

TEST DATA OF DHS50B03

Regulated DC Power Supply
May 25, 2009

Approved by : Tatsuya Mano
Tatsuya Mano Design Manager

Prepared by : Shuhei Sawada
Shuhei Sawada Design Engineer

COSEL CO.,LTD.

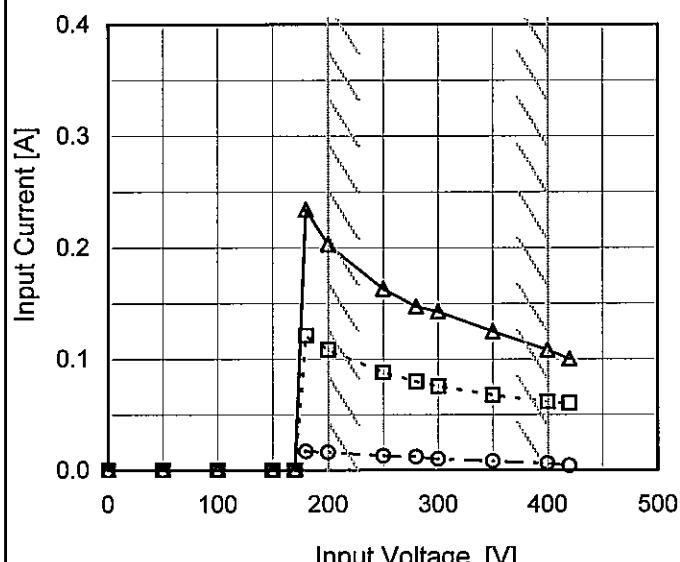


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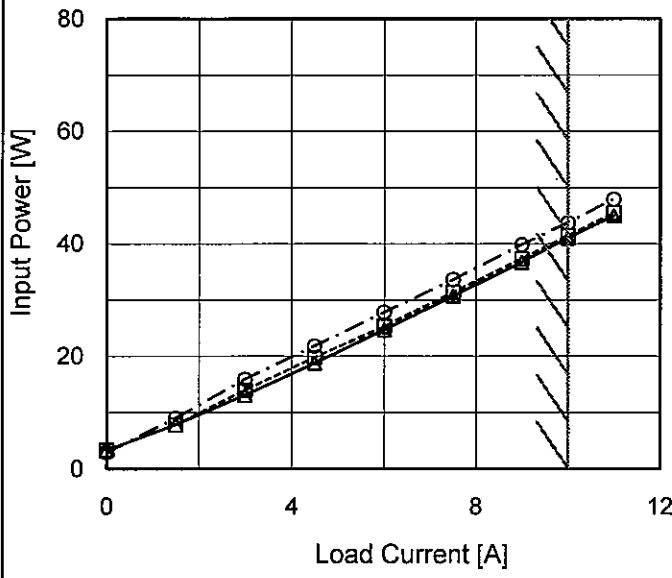
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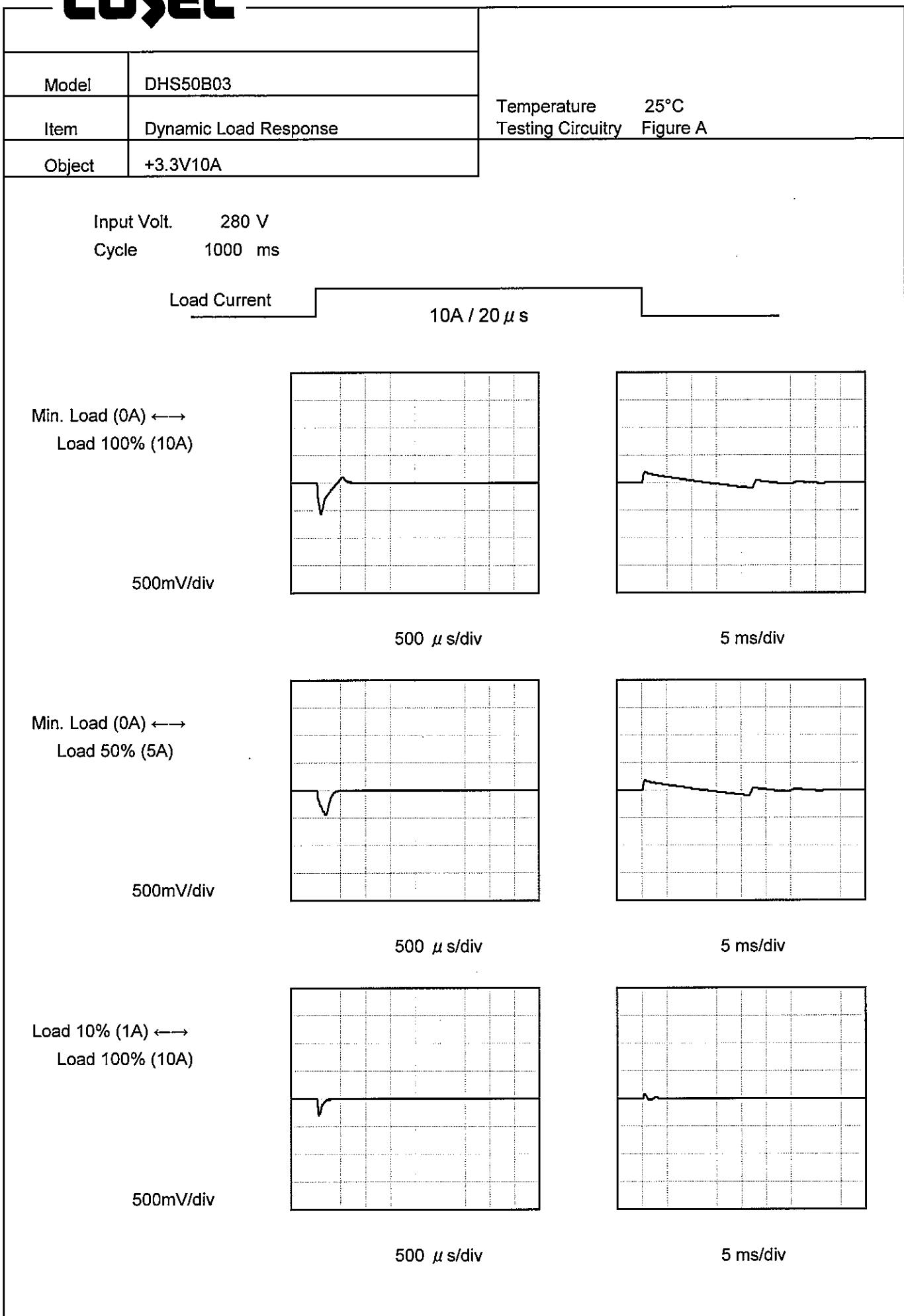
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COSEL

Model	DHS50B03	Temperature	25°C																																																			
Item	Load Regulation	Testing Circuitry	Figure A																																																			
Object	+3.3V10A																																																					
1.Graph	<p>—▲— Input Volt. 200V ---□--- Input Volt. 280V ---○--- Input Volt. 400V</p>																																																					
2.Values	<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Output Voltage [V]</th> </tr> <tr> <th>Input Volt. 200[V]</th> <th>Input Volt. 280[V]</th> <th>Input Volt. 