

TEST DATA OF LFA300F-36-TY

Regulated DC Power Supply
December 20, 2010

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Tomoyuki Mukaiyama Design Engineer

COSEL CO.,LTD.

CONTENTS

1.Input Current (by Load Current)	1
2.Input Power (by Load Current)	2
3.Efficiency (by Input Voltage)	3
4.Efficiency (by Load Current)	4
5.Power Factor (by Input Voltage)	5
6.Power Factor (by Load Current)	6
7.Inrush Current	7
8.Leakage Current	8
9.Line Regulation	9
10.Load Regulation	10
11.Dynamic Load Response	11
12.Ripple Voltage (by Load Current)	12
13.Ripple-Noise	13
14.Ripple Voltage (by Ambient Temperature)	14
15.Ambient Temperature Drift	15
16.Output Voltage Accuracy	16
17.Time Lapse Drift	17
18.Rise and Fall Time	18
19.Hold-Up Time	19
20.Instantaneous Interruption Compensation	20
21.Minimum Input Voltage for Regulated Output Voltage	21
22.Overcurrent Protection	22
23.Oversupply Protection	23
24.Figure of Testing Circuitry	24

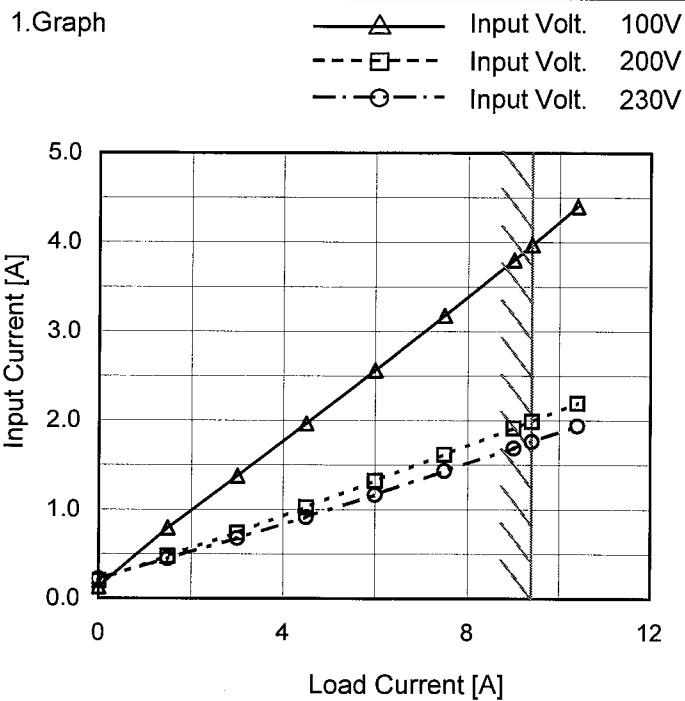
(Final Page 25)

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Model LFA300F-36-TY

Item Input Current (by Load Current)

Object _____



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

Temperature 25°C
Testing Circuitry Figure A

2. Values

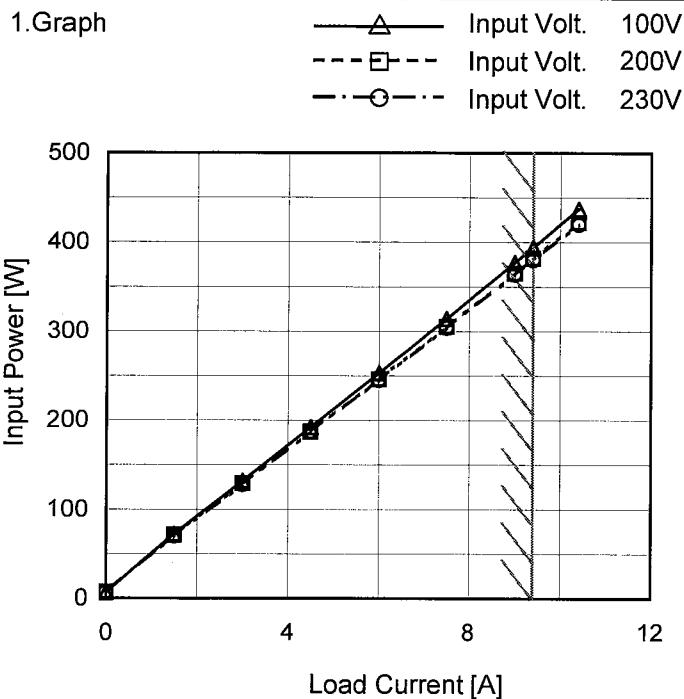
Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	0.131	0.198	0.220
1.5	0.790	0.474	0.444
3.0	1.377	0.736	0.676
4.5	1.965	1.024	0.914
6.0	2.562	1.323	1.162
7.5	3.176	1.616	1.432
9.0	3.800	1.916	1.688
9.4	3.970	1.990	1.762
10.4	4.400	2.194	1.940
--	-	-	-
--	-	-	-

COSEL

Model LFA300F-36-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]
0.0	6.3	7.0	7.0
1.5	72.3	71.0	70.0
3.0	131.8	129.0	128.0
4.5	192.0	187.0	187.0
6.0	252.9	246.0	245.0
7.5	314.0	305.0	304.0
9.0	377.0	365.0	364.0
9.4	394.0	382.0	380.0
10.4	437.0	422.0	420.0
--	-	-	-
--	-	-	-

