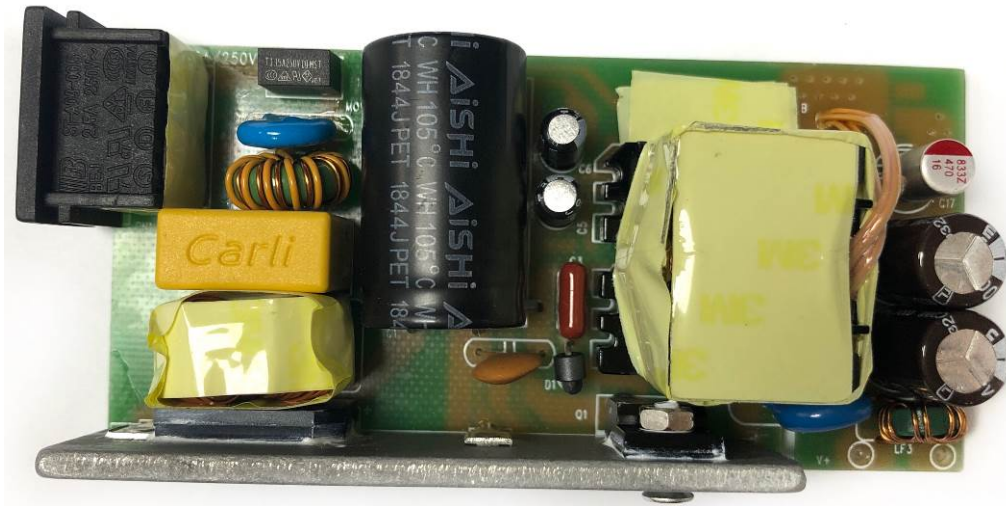


Subject**OB2710+2004A Demo Board Manual**

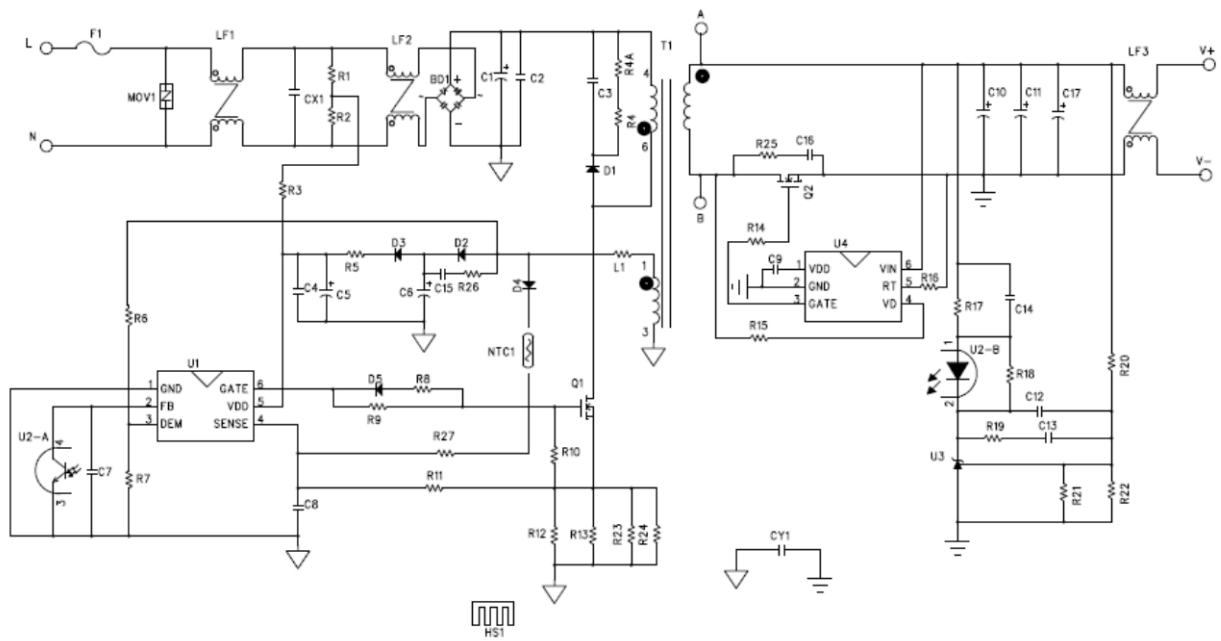
Board Model: AD12V5A 2710+2004A

Doc. No: OB_DOC_DBM_2710+2004A00

**Key Features**

- Standby Power < 60mW(230Vac input, no load)
- Averaged efficiency more than 89.0% @115/230Vac at AWG16 1.5M cable end
- High performance OCP compensation
- Frequency shuffling technology for improved EMI performance
- EMI passed EN55022 and FCC Part15 Class B test with more than 6dB margin
- Average efficiency meet COC V5 tier2, 1.0% margin
- Offers comprehensive protection coverage with auto-recovery including OCP, OLP, UVLO, OVP, and Brownout protection.

Schematic



Performance Evaluation

All measurements were taken at room temperature, AWG16 1.5m Cable end.

Performance Highlights

- No load standby power under 60mW @230VAC
- Averaged efficiency more than 89.0% @115VAC&230VAC
- EMI passed EN55022 and FCC Part15 Class B test with more than 6dB margin.

Characterization Results Summary

Test Item	Test result
