



# TEST DATA OF LGA240A-24

Regulated DC Power Supply  
April 10, 2008

Approved by : Yoshiaki Shimizu  
Yoshiaki Shimizu Design Manager

Prepared by : Yoshiki Ishikawa  
Yoshiki Ishikawa Design Engineer

**COSEL CO.,LTD.**



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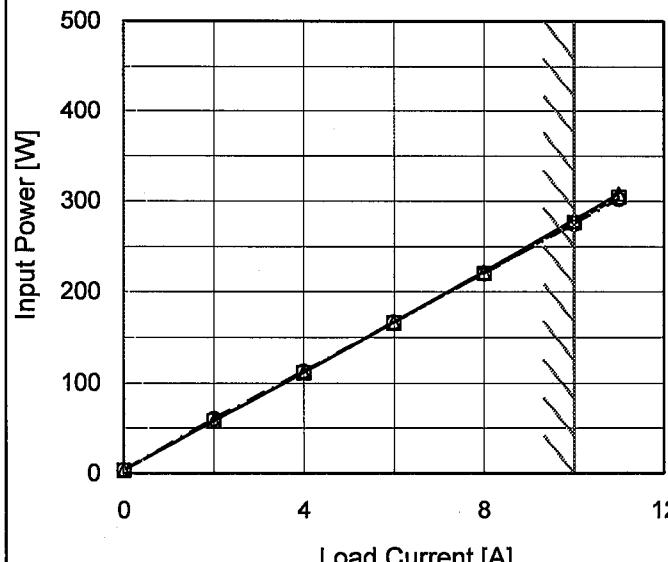
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Model	LGA240A-24																																																					
Item	Input Current (by Load Current)	Temperature 25°C	Testing Circuitry Figure A																																																			
Object	—	—	—																																																			
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 <p>The graph plots Input Power [W] on the Y-axis (0 to 500) against Load Current [A] on the X-axis (0 to 12). Three straight lines represent different input voltages: 85V (solid line with triangles), 100V (dashed line with squares), and 132V (dash-dot line with circles). All lines pass through the origin (0,0). A slanted line is drawn across the graph, starting from approximately (2.5, 60) and ending at (10, 300), representing the rated load current range.</p>																																																						
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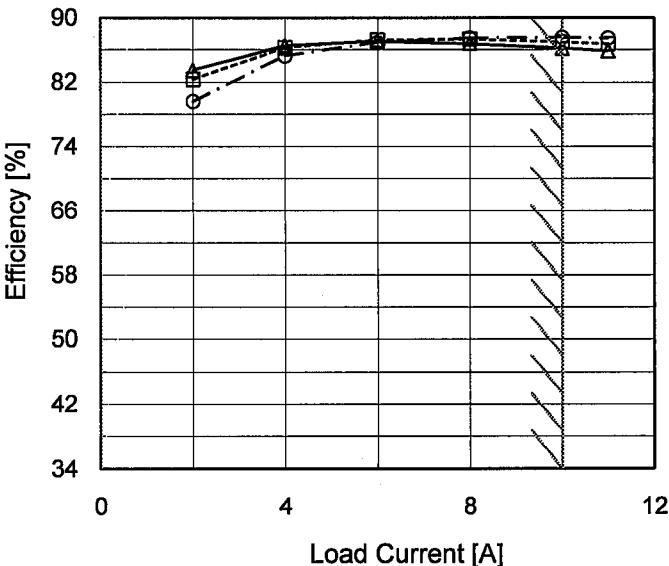
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<p>The graph plots Efficiency [%] on the y-axis (34 to 90) against Input Voltage [V] on the x-axis (70 to 150). Two data series are shown: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show efficiency remaining relatively constant around 85-87% across the entire input voltage range. A slanted line on the graph 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>86.7</td><td>85.4</td></tr> <tr><td>80</td><td>86.7</td><td>85.8</td></tr> <tr><td>85</td><td>86.9</td><td>86.2</td></tr> <tr><td>90</td><td>86.8</td><td>86.5</td></tr> <tr><td>100</td><td>86.7</td><td>86.9</td></tr> <tr><td>110</td><td>86.6</td><td>87.2</td></tr> <tr><td>120</td><td>86.4</td><td>87.4</td></tr> <tr><td>132</td><td>86.1</td><td>87.5</td></tr> <tr><td>140</td><td>85.9</td><td>87.5</td></tr> </tbody> </table>			Input Voltage [V]	Efficiency Load 50% [%]	Efficiency Load 100% [%]	75	86.7	85.4	80	86.7	85.8	85	86.9	86.2	90	86.8	86.5	100	86.7	86.9	110	86.6	87.2	120	86.4	87.4	132	86.1	87.5	140	85.9	87.5		
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<p>Note: Slanted line shows the range of the rated input voltage.</p>																																		

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Model	LGA240A-24
Item	Efficiency (by Load Current)
Object	—

