

# TEST DATA OF LFA300F-5-TY

Regulated DC Power Supply  
December 22, 2010

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Yoshaki Shimizu Design Manager

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Tomoyuki Mukaiyama Design Engineer

**COSEL CO.,LTD.**

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Model	LFA300F-5-TY																																																	
Item	Input Current (by Load Current)	Temperature Testing Circuitry	25°C Figure A																																															
Object	—	—	—																																															
1.Graph	—△— Input Volt. 100V ---□--- Input Volt. 200V -·○-· Input Volt. 230V	2.Values																																																
<p>The graph plots Input Current [A] on the y-axis against Load Current [A] on the x-axis. Three data series 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 a positive linear relationship between input current and load current. A slanted line is drawn across the graph, representing the rated load current range.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr><td>0</td><td>0.162</td><td>0.206</td><td>0.228</td></tr> <tr><td>10</td><td>0.822</td><td>0.479</td><td>0.450</td></tr> <tr><td>20</td><td>1.378</td><td>0.746</td><td>0.672</td></tr> <tr><td>30</td><td>1.940</td><td>1.018</td><td>0.906</td></tr> <tr><td>40</td><td>2.540</td><td>1.305</td><td>1.154</td></tr> <tr><td>50</td><td>3.178</td><td>1.612</td><td>1.418</td></tr> <tr><td>60</td><td>3.870</td><td>1.938</td><td>1.696</td></tr> <tr><td>66</td><td>4.310</td><td>2.142</td><td>1.874</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> </tbody> </table>			Load Current [A]	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0	0.162	0.206	0.228	10	0.822	0.479	0.450	20	1.378	0.746	0.672	30	1.940	1.018	0.906	40	2.540	1.305	1.154	50	3.178	1.612	1.418	60	3.870	1.938	1.696	66	4.310	2.142	1.874	--	-	-	-	--	-	-	-	--	-	-	-
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Note: Slanted line shows the range of the rated load current.

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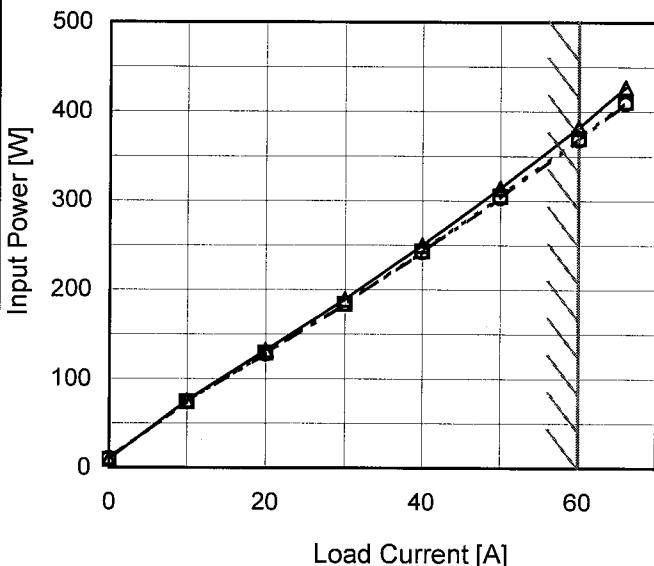
Model LFA300F-5-TY

Item Input Power (by Load Current)

Object \_\_\_\_\_

## 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]	Input Power [W]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	9.5	9.0	10.0
10	75.3	74.0	74.0
20	131.7	129.0	128.0
30	189.0	184.0	184.0
40	249.6	243.0	242.0
50	313.8	305.0	303.0
60	382.0	370.0	368.0
66	427.0	411.0	409.0
--	-	-	-
--	-	-	-
--	-	-	-

Model	LFA300F-5-TY																																	
Item	Efficiency (by Input Voltage)	Temperature      25°C Testing Circuitry      Figure A																																
Object	_____	_____																																
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<p>The graph plots Efficiency [%] on the y-axis (40 to 90) against Input Voltage [V] on the x-axis (50 to 300). Two data series are shown: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show efficiency increasing slightly with input voltage. A slanted line indicates the rated input voltage range.</p> <table border="1"> <thead> <tr> <th>Input Voltage [V]</th> <th>Efficiency Load 50% [%]</th> <th>Efficiency Load 100% [%]</th> </tr> </thead> <tbody> <tr><td>75</td><td>79.5</td><td>76.5</td></tr> <tr><td>85</td><td>80.1</td><td>78.1</td></tr> <tr><td>100</td><td>80.7</td><td>79.7</td></tr> <tr><td>120</td><td>81.3</td><td>80.5</td></tr> <tr><td>200</td><td>82.9</td><td>82.3</td></tr> <tr><td>230</td><td>82.9</td><td>82.7</td></tr> <tr><td>264</td><td>83.4</td><td>83.0</td></tr> <tr><td>280</td><td>83.4</td><td>83.0</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>			Input Voltage [V]	Efficiency Load 50% [%]	Efficiency Load 100% [%]	75	79.5	76.5	85	80.1	78.1	100	80.7	79.7	120	81.3	80.5	200	82.9	82.3	230	82.9	82.7	264	83.4	83.0	280	83.4	83.0	--	-	-		
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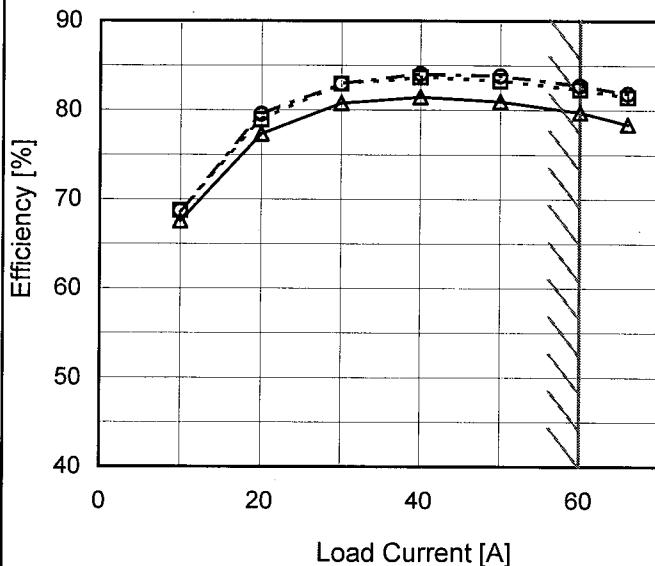
Model LFA300F-5-TY

