

# TEST DATA OF CBS3504828

Regulated DC Power Supply  
Dec.20. 2004

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**COSEL CO.,LTD.**

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# COSEL

Model

CBS3504828

Item

Input Current (by Input Voltage)

Object

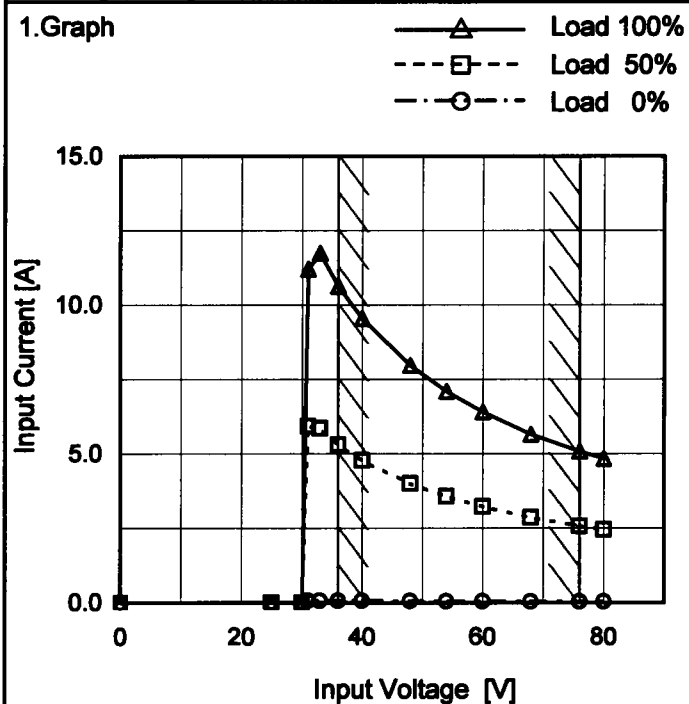
Temperature

25°C

Testing Circuitry

Figure A

## 1. Graph



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

## 2. Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0	0.000	0.000	0.000
25.0	0.008	0.006	0.006
30.0	0.014	0.003	0.008
31.0	0.074	5.941	11.206
33.0	0.075	5.859	11.750
36.0	0.071	5.313	10.640
40.0	0.073	4.787	9.549
48.0	0.063	4.006	7.976
54.0	0.056	3.573	7.101
60.0	0.053	3.228	6.408
68.0	0.044	2.864	5.662
76.0	0.040	2.578	5.087
80.0	0.038	2.461	4.841
—	—	—	—
—	—	—	—
—	—	—	—

# COSEL

Model

CBS3504828

Item

Input Current (by Load Current)

Object

Temperature

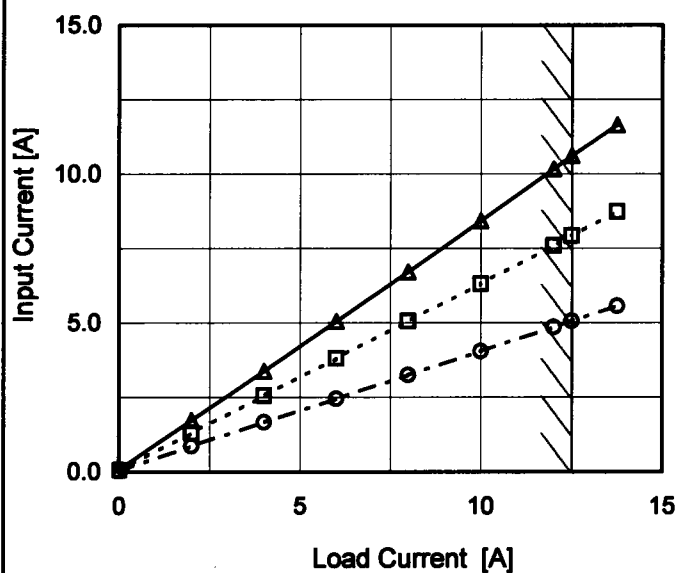
25°C

Testing Circuitry

Figure A

## 1. Graph

—△— Input Volt. 36V  
 ---□--- Input Volt. 48V  
 ---○--- Input Volt. 76V



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

## 2. Values

Load Current [A]	Input Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.00	0.072	0.067	0.037
2.00	1.734	1.308	0.874
4.00	3.384	2.564	1.666
6.00	5.058	3.811	2.457
8.00	6.712	5.069	3.252
10.00	8.429	6.316	4.047
12.00	10.175	7.601	4.861
12.50	10.617	7.928	5.063
13.75	11.652	8.740	5.575
—	—	—	—
—	—	—	—

