

Texas Instruments

PMP4336 Power Reference Design Test Procedure

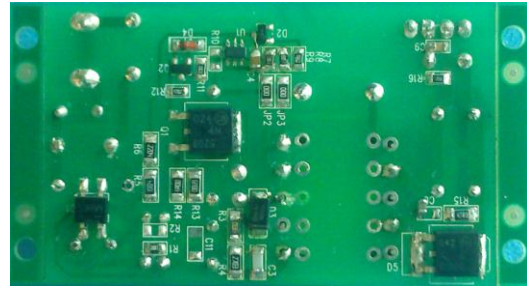
REV A

11/12/2012

GENERAL

1.1 PURPOSE

To provide detailed data for evaluating and verifying the PMP4336, which uses TI's new Primary Side Controller UCC28700 for 12W adapter with 64mmx40mmx20mm. The below photo shows this demo board.



1.2 REFERENCE DOCUMENTATION

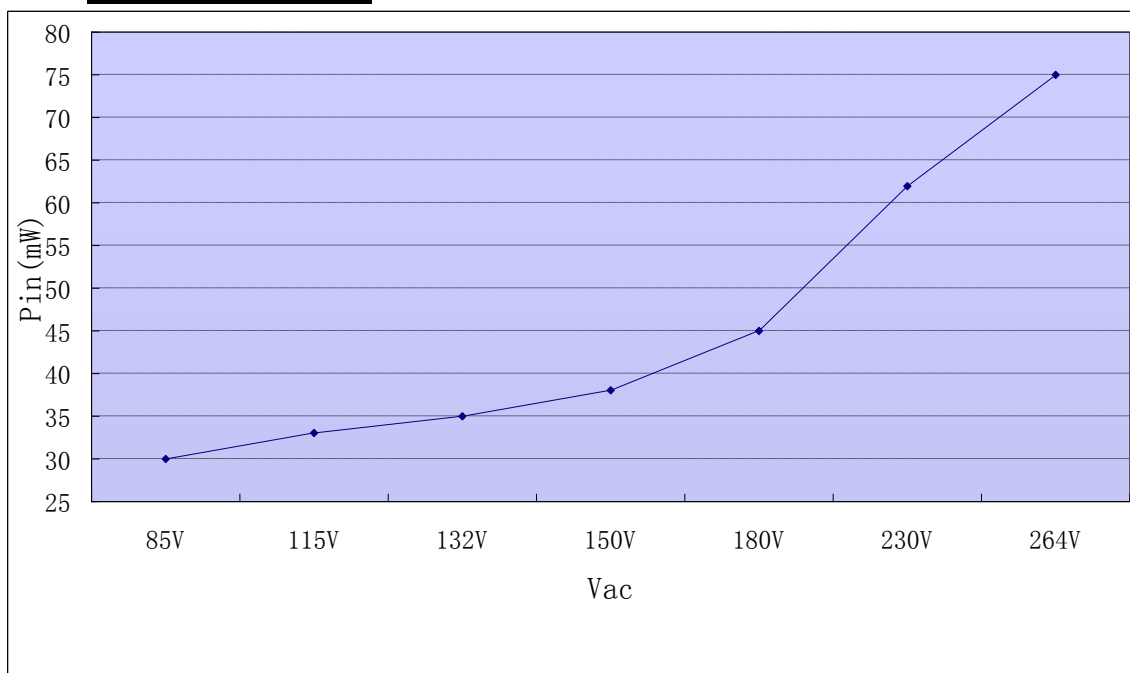
Schematic PMP4336_SCH.PDF
Assembly PMP4336_PCB.PDF
BOM
Promotion tools