Item Efficiency (by Load Current)

Object \_\_\_\_\_

## 1. Graph

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



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

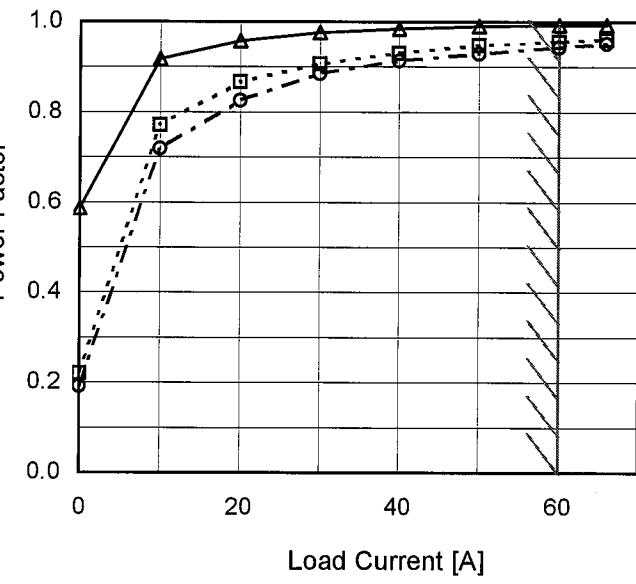
 Temperature 25°C  
 Testing Circuitry Figure A

## 2. Values

Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	-	-	-
10	67.5	68.7	68.7
20	77.3	78.9	79.6
30	80.8	82.9	82.9
40	81.5	83.7	84.0
50	80.9	83.3	83.8
60	79.7	82.3	82.7
66	78.4	81.5	81.9
--	-	-	-
--	-	-	-
--	-	-	-



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Item	Power Factor (by Input Voltage)	Temperature      25°C Testing Circuitry      Figure A																																
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<p>Legend: ---□--- Load 50%    —△— Load 100%</p> <p>Input Voltage [V]</p> <p>Power Factor</p>																																		
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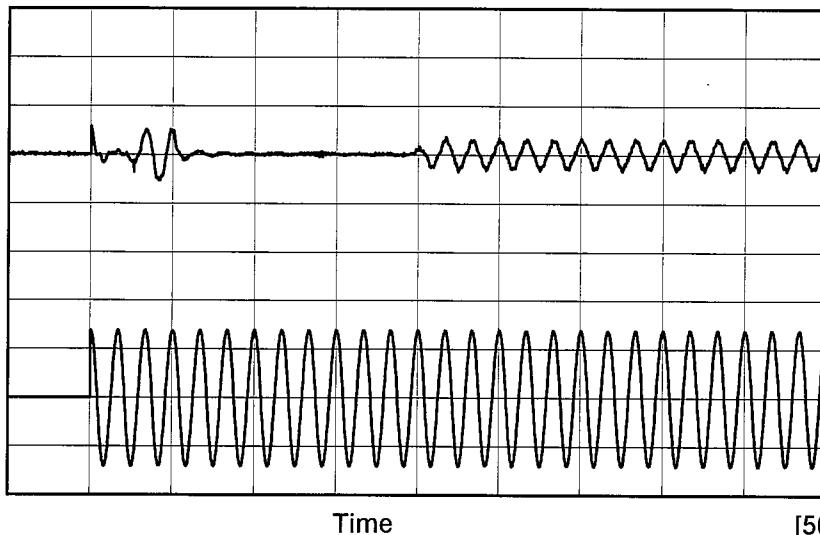
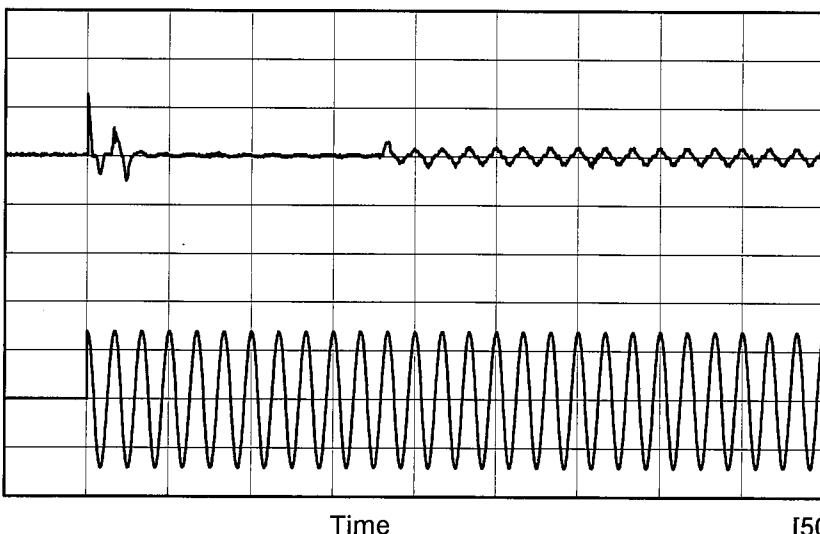
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Model LFA300F-5-TY

Item Inrush Current

Object

Temperature 25°C  
Testing Circuitry Figure AInput  
Current  
[20A/div]Input  
Voltage  
[100V/div]Input Voltage 100 V  
Frequency 60 Hz  
Load 100 %Primary inrush current :  
11.4 A  
Secondary inrush current :  
9.6 AInput  
Current  
[20A/div]Input  
Voltage  
[200V/div]Input Voltage 230 V  
Frequency 60 Hz  
Load 100 %Primary inrush current :  
25.1 A  
Secondary inrush current :  
5.9 A

Primary inrush current

Secondary inrush current



Model	LFA300F-5-TY	Temperature Testing Circuitry 25°C 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.

