

120W Adaptor
Demo Board Manual
(OB2203 + OB6563)

Key Features

- PFC is shut down when system goes to standby
- Standby power less than 0.29W under 240VAC no load
- High efficiency more than 87.7% under normal line with full load
- OCP with line compensation
- Programmable soft start
- Precise OVP
- Low components count
- Meet EN55022 EMI
- Pass 4kV surge test
- Pass 15kV/8kV ESD test

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1 Adaptor Module Specification

Model number: OBPD120W-H240A Rev.: 01

1.1 Input Characteristics

- AC input voltage rating 100Vac ~ 240Vac
- AC input voltage range 90Vac ~ 264Vac
- AC input frequency range 47Hz ~ 63Hz
- Inrush current at 25°C 25A maximum at 115VAC
50A maximum at 230VAC
- Input current 1.56 Arms max.

1.2 Output Characteristics

- Output Voltage 19.0V
- Output Tolerance $\pm 5\%$
- Min. load current 0A
- Max. load current 6.3A

1.3 Performance Specifications

- Max. Output Power 120W
- Standby Power <0.5W @ 240V/50Hz, no load
- Efficiency >85% @ normal line, full load, including power loss in input filters
- Line Regulation <1%
- Load Regulation <5%
- Ripple (Po: 10 to 90%) <350 mVpp
- Noise (F<640KHz) <200mVpp
- Hold up Time 16.7m Sec. Min. @100Vac with full load
- Turn on Delay Time 2 Sec. Max. @100Vac with full load

1.4 Soft Start

- Settling time <15ms to within 1% at nominal load
- Overshoot <3%

1.5 Protection Features

- Short circuit Protection Output shut down with automatic recovery
- Over Voltage Protection <25V
- Over Current Protection Output shut down with automatic recovery. The protection function will be enabled if output current exceeds 110%~140% of rated output current.

1.6 Environments

- Operating Temperature 0°C to +40°C
- Operating Humidity 20% to 90% R.H.
- Storage Temperature -40°C to +60°C
- Storage Humidity 0% to 95% R.H.

1.7 Dielectric withstand

The power supply shall withstand for 1 minute without breakdown by the application of a 60Hz 1500V AC voltage applied between both input line and ground (10mA DC cut-off current). Main transformer shall similarly withstand 3000Vac applied between both primary and secondary windings for a minimum of one minute.

1.8 Insulation

The insulation resistance should be not less than 30 MOHM after applying of 500VDC for 1 minute

1.9 Leakage current

The AC leakage current is less than 3.5mA when the power supply connects to 264V/50Hz AC input voltage.

1.10 Printed circuit board

- Technology Single sided FR2
- Dimensions 134mm(L), 88mm(W) and 40mm(H)

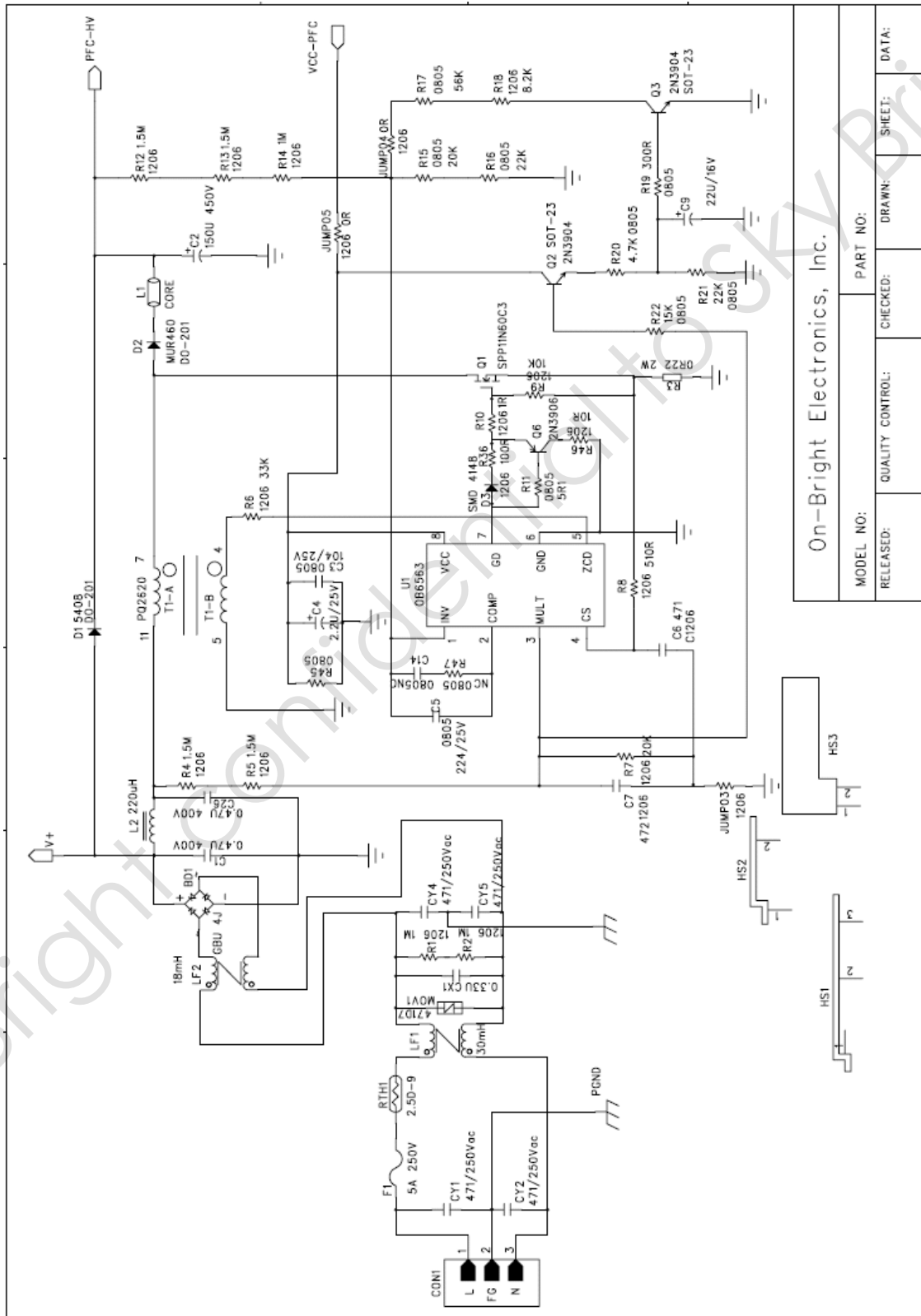
1.11 EMI

Meet international standards

2 Adaptor Module Information

2.1 Schematic

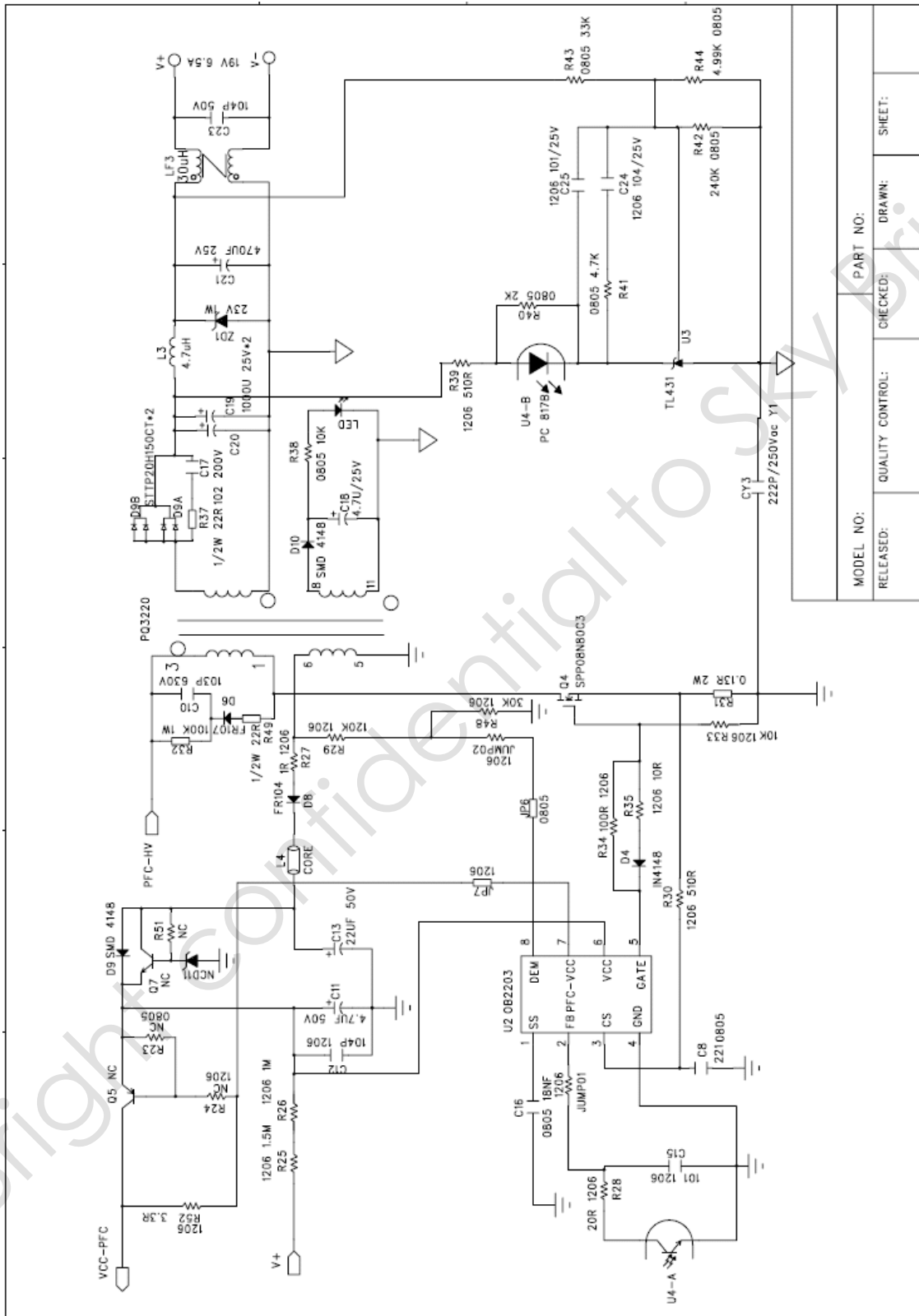
PFC Part:



On-Bright Electronics, Inc.

