

# 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			
1.Graph		<div><div><div><div></div></div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></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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Model		SNDHS100B24	
Item		Input Current (by Load Current)	
Object		_____	
1.Graph		2.Values	

—△—

Input Volt.

200V

---□---

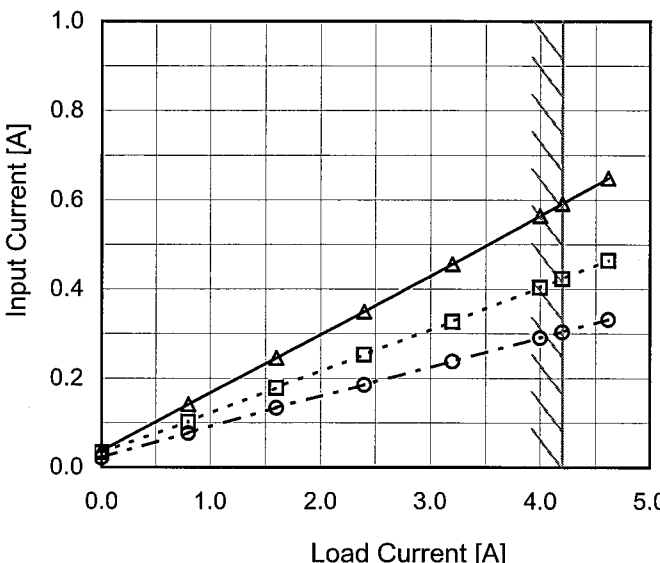
Input Volt.

280V

- - -○- - -

Input Volt.

400V



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

Load Current [A]	Input 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
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Model SNDHS100B24

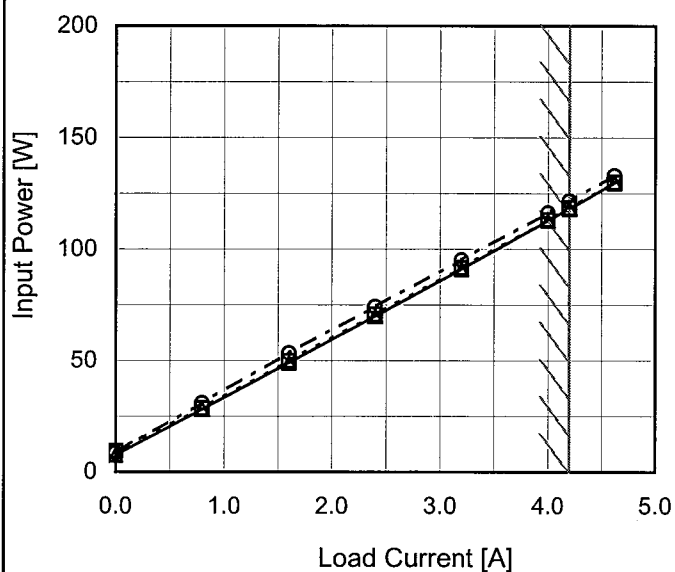
Item Input Power (by Load Current)

