

# TEST DATA OF LFA150F-36

Regulated DC Power Supply  
November 11, 2010

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Yoshiaki Shimizu Design Manager

Prepared by : *Daisuke Sumiwa*  
Daisuke Sumiwa Design Engineer

**COSEL CO.,LTD.**

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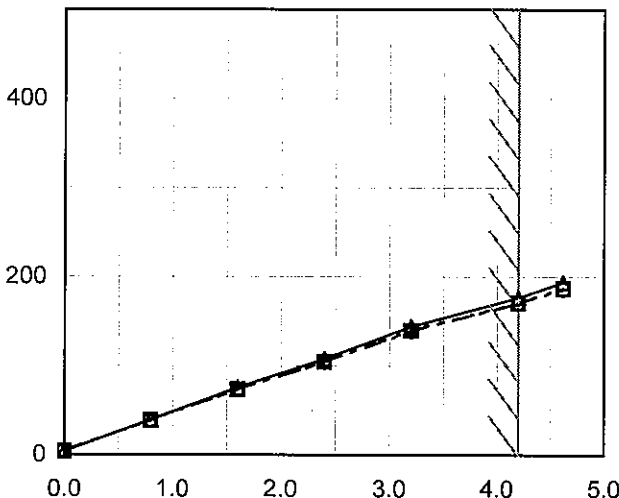
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Model		LFA150F-36																																																				
Item		Input Current (by Load Current)																																																				
Object																																																						
1.Graph		<div><div><div>—△—</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 Current [A]</p><p>Load Current [A]</p></div> <div>Note: Slanted line shows the range of the rated load current.</div>																																																				
2.Values		<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>0.00</td><td>0.074</td><td>0.113</td><td>0.124</td></tr><tr><td>0.80</td><td>0.412</td><td>0.252</td><td>0.247</td></tr><tr><td>1.60</td><td>0.770</td><td>0.414</td><td>0.379</td></tr><tr><td>2.40</td><td>1.089</td><td>0.564</td><td>0.506</td></tr><tr><td>3.20</td><td>1.450</td><td>0.736</td><td>0.656</td></tr><tr><td>4.20</td><td>1.774</td><td>0.892</td><td>0.792</td></tr><tr><td>4.62</td><td>1.944</td><td>0.970</td><td>0.858</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 Current [A]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.00	0.074	0.113	0.124	0.80	0.412	0.252	0.247	1.60	0.770	0.414	0.379	2.40	1.089	0.564	0.506	3.20	1.450	0.736	0.656	4.20	1.774	0.892	0.792	4.62	1.944	0.970	0.858	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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Model		LFA150F-36		Temperature		25°C																																																				
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1.Graph		<div><div>—△—</div>Input Volt. 100V</div> <div><div>---□---</div>Input Volt. 200V</div> <div><div>-○-</div>Input Volt. 230V</div>		2.Values																																																						
<div><div>Input Power [W]</div><div></div><div><div>Load Current [A]</div></div></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>0.00</td><td>3.6</td><td>4.1</td><td>4.0</td></tr><tr><td>0.80</td><td>39.2</td><td>38.6</td><td>38.7</td></tr><tr><td>1.60</td><td>75.6</td><td>73.4</td><td>73.3</td></tr><tr><td>2.40</td><td>107.6</td><td>104.5</td><td>104.2</td></tr><tr><td>3.20</td><td>144.0</td><td>139.6</td><td>139.1</td></tr><tr><td>4.20</td><td>176.7</td><td>171.1</td><td>170.6</td></tr><tr><td>4.62</td><td>193.8</td><td>187.0</td><td>186.2</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]	0.00	3.6	4.1	4.0	0.80	39.2	38.6	38.7	1.60	75.6	73.4	73.3	2.40	107.6	104.5	104.2	3.20	144.0	139.6	139.1	4.20	176.7	171.1	170.6	4.62	193.8	187.0	186.2	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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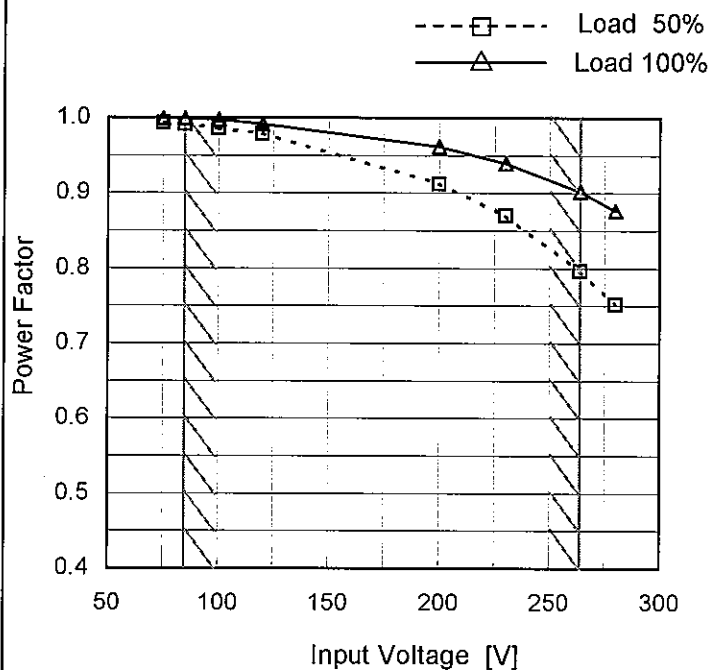
Model LFA150F-36

Item Power Factor (by Input Voltage)

