



# TEST DATA OF CBS502428

(24V INPUT)

Regulated DC Power Supply  
Mar. 12, 2002

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コーワセル株式会社  
**COSEL CO.,LTD.**

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Model	CBS502428	Temperature	25°C																																
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Object	+28V1.8A																																		
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<p>The graph plots Input Current [A] on the Y-axis (0.0 to 5.0) against Load Current [A] on the X-axis (0.0 to 2.0). Three curves are shown for different input voltages: 18V (solid line with triangles), 24V (dashed line with squares), and 36V (dash-dot line with circles). A diagonal line from (0,0) to approximately (1.8, 3.6) represents the rated load current range.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Input Current [A]</th> </tr> <tr> <th>Input Volt. 18[V]</th> <th>Input Volt. 24[V]</th> <th>Input Volt. 36[V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>0.111</td><td>0.090</td><td>0.074</td></tr> <tr><td>0.30</td><td>0.636</td><td>0.484</td><td>0.346</td></tr> <tr><td>0.60</td><td>1.141</td><td>0.869</td><td>0.603</td></tr> <tr><td>0.90</td><td>1.648</td><td>1.244</td><td>0.852</td></tr> <tr><td>1.20</td><td>2.180</td><td>1.632</td><td>1.108</td></tr> <tr><td>1.50</td><td>2.716</td><td>2.024</td><td>1.362</td></tr> <tr><td>1.80</td><td>3.259</td><td>2.416</td><td>1.616</td></tr> <tr><td>1.98</td><td>3.600</td><td>2.662</td><td>1.774</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> </tbody> </table>		Load Current [A]	Input Current [A]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.00	0.111	0.090	0.074	0.30	0.636	0.484	0.346	0.60	1.141	0.869	0.603	0.90	1.648	1.244	0.852	1.20	2.180	1.632	1.108	1.50	2.716	2.024	1.362	1.80	3.259	2.416	1.616	1.98	3.600	2.662	1.774	---	—	—	—	---	—	—	—	---	—	—	—
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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。

**COSSEL**

Model	CBS502428		Temperature	25°C																																															
Item	Load Regulation 静的負荷変動		Testing Circuitry	Figure A																																															
Object	+28V1.8A																																																		
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COSEL

Model	CBS502428	Temperature	25°C																																																															
Item	Ripple Voltage (by Load Current) リップル電圧 (負荷特性)	Testing Circuitry	Figure A																																																															
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1. Graph			2. Values																																																															
<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 0.0 to 2.0 A. Two sets of data points are plotted: Input Volt. 18V (solid triangles) and Input Volt. 36V (open circles). A dashed line indicates the range of the rated load current.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Ripple Voltage [mV] (18V)</th> <th>Ripple Voltage [mV] (36V)</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>5</td><td>5</td></tr> <tr><td>0.4</td><td>15</td><td>25</td></tr> <tr><td>0.7</td><td>15</td><td>25</td></tr> <tr><td>1.0</td><td>15</td><td>25</td></tr> <tr><td>1.4</td><td>15</td><td>25</td></tr> <tr><td>1.8</td><td>15</td><td>25</td></tr> <tr><td>2.2</td><td>15</td><td>25</td></tr> </tbody> </table>			Load Current [A]	Ripple Voltage [mV] (18V)	Ripple Voltage [mV] (36V)	0.0	5	5	0.4	15	25	0.7	15	25	1.0	15	25	1.4	15	25	1.8	15	25	2.2	15	25	<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 18 [V]</th> <th>Input Volt. 36 [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>5</td><td>5</td></tr> <tr><td>0.4</td><td>15</td><td>25</td></tr> <tr><td>0.7</td><td>15</td><td>25</td></tr> <tr><td>1.0</td><td>15</td><td>25</td></tr> <tr><td>1.4</td><td>15</td><td>25</td></tr> <tr><td>1.8</td><td>15</td><td>25</td></tr> <tr><td>2.2</td><td>15</td><td>25</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 18 [V]	Input Volt. 36 [V]	0.0	5	5	0.4	15	25	0.7	15	25	1.0	15	25	1.4	15	25	1.8	15	25	2.2	15	25	—	—	—	—	—	—	—	—	—	—	—	—
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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]