Object

Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph

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



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

## 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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# COSEL

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<div><div><div><div><div></div><div></div></div><div>—△—</div><div>Input Volt.</div><div>200V</div></div><div><div><div></div><div></div></div><div>---□---</div><div>Input Volt.</div><div>280V</div></div><div><div><div></div><div></div></div><div>-·-○-·-</div><div>Input Volt.</div><div>400V</div></div></div><div><p>Efficiency [%]</p><p>Load Current [A]</p></div></div> <div>Note: Slanted line shows the range of the rated load current.</div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Efficiency [%]</th></tr><tr><th>Input Volt. 200[V]</th><th>Input Volt. 280[V]</th><th>Input Volt. 400[V]</th></tr><tr><td>0.00</td><td>-</td><td>-</td><td>-</td></tr><tr><td>0.80</td><td>71.6</td><td>70.5</td><td>65.1</td></tr><tr><td>1.60</td><td>81.0</td><td>79.7</td><td>74.3</td></tr><tr><td>2.40</td><td>85.0</td><td>84.0</td><td>79.9</td></tr><tr><td>3.20</td><td>86.6</td><td>86.0</td><td>82.7</td></tr><tr><td>4.00</td><td>87.2</td><td>87.0</td><td>84.5</td></tr><tr><td>4.20</td><td>87.4</td><td>87.2</td><td>84.9</td></tr><tr><td>4.62</td><td>87.5</td><td>87.3</td><td>85.4</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></table>		Load Current [A]	Efficiency [%]			Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]	0.00	-	-	-	0.80	71.6	70.5	65.1	1.60	81.0	79.7	74.3	2.40	85.0	84.0	79.9	3.20	86.6	86.0	82.7	4.00	87.2	87.0	84.5	4.20	87.4	87.2	84.9	4.62	87.5	87.3	85.4	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Efficiency [%]																																																					
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Model	SNDHS100B24																																		
Item	Line Regulation	Temperature	25°C																																
Object	+24V4.2A	Testing Circuitry	Figure A																																
1.Graph		2.Values																																	
<div><div><div>---</div><div>□</div><div>---</div></div><div>Load 50%</div><div>---</div><div>△</div><div>---</div></div> <div>Load 100%</div> <p>Note: Slanted line shows the range of the rated input voltage.</p>		<table><tr><th rowspan="2">Input Voltage [V]</th><th colspan="2">Output Voltage [V]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr><tr><td>195</td><td>24.554</td><td>24.542</td></tr><tr><td>200</td><td>24.554</td><td>24.540</td></tr><tr><td>240</td><td>24.555</td><td>24.541</td></tr><tr><td>280</td><td>24.554</td><td>24.539</td></tr><tr><td>320</td><td>24.554</td><td>24.539</td></tr><tr><td>360</td><td>24.553</td><td>24.538</td></tr><tr><td>400</td><td>24.552</td><td>24.536</td></tr><tr><td>420</td><td>24.553</td><td>24.535</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		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	--	-	-
Input Voltage [V]	Output Voltage [V]																																		
	Load 50%	Load 100%																																	
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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																																	
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Model	SNDHS100B24																																																					
Item	Load Regulation	Temperature	25°C																																																			
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<div><div><div>—△—</div><div>Input Volt.</div><div>200V</div></div><div><div>---□---</div><div>Input Volt.</div><div>280V</div></div><div><div>-·-○-·-</div><div>Input Volt.</div><div>400V</div></div></div> <div><p>Output Voltage [V]</p><p>Load Current [A]</p></div> <div>Note: Slanted line shows the range of the rated load current.</div>		<table><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><tr><td>0.00</td><td>24.566</td><td>24.565</td><td>24.567</td></tr><tr><td>0.80</td><td>24.553</td><td>24.554</td><td>24.556</td></tr><tr><td>1.60</td><td>24.548</td><td>24.550</td><td>24.552</td></tr><tr><td>2.40</td><td>24.545</td><td>24.546</td><td>24.548</td></tr><tr><td>3.20</td><td>24.541</td><td>24.543</td><td>24.544</td></tr><tr><td>4.00</td><td>24.537</td><td>24.539</td><td>24.541</td></tr><tr><td>4.20</td><td>24.537</td><td>24.538</td><td>24.540</td></tr><tr><td>4.62</td><td>24.535</td><td>24.537</td><td>24.538</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></table>		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	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Output Voltage [V]																																																					
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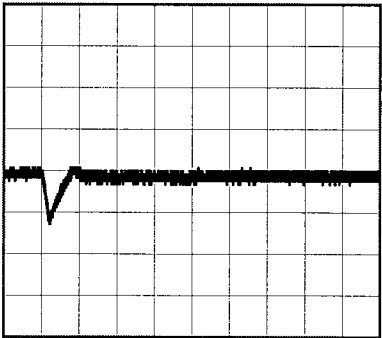
Model	SNDHS100B24		
Item	Dynamic Load Response	Temperature	25°C
Object	+24V4.2A	Testing Circuitry	Figure A

