

# TEST DATA OF CBS2004828

(48V INPUT)

Regulated DC Power Supply  
Feb.15, 2001

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**コーセル株式会社**  
**COSEL CO.,LTD.**

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(Final Page 21)

# COSEL

Model		CBS2004828	
Item		Line Regulation 静的入力変動	
Object		+28V7.2A	
1. Graph		2. Values	

---□---

Load 50%

---△---

Load 100%

Output Voltage [V]

# COSEL

Model		CBS2004828	
Item	Input Current (by Input Voltage) 入力電流 (入力電圧特性)		
Object			

1. Graph

—△—

Load 100%

---□---

Load 50%

---○---

Load 0%

Input Current [A]

Input Voltage [V]

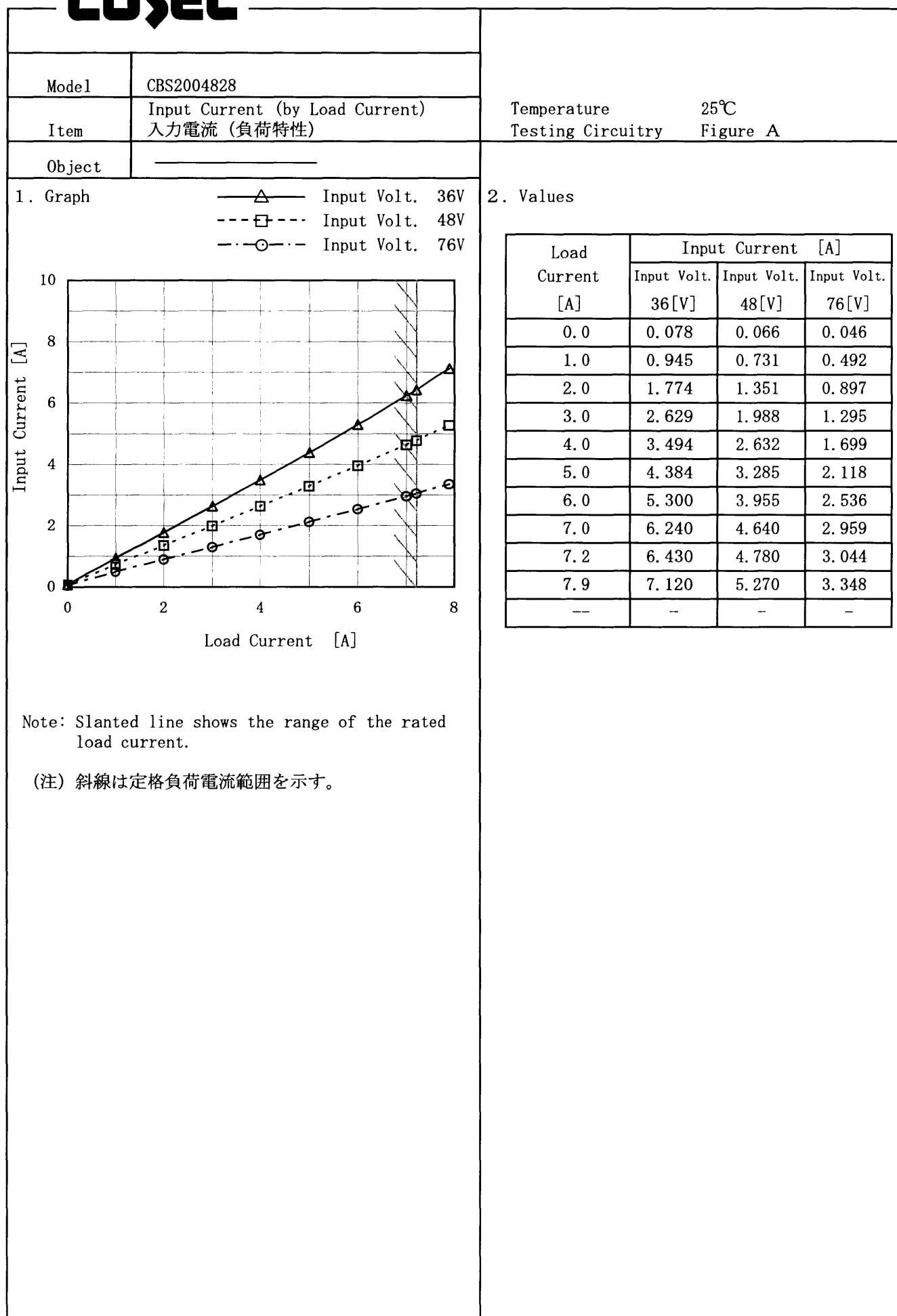
Note: Slanted line shows the range of the rated input voltage.

