

TEST DATA OF CES48120-6

Regulated DC Power Supply
Dec. 20, 2005

Approved by : Isao Yasuda Isao Yasuda Design Manager

Prepared by : Takashi Mizuhara Takashi Mizuhara Design Engineer

COSEL CO.,LTD.



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Model	CES48120-6	Temperature Testing Circuitry	25°C Figure A																																																																															
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Item	Input Current (by Load Current)	Testing Circuitry	Figure A																																																			
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1.Graph		2.Values																																																				
<p>The graph shows three curves representing different input voltages: 36V (solid line with triangle markers), 48V (dashed line with square markers), and 76V (dash-dot line with circle markers). The x-axis is labeled 'Load Current [A]' and ranges from 0 to 6. The y-axis is labeled 'Input Current [A]' and ranges from 0 to 4. A slanted line is drawn across the graph, starting from approximately (0, 0.1) and ending at (6, 2.5), indicating the range of the rated load current.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Input Current [A]</th> </tr> <tr> <th>Input Volt. 36[V]</th> <th>Input Volt. 48[V]</th> <th>Input Volt. 76[V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>0.087</td><td>0.073</td><td>0.066</td></tr> <tr><td>1.0</td><td>0.420</td><td>0.328</td><td>0.228</td></tr> <tr><td>2.0</td><td>0.764</td><td>0.584</td><td>0.393</td></tr> <tr><td>3.0</td><td>1.111</td><td>0.844</td><td>0.557</td></tr> <tr><td>4.0</td><td>1.460</td><td>1.110</td><td>0.724</td></tr> <tr><td>5.0</td><td>1.823</td><td>1.381</td><td>0.894</td></tr> <tr><td>6.0</td><td>2.185</td><td>1.649</td><td>1.067</td></tr> <tr><td>6.6</td><td>2.408</td><td>1.817</td><td>1.173</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 Current [A]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.0	0.087	0.073	0.066	1.0	0.420	0.328	0.228	2.0	0.764	0.584	0.393	3.0	1.111	0.844	0.557	4.0	1.460	1.110	0.724	5.0	1.823	1.381	0.894	6.0	2.185	1.649	1.067	6.6	2.408	1.817	1.173	—	—	—	—	—	—	—	—	—	—	—	—
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0.0	3.11	3.50	5.02
1.0	15.10	15.69	17.34
2.0	27.41	27.93	29.83
3.0	39.93	40.51	42.25
4.0	52.64	53.22	55.04
5.0	65.52	66.10	67.98
6.0	78.67	79.17	81.01
6.6	86.72	87.12	89.01
-	-	-	-
-	-	-	-
-	-	-	-