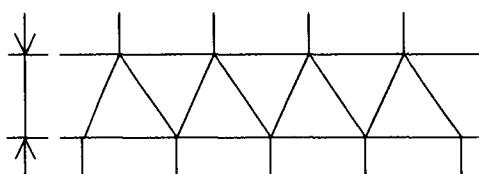


Fig. Complex Ripple Wave Form  
図 リップル波形詳細図

**CSEL**

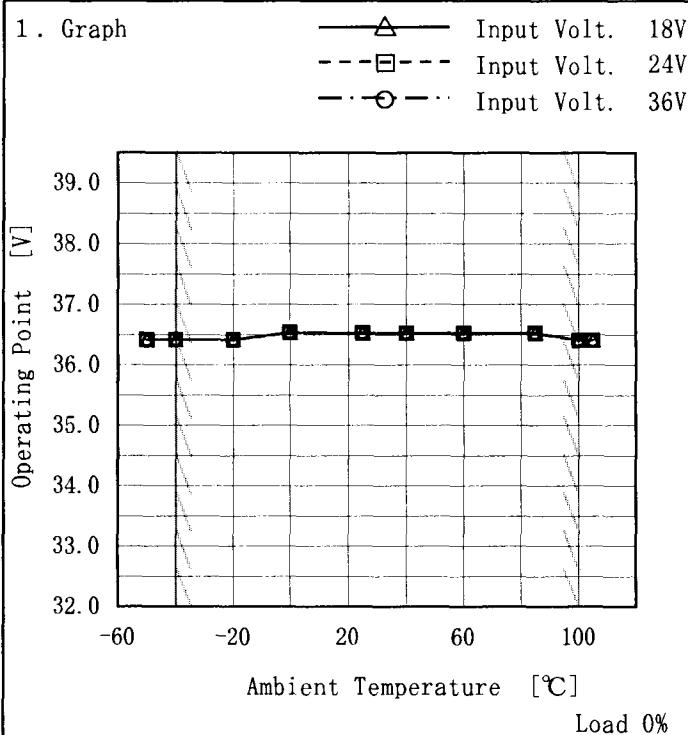
Model	CBS502428																																							
Item	Ripple-Noise リップルノイズ	Temperature 25°C Testing Circuitry Figure A																																						
Object	+28V 1.8A																																							
1. Graph																																								
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<p>Fig. Complex Ripple Noise Wave Form  图 リップルノイズ波形</p>																																								



Model	CBS502428
Item	Overvoltage Protection 過電壓保護
Object	+28V1.8A

### Testing Circuitry      Figure A

## 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。

## 2. Values

Ambient Temperature [°C]	Operating Point [V]		
	Input Volt.	Input Volt.	Input Volt.
-50	36.42	36.42	36.42
-40	36.42	36.42	36.42
-20	36.42	36.42	36.42
0	36.54	36.54	36.54
25	36.53	36.53	36.53
40	36.53	36.53	36.53
60	36.53	36.53	36.53
85	36.53	36.53	36.53
100	36.41	36.41	36.41
105	36.41	36.41	36.41
--	--	--	--

**COSSEL**

Model	CBS502428
Item	Dynamic Load Response 動的負荷變動
Object	+28V1.8A

Temperature 25°C  
Testing Circuitry Figure A

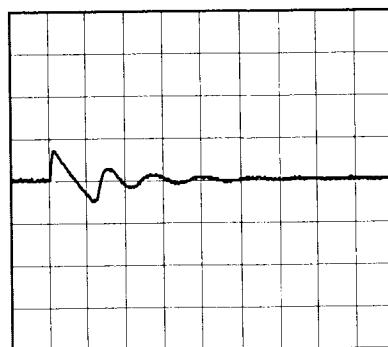
Input Volt. 24 V

Cycle 1000 ms

Min. Load (0A) ↔  
Load 100% (1.8A)

500 mV/div

500 μs/div

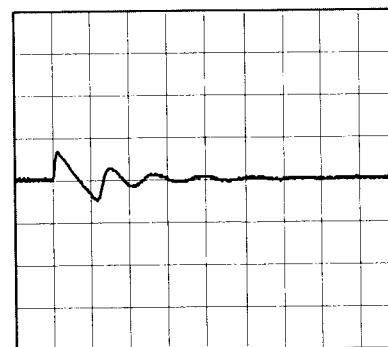


5 ms/div

Min. Load (0A) ↔  
Load 50% (0.9A)

