

TEST DATA OF SNDHS200A24

Regulated DC Power Supply
April 10, 2012

Approved by : Takahiro Yoneda
Takahiro Yoneda Design Manager

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Tadashi Arai Design Engineer

COSEL CO.,LTD.

CONTENTS

1.Input Current (by Input Voltage)	1
2.Input Current (by Load Current)	2
3.Input Power (by Load Current)	3
4.Efficiency (by Input Voltage)	4
5.Efficiency (by Load Current)	5
6.Line Regulation	6
7.Load Regulation	7
8.Dynamic Load Response	8
9.Ripple Voltage (by Load Current)	9
10.Ripple-Noise	10
11.Ripple Voltage (by Ambient Temperature)	11
12.Ambient Temperature Drift	12
13.Output Voltage Accuracy	13
14.Time Lapse Drift	14
15.Rise and Fall Time	15
16.Minimum Input Voltage for Regulated Output Voltage	16
17.Overcurrent Protection	17
18.Overvoltage Protection	18
19.Figure of Testing Circuitry	19

(Final Page 19)

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Model	SNDHS200A24																																																																																	
Item	Input Current (by Input Voltage)	Temperature	25°C																																																																															
Object	+24V8.4A	Testing Circuitry	Figure A																																																																															
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- 2 -

BC-10647

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- 3 -

BC-10647

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9.3	24.529	24.528	24.528																																																			
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BC-10647



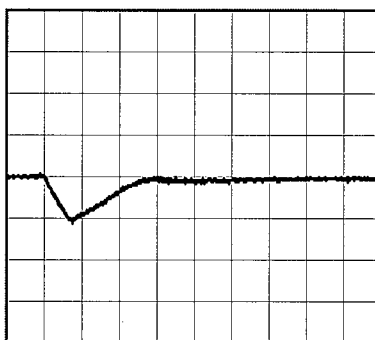
Model	SNDHS200A24	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Response	
Object	+24V8.4A	

Input Volt. 110 V
Cycle 1000 ms

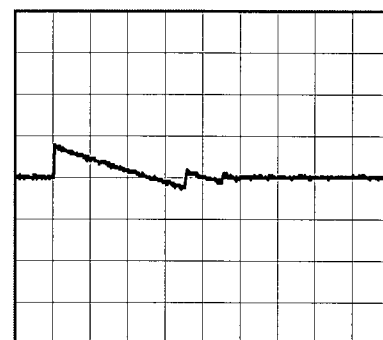
Load Current 8.4A/50 μ s

Min. Load (0A) \longleftrightarrow
Load 100% (8.4A)

1 V/div



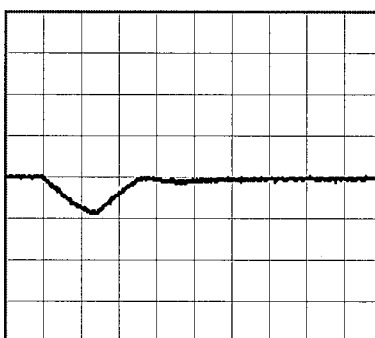
400 μ s/div



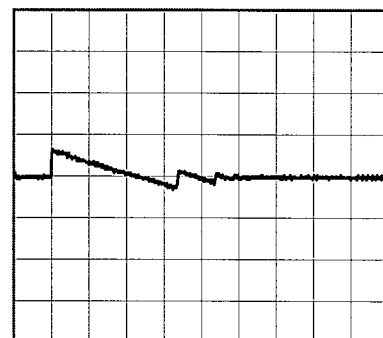
40ms/div

Min. Load (0A) \longleftrightarrow
Load 50% (4.2A)

1 V/div



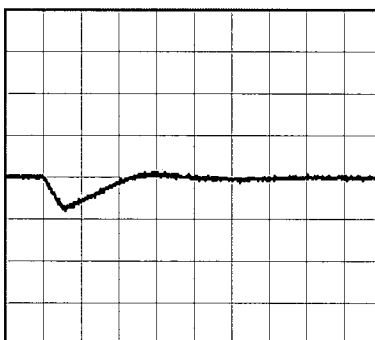
400 μ s/div



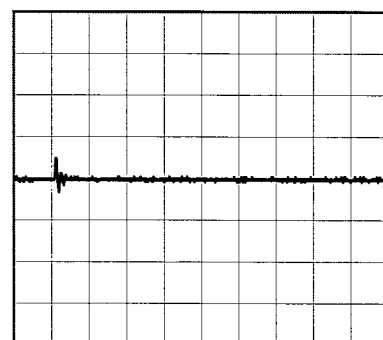
40ms/div

Load 10% (0.84A) \longleftrightarrow
Load 100% (8.4A)

