



Supplemental test data  
(参考資料)

Date of issue: Jul. 25, 2011

# Test Data

Model Number: OZ-060-15

Model Name: DC POWER SUPPLY

INPUT: 85V - 264V AC, 50 / 60 Hz

OUTPUT: 15 V 4.0A

Minimum load : 0W  
Rated load :60W

Approved by : Makoto Urasue (QA manager)

Designed by : A. Takeda (R&D engineer)

Tested by : Kohei Sawada (Evaluation test engineer)

**Nipron Co., Ltd.**

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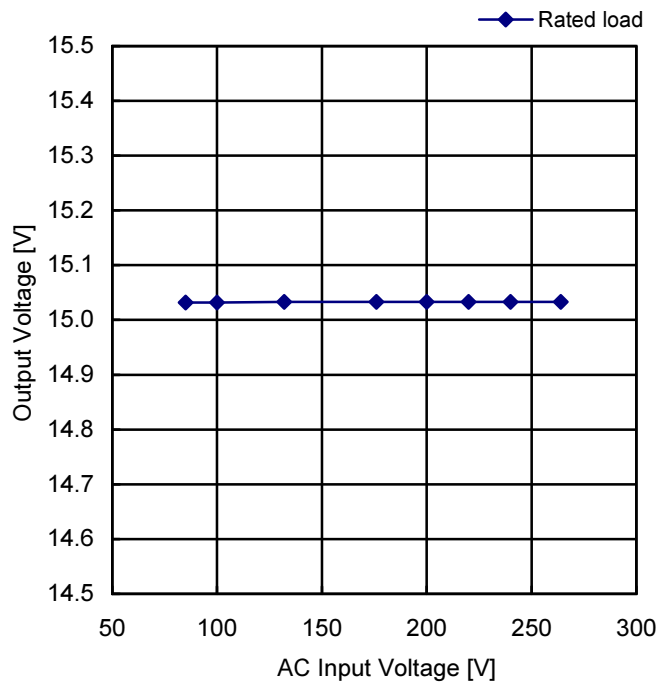
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Model	OZ-60-15	Temperature: 25°C																																					
Item	Input Current (by Load Power)																																						
<p>The graph plots Input Current [A rms] on the y-axis (0.0 to 1.6) against Load Power [W] on the x-axis (0 to 70). Four data series are shown: 85V AC (blue diamonds), 100V AC (magenta squares), 240V AC (red triangles), and 264V AC (green crosses). All series show a linear increase in current with power. The 85V AC series has the highest current, while the 264V AC series has the lowest.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Load Power [W]</th> <th colspan="4">Input Current [A rms]</th> </tr> <tr> <th>Input Voltage 85V AC</th> <th>Input Voltage 100V AC</th> <th>Input Voltage 240V AC</th> <th>Input Voltage 264V AC</th> </tr> </thead> <tbody> <tr> <td>0.0</td> <td>0.05</td> <td>0.05</td> <td>0.07</td> <td>0.08</td> </tr> <tr> <td>15.0</td> <td>0.39</td> <td>0.34</td> <td>0.24</td> <td>0.24</td> </tr> <tr> <td>30.0</td> <td>0.68</td> <td>0.59</td> <td>0.37</td> <td>0.36</td> </tr> <tr> <td>45.0</td> <td>0.98</td> <td>0.85</td> <td>0.48</td> <td>0.46</td> </tr> <tr> <td>60.0</td> <td>1.29</td> <td>1.12</td> <td>0.61</td> <td>0.58</td> </tr> </tbody> </table>				Load Power [W]	Input Current [A rms]				Input Voltage 85V AC	Input Voltage 100V AC	Input Voltage 240V AC	Input Voltage 264V AC	0.0	0.05	0.05	0.07	0.08	15.0	0.39	0.34	0.24	0.24	30.0	0.68	0.59	0.37	0.36	45.0	0.98	0.85	0.48	0.46	60.0	1.29	1.12	0.61	0.58
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Model	OZ-60-15	Temperature: 25°C
Item	Line Regulation	

## 15V/4A

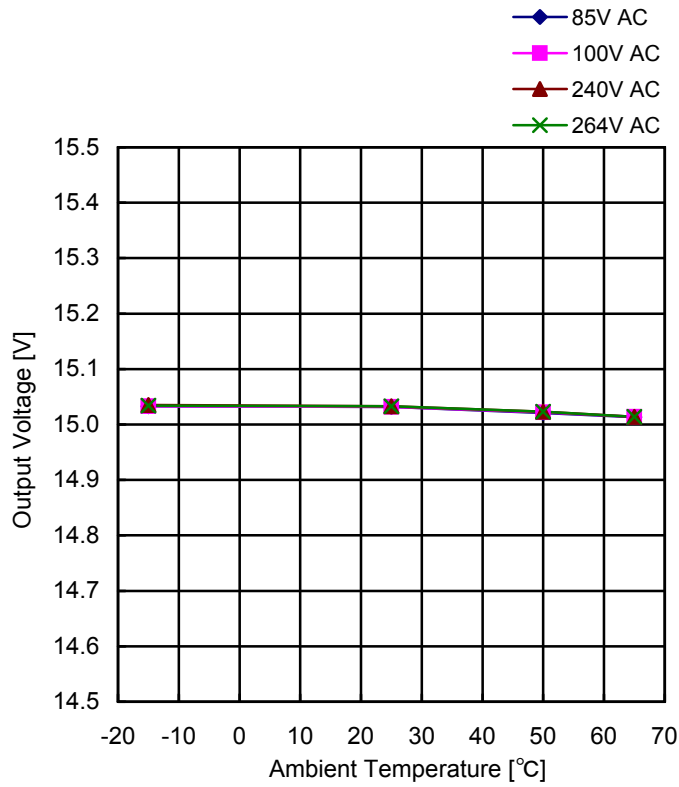


AC Input Voltage [V]	Output Voltage [V]
85	15.032
100	15.032
132	15.033
176	15.033
200	15.033
220	15.033
240	15.033
264	15.033