**BC-3612**

# COSEL

Model		CBS3504828		Temperature 25°C																															
Item		Efficiency (by Input Voltage)		Testing Circuitry Figure A																															
Object																																			
1.Graph				2.Values																															
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>---△---</div><div>Load 100%</div></div></div> <table><thead><tr><th>Input Voltage [V]</th><th>Efficiency [%] (Load 50%)</th><th>Efficiency [%] (Load 100%)</th></tr></thead><tbody><tr><td>33</td><td>90.4</td><td>90.2</td></tr><tr><td>36</td><td>92.0</td><td>91.4</td></tr><tr><td>40</td><td>92.0</td><td>91.6</td></tr><tr><td>48</td><td>91.5</td><td>91.5</td></tr><tr><td>55</td><td>91.0</td><td>91.2</td></tr><tr><td>60</td><td>90.6</td><td>91.1</td></tr><tr><td>70</td><td>89.8</td><td>90.7</td></tr><tr><td>76</td><td>89.5</td><td>90.4</td></tr><tr><td>80</td><td>89.1</td><td>90.3</td></tr></tbody></table>				Input Voltage [V]	Efficiency [%] (Load 50%)	Efficiency [%] (Load 100%)	33	90.4	90.2	36	92.0	91.4	40	92.0	91.6	48	91.5	91.5	55	91.0	91.2	60	90.6	91.1	70	89.8	90.7	76	89.5	90.4	80	89.1	90.3		
Input Voltage [V]	Efficiency [%] (Load 50%)	Efficiency [%] (Load 100%)																																	
33	90.4	90.2																																	
36	92.0	91.4																																	
40	92.0	91.6																																	
48	91.5	91.5																																	
55	91.0	91.2																																	
60	90.6	91.1																																	
70	89.8	90.7																																	
76	89.5	90.4																																	
80	89.1	90.3																																	
<p>Note: Slanted line shows the range of the rated input voltage.</p>																																			

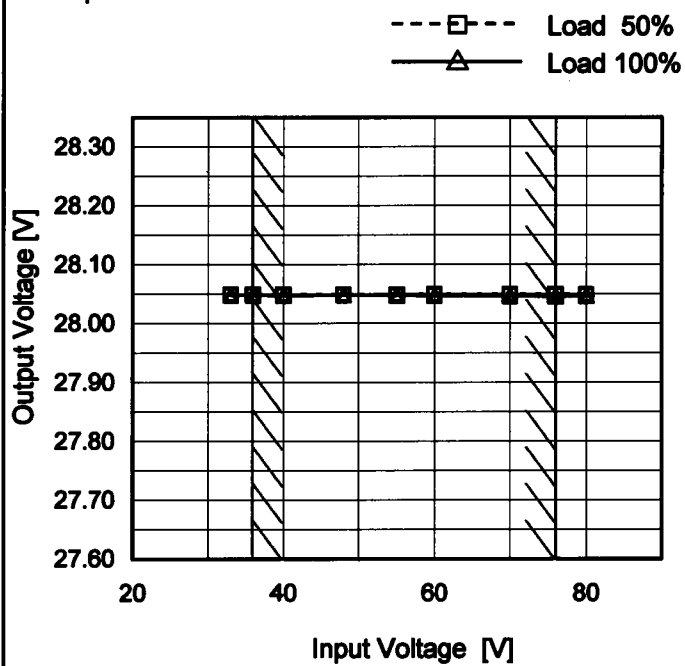
BC-3612

# COSEL

Model	CBS3504828
Item	Line Regulation
Object	+28V12.5A

Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph



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

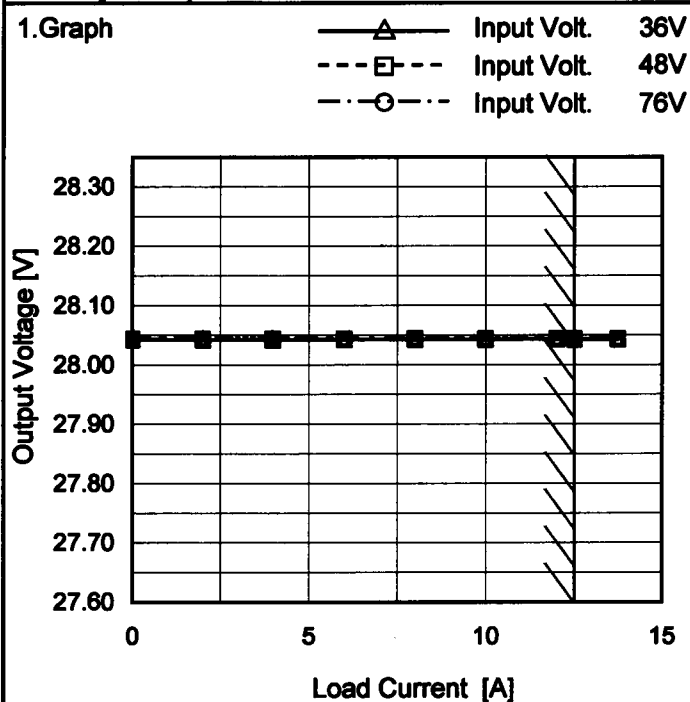
## 2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
33	28.049	28.048
36	28.049	28.049
40	28.049	28.048
48	28.049	28.049
55	28.049	28.048
60	28.049	28.048
70	28.049	28.047
76	28.049	28.047
80	28.049	28.047

