

# TEST DATA OF LFA300F-3R3-TY

Regulated DC Power Supply  
December 22, 2010

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Yoshiaki Shimizu Design Manager

Prepared by : Tomoyuki Mukaiyama  
Tomoyuki Mukaiyama Design Engineer

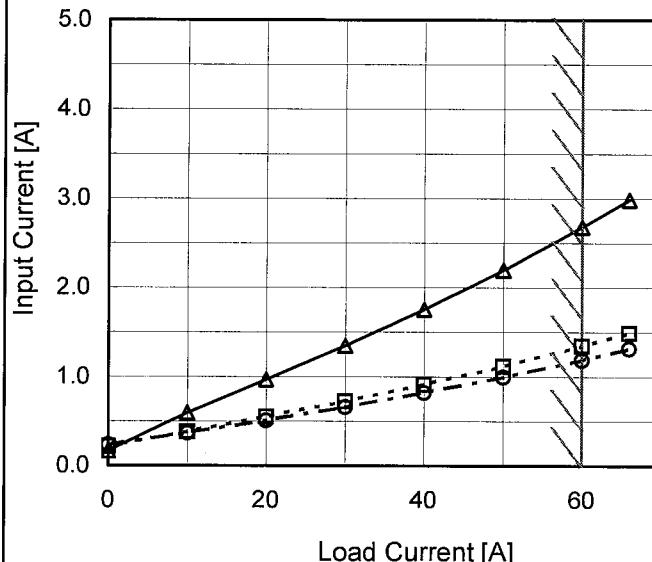
**COSEL CO.,LTD.**

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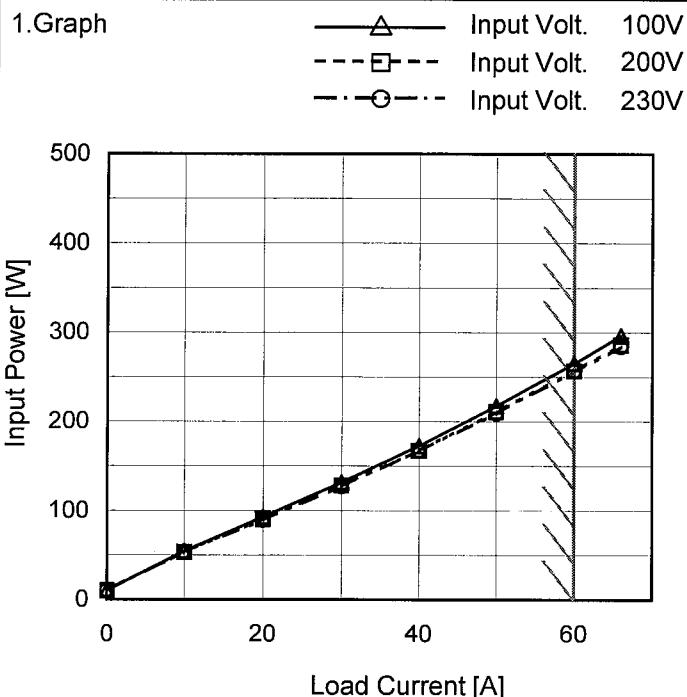
Model	LFA300F-3R3-TY																																																					
Item	Input Current (by Load Current)																																																					
Object	_____																																																					
1. Graph																																																						
<p style="text-align: center;"> <span style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; border-radius: 50%; background-color: white;"></span> Input Volt. 100V  <span style="display: inline-block; width: 15px; height: 15px; border: 1px dashed black; border-radius: 50%; background-color: white;"></span> Input Volt. 200V  <span style="display: inline-block; width: 15px; height: 15px; border: 1px dashed black; border-radius: 50%; border: 1px solid black;"></span> Input Volt. 230V     </p>  <p>The graph plots Input Current [A] on the Y-axis (0.0 to 5.0) against Load Current [A] on the X-axis (0 to 60). Three curves are shown for input voltages of 100V, 200V, and 230V. The 100V curve (triangles) has the steepest slope, followed by 230V (circles), and 200V (squares) has the lowest slope. A slanted line from the top left to the bottom right represents the rated load current range.</p>																																																						
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<p>Note: Slanted line shows the range of the rated load current.</p>																																																						

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Model LFA300F-3R3-TY

Item Input Power (by Load Current)

Object \_\_\_\_\_

Temperature 25°C  
Testing Circuitry Figure A

## 2. Values

Load Current [A]	Input Power [W]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	9.9	10.0	10.0
10	54.3	53.0	53.0
20	92.7	90.0	89.0
30	131.4	128.0	127.0
40	172.5	167.0	167.0
50	217.2	211.0	209.0
60	265.2	257.0	256.0
66	296.4	286.0	284.0
--	-	-	-
--	-	-	-
--	-	-	-

Note: Slanted line shows the range of the rated load current.

Model	LFA300F-3R3-TY	Temperature Testing Circuitry 25°C Figure A																																
Item	Efficiency (by Input Voltage)																																	
Object	_____																																	
1. Graph		2. Values																																
<p>Efficiency [%]</p> <p>Input Voltage [V]</p> <p>Legend: ---□--- Load 50% —△— Load 100%</p>		<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Efficiency [%]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr> <td>75</td> <td>75.4</td> <td>73.8</td> </tr> <tr> <td>85</td> <td>76.0</td> <td>74.5</td> </tr> <tr> <td>100</td> <td>76.5</td> <td>75.5</td> </tr> <tr> <td>120</td> <td>77.0</td> <td>76.2</td> </tr> <tr> <td>200</td> <td>78.6</td> <td>77.9</td> </tr> <tr> <td>230</td> <td>79.2</td> <td>78.2</td> </tr> <tr> <td>264</td> <td>79.2</td> <td>78.8</td> </tr> <tr> <td>280</td> <td>79.2</td> <td>78.8</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Input Voltage [V]	Efficiency [%]		Load 50%	Load 100%	75	75.4	73.8	85	76.0	74.5	100	76.5	75.5	120	77.0	76.2	200	78.6	77.9	230	79.2	78.2	264	79.2	78.8	280	79.2	78.8	--	-	-
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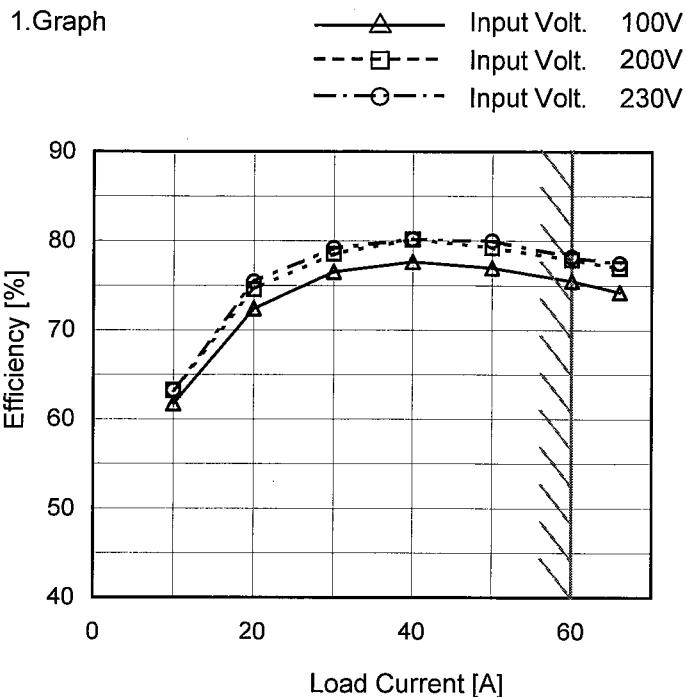
Note: Slanted line shows the range of the rated input voltage.