1 V/div



400 μ s/div



40ms/div

Model	SNDHS200A24																																								
Item	Ripple Voltage (by Load Current)	Temperature	25°C																																						
Object	+24V8.4A	Testing Circuitry	Figure B																																						
1.Graph		2.Values																																							
<div><div><div>△</div><div>Input Volt.</div><div>60V</div></div><div><div>○</div><div>Input Volt.</div><div>160V</div></div></div> <table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 60 [V]</th><th>Input Volt. 160 [V]</th></tr><tr><td>0.0</td><td>5</td><td>5</td></tr><tr><td>1.5</td><td>15</td><td>20</td></tr><tr><td>3.0</td><td>15</td><td>20</td></tr><tr><td>4.5</td><td>15</td><td>20</td></tr><tr><td>6.0</td><td>15</td><td>20</td></tr><tr><td>7.5</td><td>15</td><td>20</td></tr><tr><td>8.4</td><td>15</td><td>20</td></tr><tr><td>9.3</td><td>15</td><td>20</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 Voltage [mV]		Input Volt. 60 [V]	Input Volt. 160 [V]	0.0	5	5	1.5	15	20	3.0	15	20	4.5	15	20	6.0	15	20	7.5	15	20	8.4	15	20	9.3	15	20	--	-	-	--	-	-	--	-	-		
Load Current [A]	Ripple Voltage [mV]																																								
	Input Volt. 60 [V]	Input Volt. 160 [V]																																							
0.0	5	5																																							
1.5	15	20																																							
3.0	15	20																																							
4.5	15	20																																							
6.0	15	20																																							
7.5	15	20																																							
8.4	15	20																																							
9.3	15	20																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
<p>Measured by 100 MHz Oscilloscope.</p> <p>Ripple Voltage is shown as p-p in the figure below.</p> <p>Note: Slanted line shows the range of the rated load current.</p>																																									
<p>Ripple [mVp-p]</p> <p>Fig.Complex Ripple Wave Form</p>																																									

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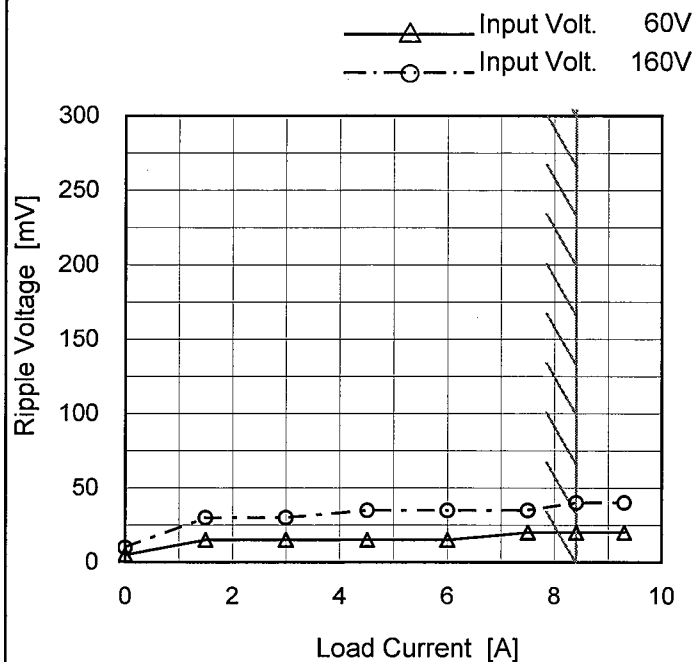
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BC-10647

Model	SNDHS200A24
Item	Ripple-Noise
Object	+24V8.4A

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.

