



TEST DATA OF LCA50S-36

Regulated DC Power Supply
Aug.11. 2004

Approved by :

K.Shibutani

Design Manager

Prepared by :

A.Kawai

Design Engineer

COSEL CO.,LTD.



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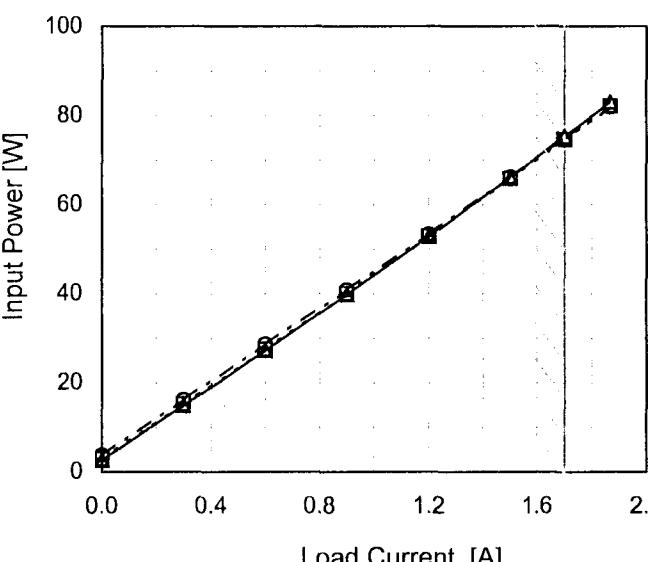
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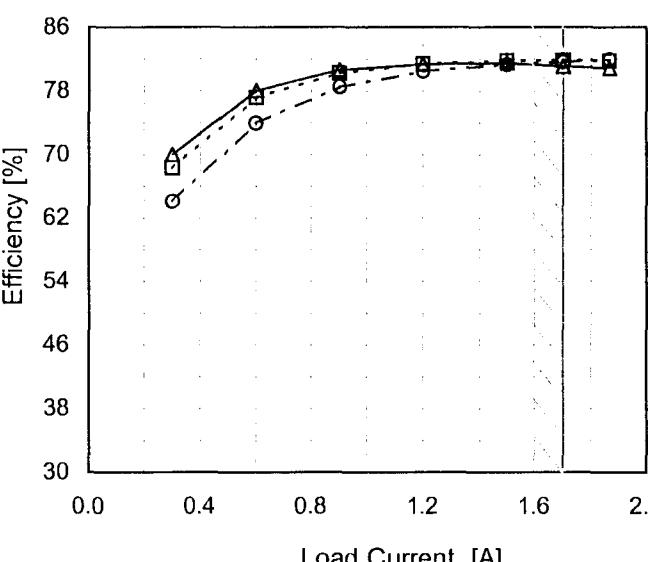
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<p>The graph plots Efficiency [%] on the y-axis (58 to 86) against Input Voltage [V] on the x-axis (70 to 150). Two data series are shown: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show 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>80.4</td><td>80.1</td></tr> <tr><td>80</td><td>80.7</td><td>81.2</td></tr> <tr><td>85</td><td>80.5</td><td>81.4</td></tr> <tr><td>90</td><td>80.5</td><td>81.7</td></tr> <tr><td>100</td><td>80.1</td><td>81.9</td></tr> <tr><td>110</td><td>79.4</td><td>82.0</td></tr> <tr><td>120</td><td>78.8</td><td>82.0</td></tr> <tr><td>132</td><td>78.0</td><td>81.8</td></tr> <tr><td>140</td><td>77.2</td><td>81.5</td></tr> </tbody> </table>			Input Voltage [V]	Efficiency Load 50% [%]	Efficiency Load 100% [%]	75	80.4	80.1	80	80.7	81.2	85	80.5	81.4	90	80.5	81.7	100	80.1	81.9	110	79.4	82.0	120	78.8	82.0	132	78.0	81.8	140	77.2	81.5		
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Model LCA50S-36

Item Inrush Current

Temperature 25°C
Testing Circuitry Figure A

Object

Input
Current
[20A/div]Input
Voltage
[100V/div]

Time

[50ms/div]

