

# TEST DATA OF LFA150F-3R3-Y

Regulated DC Power Supply  
November 12, 2010

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Yoshiaki Shimizu Design Manager

Prepared by : Daisuke Sumiwa  
Daisuke Sumiwa Design Engineer

**COSEL CO.,LTD.**

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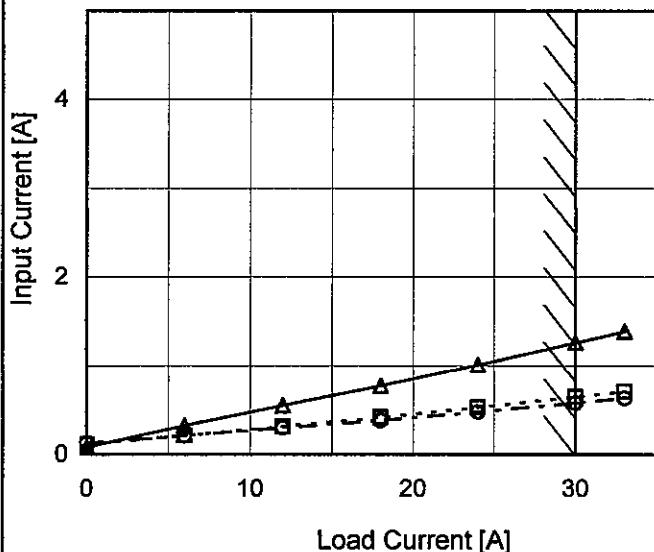
Model LFA150F-3R3-Y

Item Input Current (by Load Current)

Object \_\_\_\_\_

## 1. Graph

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



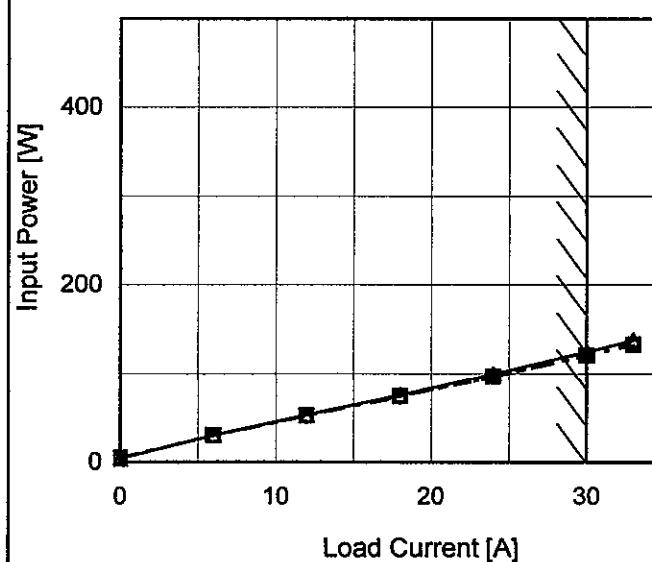
Note: Slanted line shows the range of the rated load current.

 Temperature 25°C  
 Testing Circuitry Figure A

## 2. Values

Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	0.078	0.113	0.125
6	0.323	0.214	0.212
12	0.550	0.313	0.296
18	0.773	0.416	0.382
24	1.010	0.528	0.478
30	1.261	0.646	0.579
33	1.387	0.707	0.632
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	LFA150F-3R3-Y																																																		
Item	Input Power (by Load Current)	Temperature	25°C																																																
Object	—	Testing Circuitry	Figure A																																																
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 <p>The graph plots Input Power [W] on the Y-axis (0 to 400) against Load Current [A] on the X-axis (0 to 30). 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). A slanted line at approximately 25A indicates 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>4.1</td><td>4.6</td><td>4.6</td></tr> <tr><td>6</td><td>30.1</td><td>30.0</td><td>29.9</td></tr> <tr><td>12</td><td>53.1</td><td>52.0</td><td>51.9</td></tr> <tr><td>18</td><td>75.5</td><td>73.9</td><td>73.6</td></tr> <tr><td>24</td><td>99.5</td><td>96.5</td><td>96.4</td></tr> <tr><td>30</td><td>124.6</td><td>120.6</td><td>120.2</td></tr> <tr><td>33</td><td>137.4</td><td>133.0</td><td>132.6</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> </tbody> </table>	Load Current [A]	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0	4.1	4.6	4.6	6	30.1	30.0	29.9	12	53.1	52.0	51.9	18	75.5	73.9	73.6	24	99.5	96.5	96.4	30	124.6	120.6	120.2	33	137.4	133.0	132.6	—	-	-	-	—	-	-	-	—	-	-	-	—	-	-	-			
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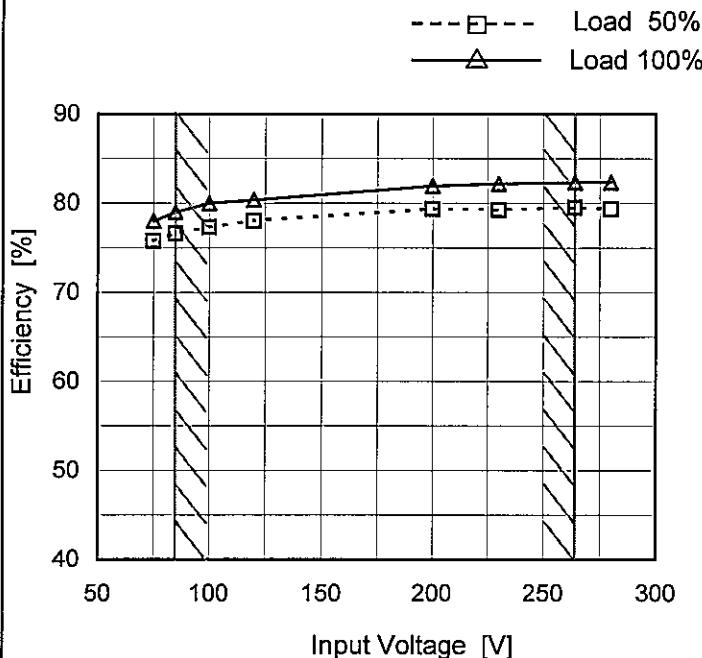
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Model LFA150F-3R3-Y

Item Efficiency (by Input Voltage)

Object \_\_\_\_\_

## 1. Graph

Temperature 25°C  
Testing Circuitry Figure A

## 2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
75	75.8	78.0
85	76.6	79.0
100	77.3	80.0
120	78.0	80.4
200	79.4	82.0
230	79.3	82.2
264	79.5	82.4
280	79.4	82.4
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Note: Slanted line shows the range of the rated input voltage.