Model	OZ-60-15	Temperature: 25°C																																																								
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<p><b>15V</b></p> <p>Legend:</p> <ul style="list-style-type: none"> <li>85V AC</li> <li>100V AC</li> <li>240V AC</li> <li>264V AC</li> </ul>		<table border="1"> <thead> <tr> <th rowspan="2">Load Power [W]</th> <th colspan="4">Output Voltage [V]</th> </tr> <tr> <th>Input Voltage 85V AC</th> <th>Input Voltage 100V AC</th> <th>Input Voltage 240V AC</th> <th>Input Voltage 264V AC</th> </tr> </thead> <tbody> <tr> <td>0.0</td> <td>15.038</td> <td>15.038</td> <td>15.039</td> <td>15.038</td> </tr> <tr> <td>15.0</td> <td>15.036</td> <td>15.035</td> <td>15.037</td> <td>15.037</td> </tr> <tr> <td>30.0</td> <td>15.035</td> <td>15.035</td> <td>15.036</td> <td>15.035</td> </tr> <tr> <td>45.0</td> <td>15.033</td> <td>15.033</td> <td>15.034</td> <td>15.035</td> </tr> <tr> <td>60.0</td> <td>15.032</td> <td>15.032</td> <td>15.033</td> <td>15.033</td> </tr> <tr> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="2">Load Condition</th> </tr> <tr> <th rowspan="2">Load Power [W]</th> <th>Load Current [A]</th> </tr> <tr> <th>15V</th> </tr> </thead> <tbody> <tr> <td>0.0</td> <td>0.00</td> </tr> <tr> <td>15.0</td> <td>1.00</td> </tr> <tr> <td>30.0</td> <td>2.00</td> </tr> <tr> <td>45.0</td> <td>3.00</td> </tr> <tr> <td>60.0</td> <td>4.00</td> </tr> <tr> <td>-</td> <td>-</td> </tr> </tbody> </table>	Load Power [W]	Output Voltage [V]				Input Voltage 85V AC	Input Voltage 100V AC	Input Voltage 240V AC	Input Voltage 264V AC	0.0	15.038	15.038	15.039	15.038	15.0	15.036	15.035	15.037	15.037	30.0	15.035	15.035	15.036	15.035	45.0	15.033	15.033	15.034	15.035	60.0	15.032	15.032	15.033	15.033	-	-	-	-	-	Load Condition		Load Power [W]	Load Current [A]	15V	0.0	0.00	15.0	1.00	30.0	2.00	45.0	3.00	60.0	4.00	-	-
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Model	OZ-60-15
Item	Ambient Temperature Drift

## 15V



Ambient Temp. (°C)	Output Voltage [V]			
	Input Voltage 85V AC	Input Voltage 100V AC	Input Voltage 240V AC	Input Voltage 264V AC
-15	15.033	15.033	15.035	15.034
25	15.032	15.032	15.033	15.033
50	15.021	15.022	15.023	15.023
65	15.013	15.014	15.014	15.014

### Load Condition

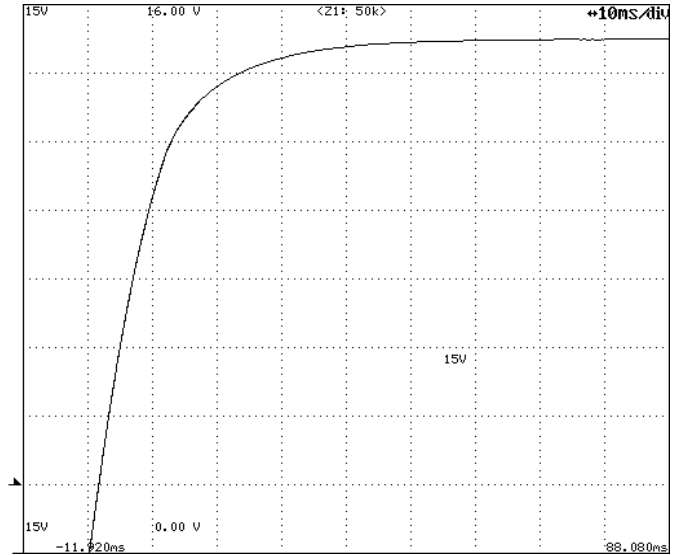
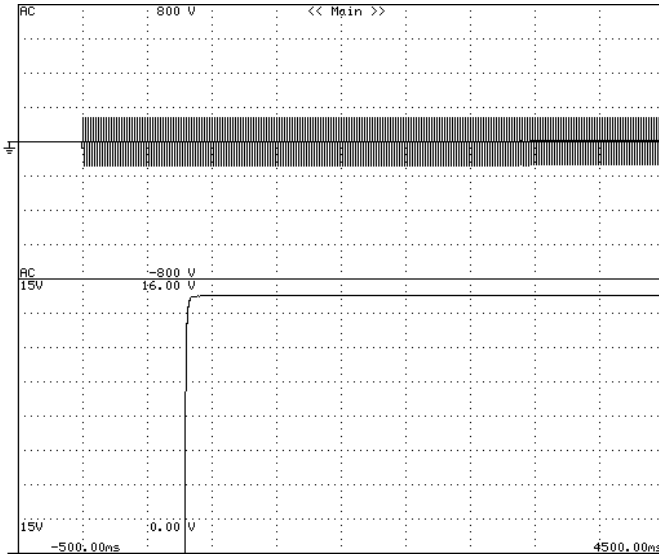
Ambient Temp. (°C)	Load Current [A]
	15V
-15	4.00
25	4.00
50	4.00
65	2.80

