



TEST DATA OF CBS1004805 (48V INPUT)

Regulated DC Power Supply
Feb.27, 2001

Approved by : Takayuki Fukuda
Takayuki Fukuda Design Manager

Prepared by : Atsushi Yoshiyama
Atsushi Yoshiyama Design Engineer

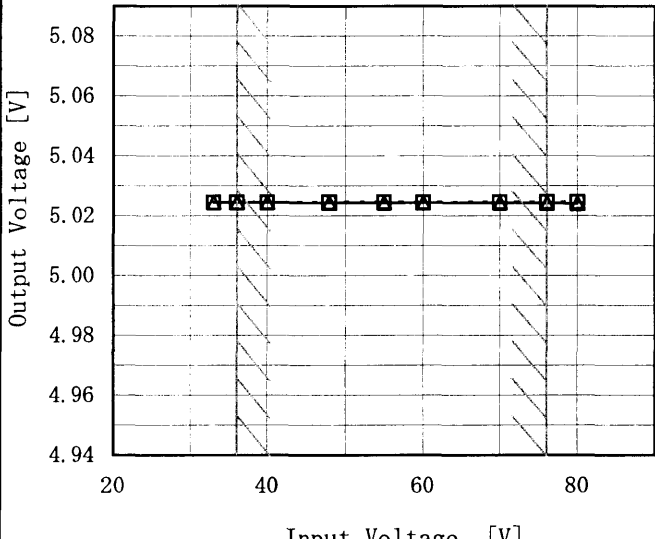
コーセル株式会社
COSEL CO.,LTD.

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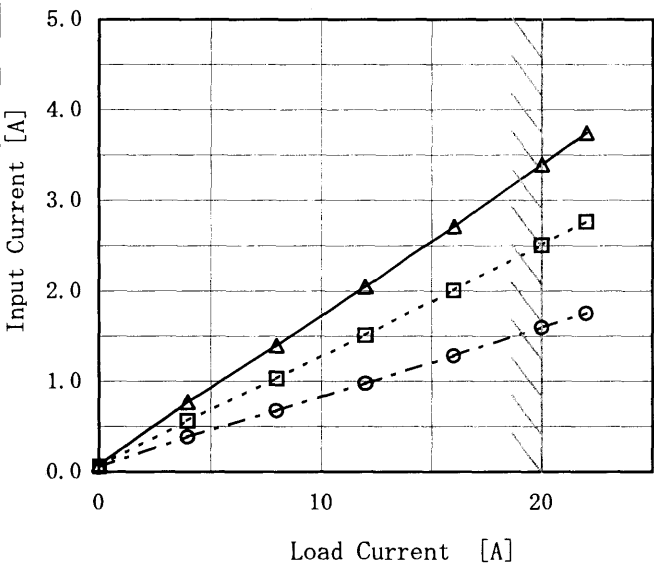
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Model CBS1004805		Temperature 25°C Testing Circuitry Figure A																																
Item	Line Regulation 静的入力変動																																	
Object	+5V20A																																	
<p>1. Graph</p> <p>---□--- Load 50% —△— Load 100%</p>  <p>Output Voltage [V]</p> <p>Input Voltage [V]</p> <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>		<p>2. Values</p> <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>33</td><td>5.025</td><td>5.025</td></tr> <tr><td>36</td><td>5.025</td><td>5.025</td></tr> <tr><td>40</td><td>5.025</td><td>5.025</td></tr> <tr><td>48</td><td>5.025</td><td>5.024</td></tr> <tr><td>55</td><td>5.025</td><td>5.024</td></tr> <tr><td>60</td><td>5.025</td><td>5.024</td></tr> <tr><td>70</td><td>5.025</td><td>5.024</td></tr> <tr><td>76</td><td>5.025</td><td>5.024</td></tr> <tr><td>80</td><td>5.025</td><td>5.024</td></tr> </tbody> </table>	Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	33	5.025	5.025	36	5.025	5.025	40	5.025	5.025	48	5.025	5.024	55	5.025	5.024	60	5.025	5.024	70	5.025	5.024	76	5.025	5.024	80	5.025	5.024
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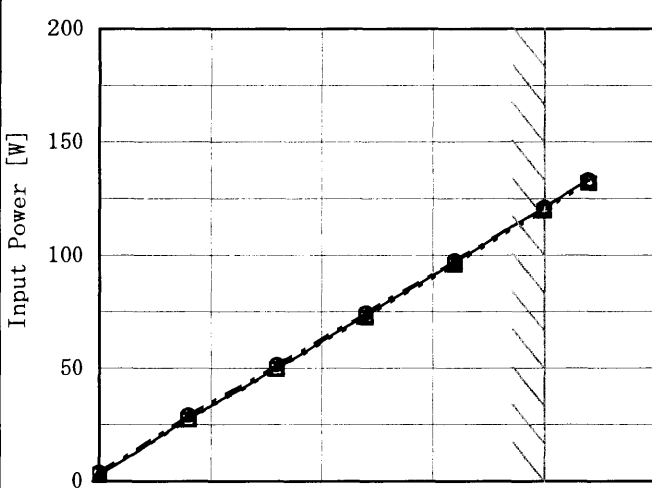
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Model		CBS1004805		Temperature		25℃	
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Object							
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16	2.712	2.004	1.281																																																							
20	3.396	2.506	1.593																																																							
22	3.748	2.764	1.753																																																							
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(注) 斜線は定格負荷電流範囲を示す。																																																										

