

TEST DATA OF CBS3502448

Regulated DC Power Supply
Feb.23, 2008

Approved by : Tatsuya Mano
Tatsuya Mano Design Manager

Prepared by : Eiji Nagata
Eiji Nagata Design Engineer

COSEL CO.,LTD.

CONTENTS

1.Input Current (by Input Voltage)	1
2.Input Current (by Load Current)	2
3.Input Power (by Load Current)	3
4.Efficiency (by Input Voltage)	4
5.Efficiency (by Load Current)	5
6.Line Regulation	6
7.Load Regulation	7
8.Dynamic Load Response	8
9.Ripple Voltage (by Load Current)	9
10.Ripple-Noise	10
11.Ripple Voltage (by Ambient Temperature)	11
12.Ambient Temperature Drift	12
13.Output Voltage Accuracy	13
14.Time Lapse Drift	14
15.Rise and Fall Time	15
16.Minimum Input Voltage for Regulated Output Voltage	16
17.Overcurrent Protection	17
18.Overvoltage Protection	18
19.Figure of Testing Circuitry	19

(Final Page 19)

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Model		CBS3502448																																																																																
Item		Input Current (by Input Voltage)																																																																																
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1.Graph		<div><div><div></div><div></div><div></div></div><div><div>Load 100%</div><div>Load 50%</div><div>Load 0%</div></div></div> <p>Note: Slanted line shows the range of the rated input voltage.</p>																																																																																
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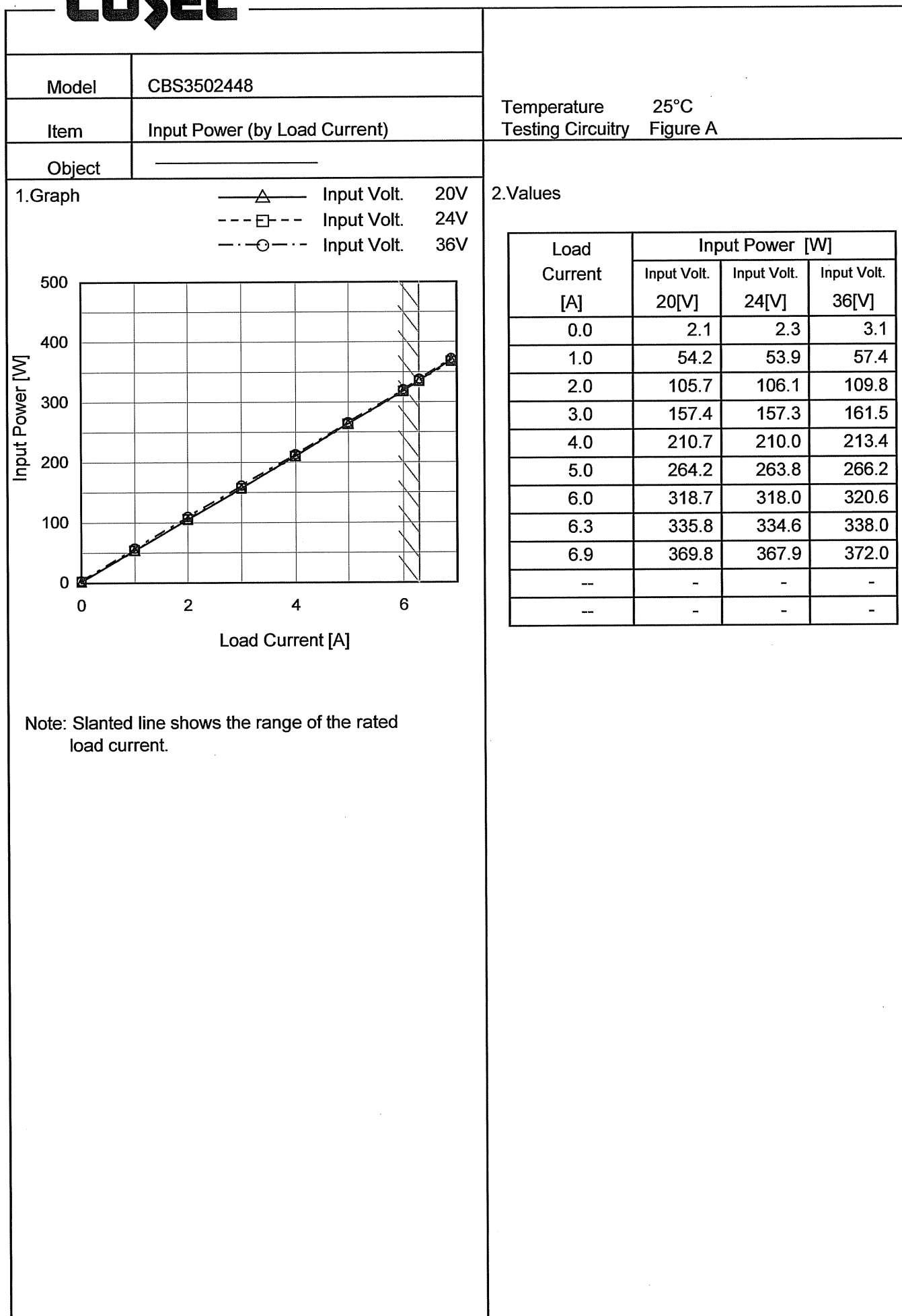
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Model		CBS3502448																																																				
Item		Input Current (by Load Current)																																																				
Object																																																						
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>---□---</div><div>-○-</div></div><div>Input Volt. 20V</div><div>Input Volt. 24V</div><div>Input Volt. 36V</div></div> <p>Input Current [A]</p> <p>Load Current [A]</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Current [A]</th></tr><tr><th>Input Volt. 20[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>0.0</td><td>0.105</td><td>0.094</td><td>0.085</td></tr><tr><td>1.0</td><td>2.716</td><td>2.240</td><td>1.597</td></tr><tr><td>2.0</td><td>5.300</td><td>4.424</td><td>3.050</td></tr><tr><td>3.0</td><td>7.890</td><td>6.570</td><td>4.490</td></tr><tr><td>4.0</td><td>10.510</td><td>8.760</td><td>5.920</td></tr><tr><td>5.0</td><td>13.220</td><td>10.990</td><td>7.410</td></tr><tr><td>6.0</td><td>15.910</td><td>13.230</td><td>8.910</td></tr><tr><td>6.3</td><td>16.820</td><td>13.950</td><td>9.400</td></tr><tr><td>6.9</td><td>18.530</td><td>15.360</td><td>10.320</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Input Current [A]			Input Volt. 20[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.0	0.105	0.094	0.085	1.0	2.716	2.240	1.597	2.0	5.300	4.424	3.050	3.0	7.890	6.570	4.490	4.0	10.510	8.760	5.920	5.0	13.220	10.990	7.410	6.0	15.910	13.230	8.910	6.3	16.820	13.950	9.400	6.9	18.530	15.360	10.320	--	-	-	-	--	-	-	-
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Model	CBS3502448																																
Item	Efficiency (by Input Voltage)	Temperature	25°C																														
		Testing Circuitry	Figure A																														
Object																																	
1.Graph		2.Values																															
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Input Voltage [V]	Load 50% Efficiency [%]	Load 100% Efficiency [%]																															
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Model CBS3502448