400[V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>3.356</td><td>3.356</td><td>3.356</td></tr> <tr><td>1.5</td><td>3.355</td><td>3.355</td><td>3.356</td></tr> <tr><td>3.0</td><td>3.355</td><td>3.355</td><td>3.355</td></tr> <tr><td>4.5</td><td>3.355</td><td>3.355</td><td>3.355</td></tr> <tr><td>6.0</td><td>3.355</td><td>3.355</td><td>3.355</td></tr> <tr><td>7.5</td><td>3.355</td><td>3.355</td><td>3.355</td></tr> <tr><td>9.0</td><td>3.355</td><td>3.355</td><td>3.355</td></tr> <tr><td>10.0</td><td>3.355</td><td>3.355</td><td>3.355</td></tr> <tr><td>11.0</td><td>3.355</td><td>3.355</td><td>3.355</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]	Output Voltage [V]			Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]	0.0	3.356	3.356	3.356	1.5	3.355	3.355	3.356	3.0	3.355	3.355	3.355	4.5	3.355	3.355	3.355	6.0	3.355	3.355	3.355	7.5	3.355	3.355	3.355	9.0	3.355	3.355	3.355	10.0	3.355	3.355	3.355	11.0	3.355	3.355	3.355	--	-	-	-	--	-	-	-
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Note:	Slanted line shows the range of the rated load current.																																																					

