

TEST DATA OF SNDHS100B24

Regulated DC Power Supply
June 30, 2011

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COSEL CO.,LTD.

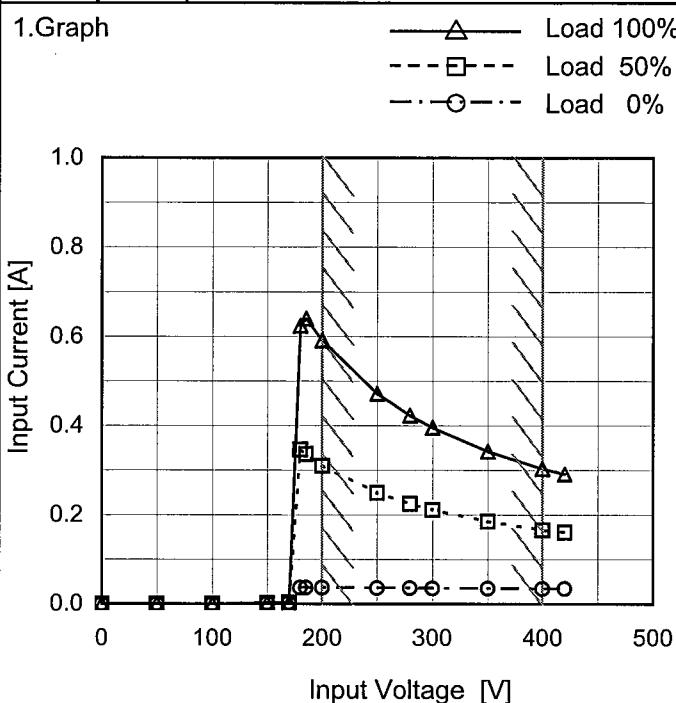
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Model	SNDHS100B24
Item	Input Current (by Input Voltage)
Object	—



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

Temperature 25°C
Testing Circuitry Figure A

2.Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0	0.000	0.000	0.000
50	0.000	0.000	0.000
100	0.000	0.000	0.000
150	0.002	0.002	0.002
170	0.003	0.003	0.003
180	0.037	0.347	0.624
185	0.037	0.336	0.640
200	0.036	0.310	0.591
250	0.036	0.249	0.472
280	0.036	0.225	0.423
300	0.035	0.211	0.396
350	0.035	0.185	0.343
400	0.035	0.166	0.304
420	0.035	0.161	0.292
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Model	SNDHS100B24	Temperature Testing Circuitry 25°C Figure A																																														
Item	Input Current (by Load Current)																																															
Object	—																																															
1.Graph		2.Values																																														
<p>—△— Input Volt. 200V - -□--- Input Volt. 280V - -○--- Input Volt. 400V</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>0.038</td><td>0.033</td><td>0.021</td></tr> <tr><td>0.80</td><td>0.141</td><td>0.102</td><td>0.077</td></tr> <tr><td>1.60</td><td>0.246</td><td>0.178</td><td>0.134</td></tr> <tr><td>2.40</td><td>0.350</td><td>0.253</td><td>0.186</td></tr> <tr><td>3.20</td><td>0.456</td><td>0.327</td><td>0.238</td></tr> <tr><td>4.00</td><td>0.565</td><td>0.404</td><td>0.291</td></tr> <tr><td>4.20</td><td>0.592</td><td>0.423</td><td>0.304</td></tr> <tr><td>4.62</td><td>0.649</td><td>0.464</td><td>0.332</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	0.038	0.033	0.021	0.80	0.141	0.102	0.077	1.60	0.246	0.178	0.134	2.40	0.350	0.253	0.186	3.20	0.456	0.327	0.238	4.00	0.565	0.404	0.291	4.20	0.592	0.423	0.304	4.62	0.649	0.464	0.332	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]																																													
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Note: Slanted line shows the range of the rated load current.

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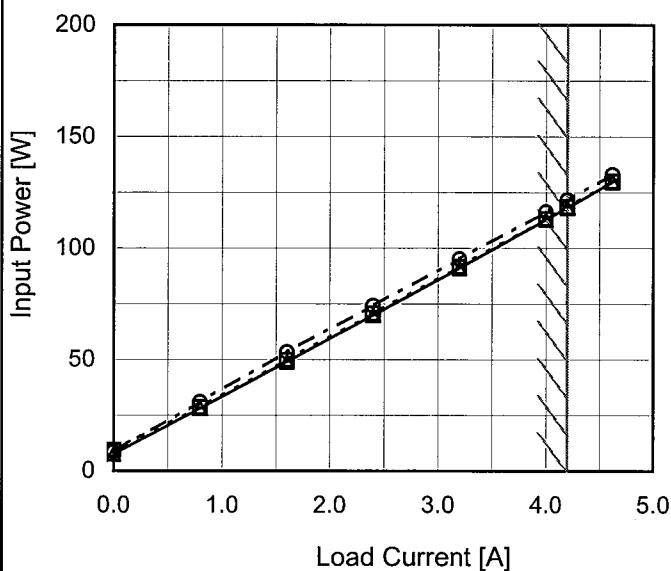
Model SNDHS100B24