Model	OZ-060-15	Temperature: 25°C
Item	Output Rise Characteristics (at AC Power ON)	

Input: 100V AC  
Load: Rated Load

Timebase Range: 500ms/div

Vertical Sensitivity: 0.4V/div  
Timebase Range: 2ms/div



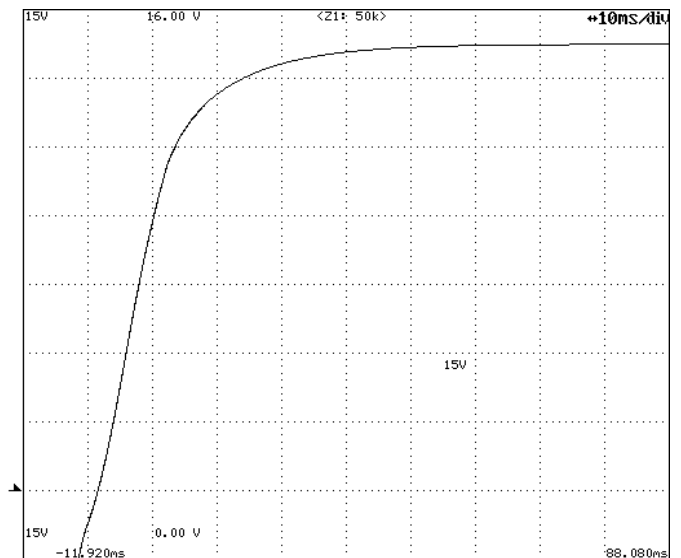
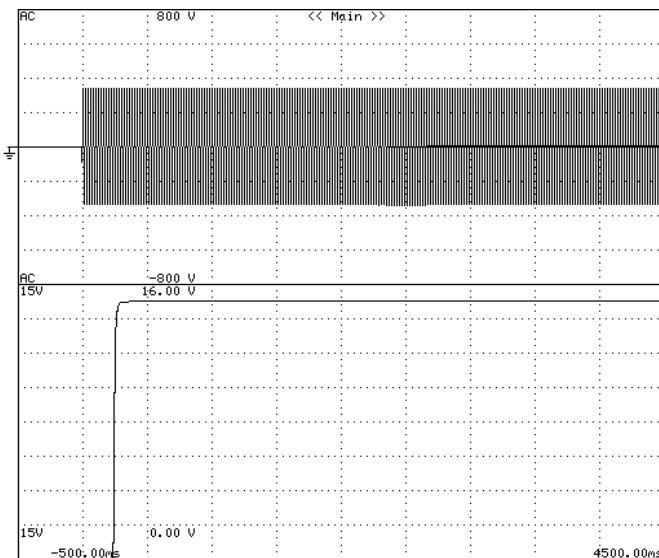
All Output Start-up Sequence

3.3V DC Output Rise Characteristics

Input: 240V AC  
Load: Rated Load

Timebase Range: 500ms/div

Vertical Sensitivity: 0.4V/div  
Timebase Range: 2ms/div



All Output Start-up Sequence

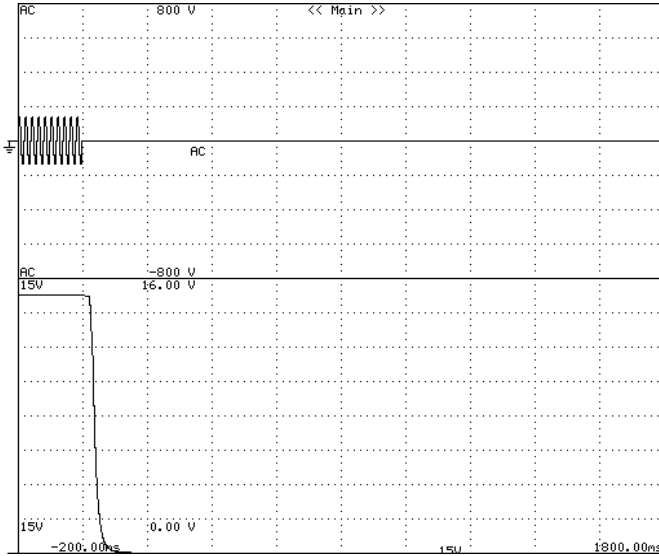
3.3V DC Output Rise Characteristics



Model	OZ-060-15	Temperature: 25°C
Item	Output Fall Characteristics (at AC Power OFF)	

