



TEST DATA OF CBS2002403

(24V INPUT)

Regulated DC Power Supply
Apr. 9, 2002

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Prepared by : Tomoaki Oiwake Tomoaki Oiwake Design Engineer

コーワセル株式会社
COSEL CO.,LTD.

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COSSEL

Model	CBS2002403																																	
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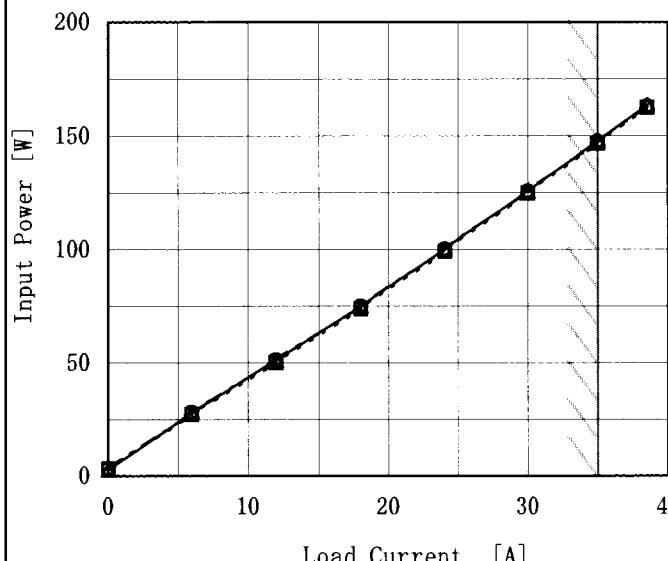
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30.0	125.8	124.7	125.6																																																			
35.0	147.9	146.6	147.5																																																			
38.5	163.6	162.4	163.1																																																			
—	—	—	—																																																			
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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。

Model	CBS2002403																																	
Item	Efficiency (by Input Voltage) 効率(入力電圧特性)	Temperature 25°C Testing Circuitry Figure A																																
Object	_____																																	
1. Graph																																		
<p>Efficiency [%]</p> <p>Input Voltage [V]</p> <p>Legend: Load 50% (dashed line with squares), Load 100% (solid line with triangles)</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>																																		
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Model	CBS2002403																																																				
Item	Efficiency (by Load Current) 効率(負荷特性)	Temperature Testing Circuitry	25°C Figure A																																																		
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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。

Model	CBS2002403		
Item	Load Regulation 静的負荷変動	Temperature Testing Circuitry	25°C Figure A
Object	+3.3V35A		
1. Graph	<p>—▲— Input Volt. 18V - - ■ - - Input Volt. 24V - · ○ - - Input Volt. 36V</p>		
2. Values	Load Current [A]	Output Voltage [V]	
	Input Volt.	Input Volt.	Input Volt.
	18[V]	24[V]	36[V]
0.0	3.350	3.350	3.350
6.0	3.350	3.350	3.350
12.0	3.350	3.350	3.350
18.0	3.350	3.350	3.350
24.0	3.350	3.350	3.350
30.0	3.350	3.350	3.350
35.0	3.350	3.350	3.350
38.5	3.350	3.350	3.350
—	—	—	—
—	—	—	—