Input Volt. 280 V  
Cycle 1000 ms

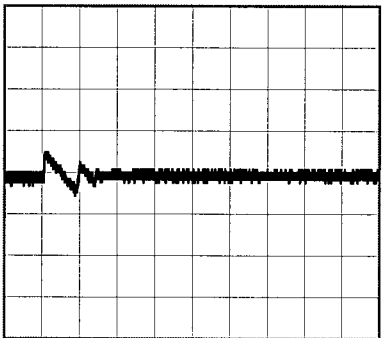


Min. Load (0A)  $\longleftrightarrow$   
Load 100% (4.2A)

0.5 V/div



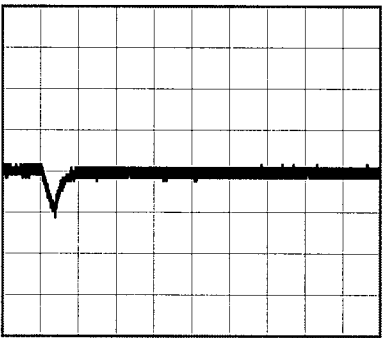
1ms/div



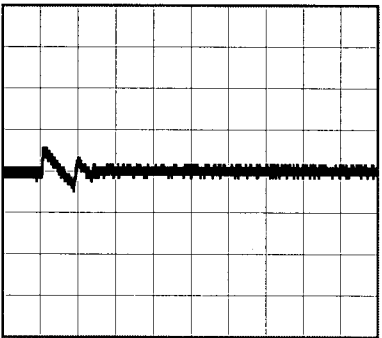
20ms/div

Min. Load (0A)  $\longleftrightarrow$   
Load 50% (2.1A)

0.5 V/div



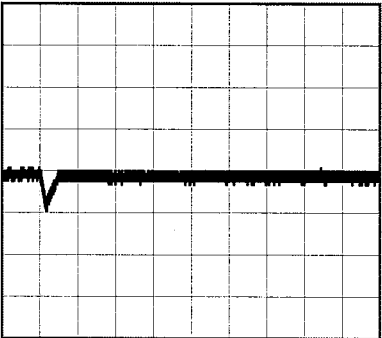
1ms/div



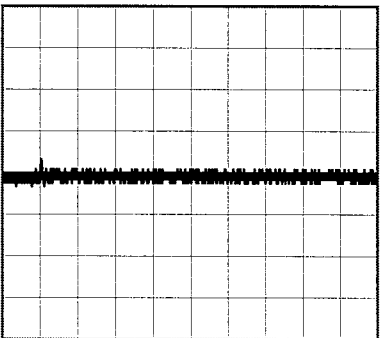
20ms/div

Load 10% (0.42A)  $\longleftrightarrow$   
Load 100% (4.2A)

0.5 V/div



1ms/div

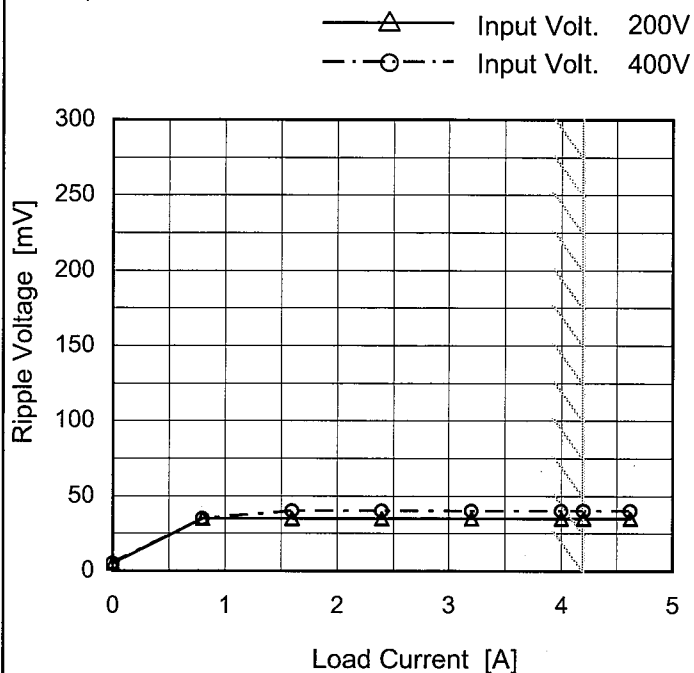


20ms/div

Model	SNDHS100B24
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	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]

