

TEST DATA OF LFA300F-24-TY

Regulated DC Power Supply
December 20, 2010

Approved by : *Yoshiaki Shimizu*
Yoshiaki Shimizu Design Manager

Prepared by : *Tomoyuki Mukaiyama*
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.Overvoltage Protection	23
24.Figure of Testing Circuitry	24

(Final Page 25)

Model		LFA300F-24-TY																																																				
Item		Input Current (by Load Current)																																																				
Object																																																						
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>---□---</div><div>- - -○- - -</div></div><div><div>Input Volt.</div><div>Input Volt.</div><div>Input Volt.</div></div><div><div>100V</div><div>200V</div><div>230V</div></div></div> <p>Input Current [A]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Current [A]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.0</td><td>0.138</td><td>0.202</td><td>0.224</td></tr><tr><td>2.0</td><td>0.710</td><td>0.423</td><td>0.402</td></tr><tr><td>4.0</td><td>1.232</td><td>0.672</td><td>0.610</td></tr><tr><td>6.0</td><td>1.748</td><td>0.932</td><td>0.826</td></tr><tr><td>8.0</td><td>2.274</td><td>1.194</td><td>1.056</td></tr><tr><td>10.0</td><td>2.820</td><td>1.450</td><td>1.296</td></tr><tr><td>12.0</td><td>3.366</td><td>1.716</td><td>1.516</td></tr><tr><td>14.0</td><td>3.930</td><td>1.978</td><td>1.756</td></tr><tr><td>15.4</td><td>4.340</td><td>2.166</td><td>1.901</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Input Current [A]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.0	0.138	0.202	0.224	2.0	0.710	0.423	0.402	4.0	1.232	0.672	0.610	6.0	1.748	0.932	0.826	8.0	2.274	1.194	1.056	10.0	2.820	1.450	1.296	12.0	3.366	1.716	1.516	14.0	3.930	1.978	1.756	15.4	4.340	2.166	1.901	--	-	-	-	--	-	-	-
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Model		LFA300F-24-TY		Temperature Testing Circuitry	25°C Figure A																																																			
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Object		_____																																																						
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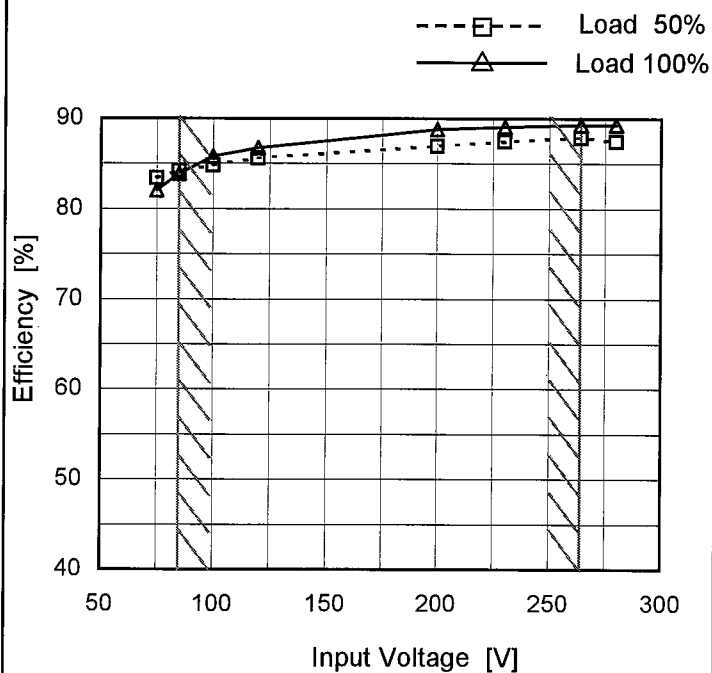
Model LFA300F-24-TY

Item Efficiency (by Input Voltage)

Object

Temperature 25°C
Testing Circuitry Figure A

1. Graph



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

2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
75	83.4	82.1
85	84.2	83.9
100	84.8	85.8
120	85.6	86.7
200	87.0	88.8
230	87.4	89.1
264	87.9	89.3
280	87.4	89.3
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Model

LFA300F-24-TY

Item

Efficiency (by Load Current)

Object

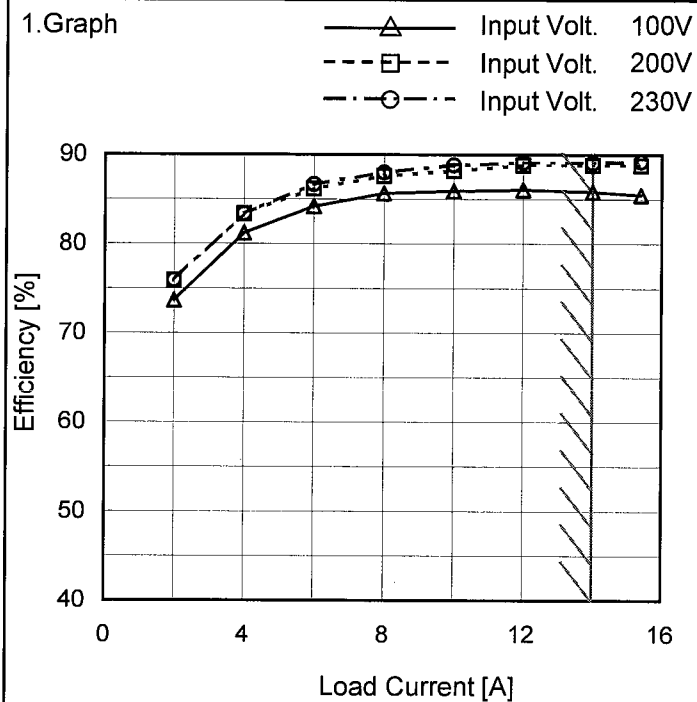
Temperature

25°C

Testing Circuitry

Figure A

1. Graph



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

2. Values

Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	-	-	-
2.0	73.6	75.9	75.9
4.0	81.2	83.4	83.4
6.0	84.2	86.1	86.7
8.0	85.7	87.6	88.0
10.0	85.9	88.2	88.8
12.0	86.1	88.8	89.1
14.0	85.8	88.8	89.1
15.4	85.5	88.8	89.2
--	-	-	-
--	-	-	-