500 mV/div

500 μs/div

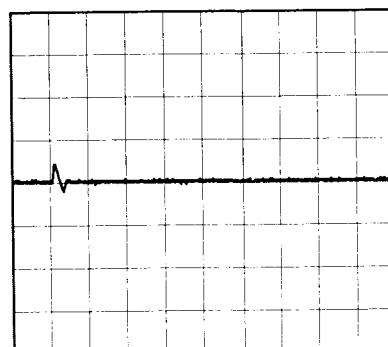


5 ms/div

Load 10% (0.18A) ↔  
Load 100% (1.8A)

500 mV/div

500 μs/div



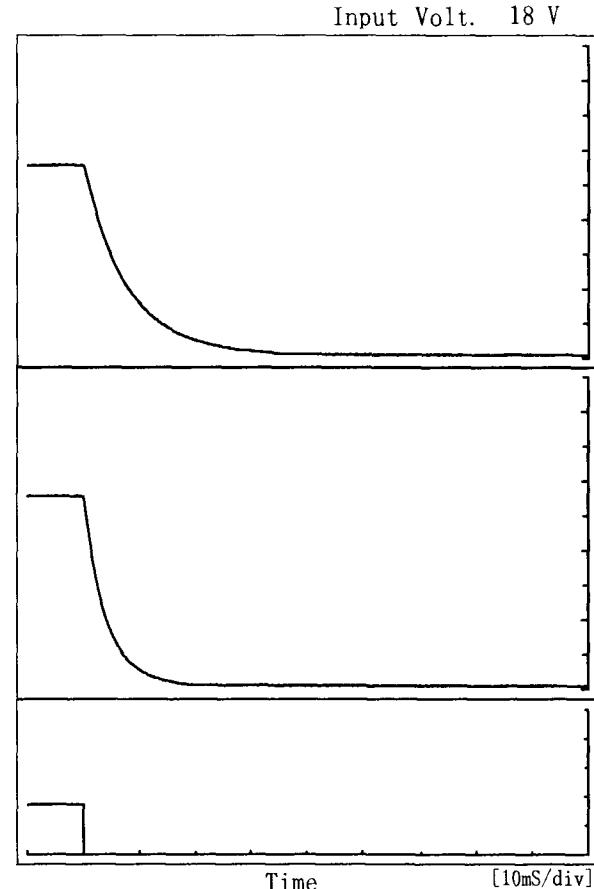
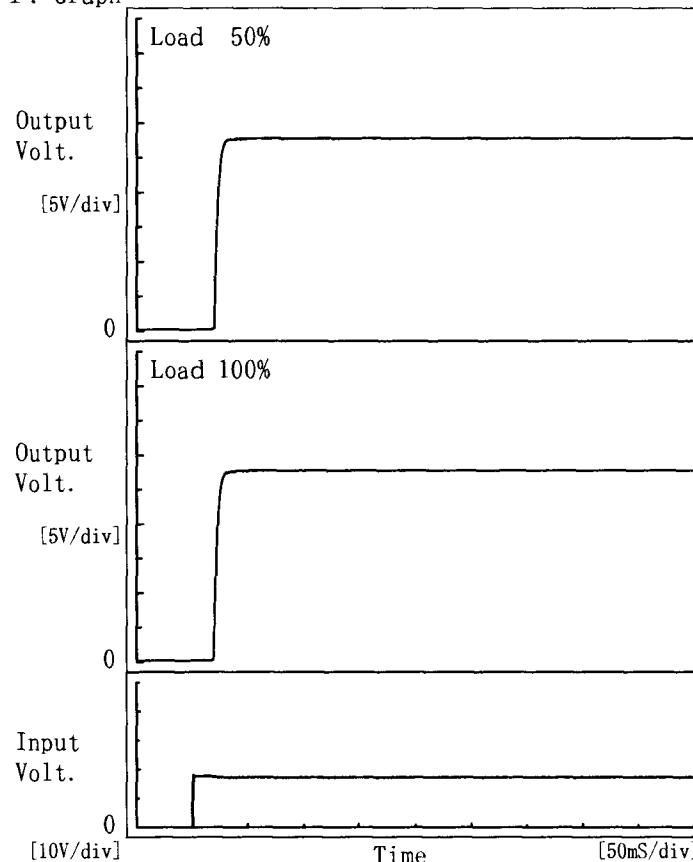
5 ms/div