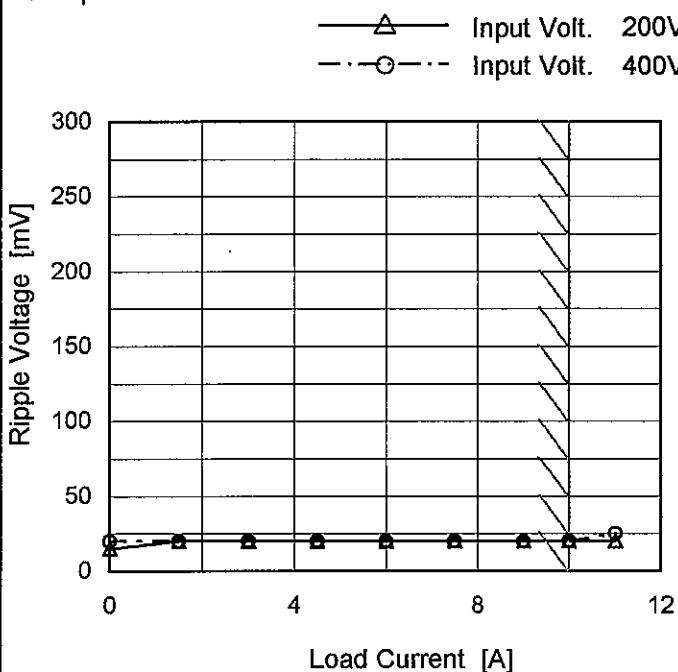
COSEL

COSEL

Model	DHS50B03
Item	Ripple Voltage (by Load Current)
Object	+3.3V10A

Temperature 25°C
 Testing Circuitry Figure B

1. Graph



2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 200 [V]	Input Volt. 400 [V]
0.0	15	20
1.5	20	20
3.0	20	20
4.5	20	20
6.0	20	20
7.5	20	20
9.0	20	20
10.0	20	20
11.0	20	25
--	-	-
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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.

Ripple [mVp-p]

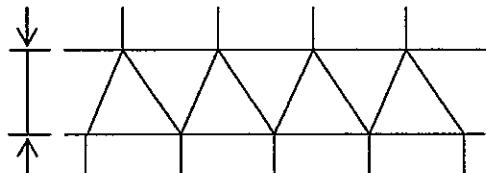
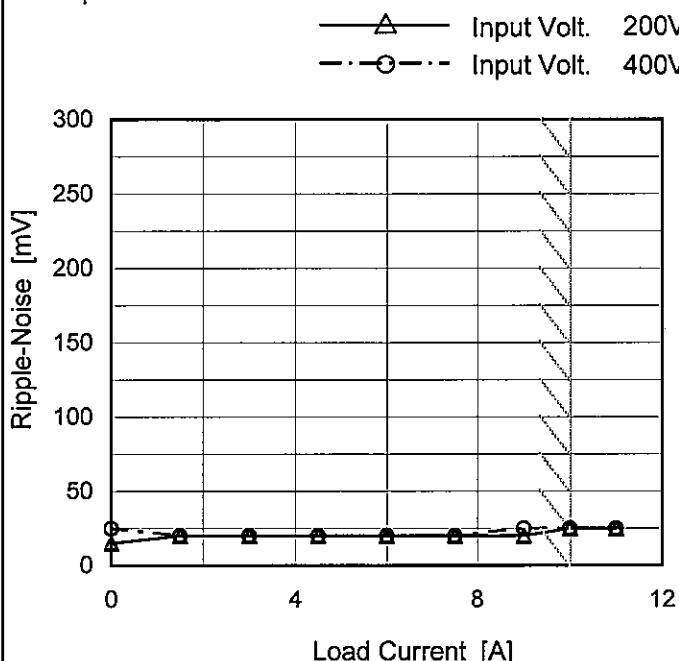


