

TEST DATA OF LFA100F-3R3-Y

Regulated DC Power Supply
November 18, 2010

Approved by : *Yoshiaki Shimizu*
Yoshiaki Shimizu Design Manager

Prepared by : *Daisuke Sumiwa*
Daisuke Sumiwa 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)

COSEL

Model

LFA100F-3R3-Y

Item

Input Current (by Load Current)

Object

Temperature

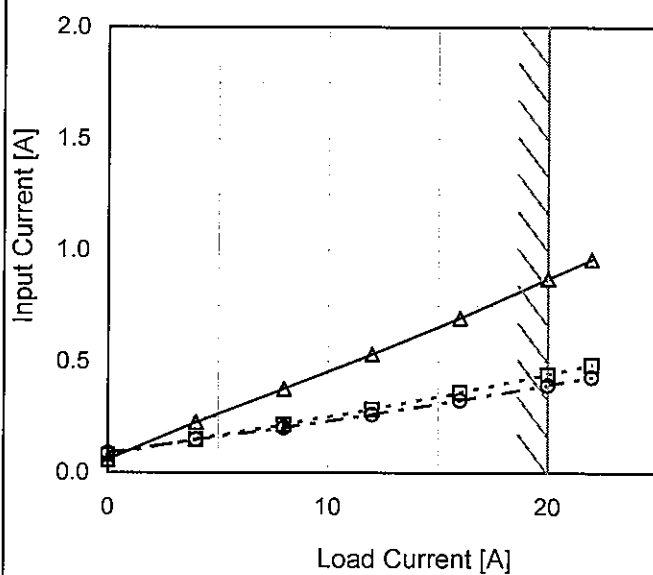
25°C

Testing Circuitry

Figure A

1. Graph

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



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

2. Values

Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	0.059	0.079	0.087
4	0.225	0.149	0.148
8	0.377	0.216	0.202
12	0.532	0.285	0.261
16	0.695	0.360	0.326
20	0.872	0.442	0.394
22	0.959	0.485	0.430
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model		LFA100F-3R3-Y		Temperature 25°C																																																				
Item		Input Power (by Load Current)		Testing Circuitry Figure A																																																				
Object																																																								
1.Graph				2.Values																																																				
<div><div><div><div>—△—</div><div>Input Volt.</div><div>100V</div></div><div><div>---□---</div><div>Input Volt.</div><div>200V</div></div><div><div>---○---</div><div>Input Volt.</div><div>230V</div></div></div><div><p>Input Power [W]</p><p>Load Current [A]</p></div><p>Note: Slanted line shows the range of the rated load current.</p></div>				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Power [W]</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</td><td>3.57</td><td>4.10</td><td>4.10</td></tr><tr><td>4</td><td>21.24</td><td>21.10</td><td>21.30</td></tr><tr><td>8</td><td>36.75</td><td>36.00</td><td>36.10</td></tr><tr><td>12</td><td>52.40</td><td>51.10</td><td>51.00</td></tr><tr><td>16</td><td>68.70</td><td>66.90</td><td>66.80</td></tr><tr><td>20</td><td>86.40</td><td>83.90</td><td>83.50</td></tr><tr><td>22</td><td>95.20</td><td>92.50</td><td>92.20</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</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 Power [W]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0	3.57	4.10	4.10	4	21.24	21.10	21.30	8	36.75	36.00	36.10	12	52.40	51.10	51.00	16	68.70	66.90	66.80	20	86.40	83.90	83.50	22	95.20	92.50	92.20	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Input Power [W]																																																							
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																					
0	3.57	4.10	4.10																																																					
4	21.24	21.10	21.30																																																					
8	36.75	36.00	36.10																																																					
12	52.40	51.10	51.00																																																					
16	68.70	66.90	66.80																																																					
20	86.40	83.90	83.50																																																					
22	95.20	92.50	92.20																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					

- 2 -

BC-10474

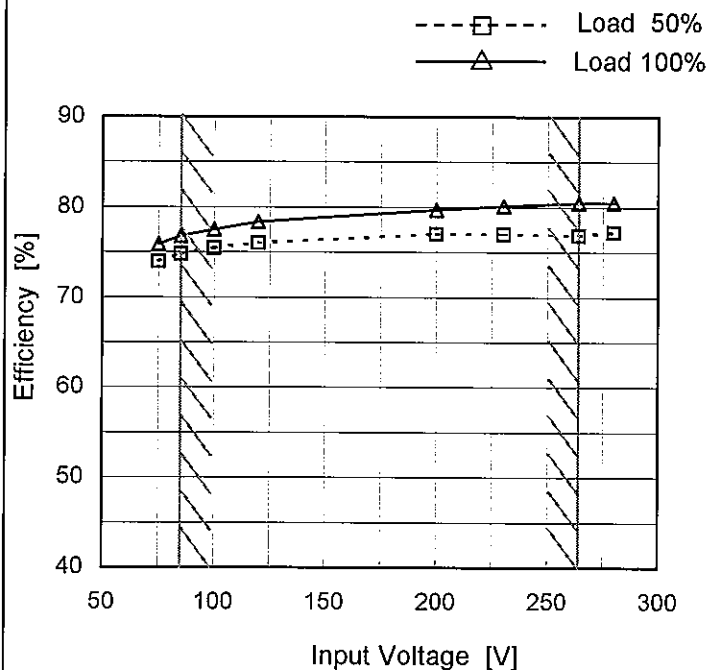
Model LFA100F-3R3-Y

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	74.0	75.8
85	74.8	76.8
100	75.5	77.5
120	76.0	78.3
200	77.0	79.7
230	77.0	80.1
264	76.9	80.5
280	77.2	80.5
--	-	-

COSEL

Model		LFA100F-3R3-Y																																																				
Item		Efficiency (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>Efficiency [%]</p> <p>Load Current [A]</p>		<table><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><tr><td>0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>4</td><td>62.8</td><td>63.2</td><td>62.6</td></tr><tr><td>8</td><td>72.8</td><td>74.3</td><td>74.1</td></tr><tr><td>12</td><td>76.6</td><td>78.5</td><td>78.7</td></tr><tr><td>16</td><td>77.9</td><td>80.0</td><td>80.1</td></tr><tr><td>20</td><td>77.5</td><td>79.7</td><td>80.1</td></tr><tr><td>22</td><td>77.3</td><td>79.5</td><td>79.8</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</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]	Efficiency [%]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0	-	-	-	4	62.8	63.2	62.6	8	72.8	74.3	74.1	12	76.6	78.5	78.7	16	77.9	80.0	80.1	20	77.5	79.7	80.1	22	77.3	79.5	79.8	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Efficiency [%]																																																					
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																			
0	-	-	-																																																			
4	62.8	63.2	62.6																																																			
8	72.8	74.3	74.1																																																			
12	76.6	78.5	78.7																																																			
16	77.9	80.0	80.1																																																			
20	77.5	79.7	80.1																																																			
22	77.3	79.5	79.8																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
Note: Slanted line shows the range of the rated load current.																																																						