**COSSEL**

Model	CBS502428
Item	Rise and Fall Time 立上り、立下り時間
Object	+28V1.8A

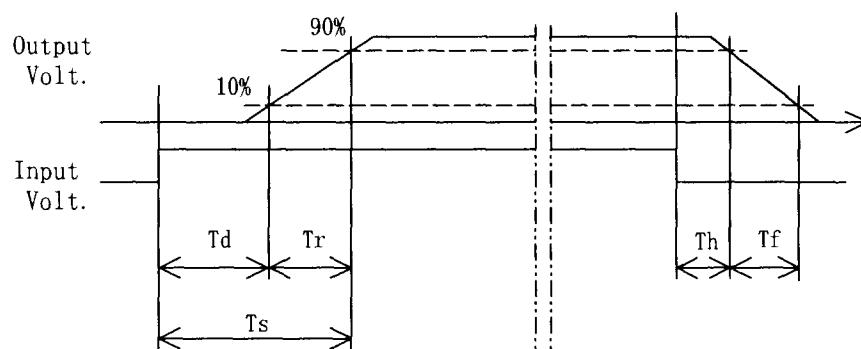
Temperature 25°C  
Testing Circuitry Figure A

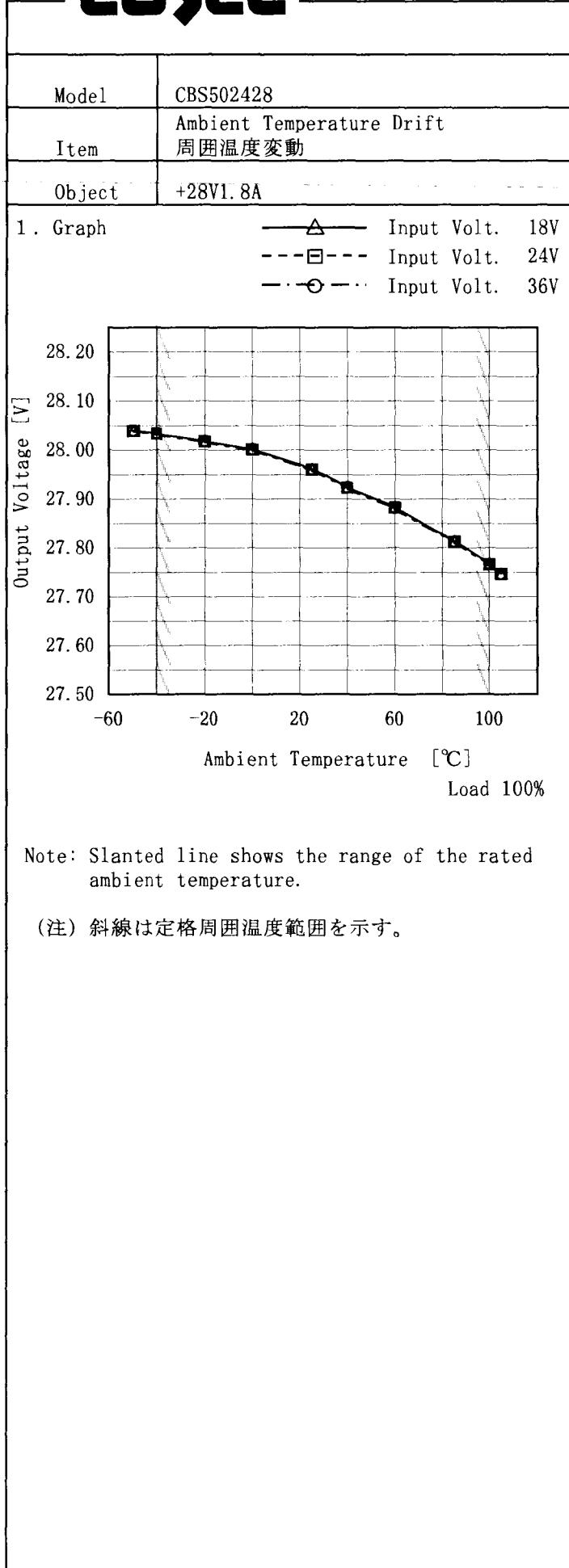
## 1. Graph



## 2. Values

Load	Time	T <sub>d</sub>	T <sub>r</sub>	T <sub>s</sub>	T <sub>h</sub>	T <sub>f</sub>	[mS]
50 %		19.5	6.5	26.0	0.8	17.8	
100 %		19.3	6.8	26.0	0.5	9.2	