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

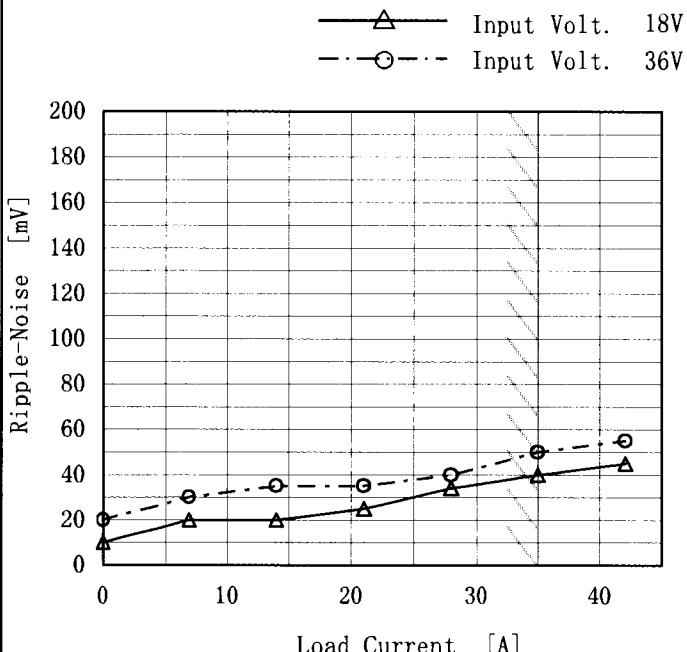
(注) 斜線は定格負荷電流範囲を示す。

Model	CBS2002403																																							
Item	Ripple Voltage (by Load Current) リップル電圧 (負荷特性)	Temperature 25°C Testing Circuitry Figure A																																						
Object	+3.3V35A																																							
1. Graph																																								
<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The Y-axis ranges from 0 to 50 mV, and the X-axis ranges from 0 to 40 A. Two sets of data points are plotted: Input Volt. 18V (triangles) and Input Volt. 36V (circles). A slanted line indicates the rated load current range.</p> <table border="1"> <caption>Data points estimated from the graph</caption> <thead> <tr> <th>Load Current [A]</th> <th>Ripple Voltage [mV] (Input Volt. 18V)</th> <th>Ripple Voltage [mV] (Input Volt. 36V)</th> </tr> </thead> <tbody> <tr><td>0</td><td>5</td><td>5</td></tr> <tr><td>7</td><td>10</td><td>15</td></tr> <tr><td>14</td><td>10</td><td>15</td></tr> <tr><td>21</td><td>10</td><td>15</td></tr> <tr><td>28</td><td>10</td><td>15</td></tr> <tr><td>35</td><td>10</td><td>15</td></tr> <tr><td>42</td><td>10</td><td>15</td></tr> </tbody> </table>			Load Current [A]	Ripple Voltage [mV] (Input Volt. 18V)	Ripple Voltage [mV] (Input Volt. 36V)	0	5	5	7	10	15	14	10	15	21	10	15	28	10	15	35	10	15	42	10	15														
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<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> <p>Ripple [mV_{p-p}]</p> <p>Fig. Complex Ripple Wave Form 図 リップル波形詳細図</p>																																								

Model	CBS2002403
Item	Ripple-Noise リップルノイズ
Object	+3.3V35A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0	10	20
7	20	30
14	20	35
21	25	35
28	34	40
35	40	50
42	45	55
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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。