(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	0.008	0.008	0.008
30.6	0.096	3.737	7.700
33.0	0.090	3.436	7.060
36.0	0.079	3.132	6.400
40.0	0.075	2.822	5.720
48.0	0.067	2.364	4.750
60.0	0.055	1.910	3.804
70.0	0.048	1.650	3.276
76.0	0.046	1.530	3.028
80.0	0.045	1.460	2.884
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# COSEL



# COSEL

ModelCBS2004828

ItemInput Power (by Load Current)  
入力電力 (負荷特性)

Object

1. Graph

—△—

Input Volt.

36V

---□---

Input Volt.

48V

---○---

Input Volt.

76V

Input Power [W]

500

400

300

200

100

0

0

2

4

6

8

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。

Temperature25℃

Testing CircuitryFigure A

2. Values

Load Current [A]	Input Power [W]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	2.9	3.2	3.6
1.0	34.0	35.1	37.5
2.0	63.6	64.7	68.3
3.0	94.1	95.2	98.6
4.0	124.6	125.8	129.2
5.0	155.6	156.5	161.3
6.0	187.9	188.2	192.9
7.0	220.4	220.6	224.6
7.2	227.0	226.9	231.2
7.9	250.4	249.8	254.0
--	-	-	-

# COSEL

Model		CBS2004828	
Item		Efficiency (by Input Voltage) 効率 (入力電圧特性)	
Object			

1. Graph

---

□

---

Load 50%

—

△

—

Load 100%

Efficiency [%]