Fig.Complex Ripple Wave Form

COSEL

Model	DHS50B03
Item	Ripple-Noise
Object	+3.3V10A

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.

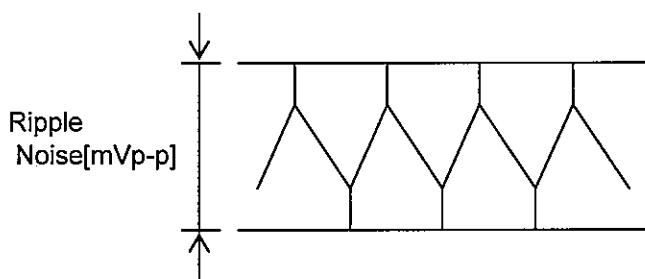


Fig.Complex Ripple Noise Wave Form

Temperature 25°C
Testing Circuitry Figure B

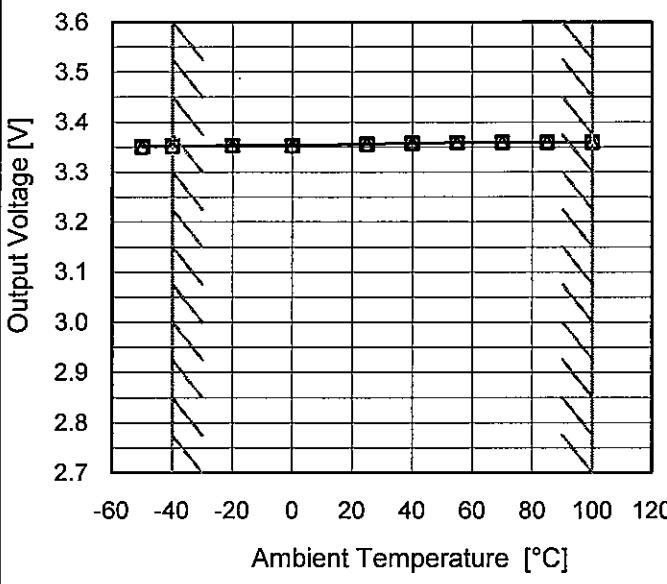
2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 200 [V]	Input Volt. 400 [V]
0.0	15	25
1.5	20	20
3.0	20	20
4.5	20	20
6.0	20	20
7.5	20	20
9.0	20	25
10.0	25	25
11.0	25	25
--	-	-
--	-	-

COSEL

Model DHS50B03 Item Ripple Voltage (by Ambient Temp.) Object +3.3V10A		Testing Circuitry Figure B 2.Values																																			
1.Graph <p>Graph showing Ripple Voltage [mV] vs Ambient Temperature [°C]. The Y-axis ranges from 0 to 300 mV, and the X-axis ranges from -60 to 120 °C. Two data series are plotted: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show a sharp increase in ripple voltage starting around 20°C, reaching a plateau between 20-85°C where they both reach approximately 20 mV, and then decreasing again towards 100°C.</p> <table border="1"> <thead> <tr> <th>Ambient Temperature [°C]</th> <th>Ripple Voltage [mV] (Load 50%)</th> <th>Ripple Voltage [mV] (Load 100%)</th> </tr> </thead> <tbody> <tr><td>-50</td><td>35</td><td>40</td></tr> <tr><td>-40</td><td>35</td><td>40</td></tr> <tr><td>-20</td><td>35</td><td>40</td></tr> <tr><td>0</td><td>25</td><td>25</td></tr> <tr><td>25</td><td>20</td><td>20</td></tr> <tr><td>40</td><td>20</td><td>20</td></tr> <tr><td>55</td><td>20</td><td>20</td></tr> <tr><td>70</td><td>20</td><td>20</td></tr> <tr><td>85</td><td>20</td><td>20</td></tr> <tr><td>100</td><td>20</td><td>20</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>		Ambient Temperature [°C]	Ripple Voltage [mV] (Load 50%)	Ripple Voltage [mV] (Load 100%)	-50	35	40	-40	35	40	-20	35	40	0	25	25	25	20	20	40	20	20	55	20	20	70	20	20	85	20	20	100	20	20	--	-	-
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100	20	20																																			
--	-	-																																			
Input Volt. 280V Measured by 100 MHz Oscilloscope. Note: Slanted line shows the range of the rated ambient temperature.																																					

