



# TEST DATA OF DBS400B28 (280V INPUT)

Regulated DC Power Supply

Apr. 12, 2000

Approved by : Makoto Takashima  
Design Manager

Prepared by : Kouichi Kinoshita  
Design Engineer

コーセル株式会社  
COSEL CO., LTD.

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Model		DBS400B28		Temperature		25℃																																	
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<div><div><div>□----- Load 50%</div><div>△----- Load 100%</div></div><div><div>[V]</div><div><div>Output Voltage</div><div>[V]</div></div><div><div>28.200</div><div>28.100</div><div>28.000</div><div>27.900</div><div>27.800</div><div>27.700</div><div>27.600</div><div>27.500</div></div><div><div>100</div><div>150</div><div>200</div><div>250</div><div>300</div><div>350</div><div>400</div><div>450</div><div>500</div></div><div><div>Input Voltage</div><div>[V]</div></div></div><div><div>Note: Slanted line shows the range of the rated input voltage.</div><div>(注)斜線は定格入力電圧範囲を示す。</div></div></div>				<table><tr><th rowspan="2">Input Voltage [V]</th><th colspan="2">Output Voltage [V]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr><tr><td>170</td><td>27.892</td><td>27.856</td></tr><tr><td>180</td><td>27.891</td><td>27.859</td></tr><tr><td>200</td><td>27.891</td><td>27.861</td></tr><tr><td>220</td><td>27.891</td><td>27.862</td></tr><tr><td>250</td><td>27.892</td><td>27.863</td></tr><tr><td>300</td><td>27.892</td><td>27.865</td></tr><tr><td>350</td><td>27.891</td><td>27.867</td></tr><tr><td>400</td><td>27.891</td><td>27.868</td></tr><tr><td>420</td><td>27.891</td><td>27.869</td></tr></table>				Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	170	27.892	27.856	180	27.891	27.859	200	27.891	27.861	220	27.891	27.862	250	27.892	27.863	300	27.892	27.865	350	27.891	27.867	400	27.891	27.868	420	27.891	27.869
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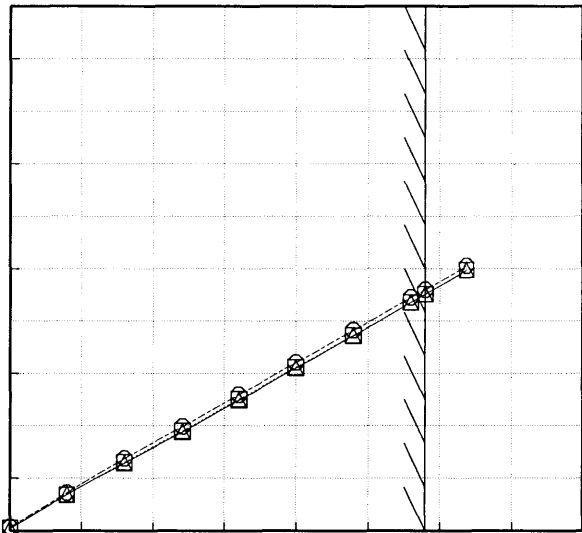
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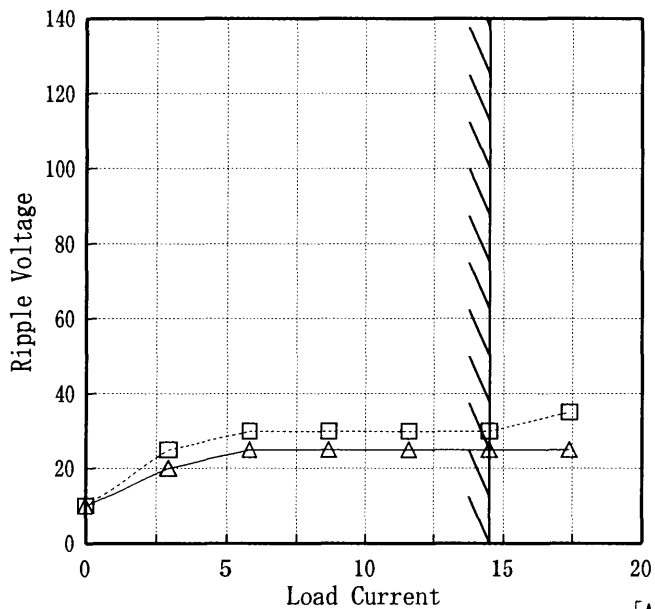
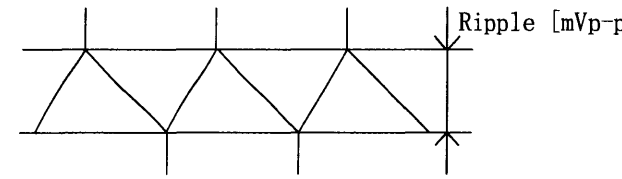
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10.00	88.8	88.4	85.9																																																											
12.00	88.7	88.6	86.4																																																											
14.00	88.5	88.5	86.6																																																											
14.50	88.5	88.5	86.8																																																											
15.95	88.1	88.3	86.8																																																											
—	—	—	—																																																											
—	—	—	—																																																											
—	—	—	—																																																											
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。																																																														