<b>Model</b>		<b>CBS3504828</b>
<b>Item</b>		<b>Load Regulation</b>
<b>Object</b>		<b>+28V12.5A</b>

**Temperature** 25°C  
**Testing Circuitry** Figure A

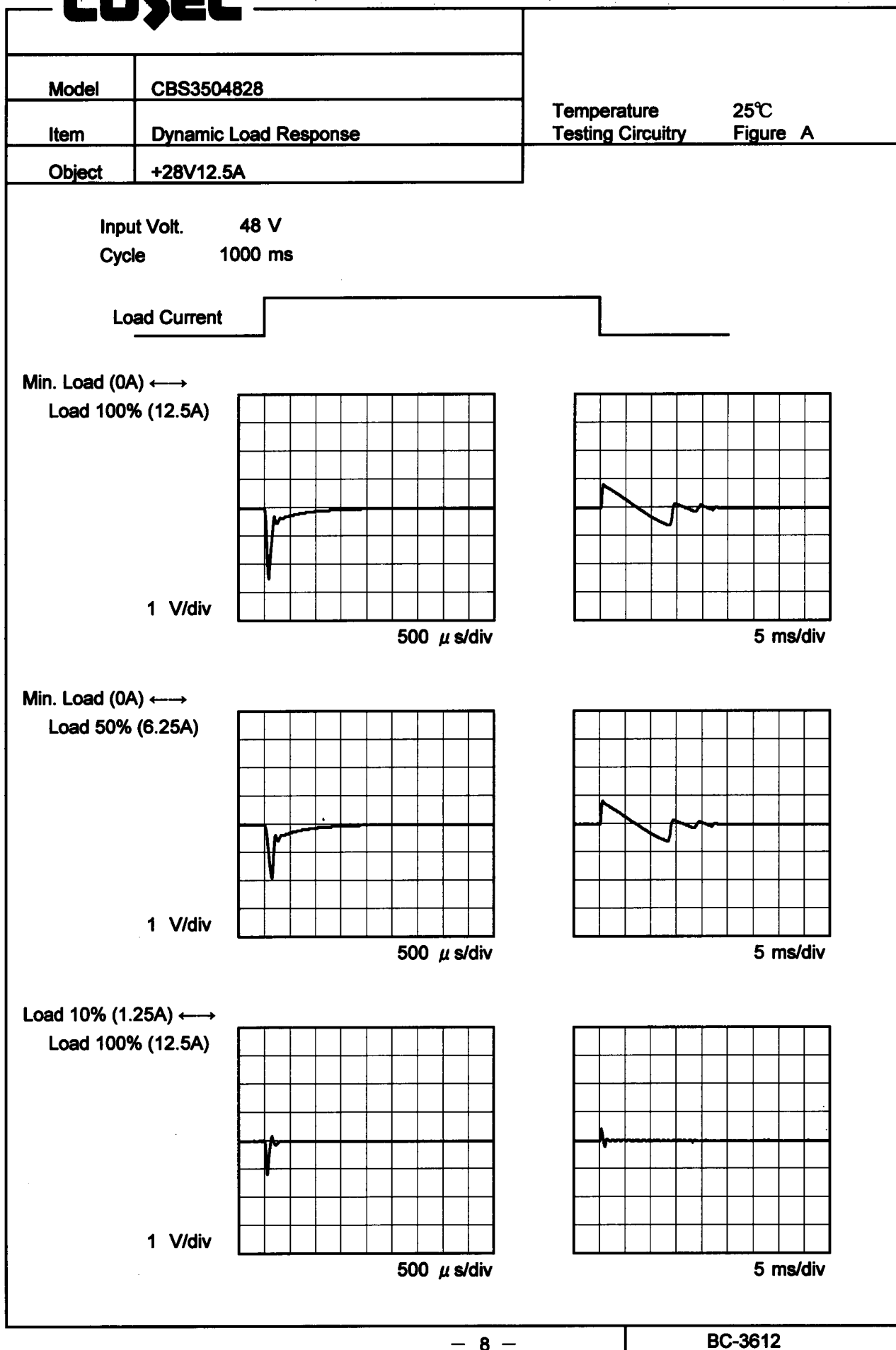
## 1. Graph



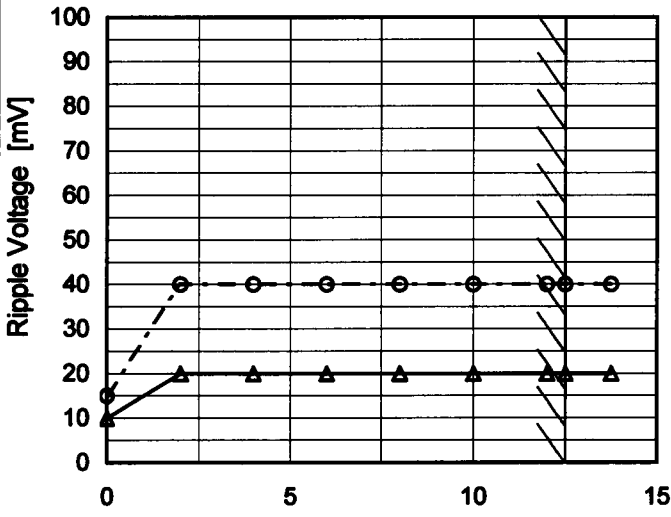
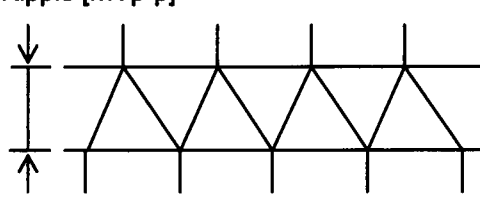
**Note: Slanted line shows the range of the rated load current.**