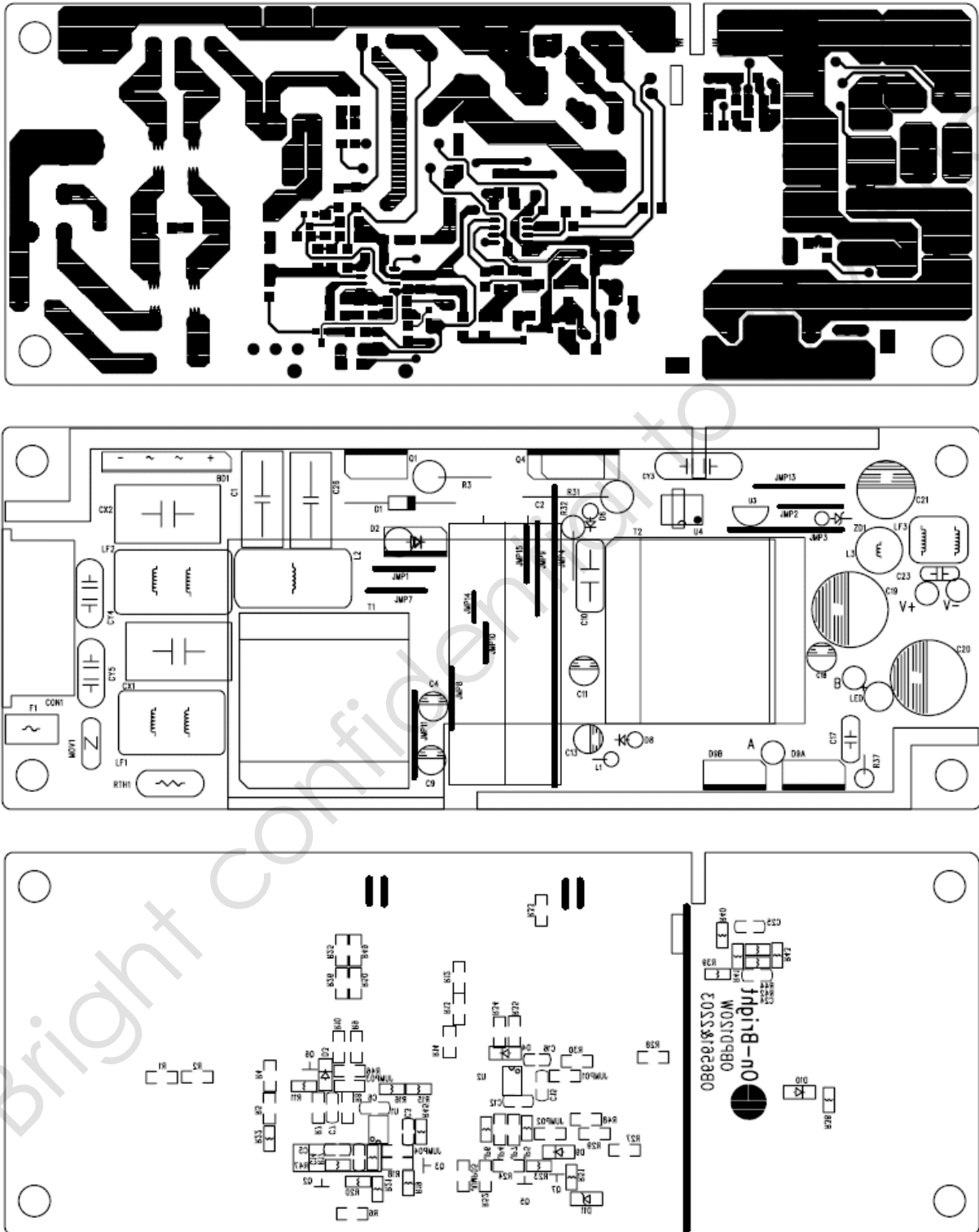
| | | | |
|------------------|----------|--------|-------|
| MODEL NO: | PART NO: | SHEET: | DATA: |
| RELEASED: | CHECKED: | DRAWN: | |
| QUALITY CONTROL: | | | |

PWM Part:



| | |
|------------------|----------|
| MODEL NO: | PART NO: |
| RELEASED: | CHECKED: |
| QUALITY CONTROL: | DRAWN: |
| | SHEET: |

2.2 PCB Gerber File



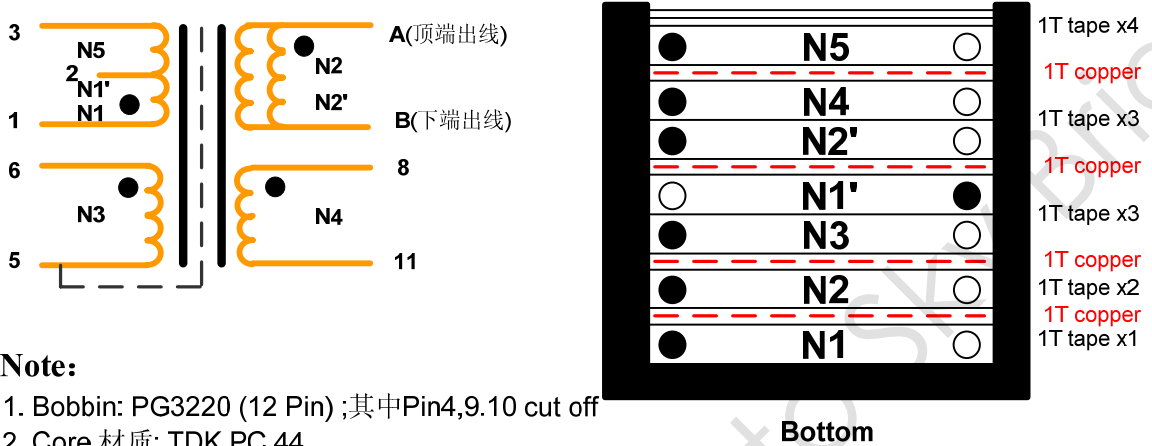
2.3 Bill of material

| Position | Description | QTY |
|--------------------|---|-----|
| BD1 | Diode, bridge recovery, GBU4J, 4A/ 600V | 1 |
| C1.C26 | Capacitor, metal poly, 0.47U/400V, -40/85°C, ±20% | 2 |
| C2 | Capacitor, aluminum electrolytic, 150uF/450V, -40/85°C, ±20%, Φ18*45mm | 1 |
| C3 | Capacitor, ceramic,100nF/25V, X7R, ±10%, SMD0805 | 1 |
| C4. | Capacitor, aluminum electrolytic, 2.2uF/25V, -40/85°C, ±20% | 1 |
| C5 | Capacitor, ceramic,220nF/25V, X7R, ±10%, SMD0805 | 1 |
| C6 | Capacitor, ceramic,470PF/25V, X7R, ±10%, SMD1206 | 1 |
| C7 | Capacitor, ceramic,4.7nF/25V, X7R, ±10%, SMD1206 | 1 |
| C8 | Capacitor, ceramic,220PF/25V, X7R, ±10%, SMD0805 | 1 |
| C9.C13 | Capacitor, aluminum electrolytic, 22uF/50V, -40/85°C, ±20% | 2 |
| C10 | Capacitor, metal poly, 10nF/630V, -40/85°C, ±20% | 1 |
| C11.C18 | Capacitor, aluminum electrolytic, 4.7uF/50V, -40/85°C, ±20% | 2 |
| C12.C24 | Capacitor, ceramic,100nF/25V, X7R, ±10%, SMD1206 | 2 |
| C15.C25 | Capacitor, ceramic,100PF/25V, X7R, ±10%, SMD1206 | 2 |
| C16 | Capacitor, ceramic,18nF/25V, X7R, ±10%, SMD0805 | 1 |
| C17 | Capacitor, film,1nF/50V, -40/85°C, ±10%, | 1 |
| C19.C20 | Capacitor, aluminum electrolytic, 1000uF/25V, -40/85°C, ±20%,Φ12.5*20mm | 2 |
| C21 | Capacitor, aluminum electrolytic, 470uF/25V, -40/85°C, ±20%,Φ10*16mm | 1 |
| C23 | Capacitor, film,100nF/50V, -40/85°C, ±10%, | 1 |
| CON1 | Connect,AC SOCKET,2.5A/250Vac,3PIN | 1 |
| CX1 | Capacitor,X2, 0.33uF/275VAC, -40/85°C, ±20% | 1 |
| CY1.CY2. CY4.CY5 | Capacitor,Y2,disc,470PF/250VAC, -40/85°C, ±20% | 4 |
| CY3 | Capacitor,Y2,disc,2.2nF/250VAC, -40/85°C, ±20% | 1 |
| D1 | Diode,recovery, 1N5408,3A/1000V,DO-201 | 1 |
| D2 | Diode,ultra fast recovery,MUR460, 4A/600V, DO-201 | 1 |
| D3.D4.D9.D10 | Diode ,fast recovery, 1N4148, 0.1A /100V,SMD1206H | 4 |
| D6 | Diode ,fast recovery, FR107, 1A/1000V,DO-401 | 1 |
| D8 | Diode ,fast recovery, FR104, 1A/600V,DO-401 | 1 |
| D9A.D9B | Diode,dual schottky, STPS20H100CT, 2*10A/100V,TO220 | 2 |
| F1 | Fuse, 5A/250V, Φ4*10mm | 1 |
| JP6 | Resistor,chip, 0R ,1/4W,±5%,SMD0805 | 1 |
| JP7 | Resistor,chip, 0R ,1/2W,±5%,SMD1206 | 1 |
| JUMP01.02.03.04.05 | Resistor,chip, 0R ,1/2W,±5%,SMD1206 | 4 |
| L1 | Core,for D2,1.5*3.5*8mm | |
| L2 | Inductor, choke,220uH min, core9*18*6.5mm | 1 |
| L3 | Inductor,power choke,4.7uH,±10%,core, Φ5*20mm | 1 |
| L4 | Core,for D8,1.5*3.5*8mm | |
| LED | LED, Φ5mm | 1 |
| LF1 | Inductor, choke,dual winding,13mH min, core8.5*14*7mm | 1 |
| LF2 | Inductor, choke,dual winding,18mH min, core13.5*22*8.5mm | 1 |
| LF3 | Inductor, choke,dual winding,30uH,±10%, core5*9.5*5mm | 1 |

| | | |
|-------------------|---|---|
| MOV1 | Varistor ,disk, 7D471,300Vac rms max,385Vdc rms max, 600Amax,Φ7mm | 1 |
| Q1 | MOSFET,cool MOS power N-channel, SPP11N60C3, 11A/650V,0.38R,TO220 | 1 |
| Q2.Q3 | Transistor, NPN,2N3904,0.2A/40V,SMD,SOT23 | 2 |
| Q4 | MOSFET, N-channel, SPP8N80C3, 8A/800V, 0.65R,TO220 | 1 |
| Q6 | Transistor, PNP,2N3906,0.2A/40V,SMD,SOT23 | 1 |
| R1.R2.R14.R26 | Resistor,chip, 1M ,1/2W, ±5%,SMD1206 | 4 |
| R3 | Resistor,metal film,axial,RN55,0R22, 2W, ±5% | 1 |
| R4.R5.R12.R13.R25 | Resistor,chip, 1.5M ,1/2W, ±5%,SMD1206 | 5 |
| R6 | Resistor,chip, 33K ,1/2W, ±5%,SMD1206 | 1 |
| R7 | Resistor,chip, 20K ,1/2W, ±5%,SMD1206 | 1 |
| R8.R30.R39 | Resistor,chip, 510R ,1/2W, ±5%,SMD1206 | 3 |
| R9.R33 | Resistor,chip, 10K ,1/2W, ±5%,SMD1206 | 2 |
| R10.R27 | Resistor,chip, 1R ,1/2W, ±5%,SMD1206 | 2 |
| R11 | Resistor,chip, 5R1 ,1/4W, ±5%,SMD0805 | 1 |
| R15.R22 | Resistor,chip, 20K ,1/4W, ±5%,SMD0805 | 2 |
| R16 | Resistor,chip, 22K,1/4W, ±5%,SMD0805 | 1 |
| R17 | Resistor,chip, 56K,1/4W, ±5%,SMD0805 | 1 |
| R18 | Resistor,chip, 8.2K,1/4W, ±5%,SMD0805 | 1 |
| R19 | Resistor,chip, 300R,1/4W, ±5%,SMD0805 | 1 |
| R20.R41 | Resistor,chip, 4.7K,1/4W, ±5%,SMD0805 | 2 |
| R21 | Resistor,chip, 15K,1/4W, ±5%,SMD0805 | 1 |
| R28 | Resistor,chip, 22R,1/2W, ±5%,SMD1206 | 1 |
| R29 | Resistor,chip, 120K,1/2W, ±5%,SMD1206 | 1 |
| R31 | Resistor,metal film,axial,RN55,0R13, 2W, ±5% | 1 |
| R32 | Resistor,metal film,axial, 100K, 1W, ±5% | 1 |
| R34.R36 | Resistor,chip, 47R,1/2W, ±5%,SMD1206 | 2 |
| R35.R46 | Resistor,chip,10R,1/2W, ±5%,SMD1206 | 2 |
| R37.R49 | Resistor,metal film,axial,22R, 1W, ±5% | 2 |
| R38 | Resistor,chip, 10K,1/4W, ±5%,SMD0805 | 1 |
| R40 | Resistor,chip, 2K,1/4W, ±5%,SMD0805 | 1 |
| R42 | Resistor,chip, 240K,1/4W, ±1%,SMD0805 | 1 |
| R43 | Resistor,chip, 33K,1/4W, ±1%,SMD0805 | 1 |
| R44 | Resistor,chip, 4.99K,1/4W, ±1%,SMD0805 | 1 |
| R52 | Resistor,chip, 3.3R,1/2W, ±5%,SMD1206 | 1 |
| R48 | Resistor,chip, 30K,1/2W, ±5%,SMD1206 | 1 |
| RTH1 | NTC thermistor,disk, 2.5R-9,2.5R,8Arms, Φ9mm | 1 |
| T1 | Xfmr,boost inductor,400uH,10KHz/1V,PQ2620 | 1 |
| T2 | Transformer, 300uH,10KHz/1V,PQ3220 | 1 |
| U1 | IC, PFC controller,OB6563,SO-8 | 1 |
| U2 | IC,QR controller, OB2203, SO-8 | 1 |
| U3 | IC,Precision Adjustable Shunt Regulator ,TL431, TO-92 | 1 |
| U4 | IC,Photocoupler ,PC817B, DIP4 | 1 |
| ZD1 | Diode,zener, 24V, 1W,DO401 | 1 |
| PCB | OBPD120W,65*167mm | 1 |