**COSEL**

Model		DBS400B28		Temperature		25℃	
Item		Load Regulation 静的負荷変動		Testing Circuitry		Figure A	
Object		+28.0V 14.5A					
1. Graph				2. Values			
<div><div><div>△</div><div>□</div><div>○</div></div><div>Input Volt. 200 V</div><div>Input Volt. 280 V</div><div>Input Volt. 400 V</div></div> <div><div><div>Output Voltage [V]</div><div><div><div>28.200</div><div>28.100</div><div>28.000</div><div>27.900</div><div>27.800</div><div>27.700</div><div>27.600</div><div>27.500</div></div><div><div>0</div><div>5</div><div>10</div><div>15</div><div>20</div></div></div><div><div>Load Current [A]</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></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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# COSEL

Model		DBS400B28		Temperature		25℃																																										
Item		Ripple Voltage (by Load Current) リップル電圧 (負荷特性)		Testing Circuitry		Figure A																																										
Object		+28V 14.5A																																														
1. Graph				2. Values																																												
<div><div>—△— Input Volt. 200V</div><div>- - -□- - - Input Volt. 400V</div></div>																																																
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。																																																
																																																
図 リップル波形図																																																
				<table><tr><th rowspan="2">Load Current</th><th colspan="2">Ripple Output Volt. [mV]</th></tr><tr><th>Input Volt. 200 [V]</th><th>Input Volt. 400 [V]</th></tr><tr><td>[A]</td><td></td><td></td></tr><tr><td>0</td><td>10</td><td>10</td></tr><tr><td>2.9</td><td>20</td><td>25</td></tr><tr><td>5.8</td><td>25</td><td>30</td></tr><tr><td>8.7</td><td>25</td><td>30</td></tr><tr><td>11.6</td><td>25</td><td>30</td></tr><tr><td>14.5</td><td>25</td><td>30</td></tr><tr><td>17.4</td><td>25</td><td>35</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	Ripple Output Volt. [mV]		Input Volt. 200 [V]	Input Volt. 400 [V]	[A]			0	10	10	2.9	20	25	5.8	25	30	8.7	25	30	11.6	25	30	14.5	25	30	17.4	25	35	—	—	—	—	—	—	—	—	—	—	—	—
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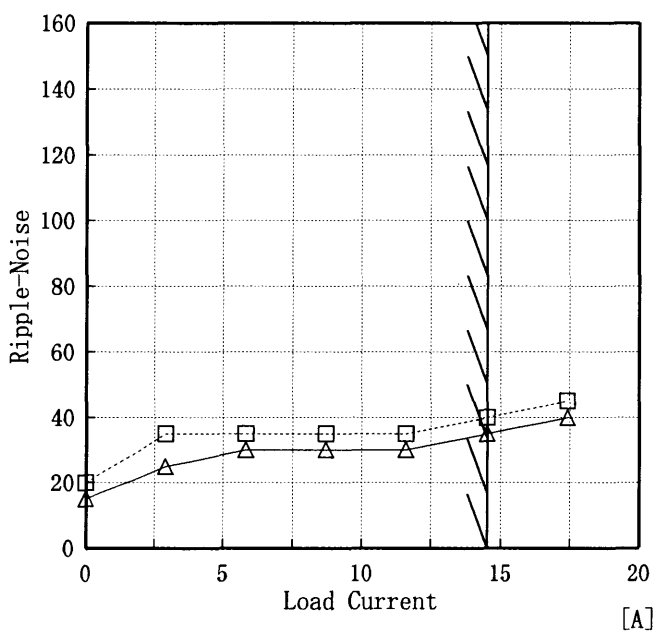
# COSEL