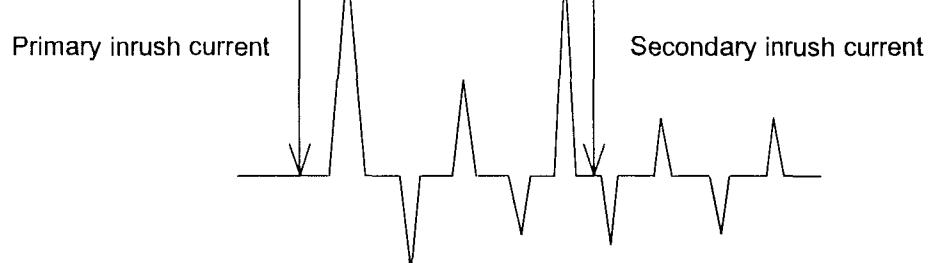
Input Voltage 100 V

Frequency 60 Hz

Load 100 %

Primary inrush current 23.6 A

Secondary inrush current 3.6 A

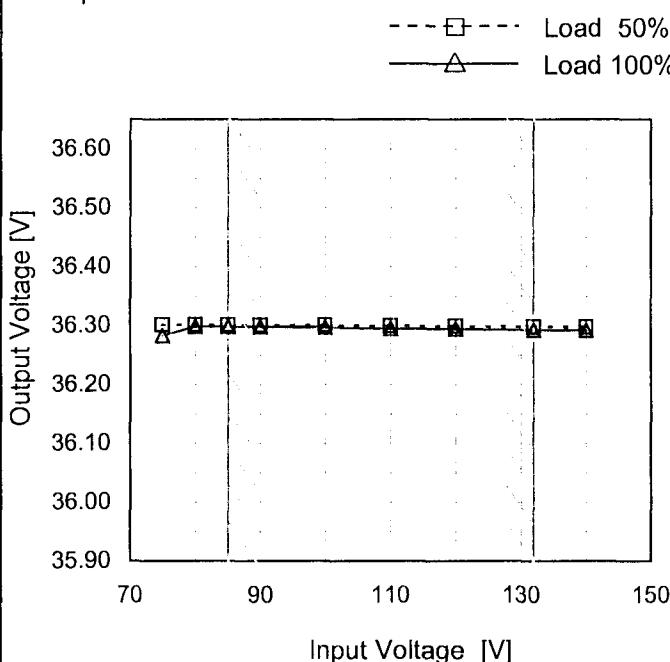


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Model	LCA50S-36
Item	Line Regulation
Object	+36V1.7A

Temperature 25°C
 Testing Circuitry Figure A

1.Graph

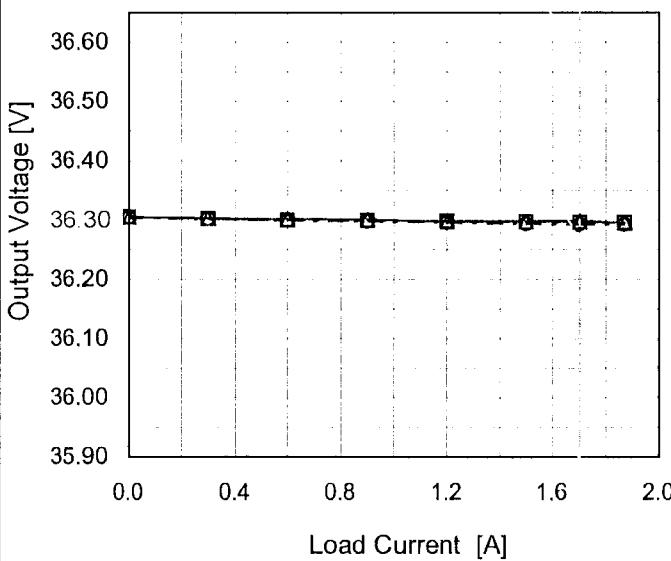


2.Values

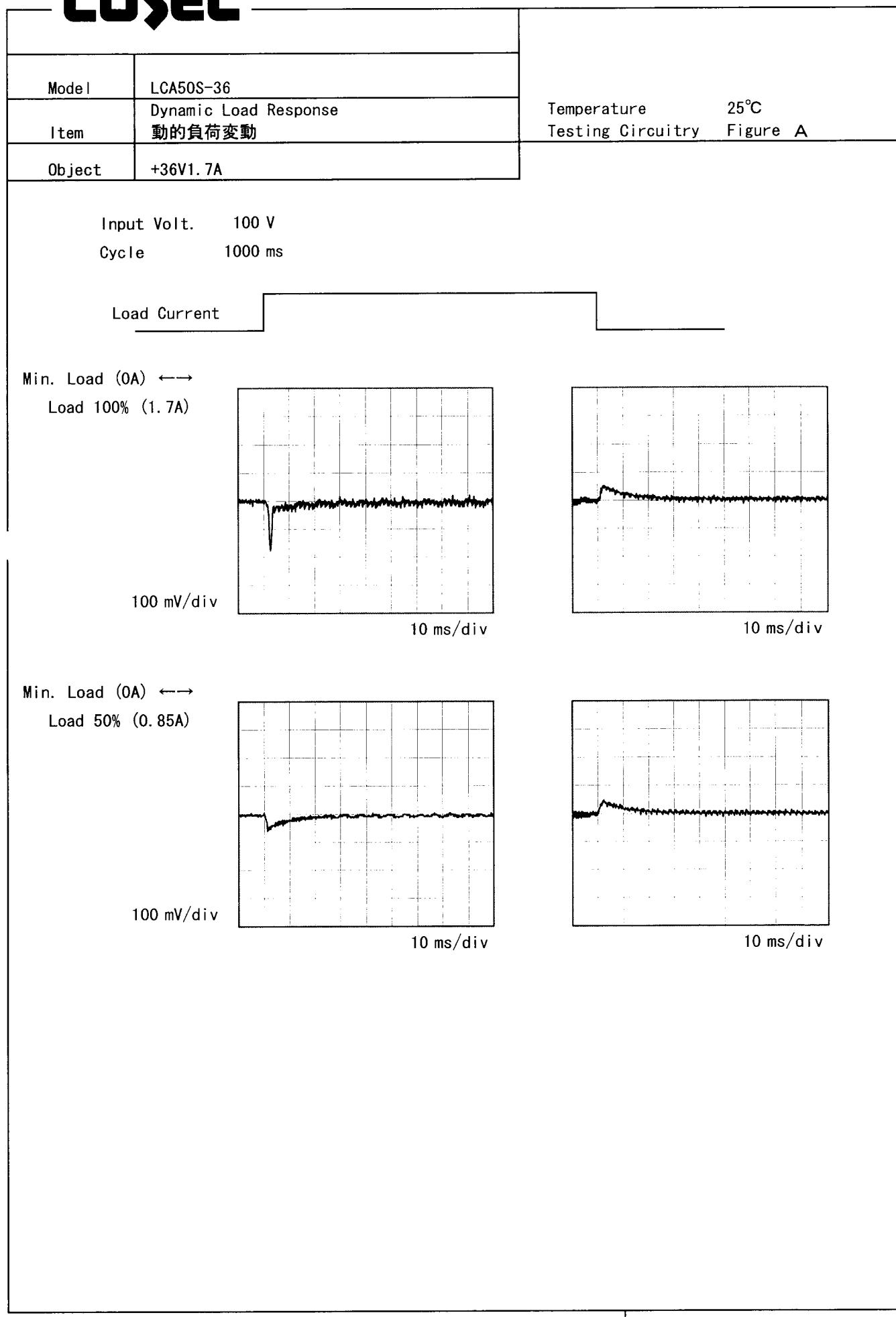
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	36.301	36.283
80	36.301	36.299
85	36.301	36.298
90	36.301	36.298
100	36.301	36.297
110	36.300	36.295
120	36.299	36.295
132	36.298	36.293
140	36.298	36.292