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

COSEL

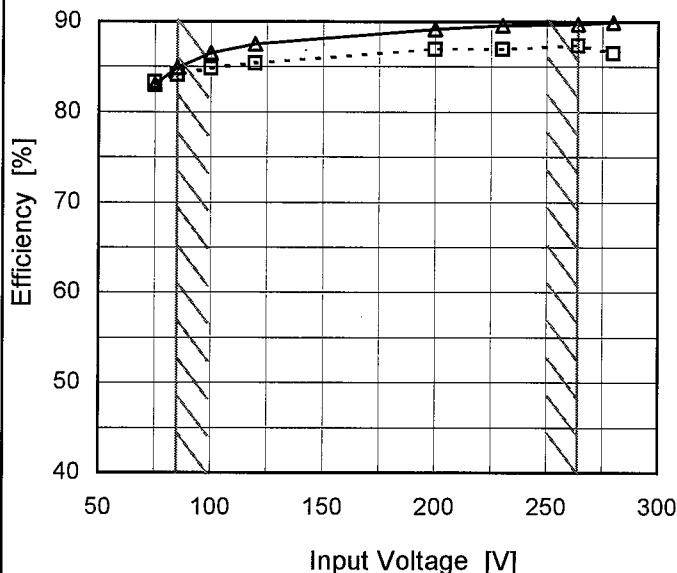
Model LFA300F-36-TY

Item Efficiency (by Input Voltage)

Object _____

1. Graph

---□--- Load 50%
 —△— Load 100%



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

Temperature 25°C
 Testing Circuitry Figure A

2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
75	83.3	83.1
85	84.1	84.9
100	84.8	86.4
120	85.4	87.5
200	86.9	89.1
230	86.9	89.6
264	87.4	89.7
280	86.5	89.9
--	-	-

COSEL

Model	LFA300F-36-TY	Temperature Testing Circuitry	25°C Figure A																																																			
Item	Efficiency (by Load Current)																																																					
Object	_____																																																					
1. Graph		2. Values																																																				
<p>Efficiency [%]</p> <p>Load Current [A]</p> <p>Legend:</p> <ul style="list-style-type: none"> Input Volt. 100V Input Volt. 200V Input Volt. 230V 		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Efficiency [%]</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>0.0</td><td>-</td><td>-</td><td>-</td></tr> <tr> <td>1.5</td><td>73.4</td><td>74.7</td><td>75.8</td></tr> <tr> <td>3.0</td><td>81.7</td><td>83.4</td><td>84.1</td></tr> <tr> <td>4.5</td><td>84.5</td><td>86.7</td><td>86.8</td></tr> <tr> <td>6.0</td><td>85.7</td><td>88.1</td><td>88.5</td></tr> <tr> <td>7.5</td><td>86.4</td><td>89.0</td><td>89.3</td></tr> <tr> <td>9.0</td><td>86.5</td><td>89.3</td><td>89.5</td></tr> <tr> <td>9.4</td><td>86.4</td><td>89.1</td><td>89.6</td></tr> <tr> <td>10.4</td><td>86.2</td><td>89.3</td><td>89.7</td></tr> <tr> <td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr> <td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>		Load Current [A]	Efficiency [%]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.0	-	-	-	1.5	73.4	74.7	75.8	3.0	81.7	83.4	84.1	4.5	84.5	86.7	86.8	6.0	85.7	88.1	88.5	7.5	86.4	89.0	89.3	9.0	86.5	89.3	89.5	9.4	86.4	89.1	89.6	10.4	86.2	89.3	89.7	--	-	-	-	--	-	-	-
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Note: Slanted line shows the range of the rated load current.

Model	LFA300F-36-TY																																	
Item	Power Factor (by Input Voltage)	Temperature 25°C Testing Circuitry Figure A																																
Object	_____																																	
1. Graph																																		
<p>Power Factor</p> <p>Input Voltage [V]</p> <p>Load 50% (dashed line with squares)</p> <p>Load 100% (solid line with triangles)</p>																																		
<p>Note: Slanted line shows the range of the rated input voltage.</p>																																		
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Model	LFA300F-36-TY
Item	Power Factor (by Load Current)
Object	_____
1. Graph	
<p style="text-align: center;"> —△— Input Volt. 100V ---□--- Input Volt. 200V ---○--- Input Volt. 230V </p> <p>The graph plots Power Factor on the Y-axis (0.0 to 1.0) against Load Current [A] on the X-axis (0 to 12). Three curves are shown for different input voltages: 100V (solid line with triangles), 200V (dashed line with squares), and 230V (dash-dot line with circles). All curves show an initial increase in power factor with load current, followed by a slight decrease as the load approaches the rated current. A slanted line on the graph indicates the range of the rated load current.</p>	
<p>Note: Slanted line shows the range of the rated load current.</p>	