Object

Temperature 25°C  
Testing Circuitry Figure A

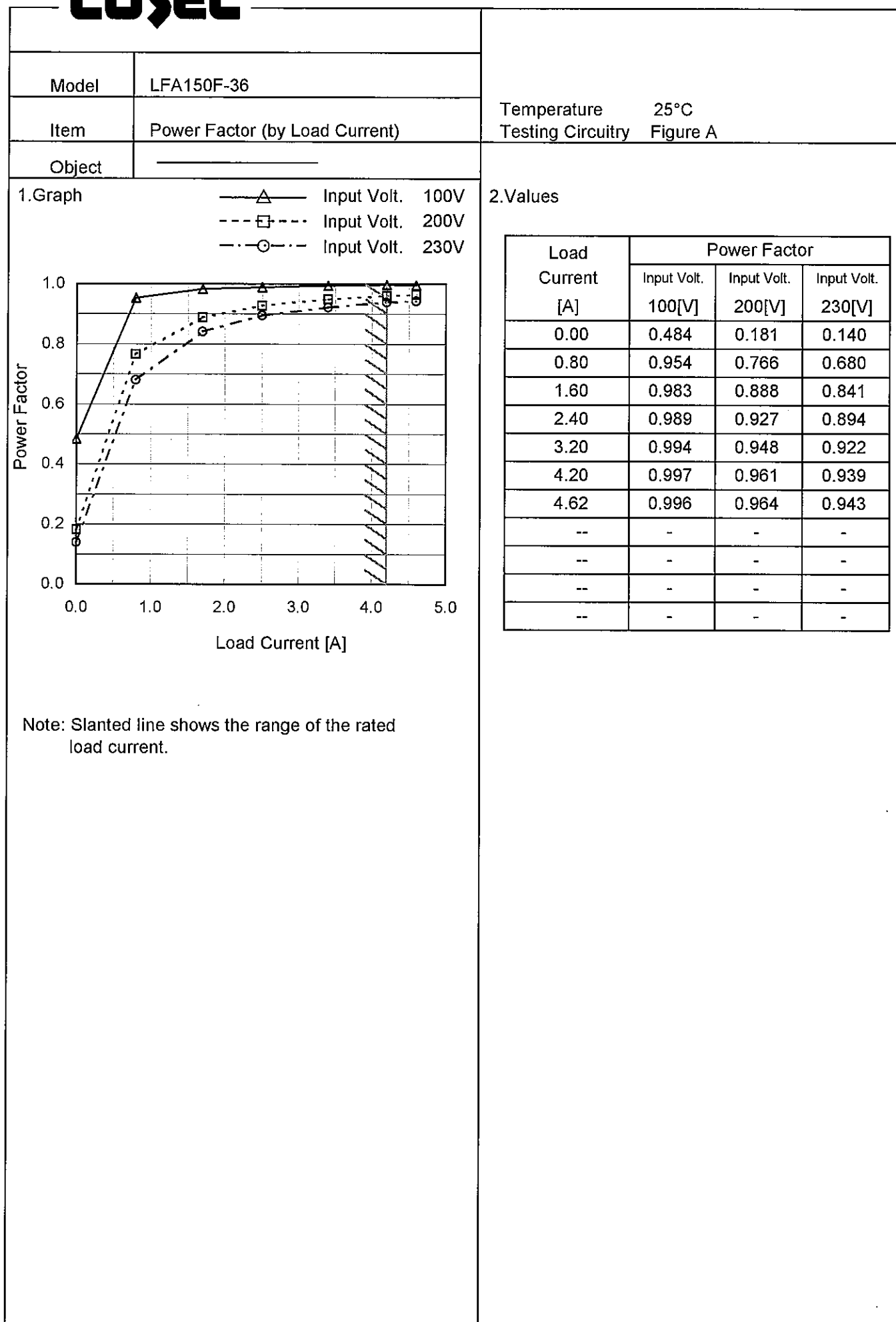
## 1. Graph



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

## 2. Values

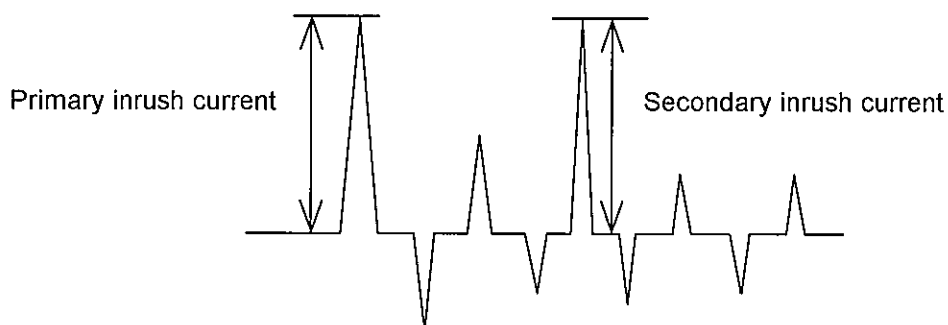
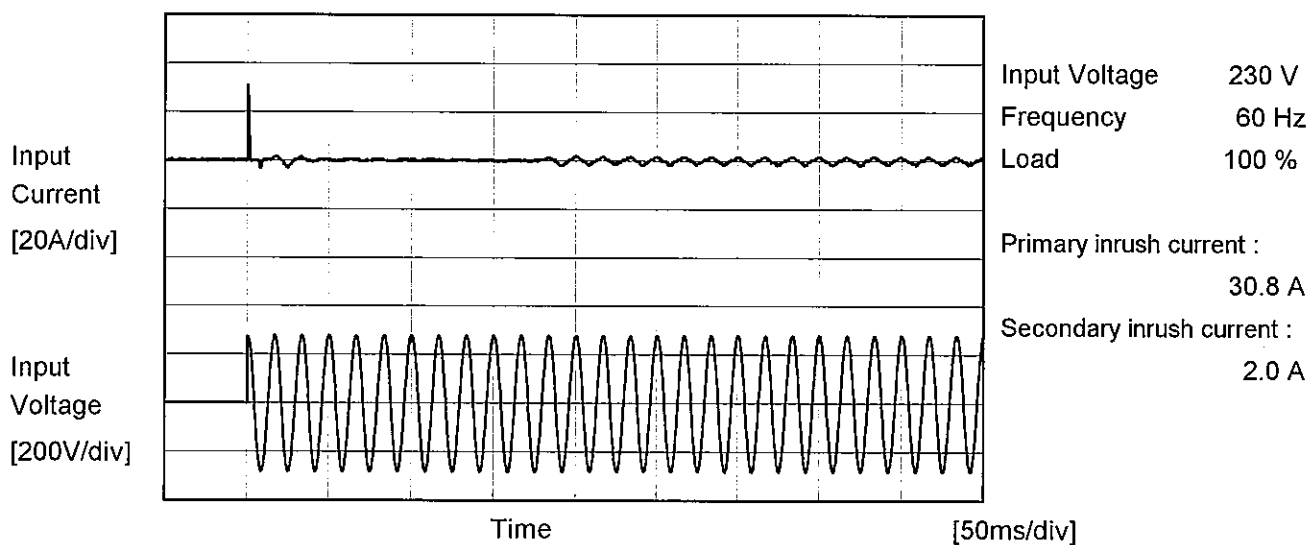
