



TEST DATA OF LFA30F-12

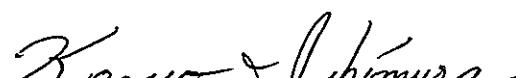
Regulated DC Power Supply
June 29, 2009

Approved by :


Yoshiaki Shimizu

Design Manager

Prepared by :


Kazuo Ishimura

Design Engineer

COSEL CO.,LTD.



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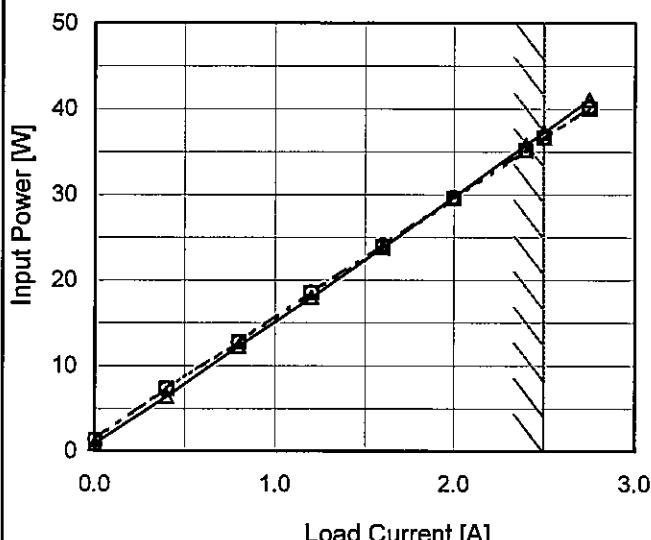
(Final Page 25)

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Model	LFA30F-12																																																			
Item	Input Current (by Load Current)	Temperature	25°C																																																	
Object		Testing Circuitry	Figure A																																																	
1.Graph	—▲— Input Volt. 100V - -□--- Input Volt. 200V - -○--- Input Volt. 230V																																																			
	<p>The graph shows three curves representing different input voltages: 100V (solid line with triangles), 200V (dashed line with squares), and 230V (dash-dot line with circles). All curves show a linear increase in input current with load current. A slanted line is drawn across the graph, starting from approximately (0.5, 0.1) and ending at (2.5, 0.6), indicating the range of the rated load current.</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>0.00</td><td>0.026</td><td>0.025</td><td>0.025</td></tr> <tr><td>0.40</td><td>0.124</td><td>0.088</td><td>0.081</td></tr> <tr><td>0.80</td><td>0.219</td><td>0.139</td><td>0.127</td></tr> <tr><td>1.20</td><td>0.309</td><td>0.192</td><td>0.175</td></tr> <tr><td>1.60</td><td>0.401</td><td>0.241</td><td>0.221</td></tr> <tr><td>2.00</td><td>0.494</td><td>0.292</td><td>0.266</td></tr> <tr><td>2.40</td><td>0.586</td><td>0.343</td><td>0.311</td></tr> <tr><td>2.50</td><td>0.611</td><td>0.357</td><td>0.323</td></tr> <tr><td>2.75</td><td>0.669</td><td>0.389</td><td>0.352</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]	0.00	0.026	0.025	0.025	0.40	0.124	0.088	0.081	0.80	0.219	0.139	0.127	1.20	0.309	0.192	0.175	1.60	0.401	0.241	0.221	2.00	0.494	0.292	0.266	2.40	0.586	0.343	0.311	2.50	0.611	0.357	0.323	2.75	0.669	0.389	0.352	--	-	-	-	--	-	-	-	2.Values		
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Note: Slanted line shows the range of the rated load current.

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Model	LFA30F-12		
Item	Input Power (by Load Current)		
Object	_____		
1.Graph	<p style="text-align: center;"> △ Input Volt. 100V □ Input Volt. 200V ○ Input Volt. 230V </p>  <p>The graph plots Input Power [W] on the Y-axis (0 to 50) against Load Current [A] on the X-axis (0.0 to 3.0). Three curves are shown for different input voltages: 100V (solid line with triangles), 200V (dashed line with squares), and 230V (dotted line with circles). All curves show a linear increase in power with load current. A slanted line is drawn across the graph, starting from approximately (0.4, 4) and ending at (2.5, 40), representing the rated load current range.</p>		
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]
0.00	0.90	1.30	1.40
0.40	6.40	7.30	7.40
0.80	12.30	12.70	12.80
1.20	18.00	18.50	18.60
1.60	23.80	23.80	24.10
2.00	29.70	29.50	29.70
2.40	35.80	35.10	35.20
2.50	37.30	36.60	36.60
2.75	41.10	40.00	40.20
--	-	-	-
--	-	-	-

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

COSEL

Model	LFA30F-12
Item	Efficiency (by Input Voltage)
Object	—
1. Graph	
<p>Efficiency [%]</p> <p>Input Voltage [V]</p> <p>Legend: Load 50% (dashed line with squares), Load 100% (solid line with triangles)</p>	

 Temperature 25°C
 Testing Circuitry Figure A

2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
75	79.3	78.0
85	80.1	79.6
100	81.0	80.7
120	81.0	82.0
200	79.7	82.3
230	78.4	82.3
264	76.8	81.6
280	76.1	81.1
—	—	—