Temperature 25°C
Testing Circuitry Figure A

2. Values

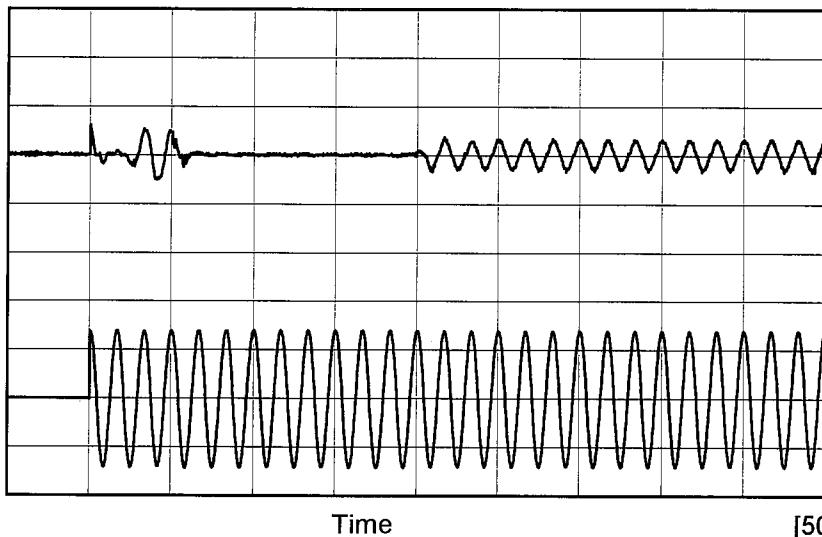
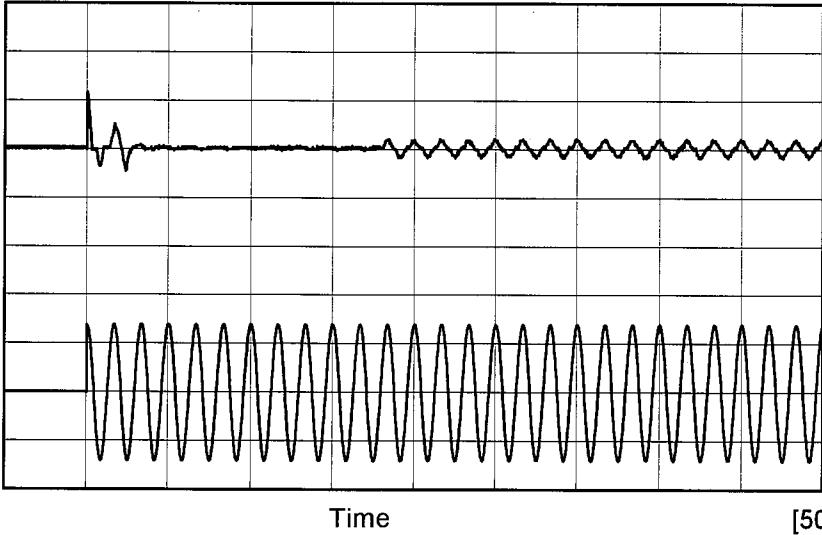
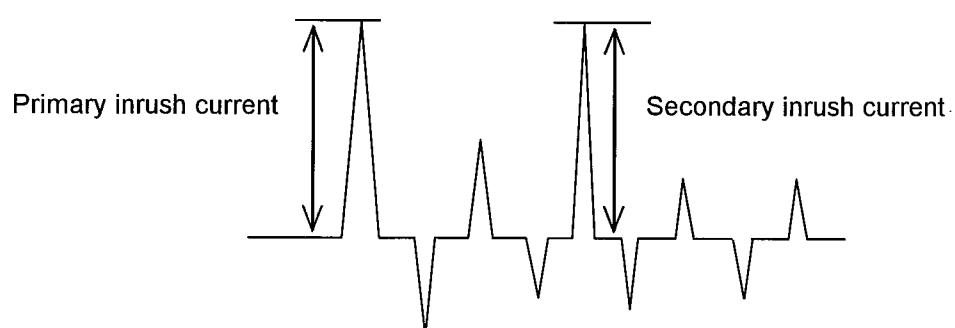
Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	0.481	0.175	0.137
1.5	0.916	0.747	0.686
3.0	0.959	0.878	0.826
4.5	0.978	0.912	0.890
6.0	0.988	0.932	0.918
7.5	0.990	0.944	0.924
9.0	0.992	0.953	0.938
9.4	0.993	0.960	0.938
10.4	0.995	0.963	0.942
--	-	-	-
--	-	-	-

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Model LFA300F-36-TY

Item Inrush Current

Object _____

Temperature 25°C
Testing Circuitry Figure AInput
Current
[20A/div]Input Voltage 100 V
Frequency 60 Hz
Load 100 %Input
Voltage
[100V/div]Input
Current
[20A/div]Input Voltage 230 V
Frequency 60 Hz
Load 100 %Input
Voltage
[200V/div]



Model	LFA300F-36-TY	Temperature Testing Circuitry Figure B
Item	Leakage Current	
Object	_____	

1. Results

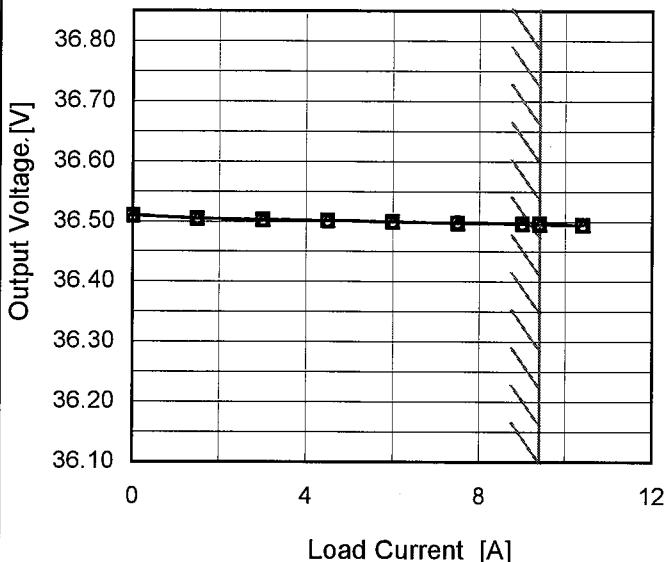
Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
DEN-AN	Both phases	0.33	0.53	0.60	Operation
	One of phases	0.34	0.70	0.83	Stand by
IEC60950-1	Both phases	0.24	0.50	0.57	Operation
	One of phases	0.32	0.68	0.74	Stand by