COSEL

Model	DHS50B03
Item	Ambient Temperature Drift
Object	+3.3V10A
1.Graph	<p>—▲— Input Volt. 200V - - □ - - Input Volt. 280V - - ○ - - Input Volt. 400V</p>  <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>
Note:	Slanted line shows the range of the rated ambient temperature.

Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
-50	3.351	3.350	3.351
-40	3.352	3.352	3.352
-20	3.353	3.353	3.353
0	3.353	3.353	3.353
25	3.355	3.355	3.355
40	3.357	3.357	3.357
55	3.359	3.359	3.358
70	3.359	3.359	3.359
85	3.359	3.359	3.359
100	3.359	3.359	3.359
--	-	-	-



Model	DHS50B03	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+3.3V10A	

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 : 200 - 400V

Load Current : 0 - 10A

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

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

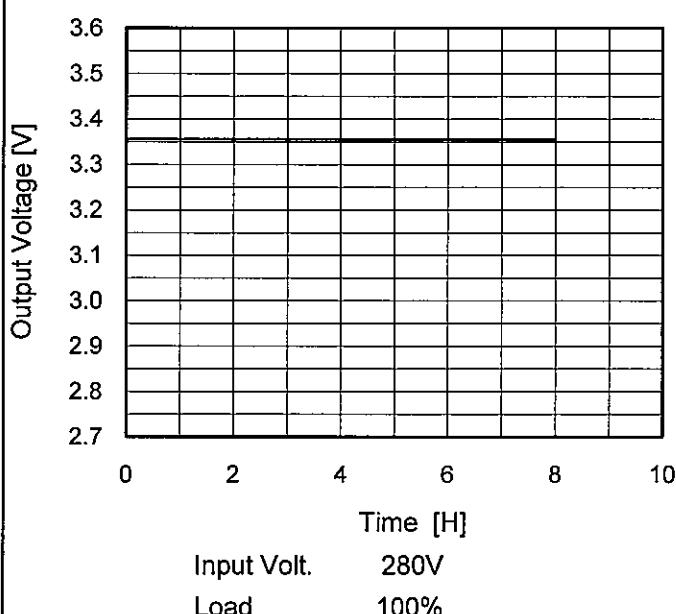
2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	85	200	0	3.361	±5	±0.2
Minimum Voltage	-40	280	10	3.352		

COSEL

Model	DHS50B03
Item	Time Lapse Drift
Object	+3.3V10A

1.Graph



Temperature 25°C
Testing Circuitry Figure A

2.Values

Time since start [H]	Output Voltage [V]
0.0	3.355
0.5	3.355
1.0	3.355
2.0	3.355
3.0	3.355
4.0	3.355
5.0	3.355
6.0	3.355
7.0	3.355
8.0	3.355