Model		DBS400B28	
Item		Ripple-Noise   リップルノイズ	
Object		+28V 14.5A	

1. Graph

—△—   Input Volt. 200V

- - -□- -   Input Volt. 400V



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。

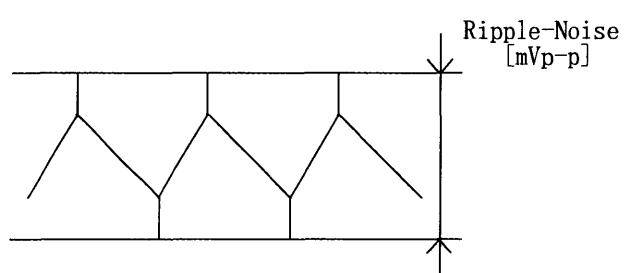


図   リップルノイズ波形図

Temperature	25℃
Testing Circuitry	Figure A

2. Values

Load current	Ripple-Noise	
	Input Volt. 200 [V]	Input Volt. 400 [V]
0	15	20
2.9	25	35
5.8	30	35
8.7	30	35
11.6	30	35
14.5	35	40
17.4	40	45
—	—	—
—	—	—
—	—	—
—	—	—

**COSEL**

Model		DBS400B28		Temperature		25℃																																																								
Item		Overcurrent Protection 過電流保護		Testing Circuitry		Figure A																																																								
Object		+28.0V 14.5A																																																												
1. Graph				2. Values																																																										
<div><div><div></div><div></div><div></div></div><div>Input Volt. 200 V Input Volt. 280 V Input Volt. 400 V</div></div> <div><div><div>[V]</div><div></div></div><div><div>40.0</div><div>30.0</div><div>20.0</div><div>10.0</div><div>0.0</div></div><div><div>0</div><div>5</div><div>10</div><div>15</div><div>20</div></div><div><div>Output Voltage</div><div></div><div>Load Current</div><div>[A]</div></div></div>				<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="3">Load Current [A]</th></tr><tr><th>Input Volt. 200 [V]</th><th>Input Volt. 280 [V]</th><th>Input Volt. 400 [V]</th></tr><tr><td>28.00</td><td>17.424</td><td>17.398</td><td>17.894</td></tr><tr><td>26.60</td><td>17.413</td><td>17.439</td><td>18.021</td></tr><tr><td>25.20</td><td>17.403</td><td>17.507</td><td>18.130</td></tr><tr><td>22.40</td><td>17.515</td><td>17.623</td><td>18.312</td></tr><tr><td>19.60</td><td>17.553</td><td>17.682</td><td>18.452</td></tr><tr><td>16.80</td><td>—</td><td>—</td><td>—</td></tr><tr><td>14.00</td><td>—</td><td>—</td><td>—</td></tr><tr><td>11.20</td><td>—</td><td>—</td><td>—</td></tr><tr><td>8.40</td><td>—</td><td>—</td><td>—</td></tr><tr><td>5.60</td><td>—</td><td>—</td><td>—</td></tr><tr><td>2.80</td><td>—</td><td>—</td><td>—</td></tr><tr><td>0.00</td><td>—</td><td>—</td><td>—</td></tr></table>				Output Voltage [V]	Load Current [A]			Input Volt. 200 [V]	Input Volt. 280 [V]	Input Volt. 400 [V]	28.00	17.424	17.398	17.894	26.60	17.413	17.439	18.021	25.20	17.403	17.507	18.130	22.40	17.515	17.623	18.312	19.60	17.553	17.682	18.452	16.80	—	—	—	14.00	—	—	—	11.20	—	—	—	8.40	—	—	—	5.60	—	—	—	2.80	—	—	—	0.00	—	—	—
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16.80	—	—	—																																																											
14.00	—	—	—																																																											
11.20	—	—	—																																																											
8.40	—	—	—																																																											
5.60	—	—	—																																																											
2.80	—	—	—																																																											
0.00	—	—	—																																																											
<p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when the output voltage is from 18V to 0V.</p> <p>(注)斜線は定格負荷電流範囲を示す。 18V～0V間は、間欠モードとなる。</p>																																																														

# COSEL

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Testing Circuitry Figure A

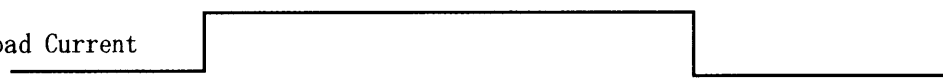
# COSEL

Model	DBS400B28	Temperature	25°C
Item	Dynamic Load Responce 動的負荷変動	Testing Circuitry	Figure A
Object	+28V 14.5A		

Input Volt. 280 V

Cycle 1000 mS

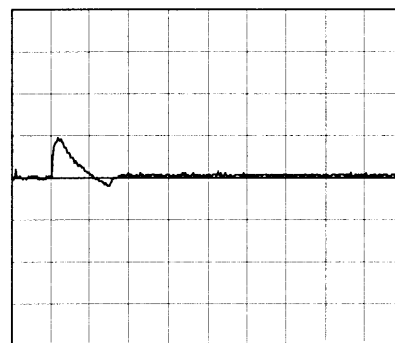
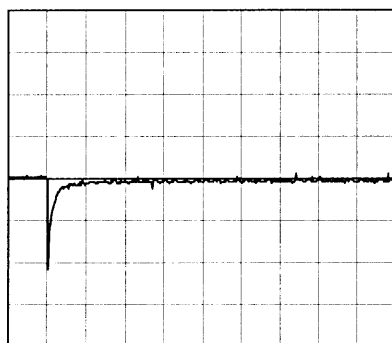
Load Current