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

2. Condition

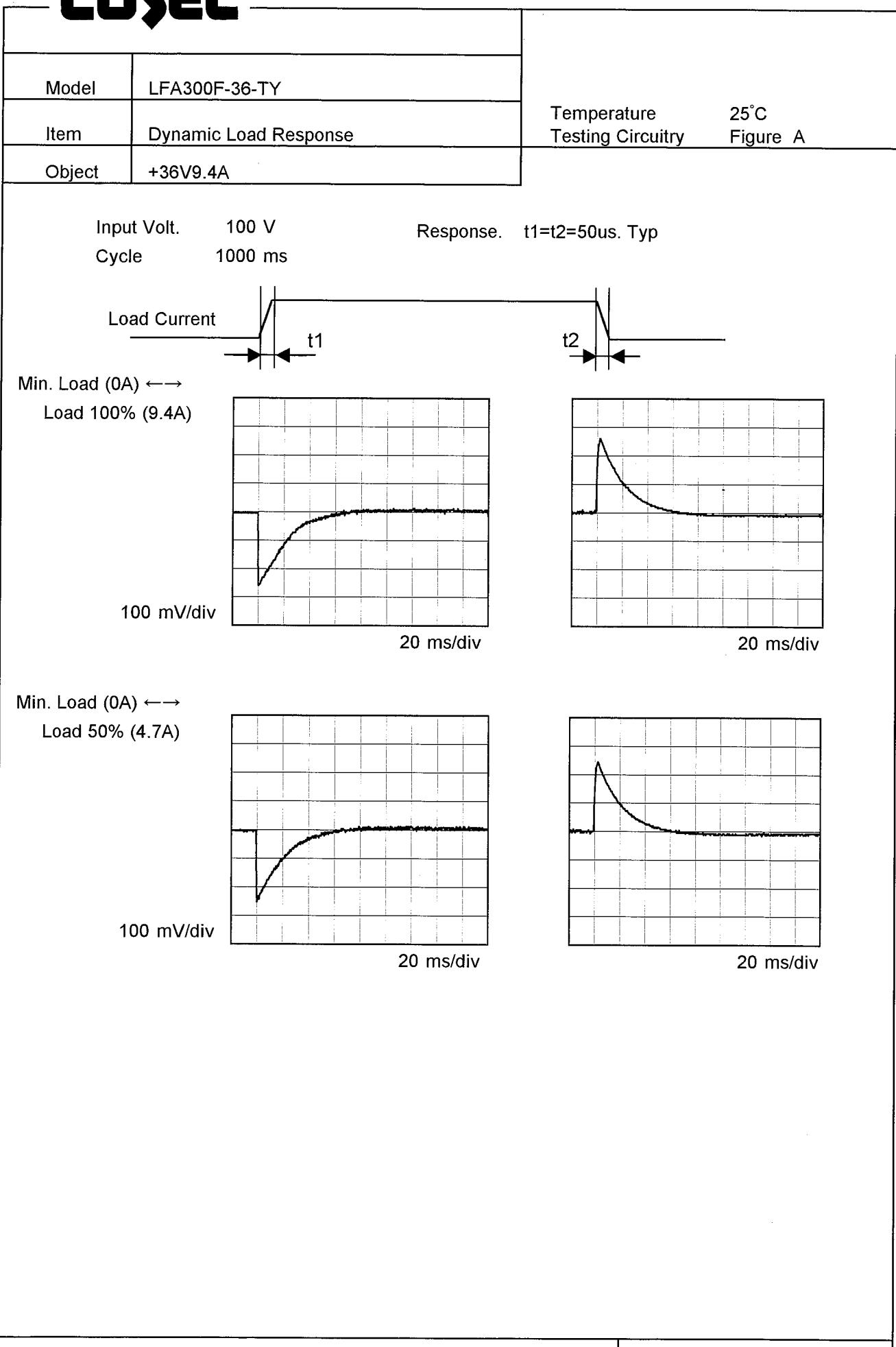
Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

Model	LFA300F-36-TY																																	
Item	Line Regulation	Temperature 25°C Testing Circuitry Figure A																																
Object	+36V9.4A																																	
1. Graph																																		
<p style="text-align: center;"> Output Voltage [V] Input Voltage [V] </p>																																		
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Note: Slanted line shows the range of the rated load current.