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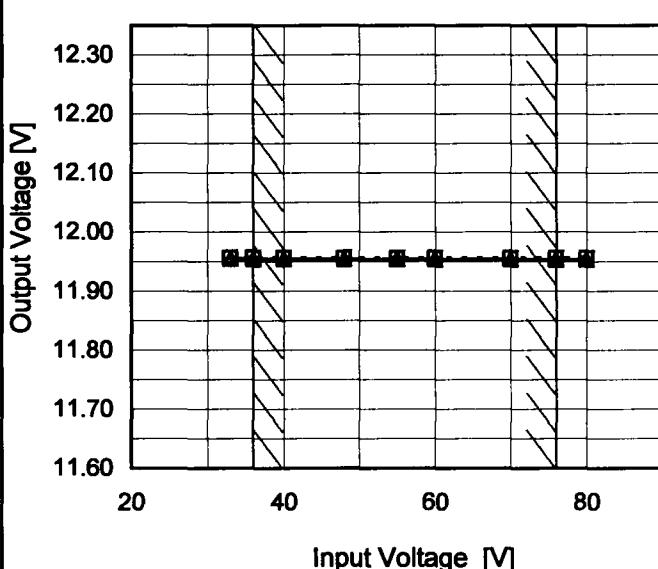
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<p>The graph plots Efficiency [%] on the y-axis (72 to 100) against Input Voltage [V] on the x-axis (20 to 80). Two data series are shown: Load 50% (dashed line with open squares) and Load 100% (solid line with open triangles). Both series show a slight downward trend as input voltage increases. A slanted line on the graph indicates the rated input voltage range.</p>			<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Efficiency [%]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr> <td>33</td> <td>89.6</td> <td>91.0</td> </tr> <tr> <td>36</td> <td>89.7</td> <td>91.1</td> </tr> <tr> <td>40</td> <td>89.4</td> <td>91.1</td> </tr> <tr> <td>48</td> <td>88.5</td> <td>90.6</td> </tr> <tr> <td>55</td> <td>87.6</td> <td>90.0</td> </tr> <tr> <td>60</td> <td>87.0</td> <td>89.7</td> </tr> <tr> <td>70</td> <td>85.6</td> <td>88.9</td> </tr> <tr> <td>76</td> <td>84.7</td> <td>88.5</td> </tr> <tr> <td>80</td> <td>84.4</td> <td>88.0</td> </tr> </tbody> </table>	Input Voltage [V]	Efficiency [%]		Load 50%	Load 100%	33	89.6	91.0	36	89.7	91.1	40	89.4	91.1	48	88.5	90.6	55	87.6	90.0	60	87.0	89.7	70	85.6	88.9	76	84.7	88.5	80	84.4	88.0
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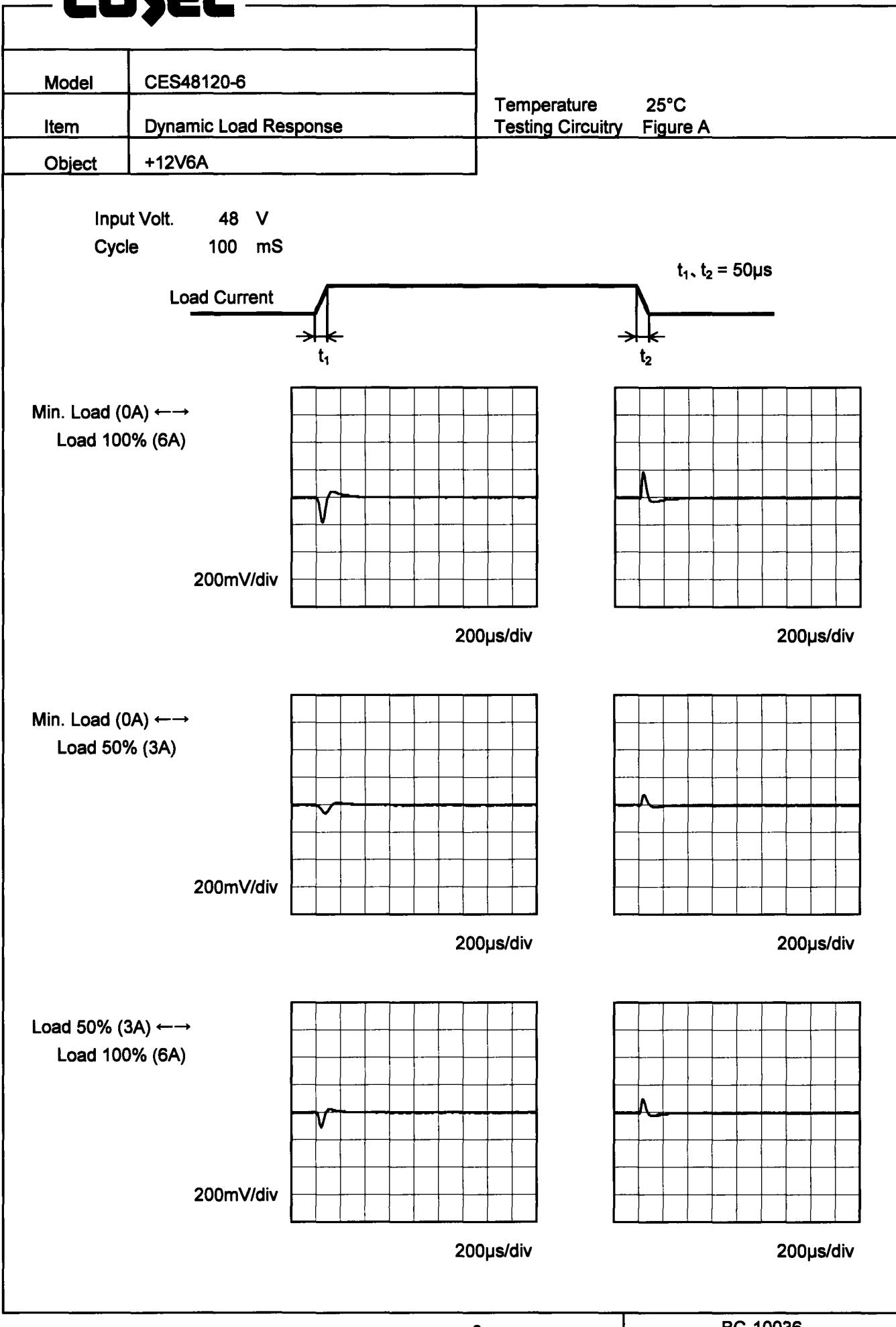
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Note: Slanted line shows the range of the rated input voltage.

