



TEST DATA OF CBS504812

(48V INPUT)

Regulated DC Power Supply
Feb. 21, 2001

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Atsushi Yoshiyama Design Engineer

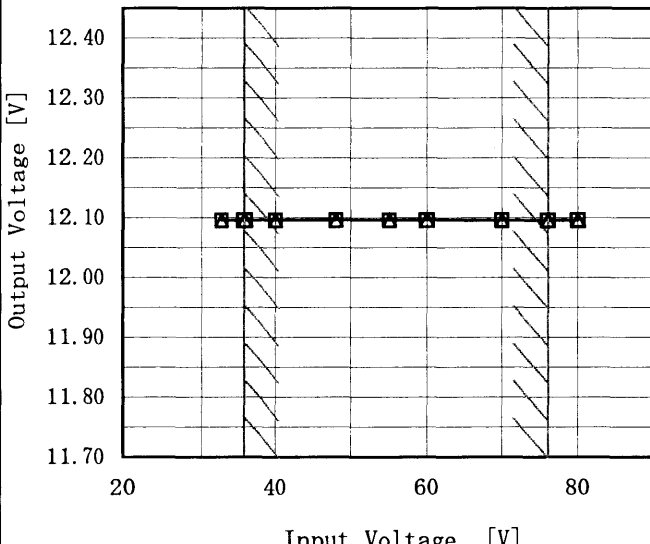
コーセル株式会社
COSEL CO.,LTD.

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(Final Page 21)

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Model		CBS504812	Temperature		25℃																																
Item		Line Regulation 静的入力変動	Testing Circuitry		Figure A																																
Object		+12V4.2A																																			
1. Graph			2. Values																																		
<div><div>---□--- Load 50%</div><div>—△— Load 100%</div></div>  <p>Note: Slanted line shows the range of the rated input voltage.</p> <p>(注) 斜線は定格入力電圧範囲を示す。</p>			<table><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><tr><td>33</td><td>12.096</td><td>12.096</td></tr><tr><td>36</td><td>12.096</td><td>12.096</td></tr><tr><td>40</td><td>12.096</td><td>12.096</td></tr><tr><td>48</td><td>12.096</td><td>12.096</td></tr><tr><td>55</td><td>12.096</td><td>12.096</td></tr><tr><td>60</td><td>12.096</td><td>12.096</td></tr><tr><td>70</td><td>12.096</td><td>12.096</td></tr><tr><td>76</td><td>12.096</td><td>12.096</td></tr><tr><td>80</td><td>12.096</td><td>12.096</td></tr></table>			Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	33	12.096	12.096	36	12.096	12.096	40	12.096	12.096	48	12.096	12.096	55	12.096	12.096	60	12.096	12.096	70	12.096	12.096	76	12.096	12.096	80	12.096	12.096
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Model		CBS504812	
Item		Input Current (by Load Current) 入力電流 (負荷特性)	
Object			
1. Graph		2. Values	

—△—

Input Volt. 36V

---□---

Input Volt. 48V

---○---

Input Volt. 76V

Input Current [A]