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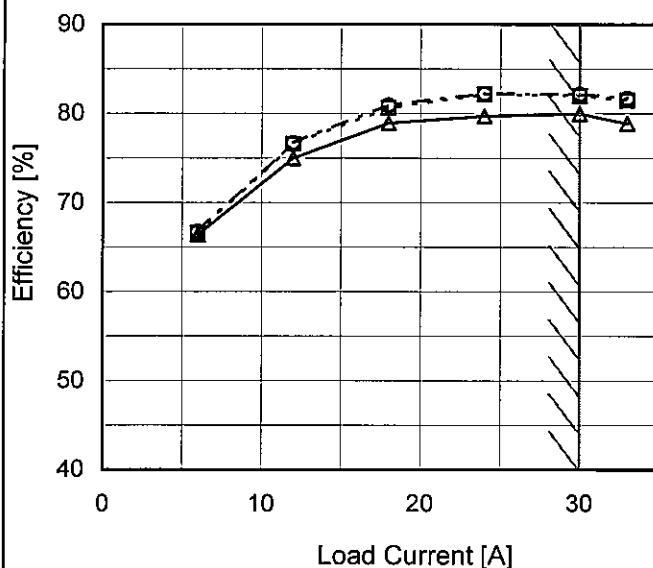
Model LFA150F-3R3-Y

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	-	-	-
6	66.4	66.5	66.8
12	75.0	76.6	76.7
18	78.9	80.6	80.9
24	79.7	82.2	82.3
30	80.0	82.0	82.2
33	78.9	81.5	81.7
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	LFA150F-3R3-Y																																
Item	Power Factor (by Input Voltage)	Temperature 25°C Testing Circuitry Figure A																															
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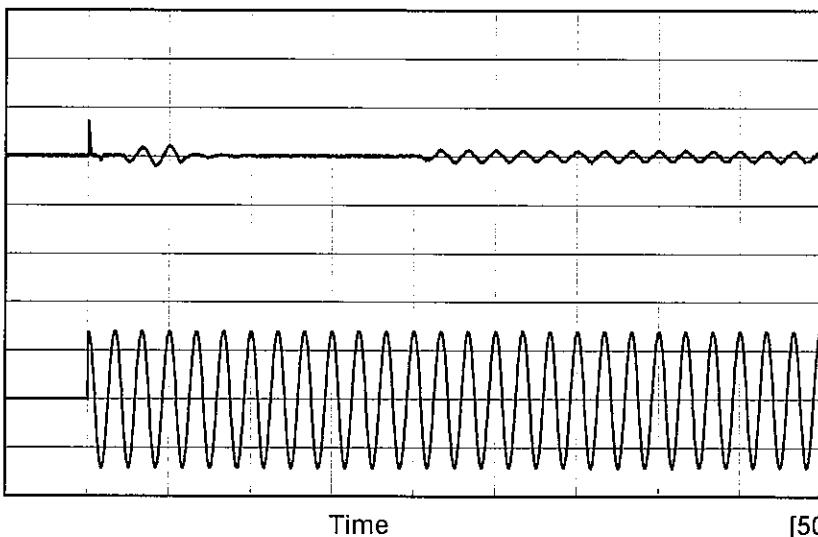
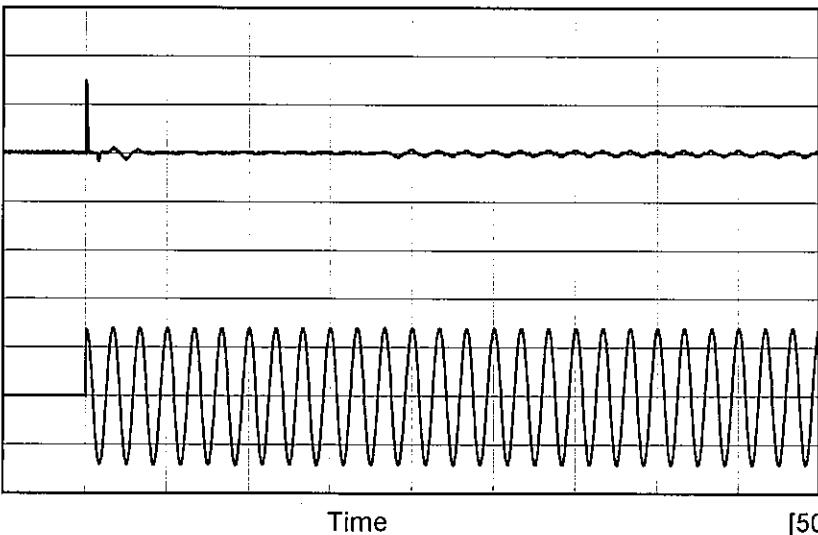
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Model LFA150F-3R3-Y

Temperature 25°C  
Testing Circuitry Figure A

Item Inrush Current

Object \_\_\_\_\_

Input  
Current  
[20A/div]Input  
Voltage  
[100V/div]Input Voltage 100 V  
Frequency 60 Hz  
Load 100 %Primary inrush current :  
14.2 A  
Secondary inrush current :  
4.2 AInput  
Current  
[20A/div]Input  
Voltage  
[200V/div]Input Voltage 230 V  
Frequency 60 Hz  
Load 100 %Primary inrush current :  
29.4 A  
Secondary inrush current :  
1.8 A

