COSEL

TEST DATA OF CBS2004815
(48V INPUT)

Regulated DC Power Supply
Mar. 3, 2001

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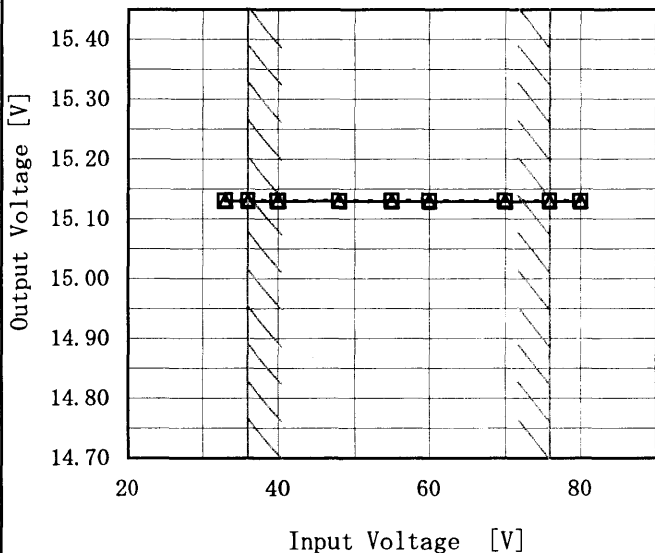
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Model	CBS2004815
Item	Line Regulation 静的入力変動
Object	+15V13.4A

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]	Output Voltage [V]	
	Load 50%	Load 100%
33	15.132	15.130
36	15.131	15.130
40	15.131	15.130
48	15.131	15.130
55	15.131	15.129
60	15.131	15.129
70	15.131	15.129
76	15.131	15.129
80	15.131	15.129

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Model	CBS2004815
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] vs 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
31.4	0.091	3.768	7.520
33.0	0.088	3.542	7.240
36.0	0.083	3.206	6.520
40.0	0.077	2.878	5.800
48.0	0.063	2.406	4.820
60.0	0.052	1.936	3.840
70.0	0.048	1.668	3.294
76.0	0.045	1.543	3.036
80.0	0.044	1.470	2.888
——	—	—	—
——	—	—	—
——	—	—	—
——	—	—	—

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COSEL

Model	CBS2004815
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

Load Current　[A]

2. Values

Load Current [A]	Input Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	0.082	0.062	0.044
2.0	1.012	0.774	0.509
4.0	1.918	1.449	0.948
6.0	2.844	2.140	1.380
8.0	3.798	2.842	1.820
10.0	4.720	3.536	2.264
12.0	5.710	4.261	2.717
13.4	6.410	4.770	3.026
14.8	7.080	5.270	3.354
——	–	–	–
——	–	–	–

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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COSEL

Model	CBS2004815
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

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]	Input Power [W]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	3.0	3.0	3.4
2.0	36.6	37.2	38.7
4.0	69.1	69.4	72.2
6.0	102.1	102.6	104.9
8.0	135.7	135.8	138.6
10.0	170.2	169.7	172.2
12.0	205.1	204.0	206.1
13.4	229.7	228.1	230.1
14.8	255.3	252.9	254.8
---	–	–	–
---	–	–	–

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Model	CBS2004815
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%

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]	Efficiency [%]	
	Load 50%	Load 100%
33	87.8	86.8
36	88.4	87.5
40	88.7	88.0
48	88.3	88.0
55	87.9	88.2
60	87.7	88.1
70	87.0	87.6
76	86.6	87.4
80	86.4	87.3

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COSEL

Model	CBS2004815
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	–	–	–
2.0	81.3	80.2	76.8
4.0	86.4	86.3	82.9
6.0	88.0	87.8	86.0
8.0	88.4	88.6	86.9
10.0	88.2	88.6	87.3
12.0	87.7	88.3	87.5
13.4	87.4	88.0	87.5
14.8	86.9	87.6	87.1
——	–	–	–
——	–	–	–

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	CBS2004815
Item	Load Regulation 静的負荷変動
Object	+15V13.4A

Temperature　　　25℃
Testing Circuitry　　Figure A

1. Graph

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

Output Voltage [V] vs Load Current [A]

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	15.127	15.127	15.127
2.0	15.127	15.127	15.128
4.0	15.127	15.128	15.128
6.0	15.127	15.128	15.128
8.0	15.127	15.128	15.129
10.0	15.127	15.128	15.128
12.0	15.127	15.128	15.128
13.4	15.128	15.128	15.128
14.8	15.128	15.128	15.129
--	–	–	–

