

TEST DATA OF SNDHS100B03

Regulated DC Power Supply
June 30, 2011

Approved by : Takahiro Yoneda
Takahiro Yoneda Design Manager

Prepared by : Tadashi Arai
Tadashi Arai Design Engineer

COSEL CO.,LTD.

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<p>The graph plots Input Power [W] on the Y-axis (0 to 100) against Load Current [A] on the X-axis (0 to 20). Three curves are shown for different input voltages: 200V (solid line with triangle markers), 280V (dashed line with square markers), and 400V (dash-dot line with circle markers). All curves show a linear increase in power with load current. A slanted line is drawn across the graph, starting from approximately (0, 5) and ending at (20, 95), indicating the range of the rated load current.</p>			2. Values																																																			
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<p>The graph plots Efficiency [%] on the y-axis (30 to 86) 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 slight decrease in efficiency as input voltage increases. A vertical dashed line at 200V 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>200</td><td>78.1</td><td>78.4</td></tr> <tr><td>220</td><td>77.8</td><td>78.1</td></tr> <tr><td>240</td><td>77.5</td><td>78.0</td></tr> <tr><td>260</td><td>77.2</td><td>77.8</td></tr> <tr><td>280</td><td>76.9</td><td>77.5</td></tr> <tr><td>300</td><td>76.6</td><td>77.2</td></tr> <tr><td>320</td><td>76.3</td><td>76.9</td></tr> <tr><td>340</td><td>76.0</td><td>76.6</td></tr> <tr><td>360</td><td>75.7</td><td>76.3</td></tr> <tr><td>380</td><td>75.4</td><td>76.0</td></tr> <tr><td>400</td><td>75.1</td><td>75.7</td></tr> <tr><td>420</td><td>74.8</td><td>75.4</td></tr> </tbody> </table>		