



TEST DATA OF LGA150A-12

Regulated DC Power Supply
April 15 , 2008

Approved by : Yoshiaki Shimizu Design Manager
Yoshiaki Shimizu

Prepared by : Kazuo Ishimura Design Engineer
Kazuo Ishimura

COSEL CO.,LTD.

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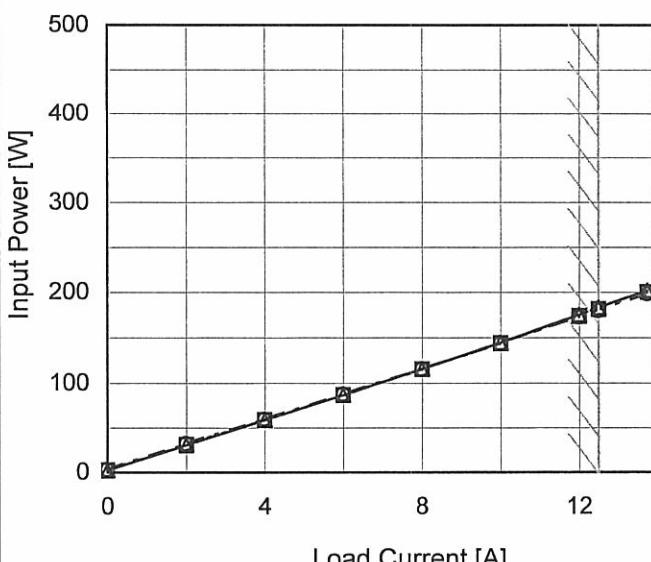
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(Final Page 25)

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Item	Input Current (by Load Current)	Temperature Testing Circuitry	25°C Figure A																																																			
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Model	LGA150A-12	Temperature Testing Circuitry	25°C Figure A
Item	Efficiency (by Input Voltage)		
Object	—		

1. Graph

Efficiency [%]

Input Voltage [V]

Legend: - - □ - - Load 50%
— △ — Load 100%

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
75	84.5	82.9
80	84.7	83.4
85	84.7	83.8
90	84.7	84.3
100	84.7	84.7
110	84.7	84.9
120	84.4	85.0
132	83.8	85.1
140	83.6	85.1

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

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	<p>The graph shows efficiency increasing with load current for all input voltages. The 85V curve is the highest, followed by 100V, and then 132V. A slanted line indicates the rated load current range.</p>	2.Values																																																						
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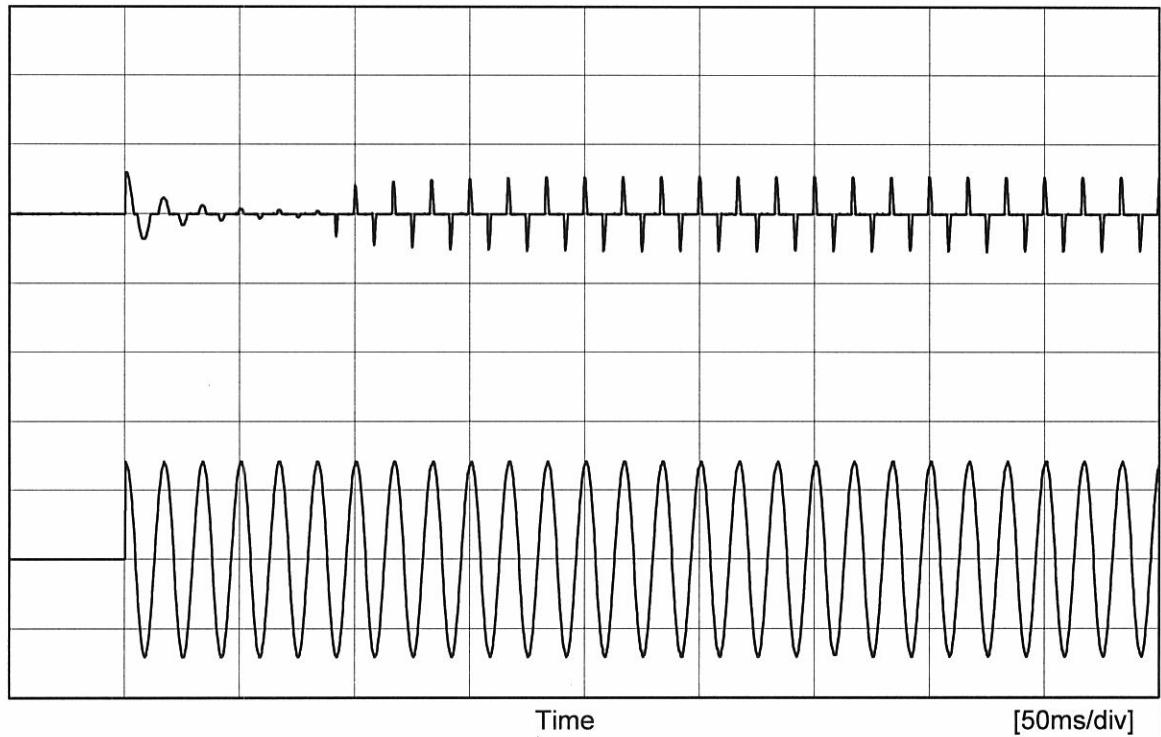
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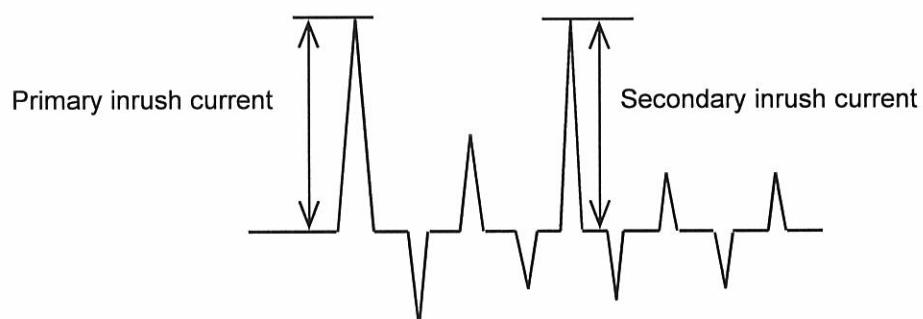
Item Inrush Current