COSEL

Model		CBS504812		Temperature		25℃																																																				
Item		Input Power (by Load Current) 入力電力 (負荷特性)		Testing Circuitry		Figure A																																																				
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<div><div><div>—△—</div><div>Input Volt.</div><div>36V</div></div><div><div>---□---</div><div>Input Volt.</div><div>48V</div></div><div><div>-·-○-·-</div><div>Input Volt.</div><div>76V</div></div></div> <div><p>Input Power [W]</p><p>Load Current [A]</p></div>				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Power [W]</th></tr><tr><th>Input Volt. 36[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr><tr><td>0.0</td><td>1.72</td><td>2.02</td><td>2.18</td></tr><tr><td>0.8</td><td>12.38</td><td>12.45</td><td>13.53</td></tr><tr><td>1.6</td><td>22.63</td><td>22.73</td><td>23.76</td></tr><tr><td>2.4</td><td>33.00</td><td>33.02</td><td>34.10</td></tr><tr><td>3.2</td><td>43.40</td><td>43.50</td><td>44.60</td></tr><tr><td>4.0</td><td>54.10</td><td>54.10</td><td>55.10</td></tr><tr><td>4.2</td><td>56.70</td><td>56.70</td><td>57.70</td></tr><tr><td>4.6</td><td>62.10</td><td>62.10</td><td>63.00</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>				Load Current [A]	Input Power [W]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.0	1.72	2.02	2.18	0.8	12.38	12.45	13.53	1.6	22.63	22.73	23.76	2.4	33.00	33.02	34.10	3.2	43.40	43.50	44.60	4.0	54.10	54.10	55.10	4.2	56.70	56.70	57.70	4.6	62.10	62.10	63.00	--	--	--	--	--	--	--	--	--	--	--	--
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Input Voltage [V]	Load 50% Efficiency [%]	Load 100% Efficiency [%]																																			
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Model		CBS504812	
Item		Efficiency (by Load Current) 効率 (負荷特性)	
Object			
1. Graph		2. Values	

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Model		CBS504812	
Item		Load Regulation 静的負荷変動	
Object		+12V4.2A	

1. Graph

—△—

Input Volt.

36V

---□---

Input Volt.

48V

---○---

Input Volt.

76V

Output Voltage [V]

12.40

12.30

12.20

12.10

12.00

11.90

11.80

11.70

0.0

1.0

2.0

3.0

4.0

5.0

Load Current [A]

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

(注) 斜線は定格負荷電流範囲を示す。

2. Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	12.097	12.097	12.096
0.8	12.097	12.096	12.097
1.6	12.096	12.096	12.097
2.4	12.097	12.097	12.097
3.2	12.096	12.097	12.097
4.0	12.097	12.097	12.096
4.2	12.097	12.097	12.097
4.6	12.097	12.097	12.097
--	-	-	-
--	-	-	-

COSEL

Model	CBS504812																																																																												
Item	Ripple Voltage (by Load Current) リップル電圧 (負荷特性)	Temperature	25℃																																																																										
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<div><div>Ripple Voltage is shown as p-p in the figure below.</div><div>Note: Slanted line shows the range of the rated load current.</div><div>リップル電圧は、下図 p - p 値で示される。 (注) 斜線は定格負荷電流範囲を示す。</div></div>																																																																													
<div><div>Ripple [mVp-p]</div><div><div>Fig. Complex Ripple Wave Form 図 リップル波形図</div></div></div>																																																																													

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Model		CBS504812	
Item		Ripple-Noise リップルノイズ	
Object		+12V4. 2A	

1. Graph

—△—

Input Volt. 36V

- - ○ - -

Input Volt. 76V

200

180

160

140

120

100

80

60

40

20

0

0

2

4

6

Ripple-Noise [mV]

Load Current [A]

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

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

リップルノイズは、下図 p - p 値で示される。

(注) 斜線は定格負荷電流範囲を示す。

Ripple Noise[mVp-p]

Fig. Complex Ripple Noise Wave Form

図 リップルノイズ波形

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.0	5	10
0.8	15	20
1.7	15	20
2.5	15	20
3.4	15	20
4.2	15	20
5.0	15	20
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2. Values

COSEL

Model	CBS504812																																																													
Item	Overcurrent Protection 過電流保護	Temperature	25℃																																																											
Object	+12V4.2A	Testing Circuitry	Figure A																																																											
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<div><div><div>—</div><div>Input Volt. 36V</div></div><div><div>—</div><div>Input Volt. 48V</div></div><div><div>—</div><div>Input Volt. 76V</div></div></div> <p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current. (注) 斜線は定格負荷電流範囲を示す。</p> <p>Intermittent operation occurs when the output voltage is from 8.4V to 0V. 8.4V～0V間は、間欠モードとなる。</p>		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="3">Load Current [A]</th></tr><tr><th>Input Volt. 36[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr><tr><td>12.0</td><td>5.84</td><td>5.64</td><td>5.63</td></tr><tr><td>11.4</td><td>5.81</td><td>5.65</td><td>5.65</td></tr><tr><td>10.8</td><td>5.79</td><td>5.66</td><td>5.67</td></tr><tr><td>9.6</td><td>5.78</td><td>5.67</td><td>5.71</td></tr><tr><td>8.4</td><td>5.77</td><td>5.68</td><td>5.77</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. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	12.0	5.84	5.64	5.63	11.4	5.81	5.65	5.65	10.8	5.79	5.66	5.67	9.6	5.78	5.67	5.71	8.4	5.77	5.68	5.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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(注) 斜線は定格周囲温度範囲を示す。