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

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1.Graph	—△— Input Volt. 100V -□--- Input Volt. 200V -○--- Input Volt. 230V																																																					
	<p>The graph shows efficiency increasing with load current for all input voltages. The 100V curve is the highest, followed by 200V, and then 230V. A slanted line from the origin marks the rated load current range.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Efficiency [100V] (%)</th> <th>Efficiency [200V] (%)</th> <th>Efficiency [230V] (%)</th> </tr> </thead> <tbody> <tr><td>0.40</td><td>75.3</td><td>66.1</td><td>65.2</td></tr> <tr><td>0.80</td><td>78.4</td><td>75.9</td><td>75.3</td></tr> <tr><td>1.20</td><td>80.4</td><td>78.2</td><td>77.8</td></tr> <tr><td>1.60</td><td>81.0</td><td>81.0</td><td>80.0</td></tr> <tr><td>2.00</td><td>81.1</td><td>81.7</td><td>81.1</td></tr> <tr><td>2.40</td><td>80.8</td><td>82.4</td><td>82.1</td></tr> <tr><td>2.50</td><td>80.7</td><td>82.3</td><td>82.3</td></tr> <tr><td>2.75</td><td>80.6</td><td>82.8</td><td>82.4</td></tr> </tbody> </table>	Load Current [A]	Efficiency [100V] (%)	Efficiency [200V] (%)	Efficiency [230V] (%)	0.40	75.3	66.1	65.2	0.80	78.4	75.9	75.3	1.20	80.4	78.2	77.8	1.60	81.0	81.0	80.0	2.00	81.1	81.7	81.1	2.40	80.8	82.4	82.1	2.50	80.7	82.3	82.3	2.75	80.6	82.8	82.4	2.Values																
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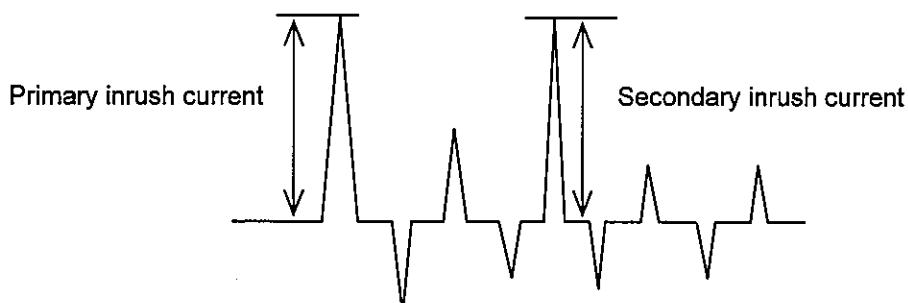
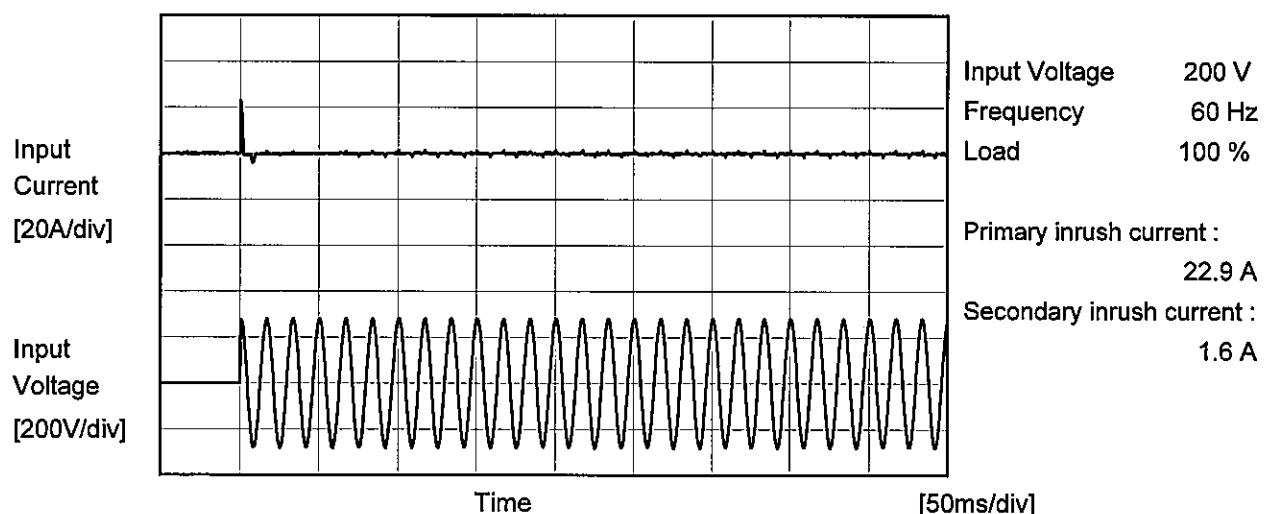
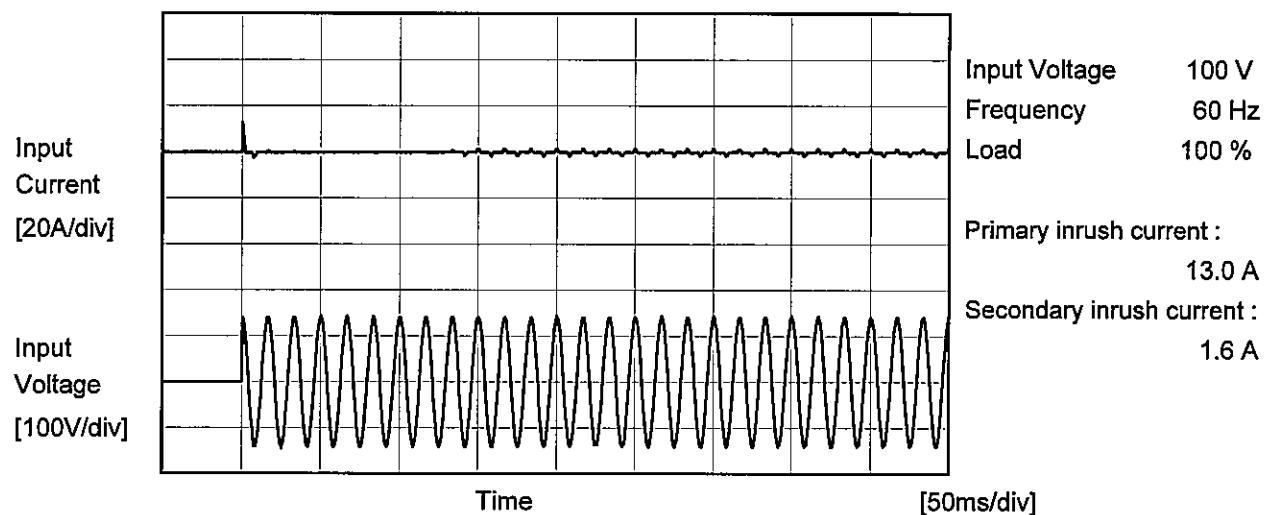
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Model	LFA30F-12	Temperature Testing Circuitry Figure A	25°C
Item	Inrush Current		
Object	—		





