



TEST DATA OF CBS4504828

Regulated DC Power Supply
Jul 4, 2007

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Tatsuya Mano Design Manager

Prepared by : Eiji Nagata
Eiji Nagata Design Engineer

COSEL CO.,LTD.



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Model	CBS4504828
Item	Input Current (by Input Voltage)
Object	_____
1. Graph	
<p>The graph plots Input Current [A] on the Y-axis (0 to 20) against Input Voltage [V] on the X-axis (0 to 80). Three curves are shown: Load 100% (solid line with triangle markers), Load 50% (dashed line with square markers), and Load 0% (dotted line with circle markers). A slanted line indicates the rated input voltage range.</p>	
<p>Note: Slanted line shows the range of the rated input voltage.</p>	

 Temperature 25°C
 Testing Circuitry Figure A

2. Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
8.0	0.002	0.002	0.002
16.0	0.002	0.002	0.002
24.0	0.006	0.006	0.006
27.4	0.005	0.005	0.005
30.6	0.097	7.250	13.720
32.2	0.095	7.620	14.420
33.0	0.094	7.500	14.760
33.8	0.093	7.290	14.790
36.0	0.091	6.760	13.620
40.0	0.088	6.090	12.320
48.0	0.077	5.100	10.180
60.0	0.055	4.108	8.200
70.0	0.045	3.551	7.070
76.0	0.042	3.288	6.480
80.0	0.040	3.134	6.200
-	-	-	-
-	-	-	-

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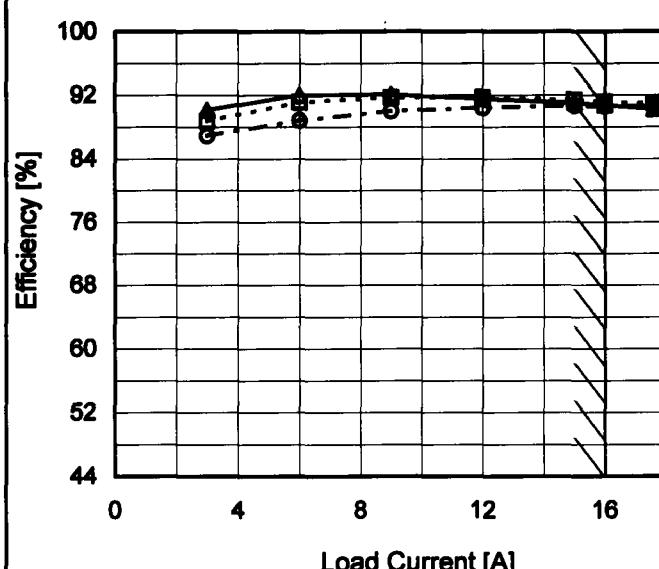
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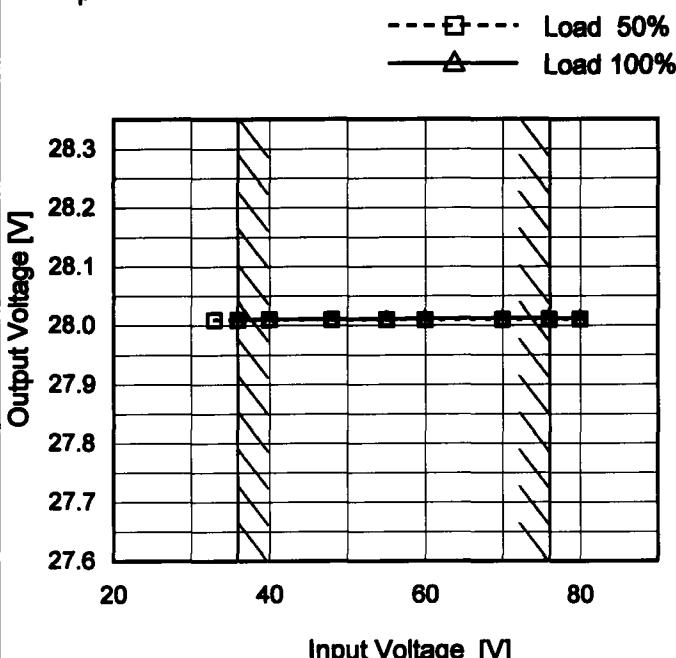
Note: Slanted line shows the range of the rated load current.