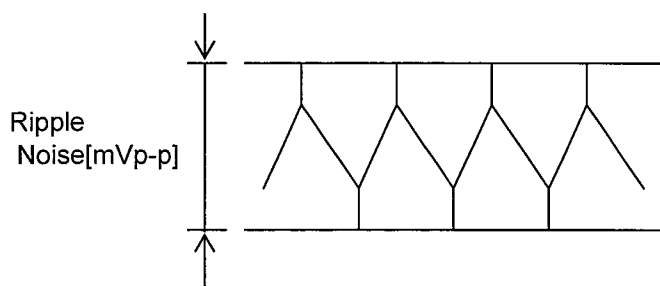


Fig.Complex Ripple Noise Wave Form

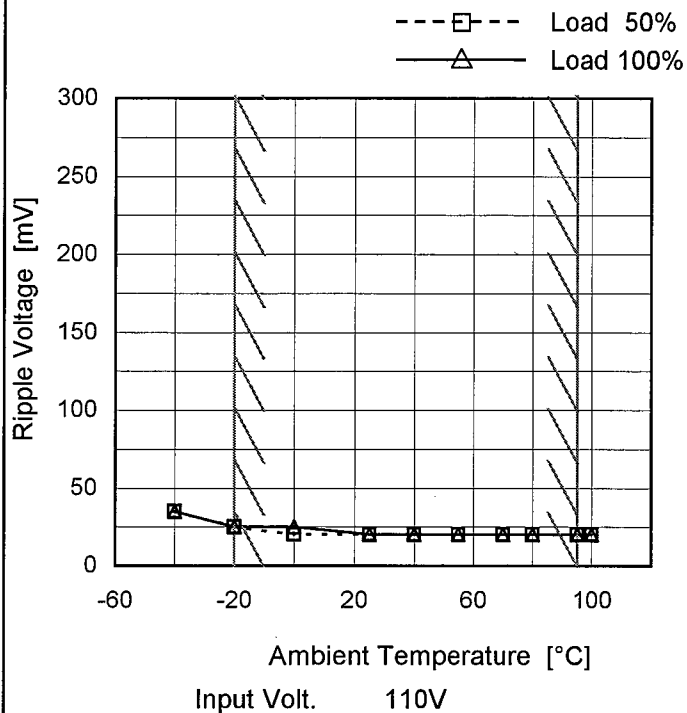
2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 60 [V]	Input Volt. 160 [V]
0.0	5	10
1.5	15	30
3.0	15	30
4.5	15	35
6.0	15	35
7.5	20	35
8.4	20	40
9.3	20	40
--	-	-
--	-	-
--	-	-

Model	SNDHS200A24
Item	Ripple Voltage (by Ambient Temp.)
Object	+24V8.4A

Testing Circuitry Figure B

1.Graph



Measured by 100 MHz Oscilloscope.

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

Ripple [mVp-p]

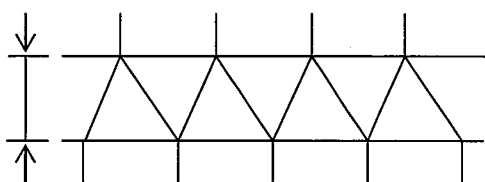


Fig.Complex Ripple Wave Form

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-40	35	35
-20	25	25
0	20	25
25	20	20
40	20	20
55	20	20
70	20	20
80	20	20
95	20	20
100	20	20
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Model		SNDHS200A24																																																				
Item		Ambient Temperature Drift																																																				
Object		+24V8.4A																																																				
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>Input Volt. 60V</div></div><div><div>---□---</div><div>Input Volt. 110V</div></div><div><div>---○---</div><div>Input Volt. 160V</div></div></div> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 60[V]</th><th>Input Volt. 110[V]</th><th>Input Volt. 160[V]</th></tr><tr><td>-40</td><td>24.428</td><td>24.429</td><td>24.431</td></tr><tr><td>-20</td><td>24.474</td><td>24.475</td><td>24.476</td></tr><tr><td>0</td><td>24.513</td><td>24.514</td><td>24.515</td></tr><tr><td>25</td><td>24.534</td><td>24.534</td><td>24.535</td></tr><tr><td>40</td><td>24.543</td><td>24.543</td><td>24.544</td></tr><tr><td>55</td><td>24.549</td><td>24.550</td><td>24.550</td></tr><tr><td>70</td><td>24.554</td><td>24.555</td><td>24.555</td></tr><tr><td>80</td><td>24.557</td><td>24.557</td><td>24.557</td></tr><tr><td>95</td><td>24.566</td><td>24.567</td><td>24.567</td></tr><tr><td>100</td><td>24.569</td><td>24.570</td><td>24.570</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]	-40	24.428	24.429	24.431	-20	24.474	24.475	24.476	0	24.513	24.514	24.515	25	24.534	24.534	24.535	40	24.543	24.543	24.544	55	24.549	24.550	24.550	70	24.554	24.555	24.555	80	24.557	24.557	24.557	95	24.566	24.567	24.567	100	24.569	24.570	24.570	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																					
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]																																																			
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0	24.513	24.514	24.515																																																			
25	24.534	24.534	24.535																																																			
40	24.543	24.543	24.544																																																			
55	24.549	24.550	24.550																																																			
70	24.554	24.555	24.555																																																			
80	24.557	24.557	24.557																																																			
95	24.566	24.567	24.567																																																			
100	24.569	24.570	24.570																																																			
--	-	-	-																																																			