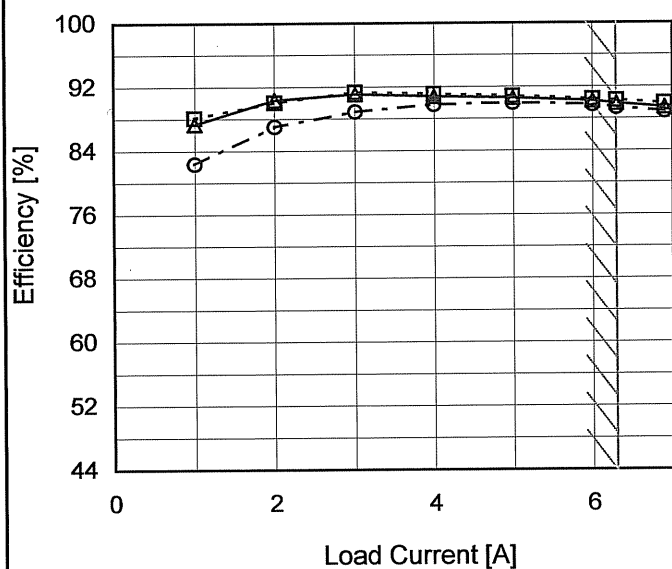
Item Efficiency (by Load Current)