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Model	CBS2004815
Item	Ripple Voltage (by Load Current) リップル電圧（負荷特性）
Object	+15V13.4A

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]
0.0	5	5
2.7	10	15
5.4	10	15
8.0	10	15
10.7	10	15
13.4	10	15
16.1	10	15
——	—	—
——	—	—
——	—	—
——	—	—

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	CBS2004815
Item	Ripple-Noise リップルノイズ
Object	+15V13.4A

Temperature	25℃
Testing Circuitry	Figure A

1. Graph

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

Ripple-Noise [mV] vs 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

2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.0	20	30
2.7	35	45
5.4	45	45
8.0	55	45
10.7	75	50
13.4	85	65
16.1	85	75
--	—	—
--	—	—
--	—	—
--	—	—

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Model	CBS2004815
Item	Overcurrent Protection 過電流保護
Object	+15V13.4A

Temperature	25℃
Testing Circuitry	Figure A

1. Graph

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

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。

Intermittent operation occurs when the output voltage is from 10V to 0V.
10V～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]
15.00	14.27	13.42	13.43
14.25	17.56	17.68	18.24
13.50	17.74	17.73	18.39
12.00	17.79	17.89	18.61
10.50	17.81	17.98	18.84
---	—	—	—
---	—	—	—
---	—	—	—
---	—	—	—
---	—	—	—
---	—	—	—
---	—	—	—

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参考資料

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Model	CBS2004815
Item	Overvoltage Protection 過電圧保護
Object	+15V13.4A

Testing Circuitry   Figure A

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

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	19.50	19.50	19.50
-40	19.49	19.49	19.49
-20	19.56	19.56	19.56
0	19.56	19.56	19.56
25	19.55	19.55	19.55
40	19.55	19.55	19.55
60	19.49	19.49	19.49
85	19.48	19.48	19.48
100	19.48	19.48	19.48
105	19.42	19.42	19.42
──	─	─	─

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Model	CBS2004815		
Item	Dynamic Load Response 動的負荷変動	Temperature	25℃
		Testing Circuitry	Figure A
Object	+15V13.4A		

Input Volt.　　48 V

Cycle　　　　1000 ms

Load Current

Min. Load (0A) ←→
Load 100% (13.4A)
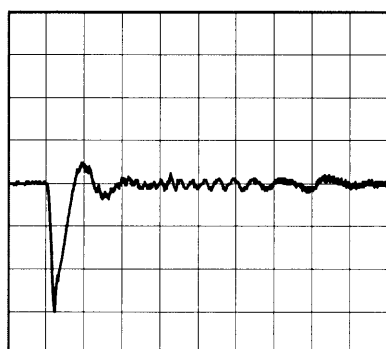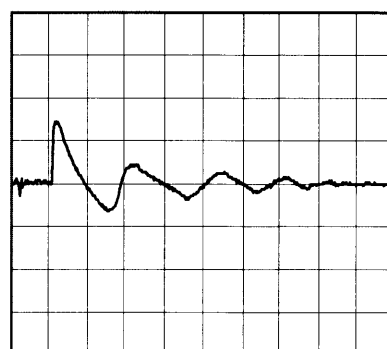
200 mV/div　　　　　200 μs/div　　　　　2 ms/div

Min. Load (0A) ←→
Load 50% (6.7A)
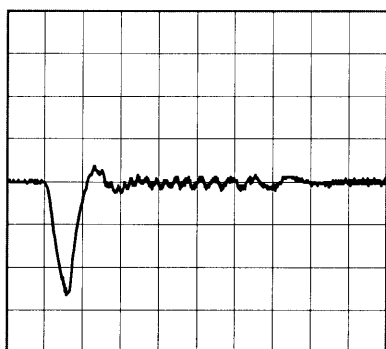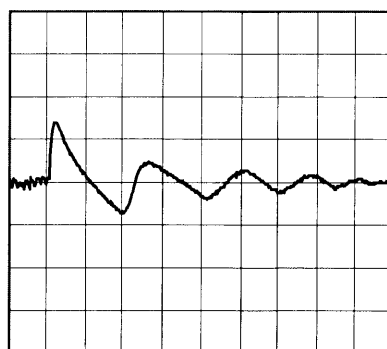
200 mV/div　　　　　200 μs/div　　　　　2 ms/div

Load 10% (1.34A) ←→
Load 100% (13.4A)

200 mV/div　　　　　200 μs/div　　　　　2 ms/div

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Model	CBS2004815
Item	Rise and Fall Time 立上り、立下り時間
Object	+15V13.4A

Temperature	25℃
Testing Circuitry	Figure A

1. Graph

Input Volt. 36 V

Load 50%

Output Volt. [2V/div]

0

Load 100%

Output Volt. [2V/div]

0

Input Volt. [10V/div]

0

Time   [50mS/div]

Time   [10mS/div]

2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	16.3	6.5	22.8	0.3	6.1
100 %	16.3	6.5	22.8	0.2	3.0

Output Volt.

