



# TEST DATA OF CQS48120-14

Regulated DC Power Supply  
Jan 15, 2007

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Prepared by : Takashi Mizuhara  
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**COSEL CO.,LTD.**



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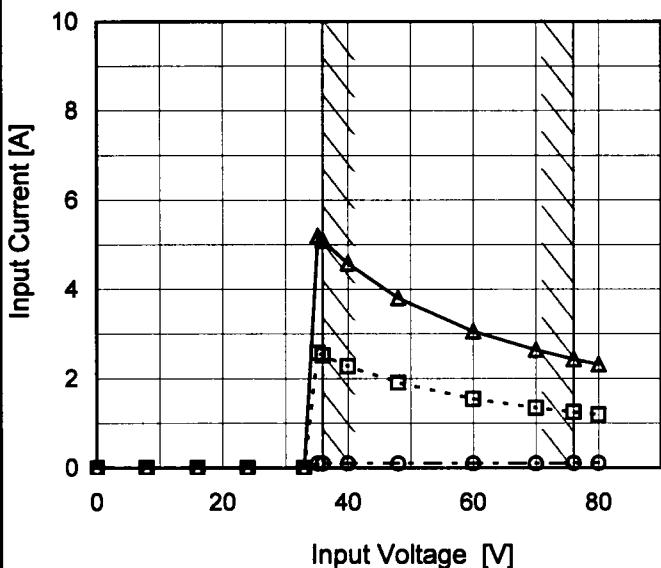
**COSEL**

Model	CQS48120-14
Item	Input Current (by Input Voltage)
Object	_____

Temperature 25°C  
Testing Circuitry Figure A

## 1.Graph

—△— Load 100%  
 - - -□-- Load 50%  
 - - -○-- Load 0%



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

## 2.Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
8.0	0.000	0.000	0.000
16.0	0.000	0.000	0.000
24.0	0.000	0.000	0.000
33.0	0.000	0.000	0.000
35.2	0.101	2.578	5.200
36.0	0.101	2.524	5.090
40.0	0.100	2.274	4.580
48.0	0.100	1.910	3.809
60.0	0.099	1.546	3.060
70.0	0.101	1.346	2.642
76.0	0.105	1.248	2.435
80.0	0.107	1.193	2.322
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--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

**COSEL**

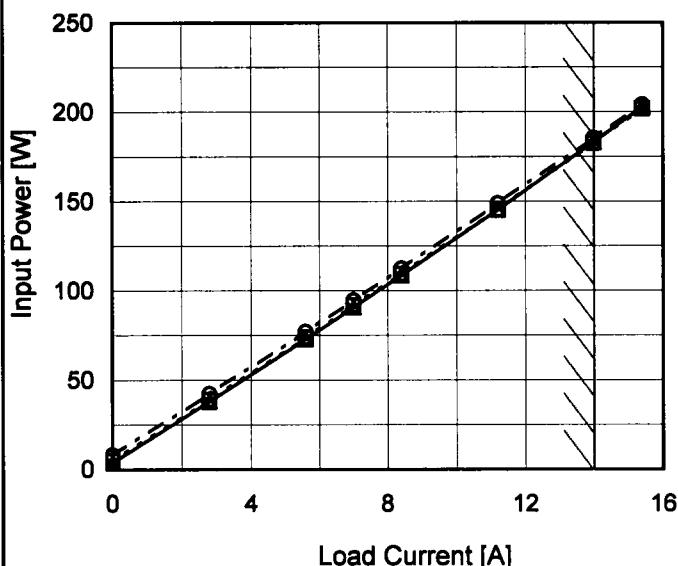
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Item	Input Current (by Load Current)	Temperature 25°C Testing Circuitry Figure A																																																			
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<p style="text-align: center;"> <span style="color: black;">△</span> Input Volt. 36V  <span style="color: gray;">□</span> Input Volt. 48V  <span style="color: gray;">○</span> Input Volt. 76V         </p> <p>The graph plots Input Current [A] on the Y-axis (0 to 10) against Load Current [A] on the X-axis (0 to 16). Three data series are shown: 36V (solid triangles), 48V (dashed squares), and 76V (dotted circles). All series show a linear increase. A solid diagonal line from (0,0) to approximately (14, 5.5) represents the rated load current range.</p>																																																					
2. Values																																																					
<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>0.101</td><td>0.100</td><td>0.105</td></tr> <tr><td>2.8</td><td>1.054</td><td>0.813</td><td>0.555</td></tr> <tr><td>5.6</td><td>2.025</td><td>1.542</td><td>1.015</td></tr> <tr><td>7.0</td><td>2.524</td><td>1.910</td><td>1.248</td></tr> <tr><td>8.4</td><td>3.021</td><td>2.284</td><td>1.482</td></tr> <tr><td>11.2</td><td>4.035</td><td>3.036</td><td>1.953</td></tr> <tr><td>14.0</td><td>5.090</td><td>3.809</td><td>2.435</td></tr> <tr><td>15.4</td><td>5.640</td><td>4.214</td><td>2.684</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	0.101	0.100	0.105	2.8	1.054	0.813	0.555	5.6	2.025	1.542	1.015	7.0	2.524	1.910	1.248	8.4	3.021	2.284	1.482	11.2	4.035	3.036	1.953	14.0	5.090	3.809	2.435	15.4	5.640	4.214	2.684	--	-	-	-	--	-	-	-	--	-	-	-
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<p>Note: Slanted line shows the range of the rated load current.</p>																																																					