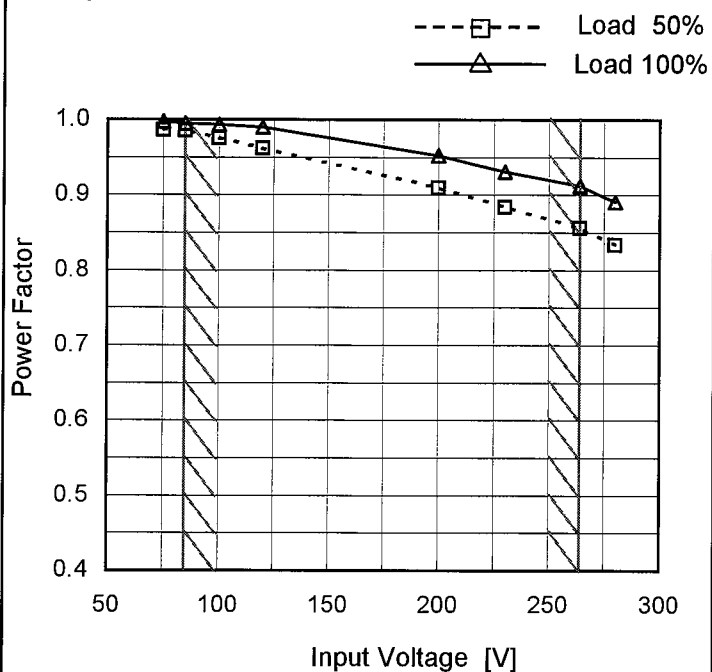
Model LFA300F-24-TY

Item Power Factor (by Input Voltage)

Object

Temperature 25°C
Testing Circuitry Figure A

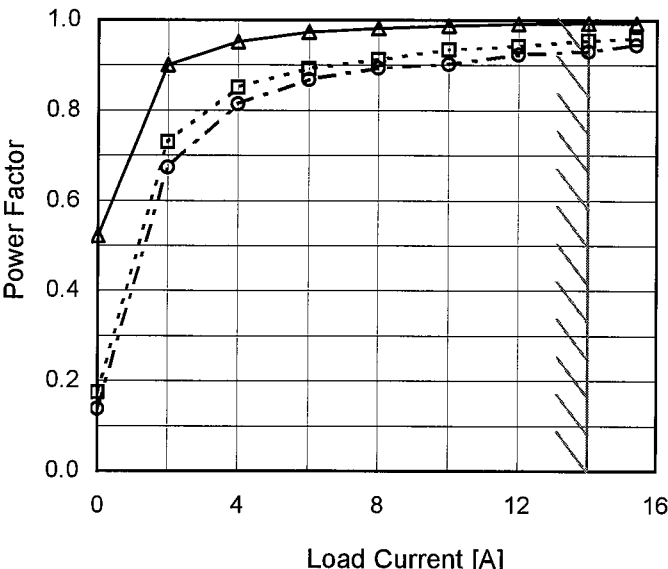
1. Graph



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

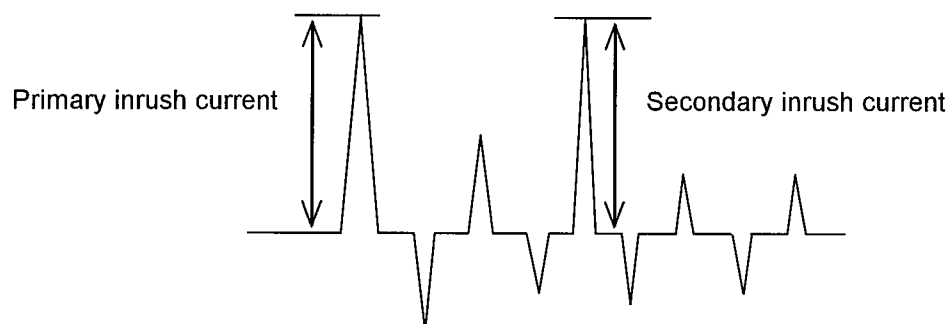
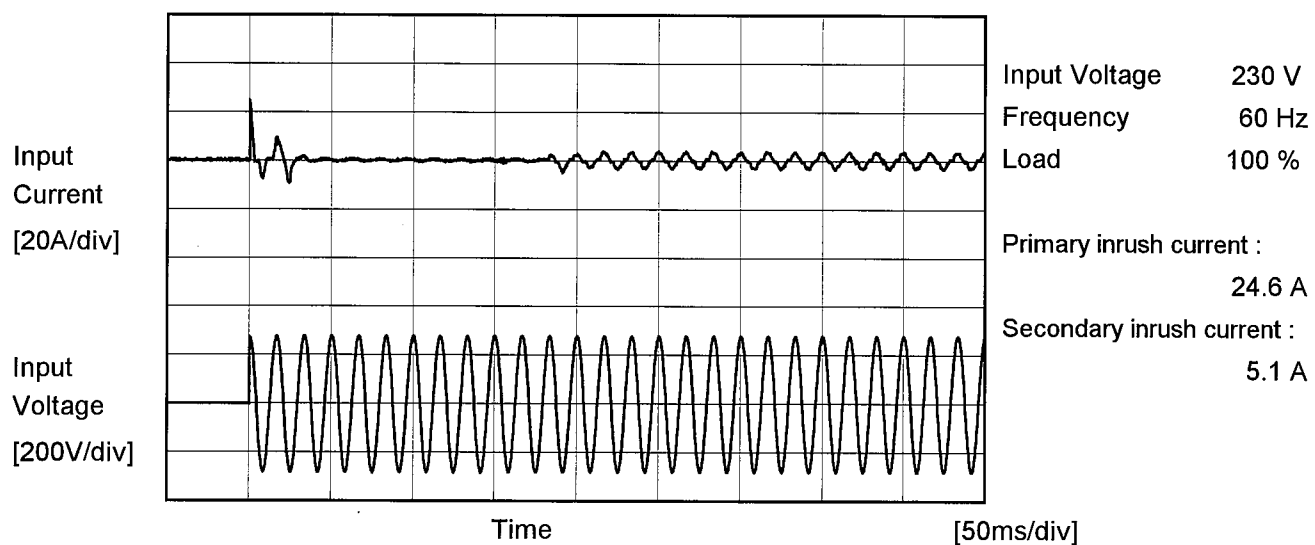
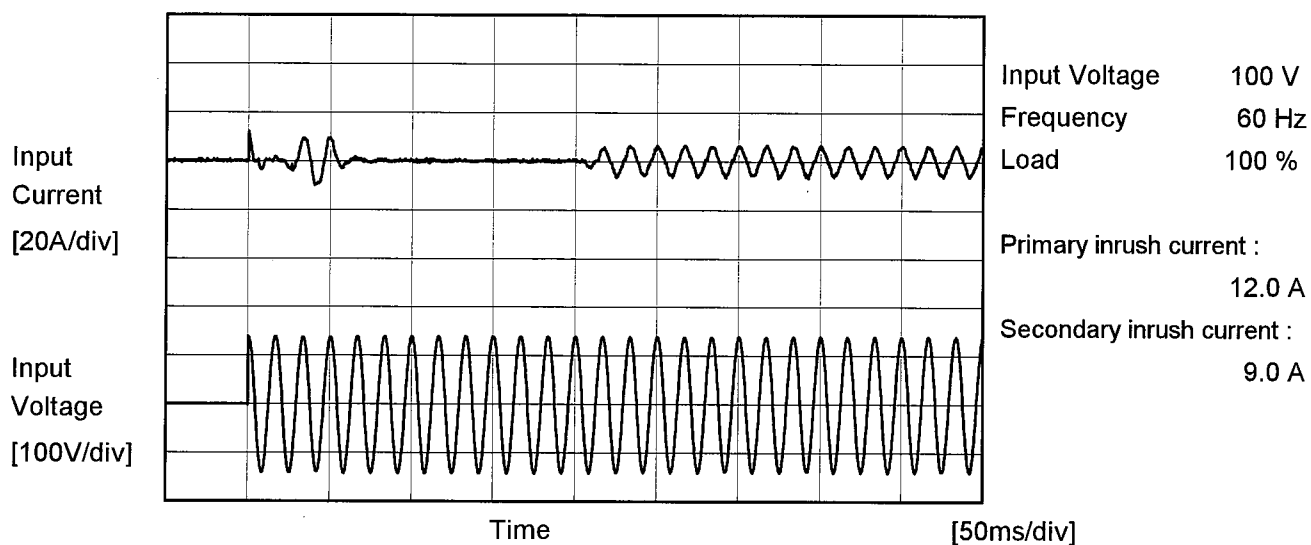
2. Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
75	0.986	0.998
85	0.985	0.995
100	0.975	0.993
120	0.962	0.990
200	0.910	0.952
230	0.884	0.931
264	0.856	0.912
280	0.834	0.891
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Model		LFA300F-24-TY	
Item		Inrush Current	Temperature 25°C Testing Circuitry Figure A
Object			