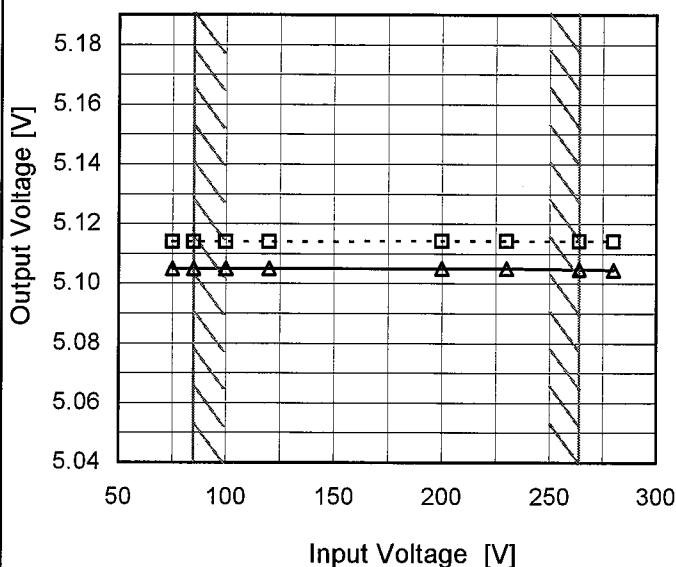
### 2. Condition

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

Model	LFA300F-5-TY
Item	Line Regulation
Object	+5V60A

## 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

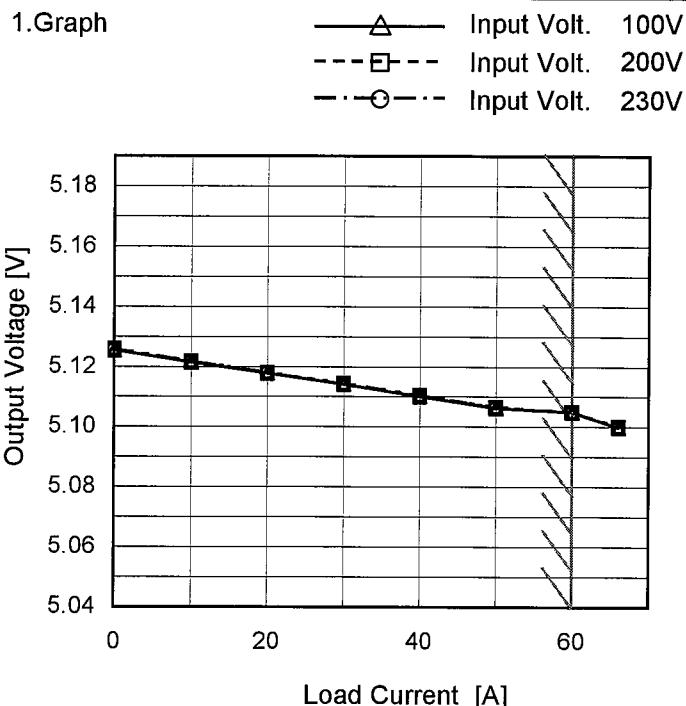
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	5.114	5.105
85	5.114	5.105
100	5.114	5.105
120	5.114	5.105
200	5.114	5.105
230	5.114	5.105
264	5.114	5.105
280	5.114	5.104
--	-	-