1. Input characteristics	
Input current (90V/60Hz, full load)	1.29A
Standby power at no load (230Vac)	51mW
Averaged Efficiency (115/230 Vac, 25%~100% load for Cable end)	90.22%/91.08%
2. Output characteristics	
Line regulation	0.07%
Load regulation	2.8%
Ripple & noise	<120mV
Over shoot	5% Max
Dynamic test	±372mV
3. Time sequence (110Vac, Full load)	
Turn on delay time	1.5S
Hold up time	10.13mS
4. Protections	
Over Voltage protection	OK
Over Current protection (90Vac ~264Vac)	OK
Short Circuit protection	OK
Secondary Rectifier Short Protection	OK

Test Equipments

Item	Vender	Module
AC Source:	WEST	WEW1010
Digital Power Meter	YOKOGAWA	WT210
Electrical Load	Prodigit	3315C
Oscilloscope	LeCroy	WS424
Multimeter	VICTORY	VC9807A
Thermal	FLUKE	HS2

1. Input Characteristics

1.1 Input current and Standby power

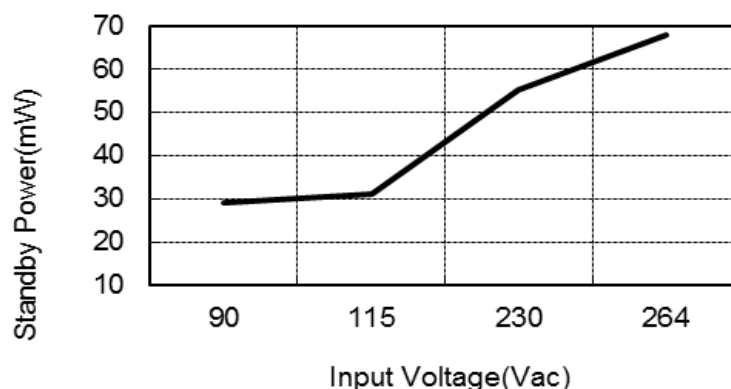
The module was tested at different input voltages (from 90Vac to 264Vac)

Table 1 Input current at full load

Input Voltage	90V/60Hz	115V/60Hz	230V/50Hz	264V/50Hz
Input Current(A)	1.29	1.08	0.77	0.69