		Testing Circuitry Figure A
Model	SNDHS200A24	
Item	Output Voltage Accuracy	
Object	+24V8.4A	

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 : 60 - 160V

Load Current : 0 - 8.4A

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

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

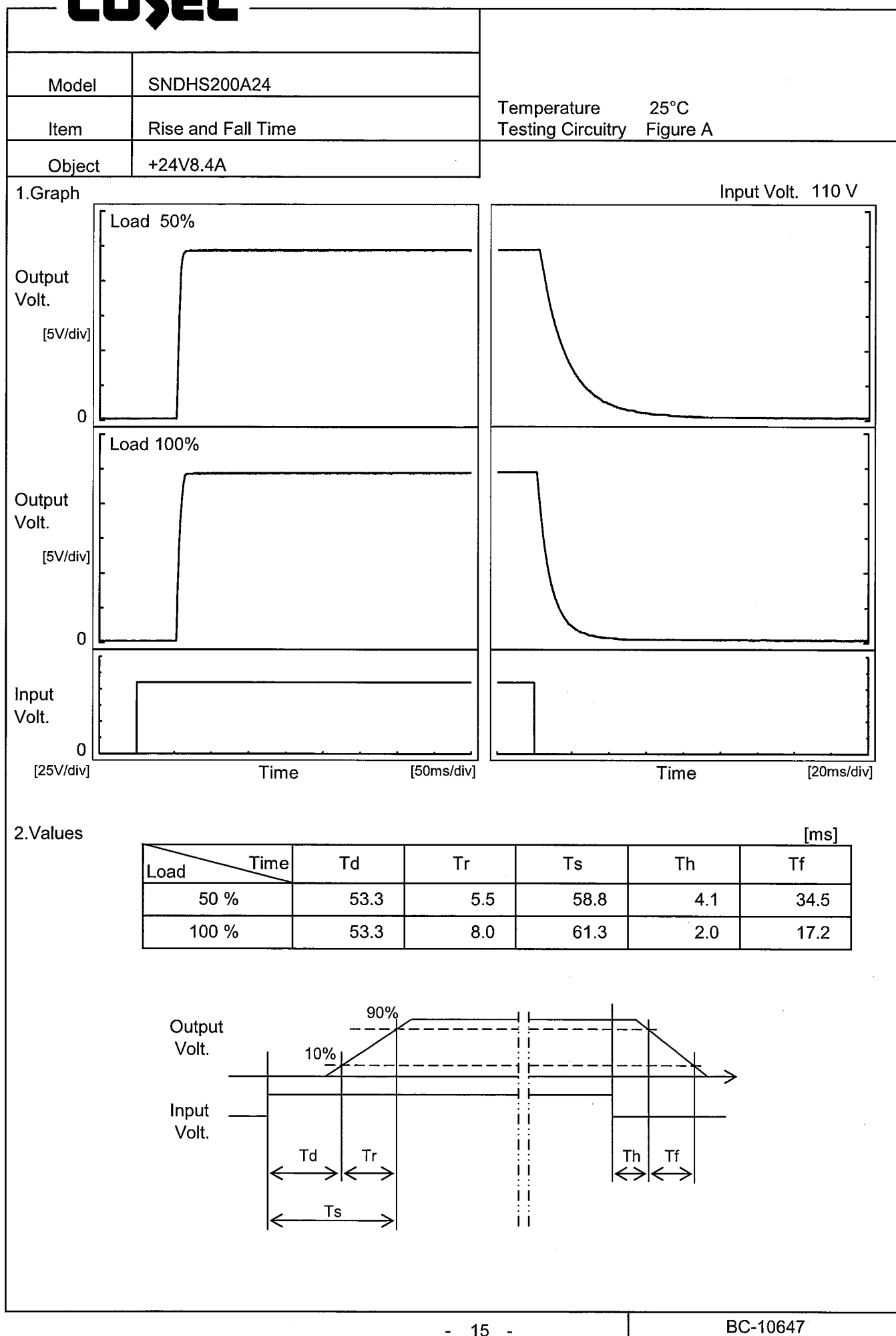
2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	95	60	0	24.573	±50	±0.2
Minimum Voltage	-20	60	8.4	24.474		



