

TEST DATA OF SNDHS50A15

Regulated DC Power Supply
April 8, 2012

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Takahiro Yoneda Design Manager

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Tadashi Arai Design Engineer

COSEL CO.,LTD.

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(Final Page 19)

Model

SNDHS50A15

Item

Input Current (by Input Voltage)

Object

+15V3.4A

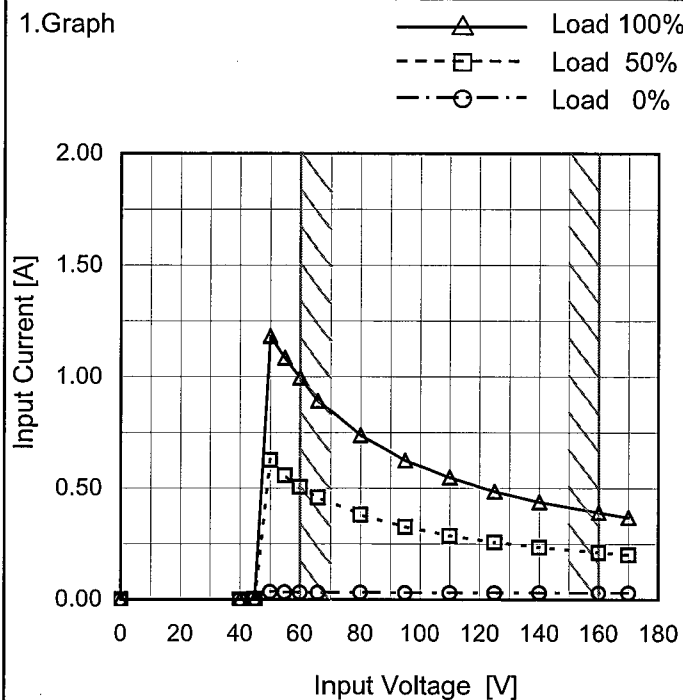
Temperature

25°C

Testing Circuitry

Figure A

1.Graph



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

2.Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0	0.000	0.000	0.000
40	0.000	0.000	0.000
45	0.002	0.002	0.002
50	0.035	0.626	1.182
55	0.033	0.557	1.085
60	0.032	0.506	0.995
66	0.032	0.458	0.892
80	0.031	0.380	0.738
95	0.031	0.326	0.625
110	0.030	0.287	0.549
125	0.030	0.257	0.486
140	0.030	0.234	0.438
160	0.030	0.211	0.392
170	0.030	0.202	0.370
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Model	SNDHS50A15																																																					
Item	Input Current (by Load Current)	Temperature	25°C																																																			
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Model		SNDHS50A15	
Item		Efficiency (by Input Voltage)	
Object		+15V3.4A	
1.Graph		2.Values	

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Model	SNDHS50A15																																																					
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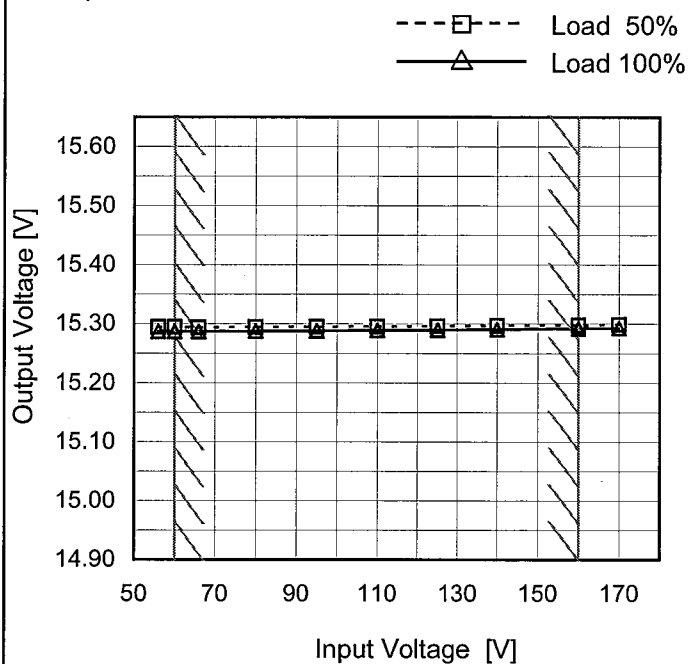
Model SNDHS50A15