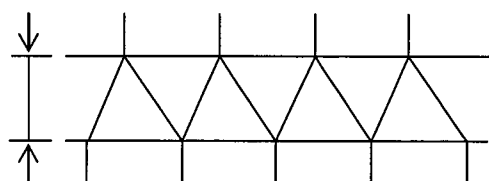


Fig. Complex Ripple Wave Form

Model	SNDHS100B24																																								
Item	Ripple-Noise	Temperature	25°C																																						
Object	+24V4.2A	Testing Circuitry	Figure B																																						
1.Graph		2.Values																																							
<div><div><div><div></div><div>Input Volt. 200V</div></div><div><div></div><div>Input Volt. 400V</div></div></div><div><p>Ripple-Noise [mV]</p><p>Load Current [A]</p></div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple-Noise [mV]</th></tr><tr><th>Input Volt. 200 [V]</th><th>Input Volt. 400 [V]</th></tr><tr><td>0.00</td><td>20</td><td>35</td></tr><tr><td>0.80</td><td>40</td><td>55</td></tr><tr><td>1.60</td><td>40</td><td>60</td></tr><tr><td>2.40</td><td>45</td><td>70</td></tr><tr><td>3.20</td><td>45</td><td>70</td></tr><tr><td>4.00</td><td>40</td><td>70</td></tr><tr><td>4.20</td><td>40</td><td>75</td></tr><tr><td>4.62</td><td>40</td><td>70</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		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	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple-Noise [mV]																																								
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4.00	40	70																																							
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4.62	40	70																																							
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--	-	-																																							
<p>Measured by 100 MHz Oscilloscope.</p> <p>Ripple-Noise is shown as p-p in the figure below.</p> <p>Note: Slanted line shows the range of the rated load current.</p>																																									
<div><div><div></div><div>Ripple Noise[mVp-p]</div></div><div><p>Fig.Complex Ripple Noise Wave Form</p></div></div>																																									

Model		SNDHS100B24	Testing Circuitry    Figure B
Item		Ripple Voltage (by Ambient Temp.)	
Object		+24V4.2A	
1.Graph			2.Values
<div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div><div>Load 50%</div><div>Load 100%</div></div> <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>			

BC-10589



Model	SNDHS100B24		
Item	Output Voltage Accuracy		Testing Circuitry    Figure A
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 =  $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