100

96

92

88

84

80

76

72

20

40

60

80

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

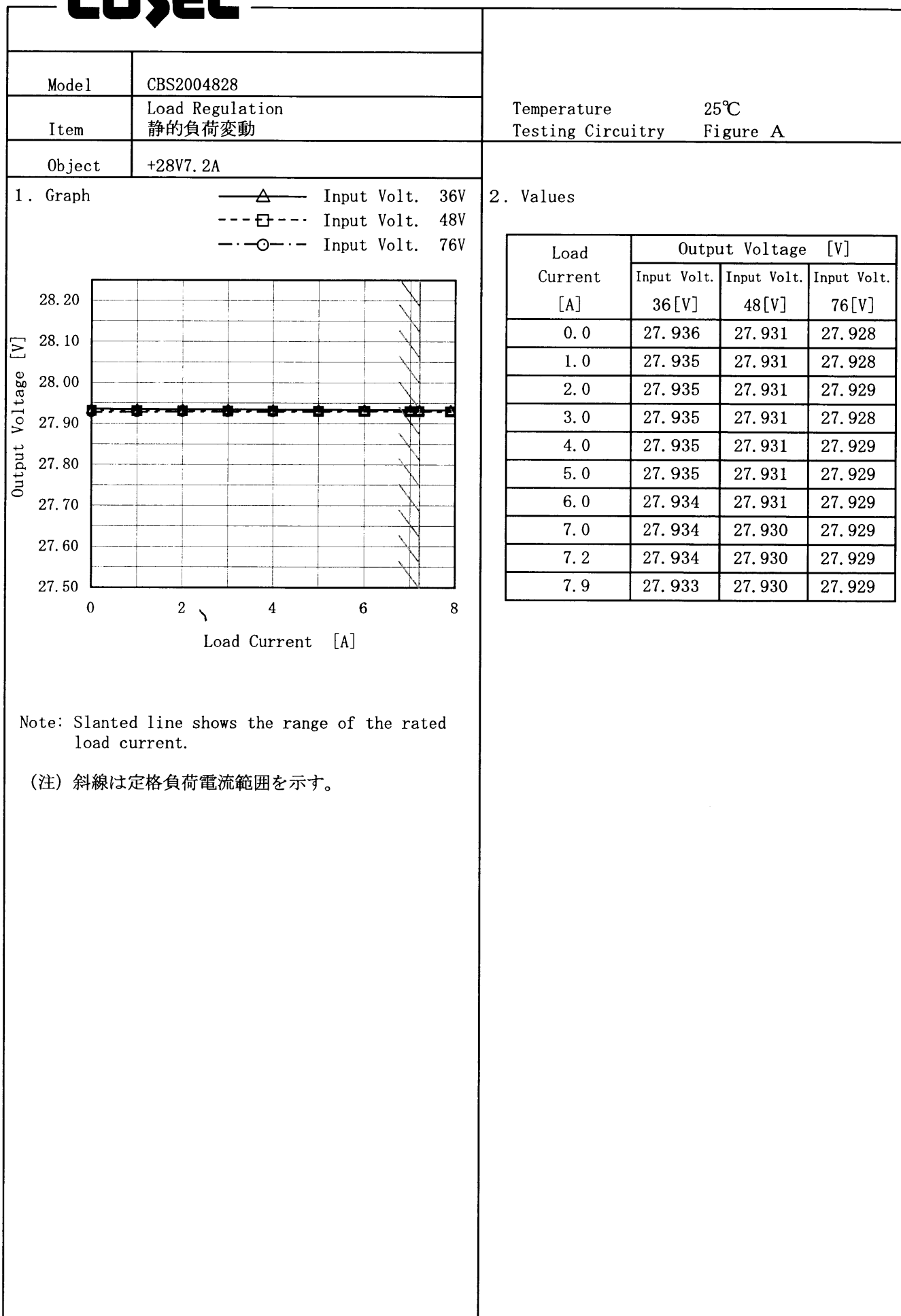
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
33	88.3	87.6
36	88.6	88.0
40	88.4	88.2
48	87.8	88.1
55	87.0	88.0
60	86.6	87.8
70	85.5	86.9
76	84.9	86.5
80	84.5	86.3

# COSEL

Model		CBS2004828		Temperature		25℃																																																				
Item		Efficiency (by Load Current) 効率（負荷特性）		Testing Circuitry		Figure A																																																				
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1. Graph				2. Values																																																						
<div><div><div>—△—</div><div>Input Volt.</div><div>36V</div></div><div><div>---□---</div><div>Input Volt.</div><div>48V</div></div><div><div>---○---</div><div>Input Volt.</div><div>76V</div></div></div> <table><thead><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></thead><tbody><tr><td>0.0</td><td>—</td><td>—</td><td>—</td></tr><tr><td>1.0</td><td>80.7</td><td>78.1</td><td>72.7</td></tr><tr><td>2.0</td><td>86.4</td><td>85.0</td><td>80.3</td></tr><tr><td>3.0</td><td>88.0</td><td>87.0</td><td>83.8</td></tr><tr><td>4.0</td><td>88.7</td><td>88.0</td><td>85.3</td></tr><tr><td>5.0</td><td>89.0</td><td>88.5</td><td>85.8</td></tr><tr><td>6.0</td><td>88.6</td><td>88.6</td><td>86.3</td></tr><tr><td>7.0</td><td>88.1</td><td>88.2</td><td>86.6</td></tr><tr><td>7.2</td><td>88.0</td><td>88.2</td><td>86.5</td></tr><tr><td>7.9</td><td>87.6</td><td>87.9</td><td>86.5</td></tr><tr><td>--</td><td>—</td><td>—</td><td>—</td></tr></tbody></table>				Load Current [A]	Efficiency [%]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.0	—	—	—	1.0	80.7	78.1	72.7	2.0	86.4	85.0	80.3	3.0	88.0	87.0	83.8	4.0	88.7	88.0	85.3	5.0	89.0	88.5	85.8	6.0	88.6	88.6	86.3	7.0	88.1	88.2	86.6	7.2	88.0	88.2	86.5	7.9	87.6	87.9	86.5	--	—	—	—				
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(注) 斜線は定格負荷電流範囲を示す。																																																										



