Subject

# OB25115 + OB2011E Demo Board Manual

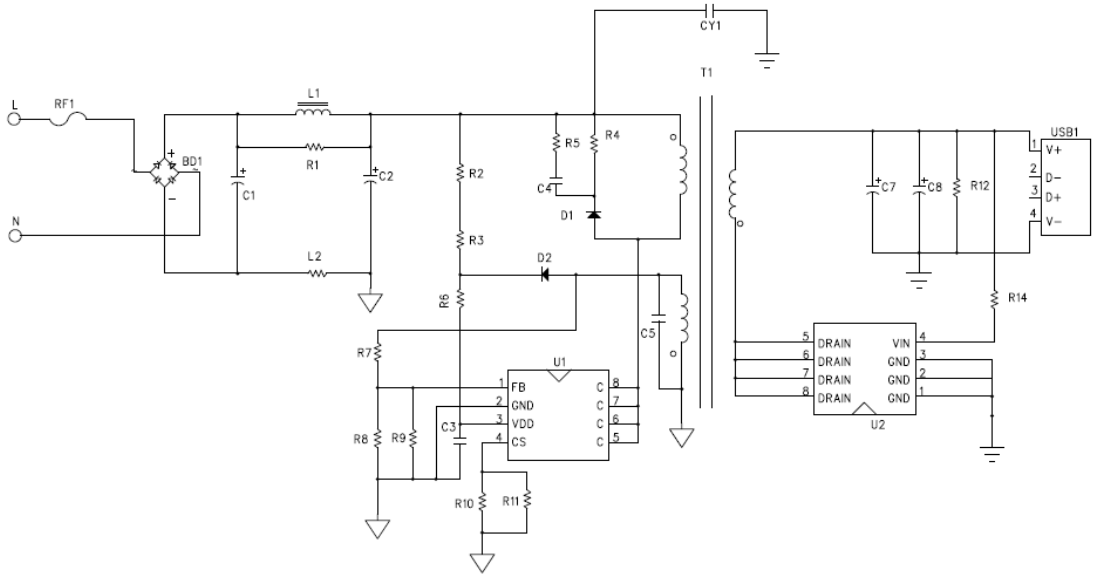
Board Model: CH5V2A25115

Doc. No.: OB_DOC_DBM_25115+2011E00


**Key features:**

- Standby power less than 75mW@264Vac
- Precise CV/CC regulation
- Primary-side sensing and regulation without TL431 and opto-coupler
- Cost effective and simplified system design
- Average efficiency meet DOE/COC
- Integrated BJT Switch
- Proprietary fast dynamic response control
- PSR + Synchronous rectification for high efficiency
- Audio noised free operation
- Meet EN55022 EMI

## Schematic



# Performance Evaluation

This session presents the test results of OB25115 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. All data was measured at the end of 1.5m, 22 AWG output cable.

***Performance Highlights***

- Standby power less than 75mW@264V
- Precise CV/CC regulation
- The average efficiency meet DOE Level 6/COC
- EMI passed EN55022 and FCC15 Class B test with more than 6dB margin

**System Electrical Specification**

| Description | | Symbol | Min | Typ. | Max | Units | Comment |
|---|---|---|---|---|---|---|---|
| **Input Section** | | | | | | | |
| Input Voltage | | $V_{IN}$ | 90 | | 264 | V | 2 Wire |
| Line Frequency | | $f_{LINE}$ | 47 | 50/60 | 63 | Hz | |
| Standby Power | | | | | 75 | mW | 230V |
| **Output characteristics** | | | | | | | |
| CV Section | Output Voltage | $V_{OUT\ CV}$ | 4.75 | | 5.25 | V | |
| | Output Current | $I_{OUT\ CV}$ | 0 | | 2 | A | |
| CC Section | Output Voltage | $V_{OUT\ CC}$ | 3.0 | | | V | |
| | Output Current | $I_{OUT\ CC}$ | 2.2 | | 2.4 | A | |
| Ripple & Noise | | $V_{RIPPLE}$ | | | 150 | $mV_{P-P}$ | |
| Continuous Output Power | | $P_{OUT}$ | | 10W | | | |
| Over Current Protection | | $I_{OUT\ MAX}$ | | | 2.6 | A | |
| Active Mode Efficiency | | η | 79.00/ 69.73 | | | % | Measured at Line End, $V_{IN}$=115V/230V |
| **Time sequence** | | | | | | | |
| Turn on delay time | | | | | 2 | s | |
| **Environmental** | | | | | | | |
| Conducted/Radiation EMI | | Meets EN55022B\FCC 15 | | | | | |
| Safety | | Meets IEC950,UL1950,Class II | | | | | |
| ESD | | | 8/15 | | | kV | |