90%

10%

Input Volt.

Td   Tr   Th   Tf

Ts

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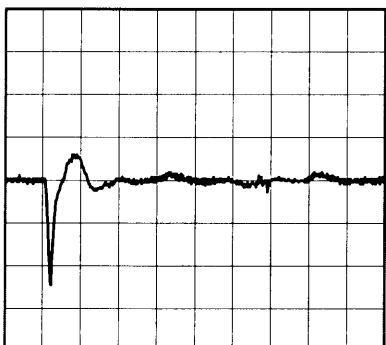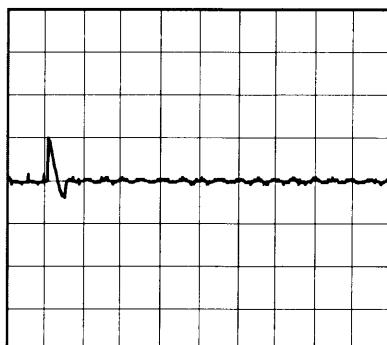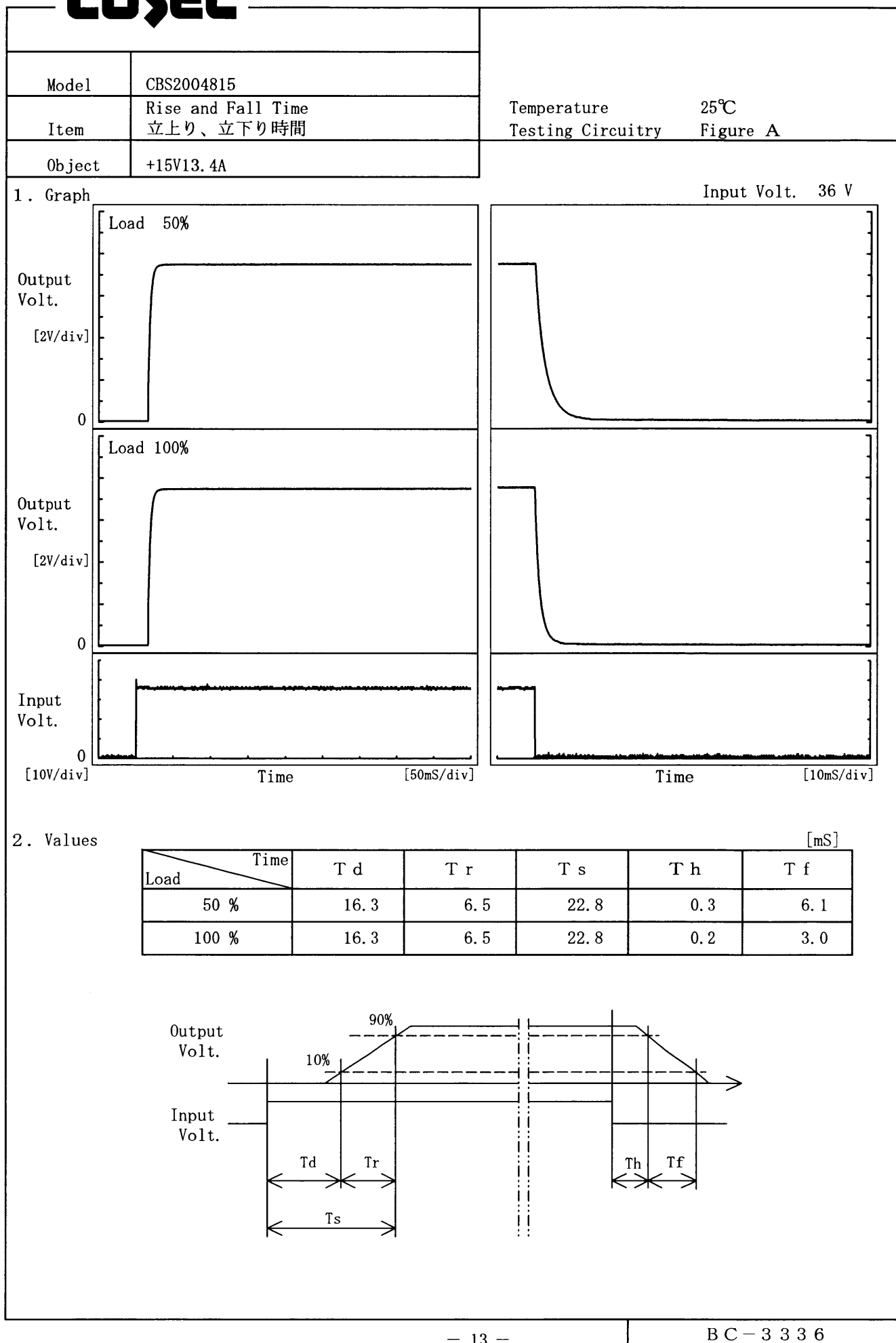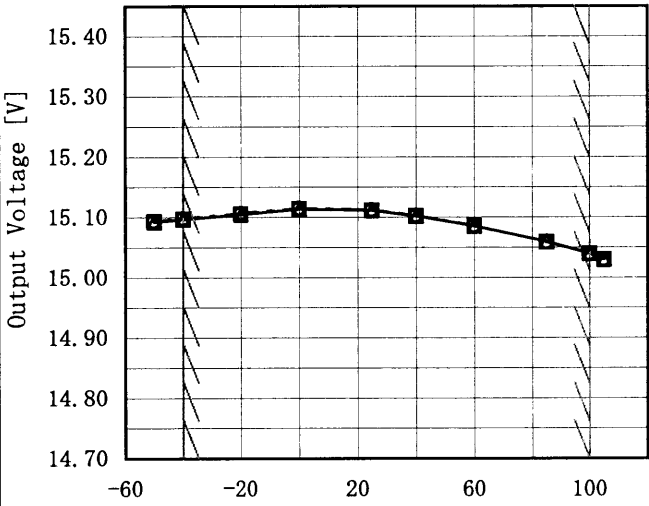
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Model	CBS2004815
Item	Ambient Temperature Drift 周囲温度変動
Object	+15V13.4A