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

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COSEL

Model	LCA50S-36																																							
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure A																																						
Object	+36V1.7A																																							
1.Graph																																								
<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The Y-axis ranges from 0 to 200 mV, and the X-axis ranges from 0.0 to 2.0 A. Two curves are plotted: Input Volt. 85V (solid line with triangle markers) and Input Volt. 132V (dashed line with circle markers). Both curves show a slight increase in ripple voltage as load current increases.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Ripple Voltage [mV] (Input Volt. 85V)</th> <th>Ripple Voltage [mV] (Input Volt. 132V)</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>15</td><td>15</td></tr> <tr><td>0.30</td><td>25</td><td>20</td></tr> <tr><td>0.60</td><td>30</td><td>25</td></tr> <tr><td>0.90</td><td>30</td><td>30</td></tr> <tr><td>1.20</td><td>35</td><td>35</td></tr> <tr><td>1.50</td><td>40</td><td>35</td></tr> <tr><td>1.70</td><td>40</td><td>35</td></tr> <tr><td>1.87</td><td>45</td><td>35</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>		Load Current [A]	Ripple Voltage [mV] (Input Volt. 85V)	Ripple Voltage [mV] (Input Volt. 132V)	0.00	15	15	0.30	25	20	0.60	30	25	0.90	30	30	1.20	35	35	1.50	40	35	1.70	40	35	1.87	45	35	--	-	-	--	-	-	--	-	-			
Load Current [A]	Ripple Voltage [mV] (Input Volt. 85V)	Ripple Voltage [mV] (Input Volt. 132V)																																						
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2.Values																																								
<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 85 [V]</th> <th>Input Volt. 132 [V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>15</td><td>15</td></tr> <tr><td>0.30</td><td>25</td><td>20</td></tr> <tr><td>0.60</td><td>30</td><td>25</td></tr> <tr><td>0.90</td><td>30</td><td>30</td></tr> <tr><td>1.20</td><td>35</td><td>35</td></tr> <tr><td>1.50</td><td>40</td><td>35</td></tr> <tr><td>1.70</td><td>40</td><td>35</td></tr> <tr><td>1.87</td><td>45</td><td>35</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>			Load Current [A]	Ripple Voltage [mV]		Input Volt. 85 [V]	Input Volt. 132 [V]	0.00	15	15	0.30	25	20	0.60	30	25	0.90	30	30	1.20	35	35	1.50	40	35	1.70	40	35	1.87	45	35	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																							
	Input Volt. 85 [V]	Input Volt. 132 [V]																																						
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0.90	30	30																																						
1.20	35	35																																						
1.50	40	35																																						
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<p>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.</p>																																								
<p>Fig. Complex Ripple Wave Form</p>																																								

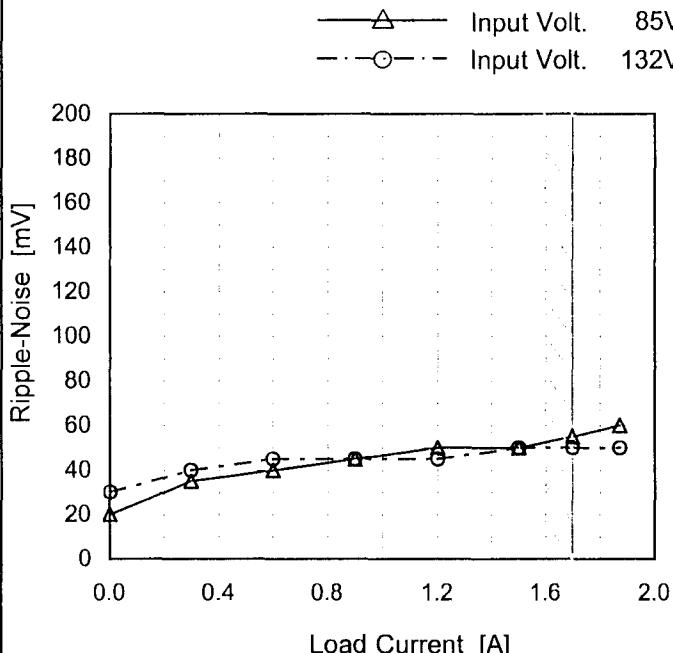
COSEL

Model LCA50S-36

Item Ripple-Noise

Object +36V1.7A

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.

Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 85 [V]	Input Volt. 132 [V]
0.00	20	30
0.30	35	40
0.60	40	45
0.90	45	45
1.20	50	45
1.50	50	50
1.70	55	50
1.87	60	50
--	-	-
--	-	-
--	-	-

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

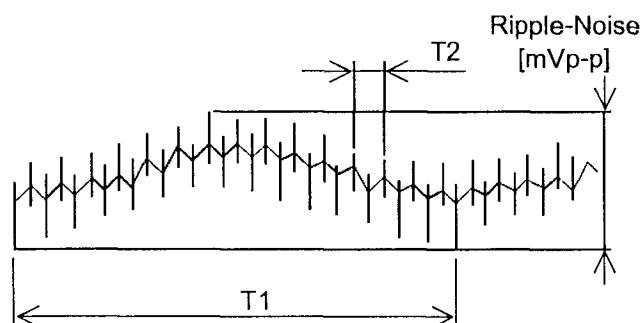
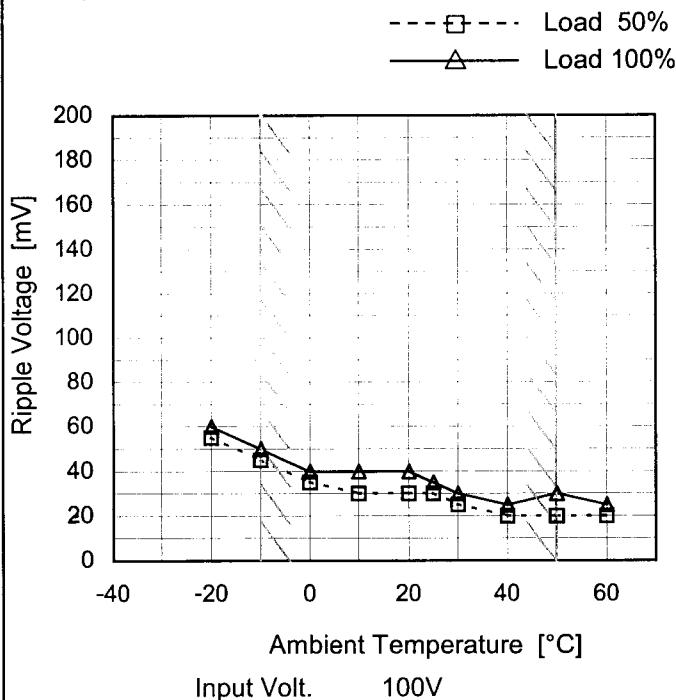


Fig. Complex Ripple Wave Form

Model	LCA50S-36
Item	Ripple Voltage (by Ambient Temp.)
Object	+36V1.7A

1. Graph



Measured by 20 MHz Oscilloscope.

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

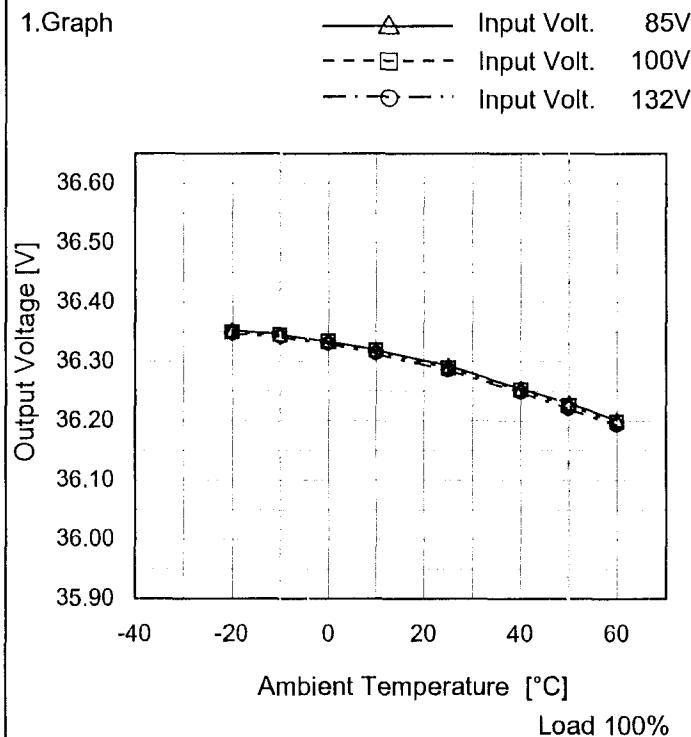
Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-20	55	60
-10	45	50
0	35	40
10	30	40
20	30	40
25	30	35
30	25	30
40	20	25
50	20	30
60	20	25
--	-	-

COSEL

Model	LCA50S-36
Item	Ambient Temperature Drift
Object	+36V1.7A



Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
-20	36.352	36.349	36.347
-10	36.345	36.344	36.341
0	36.333	36.334	36.330
10	36.319	36.318	36.314
25	36.292	36.288	36.285
40	36.254	36.252	36.248
50	36.229	36.225	36.221
60	36.201	36.198	36.193
--	-	-	-
--	-	-	-
--	-	-	-