COSEL

Model		CBS1004805		Temperature		25℃																																																				
Item		Input Power (by Load Current) 入力電力（負荷特性）		Testing Circuitry		Figure A																																																				
Object																																																										
1. Graph				2. Values																																																						
<div><div>—△—</div>Input Volt. 36V</div> <div><div>---□---</div>Input Volt. 48V</div> <div><div>---○---</div>Input Volt. 76V</div>  <p>Input Power [W]</p> <p>Load Current [A]</p>				<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</td><td>2.8</td><td>2.9</td><td>3.8</td></tr><tr><td>4</td><td>27.7</td><td>27.1</td><td>29.1</td></tr><tr><td>8</td><td>50.1</td><td>49.5</td><td>51.5</td></tr><tr><td>12</td><td>73.4</td><td>72.3</td><td>74.5</td></tr><tr><td>16</td><td>97.0</td><td>95.9</td><td>97.6</td></tr><tr><td>20</td><td>121.0</td><td>119.7</td><td>121.1</td></tr><tr><td>22</td><td>133.3</td><td>131.9</td><td>133.2</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>				Load Current [A]	Input Power [W]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0	2.8	2.9	3.8	4	27.7	27.1	29.1	8	50.1	49.5	51.5	12	73.4	72.3	74.5	16	97.0	95.9	97.6	20	121.0	119.7	121.1	22	133.3	131.9	133.2	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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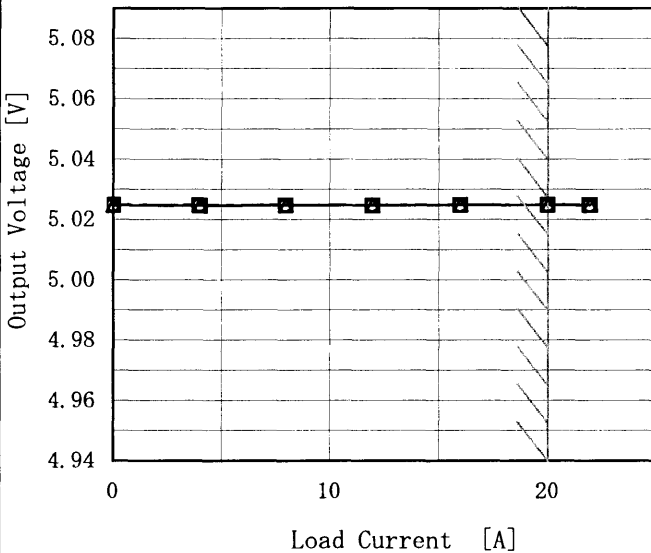
COSEL