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Model LFA300F-5-TY

Item Load Regulation

Object +5V60A

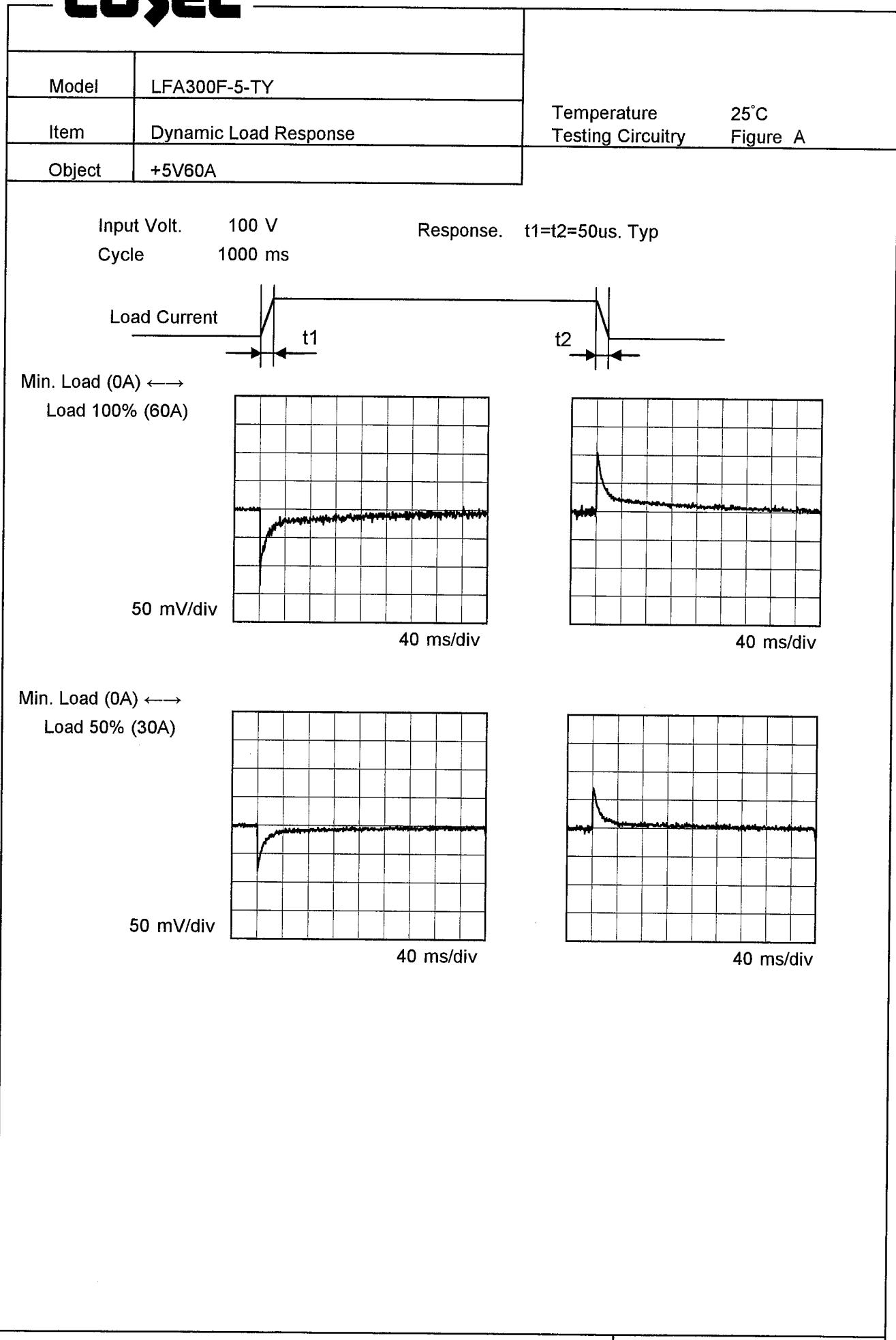


Note: Slanted line shows the range of the rated load current.

 Temperature 25°C  
 Testing Circuitry Figure A

## 2. Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	5.126	5.126	5.126
10	5.121	5.122	5.122
20	5.118	5.118	5.118
30	5.114	5.114	5.114
40	5.110	5.111	5.110
50	5.106	5.107	5.106
60	5.105	5.105	5.105
66	5.100	5.100	5.100
--	-	-	-
--	-	-	-
--	-	-	-

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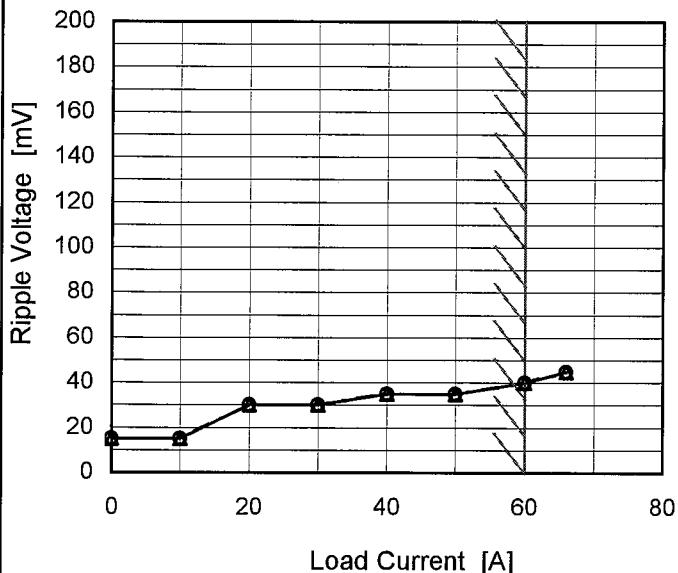
Model LFA300F-5-TY

Item Ripple Voltage (by Load Current)

Object +5V60A

## 1. Graph

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



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.

Temperature 25°C  
Testing Circuitry Figure C

## 2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 230 [V]
0	15	15
10	15	15
20	30	30
30	30	30
40	35	35
50	35	35
60	40	40
66	45	45
--	-	-
--	-	-
--	-	-

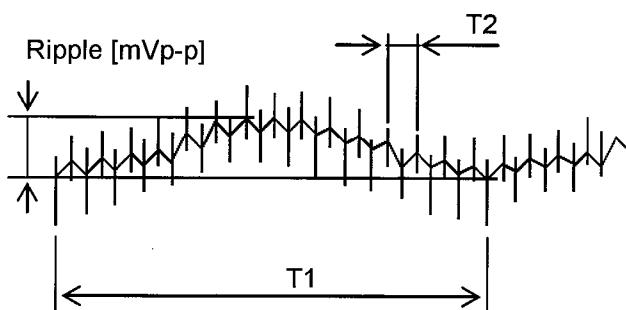
T1: Due to AC Input Line  
T2: Due to Switching

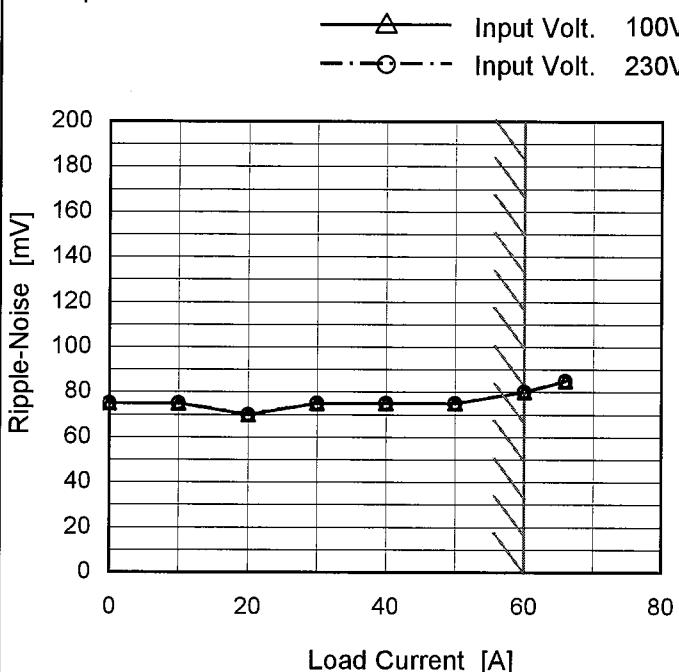
Fig. Complex Ripple Wave Form

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Model	LFA300F-5-TY
Item	Ripple-Noise
Object	+5V60A