Model	LFA30F-12	Temperature Testing Circuitry Figure B	25°C
Item	Leakage Current		
Object	_____		

1. Results

Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
DEN-AN	Both phases	0.13	0.27	0.32	Operation
	One of phases	0.21	0.45	0.55	Stand by
IEC60950	Both phases	0.15	0.30	0.37	Operation
	One of phases	0.22	0.46	0.55	Stand by

The value for "One of phases" is the reference value only.

2. Condition

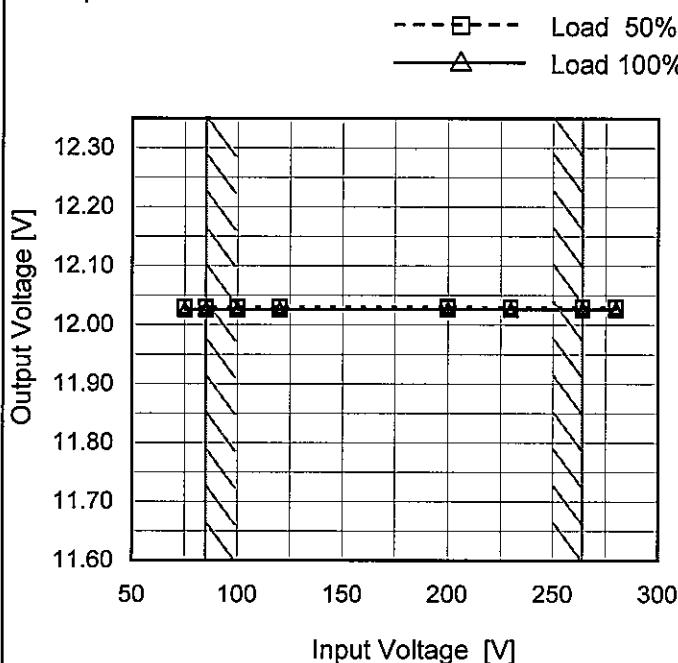
Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

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Model	LFA30F-12
Item	Line Regulation
Object	+12V2.5A

Temperature 25°C
Testing Circuitry Figure A

1. Graph

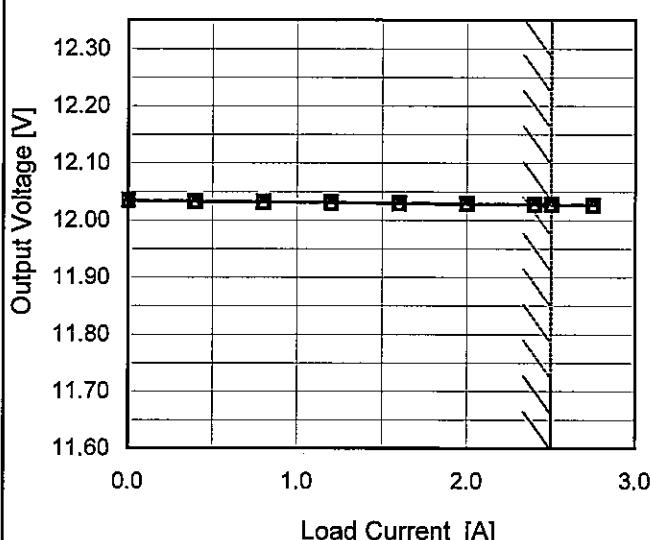


2. Values

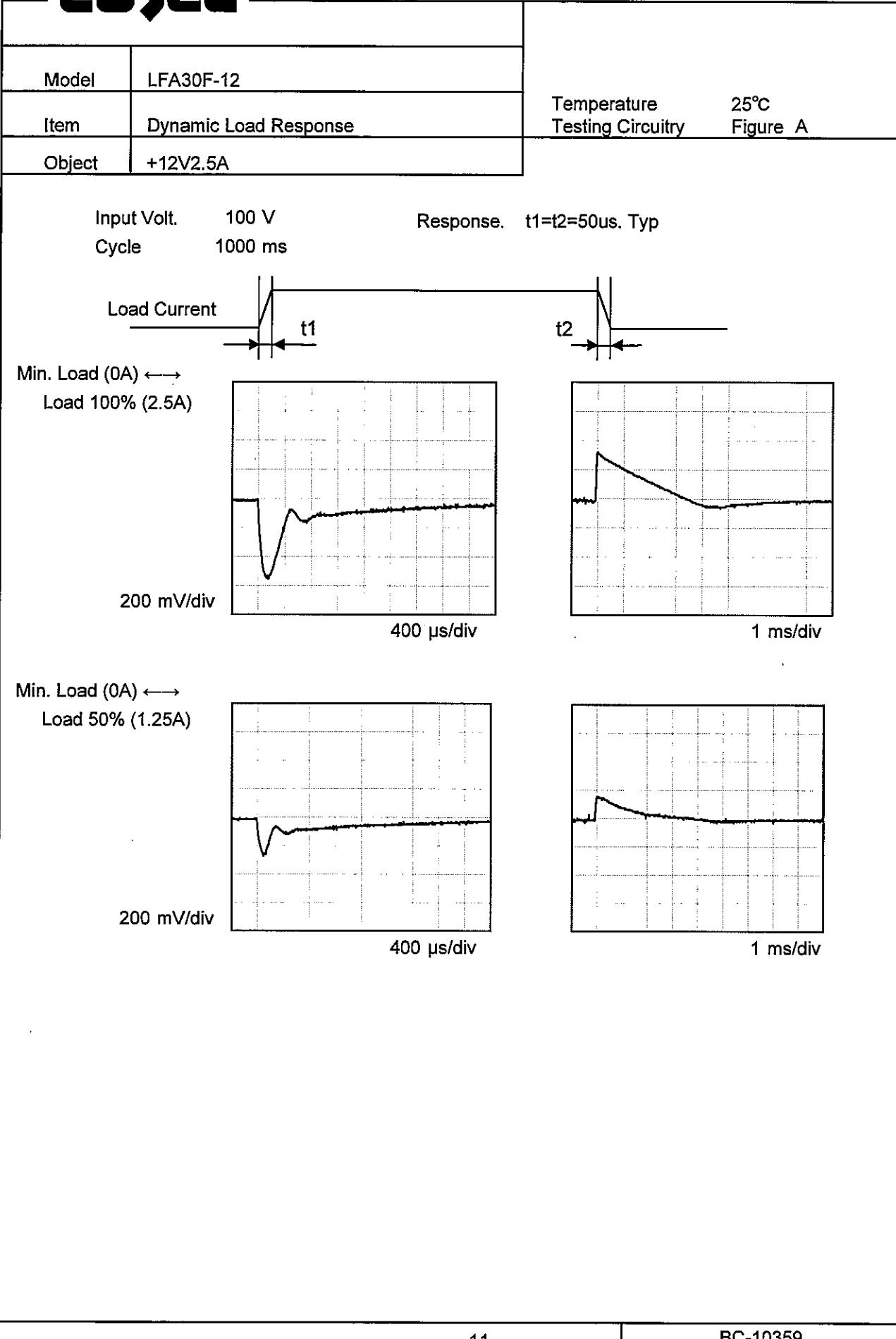
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	12.030	12.027
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Note: Slanted line shows the range of the rated input voltage.