Model		CBS1004805																																	
Item	Efficiency (by Input Voltage) 効率（入力電圧特性）		Temperature 25℃ Testing Circuitry Figure A																																
Object																																			
1. Graph		2. Values																																	
<div><div>---□--- Load 50%</div><div>—△— Load 100%</div><div>Efficiency [%]</div><div>Input Voltage [V]</div></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></div>		<table><tr><th rowspan="2">Input Voltage [V]</th><th colspan="2">Efficiency [%]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr><tr><td>33</td><td>79.5</td><td>81.8</td></tr><tr><td>36</td><td>81.4</td><td>82.9</td></tr><tr><td>40</td><td>82.5</td><td>83.7</td></tr><tr><td>48</td><td>82.6</td><td>84.0</td></tr><tr><td>55</td><td>81.9</td><td>83.6</td></tr><tr><td>60</td><td>81.3</td><td>83.3</td></tr><tr><td>70</td><td>80.4</td><td>82.9</td></tr><tr><td>76</td><td>79.8</td><td>82.7</td></tr><tr><td>80</td><td>79.3</td><td>82.5</td></tr></table>		Input Voltage [V]	Efficiency [%]		Load 50%	Load 100%	33	79.5	81.8	36	81.4	82.9	40	82.5	83.7	48	82.6	84.0	55	81.9	83.6	60	81.3	83.3	70	80.4	82.9	76	79.8	82.7	80	79.3	82.5
Input Voltage [V]	Efficiency [%]																																		
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COSEL

Model		CBS1004805		Temperature		25℃																																																				
Item		Efficiency (by Load Current) 効率 (負荷特性)		Testing Circuitry		Figure A																																																				
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<div><div>Efficiency [%]</div><div><div>01020</div><div>Load Current [A]</div></div></div>				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Efficiency [%]</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</td><td>—</td><td>—</td><td>—</td></tr><tr><td>4</td><td>72.1</td><td>73.7</td><td>68.6</td></tr><tr><td>8</td><td>79.9</td><td>80.9</td><td>77.7</td></tr><tr><td>12</td><td>82.0</td><td>83.2</td><td>80.7</td></tr><tr><td>16</td><td>82.7</td><td>83.6</td><td>82.1</td></tr><tr><td>20</td><td>83.0</td><td>84.0</td><td>82.9</td></tr><tr><td>22</td><td>82.7</td><td>83.6</td><td>82.8</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>				Load Current [A]	Efficiency [%]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0	—	—	—	4	72.1	73.7	68.6	8	79.9	80.9	77.7	12	82.0	83.2	80.7	16	82.7	83.6	82.1	20	83.0	84.0	82.9	22	82.7	83.6	82.8	--	—	—	—	--	—	—	—	--	—	—	—	--	—	—	—
Load Current [A]	Efficiency [%]																																																									
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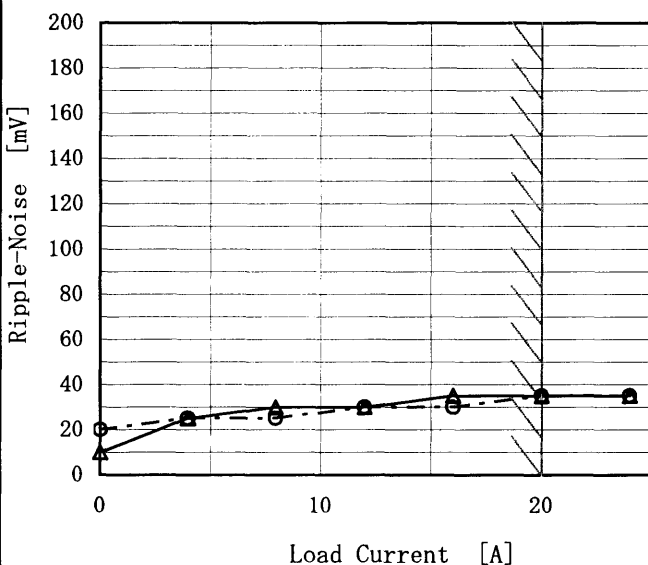
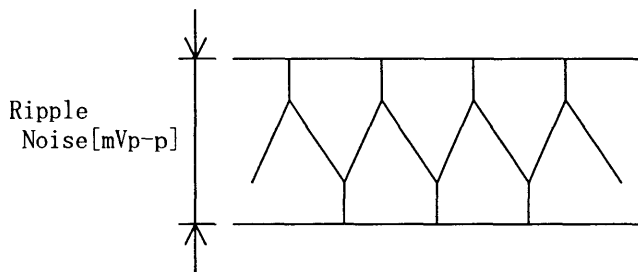
COSEL