Item Input Power (by Load Current)

Object _____

1. Graph

- △— Input Volt. 200V
- -□--- Input Volt. 280V
- -○--- Input Volt. 400V



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

Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Input Power [W]		
	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
0.00	7.6	9.3	8.6
0.80	28.2	28.6	31.0
1.60	49.1	49.9	53.5
2.40	69.9	70.7	74.3
3.20	91.1	91.7	95.3
4.00	112.9	113.2	116.4
4.20	118.3	118.6	121.7
4.62	129.8	130.1	133.1
--	-	-	-
--	-	-	-
--	-	-	-

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Model	SNDHS100B24	Temperature 25°C																																
Item	Efficiency (by Input Voltage)	Testing Circuitry Figure A																																
Object	—																																	
1. Graph																																		
<p>The graph plots Efficiency [%] on the y-axis (44 to 100) 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 vertical slanted line is drawn through the data points at approximately 220V to 240V, indicating the rated input voltage range.</p>																																		
2. Values																																		
<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Efficiency [%]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr> <td>195</td> <td>83.0</td> <td>87.1</td> </tr> <tr> <td>200</td> <td>83.1</td> <td>87.1</td> </tr> <tr> <td>240</td> <td>82.9</td> <td>87.3</td> </tr> <tr> <td>280</td> <td>81.8</td> <td>87.0</td> </tr> <tr> <td>320</td> <td>80.6</td> <td>86.4</td> </tr> <tr> <td>360</td> <td>79.2</td> <td>85.6</td> </tr> <tr> <td>400</td> <td>77.5</td> <td>84.6</td> </tr> <tr> <td>420</td> <td>76.2</td> <td>84.0</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> </tr> </tbody> </table>			Input Voltage [V]	Efficiency [%]		Load 50%	Load 100%	195	83.0	87.1	200	83.1	87.1	240	82.9	87.3	280	81.8	87.0	320	80.6	86.4	360	79.2	85.6	400	77.5	84.6	420	76.2	84.0	--	-	-
Input Voltage [V]	Efficiency [%]																																	
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<p>Note: Slanted line shows the range of the rated input voltage.</p>																																		

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Model	SNDHS100B24	Temperature Testing Circuitry	25°C Figure A																								
Item	Efficiency (by Load Current)																										
Object	_____																										
1. Graph		2. Values																									
<p>The graph shows efficiency increasing with load current for all input voltages. The 200V curve is the highest, followed by 280V, and then 400V. A slanted line from the origin indicates the rated load current range.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Efficiency [200V] (%)</th> <th>Efficiency [280V] (%)</th> <th>Efficiency [400V] (%)</th> </tr> </thead> <tbody> <tr><td>1.0</td><td>71.6</td><td>70.5</td><td>65.1</td></tr> <tr><td>2.0</td><td>81.0</td><td>79.7</td><td>74.3</td></tr> <tr><td>3.0</td><td>85.0</td><td>84.0</td><td>79.9</td></tr> <tr><td>4.0</td><td>86.6</td><td>86.0</td><td>82.7</td></tr> <tr><td>4.62</td><td>87.5</td><td>87.3</td><td>85.4</td></tr> </tbody> </table>		Load Current [A]	Efficiency [200V] (%)	Efficiency [280V] (%)	Efficiency [400V] (%)	1.0	71.6	70.5	65.1	2.0	81.0	79.7	74.3	3.0	85.0	84.0	79.9	4.0	86.6	86.0	82.7	4.62	87.5	87.3	85.4		
Load Current [A]	Efficiency [200V] (%)	Efficiency [280V] (%)	Efficiency [400V] (%)																								
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<p>Note: Slanted line shows the range of the rated load current.</p>																											

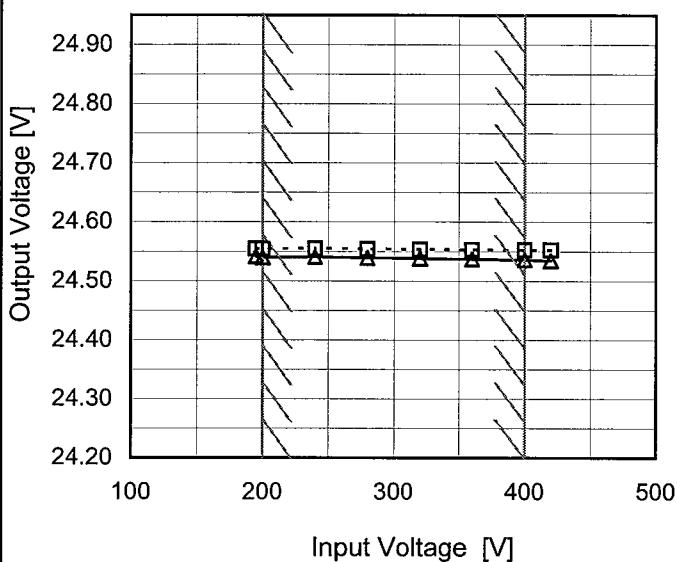
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Model	SNDHS100B24
Item	Line Regulation
Object	+24V4.2A