Item Line Regulation

Object +15V3.4A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



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

2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
56	15.294	15.287
60	15.294	15.287
66	15.294	15.287
80	15.294	15.288
95	15.295	15.288
110	15.295	15.289
125	15.296	15.290
140	15.297	15.291
160	15.298	15.293
170	15.299	15.293

Model		SNDHS50A15		Temperature		25°C																																																				
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Model	SNDHS50A15	Temperature 25°C Testing Circuitry Figure A	
Item	Dynamic Load Response		
Object	+15V3.4A		

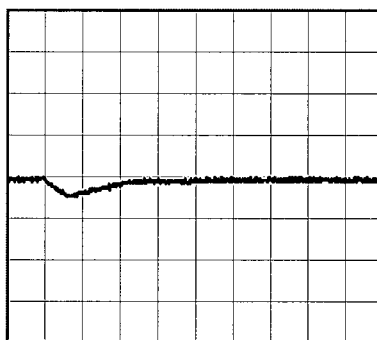
Input Volt. 110 V
Cycle 1000 ms

Load Current 3.4A/50 μ s

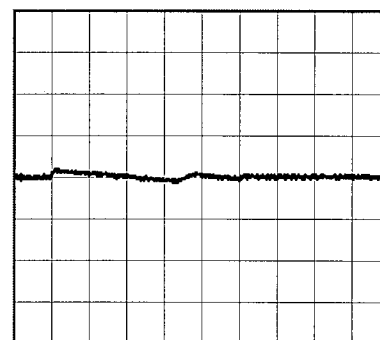


Min. Load (0A) \longleftrightarrow
Load 100% (3.4A)

1 V/div



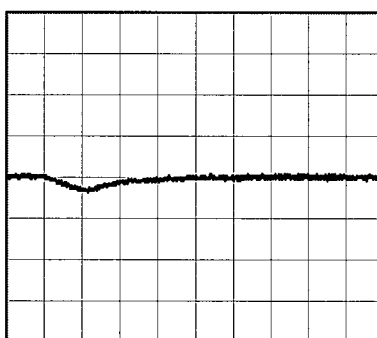
400 μ s/div



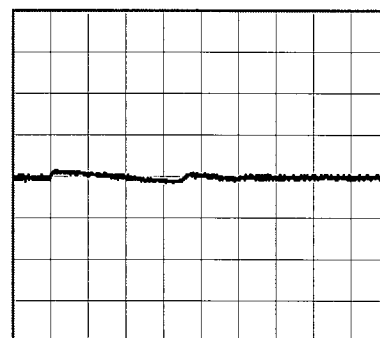
10ms/div

Min. Load (0A) \longleftrightarrow
Load 50% (1.7A)

1 V/div



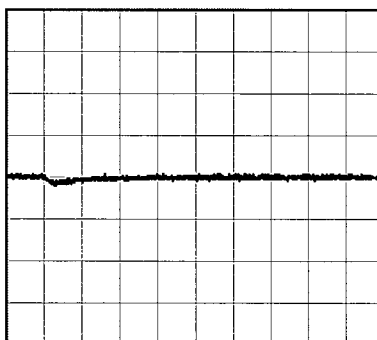
400 μ s/div



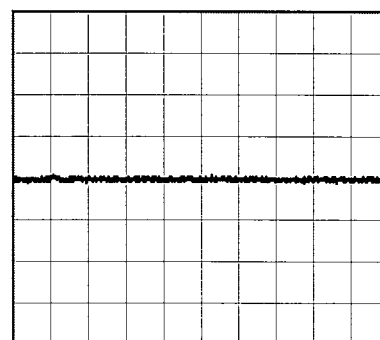
10ms/div

Load 10% (0.34A) \longleftrightarrow
Load 100% (3.4A)