Min. Load (0.0 A) ↔

Load 100% (14.5 A)

500 mV/div

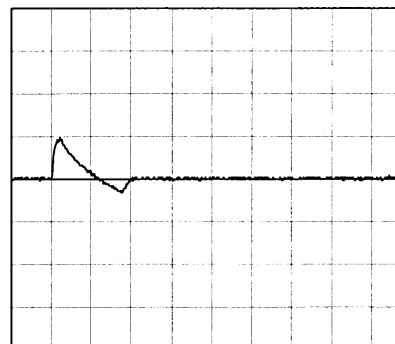
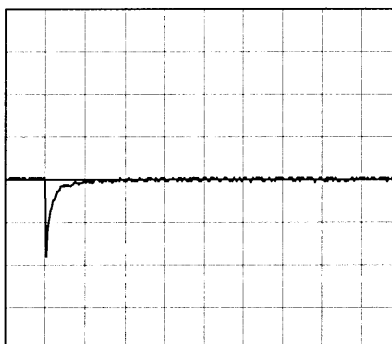


5 ms/div

Min. Load (0.0 A) ↔

Load 50% (7.3 A)

500 mV/div

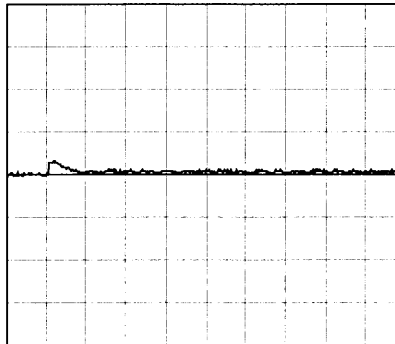
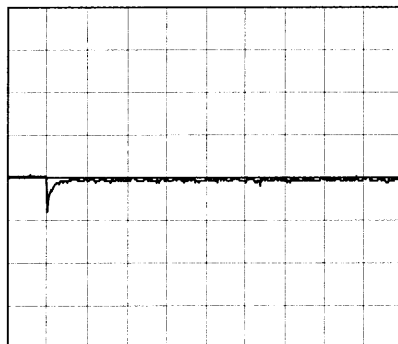


5 ms/div

Load 10% (1.5 A) ↔

Load 100% (14.5 A)