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



Model	LCA50S-36	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+36V1.7A	

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 - 132V

Load Current : 0 - 1.7A

* 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

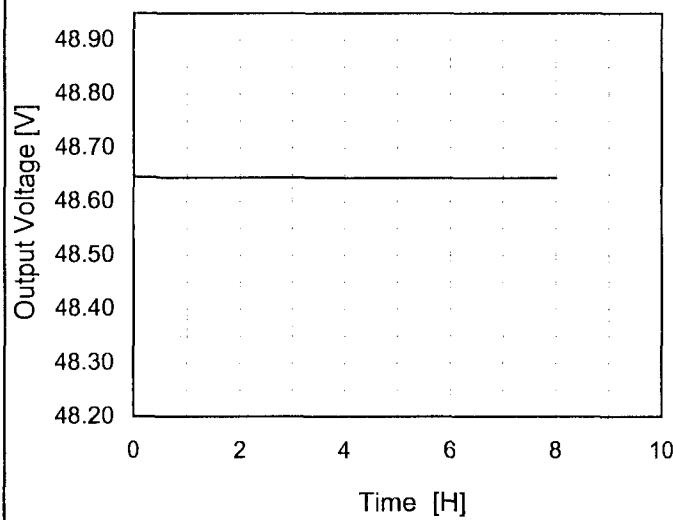
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-10	85	0	48.725	± 101	± 0.3
Minimum Voltage	50	132	1.3	48.523		

COSEL

Model	LCA50S-36
Item	Time Lapse Drift
Object	+36V1.7A

Temperature 25°C
 Testing Circuitry Figure A

1.Graph



Input Volt. 100V
 Load 100%

2.Values

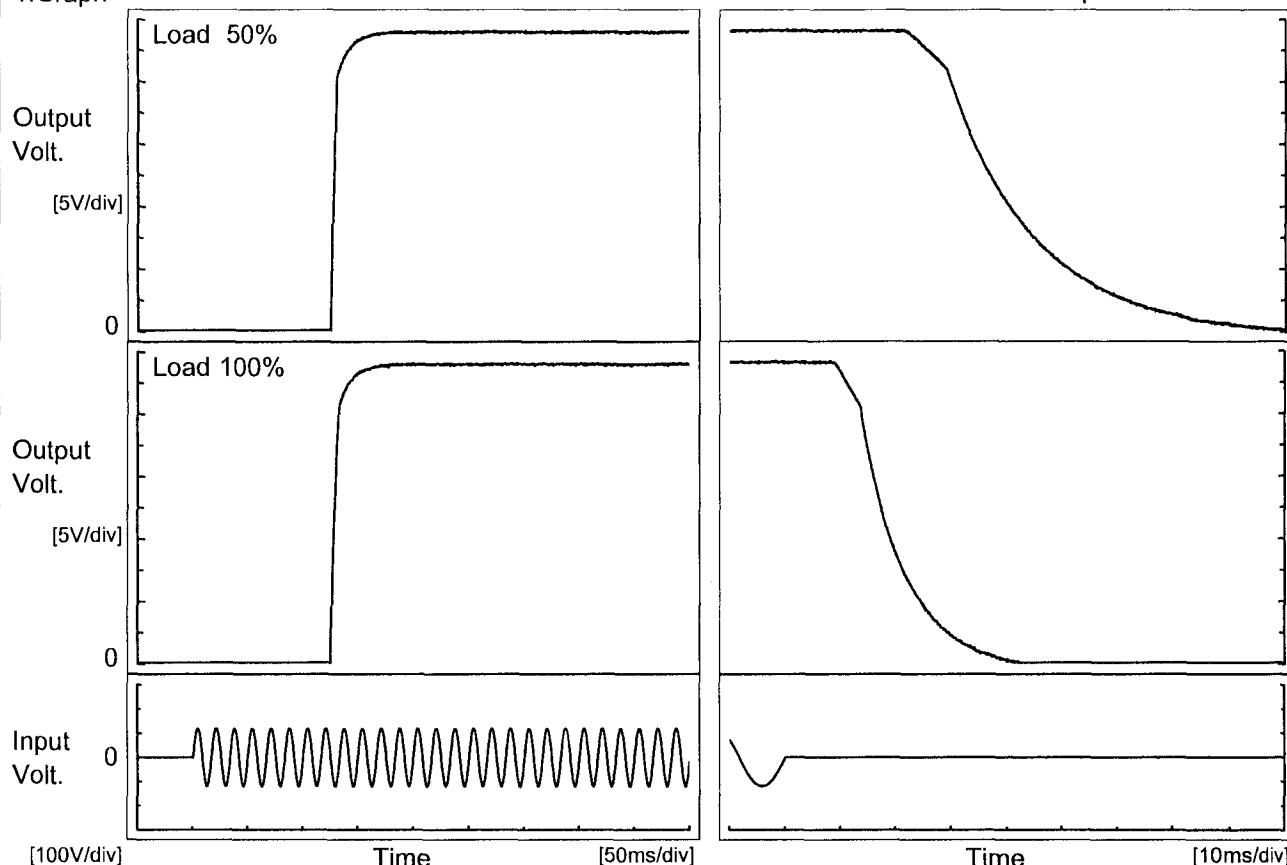
Time since start [H]	Output Voltage [V]
0.0	48.645
0.5	48.644
1.0	48.644
2.0	48.644
3.0	48.644
4.0	48.644
5.0	48.643
6.0	48.643
7.0	48.643
8.0	48.643