Temperature 25°C
 Testing Circuitry Figure A

1. Graph

--- □ --- Load 50%
 —△— Load 100%



2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
195	24.554	24.542
200	24.554	24.540
240	24.555	24.541
280	24.554	24.539
320	24.554	24.539
360	24.553	24.538
400	24.552	24.536
420	24.553	24.535
--	-	-

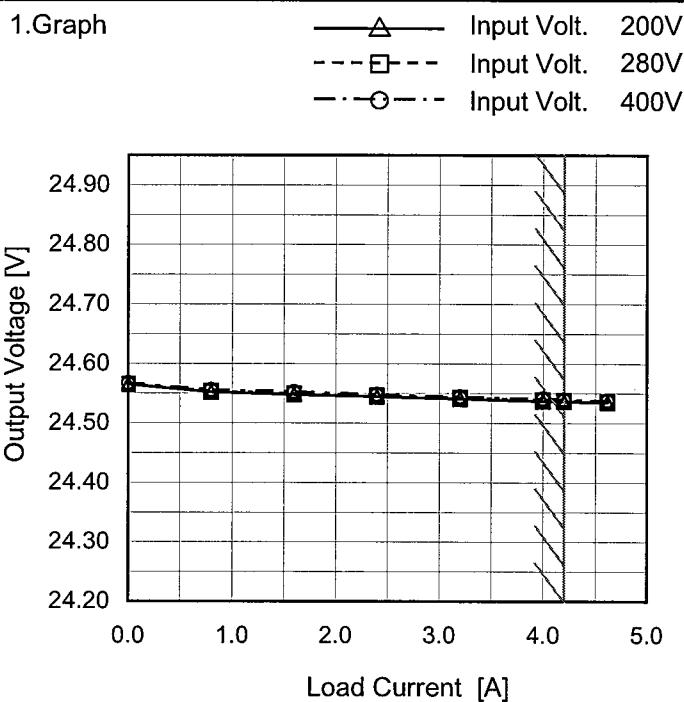
Note: Slanted line shows the range of the rated input voltage.