Model	CBS1004805																																																	
Item	Load Regulation 静的負荷変動	Temperature	25℃																																															
Object	+5V20A	Testing Circuitry	Figure A																																															
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COSEL

ModelCBS1004805		Temperature25℃ Testing CircuitryFigure A																																					
Item	Ripple Voltage (by Load Current) リップル電圧 (負荷特性)																																						
Object	+5V20A																																						
1. Graph		2. Values																																					
<div><div>—△—Input Volt. 36V</div><div>---○---Input Volt. 76V</div></div> <p>Ripple Voltage is shown as p-p in the figure below. Note: Slanted line shows the range of the rated load current.</p> <p>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。</p> <div><p>Ripple [mVp-p]</p></div> <p>Fig. Complex Ripple Wave Form 図 リップル波形図</p>																																							
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Load Current [A]	Ripple Output Voltage [mV]																																						
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COSEL

ModelCBS1004805		Temperature25℃																																							
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COSEL

Model	CBS1004805																																																									
Item	Overcurrent Protection 過電流保護	Temperature	25℃																																																							
Object	+5V20A	Testing Circuitry	Figure A																																																							
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(注) 斜線は定格周囲温度範囲を示す。

BC-3328

COSEL

Model	CBS1004805	Temperature	25°C
Item	Dynamic Load Response 動的負荷変動	Testing Circuitry	Figure A
Object	+5V20A		

Input Volt. 48 V
Cycle 1000 ms

Load Current

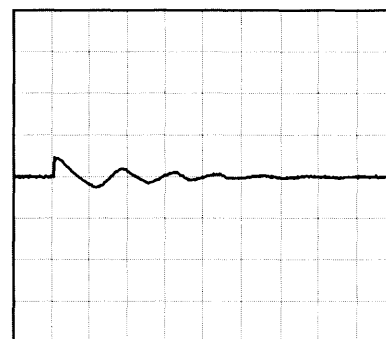
Min. Load (0A) ←→

Load 100% (20A)

500 mV/div



200 μs/div

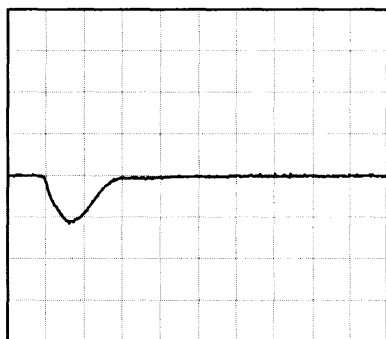


5 ms/div

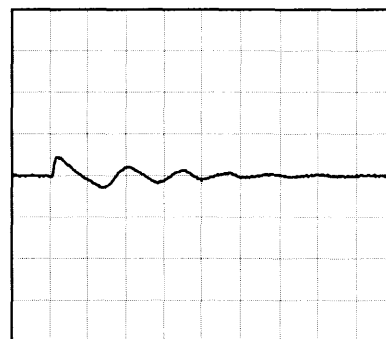
Min. Load (0A) ←→

Load 50% (10A)