COSEL

Model	CQS48120-14
Item	Input Power (by Load Current)
Object	_____

## 1. Graph

—△— Input Volt. 36V  
 - - -□--- Input Volt. 48V  
 - - ○ - - Input Volt. 76V



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

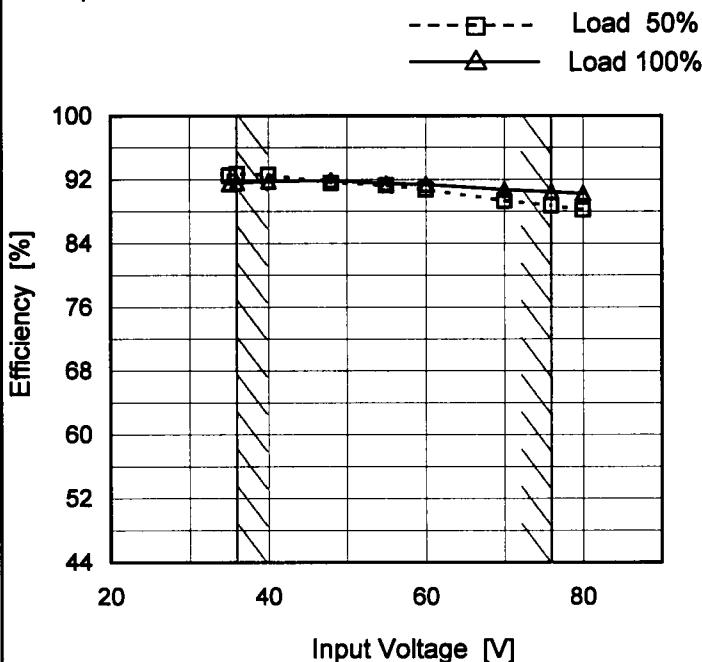
Temperature 25°C  
 Testing Circuitry Figure A

## 2. Values

Load Current [A]	Input Power [W]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	3.7	4.8	8.0
2.8	38.0	39.0	42.3
5.6	73.0	73.8	77.0
7.0	90.7	91.7	94.7
8.4	108.7	109.3	112.5
11.2	145.3	145.7	148.9
14.0	183.1	182.6	185.3
15.4	202.8	201.8	204.0
--	-	-	-
--	-	-	-
--	-	-	-

# COSEL

Model	CQS48120-14
Item	Efficiency (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]	Efficiency [%]	
	Load 50%	Load 100%
35	92.5	91.5
36	92.7	91.6
40	92.6	91.8
48	91.6	91.9
55	91.3	91.5
60	90.8	91.4
70	89.3	90.8
76	88.8	90.5
80	88.2	90.3

**COSEL**

Model	CQS48120-14	Temperature Testing Circuitry	25°C Figure A																																																			
Item	Efficiency (by Load Current)																																																					
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1.Graph	<p>—▲— Input Volt. 36V        - - □ - - Input Volt. 48V        - - ○ - - Input Volt. 76V</p> <table border="1"> <caption>Data points estimated from the graph</caption> <thead> <tr> <th>Load Current [A]</th> <th>Efficiency [36V] (%)</th> <th>Efficiency [48V] (%)</th> <th>Efficiency [76V] (%)</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>88.7</td><td>86.4</td><td>79.6</td></tr> <tr><td>2.8</td><td>92.1</td><td>91.1</td><td>87.3</td></tr> <tr><td>5.6</td><td>92.7</td><td>91.6</td><td>88.8</td></tr> <tr><td>7.0</td><td>92.8</td><td>92.3</td><td>89.6</td></tr> <tr><td>8.4</td><td>92.5</td><td>92.2</td><td>90.2</td></tr> <tr><td>11.2</td><td>91.6</td><td>91.9</td><td>90.5</td></tr> <tr><td>14.0</td><td>91.0</td><td>91.5</td><td>90.5</td></tr> <tr><td>15.4</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]	Efficiency [36V] (%)	Efficiency [48V] (%)	Efficiency [76V] (%)	0.0	88.7	86.4	79.6	2.8	92.1	91.1	87.3	5.6	92.7	91.6	88.8	7.0	92.8	92.3	89.6	8.4	92.5	92.2	90.2	11.2	91.6	91.9	90.5	14.0	91.0	91.5	90.5	15.4	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	2.Values				
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11.2	92.5	92.2	90.2																																																			
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Note: Slanted line shows the range of the rated load current.