Object _____

Temperature 25°C
Testing Circuitry Figure AInput
Current
[20A/div]

Input Voltage	100 V
Frequency	60 Hz
Load	100 %

Primary inrush current	13.4 A
Secondary inrush current	13.8 A





Model	LGA150A-12	Temperature	25°C
Item	Leakage Current	Testing Circuitry	Figure B
Object	_____		

1. Results

Standards	Leakage Current [mA]		
	Input Volt. 100 [V]	Input Volt. 120 [V]	Input Volt. 132 [V]
(A)DEN-AN	0.30	0.39	0.43
(B)IEC60950	0.30	0.37	0.42

frequency 60Hz

2. Condition

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

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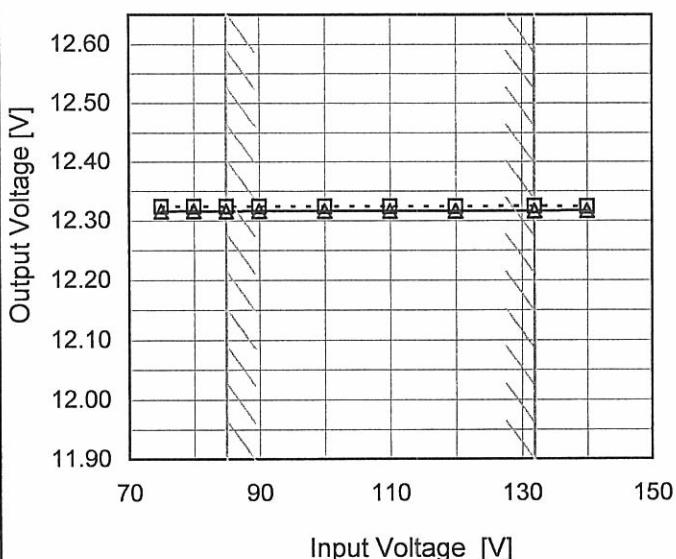
Model LGA150A-12

Item Line Regulation

Object +12V12.5A

1. Graph

--- □ --- Load 50%
 —△— Load 100%



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

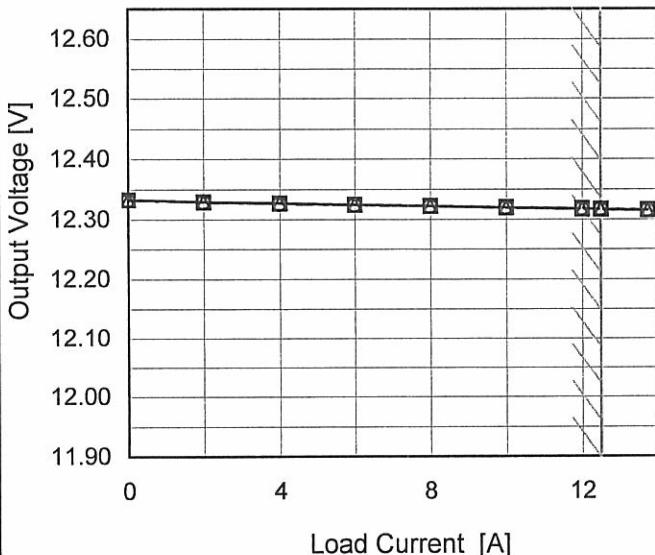
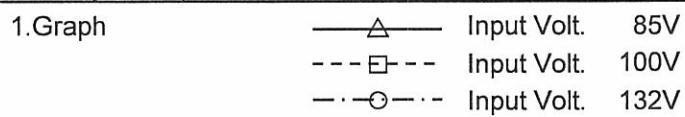
Temperature 25°C
 Testing Circuitry Figure A

2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	12.324	12.316
80	12.324	12.316
85	12.324	12.316
90	12.324	12.316
100	12.324	12.316
110	12.324	12.317
120	12.324	12.317
132	12.325	12.317
140	12.324	12.317