Testing Circuitry Figure A

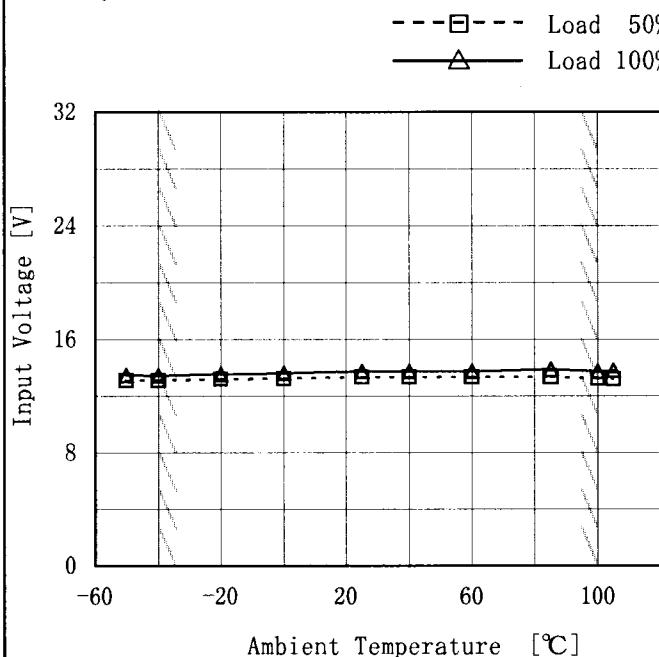
## 2. Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-50	28.040	28.039	28.039
-40	28.034	28.033	28.033
-20	28.018	28.018	28.017
0	28.002	28.001	28.001
25	27.962	27.960	27.959
40	27.925	27.923	27.922
60	27.884	27.882	27.880
85	27.814	27.813	27.812
100	27.768	27.766	27.765
105	27.748	27.746	27.746
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Model	CBS502428
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+28V1.8A

Testing Circuitry Figure A

## 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。

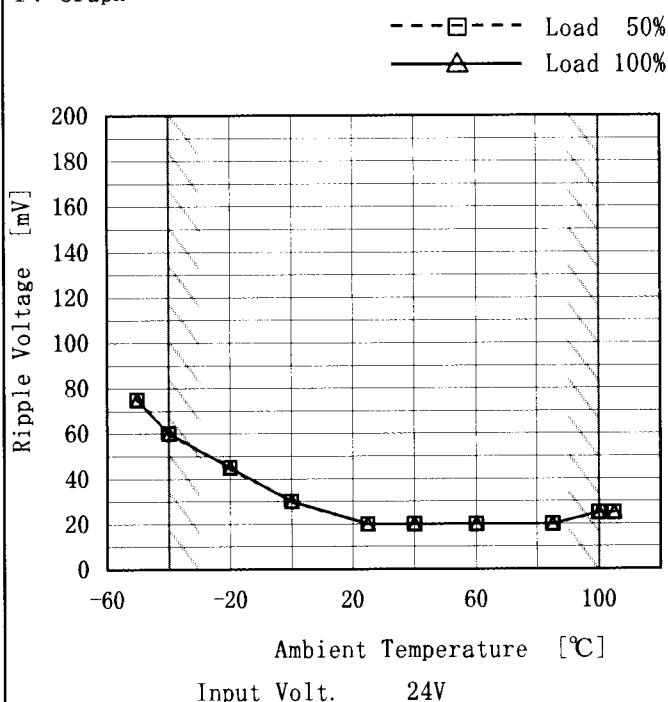
## 2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-50	13.1	13.5
-40	13.1	13.5
-20	13.2	13.5
0	13.2	13.6
25	13.3	13.8
40	13.3	13.8
60	13.3	13.8
85	13.3	13.9
100	13.2	13.8
105	13.2	13.8
—	—	—

Model	CBS502428
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)
Object	+28V1.8A