**COSEL**

Model	CQS48120-14																																	
Item	Line Regulation	Temperature 25°C Testing Circuitry Figure A																																
Object	+12V14A																																	
1. Graph																																		
<p>Output Voltage [V]</p> <p>Input Voltage [V]</p> <p>Legend: ---□--- Load 50% —△— Load 100%</p>																																		
Note: Slanted line shows the range of the rated input voltage.																																		
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<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Output Voltage [V]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr> <td>35</td> <td>12.019</td> <td>12.019</td> </tr> <tr> <td>36</td> <td>12.019</td> <td>12.018</td> </tr> <tr> <td>40</td> <td>12.019</td> <td>12.018</td> </tr> <tr> <td>48</td> <td>12.019</td> <td>12.017</td> </tr> <tr> <td>55</td> <td>12.020</td> <td>12.017</td> </tr> <tr> <td>60</td> <td>12.020</td> <td>12.017</td> </tr> <tr> <td>70</td> <td>12.020</td> <td>12.017</td> </tr> <tr> <td>76</td> <td>12.020</td> <td>12.016</td> </tr> <tr> <td>80</td> <td>12.020</td> <td>12.016</td> </tr> </tbody> </table>			Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	35	12.019	12.019	36	12.019	12.018	40	12.019	12.018	48	12.019	12.017	55	12.020	12.017	60	12.020	12.017	70	12.020	12.017	76	12.020	12.016	80	12.020	12.016
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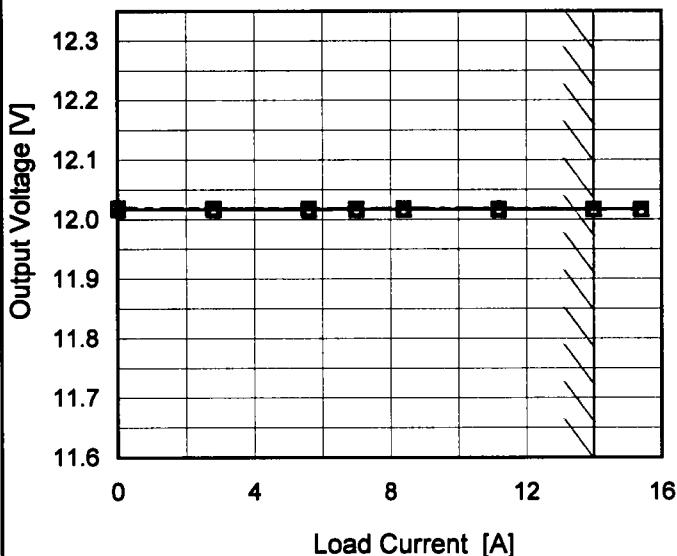
**COSEL**
**Model** CQS48120-14

**Item** Load Regulation

**Object** +12V14A

1.Graph

—△— Input Volt. 36V  
 - - -□--- Input Volt. 48V  
 - - ○ - - Input Volt. 76V

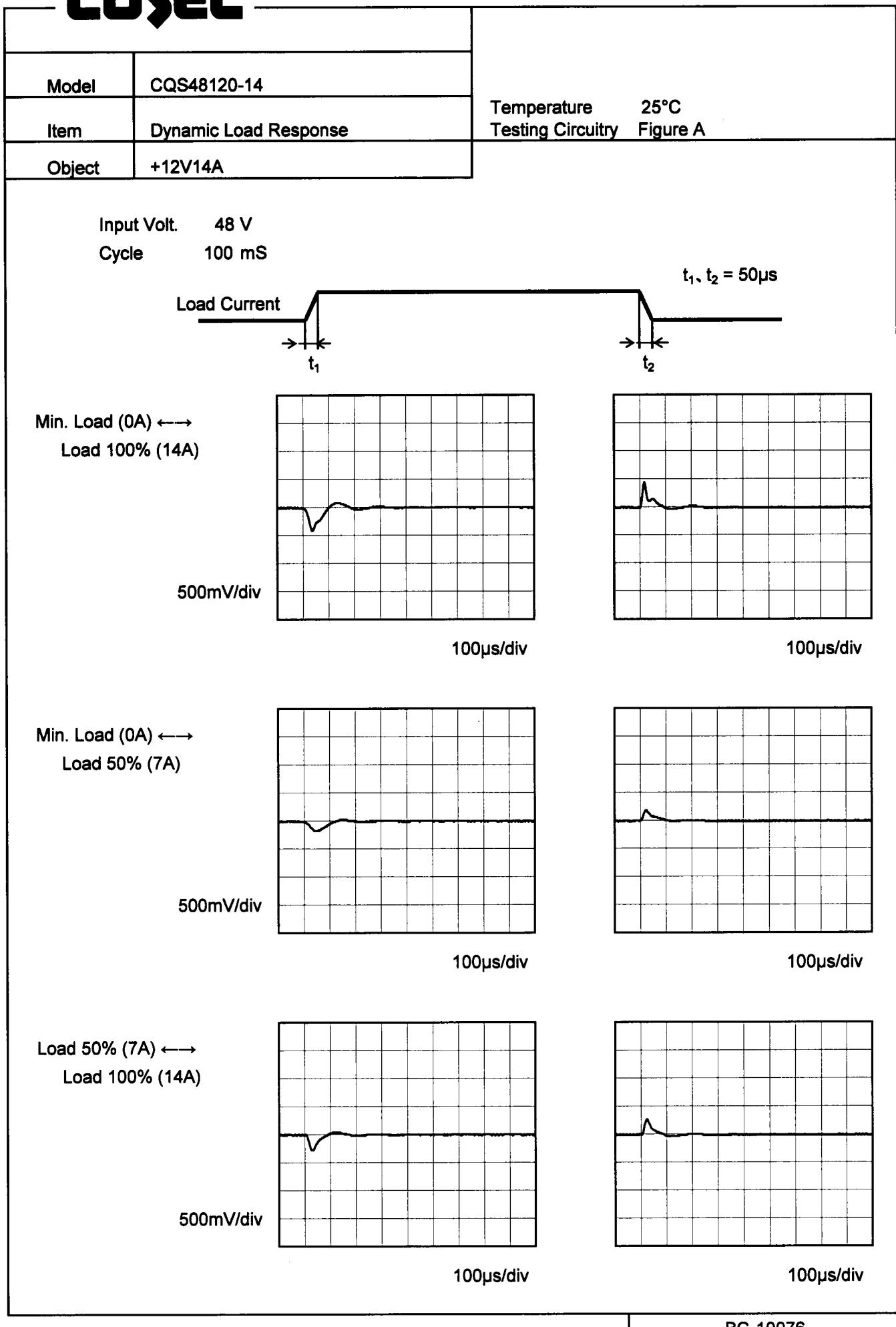


Note: Slanted line shows the range of the rated load current.