Object

Temperature 25°C
Testing Circuitry Figure A

1. Graph

—△— Input Volt. 20V
 ---□--- Input Volt. 24V
 ---○--- Input Volt. 36V



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

2. Values

Load Current [A]	Efficiency [%]		
	Input Volt. 20[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.0	-	-	-
1.0	87.4	88.1	82.4
2.0	90.4	90.1	87.0
3.0	91.1	91.4	88.9
4.0	90.8	91.1	89.8
5.0	90.6	90.8	90.0
6.0	90.2	90.4	89.7
6.3	89.9	90.3	89.4
6.9	89.4	89.9	88.9
--	-	-	-
--	-	-	-

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Model	CBS3502448																																
Item	Line Regulation	Temperature	25°C																														
Object	+48V6.3A	Testing Circuitry	Figure A																														
1.Graph		2.Values																															
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <table><thead><tr><th>Input Voltage [V]</th><th>Output Voltage [V] Load 50%</th><th>Output Voltage [V] Load 100%</th></tr></thead><tbody><tr><td>19</td><td>48.191</td><td>48.055</td></tr><tr><td>20</td><td>48.190</td><td>48.191</td></tr><tr><td>24</td><td>48.190</td><td>48.191</td></tr><tr><td>30</td><td>48.191</td><td>48.192</td></tr><tr><td>36</td><td>48.191</td><td>48.192</td></tr><tr><td>40</td><td>48.191</td><td>48.192</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> <p>Note: Slanted line shows the range of the rated input voltage.</p>		Input Voltage [V]	Output Voltage [V] Load 50%	Output Voltage [V] Load 100%	19	48.191	48.055	20	48.190	48.191	24	48.190	48.191	30	48.191	48.192	36	48.191	48.192	40	48.191	48.192	--	-	-	--	-	-	--	-	-		
Input Voltage [V]	Output Voltage [V] Load 50%	Output Voltage [V] Load 100%																															
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--	-	-																															

Temperature	25°C
Testing Circuitry	Figure A



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



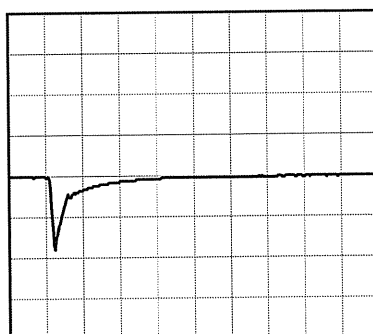
Model	CBS3502448	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Response	
Object	+48V6.3A	

Input Volt. 24 V
Cycle 1000 mS

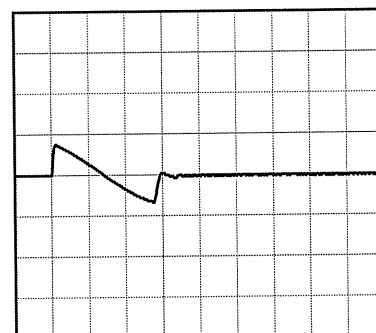
Load Current 6.3A / 200 μ

Min. Load (0A) \longleftrightarrow
Load 100% (6.3A)

2V/div



1 ms/div



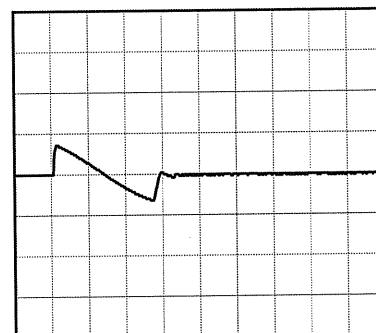
10 ms/div

Min. Load (0A) \longleftrightarrow
Load 50% (3.15A)

2V/div



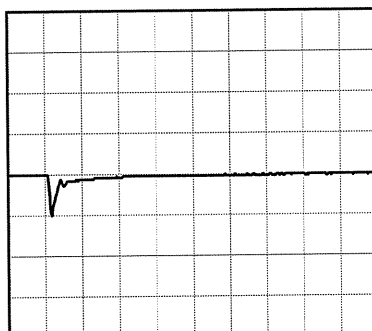
1 ms/div



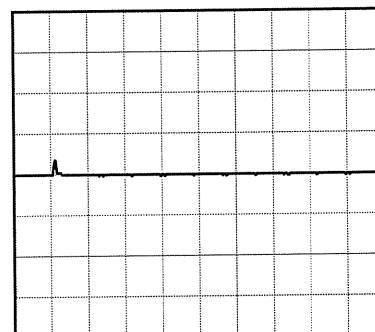
10 ms/div

Load 10% (0.63A) \longleftrightarrow
Load 100% (6.3A)