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

### 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		

# COSEL

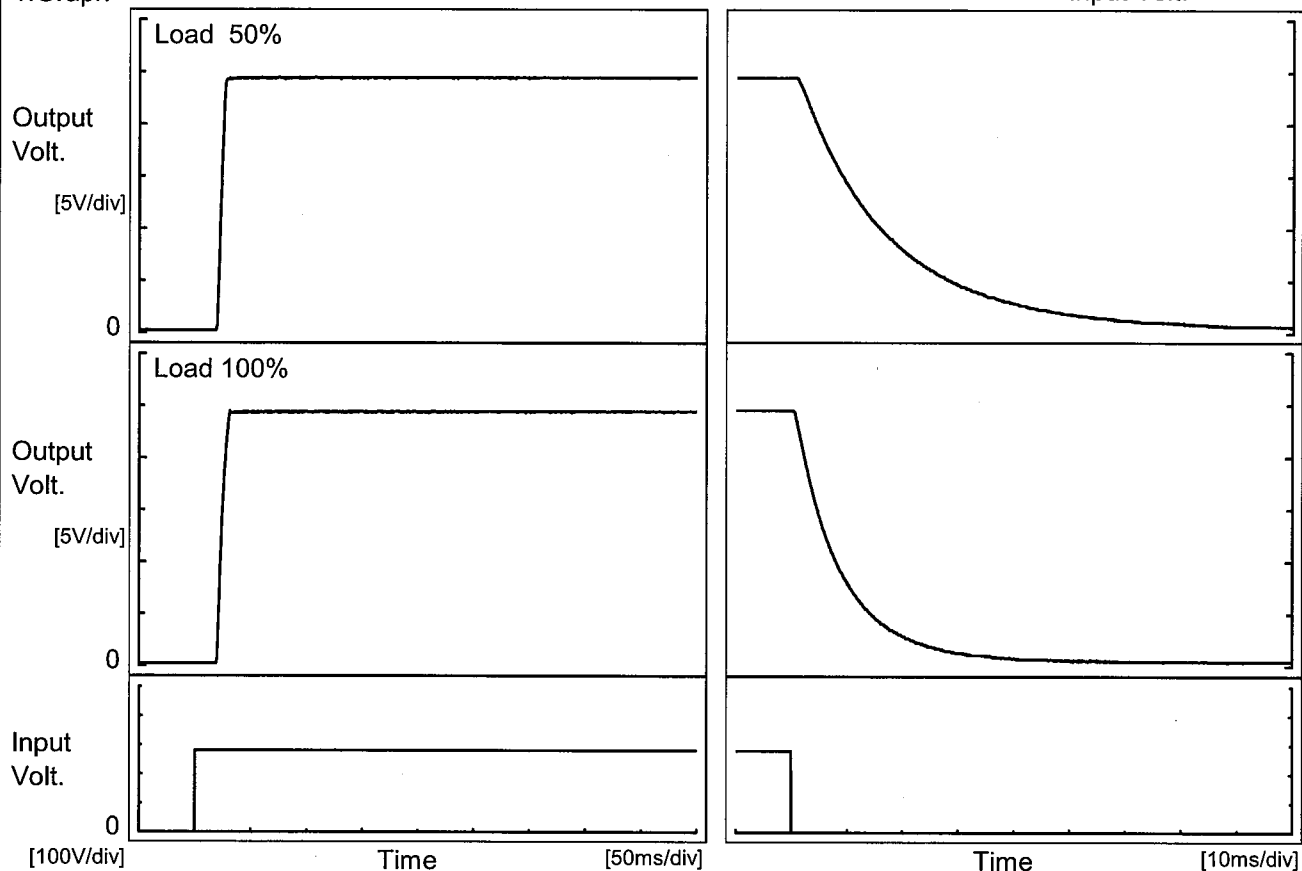
Model		SNDHS100B24																							
Item		Time Lapse Drift																							
Object		+24V4.2A																							
1.Graph		2.Values																							
<div><div><div>24.80</div><div>24.70</div><div>24.60</div><div>24.50</div><div>24.40</div><div>24.30</div><div>24.20</div><div>24.10</div></div><div><div>0</div><div>2</div><div>4</div><div>6</div><div>8</div><div>10</div></div><div><div>Output Voltage [V]</div><div>Time [H]</div></div><div><div>Input Volt.</div><div>280V</div></div><div><div>Load</div><div>100%</div></div></div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>24.547</td></tr><tr><td>0.5</td><td>24.535</td></tr><tr><td>1.0</td><td>24.534</td></tr><tr><td>2.0</td><td>24.534</td></tr><tr><td>3.0</td><td>24.533</td></tr><tr><td>4.0</td><td>24.533</td></tr><tr><td>5.0</td><td>24.534</td></tr><tr><td>6.0</td><td>24.534</td></tr><tr><td>7.0</td><td>24.534</td></tr><tr><td>8.0</td><td>24.534</td></tr></table>		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
Time since start [H]	Output Voltage [V]																								
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7.0	24.534																								
8.0	24.534																								
		Temperature 25°C																							
		Testing Circuitry Figure A																							