1.3 TEST EQUIPMENT

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

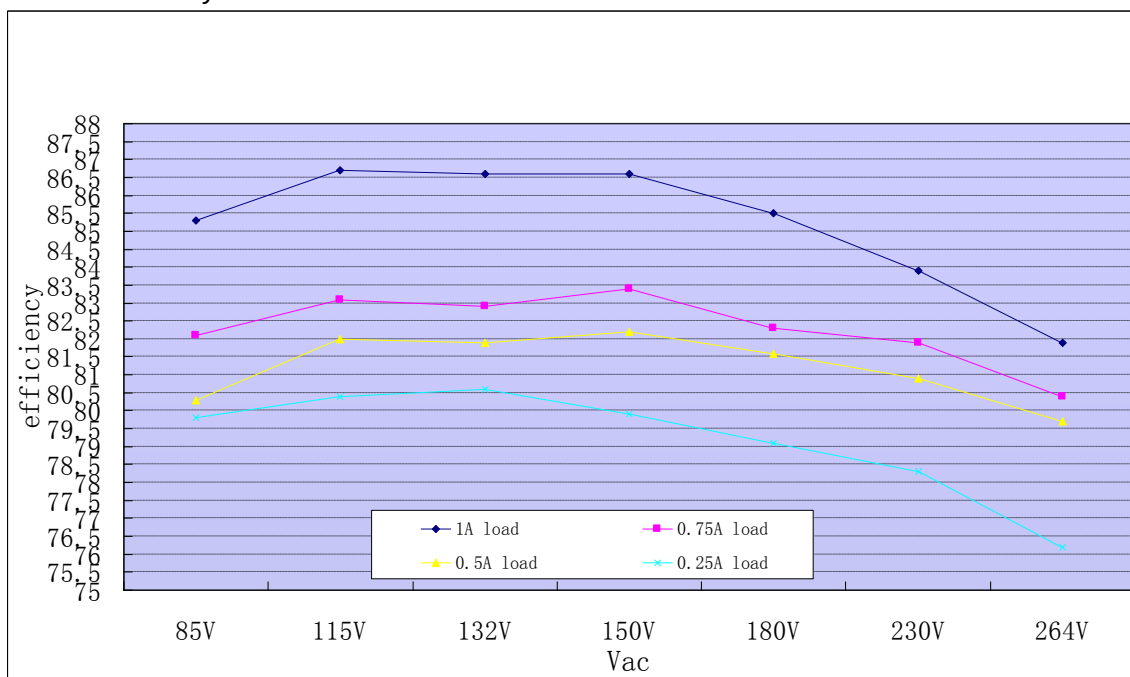
2 INPUT CHARACTERISTICS

2.1 STANDBY POWER



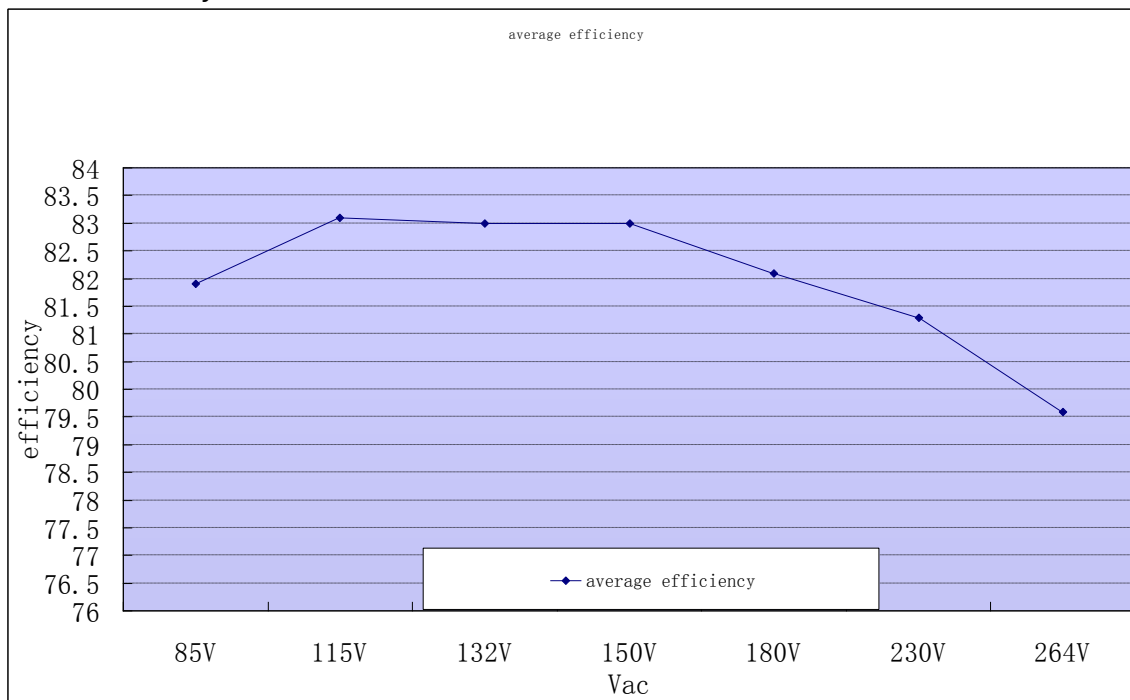
2.2 LOAD AND INPUT VOLTAGE VS EFFICIENCY

Notes: efficiency test is based on board end



2.3 AVERAGE EFFICIENCY AT 0.25A, 0.5A, 0.75A AND 1A

Notes: efficiency test is based on board end



2.4 EFFICIENCY VS LOAD

Notes: efficiency test is based on board end

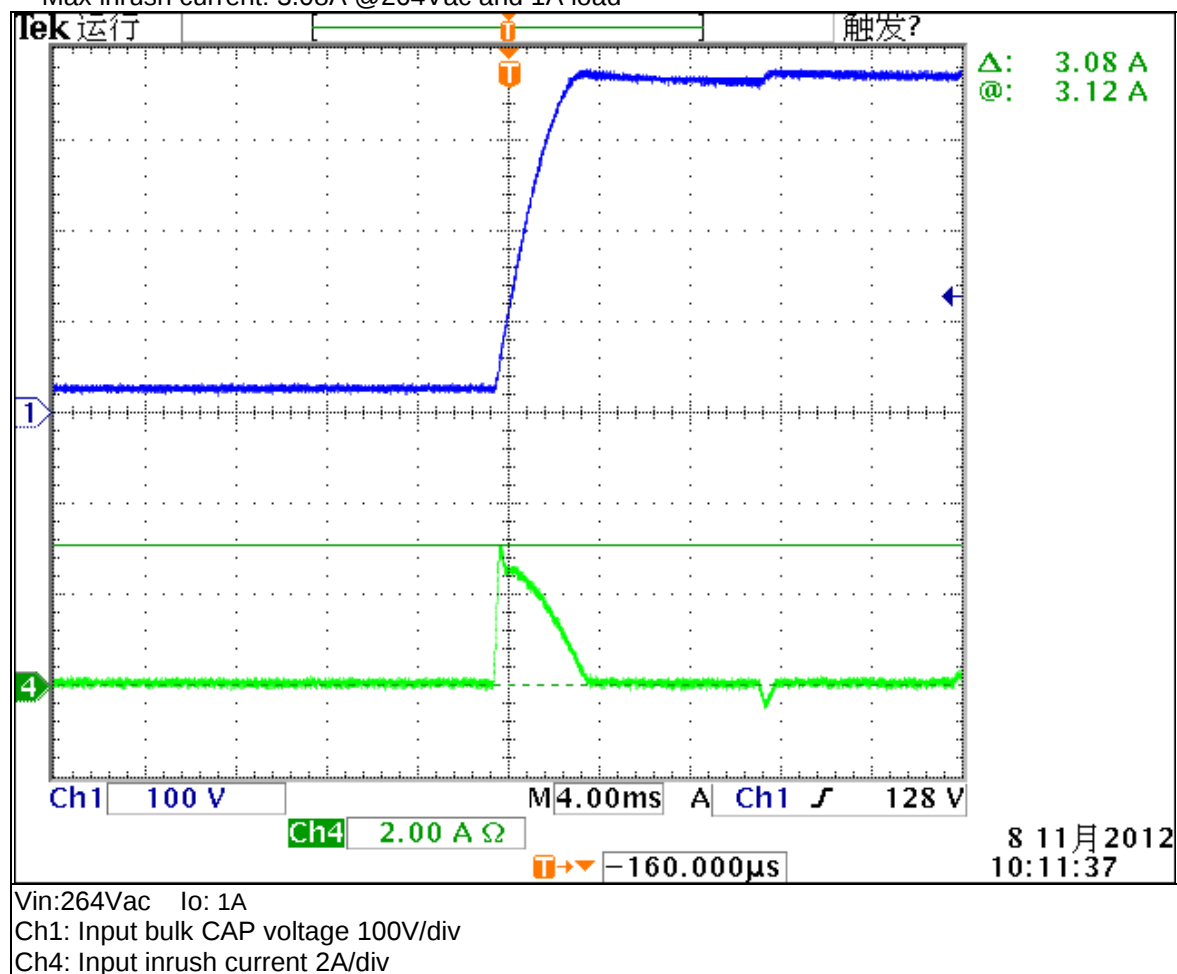


2.5 INPUT CURRENT

Vin(Vac)	Freq(Hz)	Iin(Arms)	Pass/Fail
85	60	0.292	

2.6 INPUT INRUSH CURRENT

Max inrush current: 3.08A @264Vac and 1A load



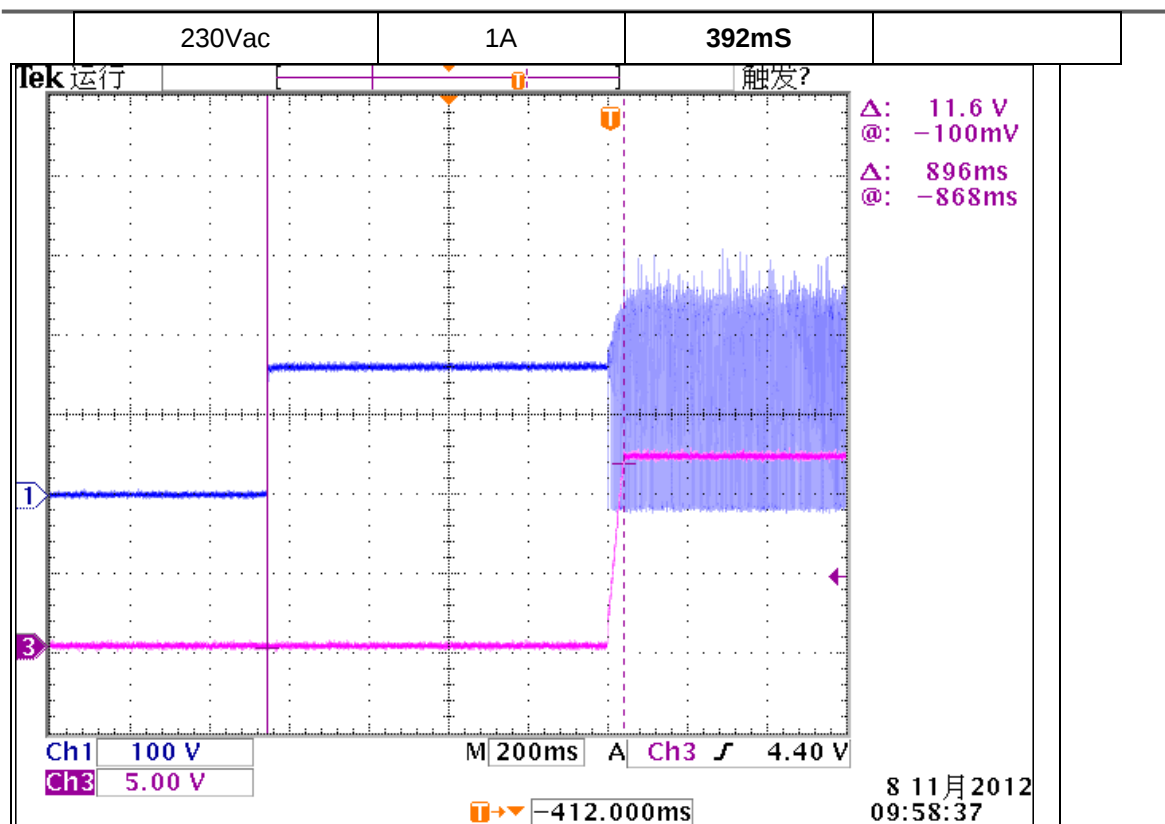
3 OUTPUT CHARACTERISTICS

3.1 STARTUP TIME

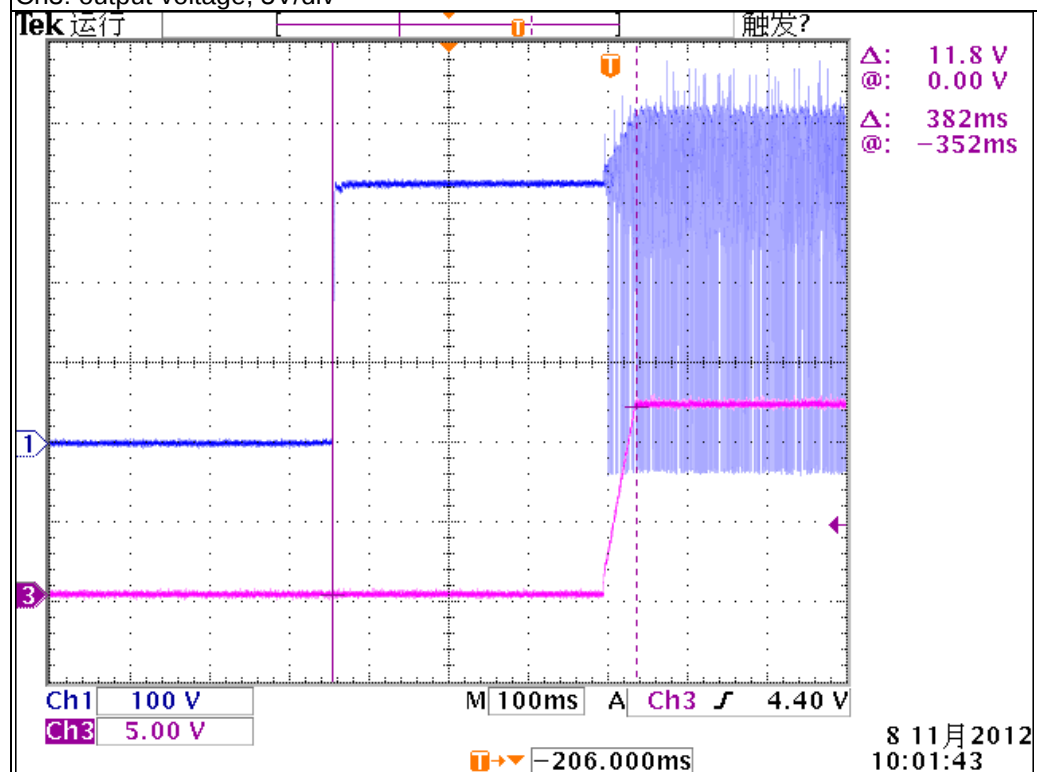
Input voltage	Output current	Startup time	Pass/Fail
115Vac	1A	896mS	

11/15/2012

PMP4336 RevA Test Results



Vin:115Vac Io: 1A
 Ch1: MOSFET's drain voltage, 100V/div
 Ch3: output voltage, 5V/div



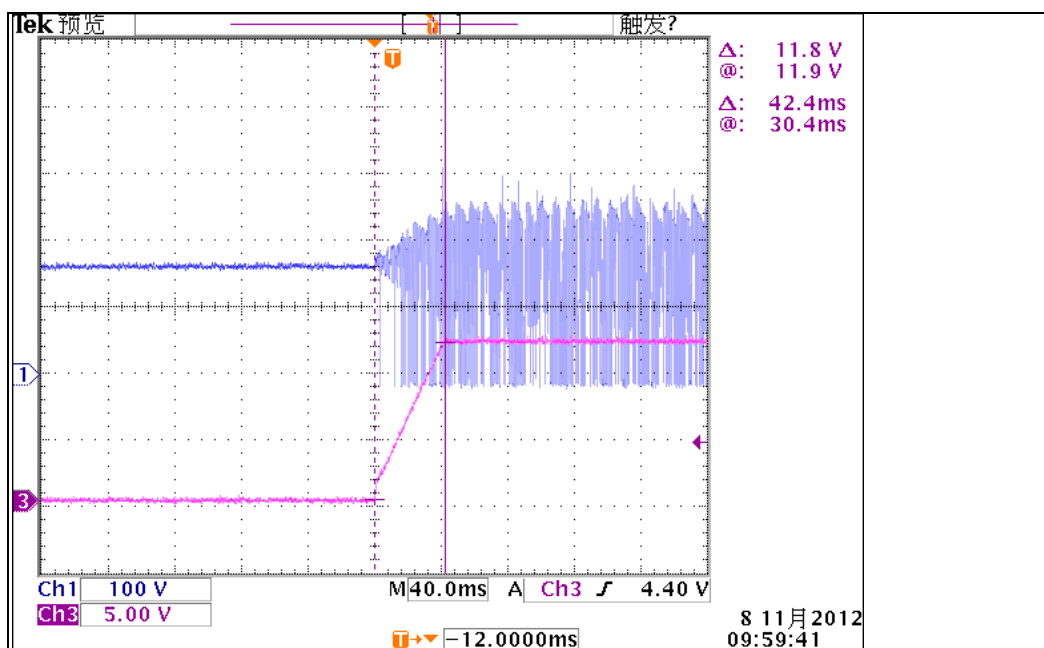
Vin:230Vac Io: 1A

Ch1: MOSFET's drain voltage, 100V/div

Ch3: output voltage, 5V/div

3.2 OUTPUT VOLTAGE RISE TIME

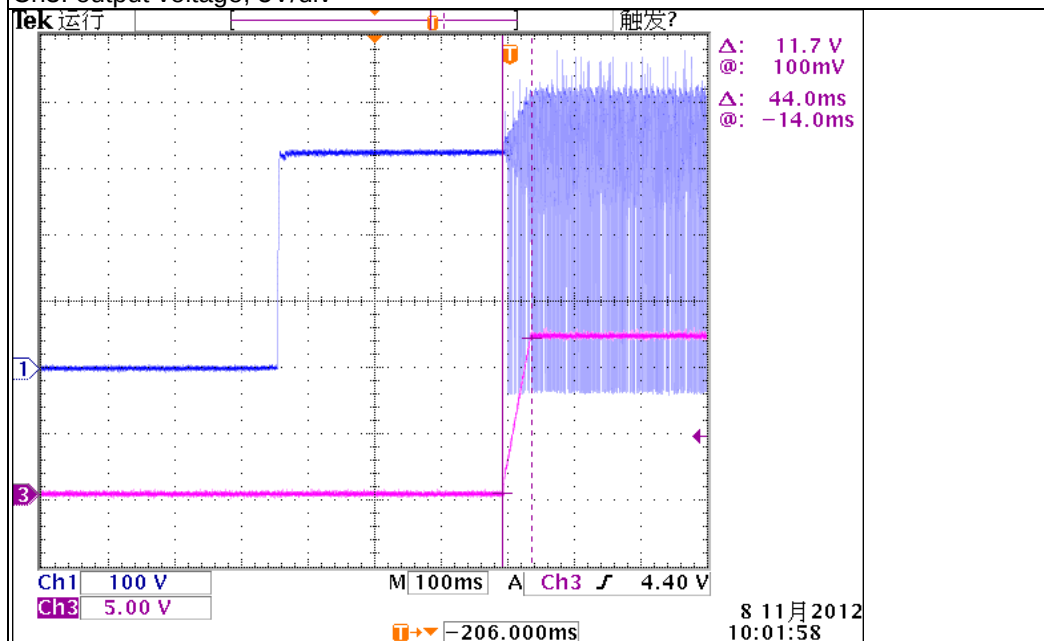
Input voltage	Output current	Startup time	Pass/Fail
115Vac	1A	42.4mS	
230Vac	1A	44mS	