Table 2 Standby power at no load

Input Voltage	90V/60Hz	115V/60Hz	230V/50Hz	264V/50Hz
Pin (mW)	27	30	51	62

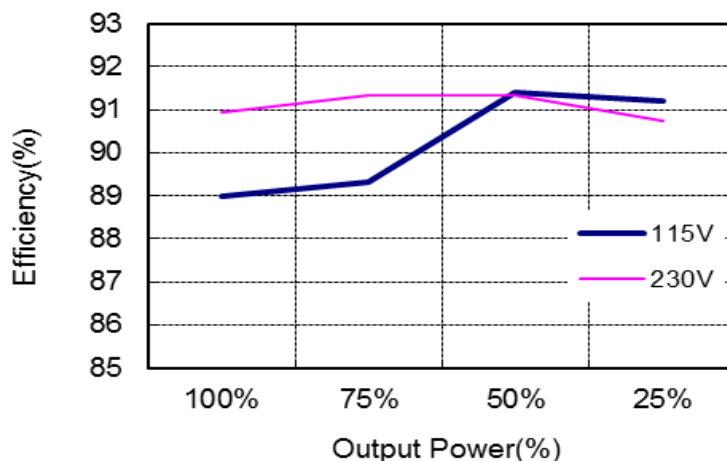


No-load Input Power vs. Input Line Voltage

1.2 Efficiency

Table 3 Efficiency

Input voltage	100%	75%	50%	25%	Aver. Eff.	Spec. COC V 5 tier2
115Vac/60HZ	88.98	89.33	91.4	91.19	90.22%	>89.0%
230Vac/50HZ	90.92	91.34	91.32	90.75	91.08%	



Efficiency vs. Percent of Rated Output Power

2. Output Characteristics

2.1 Line Regulation & Load Regulation

Table 4 Line Regulation & Load Regulation

Input Voltage	Output Voltage (V)			Load Regulation ($\leq 5\%$)
	No Load	Half Load	Full Load	
90V/47Hz	12.26	12.097	11.929	2.75
115V/60Hz	12.257	12.09	11.921	2.8
230V/50Hz	12.259	12.09	11.923	2.8
264V/63Hz	12.257	12.09	11.925	2.77
Line Regulation ($\leq 2\%$)	0.03	0.06	0.07	

2.2 Ripple & Noise

Table 5 Ripple & Noise measure results

Input Voltage	R&N (mV)		Waveform
	No Load	Full Load	
90Vac/60HZ	48	102	
115Vac/60HZ	50	96	
230Vac/50HZ	56	96	
264Vac/50HZ	56	96	

Note: Ripple & noise were measured at AWG16 1.5M CABLE end with a 0.1uF/100V ceramic cap connected in parallel with a 10uF/50V Electrolytic cap. Bandwidth was limited to 20MHz.

2.3 Dynamic Test

A dynamic loading with low set at 10% load lasting for 20mS and high set at 100% load lasting for 20mS is added to output. The ramp is set at 0.25A/uS at transient.

All data was measurement at AWG16 1.5M CABLE end.

Table 6 Output voltage under dynamic test

Input voltage	Output voltage (mV)	Waveform
90V/60HZ	± 432	Fig.11
264V/50HZ	± 416	Fig.12

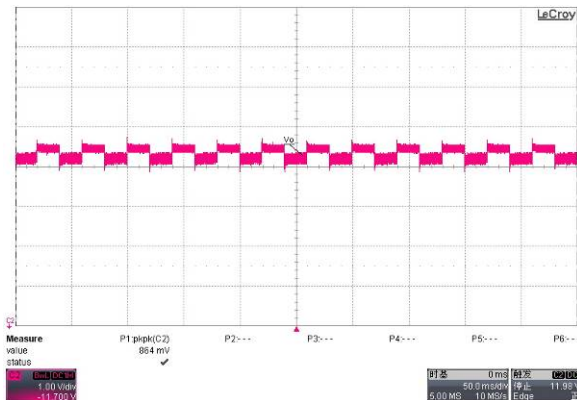


Fig. 1 Dynamic waveform @90Vac input

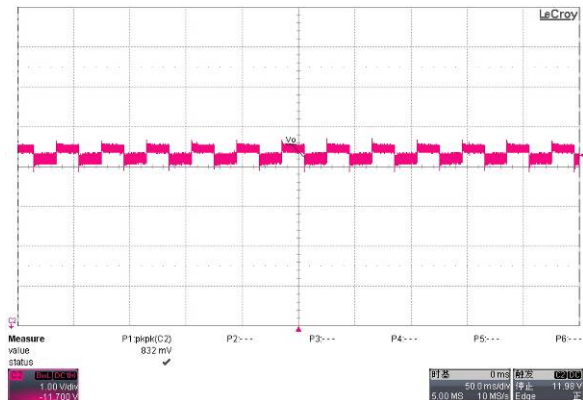
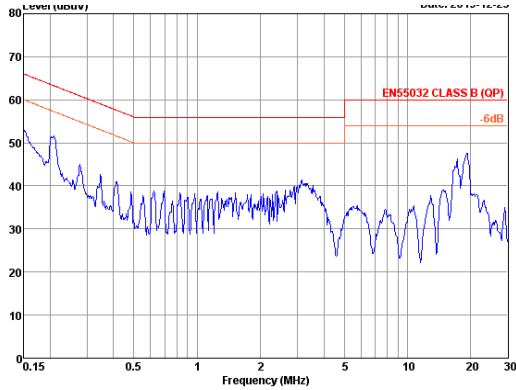