500 mV/div



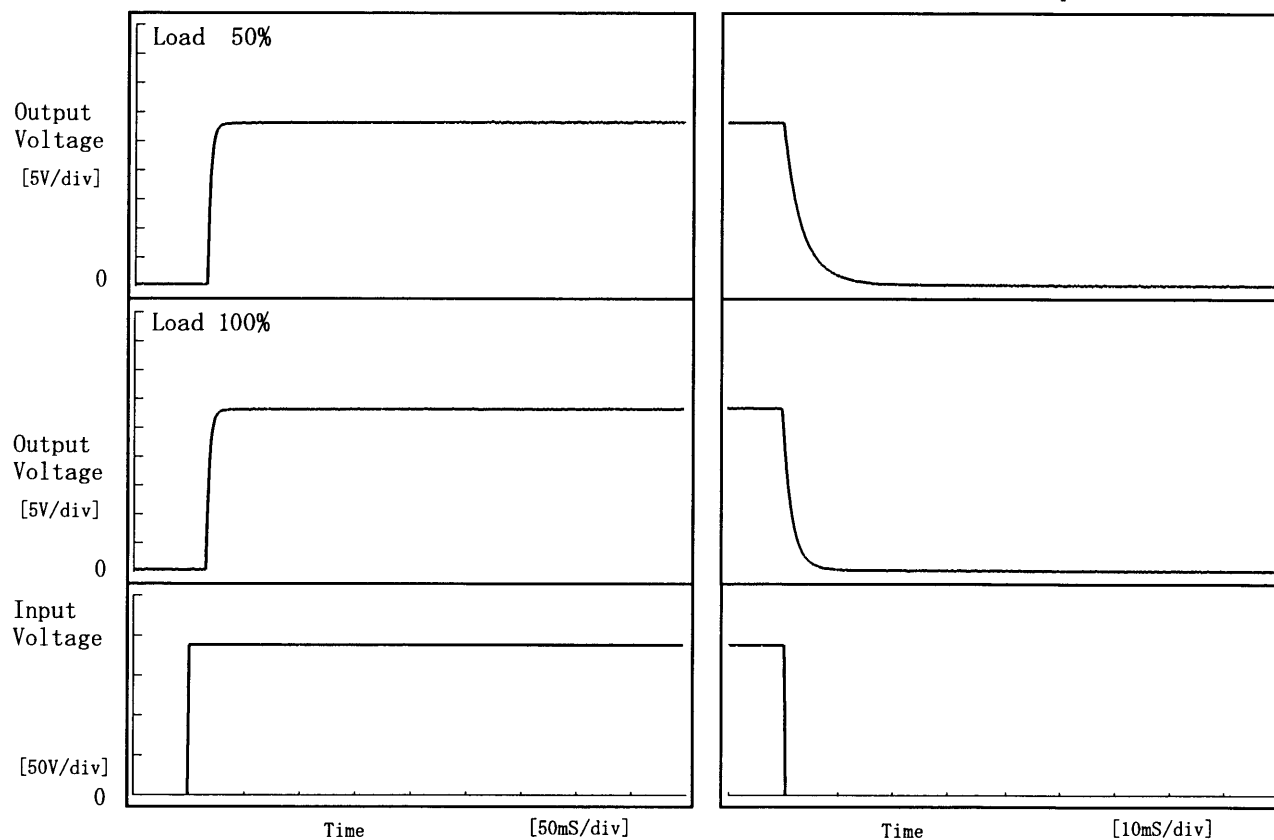
5 ms/div

**COSEL**

Model	DBS400B28	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+28.0V 14.5A		

## 1. Graph

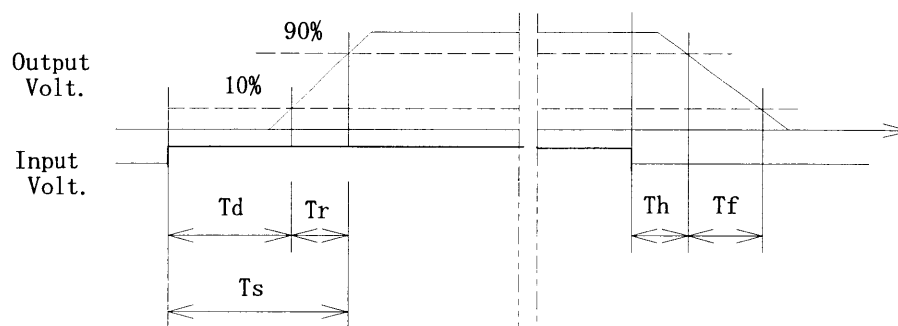
Input Volt. 200 V



## 2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	14.50	6.25	20.75	0.25	8.05
100 %	14.75	6.00	20.75	0.10	3.95



**COSEL**

Model		DBS400B28	
Item		Ambient Temperature Drift 周囲温度変動	
Object		+28.0V14.5A	
1. Graph		2. Values	

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# COSEL

Model DBS400B28		Testing Circuitry Figure A																																						
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧																																							
Object	+28.0V 14.5A																																							
<p>1. Graph</p> <p>[V]</p> <p>200.0</p> <p>160.0</p> <p>120.0</p> <p>80.0</p> <p>40.0</p> <p>0.0</p> <p>Input Voltage</p> <p>-----□----- Load 50%</p> <p>-----△----- Load 100%</p> <p>-50 -10 30 70 110</p> <p>Ambient Temperature [°C]</p> <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>		<p>2. Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Input Voltage [V]</th></tr> <tr> <th>Load 50%</th><th>Load 100%</th></tr> </thead> <tbody> <tr><td>-35</td><td>153</td><td>157</td></tr> <tr><td>-20</td><td>153</td><td>158</td></tr> <tr><td>0</td><td>154</td><td>159</td></tr> <tr><td>15</td><td>154</td><td>160</td></tr> <tr><td>25</td><td>154</td><td>161</td></tr> <tr><td>40</td><td>155</td><td>161</td></tr> <tr><td>55</td><td>155</td><td>162</td></tr> <tr><td>70</td><td>156</td><td>163</td></tr> <tr><td>85</td><td>156</td><td>164</td></tr> <tr><td>90</td><td>156</td><td>164</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>	Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-35	153	157	-20	153	158	0	154	159	15	154	160	25	154	161	40	155	161	55	155	162	70	156	163	85	156	164	90	156	164	—	—	—
Ambient Temperature [°C]	Input Voltage [V]																																							
	Load 50%	Load 100%																																						
-35	153	157																																						
-20	153	158																																						
0	154	159																																						
15	154	160																																						
25	154	161																																						
40	155	161																																						
55	155	162																																						
70	156	163																																						
85	156	164																																						
90	156	164																																						
—	—	—																																						