COSEL

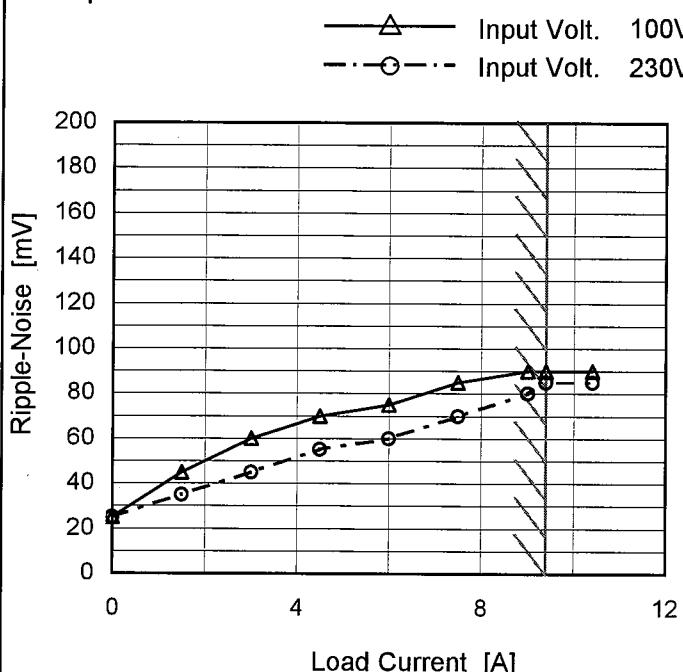


COSEL

Model	LFA300F-36-TY																																							
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure C																																						
Object	+36V9.4A																																							
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<p style="text-align: center;"> —△— Input Volt. 100V —○— Input Volt. 230V </p> <table border="1"> <caption>Data points estimated from Graph 1</caption> <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>0.0</td><td>10</td><td>10</td></tr> <tr><td>1.5</td><td>20</td><td>20</td></tr> <tr><td>3.0</td><td>25</td><td>25</td></tr> <tr><td>4.5</td><td>30</td><td>30</td></tr> <tr><td>6.0</td><td>30</td><td>30</td></tr> <tr><td>7.5</td><td>35</td><td>35</td></tr> <tr><td>9.0</td><td>40</td><td>40</td></tr> <tr><td>9.4</td><td>45</td><td>45</td></tr> <tr><td>10.4</td><td>55</td><td>55</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>		Load Current [A]	Ripple Voltage [mV] (Input Volt. 100V)	Ripple Voltage [mV] (Input Volt. 230V)	0.0	10	10	1.5	20	20	3.0	25	25	4.5	30	30	6.0	30	30	7.5	35	35	9.0	40	40	9.4	45	45	10.4	55	55	--	-	-	--	-	-			
Load Current [A]	Ripple Voltage [mV] (Input Volt. 100V)	Ripple Voltage [mV] (Input Volt. 230V)																																						
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<p>Measured by 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 style="text-align: center;"> T1: Due to AC Input Line T2: Due to Switching </p>																																								
<p style="text-align: center;">Fig. Complex Ripple Wave Form</p>																																								

Model	LFA300F-36-TY	Temperature Testing Circuitry 25°C Figure C
Item	Ripple-Noise	
Object	+36V9.4A	

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.

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 230 [V]
0.0	25	25
1.5	45	35
3.0	60	45
4.5	70	55
6.0	75	60
7.5	85	70
9.0	90	80
9.4	90	85
10.4	90	85
--	-	-
--	-	-

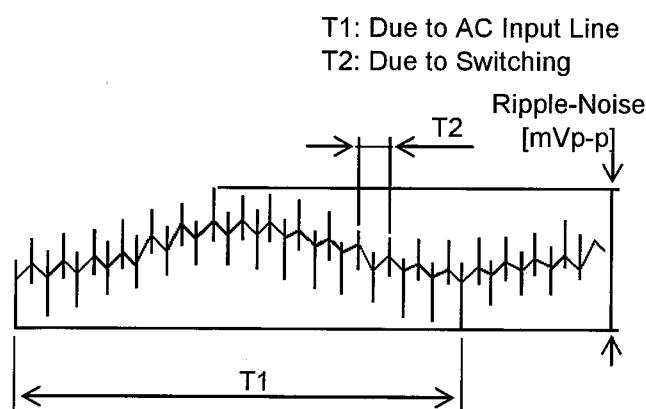
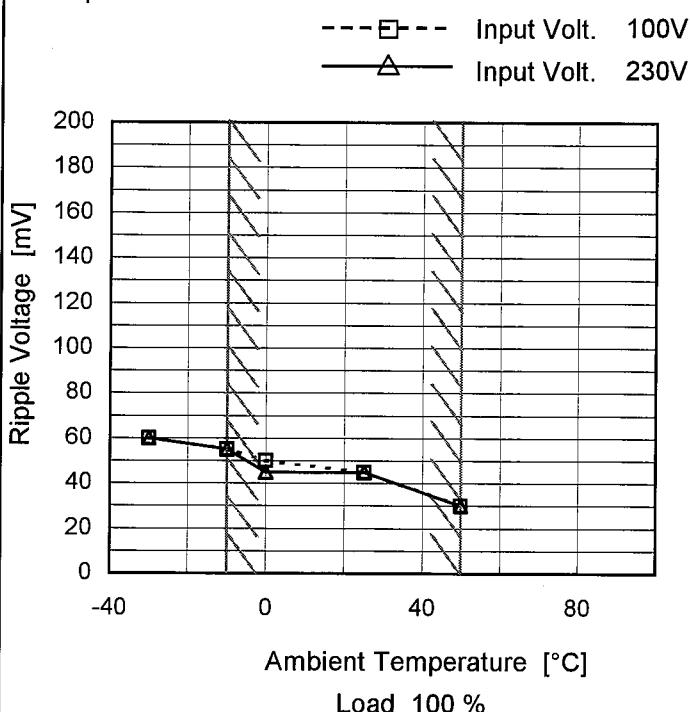


Fig. Complex Ripple Wave Form

Model	LFA300F-36-TY
Item	Ripple Voltage (by Ambient Temp.)
Object	+36V9.4A

Testing Circuitry Figure C

1.Graph



Measured by 20 MHz Oscilloscope.

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

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 230 [V]
-30	60	60
-10	55	55
0	50	45
25	45	45
50	30	30
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

Model	LFA300F-36-TY	Testing Circuitry Figure A		
Item	Ambient Temperature Drift			
Object	+36V9.4A			
1.Graph	<p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p> <p>Legend:</p> <ul style="list-style-type: none"> Input Volt. 100V Input Volt. 200V Input Volt. 230V 	2.Values		
		Ambient Temperature [°C]	Output Voltage [V]	
			Input Volt. 100[V]	Input Volt. 200[V]
		-20	36.442	36.442
		-10	36.450	36.450
		0	36.459	36.459
		10	36.472	36.472
		20	36.488	36.489
		25	36.496	36.496
		30	36.501	36.502
		40	36.506	36.506
		50	36.504	36.504
		60	36.497	36.496
		--	-	-

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



Model	LFA300F-36-TY	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+36V9.4A	

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 - 9.4A

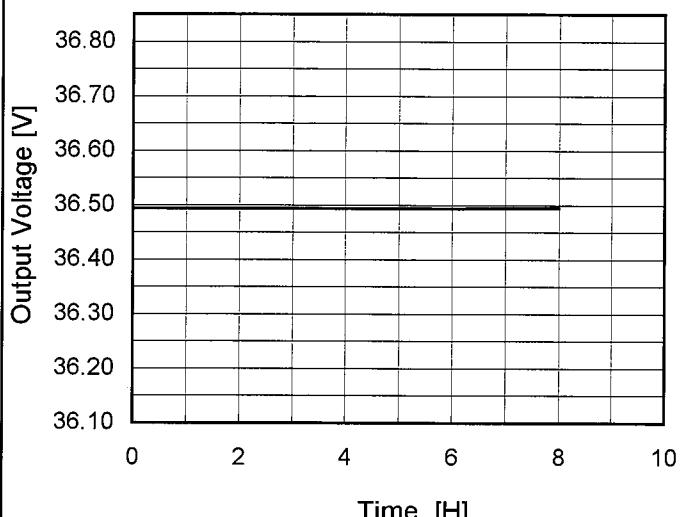
* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