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Model	CBS4504828
Item	Line Regulation
Object	+28V16A

 Temperature 25°C
 Testing Circuitry Figure A

1. Graph



2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
33	28.009	—
36	28.009	28.010
40	28.009	28.011
48	28.009	28.011
55	28.010	28.011
60	28.009	28.012
70	28.010	28.012
76	28.010	28.012
80	28.010	28.012

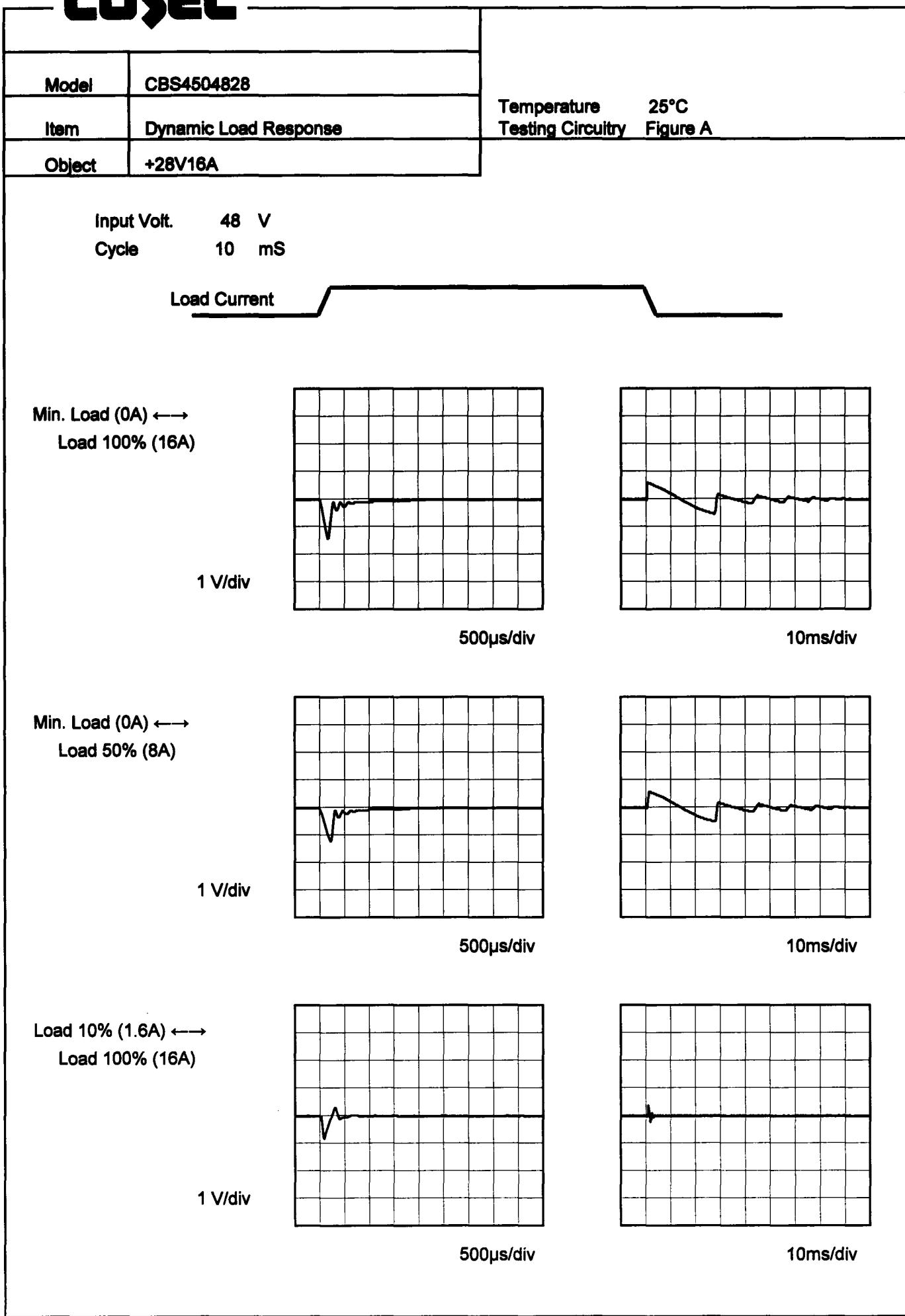
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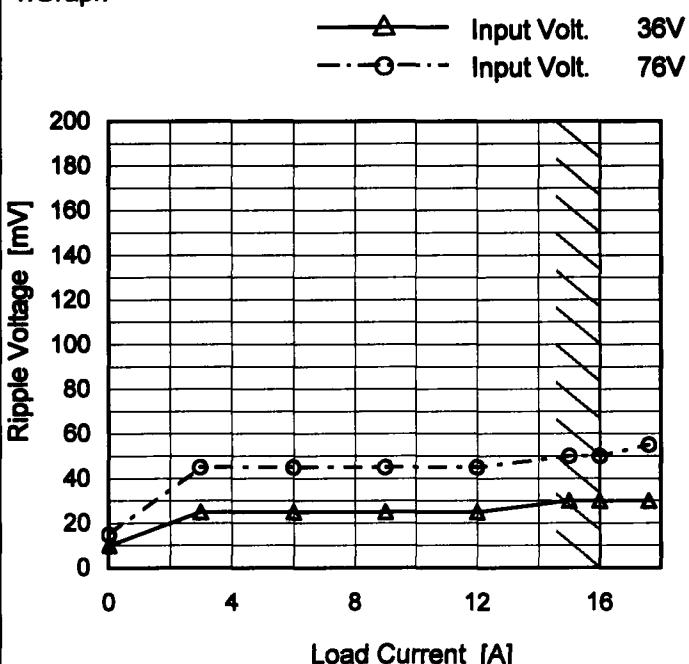