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	75	75
10	75	75
20	70	70
30	75	75
40	75	75
50	75	75
60	80	80
66	85	85
--	-	-
--	-	-
--	-	-

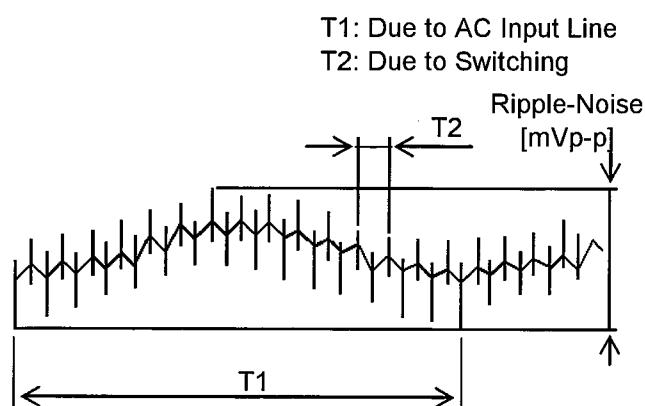
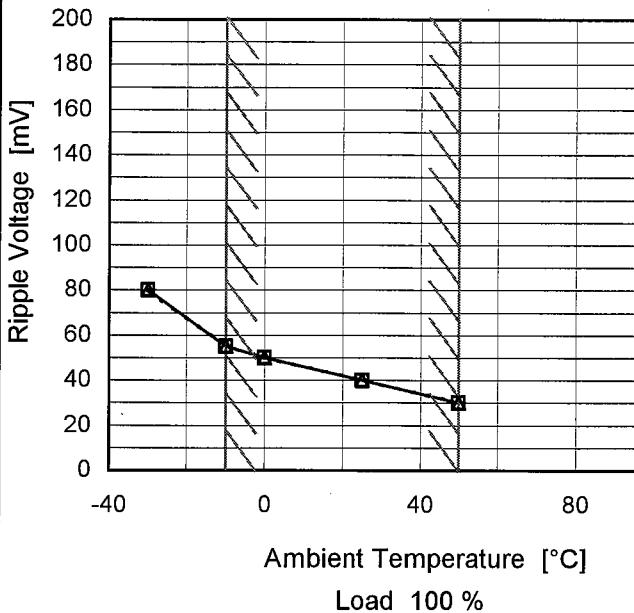


Fig. Complex Ripple Wave Form

Model	LFA300F-5-TY
Item	Ripple Voltage (by Ambient Temp.)
Object	+5V60A

## 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	80	80
-10	55	55
0	50	50
25	40	40
50	30	30
--	-	-
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Model	LFA300F-5-TY																																																					
Item	Ambient Temperature Drift																																																					
Object	+5V60A																																																					
1.Graph	<p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p> <ul style="list-style-type: none"> <li>—△— Input Volt. 100V</li> <li>- -□-- Input Volt. 200V</li> <li>- -○-- Input Volt. 230V</li> </ul>																																																					
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Note:	Slanted line shows the range of the rated ambient temperature.																																																					



Model	LFA300F-5-TY	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+5V60A	

### 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	30	264	0	5.128	$\pm 14$	$\pm 0.3$
Minimum Voltage	50	264	60	5.100		

**COSEL**

Model	LFA300F-5-TY
Item	Time Lapse Drift
Object	+5V60A

1. Graph

Output Voltage [V]	5.18
	5.16
	5.14
	5.12
	5.10
	5.08
	5.06
	5.04

Time [H]	0	2	4	6	8	10
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Input Volt. 100V  
Load 100%

Temperature	25°C
Testing Circuitry	Figure A
2. Values	
Time since start [H]	Output Voltage [V]
0.0	5.106
0.5	5.105
1.0	5.105
2.0	5.105
3.0	5.105
4.0	5.105
5.0	5.105
6.0	5.105
7.0	5.105
8.0	5.105

\* The characteristic of AC230V is equal.