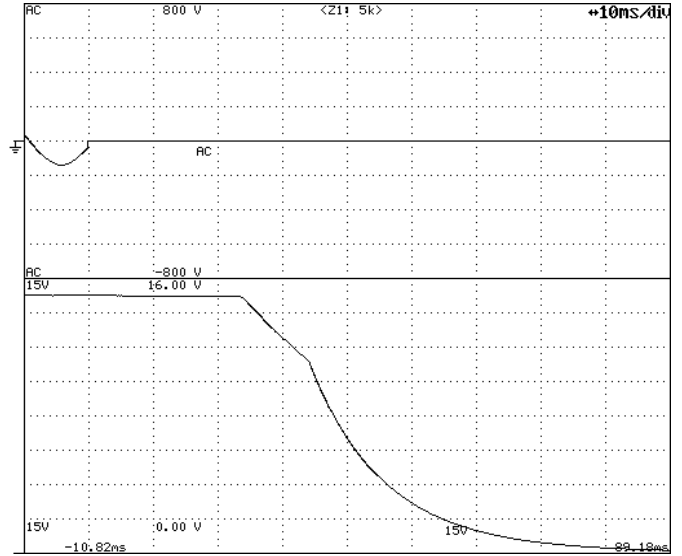
Input: 100V AC  
Load: Rated Load

Timebase Range: 200ms/div



Output Fall Characteristics

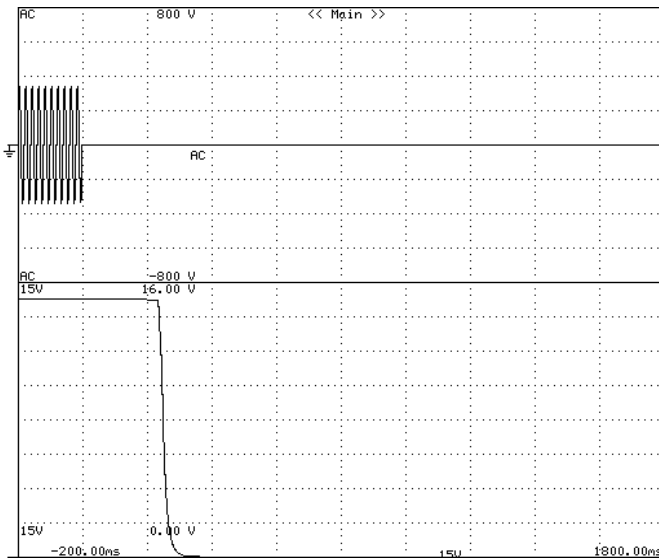
Timebase Range: 10ms/div



Output Fall Characteristics (magnification)

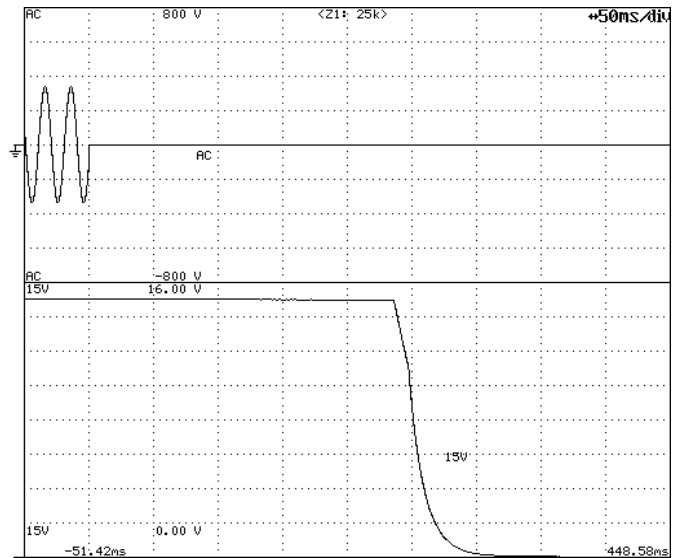
Input: 240V AC  
Load: Rated Load

Timebase Range: 200ms/div



Output Fall Characteristics

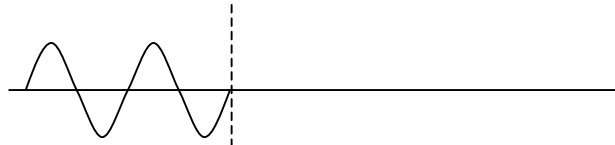
Timebase Range: 50ms/div



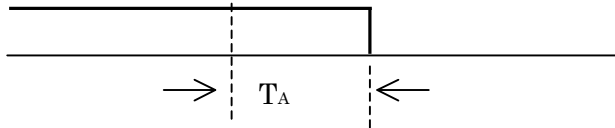
Output Fall Characteristics (magnification)

Model	OZ-060-15	Temperature: 25°C
Item	Instantaneous Interruption Compensation (by Load Power)	

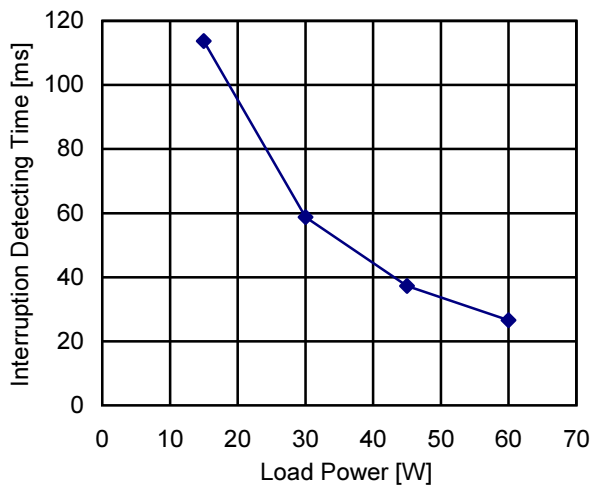
**Input Voltage**



**Output Voltage**

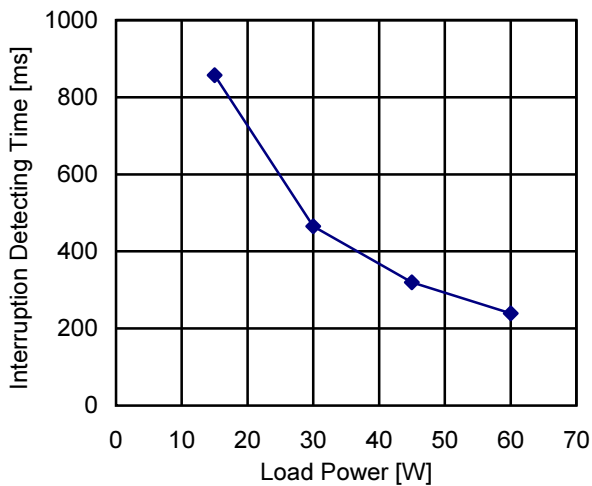


### Input Voltage: 100V AC



Load Power [W]	Interruption Detecting Time [ms]
	Output Voltage
	$T_A$
15.0	113.7
30.0	58.8
45.0	37.3
60.0	26.6