# COSEL

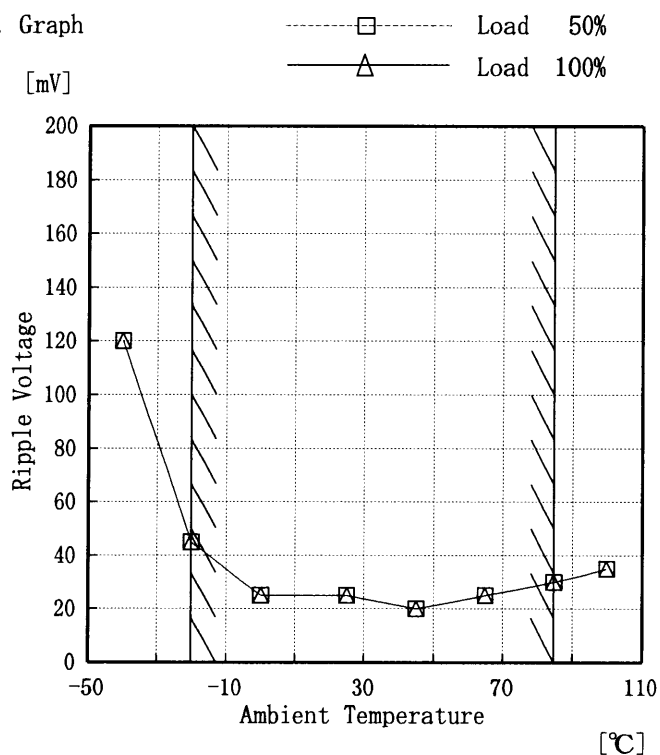
Model DBS400B28

Item Ripple Voltage (by Ambient Temp.)  
リップル電圧 (周囲温度特性)

Object +28V14.5A

Testing Circuitry Figure A

## 1. Graph



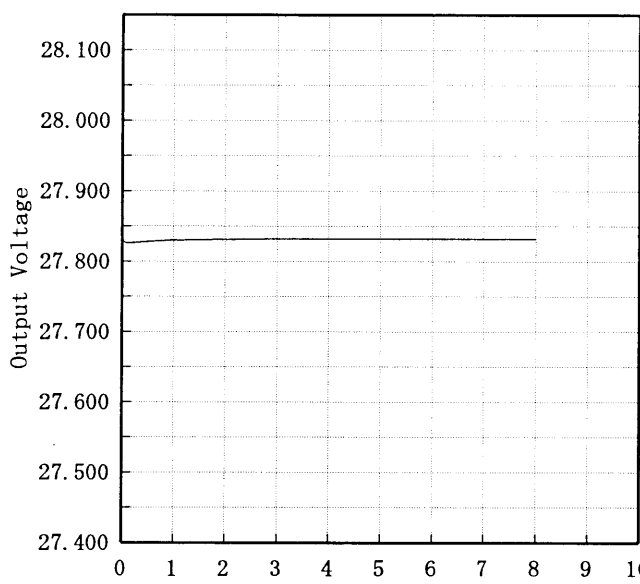
Note: Slanted line shows the range of the rated ambient temperature.

(注)斜線は定格周囲温度範囲を示す。

## 2. Values

Ambient Temp. [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-40	120	120
-20	45	45
0	25	25
25	25	25
45	20	20
65	25	25
85	30	30
100	35	35
—	—	—
—	—	—
—	—	—

**COSEL**

COSEL																									
Model	DBS400B28																								
Item	Time Lapse Drift 経時ドリフト	Temperature	25℃																						
		Testing Circuitry	Figure A																						
Object	+28.0V14.5A																								
1. Graph		2.Values																							
<div>[V]</div> <div></div> <div>Output Voltage [V]</div> <div>Time [H]</div> <div>Input Volt. 280V</div> <div>Load 100%</div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>27.842</td></tr><tr><td>0.5</td><td>27.828</td></tr><tr><td>1.0</td><td>27.830</td></tr><tr><td>2.0</td><td>27.831</td></tr><tr><td>3.0</td><td>27.832</td></tr><tr><td>4.0</td><td>27.832</td></tr><tr><td>5.0</td><td>27.832</td></tr><tr><td>6.0</td><td>27.832</td></tr><tr><td>7.0</td><td>27.832</td></tr><tr><td>8.0</td><td>27.832</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	27.842	0.5	27.828	1.0	27.830	2.0	27.831	3.0	27.832	4.0	27.832	5.0	27.832	6.0	27.832	7.0	27.832	8.0	27.832
Time since start [H]	Output Voltage [V]																								
0.0	27.842																								
0.5	27.828																								
1.0	27.830																								
2.0	27.831																								
3.0	27.832																								
4.0	27.832																								
5.0	27.832																								
6.0	27.832																								
7.0	27.832																								
8.0	27.832																								