**COSEL**

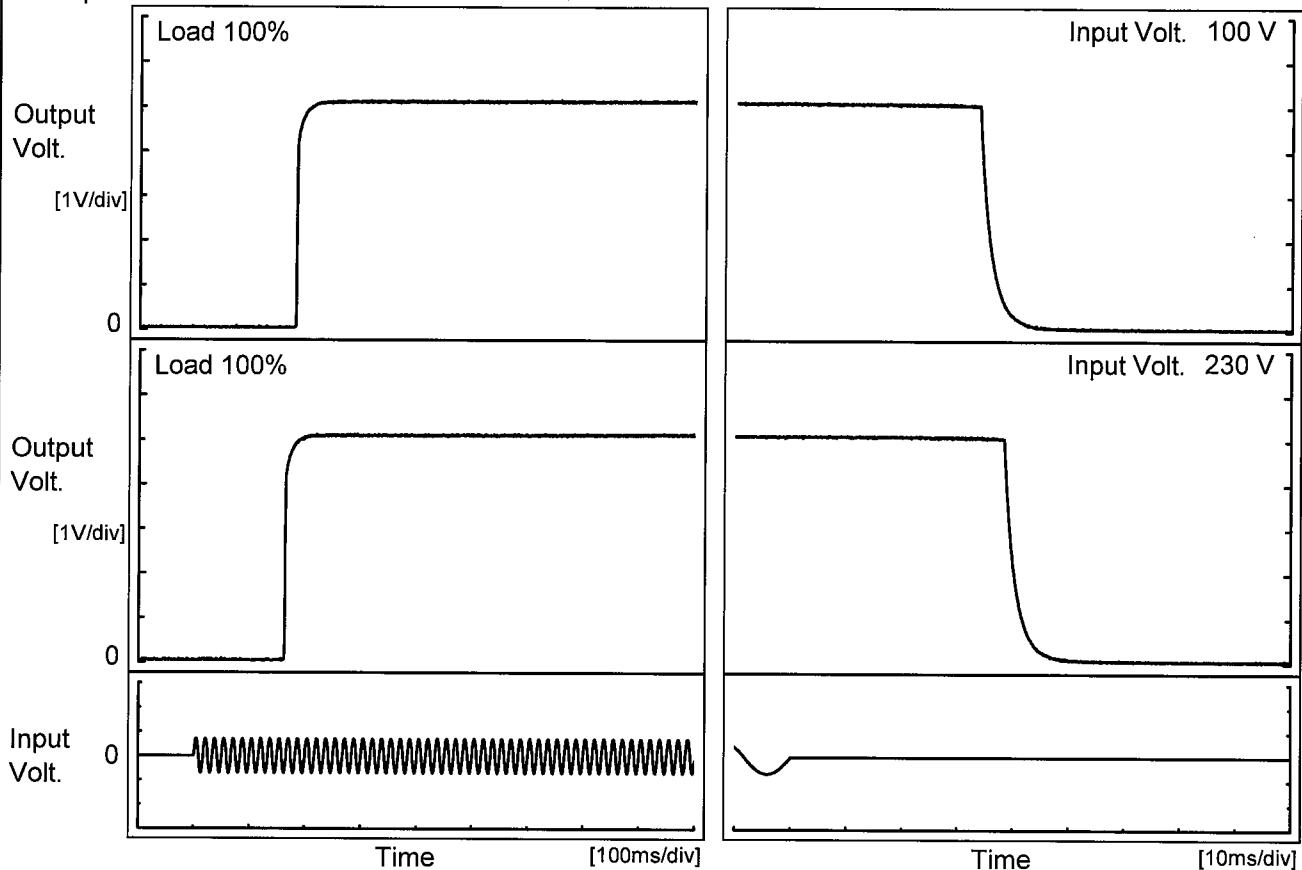
Model LFA300F-5-TY

Item Rise and Fall Time

Object +5V60A

Temperature 25°C  
Testing Circuitry Figure A

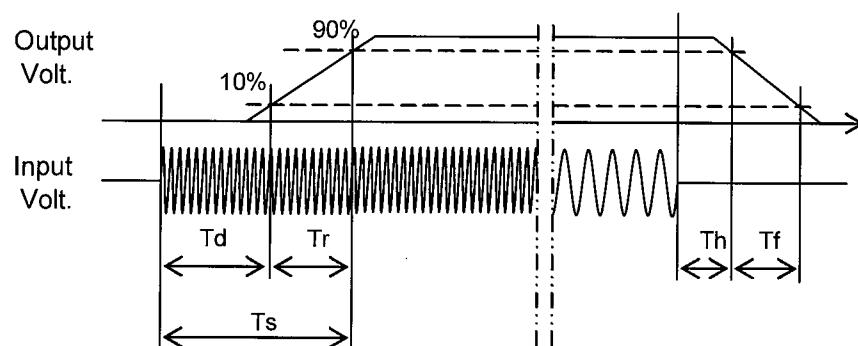
## 1. Graph



## 2. Values

[ms]

Input Volt.	Time	Td	Tr	Ts	Th	Tf
100 V		182.5	7.5	190.0	34.1	4.7
230 V		164.0	7.5	171.5	38.7	4.6