2.4 Transformer Design

2.4.1 Transformer Specification

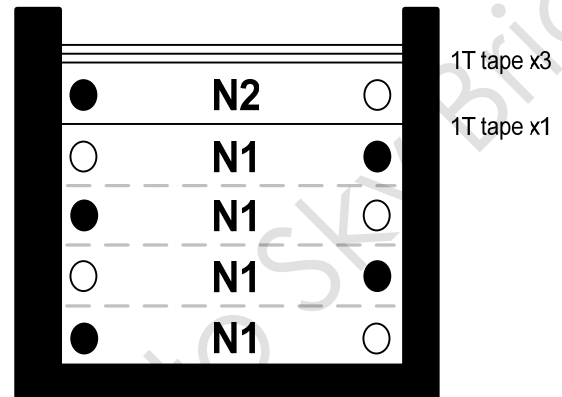
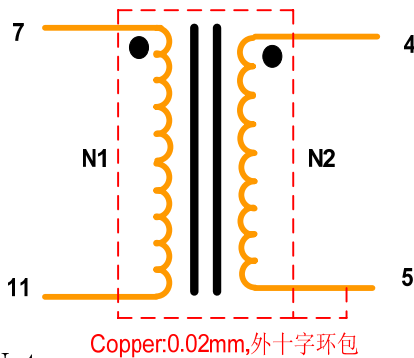


2.4.2 Transformer Winding data

| c | Winging | Material | Start | Turns | Finish |
|----|---------|-----------------------|-------|-------|--------|
| 1 | N1 | Φ0.45*2 2UEW | 1 | 9 | 不断线 → |
| 2 | TAPE | TAPE W=10mm (Y) | | 1.3 | |
| 3 | Copper | Copper W=9mm P=0.02mm | | 1.1 | 5 |
| 4 | TAPE | TAPE W=10mm (Y) | | 1.3 | |
| 5 | N2 | Φ0.60*2 三层绝缘线 | A | 5 | B |
| 6 | TAPE | TAPE W=10mm (Y) | | 1.3 | |
| 7 | Copper | Copper W=9mm P=0.02mm | | 1.1 | 5 |
| 8 | TAPE | TAPE W=10mm (Y) | | 1.3 | |
| 9 | N3 | Φ0.12*3 2UEW 间绕 | 6 | 4 | 5 |
| 10 | TAPE | TAPE W=10mm (Y) | | 1.3 | |
| 11 | N1' | Φ0.45*2 2UEW | → 不断线 | 9 | 2 |
| 12 | TAPE | TAPE W=10mm (Y) | | 1.3 | |
| 13 | Copper | Copper W=9mm P=0.02mm | | 1.1 | 5 |
| 14 | TAPE | TAPE W=10mm (Y) | | 1.3 | |
| 15 | N2' | Φ0.60*2 三层绝缘线 | A | 5 | B |
| 16 | N4 | Φ0.20*1 三层绝缘线 间绕到 N2 | 8 | 2 | 11 |
| 17 | TAPE | TAPE W=10mm (Y) | | 1.3 | |
| 18 | Copper | Copper W=9mm P=0.02mm | | 1.1 | 5 |

| | | | | | |
|----|------|--------------------|---|-----|---|
| 19 | TAPE | TAPE W=10mm (Y) | | 1.3 | |
| 20 | N5 | $\Phi 0.45*2$ 2UEW | 2 | 9 | 3 |
| 21 | TAPE | TAPE W=10mm (Y) | | 3 | |

2.4.3 Boost inductor Specification



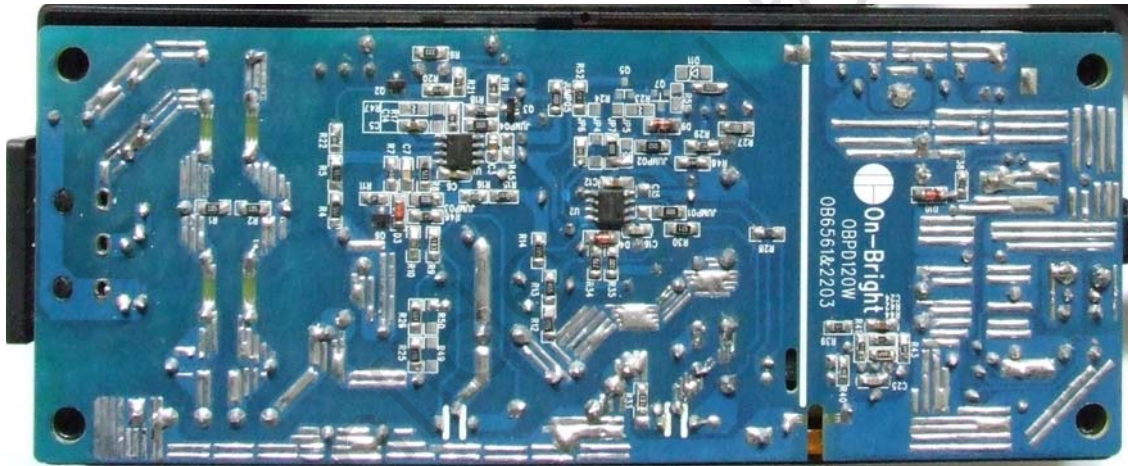
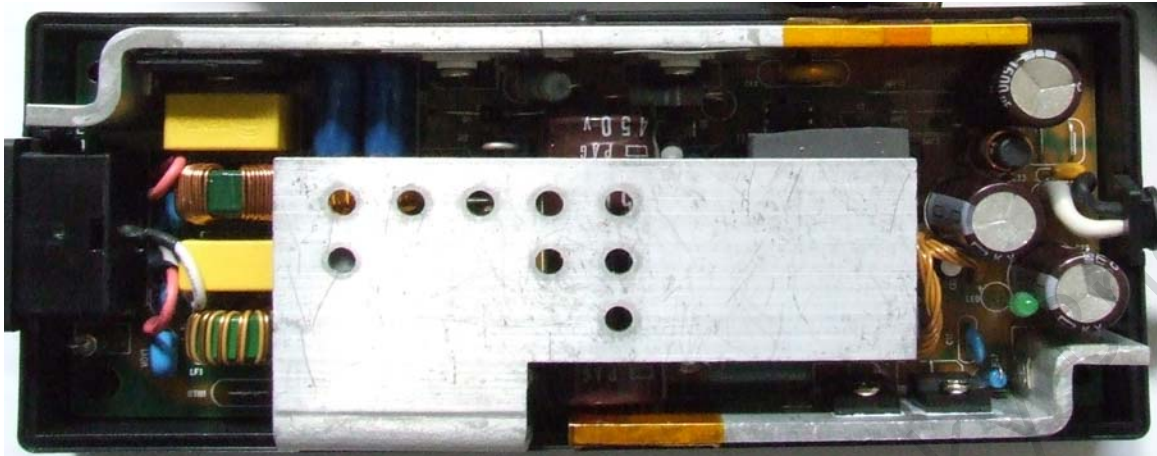
Note:

1. Bobbin: PG2620 (12 Pin) ;其中Pin6,8,9,10,12 cut off
2. Core 材质: TDK PC 44.
3. L7-11=400u H +/- 5%. (at: 10 K Hz, 0.3 V)
4. HI-POT: (60 Hz/5 m A/2 SET)
Pri to Sec 3750 Vac; Pri to core 1500Vac

2.4.4 Boost inductor Winding data

| c | Winging | Material | Start | Turns | Finish |
|---|---------|--------------------|-------|-------|--------|
| 1 | N1 | $\Phi 0.20*10$ 利兹线 | 7 | 52 | 11 |
| 2 | TAPE | TAPE W=10mm (Y) | | 1.3 | |
| 3 | N2 | $\Phi 0.20*1$ 2UEW | 4 | 7 | 5 |
| 4 | TAPE | TAPE W=10mm (Y) | | 3 | |

2.5 Adaptor Module Snapshot



3 Performance Evaluation

This session presents the test results of OBPD120W-H240A module up to date. Results on inrush current and safety test are not included and will be added when they become available.

Overall, the module meets design specifications.

Performance Highlights

- The standby power is about 0.29W under 240Vac/50HZ no load.
- The efficiency more than 87.7% under normal line with full load.
- ESD passed 15kV air discharge and 8kV contact discharge test.
- EMI passed EN55022 and FCC15 Class B test with more than 6dB margin

Characterization Results Summary

| Test Item | Test result |
|--|-------------|
| 1. Input characteristics | |
| Input current (90V/60Hz, full load) | 1.56A Max |
| Standby power at no load with LED (240Vac, With PFC) | 0.29W |
| Efficiency (110Vac, full load for PCB end) | 87.7% |
| 2. Output characteristics | |
| Line regulation | 0.20% |
| Load regulation | 0.26% |
| Ripple & noise | 40mV |
| Over shoot | 2.5% Max |
| Under shoot | 2.1% Max |
| Dynamic test | 308mV |
| 3. Time sequence (90Vac with Full load) | |
| Turn on delay time | 1573mS |
| Hold up time | 89mS |
| Rise time | 26mS |
| Fall time | 15mS |
| 4. Protections | |
| Over voltage protection | 23V |
| Over current protection (90Vac ~264Vac) | 7.3A ~8.1A |
| Short Circuit protection | OK |

Test Equipments

- | | | |
|------------------------|----------|---------|
| ■ AC Source: | WEST | WEW1010 |
| ■ Digital Power Meter: | YOKOGAWA | WT210 |
| ■ Electrical Load: | Prodigit | 3315C |
| ■ Oscilloscope: | LeCroy | WS424 |
| ■ Multimeter | VICTORY | VC9807A |

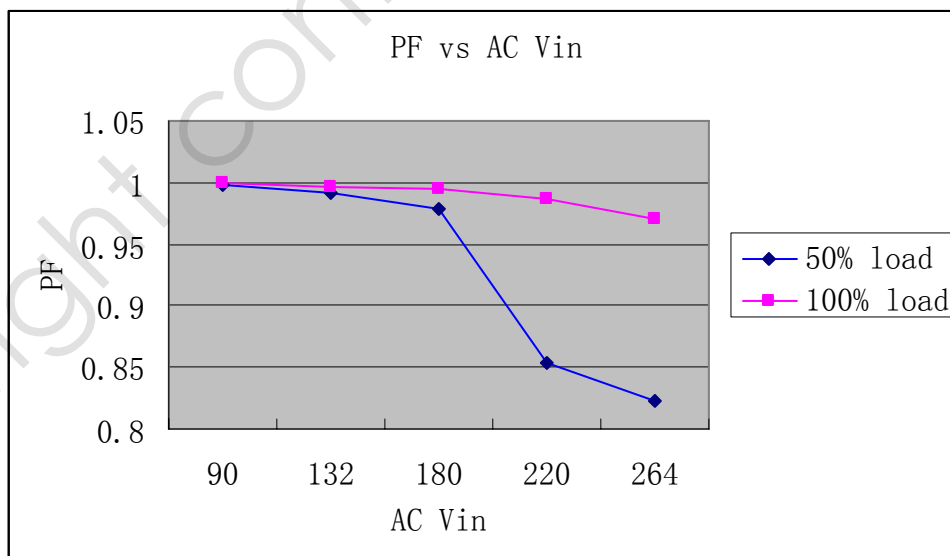
3.1 Input Characteristics

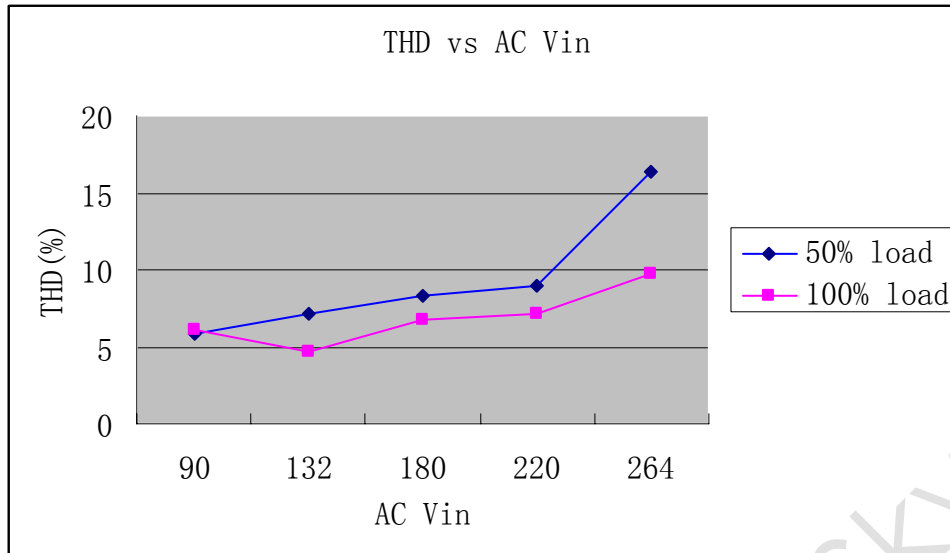
3.1.1 Input Normal Characteristics

| 100% load | | | | | |
|----------------|-----------|-------|-------|-------|-------|
| Test Items | Test data | | | | |
| Vin(Vac) | 90 | 132 | 180 | 220 | 264 |
| Frequency (Hz) | 63 | 57 | 53 | 50 | 47 |
| Iin(A) | 1.56 | 1.07 | 0.75 | 0.62 | 0.54 |
| PF | 0.999 | 0.997 | 0.994 | 0.986 | 0.971 |
| THD (%) | 6.1 | 4.7 | 6.8 | 7.2 | 9.7 |