## 2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.00	28.043	28.044	28.044
2.00	28.042	28.044	28.044
4.00	28.043	28.044	28.044
6.00	28.043	28.044	28.044
8.00	28.043	28.044	28.044
10.00	28.043	28.044	28.044
12.00	28.043	28.044	28.044
12.50	28.043	28.044	28.044
13.75	28.043	28.044	28.044
-	-	-	-
-	-	-	-

**COSEL**

**COSEL**

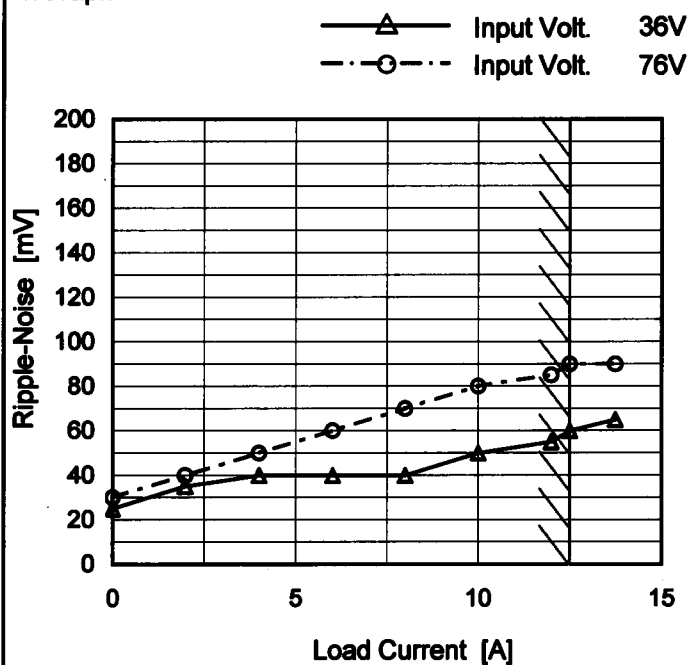
<b>Model</b> CBS3504828		Temperature 25°C Testing Circuitry Figure A																																						
<b>Item</b>	Ripple Voltage (by Load Current)																																							
<b>Object</b>	+28V12.5A																																							
<b>1. Graph</b> <div style="text-align: right; margin-right: 50px;">             —△— Input Volt. 36V              - - ○ - - Input Volt. 76V           </div>  <p style="text-align: center;">Load Current [A]</p>		<b>2. Values</b> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr> <tr> <th>Input Volt. 36 [V]</th><th>Input Volt. 76 [V]</th></tr> </thead> <tbody> <tr><td>0.00</td><td>10</td><td>15</td></tr> <tr><td>2.00</td><td>20</td><td>40</td></tr> <tr><td>4.00</td><td>20</td><td>40</td></tr> <tr><td>6.00</td><td>20</td><td>40</td></tr> <tr><td>8.00</td><td>20</td><td>40</td></tr> <tr><td>10.00</td><td>20</td><td>40</td></tr> <tr><td>12.00</td><td>20</td><td>40</td></tr> <tr><td>12.50</td><td>20</td><td>40</td></tr> <tr><td>13.75</td><td>20</td><td>40</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. 36 [V]	Input Volt. 76 [V]	0.00	10	15	2.00	20	40	4.00	20	40	6.00	20	40	8.00	20	40	10.00	20	40	12.00	20	40	12.50	20	40	13.75	20	40	—	—	—	—	—	—
Load Current [A]	Ripple Voltage [mV]																																							
	Input Volt. 36 [V]	Input Volt. 76 [V]																																						
0.00	10	15																																						
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<p>Measured by 100 MHz Oscilloscope.          Ripple Voltage is shown as p-p in the figure below.          Note: Slanted line shows the range of the rated load current.</p>																																								
<p>Ripple [mVp-p]</p>  <p style="text-align: center;">Fig. Complex Ripple Wave Form</p>																																								

# COSEL

Model	CBS3504828
Item	Ripple-Noise
Object	+28V12.5A

Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph



Measured by 100 MHz Oscilloscope.  
Ripple-Noise is shown as p-p in the figure below.  
Note: Slanted line shows the range of the rated load current.