Input Voltage [V]	Efficiency Load 50% [%]	Efficiency Load 100% [%]	200	78.1	78.4	220	77.8	78.1	240	77.5	78.0	260	77.2	77.8	280	76.9	77.5	300	76.6	77.2	320	76.3	76.9	340	76.0	76.6	360	75.7	76.3	380	75.4	76.0	400	75.1	75.7	420	74.8	75.4
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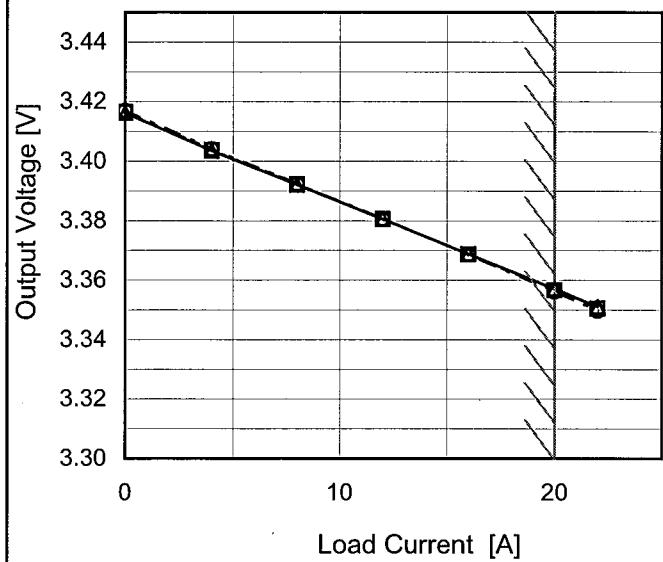
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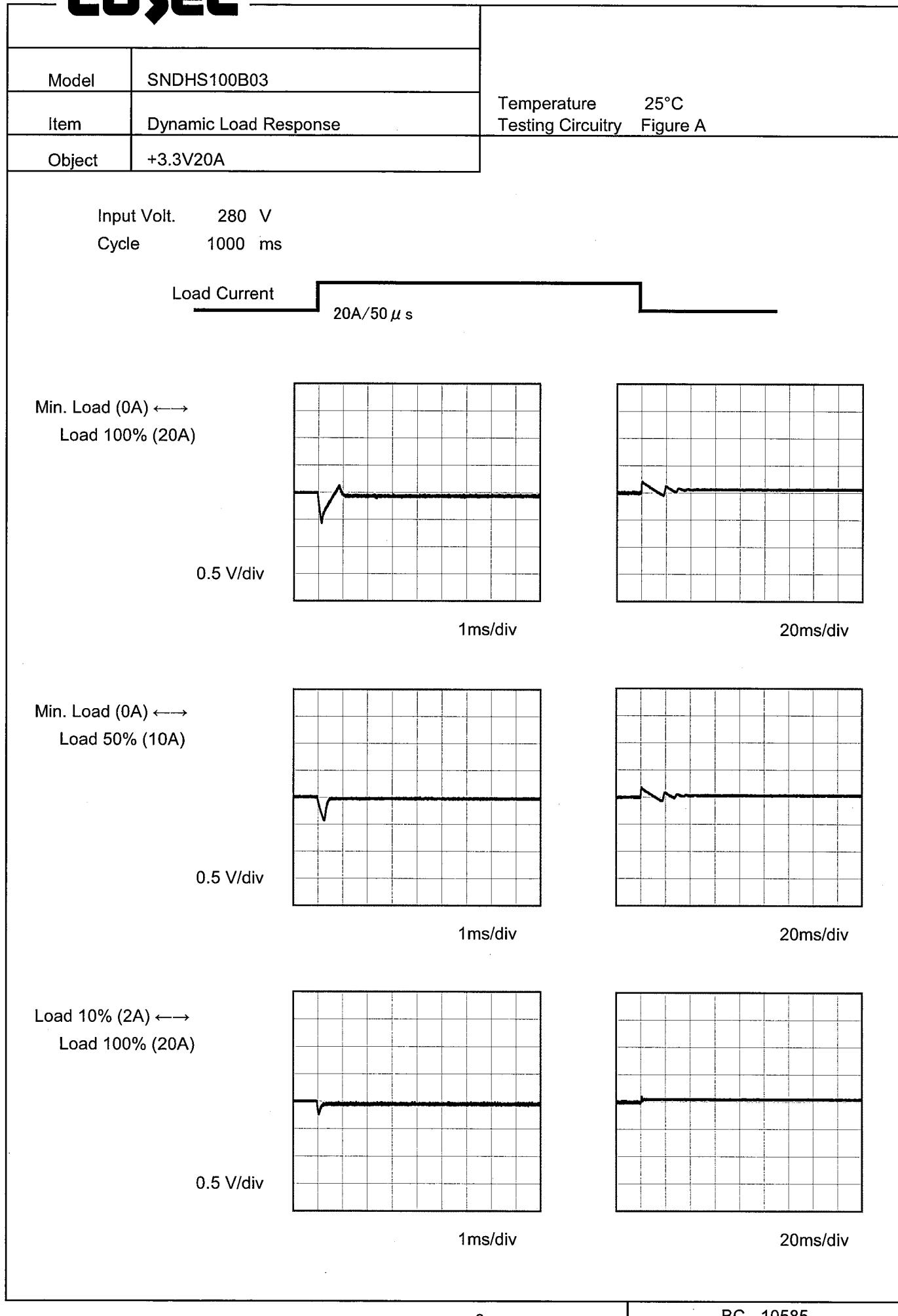
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<p>Note: Slanted line shows the range of the rated load current.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Output Voltage [V]</th> </tr> <tr> <th>Input Volt. 200[V]</th> <th>Input Volt. 280[V]</th> <th>Input Volt. 400[V]</th> </tr> </thead> <tbody> <tr><td>0</td><td>3.416</td><td>3.417</td><td>3.417</td></tr> <tr><td>4</td><td>3.404</td><td>3.404</td><td>3.404</td></tr> <tr><td>8</td><td>3.392</td><td>3.392</td><td>3.392</td></tr> <tr><td>12</td><td>3.381</td><td>3.381</td><td>3.381</td></tr> <tr><td>16</td><td>3.369</td><td>3.369</td><td>3.369</td></tr> <tr><td>20</td><td>3.357</td><td>3.357</td><td>3.356</td></tr> <tr><td>22</td><td>3.351</td><td>3.351</td><td>3.350</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>		Load Current [A]	Output Voltage [V]			Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]	0	3.416	3.417	3.417	4	3.404	3.404	3.404	8	3.392	3.392	3.392	12	3.381	3.381	3.381	16	3.369	3.369	3.369	20	3.357	3.357	3.356	22	3.351	3.351	3.350	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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COSEL