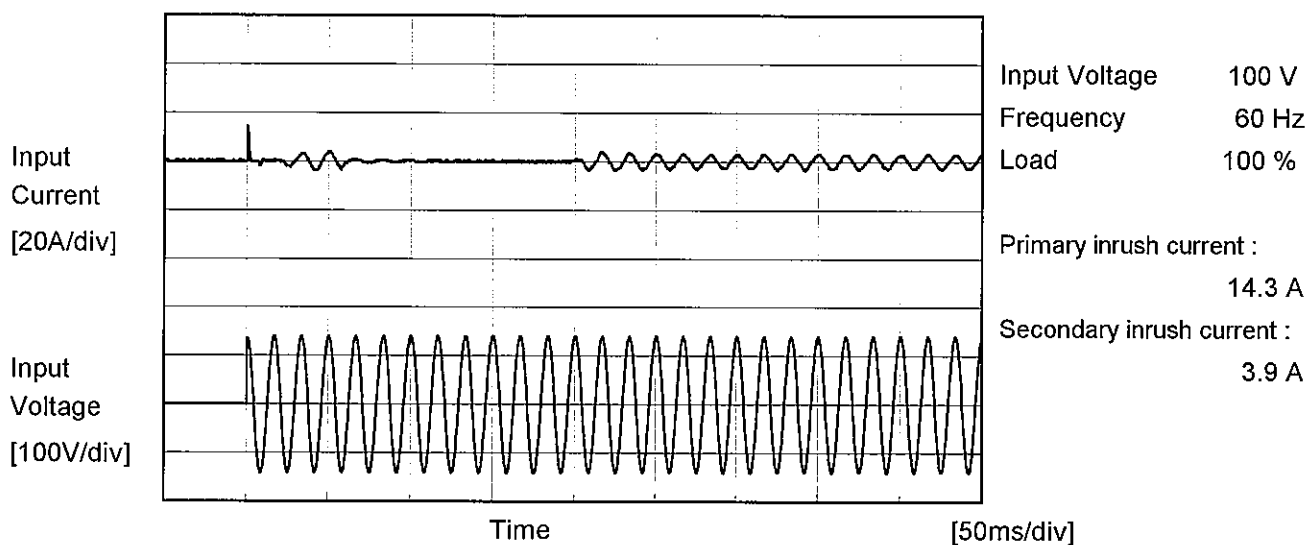
Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
75	0.994	0.999
85	0.991	0.999
100	0.986	0.997
120	0.978	0.991
200	0.912	0.961
230	0.870	0.939
264	0.797	0.902
280	0.752	0.876
--	-	-