 Temperature 25°C  
 Testing Circuitry Figure A

2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	12.017	12.019	12.019
2.8	12.017	12.018	12.018
5.6	12.017	12.018	12.018
7.0	12.017	12.018	12.018
8.4	12.017	12.018	12.018
11.2	12.017	12.017	12.018
14.0	12.017	12.017	12.017
15.4	12.017	12.017	12.017
--	-	-	-
--	-	-	-
--	-	-	-

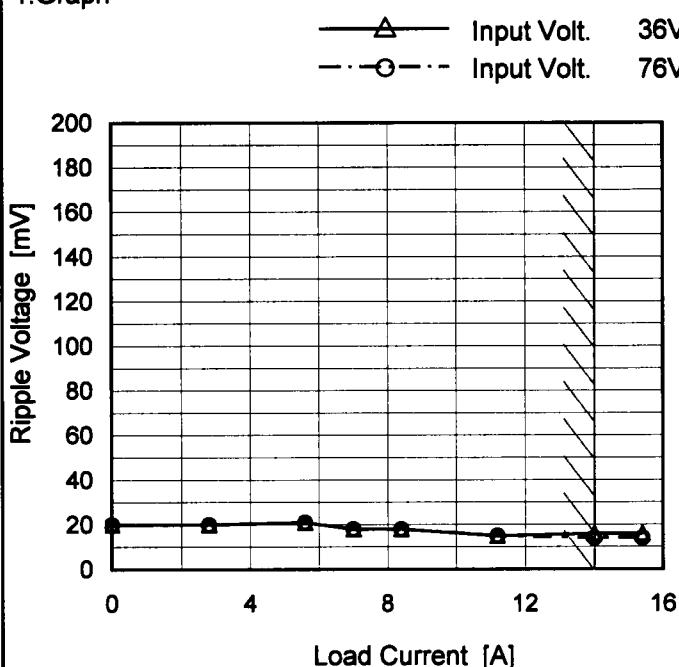
**COSEL**

**COSEL**

Model	CQS48120-14
Item	Ripple Voltage (by Load Current)
Object	+12V14A

Temperature 25°C  
Testing Circuitry Figure B

## 1.Graph



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.

## 2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.0	20	20
2.8	20	20
5.6	21	21
7.0	18	18
8.4	18	18
11.2	15	15
14.0	16	14
15.4	16	14
--	-	-
--	-	-
--	-	-

Ripple [mVp-p]

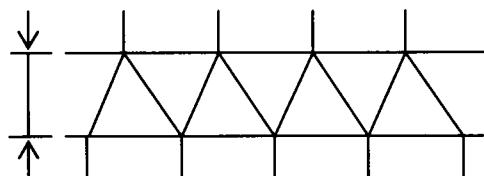
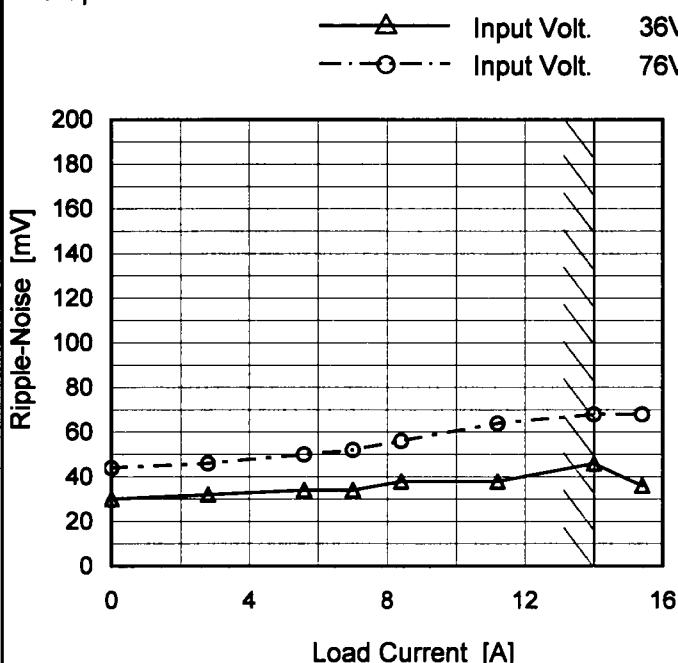


Fig.Complex Ripple Wave Form

**COSEL**

Model	CQS48120-14
Item	Ripple-Noise
Object	+12V14A

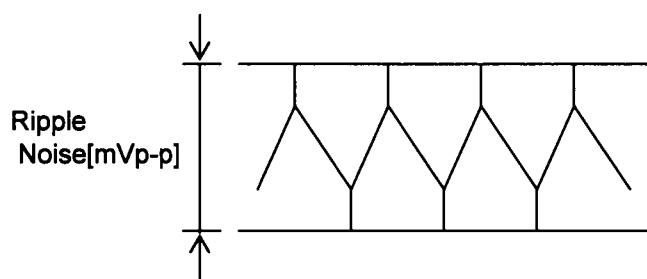
## 1. Graph



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.