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Model SNDHS100B24

Item Load Regulation

Object +24V4.2A

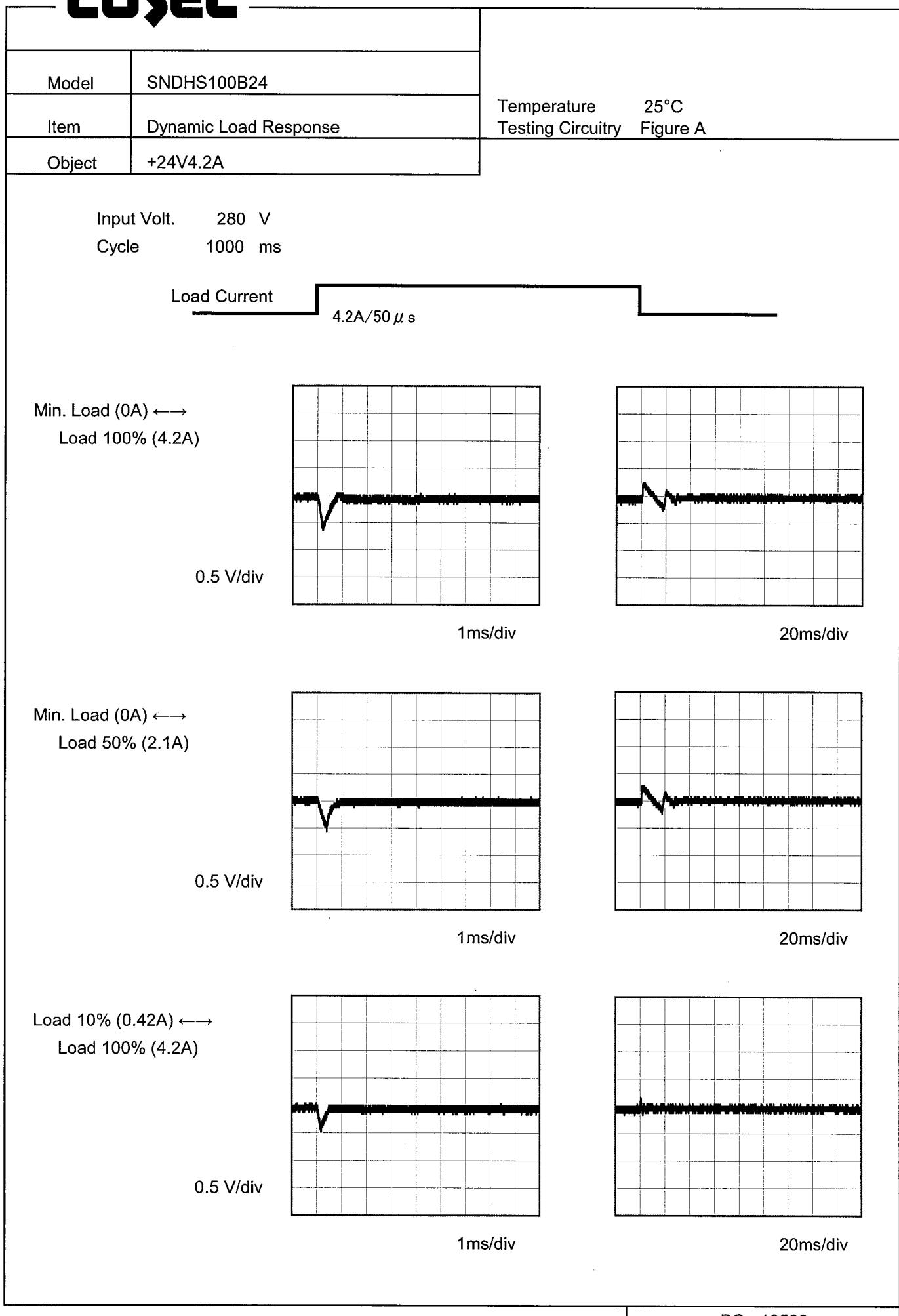


Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
0.00	24.566	24.565	24.567
0.80	24.553	24.554	24.556
1.60	24.548	24.550	24.552
2.40	24.545	24.546	24.548
3.20	24.541	24.543	24.544
4.00	24.537	24.539	24.541
4.20	24.537	24.538	24.540
4.62	24.535	24.537	24.538
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--	-	-	-
--	-	-	-

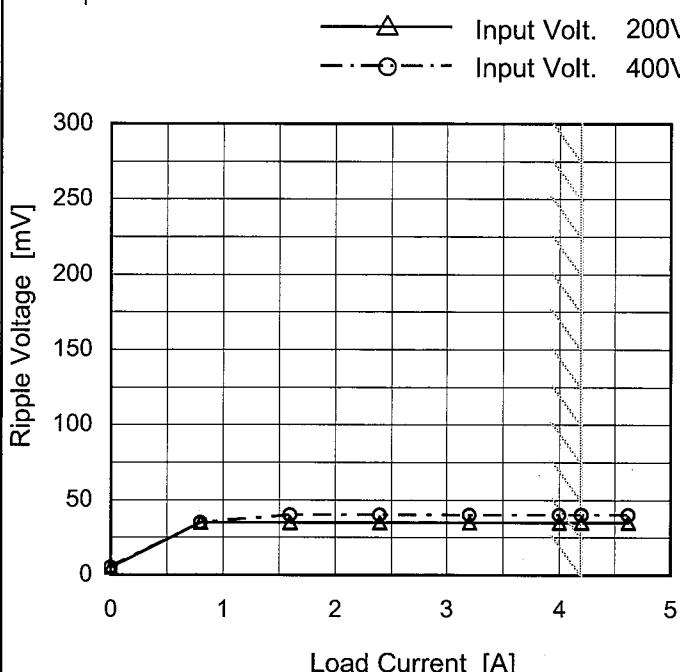
Note: Slanted line shows the range of the rated load current.

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Model	SNDHS100B24	Temperature	25°C
Item	Ripple Voltage (by Load Current)	Testing Circuitry	Figure B
Object	+24V4.2A		

1. Graph



2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 200 [V]	Input Volt. 400 [V]
0.00	5	5
0.80	35	35
1.60	35	40
2.40	35	40
3.20	35	40
4.00	35	40
4.20	35	40
4.62	35	40
--	-	-
--	-	-
--	-	-

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]

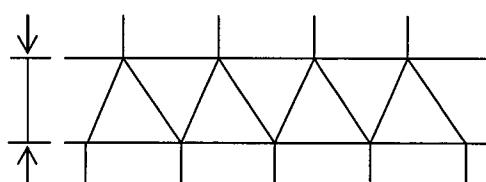
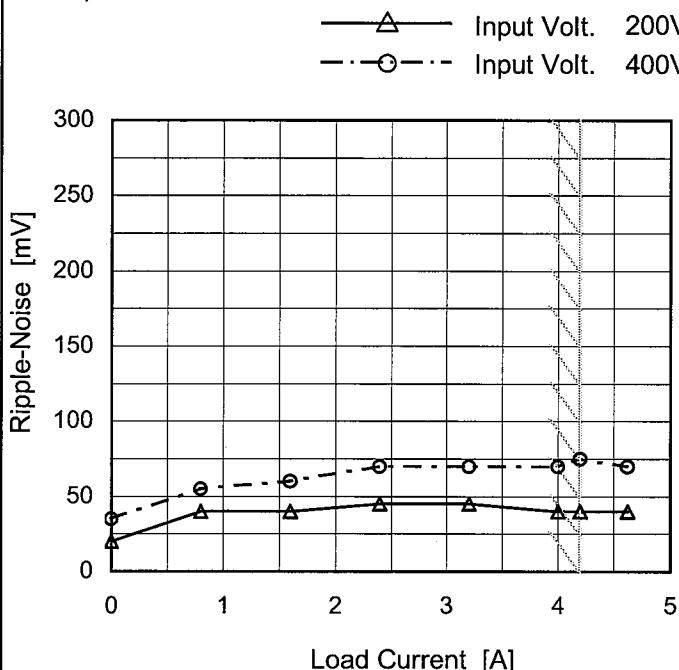