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Model	CBS4504828
Item	Ripple Voltage (by Load Current)
Object	+28V16A

 Temperature 25°C
 Testing Circuitry Figure C

1. Graph



2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.0	10	15
3.0	25	45
6.0	25	45
9.0	25	45
12.0	25	45
15.0	30	50
16.0	30	50
17.6	30	55
-	-	-
-	-	-
-	-	-

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

Ripple [mVp-p]

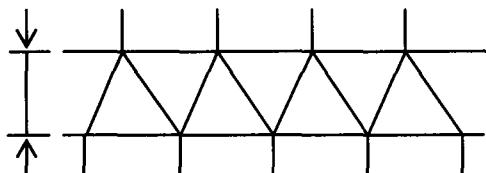


Fig.Complex Ripple Wave Form

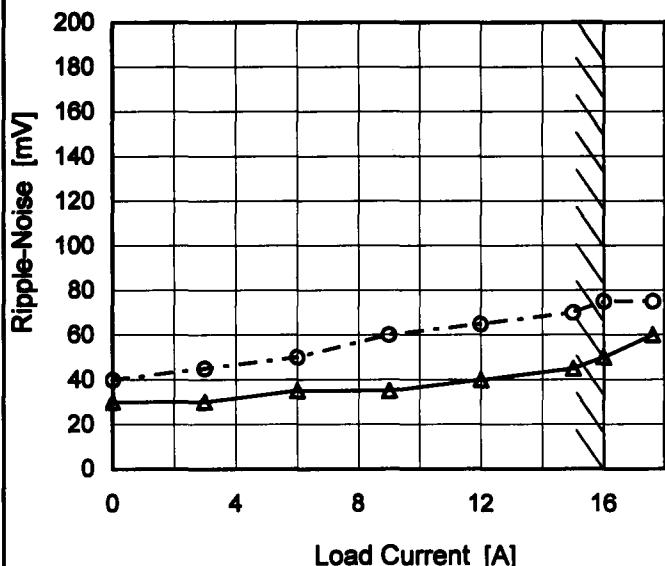
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Model	CBS4504828
Item	Ripple-Noise
Object	+28V16A

 Temperature 25°C
 Testing Circuitry Figure C

1.Graph

—▲— Input Volt. 36V
 -·○- Input Volt. 76V



2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.0	30	40
3.0	30	45
6.0	35	50
9.0	35	60
12.0	40	65
15.0	45	70
16.0	50	75
17.6	60	75
-	-	-
-	-	-
-	-	-

Measured by 100MHz Ossiloscope.

Ripple-Noise is shown as p-p in the figure below.