COSEL

Model	SNDHS100B03	Temperature Testing Circuitry	25°C Figure B																																						
Item	Ripple Voltage (by Load Current)																																								
Object	+3.3V20A																																								
1. Graph			2. Values																																						
<p>—△— Input Volt. 200V -·○-· Input Volt. 400V</p>			<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 200 [V]</th> <th>Input Volt. 400 [V]</th> </tr> </thead> <tbody> <tr><td>0</td><td>5</td><td>5</td></tr> <tr><td>4</td><td>5</td><td>10</td></tr> <tr><td>8</td><td>10</td><td>10</td></tr> <tr><td>12</td><td>10</td><td>10</td></tr> <tr><td>16</td><td>10</td><td>10</td></tr> <tr><td>20</td><td>10</td><td>10</td></tr> <tr><td>22</td><td>10</td><td>10</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> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>	Load Current [A]	Ripple Voltage [mV]		Input Volt. 200 [V]	Input Volt. 400 [V]	0	5	5	4	5	10	8	10	10	12	10	10	16	10	10	20	10	10	22	10	10	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																								
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<p>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.</p>																																									
<p>Ripple [mVp-p]</p>																																									
<p>Fig. Complex Ripple Wave Form</p>																																									

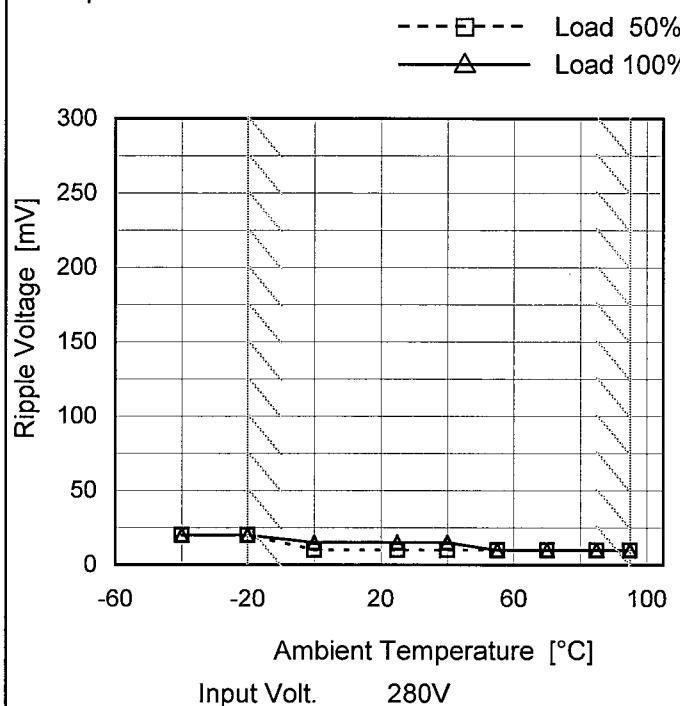
COSEL

Model	SNDHS100B03	Temperature Testing Circuitry 25°C Figure B																							
Item	Ripple-Noise																								
Object	+3.3V20A																								
1.Graph		2.Values																							
<p>Graph showing Ripple-Noise [mV] vs Load Current [A]. The Y-axis ranges from 0 to 300 mV, and the X-axis ranges from 0 to 25 A. Two curves are plotted: Input Volt. 200V (solid line with open circles) and Input Volt. 400V (dashed line with open squares). Both curves show a slight increase in noise as load current increases.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Ripple-Noise [mV] (Input Volt. 200V)</th> <th>Ripple-Noise [mV] (Input Volt. 400V)</th> </tr> </thead> <tbody> <tr><td>0</td><td>10</td><td>15</td></tr> <tr><td>4</td><td>15</td><td>15</td></tr> <tr><td>8</td><td>25</td><td>25</td></tr> <tr><td>12</td><td>25</td><td>30</td></tr> <tr><td>16</td><td>30</td><td>40</td></tr> <tr><td>20</td><td>40</td><td>45</td></tr> <tr><td>22</td><td>45</td><td>50</td></tr> </tbody> </table>		Load Current [A]	Ripple-Noise [mV] (Input Volt. 200V)	Ripple-Noise [mV] (Input Volt. 400V)	0	10	15	4	15	15	8	25	25	12	25	30	16	30	40	20	40	45	22	45	50
Load Current [A]	Ripple-Noise [mV] (Input Volt. 200V)	Ripple-Noise [mV] (Input Volt. 400V)																							
0	10	15																							
4	15	15																							
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<p>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.</p> <p>Fig.Complex Ripple Noise Wave Form</p>																									