2V/div



1 ms/div



10 ms/div

Model	CBS3502448																																								
Item	Ripple Voltage (by Load Current)	Temperature	25°C																																						
Object	+48V6.3A	Testing Circuitry	Figure B																																						
1.Graph		2.Values																																							
<div><div><div>—△—</div><div>Input Volt.</div><div>20V</div></div><div><div>- - -○- - -</div><div>Input Volt.</div><div>36V</div></div></div> <p>Measured by 100MHz Ossilloscope. Ripple Voltage is shown as p-p in the figure below. Note: Slanted line shows the range of the rated load current.</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 20 [V]</th><th>Input Volt. 36 [V]</th></tr><tr><td>0.0</td><td>15</td><td>20</td></tr><tr><td>1.0</td><td>80</td><td>95</td></tr><tr><td>2.0</td><td>80</td><td>120</td></tr><tr><td>3.0</td><td>80</td><td>120</td></tr><tr><td>4.0</td><td>80</td><td>120</td></tr><tr><td>5.0</td><td>80</td><td>120</td></tr><tr><td>6.0</td><td>80</td><td>120</td></tr><tr><td>6.3</td><td>80</td><td>120</td></tr><tr><td>6.9</td><td>80</td><td>120</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 20 [V]	Input Volt. 36 [V]	0.0	15	20	1.0	80	95	2.0	80	120	3.0	80	120	4.0	80	120	5.0	80	120	6.0	80	120	6.3	80	120	6.9	80	120	--	-	-	--	-	-
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<p>Ripple [mVp-p]</p> <p>Fig.Complex Ripple Wave Form</p>																																									

Model	CBS3502448																																								
Item	Ripple-Noise	Temperature	25°C																																						
		Testing Circuitry	Figure B																																						
Object	+48V6.3A																																								
1.Graph		2.Values																																							
<div><div><div>—△—</div><div>Input Volt. 20V</div></div><div><div>- - ○ - -</div><div>Input Volt. 36V</div></div></div> <p>Ripple-Noise [mV]</p> <p>Load Current [A]</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple-Noise [mV]</th></tr><tr><th>Input Volt. 20 [V]</th><th>Input Volt. 36 [V]</th></tr><tr><td>0.0</td><td>25</td><td>55</td></tr><tr><td>1.0</td><td>85</td><td>115</td></tr><tr><td>2.0</td><td>85</td><td>125</td></tr><tr><td>3.0</td><td>85</td><td>125</td></tr><tr><td>4.0</td><td>85</td><td>125</td></tr><tr><td>5.0</td><td>85</td><td>125</td></tr><tr><td>6.0</td><td>85</td><td>125</td></tr><tr><td>6.3</td><td>90</td><td>125</td></tr><tr><td>6.9</td><td>95</td><td>125</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Ripple-Noise [mV]		Input Volt. 20 [V]	Input Volt. 36 [V]	0.0	25	55	1.0	85	115	2.0	85	125	3.0	85	125	4.0	85	125	5.0	85	125	6.0	85	125	6.3	90	125	6.9	95	125	--	-	-	--	-	-
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<p>Measured by 100MHz Ossilloscope.</p> <p>Ripple-Noise is shown as p-p in the figure below.</p> <p>Note: Slanted line shows the range of the rated load current.</p>																																									
<p>Ripple Noise[mVp-p]</p>																																									
Fig.Complex Ripple Noise Wave Form																																									

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<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <table><thead><tr><th>Ambient Temperature [°C]</th><th>Load 50% [mV]</th><th>Load 100% [mV]</th></tr></thead><tbody><tr><td>-50</td><td>140</td><td>140</td></tr><tr><td>-40</td><td>130</td><td>130</td></tr><tr><td>-20</td><td>125</td><td>125</td></tr><tr><td>0</td><td>120</td><td>120</td></tr><tr><td>25</td><td>105</td><td>105</td></tr><tr><td>40</td><td>95</td><td>95</td></tr><tr><td>60</td><td>95</td><td>95</td></tr><tr><td>85</td><td>90</td><td>90</td></tr><tr><td>100</td><td>90</td><td>90</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table> <p>Input Volt. 24V</p>		Ambient Temperature [°C]	Load 50% [mV]	Load 100% [mV]	-50	140	140	-40	130	130	-20	125	125	0	120	120	25	105	105	40	95	95	60	95	95	85	90	90	100	90	90	--	-	-		
Ambient Temperature [°C]	Load 50% [mV]	Load 100% [mV]																																		
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100	90	90																																		
--	-	-																																		
Measured by 100MHz Ossilloscope. Note: Slanted line shows the range of the rated ambient temperature.																																				