***Test Equipments***

| Item | Vender | Module |
|---|---|---|
| AC Source | WEST | WEW1010 |
| Digital Power Meter | YOKOGAWA | WT210 |
| Electrical Load | Chroma | 63030 |
| Oscilloscope | LeCroy | WS424 |
| Multimeter | VICTORY | VC9807A |

# 1. Input Characteristics

## 1.1 Standby power

*Table. 1 Standby power*

| Input voltage | Pin(mW) | Vo(V) | Specification | Test result |
|---|---|---|---|---|
| 90V/60HZ | 31 | 4.979 | <75mW | Pass |
| 115V/60HZ | 33 | 4.979 | | |
| 230V/50HZ | 46 | 4.975 | | |
| 264V/50HZ | 55 | 4.973 | | |

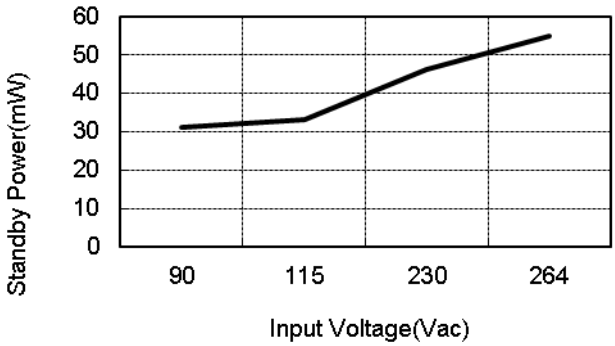



*Fig. 1 Standby Power vs. Input Voltage*

## 1.2 Efficiency

*Table. 2 Efficiency Line end with 22AWG,1.5m（163mΩ） output line.*

| Input voltage | 10% | 25% | 50% | 75% | 100% | 25%~100% Load Aver. Eff. | Standards | | Test Result |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | DOE | COC | |
| 115V/60Hz | 81.54 | 83.32 | 82.24 | 80.6 | 79.31 | 81.36 | 78.70% | 69.73% (10%Load) | Pass |
| 230V/50Hz | 79.11 | 82.51 | 82.42 | 81.2 | 80.01 | 81.53 | | 79.00% | |