COSEL

Model	LGA150A-12
Item	Load Regulation
Object	+12V12.5A

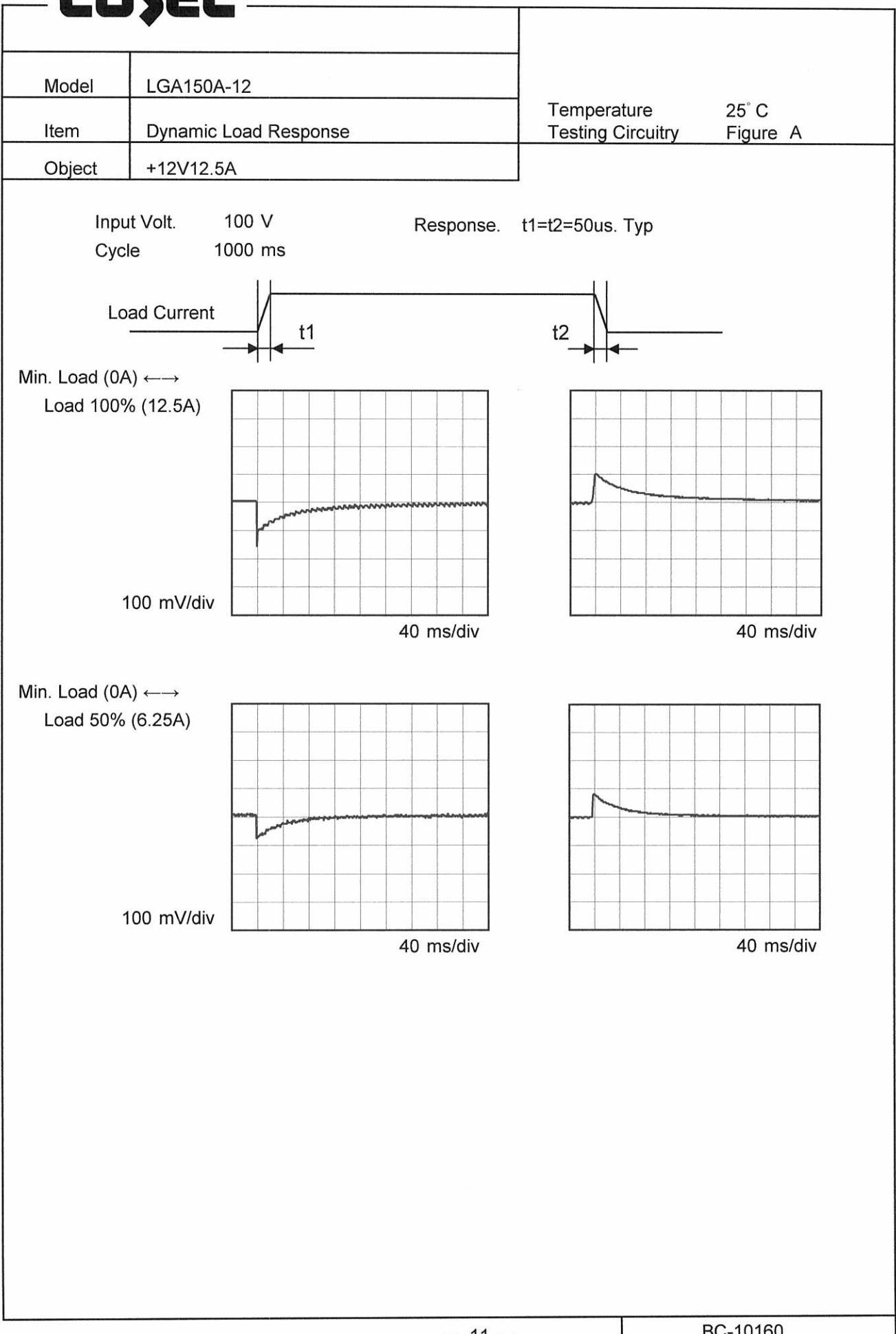


Note: Slanted line shows the range of the rated load current.

Temperature 25°C
Testing Circuitry Figure A

2.Values

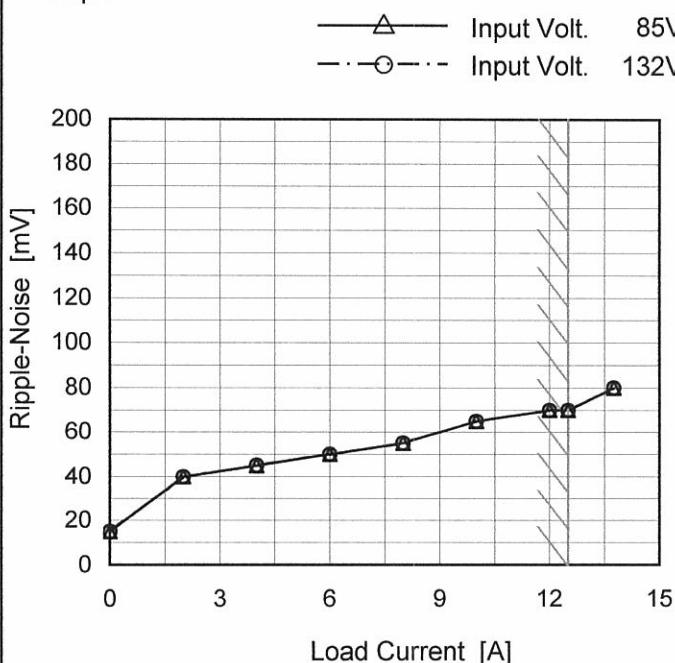
Load Current [A]	Output Voltage [V]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
0.00	12.333	12.333	12.332
2.00	12.329	12.329	12.329
4.00	12.327	12.327	12.326
6.00	12.325	12.324	12.324
8.00	12.322	12.322	12.322
10.00	12.320	12.320	12.320
12.00	12.318	12.317	12.317
12.50	12.317	12.317	12.317
13.75	12.316	12.315	12.315
--	-	-	-
--	-	-	-