Model		LFA300F-24-TY	Temperature 25°C Testing Circuitry Figure B
Item		Leakage Current	
Object		_____	

1.Results

[mA]

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.

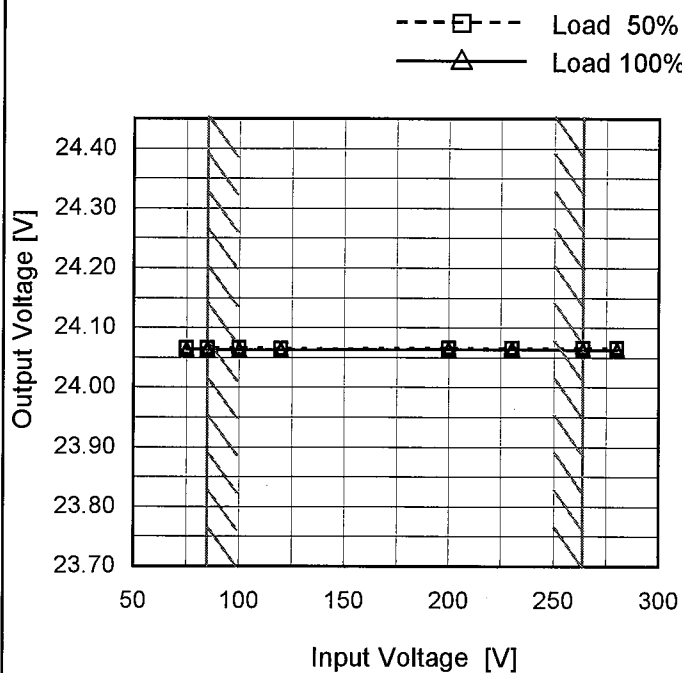
Model LFA300F-24-TY

Item Line Regulation

Object +24V14A

Temperature 25°C
Testing Circuitry Figure A

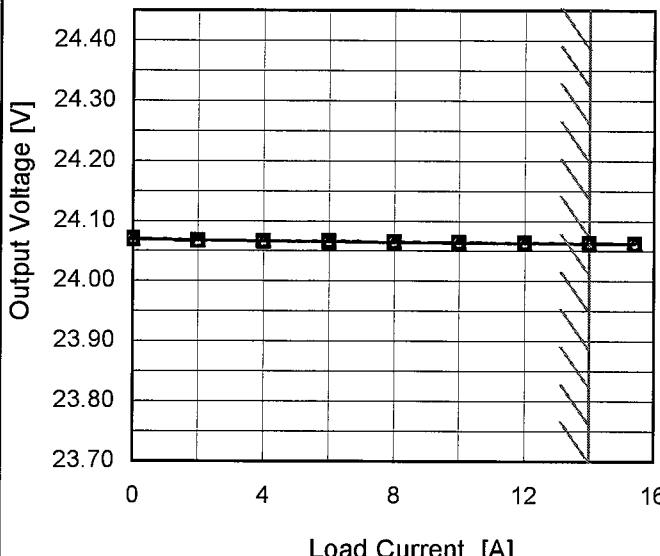
1. Graph



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

2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	24.066	24.063
85	24.066	24.063
100	24.065	24.063
120	24.065	24.063
200	24.066	24.063
230	24.066	24.063
264	24.066	24.063
280	24.066	24.063
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Model	LFA300F-24-TY																																																					
Item	Load Regulation	Temperature	25°C																																																			
Object	+24V14A	Testing Circuitry	Figure A																																																			
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Model	LFA300F-24-TY	Temperature Testing Circuitry	25°C Figure A
Item	Dynamic Load Response		
Object	+24V14A		