1.Graph

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



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

Temperature 25°C  
 Testing Circuitry Figure A

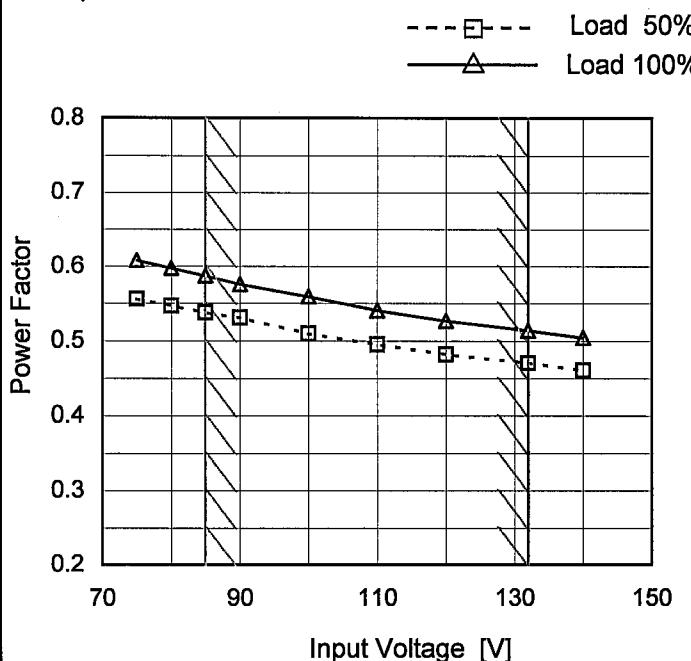
## 2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
0	-	-	-
2	83.4	82.4	79.6
4	86.5	86.2	85.3
6	87.0	87.2	86.9
8	86.8	87.3	87.5
10	86.2	87.0	87.6
11	85.9	86.7	87.4
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

**COSEL**

Model	LGA240A-24
Item	Power Factor (by Input Voltage)
Object	_____

## 1.Graph



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

 Temperature 25°C  
 Testing Circuitry Figure A

## 2.Values

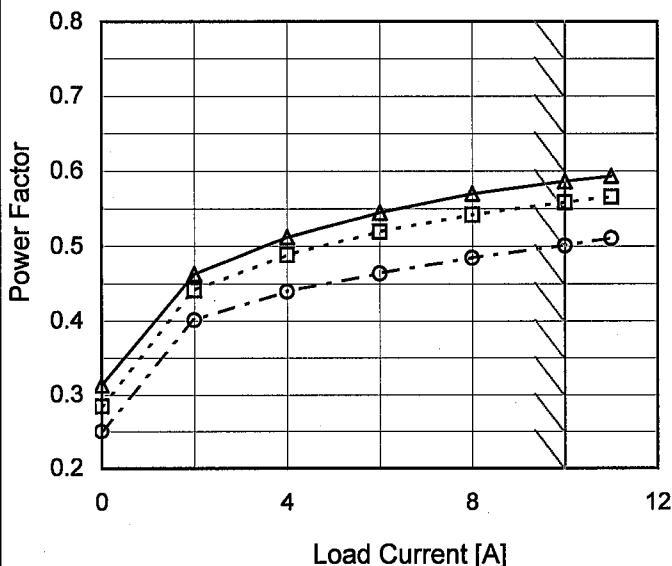
Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
75	0.556	0.608
80	0.547	0.598
85	0.538	0.587
90	0.530	0.576
100	0.510	0.559
110	0.495	0.541
120	0.483	0.527
132	0.471	0.514
140	0.461	0.504

**COSEL**

Model	LGA240A-24
Item	Power Factor (by Load Current)
Object	_____

## 1. Graph

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



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

 Temperature 25°C  
 Testing Circuitry Figure A

## 2. Values

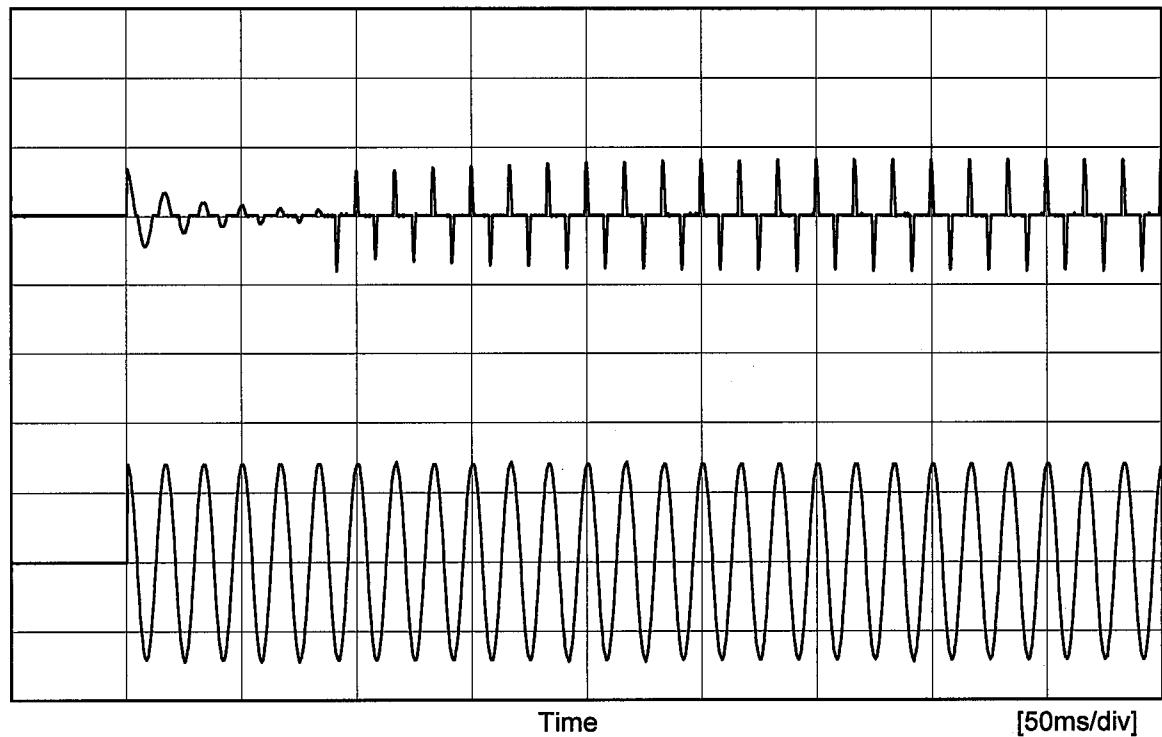
Load Current [A]	Power Factor		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
0	0.313	0.284	0.250
2	0.463	0.441	0.401
4	0.512	0.488	0.440
6	0.545	0.519	0.464
8	0.570	0.542	0.485
10	0.586	0.558	0.501
11	0.593	0.565	0.511
--	-	-	-
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--	-	-	-
--	-	-	-