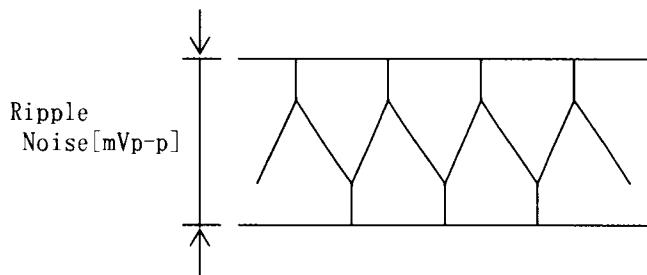


Fig. Complex Ripple Noise Wave Form
図 リップルノイズ波形

COSEL

Model	CBS2002403	Temperature 25°C Testing Circuitry Figure A		
Item	Overcurrent Protection 過電流保護			
Object	+3.3V35A			
1. Graph	<p>The graph plots Output Voltage [V] on the y-axis (0.0 to 6.0) against Load Current [A] on the x-axis (0 to 60). Three curves represent different input voltages: 18V (solid line), 24V (dashed line), and 36V (dash-dot line). All curves show a horizontal plateau at approximately 3.3V until a certain load current is reached, after which the output voltage drops sharply. A shaded rectangular region highlights the load current range where the output voltage is between 1.65V and 0V.</p>			
2. Values				
Output Voltage [V]	Load Current [A]			
Output Voltage [V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	
3.300	46.59	45.34	45.34	
3.135	46.53	45.44	45.53	
2.970	46.34	45.58	45.80	
2.640	46.22	45.78	46.29	
2.310	46.34	46.03	46.92	
1.980	46.49	46.32	47.63	
1.650	46.61	46.65	48.42	
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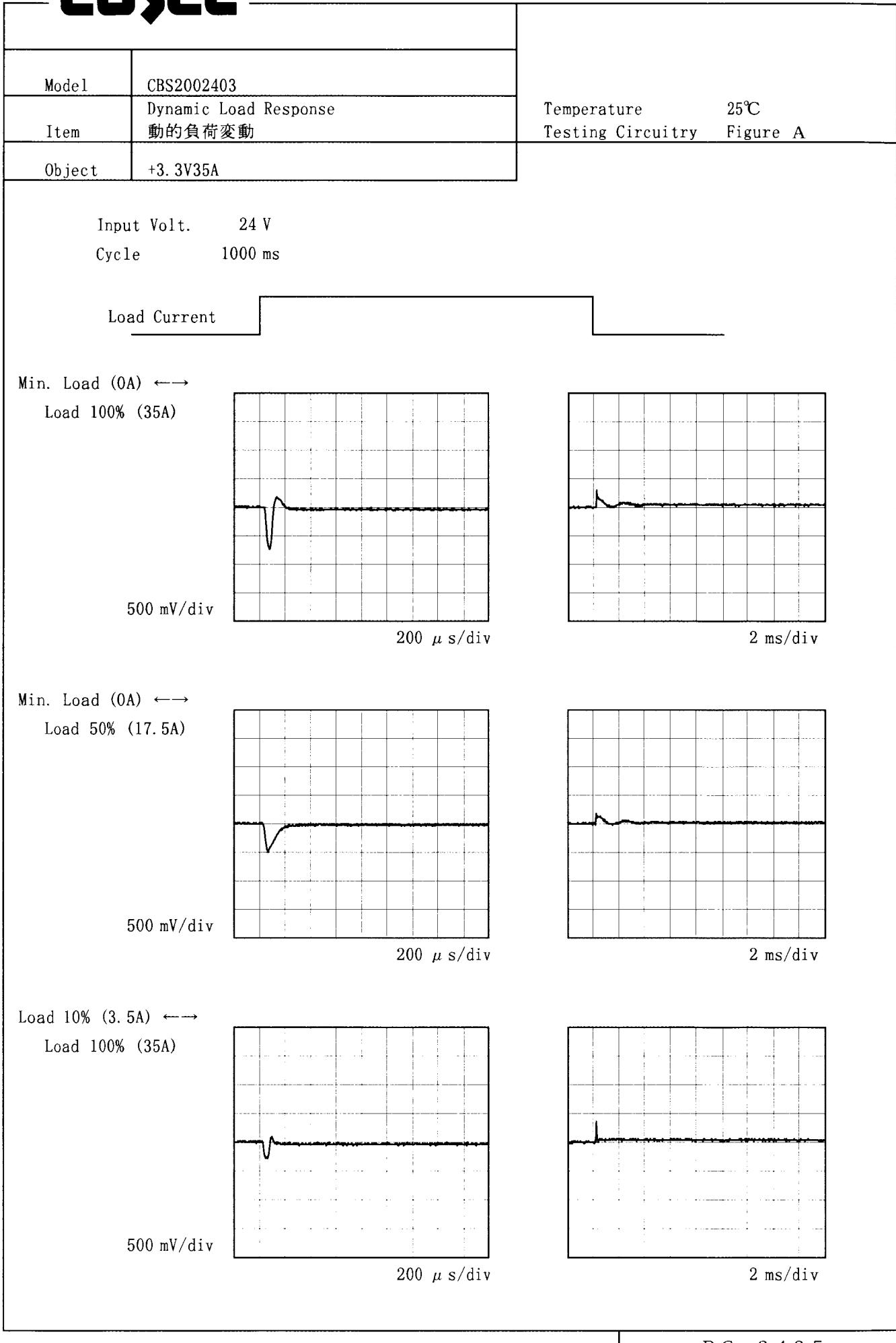
Note: Slanted line shows the range of the rated load current.
(注) 斜線は定格負荷電流範囲を示す。

Intermittent operation occurs when the output voltage is from 1.65V to 0V.
1.65V～0V間は、間欠モードとなる。

<p>Model CBS2002403</p> <p>Item Overvoltage Protection 過電圧保護</p> <p>Object +3.3V35A</p>	Testing Circuitry Figure A		
	2. Values		
1. Graph	<p>Operating Point [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 0%</p> <ul style="list-style-type: none"> — ▲ — Input Volt. 18V - - - □ - - Input Volt. 24V - - ○ - - Input Volt. 36V 		
Ambient Temperature [°C]	Operating Point [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-50	4.27	4.24	4.25
-40	4.27	4.27	4.26
-20	4.27	4.26	4.26
0	4.27	4.27	4.26
25	4.27	4.27	4.26
40	4.27	4.27	4.27
60	4.27	4.27	4.27
85	4.27	4.26	4.26
100	4.26	4.26	4.26
105	4.26	4.26	4.26
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Note: Slanted line shows the range of the rated ambient temperature.