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BC-3284

**COSEL**

Model		DBS400B28	Testing Circuitry    Figure A
Item		Output Voltage Accuracy 定電圧精度	
Object		+28.0 V 14.5 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 : -20~85 °C

Input Voltage : 200~400 V

Load Current : 0~14.5 A

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

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

## 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            -20~85 °C

入力電圧            200~400 V

負荷電流            0~14.5 A

\* 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 [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ratio) [%]
Maximum Voltage	-20	200	0.0	27.914	±94	±0.4
Minimum Voltage	85	400	14.5	27.728		

# COSEL

Model		DBS400B28	Testing Circuitry	Figure A
Item		Condensation 結露特性		
Object		+28V14.5A		
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]		27.731	Input Volt.: 280V, Load Current:14.5A	
Line Regulation [mV]		18	Input Volt.: 200~400V, Load Current:14.5A	
Load Regulation [mV]		56	Input Volt.: 280V, Load Current:0~14.5A	

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BC-3284

# COSEL

Model	DBS400B28	Temperature	25°C
Item	Line Noise Tolerance 入力雑音耐量	Testing Circuitry	Figure C
Object	+28V14.5A		

## 1. Results

Pulse Width [n S]	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
50	COMMON	OK	no fluctuation
	NORMAL	OK	no fluctuation
1000	COMMON	OK	no fluctuation
	NORMAL	OK	no fluctuation

## Conditions

Input Voltage : 200 V  
 Pulse Voltage :  $\pm 2000$  V  
 Pulse Cycle : 10 mS  
 Pulse Input Duration: 1 min. or more  
 Load : 100 %

# COSEL

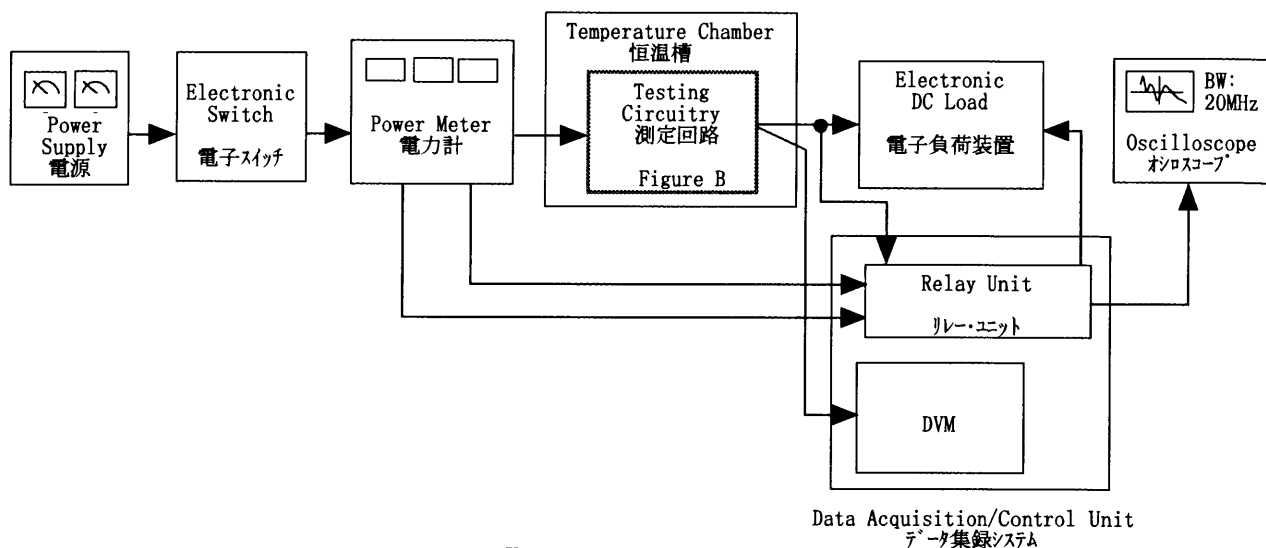
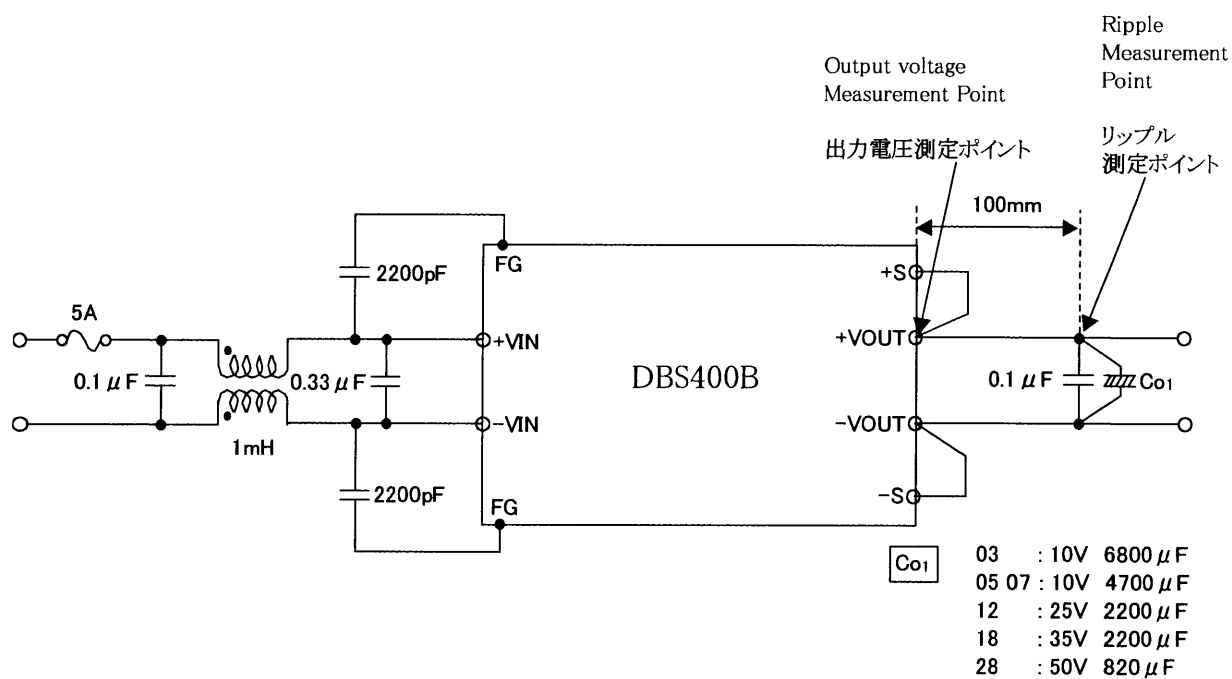