COSEL

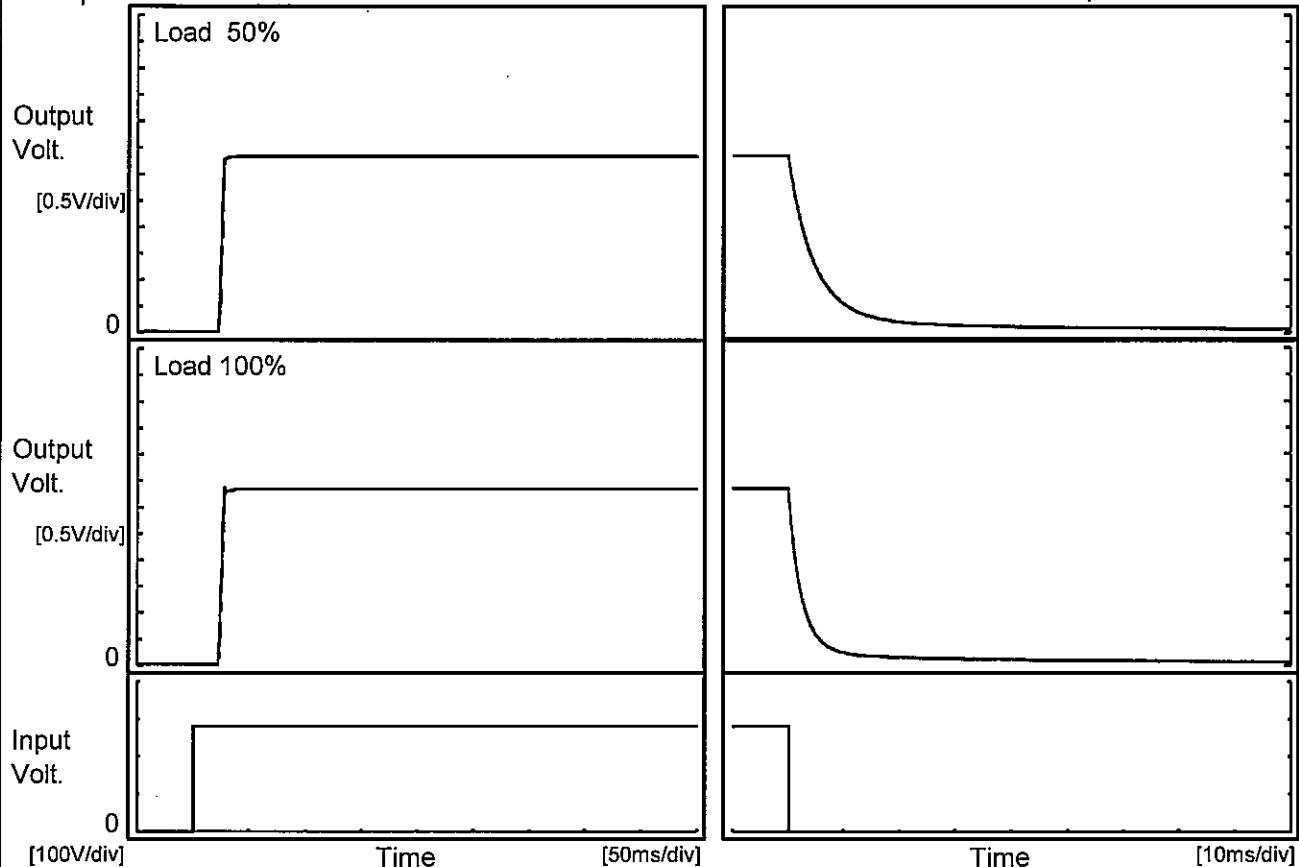
Model DHS50B03

Temperature 25°C
Testing Circuitry Figure A

Item Rise and Fall Time

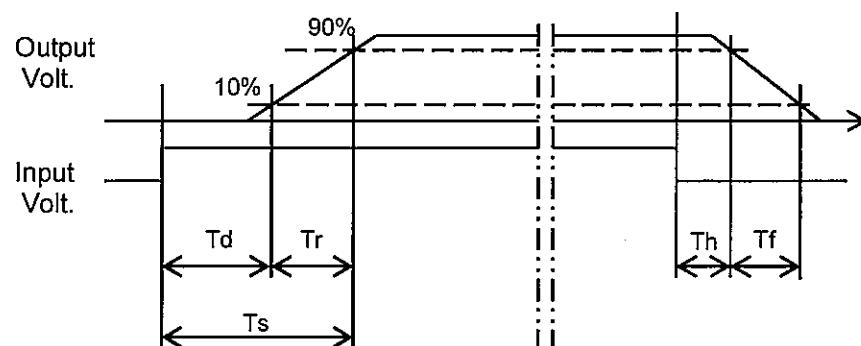
Object +3.3V10A

1. Graph



2. Values

Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		23.8	3.8	27.6	0.6	13.4	
100 %		23.5	4.3	27.8	0.1	6.9	

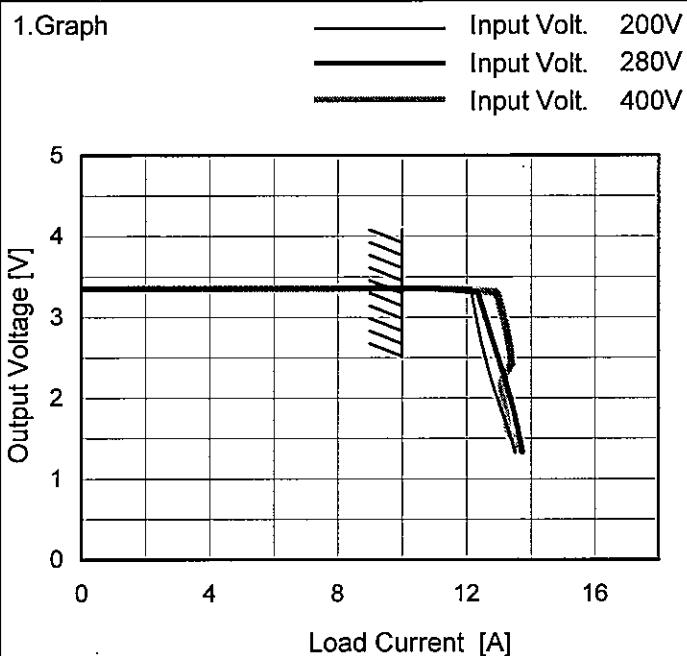


COSEL

Model	DHS50B03																																								
Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A																																							
Object	+3.3V10A																																								
1.Graph																																									
	<p>Input Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Legend:</p> <ul style="list-style-type: none"> Load 50% (dashed line with squares) Load 100% (solid line with triangles) 	2.Values																																							
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	<p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																								

COSEL

Model	DHS50B03
Item	Overcurrent Protection
Object	+3.3V10A



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

Intermittent operation occurs when the output voltage is from 1.32V to 0V.

Temperature 25°C
Testing Circuitry Figure A

2. Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
3.30	10.01	10.06	10.06
3.14	12.24	12.46	13.04
2.97	12.31	12.59	13.15
2.64	12.47	12.87	13.33
2.31	12.69	13.12	13.24
1.98	12.95	13.36	13.14
1.65	13.25	13.57	13.26
1.32	13.51	13.74	13.55
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	DHS50B03
Item	Oversupply Protection
Object	+3.3V10A
1.Graph	<p>—▲— Input Volt. 200V - - □ - - Input Volt. 280V - - ○ - - Input Volt. 400V</p> <p>Operating Point [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 0%</p>
Note:	Slanted line shows the range of the rated ambient temperature.

Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Operating Point [V]		
	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
-50	5.13	5.13	5.13
-40	5.01	5.01	5.01
-20	5.01	5.01	5.01
0	4.90	4.90	4.90
25	4.78	4.78	4.78
40	4.72	4.72	4.72
55	4.60	4.60	4.60
70	4.54	4.54	4.54
85	4.43	4.43	4.43
100	4.43	4.43	4.43
--	-	-	-