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0.40	12.033	12.034	12.034																																																		
0.80	12.032	12.032	12.032																																																		
1.20	12.031	12.031	12.031																																																		
1.60	12.030	12.030	12.030																																																		
2.00	12.029	12.029	12.029																																																		
2.40	12.027	12.027	12.028																																																		
2.50	12.027	12.027	12.027																																																		
2.75	12.026	12.026	12.027																																																		
--	-	-	-																																																		
--	-	-	-																																																		

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

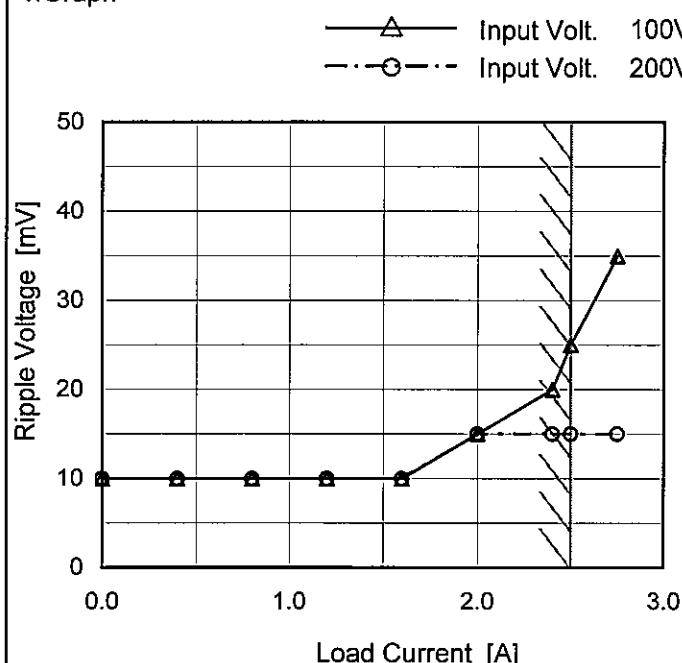
COSEL

COSEL

Model	LFA30F-12
Item	Ripple Voltage (by Load Current)
Object	+12V2.5A

Temperature 25°C
Testing Circuitry Figure C

1.Graph



2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.00	10	10
0.40	10	10
0.80	10	10
1.20	10	10
1.60	10	10
2.00	15	15
2.40	20	15
2.50	25	15
2.75	35	15
--	-	-
--	-	-

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.

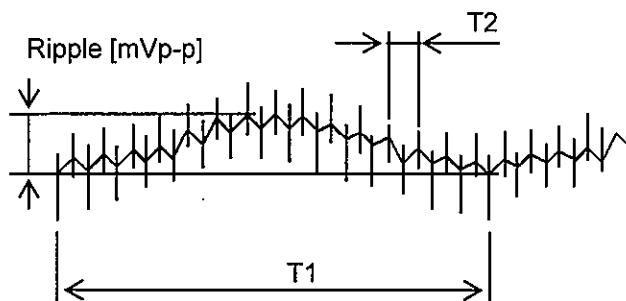
T1: Due to AC Input Line
T2: Due to Switching