Figure A

Figure B (General Electric Characteristic)  
一般電気特性

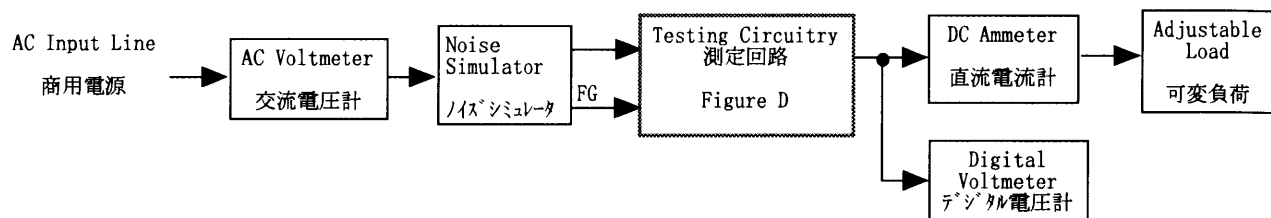
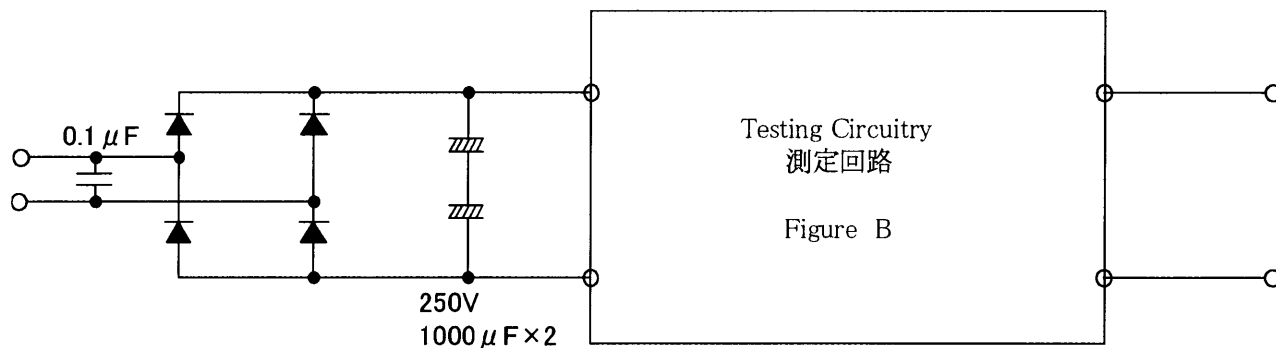


Figure C

Figure D (Line Noise Tolerance)  
入力雑音耐量