Primary inrush current

Secondary inrush current



Model	LFA150F-3R3-Y	Temperature Testing Circuitry	25°C Figure B
Item	Leakage Current		
Object	<hr/>		

### 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

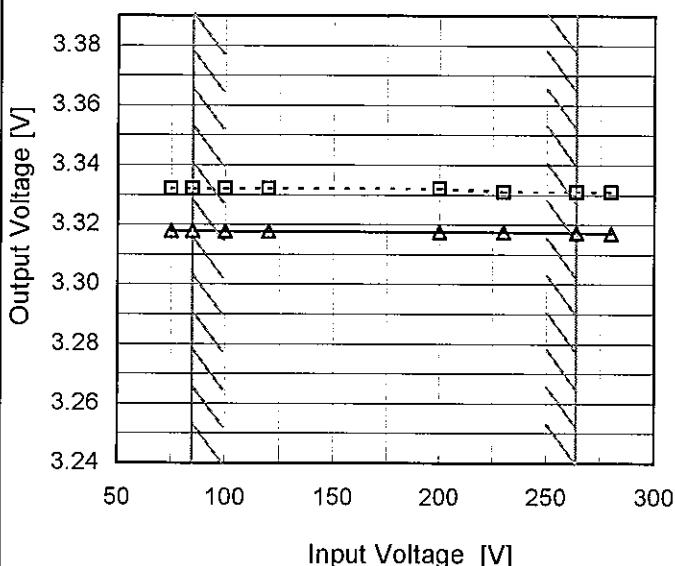
Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

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Model	LFA150F-3R3-Y
Item	Line Regulation
Object	+3.3V30A

## 1. Graph

---□--- Load 50%  
 —△— Load 100%



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

Temperature 25°C  
Testing Circuitry Figure A

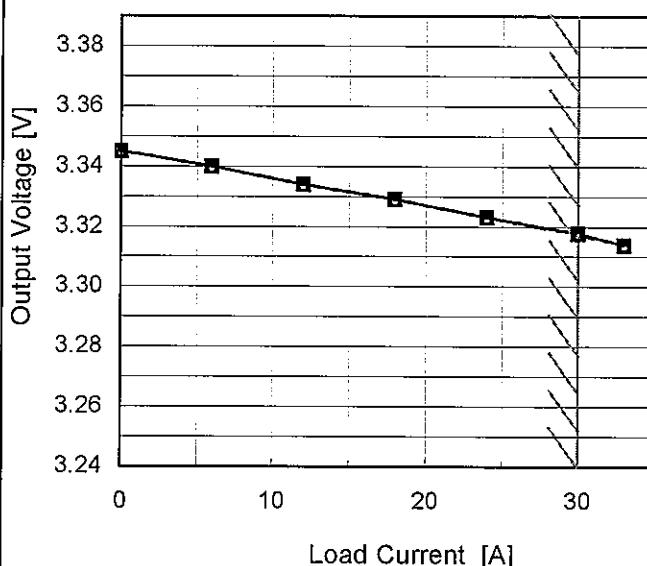
## 2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	3.332	3.318
85	3.332	3.318
100	3.332	3.318
120	3.332	3.318
200	3.332	3.318
230	3.331	3.317
264	3.331	3.317
280	3.331	3.317
--	-	-

Model	LFA150F-3R3-Y
Item	Load Regulation
Object	+3.3V30A

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

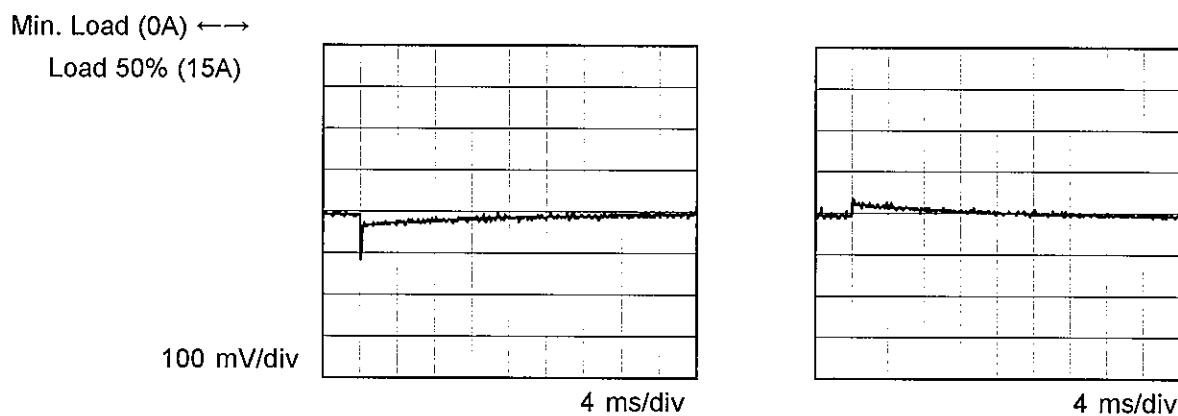
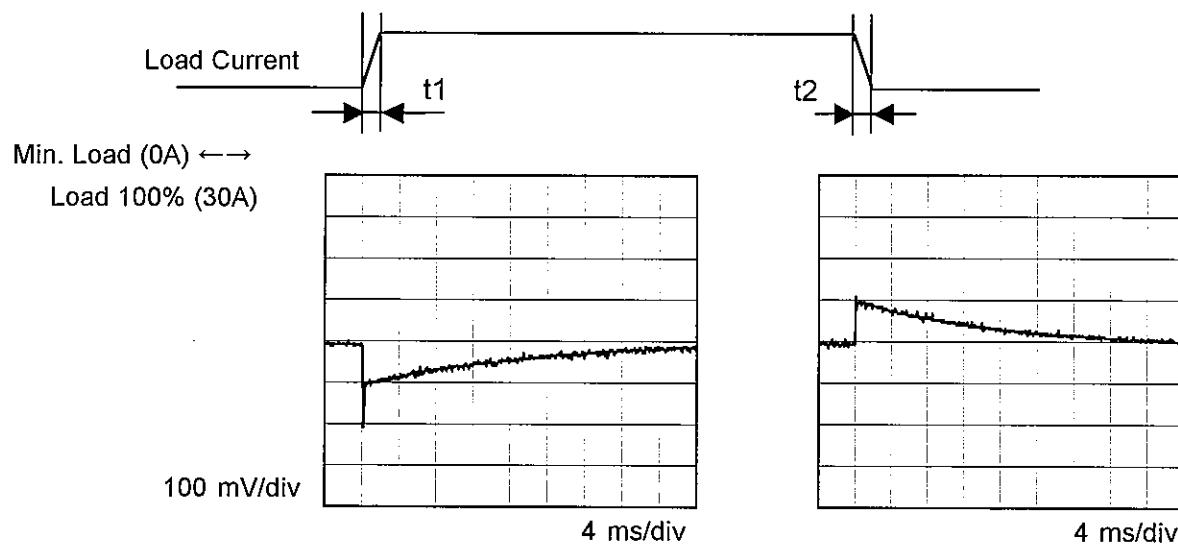
Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	3.345	3.345	3.345
6	3.340	3.340	3.340
12	3.334	3.334	3.334
18	3.329	3.329	3.329
24	3.323	3.323	3.323
30	3.318	3.318	3.317
33	3.314	3.314	3.314
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	LFA150F-3R3-Y	Temperature Testing Circuitry	25°C
Item	Dynamic Load Response		Figure A
Object	+3.3V30A		