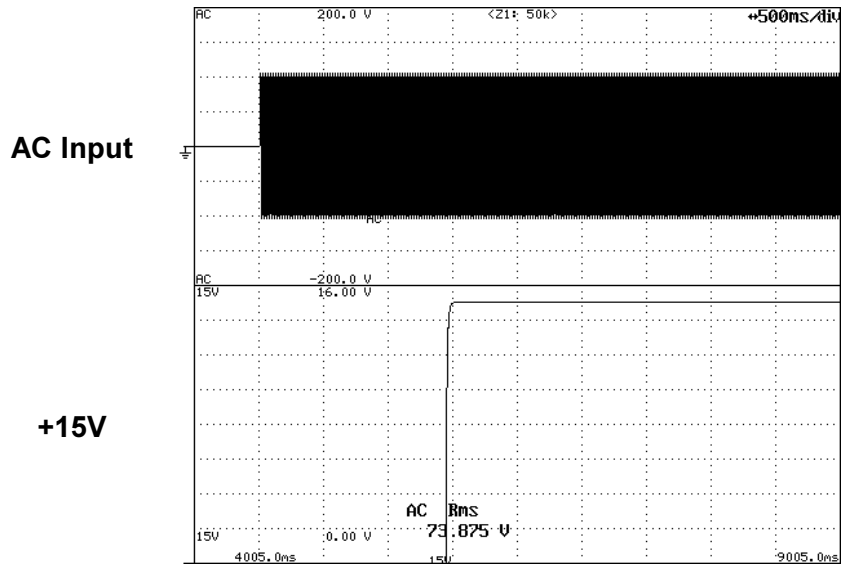
### Input Voltage: 240V AC



Load Power [W]	Interruption Detecting Time [ms]
	Output Voltage
	$T_A$
15.0	857.0
30.0	465.0
45.0	319.8
60.0	239.2

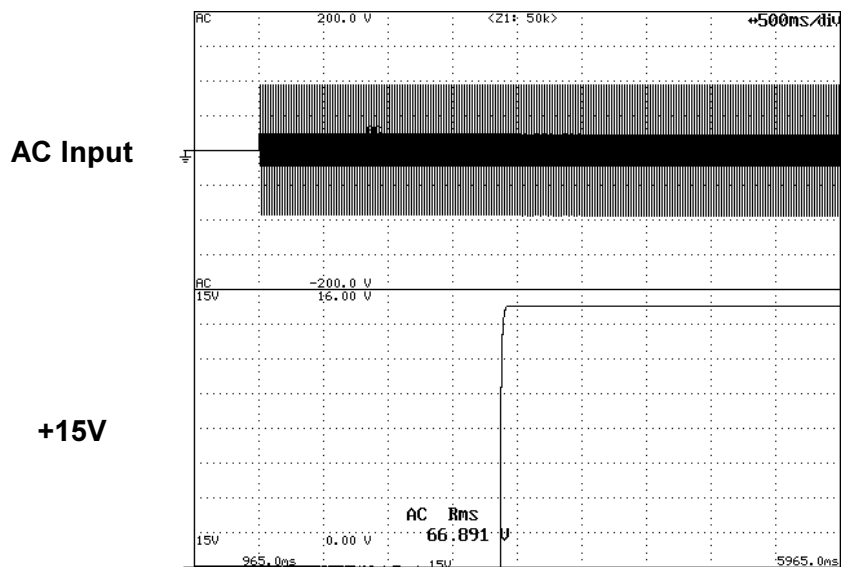
Model	OZ-060-15	Temperature: 25°C
Item	Start-Up Voltage	

**Timebase Range: 500ms/div  
Load: Rated Load**



**Start-up Voltage: 73.875V AC**

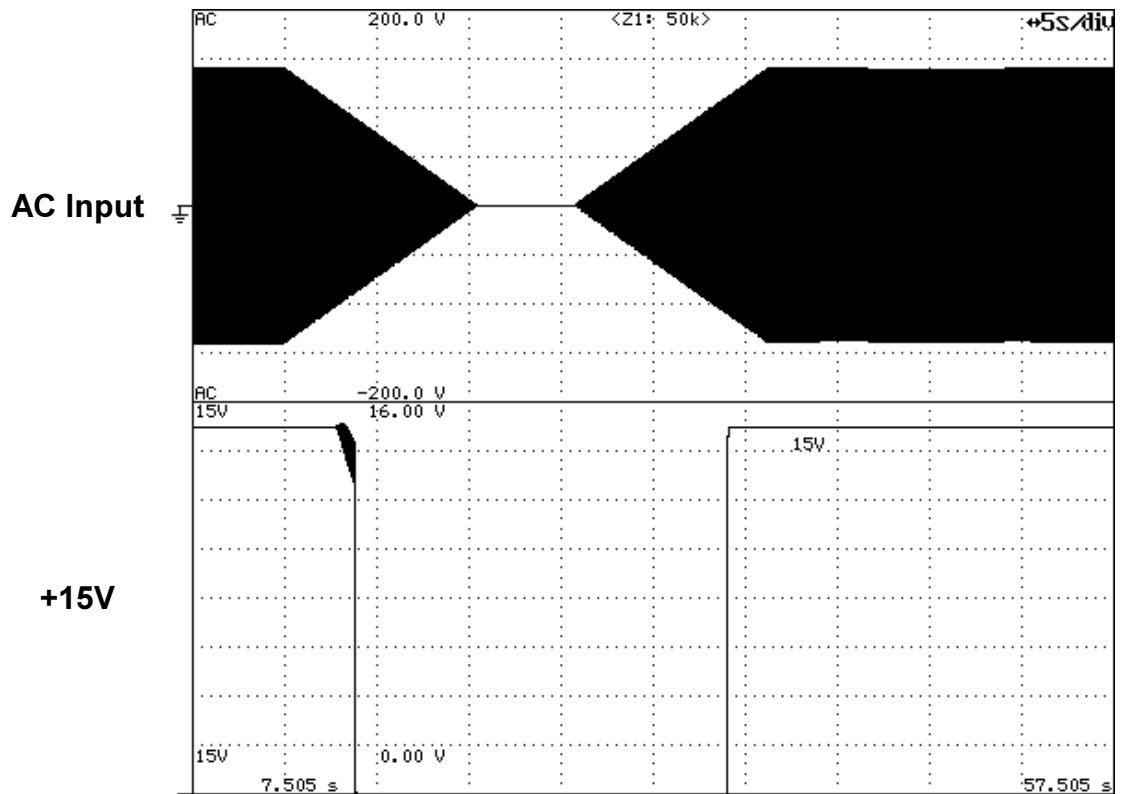
**Timebase Range: 500ms/div  
Load: Minimum Load**