Fig. 2 Dynamic waveform @264Vac input

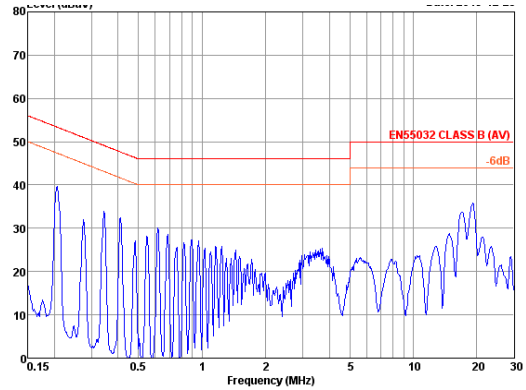
3. EMI Test

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

3.1 Conduction EMI Test

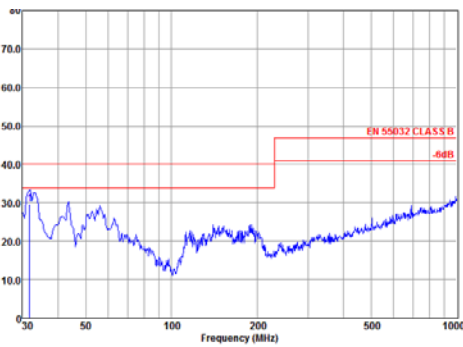


Site : Audix (Shanghai) Shielded 3
 Condition : EN55032 CLASS B (QP) ENV4200-2019 LINE
 Project No. :
 Applicant :
 EUT : OB2710
 M/N : 12V 5A
 S/N :
 Power Supply : 230V/50Hz
 Ambient : 23°C/52%RH
 Test Line : L
 Test Mode :
 Test Engineer: Kevin
 Memo :



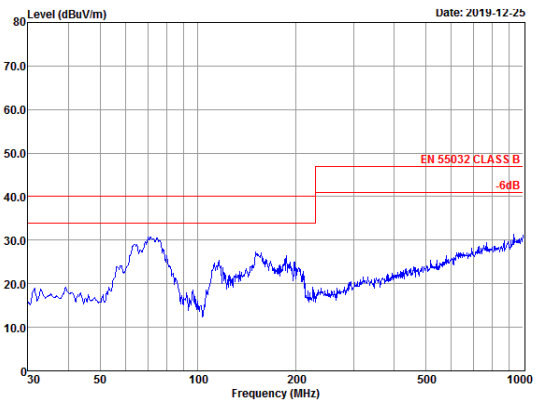
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 Condition : EN55032 CLASS B (AV) ENV4200-2019 LINE
 Project No. :
 Applicant :
 EUT : OB2710
 M/N : 12V 5A
 S/N :
 Power Supply : 230V/50Hz
 Ambient : 23°C/52%RH
 Test Line : L
 Test Mode :
 Test Engineer: Kevin
 Memo :

3.2 Radiation EMI Test



Site : Audix (Shanghai) Chamber3
 Condition : EN 55032 CLASS B VERTICAL
 Project No. :
 Applicant :
 EUT : OB2710
 M/N : OB MOS+CORE
 S/N :
 Power Supply : 230V/50Hz
 Ambient : 22°C 60%RH
 Test Mode : 12V 5A
 Test Engineer: Richard
 Memo :

Read	Cable	Antenna	Preamp	Limit	Over				
Freq	Level	Loss	Factor	Line	Limit				
MHz	dBµV	Factor	Factor	dB	dBµV/m				
1	31.83	38.20	0.67	18.31	27.63	40.00	29.55	-10.45	QP



Site : Audix (Shanghai) Chamber3
 Condition : EN 55032 CLASS B HORIZONTAL
 Project No. :
 Applicant :
 EUT : OB2710
 M/N : OB MOS+CORE
 S/N :
 Power Supply : 230V/50Hz
 Ambient : 22°C 60%RH
 Test Mode : 12V 5A
 Test Engineer: Richard
 Memo :

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