Ambient Temperature [°C]	Operating Point [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-50	15.66	15.66	15.66
-40	15.66	15.66	15.66
-20	15.66	15.66	15.73
0	15.73	15.73	15.73
25	15.72	15.72	15.72
40	15.72	15.72	15.72
60	15.72	15.72	15.72
85	15.65	15.65	15.65
100	15.65	15.65	15.65
105	15.64	15.64	15.64
--	-	-	-

COSEL

Model	CBS504812	Temperature	25°C
Item	Dynamic Load Response 動的負荷変動	Testing Circuitry	Figure A
Object	+12V4.2A		

Input Volt. 48 V
Cycle 1000 ms

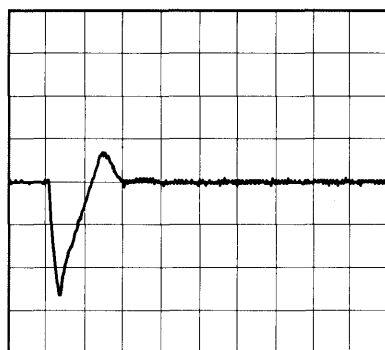
Load Current



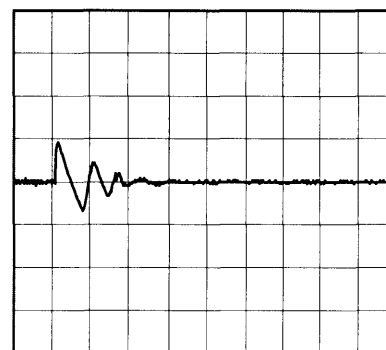
Min. Load (0A) \longleftrightarrow

Load 100% (4.2A)

200 mV/div



200 μ s/div

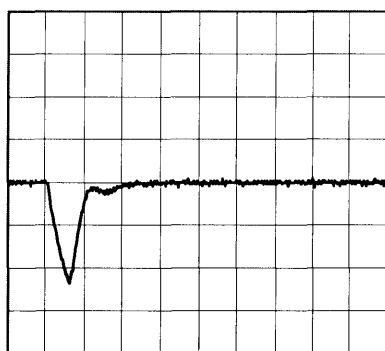


5 ms/div

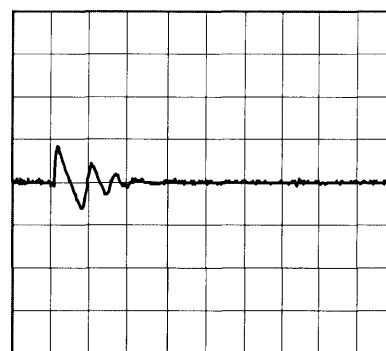
Min. Load (0A) \longleftrightarrow

Load 50% (2.1A)

200 mV/div



200 μ s/div

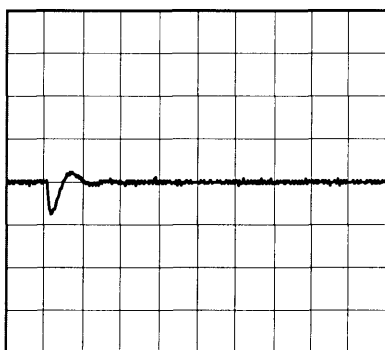


5 ms/div

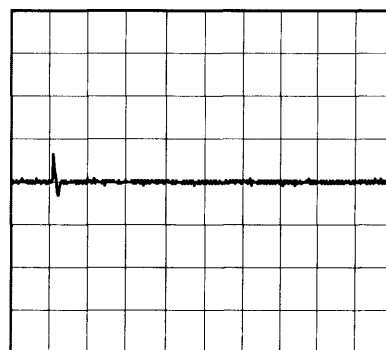
Load 10% (0.42A) \longleftrightarrow

Load 100% (4.2A)