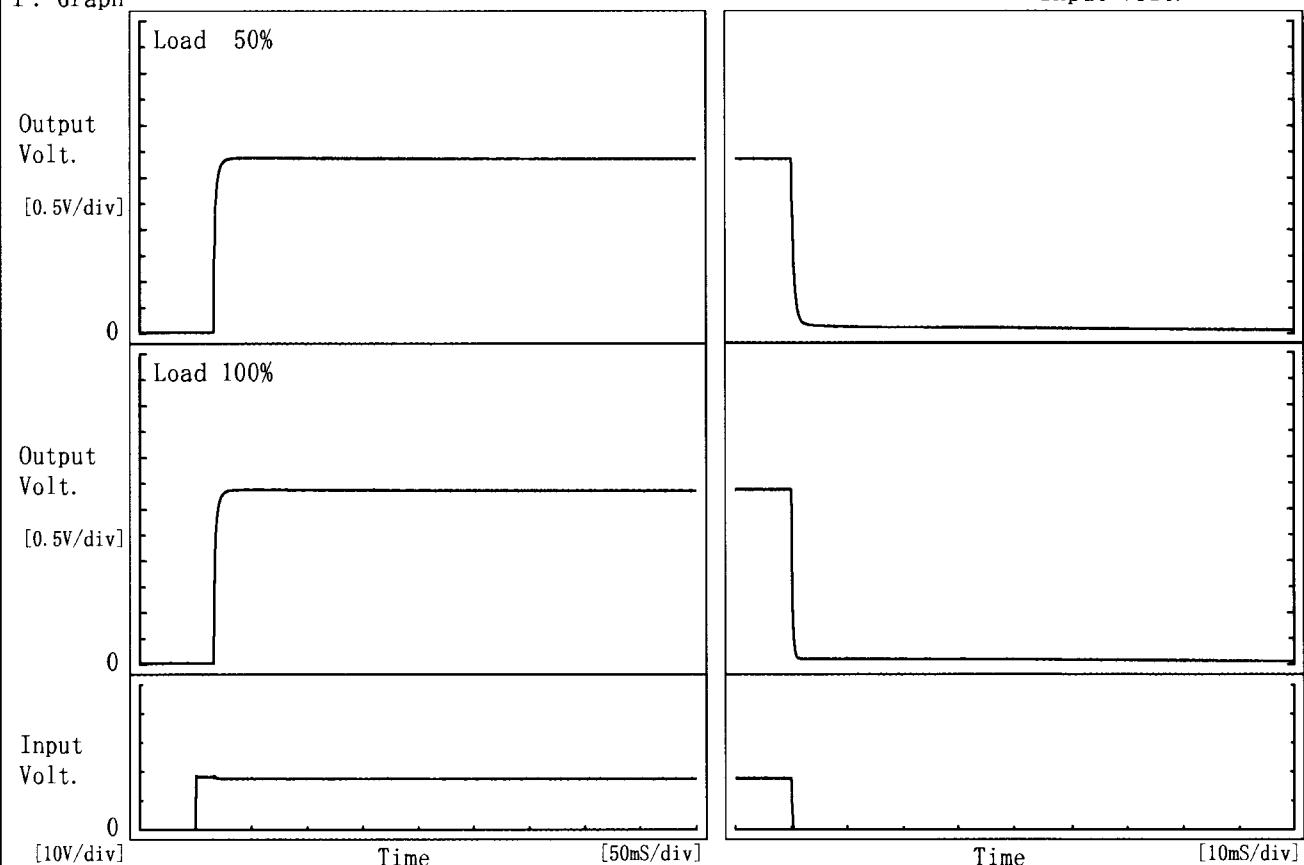
(注) 斜線は定格周囲温度範囲を示す。

COSSEL

COSEL

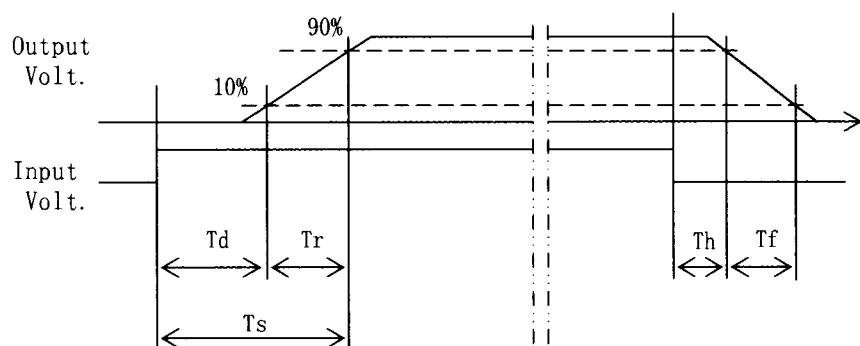
Model	CBS2002403	Temperature Testing Circuitry Figure A	25°C Figure A
Item	Rise and Fall Time 立上り、立下り時間		
Object	+3.3V35A		