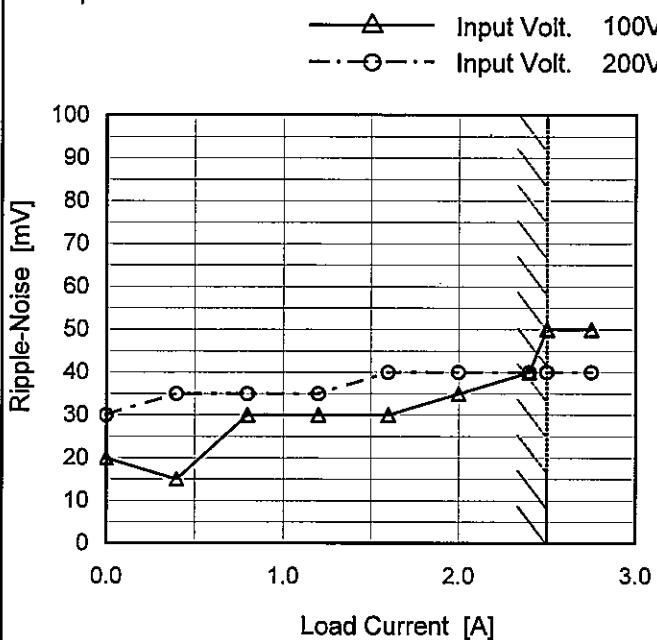
Fig. Complex Ripple Wave Form

COSEL

Model	LFA30F-12
Item	Ripple-Noise
Object	+12V2.5A

Temperature 25°C
Testing Circuitry Figure C

1. Graph



2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.00	20	30
0.40	15	35
0.80	30	35
1.20	30	35
1.60	30	40
2.00	35	40
2.40	40	40
2.50	50	40
2.75	50	40
--	-	-
--	-	-

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.

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

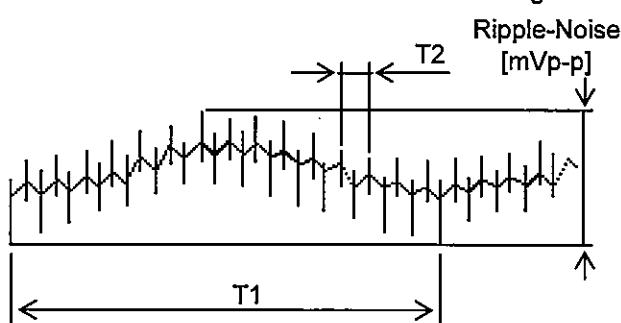


Fig. Complex Ripple Wave Form

COSEL

Model	LFA30F-12	Testing Circuitry Figure C																				
Item	Ripple Voltage (by Ambient Temp.)																					
Object	+12V2.5A																					
1. Graph		2. Values																				
<p>Graph showing Ripple Voltage [mV] vs Ambient Temperature [°C] for LFA30F-12 at +12V2.5A load. The graph shows two data series: Input Volt. 100V (dashed line with squares) and Input Volt. 200V (solid line with triangles). Both series show a decrease in ripple voltage as ambient temperature increases from -40°C to 50°C. A slanted line indicates the rated ambient temperature range.</p> <table border="1"> <thead> <tr> <th>Ambient Temperature [°C]</th> <th>Ripple Voltage [mV] (Input Volt. 100V)</th> <th>Ripple Voltage [mV] (Input Volt. 200V)</th> </tr> </thead> <tbody> <tr><td>-30</td><td>55</td><td>40</td></tr> <tr><td>-10</td><td>30</td><td>25</td></tr> <tr><td>0</td><td>25</td><td>15</td></tr> <tr><td>25</td><td>25</td><td>15</td></tr> <tr><td>50</td><td>20</td><td>10</td></tr> <tr><td>60</td><td>20</td><td>10</td></tr> </tbody> </table>		Ambient Temperature [°C]	Ripple Voltage [mV] (Input Volt. 100V)	Ripple Voltage [mV] (Input Volt. 200V)	-30	55	40	-10	30	25	0	25	15	25	25	15	50	20	10	60	20	10
Ambient Temperature [°C]	Ripple Voltage [mV] (Input Volt. 100V)	Ripple Voltage [mV] (Input Volt. 200V)																				
-30	55	40																				
-10	30	25																				
0	25	15																				
25	25	15																				
50	20	10																				
60	20	10																				
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Ambient Temperature [°C]	Ripple Voltage [mV] (Input Volt. 100V)	Ripple Voltage [mV] (Input Volt. 200V)																				
-30	55	40																				
-10	30	25																				
0	25	15																				
25	25	15																				
50	20	10																				
60	20	10																				

Measured by 20 MHz Oscilloscope.

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

COSEL

Model	LFA30F-12	Testing Circuitry Figure A		
Item	Ambient Temperature Drift			
Object	+12V2.5A			
1.Graph	<p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p> <p>Legend:</p> <ul style="list-style-type: none"> Input Volt. 100V Input Volt. 200V Input Volt. 230V 	2.Values		
		Ambient Temperature [°C]	Output Voltage [V]	
			Input Volt.	Input Volt.
			100[V]	200[V]
		-20	12.042	12.042
		-10	12.039	12.039
		0	12.035	12.035
		10	12.033	12.033
		20	12.030	12.031
		25	12.029	12.029
		30	12.027	12.028
		40	12.023	12.023
		50	12.017	12.017
		60	12.008	12.008
		-	-	-