200 mV/div

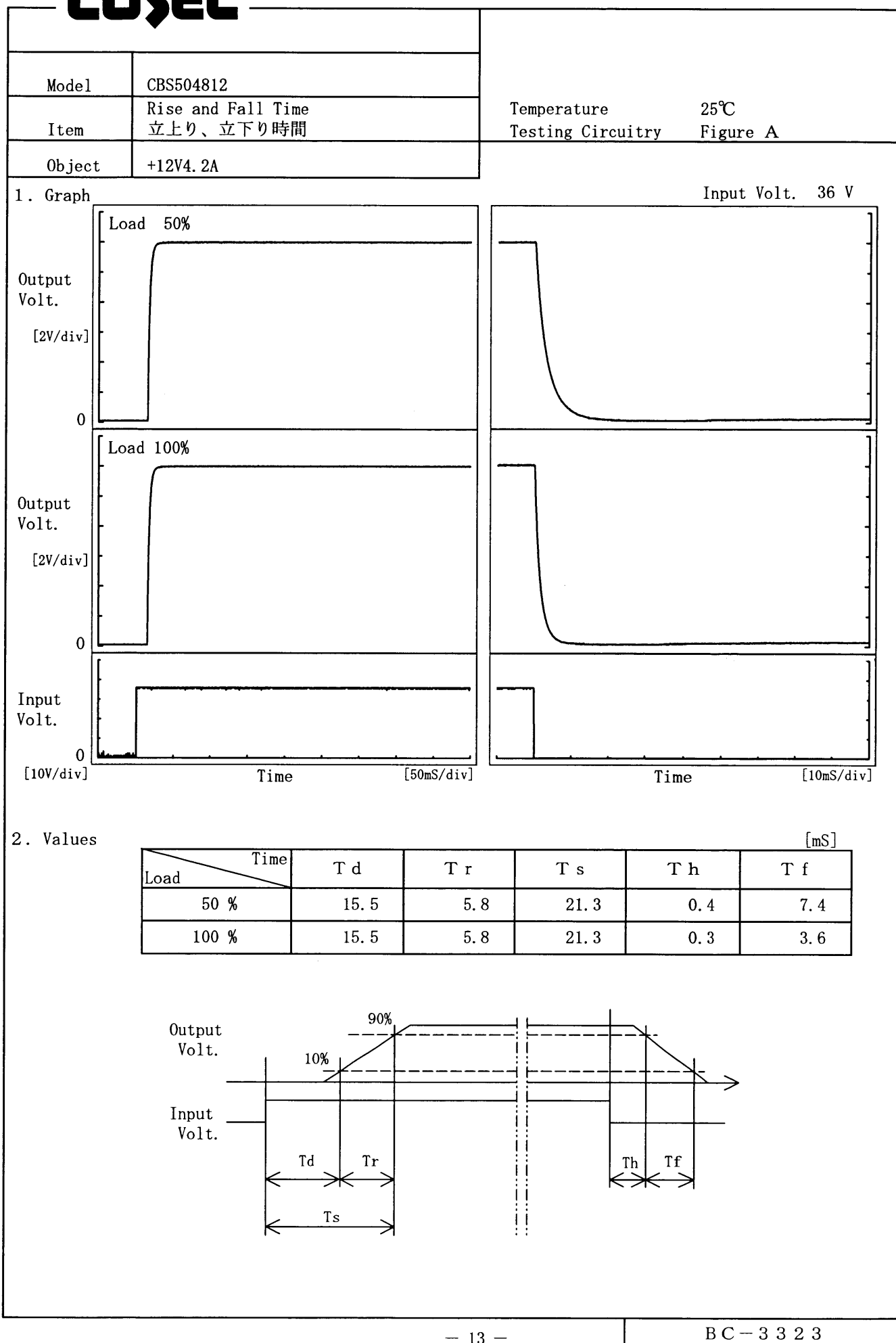


200 μ s/div

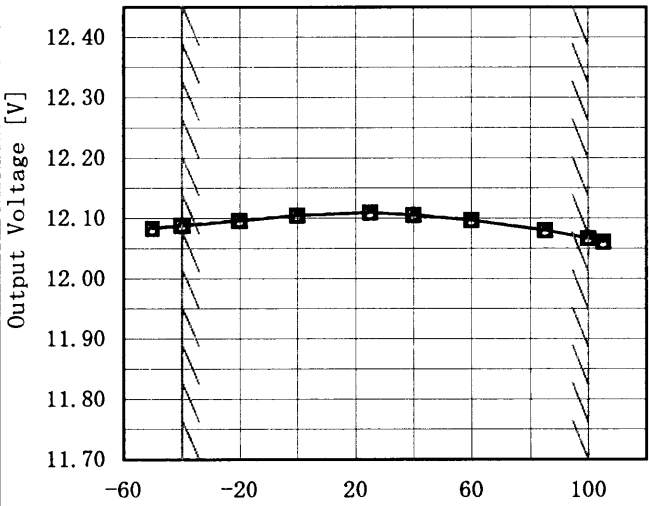


5 ms/div

COSEL



COSEL

Model	CBS504812																																																						
Item	Ambient Temperature Drift 周囲温度変動	Testing Circuitry Figure A																																																					
Object	+12V4.2A																																																						
1. Graph		2. Values																																																					
<div><div>—△— Input Volt. 36V ---□--- Input Volt. 48V ---○--- Input Volt. 76V</div><div>Output Voltage [V]</div><div>Ambient Temperature [°C]</div><div>Load 100%</div></div>		<table><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><tr><td>-50</td><td>12.083</td><td>12.083</td><td>12.083</td></tr><tr><td>-40</td><td>12.088</td><td>12.088</td><td>12.088</td></tr><tr><td>-20</td><td>12.096</td><td>12.096</td><td>12.096</td></tr><tr><td>0</td><td>12.105</td><td>12.105</td><td>12.105</td></tr><tr><td>25</td><td>12.110</td><td>12.110</td><td>12.109</td></tr><tr><td>40</td><td>12.106</td><td>12.106</td><td>12.106</td></tr><tr><td>60</td><td>12.097</td><td>12.097</td><td>12.097</td></tr><tr><td>85</td><td>12.080</td><td>12.080</td><td>12.080</td></tr><tr><td>100</td><td>12.067</td><td>12.067</td><td>12.067</td></tr><tr><td>105</td><td>12.061</td><td>12.061</td><td>12.061</td></tr><tr><td>--</td><td>—</td><td>—</td><td>—</td></tr></table>			Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	-50	12.083	12.083	12.083	-40	12.088	12.088	12.088	-20	12.096	12.096	12.096	0	12.105	12.105	12.105	25	12.110	12.110	12.109	40	12.106	12.106	12.106	60	12.097	12.097	12.097	85	12.080	12.080	12.080	100	12.067	12.067	12.067	105	12.061	12.061	12.061	--	—	—	—
Ambient Temperature [°C]	Output Voltage [V]																																																						
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Note: Slanted line shows the range of the rated ambient temperature. (注) 斜線は定格周囲温度範囲を示す。																																																							

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COSEL

Model		CBS504812
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)	
Object	+12V4.2A	

1. Graph

---□---

Load 50%

—△—

Load 100%

Ripple Voltage [mV]

200

180

160

140

120

100

80

60

40

20

0

-60

-20

20

60

100

Ambient Temperature [°C]