Temperature 25°C  
Testing Circuitry Figure B

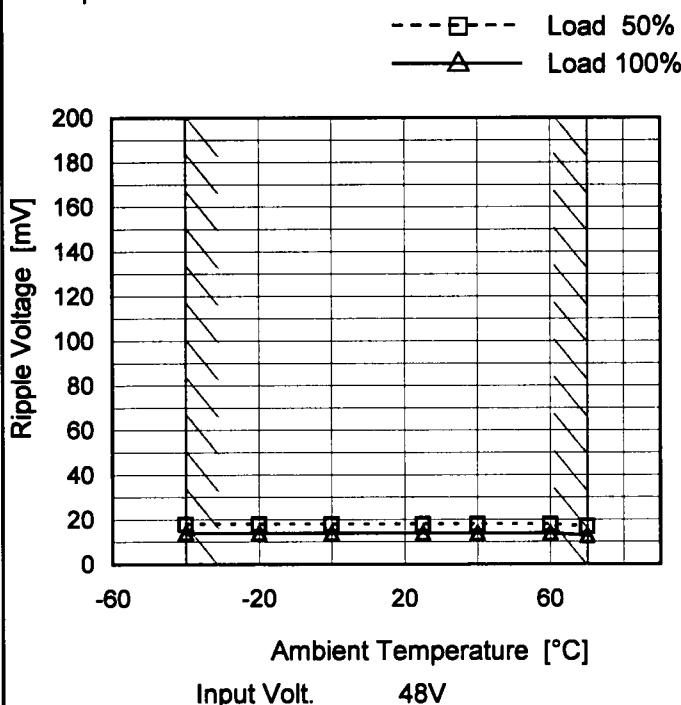
## 2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.0	30	44
2.8	32	46
5.6	34	50
7.0	34	52
8.4	38	56
11.2	38	64
14.0	46	68
15.4	36	68
--	-	-
--	-	-
--	-	-

**COSEL**

Model	CQS48120-14
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V14A

## 1. Graph



Measured by 100 MHz Oscilloscope.

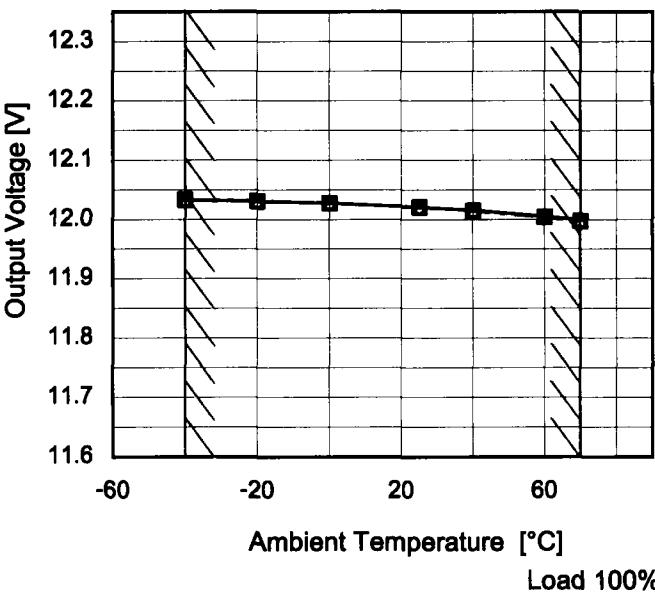
Note: Slanted line shows the range of the rated ambient temperature.

## Testing Circuitry Figure B

## 2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-40	18	14
-20	18	14
0	18	14
25	18	14
40	18	14
60	18	14
70	17	13
--	-	-
--	-	-
--	-	-
--	-	-

**COSEL**

Model	CQS48120-14	Testing Circuitry Figure A																																																					
Item	Ambient Temperature Drift																																																						
Object	+12V14A																																																						
1.Graph	<p style="text-align: center;"> <span style="display: inline-block; width: 15px; height: 10px; border-left: 2px solid black; border-bottom: 2px solid black; transform: rotate(45deg); margin-right: 5px;"></span> Input Volt. 36V  <span style="display: inline-block; width: 15px; height: 10px; border-top: 2px solid black; border-bottom: 2px solid black; transform: rotate(-45deg); margin-right: 5px;"></span> Input Volt. 48V  <span style="display: inline-block; width: 15px; height: 10px; border: 1px dashed black; border-radius: 50%; margin-right: 5px;"></span> Input Volt. 76V         </p>  <p style="text-align: center;">Output Voltage [V]</p> <p style="text-align: center;">Ambient Temperature [°C]</p> <p style="text-align: center;">Load 100%</p>	2.Values																																																					
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<p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																																							



Model	CQS48120-14	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+12V14A	

### 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 - 70°C

Input Voltage : 36 - 76V

Load Current : 0 - 14A

\* 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	0	12.035	±20	±0.2
Minimum Voltage	70	76	14	11.996		