**Start-up Voltage: 66.891V AC**

Model	OZ-060-15	Temperature: 25°C
Item	Input Voltage Sweep Up/Down	

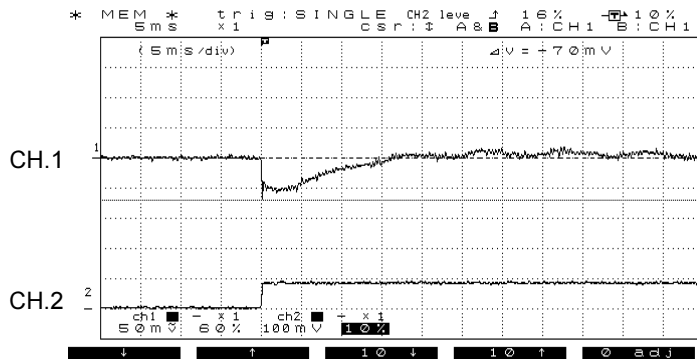
Timebase Range: 5s/div  
Load: Rated Load



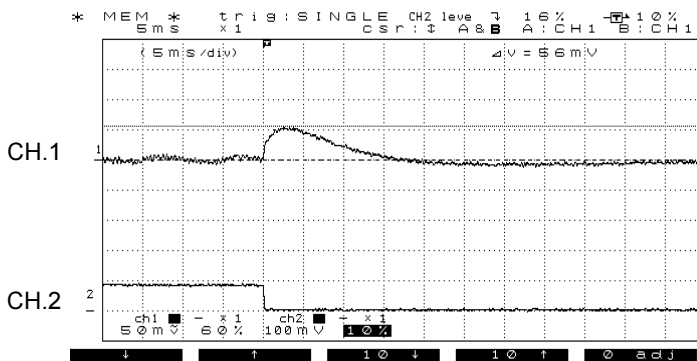
Sweep Rate: 10Vave/sec

Model	OZ-060-15	Temperature: 25°C
Item	Dynamic Load Response	

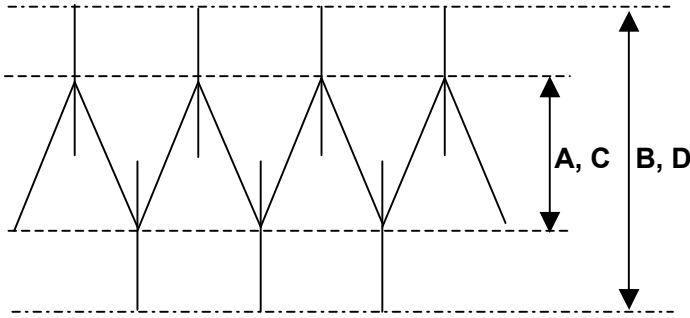
## +15V DC Output Transient Response Waveforms



Waveform 1	
CH1	Measuring Point: DC Output Voltage
	Vertical Sensitivity: 50mV/div
CH2	Measuring Point: DC Output Current
	Vertical Sensitivity: 5A/div
Timebase Range	5ms/div
Condition	Input: 100V AC
Note: Rated Load(4A) ⇒ Minimum load(0A)	



Model	OZ-60-15	Load: Rated Load
Item	Ambient Temperature Drift	



**at 100V AC**

A: Ripple Voltage (mV<sub>P-P</sub>)

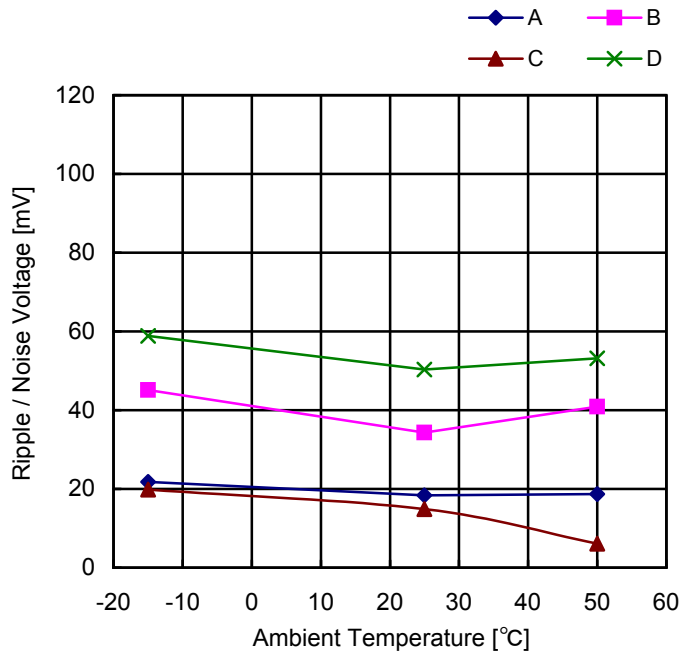
B: Noise Voltage (mV<sub>P-P</sub>)