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

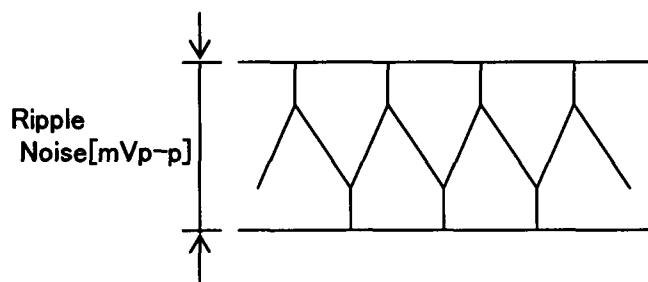


Fig.Complex Ripple Noise Wave Form

COSEL

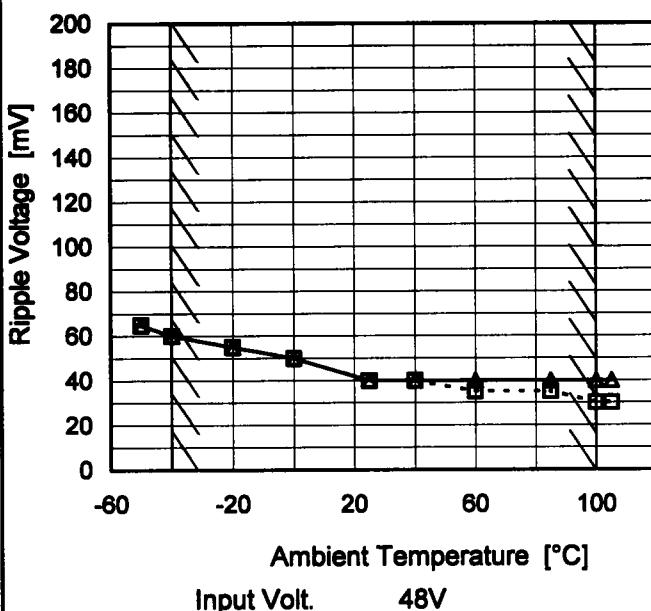
Model CBS4504828

Item Ripple Voltage (by Ambient Temp.)

Object +28V16A

1. Graph

---□--- Load 50%
 —△— Load 100%



Testing Circuitry Figure C

2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-50	65	65
-40	60	60
-20	55	55
0	50	50
25	40	40
40	40	40
60	35	40
85	35	40
100	30	40
105	30	40
-	-	-

Measured by 100MHz Ossiloscope.

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

Model CBS4504828	Testing Circuitry Figure A																																																
Item Ambient Temperature Drift																																																	
Object +28V16A																																																	
1. Graph Legend: <ul style="list-style-type: none"> Input Volt. 36V Input Volt. 48V Input Volt. 76V 	2. Values																																																
 Output Voltage [V]	<table border="1"> <thead> <tr> <th>Ambient Temperature [°C]</th> <th>Output Voltage [V] (Input Volt. 36[V])</th> <th>Output Voltage [V] (Input Volt. 48[V])</th> <th>Output Voltage [V] (Input Volt. 76[V])</th> </tr> </thead> <tbody> <tr><td>-50</td><td>27.854</td><td>27.860</td><td>27.867</td></tr> <tr><td>-40</td><td>27.891</td><td>27.897</td><td>27.903</td></tr> <tr><td>-20</td><td>27.952</td><td>27.957</td><td>27.960</td></tr> <tr><td>0</td><td>27.993</td><td>27.996</td><td>27.998</td></tr> <tr><td>25</td><td>28.022</td><td>28.023</td><td>28.024</td></tr> <tr><td>40</td><td>28.027</td><td>28.027</td><td>28.028</td></tr> <tr><td>60</td><td>28.024</td><td>28.023</td><td>28.022</td></tr> <tr><td>85</td><td>28.004</td><td>28.003</td><td>28.000</td></tr> <tr><td>100</td><td>27.987</td><td>27.984</td><td>27.981</td></tr> <tr><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>-</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>	Ambient Temperature [°C]	Output Voltage [V] (Input Volt. 36[V])	Output Voltage [V] (Input Volt. 48[V])	Output Voltage [V] (Input Volt. 76[V])	-50	27.854	27.860	27.867	-40	27.891	27.897	27.903	-20	27.952	27.957	27.960	0	27.993	27.996	27.998	25	28.022	28.023	28.024	40	28.027	28.027	28.028	60	28.024	28.023	28.022	85	28.004	28.003	28.000	100	27.987	27.984	27.981	-	-	-	-	-	-	-	-
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Model	CBS4504828	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+28V16A	

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 - 16A

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

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

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	40	76	16	28.028	±69	±0.2
Minimum Voltage	-40	36	16	27.891		

COSEL

Model	CBS4504828
Item	Time Lapse Drift
Object	+28V16A

1. Graph

Time [H]	Output Voltage [V]
0.0	28.002
0.5	28.013
1.0	28.013
2.0	28.013
3.0	28.013
4.0	28.013
5.0	28.013
6.0	28.013
7.0	28.013
8.0	28.013