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		Testing Circuitry Figure A
Model	CBS3502448	
Item	Output Voltage Accuracy	
Object	+48V6.3A	

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 - 100°C

Input Voltage : 20 - 36V

Load Current : 0 - 6.3A

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

* 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	36	0	48.184	±102	±0.2
Minimum Voltage	-40	20	0	47.980		



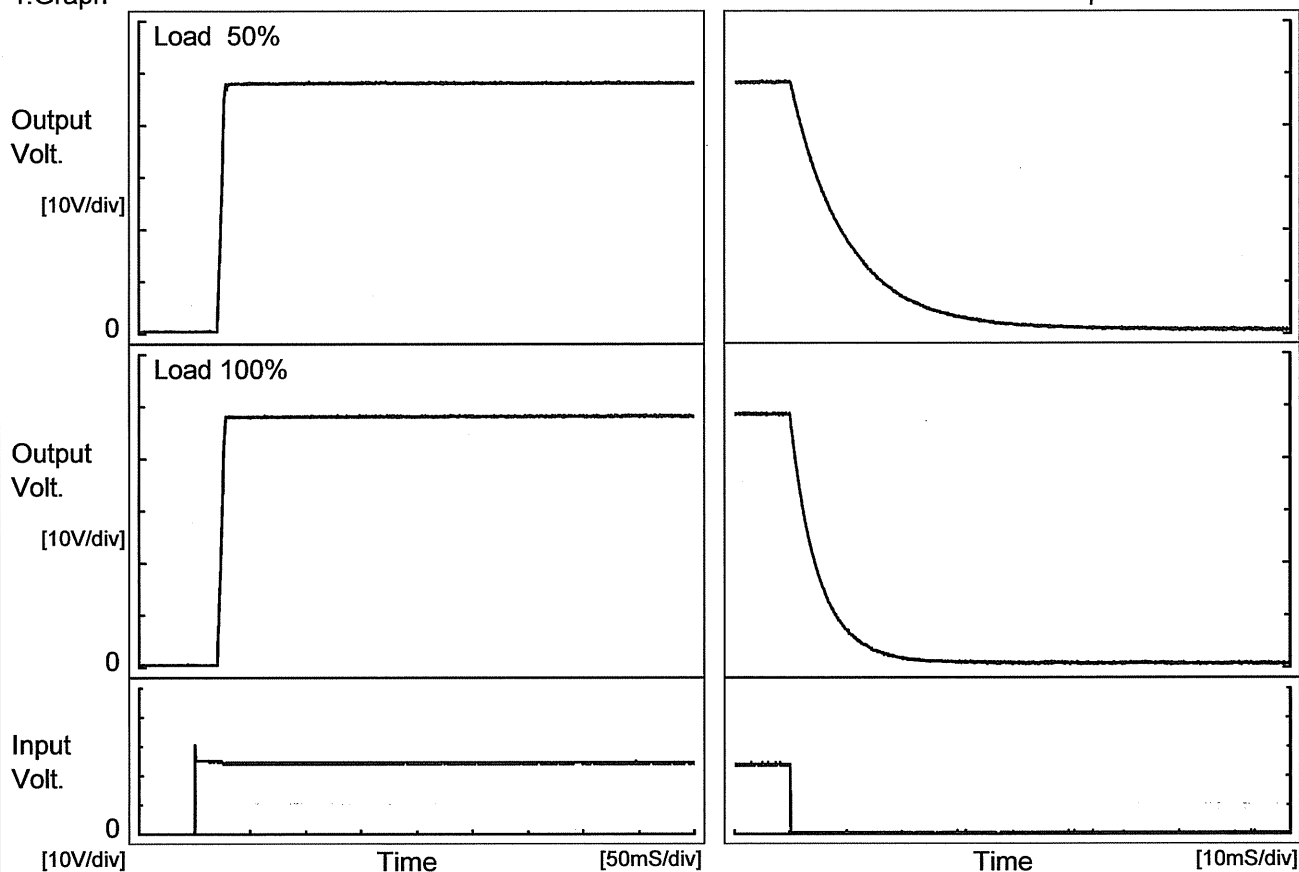
Model	CBS3502448		
Item	Time Lapse Drift	Temperature	25°C
Object	+48V6.3A	Testing Circuitry	Figure A
1.Graph		2.Values	
<div><div>Output Voltage [V]</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></di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COSEL