COSEL

Model	CES48120-6	Temperature Testing Circuitry	25°C Figure A																																																				
Item	Load Regulation																																																						
Object	+12V6A	2. Values																																																					
1. Graph	<p>—▲— Input Volt. 36V - - □ - - Input Volt. 48V - - ○ - - Input Volt. 76V</p> <p>Output Voltage [V]</p> <p>Load Current [A]</p>	<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Output Voltage [V]</th> </tr> <tr> <th>36[V]</th> <th>48[V]</th> <th>76[V]</th> </tr> </thead> <tbody> <tr> <td>0.0</td> <td>11.954</td> <td>11.954</td> <td>11.955</td> </tr> <tr> <td>1.0</td> <td>11.954</td> <td>11.955</td> <td>11.955</td> </tr> <tr> <td>2.0</td> <td>11.954</td> <td>11.955</td> <td>11.955</td> </tr> <tr> <td>3.0</td> <td>11.955</td> <td>11.955</td> <td>11.955</td> </tr> <tr> <td>4.0</td> <td>11.955</td> <td>11.955</td> <td>11.955</td> </tr> <tr> <td>5.0</td> <td>11.955</td> <td>11.955</td> <td>11.955</td> </tr> <tr> <td>6.0</td> <td>11.955</td> <td>11.955</td> <td>11.955</td> </tr> <tr> <td>6.6</td> <td>11.955</td> <td>11.955</td> <td>11.955</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]	Output Voltage [V]			36[V]	48[V]	76[V]	0.0	11.954	11.954	11.955	1.0	11.954	11.955	11.955	2.0	11.954	11.955	11.955	3.0	11.955	11.955	11.955	4.0	11.955	11.955	11.955	5.0	11.955	11.955	11.955	6.0	11.955	11.955	11.955	6.6	11.955	11.955	11.955	-	-	-	-	-	-	-	-	-	-	-	-
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Note: Slanted line shows the range of the rated load current.