Input Volt. 48V
Load 100%

Temperature 25°C
Testing Circuitry Figure A

2. Values

Time since start [H]	Output Voltage [V]
0.0	28.002
0.5	28.013
1.0	28.013
2.0	28.013
3.0	28.013
4.0	28.013
5.0	28.013
6.0	28.013
7.0	28.013
8.0	28.013

COSEL

Model CBS4504828

Item Rise and Fall Time

Object +28V16A

Temperature 25°C
Testing Circuitry Figure A

1. Graph

Input Volt. 48 V

Output Volt.

[5V/div]

Load 50%

0

Output Volt.

[5V/div]

Load 100%

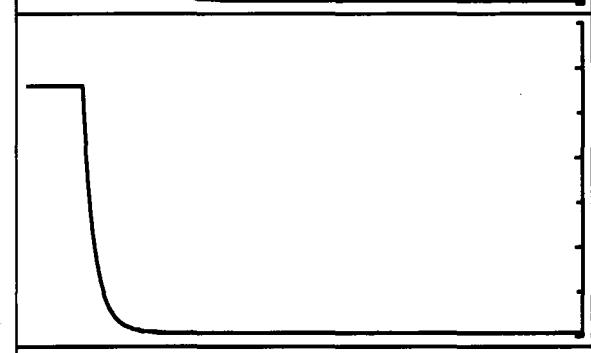
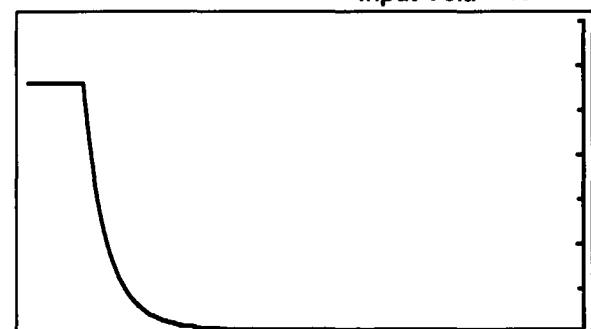
0

Input Volt.

[10V/div]

Time

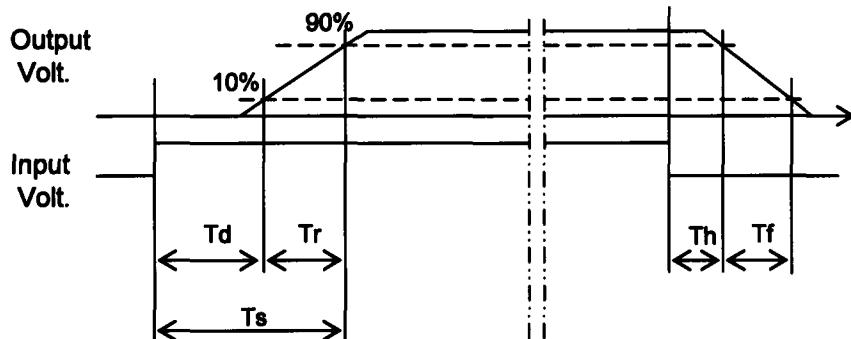
[50mS/div]



2. Values

[mS]

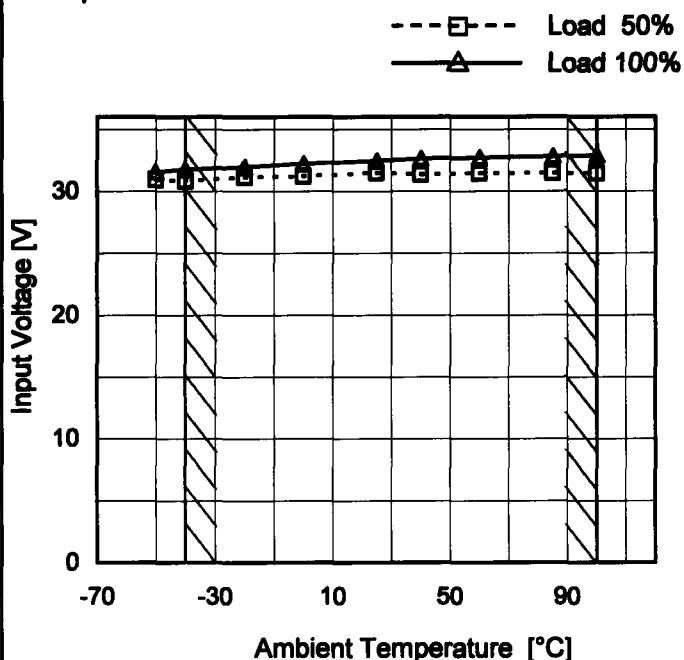
Load	Time	Td	Tr	Ts	Th	Tf
50 %		25.8	5.3	31.1	0.5	9.4
100 %		25.8	5.3	31.1	0.3	4.7