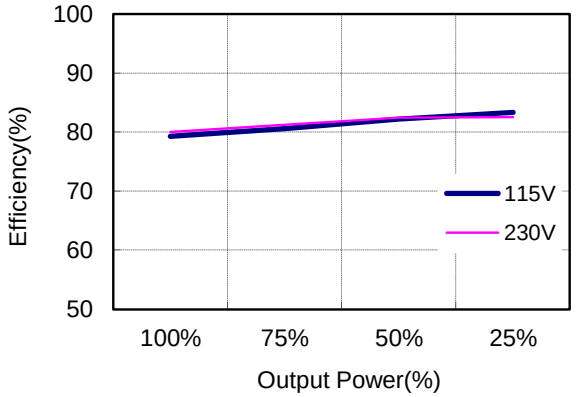



*Fig. 2 Efficiency vs. Percent of Rated Output Power*

## 1.3 I-V Curve

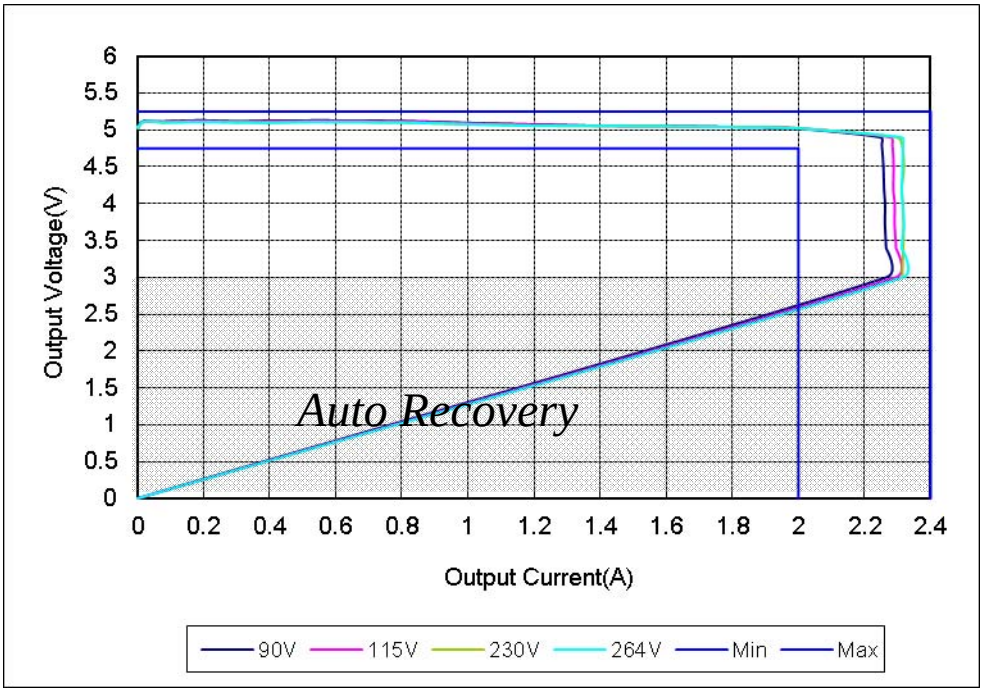



*Fig. 3 I-V Curve*

# 2. Output Characteristics

## 2.1 Line Regulation & Load Regulation

*Table. 3 Line Regulation & Load Regulation*

| Input voltage | No load(V) | Half load(V) | Full load(V) | Specification(V) | Test result |
|---|---|---|---|---|---|
| 90V/60Hz | 4.981 | 5.068 | 4.993 | 4.75-5.25 | **Pass** |
| 115V/60Hz | 4.981 | 5.064 | 4.993 | 4.75-5.25 | |
| 230V/50Hz | 4.981 | 5.050 | 4.993 | 4.75-5.25 | |
| 264V/50Hz | 4.981 | 5.047 | 4.992 | 4.75-5.25 | |
| Line Regulation | 0.42 % | | | <2% | **Pass** |
| Load Regulation | ±0.87% | | | <±5% | **Pass** |

## 2.2 Ripple & Noise

*Table. 4 Ripple & Noise*

| Input voltage | R&N (mV) | | |
|---|---|---|---|
| | No load | Full load | Remark |
| 90V/60Hz | 21 | 117 | Fig. 4,5 |
| 115V/60Hz | 20 | 110 | |
| 230V/50Hz | 20 | 109 | |
| 264V/50Hz | 22 | 104 | Fig. 6,7 |

Note: Ripple& noise was measured at line end with probe cap and ground clip. Measurement bandwidth was limited to 20MHz.