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Model LGA240A-24

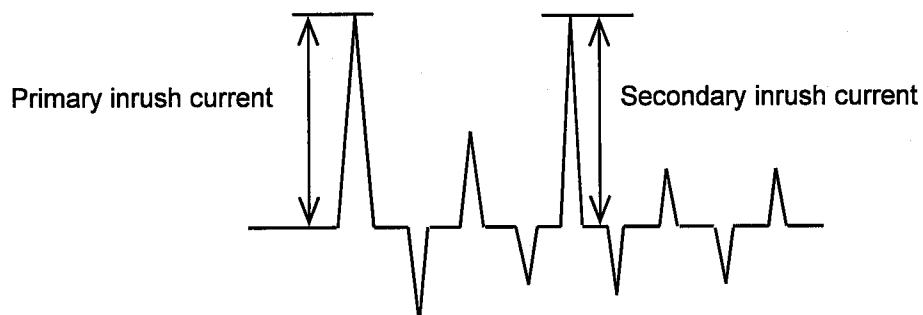
Item Inrush Current

Object \_\_\_\_\_

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

Input Voltage	100 V
Frequency	60 Hz
Load	100 %

Primary inrush current	13.2 A
Secondary inrush current	16.4 A





Model	LGA240A-24	Temperature	25°C
Item	Leakage Current	Testing Circuitry	Figure B
Object	<hr/>		

### 1. Results

Standards	Leakage Current [mA]		
	Input Volt. 100 [V]	Input Volt. 120 [V]	Input Volt. 132 [V]
(A)DEN-AN	0.30	0.37	0.41
(B)IEC60950	0.28	0.35	0.39

frequency 60Hz

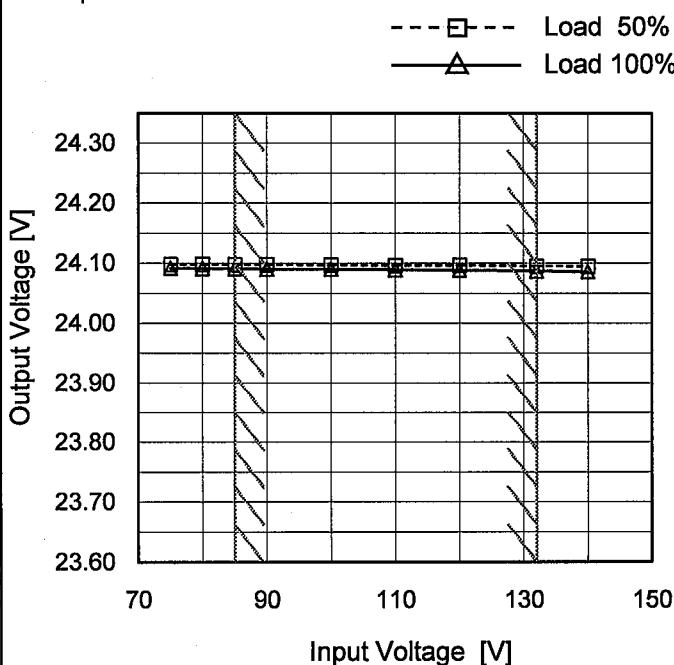
### 2. Condition

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

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Model	LGA240A-24
Item	Line Regulation
Object	+24V10A

## 1.Graph



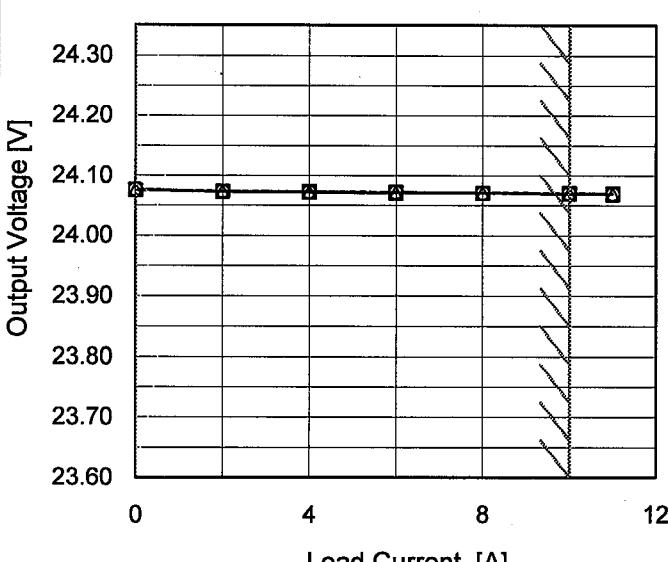
Note: Slanted line shows the range of the rated input voltage.