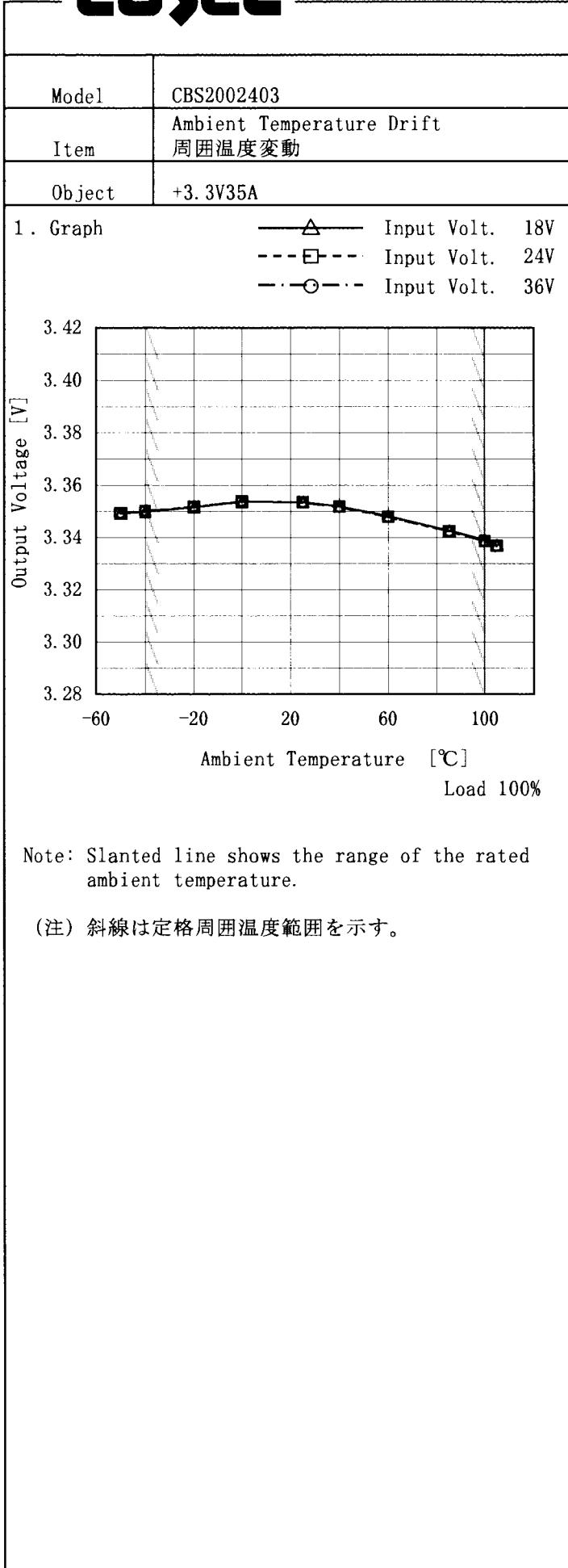
1. Graph



2. Values

Load	Time	T _d	T _r	T _s	T _h	T _f	[mS]
50 %		15.8	4.3	20.0	0.1	1.3	
100 %		15.8	4.0	19.8	0.1	0.6	