Input Volt. 48V

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

(注) 斜線は定格周囲温度範囲を示す。

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-50	20	20
-40	15	15
-20	10	10
0	10	10
25	10	10
40	10	10
60	10	10
85	10	10
100	10	10
105	10	10
--	—	—

2. Values

COSEL

Model	CBS504812		
Item	Time Lapse Drift 経時ドリフト	Temperature	25℃
Object	+12V4.2A	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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Model		CBS504812	Testing Circuitry Figure A
Item		Output Voltage Accuracy 定電圧精度	
Object		+12V4.2A	

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℃

Input Voltage : 36 ~ 76V

Load Current : 0 ~ 4.2A

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

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

1. 定電圧精度

周囲温度、入力電圧、負荷電流を下記仕様内で、任意に変動させたときの出力電圧の変動をいう。

周囲温度 : -40 ~ 100℃

入力電圧 : 36 ~ 76V

負荷電流 : 0 ~ 4.2A

* 定電圧精度(変動値) = $\pm (\text{出力電圧の最高値} - \text{出力電圧の最低値}) / 2$

* 定電圧精度(変動率) = $\frac{\text{変動値}}{\text{定格出力電圧}} \times 100$

2. Values

Item	Temperature [℃]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	36	0	12.109	±23	±0.2
Minimum Voltage	100	48	4.2	12.063		

		Testing Circuitry Figure A
Model	CBS504812	
Item	Condense 結露特性	
Object	+12V4.2A	

1. Condensation test

Testing procedure is as follows.

- ① Keeping and cooling the unit in a tank at -10℃ for an hour with the input off.
- ② Taking it out of the tank and dewing itself in a room where the temperature is 25℃ and the humidity is 40%RH.
- ③ Testing electrical characteristics of the unit to confirm there be no fault.

1. 結露特性試験

入力を切った状態で、恒温槽で-10℃に冷却しておき、約1時間後に恒温槽から取り出し、室温25℃、湿度40%RHの状態におき結露させ、その電気的特性の測定を行い異常のないことを確認する。

2. Values

Item	Data	Testing Conditions
Output Voltage [V]	12.037	Input Volt. :48V, Load Current. :4.2A
Line Regulation [mV]	1	Input Volt. :36~76V, Load Current. :4.2A
Load Regulation [mV]	1	Input Volt. :48V, Load Current. :0~4.2A

COSEL

Model	CBS504812		
Item	Line Noise Tolerance 入力雑音耐量	Temperature	25℃
Object	+12V4.2A	Testing Circuitry	Figure B

1. Conditions

- Input Voltage : 48 V
- Pulse Voltage : 2000 V
- Pulse Cycle : 16.7 ms
- Pulse Input Duration : 1 min. or more
- Load : 100 %

2. Results

Pulse Width [ns]	MODE		No protection failure should occur	DC-like Regulation of Output Voltage
		POLARITY	保護回路の誤動作がない	出力電圧の直流的変動
50	COMMON	+	OK	no fluctuation
		—	OK	no fluctuation
	NORMAL	+	OK	no fluctuation
		—	OK	no fluctuation
1000	COMMON	+	OK	no fluctuation
		—	OK	no fluctuation
	NORMAL	+	OK	no fluctuation
		—	OK	no fluctuation