Vin:115Vac Io: 1A

Ch1: MOSFET's drain voltage, 100V/div

Ch3: output voltage, 5V/div



Vin:230Vac Io: 1A

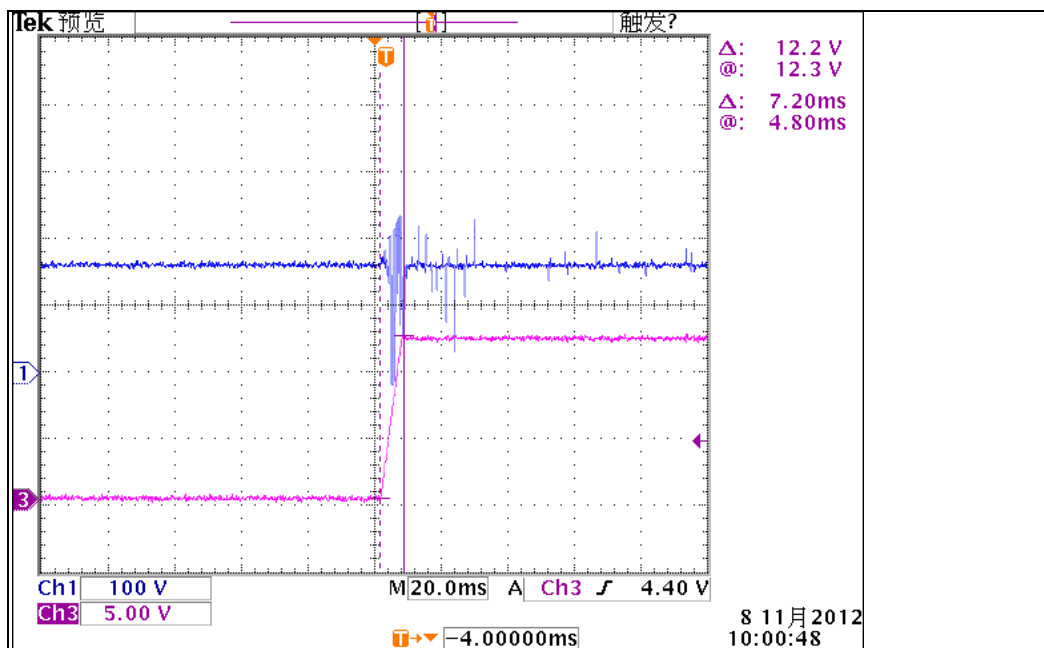
PMP4336 RevA Test Results

Ch1: MOSFET's drain voltage, 100V/div

Ch3: output voltage, 5V/div

3.3 OUTPUT VOLTAGE OVERSHOOT

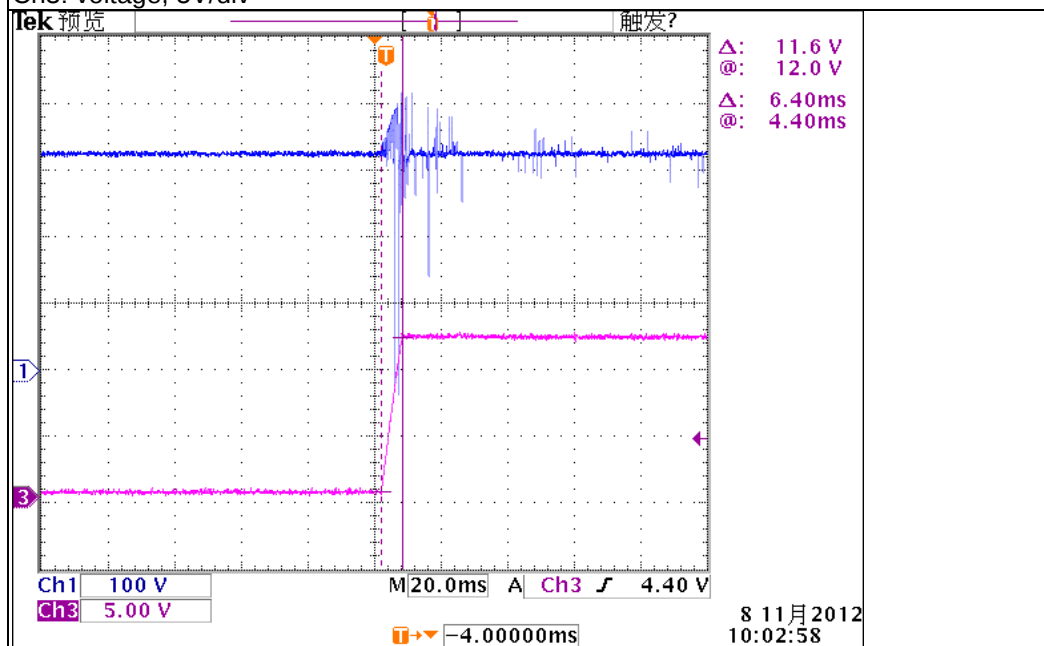
Input voltage	Output current	overshoot voltage	Pass/Fail
115Vac	0A	<1%	
230Vac	0A	<1%	