COSEL

Model	CBS4504828
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+28V16A

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	31.0	31.6
-40	30.9	31.8
-20	31.2	32.0
0	31.2	32.2
25	31.5	32.5
40	31.4	32.7
60	31.5	32.7
85	31.5	32.8
100	31.5	32.9
-	-	-
-	-	-

COSEL

Model	CBS4504828
Item	Overcurrent Protection
Object	+28V16A
1.Graph	<p style="text-align: right;">Input Volt. 36V Input Volt. 48V Input Volt. 76V</p> <p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when the output voltage is from 8.4V to 0V.</p>

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	16.26	16.04	16.04
26.6	20.01	19.72	20.01
25.2	19.95	19.80	20.19
22.4	19.97	20.01	20.55
19.6	20.08	20.25	20.91
16.8	20.21	20.44	21.33
14.0	20.37	20.63	21.60
11.2	20.40	20.73	21.60
8.4	20.40	20.73	21.60
--	-	-	-
--	-	-	-
--	-	-	-

<p>Model CBS4504828</p>																																																				
<p>Item Overvoltage Protection</p>	<p>Testing Circuitry Figure A</p>																																																			
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<p>1. Graph</p> <p>—△— Input Volt. 36V - - □ - - Input Volt. 48V - - ○ - - Input Volt. 76V</p> <p>Operating Point [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 0%</p>	<p>2. Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="3">Operating Point [V]</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>-50</td> <td>36.57</td> <td>36.57</td> <td>36.57</td> </tr> <tr> <td>-40</td> <td>36.57</td> <td>36.57</td> <td>36.57</td> </tr> <tr> <td>-20</td> <td>36.57</td> <td>36.57</td> <td>36.57</td> </tr> <tr> <td>0</td> <td>36.57</td> <td>36.57</td> <td>36.57</td> </tr> <tr> <td>25</td> <td>36.56</td> <td>36.57</td> <td>36.57</td> </tr> <tr> <td>40</td> <td>36.45</td> <td>36.45</td> <td>36.45</td> </tr> <tr> <td>60</td> <td>36.45</td> <td>36.45</td> <td>36.45</td> </tr> <tr> <td>85</td> <td>36.44</td> <td>36.44</td> <td>36.44</td> </tr> <tr> <td>100</td> <td>36.38</td> <td>36.38</td> <td>36.38</td> </tr> <tr> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Ambient Temperature [°C]	Operating Point [V]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	-50	36.57	36.57	36.57	-40	36.57	36.57	36.57	-20	36.57	36.57	36.57	0	36.57	36.57	36.57	25	36.56	36.57	36.57	40	36.45	36.45	36.45	60	36.45	36.45	36.45	85	36.44	36.44	36.44	100	36.38	36.38	36.38	-	-	-	-	-	-	-	-
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COSEL