Testing Circuitry Figure A

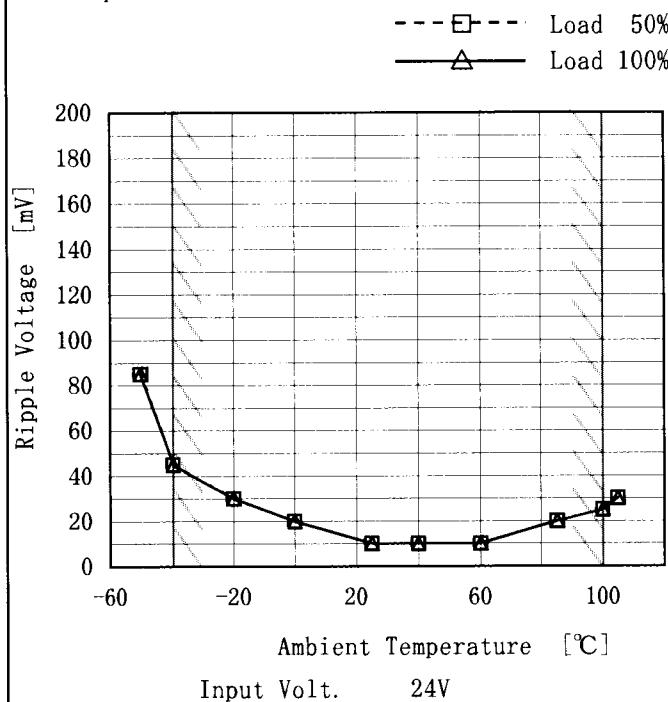
2. Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-50	3.349	3.349	3.349
-40	3.350	3.350	3.350
-20	3.352	3.352	3.352
0	3.354	3.354	3.354
25	3.354	3.354	3.353
40	3.352	3.352	3.352
60	3.348	3.348	3.348
85	3.343	3.342	3.342
100	3.339	3.339	3.339
105	3.337	3.337	3.337
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Ambient Temperature [°C]	Input Voltage [V]																																							
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<p>Note: Slanted line shows the range of the rated ambient temperature.</p> <p>(注) 斜線は定格周囲温度範囲を示す。</p>																																								

Model	CBS2002403
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)
Object	+3.3V35A

1. Graph



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。

Testing Circuitry Figure A

2. Values

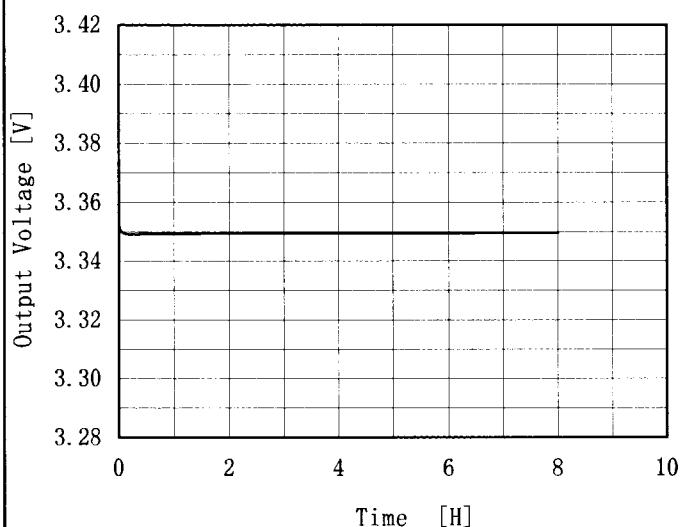
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-50	85	85
-40	45	45
-20	30	30
0	20	20
25	10	10
40	10	10
60	10	10
85	20	20
100	25	25
105	30	30
--	--	--

COSEL

Model	CBS2002403
Item	Time Lapse Drift 経時ドリフト
Object	+3.3V35A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



Input Volt. 24V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	3.353
0.5	3.349
1.0	3.349
2.0	3.349
3.0	3.350
4.0	3.350
5.0	3.350
6.0	3.350
7.0	3.350
8.0	3.350



Model	CBS2002403	Testing Circuitry Figure A
Item	Output Voltage Accuracy 定電圧精度	
Object	+3.3V35A	

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 : 18 ~ 36V

Load Current : 0 ~ 35A

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

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

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°C

入力電圧 : 18 ~ 36V

負荷電流 : 0 ~ 35A

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

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

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	18	0	3.353	± 8	± 0.2
Minimum Voltage	100	36	35	3.338		



Model	CBS2002403	Testing Circuitry Figure A
Item	Condense 結露特性	
Object	+3.3V35A	

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]	3.334	Input Volt.:24V, Load Current.:35A
Line Regulation [mV]	1	Input Volt.:18~36V, Load Current.:35A
Load Regulation [mV]	1	Input Volt.:24V, Load Current.:0~35A



Model	CBS2002403	Temperature Testing Circuitry	25°C Figure B
Item	Line Noise Tolerance 入力雑音耐量		
Object	+3.3V35A		