1 V/div



400 μ s/div



10ms/div

Model	SNDHS50A15																																								
Item	Ripple Voltage (by Load Current)	Temperature	25°C																																						
Object	+15V3.4A	Testing Circuitry	Figure B																																						
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<div><div><div>—△—</div><div>Input Volt.</div><div>60V</div></div><div><div>- - ○ - -</div><div>Input Volt.</div><div>160V</div></div></div> <div><div>Ripple Voltage [mV]</div><div>Load Current [A]</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>0.00</td><td>10</td><td>10</td></tr><tr><td>0.60</td><td>35</td><td>50</td></tr><tr><td>1.20</td><td>35</td><td>50</td></tr><tr><td>1.80</td><td>35</td><td>50</td></tr><tr><td>2.40</td><td>35</td><td>50</td></tr><tr><td>3.00</td><td>35</td><td>50</td></tr><tr><td>3.40</td><td>35</td><td>50</td></tr><tr><td>3.74</td><td>35</td><td>50</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]	0.00	10	10	0.60	35	50	1.20	35	50	1.80	35	50	2.40	35	50	3.00	35	50	3.40	35	50	3.74	35	50	--	-	-	--	-	-	--	-	-
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<div><div>Ripple [mVp-p]</div><div>Fig.Complex Ripple Wave Form</div></div>																																									

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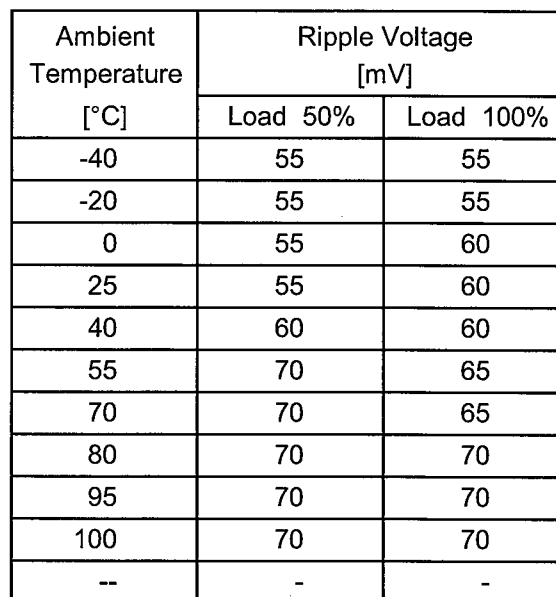
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<div><div><div>—△—</div><div>Input Volt.</div><div>60V</div></div><div><div>- - ○ - -</div><div>Input Volt.</div><div>160V</div></div></div> <p>Measured by 100 MHz Oscilloscope. Ripple-Noise is shown as p-p in the figure below. Note: Slanted line shows the range of the rated load current.</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple-Noise [mV]</th></tr><tr><th>Input Volt. 60 [V]</th><th>Input Volt. 160 [V]</th></tr><tr><td>0.00</td><td>10</td><td>25</td></tr><tr><td>0.60</td><td>40</td><td>65</td></tr><tr><td>1.20</td><td>40</td><td>70</td></tr><tr><td>1.80</td><td>40</td><td>70</td></tr><tr><td>2.40</td><td>45</td><td>70</td></tr><tr><td>3.00</td><td>45</td><td>70</td></tr><tr><td>3.40</td><td>45</td><td>70</td></tr><tr><td>3.74</td><td>45</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. 60 [V]	Input Volt. 160 [V]	0.00	10	25	0.60	40	65	1.20	40	70	1.80	40	70	2.40	45	70	3.00	45	70	3.40	45	70	3.74	45	70	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple-Noise [mV]																																								
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<p>Fig.Complex Ripple Noise Wave Form</p>																																									

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Testing Circuitry Figure B

2.Values



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

A diagram of a truss structure consisting of four triangular units connected in a row. The top and bottom members are horizontal. Vertical members connect the top and bottom joints. Diagonal members connect the top joints to the bottom joints, forming a series of triangles. Arrows indicate downward and upward forces at the ends of the top and bottom chords.