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Model		LFA150F-36	Temperature 25°C Testing Circuitry Figure A
Item		Inrush Current	
Object		_____	



Model		LFA150F-36	Temperature 25°C Testing Circuitry Figure B
Item		Leakage Current	
Object			

## 1.Results

Standards		Input Volt.			Note
		100 [V]	200 [V]	230 [V]	
DEN-AN	Both phases	0.27	0.40	0.44	Operation
	One of phases	0.23	0.51	0.60	Stand by
IEC60950-1	Both phases	0.16	0.35	0.41	Operation
	One of phases	0.24	0.52	0.61	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.

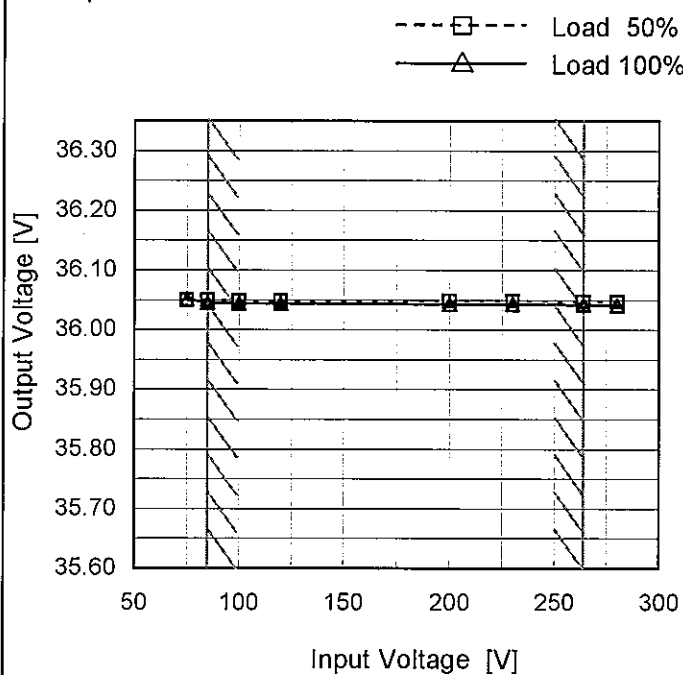
Model LFA150F-36

Item Line Regulation

Object +36V4.2A

Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph



## 2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	36.050	36.051
85	36.050	36.045
100	36.049	36.044
120	36.049	36.044
200	36.049	36.043
230	36.048	36.043
264	36.048	36.042
280	36.048	36.041
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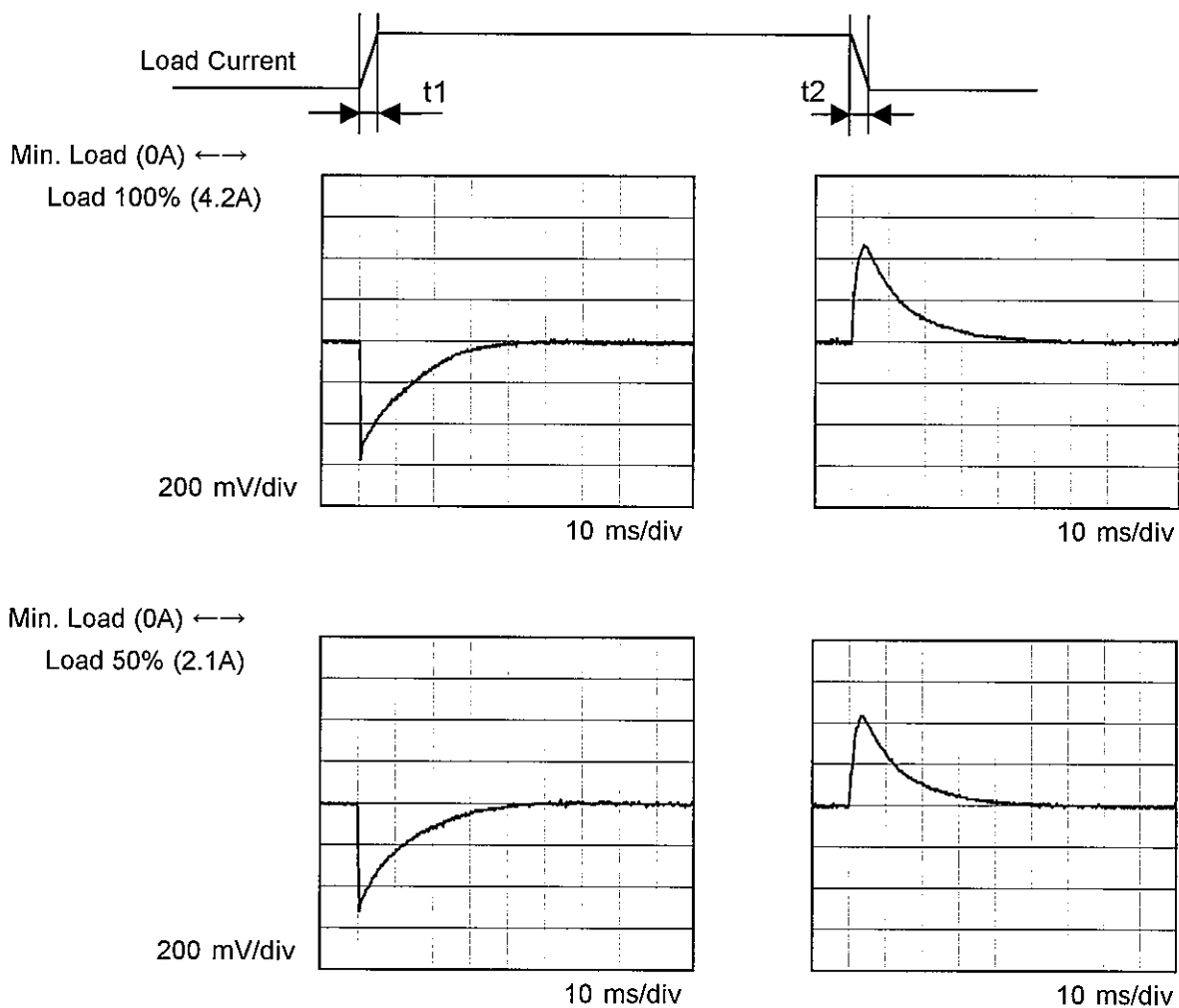


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Model	LFA150F-36	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+36V4.2A		

Input Volt. 100 V  
Cycle 1000 ms

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



Model		LFA150F-36	Temperature25°C																																					
Item		Ripple Voltage (by Load Current)	Testing CircuitryFigure C																																					
Object		+36V4.2A																																						
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Load Current [A]	Input Volt. 100 [V]	Input Volt. 230 [V]																																						
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<div><div>T1: Due to AC Input Line</div><div>T2: Due to Switching</div></div> <p>Fig. Complex Ripple Wave Form</p>																																								

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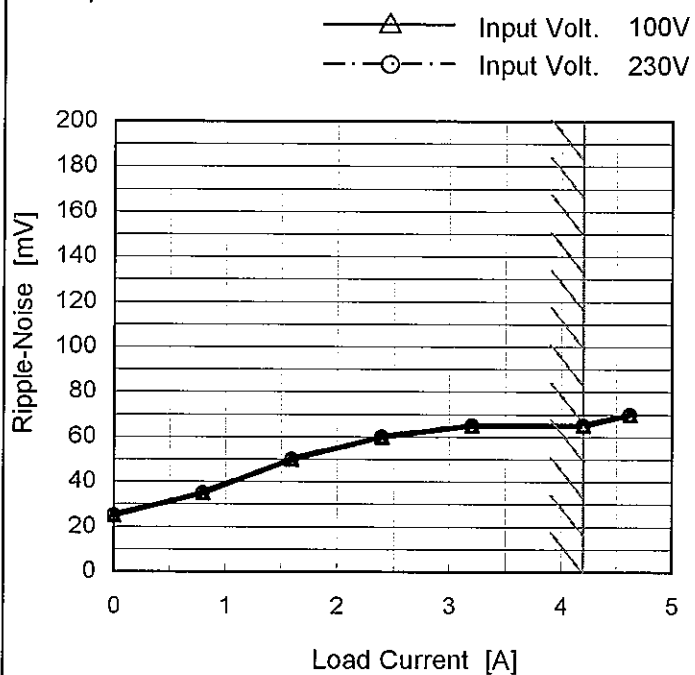
Model LFA150F-36

Item Ripple-Noise

Object +36V4.2A

 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]
0.00	25	25
0.80	35	35
1.60	50	50
2.40	60	60
3.20	65	65
4.20	65	65
4.62	70	70
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--	-	-
--	-	-
--	-	-