500 mV/div



200 μs/div

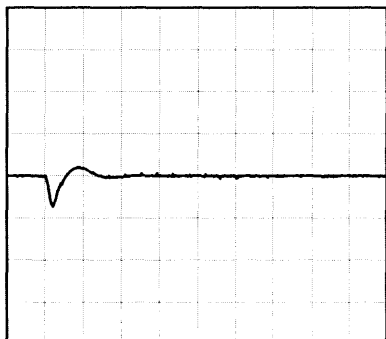


5 ms/div

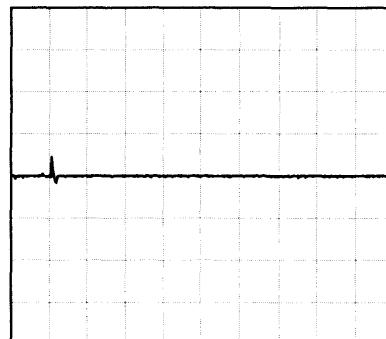
Load 10% (2A) ←→

Load 100% (20A)

500 mV/div



200 μs/div



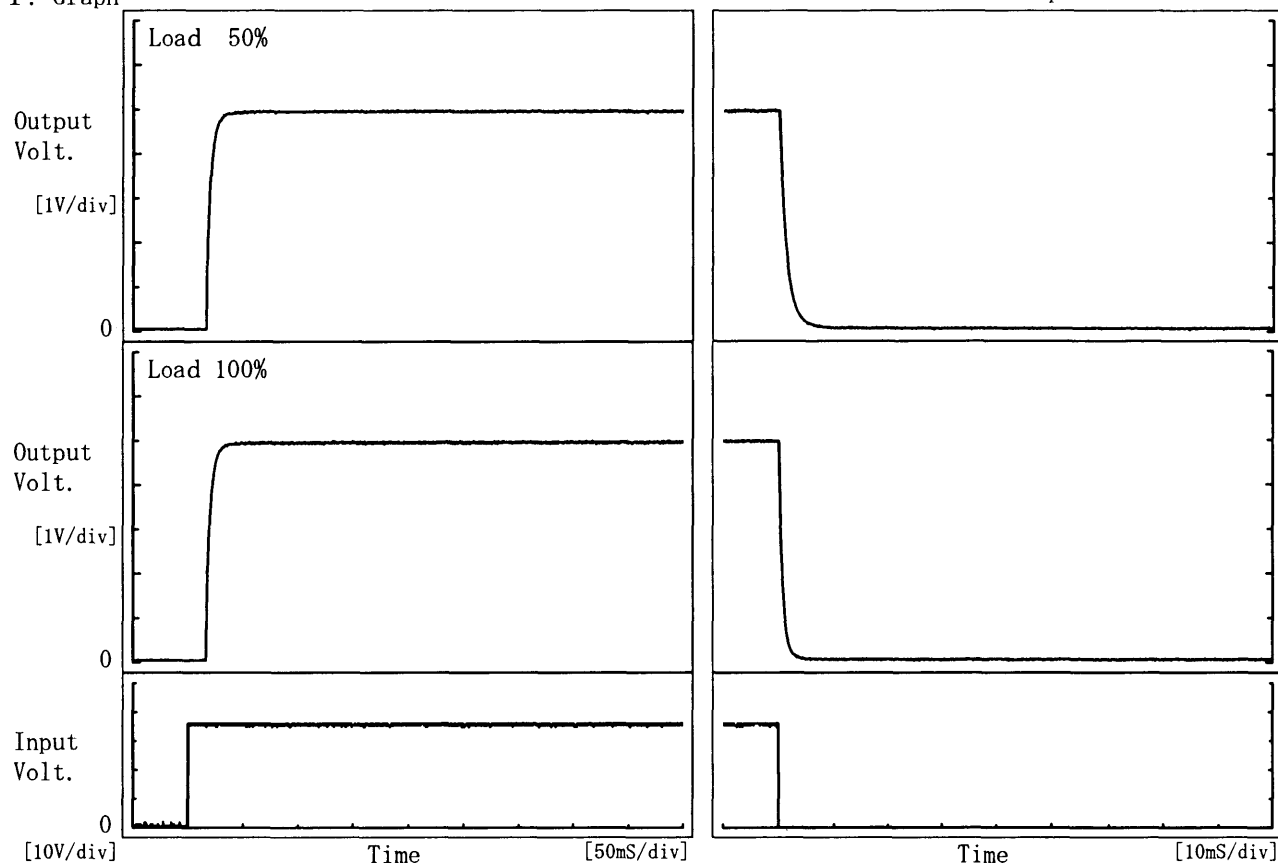
5 ms/div

COSEL

Model	CBS1004805	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+5V20A		

1. Graph

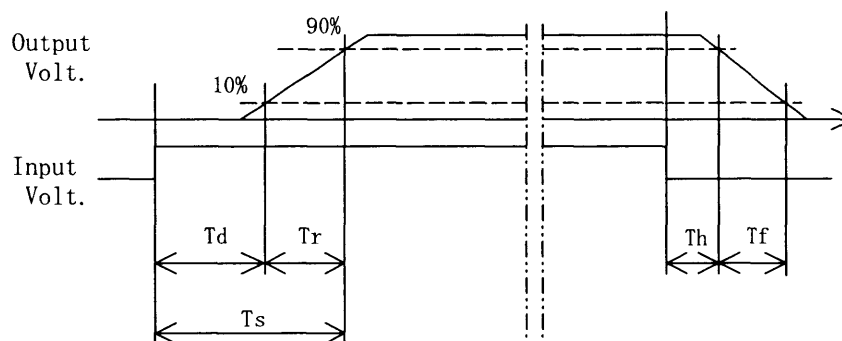
Input Volt. 36 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	15.5	9.5	25.0	0.2	3.0
100 %	15.5	9.3	24.8	0.1	1.6



COSEL

Model		CBS1004805	
Item		Ambient Temperature Drift 周囲温度変動	
Object		+5V20A	

1. Graph

—△—

Input Volt. 36V

---□---

Input Volt. 48V

---○---

Input Volt. 76V

Ambient Temperature [°C]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-50	5.034	5.034	5.034
-40	5.035	5.035	5.035
-20	5.036	5.036	5.036
0	5.037	5.037	5.037
25	5.034	5.034	5.034
40	5.030	5.030	5.030
60	5.024	5.023	5.023
85	5.013	5.013	5.013
100	5.006	5.006	5.006
105	5.003	5.003	5.002
--	-	-	-

Ambient Temperature [°C]

Load 100%

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。

2. Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-50	5.034	5.034	5.034
-40	5.035	5.035	5.035
-20	5.036	5.036	5.036
0	5.037	5.037	5.037
25	5.034	5.034	5.034
40	5.030	5.030	5.030
60	5.024	5.023	5.023
85	5.013	5.013	5.013
100	5.006	5.006	5.006
105	5.003	5.003	5.002
--	-	-	-

COSEL

Model		CBS1004805
Item		Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object		+5V20A

1. Graph

Load 50%

Load 100%

Input Voltage [V]