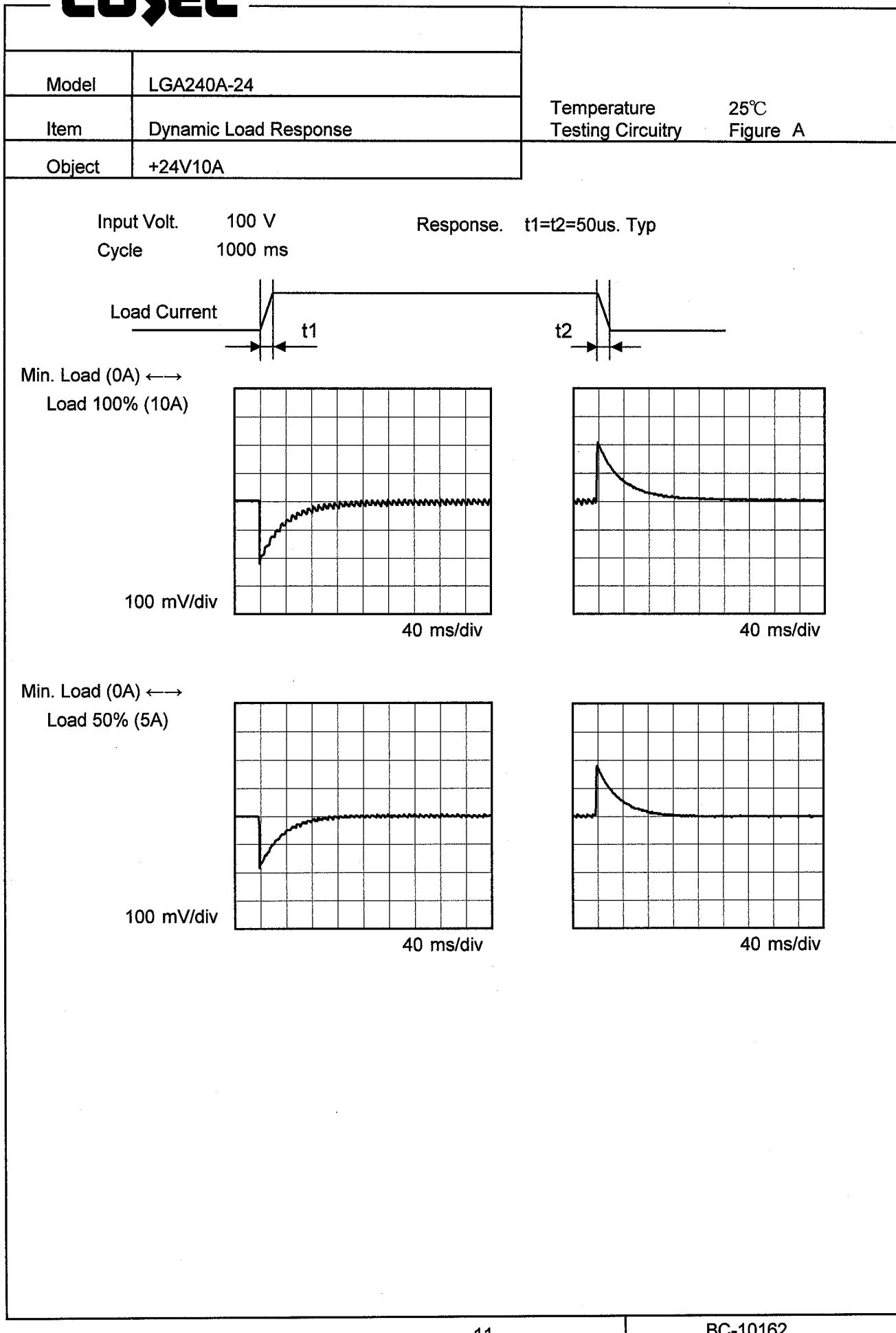
Temperature 25°C  
Testing Circuitry Figure A

## 2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	24.098	24.092
80	24.098	24.092
85	24.098	24.091
90	24.098	24.091
100	24.097	24.090
110	24.097	24.089
120	24.096	24.089
132	24.096	24.087
140	24.095	24.086

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Load Current [A]	Output Voltage [V]																																																					
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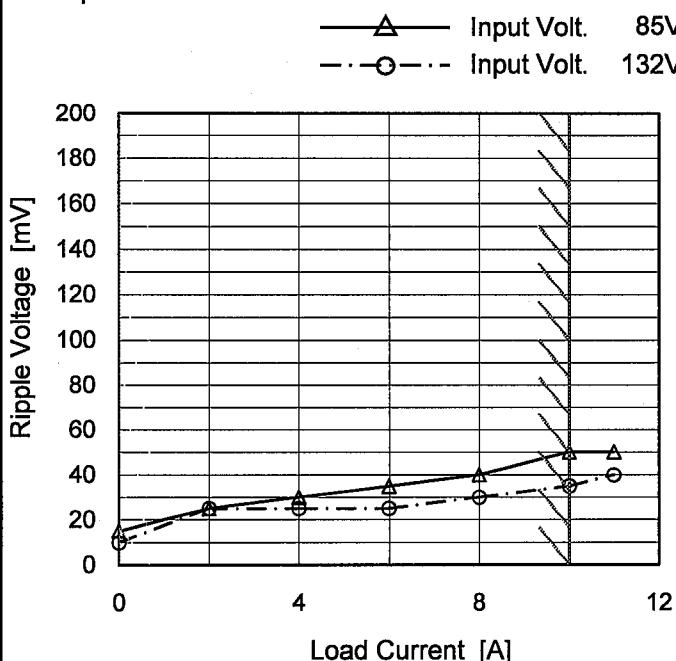
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**COSEL**

Model	LGA240A-24
Item	Ripple Voltage (by Load Current)
Object	+24V10A

Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph



## 2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 85 [V]	Input Volt. 132 [V]
0	15	10
2	25	25
4	30	25
6	35	25
8	40	30
10	50	35
11	50	40
--	-	-
--	-	-
--	-	-
--	-	-

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.