Fig.Complex Ripple Wave Form

Model		SNDHS50A15		Testing Circuitry Figure A																																																		
Item		Ambient Temperature Drift																																																				
Object		+15V3.4A																																																				
1.Graph		<div><div>—△—</div>Input Volt. 60V</div> <div><div>---□---</div>Input Volt. 110V</div> <div><div>-·-○-·-</div>Input Volt. 160V</div> <div><p>Output Voltage [V]</p><p>Ambient Temperature [°C]</p><p>Load 100%</p></div>		2.Values																																																		
		<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>15.222</td><td>15.226</td><td>15.235</td></tr><tr><td>-20</td><td>15.249</td><td>15.252</td><td>15.259</td></tr><tr><td>0</td><td>15.265</td><td>15.268</td><td>15.273</td></tr><tr><td>25</td><td>15.284</td><td>15.287</td><td>15.291</td></tr><tr><td>40</td><td>15.289</td><td>15.292</td><td>15.295</td></tr><tr><td>55</td><td>15.288</td><td>15.291</td><td>15.294</td></tr><tr><td>70</td><td>15.291</td><td>15.294</td><td>15.295</td></tr><tr><td>80</td><td>15.289</td><td>15.292</td><td>15.293</td></tr><tr><td>95</td><td>15.289</td><td>15.292</td><td>15.293</td></tr><tr><td>100</td><td>15.289</td><td>15.292</td><td>15.293</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	15.222	15.226	15.235	-20	15.249	15.252	15.259	0	15.265	15.268	15.273	25	15.284	15.287	15.291	40	15.289	15.292	15.295	55	15.288	15.291	15.294	70	15.291	15.294	15.295	80	15.289	15.292	15.293	95	15.289	15.292	15.293	100	15.289	15.292	15.293	--	-	-	-
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Model	SNDHS50A15	
Item	Output Voltage Accuracy	
Object	+15V3.4A	
		Testing Circuitry Figure A

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 - 3.4A

* 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	95	110	0	15.315	±33	±0.2
Minimum Voltage	-20	60	3.4	15.249		

COSEL

Model		SNDHS50A15	
Item		Time Lapse Drift	
Object		+15V3.4A	

1.Graph

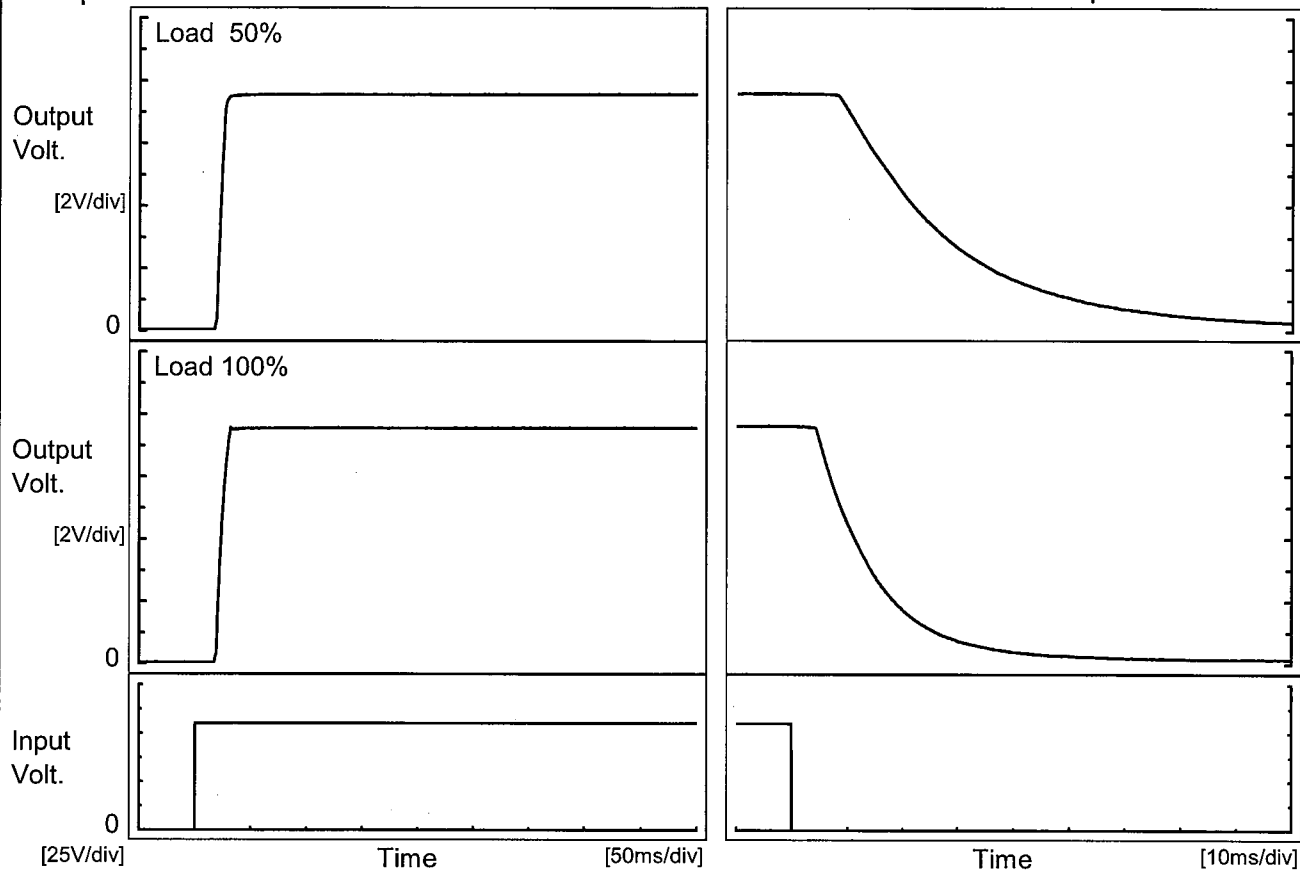
Output Voltage [V]