COSEL

Model	LGA150A-12																																							
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure C																																						
Object	+12V12.5A																																							
1. Graph																																								
<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The Y-axis ranges from 0 to 200 mV with major grid lines every 20 units. The X-axis ranges from 0 to 15 A with major grid lines every 3 units. Two data series are plotted: Input Volt. 85V (solid line with open circles) and Input Volt. 132V (dashed line with open circles). Both series show a slight increase in ripple voltage as load current increases, with the 132V input showing slightly higher ripple than the 85V input.</p>																																								
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>10</td> <td>10</td> </tr> <tr> <td>2.00</td> <td>15</td> <td>15</td> </tr> <tr> <td>4.00</td> <td>15</td> <td>15</td> </tr> <tr> <td>6.00</td> <td>20</td> <td>20</td> </tr> <tr> <td>8.00</td> <td>20</td> <td>20</td> </tr> <tr> <td>10.00</td> <td>20</td> <td>20</td> </tr> <tr> <td>12.00</td> <td>25</td> <td>25</td> </tr> <tr> <td>12.50</td> <td>25</td> <td>25</td> </tr> <tr> <td>13.75</td> <td>30</td> <td>30</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	10	10	2.00	15	15	4.00	15	15	6.00	20	20	8.00	20	20	10.00	20	20	12.00	25	25	12.50	25	25	13.75	30	30	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																							
	Input Volt. 85 [V]	Input Volt. 132 [V]																																						
0.00	10	10																																						
2.00	15	15																																						
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6.00	20	20																																						
8.00	20	20																																						
10.00	20	20																																						
12.00	25	25																																						
12.50	25	25																																						
13.75	30	30																																						
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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>T1: Due to AC Input Line T2: Due to Switching</p> <p>Fig. Complex Ripple Wave Form</p>																																								

Model	LGA150A-12
Item	Ripple-Noise
Object	+12V12.5A

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 C

2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 85 [V]	Input Volt. 132 [V]
0.00	15	15
2.00	40	40
4.00	45	45
6.00	50	50
8.00	55	55
10.00	65	65
12.00	70	70
12.50	70	70
13.75	80	80
--	-	-
--	-	-

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

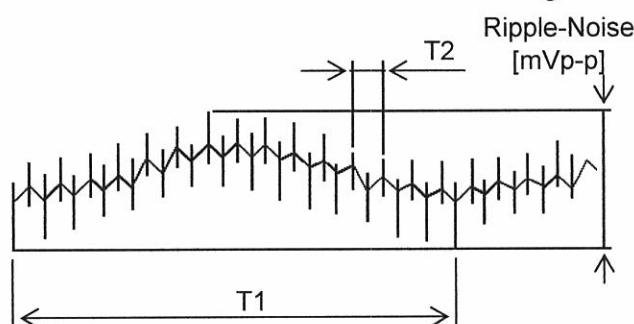


Fig. Complex Ripple Wave Form

COSEL

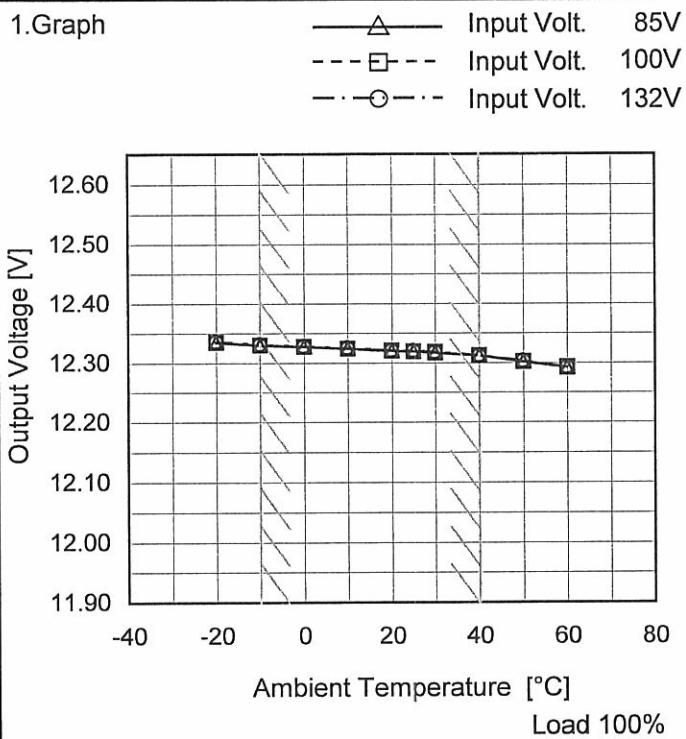
Model	LGA150A-12	Testing Circuitry FigureC																										
Item	Ripple Voltage (by Ambient Temp.)																											
Object	+12V12.5A																											
1.Graph		2.Values																										
<p>Graph showing Ripple Voltage [mV] vs Ambient Temperature [°C]. The graph shows a decreasing trend of Ripple Voltage as temperature increases from -40°C to 40°C. A slanted line indicates the range of ambient temperature.</p> <p>Input Volt. 100V Input Load. 100%</p>		<table border="1"> <thead> <tr> <th>Ambient Temperature [°C]</th> <th>Ripple Voltage [mV]</th> </tr> </thead> <tbody> <tr><td>-30</td><td>85</td></tr> <tr><td>-10</td><td>50</td></tr> <tr><td>0</td><td>45</td></tr> <tr><td>25</td><td>25</td></tr> <tr><td>40</td><td>20</td></tr> <tr><td>--</td><td>-</td></tr> <tr><td>--</td><td>-</td></tr> <tr><td>--</td><td>-</td></tr> <tr><td>--</td><td>-</td></tr> <tr><td>--</td><td>-</td></tr> <tr><td>--</td><td>-</td></tr> <tr><td>--</td><td>-</td></tr> </tbody> </table>	Ambient Temperature [°C]	Ripple Voltage [mV]	-30	85	-10	50	0	45	25	25	40	20	--	-	--	-	--	-	--	-	--	-	--	-	--	-
Ambient Temperature [°C]	Ripple Voltage [mV]																											
-30	85																											
-10	50																											
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25	25																											
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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 ambient temperature.</p> <p>T1: Due to AC Input Line T2: Due to Switching</p> <p>Ripple [mVp-p]</p> <p>Fig. Complex Ripple Wave Form</p>																												