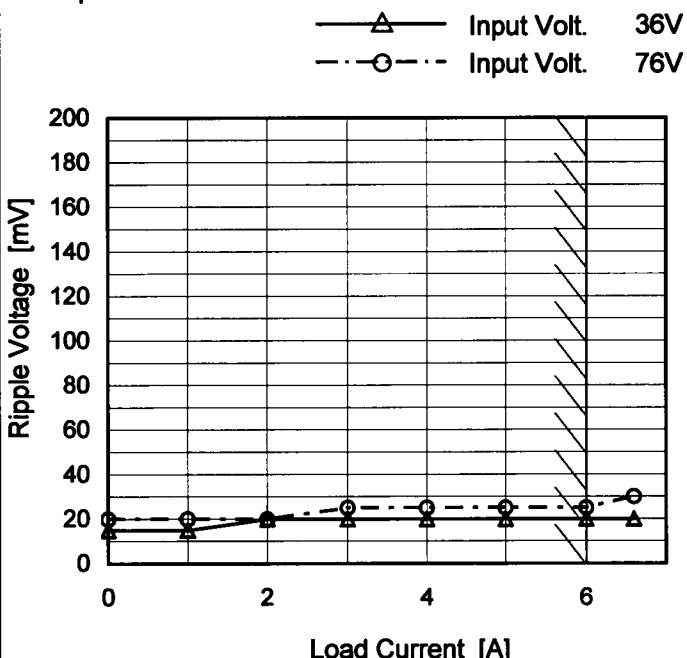
COSEL

COSEL

Model	CES48120-6
Item	Ripple Voltage (by Load Current)
Object	+12V6A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.0	15	20
1.0	15	20
2.0	20	20
3.0	20	25
4.0	20	25
5.0	20	25
6.0	20	25
6.6	20	30
--	-	-
--	-	-
--	-	-

Measured by 100 MHz Oscilloscope.

Ripple Voltage is shown as p-p in the figure below.

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

Ripple [mVp-p]

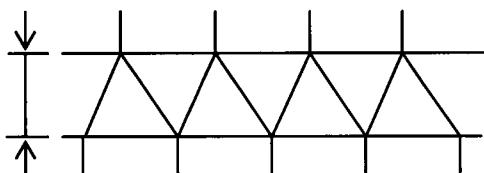


Fig.Complex Ripple Wave Form

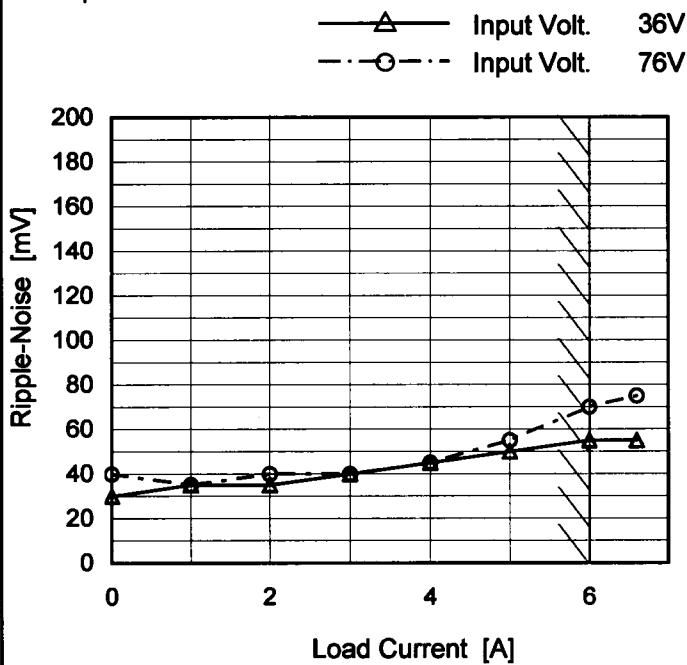
COSEL

Model CES48120-6

Item Ripple-Noise

Object +12V6A

1. Graph



Measured by 100 MHz Oscilloscope.

Ripple-Noise is shown as p-p in the figure below.