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COSEL

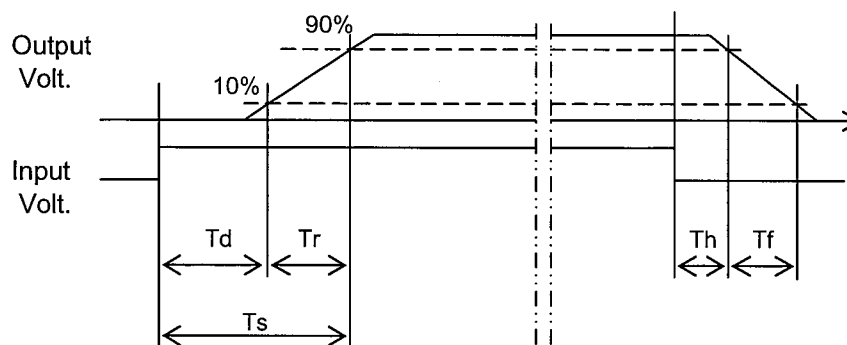
Model	SNDHS50A15	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+15V3.4A		

1. Graph



2. Values

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	19.8	6.8	26.6	10.9	46.8
100 %	19.8	9.5	29.3	5.5	23.9

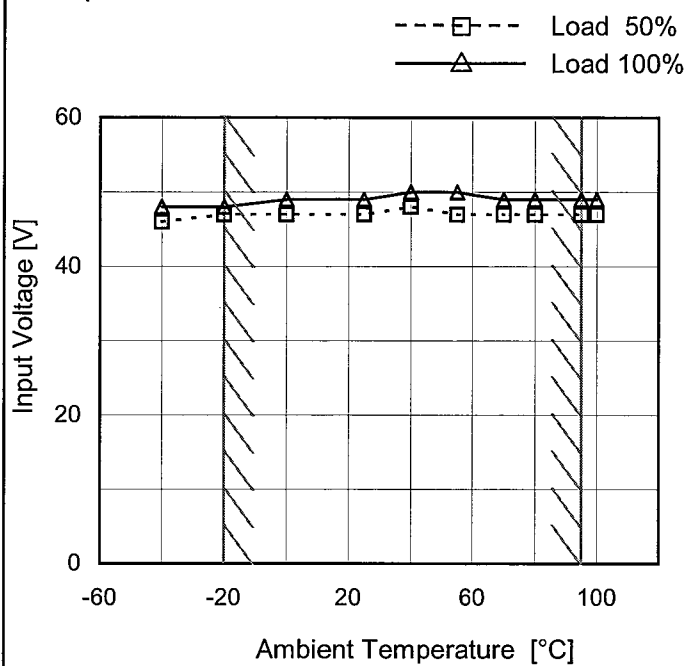


Model SNDHS50A15

Item Minimum Input Voltage
for Regulated Output Voltage

Object +15V3.4A

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%
-40	46	48
-20	47	48
0	47	49
25	47	49
40	48	50
55	47	50
70	47	49
80	47	49
95	47	49
100	47	49
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COSEL

Model	SNDHS50A15																																																													
Item	Overcurrent Protection	Temperature	25°C																																																											
Object	+15V3.4A	Testing Circuitry	Figure A																																																											
1.Graph		2.Values																																																												
<div><div><div></div><div></div><div></div></div><div><div>Input Volt. 60V</div><div>Input Volt. 110V</div><div>Input Volt. 160V</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 overcurrent protection is activated.</p> <p>Intermittent operation occurs when the output voltage is from 10V to 0V.</p>		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="3">Load Current [A]</th></tr><tr><th>Input Volt. 60[V]</th><th>Input Volt. 110[V]</th><th>Input Volt. 160[V]</th></tr><tr><td>14.3</td><td>4.33</td><td>4.50</td><td>4.61</td></tr><tr><td>13.5</td><td>4.35</td><td>4.53</td><td>4.62</td></tr><tr><td>12.0</td><td>4.38</td><td>4.57</td><td>4.62</td></tr><tr><td>10.5</td><td>4.42</td><td>4.67</td><td>4.59</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><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Output Voltage [V]	Load Current [A]			Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]	14.3	4.33	4.50	4.61	13.5	4.35	4.53	4.62	12.0	4.38	4.57	4.62	10.5	4.42	4.67	4.59	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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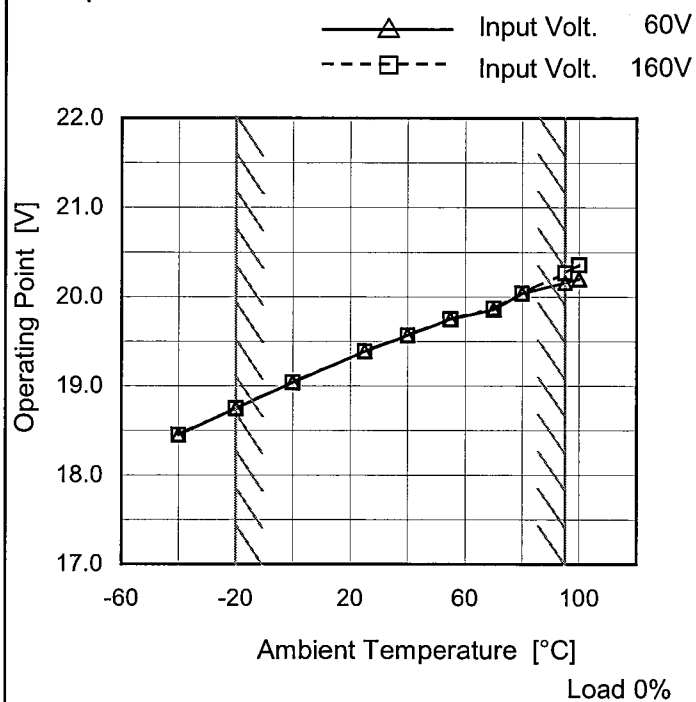
Model SNDHS50A15