| 50% load | | | | | |
|---------------|-----------|-------|-------|-------|-------|
| Test Items | Test data | | | | |
| Vin(Vac) | 90 | 132 | 180 | 220 | 264 |
| Frequency(Hz) | 63 | 57 | 53 | 50 | 47 |
| Iin (A) | 0.75 | 0.52 | 0.40 | 0.38 | 0.30 |
| PF | 0.998 | 0.992 | 0.978 | 0.853 | 0.822 |
| THD(%) | 5.9 | 7.2 | 8.3 | 9.0 | 16.3 |

Character Curve





3.1.2 Input current and Standby power

The module was tested at different input voltages (from 90Vac to 264Vac)

Table 1 Input current at full load

| Input Voltage | 90V/60Hz | 110V/60Hz | 132V/60Hz | 180V/50Hz | 220V/50Hz | 264V/50Hz |
|------------------|----------|-----------|-----------|-----------|-----------|-----------|
| Input Current(A) | 1.56 | 1.25 | 1.07 | 0.75 | 0.62 | 0.54 |

Table 2 Standby power at no load with LED (with PFC)

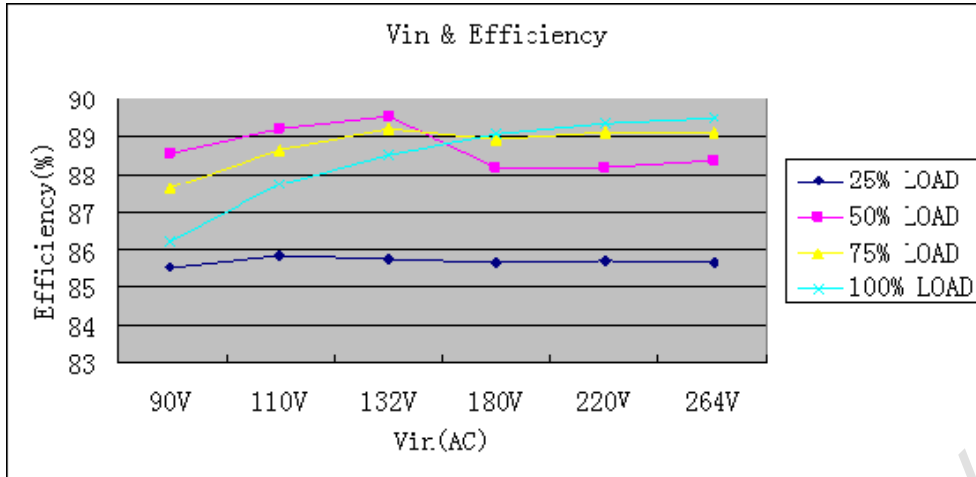
| Input Voltage | 90V/60Hz | 110V/60Hz | 132V/60Hz | 180V/50Hz | 220V/50Hz | 264V/50Hz |
|---------------|----------|-----------|-----------|-----------|-----------|-----------|
| Pin (W) | 0.116 | 0.127 | 0.147 | 0.191 | 0.256 | 0.310 |

3.1.3 Efficiency

Note: All data was measurement at PCB end.

Table 3 Efficiency with PFC part

| Vin | Efficiency (%) | | | | Average Eff (%) |
|-----------------|----------------|----------|----------|-----------|-----------------|
| | 25% Load | 50% Load | 75% Load | 100% Load | |
| 90V/60Hz | 85.54 | 88.54 | 87.63 | 86.23 | 86.98 |
| 110V/60Hz | 85.85 | 89.20 | 88.63 | 87.73 | 87.85 |
| 132V/60Hz | 85.76 | 89.51 | 89.20 | 88.51 | 88.24 |
| 180V/50Hz | 85.67 | 88.19 | 88.90 | 89.03 | 87.94 |
| 220V/50Hz | 85.75 | 88.19 | 89.11 | 89.30 | 88.08 |
| 264V/50Hz | 85.69 | 88.36 | 89.07 | 89.45 | 88.14 |
| Average Eff (%) | 85.71 | 88.66 | 88.75 | 88.37 | |



3.2 Output Characteristics

3.2.1 Line Regulation & Load Regulation

Table 4 Line Regulation & Load Regulation

| Input Voltage | Output Voltage (V) | | | Load Regulation (%) |
|---------------------|--------------------|-----------|-----------|---------------------|
| | No Load | Half Load | Full Load | |
| 90V/47Hz | 19.20 | 19.17 | 19.17 | 0.15 |
| 110V/60Hz | 19.20 | 19.17 | 19.17 | 0.15 |
| 132V/63Hz | 19.20 | 19.16 | 19.17 | 0.2 |
| 180V/47Hz | 19.20 | 19.15 | 19.16 | 0.26 |
| 240V/50Hz | 19.20 | 19.15 | 19.16 | 0.26 |
| 264V/63Hz | 19.20 | 19.15 | 19.16 | 0.26 |
| Line Regulation (%) | 0 | 0.1 | 0.05 | |

Note: All data was measured at PCB end.

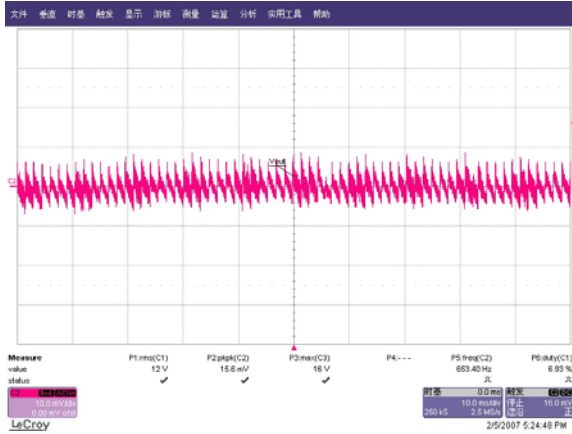
3.2.2 Ripple & Noise

Table 5 Ripple & Noise measure results

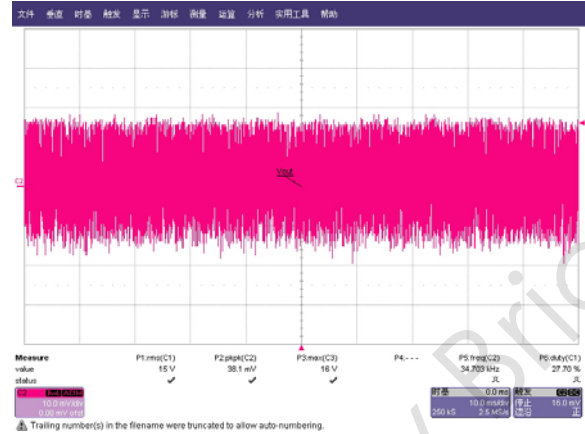
| Input Voltage | R&N (mV) | | Waveform |
|---------------|----------|-----------|----------|
| | No Load | Full Load | |
| 90Vac/60HZ | 15.6mv | 38.1mv | |
| 132Vac/60HZ | 14.4mv | 38.8mv | |
| 180Vac/50HZ | 14.4mv | 39.4mv | |
| 264Vac/50HZ | 16.3mv | 39.4mv | |

Note: Ripple & noise were measured at DC cord end with a 0.1uF/100V ceramic cap connected in parallel with a 10uF/50V Electrolytic cap. Bandwidth was limited to 20MHZ.

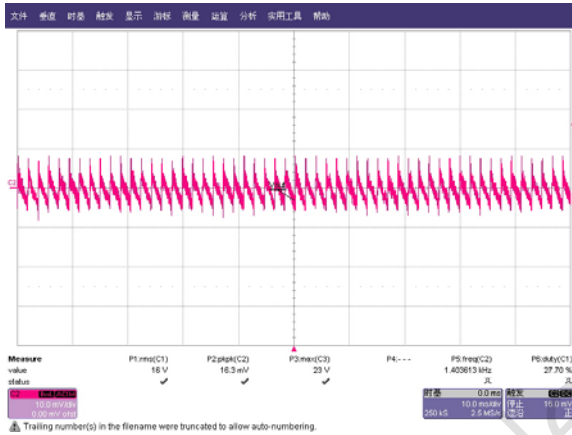
R&N Waveform



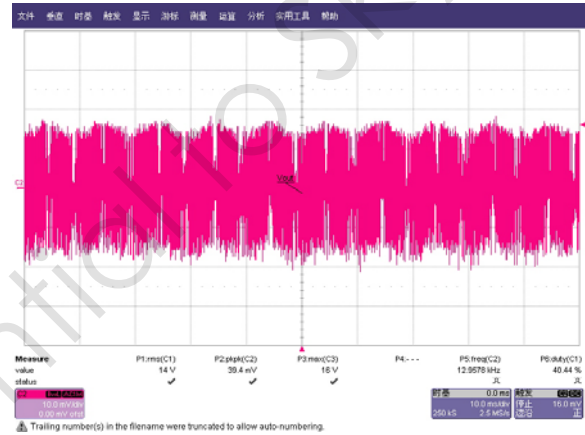
R&N waveform@90Vac input with no load



R&N waveform@90Vac input with full load



R&N waveform@264Vac input with no load



R&N waveform@264Vac input with full load

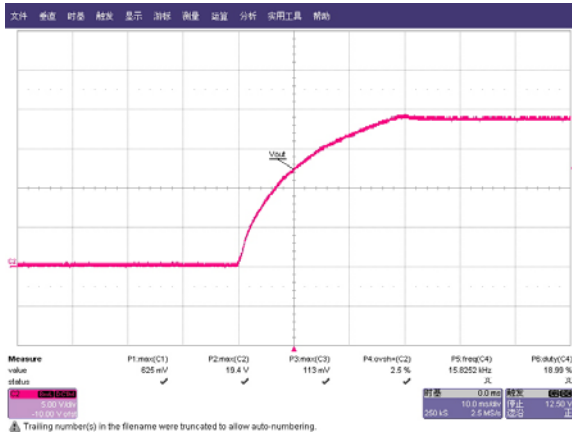
3.2.3 Overshoot & Undershoot

Ac input switches ON for overshoot and OFF for undershoot

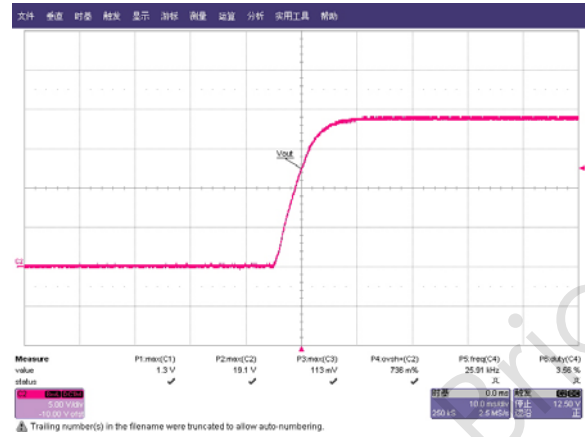
Table 6 Overshoot/undershoot measurement results

| Input Voltage | Load | Item | Meas. Data (%) | Waveform |
|---------------|-----------|------------|----------------|----------|
| 90V/60Hz | Full load | overshoot | 2.5 | |
| | | undershoot | | |
| | No load | overshoot | 0.736 | |
| | | undershoot | | |
| 264V/50Hz | Full load | overshoot | 1.8 | |
| | | undershoot | 2.1 | |
| | No load | overshoot | 1.3 | |
| | | undershoot | | |