- 4 -

BC-10474

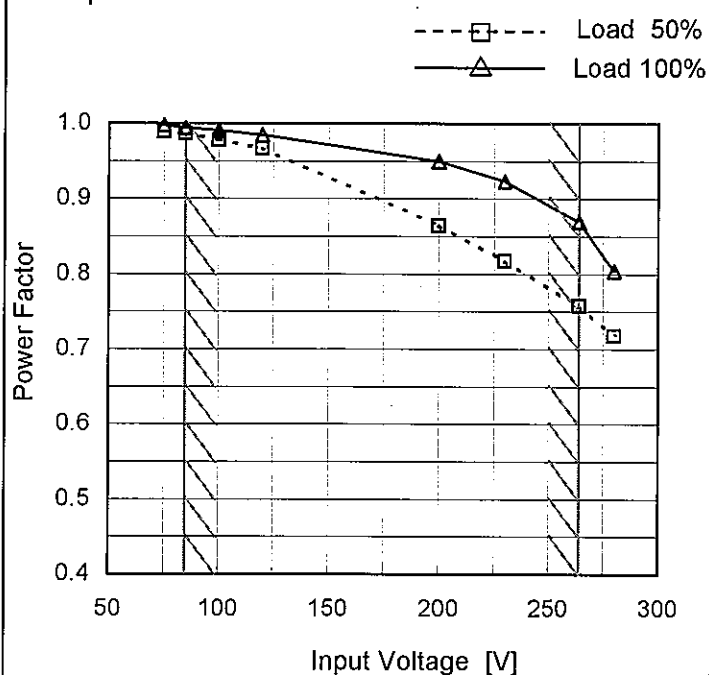
Model LFA100F-3R3-Y

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	0.989	0.998
85	0.987	0.994
100	0.978	0.991
120	0.967	0.985
200	0.865	0.950
230	0.817	0.923
264	0.758	0.869
280	0.718	0.804
--	-	-

Model

LFA100F-3R3-Y

Item

Power Factor (by Load Current)

Object

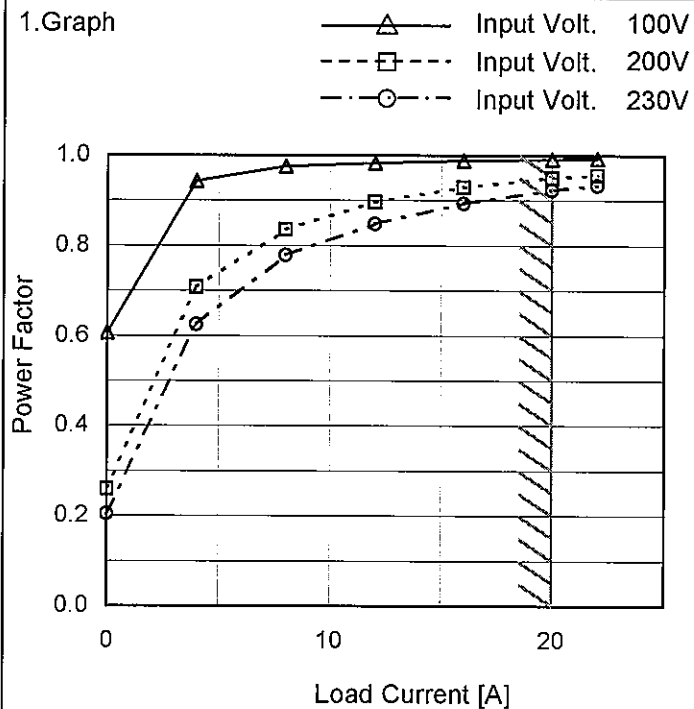
Temperature

25°C

Testing Circuitry

Figure A

1. Graph

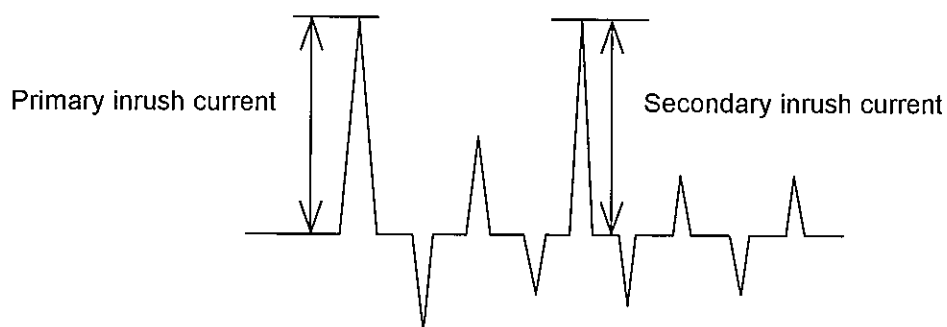
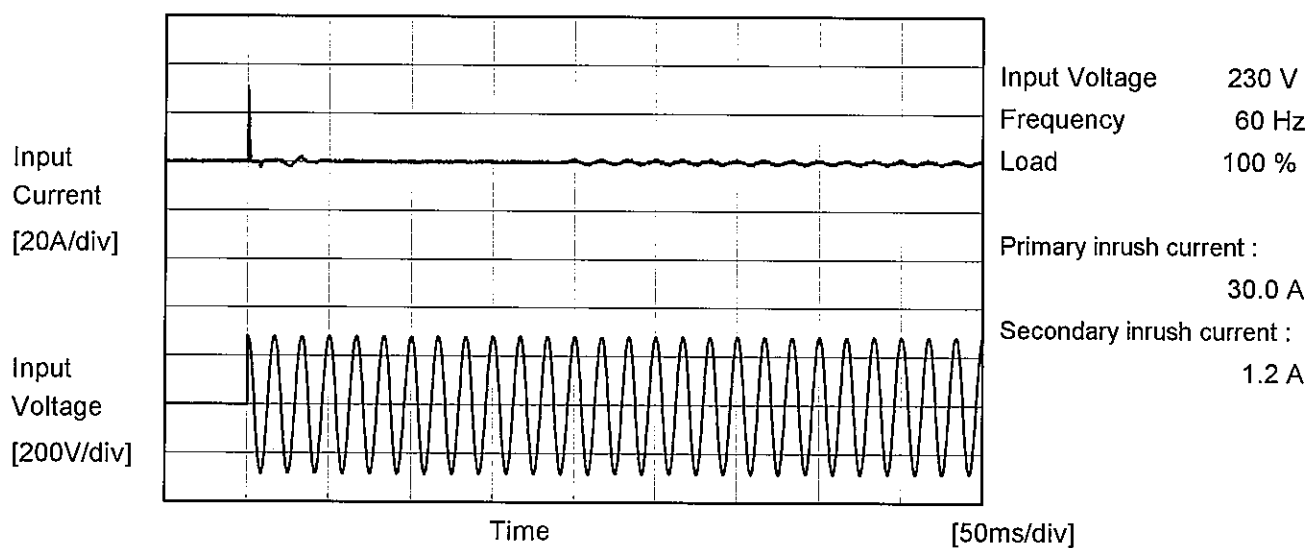
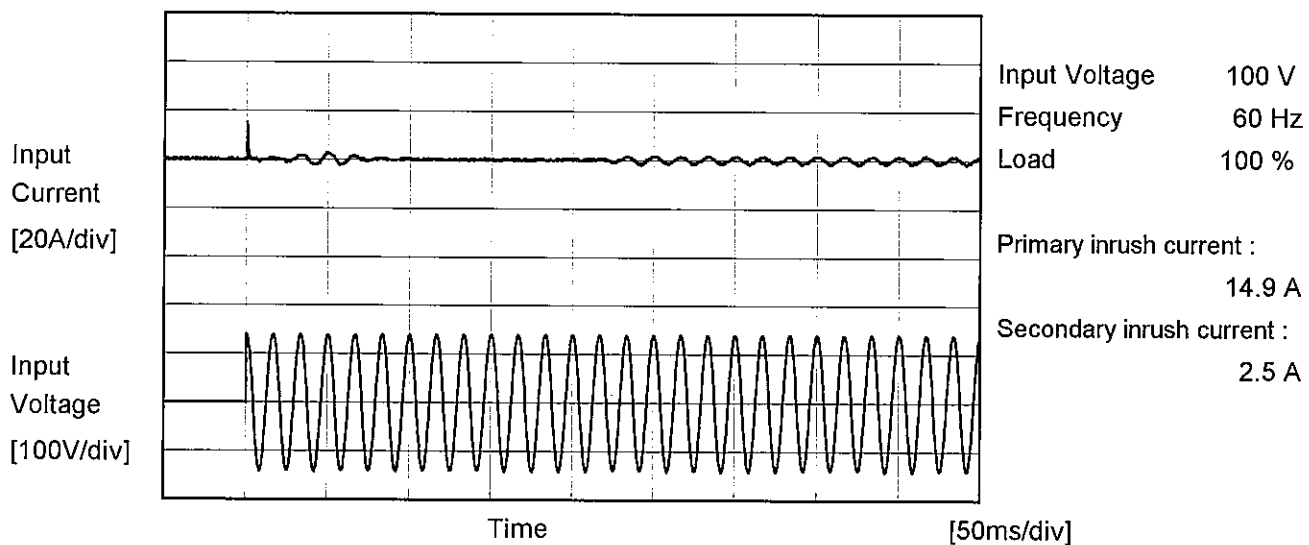


2. Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	0.606	0.259	0.204
4	0.943	0.708	0.625
8	0.976	0.835	0.778
12	0.983	0.896	0.849
16	0.988	0.929	0.893
20	0.991	0.950	0.923
22	0.993	0.956	0.933
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	LFA100F-3R3-Y	Temperature	25°C
Item	Inrush Current	Testing Circuitry	Figure A
Object	_____		



		Temperature 25°C Testing Circuitry Figure B
Model	LFA100F-3R3-Y	
Item	Leakage Current	
Object	_____	

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
DEN-AN	Both phases	0.27	0.34	0.37	Operation
	One of phase	0.25	0.55	0.67	stand by
IEC60950-1	Both phases	0.13	0.28	0.33	Operation
	One of phase	0.25	0.52	0.64	stand by

The value for "One phase" 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.

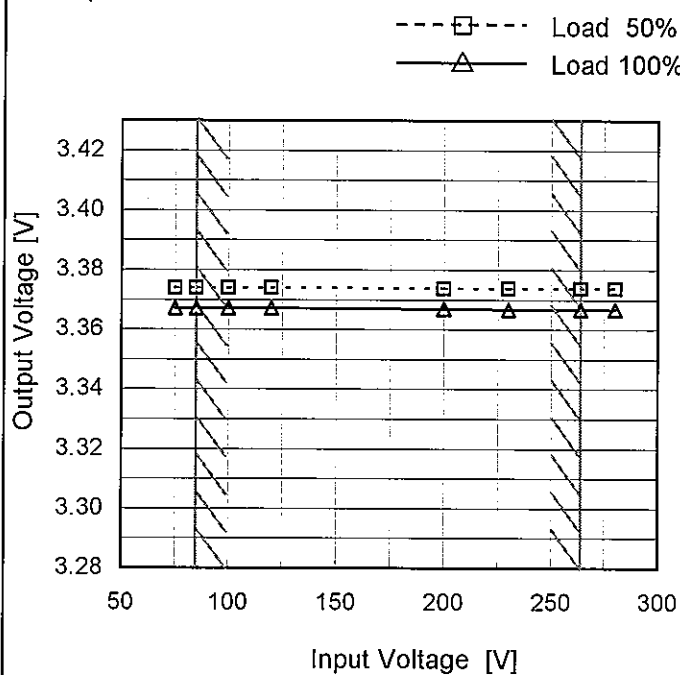
Model LFA100F-3R3-Y

Item Line Regulation

Object +3.3V20A

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	3.374	3.367
85	3.374	3.367
100	3.374	3.367
120	3.374	3.367
200	3.374	3.367
230	3.374	3.367
264	3.374	3.367
280	3.374	3.367
--	-	-