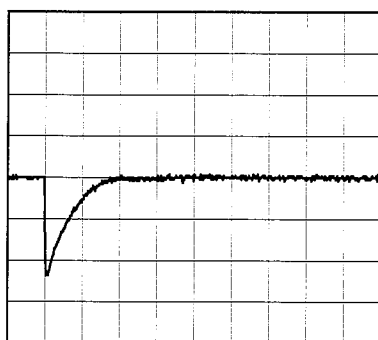
Input Volt. 100 V
Cycle 1000 ms

Response. $t_1=t_2=50\mu\text{s}$. Typ

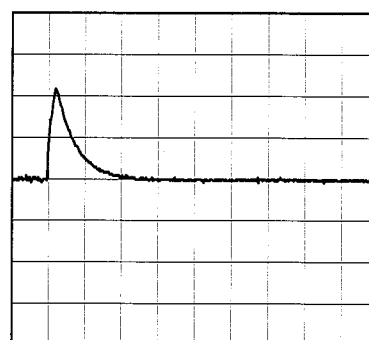


Min. Load (0A) \longleftrightarrow
Load 100% (14A)

100 mV/div



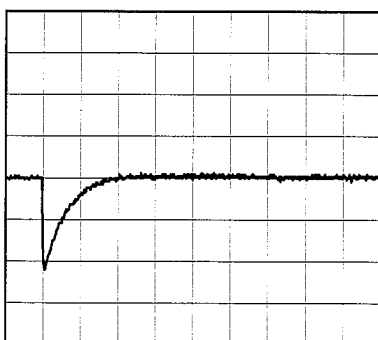
20 ms/div



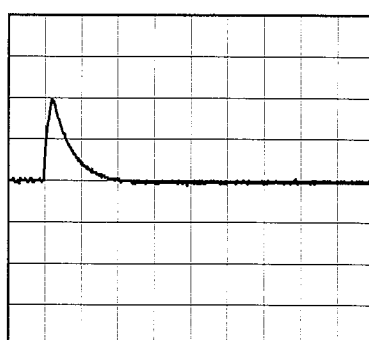
20 ms/div

Min. Load (0A) \longleftrightarrow
Load 50% (7A)