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	15.093	15.093	15.094
−40	15.097	15.097	15.098
−20	15.105	15.106	15.106
0	15.114	15.114	15.115
25	15.112	15.112	15.112
40	15.102	15.102	15.103
60	15.086	15.085	15.086
85	15.060	15.059	15.059
100	15.040	15.040	15.039
105	15.030	15.030	15.030
−−	−	−	−

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Model	CBS2004815
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+15V13.4A

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	28.5	28.9
−40	28.5	29.1
−20	28.5	29.3
0	28.5	29.4
25	28.5	29.8
40	28.5	29.8
60	28.5	30.0
85	28.5	30.1
100	28.5	30.1
105	28.5	30.1
――	−	−

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Model	CBS2004815
Item	Ripple Voltage (by Ambient Temp.) リップル電圧（周囲温度特性）
Object	+15V13.4A

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	110	115
-40	115	110
-20	75	75
0	40	35
25	15	15
40	15	15
60	15	15
85	25	25
100	35	35
105	45	40
--	—	—

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Model	CBS2004815
Item	Time Lapse Drift 経時ドリフト
Object	+15V13.4A

Temperature	25℃
Testing Circuitry	Figure A

1. Graph

Input Volt.   48V

Load   100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	15.098
0.5	15.087
1.0	15.087
2.0	15.088
3.0	15.088
4.0	15.088
5.0	15.088
6.0	15.089
7.0	15.089
8.0	15.089

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Model	CBS2004815
Item	Output Voltage Accuracy 定電圧精度
Object	+15V13.4A

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 ～ 13.4A

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

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

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 ～ 13.4A

* 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) = $\dfrac{\text{変動値}}{\text{定格出力電圧}} \times 100$

2. Values

Item	Temperature [℃]	Input Voltage[V]	Output Current[A]	Output Voltage[V]	Output Voltage Accuracy Value [mV]	Output Voltage Accuracy Ration [%]
Maximum Voltage	25	36	13.4	15.109	±38	±0.3
Minimum Voltage	100	76	13.4	15.033		

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Model	CBS2004815
Item	Condense 結露特性
Object	+15V13.4A

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]	15.124	Input Volt.:48V,Load Current.:13.4A
Line Regulation [mV]	1	Input Volt.:36～76V,Load Current.:13.4A
Load Regulation [mV]	1	Input Volt.:48V,Load Current.:0～13.4A