Vin:115Vac Io: 0A

CH1: MOSFET's drain voltage, 100V/div

Ch3: voltage, 5V/div



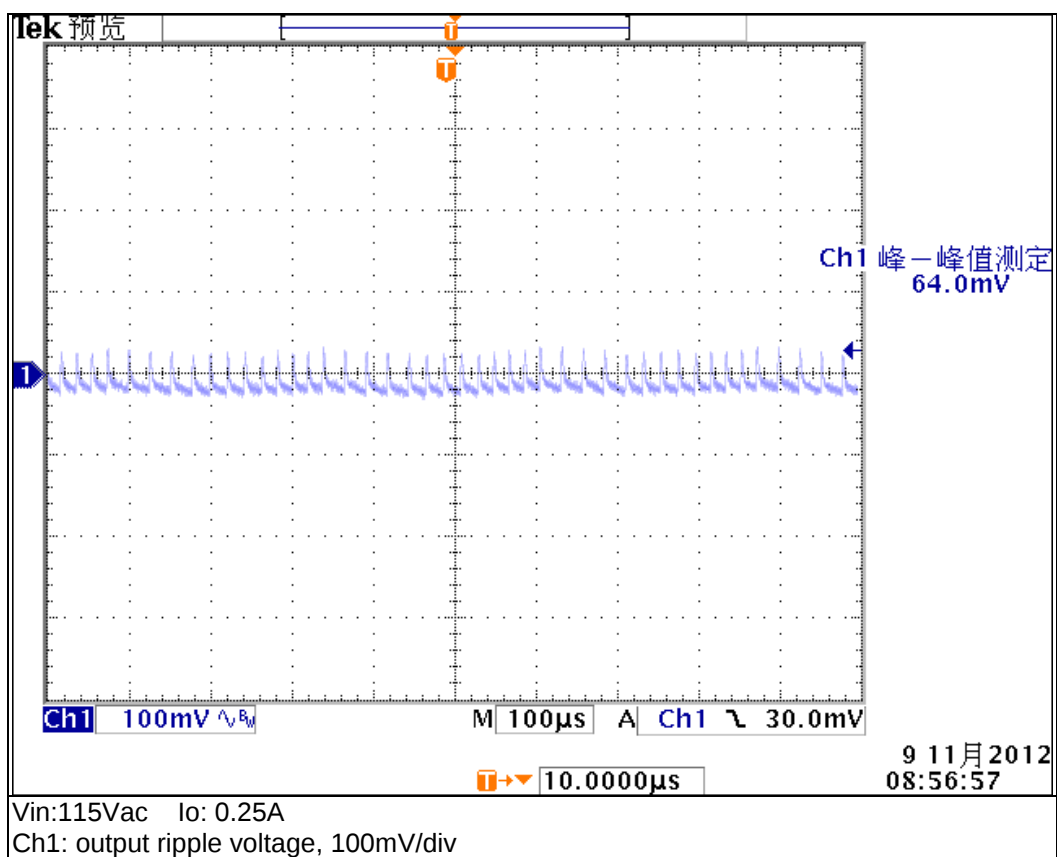
Vin:230Vac Io: 0A

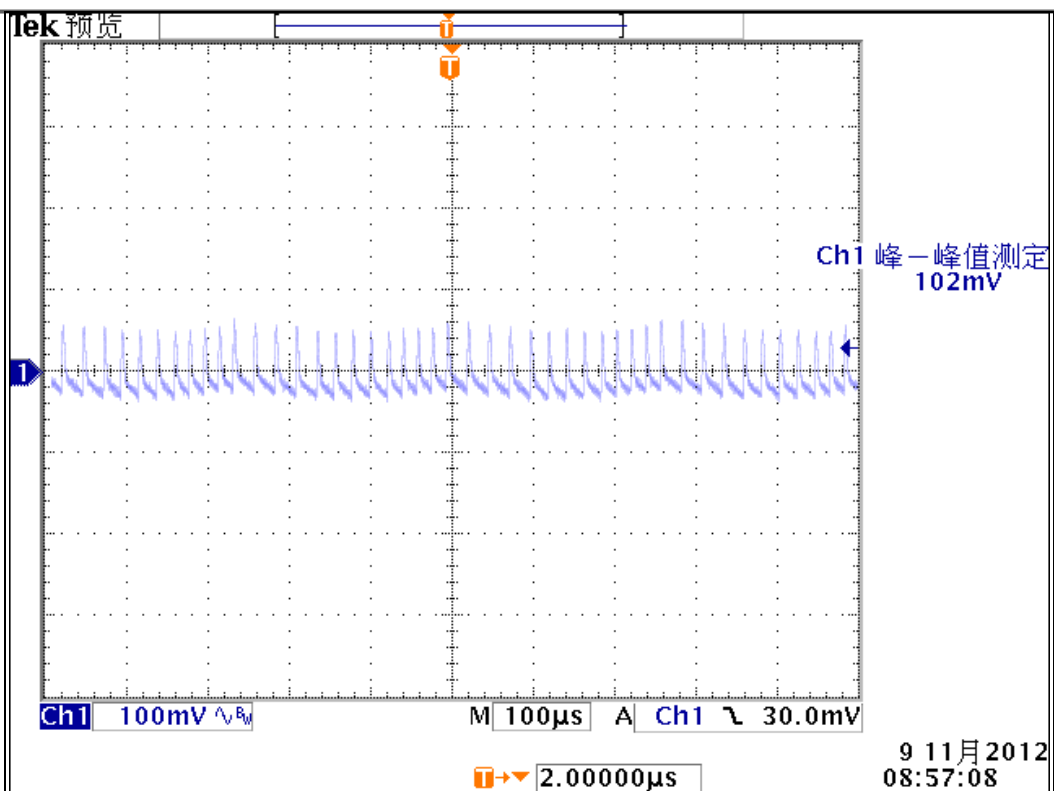
CH1: MOSFET's drain voltage, 100V/div

Ch3: output voltage, 5V/div

3.4 RIPPLE VOLTAGE

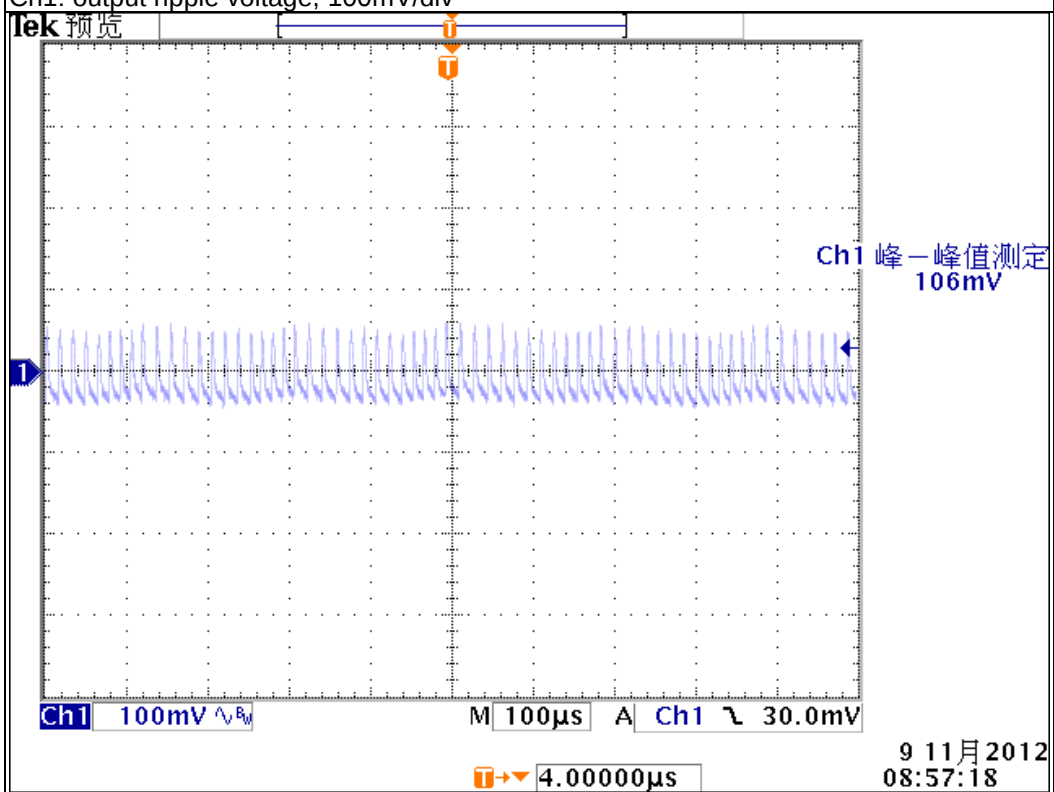
Input voltage	Output current	Ripple voltage	Pass/Fail
115Vac	0.25A	64mV	
115Vac	0.5A	102mV	
115Vac	0.75A	106mV	
115Vac	1A	110mV	
230Vac	0.25A	66mV	
230Vac	0.5A	102mV	
230Vac	0.75A	110mV	
230Vac	1A	116mV	





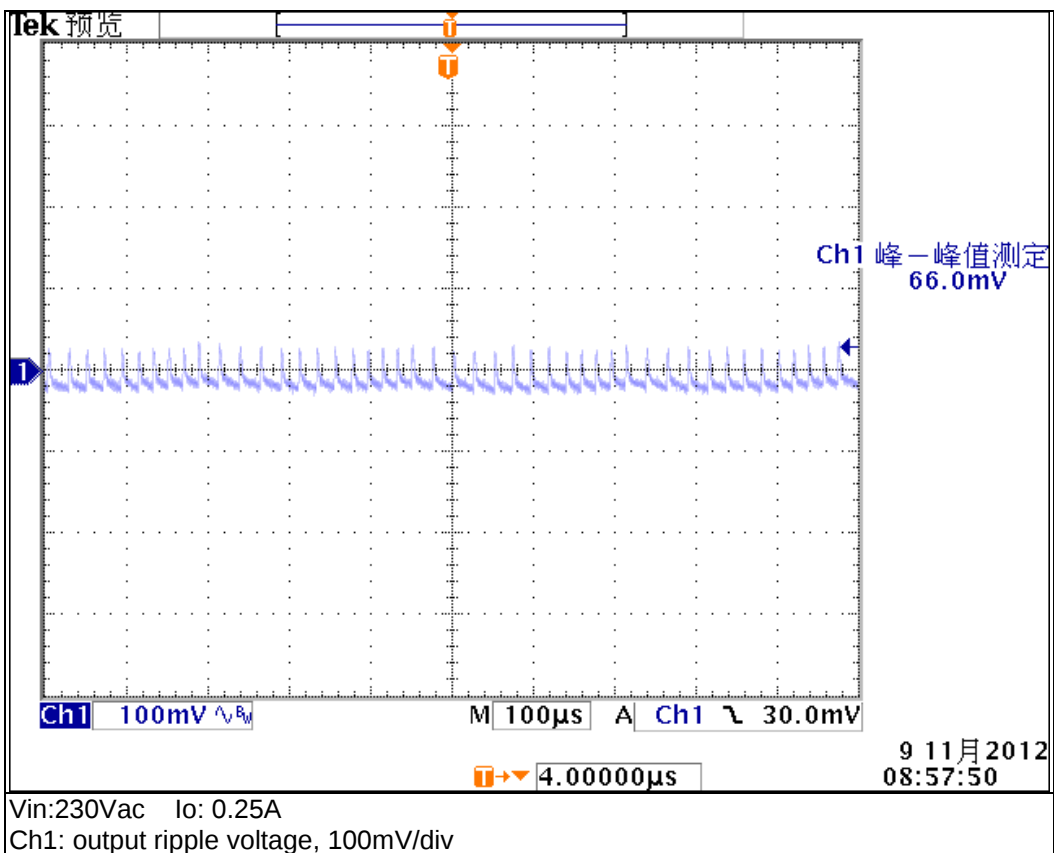
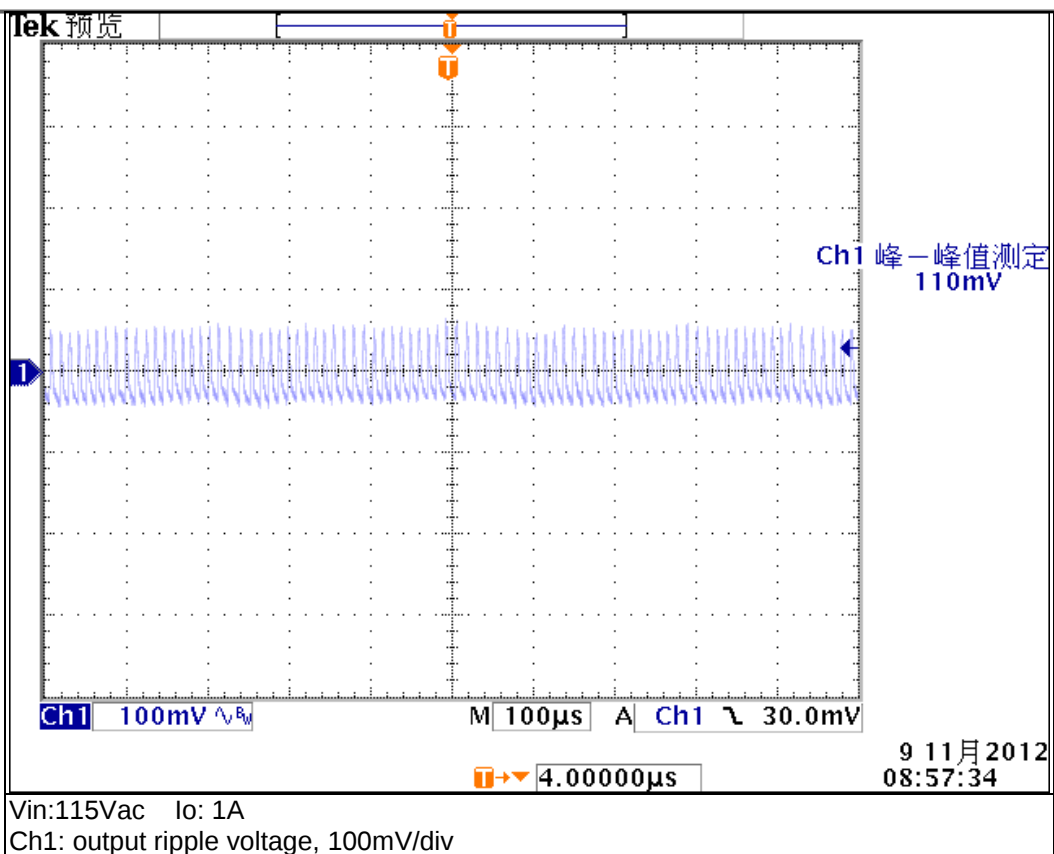
Vin:115Vac Io: 0.5A