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



Model	LFA30F-12	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+12V2.5A	

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 - 2.5A

* 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

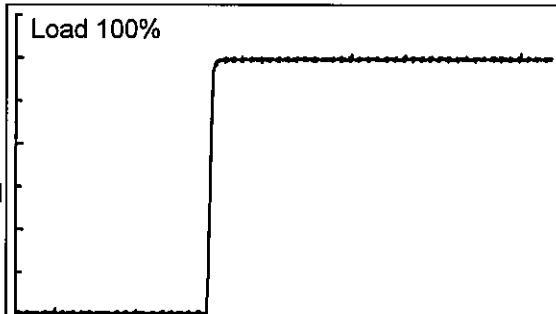
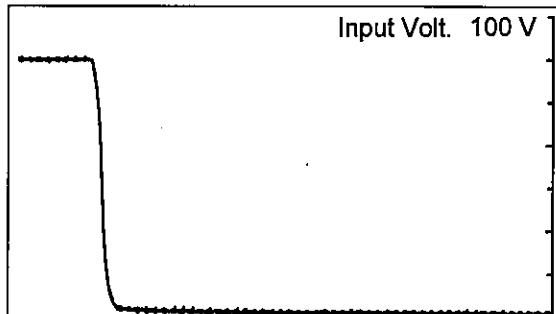
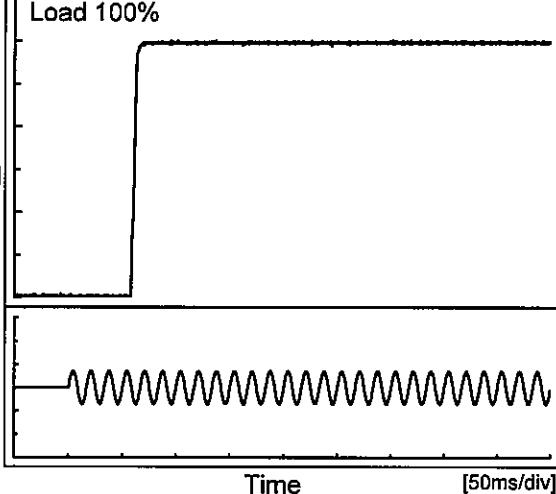
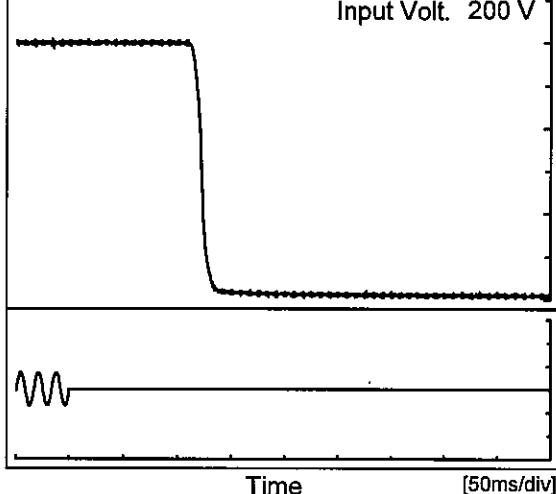
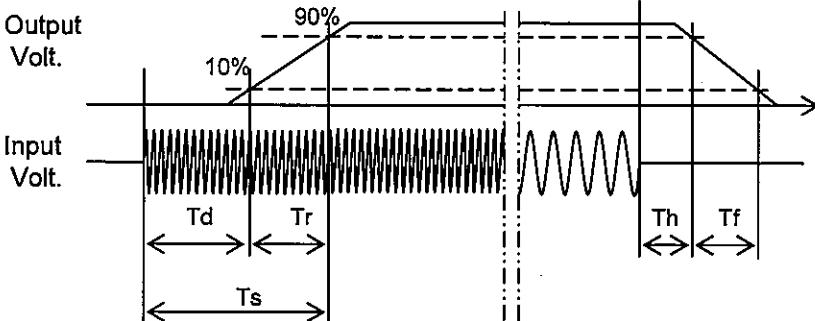
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-10	264	0	12.046	± 15	± 0.1
Minimum Voltage	50	85	2.5	12.016		

COSEL

Model	LFA30F-12	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+12V2.5A																								
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>12.031</td></tr> <tr><td>0.5</td><td>12.026</td></tr> <tr><td>1.0</td><td>12.026</td></tr> <tr><td>2.0</td><td>12.026</td></tr> <tr><td>3.0</td><td>12.026</td></tr> <tr><td>4.0</td><td>12.026</td></tr> <tr><td>5.0</td><td>12.026</td></tr> <tr><td>6.0</td><td>12.026</td></tr> <tr><td>7.0</td><td>12.026</td></tr> <tr><td>8.0</td><td>12.026</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	12.031	0.5	12.026	1.0	12.026	2.0	12.026	3.0	12.026	4.0	12.026	5.0	12.026	6.0	12.026	7.0	12.026	8.0	12.026
Time since start [H]	Output Voltage [V]																								
0.0	12.031																								
0.5	12.026																								
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5.0	12.026																								
6.0	12.026																								
7.0	12.026																								
8.0	12.026																								

* The characteristic of AC200V is equal.

COSEL

Model	LFA30F-12	Temperature	25°C																					
Item	Rise and Fall Time	Testing Circuitry	Figure A																					
Object	+12V2.5A																							
1. Graph																								
   																								
2. Values [ms]																								
<table border="1"> <thead> <tr> <th>Input Volt.</th> <th>Time</th> <th>Td</th> <th>Tr</th> <th>Ts</th> <th>Th</th> <th>Tf</th> </tr> </thead> <tbody> <tr> <td>100 V</td> <td></td> <td>128.3</td> <td>4.3</td> <td>132.6</td> <td>22.5</td> <td>13.0</td> </tr> <tr> <td>200 V</td> <td></td> <td>58.5</td> <td>4.5</td> <td>63.0</td> <td>116.0</td> <td>13.3</td> </tr> </tbody> </table>				Input Volt.	Time	Td	Tr	Ts	Th	Tf	100 V		128.3	4.3	132.6	22.5	13.0	200 V		58.5	4.5	63.0	116.0	13.3
Input Volt.	Time	Td	Tr	Ts	Th	Tf																		
100 V		128.3	4.3	132.6	22.5	13.0																		
200 V		58.5	4.5	63.0	116.0	13.3																		
																								