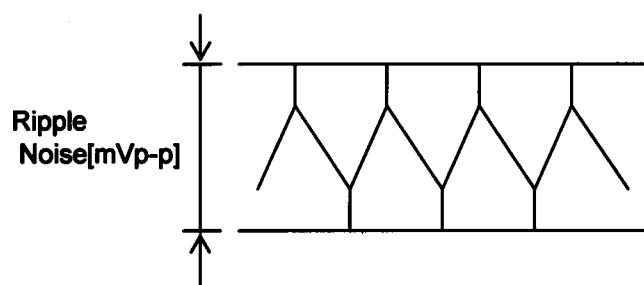


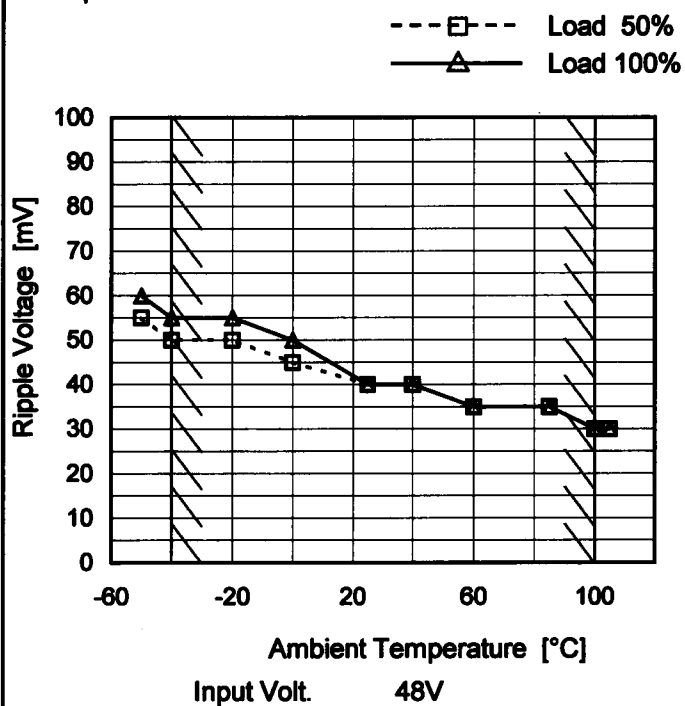
Fig.Complex Ripple Noise Wave Form

## 2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.00	25	30
2.00	35	40
4.00	40	50
6.00	40	60
8.00	40	70
10.00	50	80
12.00	55	85
12.50	60	90
13.75	65	90
—	—	—
—	—	—

<b>Model</b>	<b>CBS3504828</b>
<b>Item</b>	<b>Ripple Voltage (by Ambient Temp.)</b>
<b>Object</b>	<b>+28V12.5A</b>

## 1. Graph



**Measured by 100 MHz Oscilloscope.**

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

### Testing Circuitry Figure A

## 2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-50	55	60
-40	50	55
-20	50	55
0	45	50
25	40	40
40	40	40
60	35	35
85	35	35
100	30	30
105	30	30
—	—	—

# COSEL

Model		CBS3504828																																																				
Item		Ambient Temperature Drift																																																				
Object		+28V12.5A																																																				
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> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 36[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr><tr><td>-50</td><td>28.131</td><td>28.133</td><td>28.132</td></tr><tr><td>-40</td><td>28.126</td><td>28.126</td><td>28.126</td></tr><tr><td>-20</td><td>28.117</td><td>28.117</td><td>28.117</td></tr><tr><td>0</td><td>28.094</td><td>28.094</td><td>28.094</td></tr><tr><td>25</td><td>28.057</td><td>28.057</td><td>28.056</td></tr><tr><td>40</td><td>28.027</td><td>28.027</td><td>28.026</td></tr><tr><td>60</td><td>27.982</td><td>27.981</td><td>27.981</td></tr><tr><td>85</td><td>27.922</td><td>27.922</td><td>27.921</td></tr><tr><td>100</td><td>27.879</td><td>27.879</td><td>27.878</td></tr><tr><td>105</td><td>27.857</td><td>27.859</td><td>27.857</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	-50	28.131	28.133	28.132	-40	28.126	28.126	28.126	-20	28.117	28.117	28.117	0	28.094	28.094	28.094	25	28.057	28.057	28.056	40	28.027	28.027	28.026	60	27.982	27.981	27.981	85	27.922	27.922	27.921	100	27.879	27.879	27.878	105	27.857	27.859	27.857	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																					
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--	-	-	-																																																			
Note: Slanted line shows the range of the rated ambient temperature.																																																						

**COSEL**

Model	CBS3504828		
Item	Output Voltage Accuracy		Testing Circuitry    Figure A
Object	+28V12.5A		

**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 : 36 - 76V

Load Current : 0 - 12.5A

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

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

**2. Values**

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-40	76	0	28.127	±126	±0.5
Minimum Voltage	100	76	12.5	27.875		