Input Volt. 100 V  
Cycle 1000 ms

Response.  $t_1=t_2=50\mu s$ . Typ



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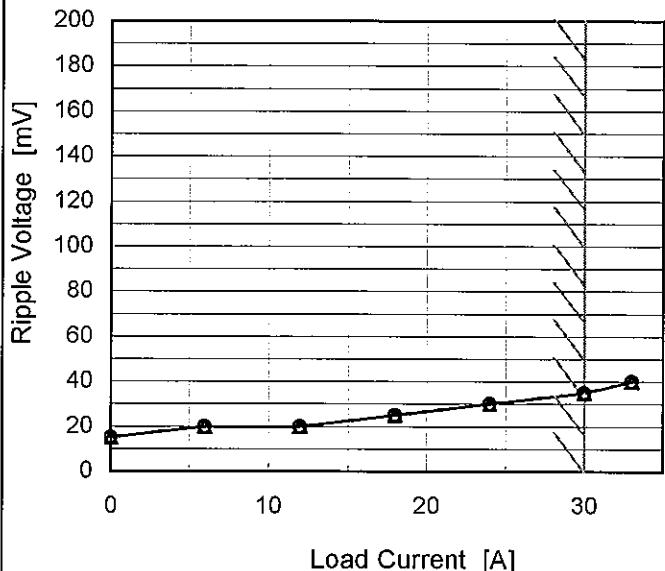
Model LFA150F-3R3-Y

Item Ripple Voltage (by Load Current)

Object +3.3V30A

## 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
6	20	20
12	20	20
18	25	25
24	30	30
30	35	35
33	40	40
--	-	-
--	-	-
--	-	-
--	-	-

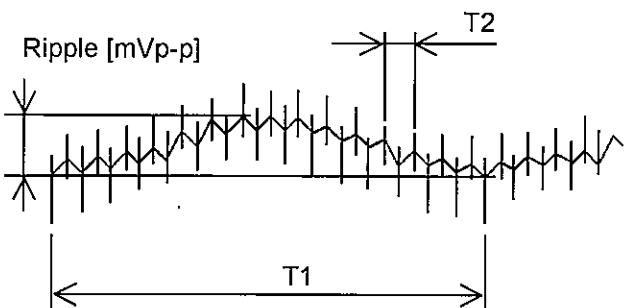
T1: Due to AC Input Line  
T2: Due to Switching

Fig. Complex Ripple Wave Form

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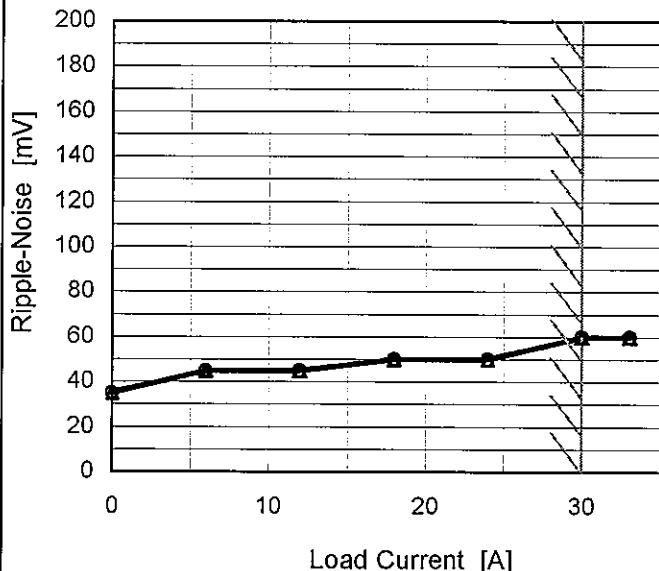
Model LFA150F-3R3-Y

Item Ripple-Noise

Object +3.3V30A

## 1. Graph

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



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.