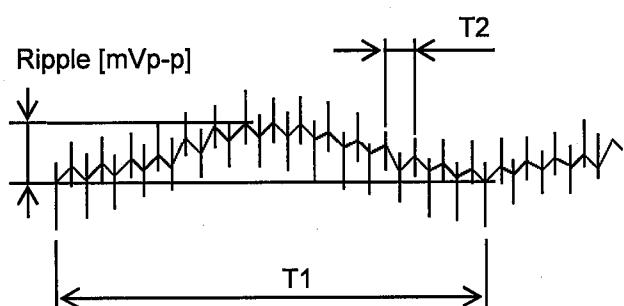
T1: Due to AC Input Line  
T2: Due to Switching

Fig. Complex Ripple Wave Form

# COSEL

Model	LGA240A-24	Temperature Testing Circuitry	25°C Figure A																																			
Item	Ripple-Noise																																					
Object	+24V10A																																					
1. Graph			2. Values																																			
<p>Graph showing Ripple-Noise [mV] vs Load Current [A]. The Y-axis ranges from 0 to 200 mV, and the X-axis ranges from 0 to 12 A. Two curves are plotted: Input Volt. 85V (solid line with triangles) and Input Volt. 132V (dashed line with circles). Both curves show an increase in noise as load current increases. A slanted line indicates the range of rated load current.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Ripple-Noise [mV] (Input Volt. 85V)</th> <th>Ripple-Noise [mV] (Input Volt. 132V)</th> </tr> </thead> <tbody> <tr><td>0</td><td>30</td><td>55</td></tr> <tr><td>2</td><td>40</td><td>65</td></tr> <tr><td>4</td><td>40</td><td>65</td></tr> <tr><td>6</td><td>45</td><td>65</td></tr> <tr><td>8</td><td>55</td><td>65</td></tr> <tr><td>10</td><td>70</td><td>70</td></tr> <tr><td>11</td><td>80</td><td>80</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> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>			Load Current [A]	Ripple-Noise [mV] (Input Volt. 85V)	Ripple-Noise [mV] (Input Volt. 132V)	0	30	55	2	40	65	4	40	65	6	45	65	8	55	65	10	70	70	11	80	80	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple-Noise [mV] (Input Volt. 85V)	Ripple-Noise [mV] (Input Volt. 132V)																																				
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<p>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.</p>																																						
<p>Fig. Complex Ripple Wave Form</p> <p>T1: Due to AC Input Line T2: Due to Switching</p> <p>Ripple-Noise [mVp-p]</p> <p>T1</p> <p>T2</p>																																						

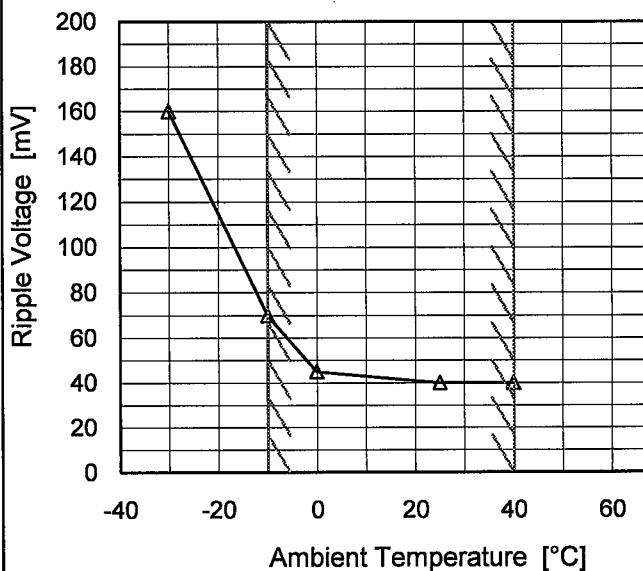
**COSEL**

Model LGA240A-24

Item Ripple Voltage (by Ambient Temp.)

Object +24V10A

## 1. Graph



Input Volt. 100V

Load 100%

Testing Circuitry FigureC

## 2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]
-30	160
-10	70
0	45
25	40
40	40
--	-
--	-
--	-
--	-
--	-
--	-
--	-

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.

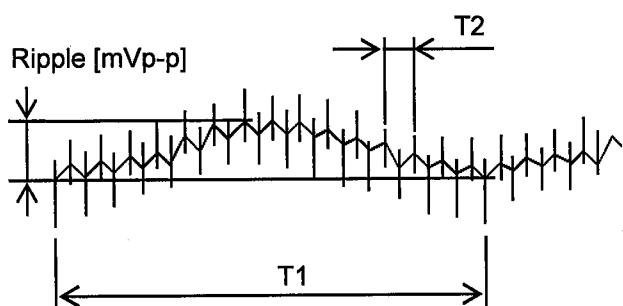
T1: Due to AC Input Line  
T2: Due to Switching

Fig. Complex Ripple Wave Form

**COSEL**

Model      LGA240A-24 Item      Ambient Temperature Drift Object    +24V10A	Testing Circuitry   Figure A																																																				
	2.Values																																																				
	<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="3">Output Voltage [V]</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>-20</td><td>24.187</td><td>24.187</td><td>24.185</td></tr> <tr> <td>-10</td><td>24.163</td><td>24.162</td><td>24.159</td></tr> <tr> <td>0</td><td>24.136</td><td>24.135</td><td>24.133</td></tr> <tr> <td>10</td><td>24.111</td><td>24.110</td><td>24.108</td></tr> <tr> <td>20</td><td>24.085</td><td>24.084</td><td>24.082</td></tr> <tr> <td>25</td><td>24.071</td><td>24.069</td><td>24.067</td></tr> <tr> <td>30</td><td>24.056</td><td>24.054</td><td>24.052</td></tr> <tr> <td>40</td><td>24.029</td><td>24.029</td><td>24.026</td></tr> <tr> <td>50</td><td>23.998</td><td>23.996</td><td>23.993</td></tr> <tr> <td>60</td><td>23.967</td><td>23.966</td><td>23.963</td></tr> <tr> <td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>			Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	-20	24.187	24.187	24.185	-10	24.163	24.162	24.159	0	24.136	24.135	24.133	10	24.111	24.110	24.108	20	24.085	24.084	24.082	25	24.071	24.069	24.067	30	24.056	24.054	24.052	40	24.029	24.029	24.026	50	23.998	23.996	23.993	60	23.967	23.966	23.963	--	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																				
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1.Graph	<p>—▲— Input Volt. 85V        - - -□- Input Volt. 100V        - - -○- Input Volt. 132V</p> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>																																																				
Note: Slanted line shows the range of the rated ambient temperature.																																																					