COSEL

Model LGA150A-12

Item Ambient Temperature Drift

Object +12V12.5A



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. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
-20	12.335	12.335	12.336
-10	12.330	12.330	12.331
0	12.327	12.327	12.328
10	12.324	12.324	12.325
20	12.320	12.321	12.321
25	12.319	12.319	12.320
30	12.317	12.318	12.318
40	12.312	12.312	12.312
50	12.302	12.302	12.303
60	12.292	12.293	12.293
--	-	-	-



Model	LGA150A-12	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+12V12.5A	

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 - 40°C

Input Voltage : 85 - 132V

Load Current : 0 - 12.5A

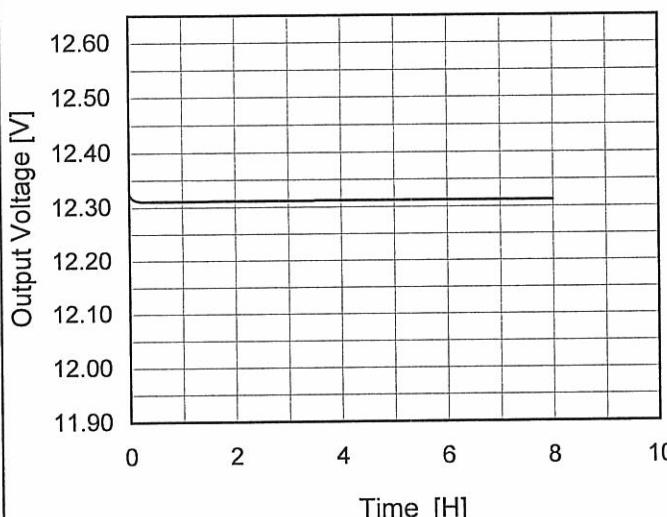
* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

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

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-10	132	0	12.345	±17	±0.1
Minimum Voltage	40	85	12.5	12.312		

COSEL

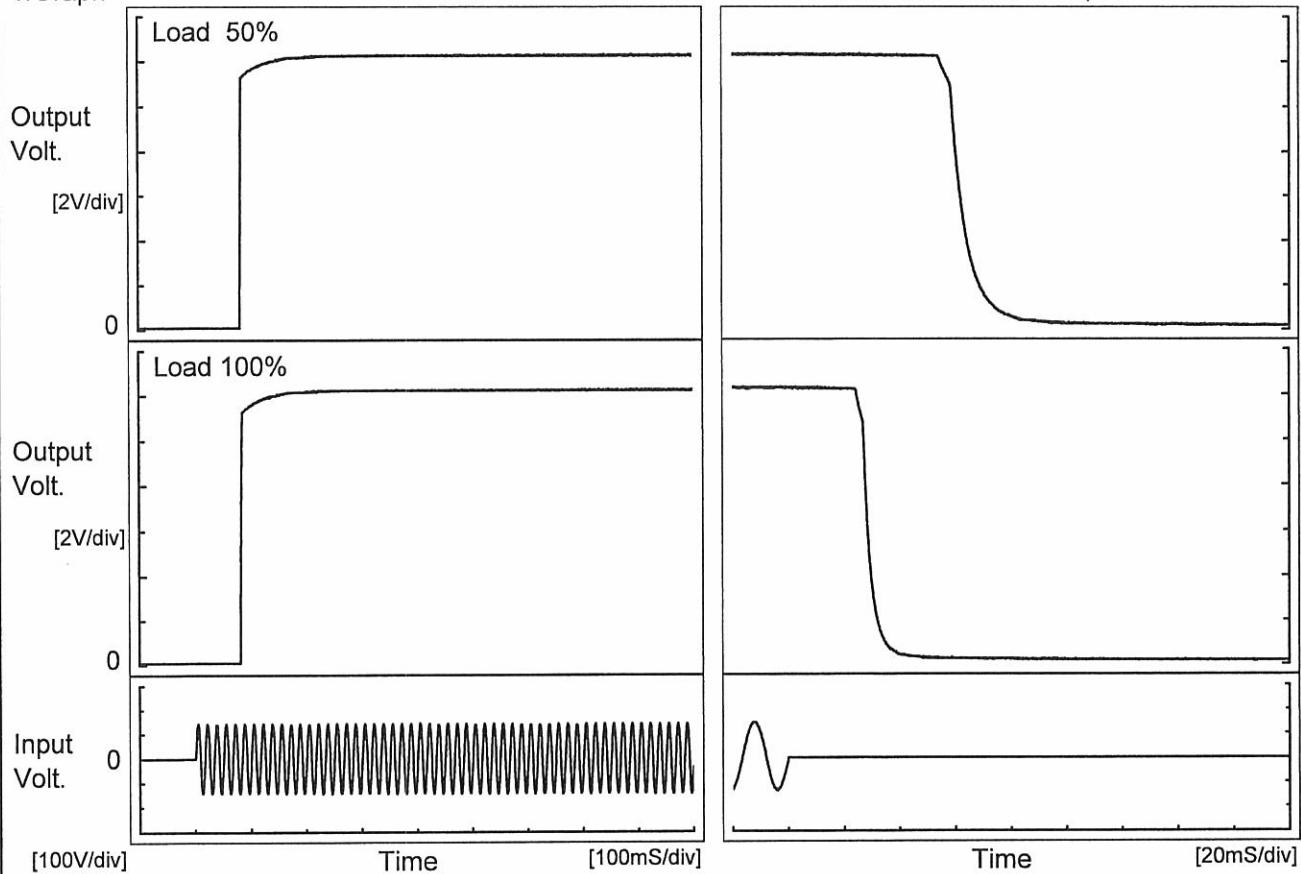
Model	LGA150A-12	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+12V12.5A																								
1. Graph			2. Values																						
 <p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 100V Load 100%</p>			<table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>12.325</td></tr> <tr><td>0.5</td><td>12.311</td></tr> <tr><td>1.0</td><td>12.311</td></tr> <tr><td>2.0</td><td>12.311</td></tr> <tr><td>3.0</td><td>12.311</td></tr> <tr><td>4.0</td><td>12.312</td></tr> <tr><td>5.0</td><td>12.312</td></tr> <tr><td>6.0</td><td>12.312</td></tr> <tr><td>7.0</td><td>12.312</td></tr> <tr><td>8.0</td><td>12.312</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	12.325	0.5	12.311	1.0	12.311	2.0	12.311	3.0	12.311	4.0	12.312	5.0	12.312	6.0	12.312	7.0	12.312	8.0	12.312
Time since start [H]	Output Voltage [V]																								
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6.0	12.312																								
7.0	12.312																								
8.0	12.312																								