Item Overvoltage Protection

Object +15V3.4A

Testing Circuitry Figure A

1. Graph



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

2. Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 60[V]	Input Volt. 160[V]
-40	18.45	18.45
-20	18.75	18.75
0	19.04	19.04
25	19.39	19.39
40	19.57	19.57
55	19.75	19.75
70	19.86	19.87
80	20.04	20.04
95	20.16	20.27
100	20.20	20.36
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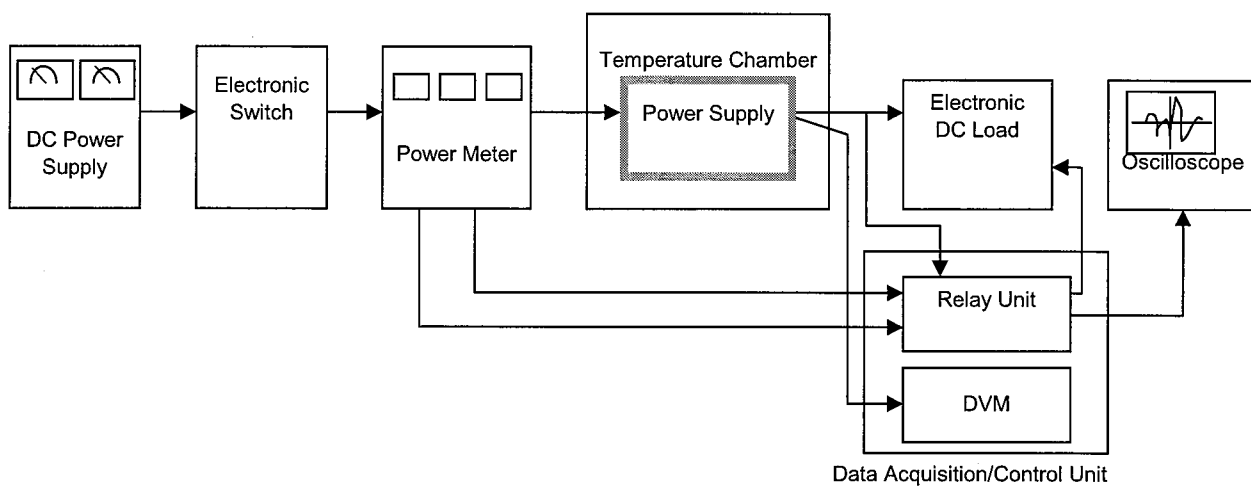


Figure A

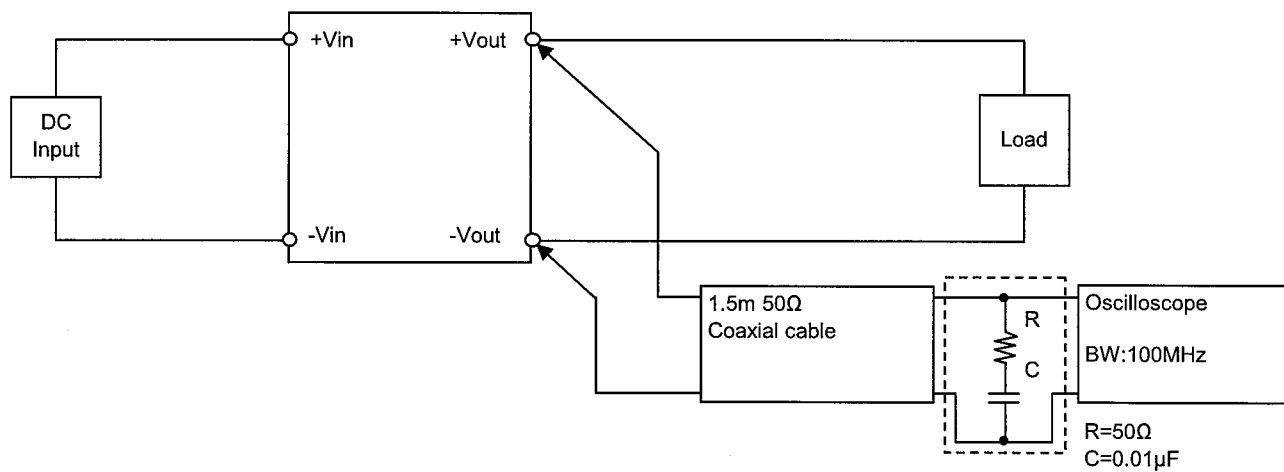


Figure B (Ripple and Ripple noise Characteristic)