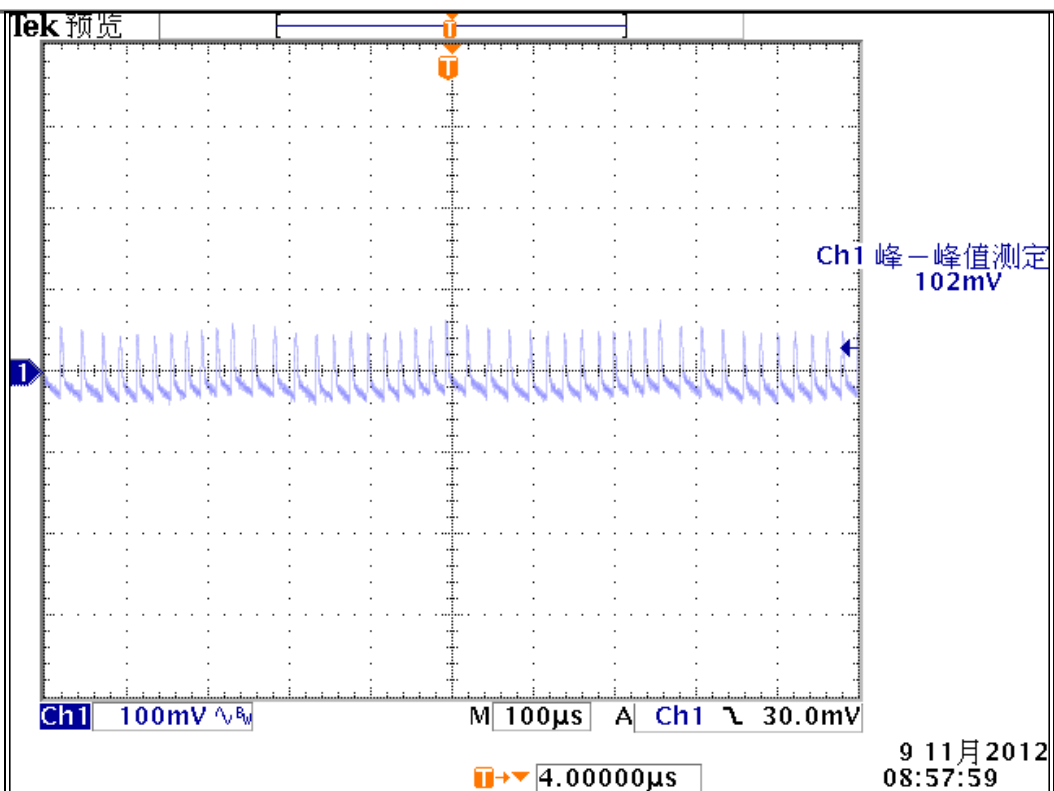
Ch1: output ripple voltage, 100mV/div



Vin:115Vac Io: 0.75A

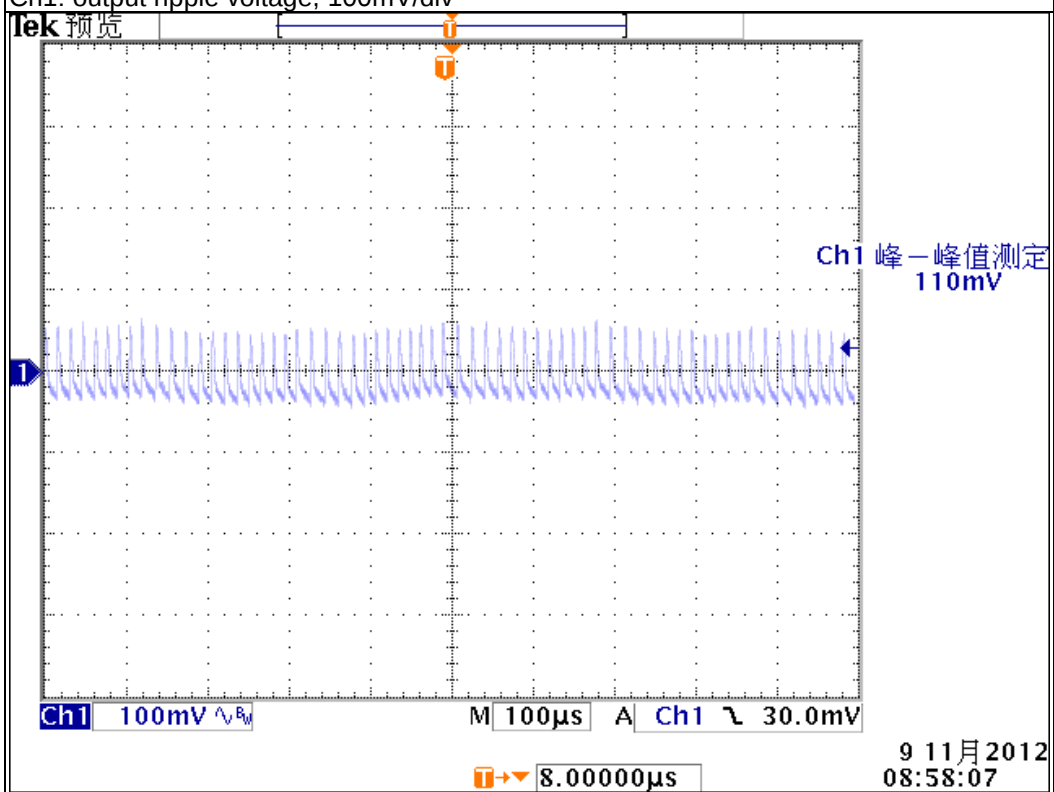
Ch1: output ripple voltage, 100mV/div





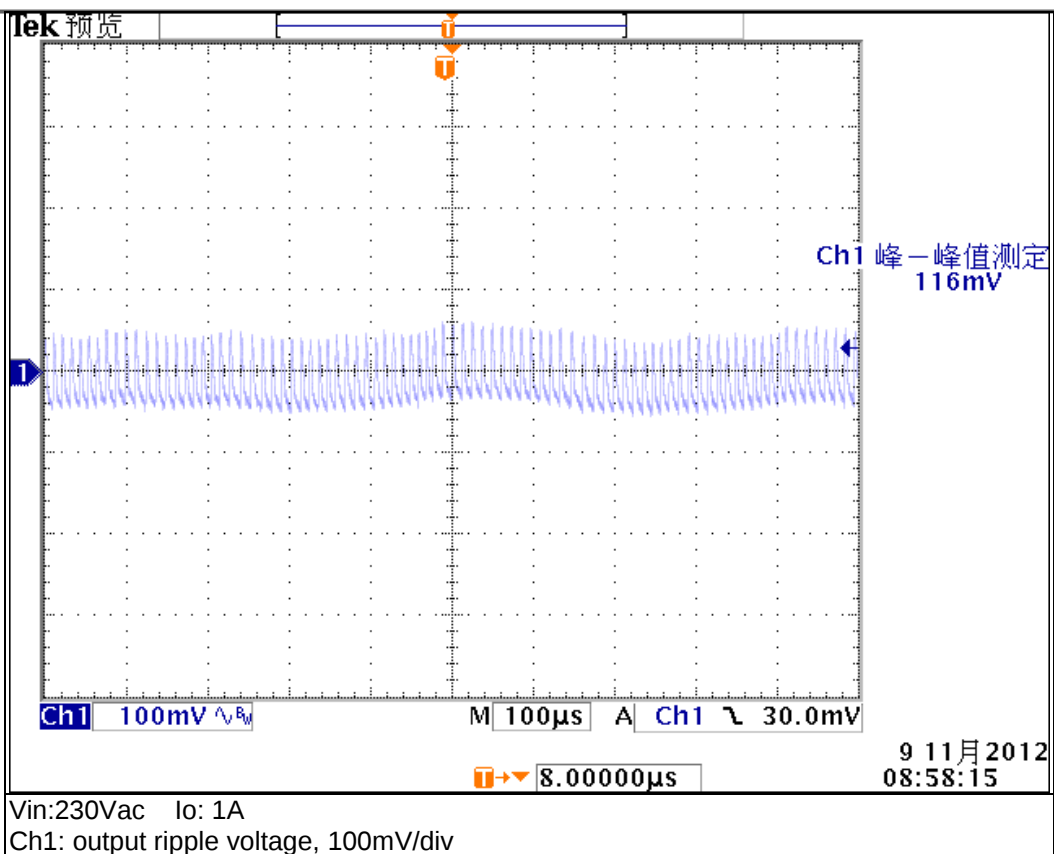
Vin:230Vac Io: 0.5A

Ch1: output ripple voltage, 100mV/div



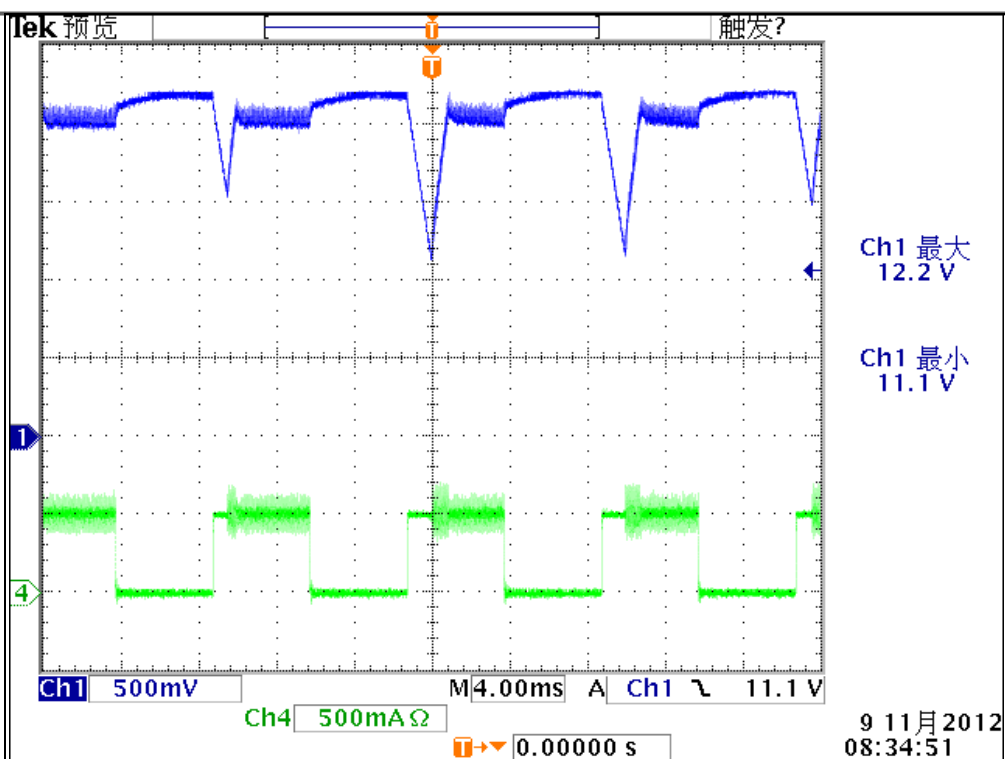
Vin:230Vac Io: 0.75A

Ch1: output ripple voltage, 100mV/div



3.5 DYNAMIC RESPONSE

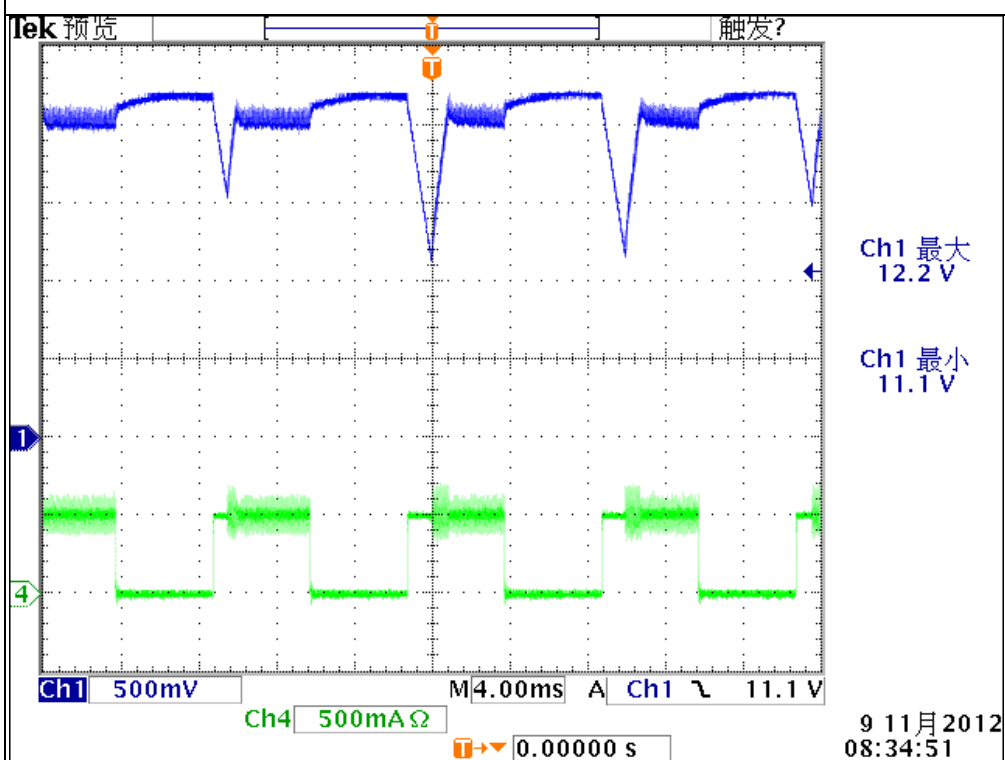
Input voltage	Output current	Max voltage	Min voltage
115Vac	0-0.5A	12.2V	11.1V
230Vac	0-0.5A	12.2V	11.1V