Model	LGA240A-24	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+24V10A	

### 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 - 10A

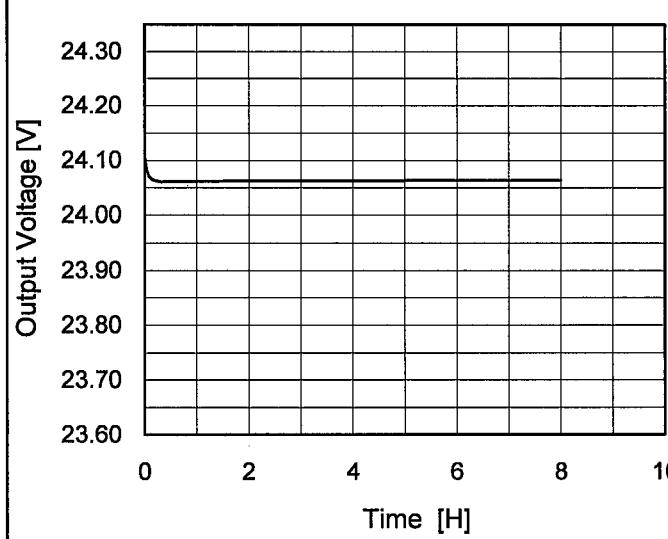
\* Output Voltage Accuracy =  $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

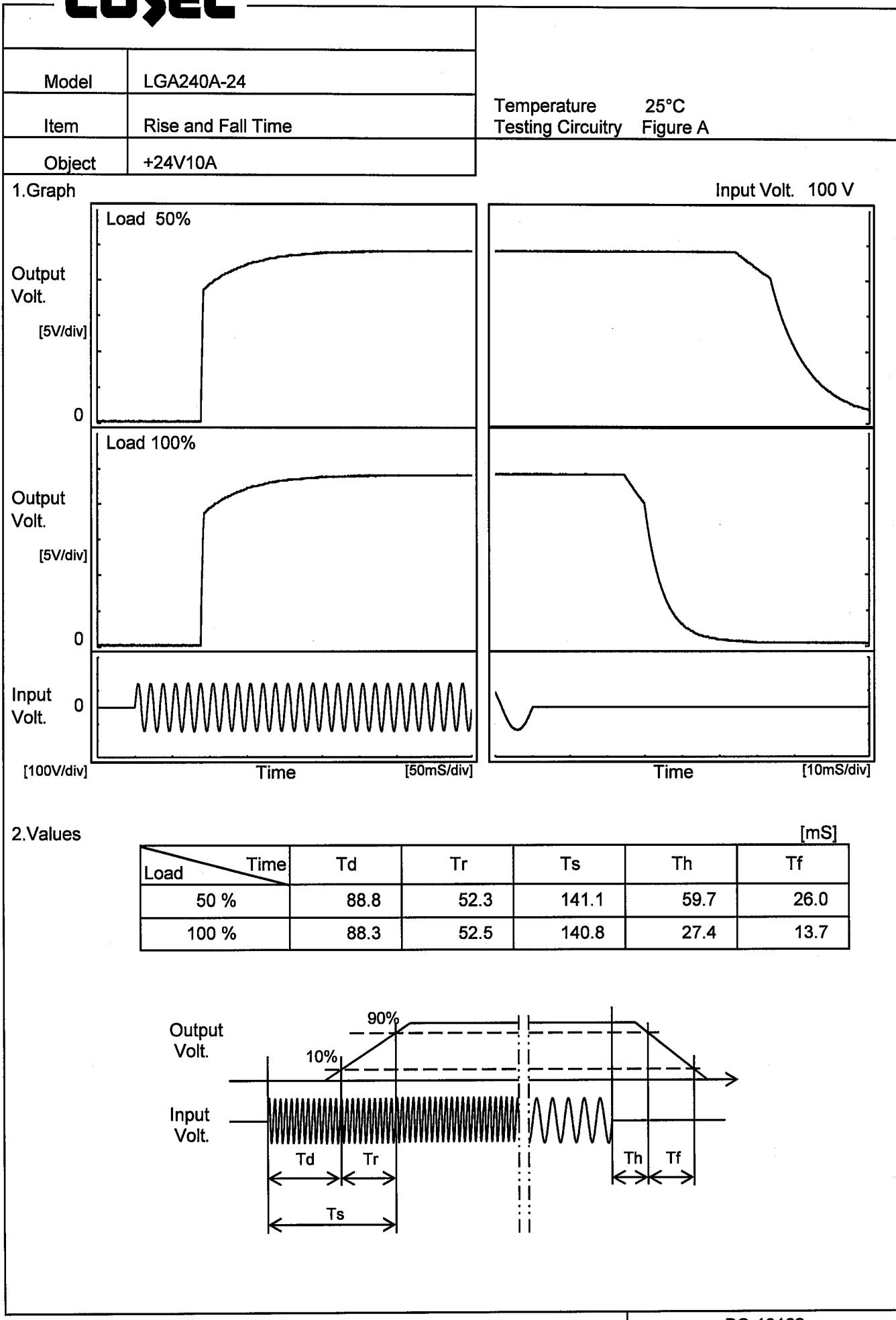
$$\text{* Output Voltage Accuracy (Ration)} = \frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