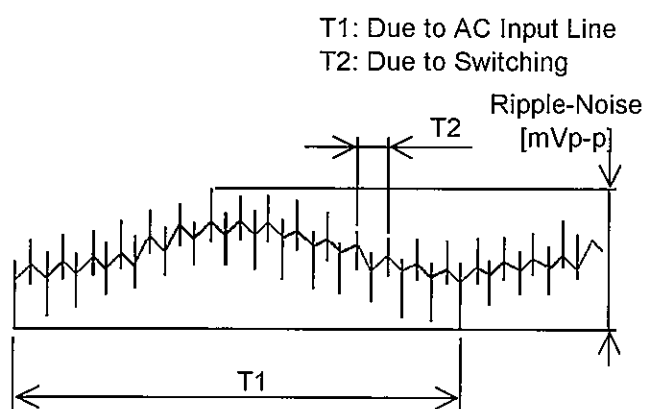


Fig. Complex Ripple Wave Form

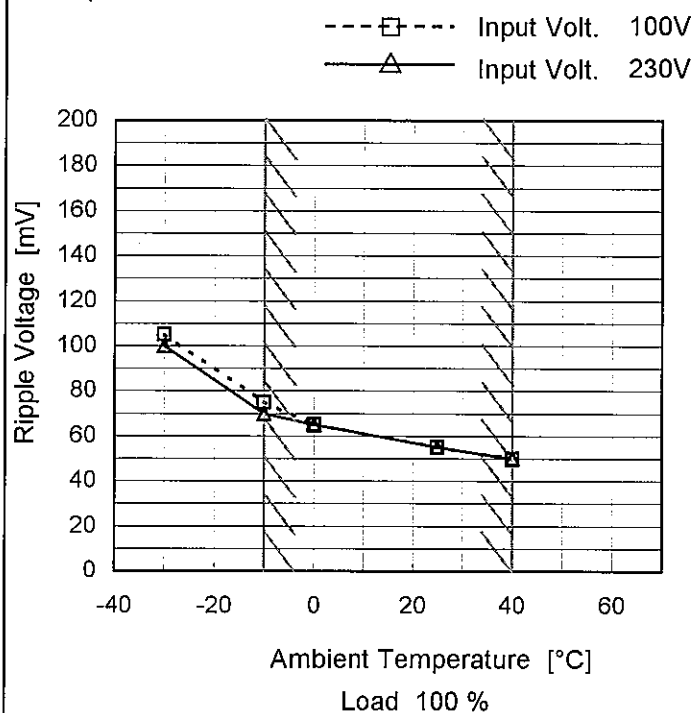
Model LFA150F-36

Item Ripple Voltage (by Ambient Temp.)

Object +36V4.2A

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	105	100
-10	75	70
0	65	65
25	55	55
40	50	50
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-



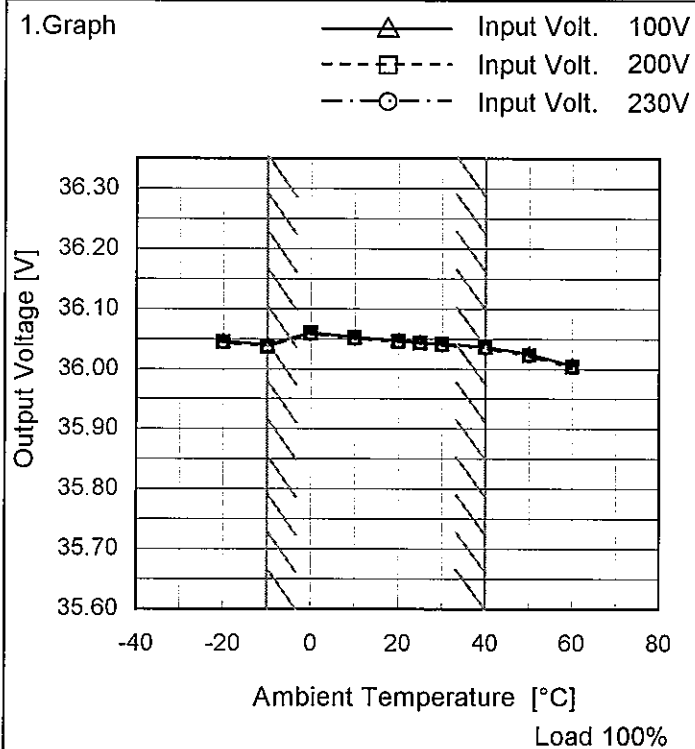
Model LFA150F-36

Item Ambient Temperature Drift

Object +36V4.2A

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	36.046	36.044	36.044
-10	36.040	36.037	36.036
0	36.060	36.059	36.058
10	36.053	36.052	36.051
20	36.047	36.045	36.045
25	36.044	36.043	36.043
30	36.042	36.041	36.040
40	36.037	36.035	36.034
50	36.025	36.023	36.022
60	36.005	36.004	36.003
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Model		LFA150F-36	Testing Circuitry Figure A
Item		Output Voltage Accuracy	
Object		+36V4.2A	

### 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 - 40°C

Input Voltage : 85 - 264V

Load Current : 0 - 4.2A

\* 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	36.053	±33	±0.1
Minimum Voltage	-10	264	4.2	35.988		

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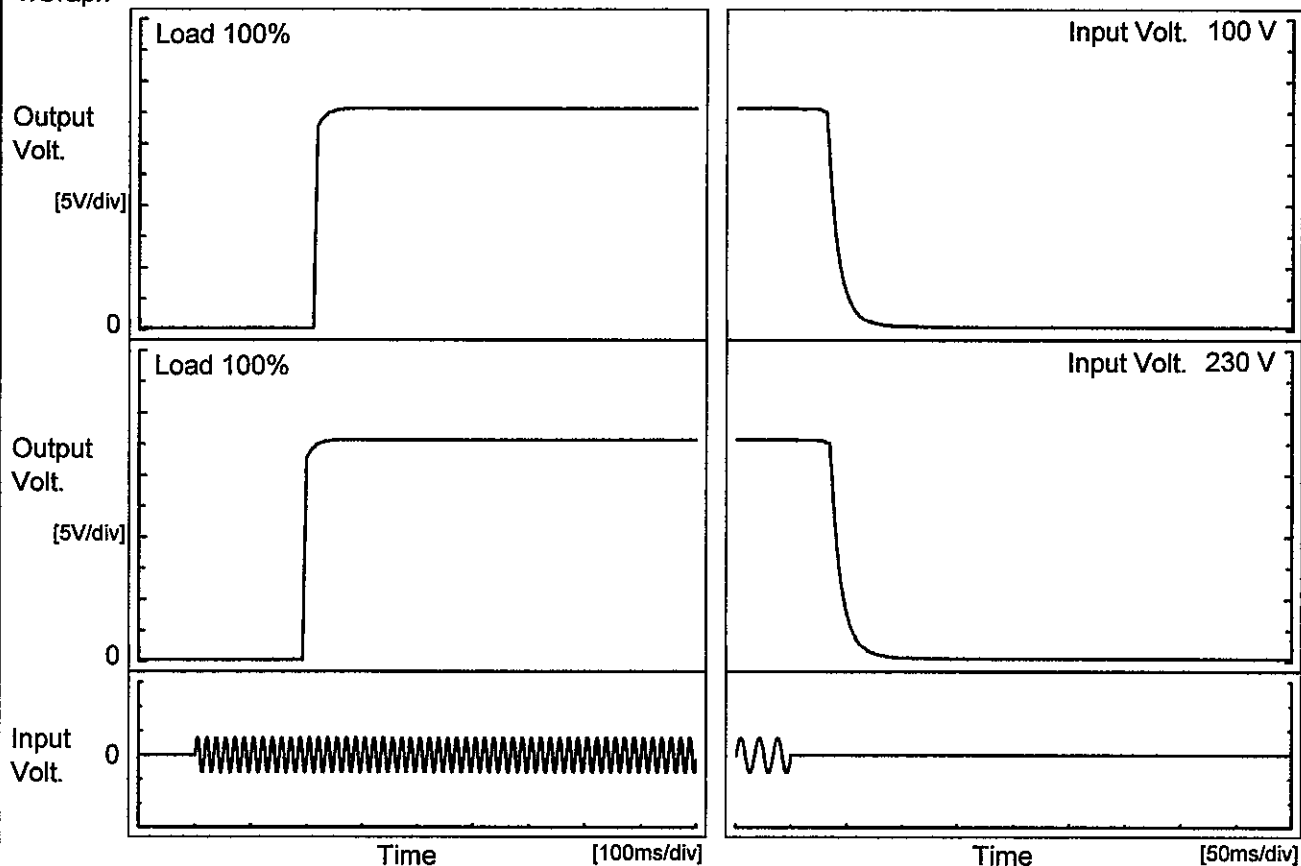
**Model** LFA150F-36