Temperature 25°C  
Testing Circuitry Figure C

## 2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 230 [V]
0	35	35
6	45	45
12	45	45
18	50	50
24	50	50
30	60	60
33	60	60
--	-	-
--	-	-
--	-	-
--	-	-

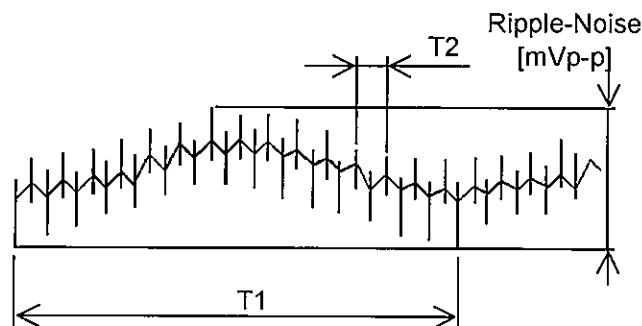
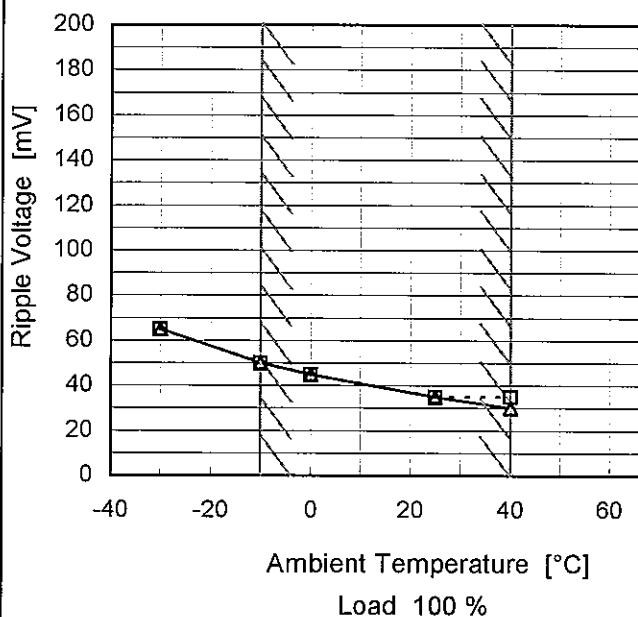
T1: Due to AC Input Line  
T2: Due to Switching

Fig. Complex Ripple Wave Form

Model	LFA150F-3R3-Y
Item	Ripple Voltage (by Ambient Temp.)
Object	+3.3V30A

## 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

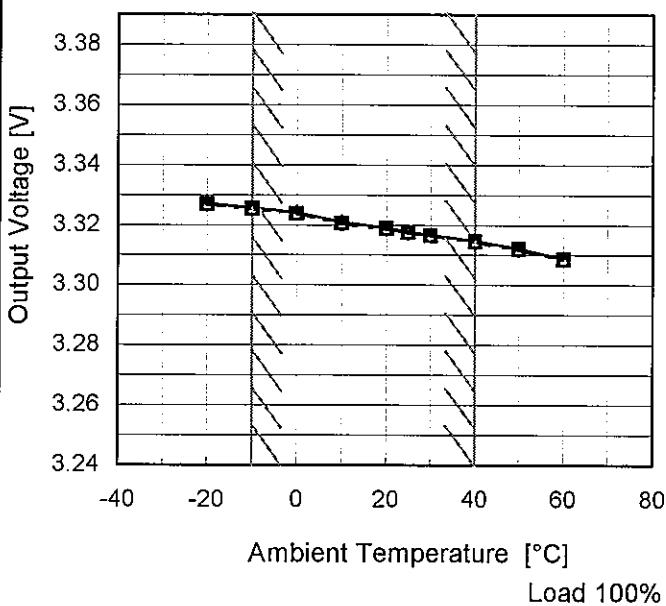
## 2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 230 [V]
-30	65	65
-10	50	50
0	45	45
25	35	35
40	35	30
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

Model	LFA150F-3R3-Y
Item	Ambient Temperature Drift
Object	+3.3V30A

## 1. Graph

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



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

## Testing Circuitry Figure A

## 2. Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt.	Input Volt.	Input Volt.
100[V]	200[V]	230[V]	
-20	3.327	3.327	3.327
-10	3.326	3.325	3.325
0	3.324	3.324	3.324
10	3.321	3.321	3.320
20	3.319	3.319	3.319
25	3.318	3.318	3.317
30	3.317	3.317	3.316
40	3.315	3.315	3.314
50	3.312	3.312	3.312
60	3.309	3.309	3.308
--	-	-	-



Model	LFA150F-3R3-Y	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+3.3V30A	

### 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 - 30A

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

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

### 2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-10	264	0	3.350	$\pm 23$	$\pm 0.7$
Minimum Voltage	40	264	30	3.304		