Fig.Complex Ripple Wave Form

Model	SNDHS100B24
Item	Ripple-Noise
Object	+24V4.2A

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	35
0.80	40	55
1.60	40	60
2.40	45	70
3.20	45	70
4.00	40	70
4.20	40	75
4.62	40	70
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--	-	-

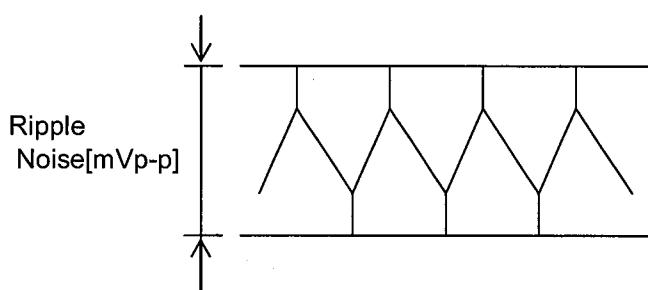


Fig.Complex Ripple Noise Wave Form

Model	SNDHS100B24	Testing Circuitry Figure B																																							
Item	Ripple Voltage (by Ambient Temp.)																																								
Object	+24V4.2A																																								
1.Graph		2.Values																																							
<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 100 °C. Data points are shown for Load 50% (squares) and Load 100% (triangles). A horizontal dashed line is at 50 mV. Two slanted lines indicate the range of rated ambient temperature from -20°C to 70°C.</p> <p>Ambient Temperature [°C]</p> <p>Input Volt. 280V</p>																																									
<p>Measured by 100 MHz Oscilloscope. Note: Slanted line shows the range of the rated ambient temperature.</p>		<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>-40</td><td>45</td><td>50</td> </tr> <tr> <td>-20</td><td>45</td><td>50</td> </tr> <tr> <td>0</td><td>40</td><td>45</td> </tr> <tr> <td>25</td><td>40</td><td>40</td> </tr> <tr> <td>40</td><td>35</td><td>40</td> </tr> <tr> <td>55</td><td>40</td><td>40</td> </tr> <tr> <td>70</td><td>40</td><td>40</td> </tr> <tr> <td>85</td><td>40</td><td>40</td> </tr> <tr> <td>95</td><td>40</td><td>45</td> </tr> <tr> <td>--</td><td>-</td><td>-</td> </tr> <tr> <td>--</td><td>-</td><td>-</td> </tr> </tbody> </table>	Ambient Temperature [°C]	Ripple Voltage [mV]		Load 50%	Load 100%	-40	45	50	-20	45	50	0	40	45	25	40	40	40	35	40	55	40	40	70	40	40	85	40	40	95	40	45	--	-	-	--	-	-	
Ambient Temperature [°C]	Ripple Voltage [mV]																																								
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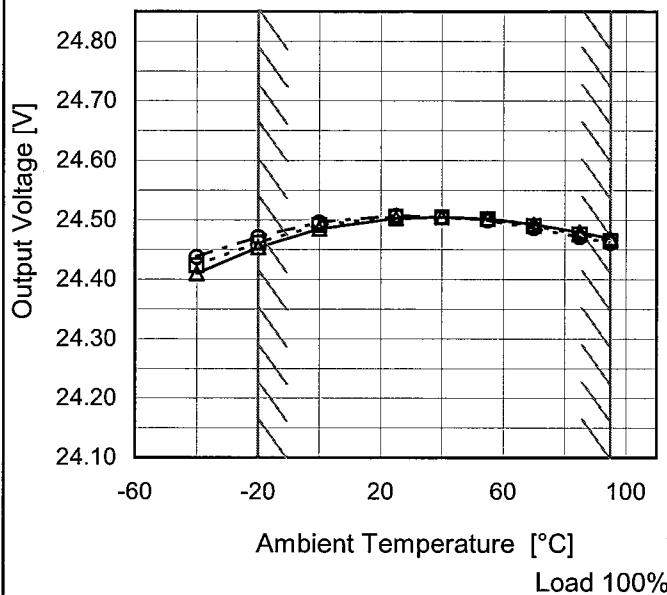
Model SNDHS100B24

Item Ambient Temperature Drift

Object +24V4.2A

1.Graph

—△— Input Volt. 200V
 - - -□- - Input Volt. 280V
 - - ○ - - Input Volt. 400V



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]
-40	24.411	24.424	24.438
-20	24.454	24.462	24.471
0	24.486	24.491	24.496
25	24.503	24.505	24.507
40	24.505	24.505	24.505
55	24.503	24.501	24.500
70	24.493	24.490	24.486
85	24.480	24.476	24.471
95	24.469	24.465	24.462
--	-	-	-
--	-	-	-



Model	SNDHS100B24	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 : -20 - 95°C