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

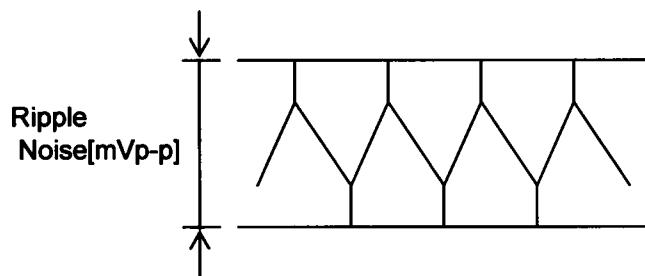


Fig.Complex Ripple Noise Wave Form

Temperature 25°C
Testing Circuitry Figure B

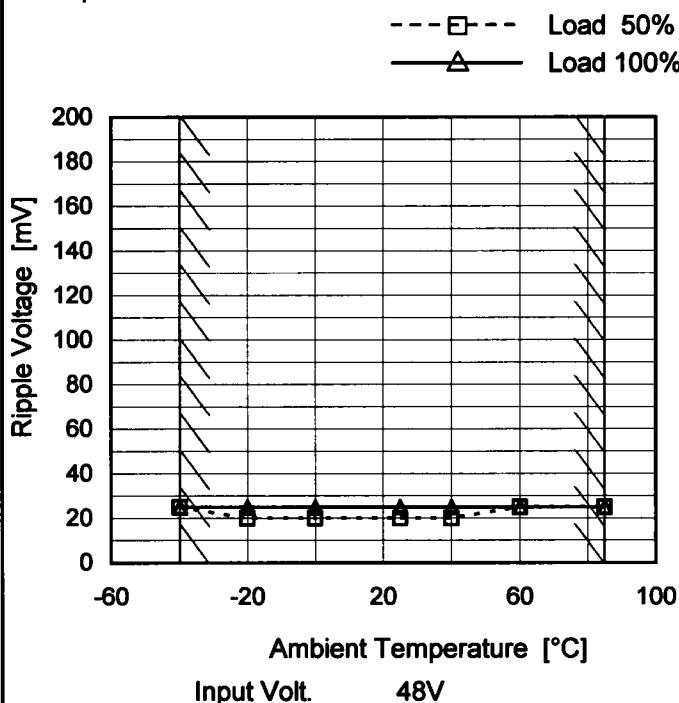
2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.0	30	40
1.0	35	35
2.0	35	40
3.0	40	40
4.0	45	45
5.0	50	55
6.0	55	70
6.6	55	75
-	-	-
--	-	-
--	-	-

COSEL

Model	CES48120-6
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V6A

1. Graph



Measured by 100 MHz Oscilloscope.

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

Testing Circuitry Figure B

2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-40	25	25
-20	20	25
0	20	25
25	20	25
40	20	25
60	25	25
85	25	25
-	-	-
-	-	-
-	-	-
-	-	-

COSEL

<table border="1"> <tr> <td>Model</td> <td>CES48120-6</td></tr> <tr> <td>Item</td> <td>Ambient Temperature Drift</td></tr> <tr> <td>Object</td> <td>+12V6A</td></tr> </table> <p>1. Graph</p> <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. 36V - - □ - - Input Volt. 48V - - ○ - - Input Volt. 76V 	Model	CES48120-6	Item	Ambient Temperature Drift	Object	+12V6A	<p>Testing Circuitry Figure A</p> <p>2. Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th><th colspan="3">Output Voltage [V]</th></tr> <tr> <th>Input Volt. 36[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr> </thead> <tbody> <tr><td>-40</td><td>11.978</td><td>11.978</td><td>11.978</td></tr> <tr><td>-20</td><td>11.974</td><td>11.974</td><td>11.974</td></tr> <tr><td>0</td><td>11.969</td><td>11.968</td><td>11.968</td></tr> <tr><td>25</td><td>11.957</td><td>11.956</td><td>11.956</td></tr> <tr><td>40</td><td>11.948</td><td>11.947</td><td>11.947</td></tr> <tr><td>60</td><td>11.934</td><td>11.932</td><td>11.932</td></tr> <tr><td>85</td><td>11.909</td><td>11.907</td><td>11.906</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>	Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	-40	11.978	11.978	11.978	-20	11.974	11.974	11.974	0	11.969	11.968	11.968	25	11.957	11.956	11.956	40	11.948	11.947	11.947	60	11.934	11.932	11.932	85	11.909	11.907	11.906	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Model	CES48120-6																																																									
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Note: Slanted line shows the range of the rated ambient temperature.



