COSEL

TEST DATA OF CBS2004803
(48V INPUT)

Regulated DC Power Supply
Feb. 19, 2001

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--- ⊟ --- Load 50%
—— △ —— Load 100%

Input Voltage [V]

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

（注）斜線は定格入力電圧範囲を示す。

2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
33	3.308	3.308
36	3.308	3.308
40	3.308	3.308
48	3.308	3.308
55	3.308	3.308
60	3.308	3.308
70	3.308	3.308
76	3.308	3.308
80	3.308	3.308

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Model	CBS2004803
Item	Input Current (by Input Voltage) 入力電流（入力電圧特性）
Object	———————

Temperature　　　　25℃
Testing Circuitry　　Figure A

1．Graph

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

Input Current [A]

Input Voltage　[V]

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

（注）斜線は定格入力電圧範囲を示す。

2．Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
8.0	0.000	0.000	0.000
16.0	0.000	0.000	0.000
24.0	0.009	0.009	0.009
30.6	0.090	2.214	4.094
33.0	0.085	2.028	3.754
36.0	0.080	1.840	3.408
40.0	0.075	1.647	3.052
48.0	0.059	1.371	2.540
60.0	0.053	1.110	2.036
70.0	0.048	0.962	1.748
76.0	0.046	0.892	1.615
80.0	0.044	0.851	1.538
––	—	—	—
––	—	—	—
––	—	—	—
––	—	—	—

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Model	CBS2004803
Item	Input Current (by Load Current) 入力電流（負荷特性）
Object	

Temperature   25℃
Testing Circuitry   Figure A

1. Graph

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

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]	Input Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	0.081	0.060	0.046
6.0	0.758	0.565	0.382
12.0	1.401	1.046	0.686
18.0	2.072	1.542	0.999
24.0	2.764	2.062	1.320
30.0	3.484	2.596	1.652
35.0	4.104	3.054	1.938
38.5	4.560	3.385	2.142
--	–	–	–
--	–	–	–
--	–	–	–

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Model	CBS2004803
Item	Input Power (by Load Current) 入力電力（負荷特性）
Object	

Temperature   25℃
Testing Circuitry   Figure A

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

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]	Input Power [W]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	3.0	2.9	3.7
6.0	27.2	27.1	29.1
12.0	50.2	50.1	52.2
18.0	74.2	73.7	76.1
24.0	98.6	98.6	100.4
30.0	124.0	123.8	125.4
35.0	145.7	145.5	147.5
38.5	161.8	161.0	162.9
--	-	-	-
--	-	-	-
--	-	-	-

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Model	CBS2004803
Item	Efficiency (by Input Voltage) 効率（入力電圧特性）
Object	———————

Temperature 25℃
Testing Circuitry Figure A

1．Graph

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

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

（注）斜線は定格入力電圧範囲を示す。

2．Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
33	80.2	79.3
36	80.7	79.7
40	80.9	80.1
48	80.9	80.0
55	80.5	79.6
60	80.0	79.6
70	79.1	79.3
76	78.6	79.1
80	78.3	78.9
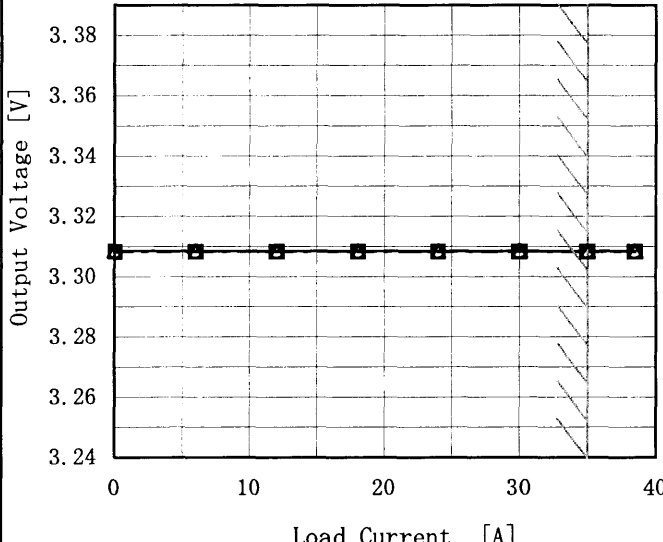
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COSEL