COSEL

Model	SNDHS100B03
Item	Ripple Voltage (by Ambient Temp.)
Object	+3.3V20A

1. Graph



Measured by 100 MHz Oscilloscope.

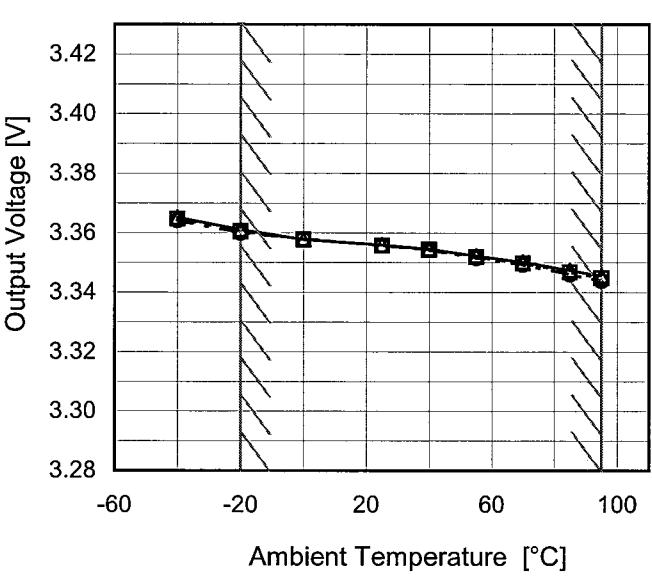
Note: Slanted line shows the range of the rated ambient temperature.

Testing Circuitry Figure B

2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-40	20	20
-20	20	20
0	10	15
25	10	15
40	10	15
55	10	10
70	10	10
85	10	10
95	10	10
--	-	-
--	-	-

COSEL

Model	SNDHS100B03	Testing Circuitry Figure A																																																						
Item	Ambient Temperature Drift																																																							
Object	+3.3V20A																																																							
1.Graph	<p style="text-align: center;"> Input Volt. 200V Input Volt. 280V Input Volt. 400V </p>  <p style="text-align: center;">Output Voltage [V]</p> <p style="text-align: center;">Ambient Temperature [°C]</p> <p style="text-align: center;">Load 100%</p>	2.Values																																																						
		<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</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>-40</td><td>3.365</td><td>3.365</td><td>3.364</td></tr> <tr><td>-20</td><td>3.361</td><td>3.361</td><td>3.360</td></tr> <tr><td>0</td><td>3.358</td><td>3.358</td><td>3.358</td></tr> <tr><td>25</td><td>3.356</td><td>3.356</td><td>3.356</td></tr> <tr><td>40</td><td>3.355</td><td>3.354</td><td>3.354</td></tr> <tr><td>55</td><td>3.352</td><td>3.352</td><td>3.352</td></tr> <tr><td>70</td><td>3.350</td><td>3.350</td><td>3.349</td></tr> <tr><td>85</td><td>3.348</td><td>3.347</td><td>3.346</td></tr> <tr><td>95</td><td>3.346</td><td>3.345</td><td>3.344</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>	Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]	-40	3.365	3.365	3.364	-20	3.361	3.361	3.360	0	3.358	3.358	3.358	25	3.356	3.356	3.356	40	3.355	3.354	3.354	55	3.352	3.352	3.352	70	3.350	3.350	3.349	85	3.348	3.347	3.346	95	3.346	3.345	3.344	--	-	-	-	--	-	-	-			
Ambient Temperature [°C]	Output Voltage [V]																																																							
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Note: Slanted line shows the range of the rated ambient temperature.