### 2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-10	85	0	24.193	±84	±0.4
Minimum Voltage	40	132	10	24.026		

**COSEL**

Model	LGA240A-24	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+24V10A																								
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>24.117</td></tr> <tr><td>0.5</td><td>24.061</td></tr> <tr><td>1.0</td><td>24.061</td></tr> <tr><td>2.0</td><td>24.062</td></tr> <tr><td>3.0</td><td>24.062</td></tr> <tr><td>4.0</td><td>24.062</td></tr> <tr><td>5.0</td><td>24.063</td></tr> <tr><td>6.0</td><td>24.063</td></tr> <tr><td>7.0</td><td>24.063</td></tr> <tr><td>8.0</td><td>24.063</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	24.117	0.5	24.061	1.0	24.061	2.0	24.062	3.0	24.062	4.0	24.062	5.0	24.063	6.0	24.063	7.0	24.063	8.0	24.063
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6.0	24.063																								
7.0	24.063																								
8.0	24.063																								

**COSEL**

# COSEL

Model	LGA240A-24	Temperature 25°C																																
Item	Hold-Up Time	Testing Circuitry Figure A																																
Object	+24V10A																																	
1.Graph		2.Values																																
<p>Y-axis: Hold-Up Time [ms] (logarithmic scale: 1, 10, 100, 1000)</p> <p>X-axis: Input Voltage [V] (linear scale: 70, 90, 110, 130, 150)</p> <p>Legend:</p> <ul style="list-style-type: none"> <li>--□-- Load 50%</li> <li>—△— Load 100%</li> </ul>		<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>18</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>55</td><td>25</td></tr> <tr><td>110</td><td>73</td><td>34</td></tr> <tr><td>120</td><td>93</td><td>44</td></tr> <tr><td>132</td><td>120</td><td>57</td></tr> <tr><td>140</td><td>139</td><td>67</td></tr> </tbody> </table>	Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	75	18	7	80	25	10	85	32	13	90	39	17	100	55	25	110	73	34	120	93	44	132	120	57	140	139	67
Input Voltage [V]	Hold-Up Time [ms]																																	
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120	93	44																																
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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>																																		

**COSEL**

Model	LGA240A-24																																																					
Item	Instantaneous Interruption Compensation																																																					
Object	+24V10A																																																					
1.Graph	<p style="text-align: center;"> <span style="color: black;">—△—</span> Input Volt. 85V  <span style="color: black;">---□---</span> Input Volt. 100V  <span style="color: black;">---○---</span> Input Volt. 132V         </p>																																																					
2.Values	<table border="1" style="width: 100%; border-collapse: collapse;"> <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</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>2</td><td>85</td><td>141</td><td>290</td></tr> <tr><td>4</td><td>41</td><td>71</td><td>150</td></tr> <tr><td>6</td><td>26</td><td>46</td><td>99</td></tr> <tr><td>8</td><td>18</td><td>33</td><td>74</td></tr> <tr><td>10</td><td>13</td><td>26</td><td>58</td></tr> <tr><td>11</td><td>12</td><td>22</td><td>52</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. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	0	-	-	-	2	85	141	290	4	41	71	150	6	26	46	99	8	18	33	74	10	13	26	58	11	12	22	52	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																					
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Note:	Slanted line shows the range of the rated load current.																																																					

**COSEL**

Model	LGA240A-24																																							
Item	Minimum Input Voltage for Regulated Output Voltage																																							
Object	+24V10A																																							
1.Graph																																								
<p>Input Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Legend:</p> <ul style="list-style-type: none"> <li>--□-- Load 50%</li> <li>—△— Load 100%</li> </ul>																																								
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Ambient Temperature [°C]	Input Voltage [V]																																							
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**COSEL**

Model	LGA240A-24		
Item	Overcurrent Protection		
Object	+24V10A		
1.Graph	<p>Input Volt. 85V Input Volt. 100V Input Volt. 132V</p> <p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p>		

 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]
24.0	10.12	11.81	11.75
22.8	11.93	11.86	11.84
21.6	10.12	11.92	11.75
19.2	12.08	12.07	12.12
16.8	12.23	12.25	12.34
14.4	12.34	12.38	12.51
12.0	12.47	12.51	12.69
9.6	12.56	12.61	12.66
7.2	12.57	12.67	12.81
4.8	12.62	12.81	12.89
2.4	12.78	12.87	12.86
0.0	12.72	12.89	12.81

**COSEL**

Model	LGA240A-24	Testing Circuitry Figure A																																																					
Item	Overvoltage Protection																																																						
Object	+24V10A																																																						
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. 85V</li> <li>Input Volt. 100V</li> <li>Input Volt. 132V</li> </ul>	2.Values																																																					
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Note: Slanted line shows the range of the rated ambient temperature.