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Model LFA300F-3R3-TY

Item Efficiency (by Load Current)

Object \_\_\_\_\_



Note: Slanted line shows the range of the rated load current.

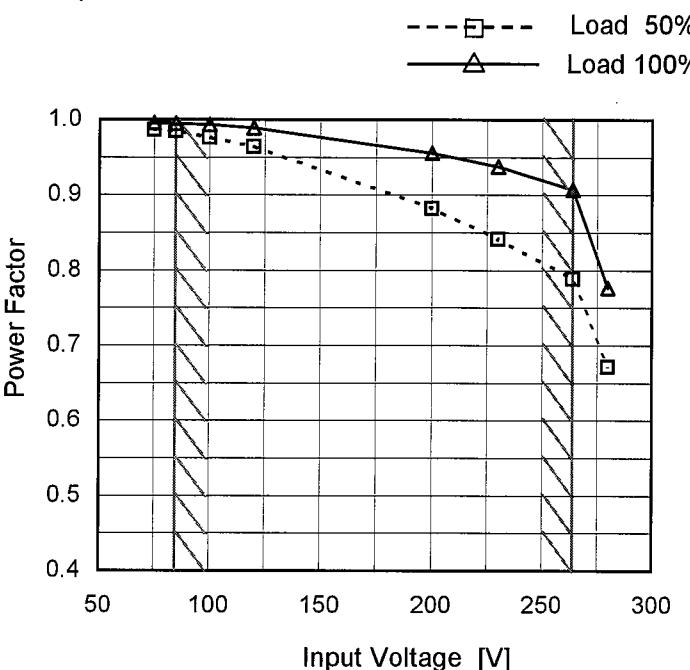
 Temperature 25°C  
 Testing Circuitry Figure A

## 2. Values

Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	-	-	-
10	61.7	63.2	63.2
20	72.4	74.6	75.4
30	76.5	78.6	79.2
40	77.6	80.2	80.2
50	76.9	79.2	80.0
60	75.5	77.9	78.2
66	74.2	76.9	77.5
--	-	-	-
--	-	-	-
--	-	-	-

Model	LFA300F-3R3-TY
Item	Power Factor (by Input Voltage)
Object	_____

## 1. Graph



Note: Slanted line shows the range of the rated input voltage.

Temperature 25°C  
Testing Circuitry Figure A

## 2. Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
75	0.986	0.996
85	0.984	0.995
100	0.977	0.993
120	0.965	0.989
200	0.889	0.955
230	0.841	0.938
264	0.789	0.907
280	0.672	0.777
--	-	-

Model	LFA300F-3R3-TY		
Item	Power Factor (by Load Current)		
Object	_____		
1.Graph	—△— Input Volt. 100V - -□-- Input Volt. 200V - -○-- Input Volt. 230V		
<p>Note: Slanted line shows the range of the rated load current.</p>			
Temperature	25°C		
Testing Circuitry	Figure A		
2.Values			
Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	0.604	0.233	0.185
10	0.919	0.697	0.631
20	0.961	0.818	0.761
30	0.977	0.889	0.841
40	0.985	0.918	0.888
50	0.991	0.942	0.913
60	0.993	0.955	0.938
66	0.994	0.960	0.944
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--	-	-	-
--	-	-	-

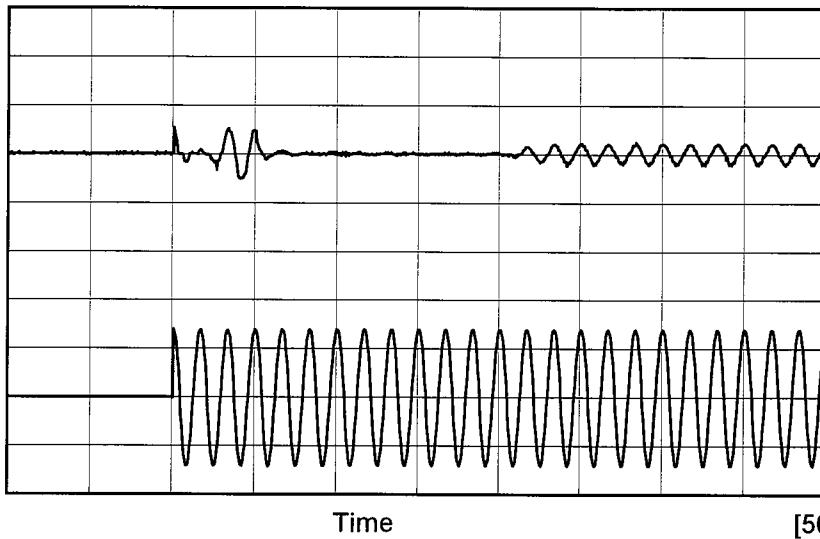
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Model LFA300F-3R3-TY

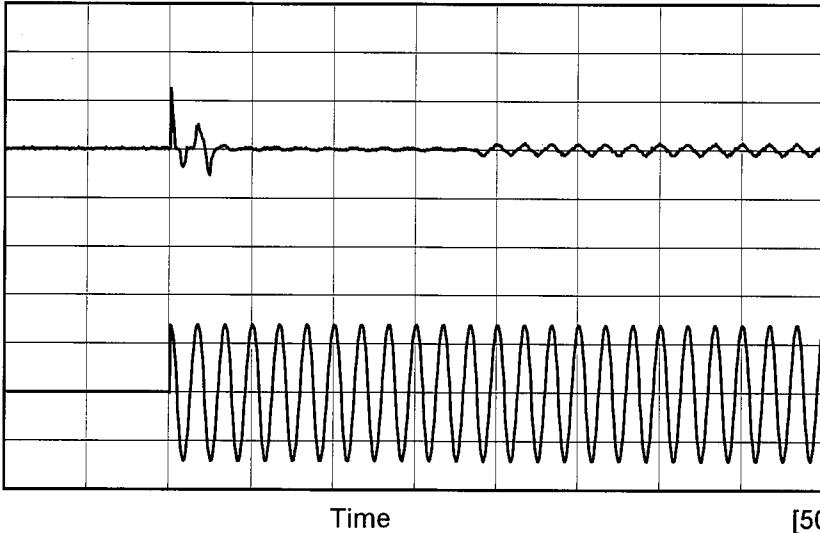
Temperature 25°C  
Testing Circuitry Figure A