Model	SNDHS100B03	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+3.3V20A	

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 - 20A

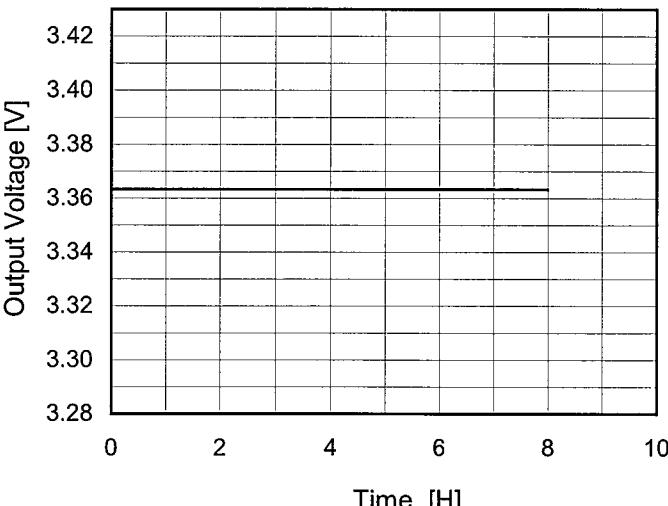
* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

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

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	70	200	0	3.418	± 37	± 1.1
Minimum Voltage	95	400	20	3.344		

COSEL

Model	SNDHS100B03	Temperature Testing Circuitry 25°C Figure A																						
Item	Time Lapse Drift																							
Object	+3.3V20A																							
1.Graph		2.Values																						
 <p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 280V Load 100%</p>		<table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>3.363</td></tr> <tr><td>0.5</td><td>3.363</td></tr> <tr><td>1.0</td><td>3.363</td></tr> <tr><td>2.0</td><td>3.363</td></tr> <tr><td>3.0</td><td>3.363</td></tr> <tr><td>4.0</td><td>3.363</td></tr> <tr><td>5.0</td><td>3.363</td></tr> <tr><td>6.0</td><td>3.363</td></tr> <tr><td>7.0</td><td>3.363</td></tr> <tr><td>8.0</td><td>3.363</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	3.363	0.5	3.363	1.0	3.363	2.0	3.363	3.0	3.363	4.0	3.363	5.0	3.363	6.0	3.363	7.0	3.363	8.0	3.363
Time since start [H]	Output Voltage [V]																							
0.0	3.363																							
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7.0	3.363																							
8.0	3.363																							