100 mV/div



20 ms/div

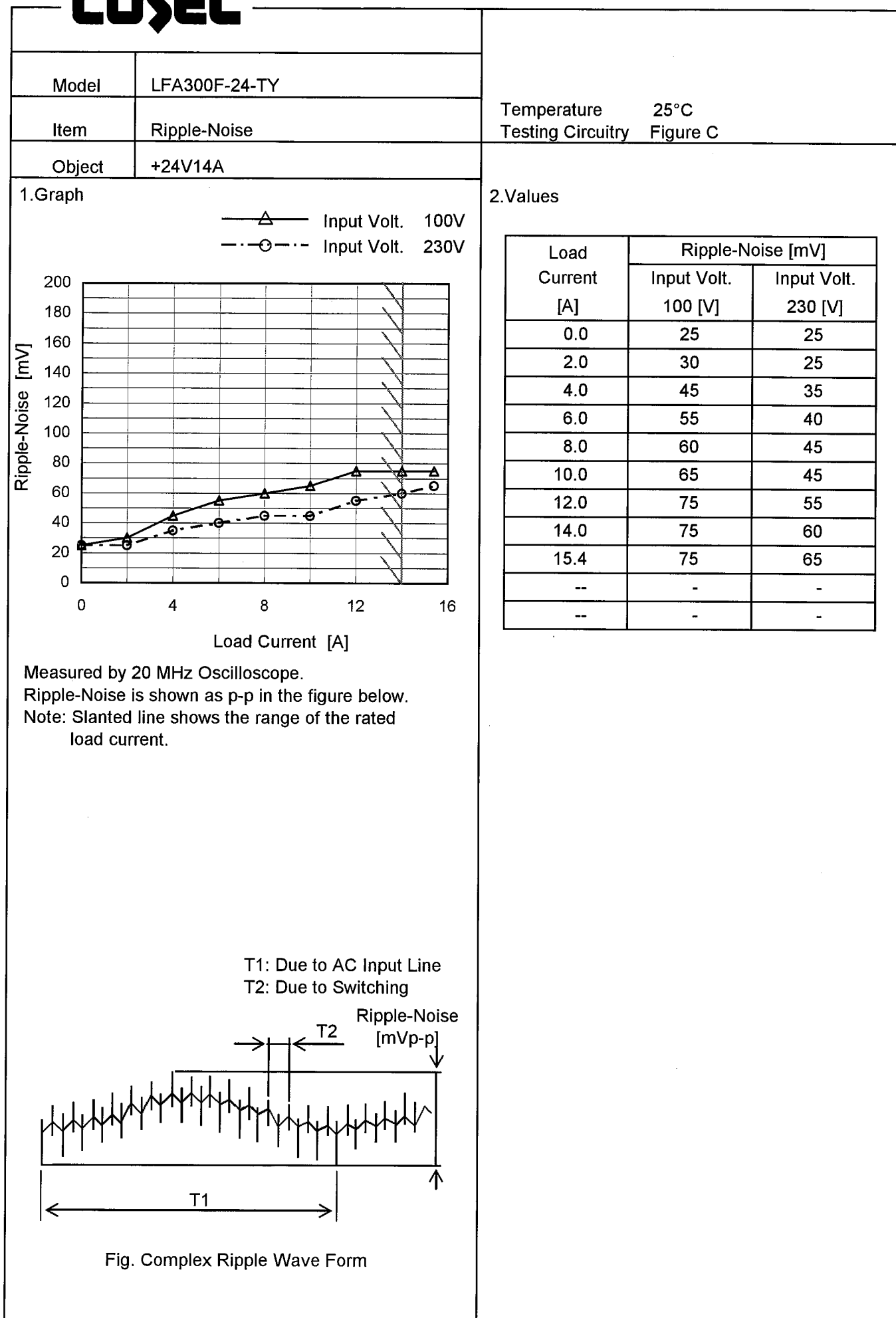


20 ms/div

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Model		LFA300F-24-TY		Temperature 25°C																																							
Item		Ripple Voltage (by Load Current)		Testing Circuitry Figure C																																							
Object		+24V14A																																									
1.Graph				2.Values																																							
<div><div><div>—△— Input Volt. 100V</div><div>- - -○- - - Input Volt. 230V</div></div><div>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.</div></div>				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 100 [V]</th><th>Input Volt. 230 [V]</th></tr><tr><td>0.0</td><td>10</td><td>10</td></tr><tr><td>2.0</td><td>15</td><td>15</td></tr><tr><td>4.0</td><td>15</td><td>15</td></tr><tr><td>6.0</td><td>15</td><td>15</td></tr><tr><td>8.0</td><td>20</td><td>20</td></tr><tr><td>10.0</td><td>20</td><td>20</td></tr><tr><td>12.0</td><td>25</td><td>25</td></tr><tr><td>14.0</td><td>30</td><td>30</td></tr><tr><td>15.4</td><td>30</td><td>30</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 100 [V]	Input Volt. 230 [V]	0.0	10	10	2.0	15	15	4.0	15	15	6.0	15	15	8.0	20	20	10.0	20	20	12.0	25	25	14.0	30	30	15.4	30	30	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																										
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0.0	10	10																																									
2.0	15	15																																									
4.0	15	15																																									
6.0	15	15																																									
8.0	20	20																																									
10.0	20	20																																									
12.0	25	25																																									
14.0	30	30																																									
15.4	30	30																																									
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<div><div><div>T1: Due to AC Input Line</div><div>T2: Due to Switching</div></div><div>Fig. Complex Ripple Wave Form</div></div>																																											

COSEL



BC-10495

Model LFA300F-24-TY

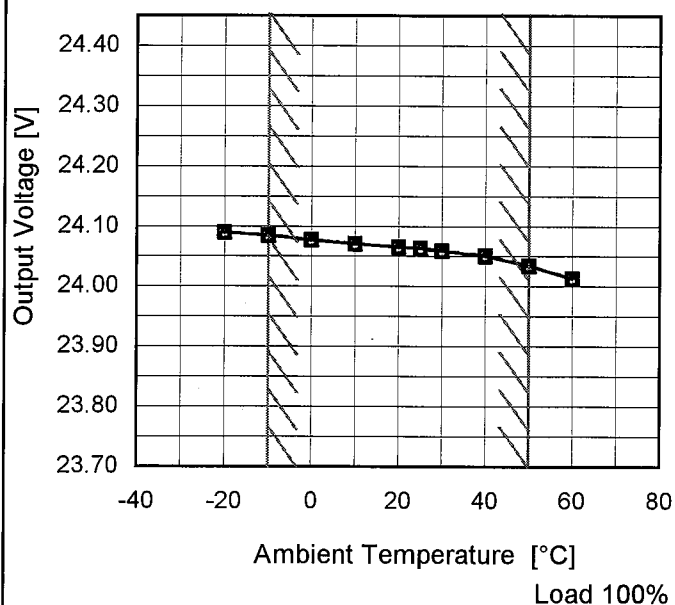
Item Ambient Temperature Drift

Object +24V14A

Testing Circuitry Figure A

1. Graph


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



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

2. Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
-20	24.090	24.090	24.090
-10	24.084	24.084	24.084
0	24.078	24.077	24.078
10	24.071	24.071	24.071
20	24.066	24.066	24.066
25	24.063	24.063	24.063
30	24.059	24.059	24.059
40	24.051	24.051	24.051
50	24.035	24.035	24.034
60	24.013	24.013	24.013
--	-	-	-

			
Model	LFA300F-24-TY		
Item	Output Voltage Accuracy		Testing Circuitry Figure A
Object	+24V14A		

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 - 14A

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

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

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-10	264	0	24.095	±29	±0.1
Minimum Voltage	50	264	14	24.038		