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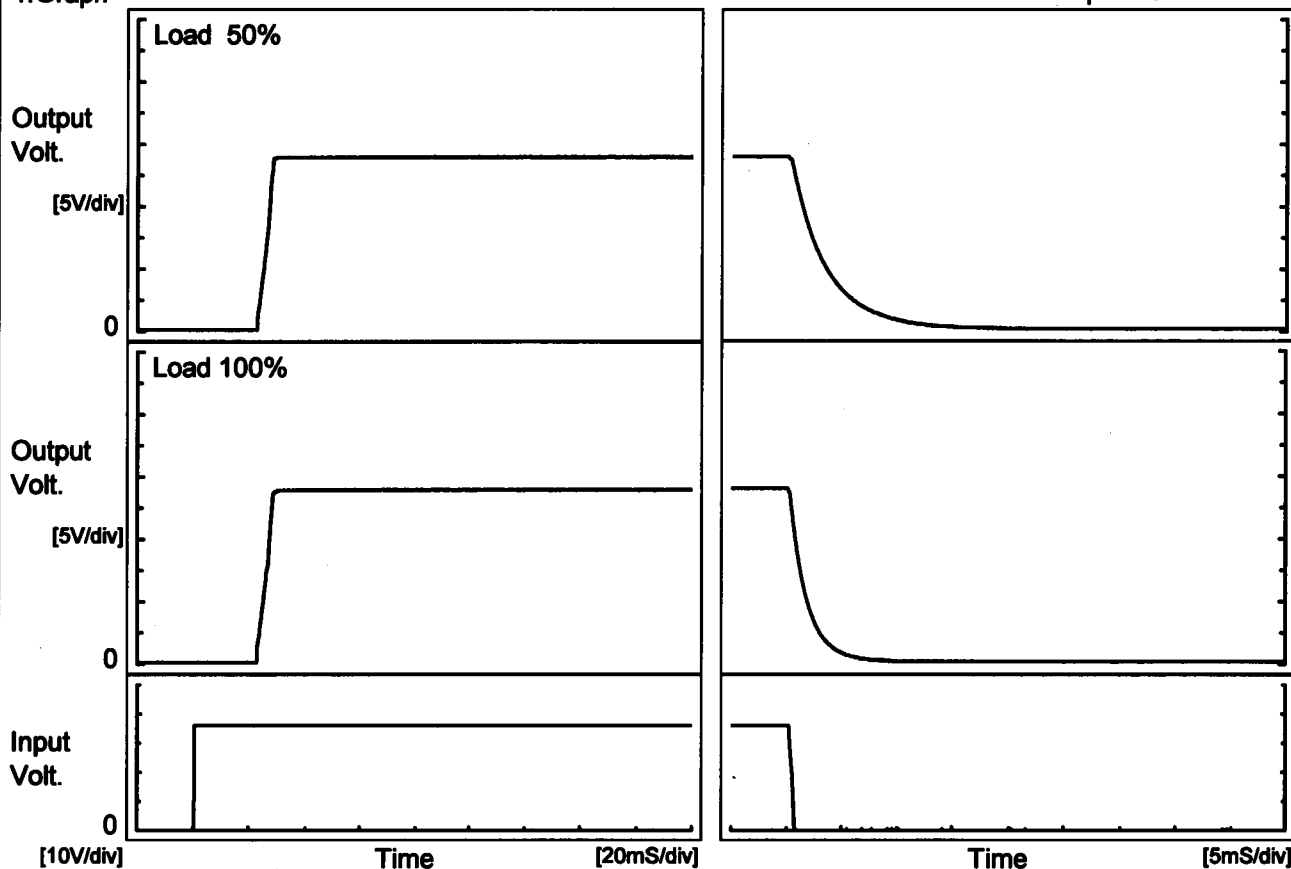
Model	CBS3504828		
Item	Time Lapse Drift	Temperature	25°C
Object	+28V12.5A	Testing Circuitry	Figure A
1.Graph		2.Values	
<div><div><div>Output Voltage [V]</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><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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**COSEL**

Model	CBS3504828	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+28V12.5A		

## 1. Graph

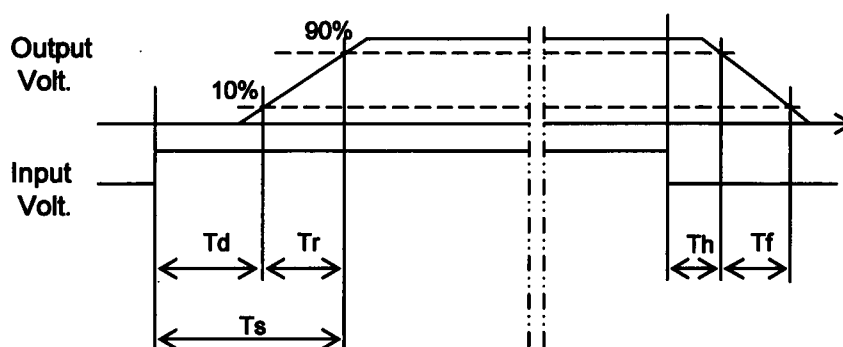
Input Volt. 36 V



## 2. Values

[mS]