# COSEL



# COSEL

Model		CBS2004828	
Item	Ripple Voltage (by Load Current) リップル電圧 (負荷特性)		Temperature 25℃ Testing Circuitry Figure A
Object	+28V7.2A		

1. Graph

—△—

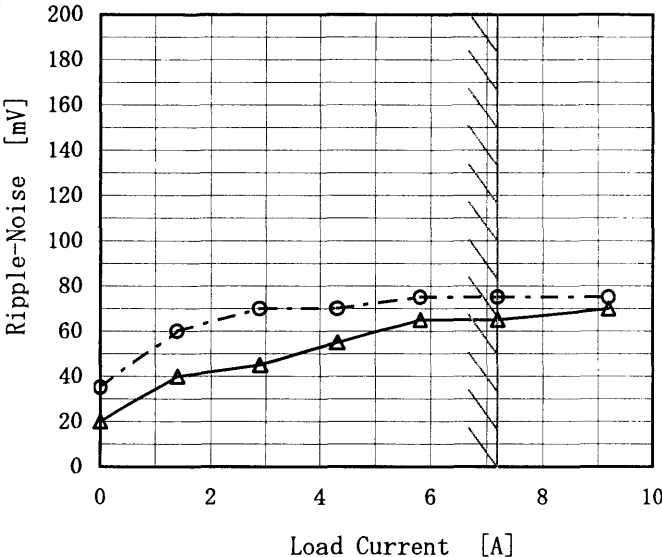
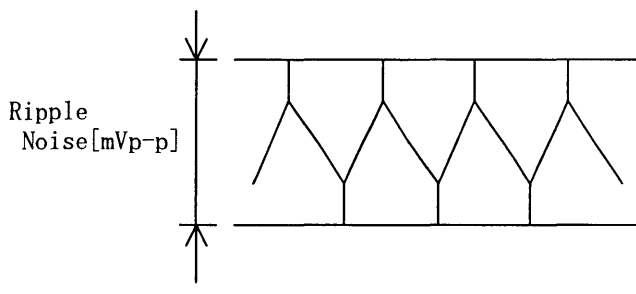
Input Volt. 36V

---○---

Input Volt. 76V

Ripple Voltage [mV]

# COSEL

Model		CBS2004828		Temperature		25℃																																							
Item		Ripple-Noise リップルノイズ		Testing Circuitry		Figure A																																							
Object		+28V7.2A																																											
1. Graph				2. Values																																									
<div><div><div>—△—</div><div>Input Volt. 36V</div></div><div><div>- - ○ - -</div><div>Input Volt. 76V</div></div></div> 				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple-Noise [mV]</th></tr><tr><th>Input Volt. 36 [V]</th><th>Input Volt. 76 [V]</th></tr><tr><td>0.0</td><td>20</td><td>35</td></tr><tr><td>1.4</td><td>40</td><td>60</td></tr><tr><td>2.9</td><td>45</td><td>70</td></tr><tr><td>4.3</td><td>55</td><td>70</td></tr><tr><td>5.8</td><td>65</td><td>75</td></tr><tr><td>7.2</td><td>65</td><td>75</td></tr><tr><td>9.2</td><td>70</td><td>75</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></table>				Load Current [A]	Ripple-Noise [mV]		Input Volt. 36 [V]	Input Volt. 76 [V]	0.0	20	35	1.4	40	60	2.9	45	70	4.3	55	70	5.8	65	75	7.2	65	75	9.2	70	75	--	--	--	--	--	--	--	--	--	--	--	--
Load Current [A]	Ripple-Noise [mV]																																												
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<p>Ripple-Noise is shown as p-p in the figure below.</p> <p>Note: Slanted line shows the range of the rated load current.</p> <p>リップルノイズは、下図 p - p 値で示される。</p> <p>(注) 斜線は定格負荷電流範囲を示す。</p> 																																													
<p>Fig. Complex Ripple Noise Wave Form</p> <p>図 リップルノイズ波形</p>																																													