**at 240V AC**

C: Ripple Voltage (mV<sub>P-P</sub>)

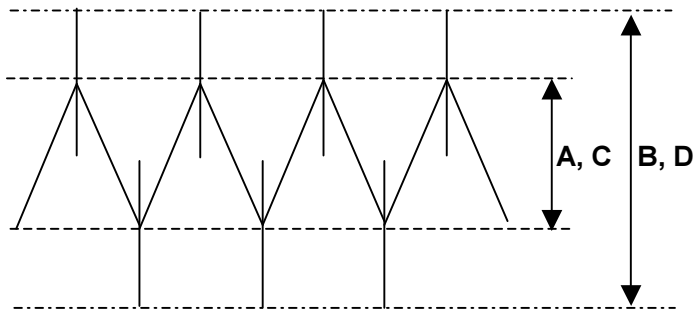
D: Noise Voltage (mV<sub>P-P</sub>)

## 15V



Ambient Temp. [°C]	Ripple / Noise Voltage [mV]			
	A	B	C	D
-15	21.8	45.1	19.8	58.9
25	18.4	34.3	14.9	50.3
50	18.7	40.9	6.1	53.2

Model	OZ-60-15	Temperature: 25°C
Item	Ambient Temperature Drift	



**at 100V AC**

A: Ripple Voltage (mV<sub>P-P</sub>)

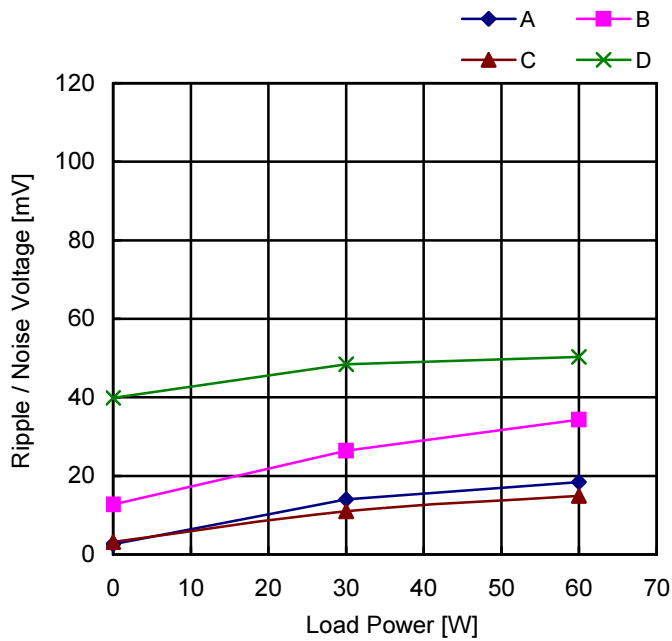
B: Noise Voltage (mV<sub>P-P</sub>)

**at 240V AC**

C: Ripple Voltage (mV<sub>P-P</sub>)

D: Noise Voltage (mV<sub>P-P</sub>)

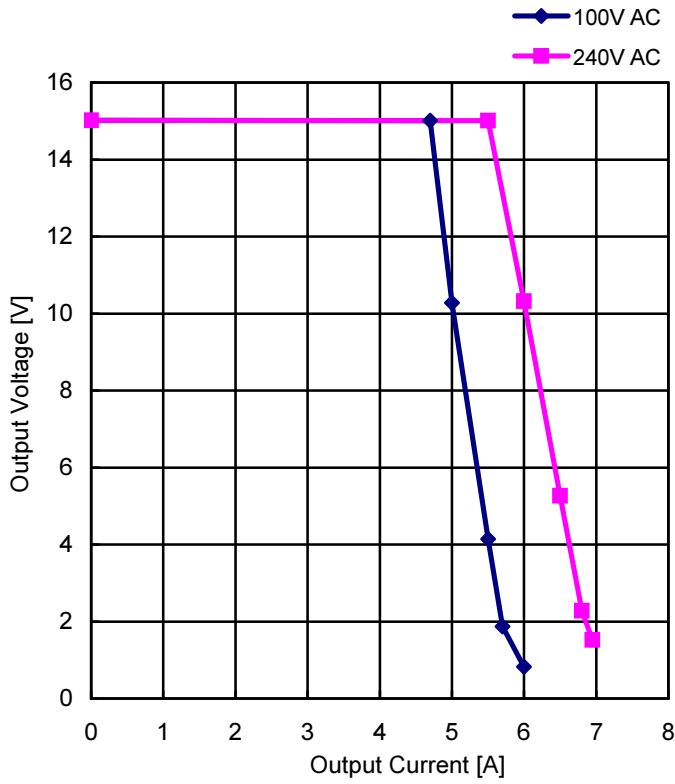
## 15V



Load Power [W]	Ripple / Noise Voltage [mV]			
	A	B	C	D
0	2.6	12.7	3.2	39.9
30	14.0	26.4	11.0	48.4
60	18.4	34.3	14.9	50.3