# COSEL

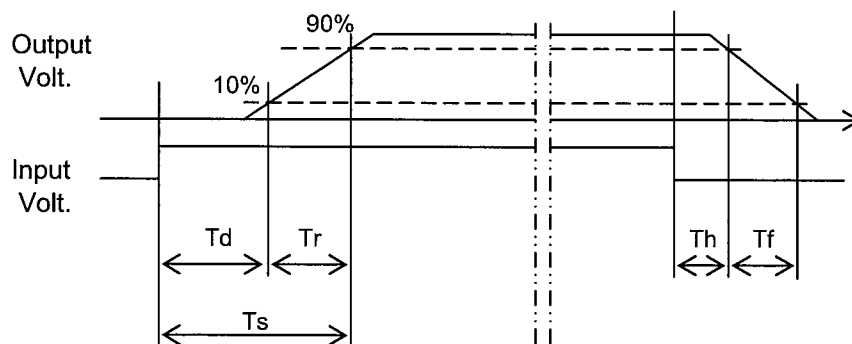
Model	SNDHS100B24	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+24V4.2A		

## 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



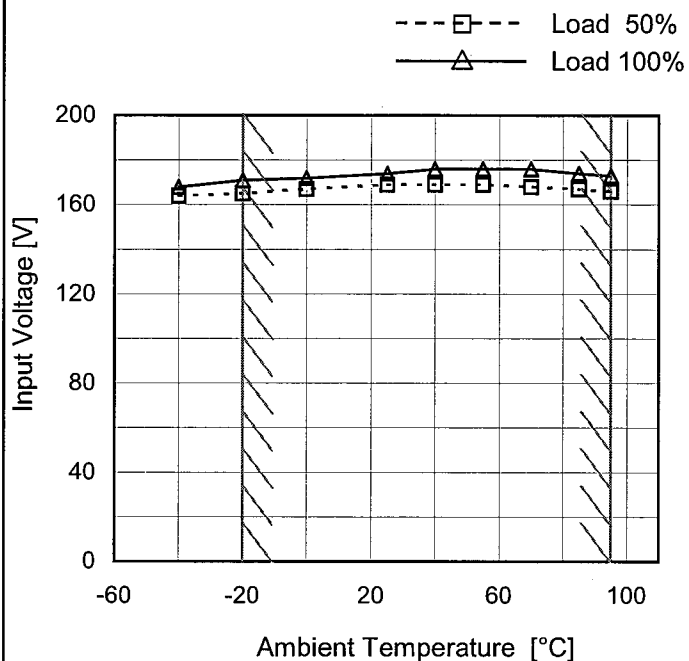
Model SNDHS100B24

Item Minimum Input Voltage  
for Regulated Output Voltage

Object +24V4.2A

Testing Circuitry Figure A