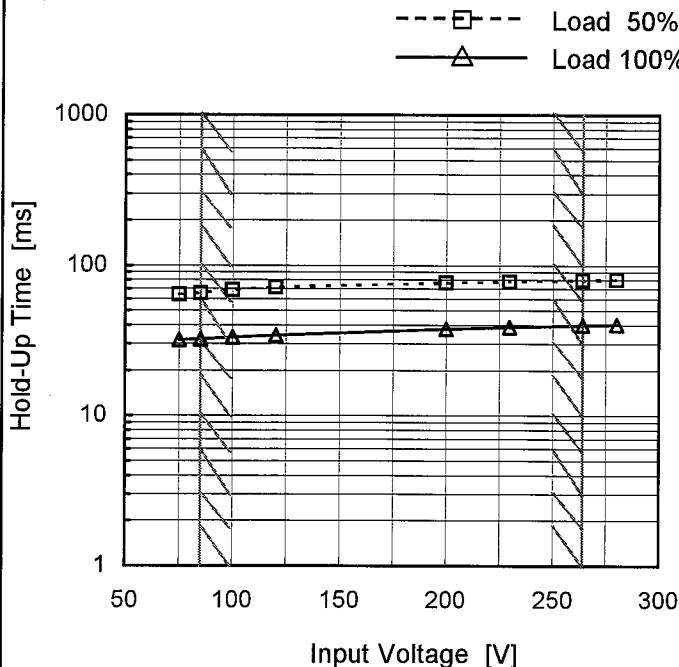


Model LFA300F-5-TY

Item Hold-Up Time

Object +5V60A

## 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

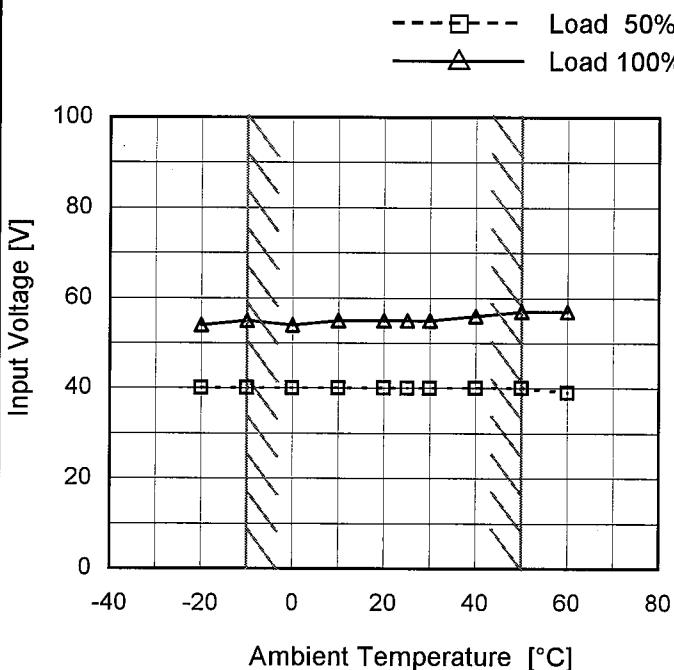
Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
75	64	32
85	65	32
100	69	33
120	72	34
200	76	38
230	78	39
264	79	40
280	80	40
--	-	-

Model	LFA300F-5-TY																																																					
Item	Instantaneous Interruption Compensation																																																					
Object	+5V60A																																																					
1. Graph																																																						
<p>—△— Input Volt. 100V        - - □ - - Input Volt. 200V        - - ○ - - Input Volt. 230V</p> <table border="1"> <caption>Data points estimated from Graph 1</caption> <thead> <tr> <th>Load Current [A]</th> <th>100V [ms]</th> <th>200V [ms]</th> <th>230V [ms]</th> </tr> </thead> <tbody> <tr><td>10</td><td>123</td><td>137</td><td>206</td></tr> <tr><td>20</td><td>65</td><td>76</td><td>113</td></tr> <tr><td>30</td><td>44</td><td>52</td><td>77</td></tr> <tr><td>40</td><td>31</td><td>40</td><td>40</td></tr> <tr><td>50</td><td>23</td><td>32</td><td>32</td></tr> <tr><td>60</td><td>22</td><td>26</td><td>27</td></tr> <tr><td>66</td><td>20</td><td>24</td><td>24</td></tr> </tbody> </table>			Load Current [A]	100V [ms]	200V [ms]	230V [ms]	10	123	137	206	20	65	76	113	30	44	52	77	40	31	40	40	50	23	32	32	60	22	26	27	66	20	24	24																				
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<p>Note: Slanted line shows the range of the rated load current.</p>																																																						

Model	LFA300F-5-TY
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+5V60A

## Testing Circuitry Figure A

## 1.Graph



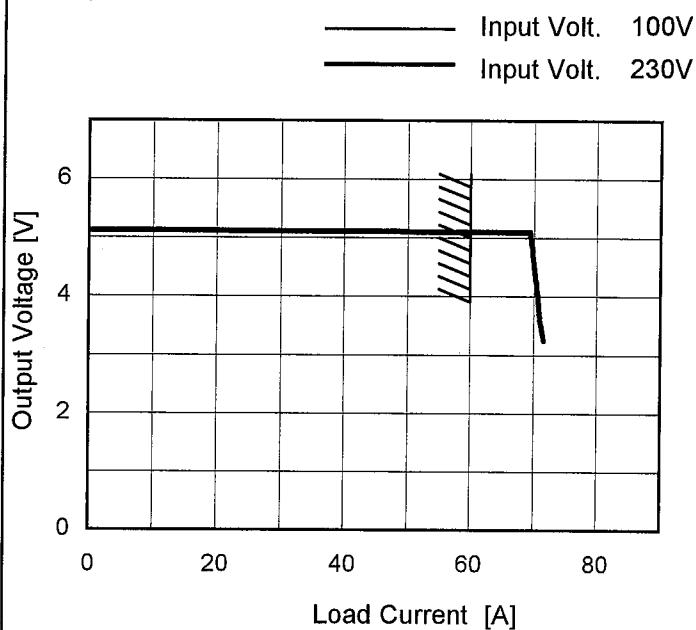
Note: Slanted line shows the range of the rated ambient temperature.

## 2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	40	54
-10	40	55
0	40	54
10	40	55
20	40	55
25	40	55
30	40	55
40	40	56
50	40	57
60	39	57
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Model	LFA300F-5-TY
Item	Overcurrent Protection
Object	+5V60A

## 1.Graph



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

Intermittent operation occurs when the output voltage is from 3V 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]
5.00	69.50	69.50
4.75	69.83	69.80
4.50	70.13	69.96
4.00	70.58	70.58
3.50	71.13	71.04
3.00	71.40	71.49
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

Model	LFA300F-5-TY																																							
Item	Overvoltage Protection																																							
Object	+5V60A																																							
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"> <li>Input Volt. 100V (Solid line)</li> <li>Input Volt. 230V (Dashed line)</li> </ul>																																							
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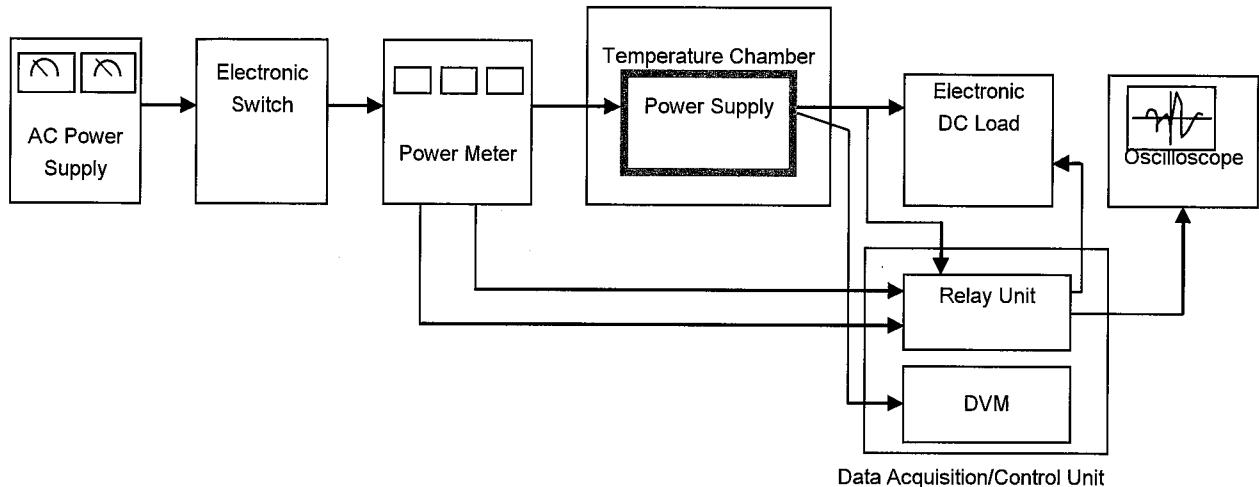