COSEL

Model	LCA50S-36
Item	Rise and Fall Time
Object	+36V1.7A

Temperature 25°C
Testing Circuitry Figure A

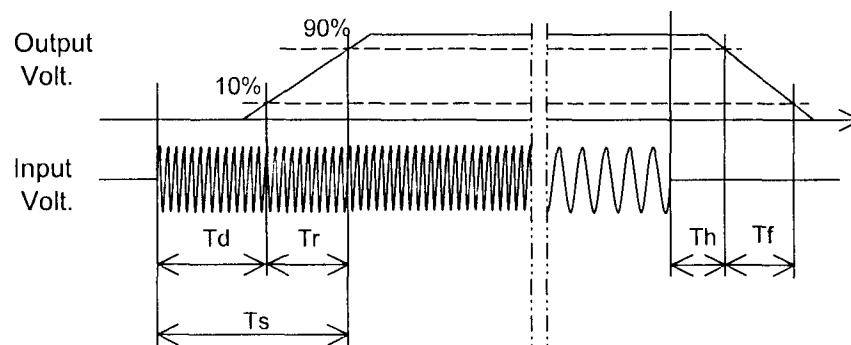
1.Graph



2.Values

[ms]

Load	Time	Td	Tr	Ts	Th	Tf
50 %		125.5	11.0	136.5	27.6	34.1
100 %		125.5	11.8	137.3	12.1	17.2



COSEL

Model	LCA50S-36	Temperature Testing Circuitry	25°C																													
Item	Hold-Up Time		Figure A																													
Object	+36V1.7A																															
1.Graph			2.Values																													
<p>Graph showing Hold-Up Time [ms] vs Input Voltage [V]. The Y-axis is logarithmic, ranging from 1 to 1000 ms. The X-axis ranges from 70 to 150 V. Two curves are plotted: Load 50% (dashed line with squares) and Load 100% (solid line with triangles). Both curves show an increase in hold-up time as input voltage decreases. A slanted line at approximately 110V indicates the rated input voltage range.</p> <table border="1"> <thead> <tr> <th>Input Voltage [V]</th> <th>Load 50% [ms]</th> <th>Load 100% [ms]</th> </tr> </thead> <tbody> <tr><td>75</td><td>13</td><td>4</td></tr> <tr><td>80</td><td>18</td><td>7</td></tr> <tr><td>85</td><td>23</td><td>9</td></tr> <tr><td>90</td><td>29</td><td>12</td></tr> <tr><td>100</td><td>41</td><td>19</td></tr> <tr><td>110</td><td>54</td><td>26</td></tr> <tr><td>120</td><td>69</td><td>34</td></tr> <tr><td>132</td><td>89</td><td>44</td></tr> <tr><td>140</td><td>104</td><td>52</td></tr> </tbody> </table>			Input Voltage [V]	Load 50% [ms]	Load 100% [ms]	75	13	4	80	18	7	85	23	9	90	29	12	100	41	19	110	54	26	120	69	34	132	89	44	140	104	52
Input Voltage [V]	Load 50% [ms]	Load 100% [ms]																														
75	13	4																														
80	18	7																														
85	23	9																														
90	29	12																														
100	41	19																														
110	54	26																														
120	69	34																														
132	89	44																														
140	104	52																														
<p>This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.</p> <p>Note: Slanted line shows the range of the rated input voltage.</p>																																