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

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	40	264	0	36.521	± 36	± 0.1
Minimum Voltage	-10	85	9.4	36.450		

COSEL

Model	LFA300F-36-TY	Temperature Testing Circuitry	25°C Figure A																						
Item	Time Lapse Drift																								
Object	+36V9.4A																								
1.Graph			2.Values																						
 <p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 230V 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>36.496</td></tr> <tr><td>0.5</td><td>36.496</td></tr> <tr><td>1.0</td><td>36.496</td></tr> <tr><td>2.0</td><td>36.496</td></tr> <tr><td>3.0</td><td>36.496</td></tr> <tr><td>4.0</td><td>36.496</td></tr> <tr><td>5.0</td><td>36.496</td></tr> <tr><td>6.0</td><td>36.496</td></tr> <tr><td>7.0</td><td>36.496</td></tr> <tr><td>8.0</td><td>36.497</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	36.496	0.5	36.496	1.0	36.496	2.0	36.496	3.0	36.496	4.0	36.496	5.0	36.496	6.0	36.496	7.0	36.496	8.0	36.497
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* The characteristic of AC100V is equal.

COSEL

Model	LFA300F-36-TY	Temperature Testing Circuitry Object	25°C Figure A
Item	Rise and Fall Time		
Object	+36V9.4A		

1. Graph

Output Volt. [5V/div]

Load 100%

Input Volt. 100 V

Output Volt. [5V/div]

Load 100%

Input Volt. 230 V

Input Volt.

Time [100ms/div] Time [10ms/div]

2. Values [ms]

Input Volt.	Time	Td	Tr	Ts	Th	Tf
100 V		197.5	15.5	213.0	30.2	32.6
230 V		166.0	15.5	181.5	35.3	32.6

Output Volt.

Input Volt.

Td

Tr

Ts

90%

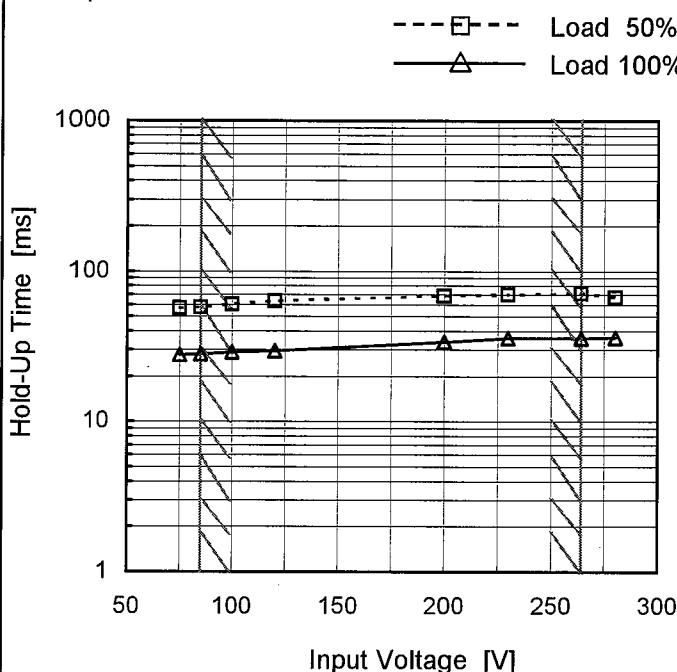
10%

Th

Tf

Model	LFA300F-36-TY
Item	Hold-Up Time
Object	+36V9.4A

1. Graph



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.

Temperature 25°C
Testing Circuitry Figure A

2. Values

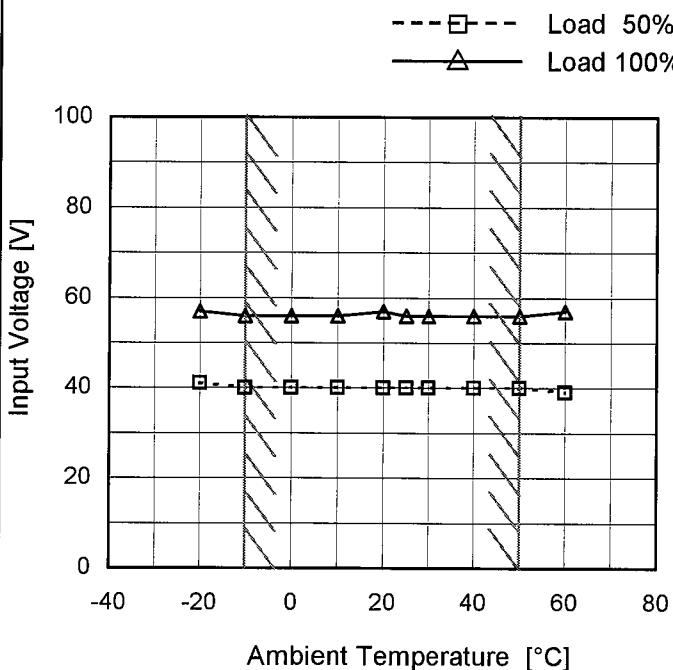
Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
75	57	28
85	58	28
100	60	30
120	63	30
200	69	34
230	70	35
264	71	36
280	68	36
--	-	-