Testing Circuitry Figure A

## 1. Graph

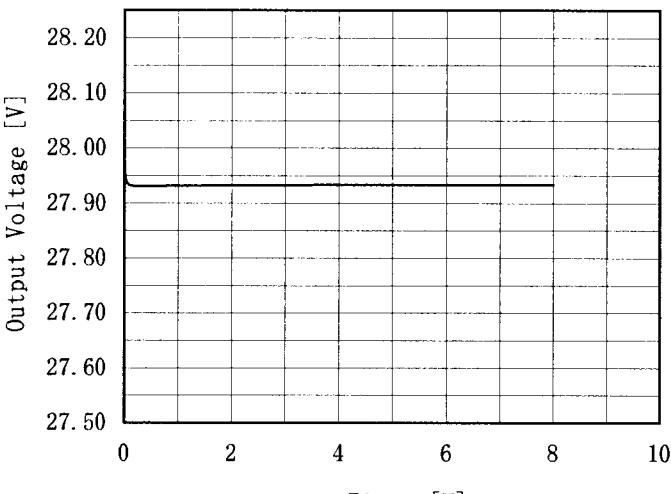


Note: Slanted line shows the range of the rated ambient temperature.

(注) 斜線は定格周囲温度範囲を示す。

## 2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-50	75	75
-40	60	60
-20	45	45
0	30	30
25	20	20
40	20	20
60	20	20
85	20	20
100	25	25
105	25	25
--	--	--

Model	CBS502428	Temperature	25°C																						
Item	Time Lapse Drift 経時ドリフト	Testing Circuitry	Figure A																						
Object	+28V1.8A																								
1. Graph			2. Values																						
 <p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 24V Load 100%</p>			<table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>27.968</td></tr> <tr><td>0.5</td><td>27.931</td></tr> <tr><td>1.0</td><td>27.932</td></tr> <tr><td>2.0</td><td>27.933</td></tr> <tr><td>3.0</td><td>27.933</td></tr> <tr><td>4.0</td><td>27.933</td></tr> <tr><td>5.0</td><td>27.934</td></tr> <tr><td>6.0</td><td>27.934</td></tr> <tr><td>7.0</td><td>27.934</td></tr> <tr><td>8.0</td><td>27.934</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	27.968	0.5	27.931	1.0	27.932	2.0	27.933	3.0	27.933	4.0	27.933	5.0	27.934	6.0	27.934	7.0	27.934	8.0	27.934
Time since start [H]	Output Voltage [V]																								
0.0	27.968																								
0.5	27.931																								
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6.0	27.934																								
7.0	27.934																								
8.0	27.934																								



Model	CBS502428	Testing Circuitry Figure A
Item	Output Voltage Accuracy 定電圧精度	
Object	+28V1.8A	

### 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 ~ 1.8A

\* Output Voltage Accuracy = ±(Maximum of Output Voltage - 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 ~ 1.8A

\* 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

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

### 2. Values

Item	Temperature [°C]	Input Voltage [V]	Output		Output Voltage Accuracy	
			Current [A]	Voltage [V]	Value [mV]	Ration [%]
Maximum Voltage	-40	24	1.8	28.030	±138	±0.5
Minimum Voltage	100	36	0	27.754		