COSEL

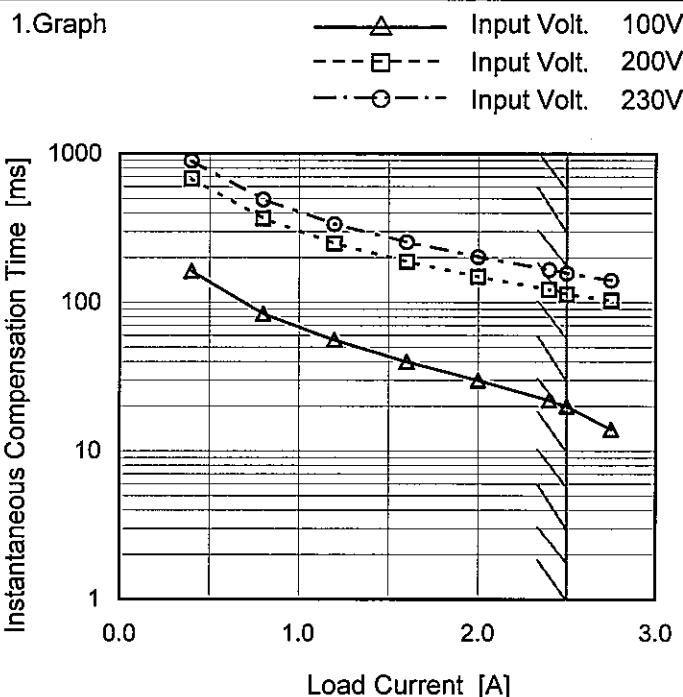
Model	LFA30F-12																																	
Item	Hold-Up Time	Temperature 25°C Testing Circuitry Figure A																																
Object	+12V2.5A																																	
1. Graph																																		
		2. Values																																
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Input Voltage [V]	Hold-Up Time [ms]																																	
	Load 50%	Load 100%																																
75	26	7																																
85	36	12																																
100	52	21																																
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200	237	116																																
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--	-	-																																
<p>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.</p>																																		

COSEL

Model LFA30F-12

Item Instantaneous Interruption Compensation

Object +12V2.5A

Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	-	-	-
0.40	163	679	897
0.80	84	367	492
1.20	56	249	335
1.60	40	188	254
2.00	30	149	202
2.40	22	122	166
2.50	20	113	157
2.75	14	103	141
--	-	-	-
--	-	-	-

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

COSEL

<p>Model LFA30F-12</p> <p>Item Minimum Input Voltage for Regulated Output Voltage</p> <p>Object +12V2.5A</p>	Testing Circuitry Figure A																																						
	2.Values																																						
	<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Input Voltage [V]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr> <td>-20</td><td>35</td><td>64</td></tr> <tr> <td>-10</td><td>33</td><td>61</td></tr> <tr> <td>0</td><td>33</td><td>60</td></tr> <tr> <td>10</td><td>34</td><td>59</td></tr> <tr> <td>20</td><td>34</td><td>59</td></tr> <tr> <td>25</td><td>32</td><td>58</td></tr> <tr> <td>30</td><td>33</td><td>59</td></tr> <tr> <td>40</td><td>33</td><td>58</td></tr> <tr> <td>50</td><td>32</td><td>57</td></tr> <tr> <td>60</td><td>32</td><td>58</td></tr> <tr> <td>-</td><td>-</td><td>-</td></tr> </tbody> </table>		Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-20	35	64	-10	33	61	0	33	60	10	34	59	20	34	59	25	32	58	30	33	59	40	33	58	50	32	57	60	32	58	-	-
Ambient Temperature [°C]	Input Voltage [V]																																						
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-	-	-																																					
<p>1.Graph</p> <p>Input Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Legend:</p> <ul style="list-style-type: none"> Load 50% (Dashed line with squares) Load 100% (Solid line with triangles) 																																							
<p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																							

COSEL

Model	LFA30F-12																																										
Item	Overcurrent Protection	Temperature 25°C Testing Circuitry Figure A																																									
Object	+12V2.5A																																										
1.Graph																																											
<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 7V to 0V.</p>																																											
2.Values																																											
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COSEL

Model	LFA30F-12	Testing Circuitry Figure A																																						
Item	Overvoltage Protection																																							
Object	+12V2.5A																																							
1.Graph		2.Values																																						
<p>Operating Point [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 0%</p> <p>Legend: Input Volt. 100V (solid line with triangle markers); Input Volt. 200V (dashed line with square markers)</p>		<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Operating Point [V]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> </tr> </thead> <tbody> <tr><td>-20</td><td>14.69</td><td>14.69</td></tr> <tr><td>-10</td><td>14.83</td><td>14.83</td></tr> <tr><td>0</td><td>14.90</td><td>14.90</td></tr> <tr><td>10</td><td>14.97</td><td>14.97</td></tr> <tr><td>20</td><td>15.04</td><td>15.04</td></tr> <tr><td>25</td><td>15.11</td><td>15.11</td></tr> <tr><td>30</td><td>15.11</td><td>15.11</td></tr> <tr><td>40</td><td>15.25</td><td>15.25</td></tr> <tr><td>50</td><td>15.32</td><td>15.32</td></tr> <tr><td>60</td><td>15.39</td><td>15.39</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>	Ambient Temperature [°C]	Operating Point [V]		Input Volt. 100[V]	Input Volt. 200[V]	-20	14.69	14.69	-10	14.83	14.83	0	14.90	14.90	10	14.97	14.97	20	15.04	15.04	25	15.11	15.11	30	15.11	15.11	40	15.25	15.25	50	15.32	15.32	60	15.39	15.39	--	-	-
Ambient Temperature [°C]	Operating Point [V]																																							
	Input Volt. 100[V]	Input Volt. 200[V]																																						
-20	14.69	14.69																																						
-10	14.83	14.83																																						
0	14.90	14.90																																						
10	14.97	14.97																																						
20	15.04	15.04																																						
25	15.11	15.11																																						
30	15.11	15.11																																						
40	15.25	15.25																																						
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60	15.39	15.39																																						
--	-	-																																						