<p>Model LFA300F-36-TY</p> <p>Item Instantaneous Interruption Compensation</p> <p>Object +36V9.4A</p>	<p>Temperature 25°C Testing Circuitry Figure A</p>																																																				
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	<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Time [ms]</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>0.0</td><td>-</td><td>-</td><td>-</td></tr> <tr> <td>1.5</td><td>98</td><td>114</td><td>197</td></tr> <tr> <td>3.0</td><td>48</td><td>62</td><td>105</td></tr> <tr> <td>4.5</td><td>31</td><td>40</td><td>72</td></tr> <tr> <td>6.0</td><td>22</td><td>32</td><td>54</td></tr> <tr> <td>7.5</td><td>19</td><td>24</td><td>24</td></tr> <tr> <td>9.0</td><td>14</td><td>21</td><td>21</td></tr> <tr> <td>9.4</td><td>14</td><td>20</td><td>21</td></tr> <tr> <td>10.4</td><td>13</td><td>19</td><td>19</td></tr> <tr> <td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr> <td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>			Load Current [A]	Time [ms]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.0	-	-	-	1.5	98	114	197	3.0	48	62	105	4.5	31	40	72	6.0	22	32	54	7.5	19	24	24	9.0	14	21	21	9.4	14	20	21	10.4	13	19	19	--	-	-	-	--	-	-
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<p>1. Graph</p>																																																					
<p>Note: Slanted line shows the range of the rated load current.</p>																																																					

Model	LFA300F-36-TY
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+36V9.4A

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	41	57
-10	40	56
0	40	56
10	40	56
20	40	57
25	40	56
30	40	56
40	40	56
50	40	56
60	39	57
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Model	LFA300F-36-TY	Temperature Testing Circuitry 25°C Figure A																																												
Item	Overcurrent Protection																																													
Object	+36V9.4A																																													
1. Graph		2. Values																																												
<p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>Input Volt. 100V</p> <p>Input Volt. 230V</p>		<table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th colspan="2">Load Current [A]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr><td>36.0</td><td>12.40</td><td>12.36</td></tr> <tr><td>34.2</td><td>12.45</td><td>12.41</td></tr> <tr><td>32.4</td><td>12.40</td><td>12.35</td></tr> <tr><td>28.8</td><td>12.59</td><td>12.55</td></tr> <tr><td>25.2</td><td>12.68</td><td>12.64</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>	Output Voltage [V]	Load Current [A]		Input Volt. 100[V]	Input Volt. 230[V]	36.0	12.40	12.36	34.2	12.45	12.41	32.4	12.40	12.35	28.8	12.59	12.55	25.2	12.68	12.64	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
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Note: Slanted line shows the range of the rated load current.

Intermittent operation occurs when the output voltage is from 23V to 0V.

Model	LFA300F-36-TY																																								
Item	Overvoltage Protection																																								
Object	+36V9.4A																																								
1.Graph																																									
<p>Operating Point [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 0%</p> <p>Legend:</p> <ul style="list-style-type: none"> Input Volt. 100V (Solid line with open triangle markers) Input Volt. 200V (Dashed line with open square markers) 		2.Values																																							
<p>Note: Slanted line shows the range of the rated ambient temperature.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Operating Point [V]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> </tr> </thead> <tbody> <tr> <td>-20</td> <td>43.92</td> <td>43.92</td> </tr> <tr> <td>-10</td> <td>44.32</td> <td>44.32</td> </tr> <tr> <td>0</td> <td>44.61</td> <td>44.61</td> </tr> <tr> <td>10</td> <td>45.03</td> <td>45.03</td> </tr> <tr> <td>20</td> <td>45.32</td> <td>45.32</td> </tr> <tr> <td>25</td> <td>45.55</td> <td>45.55</td> </tr> <tr> <td>30</td> <td>45.73</td> <td>45.73</td> </tr> <tr> <td>40</td> <td>46.02</td> <td>46.14</td> </tr> <tr> <td>50</td> <td>46.43</td> <td>46.43</td> </tr> <tr> <td>60</td> <td>46.84</td> <td>46.84</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Ambient Temperature [°C]	Operating Point [V]		Input Volt. 100[V]	Input Volt. 200[V]	-20	43.92	43.92	-10	44.32	44.32	0	44.61	44.61	10	45.03	45.03	20	45.32	45.32	25	45.55	45.55	30	45.73	45.73	40	46.02	46.14	50	46.43	46.43	60	46.84	46.84	--	-	-	
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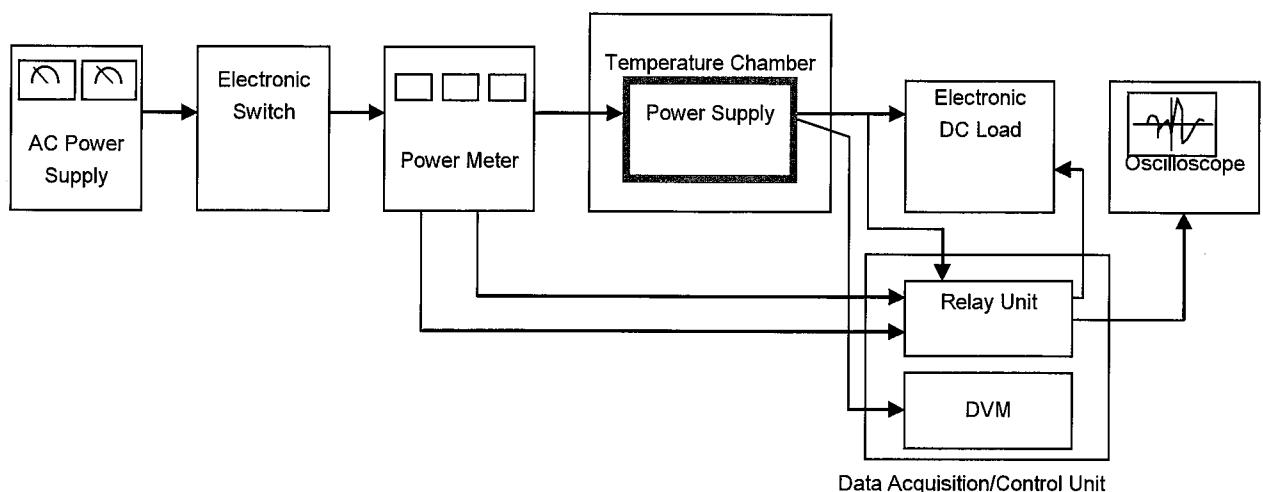