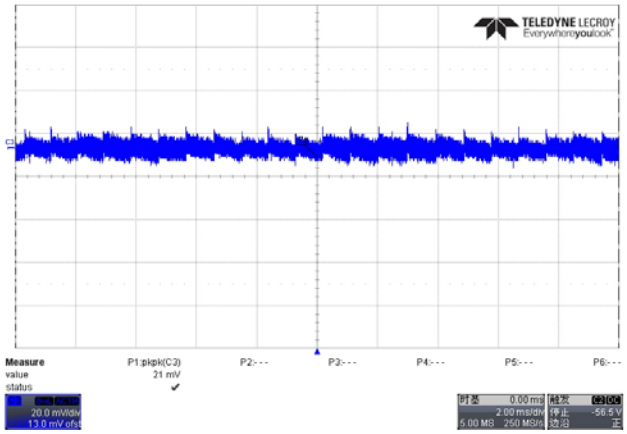



*Fig. 4 Measured ripple& noise waveform@90V/60Hz, no load*

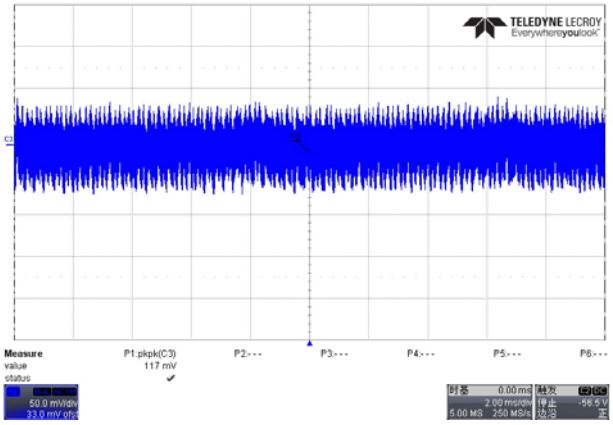



*Fig. 5 Measured ripple& noise waveform@90V/60Hz, full load*

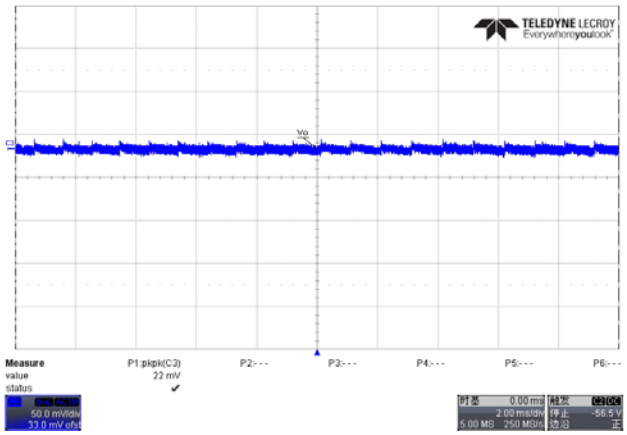



*Fig. 6 Measured ripple& noise waveform@264V/50Hz, no load*

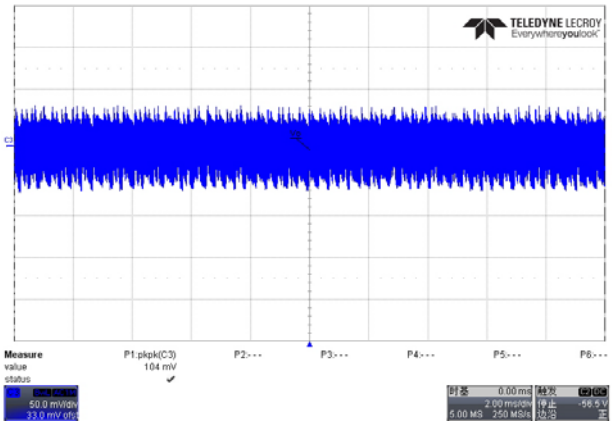



*Fig. 7 Measured ripple& noise waveform@264V/50Hz, full load*

## 2.3 Dynamic Test

A dynamic loading with low load lasting for 5ms/20ms and high load lasting for 5ms/20ms is added to output. The high load is 1A and the low load is 0A.The ramp is set at 0.125A/μs at transient. Measurement was taken at line end (Same as R&N measurement)

*Table. 5 Output voltage under dynamic test(1A lasting for 5ms,0A lasting for 5ms)*

| Input | Vomin-Vomax(v) | Remark |
|---|---|---|
| 90V/60Hz | 4.53-5.52 | |
| 115V/60Hz | 4.53-5.52 | |
| 230V/50Hz | 4.53-5.52 | |
| 264V/50Hz | 4.53-5.56 | |