Model LFA100F-3R3-Y

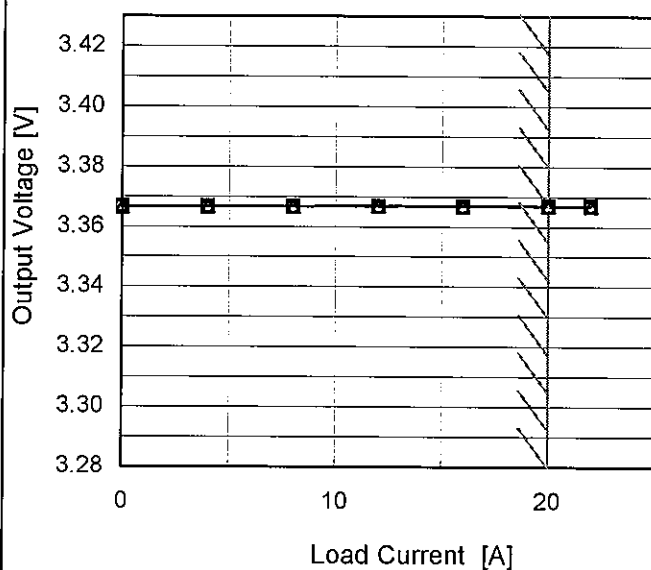
Item Load Regulation

Object +3.3V20A

Temperature 25°C
Testing Circuitry Figure A

1. Graph

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



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

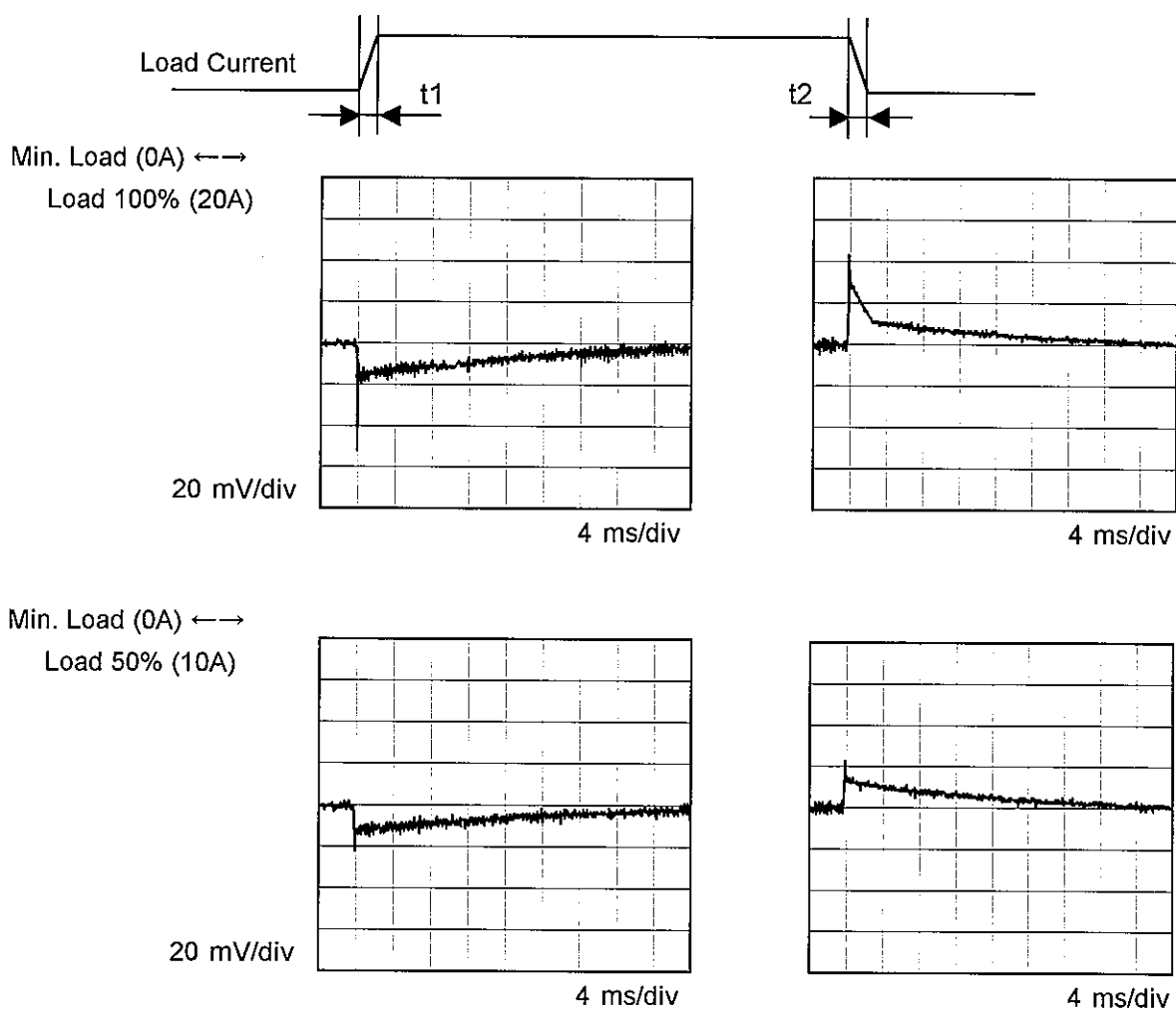
2. Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	3.382	3.382	3.382
4	3.379	3.379	3.379
8	3.376	3.376	3.376
12	3.373	3.373	3.373
16	3.370	3.370	3.370
20	3.367	3.367	3.367
22	3.366	3.366	3.366
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

Model	LFA100F-3R3-Y	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+3.3V20A		

Input Volt. 100 V
Cycle 1000 ms

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



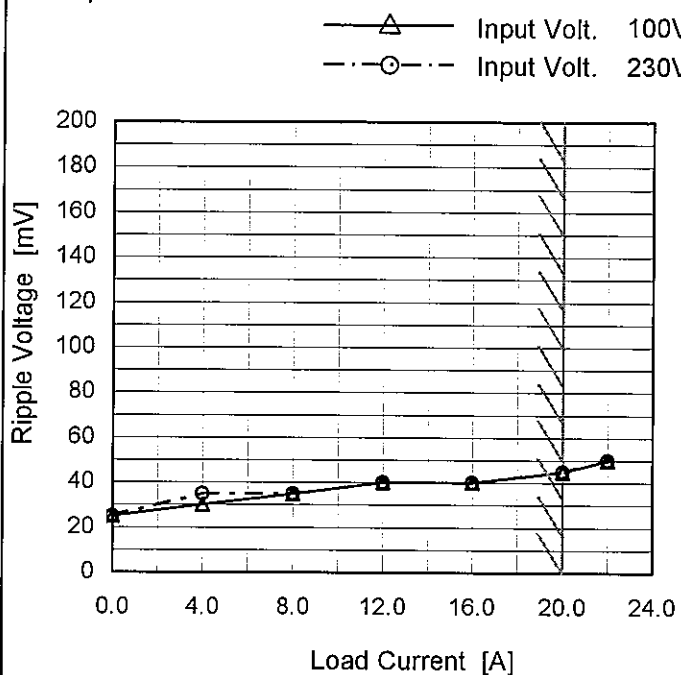
Model LFA100F-3R3-Y

Item Ripple Voltage (by Load Current)

Object +3.3V20A

Temperature 25°C
Testing Circuitry Figure C

1. Graph



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.

2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 230 [V]
0	25	25
4	30	35
8	35	35
12	40	40
16	40	40
20	45	45
22	50	50
--	-	-
--	-	-
--	-	-
--	-	-

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

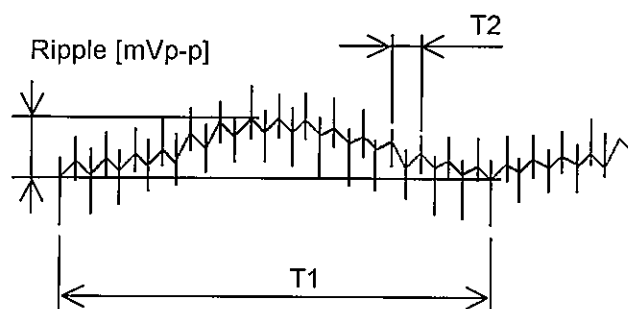


Fig. Complex Ripple Wave Form

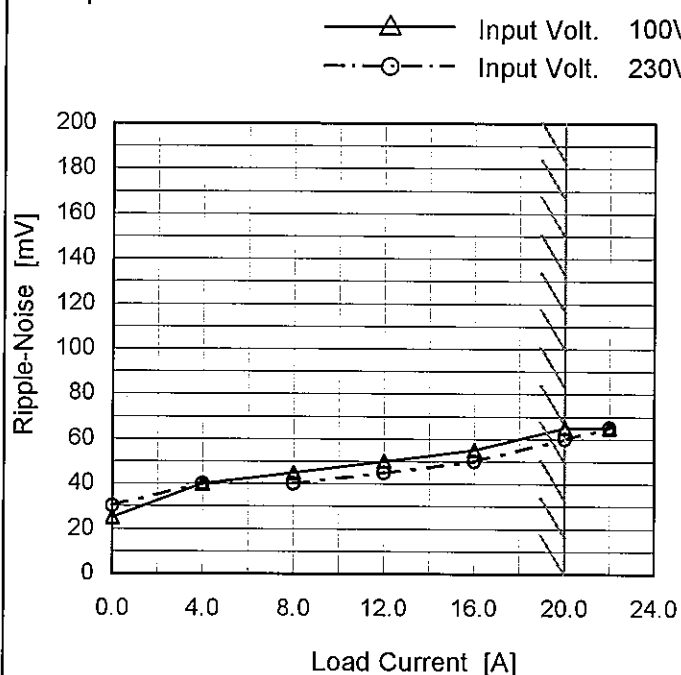
Model LFA100F-3R3-Y

Item Ripple-Noise

Object +3.3V20A

Temperature 25°C
Testing Circuitry Figure C

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	25	30
4	40	40
8	45	40
12	50	45
16	55	50
20	65	60
22	65	65
--	-	-
--	-	-
--	-	-
--	-	-