Model	CBS2004803
Item	Efficiency (by Load Current) 効率（負荷特性）
Object	————————

Temperature   25℃
Testing Circuitry   Figure A

1. Graph

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

2. Values

Load Current [A]	Efficiency [%]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	–	–	–
6.0	73.6	73.0	69.8
12.0	79.0	79.1	76.5
18.0	80.8	80.8	79.4
24.0	80.8	80.6	79.5
30.0	80.6	80.5	79.4
35.0	80.2	80.0	79.1
38.5	79.6	79.9	78.7
––	–	–	–
––	–	–	–
––	–	–	–

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。

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Model	CBS2004803
Item	Load Regulation 静的負荷変動
Object	+3.3V35A

Temperature　　　　　25℃
Testing Circuitry　　Figure A

1. Graph

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

Output Voltage [V] vs 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	3.309	3.308	3.308
6.0	3.309	3.308	3.308
12.0	3.309	3.308	3.308
18.0	3.309	3.308	3.308
24.0	3.309	3.308	3.308
30.0	3.309	3.308	3.308
35.0	3.309	3.308	3.308
38.5	3.309	3.308	3.308
---	--	--	--
---	--	--	--

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Model	CBS2004803
Item	Ripple Voltage (by Load Current) リップル電圧（負荷特性）
Object	+3.3V35A

Temperature   25℃
Testing Circuitry   Figure A

1. Graph

——△—— Input Volt. 36V
—·—○—·— Input Volt. 76V

Ripple Voltage [mV] vs Load Current [A]

2. Values

Load Current [A]	Ripple Output Voltage [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0	5	5
7	10	10
14	10	10
21	10	10
28	10	10
35	10	10
42	10	10
---	—	—
---	—	—
---	—	—
---	—	—

Ripple Voltage is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

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。

Ripple [mVp-p]

Fig. Complex Ripple Wave Form
図　リップル波形図

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Model	CBS2004803
Item	Ripple-Noise リップルノイズ
Object	+3.3V35A

Temperature	25℃
Testing Circuitry	Figure A

1. Graph

```
———△——— Input Volt.  36V
—·—○—·— Input Volt.  76V
```

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

2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0	20	30
7	25	30
14	25	30
21	30	30
28	30	30
35	35	40
42	40	45
---	—	—
---	—	—
---	—	—
---	—	—

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Model	CBS2004803
Item	Overcurrent Protection 過電流保護
Object	+3.3V35A

Temperature　　25℃
Testing Circuitry　　Figure A

1. Graph
　—————— Input Volt. 36V
　·············· Input Volt. 48V
　———————— Input Volt. 76V

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。

Intermittent operation occurs when the output voltage is from 2.5V to 0V.
2.5V〜0V間は、間欠モードとなる。

2. Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
3.300	35.51	36.99	36.93
3.135	44.88	44.73	46.51
2.970	44.93	44.89	46.95
2.640	45.04	45.14	47.59
--	—	—	—
--	—	—	—
--	—	—	—
--	—	—	—
--	—	—	—
--	—	—	—
--	—	—	—
--	—	—	—

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Model	CBS2004803
Item	Overvoltage Protection 過電圧保護
Object	+3.3V35A

Testing Circuitry   Figure A

1. Graph

————△———— Input Volt. 36V
- - -▱- - - Input Volt. 48V
—·—◯—·— Input Volt. 76V

Operating Point [V] vs Ambient Temperature [℃]

Load 0%

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 [℃]	Operating Point [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-50	4.25	4.25	4.25
-40	4.25	4.25	4.25
-20	4.25	4.25	4.25
0	4.25	4.25	4.25
25	4.25	4.25	4.25
40	4.25	4.25	4.25
60	4.24	4.24	4.24
85	4.24	4.24	4.24
100	4.23	4.23	4.23
105	4.23	4.23	4.23
--	-	-	-

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Model	CBS2004803
Item	Dynamic Load Response 動的負荷変動
Object	+3.3V35A

Temperature	25℃
Testing Circuitry	Figure A

Input Volt.   48 V

Cycle   1000 ms

Load Current

Min. Load (0A) ←→
Load 100% (35A)

500 mV/div

200 μs/div

5 ms/div

Min. Load (0A) ←→
Load 50% (17.5A)