Model	CES48120-6	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+12V6A	

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 : -40 - 85°C

Input Voltage : 36 - 76V

Load Current : 0 - 6A

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

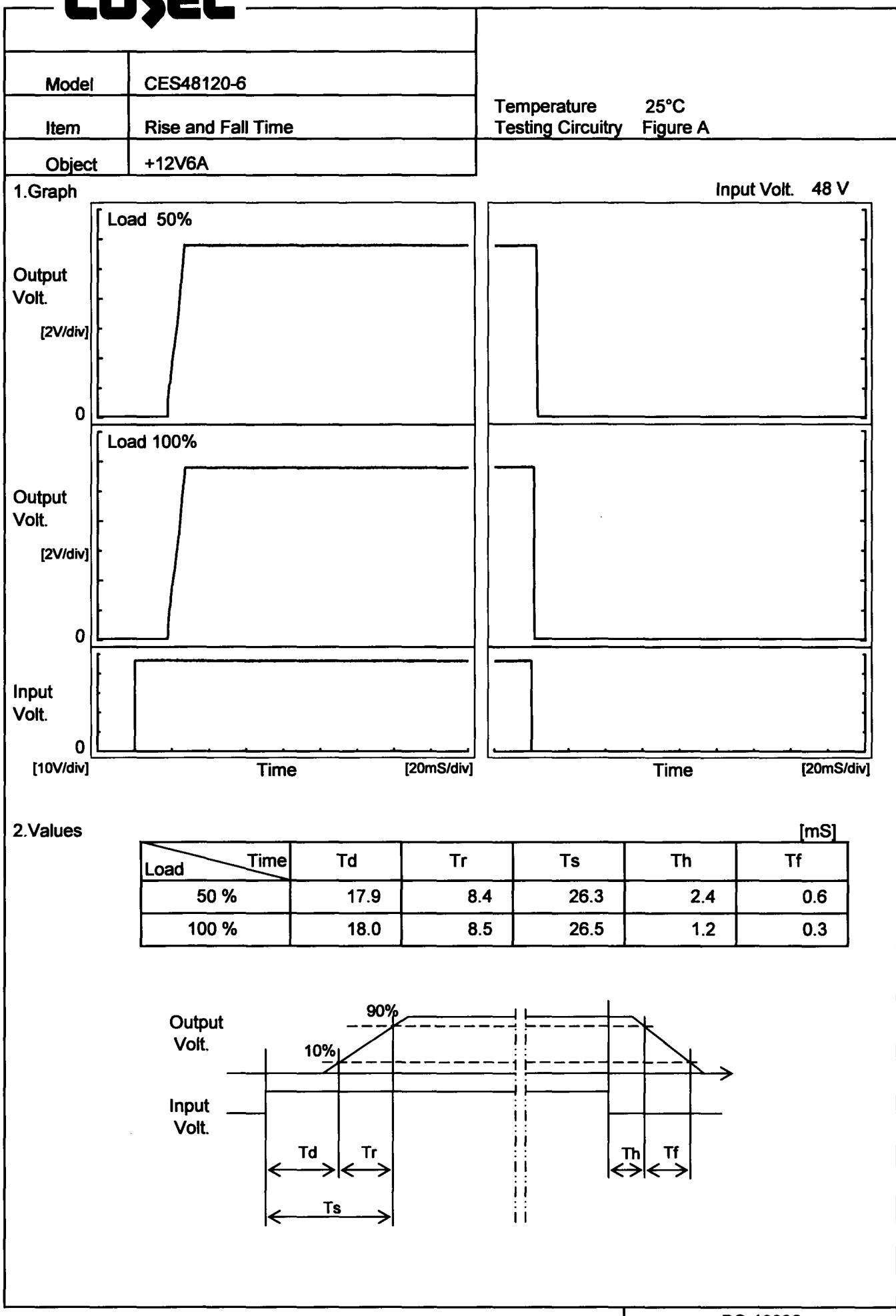
$$\text{* Output Voltage Accuracy (Ration)} = \frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-40	76	6	11.978	±36	±0.3
Minimum Voltage	85	76	6	11.906		

COSEL

Model	CES48120-6	Temperature Testing Circuitry	25°C Figure A																						
Item	Time Lapse Drift																								
Object	+12V6A																								
1. Graph			2. Values																						
<p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 48V 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>11.957</td></tr> <tr><td>0.5</td><td>11.953</td></tr> <tr><td>1.0</td><td>11.953</td></tr> <tr><td>2.0</td><td>11.953</td></tr> <tr><td>3.0</td><td>11.953</td></tr> <tr><td>4.0</td><td>11.953</td></tr> <tr><td>5.0</td><td>11.953</td></tr> <tr><td>6.0</td><td>11.953</td></tr> <tr><td>7.0</td><td>11.953</td></tr> <tr><td>8.0</td><td>11.953</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	11.957	0.5	11.953	1.0	11.953	2.0	11.953	3.0	11.953	4.0	11.953	5.0	11.953	6.0	11.953	7.0	11.953	8.0	11.953
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COSEL

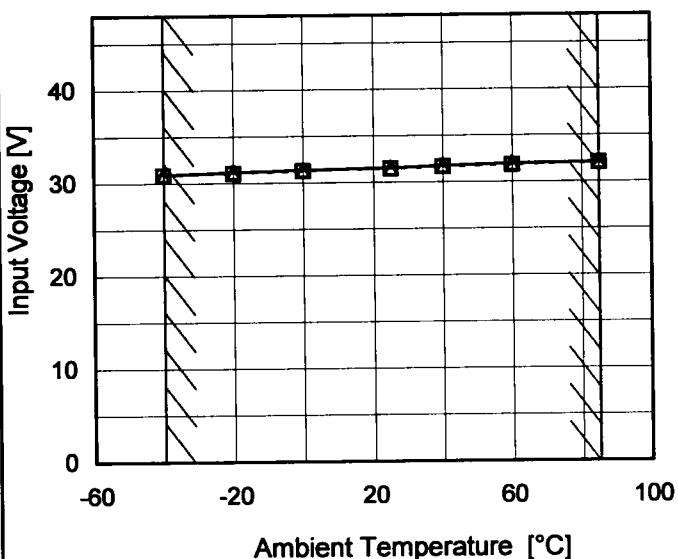
COSEL

Model	CES48120-6
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V6A

Testing Circuitry Figure A

1. Graph

--- □ --- Load 50%
— △ — Load 100%



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

2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-40	30.9	31.0
-20	31.1	31.2
0	31.3	31.4
25	31.5	31.6
40	31.7	31.8
60	31.9	32.0
85	32.1	32.1
-	-	-
-	-	-
-	-	-
-	-	-

COSEL

Model	CES48120-6	Temperature	25°C
Item	Overcurrent Protection	Testing Circuitry	Figure A
Object	+12V6A		
1.Graph	<p>— Input Volt. 36V — Input Volt. 48V — Input Volt. 76V</p> <p>Output Voltage [V]</p> <p>Load Current [A]</p>	2.Values	
Output Voltage [V]	Load Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
12.0	8.20	7.90	7.80
11.4	8.19	7.84	7.79
10.8	8.03	7.77	7.77
9.6	7.78	7.66	7.78
8.4	7.63	7.62	7.82
7.2	7.53	7.59	7.86
—	—	—	—
—	—	—	—
—	—	—	—
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—	—	—	—
—	—	—	—
—	—	—	—

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



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Item Overvoltage Protection	Testing Circuitry Figure A																																																
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Ambient Temperature [°C]	Operating Point [V] 36[V]	Operating Point [V] 48[V]	Operating Point [V] 76[V]																																														
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COSEL