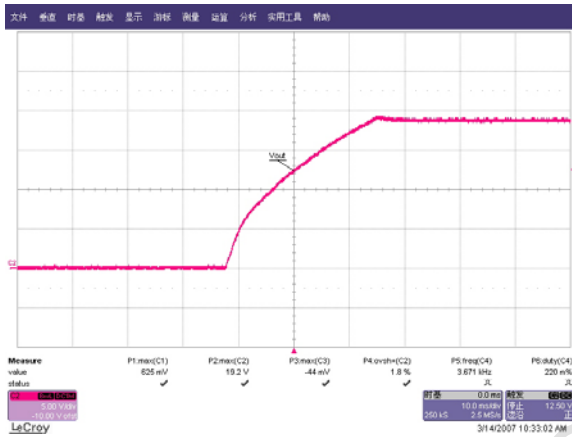
Overshoot and undershoot waveform



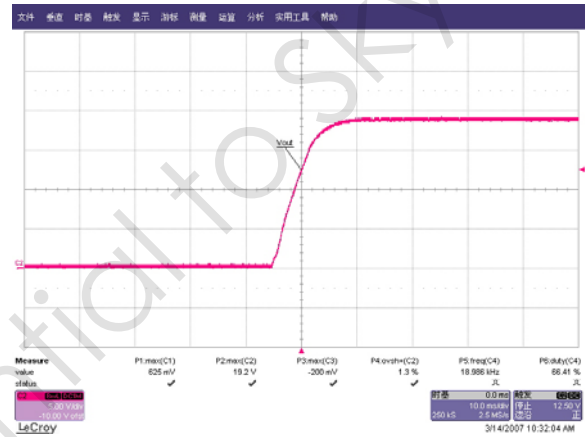
Overshoot waveform @90Vac input with full load



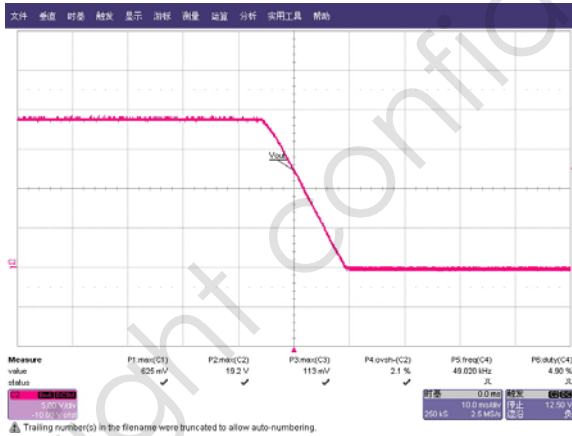
Overshoot waveform @90Vac input with no load



Overshoot waveform @264Vac input with full load



Overshoot waveform @264Vac input with no load



Undershoot waveform @264Vac input with full load

3.2.4 Dynamic Test

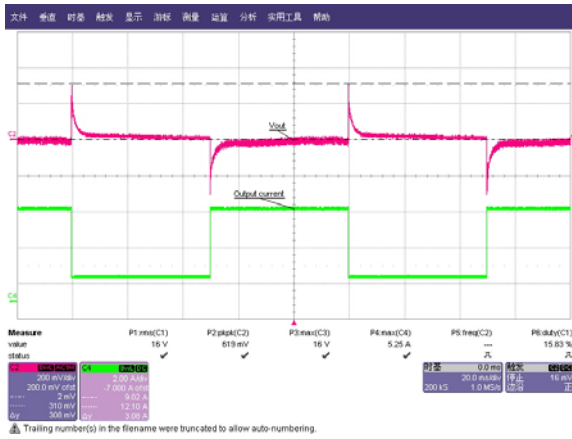
A dynamic loading with low set at 1.26 A lasting for 10mS and high set at 5.0A lasting for 50mS is added to output. The ramp is set at 0.125A/uS at transient.

All data was measurement at PCB end.

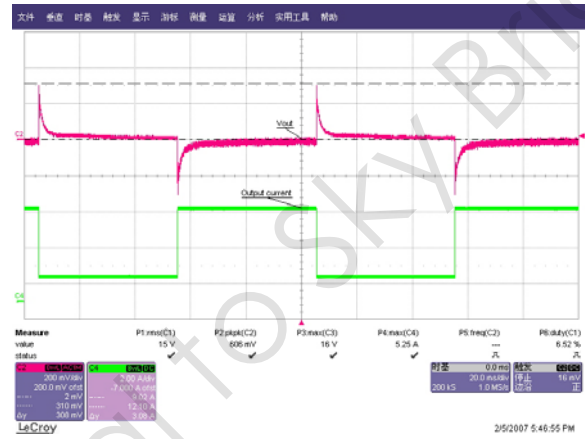
Table 7 Output voltage under dynamic test

| Input voltage | Output voltage (mV) | Waveform |
|---------------|---------------------|----------|
| 90V/60HZ | 308 | |
| 132V/60HZ | 308 | |
| 180V/50HZ | 306 | |
| 264V/50HZ | 308 | |

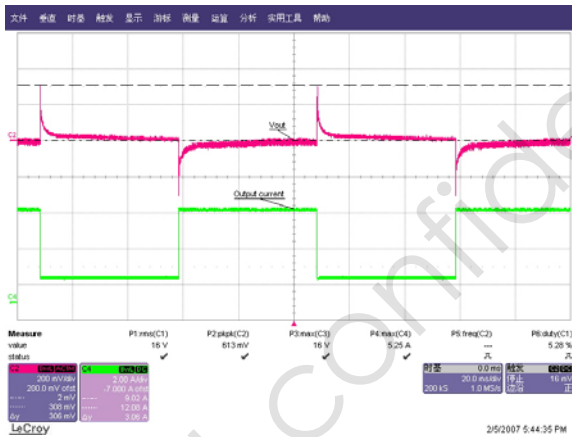
Dynamic waveform



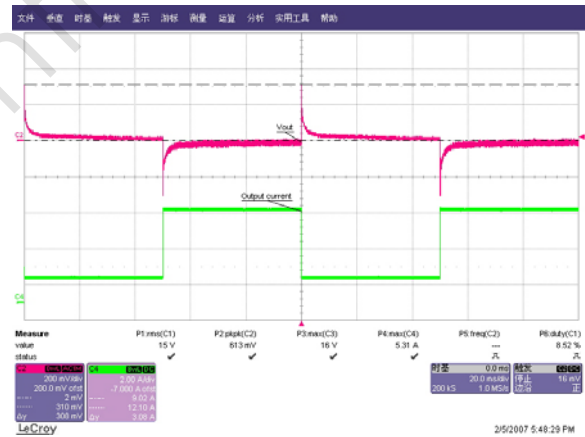
Dynamic waveform @90Vac input



Dynamic waveform @132Vac input



Dynamic waveform @180Vac input



Dynamic waveform @264Vac input

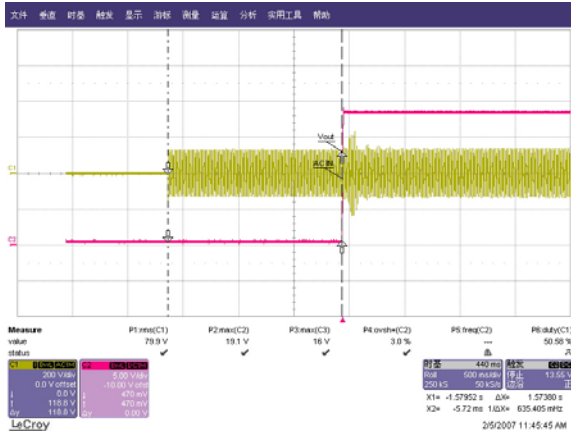
3.2.5 Time Sequence

Load condition: Full load

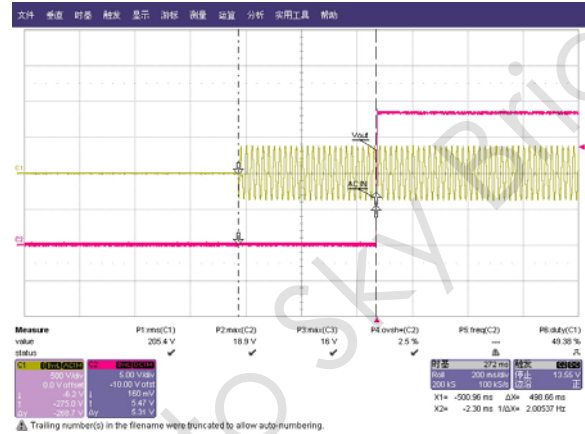
Table 8 Turn-on delay /hold-up/Rise time/Fall time measurement results

| Item | Input voltage | Meas. Data (mS) | Remark |
|--------------------|---------------|-----------------|--------|
| Turn-on delay time | 90V/60Hz | 1573 | |
| | 264V/50Hz | 498 | |
| Hold-up time | 90V/60Hz | 29.5 | |
| | 264V/50Hz | 89.4 | |

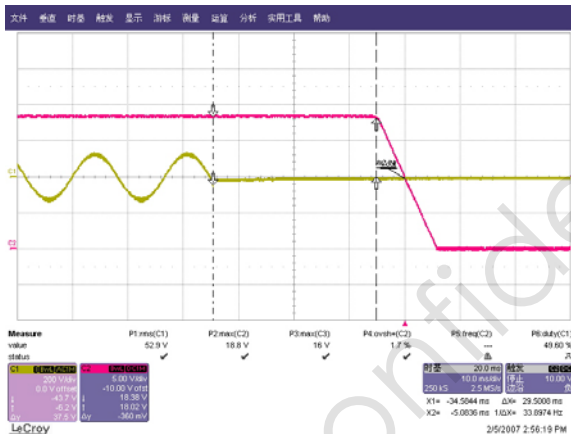
| | | | |
|-----------|-----------|------|--|
| Rise Time | 90V/60Hz | 28.4 | |
| | 264V/50Hz | 26.5 | |
| Fall Time | 90V/60Hz | 15 | |
| | 264V/50Hz | 15 | |

Time sequence waveform


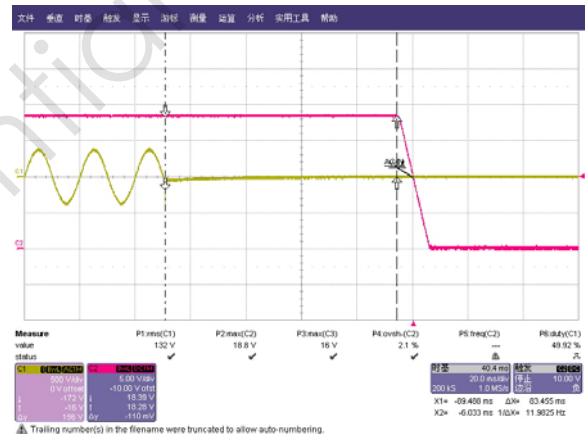
Turn on waveform @90Vac input with full load



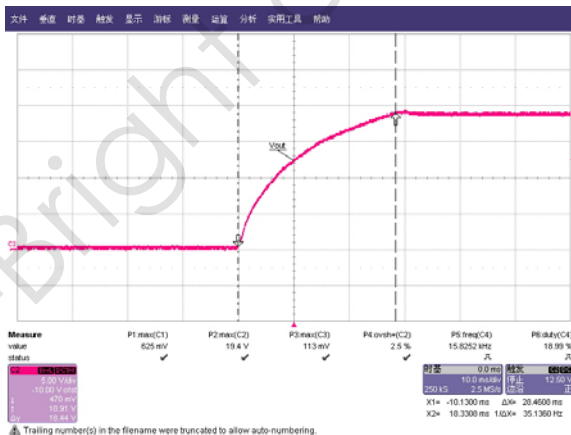
Turn on waveform @264Vac input with full load