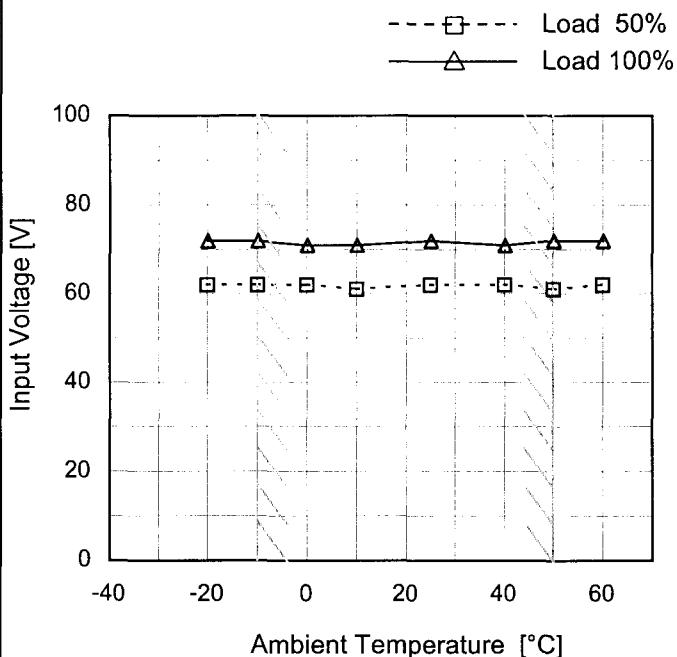
COSEL

Model	LCA50S-36																																																				
Item	Instantaneous Interruption Compensation	Temperature Testing Circuitry	25°C Figure A																																																		
Object	+36V1.7A																																																				
1.Graph	<p style="text-align: center;"> △ Input Volt. 85V □ Input Volt. 100V ○ Input Volt. 132V </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. 85[V]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 132[V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>0.30</td><td>66</td><td>116</td><td>240</td></tr> <tr><td>0.60</td><td>35</td><td>61</td><td>132</td></tr> <tr><td>0.90</td><td>22</td><td>45</td><td>89</td></tr> <tr><td>1.20</td><td>13</td><td>30</td><td>68</td></tr> <tr><td>1.50</td><td>11</td><td>22</td><td>53</td></tr> <tr><td>1.70</td><td>5</td><td>19</td><td>47</td></tr> <tr><td>1.87</td><td>5</td><td>14</td><td>40</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. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	0.00	-	-	-	0.30	66	116	240	0.60	35	61	132	0.90	22	45	89	1.20	13	30	68	1.50	11	22	53	1.70	5	19	47	1.87	5	14	40	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																				
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--	-	-	-																																																		
--	-	-	-																																																		
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<p>Note: Slanted line shows the range of the rated load current.</p>																																																					

COSEL

Model	LCA50S-36
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+36V1.7A

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	62	72
-10	62	72
0	62	71
10	61	71
25	62	72
40	62	71
50	61	72
60	62	72
--	-	-
--	-	-
--	-	-

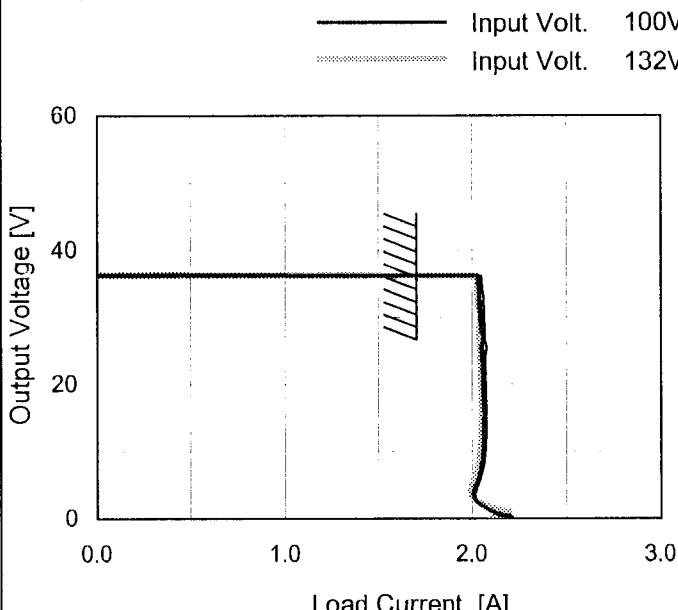
COSEL

Model LCA50S-36

Item Overcurrent Protection

Object +36V1.7A

1.Graph



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

Temperature 25°C
Testing Circuitry Figure A

2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
36.0	2.05	2.03	2.03
34.2	2.06	2.04	2.03
32.4	2.06	2.04	2.03
28.8	2.07	2.05	2.04
25.2	2.08	2.05	2.04
21.6	2.07	2.06	2.05
18.0	2.08	2.06	2.05
14.4	2.08	2.07	2.05
10.8	2.07	2.06	2.05
7.2	2.06	2.05	2.03
3.6	2.01	2.01	2.00
0.0	0.00	2.26	2.12

COSEL

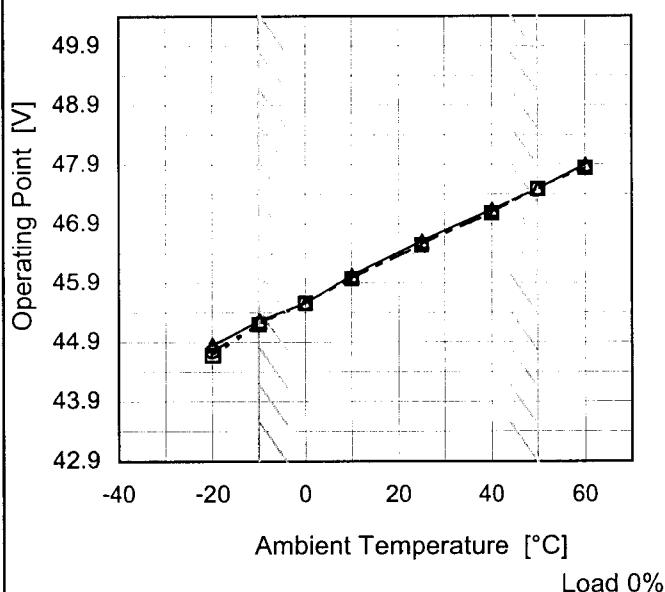
Model LCA50S-36

Item Overvoltage Protection

Object +36V1.7A

1.Graph

—△— Input Volt. 85V
 - - -□- - Input Volt. 100V
 - - ○- - Input Volt. 132V



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

Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Operating Point [V]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
-20	44.84	44.67	44.73
-10	45.25	45.19	45.20
0	45.55	45.55	45.55
10	46.02	45.96	45.96
25	46.60	46.54	46.54
40	47.13	47.07	47.07
50	47.48	47.48	47.48
60	47.89	47.83	47.83
--	-	-	-
--	-	-	-
--	-	-	-