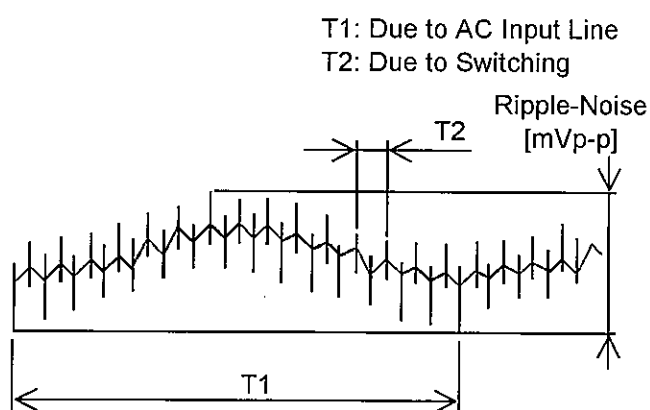


Fig. Complex Ripple Wave Form

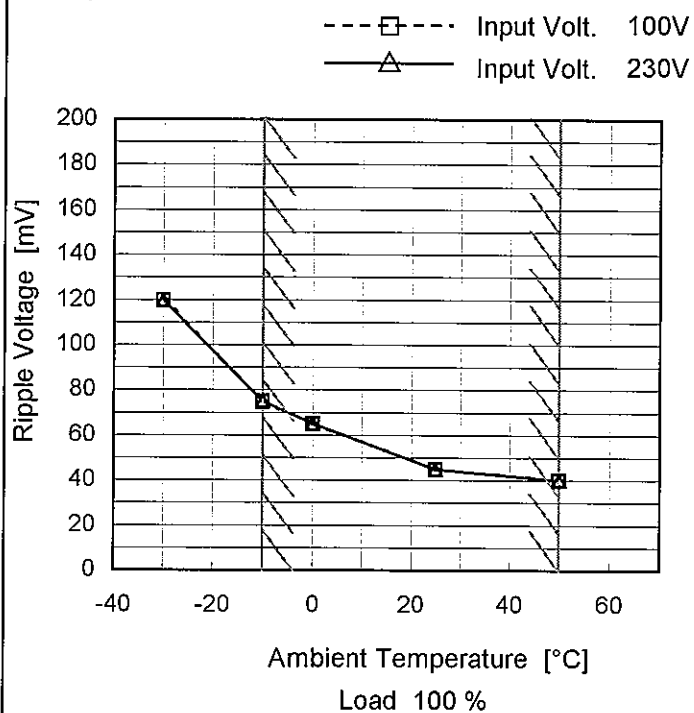
Model LFA100F-3R3-Y

Item Ripple Voltage (by Ambient Temp.)

Object +5V20A

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	120	120
-10	75	75
0	65	65
25	45	45
50	40	40
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

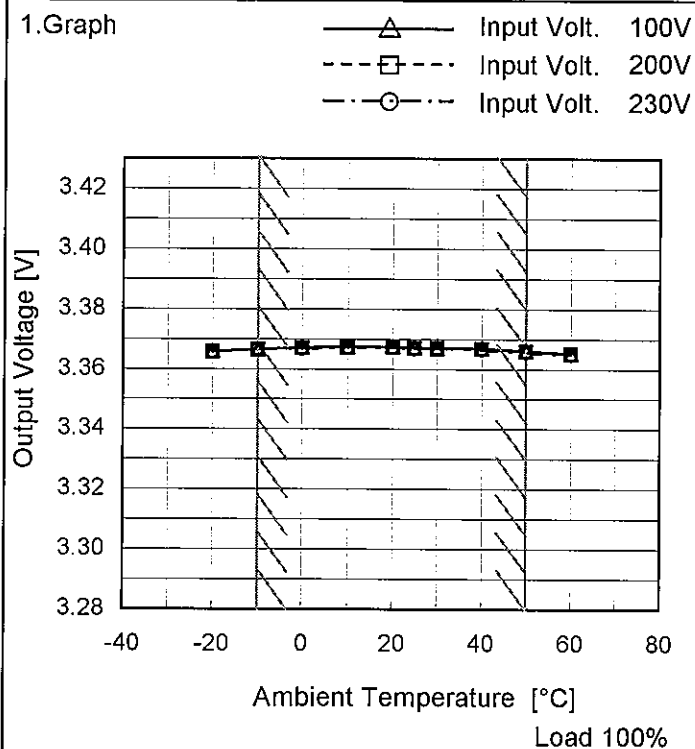
Model LFA100F-3R3-Y

Item Ambient Temperature Drift

Object +3.3V20A

Testing Circuitry Figure A

1.Graph



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	3.366	3.366	3.366
-10	3.367	3.367	3.366
0	3.367	3.367	3.367
10	3.367	3.367	3.367
20	3.367	3.367	3.367
25	3.367	3.367	3.367
30	3.367	3.367	3.367
40	3.367	3.367	3.367
50	3.366	3.366	3.366
60	3.365	3.365	3.365
--	-	-	-

		Testing Circuitry Figure A
Model	LFA100F-3R3-Y	
Item	Output Voltage Accuracy	
Object	+3.3V20A	

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 - 20A

* 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]	Ratio [%]
Maximum Voltage	20	85	0	3.382	±8	±0.2
Minimum Voltage	50	85	20	3.366		

COSEL

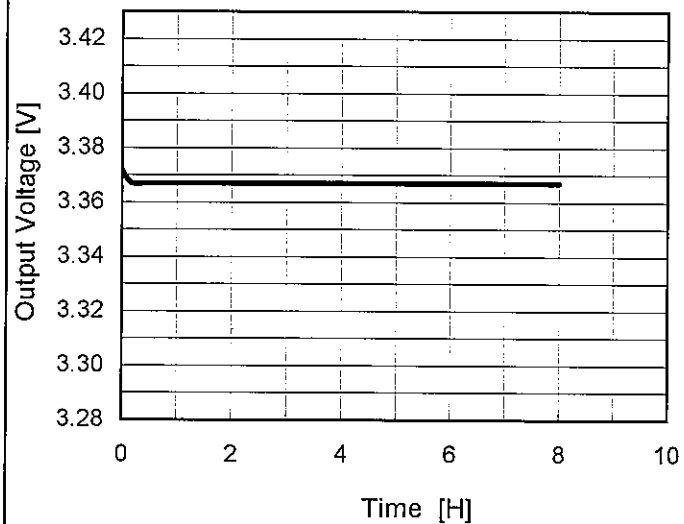
Model LFA100F-3R3-Y

Item Time Lapse Drift

Object +3.3V20A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



Input Volt. 100V

Load 100%

* The characteristic of AC230V is equal.