**Item** Rise and Fall Time

**Object** +36V4.2A

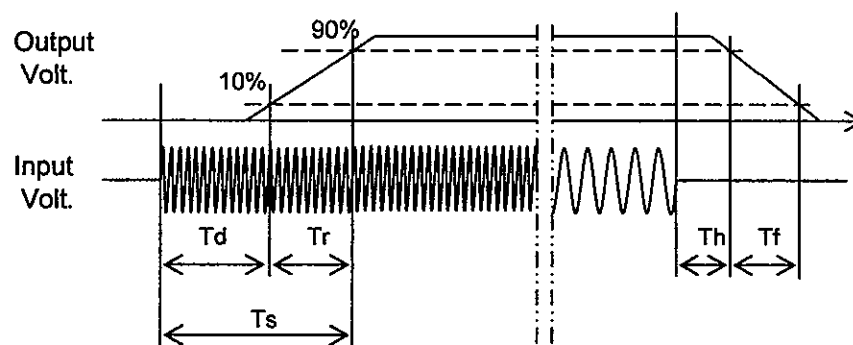
**Temperature** 25°C  
**Testing Circuitry** Figure A

## 1. Graph



## 2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf
100 V		212.0	6.0	218.0	31.5	23.0
230 V		193.0	6.0	199.0	35.3	23.0



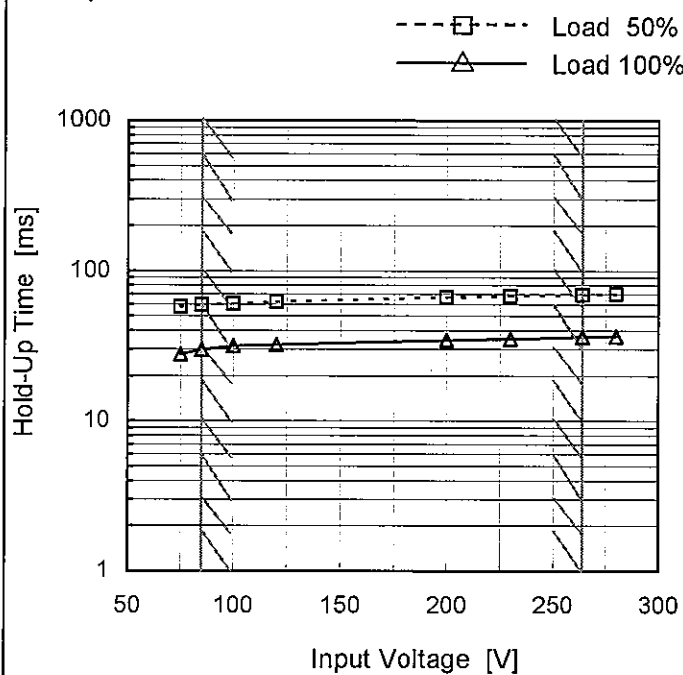
Model LFA150F-36

Item Hold-Up Time

Object +36V4.2A

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	58	28
85	59	30
100	60	32
120	62	32
200	67	34
230	68	35
264	69	36
280	70	37
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Item	Instantaneous Interruption Compensation	Temperature	25°C																																																			
Object	+36V4.2A	Testing Circuitry	Figure A																																																			
1.Graph		2.Values																																																				
<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> <p>Instantaneous Compensation Time [ms]</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">Time [ms]</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>-</td><td>-</td><td>-</td></tr><tr><td>0.8</td><td>138</td><td>163</td><td>163</td></tr><tr><td>1.7</td><td>64</td><td>87</td><td>88</td></tr><tr><td>2.5</td><td>47</td><td>57</td><td>56</td></tr><tr><td>3.4</td><td>37</td><td>44</td><td>45</td></tr><tr><td>4.2</td><td>31</td><td>33</td><td>35</td></tr><tr><td>4.6</td><td>29</td><td>31</td><td>30</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]	Time [ms]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.0	-	-	-	0.8	138	163	163	1.7	64	87	88	2.5	47	57	56	3.4	37	44	45	4.2	31	33	35	4.6	29	31	30	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																					
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- 20 -