# COSEL

Model	CBS2004828																																																													
Item	Overcurrent Protection 過電流保護	Temperature	25℃																																																											
Object	+28V7.2A	Testing Circuitry	Figure A																																																											
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BC - 3 3 3 8

# COSEL

Model	CBS2004828	Temperature	25°C
Item	Dynamic Load Response 動的負荷変動	Testing Circuitry	Figure A
Object	+28V7.2A		

Input Volt. 48 V

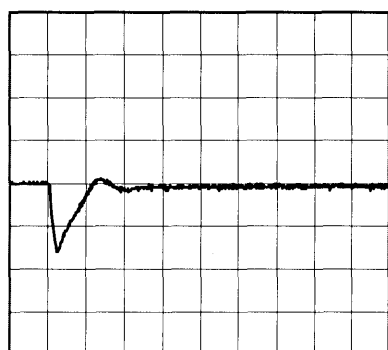
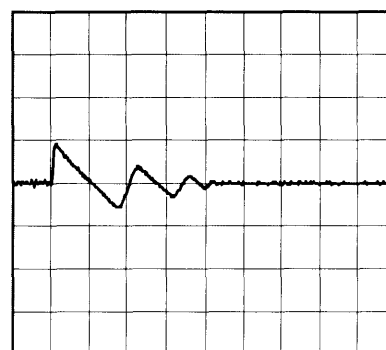
Cycle 1000 ms

Load Current

Min. Load (0A)  $\longleftrightarrow$ 

Load 100% (7.2A)

500 mV/div

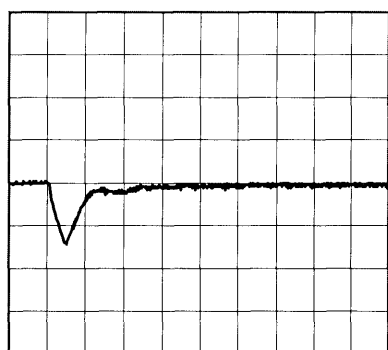
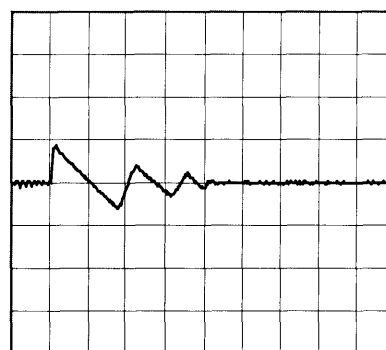
200  $\mu$ s/div

5 ms/div

Min. Load (0A)  $\longleftrightarrow$ 

Load 50% (3.6A)

500 mV/div

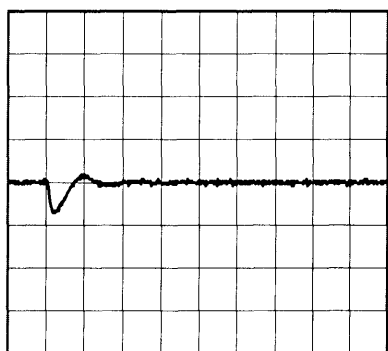
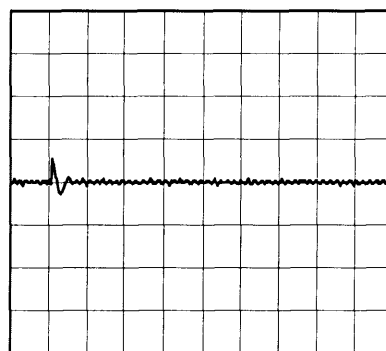
200  $\mu$ s/div