COSEL

Model	LGA150A-12
Item	Rise and Fall Time
Object	+12V12.5A

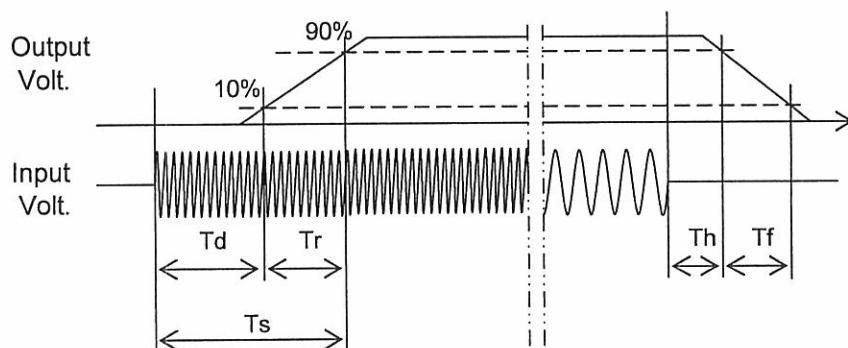
Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Load	Time	Td	Tr	Ts	Th	Tf	[mS]
50 %		82.5	2.0	84.5	58.4	13.5	
100 %		82.0	3.0	85.0	26.7	7.0	





Model	LGA150A-12																																	
Item	Hold-Up Time	Temperature 25°C Testing Circuitry Figure A																																
Object	+12V12.5A																																	
1.Graph																																		
<p>Legend: - - - □ - - - Load 50% —△— Load 100% </p> <p>Y-axis: Hold-Up Time [ms] X-axis: Input Voltage [V]</p>																																		
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<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Hold-Up Time [ms]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr> <td>75</td><td>19</td><td>7</td> </tr> <tr> <td>80</td><td>25</td><td>10</td> </tr> <tr> <td>85</td><td>32</td><td>13</td> </tr> <tr> <td>90</td><td>39</td><td>17</td> </tr> <tr> <td>100</td><td>54</td><td>25</td> </tr> <tr> <td>110</td><td>71</td><td>33</td> </tr> <tr> <td>120</td><td>90</td><td>43</td> </tr> <tr> <td>132</td><td>115</td><td>55</td> </tr> <tr> <td>140</td><td>133</td><td>64</td> </tr> </tbody> </table>			Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	75	19	7	80	25	10	85	32	13	90	39	17	100	54	25	110	71	33	120	90	43	132	115	55	140	133	64
Input Voltage [V]	Hold-Up Time [ms]																																	
	Load 50%	Load 100%																																
75	19	7																																
80	25	10																																
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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.</p> <p>Note: Slanted line shows the range of the rated input voltage.</p>																																		