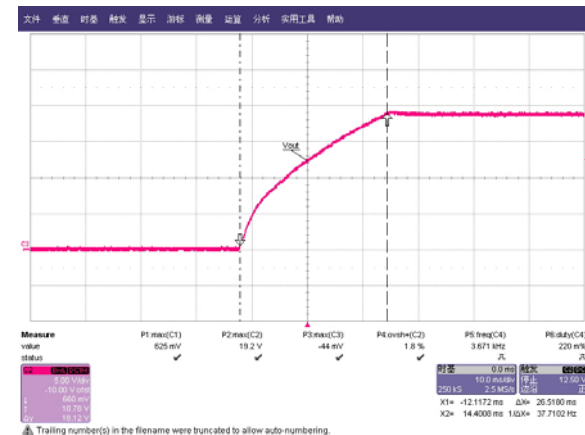
Hold up waveform @90Vac input with full load



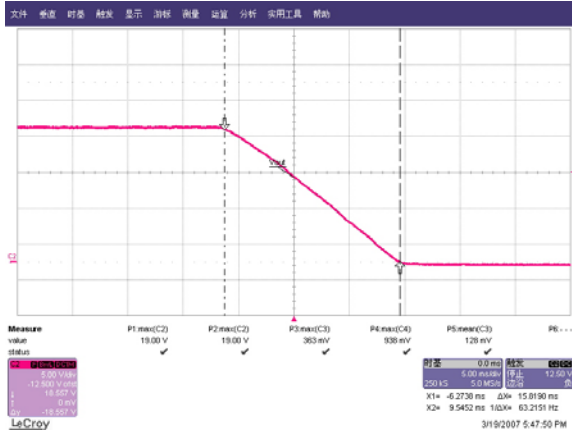
Hold up waveform @264Vac input with full load



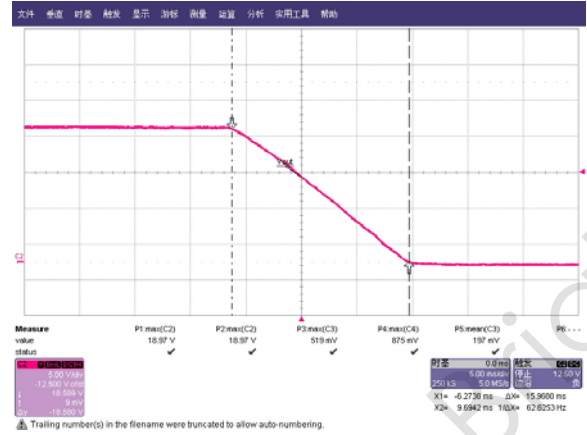
Rise waveform @90Vac input with full load



Rise waveform @264Vac input with full load



Fall waveform @90Vac with full load



Fall waveform @264Vac with full load

3.3 Protections

3.3.1 Over Current Protection (OCP)

The power supply will shut down when output current exceeds 6.9A~8.8A, and it should recover when the over current condition is removed.

Table 9 OCP value vs. input voltage

| Input Voltage | 90V/60Hz | 120V/60Hz | 132V/60Hz | 180V/50Hz | 240V/50Hz | 264V/50Hz |
|---------------|----------|-----------|-----------|-----------|-----------|-----------|
| OCP (A) | 7.32 | 7.28 | 7.48 | 8.11 | 8.14 | 8.11 |

3.3.2 Over Voltage Protection (OVP)

The power supply will shut down and latch when feedback circuit is disabled, and the output voltage can not be over 26.6V. The unit should recover when the protection condition is removed and restart input.

Table 10 OVP test result

| Input Voltage | OVP Trigger Voltage (V) | |
|---------------|-------------------------|-----------|
| | No Load | Full Load |
| 90V/60Hz | 22.6 | 22.5 |
| 132V/60Hz | 22.8 | 22.7 |
| 180V/50Hz | 22.6 | 22.5 |
| 264V/50Hz | 23.0 | 22.9 |

3.3.3 Short Circuit Protection

Short circuit placed on output will shut down the power supply and the unit should automatic recover after the short circuit condition is removed.

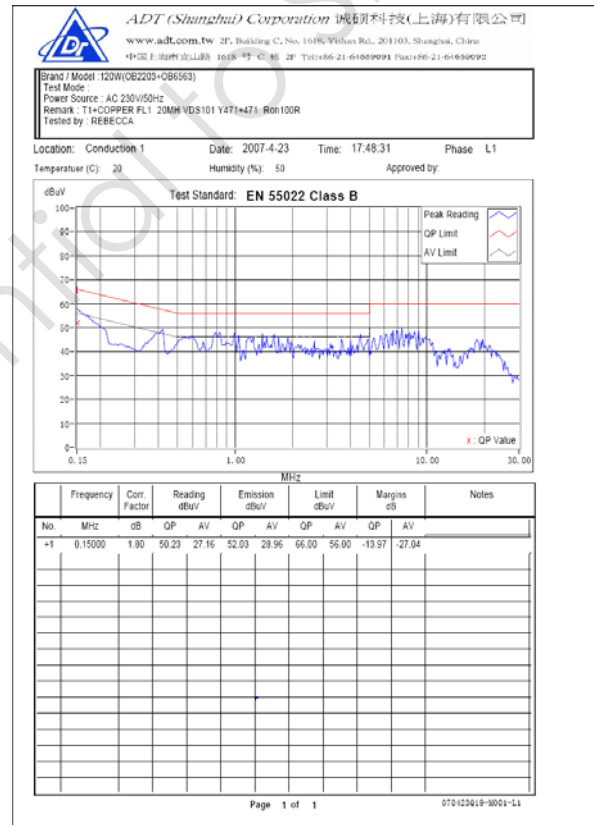
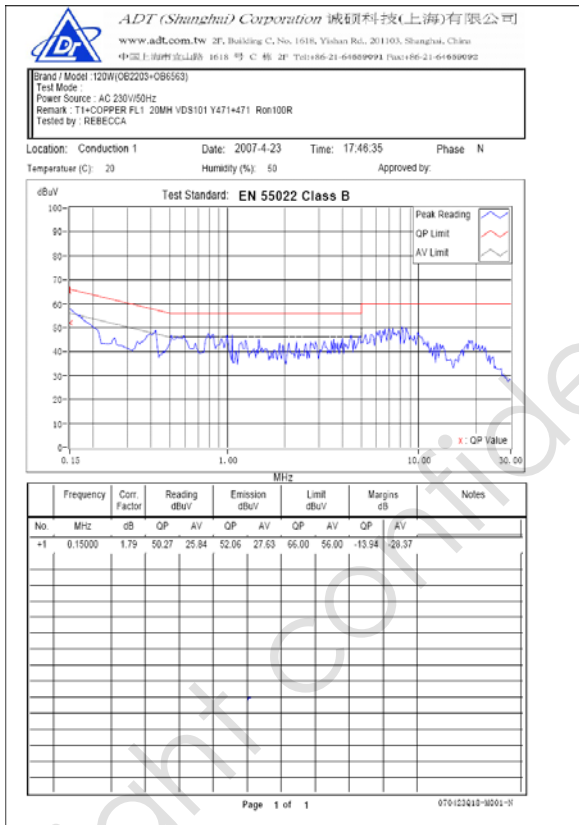
Table 11 SCP test result

| | | |
|-----------------|----------|-----------|
| Input voltage | 90V/60Hz | 264V/50Hz |
| Test Result | OK | OK |
| Input Power (W) | 0.03 | 0.28 |

3.4 EMI Test


3.4.1 Conducted EMI Test

EN55022 CLASS B @ full load report



3.4.2 Radiation EMI Test

EN55022 CLASS B @ full load report

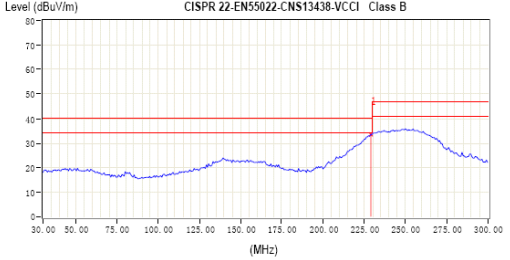


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 中国上海市宜山路 1618 号 C 栋 2F Tel:+86-21-64659091 Fax:+86-21-64659092

Brand / Model : 120W(OB2203*OB6563)
 Remark: Ron 100R MOUDLE IN COPPER
 Tested by : Brian

Location: ADT-SH 9x6x6 Chamber. Date: 2007-4-23 Time: 9:13 Approved by:
 Temperature (C): 20.0 Humidity (%): 50 Polarity: Horizontal

Level (dBuV/m) CISPR 22-EN55022-CNS13438-VCCI Class B




(MHz)

This data is for evaluation purposes only. It cannot be used for EMC approvals unless it contains the approved signature. If you have any questions regarding the test data, you can write your comments to service@mail.adt.com.tw

| No. | Frequency MHz | Factor dB | Reading dBuV/m | Emission dBuV/m | Limit dBuV/m | Margin dB | Tower / Table cm deg |
|-----|------------------|--------------|-------------------|--------------------|-----------------|--------------|-------------------------|
| * 1 | 229.12 | 14.47 | 19.05 | 33.52 | 40.00 | -6.48 | -- -- |

Page 1 of 1 D:\ADT_Radiated_V7.5.14_Shanghai\log\2007_04_23.dat

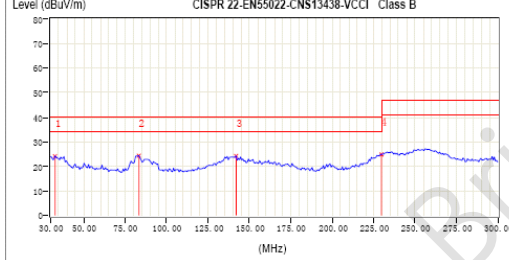


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Brand / Model : 120W(OB2203*OB6563)
 Remark: Ron 100R MOUDLE IN COPPER
 Tested by : Brian

Location: ADT-SH 9x6x6 Chamber. Date: 2007-4-23 Time: 9:13 Approved by:
 Temperature (C): 20.0 Humidity (%): 50 Polarity: Vertical

Level (dBuV/m) CISPR 22-EN55022-CNS13438-VCCI Class B




(MHz)

This data is for evaluation purposes only. It cannot be used for EMC approvals unless it contains the approved signature. If you have any questions regarding the test data, you can write your comments to service@mail.adt.com.tw

| No. | Frequency MHz | Factor dB | Reading dBuV/m | Emission dBuV/m | Limit dBuV/m | Margin dB | Tower / Table cm deg |
|-----|------------------|--------------|-------------------|--------------------|-----------------|--------------|-------------------------|
| 1 | 32.70 | 15.14 | 8.96 | 24.10 | 40.00 | -15.90 | -- -- |
| 2 | 83.33 | 11.63 | 12.68 | 24.29 | 40.00 | -15.71 | -- -- |
| 3 | 142.05 | 16.37 | 7.83 | 24.20 | 40.00 | -15.80 | -- -- |
| * 4 | 229.80 | 14.52 | 10.31 | 24.82 | 40.00 | -15.18 | -- -- |

Page 1 of 1 D:\ADT_Radiated_V7.5.14_Shanghai\log\2007_04_23.dat

3.5 ESD Test



AMC410-8 Electrostatic Discharge Test Data

Project No.: _____

| | | | |
|--|-------------------------|---|--------|
| Immunity | Electrostatic Discharge | <input checked="" type="checkbox"/> IEC 61000-4-2: 2001 <input type="checkbox"/> Others: _____ <input checked="" type="checkbox"/> PASS / <input type="checkbox"/> FAIL | |
| *Applicant: <u>ONBRIGHT</u> *EUT: <u>POWER SUPPLY</u> *M/N: <u>OBPD120W OB6561&2203</u> *S/N: _____ | | | |
| Ambient Condition: <u>19</u> °C <u>45</u> %RH Atmosphere Pressure: <u>101.3kPa</u> | | | |
| *Air Discharge: <input type="checkbox"/> ± 8kV or <input checked="" type="checkbox"/> Other: <u>15KV</u> Repeating Rate: <u>1s</u> *Contact Discharge: <input type="checkbox"/> ± 4kV or <input checked="" type="checkbox"/> Other: <u>10KV</u> Repeating Rate: <u>1s</u> *Operation Mode: <u>FULL LOAD</u> *Criterion: <u>A</u> | | | |
| Location | Points | Kind (A-Air, C-Contact) | Result |
| Output port | 2 | C | PASS |
| Input port | 2 | A | PASS |
| Output port | 2 | A | PASS |
| / | / | / | / |
| / | / | / | / |
| / | / | / | / |
| / | / | / | / |
| / | / | / | / |
| / | / | / | / |
| Test Description: | | | |
| *Test Equipment | ESD Generator | <input checked="" type="checkbox"/> EM Test Dito (S/N: <u>Y0503100054</u>) Cal: <u>2007.4.25</u> <input type="checkbox"/> KeyTek MZ-15/EC (S/N: _____) Cal: _____ Other: / _____ <input type="checkbox"/> _____ (S/N: _____) Cal: _____ | |
| Note: The Items marked with * shall be filled in prior to formal test. | | | |
| Test Engineer: <u>kamii</u> | | Date: <u>2007.04.12</u> | |