COSEL

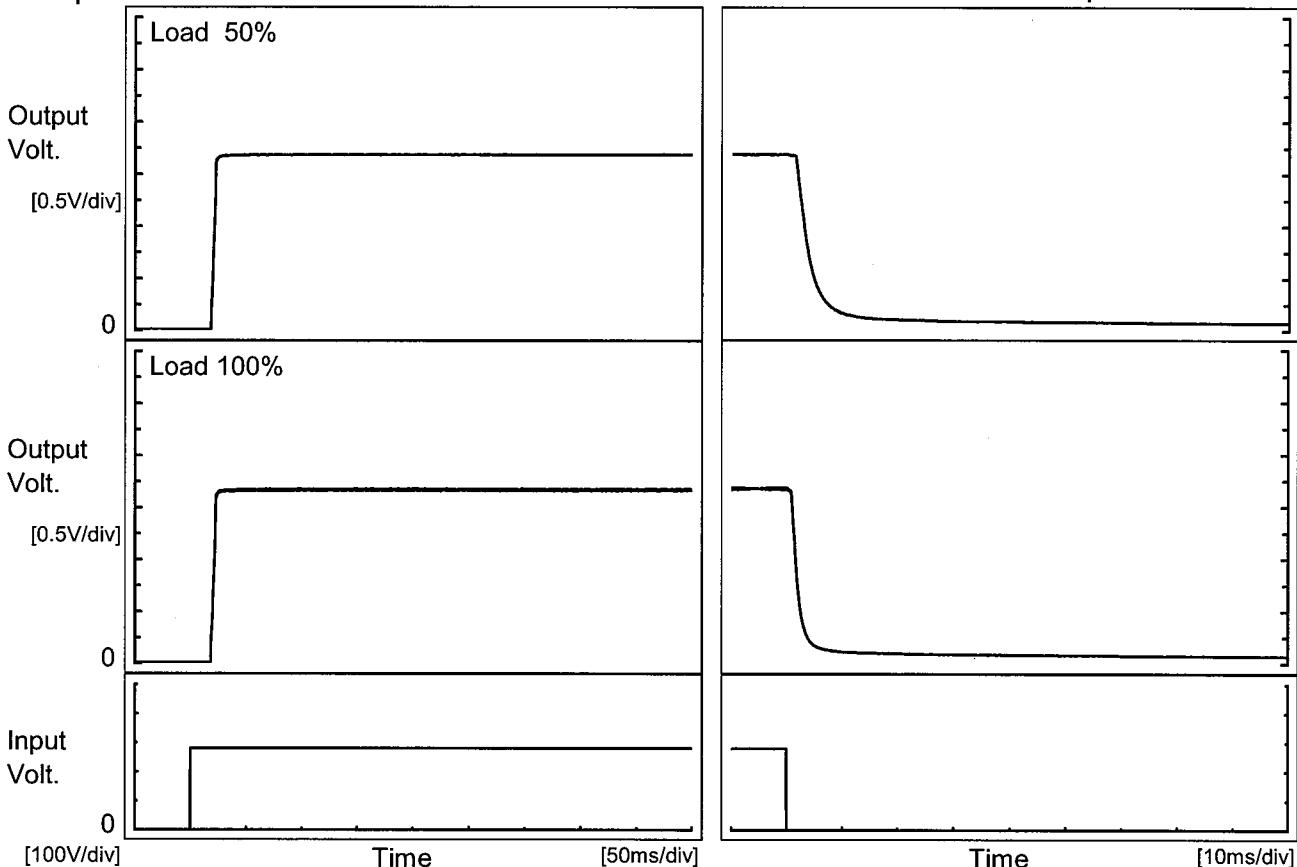
Model SNDHS100B03

Item Rise and Fall Time

Object +3.3V20A

Temperature 25°C
Testing Circuitry Figure A

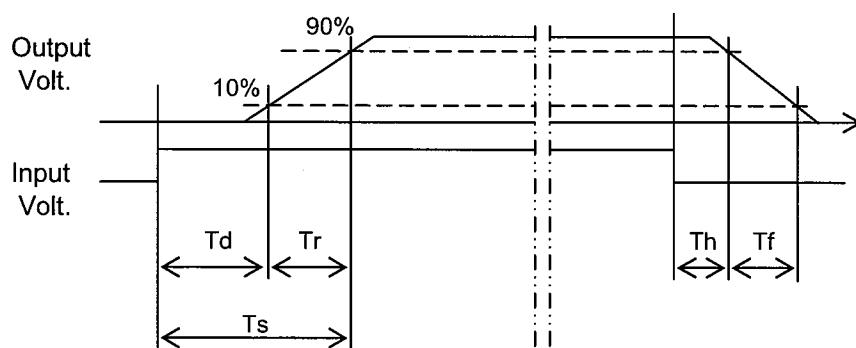
1. Graph



2. Values

[ms]

Load	Time	Td	Tr	Ts	Th	Tf
50 %		18.5	4.0	22.5	1.8	7.8
100 %		18.5	4.3	22.8	1.0	4.0