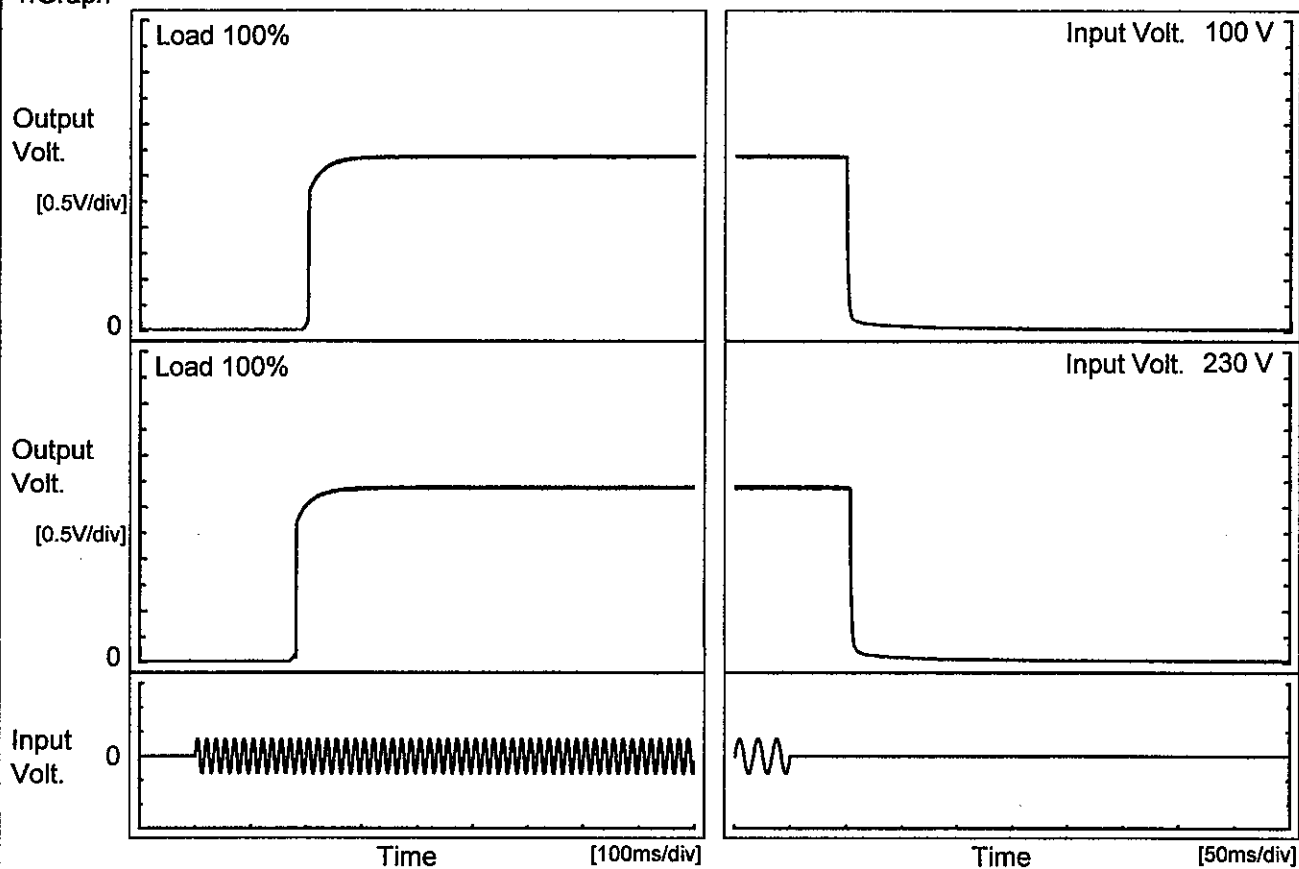
2. Values

Time since start [H]	Output Voltage [V]
0.0	3.372
0.5	3.367
1.0	3.367
2.0	3.367
3.0	3.367
4.0	3.367
5.0	3.367
6.0	3.367
7.0	3.367
8.0	3.367

COSEL

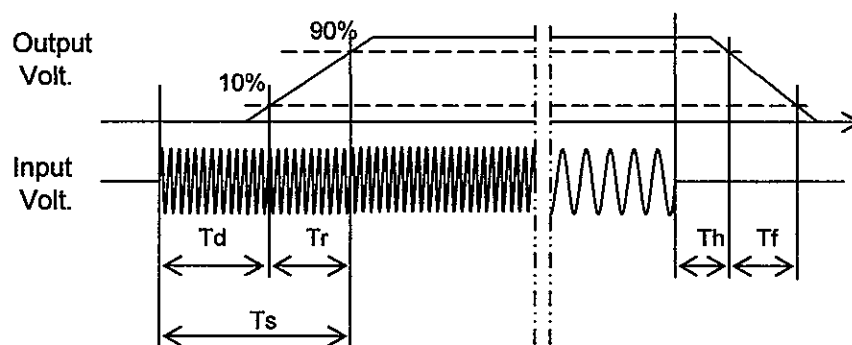
Model	LFA100F-3R3-Y	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+3.3V20A		

1. Graph



2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf
100 V		203.5	14.0	217.5	49.5	3.8
230 V		182.0	15.5	197.5	53.5	3.8



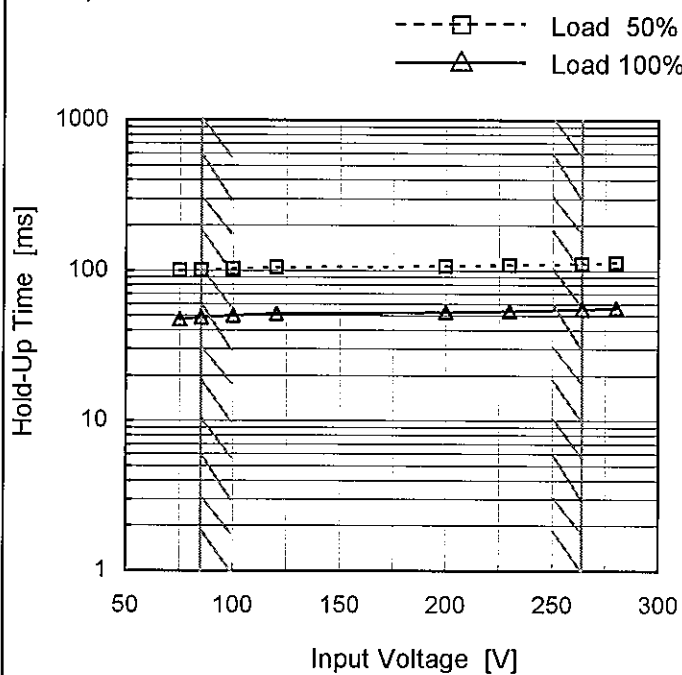
Model LFA100F-3R3-Y

Item Hold-Up Time

Object +3.3V20A

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	99	47
85	101	49
100	103	50
120	105	52
200	107	53
230	109	54
264	111	55
280	113	56
--	-	-