Item Inrush Current

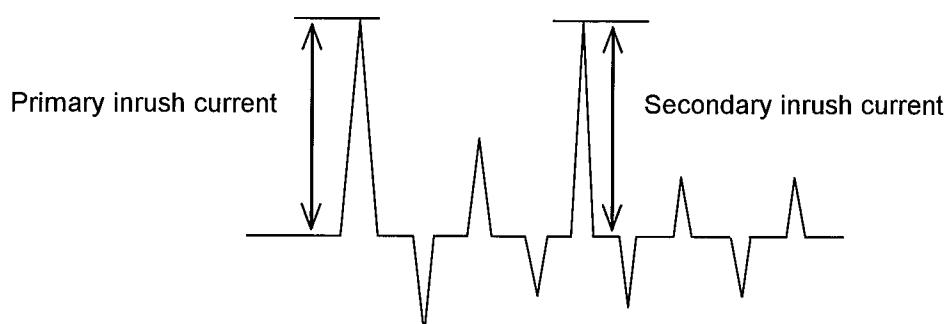
Object \_\_\_\_\_

Input  
Current  
[20A/div]

Input Voltage 100 V  
 Frequency 60 Hz  
 Load 100 %  
 Primary inrush current : 10.8 A  
 Secondary inrush current : 9.3 A

Input  
Voltage  
[100V/div]Input  
Current  
[20A/div]

Input Voltage 230 V  
 Frequency 60 Hz  
 Load 100 %  
 Primary inrush current : 24.8 A  
 Secondary inrush current : 2.9 A

Input  
Voltage  
[200V/div]



Model	LFA300F-3R3-TY	Temperature Testing Circuitry	25°C Figure B
Item	Leakage Current		
Object	<hr/>		

### 1. Results

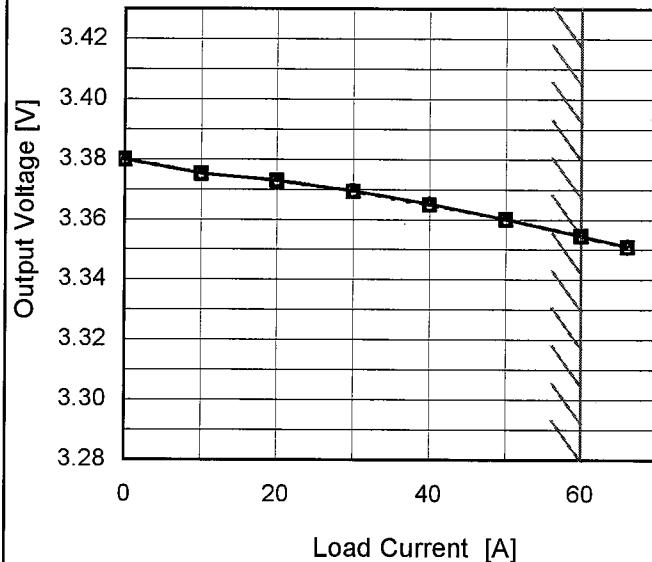
Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
DEN-AN	Both phases	0.33	0.53	0.60	Operation
	One of phases	0.34	0.70	0.83	Stand by
IEC60950-1	Both phases	0.24	0.50	0.57	Operation
	One of phases	0.32	0.68	0.74	Stand by

The value for "One of phases" is the reference value only.