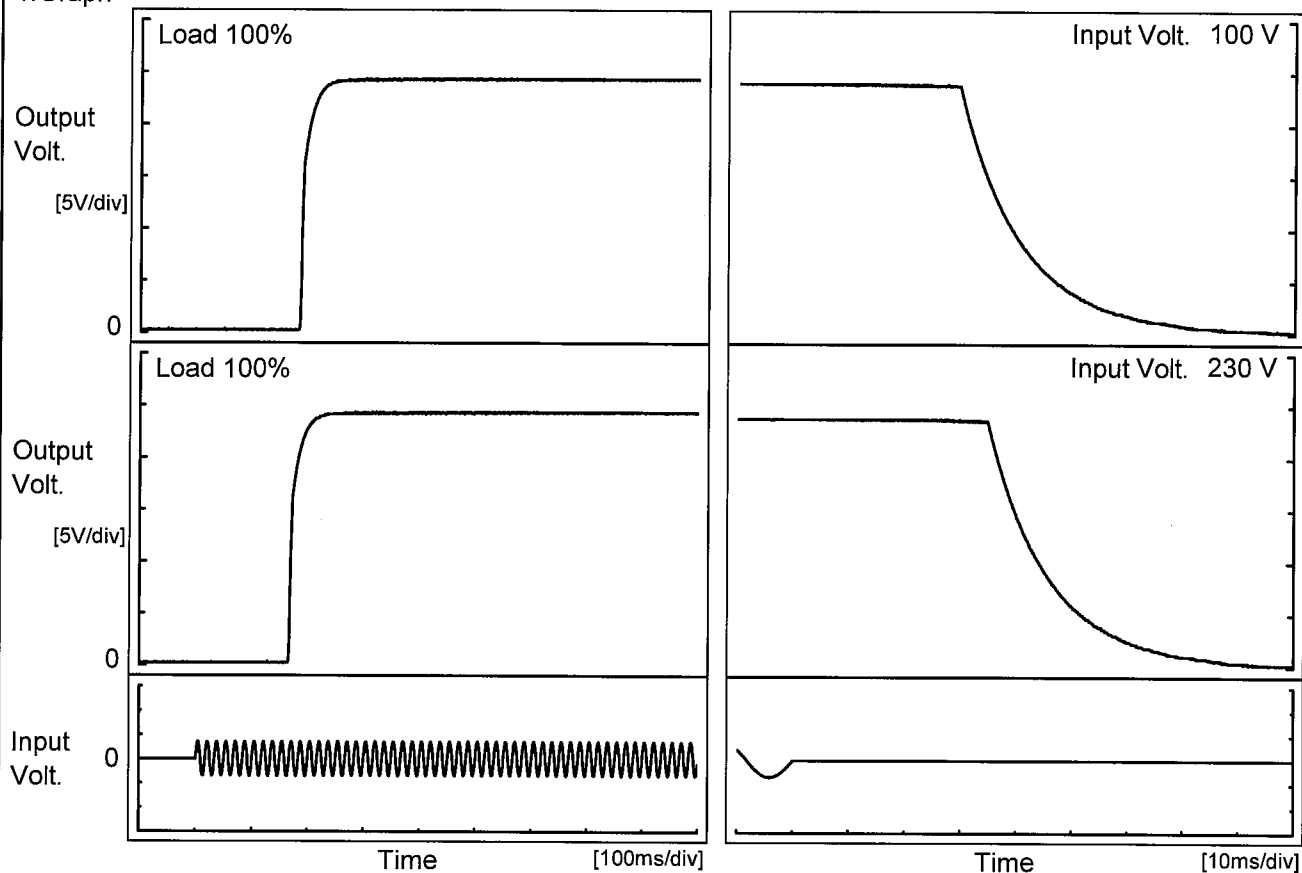
COSEL

LUXEL			
Model	LFA300F-24-TY		
Item	Time Lapse Drift	Temperature	25°C
Object	+24V14A	Testing Circuitry	Figure A
1.Graph		2.Values	
<div><div><div>Output Voltage [V]</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></di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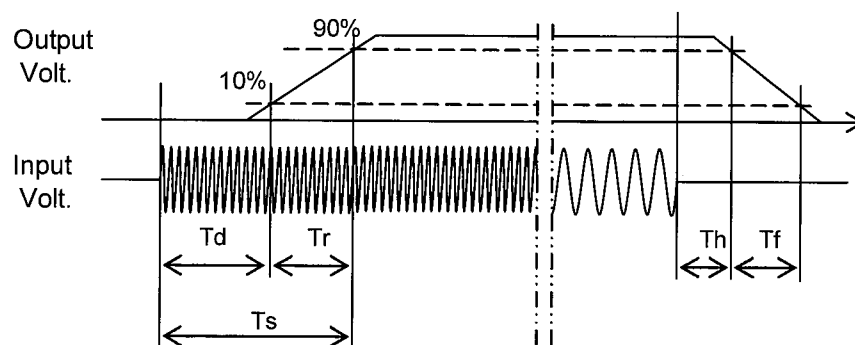
Model	LFA300F-24-TY	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+24V14A		

1. Graph



2. Values

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	185.0	25.5	210.5	30.3	25.7
230 V	167.0	25.0	192.0	36.6	25.8



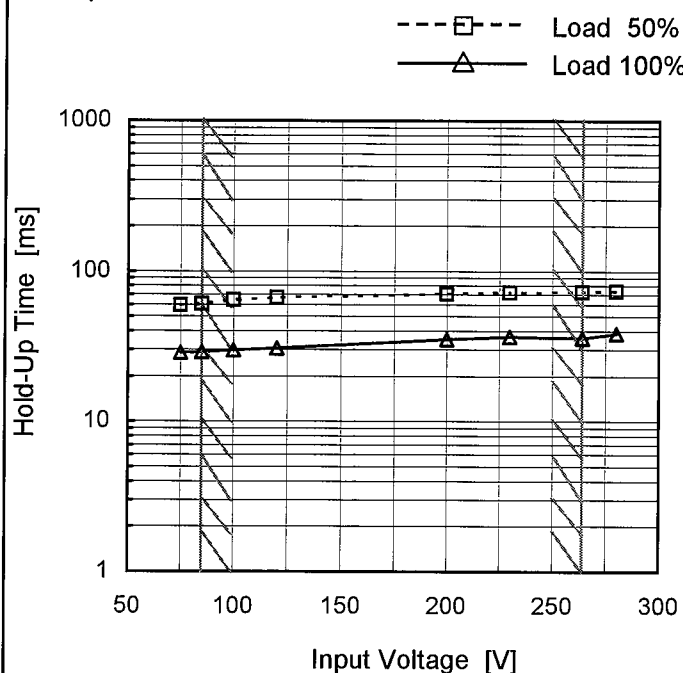
Model LFA300F-24-TY

Item Hold-Up Time

Object +24V14A

Temperature 25°C
Testing Circuitry Figure A

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.

2. Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
75	59	29
85	60	29
100	64	30
120	67	31
200	71	35
230	72	37
264	73	36
280	74	39
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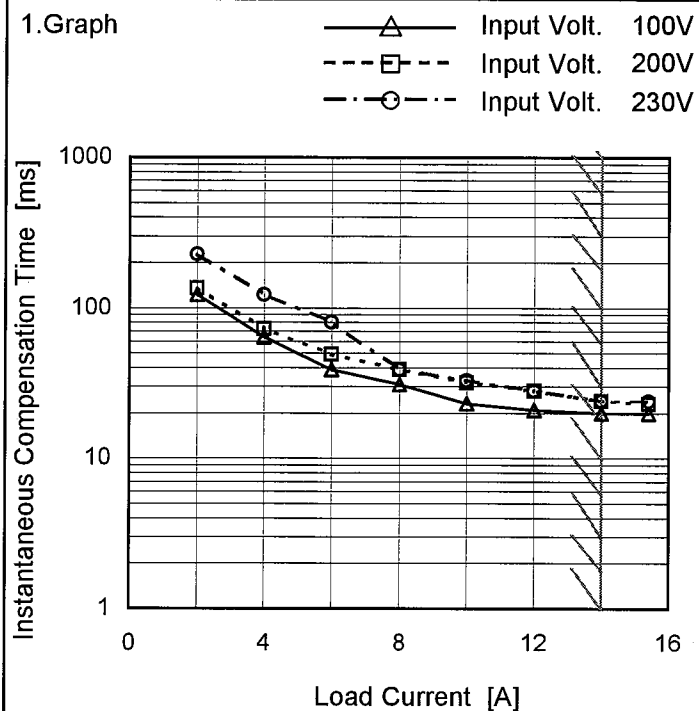
Model LFA300F-24-TY

Item Instantaneous Interruption Compensation

Object +24V14A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



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

2. Values

Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	-	-	-
2.0	123	135	228
4.0	64	73	122
6.0	39	49	80
8.0	31	39	39
10.0	23	32	33
12.0	21	28	28
14.0	20	24	24
15.4	20	23	24
--	-	-	-
--	-	-	-