**COSEL**

Model	CQS48120-14	Temperature 25°C Testing Circuitry Figure A																						
Item	Time Lapse Drift																							
Object	+12V14A																							
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>12.022</td></tr> <tr><td>0.5</td><td>12.015</td></tr> <tr><td>1.0</td><td>12.015</td></tr> <tr><td>2.0</td><td>12.015</td></tr> <tr><td>3.0</td><td>12.015</td></tr> <tr><td>4.0</td><td>12.015</td></tr> <tr><td>5.0</td><td>12.015</td></tr> <tr><td>6.0</td><td>12.015</td></tr> <tr><td>7.0</td><td>12.015</td></tr> <tr><td>8.0</td><td>12.015</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	12.022	0.5	12.015	1.0	12.015	2.0	12.015	3.0	12.015	4.0	12.015	5.0	12.015	6.0	12.015	7.0	12.015	8.0	12.015
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8.0	12.015																							

**COSEL**

Model CQS48120-14

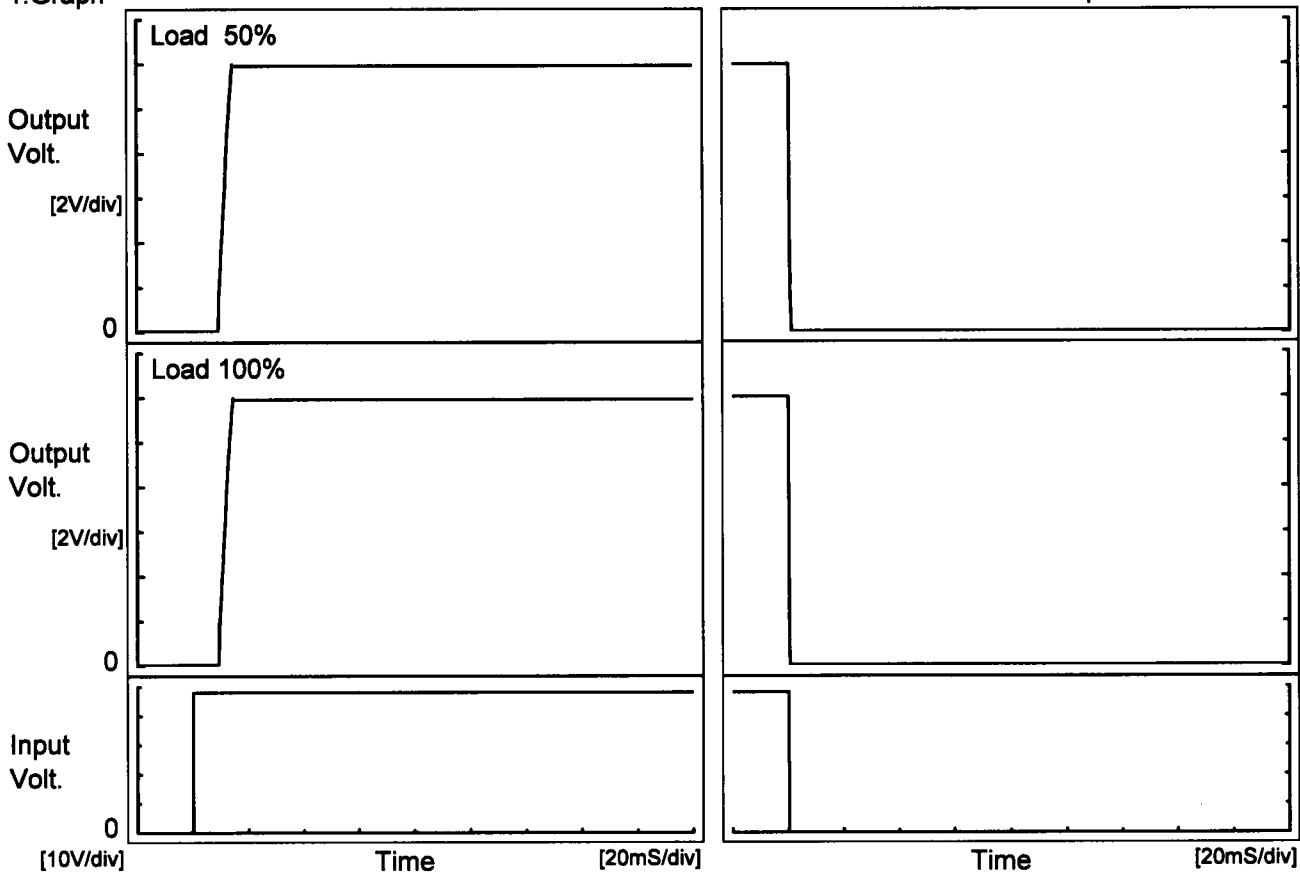
Item Rise and Fall Time

Object +12V14A

Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph

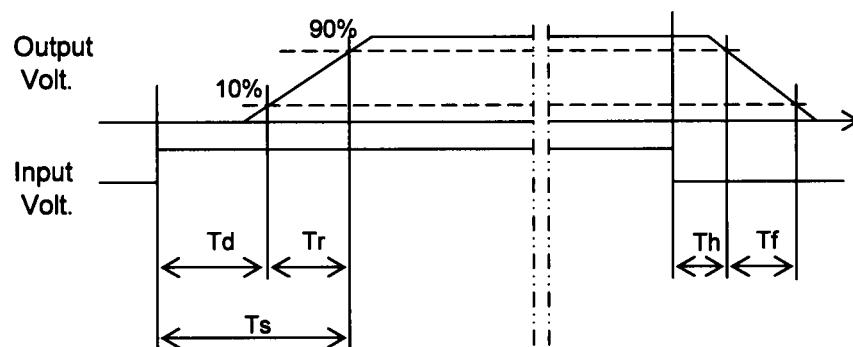
Input Volt. 48 V



## 2. Values

[mS]