COSEL

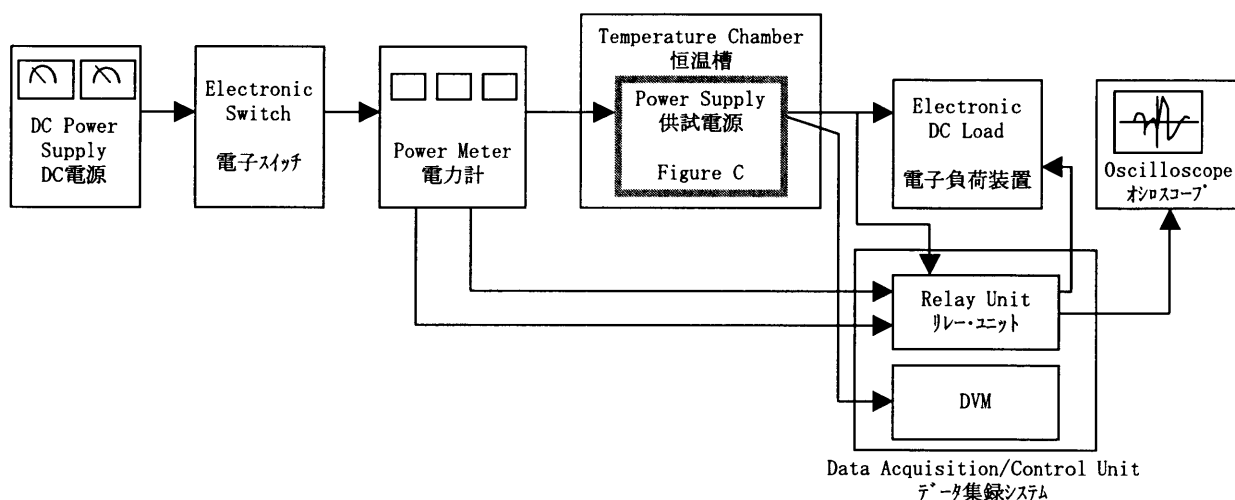


Figure A

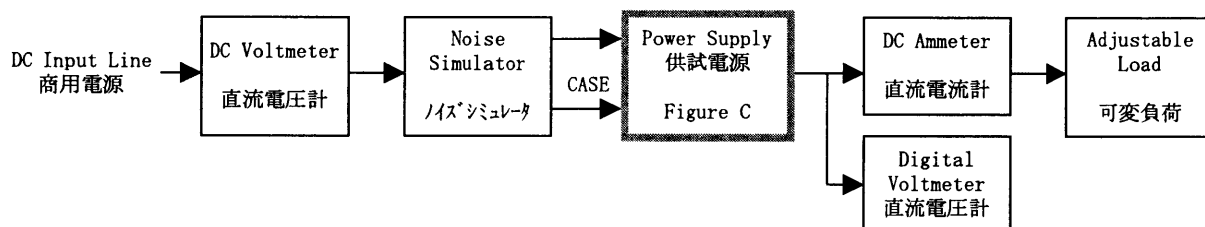


Figure B

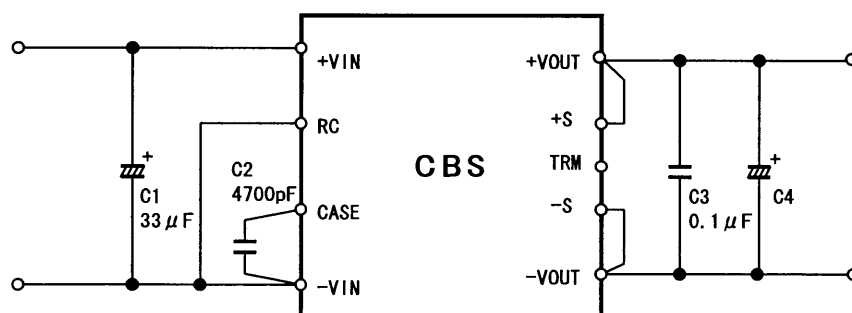


Figure C

C1 : 100V 33 μ F

C2 : 4700pF

C3 : 50V 0.1 μ F $(-40^{\circ}\text{C} \leq T_B \leq -20^{\circ}\text{C})$ C4 : CBS504803, 05 10V 2200 μ F $\times 2$ CBS504812, 15 35V 470 μ F $\times 2$ CBS504824, 28 35V 220 μ F $\times 2$ $(-20^{\circ}\text{C} < T_B \leq 100^{\circ}\text{C})$ C4 : CBS504803, 05 10V 2200 μ FCBS504812, 15 35V 470 μ FCBS504824, 28 35V 220 μ F T_B : Base Plate Temp.