COSEL

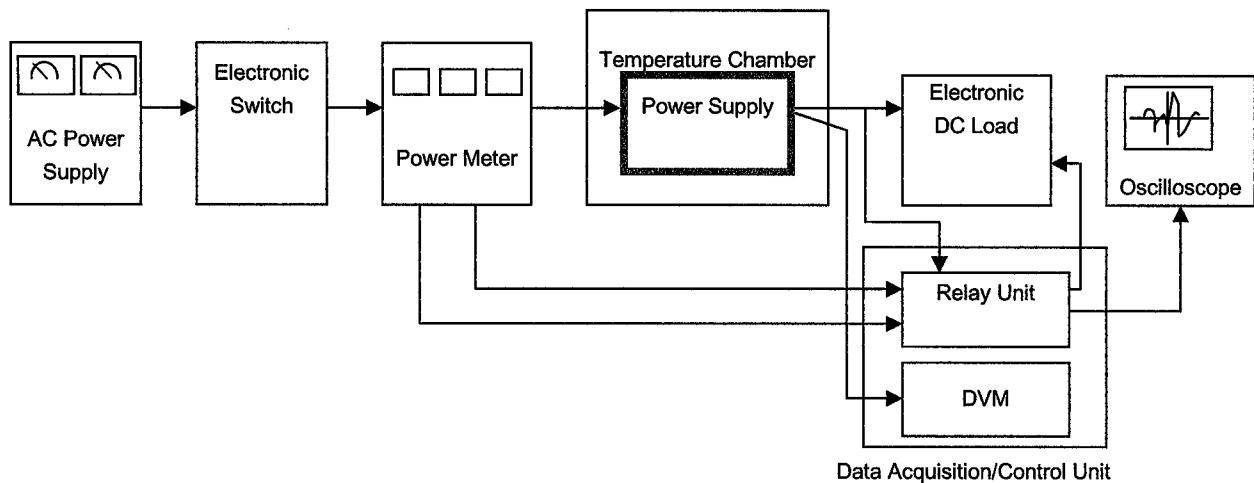


Figure A

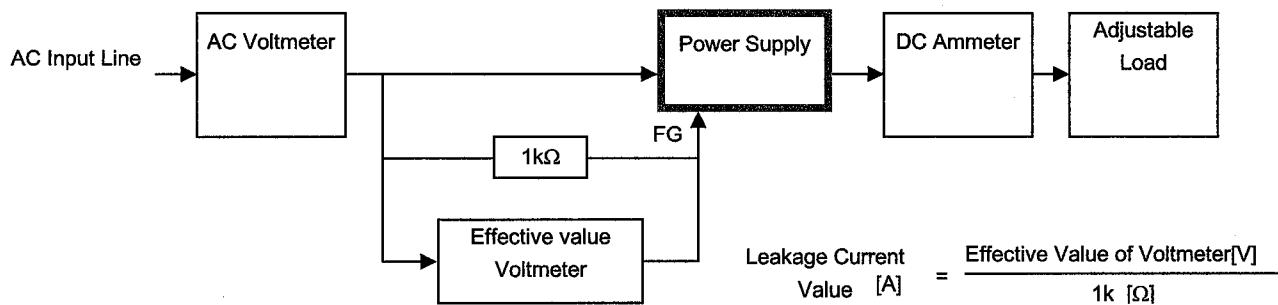


Figure B ( DEN-AN )

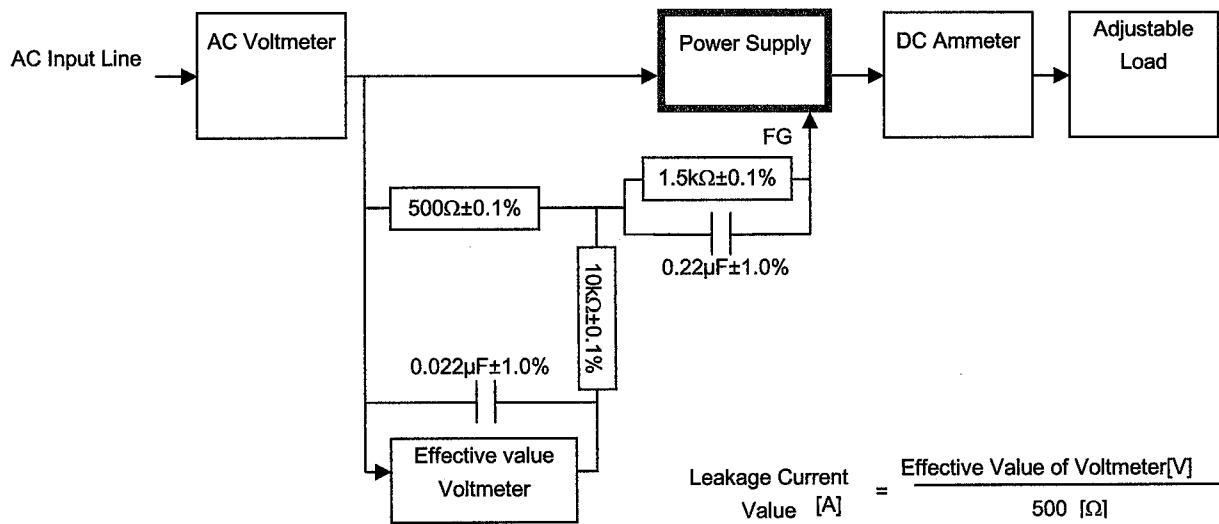


Figure B ( IEC60950-1 )

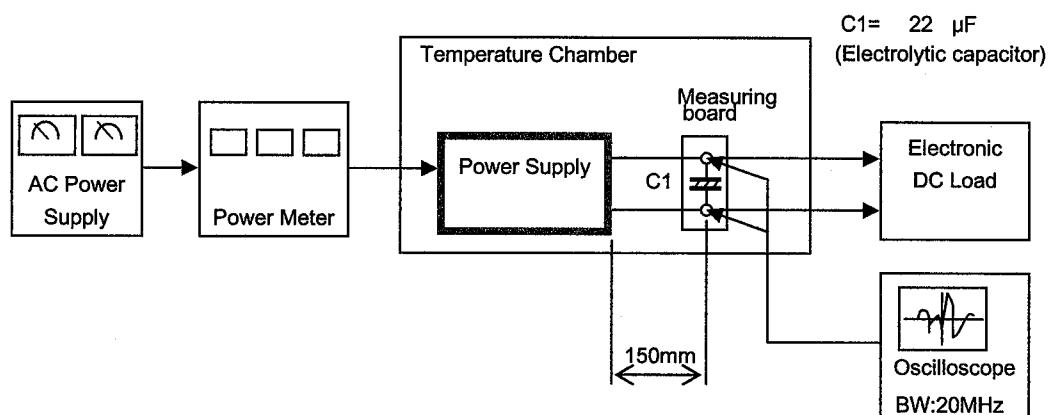
**COSEL**

Figure C