Model	OZ-60-15	Temperature: 25°C
Item	Over-Current Protection	

## V-I Characteristics of 15V O.C.P

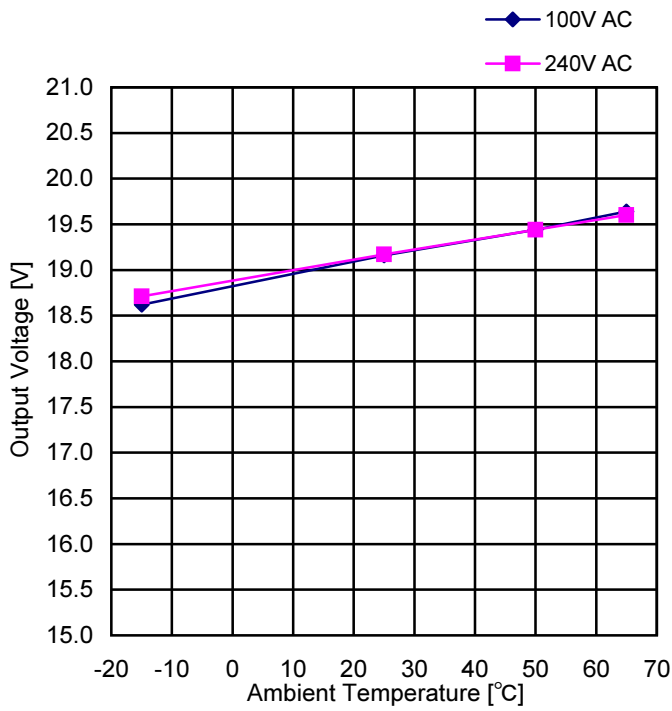


Input Voltage: 100V AC		Input Voltage: 240V AC	
Output Current [A]	Output Voltage [V]	Output Current [A]	Output Voltage [V]
0.00	15.02	0.00	15.02
4.70	15.01	5.50	15.01
5.00	10.28	6.00	10.32
5.50	4.14	6.50	5.26
5.70	1.87	6.80	2.28
6.00	0.82	6.95	1.52



Model	OZ-060-15	Load: Minimum Load
Item	Over-Voltage Protection	

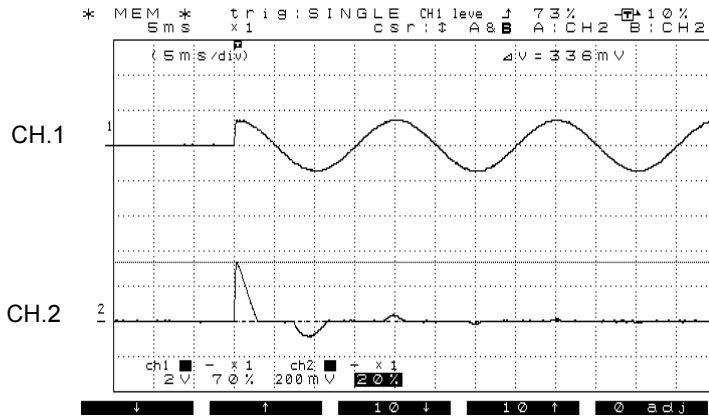
**+15V**



Ambient Temp. [°C]	Output Voltage	
	100V AC	240V AC
-15	18.62	18.71
25	19.16	19.17
50	19.44	19.44
65	19.64	19.60

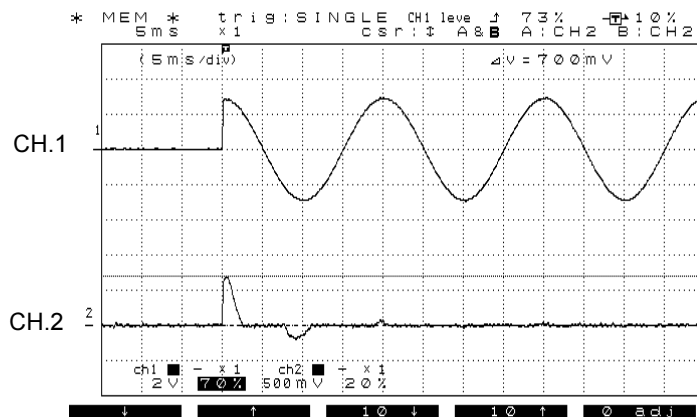
Model	OZ-060-15	Temperature: 25°C
Item	Inrush Current	Load: Rated Load

## Inrush Current Waveforms



### Waveform 1

CH1	Measuring Point: AC Input Voltage
	Range: 200V/div
CH2	Measuring Point: AC Input Current
	Range: 10A/div
Timebase Range	5ms/div
Conditions	Input: 100V AC Load: Rated Load
Note: Inrush Current: 16.8A	



### Waveform 2

CH1	Measuring Point: AC Input Voltage
	Range: 200V/div
CH2	Measuring Point: AC Input Current
	Range: 25A/div
Timebase Range	5ms/div
Conditions	Input: 200V AC Load: Rated Load
Note: Inrush Current: 35.0A	

Model	OZ-060-15	Load: Rated Load																		
Item	Leakage Current																			
		<table border="1"> <thead> <tr> <th>AC Input Voltage [V]</th> <th>Leakage Current [mA]</th> </tr> </thead> <tbody> <tr> <td>85</td> <td>0.15</td> </tr> <tr> <td>100</td> <td>0.19</td> </tr> <tr> <td>132</td> <td>0.25</td> </tr> <tr> <td>176</td> <td>0.34</td> </tr> <tr> <td>200</td> <td>0.39</td> </tr> <tr> <td>220</td> <td>0.43</td> </tr> <tr> <td>240</td> <td>0.46</td> </tr> <tr> <td>264</td> <td>0.51</td> </tr> </tbody> </table>	AC Input Voltage [V]	Leakage Current [mA]	85	0.15	100	0.19	132	0.25	176	0.34	200	0.39	220	0.43	240	0.46	264	0.51
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