500 mV/div

200 μs/div

5 ms/div
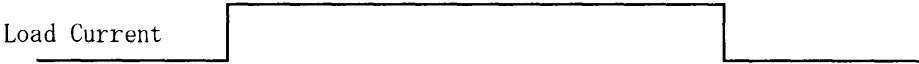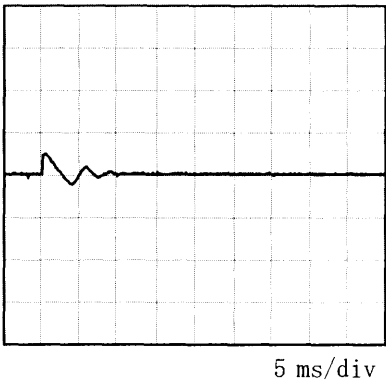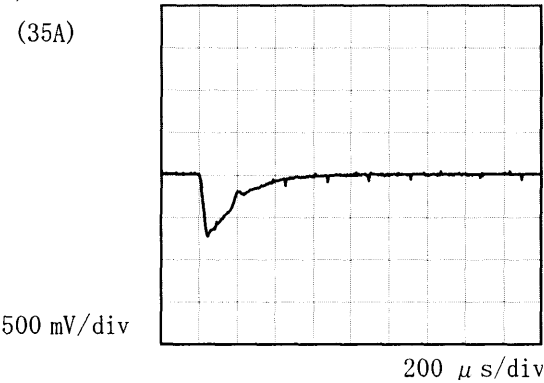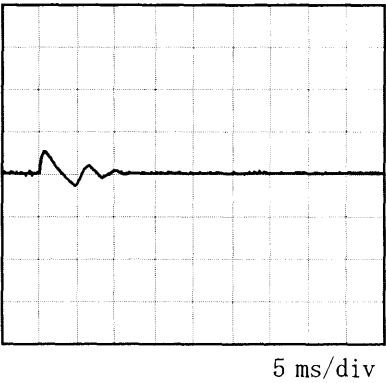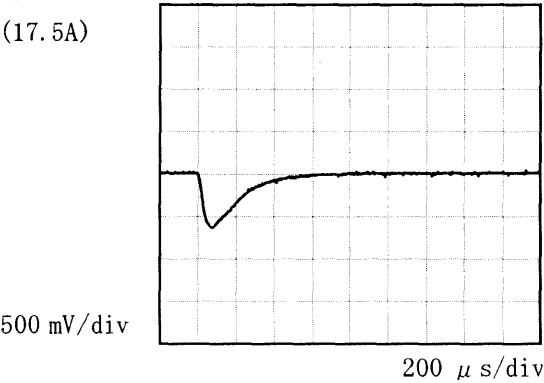
Load 10% (3.5A) ←→
Load 100% (35A)

500 mV/div

200 μs/div

5 ms/div

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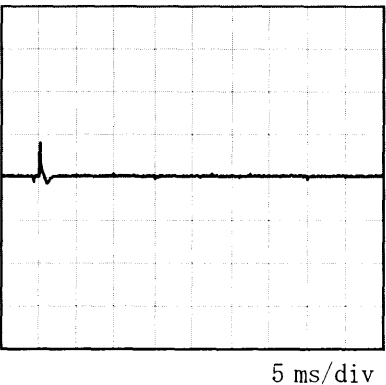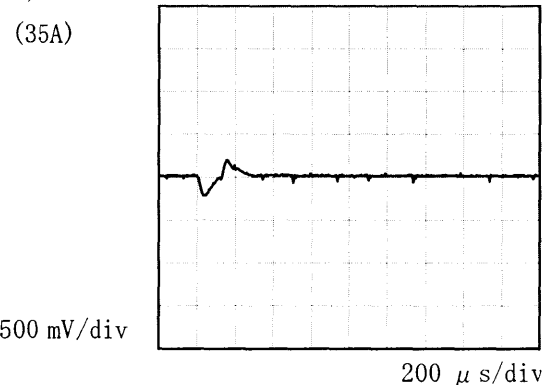
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Model	CBS2004803
Item	Rise and Fall Time 立上り、立下り時間
Object	+3.3V35A

Temperature	25℃
Testing Circuitry	Figure A

1. Graph

Input Volt.   36 V

Load 50%

Output Volt. [0.5V/div]

Load 100%

Output Volt. [0.5V/div]

Input Volt. [10V/div]

Time   [50mS/div]