Load	Time	Td	Tr	Ts	Th	Tf
50 %		9.6	4.2	13.8	0.1	0.6
100 %		9.6	13.9	23.5	0.2	0.3

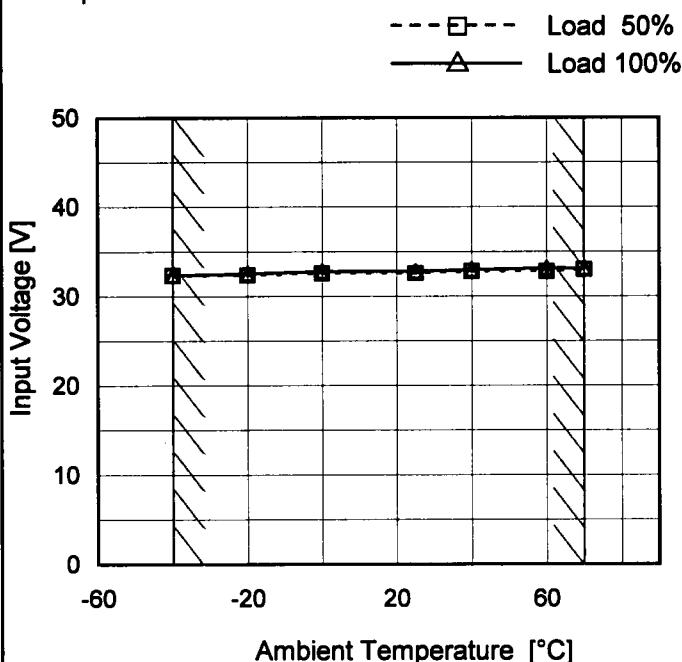


# COSEL

Model	CQS48120-14
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V14A

## Testing Circuitry Figure A

## 1. Graph



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

## 2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-40	32.4	32.4
-20	32.4	32.6
0	32.6	32.8
25	32.6	32.8
40	32.8	33.0
60	32.8	33.2
70	33.0	33.2
--	-	-
--	-	-
--	-	-
--	-	-

**COSEL**

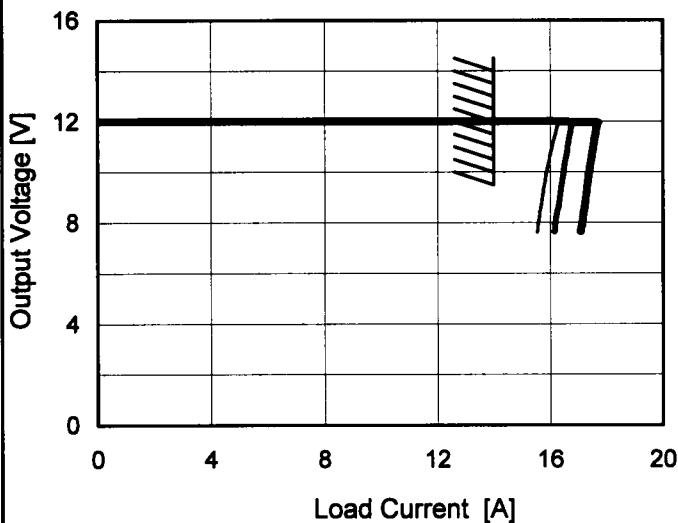
Model CQS48120-14

Item Overcurrent Protection

Object +12V14A

## 1. Graph

— Input Volt. 36V  
 — Input Volt. 48V  
 — Input Volt. 76V



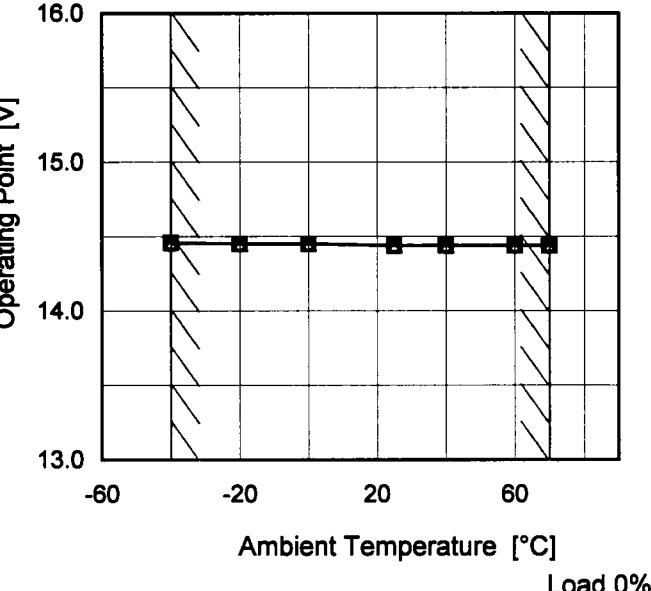
Note: Slanted line shows the range of the rated load current.