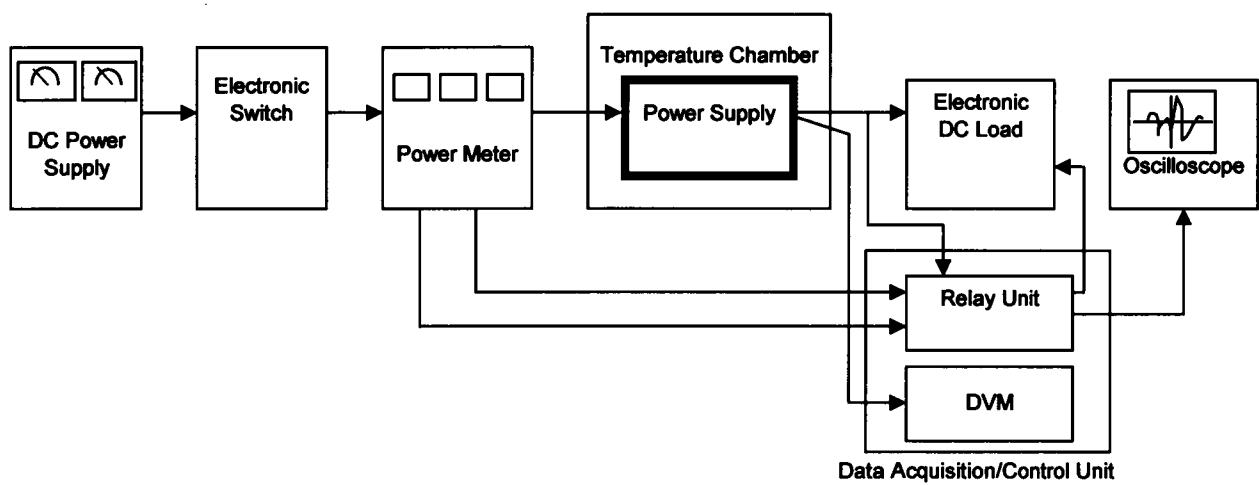


Figure A

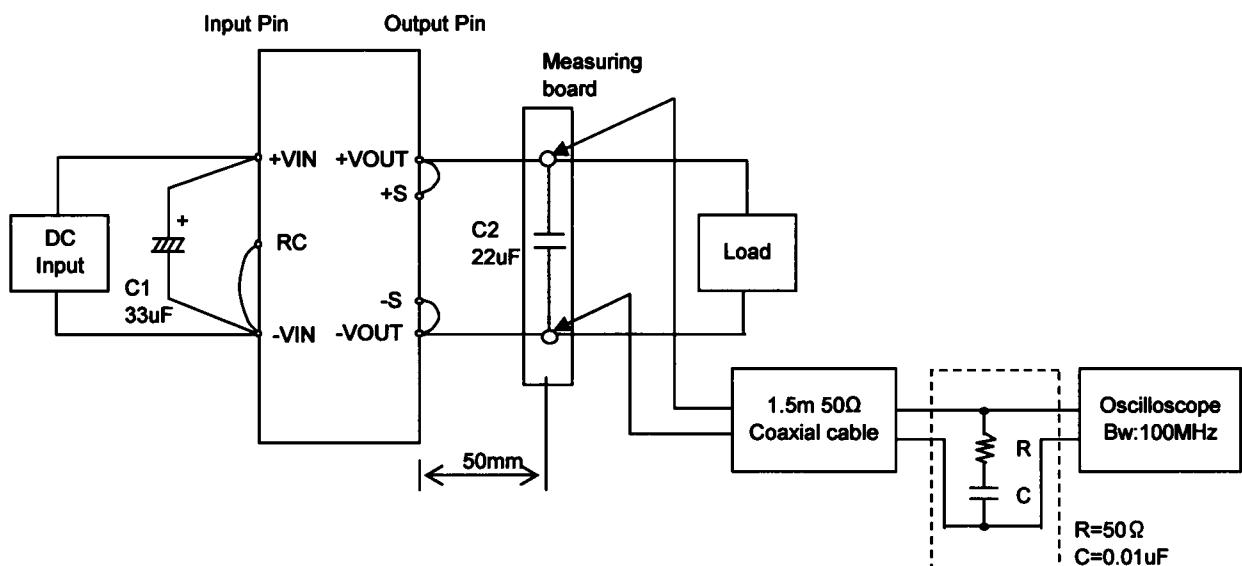


Figure B