Page of

3.6 Lighting Test



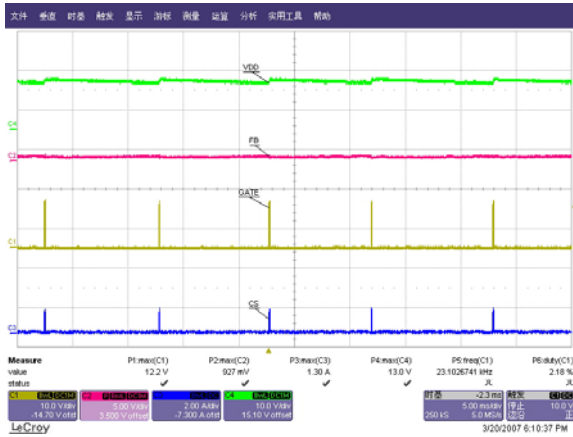
AMC410-10 Surge Test Data

Project No.: _____

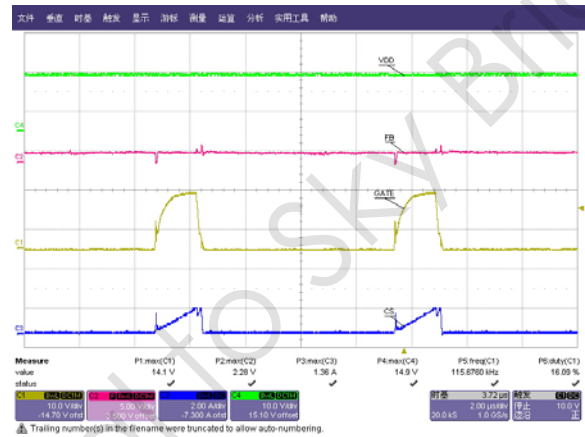
| Immunity | Surge | <input checked="" type="checkbox"/> IEC 61000-4-5: 2001 <input checked="" type="checkbox"/> Others: _____ <input checked="" type="checkbox"/> PASS / <input type="checkbox"/> FAIL | | | | | | | | | |
|---|--------|--|---|---|------|-------------------------|------|-----|---|-----|---|
| *Applicant: <u>ONBRIGHT</u> *EUT: <u>POWER SUPPLY</u> *M/N: <u>OBPD120W-L190A (OB2203)</u> *S/N: _____ | | | | | | | | | | | |
| Ambient Condition: <u>23</u> °C <u>58</u> %RH Atmosphere Pressure: <u>101.3kPa</u> | | | | | | | | | | | |
| *Power supply: <u>230V/50Hz</u> *Repetition: <u>5</u> times per test * Interval: <u>60</u> seconds *Operation Mode: <u>FULL LOAD</u> *Criterion: <u>A</u> *Line: <input checked="" type="checkbox"/> AC Mains / <input type="checkbox"/> DC Supply / <input type="checkbox"/> Signal Line | | | | | | | | | | | |
| *Conductor | *Phase | 500V | | 2kV | | 4kV | | 5kV | | 6kV | |
| | | + | - | + | - | + | - | + | - | + | - |
| <input checked="" type="checkbox"/> L1 <input checked="" type="checkbox"/> L2 <input type="checkbox"/> PE | 0° | / | / | PASS | PASS | / | / | / | / | / | / |
| | 90° | / | / | PASS | PASS | / | / | / | / | / | / |
| | 180° | / | / | PASS | PASS | / | / | / | / | / | / |
| | 270° | / | / | PASS | PASS | / | / | / | / | / | / |
| <input checked="" type="checkbox"/> L1 <input type="checkbox"/> L2 <input checked="" type="checkbox"/> PE | 0° | / | / | / | / | PASS | PASS | / | / | / | / |
| | 90° | / | / | / | / | PASS | PASS | / | / | / | / |
| | 180° | / | / | / | / | PASS | PASS | / | / | / | / |
| | 270° | / | / | / | / | PASS | PASS | / | / | / | / |
| <input type="checkbox"/> L1 <input checked="" type="checkbox"/> L2 <input checked="" type="checkbox"/> PE | 0° | / | / | / | / | PASS | PASS | / | / | / | / |
| | 90° | / | / | / | / | PASS | PASS | / | / | / | / |
| | 180° | / | / | / | / | PASS | PASS | / | / | / | / |
| | 270° | / | / | / | / | PASS | PASS | / | / | / | / |
| DC Supply | | / | / | / | / | / | / | / | / | / | / |
| Signal Line | | L-PE | / | / | / | / | / | / | / | / | / |
| | | L-L | / | / | / | / | / | / | / | / | / |
| TEST DESCRIPTION: | | | | | | | | | | | |
| *Test Equipment | | Surge Generator | | <input type="checkbox"/> ECAT (S/N: _____) Cal: _____ | | | | | | | |
| | | | | <input type="checkbox"/> CE Master (S/N: _____) Cal: _____ | | | | | | | |
| | | | | <input checked="" type="checkbox"/> EMC Pro (S/N: <u>0002256</u>) Cal: <u>2006.04.18</u> | | | | | | | |
| | | | | <input type="checkbox"/> _____ (S/N: _____) Cal: _____ | | | | | | | |
| Note: The Items marked with * shall be filled in prior to formal test. | | | | | | | | | | | |
| Test Engineer: <u>KAMII</u> | | | | | | Date: <u>2007.04.12</u> | | | | | |
| Page _____ of _____ | | | | | | | | | | | |

4 Other important waveform

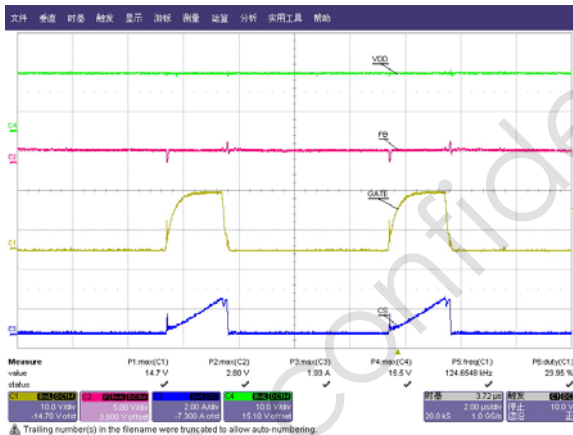
4.1 Vdd, FB, Sense& Gate wave form at no load/25% load/50% load/full load.



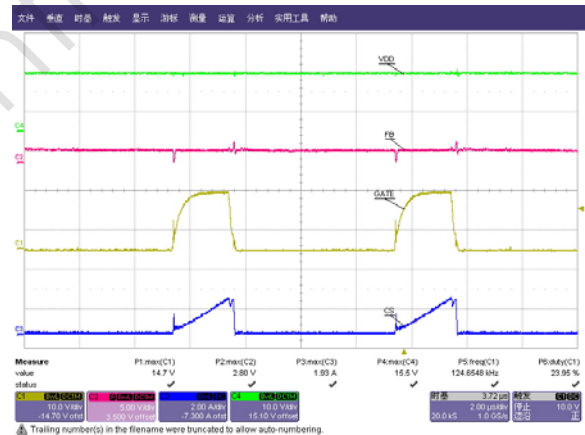
Vdd,FB,Sense&Gate wave form@90Vac; no load



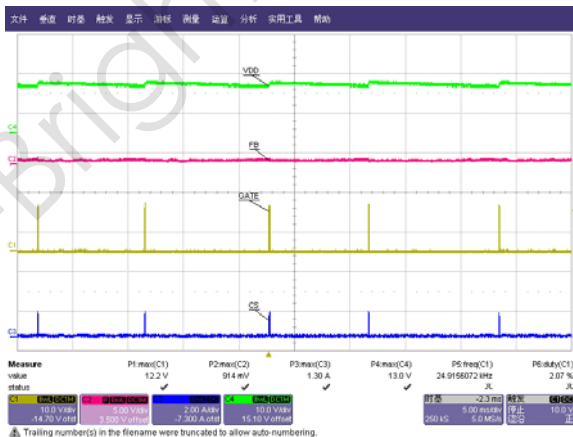
Vdd,FB,Sense&Gate wave form@90Vac; 25% load



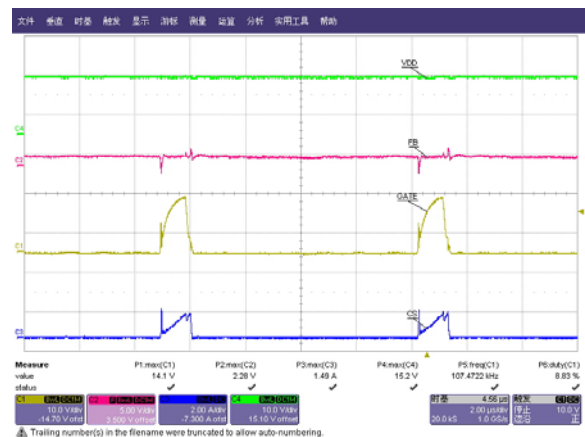
Vdd,FB,Sense&Gate wave form@90Vac; 50% load



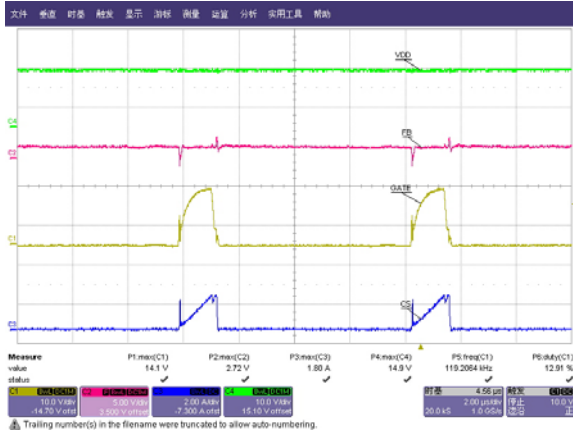
Vdd,FB,Sense&Gate wave form@90Vac; full load



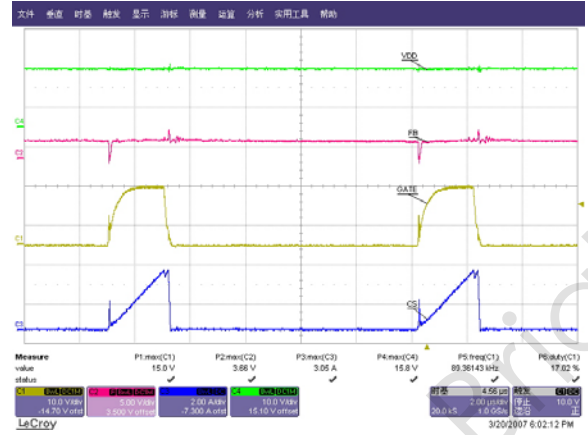
Vdd,FB,Sense&Gate wave form@264Vac; no load



Vdd,FB,Sense&Gate wave form@264Vac; 25% load



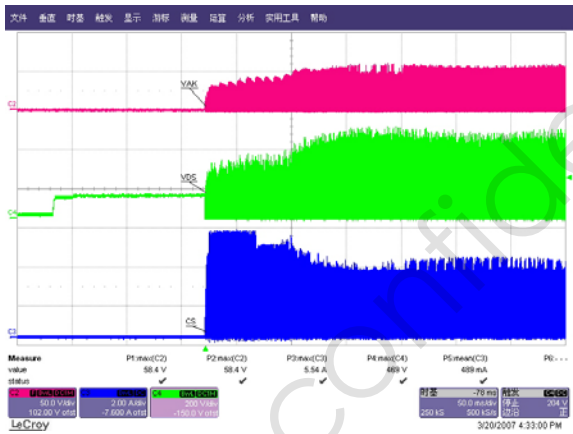
Vdd,FB,Sense&Gate wave form@264Vac; 50% load