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

COSEL

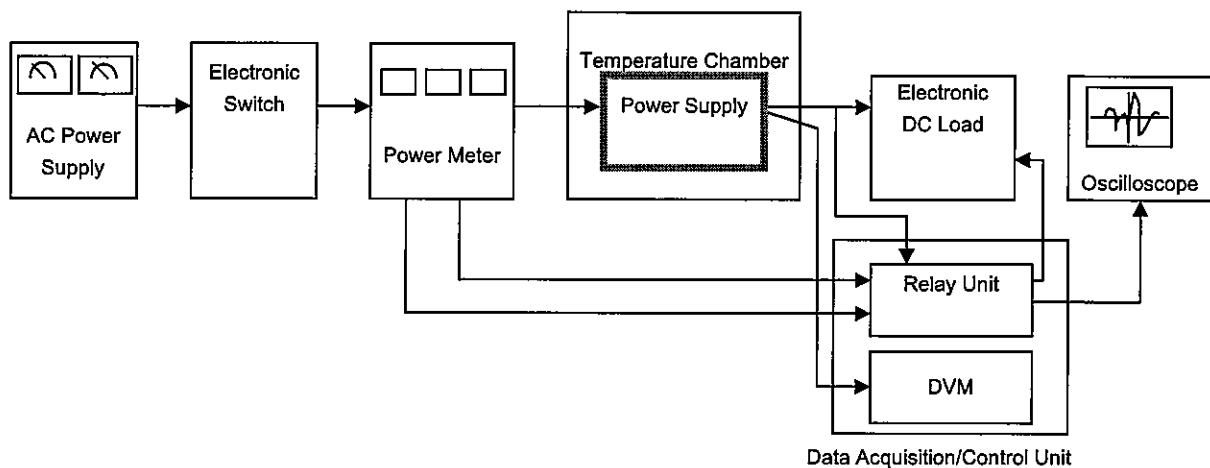


Figure A

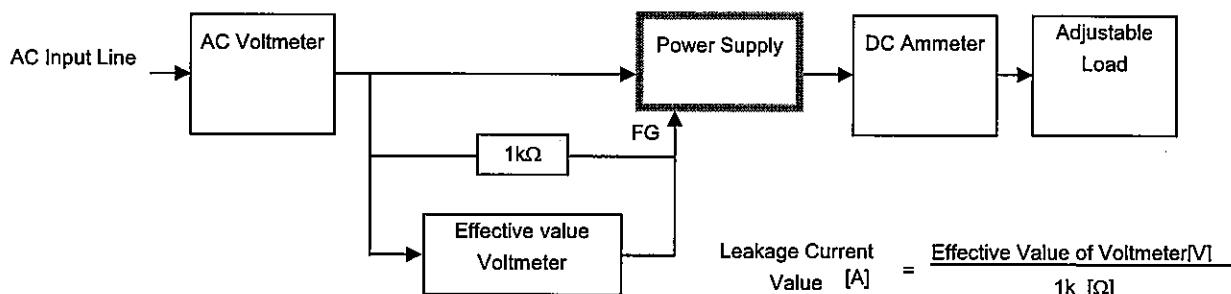


Figure B (DEN-AN)

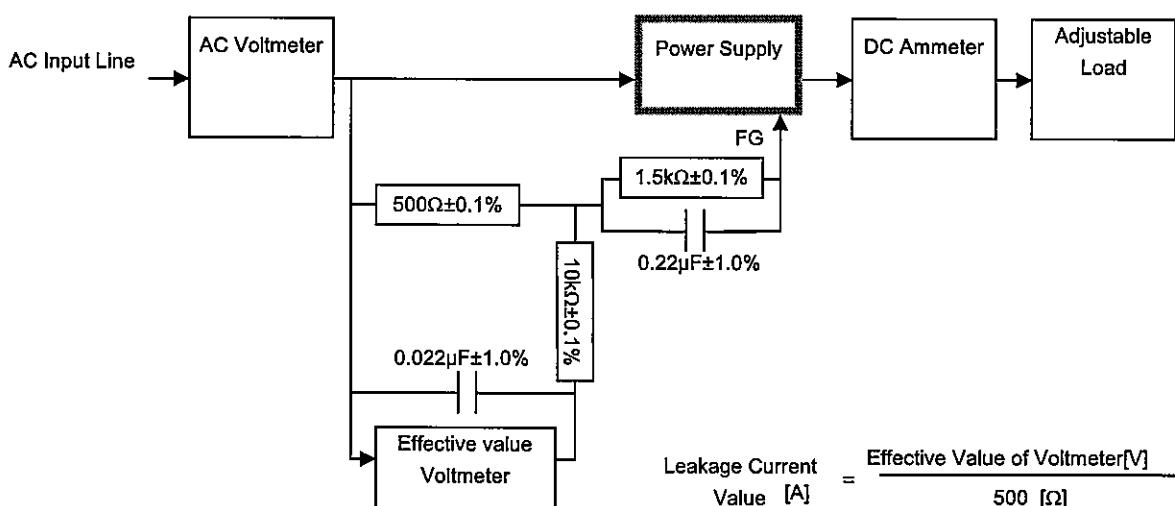


Figure B (IEC60950-1)

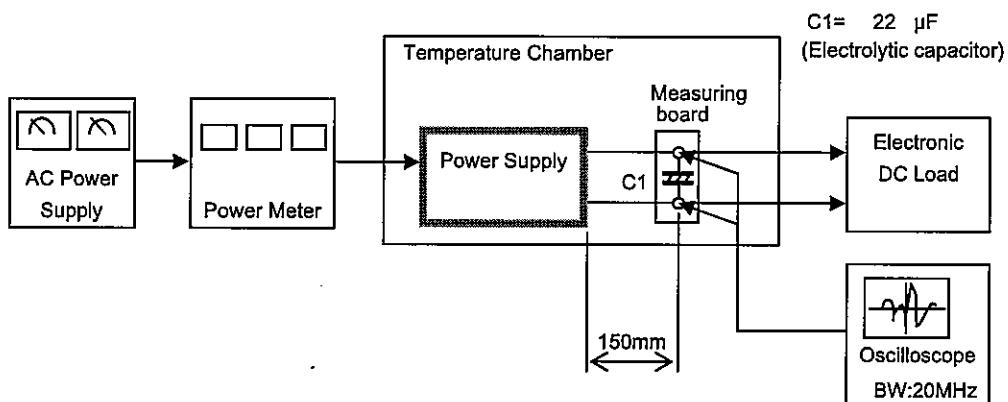
COSEL

Figure C