Input Voltage : 200 - 400V

Load Current : 0 - 4.2A

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

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

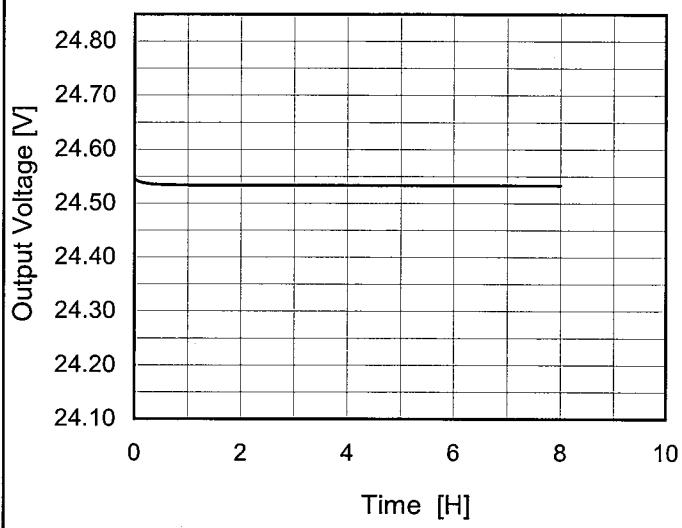
2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	40	280	0	24.536	± 41	± 0.2
Minimum Voltage	-20	200	4.2	24.454		

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Model	SNDHS100B24
Item	Time Lapse Drift
Object	+24V4.2A

1.Graph



Input Volt. 280V
Load 100%

Temperature 25°C
Testing Circuitry Figure A

2.Values

Time since start [H]	Output Voltage [V]
0.0	24.547
0.5	24.535
1.0	24.534
2.0	24.534
3.0	24.533
4.0	24.533
5.0	24.534
6.0	24.534
7.0	24.534
8.0	24.534

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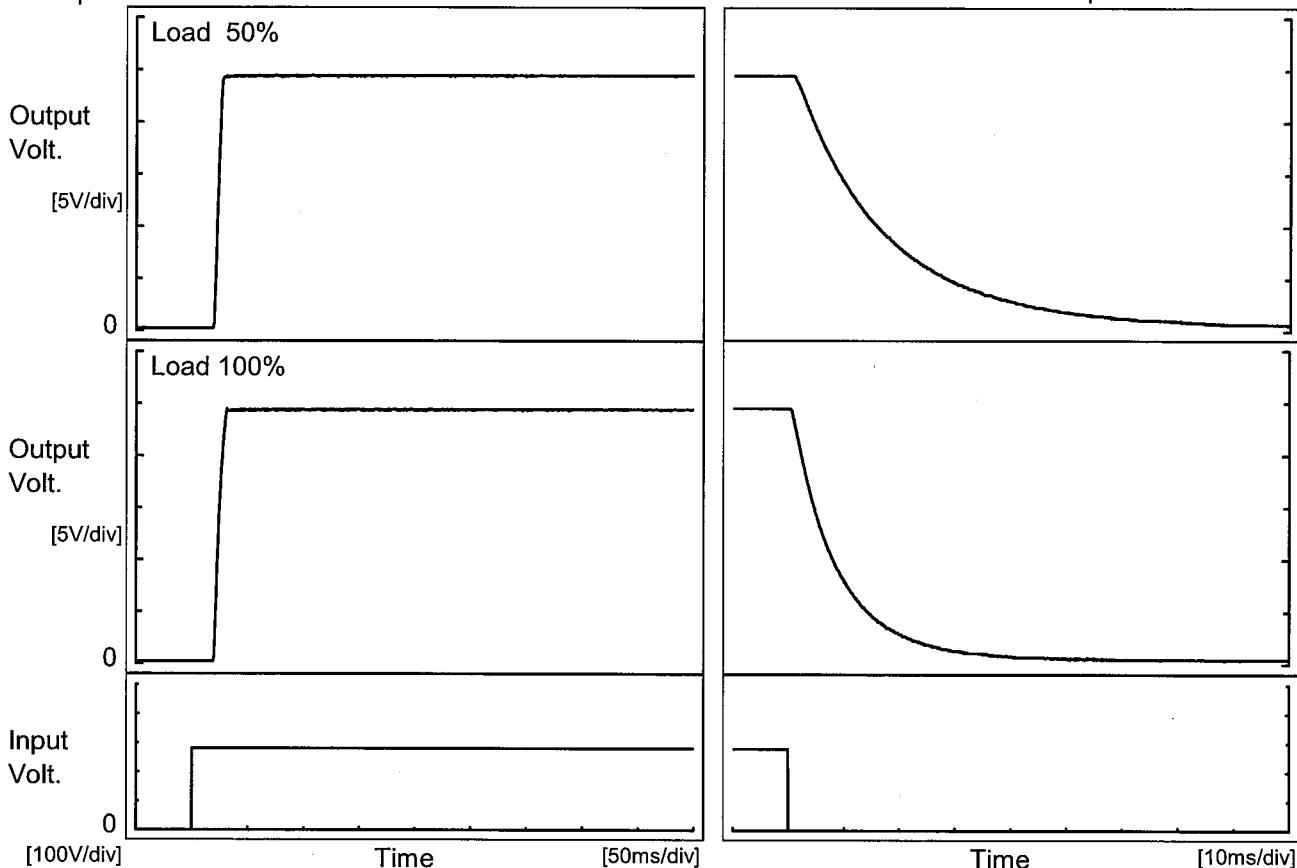
Model SNDHS100B24