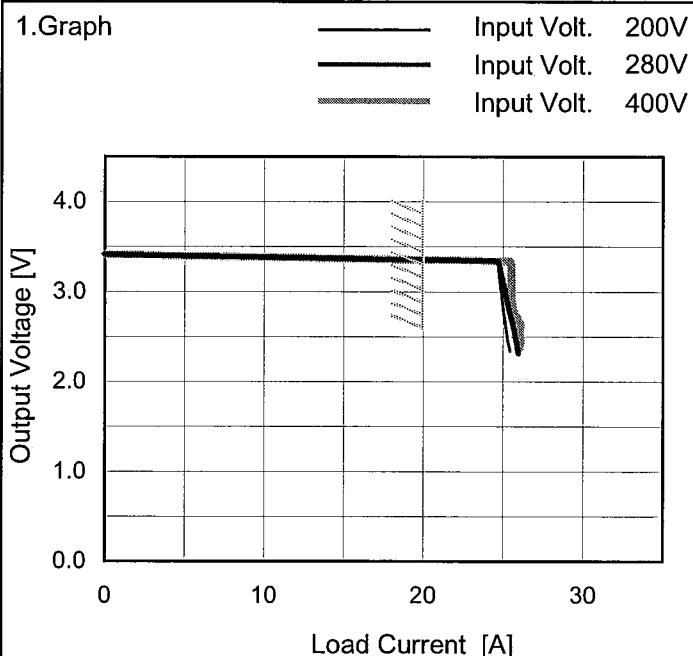




Model	SNDHS100B03	Testing Circuitry Figure A																																						
Item	Minimum Input Voltage for Regulated Output Voltage																																							
Object	+3.3V20A																																							
1.Graph																																								
<p>Input Voltage [V]</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																																								
<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Input Voltage [V]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr> <td>-40</td><td>152</td><td>160</td> </tr> <tr> <td>-20</td><td>153</td><td>162</td> </tr> <tr> <td>0</td><td>154</td><td>164</td> </tr> <tr> <td>25</td><td>155</td><td>166</td> </tr> <tr> <td>40</td><td>155</td><td>168</td> </tr> <tr> <td>55</td><td>155</td><td>169</td> </tr> <tr> <td>70</td><td>155</td><td>169</td> </tr> <tr> <td>85</td><td>154</td><td>170</td> </tr> <tr> <td>95</td><td>154</td><td>170</td> </tr> <tr> <td>--</td><td>-</td><td>-</td> </tr> <tr> <td>--</td><td>-</td><td>-</td> </tr> </tbody> </table>			Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-40	152	160	-20	153	162	0	154	164	25	155	166	40	155	168	55	155	169	70	155	169	85	154	170	95	154	170	--	-	-	--	-	-
Ambient Temperature [°C]	Input Voltage [V]																																							
	Load 50%	Load 100%																																						
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--	-	-																																						
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<p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																								

COSEL

Model	SNDHS100B03
Item	Overcurrent Protection
Object	+3.3V20A



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

Temperature 25°C
Testing Circuitry Figure A

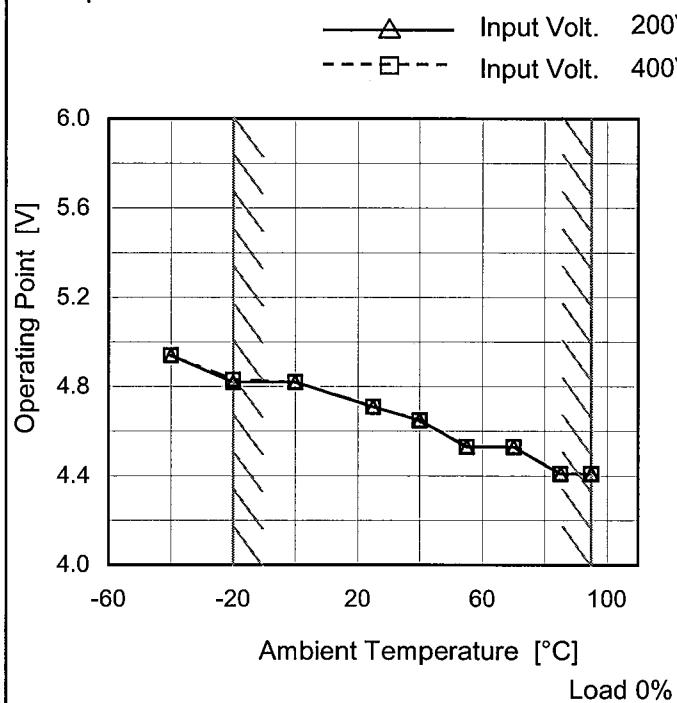
2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
3.14	24.82	24.97	25.52
2.97	24.92	25.18	25.53
2.64	25.13	25.56	26.01
2.31	25.45	25.94	26.02
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

Intermittent operation occurs when the output voltage is from 2.31V to 0V.