Time   [10mS/div]
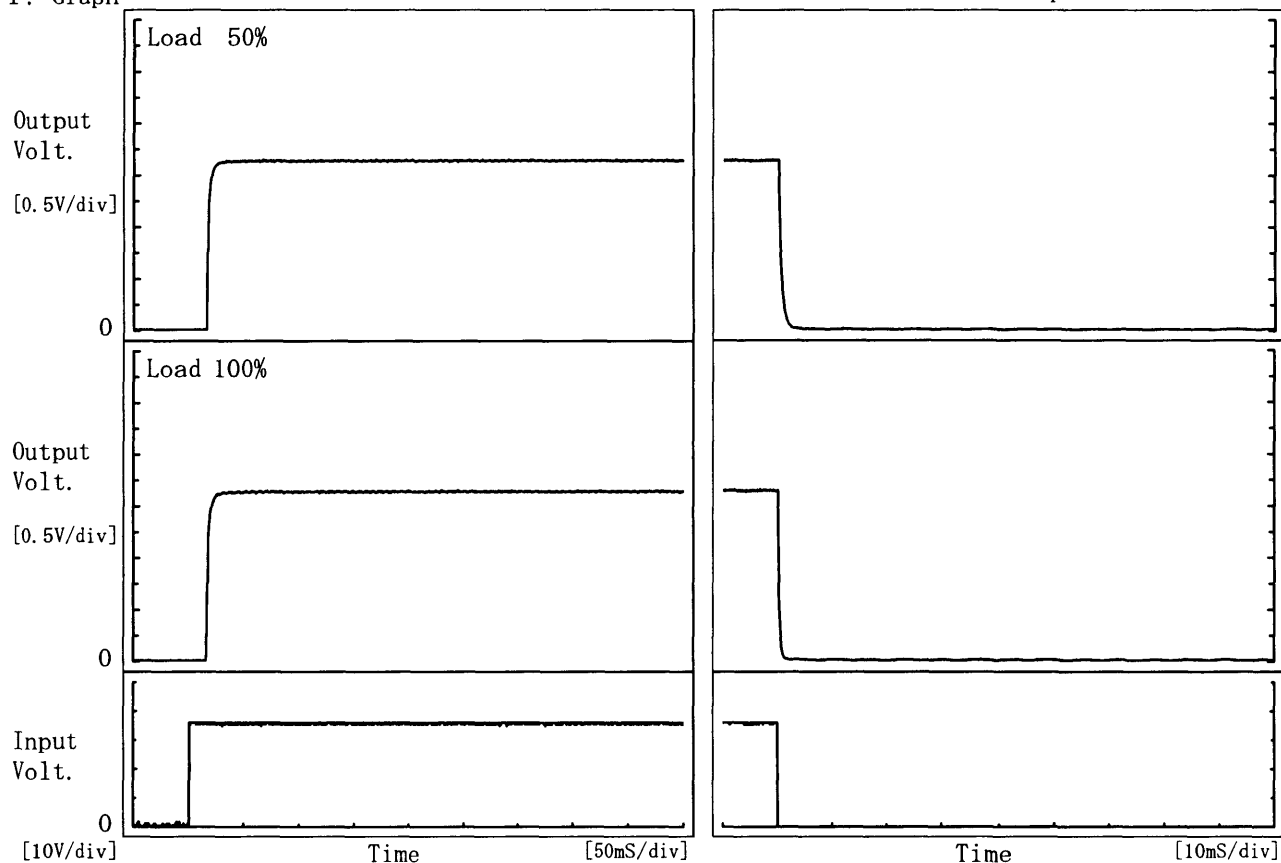
2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	16.8	5.3	22.0	0.1	1.2
100 %	16.8	5.0	21.8	0.1	0.6

Output Volt.
90%
10%
Input Volt.
Td Tr Th Tf
Ts

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Model	CBS2004803
Item	Ambient Temperature Drift 周囲温度変動
Object	+3.3V35A

Testing Circuitry   Figure A

1. Graph

———△——— Input Volt.   36V
- - -⊡- - - Input Volt.   48V
—·—○—·— Input Volt.   76V

Ambient Temperature [℃]

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 [℃]	Output Voltage [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-50	3.309	3.309	3.309
-40	3.310	3.311	3.311
-20	3.312	3.313	3.313
0	3.314	3.314	3.314
25	3.314	3.314	3.314
40	3.311	3.311	3.311
60	3.307	3.307	3.306
85	3.300	3.300	3.300
100	3.296	3.295	3.295
105	3.293	3.293	3.293
--	-	-	-