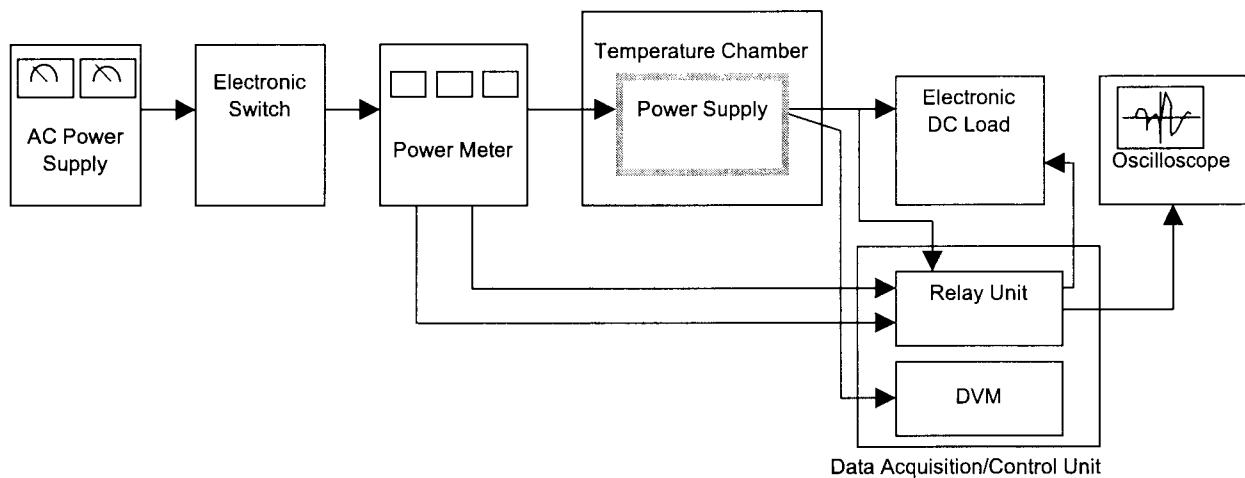


Figure A

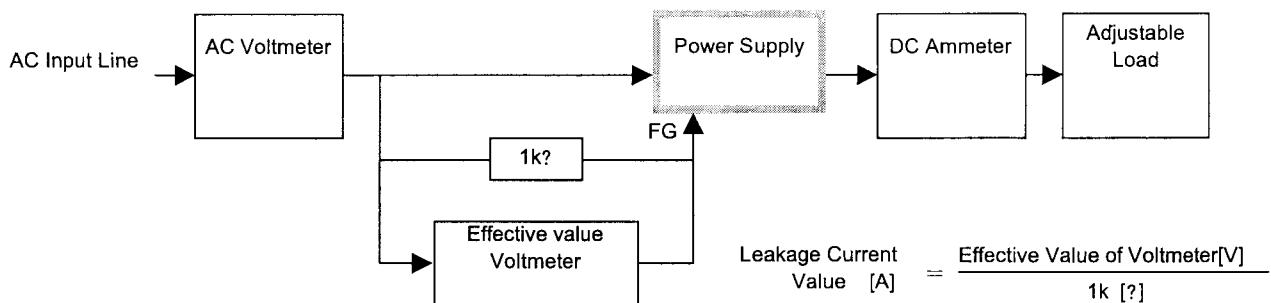


Figure B (DEN-AN)

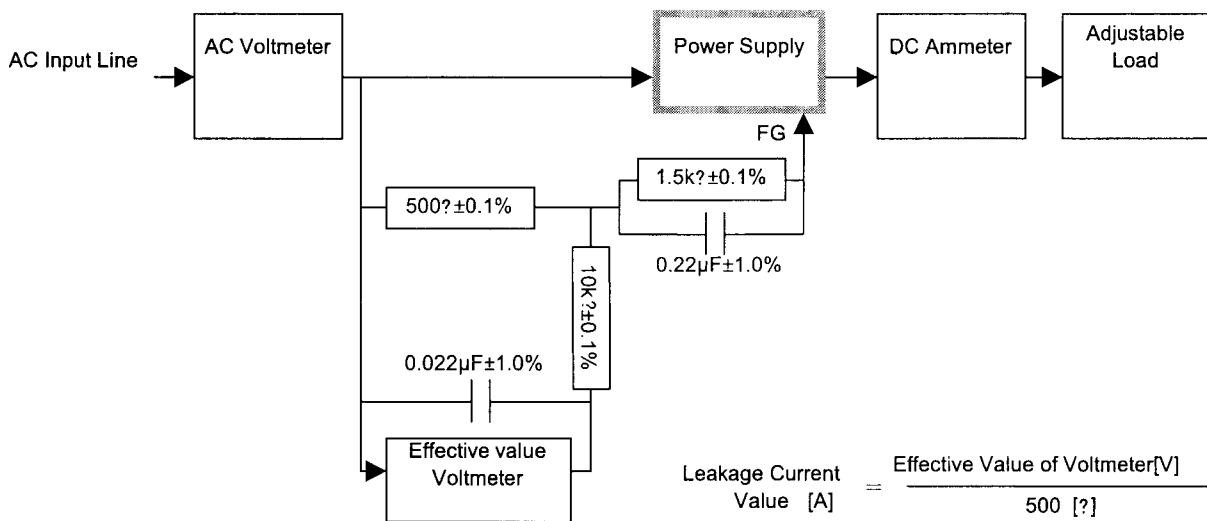


Figure B (IEC60950)