5 ms/div

Load 10% (0.72A)  $\longleftrightarrow$ 

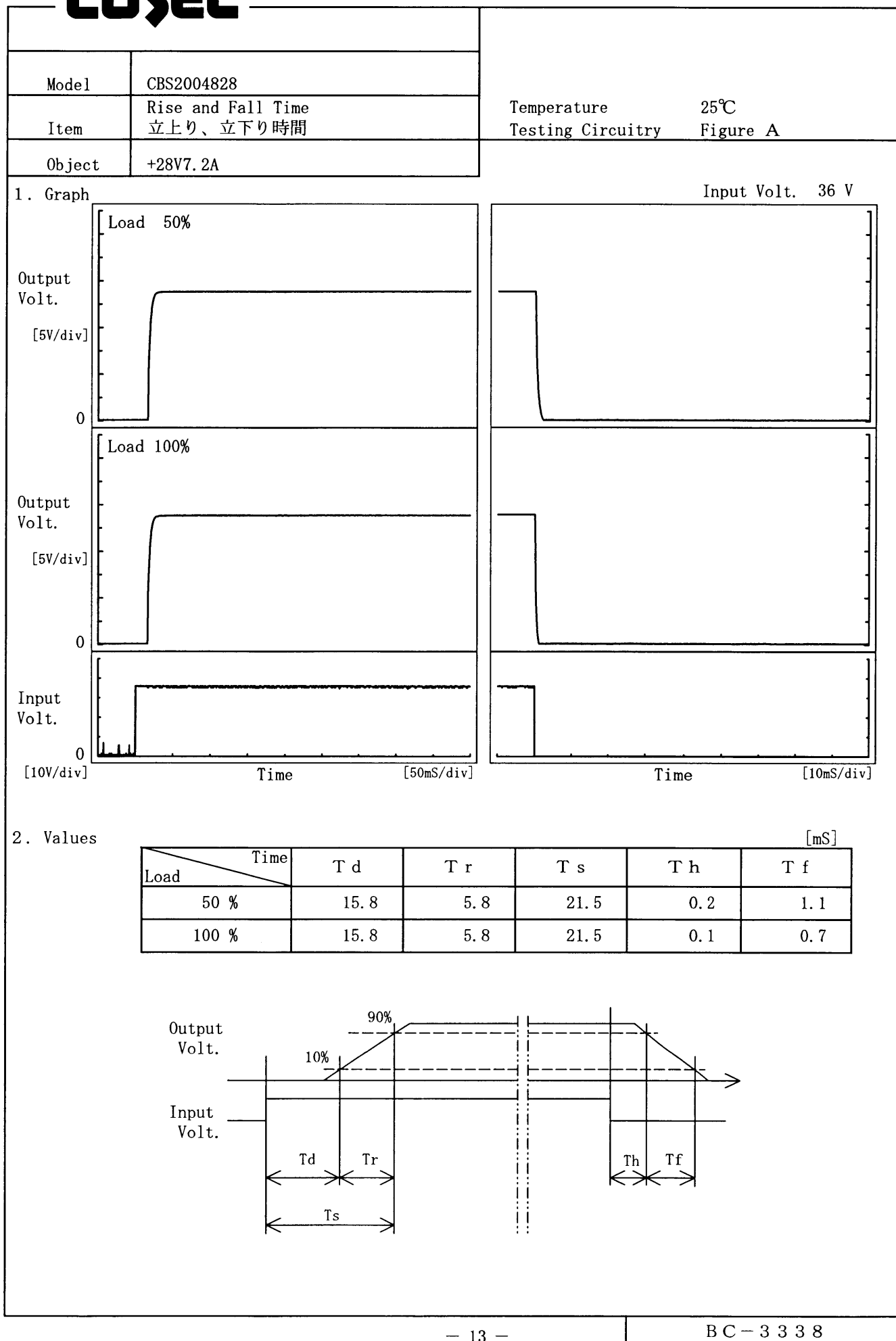
Load 100% (7.2A)

500 mV/div

200  $\mu$ s/div

5 ms/div

# COSEL



# COSEL

Model		CBS2004828	
Item		Ambient Temperature Drift 周囲温度変動	
Object		+28V7.2A	

1. Graph

—△—

Input Volt.