**COSEL**

Model	LFA150F-3R3-Y	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+3.3V10A																								
1.Graph			2.Values																						
<p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 100V 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>3.319</td></tr> <tr><td>0.5</td><td>3.318</td></tr> <tr><td>1.0</td><td>3.318</td></tr> <tr><td>2.0</td><td>3.318</td></tr> <tr><td>3.0</td><td>3.318</td></tr> <tr><td>4.0</td><td>3.318</td></tr> <tr><td>5.0</td><td>3.318</td></tr> <tr><td>6.0</td><td>3.318</td></tr> <tr><td>7.0</td><td>3.318</td></tr> <tr><td>8.0</td><td>3.318</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	3.319	0.5	3.318	1.0	3.318	2.0	3.318	3.0	3.318	4.0	3.318	5.0	3.318	6.0	3.318	7.0	3.318	8.0	3.318
Time since start [H]	Output Voltage [V]																								
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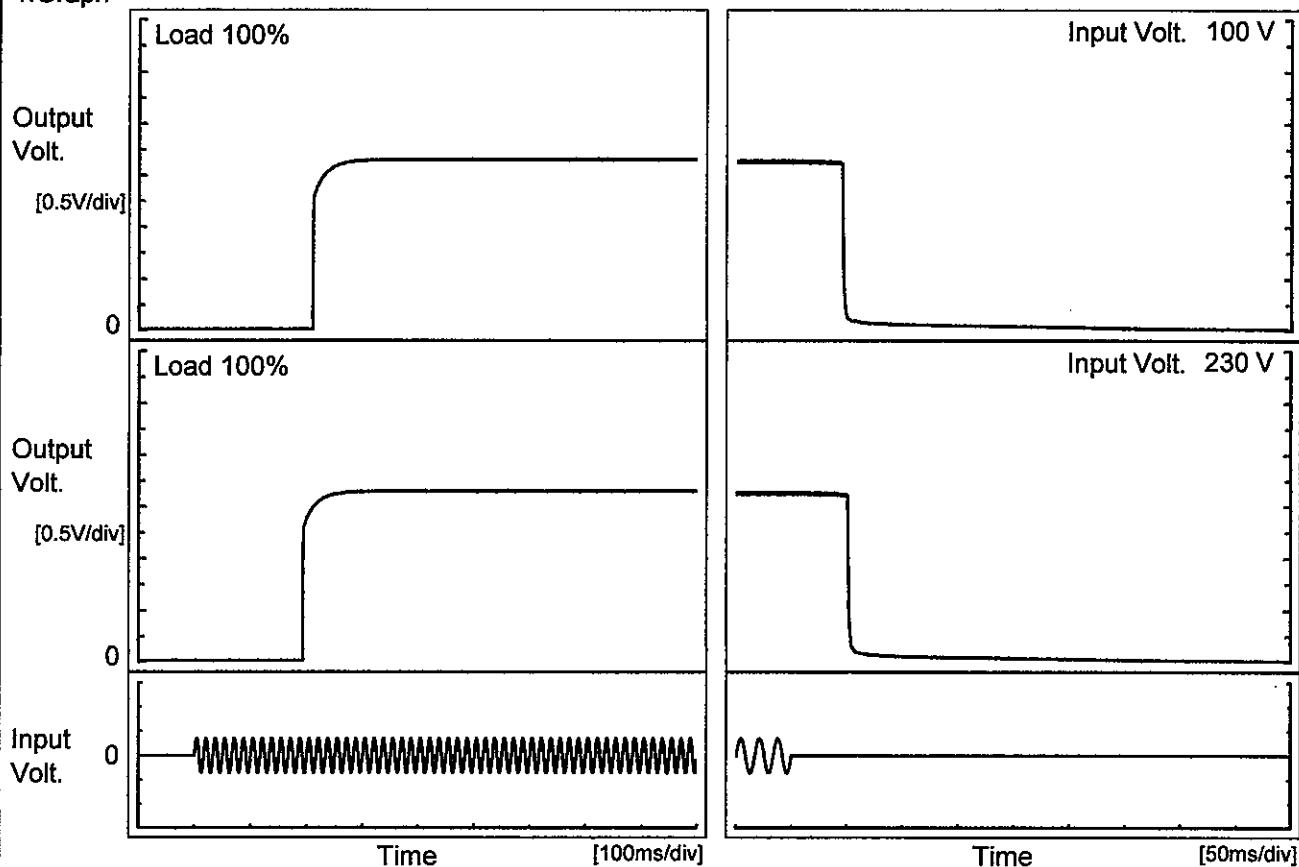
\* The characteristic of AC230V is equal.

**COSEL**

Model	LFA150F-3R3-Y
Item	Rise and Fall Time
Object	+3.3V30A

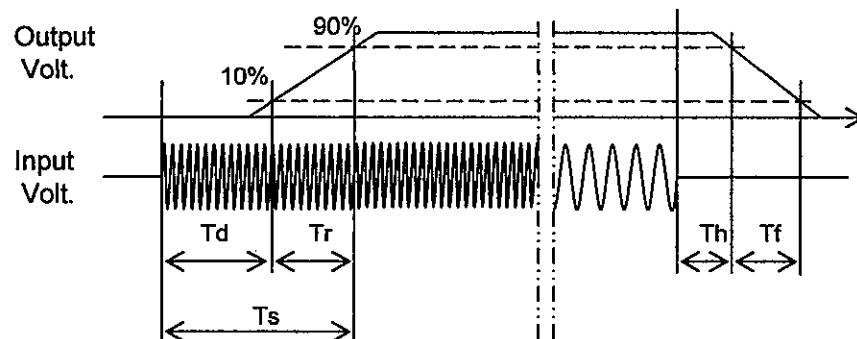
Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph



## 2. Values

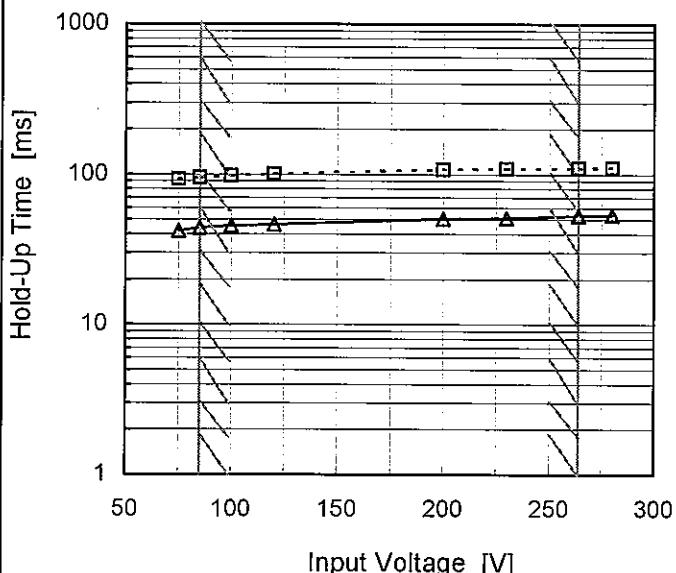
Input Volt.	Time	Td	Tr	Ts	Th	Tf	[ms]
100 V		210.5	19.5	230.0	45.3	4.0	
230 V		193.0	19.5	212.5	50.8	4.0	