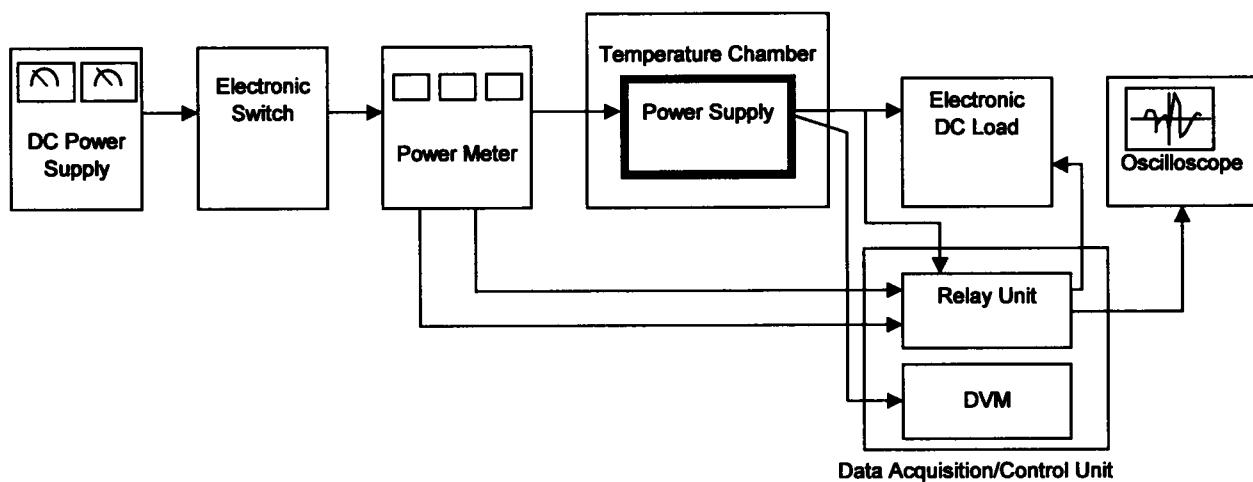
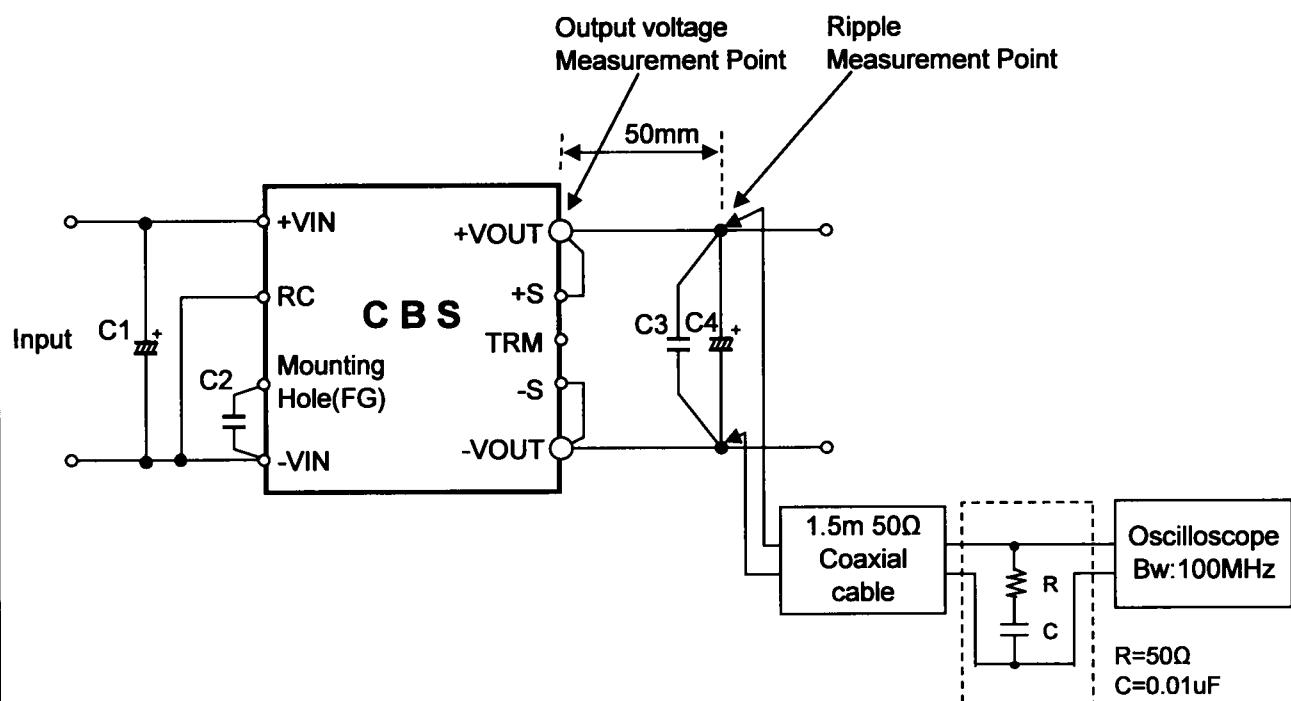


Figure A



C1 : 100V 68μF ×2

C2 : 4700pF

C3 : 50V 0.1μF

C4 : 35V 220μF ×3 (-40°C ≤ T_B ≤ -20°C)35V 220μF (-20°C < T_B ≤ 100°C)T_B : Base Plate Temp.

Figure C