BC-10486

Model

LFA150F-36

Item

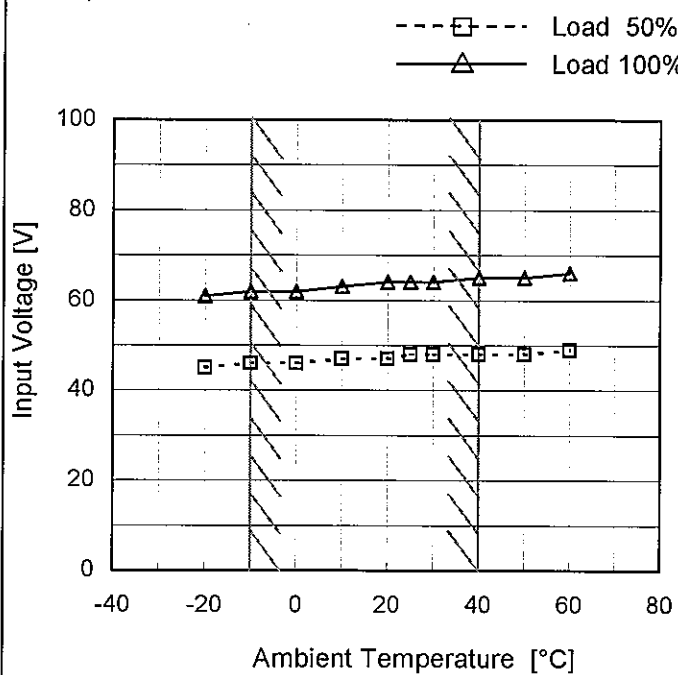
Minimum Input Voltage  
for Regulated Output Voltage

Object

+36V4.2A

Testing Circuitry Figure A

## 1. Graph



## 2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	45	61
-10	46	62
0	46	62
10	47	63
20	47	64
25	48	64
30	48	64
40	48	65
50	48	65
60	49	66
--	-	-

Model	LFA150F-36	Temperature25℃ Testing CircuitryFigure A																																										
Item	Overcurrent Protection																																											
Object	+36V4.2A																																											
1.Graph		2.Values																																										
<div><div><div></div><div>Input Volt.100V</div></div><div><div></div><div>Input Volt.230V</div></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>		<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>36.0</td><td>5.41</td><td>5.38</td></tr><tr><td>34.2</td><td>5.41</td><td>5.39</td></tr><tr><td>32.4</td><td>5.42</td><td>5.40</td></tr><tr><td>28.8</td><td>5.42</td><td>5.42</td></tr><tr><td>25.2</td><td>5.49</td><td>5.46</td></tr><tr><td>21.6</td><td>5.54</td><td>5.49</td></tr><tr><td>18.0</td><td>5.56</td><td>5.52</td></tr><tr><td>14.4</td><td>5.59</td><td>5.55</td></tr><tr><td>10.8</td><td>5.62</td><td>5.59</td></tr><tr><td>7.2</td><td>5.69</td><td>5.66</td></tr><tr><td>3.6</td><td>5.73</td><td>5.76</td></tr><tr><td>0.0</td><td>6.28</td><td>6.40</td></tr></table>		Output Voltage [V]	Load Current [A]		Input Volt. 100[V]	Input Volt. 230[V]	36.0	5.41	5.38	34.2	5.41	5.39	32.4	5.42	5.40	28.8	5.42	5.42	25.2	5.49	5.46	21.6	5.54	5.49	18.0	5.56	5.52	14.4	5.59	5.55	10.8	5.62	5.59	7.2	5.69	5.66	3.6	5.73	5.76	0.0	6.28	6.40
Output Voltage [V]	Load Current [A]																																											
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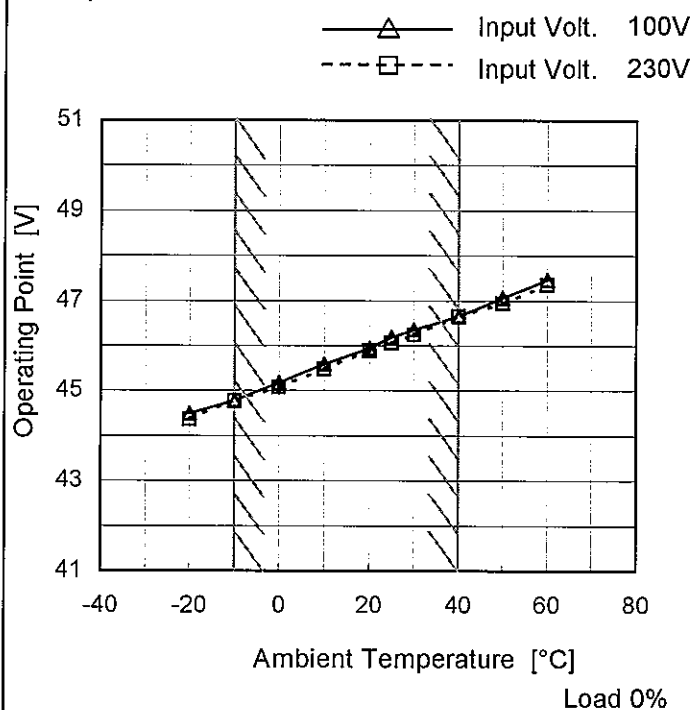
Model LFA150F-36

Item Overvoltage Protection

Object +36V4.2A

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	44.49	44.37
-10	44.78	44.78
0	45.18	45.07
10	45.59	45.48
20	45.95	45.89
25	46.18	46.06
30	46.36	46.24
40	46.65	46.65
50	47.06	46.94
60	47.47	47.35
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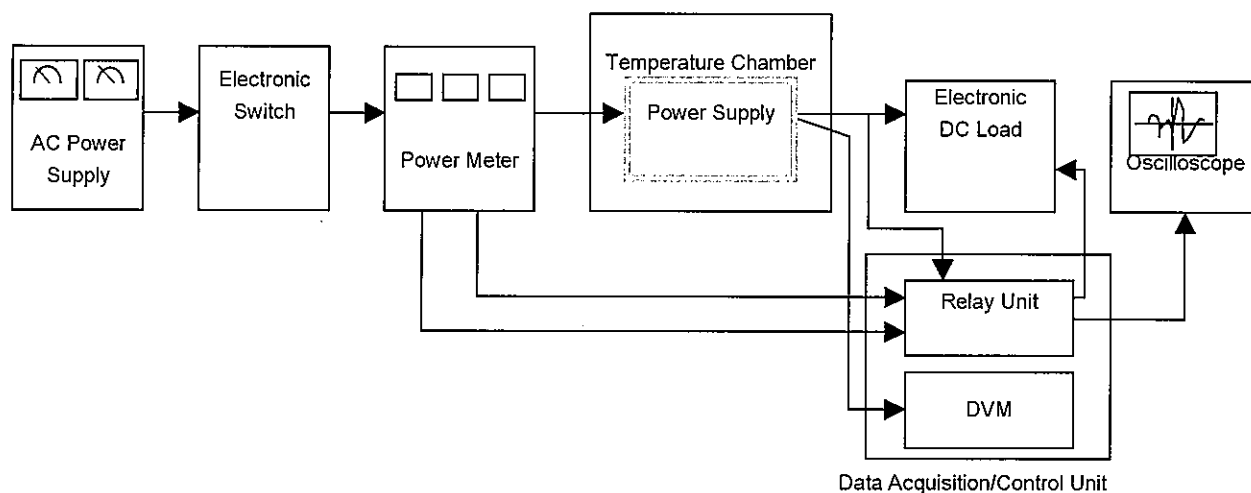