Figure A

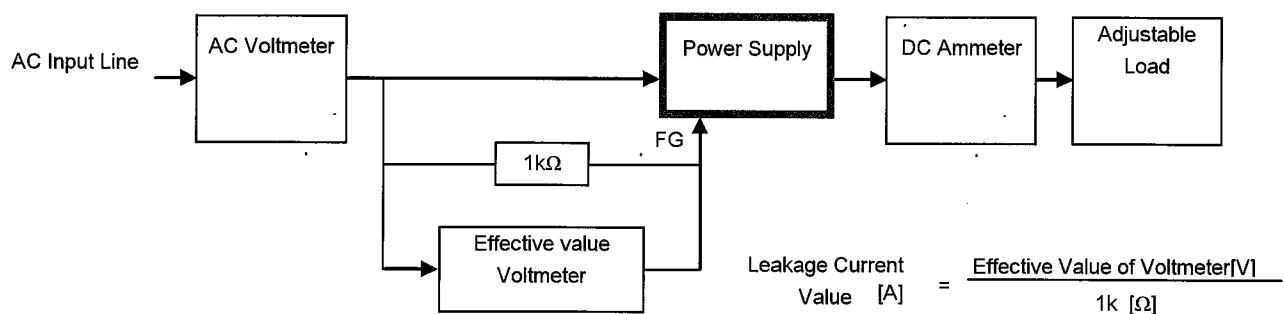


Figure B (DEN-AN)

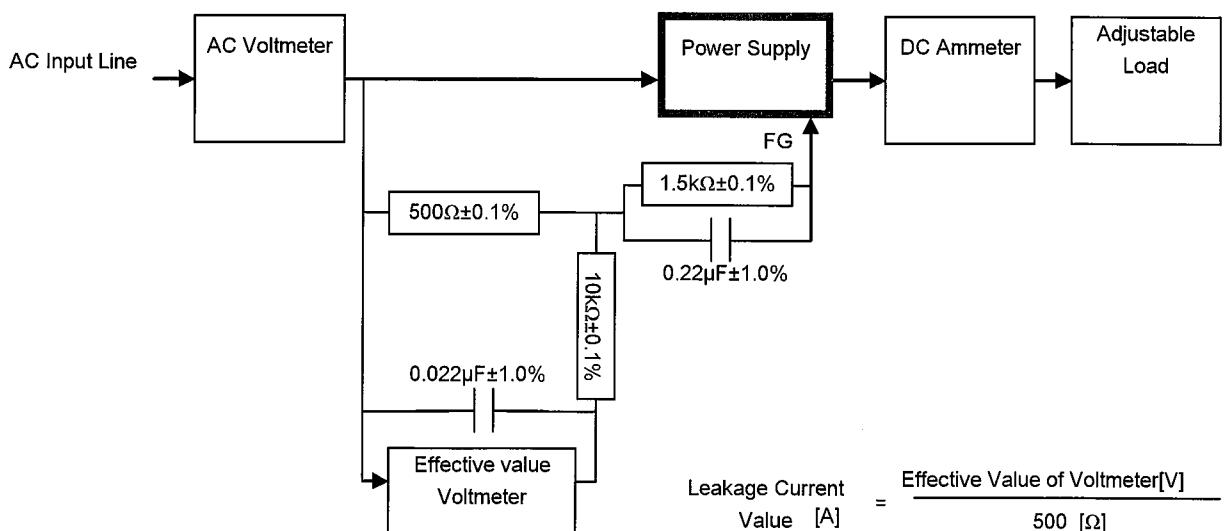


Figure B (IEC60950-1)

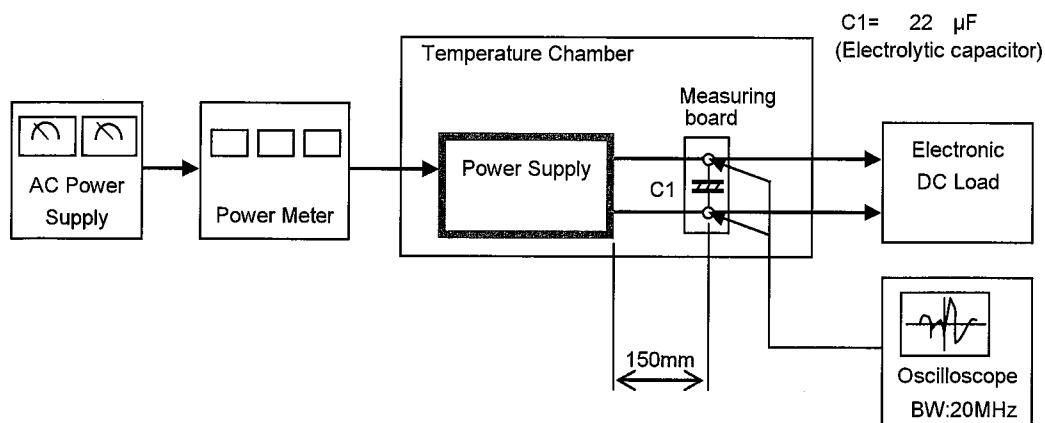


Figure C