## 1. Graph

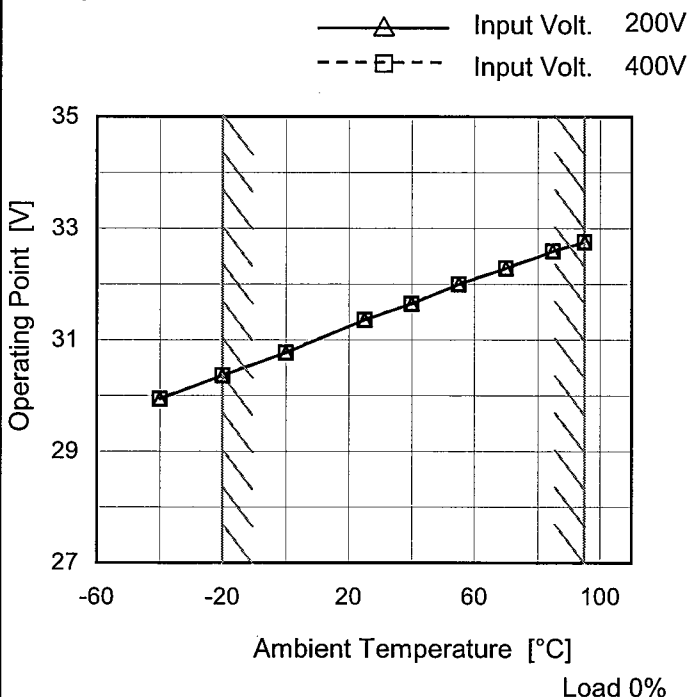


## 2. Values

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
--	-	-
--	-	-

# COSEL

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

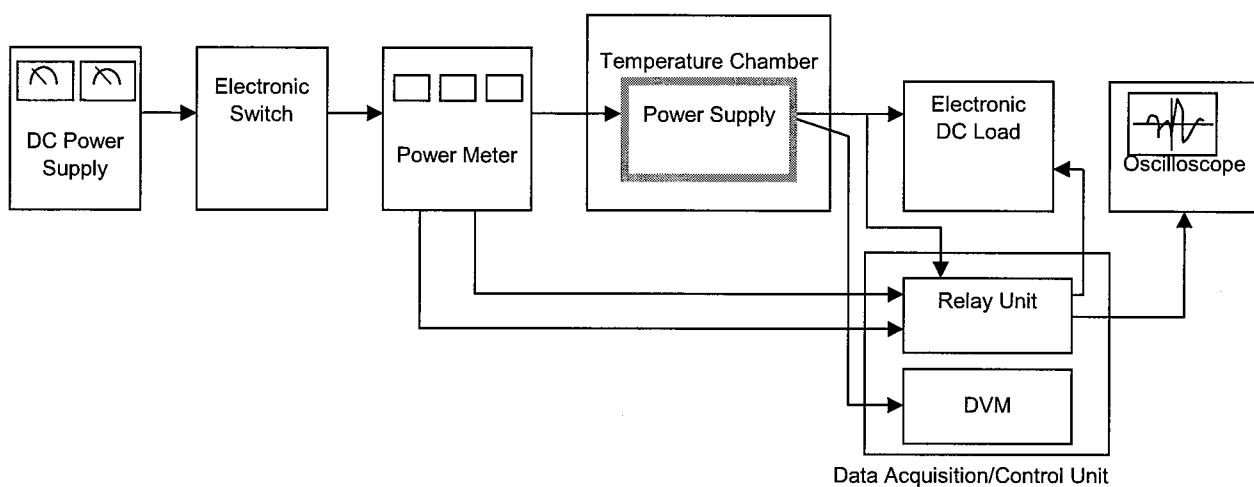


Figure A

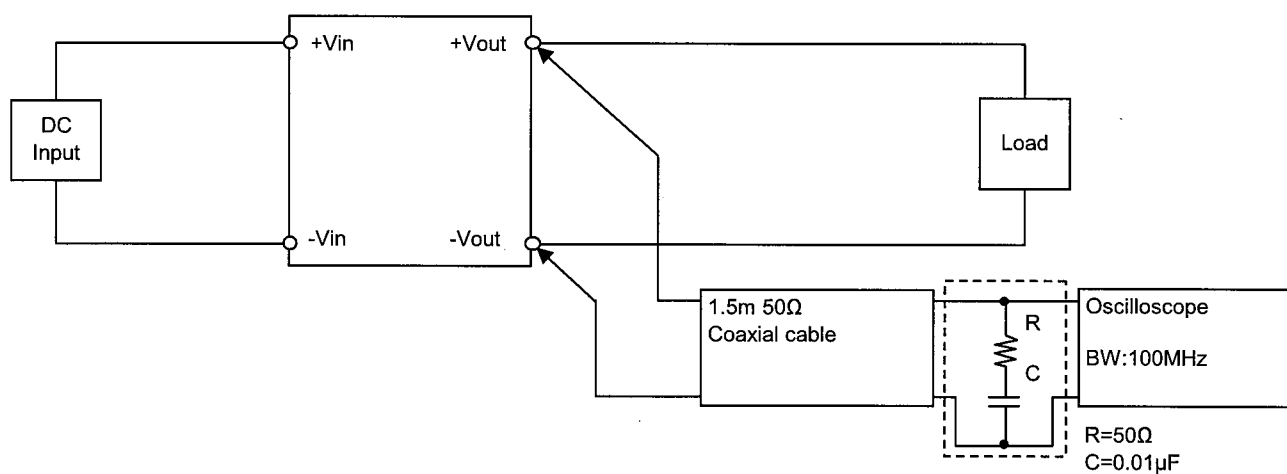


Figure B (Ripple and Ripple noise Characteristic)