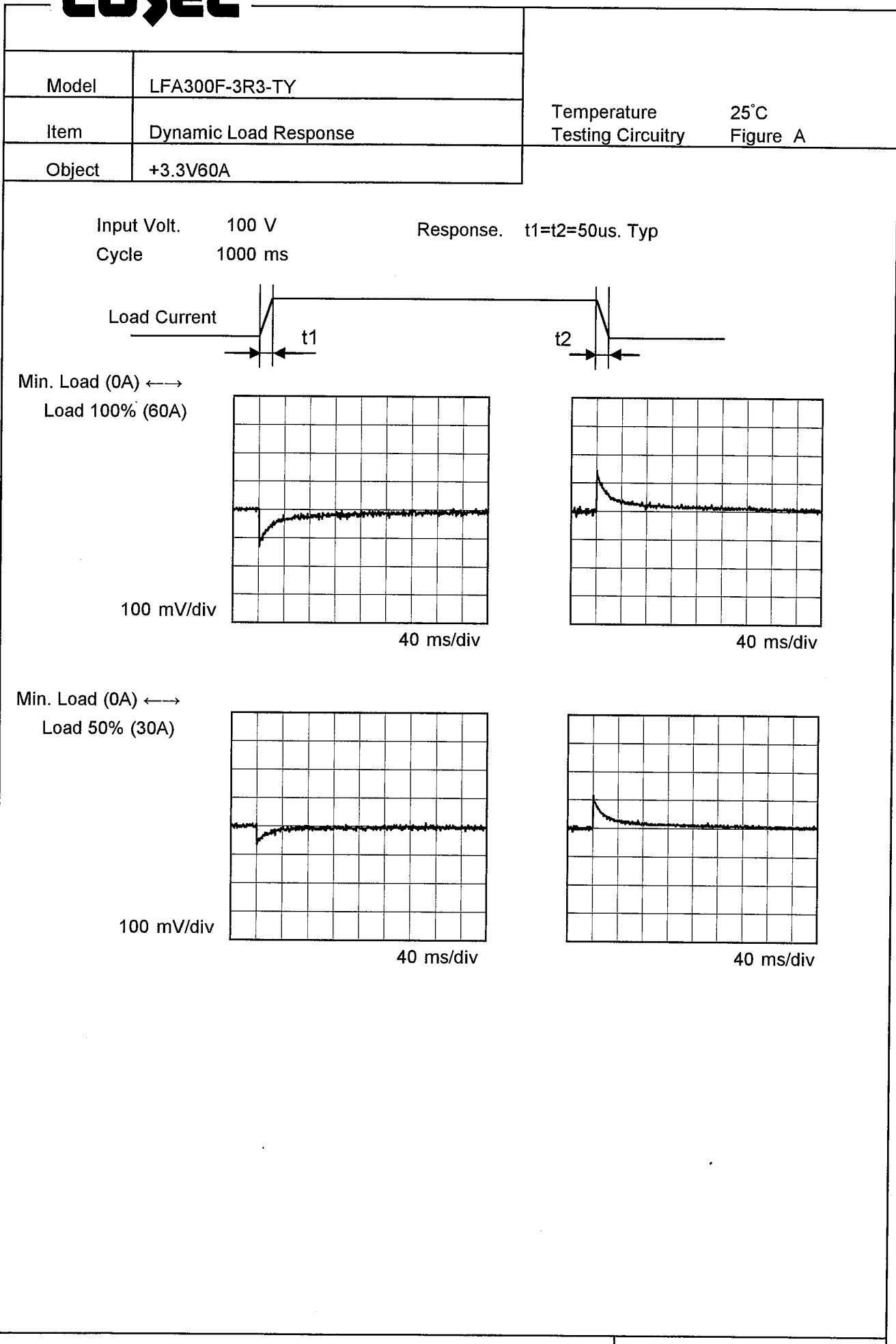
### 2. Condition

Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

Model	LFA300F-3R3-TY																																	
Item	Line Regulation	Temperature 25°C Testing Circuitry Figure A																																
Object	+3.3V60A																																	
1.Graph																																		
<p>Output Voltage [V]</p> <p>Input Voltage [V]</p> <p>Legend:</p> <ul style="list-style-type: none"> <li>Load 50% (Squares)</li> <li>Load 100% (Triangles)</li> </ul>																																		
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Object	+3.3V60A	Testing Circuitry	Figure A																																																			
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Model	LFA300F-3R3-TY																																							
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure C																																						
Object	+3.3V60A																																							
1. Graph																																								
<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The Y-axis ranges from 0 to 200 mV, and the X-axis ranges from 0 to 80 A. Two curves are shown: one for Input Volt. 100V (solid line with open circles) and another for Input Volt. 230V (dashed line with open circles). Both curves show a slight increase in ripple voltage as load current increases.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Ripple Voltage [mV] (Input Volt. 100V)</th> <th>Ripple Voltage [mV] (Input Volt. 230V)</th> </tr> </thead> <tbody> <tr><td>0</td><td>15</td><td>15</td></tr> <tr><td>20</td><td>18</td><td>18</td></tr> <tr><td>30</td><td>25</td><td>25</td></tr> <tr><td>40</td><td>30</td><td>30</td></tr> <tr><td>50</td><td>35</td><td>35</td></tr> <tr><td>60</td><td>40</td><td>40</td></tr> <tr><td>70</td><td>45</td><td>45</td></tr> </tbody> </table>			Load Current [A]	Ripple Voltage [mV] (Input Volt. 100V)	Ripple Voltage [mV] (Input Volt. 230V)	0	15	15	20	18	18	30	25	25	40	30	30	50	35	35	60	40	40	70	45	45														
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<p>Measured by 20 MHz Oscilloscope. Ripple Voltage is shown as p-p in the figure below. Note: Slanted line shows the range of the rated load current.</p> <p>Diagram illustrating a Complex Ripple Wave Form. The vertical axis is labeled "Ripple [mVp-p]". The diagram shows two types of ripples: T1, which is a low-frequency noise-like component, and T2, which is a higher-frequency switching component. The total ripple is the sum of these two components.</p>																																								
<p>Fig. Complex Ripple Wave Form</p>																																								

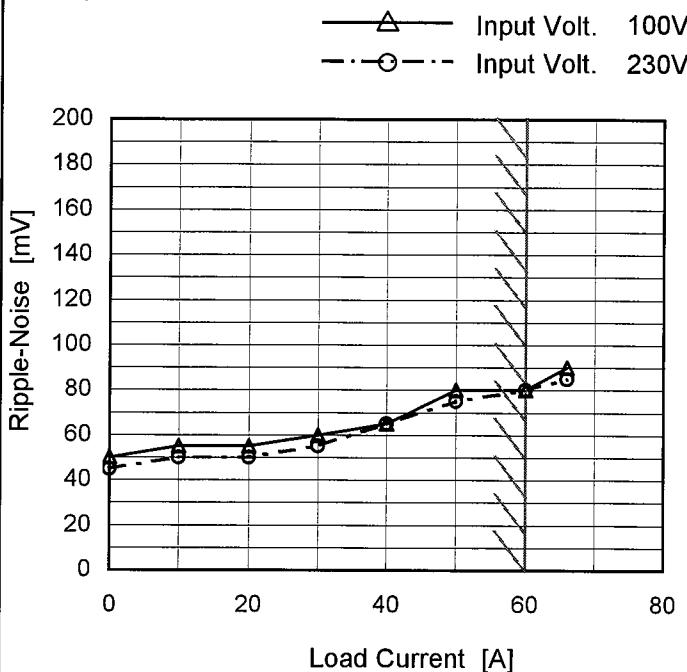
**COSEL**

Model LFA300F-3R3-TY

Item Ripple-Noise

Object +3.3V60A

## 1. Graph



Measured by 20 MHz Oscilloscope.

Ripple-Noise is shown as p-p in the figure below.

Note: Slanted line shows the range of the rated load current.

Temperature 25°C  
Testing Circuitry Figure C

## 2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 230 [V]
0	50	45
10	55	50
20	55	50
30	60	55
40	65	65
50	80	75
60	80	80
66	90	85
--	-	-
--	-	-
--	-	-

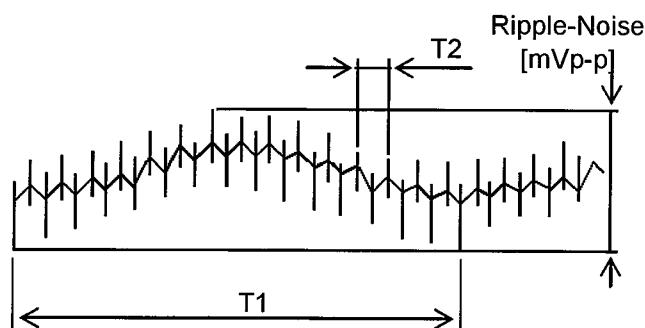
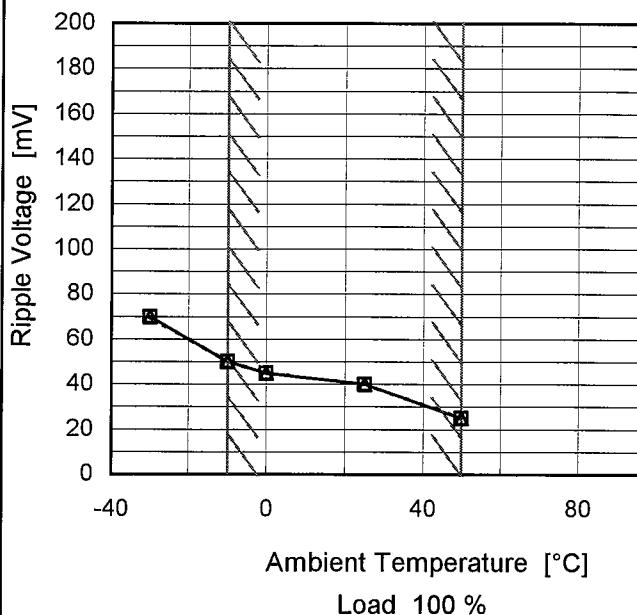
T1: Due to AC Input Line  
T2: Due to Switching

Fig. Complex Ripple Wave Form

Model	LFA300F-3R3-TY
Item	Ripple Voltage (by Ambient Temp.)
Object	+3.3V60A

## 1. Graph

--- □ --- Input Volt. 100V  
 —△— Input Volt. 230V



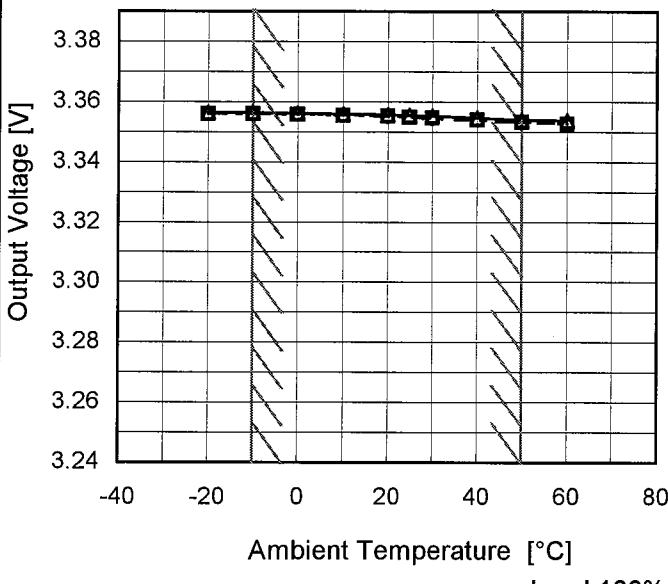
Measured by 20 MHz Oscilloscope.