36V

---□---

Input Volt.

48V

---○---

Input Volt.

76V

Output Voltage [V]

<



# COSEL

<

# COSEL

Model	CBS2004828																																								
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)	Testing Circuitry	Figure A																																						
Object	+28V7.2A																																								
1. Graph		2. Values																																							
<div><div><div>---</div><div>□</div><div>---</div></div><div>Load 50%</div></div> <div><div>—</div><div>△</div><div>—</div></div> <div>Load 100%</div> <div><p style="text-align: center;">Ambient Temperature [°C]</p><p style="text-align: center;">Input Volt. 48V</p></div> <div><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></div>		<table><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><tr><td>-50</td><td>35</td><td>35</td></tr><tr><td>-40</td><td>30</td><td>30</td></tr><tr><td>-20</td><td>30</td><td>30</td></tr><tr><td>0</td><td>30</td><td>30</td></tr><tr><td>25</td><td>25</td><td>25</td></tr><tr><td>40</td><td>25</td><td>25</td></tr><tr><td>60</td><td>25</td><td>25</td></tr><tr><td>85</td><td>15</td><td>20</td></tr><tr><td>100</td><td>15</td><td>15</td></tr><tr><td>105</td><td>15</td><td>15</td></tr><tr><td>--</td><td>—</td><td>—</td></tr></table>		Ambient Temperature [°C]	Ripple Voltage [mV]		Load 50%	Load 100%	-50	35	35	-40	30	30	-20	30	30	0	30	30	25	25	25	40	25	25	60	25	25	85	15	20	100	15	15	105	15	15	--	—	—
Ambient Temperature [°C]	Ripple Voltage [mV]																																								
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25	25	25																																							
40	25	25																																							
60	25	25																																							
85	15	20																																							
100	15	15																																							
105	15	15																																							
--	—	—																																							

# COSEL

Model	CBS2004828		
Item	Time Lapse Drift 経時ドリフト	Temperature	25℃
Object	+28V7.2A	Testing Circuitry	Figure A
1. Graph		2. Values	
<div><div><div>Output Voltage [V]</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></di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		Testing Circuitry    Figure A
Model	CBS2004828	
Item	Output Voltage Accuracy 定電圧精度	
Object	+28V7.2A	

### 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 ~ 7.2A

\* 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 ~ 7.2A

\* 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	28.012	±121	±0.4
Minimum Voltage	100	76	0	27.771		

		Testing Circuitry     Figure A
Model	CBS2004828	
Item	Condense 結露特性	
Object	+28V7.2A	

## 1. Condensation test

Testing procedure is as follows.

- ① Keeping and cooling the unit in a tank at  $-10^{\circ}\text{C}$  for an hour with the input off.
- ② Taking it out of the tank and dewing itself in a room where the temperature is  $25^{\circ}\text{C}$  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 $-10^{\circ}\text{C}$ に冷却しておき、約1時間後に恒温槽から取り出し、室温 $25^{\circ}\text{C}$ 、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]	28.016	Input Volt. :48V, Load Current. :7.2A
Line Regulation [mV]	1	Input Volt. :36~76V, Load Current. :7.2A
Load Regulation [mV]	1	Input Volt. :48V, Load Current. :0~7.2A

# COSEL

Model		CBS2004828	Temperature 25℃ Testing Circuitry Figure B
Item		Line Noise Tolerance 入力雑音耐量	
Object		+28V7.2A	