COSEL

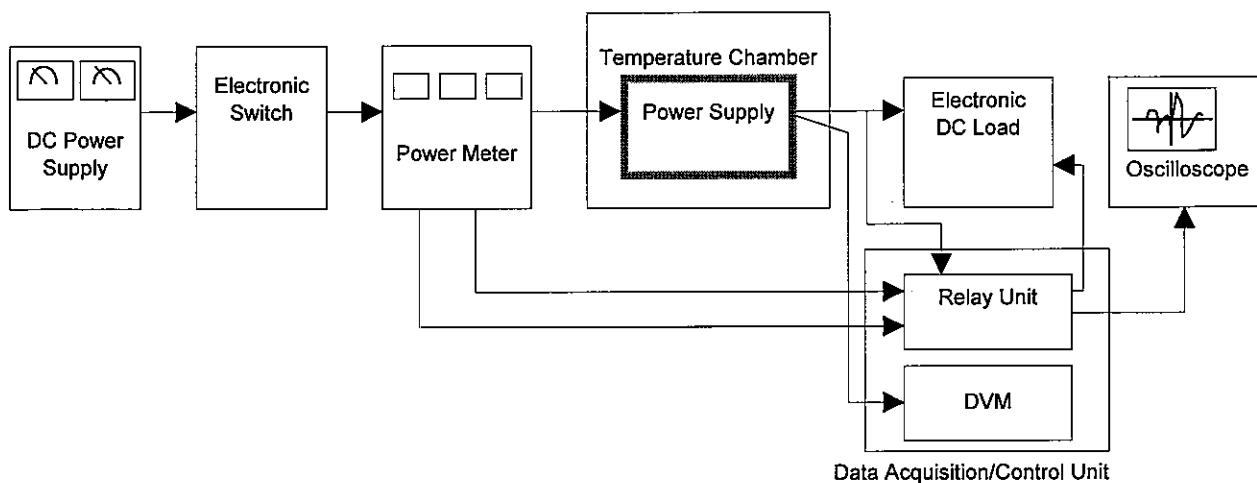
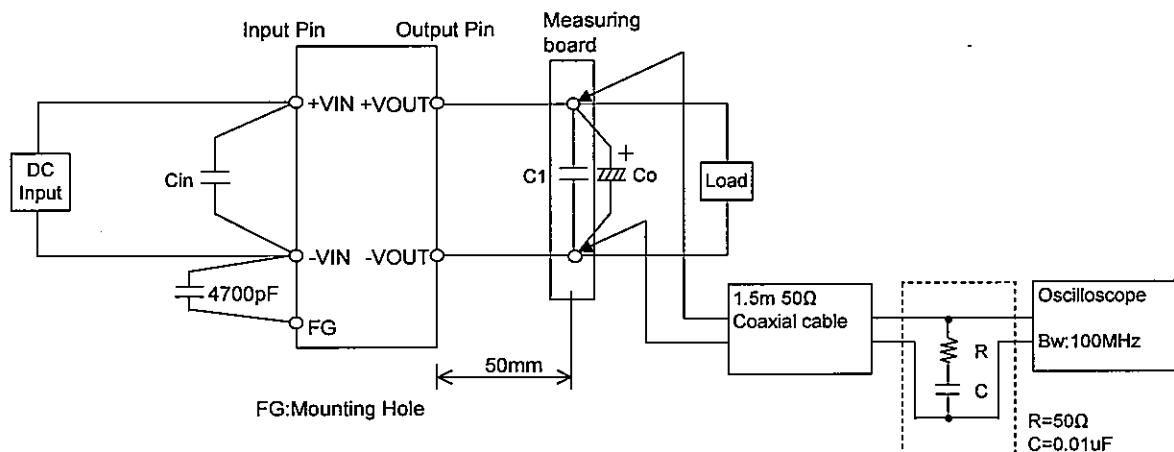


Figure A



C1 : DHS50B24 4.7uF
 DHS50B28 4.7uF
 Others 10uF

Co : DHS50B03 2200uF
 DHS50B05 2200uF
 DHS50B12 470uF
 DHS50B15 470uF
 DHS50B24 220uF
 DHS50B28 220uF

Figure B