Vin:115Vac test condition: 0-0.5A, 0.1A/us, 10ms cycle, 1m USB cable

Ch1: output voltage, 500mV/div

Ch4: output current, 500mA/div



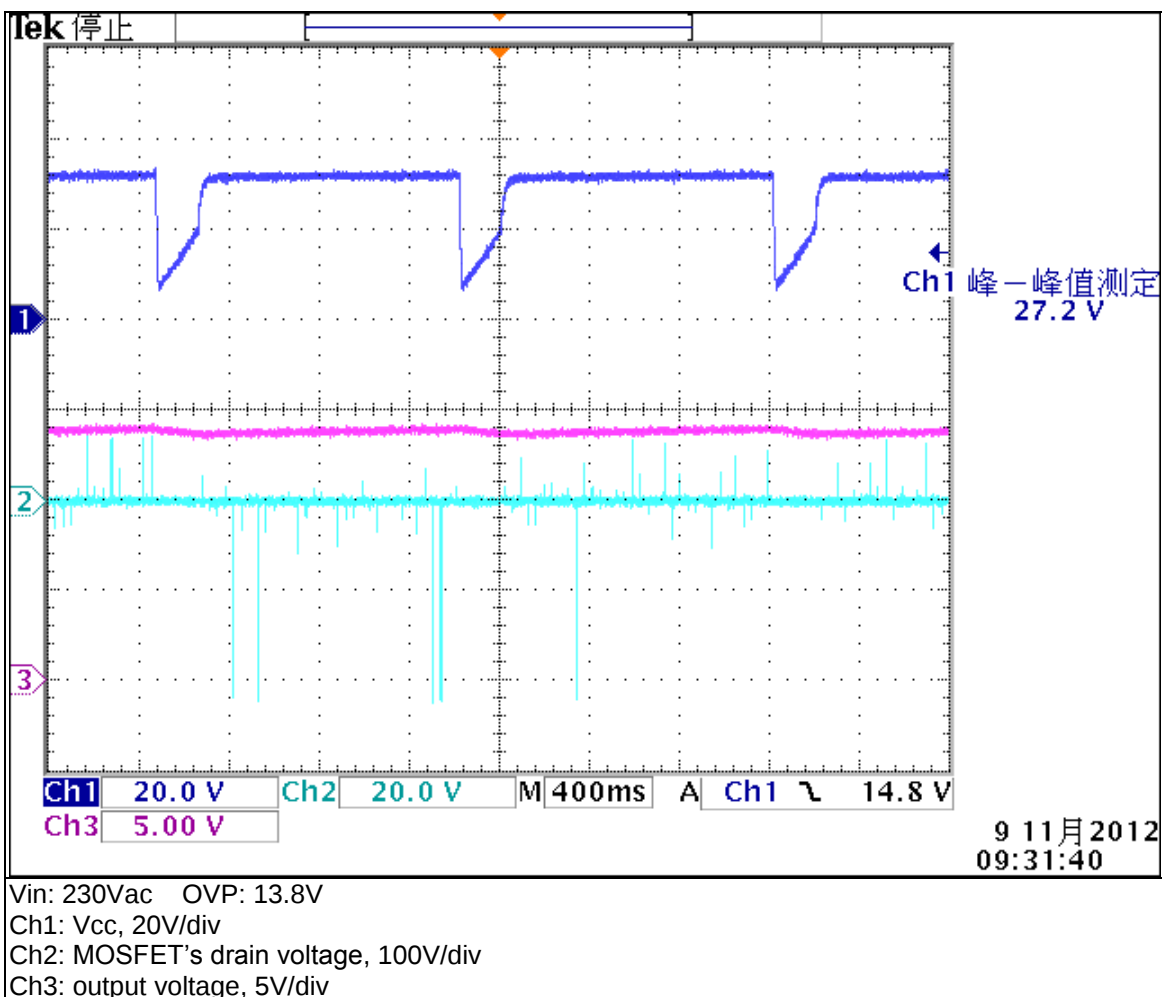
Vin:115Vac test condition: 0-0.5A, 0.1A/us, 10ms cycle, 1m USB cable