Model	SNDHS200A24																								
Item	Time Lapse Drift	Temperature	25°C																						
Object	+24V8.4A	Testing Circuitry	Figure A																						
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>110V</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>24.536</td></tr><tr><td>0.5</td><td>24.538</td></tr><tr><td>1.0</td><td>24.539</td></tr><tr><td>2.0</td><td>24.539</td></tr><tr><td>3.0</td><td>24.539</td></tr><tr><td>4.0</td><td>24.539</td></tr><tr><td>5.0</td><td>24.539</td></tr><tr><td>6.0</td><td>24.540</td></tr><tr><td>7.0</td><td>24.540</td></tr><tr><td>8.0</td><td>24.540</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	24.536	0.5	24.538	1.0	24.539	2.0	24.539	3.0	24.539	4.0	24.539	5.0	24.539	6.0	24.540	7.0	24.540	8.0	24.540
Time since start [H]	Output Voltage [V]																								
0.0	24.536																								
0.5	24.538																								
1.0	24.539																								
2.0	24.539																								
3.0	24.539																								
4.0	24.539																								
5.0	24.539																								
6.0	24.540																								
7.0	24.540																								
8.0	24.540																								

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Model		SNDHS200A24	
Item		Minimum Input Voltage for Regulated Output Voltage	
Object		+24V8.4A	
1.Graph		2.Values	

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BC-10647

Model		SNDHS200A24																																							
Item		Overvoltage Protection																																							
Object		+24V8.4A																																							
1.Graph		2.Values																																							
<div><div><div><div><div>—△—</div><div>Input Volt. 60V</div></div><div><div>---□---</div><div>Input Volt. 160V</div></div></div><div><p>Operating Point [V]</p><p>Ambient Temperature [°C]</p><p>Load 0%</p></div><p>Note: Slanted line shows the range of the rated ambient temperature.</p></div><td colspan="2"><table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Operating Point [V]</th></tr><tr><th>Input Volt. 60[V]</th><th>Input Volt. 160[V]</th></tr><tr><td>-40</td><td>29.93</td><td>29.93</td></tr><tr><td>-20</td><td>29.93</td><td>29.93</td></tr><tr><td>0</td><td>30.06</td><td>30.06</td></tr><tr><td>25</td><td>30.06</td><td>30.06</td></tr><tr><td>40</td><td>30.06</td><td>30.06</td></tr><tr><td>55</td><td>30.06</td><td>30.06</td></tr><tr><td>70</td><td>30.06</td><td>30.06</td></tr><tr><td>80</td><td>30.06</td><td>30.06</td></tr><tr><td>95</td><td>30.06</td><td>30.06</td></tr><tr><td>100</td><td>30.06</td><td>30.06</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table></td></div>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Operating Point [V]</th></tr><tr><th>Input Volt. 60[V]</th><th>Input Volt. 160[V]</th></tr><tr><td>-40</td><td>29.93</td><td>29.93</td></tr><tr><td>-20</td><td>29.93</td><td>29.93</td></tr><tr><td>0</td><td>30.06</td><td>30.06</td></tr><tr><td>25</td><td>30.06</td><td>30.06</td></tr><tr><td>40</td><td>30.06</td><td>30.06</td></tr><tr><td>55</td><td>30.06</td><td>30.06</td></tr><tr><td>70</td><td>30.06</td><td>30.06</td></tr><tr><td>80</td><td>30.06</td><td>30.06</td></tr><tr><td>95</td><td>30.06</td><td>30.06</td></tr><tr><td>100</td><td>30.06</td><td>30.06</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Ambient Temperature [°C]	Operating Point [V]		Input Volt. 60[V]	Input Volt. 160[V]	-40	29.93	29.93	-20	29.93	29.93	0	30.06	30.06	25	30.06	30.06	40	30.06	30.06	55	30.06	30.06	70	30.06	30.06	80	30.06	30.06	95	30.06	30.06	100	30.06	30.06	--	-	-
Ambient Temperature [°C]	Operating Point [V]																																								
	Input Volt. 60[V]	Input Volt. 160[V]																																							
-40	29.93	29.93																																							
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100	30.06	30.06																																							
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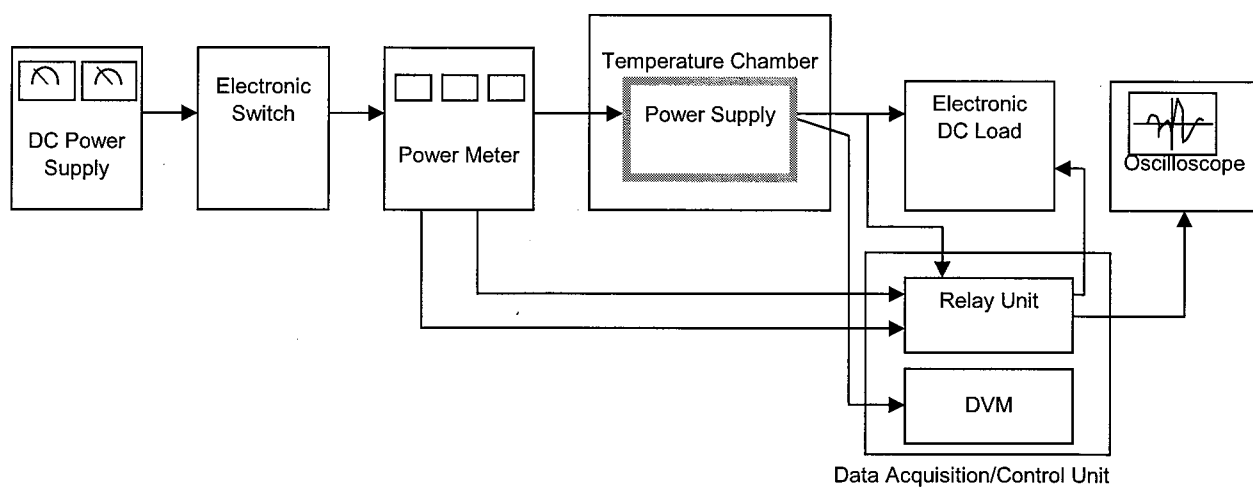