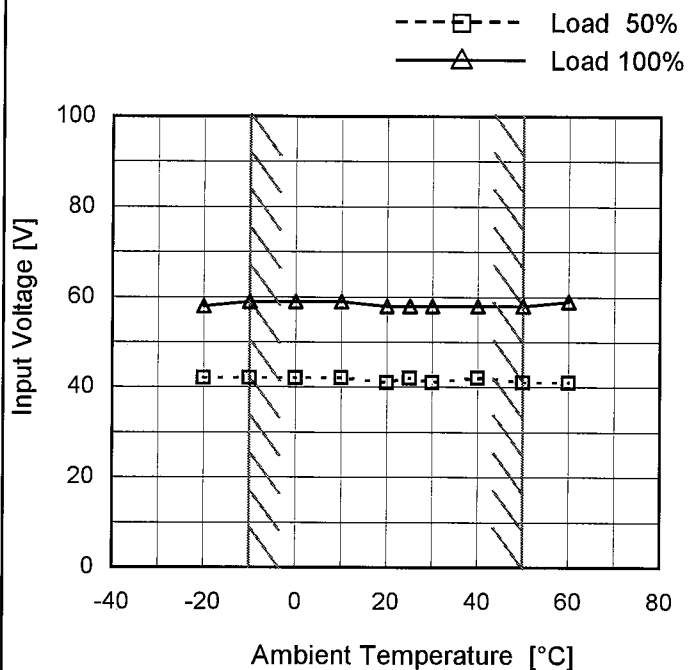
Model LFA300F-24-TY

Item Minimum Input Voltage
for Regulated Output Voltage

Object +24V14A

Testing Circuitry Figure A

1. Graph



2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	42	58
-10	42	59
0	42	59
10	42	59
20	41	58
25	42	58
30	41	58
40	42	58
50	41	58
60	41	59
--	-	-

Model	LFA300F-24-TY																																											
Item	Overcurrent Protection	Temperature	25°C																																									
Object	+24V14A	Testing Circuitry	Figure A																																									
1.Graph		2.Values																																										
<div><div><div></div>Input Volt. 100V</div><div><div></div>Input Volt. 230V</div></div> <p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when the output voltage is from 10V to 0V.</p>		<table><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><tr><td>24.0</td><td>18.69</td><td>18.62</td></tr><tr><td>22.8</td><td>18.72</td><td>18.65</td></tr><tr><td>21.6</td><td>18.69</td><td>18.62</td></tr><tr><td>19.2</td><td>18.86</td><td>18.78</td></tr><tr><td>16.8</td><td>18.93</td><td>18.83</td></tr><tr><td>14.4</td><td>18.97</td><td>18.87</td></tr><tr><td>12.0</td><td>19.03</td><td>18.94</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></table>		Output Voltage [V]	Load Current [A]		Input Volt. 100[V]	Input Volt. 230[V]	24.0	18.69	18.62	22.8	18.72	18.65	21.6	18.69	18.62	19.2	18.86	18.78	16.8	18.93	18.83	14.4	18.97	18.87	12.0	19.03	18.94	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
Output Voltage [V]	Load Current [A]																																											
	Input Volt. 100[V]	Input Volt. 230[V]																																										
24.0	18.69	18.62																																										
22.8	18.72	18.65																																										
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16.8	18.93	18.83																																										
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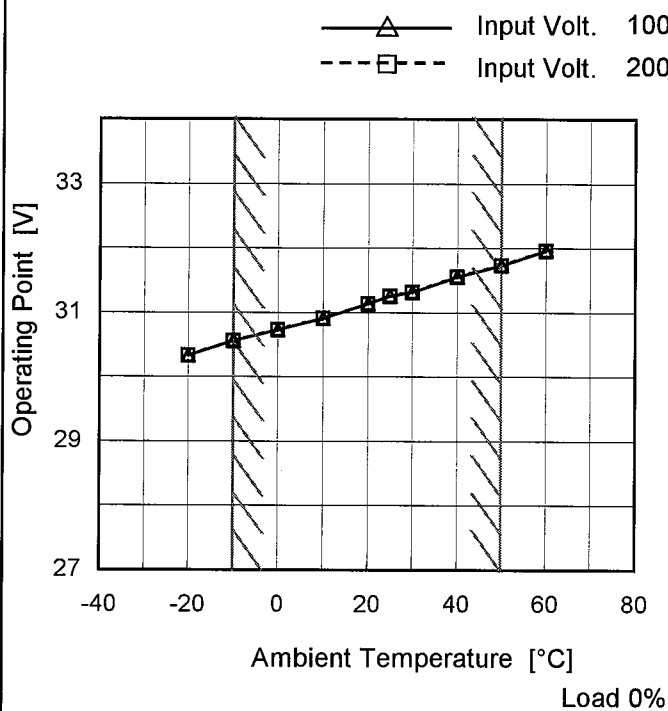
Model LFA300F-24-TY

Item Overvoltage Protection

Object +24V14A

Testing Circuitry Figure A

1. Graph



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

2. Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 200[V]
-20	30.33	30.33
-10	30.56	30.56
0	30.73	30.73
10	30.91	30.91
20	31.14	31.14
25	31.26	31.26
30	31.32	31.32
40	31.55	31.55
50	31.73	31.73
60	31.96	31.96
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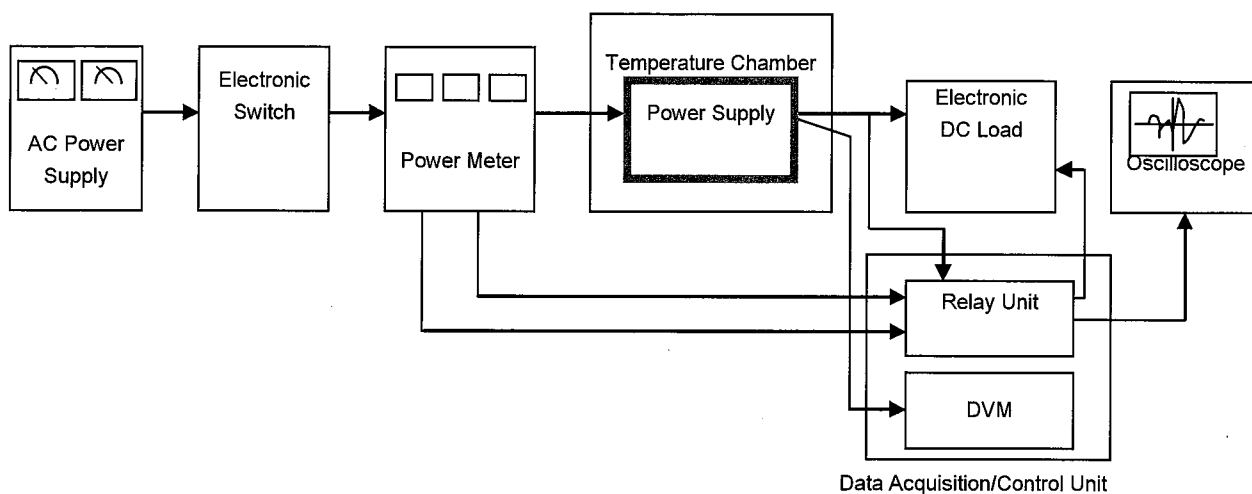