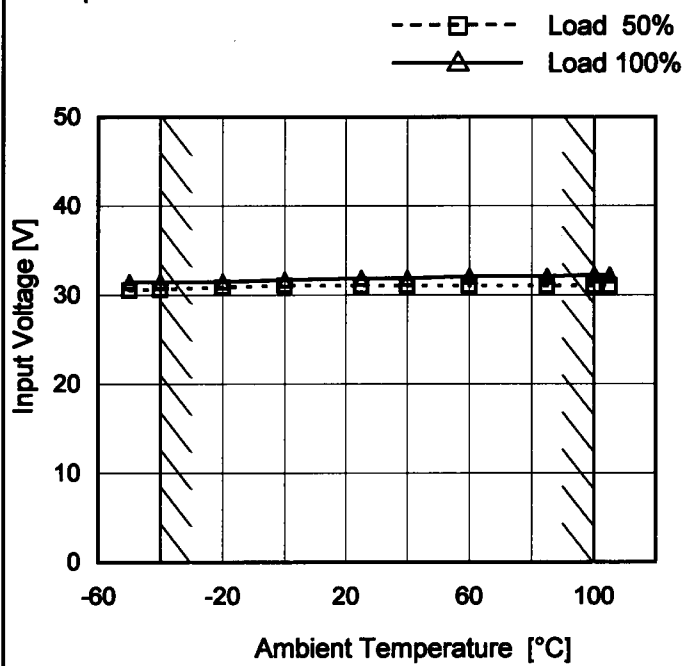
Load \ Time	Td	Tr	Ts	Th	Tf
50 %	23.2	4.9	28.1	0.6	7.5
100 %	23.1	5.1	28.2	0.4	3.7



**COSEL**

Model	CBS3504828
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+28V12.5A

## 1. Graph



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

## Testing Circuitry Figure A

## 2. Values

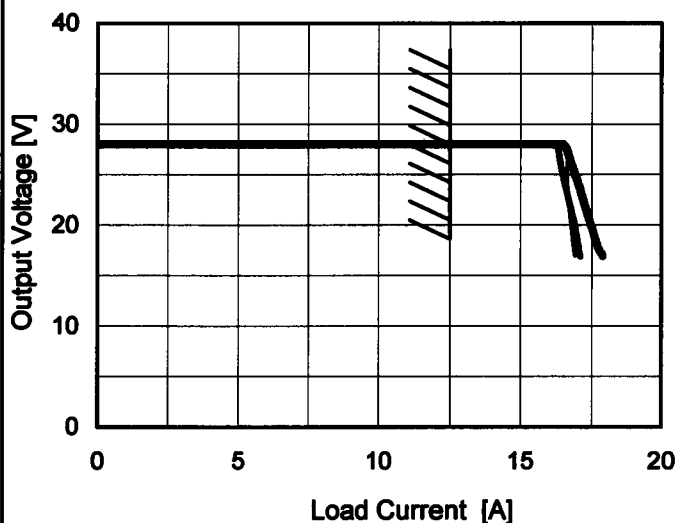
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-50	30.6	31.5
-40	30.7	31.5
-20	30.9	31.5
0	31.1	31.8
25	31.1	31.9
40	31.1	31.9
60	31.1	32.1
85	31.1	32.1
100	31.1	32.3
105	31.1	32.3
—	-	-

**COSEL**

Model	CBS3504828
Item	Overcurrent Protection
Object	+28V12.5A

1. Graph

\_\_\_\_\_ Input Volt. 36V  
 \_\_\_\_\_ Input Volt. 48V  
 \_\_\_\_\_ Input Volt. 76V



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

Intermittent operation occurs when the output voltage is from 16.8V to 0V.

Temperature 25°C  
Testing Circuitry Figure A

2. Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
28.0	12.76	13.18	13.17
26.6	16.65	16.37	16.73
25.2	16.62	16.45	16.90
22.4	16.68	16.70	17.19
19.6	16.78	16.92	17.52
16.8	16.91	17.09	17.90
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

### Testing Circuitry Figure A



Ambient Temperature [°C]	Operating Point [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-50	36.68	36.68	36.68
-40	36.68	36.68	36.68
-20	36.74	36.74	36.74
0	36.74	36.74	36.74
25	36.74	36.74	36.74
40	36.74	36.74	36.74
60	36.67	36.67	36.67
85	36.56	36.56	36.56
100	36.56	36.56	36.56
105	36.56	36.56	36.56
-	-	-	-