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Model	CBS2004803
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+3.3V35A

Testing Circuitry   Figure A

1. Graph

--- ⊟ --- Load 50%
——— △ ——— Load 100%

Ambient Temperature [℃]

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 [℃]	Input Voltage [V]	
	Load 50%	Load 100%
-50	28.3	28.4
-40	28.3	28.4
-20	28.3	28.4
0	28.3	28.4
25	28.3	28.4
40	28.1	28.1
60	28.1	27.9
85	27.8	27.9
100	27.7	27.7
105	27.7	27.7
--	-	-

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COSEL

Model	CBS2004803
Item	Ripple Voltage (by Ambient Temp.) リップル電圧（周囲温度特性）
Object	+3.3V35A

Testing Circuitry   Figure A

1. Graph

--- □ --- Load 50%
——△—— Load 100%

Ambient Temperature [℃]

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。

2. Values

Ambient Temperature [℃]	Ripple Voltage [mV]	
	Load 50%	Load 100%
−50	100	100
−40	75	75
−20	30	30
0	15	15
25	10	10
40	10	10
60	10	10
85	10	10
100	15	15
105	15	15
——	—	—

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Model	CBS2004803
Item	Time Lapse Drift 経時ドリフト
Object	+3.3V35A

Temperature   25℃
Testing Circuitry   Figure A

1. Graph

Input Volt.   48V
Load   100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	3.310
0.5	3.308
1.0	3.308
2.0	3.308
3.0	3.308
4.0	3.308
5.0	3.308
6.0	3.308
7.0	3.308
8.0	3.308

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Model	CBS2004803
Item	Output Voltage Accuracy 定電圧精度
Object	+3.3V35A

Testing Circuitry   Figure A

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 ～ 35A

* Output Voltage Accuracy = ± (Maximum of Output Voltage − Minimum of Output Voltage)／2

* Output Voltage Accuracy (Ration) = $\dfrac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}}$ × 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 ～ 35A

* 定電圧精度(変動値) ＝ ±(出力電圧の最高値−出力電圧の最低値)／2

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

2. Values

Item	Temperature [℃]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	76	0	3.313	±10	±0.3
Minimum Voltage	100	76	35	3.294		

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参考資料

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Model	CBS2004803
Item	Condense 結露特性
Object	+3.3V35A

Testing Circuitry   Figure A

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]	3.311	Input Volt.:48V, Load Current.:35A
Line Regulation [mV]	1	Input Volt.:36～76V, Load Current.:35A
Load Regulation [mV]	2	Input Volt.:48V, Load Current.:0～35A

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Model	CBS2004803
Item	Line Noise Tolerance 入力雑音耐量
Object	+3.3V35A

Temperature	25℃
Testing Circuitry	Figure B

1．Conditions

・Input Voltage ： 48 V   ・Pulse Input Duration ： 1 min. or more

・Pulse Voltage ： 2000 V   ・Load ： 100 %

・Pulse Cycle ： 16.7 ms

2．Results

Pulse Width [ns]	MODE		POLARITY	No protection failure should occur 保護回路の誤動作がない	DC-like Regulation of Output Voltage 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