Model	SNDHS100B03
Item	Oversupply Protection
Object	+3.3V20A

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	4.94	4.94
-20	4.82	4.83
0	4.82	4.82
25	4.71	4.71
40	4.65	4.65
55	4.53	4.53
70	4.53	4.53
85	4.41	4.41
95	4.41	4.41
--	-	-
--	-	-

COSEL

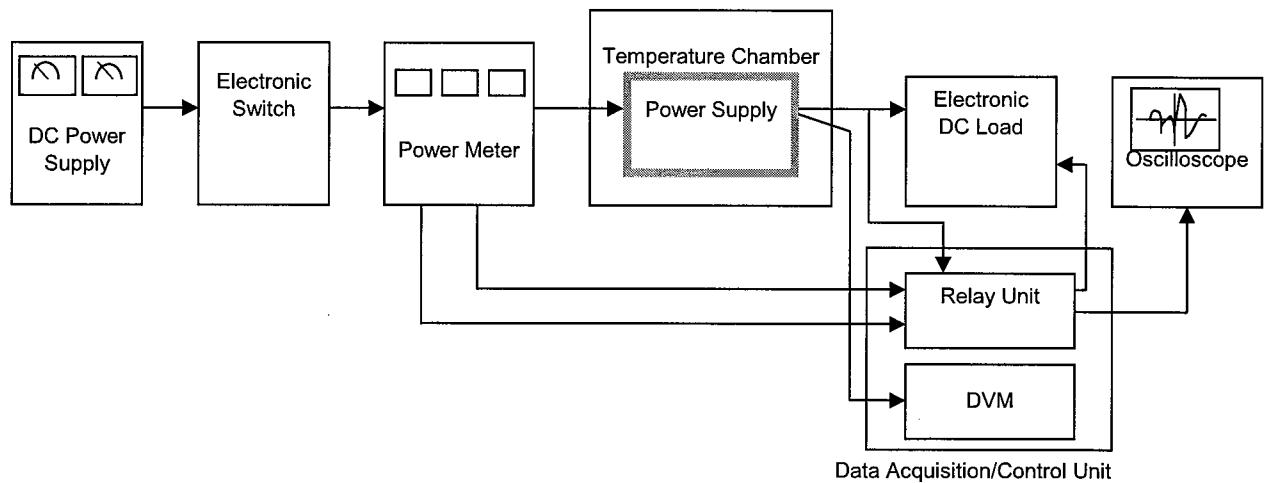


Figure A

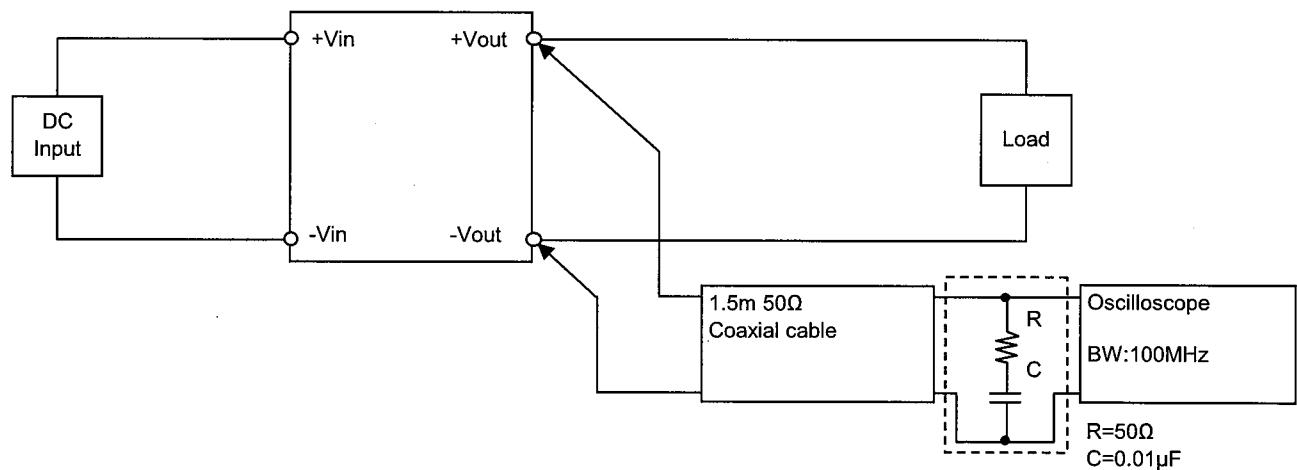


Figure B (Ripple and Ripple noise Characteristic)