Model	LFA150F-3R3-Y
Item	Hold-Up Time
Object	+3.3V30A

## 1. Graph

---□--- Load 50%  
—△— Load 100%



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

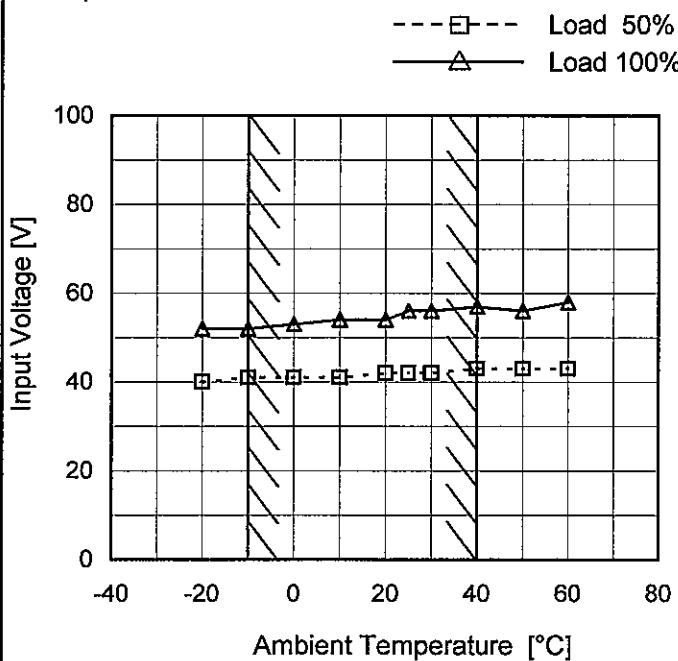
Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
75	94	42
85	95	44
100	98	45
120	100	47
200	107	50
230	109	51
264	110	53
280	111	54
--	-	-

**COSEL**

Model	LFA150F-3R3-Y																																																					
Item	Instantaneous Interruption Compensation																																																					
Object	+3.3V30A																																																					
1.Graph																																																						
<p>—△— Input Volt. 100V        - - □ - - Input Volt. 200V        - - ○ - - Input Volt. 230V</p>																																																						
2.Values																																																						
<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</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>6</td><td>196</td><td>255</td><td>256</td></tr> <tr><td>12</td><td>98</td><td>131</td><td>135</td></tr> <tr><td>18</td><td>64</td><td>88</td><td>89</td></tr> <tr><td>24</td><td>47</td><td>64</td><td>64</td></tr> <tr><td>30</td><td>44</td><td>49</td><td>50</td></tr> <tr><td>33</td><td>35</td><td>44</td><td>46</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> </tbody> </table>				Load Current [A]	Time [ms]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0	-	-	-	6	196	255	256	12	98	131	135	18	64	88	89	24	47	64	64	30	44	49	50	33	35	44	46	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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<p>Note: Slanted line shows the range of the rated load current.</p>																																																						

Model	LFA150F-3R3-Y
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+3.3V30A

## 1. Graph



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

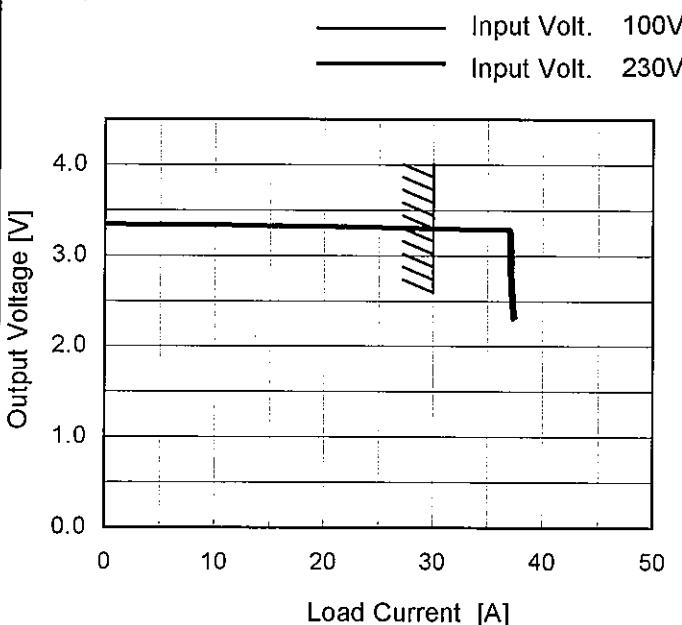
## Testing Circuitry Figure A

## 2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	40	52
-10	41	52
0	41	53
10	41	54
20	42	54
25	42	56
30	42	56
40	43	57
50	43	56
60	43	58
--	-	-



Model	LFA150F-3R3-Y
Item	Overcurrent Protection
Object	+3.3V30A

**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.

Temperature 25°C  
Testing Circuitry Figure A

**2. Values**

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 230[V]
3.300	31.55	31.73
3.135	37.27	36.97
2.970	37.30	37.01
2.640	37.36	37.09
2.310	37.58	37.29
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-



Model	LFA150F-3R3-Y																																							
Item	Overvoltage Protection																																							
Object	+3.3V30A																																							
1.Graph																																								
<p>Operating Point [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 0%</p> <p>Legend: Input Volt. 100V (solid line with triangle), Input Volt. 230V (dashed line with square)</p>																																								
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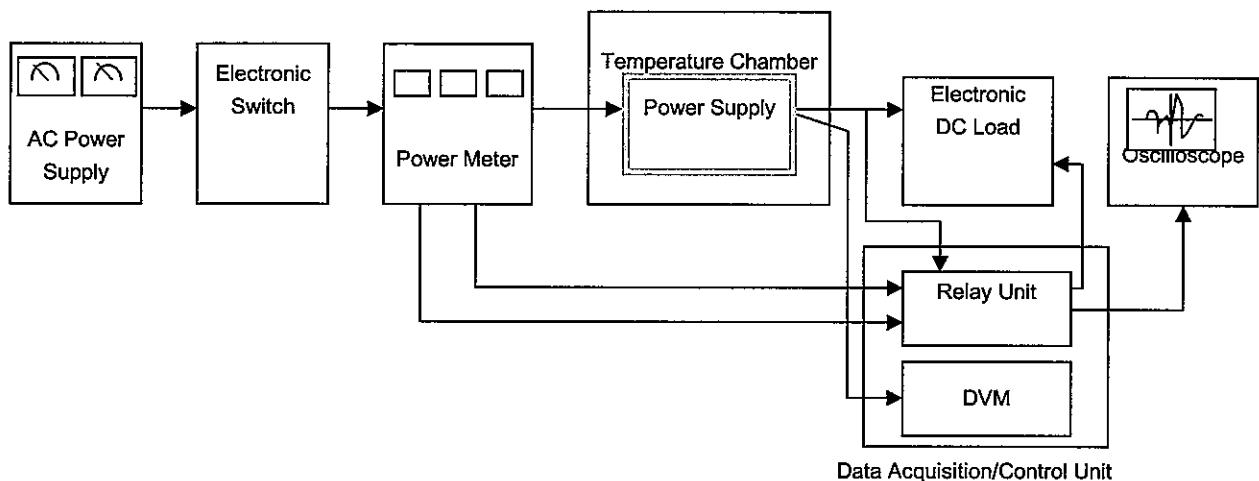