Model	CBS3502448	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+48V6.3A		

1.Graph

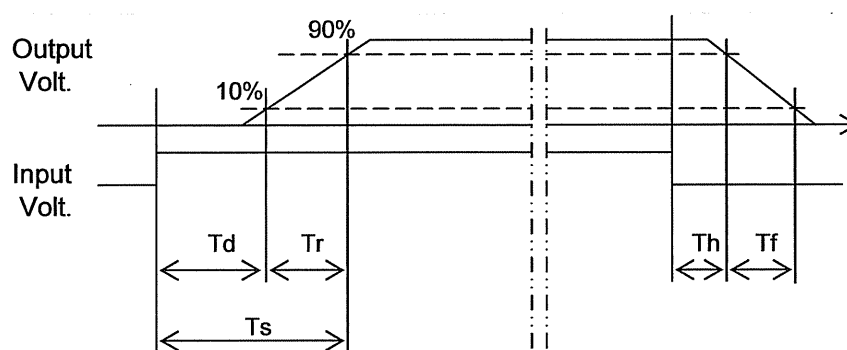
Input Volt. 24 V



2.Values

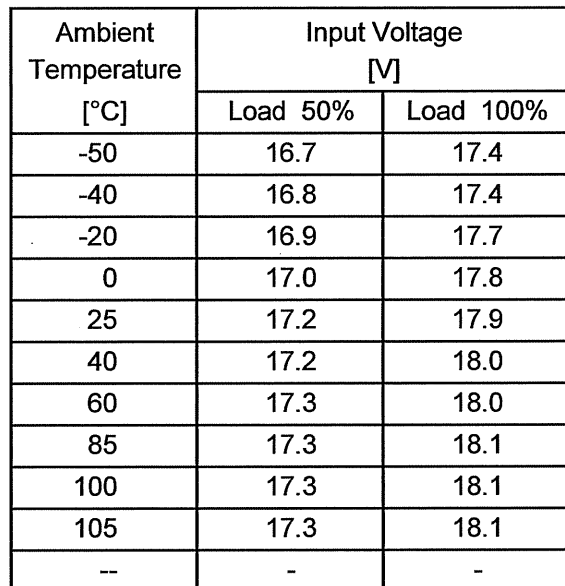
[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	21.5	5.3	26.8	1.1	22.8
100 %	21.5	5.5	27.0	0.6	11.4

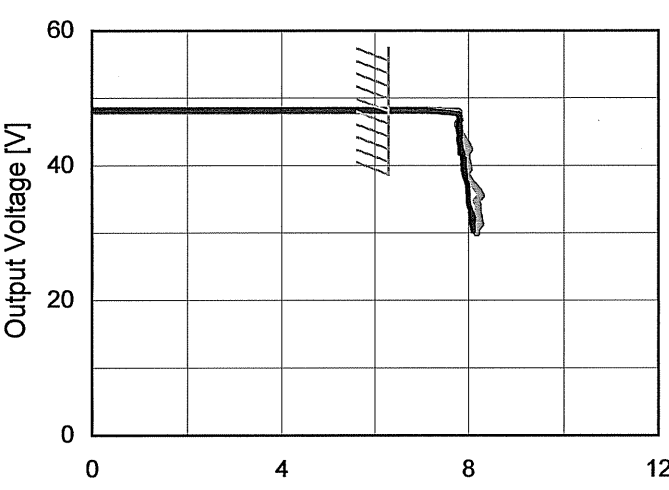


Testing Circuitry Figure A

2.Values



- 16 -

Model	CBS3502448	Temperature 25°C Testing Circuitry Figure A																																																												
Item	Overcurrent Protection																																																													
Object	+48V6.3A																																																													
1.Graph		2.Values																																																												
<div><div><div></div><div>Input Volt. 20V</div></div><div><div></div><div>Input Volt. 24V</div></div><div><div></div><div>Input Volt. 36V</div></div></div> 		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="3">Load Current [A]</th></tr><tr><th>Input Volt. 20[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>48.0</td><td>6.35</td><td>6.35</td><td>6.35</td></tr><tr><td>45.6</td><td>7.76</td><td>7.82</td><td>7.78</td></tr><tr><td>43.2</td><td>7.77</td><td>7.82</td><td>7.95</td></tr><tr><td>38.4</td><td>7.96</td><td>7.91</td><td>7.97</td></tr><tr><td>33.6</td><td>8.01</td><td>8.02</td><td>8.20</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><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></table>		Output Voltage [V]	Load Current [A]			Input Volt. 20[V]	Input Volt. 24[V]	Input Volt. 36[V]	48.0	6.35	6.35	6.35	45.6	7.76	7.82	7.78	43.2	7.77	7.82	7.95	38.4	7.96	7.91	7.97	33.6	8.01	8.02	8.20	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Output Voltage [V]	Load Current [A]																																																													
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45.6	7.76	7.82	7.78																																																											
43.2	7.77	7.82	7.95																																																											
38.4	7.96	7.91	7.97																																																											
33.6	8.01	8.02	8.20																																																											
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<p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when the output voltage is from 30V to 0V.</p>																																																														