Model	LGA150A-12																																																							
Item	Instantaneous Interruption Compensation	Temperature Testing Circuitry	25°C Figure A																																																					
Object	+12V12.5A																																																							
1.Graph	—△— Input Volt. 85V - - -□- Input Volt. 100V - · -○- Input Volt. 132V	2.Values																																																						
<p>Note: Slanted line shows the range of the rated load current.</p>			<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>2.00</td><td>112</td><td>179</td><td>351</td></tr> <tr> <td>4.00</td><td>56</td><td>90</td><td>185</td></tr> <tr> <td>6.00</td><td>37</td><td>60</td><td>123</td></tr> <tr> <td>8.00</td><td>25</td><td>42</td><td>90</td></tr> <tr> <td>10.00</td><td>20</td><td>34</td><td>72</td></tr> <tr> <td>12.00</td><td>14</td><td>28</td><td>60</td></tr> <tr> <td>12.50</td><td>14</td><td>26</td><td>57</td></tr> <tr> <td>13.75</td><td>13</td><td>23</td><td>51</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	-	-	-	2.00	112	179	351	4.00	56	90	185	6.00	37	60	123	8.00	25	42	90	10.00	20	34	72	12.00	14	28	60	12.50	14	26	57	13.75	13	23	51	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																							
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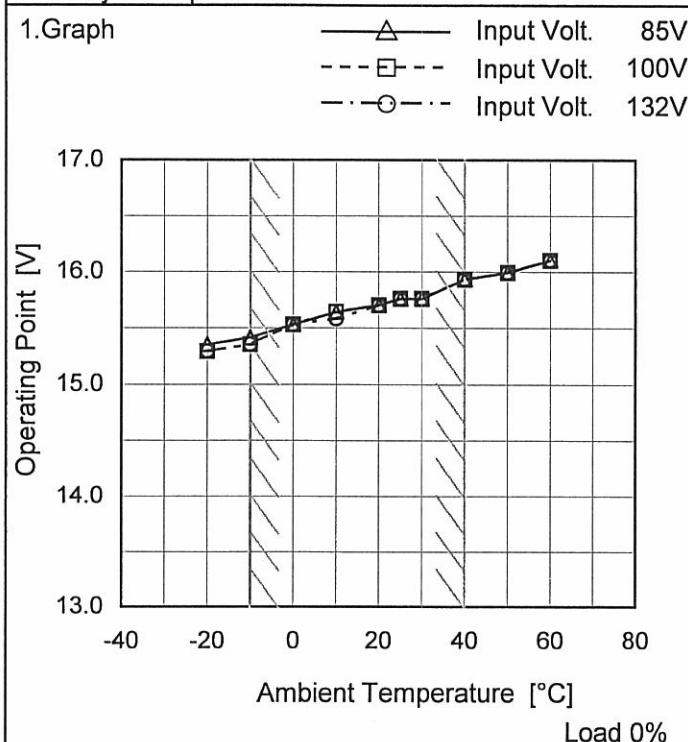
Model	LGA150A-12																																							
Item	Minimum Input Voltage for Regulated Output Voltage																																							
Object	+12V12.5A																																							
1.Graph																																								
<p style="text-align: center;"> - - - □ - - - Load 50% — △ — Load 100% </p>																																								
<p style="text-align: center;">2.Values</p> <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>58</td> <td>65</td> </tr> <tr> <td>-10</td> <td>58</td> <td>65</td> </tr> <tr> <td>0</td> <td>58</td> <td>65</td> </tr> <tr> <td>10</td> <td>57</td> <td>64</td> </tr> <tr> <td>20</td> <td>57</td> <td>64</td> </tr> <tr> <td>25</td> <td>57</td> <td>64</td> </tr> <tr> <td>30</td> <td>57</td> <td>64</td> </tr> <tr> <td>40</td> <td>57</td> <td>64</td> </tr> <tr> <td>50</td> <td>56</td> <td>64</td> </tr> <tr> <td>60</td> <td>56</td> <td>64</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> </tr> </tbody> </table>			Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-20	58	65	-10	58	65	0	58	65	10	57	64	20	57	64	25	57	64	30	57	64	40	57	64	50	56	64	60	56	64	--	-	-
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<p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																								

COSEL

Model	LGA150A-12																																																									
Item	Overcurrent Protection																																																									
Object	+12V12.5A																																																									
1. Graph																																																										
<p>The graph plots Output Voltage [V] on the Y-axis (0 to 12) against Load Current [A] on the X-axis (0 to 20). Three horizontal lines represent different input voltages: 85V (top), 100V (middle), and 132V (bottom). As load current increases, the output voltage decreases. A slanted line connects the points where the output voltage drops to zero at approximately 12.5A, indicating the rated load current range.</p>																																																										
<p>Note: Slanted line shows the range of the rated load current.</p>																																																										
Temperature 25°C Testing Circuitry Figure A																																																										
2. Values																																																										
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COSEL

Model	LGA150A-12
Item	Overshoot Protection
Object	+12V12.5A



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	15.35	15.29	15.29
-10	15.41	15.35	15.35
0	15.53	15.53	15.53
10	15.64	15.64	15.58
20	15.70	15.70	15.70
25	15.76	15.76	15.76
30	15.76	15.76	15.76
40	15.93	15.93	15.93
50	15.99	15.99	15.99
60	16.10	16.10	16.10
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Note: Slanted line shows the range of the rated ambient temperature.