Figure A

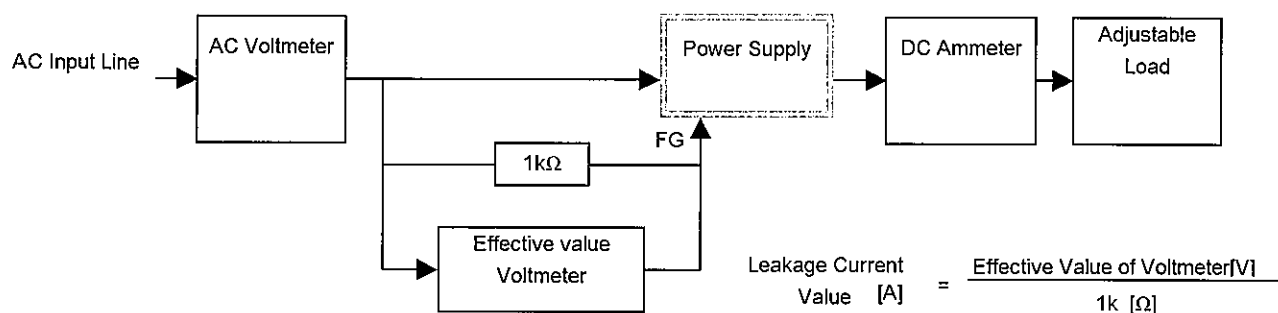


Figure B ( DEN-AN )

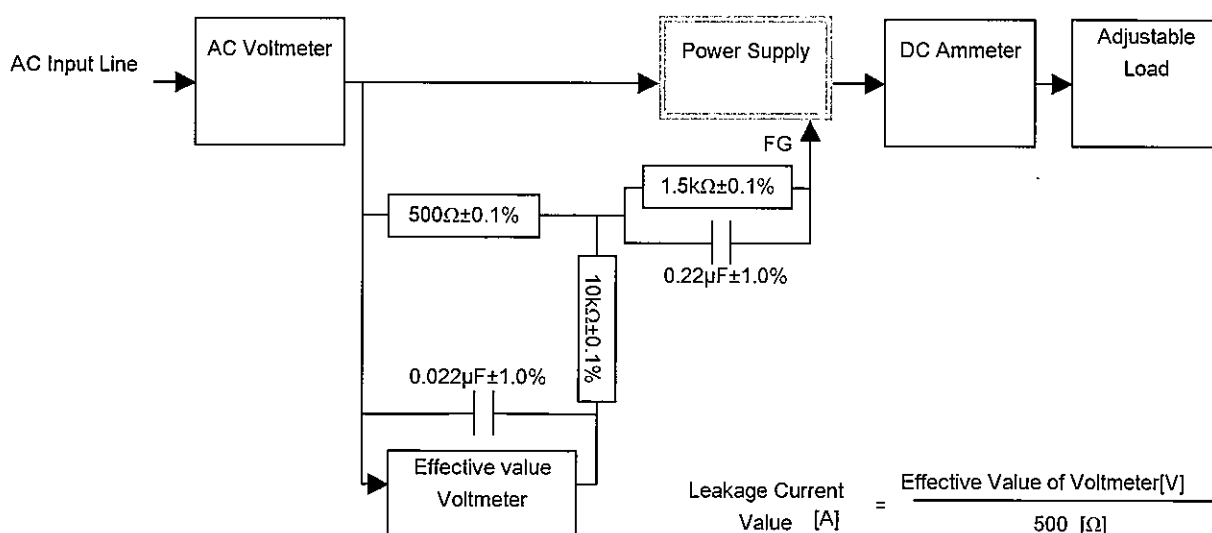


Figure B ( IEC60950-1 )

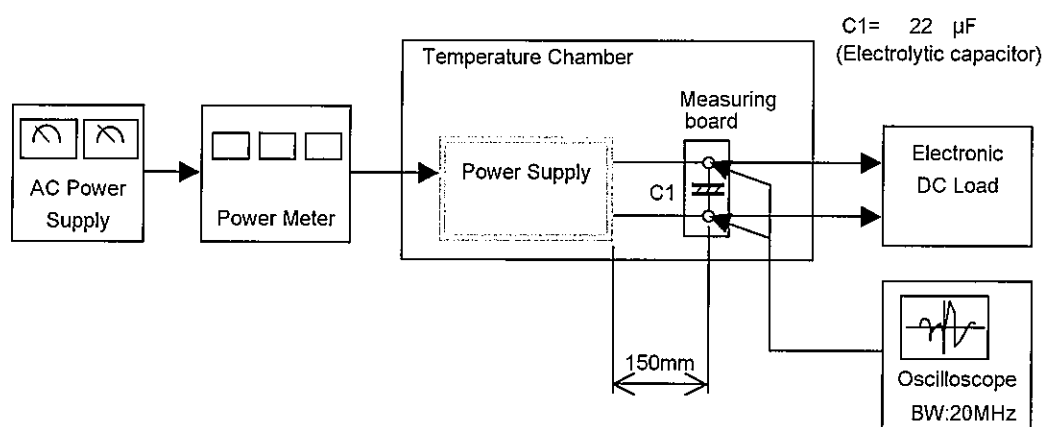


Figure C