50

40

30

20

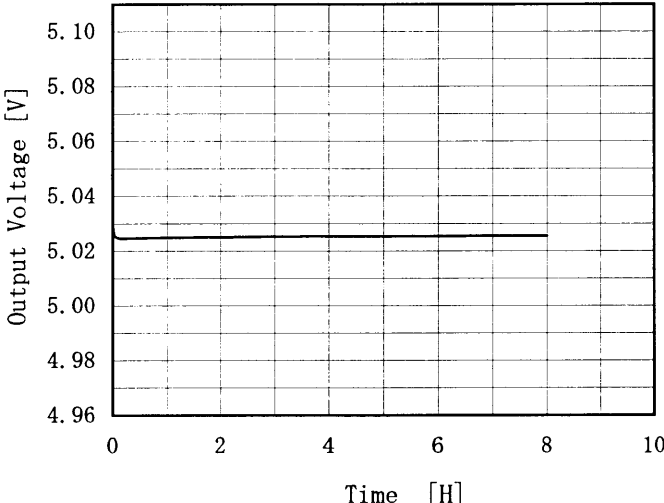
10

</

COSEL

Model CBS1004805		Testing Circuitry Figure A																																						
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)																																							
Object	+5V20A																																							
<p>1. Graph</p> <p>---□--- Load 50% —△— Load 100%</p> <p>Ripple Voltage [mV]</p> <p>Ambient Temperature [°C]</p> <p>Input Volt. 48V</p> <p>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。</p>		<p>2. Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Ripple Voltage [mV]</th></tr> <tr> <th>Load 50%</th><th>Load 100%</th></tr> </thead> <tbody> <tr><td>-50</td><td>55</td><td>60</td></tr> <tr><td>-40</td><td>50</td><td>40</td></tr> <tr><td>-20</td><td>20</td><td>15</td></tr> <tr><td>0</td><td>10</td><td>10</td></tr> <tr><td>25</td><td>5</td><td>10</td></tr> <tr><td>40</td><td>5</td><td>10</td></tr> <tr><td>60</td><td>5</td><td>10</td></tr> <tr><td>85</td><td>10</td><td>10</td></tr> <tr><td>100</td><td>10</td><td>10</td></tr> <tr><td>105</td><td>10</td><td>10</td></tr> <tr><td>--</td><td>--</td><td>--</td></tr> </tbody> </table>	Ambient Temperature [°C]	Ripple Voltage [mV]		Load 50%	Load 100%	-50	55	60	-40	50	40	-20	20	15	0	10	10	25	5	10	40	5	10	60	5	10	85	10	10	100	10	10	105	10	10	--	--	--
Ambient Temperature [°C]	Ripple Voltage [mV]																																							
	Load 50%	Load 100%																																						
-50	55	60																																						
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85	10	10																																						
100	10	10																																						
105	10	10																																						
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COSEL

Model	CBS1004805																								
Item	Time Lapse Drift 経時ドリフト	Temperature	25℃																						
Object	+5V20A	Testing Circuitry	Figure A																						
1. Graph		2. Values																							
<div></div> <div>Input Volt. 48V Load 100%</div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>5.029</td></tr><tr><td>0.5</td><td>5.025</td></tr><tr><td>1.0</td><td>5.025</td></tr><tr><td>2.0</td><td>5.025</td></tr><tr><td>3.0</td><td>5.025</td></tr><tr><td>4.0</td><td>5.025</td></tr><tr><td>5.0</td><td>5.025</td></tr><tr><td>6.0</td><td>5.025</td></tr><tr><td>7.0</td><td>5.026</td></tr><tr><td>8.0</td><td>5.026</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	5.029	0.5	5.025	1.0	5.025	2.0	5.025	3.0	5.025	4.0	5.025	5.0	5.025	6.0	5.025	7.0	5.026	8.0	5.026
Time since start [H]	Output Voltage [V]																								
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6.0	5.025																								
7.0	5.026																								
8.0	5.026																								

		Testing Circuitry Figure A
Model	CBS1004805	
Item	Output Voltage Accuracy 定電圧精度	
Object	+5V20A	

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 ~ 20A

* 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 ~ 20A

* 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	-40	36	0	5.035	±16	±0.3
Minimum Voltage	100	76	20	5.003		

COSEL

		Testing Circuitry Figure A
Model	CBS1004805	
Item	Condense 結露特性	
Object	+5V20A	

1. Condensation test

Testing procedure is as follows.

- ① Keeping and cooling the unit in a tank at -10°C 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°C 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°C 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°C 、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]	5.035	Input Volt. :48V, Load Current. :20A
Line Regulation [mV]	1	Input Volt. :36~76V, Load Current. :20A
Load Regulation [mV]	5	Input Volt. :48V, Load Current. :0~20A

COSEL

Model	CBS1004805	Temperature	25℃
Item	Line Noise Tolerance 入力雑音耐量	Testing Circuitry	Figure B
Object	+5V20A		