Note: Slanted line shows the range of the rated ambient temperature.

Testing Circuitry Figure C

## 2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 230 [V]
-30	70	70
-10	50	50
0	45	45
25	40	40
50	25	25
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

Model	LFA300F-3R3-TY	Testing Circuitry Figure A																																																					
Item	Ambient Temperature Drift																																																						
Object	+3.3V60A																																																						
1.Graph	<p style="text-align: center;"> <span style="color: black;">—△—</span> Input Volt. 100V  <span style="color: gray;">---□---</span> Input Volt. 200V  <span style="color: gray;">---○---</span> Input Volt. 230V         </p>  <p style="text-align: center;">Output Voltage [V]</p> <p style="text-align: center;">Ambient Temperature [°C]</p> <p style="text-align: center;">Load 100%</p>																																																						
2.Values	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="3">Output Voltage [V]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr> <td>-20</td> <td>3.356</td> <td>3.356</td> <td>3.356</td> </tr> <tr> <td>-10</td> <td>3.356</td> <td>3.356</td> <td>3.356</td> </tr> <tr> <td>0</td> <td>3.356</td> <td>3.356</td> <td>3.356</td> </tr> <tr> <td>10</td> <td>3.356</td> <td>3.356</td> <td>3.356</td> </tr> <tr> <td>20</td> <td>3.356</td> <td>3.355</td> <td>3.355</td> </tr> <tr> <td>25</td> <td>3.355</td> <td>3.355</td> <td>3.355</td> </tr> <tr> <td>30</td> <td>3.355</td> <td>3.355</td> <td>3.355</td> </tr> <tr> <td>40</td> <td>3.355</td> <td>3.354</td> <td>3.354</td> </tr> <tr> <td>50</td> <td>3.354</td> <td>3.353</td> <td>3.353</td> </tr> <tr> <td>60</td> <td>3.354</td> <td>3.353</td> <td>3.353</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>				Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	-20	3.356	3.356	3.356	-10	3.356	3.356	3.356	0	3.356	3.356	3.356	10	3.356	3.356	3.356	20	3.356	3.355	3.355	25	3.355	3.355	3.355	30	3.355	3.355	3.355	40	3.355	3.354	3.354	50	3.354	3.353	3.353	60	3.354	3.353	3.353	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																						
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Note:	Slanted line shows the range of the rated ambient temperature.																																																						



Model	LFA300F-3R3-TY	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+3.3V60A	

### 1. Output Voltage Accuracy

This is defined as the value of the output voltage, regulation load, ambient temperature and input voltage varied at random in the range as specified below.

Temperature : -10 ~ 50°C

Input Voltage : 85 ~ 264V

Load Current : 0 ~ 60A

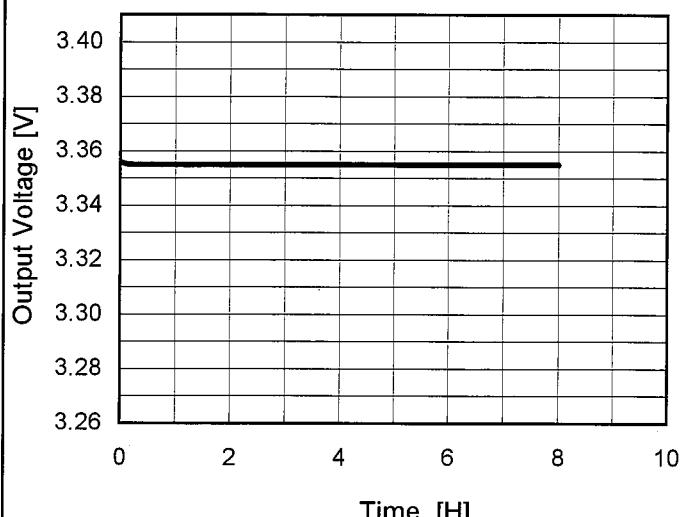
\* Output Voltage Accuracy =  $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

$$\text{* Output Voltage Accuracy (Ration)} = \frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

### 2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	50	85	0	3.380	$\pm 14$	$\pm 0.4$
Minimum Voltage	-10	264	60	3.352		