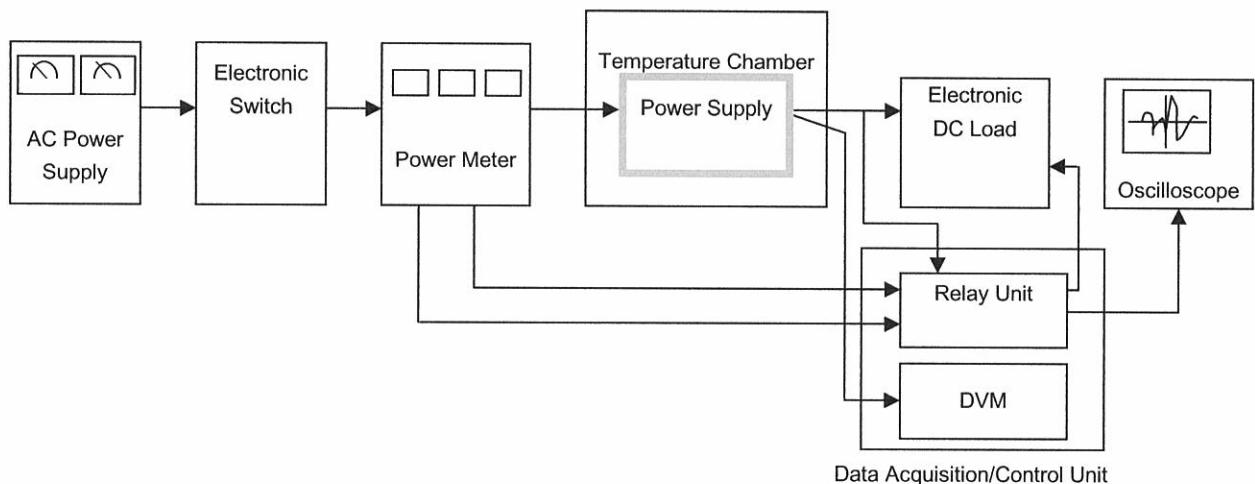


Figure A

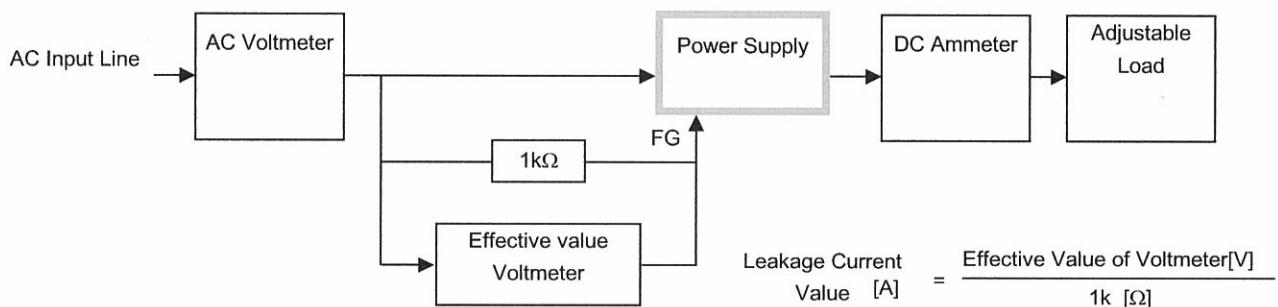


Figure B (DEN-AN)

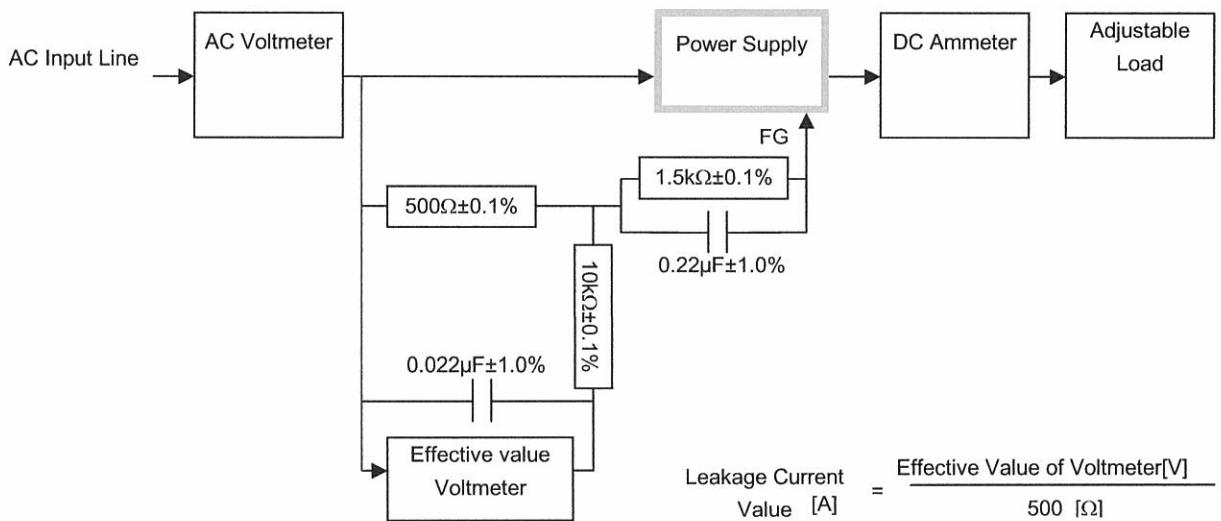


Figure B (IEC60950-1)

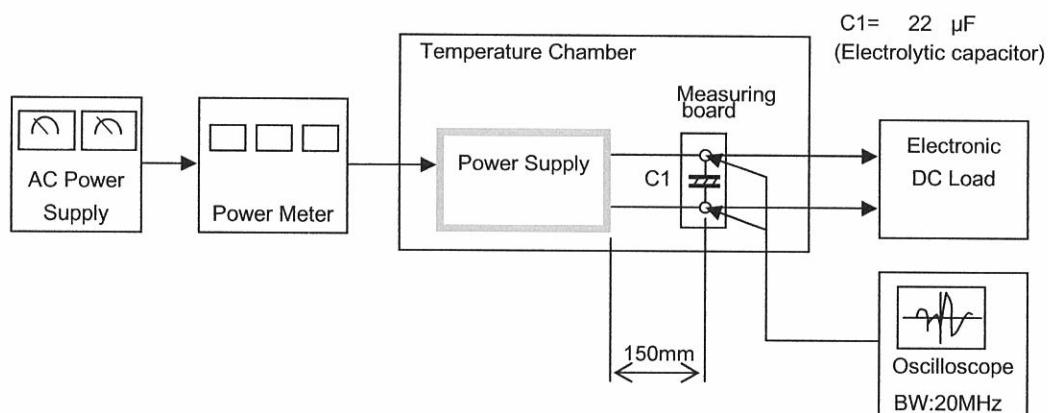


Figure C