Item Rise and Fall Time

Object +24V4.2A

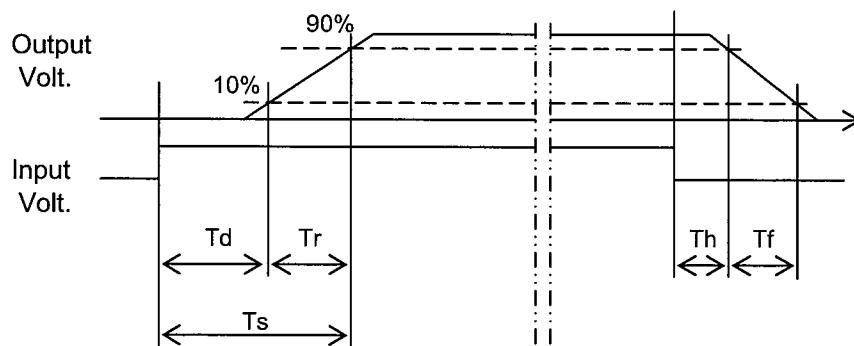
Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Load	Time	Td	Tr	Ts	Th	Tf
50 %		20.5	5.8	26.3	3.0	39.2
100 %		20.8	8.0	28.8	1.5	19.8

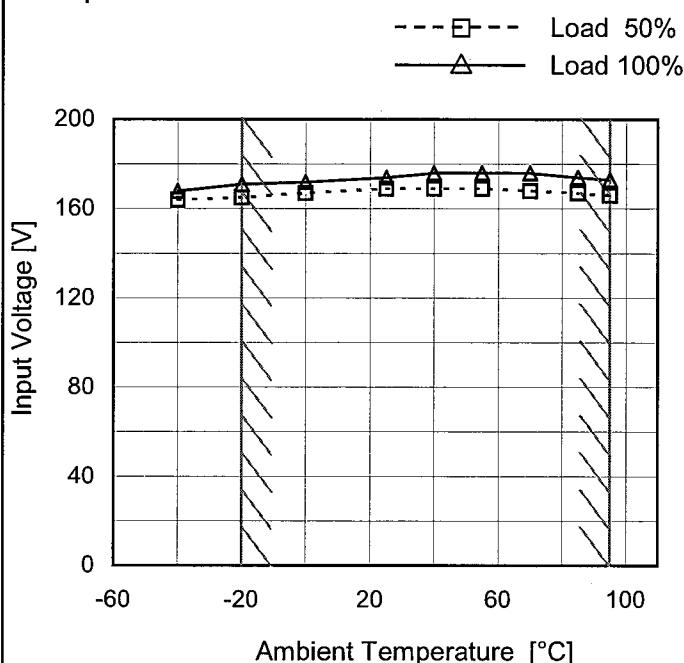




Model	SNDHS100B24
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+24V4.2A

Testing Circuitry Figure A

1.Graph



2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-40	164	168
-20	165	171
0	167	172
25	169	174
40	169	176
55	169	176
70	168	176
85	167	174
95	166	173
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Note: Slanted line shows the range of the rated ambient temperature.