## 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

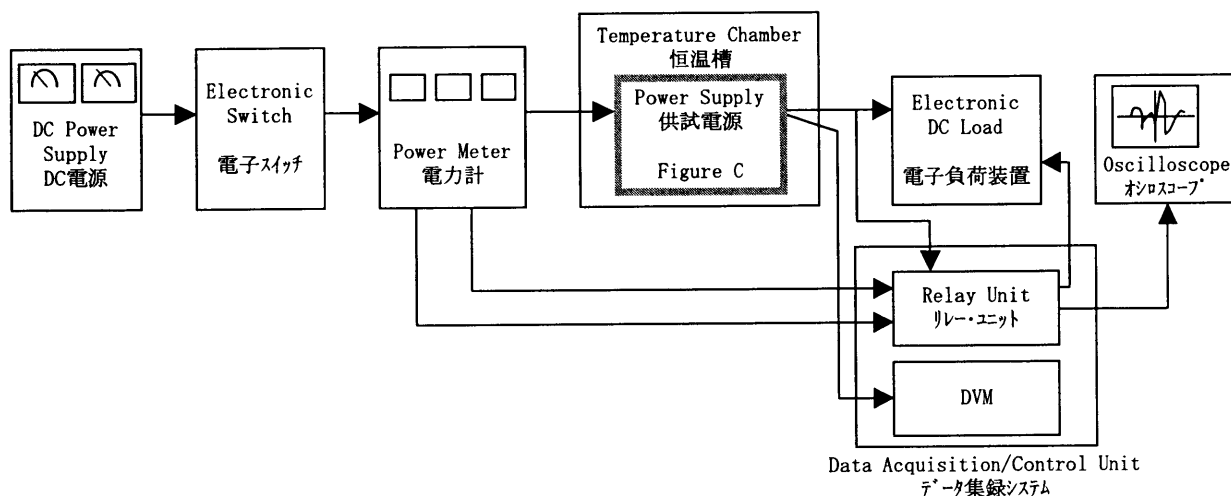


Figure A

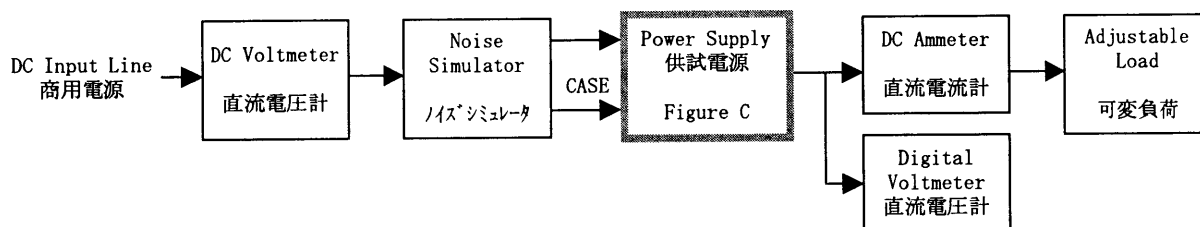


Figure B

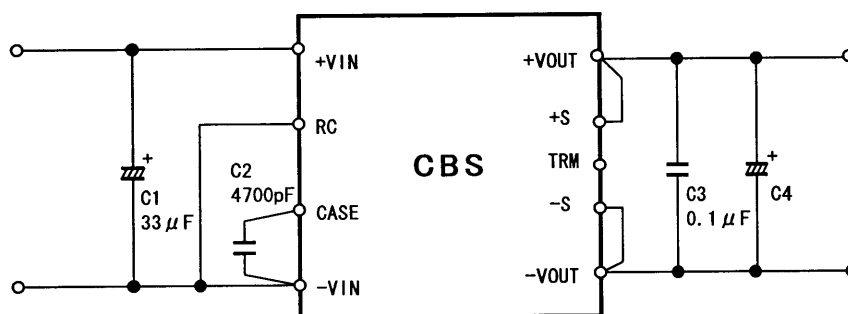


Figure C

C1 : 100V 33  $\mu$ F  
 C2 : 4700pF  
 C3 : 50V 0.1  $\mu$ F

( $-40^{\circ}\text{C} \leq T_B \leq -20^{\circ}\text{C}$ )

C4 : CBS2004803, 05	10V 2200 $\mu$ F $\times 2$
CBS2004812, 15	25V 1000 $\mu$ F $\times 2$
CBS2004824, 28	35V 470 $\mu$ F $\times 2$

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

C4 : CBS2004803, 05	10V 2200 $\mu$ F
CBS2004812, 15	25V 1000 $\mu$ F
CBS2004824, 28	35V 470 $\mu$ F

$T_B$ : Base Plate Temp.