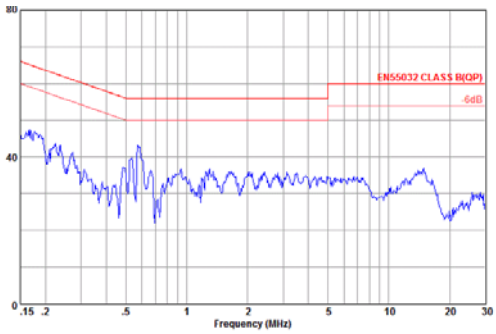
*(1A lasting for 20ms,0A lasting for 20ms)*

| Input | Vomin-Vomax(v) | Remark |
|---|---|---|
| 90V/60Hz | 4.56-5.56 | |
| 115V/60Hz | 4.59-5.59 | |
| 230V/50Hz | 4.63-5.62 | |
| 264V/50Hz | 4.63-5.62 | |

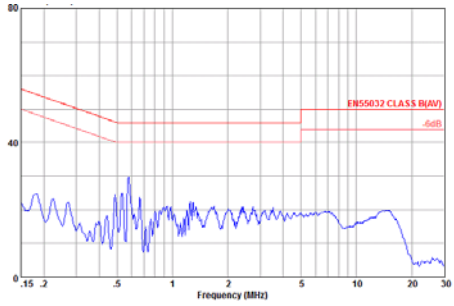
# 3. EMI Test

The Power supply passed EN55022 Class B EMI requirement with more than 6dB margin

## 3.1 Conducted EMI Test

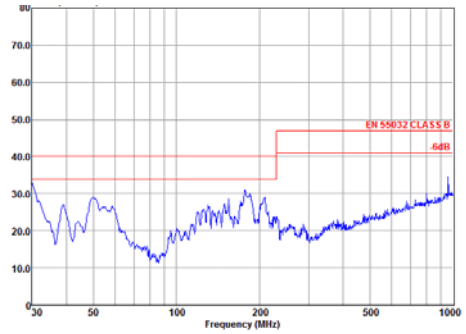



```
Site                : Audix(Shanghai) Shielded1
Condition           : EN55032 CLASS B(QP) ESH2-Z5-2020 LINE
Project No.         :
Applicant           :
EUT                 : OB25115
M/N                 : 5V 2A
S/N                 :
Power Supply        : 230V/50Hz
Ambient             : 22'C 48%RH
Test line           : L
Test Mode           :
Test Engineer       : Weaker
Memo                :
```

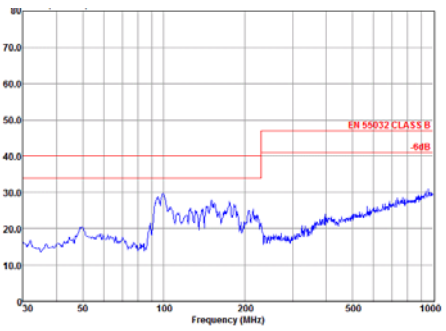



```
Site                : Audix(Shanghai) Shielded1
Condition           : EN55032 CLASS B(AV) ESH2-Z5-2020 LINE
Project No.         :
Applicant           :
EUT                 : OB25115
M/N                 : 5V 2A
S/N                 :
Power Supply        : 230V/50Hz
Ambient             : 22'C 48%RH
Test line           : L
Test Mode           :
Test Engineer       : Weaker
Memo                :
```

## 3.2 Radiation EMI Test




```
Site          : Audix(Shanghai) Chamber3
Condition     : EN 55032 CLASS B VERTICAL
Project No.   :
Applicant     :
EUT           :
M/N           : OB25115
S/N           :
Power Supply  : 230V/50Hz
Ambient       : 22'C  60%RH
Test Mode     : 5V 2A
Test Engineer: Richard
Memo          :
```




```
Site          : Audix(Shanghai) Chamber3
Condition     : EN 55032 CLASS B HORIZONTAL
Project No.   :
Applicant     :
EUT           :
M/N           : OB25115
S/N           :
Power Supply  : 230V/50Hz
Ambient       : 22'C  60%RH
Test Mode     : 5V 2A
Test Engineer: Richard
Memo          :
```

# Disclaimer

On-Bright Electronics reserves the right to make corrections, modifications, enhancements, improvements, and other changes to its documents, products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete.