

# TEST DATA OF DHS100B24

Regulated DC Power Supply  
May 21, 2009

Approved by : Tatsuya Mano  
Tatsuya Mano Design Manager

Prepared by : Shuhei Sawada  
Shuhei Sawada Design Engineer

**COSEL CO.,LTD.**

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Model	DHS100B24	Temperature	25°C																																																																															
Item	Input Current (by Input Voltage)	Testing Circuitry	Figure A																																																																															
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1.Graph	<p style="text-align: center;">—▲— Input Volt. 200V        - - □ - - Input Volt. 280V        - - ○ - - Input Volt. 400V</p> <p>The graph shows three curves representing different input voltages. The 200V curve (triangles) has the steepest slope, followed by 280V (squares), and 400V (circles) has the shallowest slope. All curves start at (0,0) and end at a point where the load current is approximately 4.62A. A slanted line is drawn through the origin, representing the rated load current range.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 280[V]</th> <th>Input Volt. 400[V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>0.028</td><td>0.017</td><td>0.016</td></tr> <tr><td>0.80</td><td>0.134</td><td>0.096</td><td>0.072</td></tr> <tr><td>1.60</td><td>0.234</td><td>0.170</td><td>0.126</td></tr> <tr><td>2.40</td><td>0.338</td><td>0.244</td><td>0.178</td></tr> <tr><td>3.20</td><td>0.443</td><td>0.319</td><td>0.232</td></tr> <tr><td>4.00</td><td>0.550</td><td>0.395</td><td>0.286</td></tr> <tr><td>4.20</td><td>0.577</td><td>0.414</td><td>0.300</td></tr> <tr><td>4.62</td><td>0.634</td><td>0.455</td><td>0.328</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</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]	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]	0.00	0.028	0.017	0.016	0.80	0.134	0.096	0.072	1.60	0.234	0.170	0.126	2.40	0.338	0.244	0.178	3.20	0.443	0.319	0.232	4.00	0.550	0.395	0.286	4.20	0.577	0.414	0.300	4.62	0.634	0.455	0.328	--	-	-	-	--	-	-	-	--	-	-	-
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 Temperature 25°C  
 Testing Circuitry Figure A

## 2.Values

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<p>The graph plots Efficiency [%] on the y-axis (40 to 96) against Input Voltage [V] on the x-axis (100 to 500). Two data series are shown: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show a general downward trend as input voltage increases. A slanted line on the graph indicates the rated input voltage range.</p> <table border="1"> <thead> <tr> <th>Input Voltage [V]</th> <th>Efficiency Load 50% [%]</th> <th>Efficiency Load 100% [%]</th> </tr> </thead> <tbody> <tr><td>195</td><td>82.9</td><td>86.3</td></tr> <tr><td>200</td><td>82.9</td><td>86.3</td></tr> <tr><td>240</td><td>82.8</td><td>86.3</td></tr> <tr><td>280</td><td>82.0</td><td>86.1</td></tr> <tr><td>320</td><td>80.8</td><td>85.4</td></tr> <tr><td>360</td><td>79.4</td><td>84.4</td></tr> <tr><td>400</td><td>77.9</td><td>83.3</td></tr> <tr><td>420</td><td>76.9</td><td>82.9</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>			Input Voltage [V]	Efficiency Load 50% [%]	Efficiency Load 100% [%]	195	82.9	86.3	200	82.9	86.3	240	82.8	86.3	280	82.0	86.1	320	80.8	85.4	360	79.4	84.4	400	77.9	83.3	420	76.9	82.9	--	-	-		
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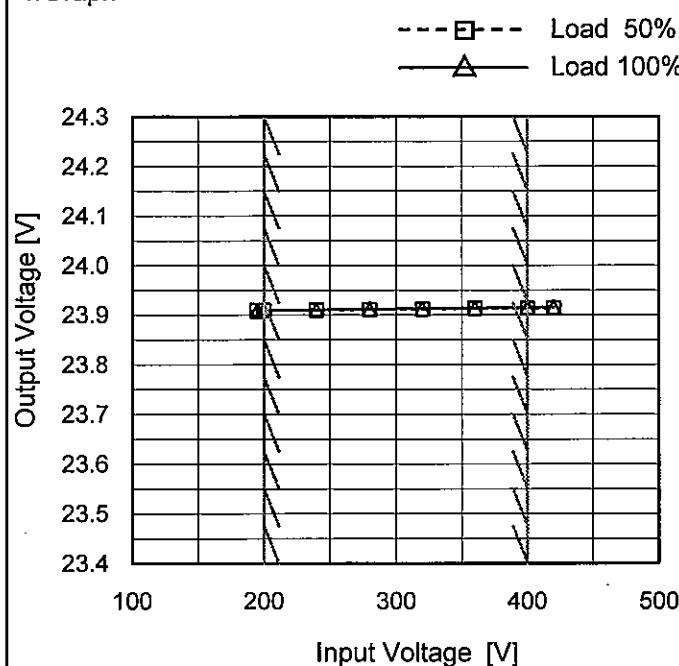
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**COSEL**

Model	DHS100B24
Item	Line Regulation
Object	+24V4.2A

 Temperature 25°C  
 Testing Circuitry Figure A

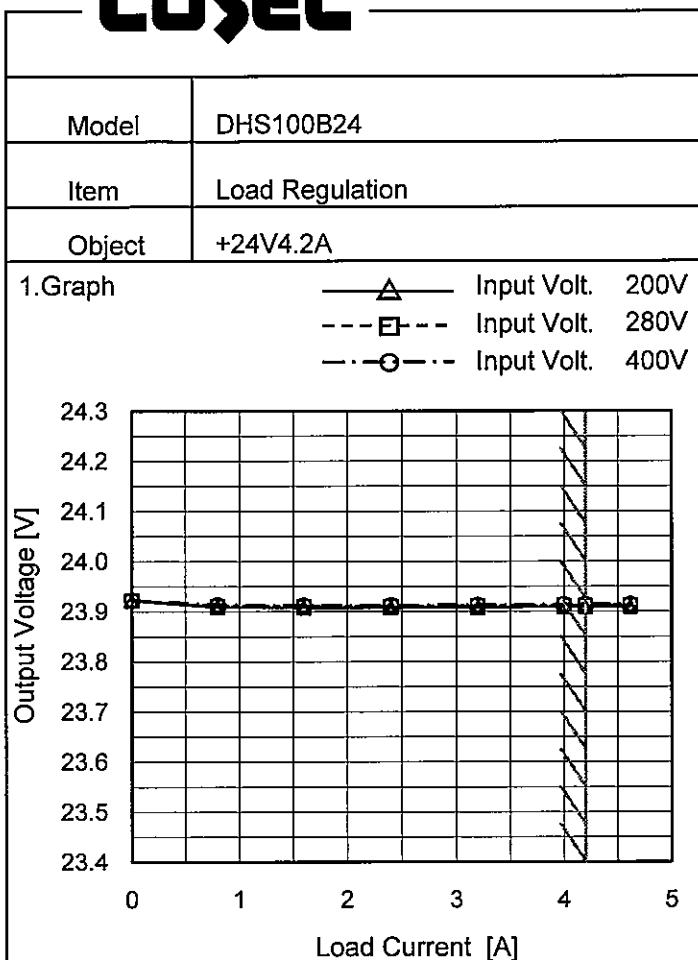
## 1.Graph



## 2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
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200	23.909	23.909
240	23.910	23.910
280	23.911	23.912
320	23.912	23.913
360	23.913	23.914
400	23.914	23.915
420	23.914	23.916
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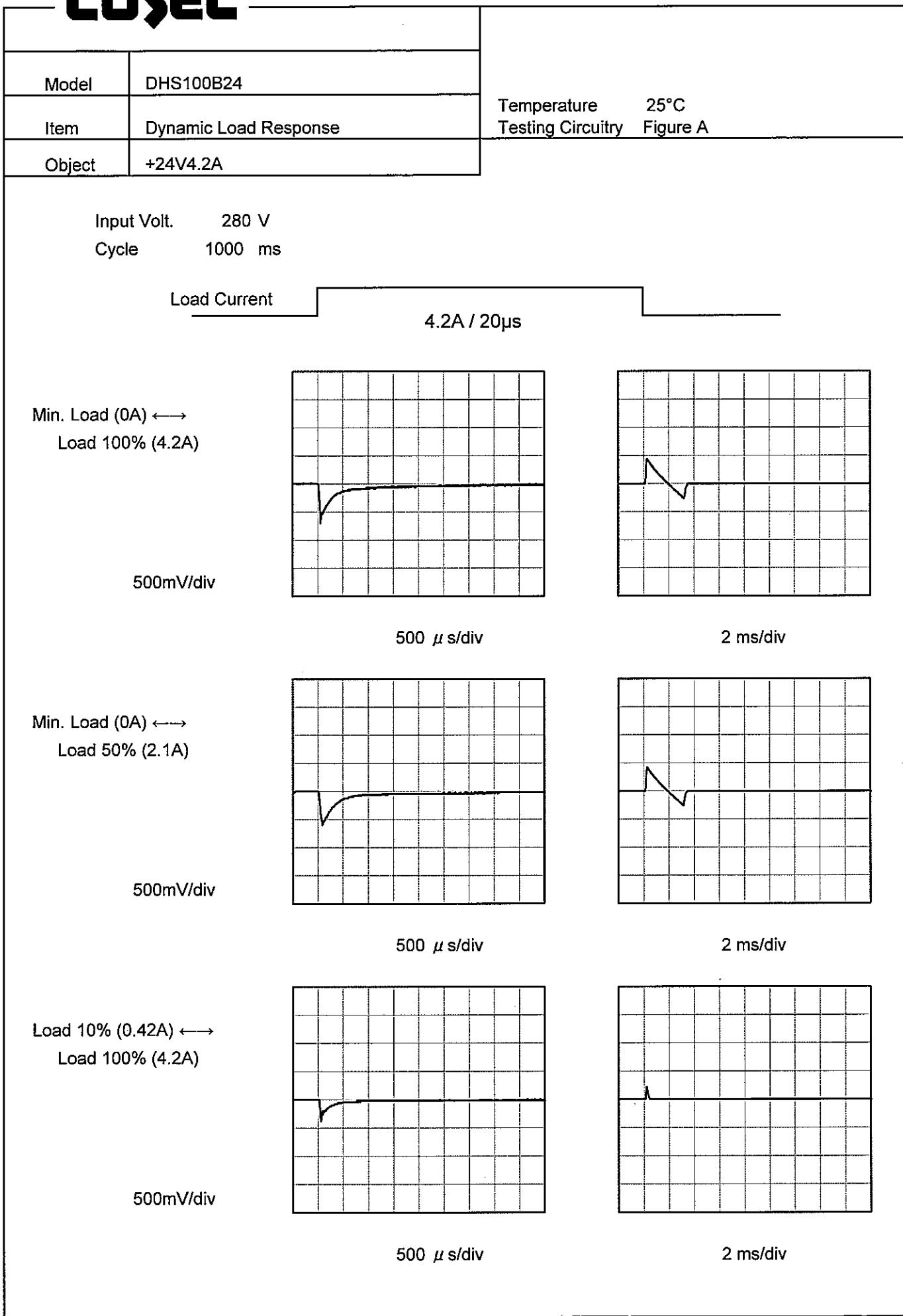
Note: Slanted line shows the range of the rated input voltage.

**COSEL**

 Temperature 25°C  
 Testing Circuitry Figure A

## 2. Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
0.00	23.921	23.922	23.923
0.80	23.908	23.911	23.914
1.60	23.908	23.910	23.913
2.40	23.908	23.910	23.913
3.20	23.908	23.911	23.914
4.00	23.908	23.911	23.914
4.20	23.909	23.912	23.915
4.62	23.909	23.912	23.915
--	-	-	-
--	-	-	-
--	-	-	-

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

**COSEL**

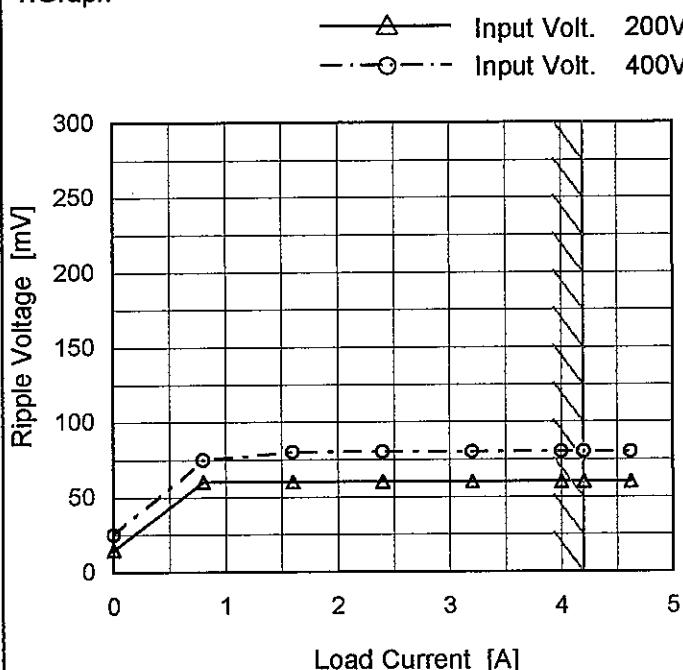
Model DHS100B24

Item Ripple Voltage (by Load Current)

Object +24V4.2A

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]
0.00	15	25
0.80	60	75
1.60	60	80
2.40	60	80
3.20	60	80
4.00	60	80
4.20	60	80
4.62	60	80
--	-	-
--	-	-
--	-	-

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]

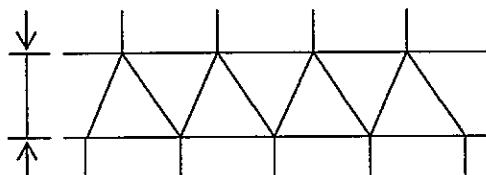


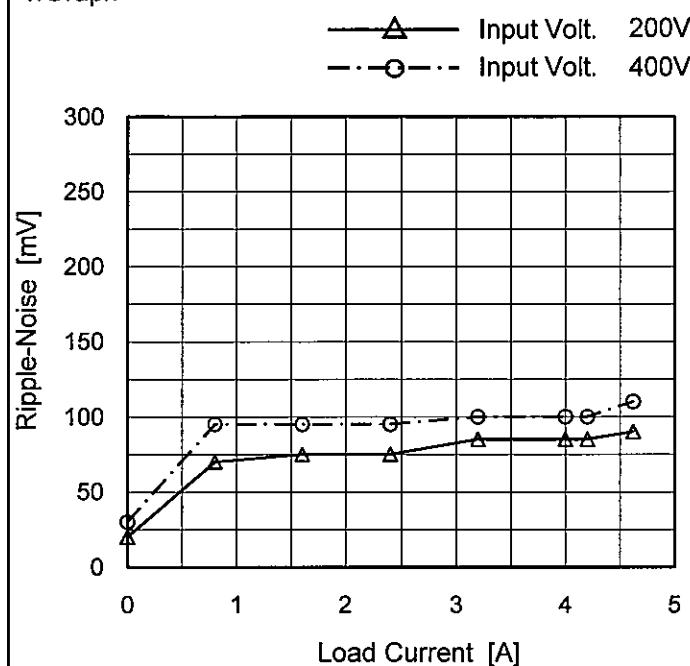
Fig.Complex Ripple Wave Form

**COSEL**

Model	DHS100B24
Item	Ripple-Noise
Object	+3.3V20A

Temperature 25°C  
Testing Circuitry Figure B

## 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.

## 2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 200 [V]	Input Volt. 400 [V]
0.00	20	30
0.80	70	95
1.60	75	95
2.40	75	95
3.20	85	100
4.00	85	100
4.20	85	100
4.62	90	110
--	-	-
--	-	-
--	-	-

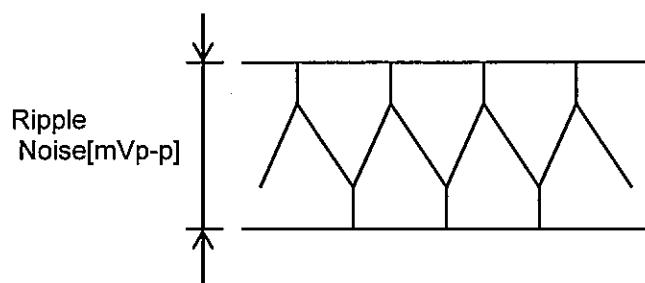
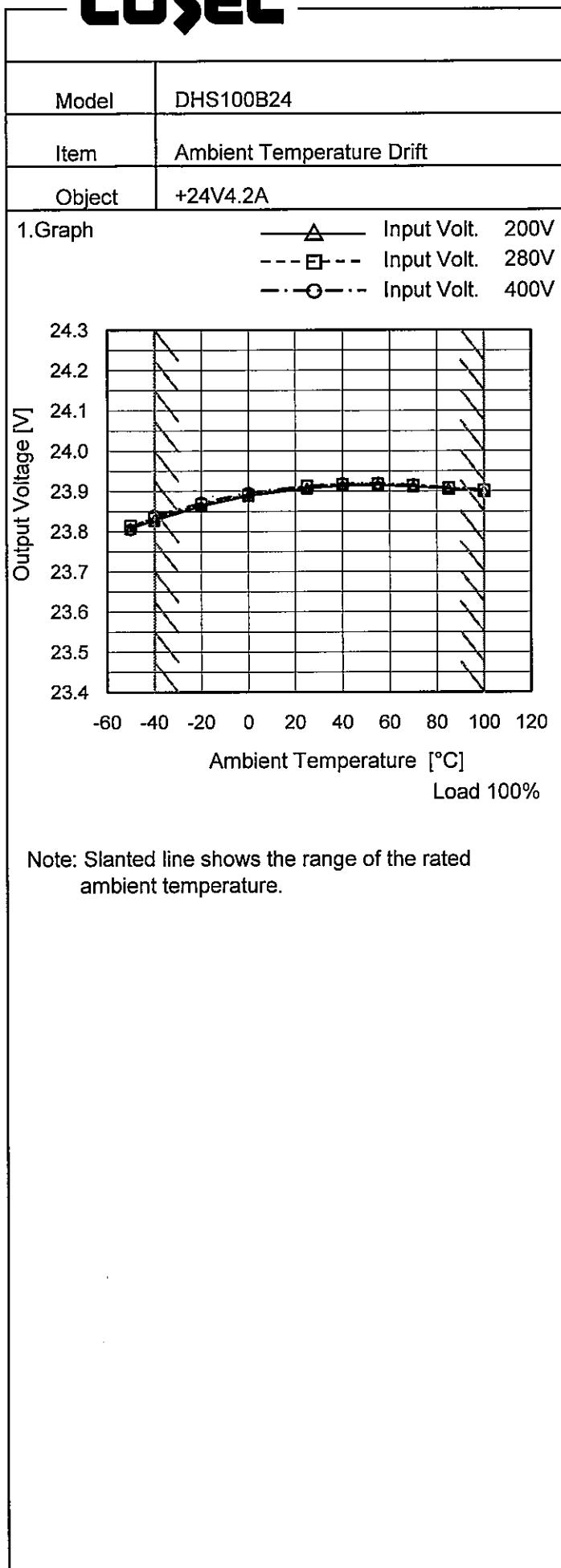


Fig.Complex Ripple Noise Wave Form



<p>Model      DHS100B24</p> <p>Item      Ripple Voltage (by Ambient Temp.)</p> <p>Object    +3.3V20A</p>	Testing Circuitry   Figure B																																						
	2.Values																																						
	<table border="1"> <thead> <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> </thead> <tbody> <tr> <td>-50</td><td>80</td><td>85</td></tr> <tr> <td>-40</td><td>80</td><td>85</td></tr> <tr> <td>-20</td><td>80</td><td>85</td></tr> <tr> <td>0</td><td>80</td><td>85</td></tr> <tr> <td>25</td><td>65</td><td>70</td></tr> <tr> <td>40</td><td>65</td><td>70</td></tr> <tr> <td>55</td><td>65</td><td>70</td></tr> <tr> <td>70</td><td>65</td><td>70</td></tr> <tr> <td>85</td><td>65</td><td>70</td></tr> <tr> <td>100</td><td>50</td><td>50</td></tr> <tr> <td>--</td><td>-</td><td>-</td></tr> </tbody> </table>		Ambient Temperature [°C]	Ripple Voltage [mV]		Load 50%	Load 100%	-50	80	85	-40	80	85	-20	80	85	0	80	85	25	65	70	40	65	70	55	65	70	70	65	70	85	65	70	100	50	50	--	-
Ambient Temperature [°C]	Ripple Voltage [mV]																																						
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40	65	70																																					
55	65	70																																					
70	65	70																																					
85	65	70																																					
100	50	50																																					
--	-	-																																					
<p>1.Graph</p> <p>Ripple Voltage [mV]</p> <p>Ambient Temperature [°C]</p> <p>Input Volt. 280V</p>																																							
<p>Measured by 100 MHz Oscilloscope.</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																							



## 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	23.807	23.814	23.805
-40	23.828	23.834	23.839
-20	23.863	23.867	23.871
0	23.888	23.891	23.896
25	23.907	23.912	23.913
40	23.913	23.916	23.919
55	23.915	23.917	23.919
70	23.912	23.914	23.915
85	23.906	23.908	23.909
100	23.899	23.902	23.903
--	-	-	-



Model	DHS100B24	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+24V4.2A	

### 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°C

Input Voltage : 200 - 400V

Load Current : 0 - 4.2A

\* Output Voltage Accuracy = ±(Maximum of Output Voltage - Minimum of Output Voltage) / 2

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

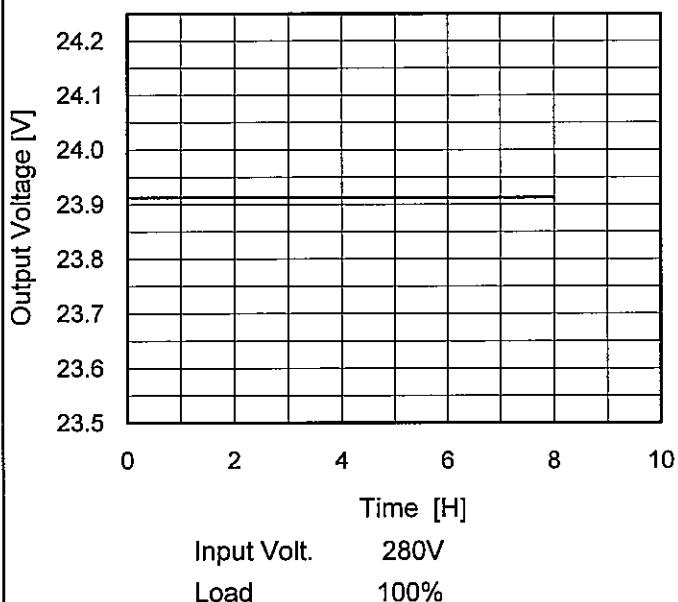
### 2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	55	200	0	23.933	±53	±0.2
Minimum Voltage	-40	200	4.2	23.828		

**COSEL**

Model	DHS100B24
Item	Time Lapse Drift
Object	+24V4.2A

## 1.Graph



Temperature 25°C  
Testing Circuitry Figure A

## 2.Values

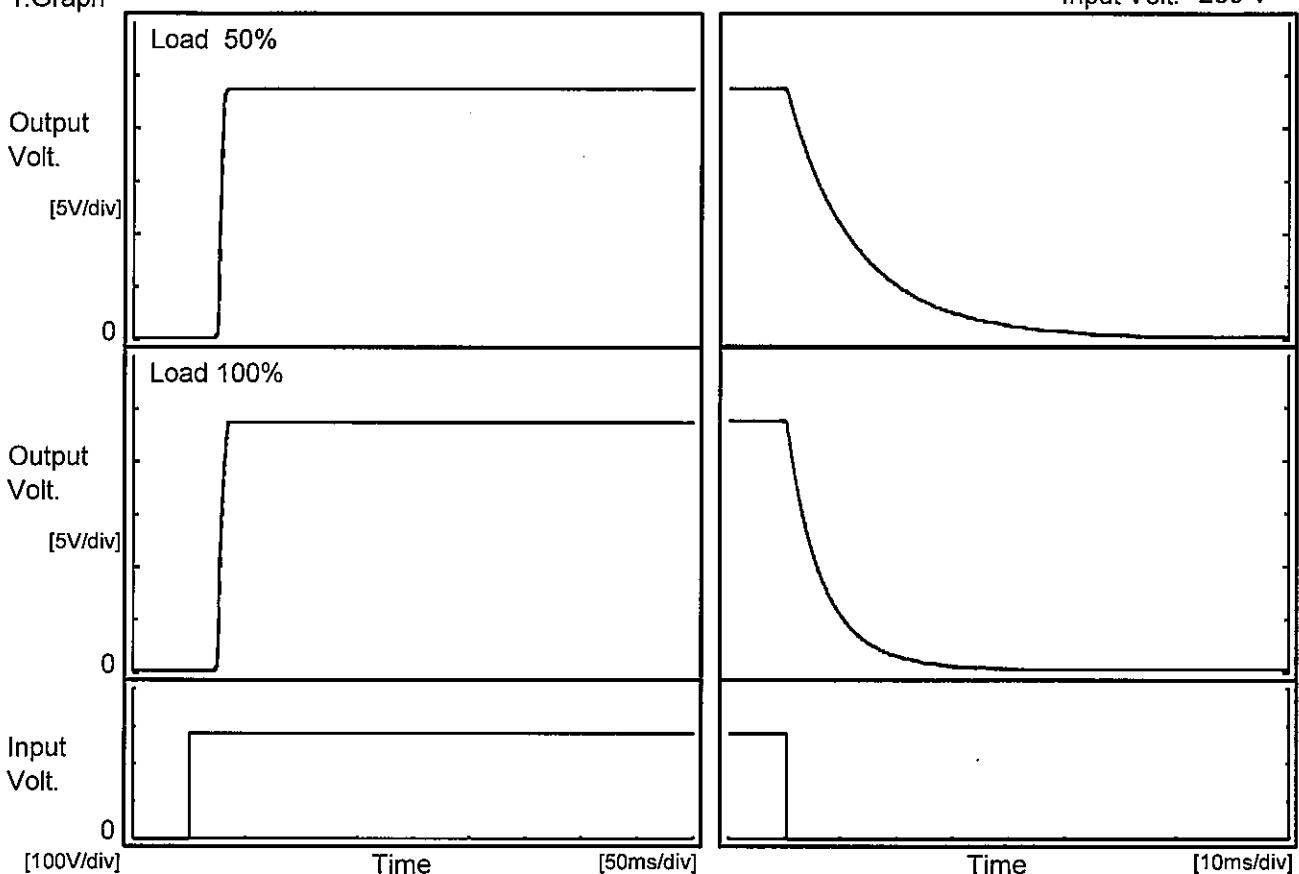
Time since start [H]	Output Voltage [V]
0.0	23.912
0.5	23.912
1.0	23.912
2.0	23.912
3.0	23.912
4.0	23.912
5.0	23.912
6.0	23.912
7.0	23.912
8.0	23.912

**COSEL**

Model DHS100B24

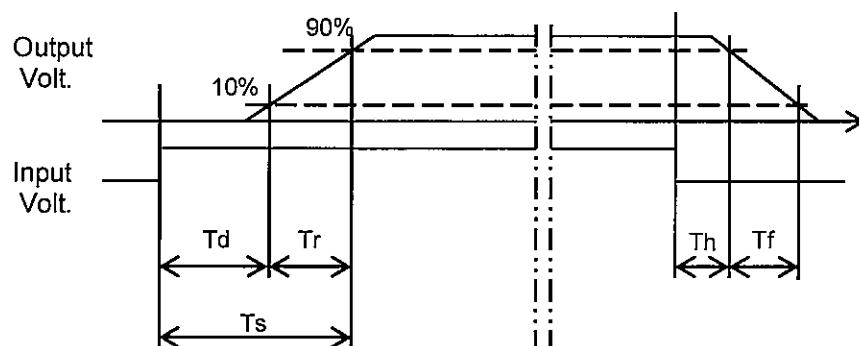
Temperature 25°C  
Testing Circuitry Figure AItem Rise and Fall Time  
Object +24V4.2A

## 1. Graph



## 2. Values

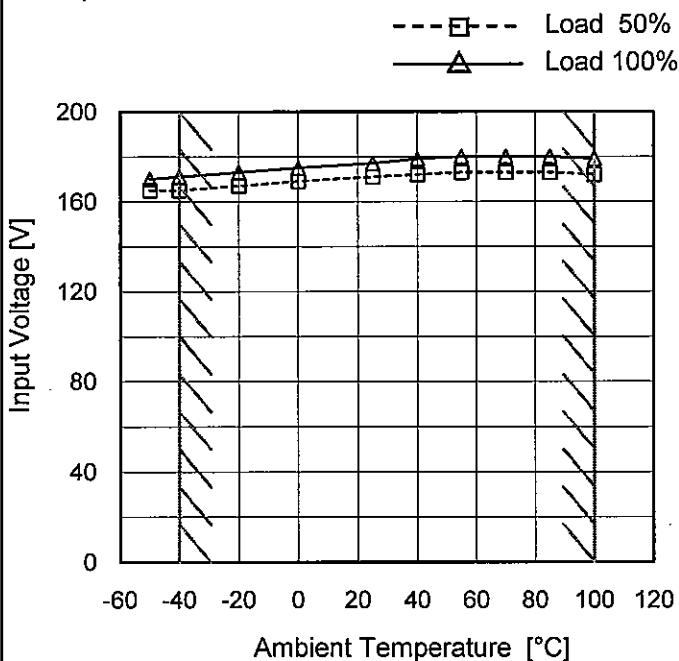
Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		25.8	4.5	30.3	1.3	28.8	
100 %		25.8	7.0	32.8	0.5	29.1	



**COSEL**

Model	DHS100B24
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+24V4.2A

## 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	165	170
-40	165	171
-20	167	173
0	169	175
25	171	177
40	172	179
55	173	180
70	173	180
85	173	180
100	172	179
--	-	-

**COSEL**

Model	DHS100B24	Temperature Testing Circuitry	25°C Figure A																																																							
Item	Overcurrent Protection																																																									
Object	+24V4.2A																																																									
1.Graph	<p>Input Volt. 200V            Input Volt. 280V            Input Volt. 400V</p> <p>Output Voltage [V]</p> <p>Load Current [A]</p>	2.Values																																																								
			<table border="1"> <thead> <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> </thead> <tbody> <tr><td>24.0</td><td>4.20</td><td>4.21</td><td>4.20</td></tr> <tr><td>22.8</td><td>5.15</td><td>5.26</td><td>5.46</td></tr> <tr><td>21.6</td><td>5.19</td><td>5.33</td><td>5.47</td></tr> <tr><td>19.2</td><td>5.27</td><td>5.45</td><td>5.55</td></tr> <tr><td>16.8</td><td>5.36</td><td>5.49</td><td>5.59</td></tr> <tr><td>14.4</td><td>5.39</td><td>5.55</td><td>5.51</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>	Output Voltage [V]	Load Current [A]			Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]	24.0	4.20	4.21	4.20	22.8	5.15	5.26	5.46	21.6	5.19	5.33	5.47	19.2	5.27	5.45	5.55	16.8	5.36	5.49	5.59	14.4	5.39	5.55	5.51	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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	Note: Slanted line shows the range of the rated load current.																																																									
	Intermittent operation occurs when the output voltage is from 13V to 0V.																																																									



Model	DHS100B24																																																
Item	Overvoltage Protection																																																
Object	+24V4.2A																																																
1.Graph	<p style="text-align: center;"> <span style="color: black;">△</span> Input Volt. 200V  <span style="color: black;">□</span> Input Volt. 280V  <span style="color: black;">○</span> Input Volt. 400V         </p> <p>The graph plots Operating Point [V] on the y-axis (27 to 35) against Ambient Temperature [°C] on the x-axis (-60 to 120). Three curves are shown for different input voltages: 200V (solid line with triangles), 280V (dashed line with squares), and 400V (dash-dot line with circles). All curves show an upward trend. A slanted line is drawn across the graph, representing the rated ambient temperature range.</p> <table border="1"> <thead> <tr> <th>Ambient Temperature [°C]</th> <th>200[V]</th> <th>280[V]</th> <th>400[V]</th> </tr> </thead> <tbody> <tr><td>-50</td><td>29.76</td><td>29.76</td><td>29.76</td></tr> <tr><td>-40</td><td>29.93</td><td>29.93</td><td>29.93</td></tr> <tr><td>-20</td><td>30.36</td><td>30.36</td><td>30.36</td></tr> <tr><td>0</td><td>30.88</td><td>30.88</td><td>30.88</td></tr> <tr><td>25</td><td>31.35</td><td>31.35</td><td>31.35</td></tr> <tr><td>40</td><td>31.76</td><td>31.64</td><td>31.64</td></tr> <tr><td>55</td><td>32.06</td><td>32.06</td><td>32.06</td></tr> <tr><td>70</td><td>32.35</td><td>32.35</td><td>32.35</td></tr> <tr><td>85</td><td>32.64</td><td>32.64</td><td>32.64</td></tr> <tr><td>100</td><td>32.99</td><td>32.99</td><td>32.87</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>	Ambient Temperature [°C]	200[V]	280[V]	400[V]	-50	29.76	29.76	29.76	-40	29.93	29.93	29.93	-20	30.36	30.36	30.36	0	30.88	30.88	30.88	25	31.35	31.35	31.35	40	31.76	31.64	31.64	55	32.06	32.06	32.06	70	32.35	32.35	32.35	85	32.64	32.64	32.64	100	32.99	32.99	32.87	--	-	-	-
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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	29.76	29.76	29.76
-40	29.93	29.93	29.93
-20	30.36	30.36	30.36
0	30.88	30.88	30.88
25	31.35	31.35	31.35
40	31.76	31.64	31.64
55	32.06	32.06	32.06
70	32.35	32.35	32.35
85	32.64	32.64	32.64
100	32.99	32.99	32.87
--	-	-	-

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

COSEL

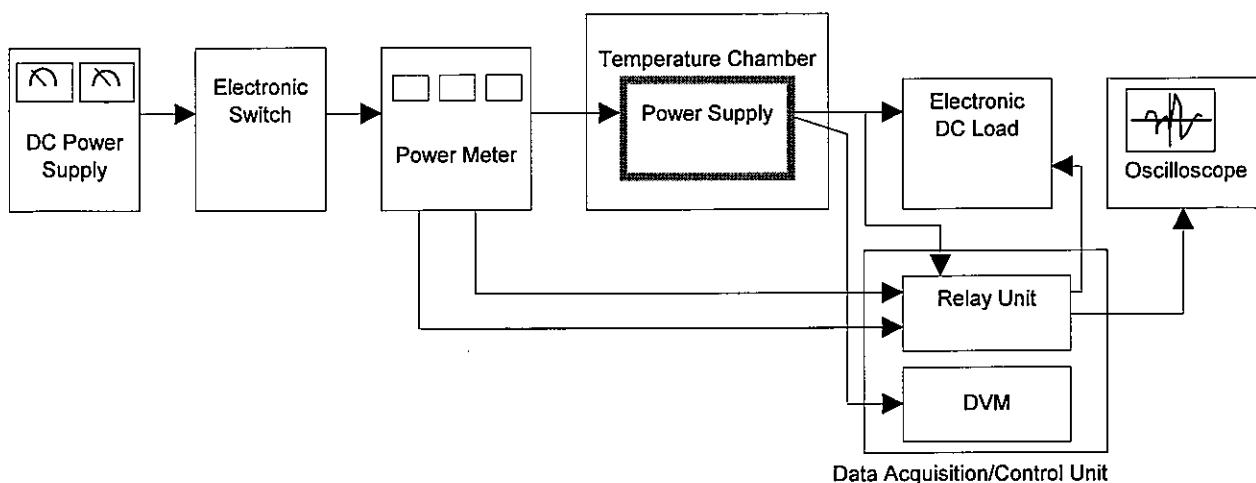
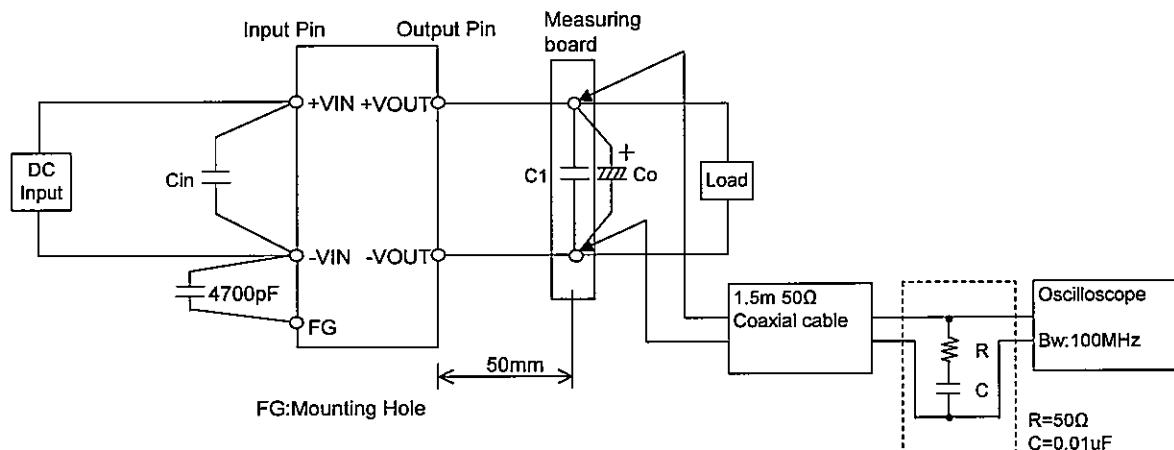


Figure A



- C1 : DHS100B24 4.7uF  
          DHS100B28 4.7uF  
          Others 10uF
- Co : DHS100B03 2200uF  
       DHS100B05 2200uF  
       DHS100B12 470uF  
       DHS100B15 470uF  
       DHS100B24 220uF  
       DHS100B28 220uF

Figure B