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

**COSEL**

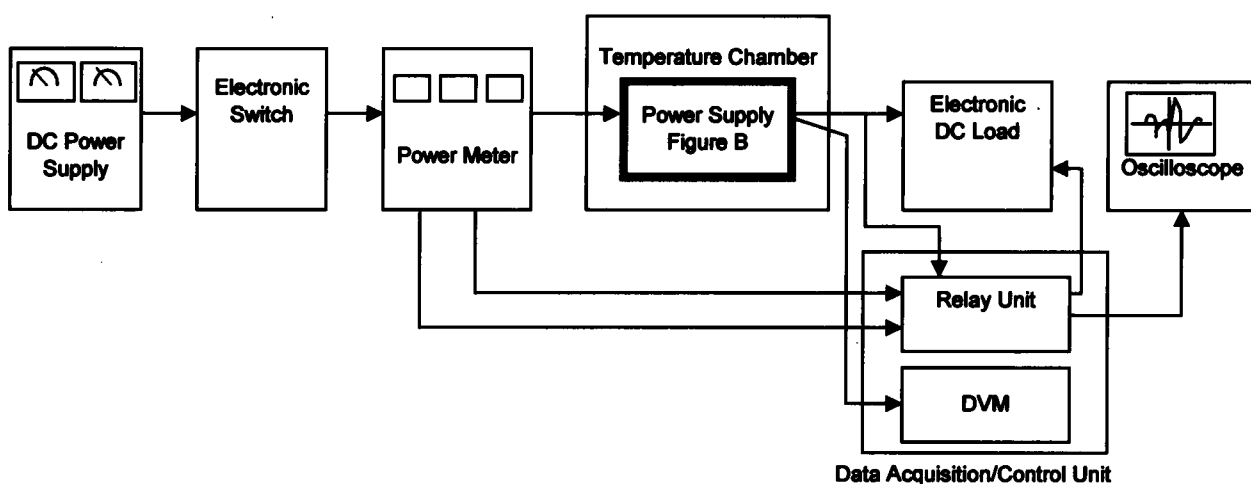


Figure A

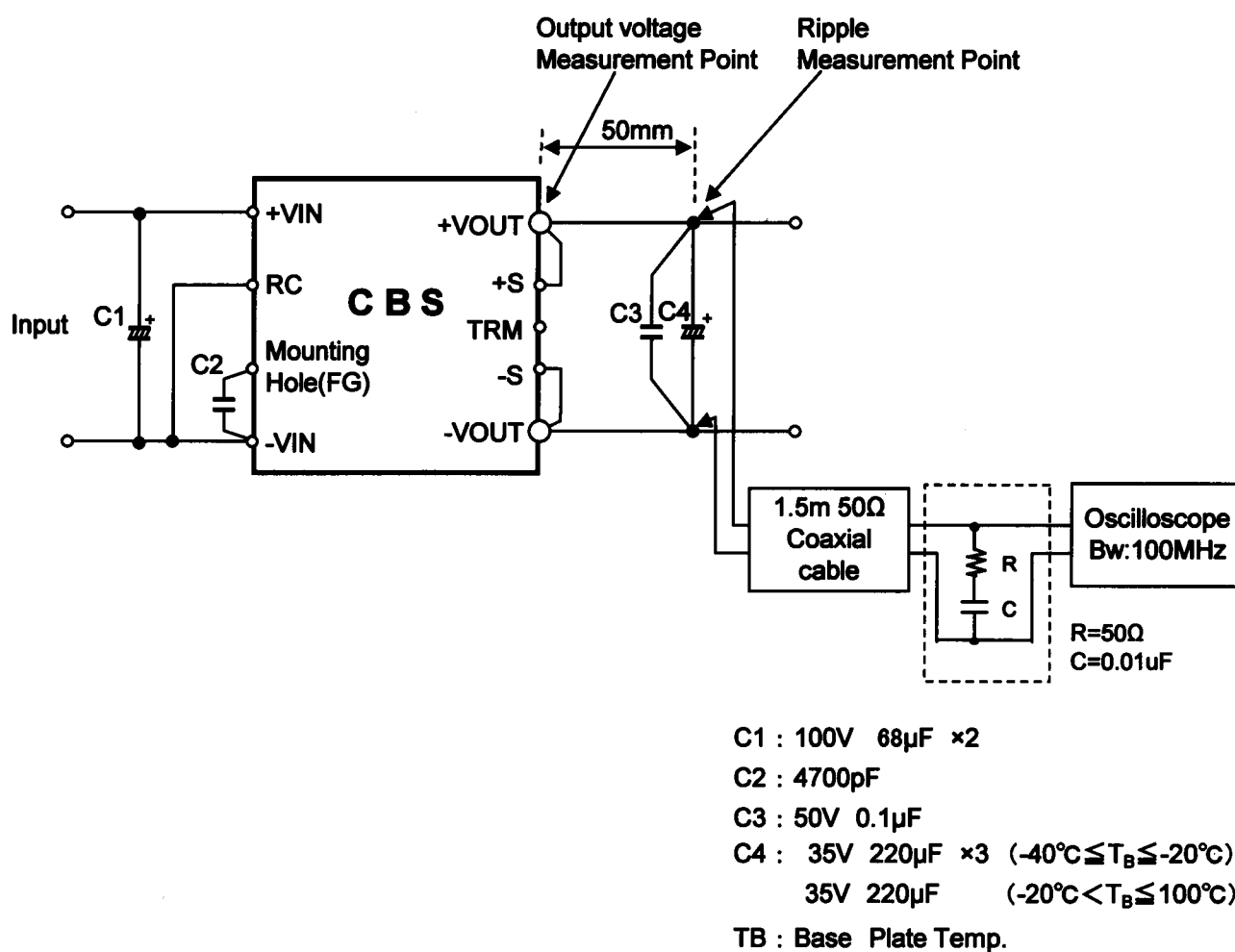


Figure B