Temperature 25°C  
 Testing Circuitry Figure A

## 2. Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
12.0	15.69	16.01	15.96
11.4	16.17	16.67	17.58
10.8	16.04	16.58	17.51
9.6	15.82	16.40	17.34
8.4	15.64	16.25	17.18
7.6	15.54	16.14	17.08
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

# COSEL

Model	CQS48120-14
Item	Overvoltage Protection
Object	+12V14A
1.Graph	<p style="text-align: center;"> <span style="display: inline-block; width: 15px; height: 10px; background-color: black; border: 1px solid black;"></span> Input Volt. 36V  <span style="display: inline-block; width: 15px; height: 10px; border: 1px dashed black;"></span> Input Volt. 48V  <span style="display: inline-block; width: 15px; height: 10px; border: 1px dashed black; border-radius: 50%;"></span> Input Volt. 76V         </p>  <p style="text-align: center;">Operating Point [V]</p> <p style="text-align: center;">Ambient Temperature [°C]</p> <p style="text-align: center;">Load 0%</p>
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. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-40	14.46	14.46	14.45
-20	14.45	14.45	14.45
0	14.45	14.45	14.45
25	14.44	14.44	14.44
40	14.44	14.44	14.44
60	14.44	14.44	14.44
70	14.44	14.44	14.44
--	-	-	-
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--	-	-	-
--	-	-	-

COSEL

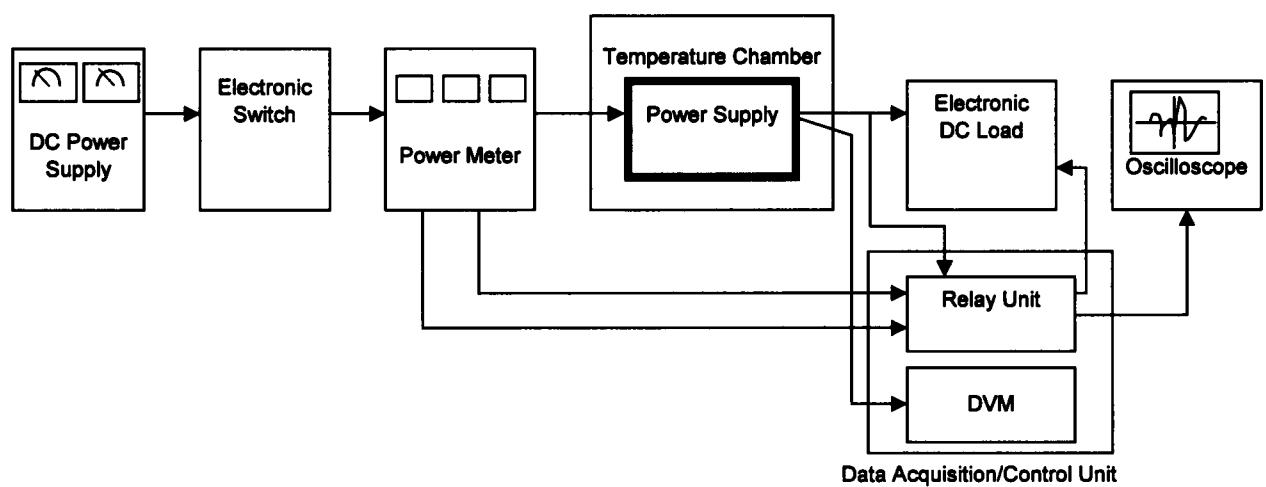


Figure A

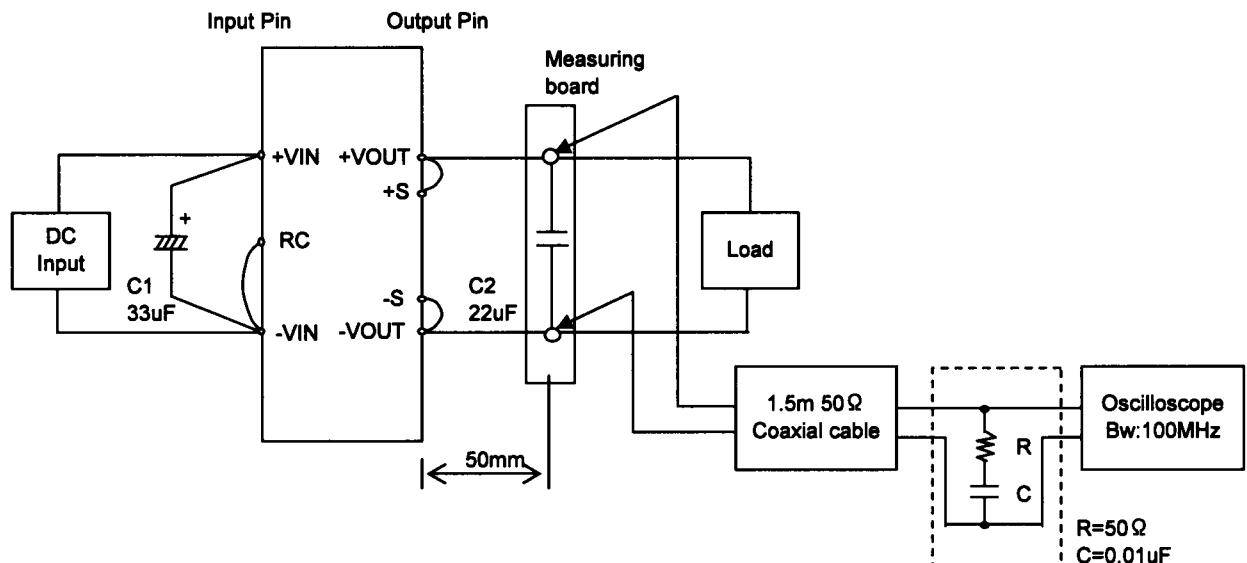


Figure B