Figure A

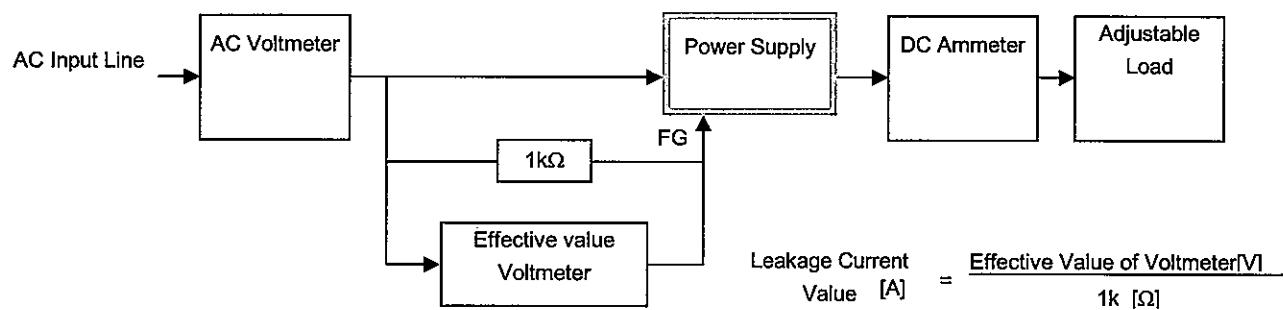


Figure B ( DEN-AN )

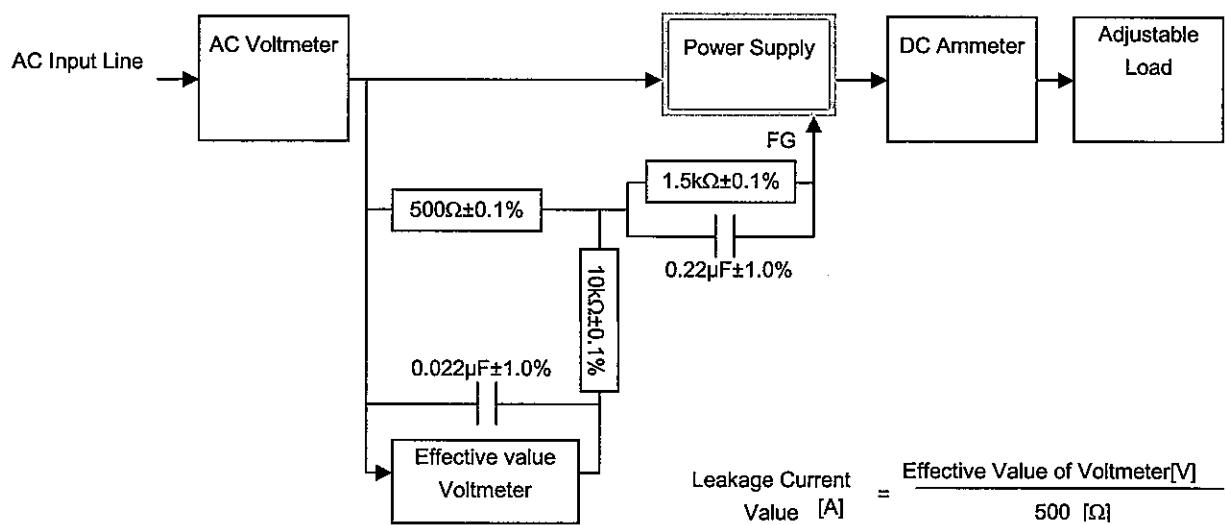


Figure B ( IEC60950-1 )

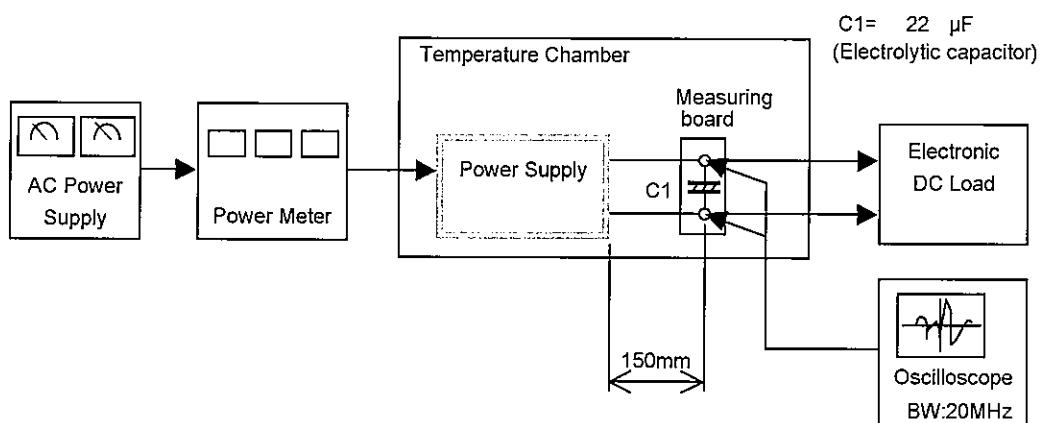


Figure C