Model	CBS3502448																																																						
Item	Overvoltage Protection	Testing Circuitry Figure A																																																					
Object	+48V6.3A																																																						
1.Graph		2.Values																																																					
<div><div>—△— Input Volt. 20V</div><div>---□--- Input Volt. 24V</div><div>---○--- Input Volt. 36V</div></div> <p>Operating Point [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 0%</p>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="3">Operating Point [V]</th></tr><tr><th>Input Volt. 20[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>-50</td><td>58.95</td><td>58.95</td><td>58.95</td></tr><tr><td>-40</td><td>58.95</td><td>58.95</td><td>58.95</td></tr><tr><td>-20</td><td>58.94</td><td>58.94</td><td>58.94</td></tr><tr><td>0</td><td>59.06</td><td>59.06</td><td>59.06</td></tr><tr><td>25</td><td>58.94</td><td>58.94</td><td>58.94</td></tr><tr><td>40</td><td>58.94</td><td>58.94</td><td>58.94</td></tr><tr><td>60</td><td>58.82</td><td>58.82</td><td>58.82</td></tr><tr><td>85</td><td>58.76</td><td>58.76</td><td>58.76</td></tr><tr><td>100</td><td>58.64</td><td>58.64</td><td>58.64</td></tr><tr><td>105</td><td>58.64</td><td>58.64</td><td>58.64</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>			Ambient Temperature [°C]	Operating Point [V]			Input Volt. 20[V]	Input Volt. 24[V]	Input Volt. 36[V]	-50	58.95	58.95	58.95	-40	58.95	58.95	58.95	-20	58.94	58.94	58.94	0	59.06	59.06	59.06	25	58.94	58.94	58.94	40	58.94	58.94	58.94	60	58.82	58.82	58.82	85	58.76	58.76	58.76	100	58.64	58.64	58.64	105	58.64	58.64	58.64	--	-	-	-
Ambient Temperature [°C]	Operating Point [V]																																																						
	Input Volt. 20[V]	Input Volt. 24[V]	Input Volt. 36[V]																																																				
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40	58.94	58.94	58.94																																																				
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Note: Slanted line shows the range of the rated ambient temperature.																																																							