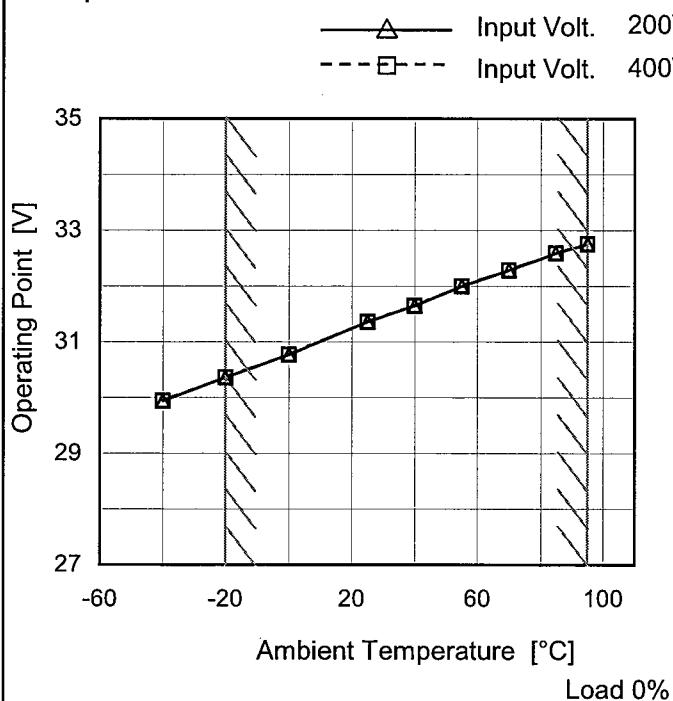


Model	SNDHS100B24	Temperature 25°C Testing Circuitry Figure A			
Item	Overcurrent Protection				
Object	+24V4.2A				
1. Graph					
		Input Volt. 200V Input Volt. 280V Input Volt. 400V			
		<p>Output Voltage [V]</p> <p>Load Current [A]</p>			
Note: Slanted line shows the range of the rated load current.					
Intermittent operation occurs when the output voltage is from 14.4V to 0V.					
2. Values					
Output Voltage [V]	Load Current [A]				
	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]		
22.8	5.40	5.57	5.80		
21.6	5.44	5.62	5.92		
19.2	5.52	5.74	5.93		
16.8	5.59	5.79	5.91		
14.4	5.58	5.88	5.85		
--	-	-	-		
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Model	SNDHS100B24
Item	Oversupply Protection
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]	Operating Point [V]	
	Input Volt. 200[V]	Input Volt. 400[V]
-40	29.94	29.94
-20	30.36	30.36
0	30.77	30.77
25	31.36	31.36
40	31.65	31.65
55	32.00	32.00
70	32.29	32.29
85	32.59	32.59
95	32.76	32.76
--	-	-
--	-	-

COSEL

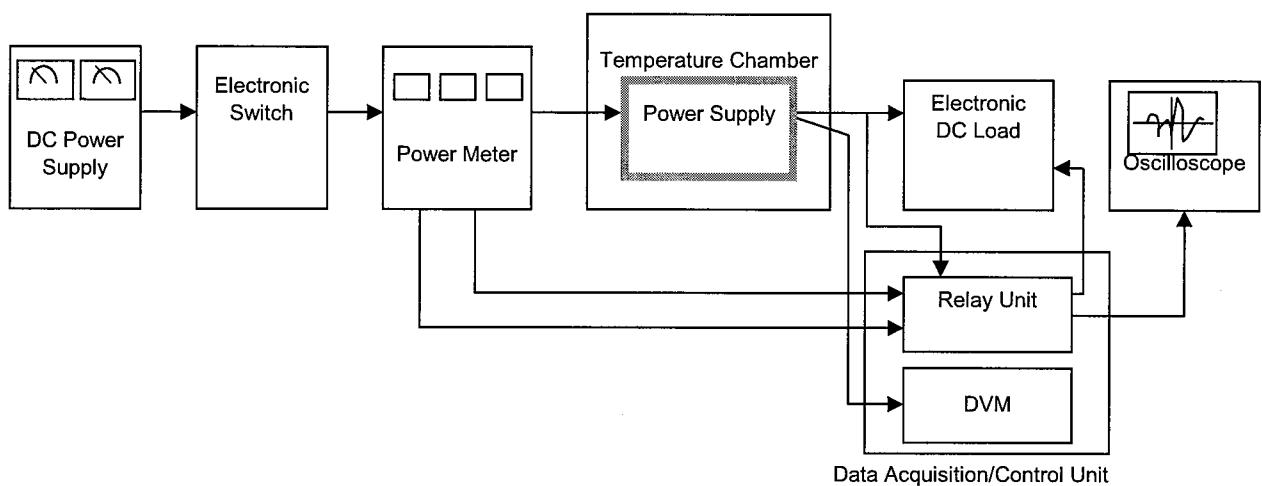


Figure A

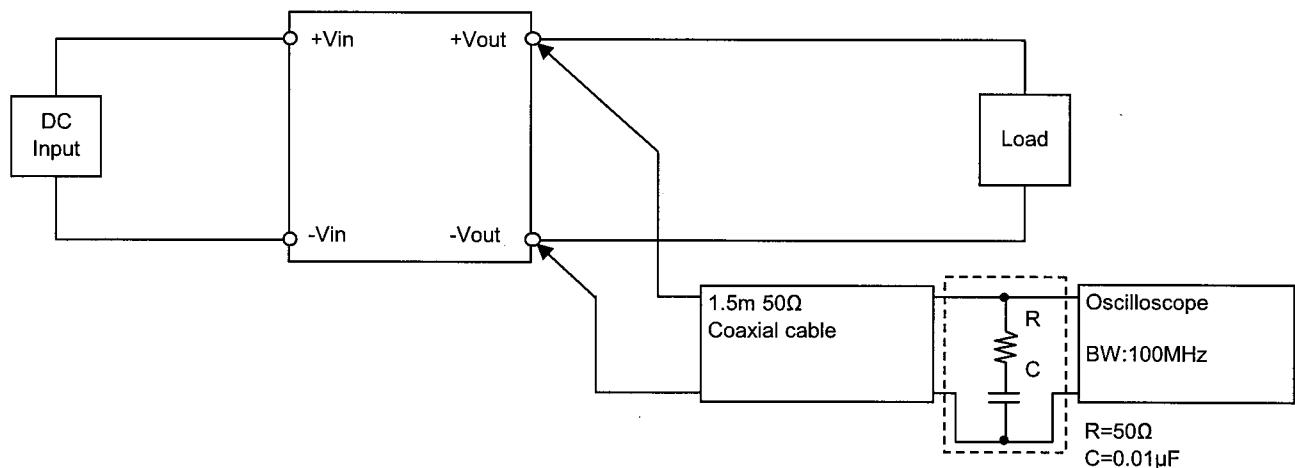


Figure B (Ripple and Ripple noise Characteristic)