Figure A

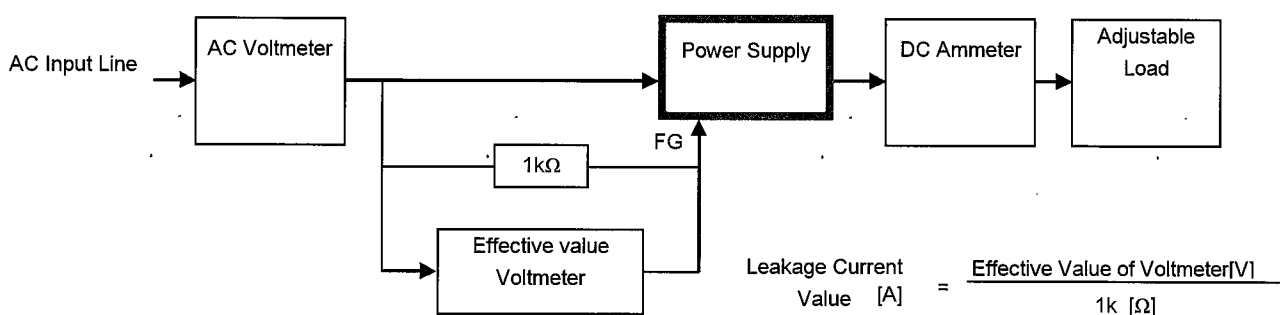


Figure B (DEN-AN)

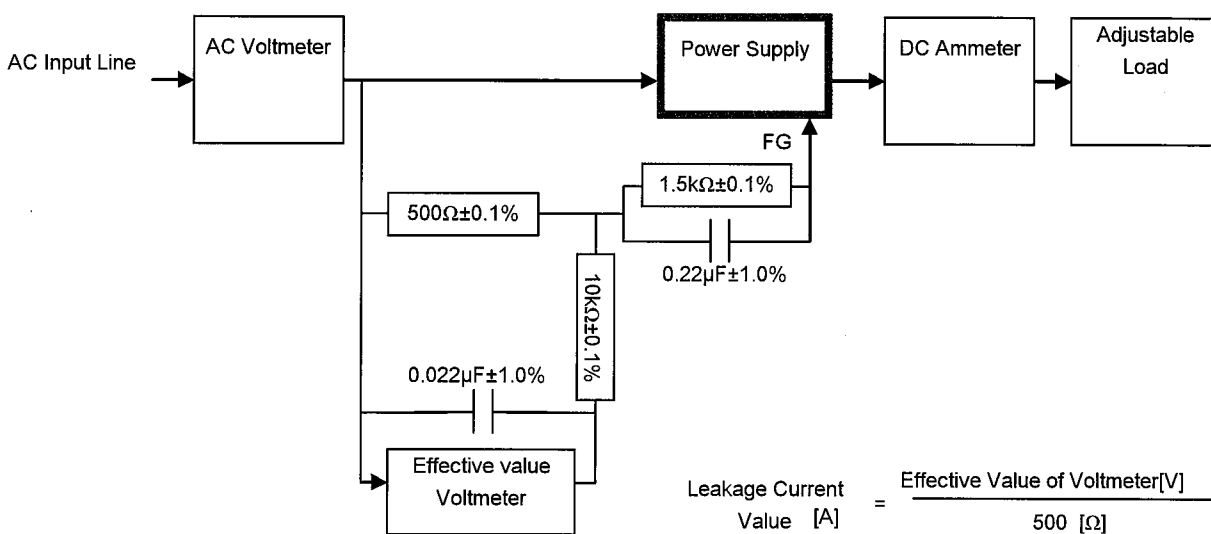


Figure B (IEC60950-1)

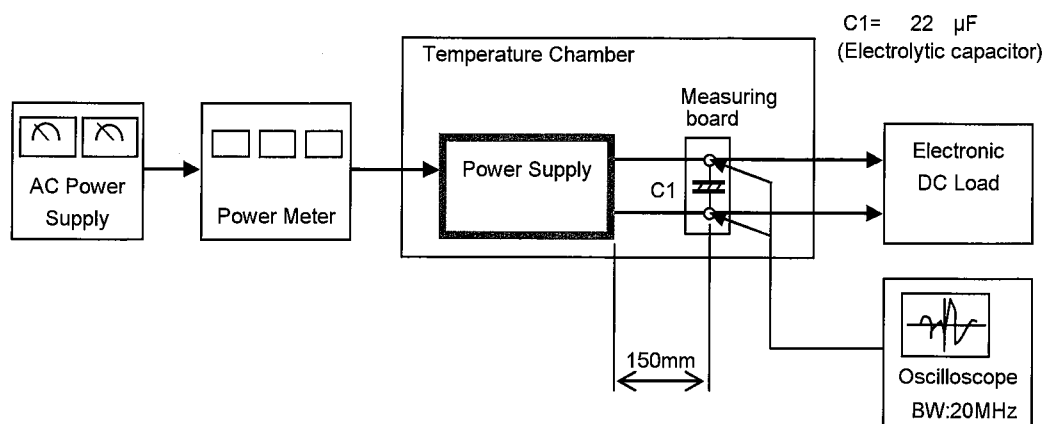


Figure C