Ch1: output voltage, 500mV/div

Ch4: output current, 500mA/div

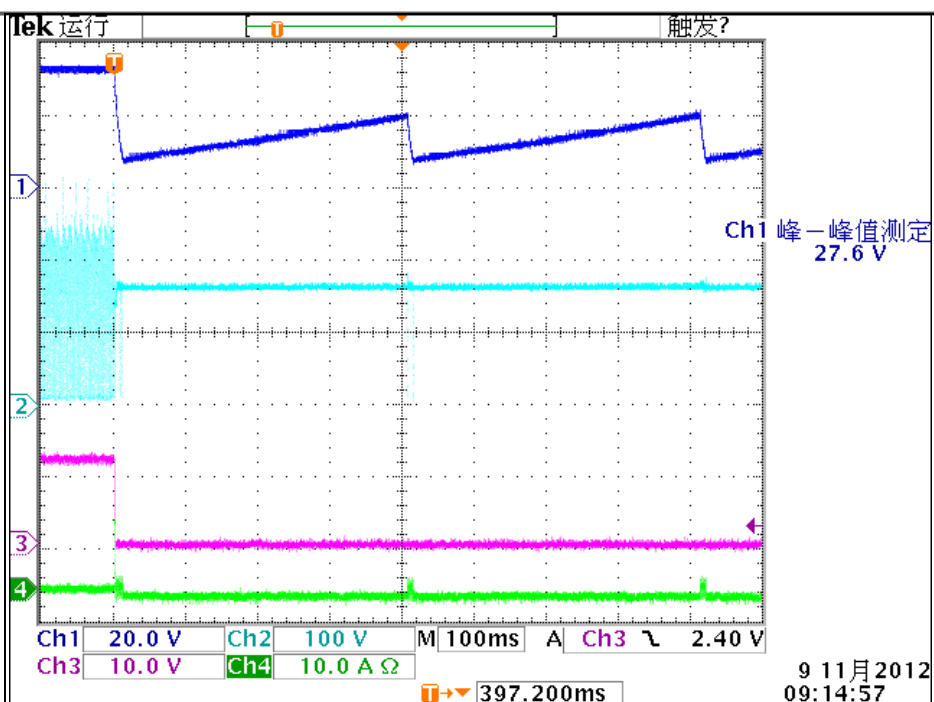
3.6 OUTPUT VOLTAGE PROTECTION

CONDITIONS	Protection voltage (V)	Pass/Fail
Vin (Vac)		
115&230	13.8	



3.7 OUTPUT SHORT PROTECTION

Input voltage	Output short protection
115&230Vac	Hiccup up mode



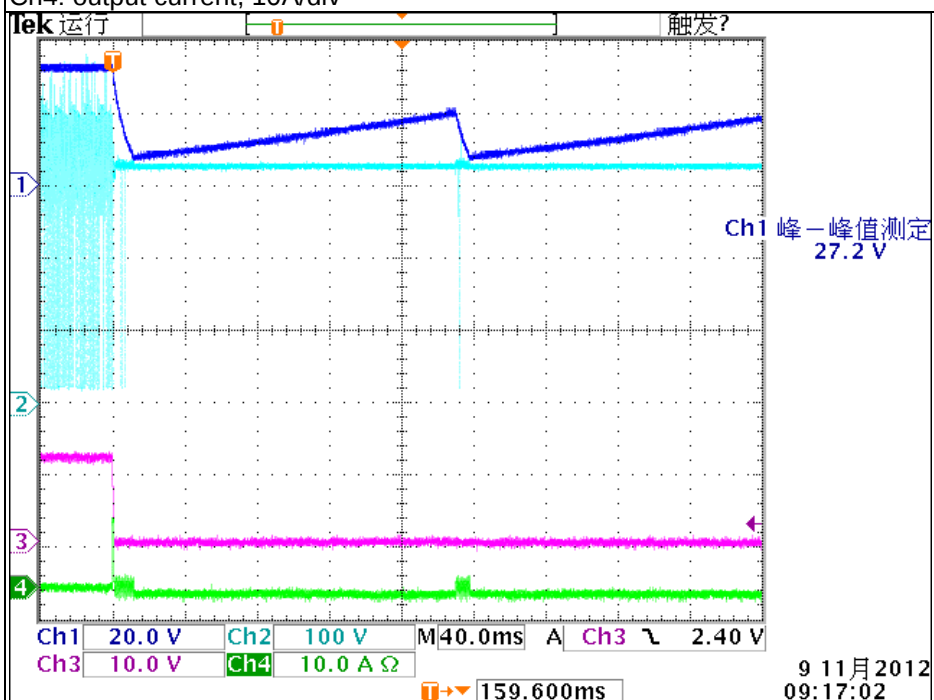
Vin:115Vac

Ch1: Vcc, 20V/div

Ch2: MOSFET's drain voltage, 100V/div

Ch3: output voltage, 10V/div

Ch4: output current, 10A/div



Vin:115Vac

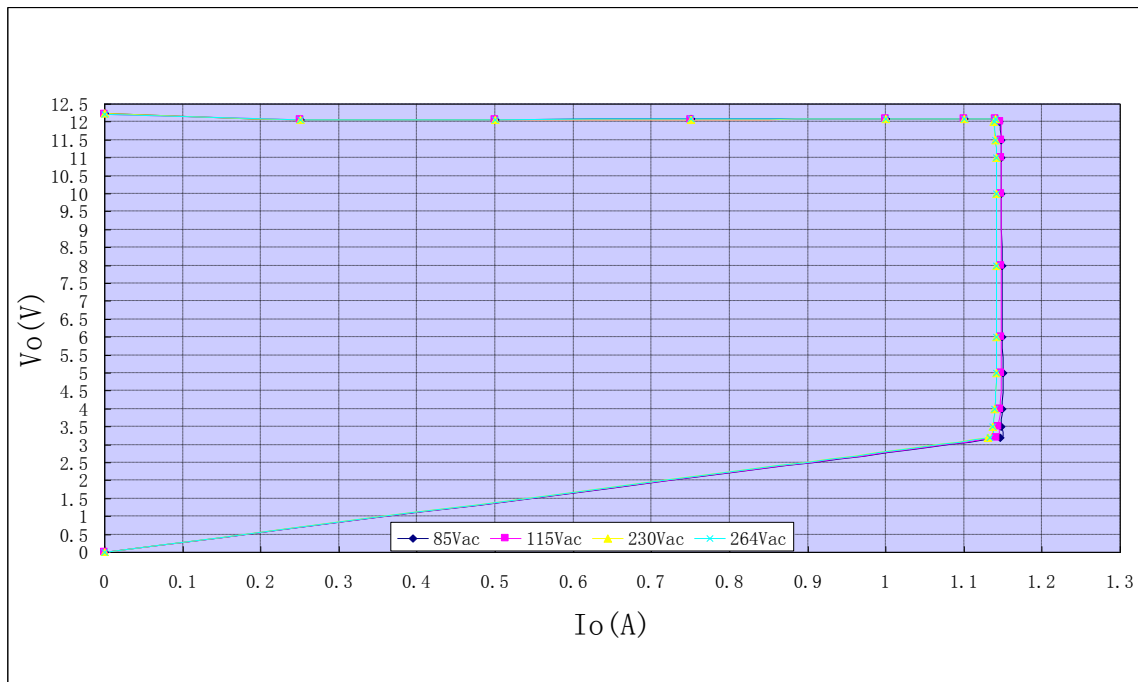
Ch1: Vcc, 20V/div

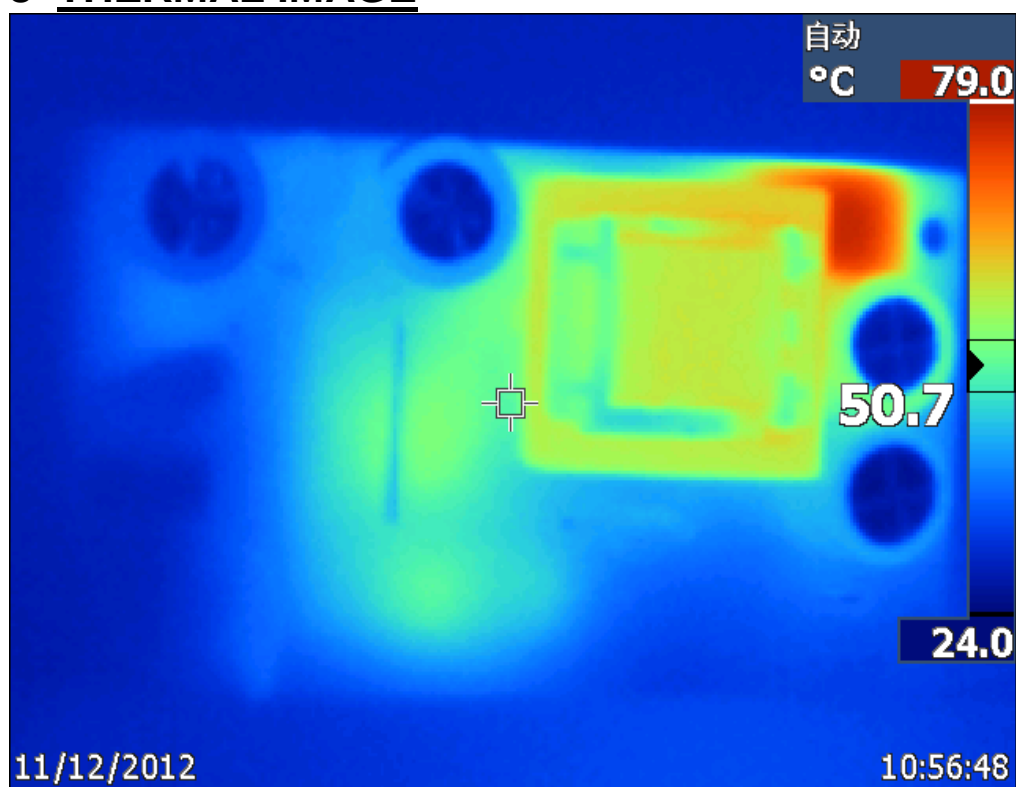
Ch2: MOSFET's drain voltage, 100V/div

Ch3: output voltage, 10V/div

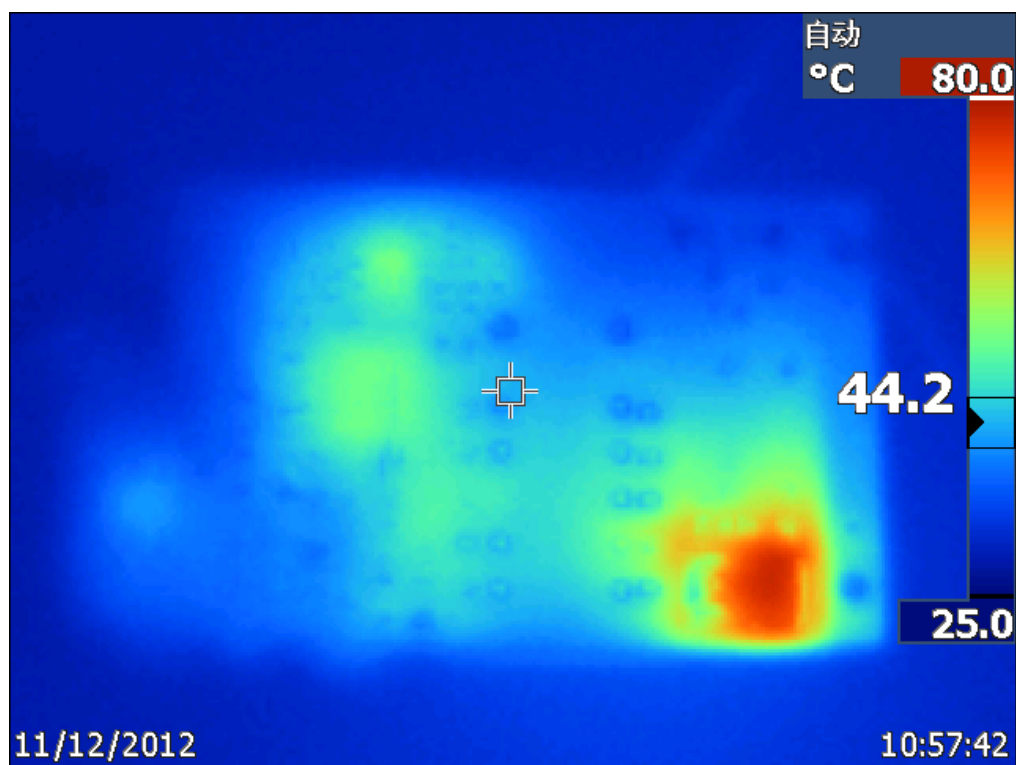
Ch4: output current, 10A/div

4 IV CURVE

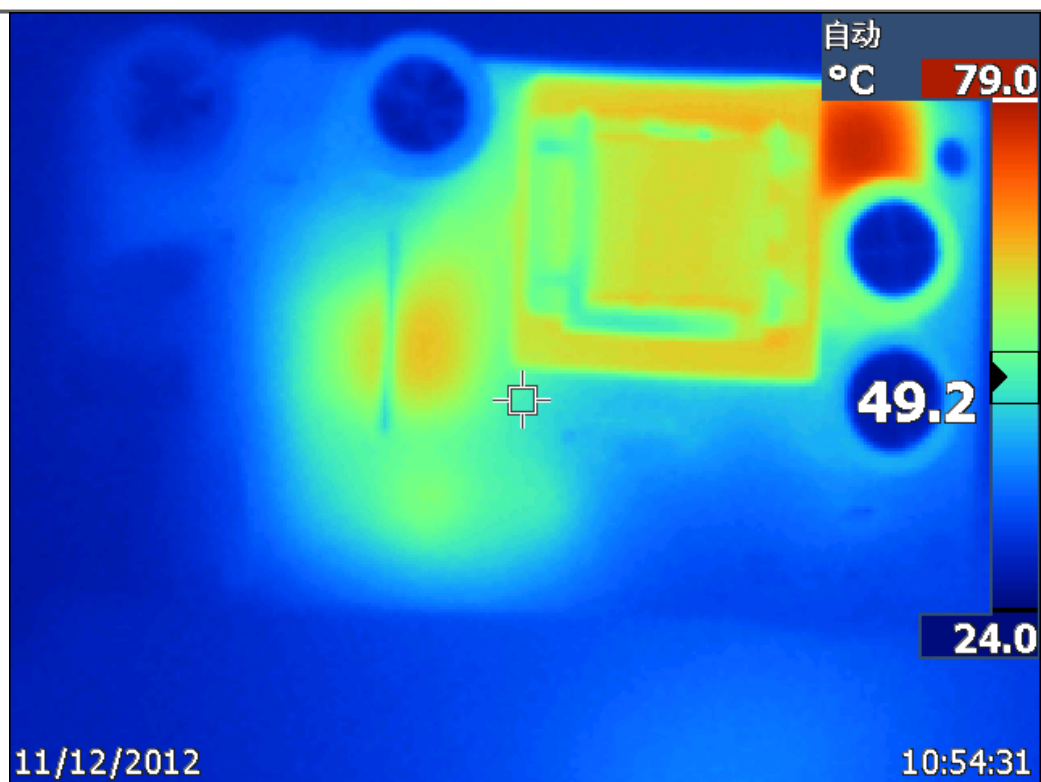