Model LFA100F-3R3-Y

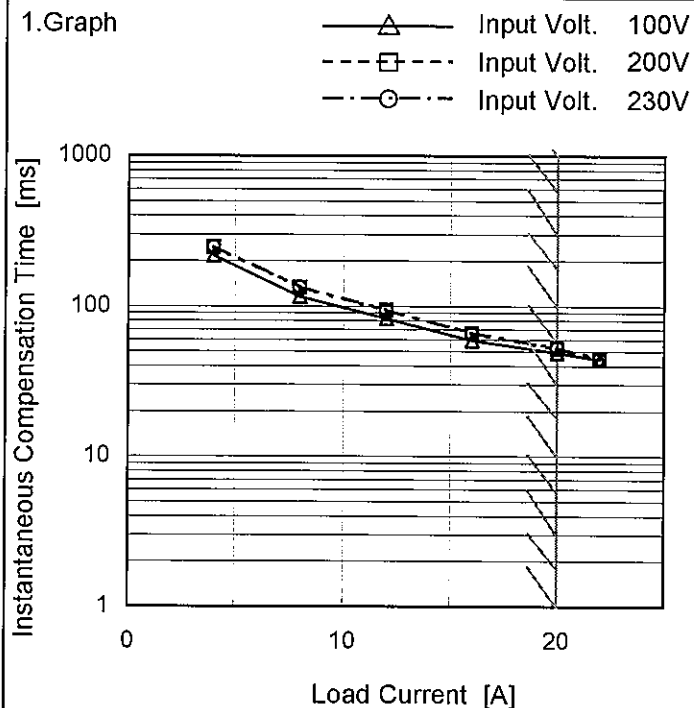
Item Instantaneous Interruption Compensation

Object +3.3V20A

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	-	-	-
4	216	245	249
8	116	132	134
12	83	94	94
16	59	66	66
20	49	52	53
22	44	44	45
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

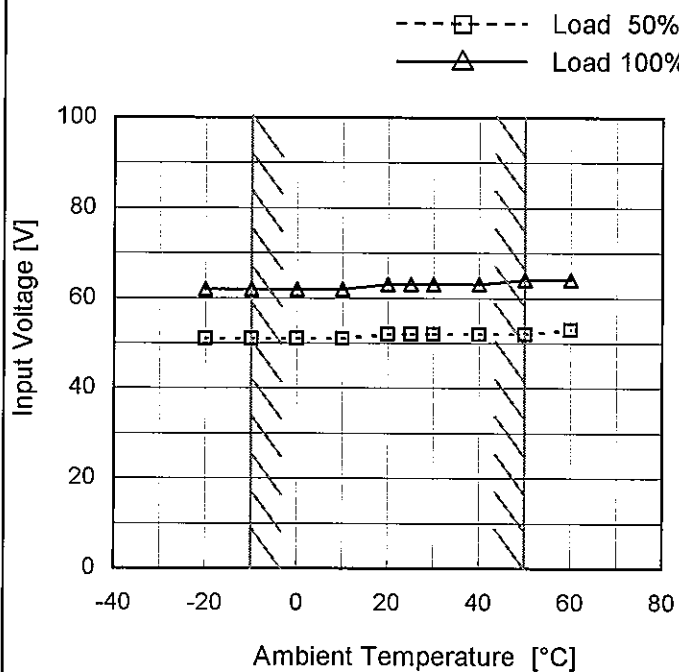
Model LFA100F-3R3-Y

Item Minimum Input Voltage
for Regulated Output Voltage

Object +3.3V20A

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	51	62
-10	51	62
0	51	62
10	51	62
20	52	63
25	52	63
30	52	63
40	52	63
50	52	64
60	53	64
--	-	-

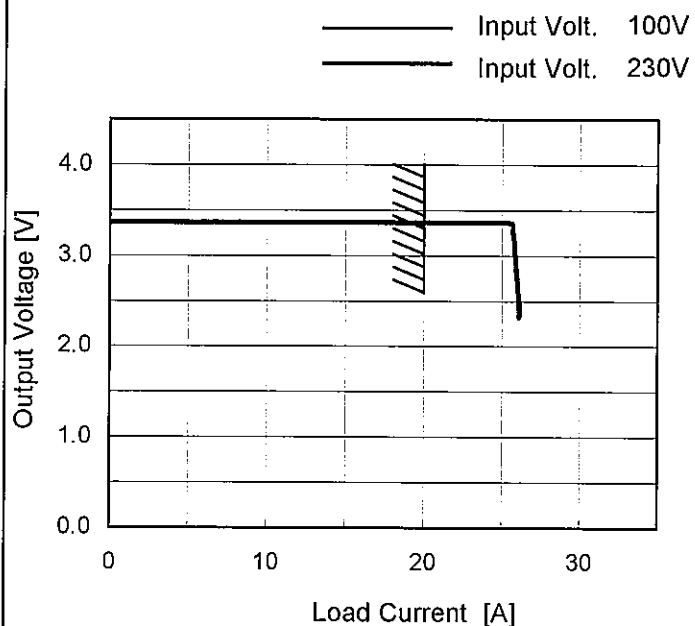
Model LFA100F-3R3-Y

Item Overcurrent Protection

Object +3.3V20A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



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

Intermittent operation occurs when the output voltage is from 2.3V to 0V.

2. Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 230[V]
3.300	25.73	25.61
3.135	25.85	25.80
2.970	25.91	25.85
2.640	26.09	26.01
2.310	26.22	26.14
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

Model

LFA100F-3R3-Y

Item

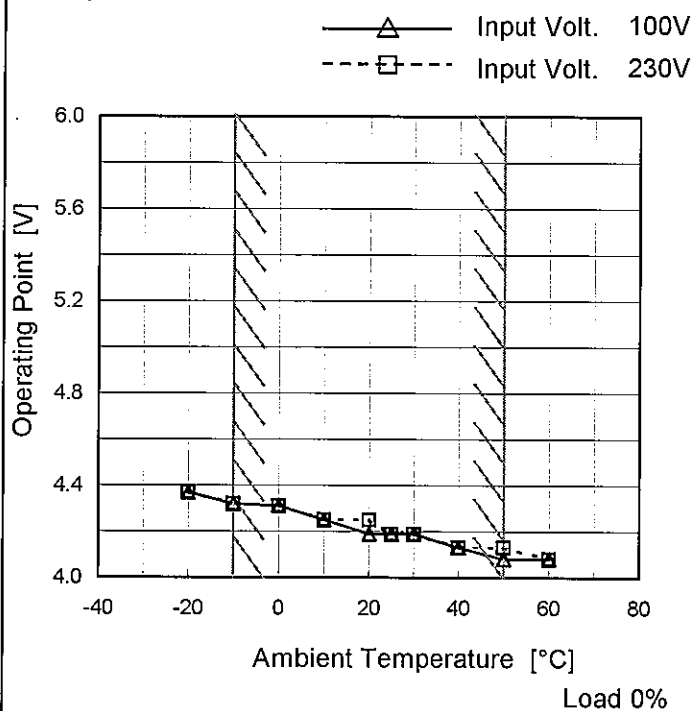
Overvoltage Protection

Object

+3.3V20A

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. 230[V]
-20	4.37	4.37
-10	4.32	4.32
0	4.31	4.31
10	4.25	4.25
20	4.19	4.25
25	4.19	4.19
30	4.19	4.19
40	4.13	4.13
50	4.08	4.13
60	4.08	4.08
--	-	-