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Temperature Chamber
恒温槽

DC Power
Supply
DC電源

Electronic
Switch
電子スイッチ

Power Meter
電力計

Power Supply
供試電源
Figure C

Electronic
DC Load
電子負荷装置

Oscilloscope
オシロスコープ

Relay Unit
リレー・ユニット

DVM

Data Acquisition/Control Unit
データ集録システム

Figure A

DC Input Line
商用電源

DC Voltmeter
直流電圧計

Noise
Simulator
ノイズ シミュレータ

CASE

Power Supply
供試電源
Figure C

DC Ammeter
直流電流計

Adjustable
Load
可変負荷

Digital
Voltmeter
直流電圧計

Figure B

+VIN

RC

C2
4700pF

CASE

C1
33μF

-VIN

CBS

+VOUT

+S

TRM

-S

-VOUT

C3
0.1μF

C4
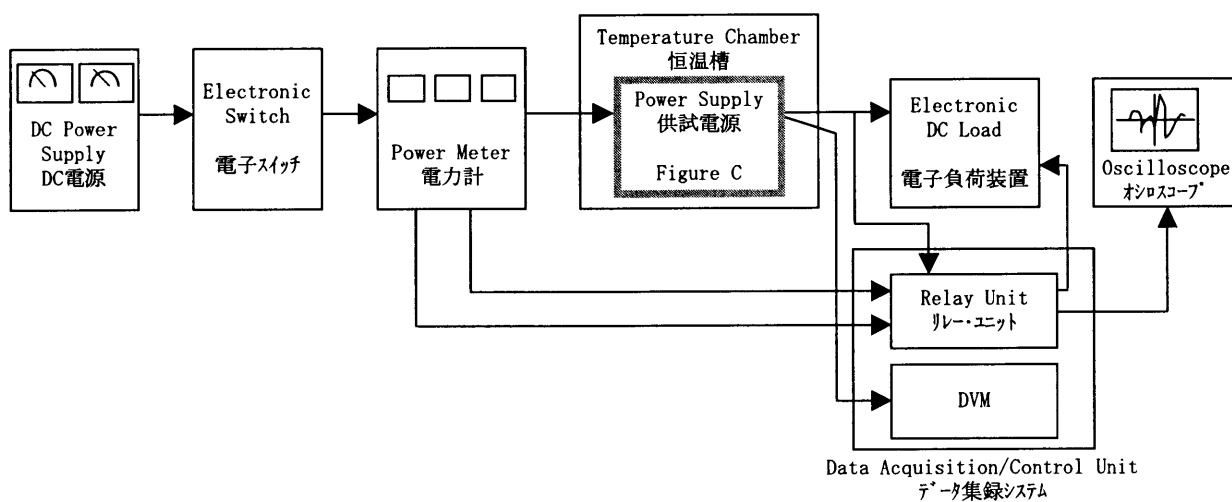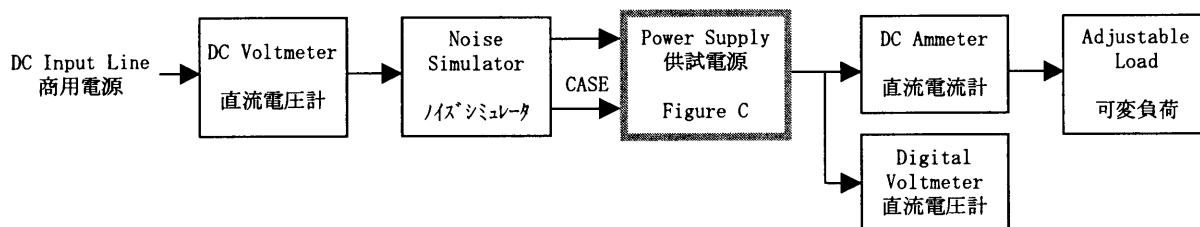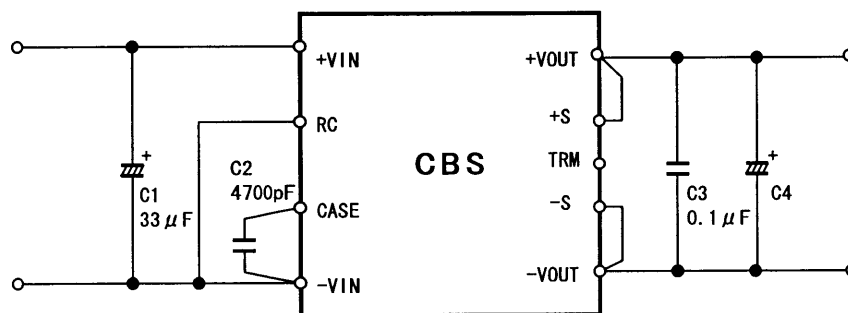
Figure C

C1 : 100V 33μF
C2 : 4700pF
C3 : 50V 0.1μF

$(-40℃ \leq T_B \leq -20℃)$

C4 : CBS2004803, 05   10V 2200μF ×2
     CBS2004812, 15   25V 1000μF ×2
     CBS2004824, 28   35V 470μF   ×2

$(-20℃ < T_B \leq 100℃)$

C4 : CBS2004803, 05   10V 2200μF
     CBS2004812, 15   25V 1000μF
     CBS2004824, 28   35V 470μF

T_B : Base Plate Temp.

BC-3333