5 THERMAL IMAGE

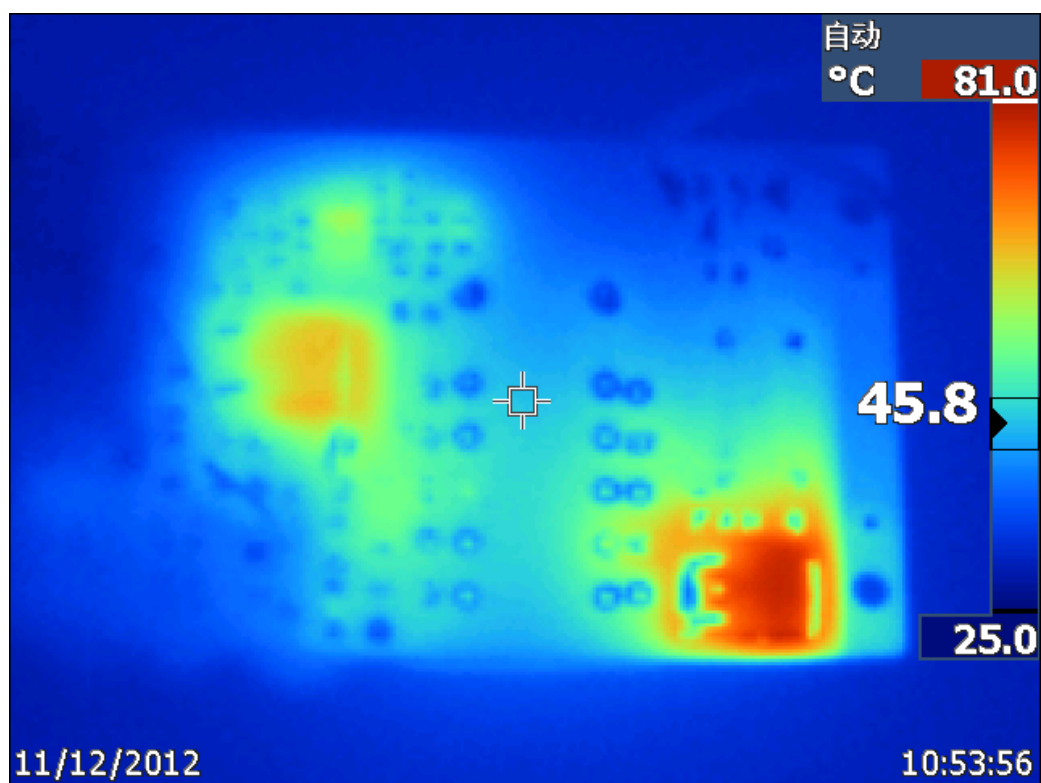
Component side, 115Vac and 1A load



Soldering side, 115Vac and 1A load

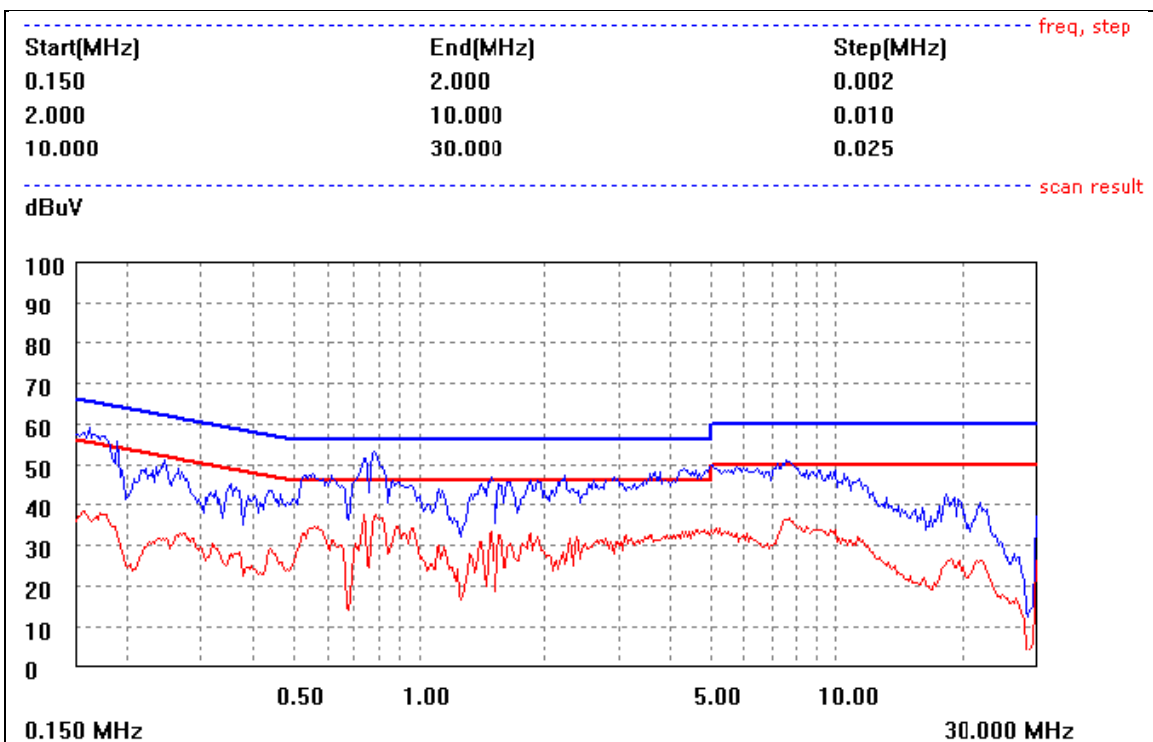


Component side, 230Vac and 1A load



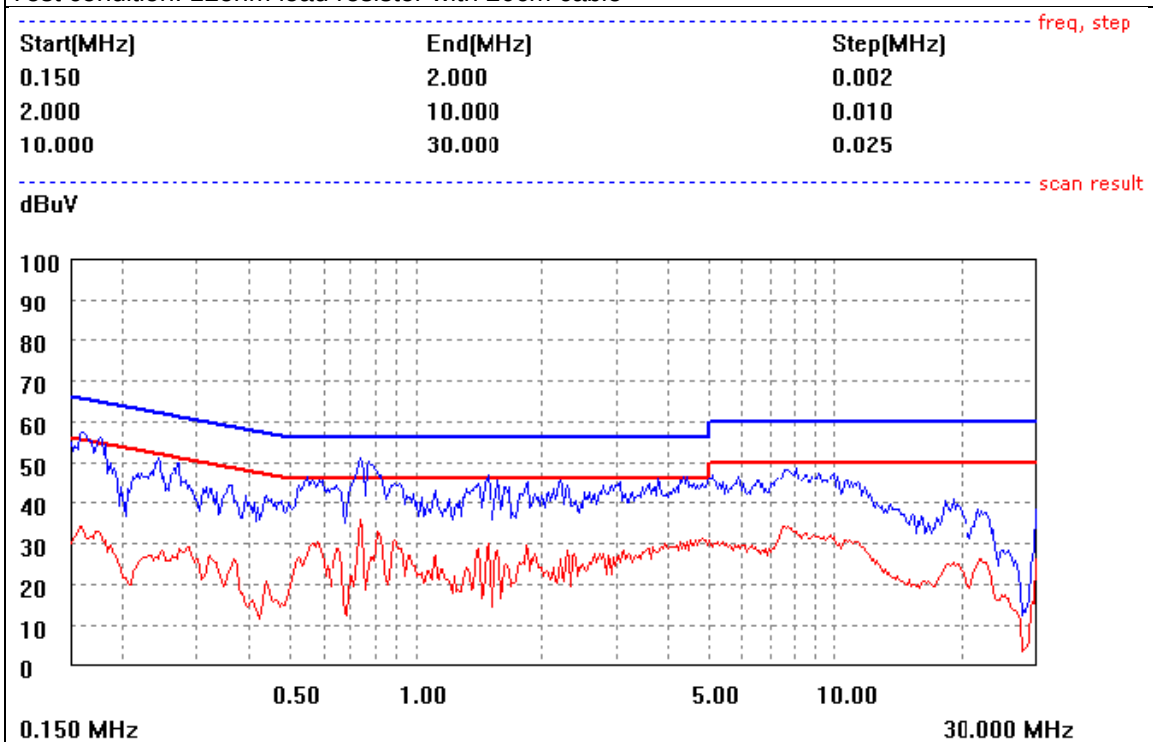
Soldering side, 230Vac and 1A load

6 EMI Test



Vin: 115Vac, Line, Io: 1A

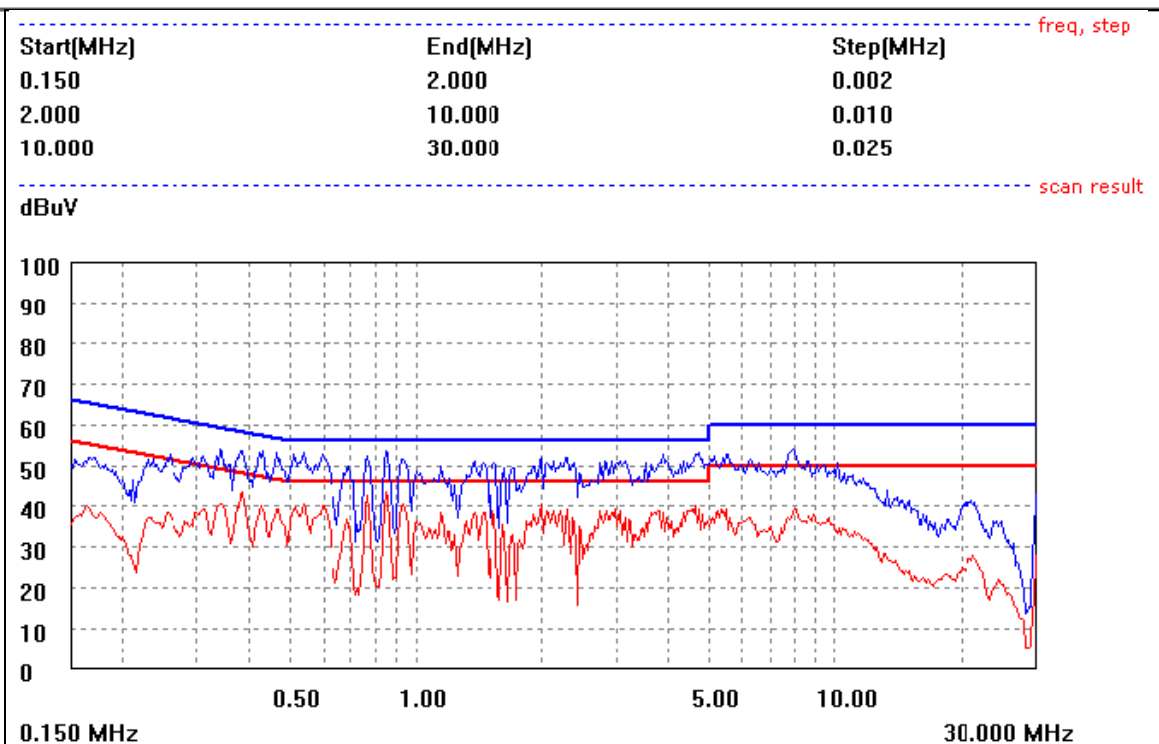
Test condition: 12ohm load resistor with 20cm cable



Vin: 115Vac, Neutral, Io: 1A

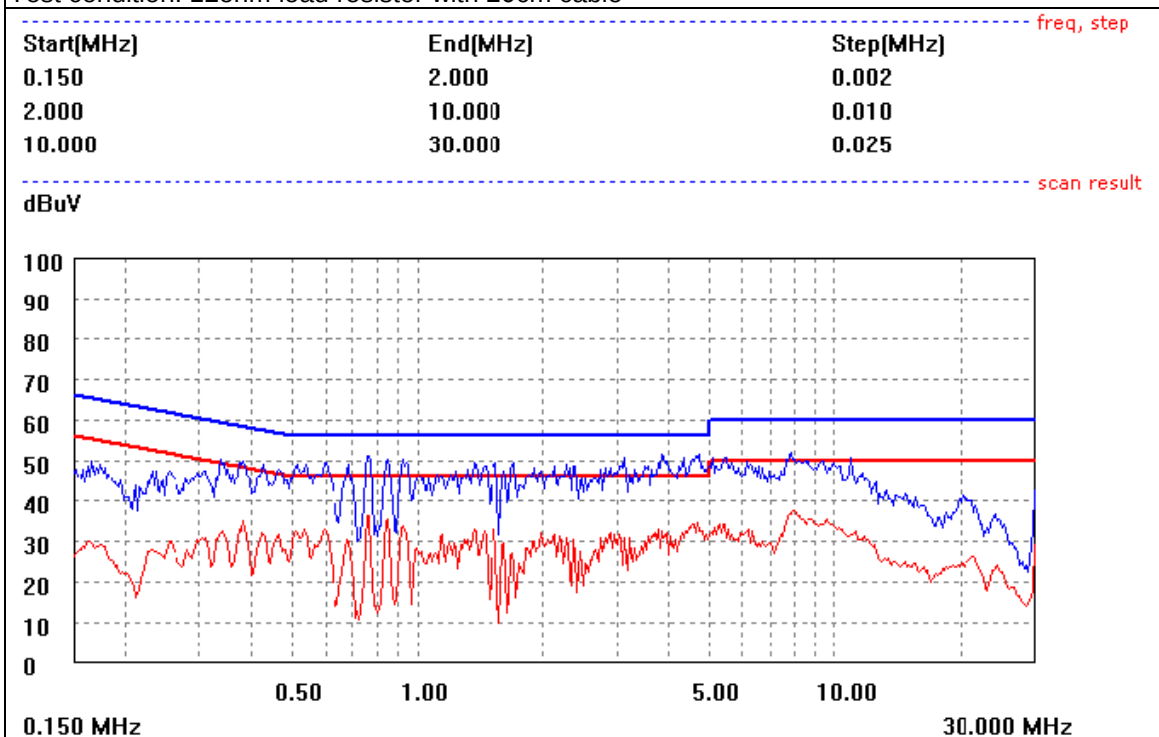
Test condition: 12ohm load resistor with 20cm cable

PMP4336 RevA Test Results



Vin: 230Vac, Line, Io: 1A

Test condition: 12ohm load resistor with 20cm cable



Vin: 230Vac, Neutral, Io: 1A

Test condition: 12ohm load resistor with 20cm cable

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