1. Conditions

- Input Voltage : 24 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	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
		POLARITY		
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

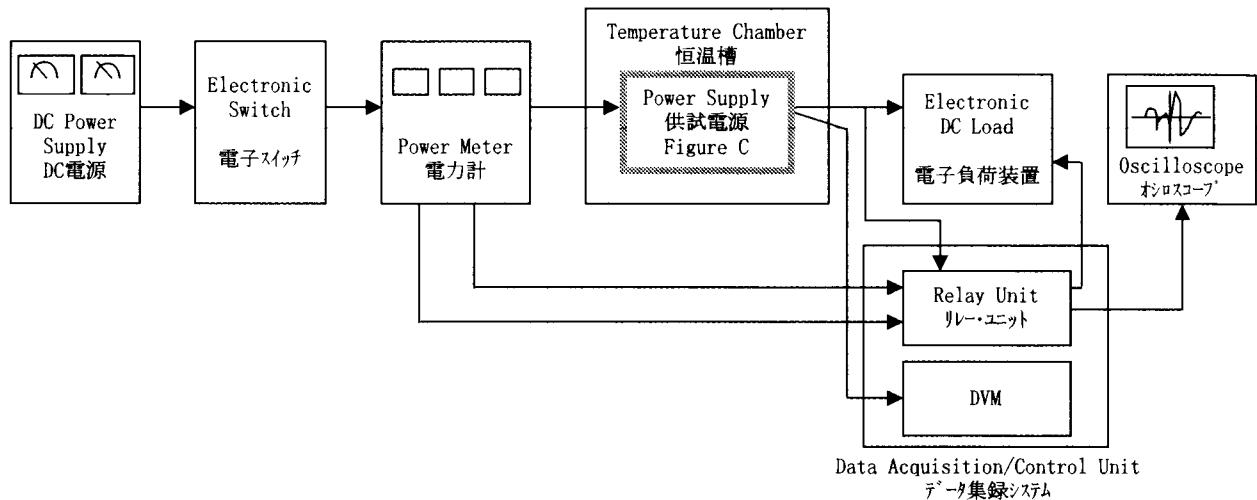


Figure A

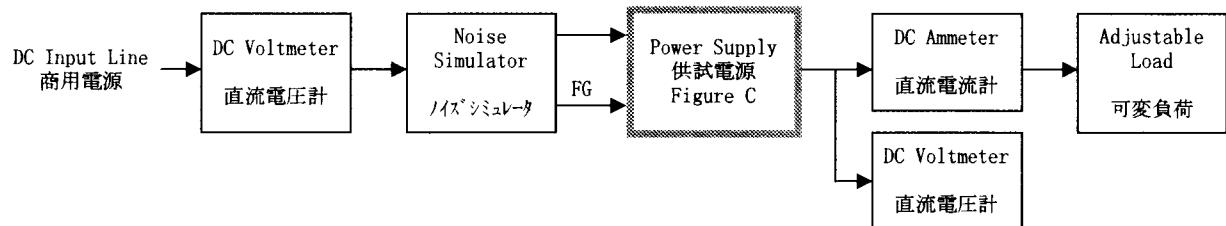
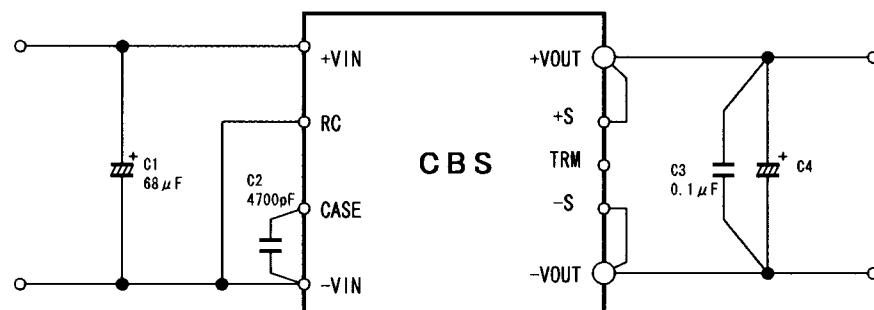


Figure B



C1 : 50V 68 μ F
 C2 : 4700pF
 C3 : 50V 0.1 μ F
 C4 : 10V 2200 μ F × 2 (-40°C ≤ T_B ≤ -20°C)
 10V 2200 μ F (-20°C < T_B ≤ 100°C)

Figure C