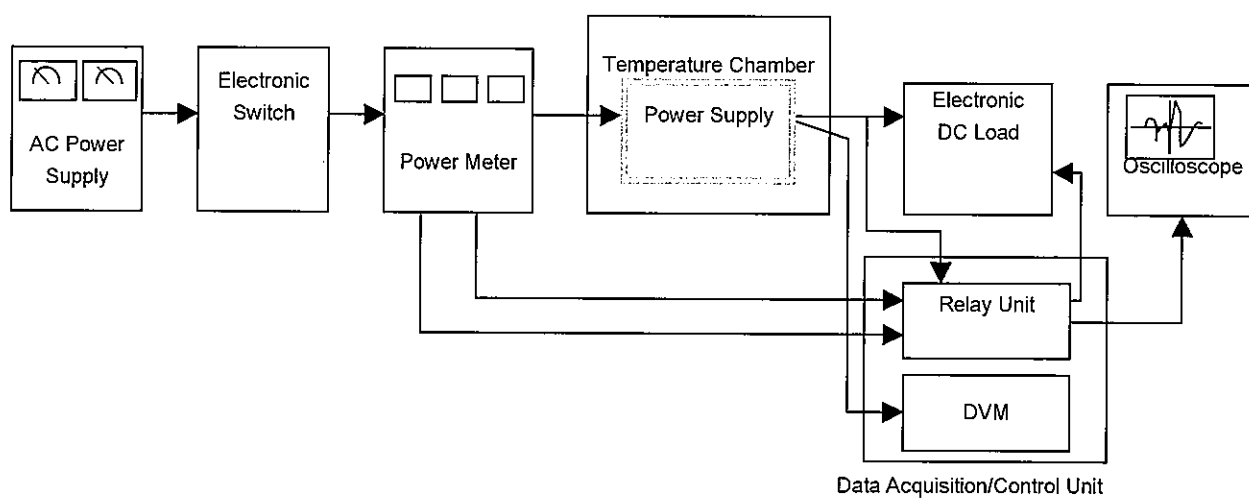


Figure A

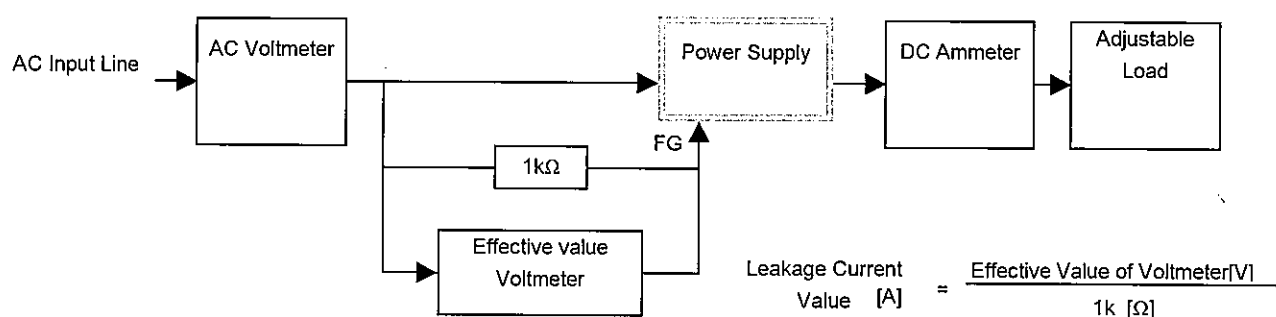


Figure B (DEN-AN)

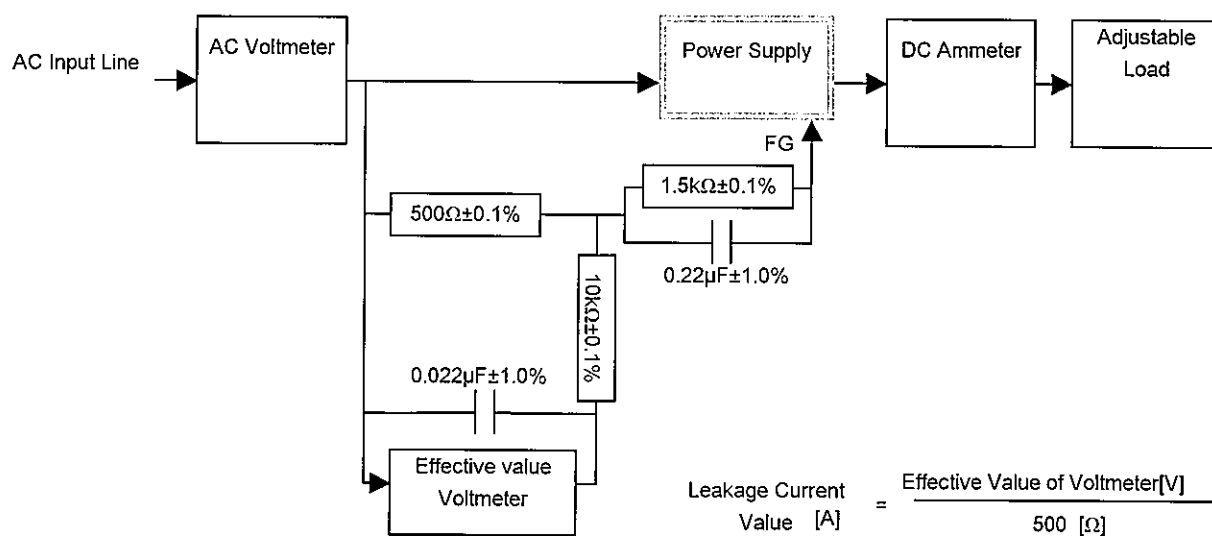


Figure B (IEC60950-1)

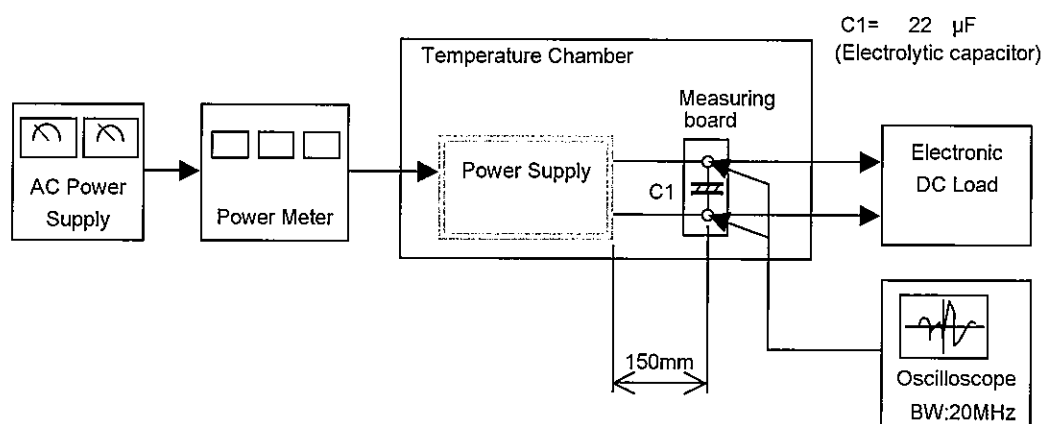


Figure C