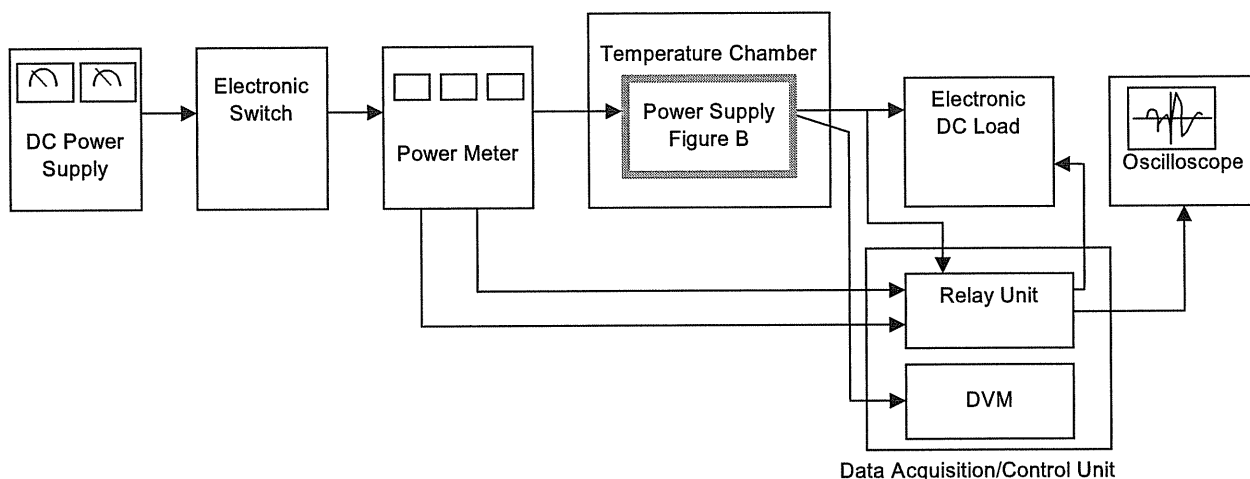


Figure A

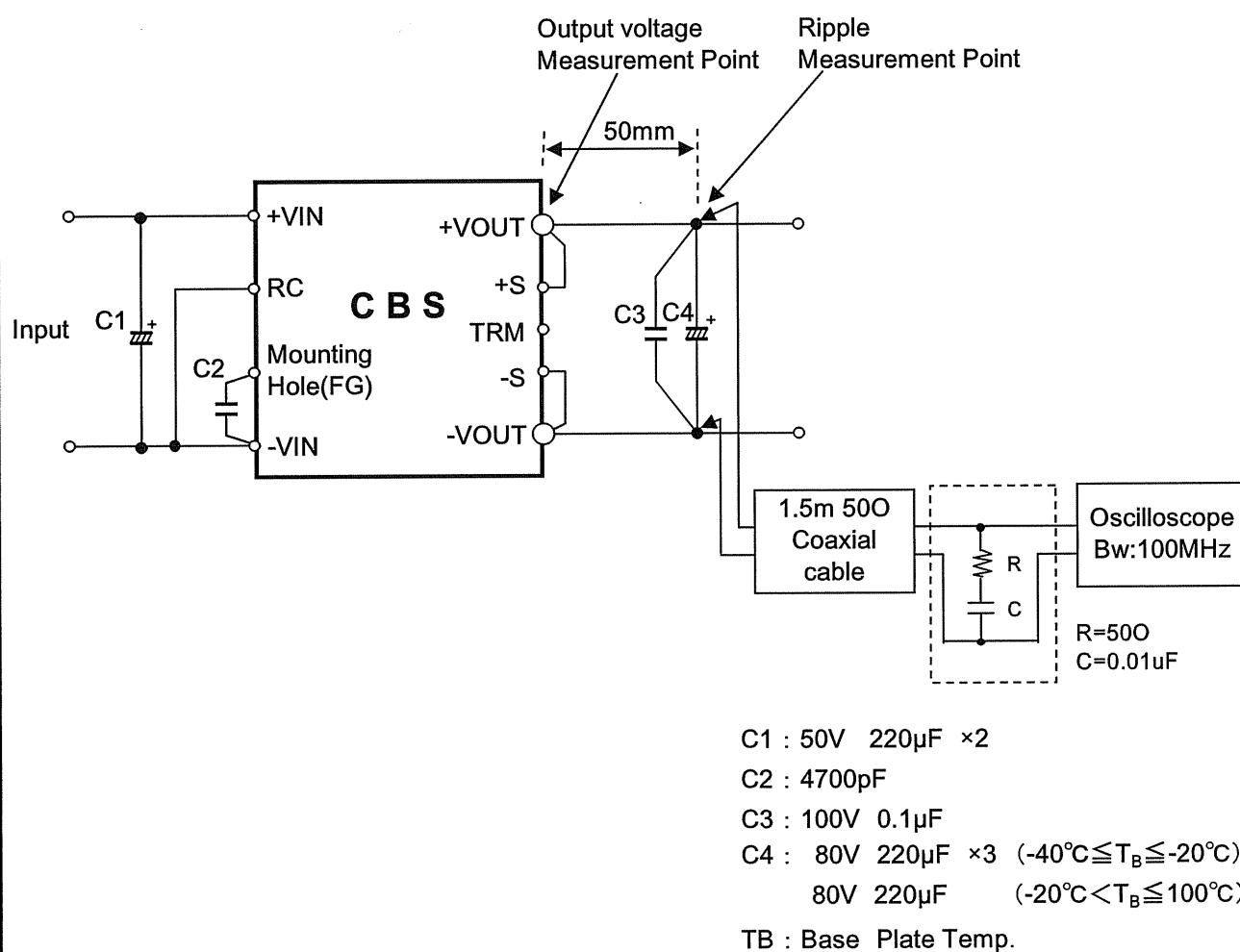


Figure B