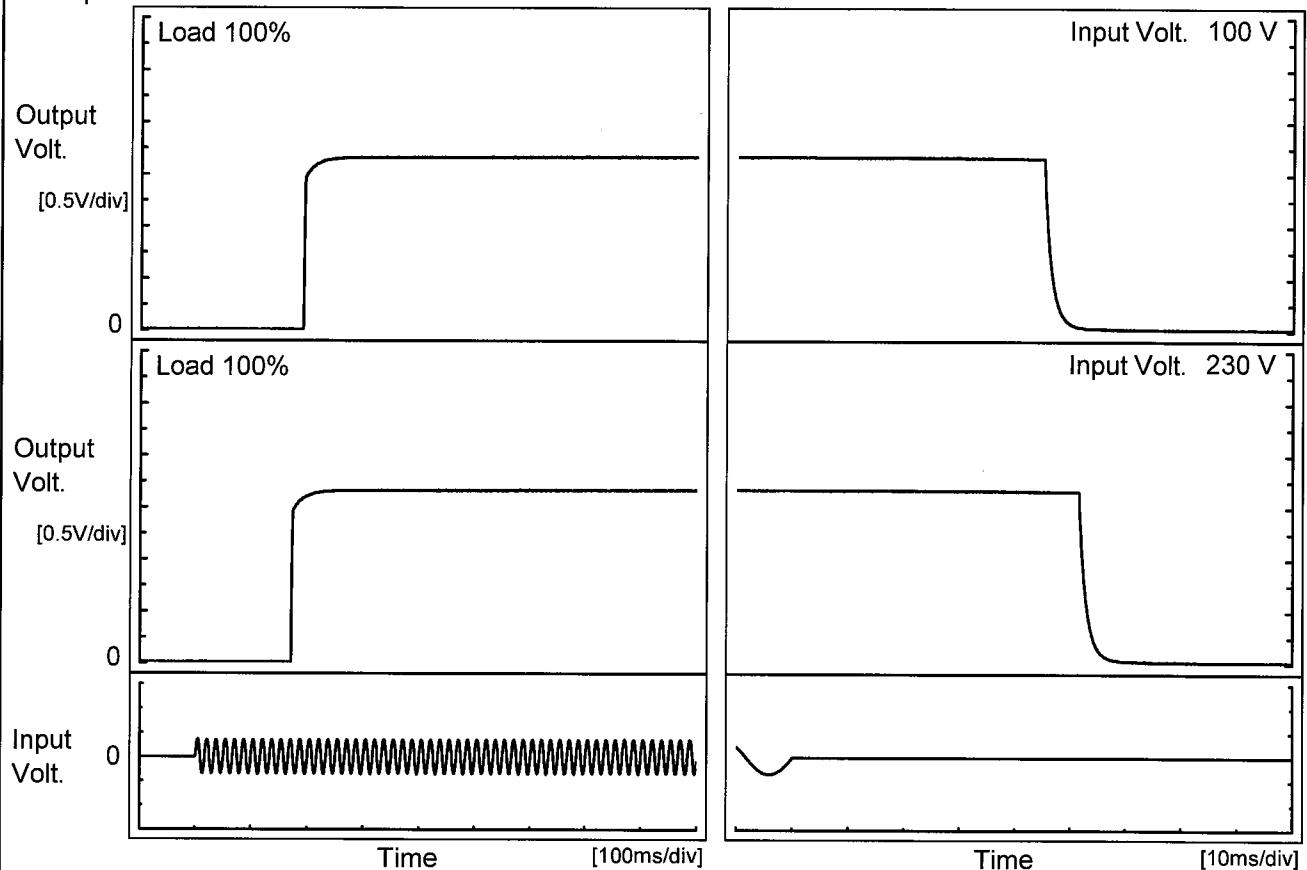
# COSEL

Model	LFA300F-3R3-TY	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+3.3V60A																								
1. Graph			2. Values																						
 <p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 100V Load 100%</p>			<table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>3.356</td></tr> <tr><td>0.5</td><td>3.355</td></tr> <tr><td>1.0</td><td>3.355</td></tr> <tr><td>2.0</td><td>3.355</td></tr> <tr><td>3.0</td><td>3.355</td></tr> <tr><td>4.0</td><td>3.355</td></tr> <tr><td>5.0</td><td>3.355</td></tr> <tr><td>6.0</td><td>3.355</td></tr> <tr><td>7.0</td><td>3.355</td></tr> <tr><td>8.0</td><td>3.355</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	3.356	0.5	3.355	1.0	3.355	2.0	3.355	3.0	3.355	4.0	3.355	5.0	3.355	6.0	3.355	7.0	3.355	8.0	3.355
Time since start [H]	Output Voltage [V]																								
0.0	3.356																								
0.5	3.355																								
1.0	3.355																								
2.0	3.355																								
3.0	3.355																								
4.0	3.355																								
5.0	3.355																								
6.0	3.355																								
7.0	3.355																								
8.0	3.355																								
<p>* The characteristic of AC230V is equal.</p>																									

**COSEL**

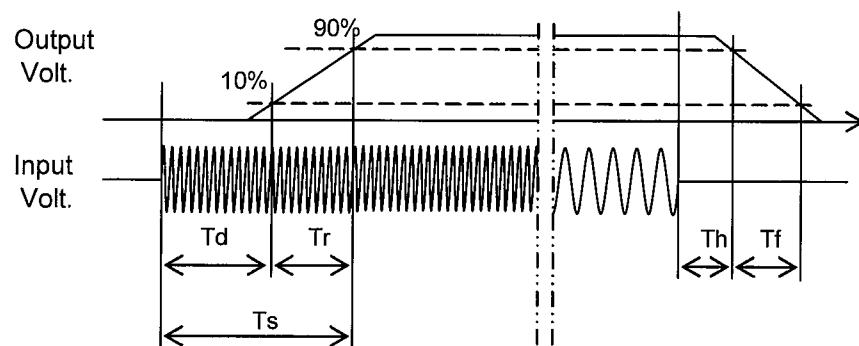
Model	LFA300F-3R3-TY	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+3.3V60A		

## 1. Graph



## 2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf	[ms]
100 V		192.0	5.0	197.0	45.2	2.9	
230 V		173.0	4.5	177.5	51.7	2.9	

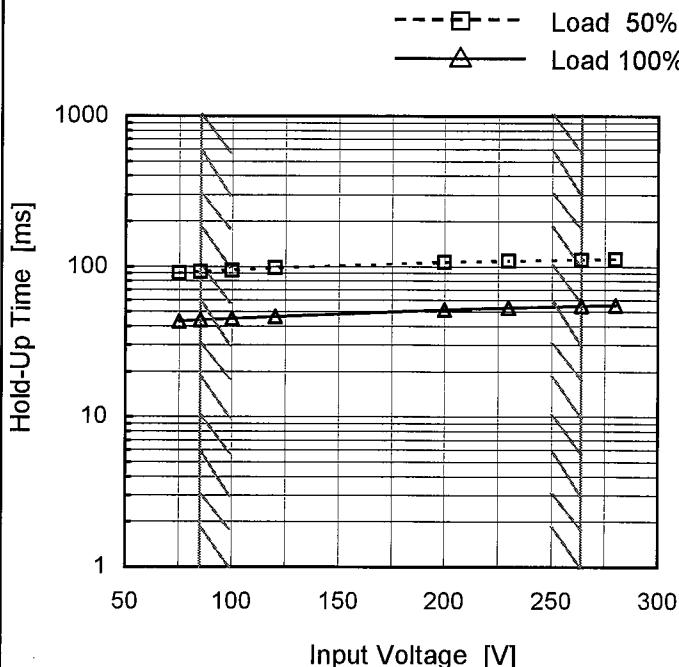


Model LFA300F-3R3-TY

Item Hold-Up Time

Object +3.3V60A

## 1. Graph

Temperature 25°C  
Testing Circuitry Figure A

## 2. Values

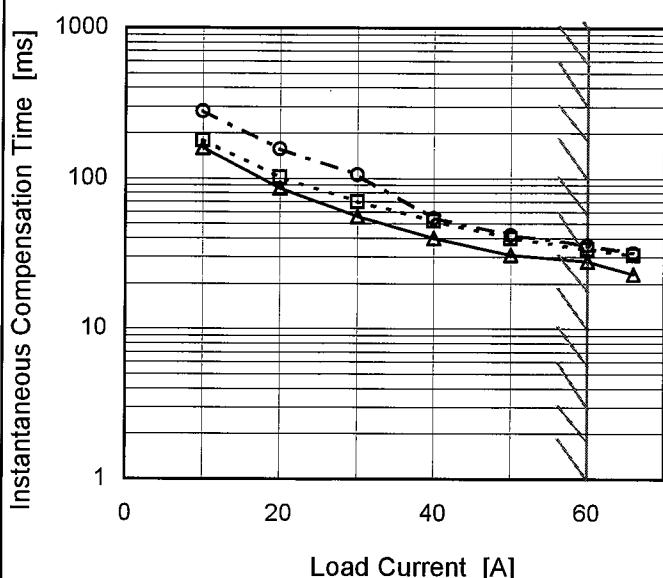
Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
75	90	43
85	92	44
100	94	45
120	98	46
200	107	52
230	109	53
264	111	55
280	112	55
--	-	-

This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.  
 Note: Slanted line shows the range of the rated input voltage.

