		Operator:		EUT:	
Place:		Time:	2012/3/1/16:59		
Detector:	PK+AV	Test-time(ms):	30		
Limit:	EN55015	Transductor(PK/AV):	PK1 / AV1		
Remark:					

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



Vin: 230Vac, Line, Io: full load

EMI TEST REPORT

parameter

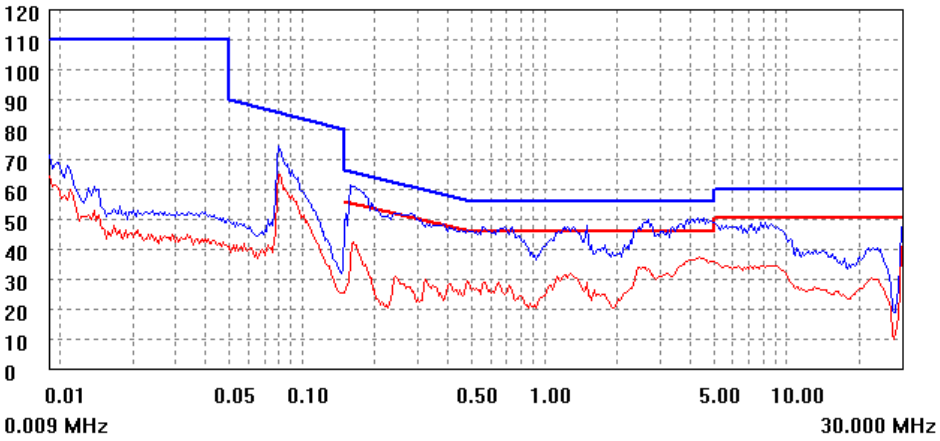
Organization:		Operator:		EUT:	
Place:		Time:	2012/3/1/17:1		
Detector:	PK+AV	Test-time(ms):	30		
Limit:	EN55015	Transductor(PK/AV):	PK1 / AV1		
Remark:					

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



Vin:230Vac, Neutral, Io: full load

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