Model	CBS502428	Testing Circuitry Figure A
Item	Condense 結露特性	
Object	+28V1.8A	

### 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

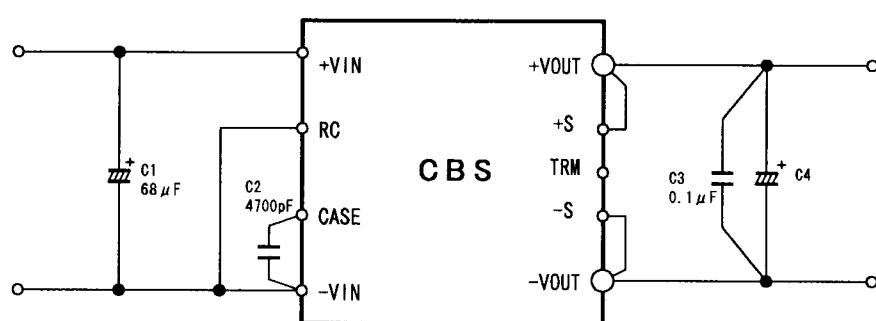
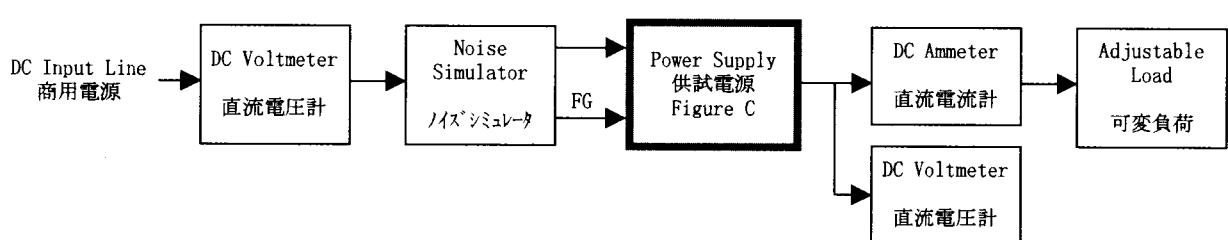
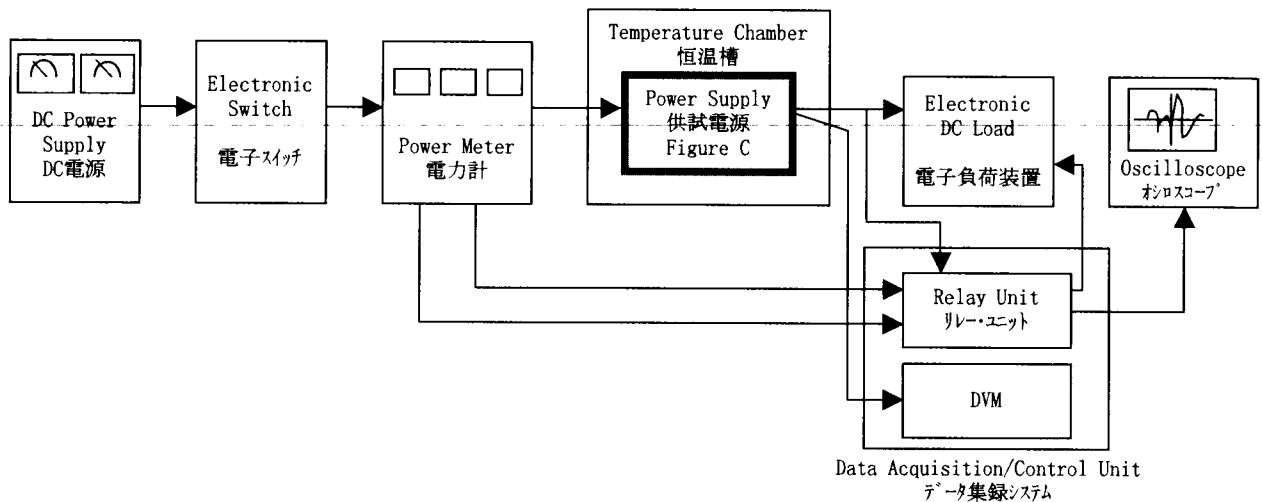
入力を切った状態で、恒温槽で-10°Cに冷却しておき、約1時間後に恒温槽から取り出し、室温25°C、湿度40%RHの状態におき結露させ、その電気的特性の測定を行い異常のないことを確認する。

### 2. Values

Item	Data	Testing Conditions
Output Voltage [V]	27.994	Input Volt.:24V, Load Current.:1.8A
Line Regulation [mV]	2	Input Volt.:18~36V, Load Current.:1.8A
Load Regulation [mV]	4	Input Volt.:24V, Load Current.:0~1.8A



Model	CBS502428			Temperature Testing Circuitry	25°C Figure B			
Item	Line Noise Tolerance 入力雑音耐量							
Object	+28V1.8A							
<b>1. Conditions</b>								
<ul style="list-style-type: none"> <li>• Input Voltage : 24 V</li> <li>• Pulse Voltage : 2000 V</li> <li>• Pulse Cycle : 16.7 mS</li> <li>• Pulse Input Duration : 1 min. or more</li> <li>• Load : 100 %</li> </ul>								
<b>2. Results</b>								
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				



$C_1 : 50V \quad 68\mu F$   
 $C_2 : 4700pF$   
 $C_3 : 50V \quad 0.1\mu F$   
 $C_4 : 35V \quad 220\mu F \times 2 \quad (-40^\circ C \leq T_B \leq -20^\circ C)$   
 $\quad \quad \quad 35V \quad 220\mu F \quad (-20^\circ C < T_B \leq 100^\circ C)$   
 $T_B : \text{Base Plate Temp.}$

Figure C