Figure A

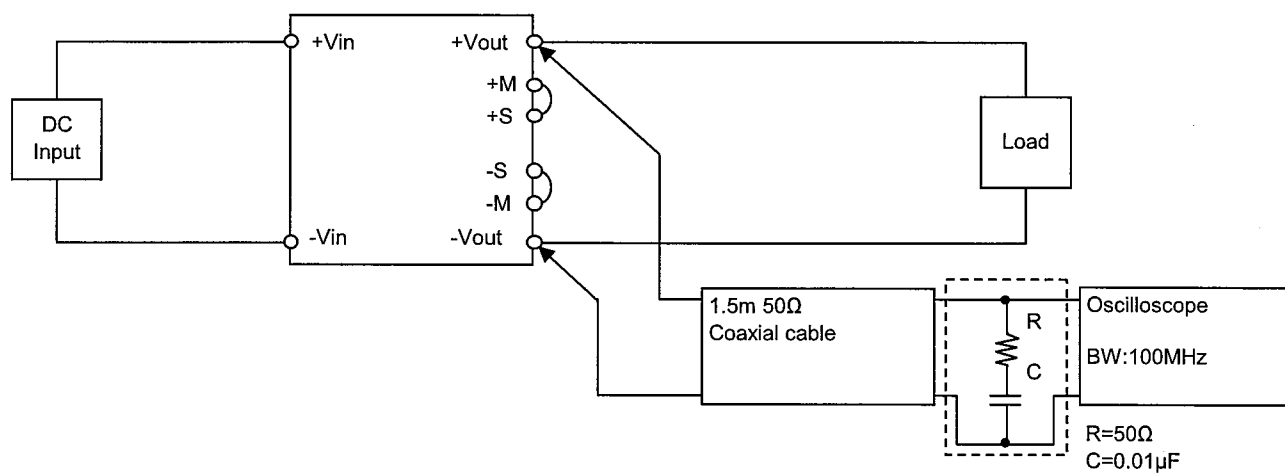


Figure B (Ripple and Ripple noise Characteristic)