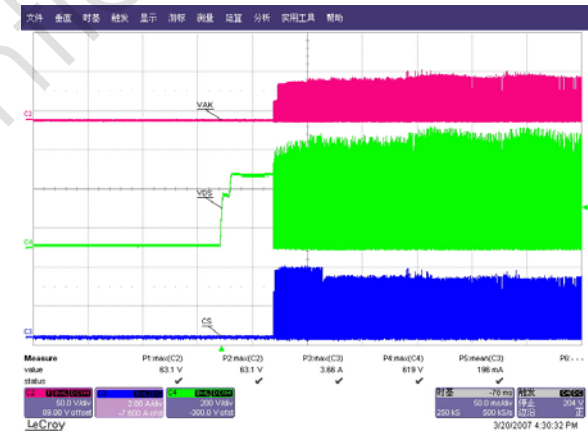
Vdd,FB,Sense&Gate wave form@264Vac; full load

4.2 MOSFET VDS wave, CS wave and Output diode VAK waveform at full load, start/normal/output short

4.2.1 VDS ,CS & VAK start waveform

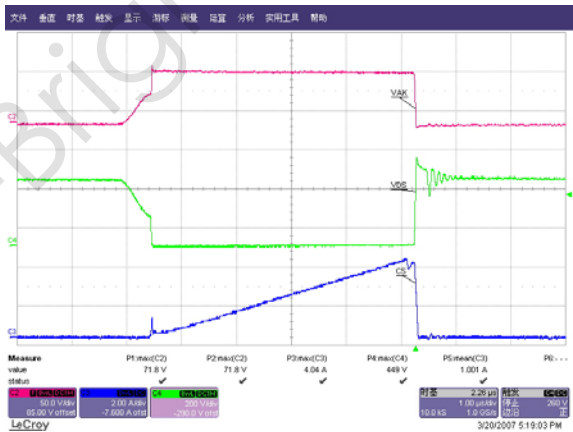


VDS ,CS & VAK start waveform@90Vac; full load

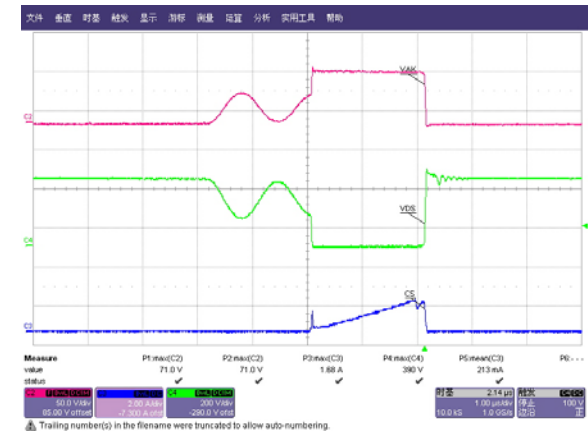


VDS ,CS & VAK start waveform@264Vac; full load

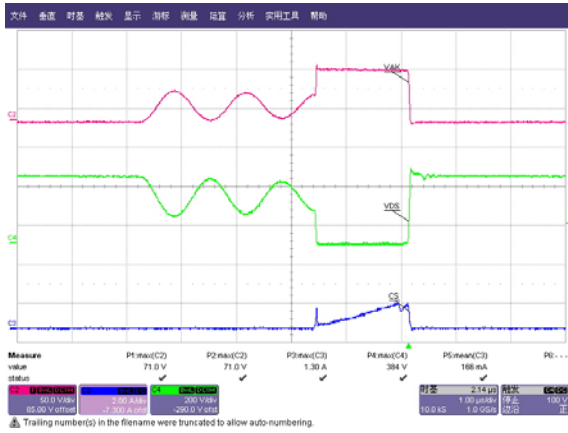
4.2.2 VDS ,CS & VAK normal waveform



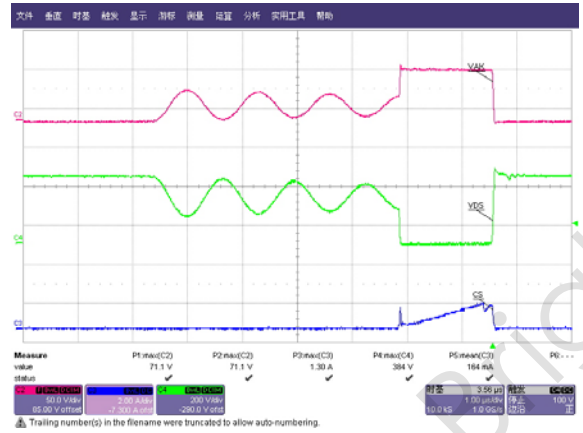
VDS ,CS & VAK normal waveform@90Vac; full load



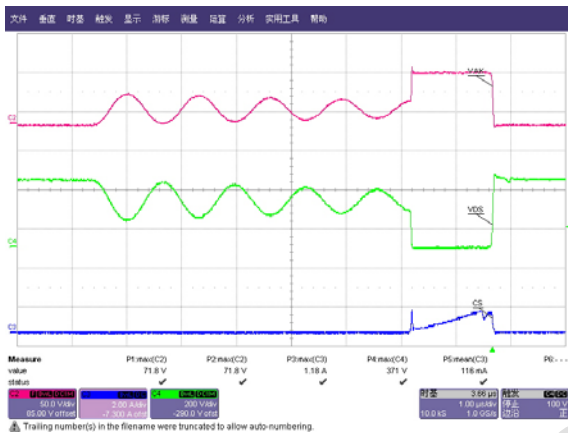
VDS ,CS & VAK normal waveform@90Vac; 2.4A load



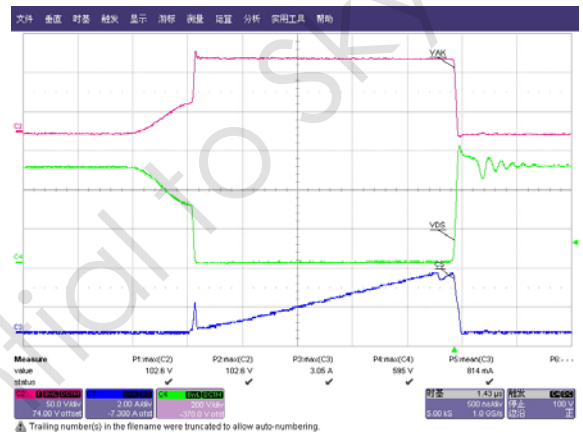
VDS ,CS & VAK normal waveform@90Vac; 1.65A load



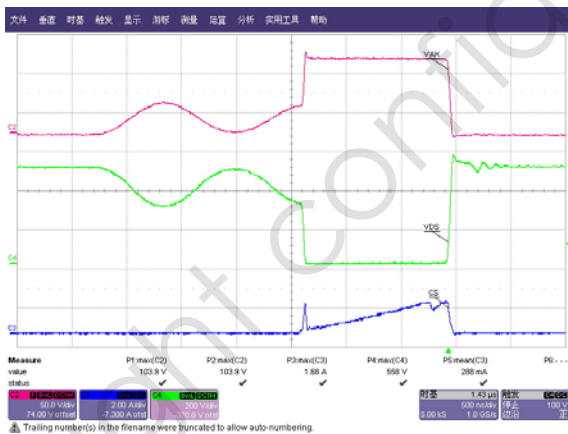
VDS ,CS & VAK normal waveform@90Vac; 1.45A load



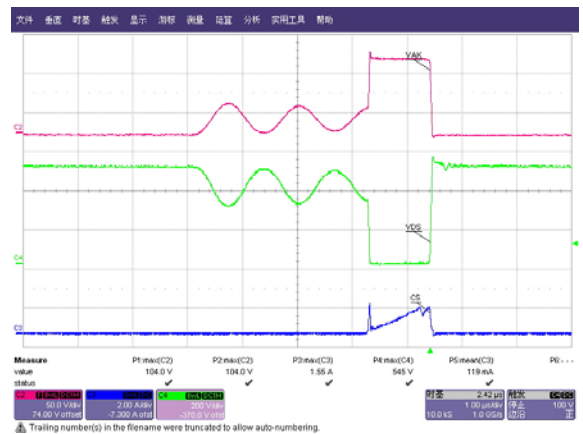
VDS ,CS & VAK normal waveform@90Vac; 1.2A load



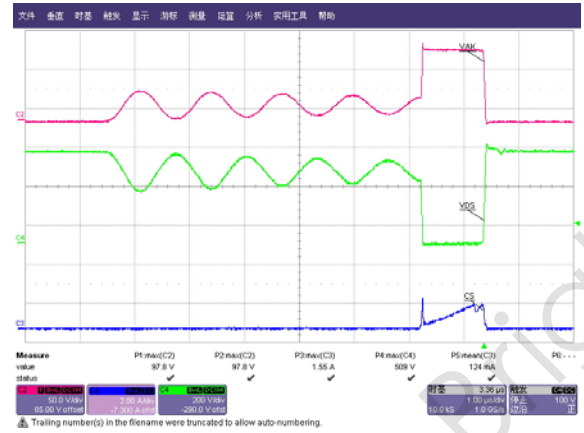
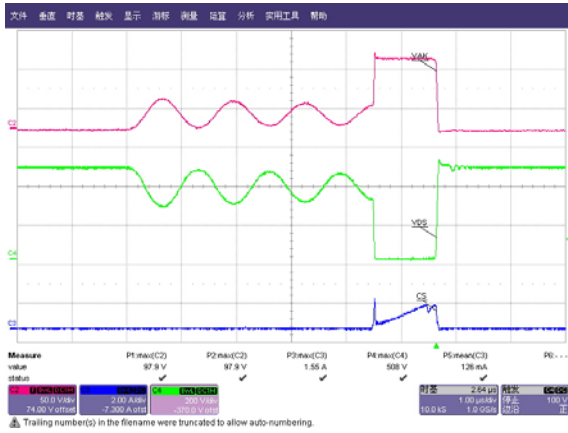
VDS ,CS & VAK normal waveform@264Vac; full load



VDS ,CS & VAK normal waveform@264Vac; 3.0A load



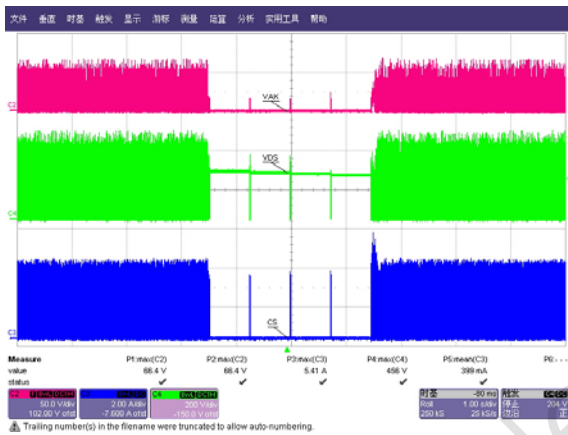
VDS ,CS & VAK normal waveform@264Vac; 2.0A load



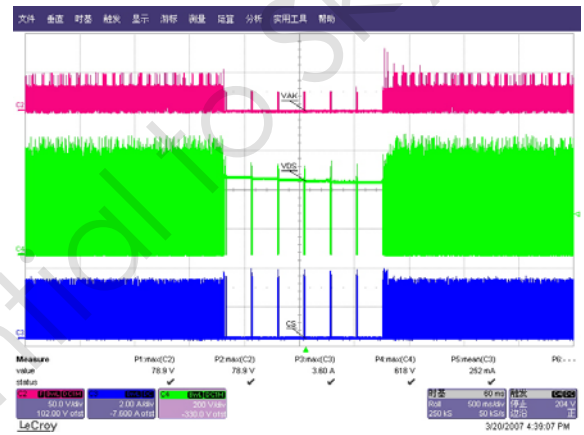
VDS ,CS & VAK normal waveform@264Vac; 1.6A load

VDS ,CS & VAK normal waveform@264Vac; 1.4A load

4.2.3 VDS ,CS & VAK output short waveform



VDS ,CS & VAK output short waveform@90Vac; full load



VDS ,CS & VAK output short waveform@264Vac; full load

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