Figure A

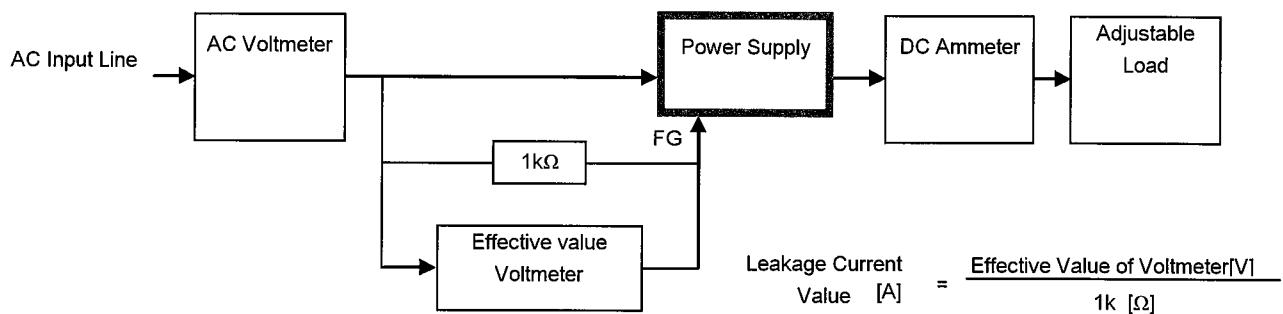


Figure B ( DEN-AN )

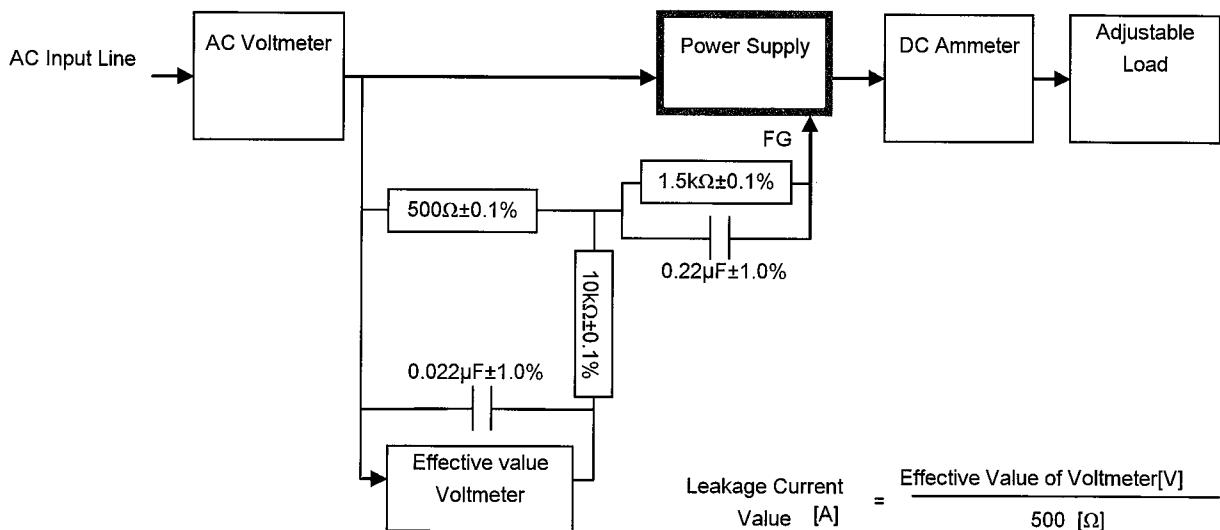


Figure B ( IEC60950-1 )

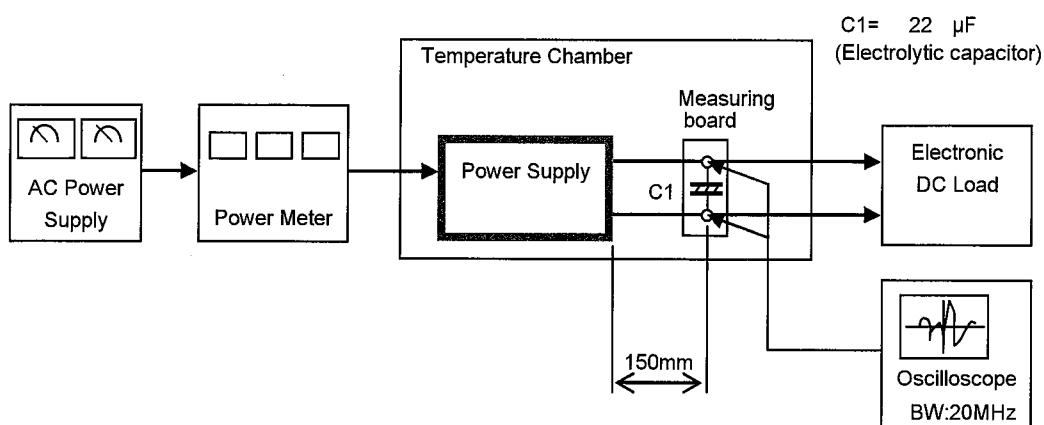


Figure C