Model	LFA300F-3R3-TY
Item	Instantaneous Interruption Compensation
Object	+3.3V60A

## 1. Graph

—△— Input Volt. 100V  
 - -□--- Input Volt. 200V  
 - -○--- Input Volt. 230V



Note: Slanted line shows the range of the rated load current.

Temperature 25°C  
Testing Circuitry Figure A

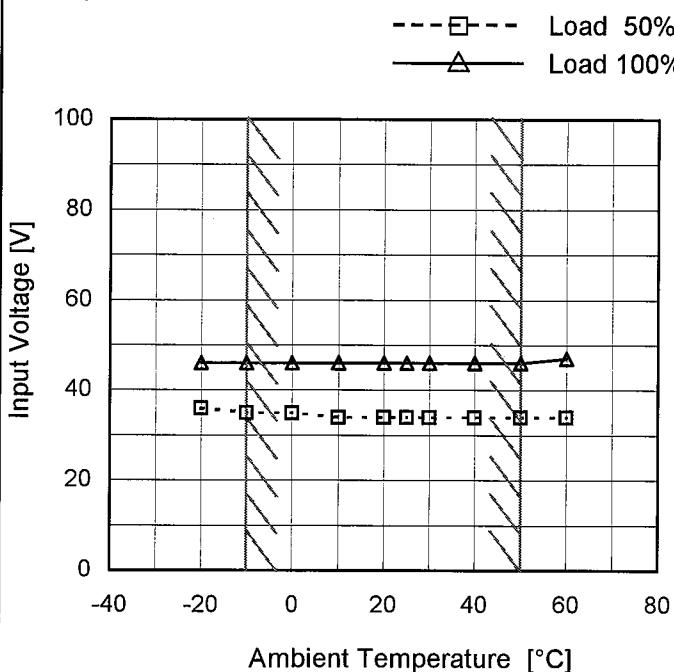
## 2. Values

Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	-	-	-
10	160	180	280
20	86	102	156
30	56	70	106
40	40	52	54
50	31	40	42
60	28	34	36
66	23	31	32
--	-	-	-
--	-	-	-
--	-	-	-

Model	LFA300F-3R3-TY
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+3.3V60A

Testing Circuitry Figure A

## 1. Graph



Note: Slanted line shows the range of the rated ambient temperature.

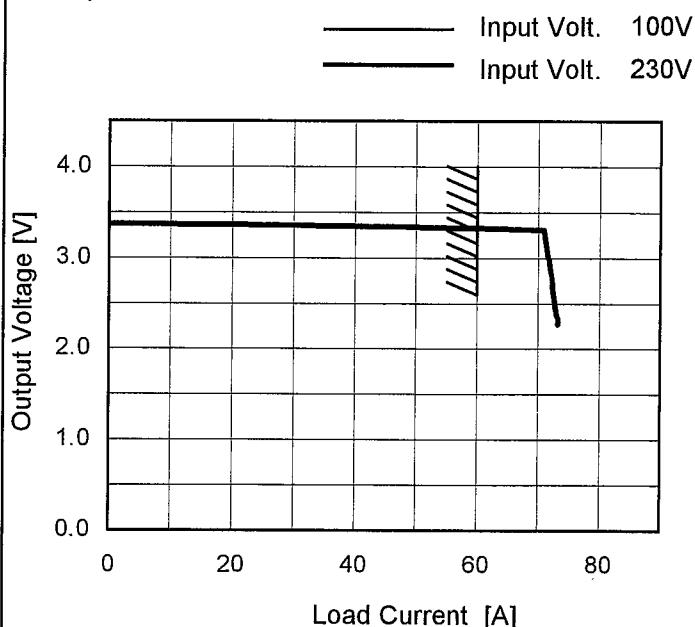
## 2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	36	46
-10	35	46
0	35	46
10	34	46
20	34	46
25	34	46
30	34	46
40	34	46
50	34	46
60	34	47
--	-	-

**COSEL**

Model	LFA300F-3R3-TY
Item	Overcurrent Protection
Object	+3.3V60A

## 1. Graph



Note: Slanted line shows the range of the rated load current.

Intermittent operation occurs when the output voltage is from 2V to 0V.

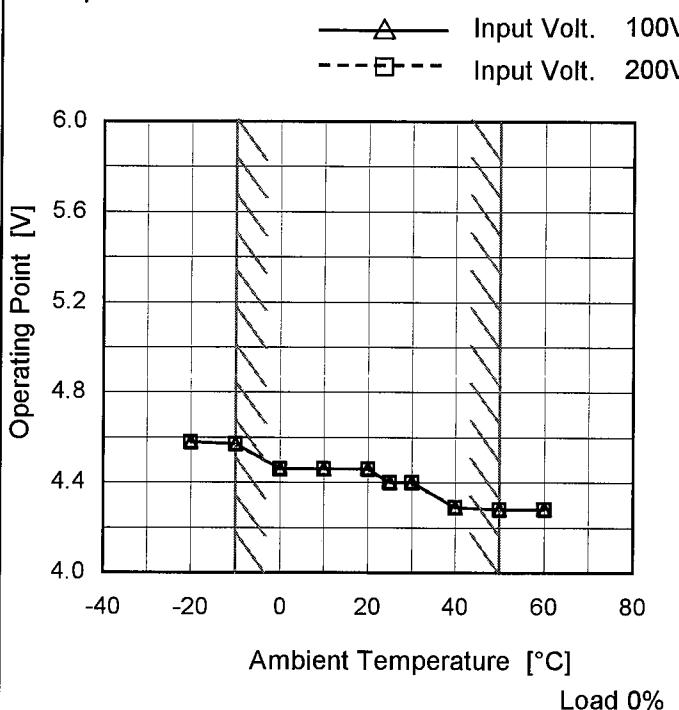
Temperature 25°C  
Testing Circuitry Figure A

## 2. Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 230[V]
3.300	71.14	70.93
3.135	71.30	71.37
2.970	71.53	71.63
2.640	72.40	72.35
2.310	73.07	73.12
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

Model	LFA300F-3R3-TY
Item	Overvoltage Protection
Object	+3.3V60A

## 1. Graph



Note: Slanted line shows the range of the rated ambient temperature.