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

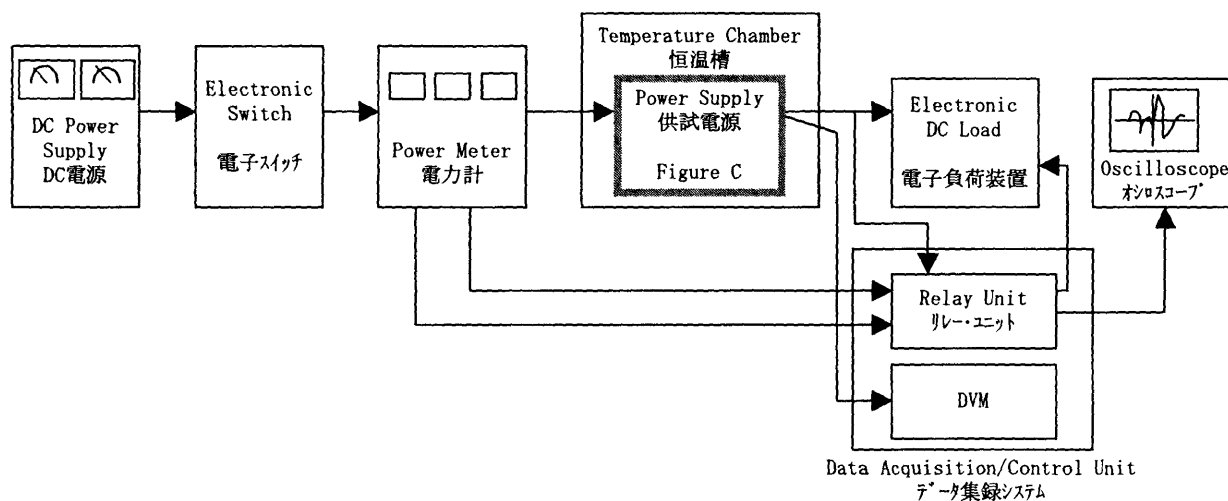


Figure A

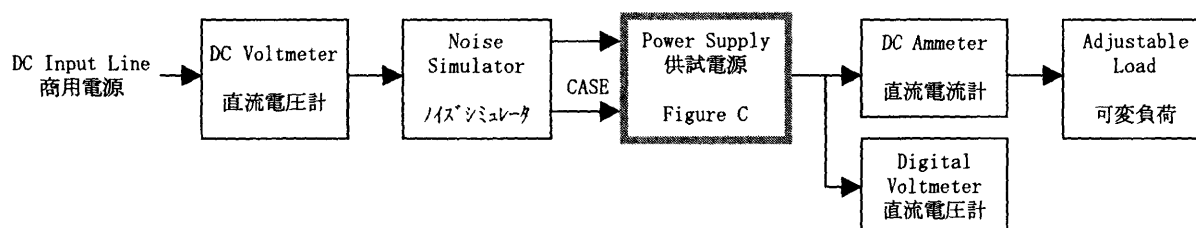


Figure B

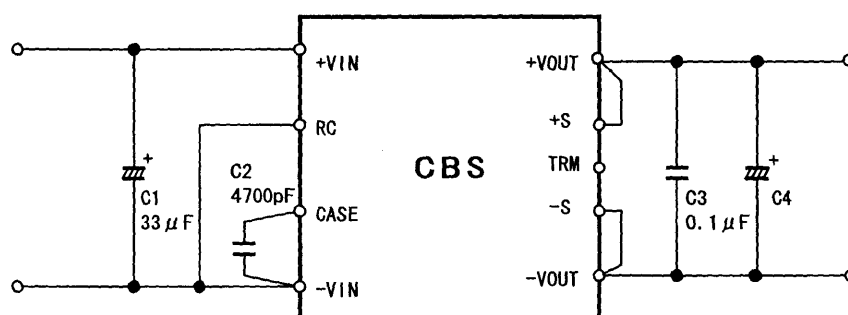


Figure C

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 : CBS1004803, 05	10V 2200 μ F	$\times 2$
CBS1004812, 15	35V 470 μ F	$\times 2$
CBS1004824, 28	35V 220 μ F	$\times 2$

($-20^{\circ}\text{C} < T_B \leq 100^{\circ}\text{C}$)

C4 : CBS1004803, 05	10V 2200 μ F
CBS1004812, 15	35V 470 μ F
CBS1004824, 28	35V 220 μ F

T_B : Base Plate Temp.