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CO$EL

Model	CBS2004815
Item	Line Noise Tolerance 入力雑音耐量
Object	+15V13.4A

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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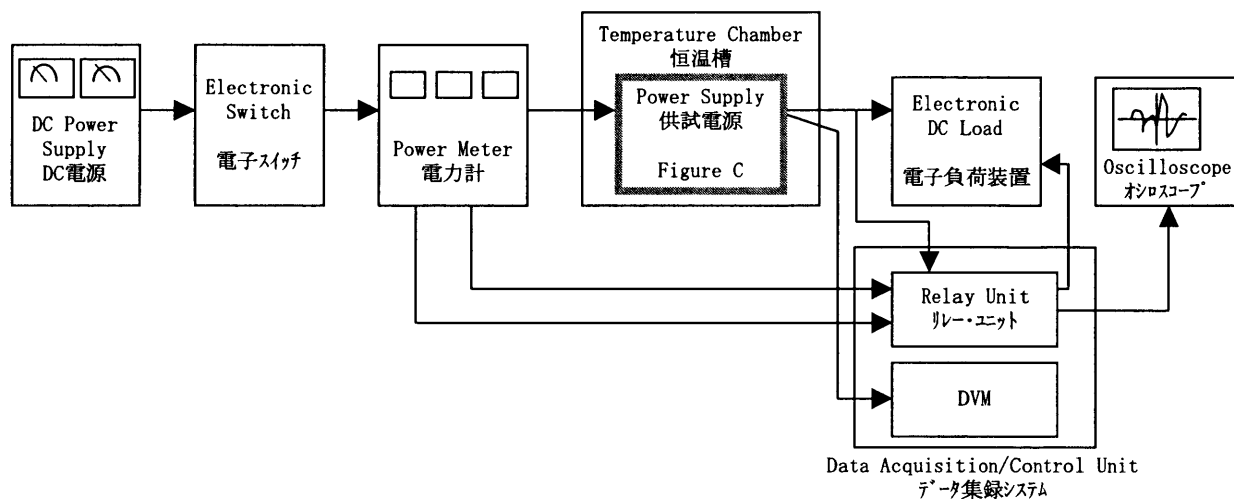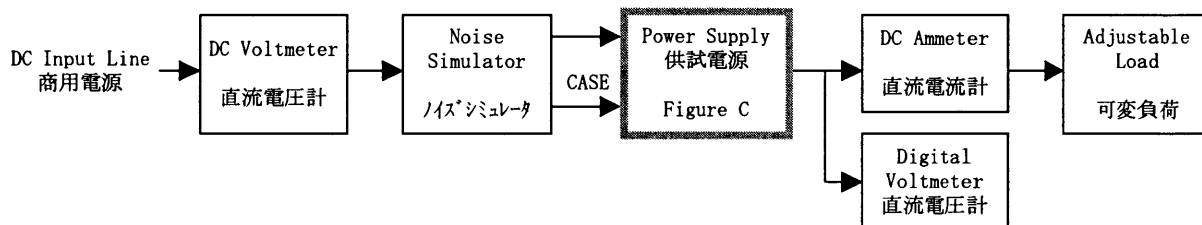
Figure A

Figure B
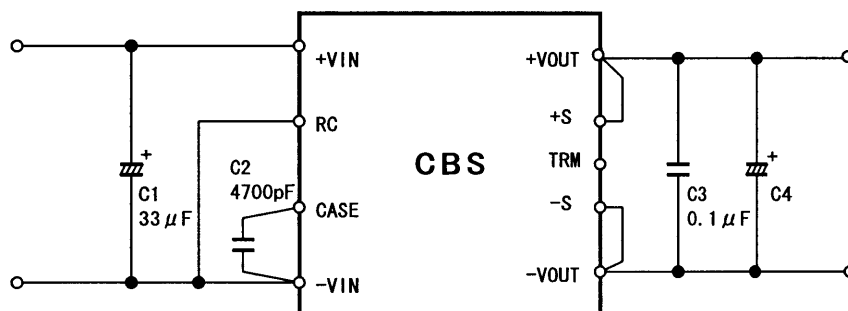
Figure C

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

($-40℃ \leqq T_B \leqq -20℃$)
C4 : CBS2004803, 05   10V 2200μF ×2
      CBS2004812, 15   25V 1000μF ×2
      CBS2004824, 28   35V 470μF ×2

($-20℃ < T_B \leqq 100℃$)
C4 : CBS2004803, 05   10V 2200μF
      CBS2004812, 15   25V 1000μF
      CBS2004824, 28   35V 470μF

T_B:Base Plate Temp.

BC－3336