## Testing Circuitry Figure A

## 2. Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 200[V]
-20	4.58	4.58
-10	4.57	4.57
0	4.46	4.46
10	4.46	4.46
20	4.46	4.46
25	4.40	4.40
30	4.40	4.40
40	4.29	4.29
50	4.28	4.28
60	4.28	4.28
--	-	-

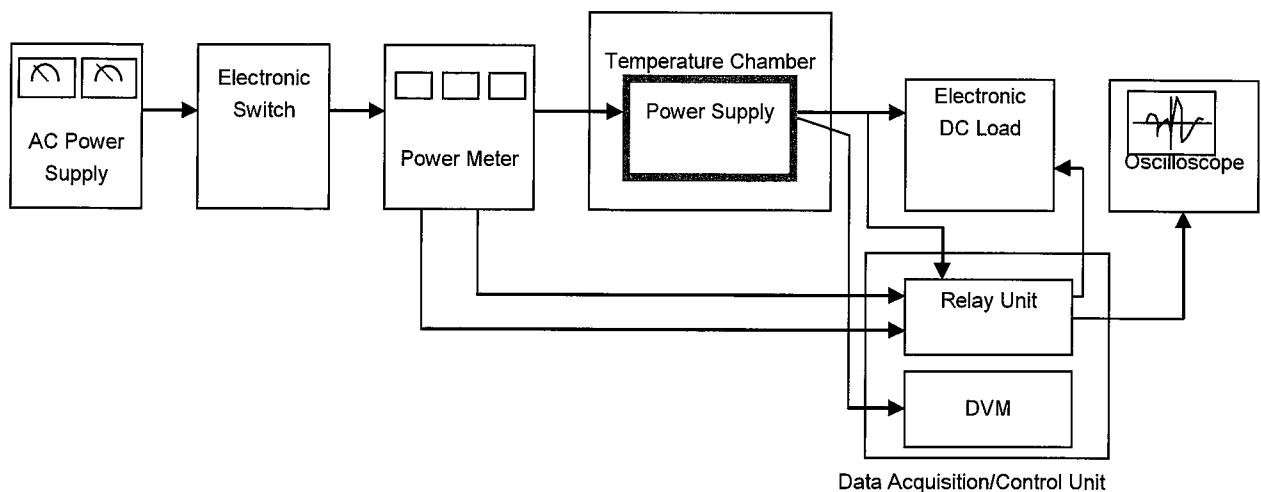


Figure A

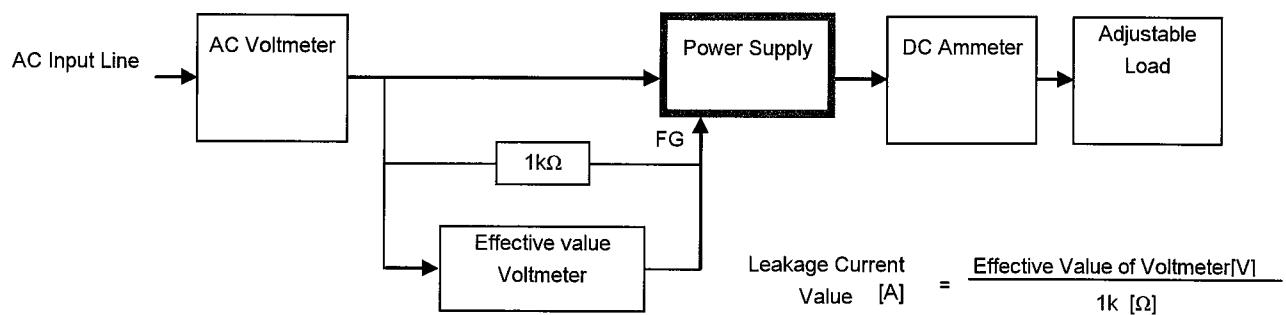


Figure B ( DEN-AN )

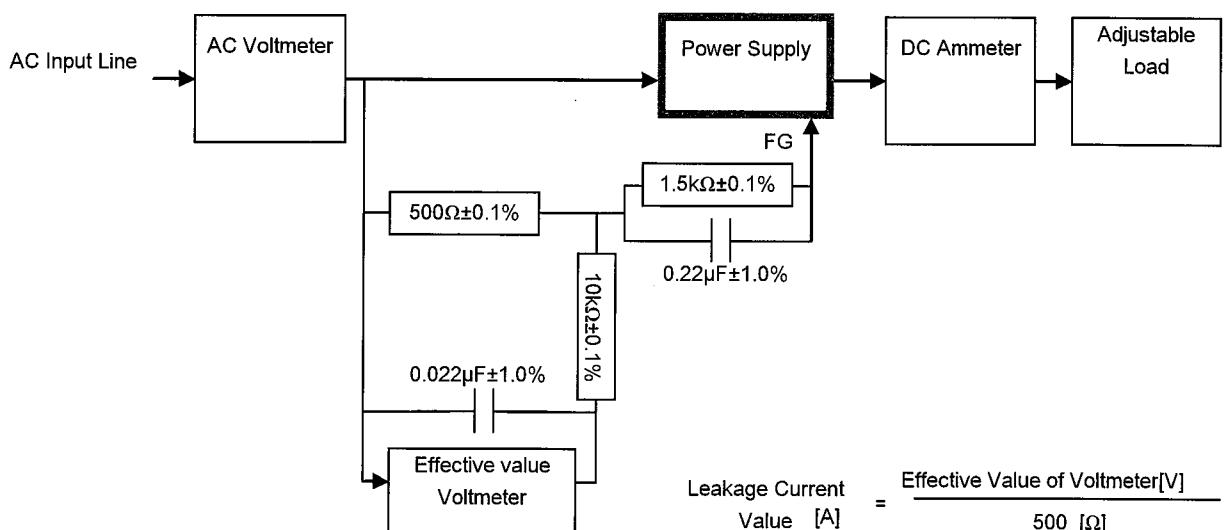


Figure B ( IEC60950-1 )

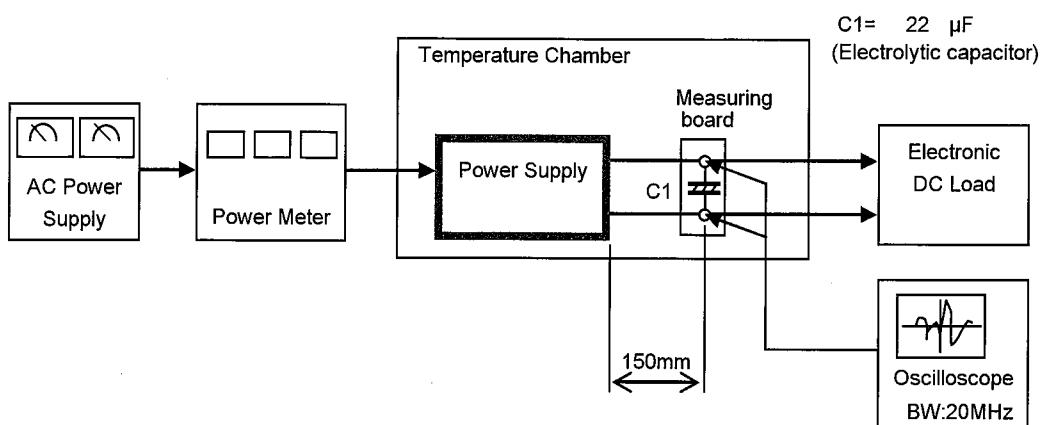


Figure C